

Bloomberg Market Concepts - Module 4

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05/10/2025

Equities: Introducing the Stock Market

Equities Introduction

The stock market serves as a primary source of financing for large and medium-sized corporations. It is famously volatile, due to the many factors that influence share prices—not only a company’s own performance, but also broader influences such as peer valuation, industry trends, and the overall economic environment. In this module, we will explore five key topics: (1) the role of the stock market and how indices serve as its storefront; (2) the fundamental differences between the rights of equity holders and bondholders; (3) how analysts evaluate industries and individual companies; (4) how investors estimate a company’s standalone value; and (5) how comparable companies are used to assess valuation. Along the way, you will: calculate equity index performance from the performance of individual stocks; explore the appeal of equity ownership; identify why equities tend to be more volatile than bonds; examine how industry and supply chain analysis forms the foundation of equity research; understand how accurate industry drivers enable more reliable earnings forecasts; describe the five-step absolute valuation process along with its potential pitfalls; and distinguish between the three main types of relative valuation—highlighting the role of future earnings growth in determining fair value.

Stock Market Volatility

You’ve just learned about the largest asset class in the world—fixed income. Now let’s turn to the second largest: equities. Equities, stocks, and shares all refer to the same thing—part ownership of a company. The stock market, where these ownership stakes are bought and sold, is often the first thing that comes to mind when people hear the word “finance.” A young man once asked J. Pierpont Morgan—the namesake of the investment bank J.P. Morgan—what the stock market was going to do. His reply was simple: “It will fluctuate.” The stock market is indeed a roller coaster, with dramatic booms and busts etched into the public imagination. The dot-com boom of the late 1990s is still fondly remembered in Silicon Valley, while the crashes of 1929, 1987, and 2008 continue to provide material for Hollywood.

Stock Market Crashes

The stock market is notoriously difficult to predict. On Thursday, October 17, 1929, celebrated Yale economist Irving Fisher famously declared, “Stock prices have reached what looks like a permanently high plateau.” Just days later, panic gripped investors. Monday, October 21st marked the beginning of a dramatic downturn. October 24th became known as “Black Thursday” after the market plunged 11% at the opening. This was followed by a 13% drop on Monday, October 28th, and another 12% decline on “Black Tuesday,” October 29th. In total, the market collapsed by 88% shortly after Fisher’s optimistic pronouncement. Fortunately, only about 2% of Americans owned shares at that time—compared to nearly 50% today.

In 1987, Richard Russell, editor of a prominent stock market newsletter, advised investors to sell stocks just one day before the peak of the bull market—right before the worst single-day crash in U.S. history. The stock market plummeted 34% over a two-week period, with the most intense drop occurring on Monday, October 19, 1987, when the market fell by 23% in a single day. That day became infamously known as “Black

Monday.” By now, you’ve heard of Black Monday, Black Tuesday, Black Wednesday (from the Currencies Module), and Black Thursday. Yes, there is also a “Black Friday.” On September 24, 1869, the gold market collapsed in what became known as Black Friday. In response to the 1987 crash, the New York Stock Exchange introduced “circuit breakers,” which temporarily halt trading after sharp declines—in particular, a 7% drop—to give investors time to reassess. Unfortunately, neither these circuit breakers nor previous experience could prevent the 2008 global financial crisis, during which the stock market declined by 50% over nine months. While Wall Street lore often claims October is the most dangerous month for stocks—due to the crashes of 1929, 1987, and 2008—historical data shows that August and September have been worse on average. Over the past 25 years, the S&P 500 has posted average declines of 0.6% and 0.7% in August and September, respectively.

The Great Covid Crash

Another major market crash occurred in 2020 when the coronavirus—an ammonia-like illness later labeled COVID-19—began spreading rapidly around the globe. The year began on a positive note, but everything changed in March, leaving the global economy in turmoil. On March 9, 2020, stocks began falling almost immediately after the market opened, triggering circuit breakers that temporarily halted trading. It was the first time in 20 years that these circuit breakers had been activated, signaling the onset of widespread fear and panic among investors. The Dow Jones Industrial Average plunged 7.8%, marking its steepest drop since the 2008 financial crisis. On March 11, the World Health Organization officially declared COVID-19 a global pandemic. The following day, March 12, the market suffered another severe downturn. Panic selling gripped investors, and equities officially entered bear market territory. Over the next several days, billions of dollars in market value were erased. The rapid spread of the coronavirus led to the largest single-day point drop in the Dow Jones’ history. The pandemic claimed millions of lives, left millions unemployed, widened the wealth gap, deepened reliance on monetary and fiscal stimulus, and fueled a speculative mania among retail investors. This surge of speculation drove the prices of previously overlooked stocks to unsustainable highs—only to crash shortly thereafter.

Purpose of the Stock Market

You may be wondering whether stock markets are more trouble than they are worth. What good do they actually serve? At their core, stock markets exist to allocate resources to productive enterprises. Over time, the fastest-growing and most profitable businesses gain access to the most funding, allowing capital to flow to its most efficient uses. The stock exchange is appealing for two key reasons. First, just as the bond market facilitates the easy entry and exit of loan agreements, the stock market allows investors to quickly buy and sell ownership stakes in companies. A private investor can gain exposure to thousands of firms with just a few trades. Second, while bonds typically offer relatively low yields—comparable to those of savings accounts—owning shares entitles investors to the underlying commercial returns of the company. Pick the right company, and the financial upside can be substantial—even life-changing.

Charging Bull

The enduring spirit of market optimism is symbolized by the famous Charging Bull sculpture near Wall Street. Created and financed by Sicilian sculptor Arturo Di Modica, the statue was conceived in response to the Black Monday stock market crash of 1987. Di Modica intended the sculpture to represent New York’s resilience and optimism in the face of adversity. In December 1989, without official permission, Di Modica installed the 18-foot, 3.5-ton bronze bull outside the New York Stock Exchange on Broad Street, placing it directly beneath the Christmas tree. The next morning, the NYSE had the sculpture removed and transported to a storage facility in Queens. However, the public and the Exchange quickly grew fond of the statue. The NYSE agreed to return the bull on the condition that Di Modica pair it with a bear—symbolizing market decline. He refused, insisting that the bear contradicted the sculpture’s message of optimism. Ultimately, the stock exchange relented, and the bull was reinstalled at the end of Broadway at Bowling Green, where it remains a celebrated landmark at the tip of Manhattan.

Total Market Value

You may be wondering: what is the size of the global equity market? Since the equity market is constantly in motion, the total global equity market capitalization fluctuates daily. To determine the current size of the equity market using the Bloomberg Terminal, you can use the **EQS** command to access Bloomberg's Equity Screening tool. This tool allows users to screen for equities based on various criteria. In the center of the screen, you will see the total number of equity securities in the global universe. At the time this screen was captured, there were 97,891 equity securities available. To find the total global equity market capitalization, do not apply any screening filters. Instead, click the **C Results** button in the bottom-right corner. On the results tab, click **Stats**, then tick the checkbox labeled **Sum**. To display results in your preferred currency, click **Settings** in the red toolbar at the top, then select **Default Settings > General**. Deselect **Use Local Currency** and enter **USD** in the amber currency box. Set the universe to **Global** to reflect global coverage. The total global equity market capitalization will then be displayed in U.S. dollars.

Listed equities tend to represent larger corporations, as these firms typically meet the regulatory, financial, and governance requirements for public listing. For example, Samsung—the largest publicly traded company in South Korea—accounts for approximately 17% of the country's total exports, highlighting the dominant role that some listed equities play within their national economies.

Initial Public Offerings

Why do only a select number of companies choose to go public? Typically, firms pursue a public listing either to raise capital for business expansion, to provide liquidity for founders and early investors to sell their stakes to the public, or both. The most common method of going public is through an Initial Public Offering (IPO). During an IPO, a company offers its shares to the public for the first time, often raising substantial funds in the process. In a typical week, dozens of companies around the world collectively raise billions of dollars via IPOs. To explore recent IPO activity on the Bloomberg Terminal, one can type **initial public offering** into the command line and select the **IPO** function.

Company listings are often marked by splashy ceremonies in which company executives, surrounded by much fanfare, ring the opening bell on the trading floor of the stock exchange. While the owners are typically all smiles during these events, it is worth pausing to ask why. After all, going public means they have just given up a percentage of ownership in the company by offering shares to the public. These smiling owners are also sellers. Are they optimistic because the capital raised will help the company grow, making their remaining stake more valuable than what they gave up? Or are they taking the opportunity to cash in while the company is performing at its peak? It raises a fundamental question: when would you choose to sell your stake in a company?

Consider the case of Blue Apron. The company traded at its all-time high on the day of its Initial Public Offering (IPO). Unfortunately for investors, its share price declined steadily thereafter, illustrating how an IPO can sometimes represent a peak in valuation rather than the beginning of long-term growth.

When companies decide to go public, it is often an exciting time—not only for the firm and its original shareholders, but also for the investing public. Investors eager to profit from the anticipated growth of a newly listed company often try to participate in the IPO by securing an allocation of shares before public trading begins. To search for upcoming IPOs on the Bloomberg Terminal, use the **IPO GO** function. At the top of the screen, you can select the type of deal you wish to search for. Tick the **IPO** box to view initial public offerings—the first sale of stock by a private company to the public. Tick **Additional** to search for follow-on offerings by companies already listed on an exchange. For example, Tesla is publicly traded; if it issues new stock, the offering would be categorized as an additional issue. You can also tick **Rights** to search for rights offerings, which give existing shareholders the entitlement to purchase new shares at a predetermined price, in proportion to their current holdings. In this case, we will search for IPOs only. Use the filters at the top of the screen to narrow your results based on specific criteria—such as limiting your search to IPOs issued in Asia. To view upcoming offerings, click on the **Calendar** tab to see deals scheduled to come to market.

Special Purpose Acquisition Company (SPAC) issuances offer an alternative route for companies to raise funding and go public. Although SPACs have existed for many years, they surged in popularity during 2020 and 2021, becoming a hot trend in capital markets. SPACs are essentially shell corporations—often referred to as “blank check companies”—that raise capital with the stated intent of acquiring a private company, thereby bringing it public without going through the traditional IPO process. Between Q1 2020 and Q1 2021, over 500 SPACs were launched, raising more than \$180 billion in what became a record-breaking frenzy. Part of their appeal lies in speed and flexibility, but another driver of investor enthusiasm is celebrity involvement. SPACs have been backed by notable public figures such as tennis champion Serena Williams, football star Peyton Manning, baseball player Alex Rodriguez, and rapper-turned-business mogul Jay-Z. To some investors, SPACs offer a smarter, faster way to gain early exposure to emerging companies. To others, they signal a frothy market and speculative excess. To search for SPACs on the Bloomberg Terminal, use the **IPO GO** function and click **Advanced** in the red toolbar. On the left, select **OffType** from the search criteria and check the box labeled **Special Purpose Acquisition Company (SPAC)**. Click **Update** to apply the filter. In this example, 3,551 matches are returned. To refine the search by time period, use the **Date Range** filter—for example, to view SPACs announced in the past three months. In that range, 31 SPAC deals were identified. Click the **Results** tab to run the search. Then, click the **Time Series** tab to plot various offering components such as deal value and deal count. This helps compare SPAC performance and activity over time.

Delistings

If there are dozens of listings each week, why are there only 98,639 listed companies in the world? The answer lies in the fact that while equities tend to list in splashy, attention-grabbing IPOs, they often delist much more quietly. Companies can delist for a variety of reasons. In some cases, a company is acquired by a private equity firm and taken private. In other instances, management may voluntarily delist due to the heavy regulatory and reporting burdens associated with being a public company. Delisting can also occur when a company goes bankrupt or fails to meet exchange listing requirements. Entire industries can even disappear. For example, before smartphone cameras became ubiquitous, there was a thriving ecosystem of consumer camera manufacturers, camera stores, film producers, and photo developers—most of which have since faded away.

Just as not all IPOs are necessarily beneficial, not all delistings occur for negative reasons. For instance, Whole Foods Market delisted from the stock exchange in the summer of 2017 when it was acquired by Amazon—a deal widely seen as favorable for both companies. Prior to Amazon’s involvement, Whole Foods shares were trading at approximately \$35 per share. The acquisition offer valued the company at \$42 per share, representing a substantial premium and a positive outcome for shareholders. In this case, delisting reflected a strategic transaction rather than financial distress.

Notwithstanding the many benefits associated with Initial Public Offerings (IPOs) in the United States, the total number of listed companies has actually declined in recent years. This trend indicates that the number of delistings has exceeded the number of new IPOs, resulting in a net decrease in the population of publicly traded firms.

Market Monitoring

Stock prices fluctuate continuously throughout the trading day. For example, one can observe how the stock price of Alphabet—Google’s parent company—moved from the market open at 9:30 a.m. to the close at 4:00 p.m. New York time during a full trading session. But how do investors monitor overall movements in global stock markets, beyond just the performance of individual companies?

Indices

Investors track global stock market movements using indices. These are baskets of stocks that represent a segment of the market, functioning similarly to the inflation baskets discussed earlier—except that the constituents are individual equities. By typing **WEI** on the Bloomberg Terminal, users can access a snapshot

of major world equity indices. According to the Index Industry Association, there are more than 3 million stock indices worldwide. Indices serve not only as tools for monitoring market performance, but also as benchmarks to evaluate whether a money manager has outperformed “the market.” Equity indices come in many forms and can be broken down by region, sector, or market capitalization. The WEI screen is organized geographically, offering views for the U.S., Canada, Mexico, Brazil, Europe, the U.K., France, Germany, Spain, Italy, Sweden, Switzerland, Japan, Hong Kong, mainland China, and Australia. It is important to note that while an index may be domiciled in one country, its constituent companies often derive revenues from around the world. For example, over one-third of the revenue generated by companies in the S&P 500—America’s leading equity index—comes from outside the United States. To explore equity activity in emerging markets, use the EMEQ function, which provides performance data for emerging market indices. To view a global summary of index price movements in real time, type **World Equity Markets** and select the WM function. This interactive, color-coded world map helps investors spot market trends as they unfold across regions.

The constituents of a stock index can be sliced and analyzed in many different ways. To demonstrate, let us examine the most closely watched equity index in the world—the Standard & Poor’s 500 (S&P 500) in the United States. This index alone represents approximately one-quarter of the entire global equity market capitalization. The S&P 500 includes 500 of the largest publicly traded companies in the U.S., and it can be broken down by sector, industry group, or even specific business models. For example, investors can view the index segmented into sectors such as Information Technology, Healthcare, Financials, Consumer Discretionary, and more. This type of breakdown provides insights into which parts of the economy are driving index performance at any given time.

The 11 primary industry groups within the S&P 500 are further subdivided into sub-industries, which ultimately consist of individual stocks. By drilling down through the classification hierarchy, investors can explore specific segments of the market in detail. For example, within the *Communication Services* sector, one can navigate to the *Media & Entertainment* group, and further into the *Interactive Media & Services* sub-industry. This category includes major companies such as Alphabet (Google), Meta Platforms (formerly Facebook), Match Group, and Twitter—each representing a key player in the digital communication and social networking landscape.

Company size, industry classification, and country of domicile are the three most common organizing principles used to construct stock market indices. For example, company size is the primary criterion for inclusion in the S&P 500. Specifically, market capitalization—the total market value of a company’s outstanding shares—is the key metric used to determine eligibility. To view the current constituents of the S&P 500 on the Bloomberg Terminal, type **MEMBER** into the command line and select the **MEMB** function. This provides a complete list of the index members. Importantly, index membership is dynamic: companies can be promoted into or removed from the S&P 500 as their market capitalization and other eligibility criteria change over time.

To analyze the movement of the S&P 500 index, we can switch to the table view using the **GP** function on the Bloomberg Terminal. On the day prior to the one shown, the S&P 500 closed at 3,577.03. On the day displayed, it had risen to 3,669.91—an increase of 92.88 points. This raises an important question: which stock or sector contributed most significantly to this upward movement?

To view the index point contributions of individual constituents within the S&P 500, use the **MOVE** function to open the Equity Index Movers tool on the Bloomberg Terminal. Under the *Leaders* section, we can identify which stocks contributed most to the index’s gain on a given day. In this example, Apple was the top contributor, providing the highest positive index point impact. If we were to repeat this analysis for every member of the S&P 500—summing both the positive and negative point contributions—we would arrive at the total index movement of 92.88 points. In essence, aggregate member contributions determine the overall movement of the index.

Equities: The Nature of Equities

Defining an Equity

What is an equity? As a refresher from the fixed income module, a bond is a tradable loan that entitles the holder to a series of fixed future repayments. An equity, by contrast, is also a claim on future cash flows, but of a very different nature. While bonds provide fixed, contractual payments, equities represent a residual claim on a company's earnings—that is, shareholders are entitled to whatever cash remains after all other obligations have been fulfilled. These prior claims include payments to suppliers, wages and benefits for employees, interest and principal repayments to lenders, and taxes owed to the government. Because equities sit at the bottom of the corporate capital structure, they are inherently riskier—but they also offer the potential for greater rewards. To illustrate the nature of equity ownership, consider the story of a young surgeon named Jenny.

Comparison of Bonds and Equities

Ginny earns \$120,000 per year and pays an average tax rate of 15%. She has accumulated \$200,000 in savings, which she plans to use as a down payment on a house in an up-and-coming neighborhood. She is particularly excited about the tax incentives available for first-time homebuyers in the area, which will allow her to make mortgage payments using pre-tax income. The house she truly wants costs \$1 million—slightly beyond her financial reach. Instead, she decides on a fixer-upper in a safe neighborhood priced at \$500,000, believing that both her planned renovations and broader gentrification will significantly increase its future value. With \$200,000 in savings, she approaches a bank to borrow the remaining \$300,000 through a 30-year mortgage. The bank agrees to issue the loan in exchange for annual mortgage payments of \$20,000, reflecting an annual percentage rate (APR) of 5.2%. Ginny is optimistic, thinking her improvements could raise the property's value to nearly \$1 million. However, she also recognizes the risks involved—real estate markets can be unpredictable.

Jenny reviews her annual budget before making the decision to purchase the home. Her gross income is \$120,000. Thanks to the available tax break for first-time homebuyers, she is able to apply her \$20,000 annual mortgage payment directly to her pre-tax income, reducing her taxable income to \$100,000. At an average tax rate of 18%, she pays \$18,000 in taxes, leaving her with \$82,000 in take-home pay. From this, she estimates that her essential living expenses—including food, utilities, and other necessities—total approximately \$16,000 per year, leaving her with \$66,000 in discretionary income. Satisfied that this amount is more than sufficient to maintain her lifestyle, Jenny proceeds with the home purchase.

The Effect of Borrowing

As luck would have it, the following year a rapidly growing biotechnology company—with a promising drug under development—moves into Ginny's neighborhood, bringing with it an influx of wealth. The cost of luxuries and leisure activities rises substantially. To help offset the increased cost of living, Ginny's hospital grants her a 17% raise, increasing her salary from \$120,000 to \$140,000. She recalculates her budget. Her gross income is now \$140,000, but her mortgage payment remains fixed at \$20,000, as it is a fixed-rate mortgage. Due to the raise, her average tax rate on \$120,000 of taxable income increases to an estimated 17%, resulting in a tax payment of \$20,400. This leaves her with \$99,600 in take-home pay. After deducting \$16,000 for essential expenses, Ginny is left with \$83,600 in discretionary income. She is pleasantly surprised to discover that her 17% raise has led to a 27% increase in discretionary income. She recognizes that this effect is due to the fixed nature of both her mortgage and basic living expenses, while her salary increased—thereby amplifying the portion of her income available for discretionary spending.

The following year, Ginny finds herself inspired by her neighbors' luxurious lifestyles and decides to participate more directly in the biotechnology boom. She leaves her hospital job to join the biotech firm that recently moved into the area. While her compensation now includes stock options that could potentially make her a millionaire in the future, her new salary is significantly lower—just \$50,000, representing a 64% decrease from her previous income of \$140,000. This sharp reduction in salary creates financial strain. Her

mortgage payment remains fixed at \$20,000, consuming a large portion of her gross income. After accounting for an estimated average tax rate of 6%, she is left with \$28,200 in take-home pay. Subtracting her \$16,000 in annual necessities, she is left with only \$12,200 in discretionary income. Ginny is dismayed to realize that a 64% reduction in salary has led to an 85% drop in discretionary income. She understands that this disproportionate effect occurs because her fixed expenses—namely the mortgage and basic necessities—have not changed, while her income has fallen sharply. This squeezes her discretionary income significantly.

Fortunately for Ginny, the experimental drug proves successful and becomes a commercial hit. She is promoted to lead nationwide sales, and her salary increases by an impressive 300%—rising from \$50,000 to \$200,000. Despite this dramatic change in income, her mortgage remains fixed at \$20,000, unchanged from previous years. This leaves her with \$180,000 in taxable income after accounting for the mortgage deduction. Assuming an average tax rate of 21%, she pays \$37,800 in income tax, resulting in a take-home pay of \$142,200. After subtracting \$16,000 for annual necessities such as food and utilities, Ginny is left with \$126,200 in discretionary income. She is amazed to find that a 300% increase in salary has translated into a 934% increase in discretionary income. While her career success is a key factor, she also recognizes that she is benefiting from two forms of financial leverage: mortgage leverage, due to fixed housing costs, and operating leverage, stemming from her largely unchanged fixed living expenses.

Difference Between Bonds and Equities

What does Ginny's story teach us about the nature of equities? In this analogy, the bank functions as the bondholder, while Ginny represents the equity holder. Each has a different set of entitlements and risk exposures. The bank, as the lender, is contractually entitled to fixed mortgage payments, regardless of how Ginny's income or property value fluctuates. Ginny, on the other hand, receives the residual value—whatever remains after fixed obligations such as the mortgage and basic expenses are met. To better understand the fundamental differences between equity and debt, let us pose a series of questions: Who bears the upside if things go well? Who absorbs the downside if things go poorly? Who gets paid first, and who gets paid last? These questions lie at the heart of the distinction between bondholders and equity holders.

The bank is entitled to fixed payments—in this case, Ginny's mortgage. Recall the tax incentive available in her area, which allows her mortgage payments to be made from pre-tax income. This means the bank effectively has the first claim on Ginny's earnings. Similarly, in the corporate world, bondholders receive their repayments from a company's pre-tax income. Ginny, like an equity holder, is only entitled to what remains after servicing debt and paying income taxes. Even then, she must first cover her basic living expenses—such as food and utilities—before she has any discretionary income. Only after these obligations are met does she have the freedom to decide how to allocate remaining funds. This discretionary income is analogous to a company's earnings: what is left over after all fixed costs and obligations are satisfied. That remainder is what shareholders are entitled to. Let us now consider what matters to each party in this scenario. When the bank issues the home loan, it asks a fundamental question: "Do we believe Ginny can repay this debt?" To answer that, the bank evaluates her income and financial stability—just as corporate bond investors assess a company's ability to meet debt obligations. Conversely, when Ginny takes on the mortgage, she asks herself: "Will I earn enough in the future to cover my mortgage, utilities, and other necessities?" This parallels the mindset of a prospective shareholder, who asks: "Will the company generate sufficient earnings in the future to justify my investment—and am I satisfied with that expected return?"

What kinds of calculations do each party perform? The bank, acting as the bondholder, calculates Ginny's ability to repay her mortgage by assessing her interest coverage ratio—that is, how many times over she can meet her debt obligations using her income. In this case, Ginny's salary allows her to cover her \$20,000 annual mortgage payment approximately six times, indicating strong repayment capacity. This mirrors the approach taken by bond rating agencies when evaluating a company's ability to service debt. Meanwhile, Ginny, acting as the equity holder, evaluates her discretionary income to determine whether she is comfortable taking on the mortgage. In her initial budget, she projects \$37,800 in discretionary income for the first year. Similarly, investors assess a company's residual earnings—what remains after all expenses and obligations—to estimate its value. It is also important to note that Ginny's mortgage is fixed: she owes \$20,000

annually, regardless of inflation. This illustrates why fixed income instruments are called “fixed”—their repayment amounts do not change with inflation. By contrast, Ginny’s salary increased significantly when the biotech industry arrived in town, helping her afford the rising cost of living. This is analogous to companies raising prices on their goods or services to protect profit margins from inflation-driven cost increases.

What is the best outcome the bank and Ginny can expect at the outset? Assuming Ginny continues to make her \$20,000 annual mortgage payments for the full 30-year term, the bank receives the 5.2% annual yield embedded in the loan agreement. Even if Ginny receives substantial pay raises during that time, the bank’s return remains capped at 5.2%. This illustrates a key principle of fixed income: bondholders do not participate in the upside if things go exceptionally well for the borrower. All a bond investor can hope for—when purchasing a bond and holding it to maturity—is the yield, which is effectively the annual interest rate equivalent to a bank deposit earning the same return. In contrast, as we saw in Ginny’s case, the combination of fixed mortgage repayments and fixed basic living costs causes her percentage increase in discretionary income to far exceed the percentage increase in her salary when things improve. This phenomenon explains why shareholders favor companies that borrow responsibly and maintain a largely fixed cost base—it introduces operating and financial leverage, which can magnify earnings growth when revenues rise.

What happens if something goes wrong? If Ginny is unable to make her mortgage payments, the bank can initiate bankruptcy proceedings, repossess her home, and liquidate other personal assets—such as her car and jewelry—in an attempt to recover the outstanding loan balance. The existence of such collateral reduces the bank’s exposure to risk. This is one of the reasons bonds are generally considered lower risk investments: lenders have legal claims on the borrower’s assets and can force liquidation if repayment fails. The same principle applies to corporate bonds. If a company defaults, creditors can declare the firm bankrupt and sell off assets such as its headquarters, aircraft, or art collection to recoup losses. In Ginny’s case, if she were to lose her job, the bank could foreclose on her home, and she would have to rely on unemployment assistance from the government. Her discretionary income would likely fall to zero. This illustrates why companies with high levels of debt are considered financially risky. If business conditions deteriorate and they are unable to meet their fixed income obligations, they may be forced into bankruptcy. In such scenarios, equity holders are the first to suffer losses—often losing their entire investment—because equity is the most junior claim in the capital structure.

Rights of Bond Holders and Shareholders

Although both bonds and equities represent claims on future cash flows, the similarity ends there. Bonds entitle the holder to known, fixed repayments over a specified period. Equities, by contrast, grant rights to residual, uncertain earnings—whatever remains after all other obligations have been met. Bonds, therefore, offer a degree of certainty and are often viewed as lower-risk investments, whereas equities offer no such guarantees. There are no promises in the world of equities. However, equity ownership confers full legal ownership of the company. Bonds, on the other hand, are contractual IOUs—debt instruments that provide lenders with repayment rights but no ownership stake. Because bondholders’ returns are capped at the agreed interest payments, the appeal of equities lies in their upside potential: if the business performs exceptionally well, equity holders can multiply their investment many times over. In contrast, the best a typical bondholder can expect—assuming the bond is held to maturity—is a stable, low to mid single-digit annual yield. Consequently, risk-averse investors tend to prefer bonds for their relative safety and predictability, while risk-tolerant investors are more drawn to equities for their growth potential.

Stock Market Volatility

It is no surprise that many people liken the stock market to a roller coaster. This analogy becomes immediately apparent when observing the performance of the S&P 500 index over a recent 30-year period. The index has experienced significant peaks and troughs, reflecting periods of rapid growth, sharp declines, and long-term volatility—hallmarks of equity markets driven by changing investor sentiment, economic cycles, and geopolitical events.

From 1994 to 2000, the S&P 500 index tripled in value. Then, from 2000 to 2002, it lost half its value. From 2002 to 2007, it doubled, only to halve again during the 2007–2009 financial crisis. From 2009 to 2019, the index tripled once more. These dramatic swings illustrate the inherent volatility of equity markets. And if a 50% decline seems severe, consider the historical precedents: the U.S. stock market fell by 88% following the 1929 crash, and the U.K. stock market declined by 73% in 1974. It is no surprise, then, that as retirement approaches, investors tend to rebalance their portfolios away from equities and toward bonds, favoring the stability and predictability of fixed income over the volatility of equity returns.

Fixed Income Volatility

How much riskier are equities compared to bonds? One way to answer this question is by comparing a major equity index to a major bond index. For example, if we plot the Bloomberg U.S. Aggregate Bond Index—representing the broad fixed income market—against the S&P 500—representing the U.S. equity market—we observe nearly 30 years of historical data indicating that the bond market has been significantly less volatile than the stock market. This result is intuitive. Recall the earlier analogy involving Ginny and the bank: the bank, like a bondholder, was entitled to fixed repayments, while Ginny’s earnings fluctuated based on her circumstances. Similarly, bondholders are promised fixed income streams, whereas equity holders participate in the uncertain residual profits of a company. This fundamental difference is clearly reflected in the comparative volatility of bond and stock indices.

Calculating Returns from Indices

Let us now examine how volatility affects what investors truly care about: annual returns. Before doing so, it is helpful to understand how to calculate a return from an index. Suppose we want to calculate the return on the S&P 500 from the 2002 trough to the 2007 peak. This involves a four-step process. First, we identify the index level at the 2002 trough, which was 777. Second, we note the index level at the 2007 peak, which was 1,571. Third, we compute the index movement by subtracting the starting level from the ending level: 1,571 minus 777 equals 794. Fourth, we calculate the percentage return by dividing the change by the starting level: 794 divided by 777 yields approximately 102%. This means the index more than doubled over the five-year period.

Calculating returns from index levels is neither quick nor straightforward. Importantly, the fact that an index rose by a certain number of points—such as the 794-point increase from the 2002 trough to the 2007 peak—has little meaning unless the starting point is known. For example, if an index was at 150 yesterday and rises 150 points today, it has doubled in value. However, if the index closed at 15,000 yesterday and rises 150 points, the gain is merely 1%. This illustrates why point changes, often cited in headlines such as “the market is down 508 points,” can be misleading and constitute poor financial journalism. Now that we understand how to compute returns from index levels, we can begin to compare the annual returns of bonds versus equities over the 30-year period previously discussed. To provide context, we will also include GDP growth on the same chart for comparison. However, before we can make a meaningful comparison between bond and equity returns, we must first address two adjustments to ensure that the return data are on equal footing.

Returns from Dividends

First, it is important to recognize that equities pay dividends—regular cash payments made to shareholders, typically drawn from a company’s after-tax earnings. Crucially, most equity indices, including the S&P 500, do not include dividends in their reported levels. As a result, return calculations based solely on index level movements understate the actual returns received by equity investors. To illustrate this, let us calculate the total return from the S&P 500 over a 30-year period, ignoring dividends. Using our standard four-step method: first, the index level at the start of the period was 461; second, the final level was 2,059; third, the change in the index was 2,059 minus 461, which equals 1,598; and fourth, the return relative to the starting point is 1,598 divided by 461, yielding approximately 347%. Thus, if an investor had placed \$1,000 in the

S&P 500 at the start of the period and ignored dividends, their investment would have grown to \$4,470 after 30 years. This implies a capital gain of \$3,470 on top of the original \$1,000 investment, exclusive of any dividend income.

The total return—what an investor actually earns when reinvesting dividends—can be viewed using the TRA (Total Return Analysis) function. This function contrasts two scenarios: the white line represents the index level excluding dividends, while the brown line represents a hypothetical index level assuming dividends are reinvested. In the case examined, the white line ends at 4,045, while the brown line, with dividends reinvested, ends significantly higher at 6,775. This implies a total return of 764% without dividends versus 1,369% with dividends. For an investor who began with \$1,000, reinvesting dividends would have yielded a final portfolio value of \$14,690—comprising \$13,690 in gains. In contrast, ignoring dividends would have produced only \$8,640, a much smaller return. This example highlights an important caveat when evaluating equity index performance: most indices do not include dividends in their level calculations. Since dividends represent a meaningful component of shareholder return, it is critical to account for them when assessing investment performance.

Volatility Comparison

Recall the earlier chart demonstrating that equities are more volatile than bonds. To complete the comparison, let us now add the S&P 500 index with dividends reinvested. Once dividends are accounted for, it becomes clear that equities significantly outperformed bonds over the same period. The inclusion of reinvested dividends reveals the full return potential of equities, reinforcing the classic investment principle: more risk, more reward.

Returns are Nominal

Let us now consider another important factor that novice investors often overlook when evaluating stock returns: the effect of inflation. Both stock and bond indices are expressed in nominal terms—just like the balances in your bank account—which means they do not account for the erosion of purchasing power over time. Historically, inflation in the United States has averaged around 2% per year over the past several decades. However, during the second half of 2021 and throughout 2022, inflation rose sharply. This increase was driven in large part by the COVID-19 pandemic and the associated lockdown measures, as well as by surging demand, global supply chain disruptions, and expansive government stimulus programs. As cash loses value each year due to inflation, stock and bond holdings must grow at least at the rate of inflation merely to preserve purchasing power. Consequently, investors should be cautious about celebrating low single-digit returns in equity or fixed income markets. Inflation serves as a persistent headwind, diminishing real returns for both asset classes. As noted in the economic indicators module, there are two measures of GDP growth: nominal and real. When evaluating investment performance, it is appropriate to compare returns with nominal GDP growth, which in the U.S. has averaged approximately 5% annually over the long term.

Comparing Equity and Bond Returns

We now understand the importance of including dividends when calculating equity returns, and that investment returns should be compared to nominal GDP growth rather than real GDP growth. With this foundation, we are ready to compare equity returns, bond returns, and GDP growth on an apples-to-apples basis. Let us begin by examining U.S. nominal GDP growth over a nearly 30-year period. This timeline highlights several key phases of economic activity, including the late 1990s boom, the early 2000s expansion, and the significant contraction during the Great Recession of 2008, when nominal GDP declined by approximately 1%. It is also essential to acknowledge the impact of the COVID-19 pandemic, which had profound effects on global economies in 2020. In the United States, nominal GDP contracted by approximately 3.5% that year, according to data from the Bureau of Economic Analysis. This reinforces the importance of incorporating current macroeconomic conditions and extraordinary events when evaluating investment

performance relative to economic growth benchmarks.

Now let us layer on U.S. annual bond returns. As discussed in the fixed income module, bonds have rarely produced negative returns; instead, they have typically delivered a steady and predictable investment performance. Next, we overlay U.S. annual equity market returns, this time including dividends. The resulting picture reveals the dramatic swings in equity markets: the boom of the 1990s, the dot-com bust, the relief rally following the Iraq War, the severe crash of 2008 during the global financial crisis, and the substantial bull run in the final six years of the period, during which equity prices tripled. Investors must also remain aware of recent developments, such as the resurgence of inflation, which can influence both equities and bonds. Equities are clearly much more volatile than bonds. In the United States, equity investors have historically been rewarded for this additional risk, as equities have outperformed bonds over the long term. However, caution is warranted: equities are not a guaranteed path to wealth. The relationship between risk and return is neither linear nor automatic. While long-term equity outperformance has held true in the U.S., numerous counterexamples exist in other countries and historical periods.

Japan experienced a massive economic and asset boom during the 1980s. At its peak, the land value of the Imperial Palace in Tokyo was reportedly greater than that of all the real estate in the state of California. Such was the optimism surrounding Japan's economic prowess that, in some schools in the United Kingdom and the United States, students were encouraged to learn Japanese as a pathway to future financial success. However, this optimism proved unsustainable. If an investor had purchased Japan's main equity index—the Nikkei 225—at the peak of the boom in 1990 and ignored dividends, they would have remained down approximately 50% even a quarter-century later. It is important to note that indices tend to understate the true volatility of equity markets. This is because the positive performance of certain index constituents often offsets the negative performance of others, masking underlying fluctuations. At the individual stock level, volatility is typically much more pronounced, highlighting the additional risks faced by concentrated equity investors.

Asymmetry of Returns

Let us consider both the downside and upside of bonds and equities to understand why equities are more volatile. First, what is the most one can lose on a bond? In the worst case, the investor can lose the entire principal if the borrower defaults and makes no repayments. However, this blow is often softened by the fact that bondholders usually receive several coupon payments before any potential bankruptcy. Furthermore, in the event of bankruptcy, bondholders are typically prioritized in the repayment hierarchy and may recover a portion of the outstanding balance. What, then, is the maximum gain on a bond? If the bond is held to maturity and the issuer repays in full, the investor earns a return equal to the yield-to-maturity calculated at the time of purchase. This return is usually a modest single-digit annual yield. Bonds, by their nature, are constrained by the fixed repayment structure promised at issuance. Now, consider the downside for equities. If the company fails and goes bankrupt, the share price can fall to zero, resulting in a 100% loss. Unlike bondholders, equity holders are last in line in bankruptcy proceedings, which further increases their downside risk. On the other hand, the upside for equities is theoretically unlimited. If the company performs exceptionally well, its share price can rise many times over. This uncapped potential for capital appreciation is the core allure of equities—but it also contributes to their higher volatility compared to bonds.

Let us illustrate the asymmetric payoff structure of equities by examining the best and worst performers in the S&P 500 over a selected 14-year period. Suppose an investor had purchased \$1,000 worth of stock in the automotive company Tesla at the beginning of the period. By the end of the period, that investment—including the initial principal—would have grown to approximately \$1,116,195, representing a staggering return of over 11,500%. Conversely, an equivalent \$1,000 investment in the healthcare supplier PG&E would have diminished to just \$368, a loss of 63%. This comparison underscores the inherent asymmetry of equity investments. While the worst-case scenario for a stock is a 100% loss—i.e., the investor loses their entire principal—the best-case scenario has no upper bound. A single high-performing stock can yield returns in the thousands of percent. This is visually evident in bar charts of index constituents, where top performers display large green bars and poor performers show relatively small red bars. Such asymmetry

helps explain the public's enduring fascination with the stock market. While it carries the risk of complete loss, the potential upside is massive. Unlike games of chance in a casino, however, long-term equity investing has historically favored the informed and patient investor. The asymmetric return potential is a foundational driver behind widespread equity participation and speculation.

Equities: Equity Research

Equity Ownership

Let us now discuss how investors analyze prospective equity investments. Earlier, we described equities as a form of ownership—but what exactly do shareholders own? First and foremost, shareholders have a claim on the earnings generated by a company after all operating expenses, interest payments, and taxes have been paid. In the earlier analogy involving Ginny, this corresponds to her discretionary income—the portion of her salary left over after paying her mortgage, taxes, and living expenses. Second, shareholders also own the company's net assets, which are the total assets of the business minus any liabilities owed to lenders. In the Ginny example, this would be the portion of her house that is not encumbered by a mortgage—the equity in her home. Therefore, when investors evaluate equity opportunities, they are fundamentally assessing both the company's residual income (earnings) and the value of its residual claims on assets (net worth).

Volatility of Earnings

Earnings represent a stream of future cash flows, much like the coupon and principal payments of a bond. However, the key distinction lies in their predictability: while fixed income repayments are predetermined and contractually guaranteed (barring default), equity earnings are inherently uncertain. Unlike bonds, equity cash flows are subject to fluctuations in both revenues and costs, making residual earnings volatile from year to year. This volatility can be best illustrated by examining the earnings history of a large public company over several decades. Consider, for example, the automotive company Ford, whose financial performance from 1988 to 2022 reveals substantial year-to-year variation in profitability. To analyze this in detail, one can retrieve the company's financial statements by using the **FA** function on the Bloomberg Terminal and selecting the income statement. This provides a comprehensive view of how revenues, expenses, and net income have evolved across economic cycles.

The income statement is structured from top to bottom, beginning with the *top line*, which is accounting jargon for revenues, and ending with the *bottom line*, referring to earnings, also known as net income. To visualize this, let us examine a chart of Ford's net income over time. As the chart shows, Ford experienced positive earnings in the late 1980s, incurred losses in the early 1990s, returned to profitability through the remainder of the 1990s, faced two periods of losses in the 2000s, and returned to profitability following the global financial crisis. Why are earnings so volatile? The answer lies in the two fundamental drivers of earnings: revenues and costs. Both components are influenced by a wide range of internal and external factors—such as product demand, input prices, operational efficiency, and macroeconomic conditions—making net income an inherently volatile metric. To better understand this variability, we must examine how fluctuations in revenues and costs contribute to changes in a firm's earnings over time.

First, let us examine Ford's revenue trends by plotting its historical revenue data on a chart. From 1988 to 2005, Ford's revenue approximately doubled, increasing from around \$90 billion to nearly \$180 billion. However, this upward trajectory was disrupted during the global financial crisis of 2008 and again during the COVID-19 pandemic, both of which caused significant declines in revenue. Now, let us overlay Ford's net income on the same chart. As previously discussed, net income is calculated as revenue minus costs. It becomes immediately clear that costs have also been highly variable throughout the period. The interplay between fluctuating revenues and equally volatile costs underscores the sensitivity of net income to external shocks and internal operational dynamics. This visualization helps explain the earnings volatility observed in Ford's financial history.

Earnings Announcements

While we have just examined Ford's annual revenues, costs, and earnings, it is important to note that most publicly traded companies report these financial figures on a quarterly basis—that is, four times per year. Investors can monitor upcoming earnings reports by accessing the earnings calendar through the Bloomberg Terminal by typing `earnings calendar` in the command line and selecting the EBTS (Events Calendar) function. Quarterly financial results are disclosed during earnings announcements, which represent critical moments of truth for shareholders. These announcements provide a snapshot of how the company is performing relative to expectations and often have a significant impact on the firm's stock price. If this dynamic sounds familiar, it should—it echoes the theme we've explored throughout: equity holders are constantly assessing a company's residual performance, and the quarterly earnings cycle is one of the most visible mechanisms for doing so.

Earnings announcements share several similarities with the release of economic indicators. Both have scheduled release dates: corporate earnings are typically reported on a quarterly basis, while economic indicators are usually published monthly or quarterly. In both cases, the releases are highly anticipated by investors, analysts, and the media, and are preceded by extensive forecasting and speculation. Moreover, both earnings announcements and economic data releases have the potential to move markets—particularly when the reported figures deviate significantly from expectations. Just as we previously explored the impact of unexpected economic indicator results, we now turn our attention to the timing of earnings announcements. So, when exactly are corporate earnings released?

Earnings Season

Publicly traded companies are required to release their earnings reports on a regular basis, typically on a quarterly schedule. These reports provide comprehensive insights into the company's financial performance over the preceding three-month period, including key metrics such as revenue, expenses, profits, and losses. The specific timing of these releases can vary by firm, but they are usually scheduled several weeks in advance and are closely monitored by investors, analysts, and financial media. One of the primary reasons earnings announcements receive such attention is their potential to significantly influence stock prices. When a company reports earnings that exceed market expectations, its share price often rises, reflecting increased investor confidence in the firm's future prospects. Conversely, if earnings fall short of expectations, the stock price may decline as market sentiment turns more negative. In extreme cases, particularly when there is a large earnings miss, the stock may experience a sharp and immediate drop in value. Beyond raw financial figures, earnings releases often contain additional information of interest to market participants. This can include forward guidance on expected future earnings, updates on major projects or strategic initiatives, and disclosures about changes to the company's leadership or overall business strategy. For these reasons, earnings releases serve as a vital tool for investors and analysts seeking to track a company's ongoing performance and outlook.

Estimating Earnings

As shareholders are entitled to a company's earnings, the core component of equity analysis lies in the estimation of future earnings. Accurately forecasting a company's profitability is essential for evaluating its investment potential. To do this effectively, analysts must develop a comprehensive understanding of several key aspects of the business. First, they must identify the industry or industries in which the company operates, as industry dynamics can significantly influence performance. Second, they must understand the company's relationships with customers and suppliers, as these affect revenue stability and input costs. Third, they must evaluate the company's revenue growth prospects, considering both market trends and competitive positioning. Finally, a detailed analysis of the cost structure is required, including the breakdown of fixed and variable costs, in order to assess operating leverage and margin sustainability. Together, these components provide the foundation for estimating future earnings and valuing the company's equity.

Industry Classification

A significant portion of revenue and cost analysis is dependent on the industry in which a company operates. The stability and predictability of both revenues and expenses can vary widely from one industry to another. Therefore, the first and most fundamental question an analyst should ask when evaluating any company is: *What industry is it in?* This question is relatively straightforward to answer when the company operates in a single, well-defined sector. For example, Tiffany & Co. is primarily a jewelry retailer, making it easy to classify and benchmark against industry peers. However, the question becomes more complex for diversified conglomerates like General Electric, which operates across multiple industries, including gas turbines, locomotives, aircraft engines, and medical imaging equipment. In such cases, a detailed segment-by-segment analysis is required to understand the performance drivers across the firm's various business lines.

Let us consider another example. By typing **Alibaba** into the command line and selecting **Alibaba Group Holding**, then accessing the security description via the **DES** function, we can observe that Alibaba operates across multiple segments. Specifically, the company provides online sales services encompassing infrastructure support, e-commerce platforms, online financial services, and digital content delivery. Now, if we enter **Tesla** into the top-left amber field and select **Tesla Inc.**, the description reveals that Tesla functions as a multinational automotive and clean energy company. It is engaged in the design and manufacture of electric vehicles, battery energy storage systems, and other related technologies. These examples demonstrate that companies frequently operate in more than one domain, further underscoring the importance of correctly identifying all relevant industries in equity analysis.

It is possible to break down a company's revenue by industry using classification tools. For example, by loading **Target Corporation**, the large U.S. discount retailer, and accessing the Company Classification Browser (CCB) function, we observe that 100% of Target's revenue is derived from the supercenter retail industry. This indicates that Target's business is highly concentrated within a single sector. In contrast, if we switch to **Google** (Alphabet Inc.) and examine its industry classification using the same CCB function, we find that it generates revenue across multiple sectors, including both the communications industry and the technology industry. These insights are critical for analysts seeking to understand the composition of a company's revenue streams and the industry-specific risks and growth drivers that may influence its performance.

Industry Hierarchy

Industries are organized into hierarchical structures to facilitate analysis and comparison. For instance, when examining the S&P 500 index, we observe that its constituent companies are grouped into 12 major industry sectors, often referred to as industry families. These broad classifications help investors and analysts to identify sector-level trends, compare performance across industries, and benchmark companies against their relevant peers.

In the case of **Target**, its classification under the supercenter retail category places it within the *Consumer Staples* sector. This sector typically includes companies that provide essential goods such as food, beverages, and household products—items that consumers purchase regularly regardless of economic conditions. In contrast, many of **Alibaba's** business segments fall under the *Consumer Discretionary* sector. This sector encompasses industries that offer non-essential goods and services, such as e-commerce platforms, apparel, and entertainment. These purchases tend to be more sensitive to changes in economic cycles, making the sector more cyclical in nature.

The nested hierarchy of industry classification resembles the zoological taxonomy system. In this analogy, the 12 major industry sectors—such as Information Technology, Health Care, and Consumer Staples—are analogous to biological *domains*. These broad categories serve as the highest level of classification in the investment context. At the other end of the hierarchy are the most granular industry groupings, which function like *species* in biological taxonomy. These represent highly specific business activities, such as *Internet Retail*, *Semiconductor Equipment*, or *Home Improvement Retail*. Just as biologists use species

to precisely identify organisms, financial analysts use these detailed classifications to accurately compare company performance and conduct peer benchmarking within narrowly defined markets.

Market Sizing

We can access the corporate industry classification system by typing the ICS function into the command line and selecting *Classification Browser* from the menu. To demonstrate how this works, consider searching for the phosphate fertilizer industry, which resides within the *Materials* sector. By drilling down through the hierarchy—first into *Materials*, then *Chemicals*, followed by *Agricultural Chemicals*, and finally into *Fertilizers*—we ultimately arrive at the *Phosphate Fertilizer* industry. The table in the bottom right-hand corner displays the companies that compete within this industry. The *Industry Revenue* column provides Bloomberg’s estimate of the phosphate fertilizer-related revenue for each listed company. As of April 2023, Bloomberg had identified 45 companies operating in this segment, with a combined estimated revenue of \$39 billion attributed to phosphate fertilizer production. The ICS function thus serves as a valuable market sizing tool, enabling users to quantify industry presence and compare firms within specific segments. This functionality highlights the vast diversity of global industries—the classification tree includes over 2,000 distinct industry categories.

Suppliers and Buyers

When estimating revenues and costs, it is helpful to understand from whom the revenues are generated and to whom the costs are paid. By identifying a company’s key customers and evaluating their financial performance, an analyst can make more informed and accurate revenue forecasts. Similarly, understanding the company’s suppliers can help anticipate potential risks such as supplier bankruptcies, production issues, or currency fluctuations that may affect input costs. To visualize a company’s supply chain, imagine a focal firm called **Widgett Co** positioned at the center of the diagram. Suppose **Widgett Co** has three major customers; subject to disclosure, revenue can be attributed to each of them. Likewise, assume that **Widgett Co** relies on three key suppliers to manufacture the widgets it sells—costs can be attributed accordingly. Naturally, **Widgett Co** is unlikely to be the sole supplier to its customers, as competitors may provide similar products. Every company operates within a broader ecosystem of customers, suppliers, and competitors. To the companies on the right, **Widgett Co** is a supplier. To those on the left, it is a customer.

Let us consider a real-world example using a large and well-known company: the aircraft manufacturer **Boeing**. We can visualize Boeing’s supply chain using the SPLC (Supply Chain) function. In the resulting diagram, Boeing is positioned at the center. To the right, we see 37 identified customers—companies that purchase aircraft or related services from Boeing. On the left, there are 364 suppliers—firms that provide components, materials, or services required for Boeing’s production. Along the bottom of the screen, we observe 10 competitors—other aerospace and defense firms operating in the same market. This visualization illustrates the complexity and breadth of Boeing’s supply chain ecosystem.

If we click on the box representing Boeing’s largest customer—the U.S. government—in the SPLC function, we can see from Boeing’s regulatory filings that approximately 40% of its revenues are derived from government contracts. This level of customer concentration highlights the importance of monitoring government-related developments. As such, Boeing shareholders should pay close attention to relevant news, particularly concerning the U.S. defense budget, since changes in government spending priorities can have a significant impact on Boeing’s future revenues and profitability.

The Supply Chain

Let us demonstrate how Boeing’s supply chain fits together. Boeing sells aircraft to Southwest Airlines for the purpose of refreshing its fleet. In this relationship, Southwest Airlines is a customer of Boeing, and Boeing is therefore a supplier to Southwest. Southwest Airlines competes with American Airlines, which, in contrast, purchases its aircraft from Airbus—making Airbus a supplier to American Airlines. Notably, Airbus competes directly with Boeing in selling planes to airlines. Airbus, in turn, buys engines from Rolls-Royce,

which itself competes with Montana Aerospace. Interestingly, Montana Aerospace supplies components to Boeing. This interconnected web of suppliers, customers, and competitors illustrates the complexity of global supply chains. Gaining insight into such relationships allows analysts and investors to develop more accurate revenue forecasts, risk assessments, and strategic evaluations.

Revenue Projections

Revenue projections lie at the heart of any company's financial model. Industry insights are essential for accurately sizing the total addressable market and estimating a firm's market share. Regardless of industry, two core questions guide revenue modeling: *How big is the pie?* and *How big is the company's slice of that pie?* While top-line (revenue) and bottom-line (net income) metrics are important, it is often changes in specific company key performance indicators (KPIs) that drive stock price movements following earnings releases. Consider the example of Netflix's earnings announcement on April 19, 2022. Despite exceeding its earnings per share (EPS) estimates by 21.47% and beating its own guidance by 23.43%, the stock price plummeted by 35% immediately following the release. This anomaly can be explored using the **ERN GO** function, which highlights whether a company beat or missed earnings expectations, and how the stock price reacted. The **ERN** function not only shows the magnitude of the earnings surprise but also helps assess whether there is a historical correlation between surprise and price movement. To understand the rationale behind this sharp decline, we can turn to the **MODL** (Company Financial Model) function. There, we find that Netflix reported a loss of 2.203 million subscribers in Q1, whereas analysts had expected a gain of 2.4 million subscribers—an unexpected shortfall of 108%. The breakdown shows only Asia-Pacific achieved growth, with 1.1 million net additions. Losses were reported in the U.S. and Canada (636,000), Latin America (351,000), and Europe, Middle East, and Africa (303,000), including a 700,000 decline in Russian accounts. The subscriber miss triggered the drastic market reaction despite the earnings beat.

Market Shares

Given the rapid changes in the healthcare industry, pharmaceuticals offer a vivid illustration of key equity analysis concepts—specifically, the growth of the overall market (the “pie”) and the market share captured by each company (the “slice”). To explore this, we can type **Bloomberg Intelligence** into the command line and select the **BI** function. From there, we navigate to **Equity Industries**, click on **Healthcare**, then **Large Pharma**, and finally access the **Industry** tab under the **Data Libraries** section. Within this view, we find a table showing global revenues of various drug families. Focusing on treatments for HER2-positive metastatic breast cancer, we click on the chart next to “HER2 Antibodies” and observe that global revenue grew steeply until 2019. What caused this change? Expanding “HER2 Antibodies,” we see that it subdivides into five treatments from two pharmaceutical companies—AstraZeneca and Roche. Clicking on the chart for *Enhertu*, we see that this treatment is relatively new and experiencing rapid growth. In contrast, clicking on the chart for *Herceptin*, we observe it peaked around 2018 and has since declined. Drilling down further, we discover that Roche's newer treatment, *Perjeta*, has captured a significant share of the market formerly dominated by *Herceptin*. By switching the view to display the last 20 periods and plotting both treatments, we can visually confirm this shift. *Perjeta* appears to have delivered better outcomes or greater commercial success, driving its growth. During this timeframe, overall HER2 treatment revenue plateaued, with AstraZeneca's successful *Enhertu* launch gaining share from Roche's older treatments.

Cost Base

As we saw earlier with Ford, earnings equal revenues minus costs. Therefore, an analyst must gain a clear understanding of a company's cost base. In particular, analysts aim to distinguish between fixed and variable costs, evaluate labor costs, and assess exposure to commodity prices. Using wind power as an example, we can demonstrate how an analyst might break down the cost base of a wind turbine manufacturer. On the Bloomberg Intelligence *Wind Energy Dashboard* under the *Cost Analysis* tab, we can view current and historical cost structure data. For instance, in Q1 of 2023, \$716,000 was spent on neodymium oxide, a rare earth element used in the production of wind turbines. If rumors arise that the price of rare earth elements

is increasing, analysts will want to know what percentage of total costs this component represents. This helps assess how such a price increase could impact the manufacturer's earnings.

Rolls-Royce Case Study

Let's demonstrate how an analyst could gain insight using the tools we have just discussed. Suppose you are an analyst trying to understand why Rolls-Royce's revenue increased from £6 billion in 2003 to £14 billion in 2014. First, you might ask: what industry is Rolls-Royce in? Luxury vehicles, right? To investigate, you type **Rolls Royce** into the Bloomberg command line, select the stock, and then open the **Company Classification Browser**. It turns out that 74% of Rolls-Royce's revenue comes from aircraft engines, while 26% comes from industrial engines. The car business was sold off long ago, which is why automobiles no longer appear in the revenue breakdown.

How big was the pie in Rolls-Royce's major line of business—aircraft engines? To find out, we go to Bloomberg Intelligence, open the *Industries* section, select *Industrials*, then navigate to the *Aerospace and Defense Dashboard*. By clicking on *Market Share* and examining the *Engines Market*, we can see that the aircraft engine industry was booming during the period in question. The chart reveals that global aircraft engine industry revenue multiplied substantially over that timeframe. As for Rolls-Royce's slice of the pie, the dashboard shows the main players and their relative sizes. United Technologies' Pratt & Whitney division was by far the largest player. The next question becomes: who was purchasing all of these Rolls-Royce and UTC engines?

Let's go back in time and examine the customer industry for aircraft engines—aircraft manufacturing. By analyzing historical data, we observe that aircraft manufacturing has long been a duopoly dominated by Boeing and Airbus. During the relevant period, their commercial aircraft revenues soared, driving demand for aircraft engines. In particular, Boeing's commercial aircraft revenue showed a notable increase in 2022, highlighting a resurgence in the sector and offering further insight into the growth of Rolls-Royce's engine sales.

Commercial aircraft revenue at rival Airbus declined by more than half over the same period. This divergence raises a critical question: what drove Boeing and Airbus's order books to shift so dramatically? To answer this, analysts would examine macroeconomic factors such as global GDP growth, passenger air travel demand, airline profitability, and geopolitical stability. In particular, surges in airline fleet expansion or replacement cycles—often spurred by fuel efficiency improvements or regulatory changes—can significantly influence order volumes for commercial aircraft manufacturers.

If we drill into the consistency of deliveries for Boeing, we observe a significant decline across its entire fleet from 2016 to 2020. However, in 2021, the 737 model played a crucial role in driving revenue back up. Notably, in 2020, Airbus surpassed Boeing in terms of commercial aircraft revenue. Analyzing Airbus's delivery consistency reveals that the A320 was a major contributor to its relative performance. Overall, the aircraft engine industry contracted because the aircraft manufacturing industry itself declined. But what caused the aircraft industry to decline? To answer this, we must examine the conditions in the ultimate customer industry—airlines.

Let's access Bloomberg Intelligence and navigate to the Airlines dashboard. The simplest way to measure airline activity is through the global Revenue Passenger Kilometer (RPK) metric, which represents the total number of kilometers flown by all paying passengers globally in a given year. According to this metric, airline activity experienced a sharp decline from 2016 to 2020, primarily due to the impact of the COVID-19 pandemic. However, since 2020, there has been a significant rebound in global airline activity. Following the reopening of schools in the United States, leisure travel typically experiences a seasonal surge. In the first summer free from pandemic-related restrictions worldwide, travel demand was expected to be extraordinary, with the potential to surpass the record levels achieved in 2019.

So let's recap what we discovered. The aircraft engine industry experienced a decline, and the reason

behind this downturn was the overall decline in the aircraft industry. Why did the aircraft industry decline? Because of reduced demand for new aircraft and engines, which was a direct consequence of the drop in global air travel during the COVID-19 pandemic. To put it simply, engine sales declined because aircraft sales drastically declined—and the root cause of this was the sharp decrease in plane ticket sales.

Historic Analysis

Once an analyst knows the relevant industries, she can then generate financial estimates for the company in question. The first step is to analyze historic performance using the reported financial numbers, otherwise known as *actuals*. By modeling historic company performance, the analyst can project the drivers of revenues and costs and use these to estimate future earnings.

The first thing an analyst does, therefore, when she picks up coverage of a company, is to examine previous earnings statements and read the transcripts of recent company investor conference calls. She does this by typing **events** in the command line and selecting the **EBT** company events database, then checking the earnings call checkbox to bring up the recent conference call transcripts for Delta Airlines. These provide context into the company's performance, and in particular, the management's Q&A with analysts.

Industry Drivers

Understanding what drives a company's success is a blend of art and science. It's about using imagination and mathematical analysis to establish the link between key drivers and financial results. Just because a company consistently shows growth in net income over the years doesn't necessarily mean it contributes to better stock returns. As an analyst, you want to know what truly influences stock returns. **DRIV <GO>**, the drivers function, uses a holdings-based approach to reveal the factors that influence an equity list or a single security by comparing them to a model security universe. The purpose of using this tool is to either verify the expected biases or inclinations in a company's investments (intended tilts) or bring to light any significant concentrations or influences that may not be immediately evident (concentrated exposures). In other words, the tool helps analysts identify and validate expected patterns or uncover obscured factors that may impact a company's financial performance or investment strategy. For a broader market perspective, check out **FTW <GO>**, the Factors to Watch screen, where you can see overall driving factors across the market, such as volatility, size, and quality.

The world is full of surprising, underlying drivers. Pandemics affect the number of air travelers. High Wall Street bonuses boost jewelry sales. Radioactive leaks affect wheat prices for food producers. Booming stock markets lift recreational vehicle sales. The declining prevalence of smoking dents pacemaker sales. The rise of the middle class in emerging markets demands more meat, which in turn demands more fertilizer.

In some instances, a company's activities can have multiple drivers. Let's say you're studying South African miner Impala, which sells the precious metal platinum. What are the main demand drivers for platinum? Auto manufacturers use it to make catalytic converters, accounting for 51% of demand. Jewelry manufacturers use it to make wedding rings, comprising 16% of demand. Electronics manufacturers use it to make circuit boards, representing 9% of demand. Investors use it to store value, contributing 6% of demand. It is also used in the chemicals, dental, glass, refining, and medical industries. Analysts need to understand many unrelated use cases to get an accurate grip on platinum demand.

Estimating Revenue and Costs

We can illustrate how drivers are used to estimate future earnings by looking at Delta Airlines shortly before it released its Q2 2023 earnings. Imagine an analyst is trying to estimate what the results would be. She clicks on the **Analyzer** tab in the **Airlines Dashboard** to view the financial model for Delta.

She looked at what drove Delta's revenues and costs. Delta's revenues came from the available capacity, known as **Available Seat Miles**, the bookings of those seats, known as **Passenger Yield**, and the resulting

revenue, known as **Passenger Revenue per Available Seat Mile (PRASM)**. The bulk of Delta's cost was fuel: how many gallons did it consume, and how much did each gallon cost? Having many years of this data helped her understand how they linked to the reported revenues and costs.

Once she understood the link between metrics and past company performance, the analyst was ready to make a call on what she thought the company would report for Q2 2023. In addition to the drivers, she would also have taken into account external data points: How well was the economy doing? Was Delta gaining or losing market share to its competitors? How much were tickets selling for? What was the price of oil for the quarter? And what guidance had management provided on company performance?

Consensus Estimates

As she was valuing Delta Airlines, she also took a look at the earnings estimates from her fellow analysts for the following few years by typing **earnings** in the command line and selecting the **EM** function. She then chose *revenue* from the Amber Measure dropdown menu. The gold numbers were Delta's reported revenue figures for the last several quarters. The first gray bar, 81.48 billion, was the sell-side estimate for Q2 2023, while the rest of the gray bars were the consensus revenue estimates for future quarters. They were educated guesses of what the orange bars would be.

She wondered where those numbers came from. She clicked on the 81.48 billion number and saw that it was the mean of the educated guesses of her fellow analysts. Now, let's switch gears and focus on what happens the day a company's results are announced.

Beats and Misses

Analysts of a stock race one another to compare the announced numbers with the consensus estimates. The difference between the reported results and the estimates is called the *surprise*. When the actual results are above the estimates, it is called a *beat*, and when below, a *miss*. Whether a company beats or misses tends to be in the headline of an earnings news story.

Turning Points

We saw that analysts' consensus estimates represent the mind of the market, but analysts are not infallible. Analysts often struggle to spot turning points. This is why companies that successfully turn themselves around may beat estimates for many quarters in a row. And this is why companies that blow up tend to release a string of profit warnings. Let's demonstrate when analysts struggled to spot two turning points in a row for the same company: BlackBerry.

Blackberry and Apple Case Study

BlackBerry was the original inventor of the phone with a full QWERTY keyboard. In the mid-2000s, their devices became much loved by white-collar professionals because they allowed businesspeople to get email on the go, meaning they could be contacted even while on vacation. The phones were so addictive that they earned the nickname "CrackBerry." They took the corporate world by storm, and BlackBerry's revenue multiplied.

Let's look at the quarterly revenue for BlackBerry from 2006 to 2008. This was when analysts debated whether BlackBerry could make the leap from niche corporate vendor to mass market brand. Here we can see that from the fourth quarter of 2006 to the fourth quarter of 2008, the actual sales of BlackBerry were greater than analyst consensus estimates, meaning that BlackBerry surprised positively for nine consecutive quarters. Analysts had missed the boat. At its zenith in 2008, BlackBerry had cornered close to half of the world's smartphone market.

Apple released the first iPhone model on June 29, 2007. For a couple of years, businesses did not allow iPhones to connect to corporate email. As soon as they did, businesspeople started switching from the

BlackBerry to the iPhone. If we look at BlackBerry's market share in the overall cell phone market, we can see that its market share dropped from 20% in 2009 to nothing a few years later. Now, let's look at the revenue surprises each quarter over this period. We see that in later quarters, BlackBerry surprised negatively. Analysts were behind the curve yet again, as businesses and consumers switched in droves to the iPhone. Imagine a world in which a very clever analyst could correctly and consistently predict the quarterly results of a company. By looking at the consensus, he could tell in advance whether the company would surprise positively or negatively. Could he guarantee that he could make his clients money each quarter?

Let's find out by analyzing Apple's earnings announcements and resulting share price moves over several quarters using the **SRP** function. Over the period shown, there have been several positive and negative sell-side surprises. On the right, there is a column showing the share price change one day after the quarterly results—green for when the stock went up, and red for when the stock went down. On six occasions, a positive surprise was met with a rising share price, and on three occasions, a negative surprise was met with a falling share price. However, on the remaining five occasions, the share price did not move in the direction that the clever analyst would have guessed. Getting it right nine out of 14 times, while not a guarantee, is pretty good odds.

Surprises Move Share Prices

We can visualize this phenomenon with another Bloomberg Terminal function. Let's pull up the earnings analysis screen to view stock price movements for each member of the S&P 500 in the wake of its results announcement. The x-axis shows the scale of the earnings surprise. If the data point is to the right of the vertical line, it means the company surprised positively; if to the left, negatively. The y-axis shows the share price performance for the day after the results were released. If the data point is above the horizontal line, it means the share price went up the day after results; if below, it went down.

When the surprise was positive, more often than not, the shares went up; hence, there were more diamonds in the top right quadrant than in the bottom right quadrant. When the surprise was negative, more often than not, the shares went down; hence, there were more diamonds in the bottom left quadrant than in the top left quadrant. But there are diamonds all over the chart. The relationship is not foolproof. Just because an analyst has a high conviction that a company will surprise positively at its results does not mean that the analyst knows for sure how the shares will react after the results are published. There's more to guessing share price movements than accurately estimating earnings. It's called valuation.

Equities: Absolute Valuation

Share Price Mechanics

In the US, 3% of all stocks change hands each business day. To facilitate this exchange, the ownership of publicly listed companies is thinly sliced into equal shares—hence the synonym for equities: *shares*. The word *company* originated from the word for bread, so to help us better understand company ownership mechanics, let's discuss a person going to the stock market to buy some shares in parallel with a person going to the supermarket to buy a loaf of bread. Let's discuss slicing and pricing. Both a loaf of bread and the ownership of a company are sliced up into equal portions to make life easy for diners and investors alike. The number of slices of each is decided by the baker and the company treasurer, respectively.

The number of slices of bread, implied by the thickness of each slice, gives you the size of the loaf. Similarly, the number of shares of a company multiplied by the price per share gives you the size of the company, otherwise known as the *market capitalization*. Both a loaf and a company can be thickly or thinly sliced. At the end of the day, people care about the overall size of the loaf or the company. This enables them to determine whether it's a bargain or not. While the slicing of the loaf and the company is analogous, the pricing convention is different: while bread is priced by the loaf, companies are priced by the slice. Notwithstanding this pricing convention for companies, when valuing a company, investors really care about the price of the whole loaf—that is, the market capitalization. This is why our ears prick up when we hear

that a stock has doubled or halved; this tells us that the size of the loaf has doubled or halved. On the flip side, when pundits reference solely the prices of shares, it tells us nothing.

A rookie mistake is to compare one share price to another. Is it meaningful that IBM is worth \$144, whereas Apple is worth \$181? No. That's like trying to compare the size of one loaf of bread to another by looking at single slices of each. In a related way, newcomers to finance may be attracted by so-called *penny stocks*, thinking that they must be a bargain. But this is like hunting around a supermarket for the thinnest-sliced loaf of bread—in both instances, you are choosing the loaf or the stock using very peculiar criteria.

Let's show how slicing and pricing works using Apple. We'll type **Apple** in the command line and open the security description screen. The number of shares outstanding for Apple was 15,634 million on August 7, 2023. The price per share was \$181. Therefore, the market capitalization was \$2,845 billion.

Stock Splits and Reverse Stock Splits

You cannot change the size of the loaf by tampering with the number of slices. This concept is most obvious when companies do stock splits and reverse stock splits. Tesla's latest stock split proves that retail investors are increasingly in the driver's seat. As a reminder, a stock split changes nothing fundamentally, because it only increases the number of shares traded, but at a lower price. None of this has any impact on Tesla's sales or profitability. However, a stock split can attract a wider base of investors. How? The appearance of affordability—by bringing its per-share price down by a third to around \$300, the electric car maker looks better to individual investors who would rather buy whole shares than fractional shares. On top of that, a lower stock price makes Tesla's options, which are based off the stock price, cheaper. This matters, because options trading is a big part of the meme stock frenzy, and you could argue that Tesla is the original meme stock. Elon Musk fans are all rocket-ship emojis, listing upcoming positive catalysts in their tweets, while others question whether the easy gains have already been made in the lead-up to the split. But with retail investors now a larger force in the market—overtaking hedge funds, for instance—the psychological benefits of a lower share price may matter more.

More Corporate Actions

To locate these kinds of stocks, type *news on reverse stock splits* in the command line and press enter. This also works with *news on stock splits*. Incidentally, when searching for a job in finance, you can impress an interviewer with your knowledge of Bloomberg's natural language processing to find information without using mnemonics. Simply demonstrate how, in the past, you would have accessed reverse stock split news by typing **NI SPL REV** in the command line. Now, you just type exactly what you're looking for: *news on reverse stock splits*. When a company thinks its own stock is cheap, it might explore another corporate action: stock buybacks. Buying back stock shows the company has faith in itself, which may encourage investors to buy more stock. When a company does a stock buyback, the value of each stock remaining in the market goes up because there are now fewer slices of bread.

Role of Earnings Estimates

Let's move on from share price mechanics to see how people form opinions on how big the loaf should be. Share prices are facts, while valuations are opinions. Remember from the Ginny example that equity holders own the residual cash flow? Therefore, when valuing companies, shareholders care deeply about earnings estimates. Economist John Maynard Keynes once said, "When the facts change, I change my mind." Analysts tend to change their earnings estimates for a company after quarterly earnings announcements, and after any other news that forces a rethink of the company's prospects. Let's demonstrate this with an example: Facebook.

The Facebook IPO was in May 2012. The share price remained below the IPO price for the following year. Then, in July 2013, Facebook surprised the market with very strong earnings.

This was due to the surging demand for mobile advertising to Facebook users through their smartphones. Facebook continued to surprise the market with stronger-than-expected earnings. In 2014, Facebook's user base overtook the population of China. Let's look at how these surprises affected the earnings estimates for Facebook. If we type **estimates** in the command line and select the Earnings Estimates Graph (EEG) function, we can see that analysts began to increase their 2016 sales estimates for Facebook from mid-2013 onwards. These continuous estimate upgrades sent Facebook shares up from \$26 in mid-2013 to \$115 by the end of 2016. In 2021, Facebook changed its name to Meta. As of August 2023, the shares are worth over \$300. This stark example shows how estimates can drive share prices. But still, the two questions remain: how do you get from earnings estimates to share price estimates, and what value do you assign to earnings estimates to assess fair market capitalization?

Absolute and Relative Valuation

There are two common ways in which investors value companies: absolute valuation and relative valuation. **Absolute valuation** is when an analyst estimates future earnings and then, in turn, estimates how much those earnings are worth in today's money. **Relative valuation** is when an analyst compares a company to another similar company or to the overall market to determine relative value. This process is more intuitive than absolute valuation; it is akin to a shopper in a store comparing one loaf of bread to another to see which is the better buy. Both approaches are grappling with the same unknown: what is the fair market value for the company in question?

Before we dive in, let's outline the pros and cons of each method. **What are the pros of absolute valuation?** It is precise, as it rests on detailed assumptions about the future, such as the price per gallon of fuel for an airline. It is derived from the profit generated by the company. Therefore, it forces an analyst to think about how a company ultimately makes money, which engenders a healthy skepticism of companies that have not yet made money. The process of framing the model and generating the assumptions means that an analyst needs to think through the full business model. **What are the cons of absolute valuation?** The problem with projecting future earnings is that you have to predict the future. It demands a detailed model of all the company's major revenues and costs, which is time consuming to produce. Moreover, an unscrupulous analyst can quite subtly manipulate the more sensitive assumptions in order to provide the desired answer.

And what are the pros of relative valuation? It's a relatable process, as it is just like comparison shopping at the supermarket—a very similar item for a lower price is a better buy. The mathematics is simple: it's the comparison of one valuation metric to another. It also demands shorter-range forecasts than absolute valuation, typically just one year. **And what are the cons of relative valuation?** It provides an opinion that a company is undervalued or overvalued, but typically doesn't provide an estimate of how much the company is actually worth. Just like snowflakes, no two companies are alike. Relative valuation uses other valuations as reference points, but who's to say that they are in turn fairly valued?

Absolute Valuation Process

Absolute valuation, otherwise known as discounted cash flow (DCF) valuation, is a five-step process. It boils down to estimating the cash flows of a company into eternity and figuring out how much those cash flows are worth today. This can then be translated into a market capitalization and, therefore, a share price. The five steps are: **Step one**, estimate long-term future cash flows from the firm. **Step two**, estimate the rate at which to discount those cash flows to derive today's value. This rate is known as the *weighted average cost of capital* (WACC). **Step three**, take the outputs from steps one and two, and discount the estimated future cash flows by the WACC. **Step four**, take the total firm value and derive the market capitalization. **Step five**, divide the market capitalization by the number of shares outstanding to arrive at the estimated fair share price.

Estimating Cash Flows

First, let's estimate long-term future cash flows. Absolute valuation involves valuing the entire firm. Most firms have both lenders (bondholders) and owners (shareholders). As we saw earlier, shareholders are entitled to the *residual earnings*—the cash that remains after all other stakeholders such as employees, suppliers, lenders, and tax authorities have been paid. This is why, when we examined Ford's income statement, we highlighted the *earnings* row—commonly referred to as the **bottom line**.

To perform an *absolute valuation*, however, an analyst must examine the entire firm's cash flows. The analyst uses projections of the company's revenues and costs to estimate the so-called **free cash flow**. Note that this does not imply that the cash is “free” in a literal sense; rather, it refers to the cash that the firm has available to distribute to both bondholders and shareholders. The derivation of free cash flow from revenue and cost projections follows a set of standardized rules. The real challenge in generating these projections lies not in the mechanical calculations, but in making informed assumptions about the future.

Estimating Discount Rates

Now that you have long-term future cash flow estimates, the second step is to calculate the rate at which those cash flows will be discounted. This is known as the **weighted average cost of capital (WACC)**. There is an old saying: “a bird in the hand is worth two in the bush.” Given the inherent uncertainty of the future, investors are generally willing to accept a smaller certain sum today over a larger uncertain sum tomorrow. This is why future cash flows are discounted — to reflect their lower present value. But what discount rate should be used? If an investor holds a pot of cash today and is considering whether to invest in a company, it is important to remember that the investor could alternatively buy U.S. Treasury bonds. Therefore, **U.S. government bond yields set the baseline for the discount rate** for equity investors.

Remember that U.S. Treasuries are considered **risk-free**. Firms, on the other hand, are not. Unlike governments, companies do not have access to taxpayers or currency printing presses to support their obligations. As a result, investors must discount corporate cash flows at a **higher rate than the government bond yield** to reflect the additional risk of investing in a firm. But how much higher should the discount rate be? A typical firm is financed by a combination of shareholders and bondholders. **Equity and debt have different risk profiles**, as we saw in the Ginny example, and thus require different discount rates. The appropriate discount rate for valuing the entire firm is a **weighted average of the equity and debt discount rates**, proportional to the firm's capital structure. This rate is known as the **Weighted Average Cost of Capital (WACC)**.

Let's show how this works mathematically. We can pull up the suggested **Weighted Average Cost of Capital (WACC)** for Delta Airlines using the WACC function. This is a blend of Delta's **cost of equity** and **cost of debt**, weighted according to the relative proportions of Delta's equity and debt financing. To compute this, we first determine the proportion of financing that comes from equity and from debt, as displayed in the pie chart at the top right of the page. The blue section represents Delta's **market capitalization**—the share price multiplied by the number of shares outstanding. The yellow and red sections represent Delta's total debt, which includes both publicly traded bonds and private loans such as bank debt. In this case, Delta's capital structure consists of **53% equity and 47% debt**. The **cost of equity** is 11.4%, while the **cost of debt** is 4.9%. By blending these two rates using a 53:47 ratio, we calculate the **WACC**, which is the discount rate we will use to value Delta's future cash flows.

The **cost of debt** is calculated from the **yield on a firm's bonds**. As we discussed in the fixed income module, **corporate bond yields** are generally higher than **government bond yields** due to the increased risk associated with lending to corporations. Unlike government bonds, which are typically viewed as risk-free, corporate bonds carry the risk of default, and investors demand a premium for taking on this additional risk. This premium is reflected in the higher yields, which in turn contribute to a higher cost of debt for the firm.

Estimating Cost of Equity

Where did Delta's **11.4% cost of equity** come from? Equities are riskier than bonds, and investors expect to be compensated for this additional risk. **Equity investors** typically demand **annual returns** that exceed government bond yields. The question is, *how much more?* The standard calculation is based on the **Capital Asset Pricing Model (CAPM)**. CAPM starts with the overall risk premium of the stock market and then adjusts for the **stock-specific risk**, which is measured as the volatility of the stock relative to the market—known as **beta**. This approach uses stock volatility as a **proxy for the riskiness of earnings estimates**. Let's walk through the **six-step process** used to estimate the cost of equity.

Step one in estimating the cost of equity is to take the **10-year government bond yield** as the starting point, since this yield represents the *risk-free rate* in the CAPM model. If we type WB into the Bloomberg terminal command line, we can observe that, at the moment the screen was captured, the **10-year U.S. government bond yield** was **4.202%**.

Step two is to calculate the **historic overall market return**. To do this, we type **country risk premium** into the Bloomberg terminal command line to access the **CRP** function, which contains the inputs we need. From the data shown, we can observe that—based on historic performance—we may expect a return of **10.138%** from the U.S. stock market.

Step three is to calculate the **market risk premium**. Returning to the **CRP** function and selecting the United States row, we find this value in the final column. It is calculated as the difference between the historic overall market return and the 10-year government bond yield: $10.138\% - 4.202\% = \mathbf{5.93\%}$.

Step four is to consider how much riskier this stock is compared to the overall market. This relative volatility is referred to as **beta**. By pulling up the **BETA** function for Delta Airlines, we see that the beta is calculated using a regression of daily returns: the S&P 500 index returns on the *x*-axis and Delta Airlines' returns on the *y*-axis. The regression estimates the best fit line, and the **beta** is the **slope** of this line. It reflects the stock's sensitivity to market movements. A beta greater than 1 indicates amplified reactions to market changes, while a beta less than 1 indicates muted reactions. In this case, Delta Airlines has a beta of **1.202**.

Step five is to multiply the **beta** by the previously calculated expected market risk premium. This yields the **equity risk premium** for Delta Airlines. In this case, a market risk premium of 5.937% multiplied by Delta's beta of 1.202 gives an equity risk premium of approximately 7.13%. **Step six** is to add back the risk-free rate, which is the 10-year government bond yield of 4.202%. Thus, Delta Airlines' cost of equity is approximately $4.202\% + 7.13\% = 11.33\%$.

You'll be relieved to hear that Bloomberg continually updates the inputs and calculations for the cost of equity within the **WACC** screen. We can see this by returning to the **WACC** function for Delta Airlines and clicking on the cost of equity number. Bloomberg takes the 10-year bond yield from the **WB** function, which is 4.202%, and the market return from the **CRP** function, 10.138%. It subtracts the bond yield from the market return to get the *country risk premium* of 5.936%. The **WACC** function then takes the beta from the **BETA** screen, which is 1.202, and multiplies it by the 5.936% premium to obtain an *equity risk premium* of approximately 7.13%. Finally, it adds back the 4.202% risk-free rate to arrive at a cost of equity of 11.33%. Many investment bankers and investors choose to simply use Bloomberg's **WACC** function, as it automates this process and saves significant time.

Discounting Cash Flows

Now that we have both the future cash flow estimates for the firm and the appropriate discount rate—known as the weighted average cost of capital (**WACC**)—we can proceed to discount the cash flows. This process involves applying the **WACC** to each projected annual cash flow to determine its present value. By discounting each future cash flow back to today, we account for the time value of money and the riskiness of those cash flows. Summing the present values of all future cash flows yields the total firm value, which serves as

the foundation for estimating the company's market capitalization and, ultimately, its share price.

Here are the estimated cash flows that were projected from Ford's historical performance, spanning the period from 2014 to 2040. We now apply Ford's weighted average cost of capital (WACC) to discount these future cash flows. The objective is to determine the present value of all future cash flows—that is, to calculate the size of the pot of gold at the beginning of the period. The estimated value of the firm today is the sum of these discounted cash flows. It is important to note that although cash flows theoretically extend indefinitely, their present value diminishes rapidly the further into the future they occur, due to the compounding effect of the discount rate.

You will now appreciate that the riskier the firm, the less valuable its future cash flows become. This is because a higher weighted average cost of capital (WACC) results in heavier discounting. For example, if the WACC were 8%, the present value of future cash flows would be significantly lower than if the WACC were only 3%. The higher the perceived risk, the higher the discount rate, and thus the smaller the contribution of future cash flows to the firm's current valuation.

Deriving Market Capitalization

Now that we have estimated the total value of the firm based on discounted future cash flows, we can compute the market capitalization, or equity value, by adjusting for debt and cash. This step involves subtracting the value of outstanding debt—what is owed to bondholders—from the enterprise value, and then adding any excess cash held by the company. For example, if Delta Airlines has an enterprise value of \$49.6 billion, and its total debt amounts to \$27.6 billion, we subtract the debt to isolate the portion of the firm's value attributable to equity holders. Since the company also holds \$6.0 billion in cash, which ultimately belongs to the shareholders, we add that amount back in. The calculation therefore becomes \$49.6 billion minus \$27.6 billion, plus \$6.0 billion, resulting in an estimated equity value of \$28.0 billion. This represents the estimated size of the "loaf" of equity, which, when divided by the number of shares outstanding, gives the estimated fair share price.

Estimating Share Price

Now that we have estimated the size of the loaf—that is, the total equity value of the company—the final step in the absolute valuation process is straightforward: divide the estimated equity value by the number of shares outstanding to arrive at the estimated fair share price. This calculation allows investors to determine what a single slice of the company is worth based on the total valuation derived from future cash flow projections and discounted using the weighted average cost of capital. If, for example, the estimated equity value is \$28.0 billion and there are 15.634 billion shares outstanding, then the estimated fair share price would be calculated by dividing \$28.0 billion by 15.634 billion, resulting in a per-share valuation of approximately \$1.79.

Absolute Valuation Process Recap

To recap the absolute valuation process: First, estimate the firm's future cash flows by formulating a coherent set of assumptions about its future performance. Second, determine the appropriate discount rate, known as the weighted average cost of capital (WACC). Third, use the WACC to discount those projected future cash flows back to their present value. Fourth, subtract the value of the firm's debt and add any excess cash on hand to derive the estimated equity value, or market capitalization. Fifth and finally, divide this equity value by the number of shares outstanding to compute the estimated fair share price. While steps two through five are largely mechanical in nature, the real skill in absolute valuation lies in the first step—developing thoughtful, data-informed assumptions about what the future holds for the firm.

Absolute Valuation Observations

Now that you understand the absolute valuation process, it's important to reflect on the assumptions that underpin it. Building a forecast of a company's performance might appear to be a precise exercise, grounded

in formal accounts and structured formulas. We saw this illusion of precision in the context of Delta Airlines' estimates. However, it is easy to lose sight of the fundamental reality: forecasting is an attempt to predict the future, and the future is inherently uncertain. Historical examples underscore this point. In the 1960s, people anticipated a future filled with flying cars and jetpacks—visions that never materialized. More recently, few analysts could have predicted the explosive rise of generative AI technologies. A quick glance at Bloomberg's Document Search and Analytics screen (DSO) reveals a dramatic increase in mentions of "generative AI" over the past three quarters. A similar surge is evident in references to "Chat-GPT," highlighting how rapidly and unexpectedly new technologies can reshape expectations and valuations.

Let's consider a concrete example of how difficult it is to foresee commercial success, using the case of Apple Inc. In 1997, Microsoft was thriving, having recently launched Windows 95, while Apple was floundering. In August of that year, Apple rehired Steve Jobs. Just two months later, Michael Dell, the founder of PC giant Dell, was asked about Apple and remarked that he would "shut it down and give the money back to the shareholders." Contrary to that prediction, Apple embarked on an unprecedented wave of innovation. In 2001, it launched the iPod; in 2003, the iTunes Store; in 2006, Apple TV; in 2007, the iPhone; in 2008, the App Store; in 2010, the iPad; in 2015, the Apple Watch; and in 2016, AirPods. Following the iPod's launch, Apple's revenue multiplied several times over. Clearly, Michael Dell's crystal ball had malfunctioned, highlighting the inherent uncertainty of forecasting future corporate performance.

10-year bonds are foundational to the WACC. The lower the 10-year bond yield, the lower the WACC; and the lower the WACC, the higher the estimated share price. This is how interest rates influence share prices. Perhaps the very low U.S. interest rates following the 2008 rate cuts through to the first rate hike in December 2015 help explain the tripling of the S&P 500 over that period. However, the relationship is not as straightforward as it may seem. Between 2015 and 2019, for example, the stock market rose even as interest rates increased. This illustrates that while interest rates are important in equity valuations, they are not the sole factor. Generally, companies tend to grow faster in an accelerating economy, prompting analysts to revise earnings estimates upward, making equities more attractive. However, stronger economic growth also typically causes central banks to raise interest rates, which in turn elevates the WACC and makes equities less attractive. Economic growth and interest rates therefore tend to offset each other in stock market valuation. An analyst must closely track both the earnings cycle and the interest rate cycle in order to form a view on where the equity market is headed next.

Recall that when we previously outlined the discounting process, we remained silent on what happens in the very long term beyond the end of the bar chart. In theory, company cash flows can continue for decades or even centuries, provided the company survives that long. For instance, Johnson & Johnson, one of the largest U.S. consumer goods companies, was founded in 1886 and is still thriving today. If a company like Johnson & Johnson can endure for centuries, then why isn't its share price extraordinarily high to reflect the vast stream of future cash flows? The reason lies in the discounting mechanism: as we saw earlier, the weighted average cost of capital (WACC) increasingly erodes the present value of future cash flows as time goes on. Moreover, no company can grow indefinitely faster than nominal GDP; if it did, it would eventually become the entire economy. Thus, long-term company revenue growth is constrained by nominal GDP growth, which has averaged around 5% in the U.S. over the past 70 years. WACC, on the other hand, is typically higher—8% is a common estimate. As a result, the value of cash flows far into the future is ground down toward zero. This is why the very long run becomes effectively irrelevant for equity investors. Or, as economists might put it: in the long run, we are all dead. In finance terms, this translates to $\text{WACC} > \text{nominal GDP growth}$.

Heavily indebted companies tend to have more volatile share prices than companies with no debt. This arises because when the total value of the firm changes, the amount owed to bondholders remains fixed. As a result, any change in the overall enterprise value disproportionately affects the equity portion (i.e., market capitalization). A helpful analogy is that of a mortgage. Suppose you are a confident property investor, and you believe that houses in a particular neighborhood are poised to appreciate significantly in value. Should you pay in cash or borrow as much as possible? If you are certain of the appreciation, you should borrow to the hilt. Imagine you purchase a \$500,000 home using an 80% mortgage: you borrow \$400,000 and contribute

\$100,000 of your own money. A month later, another investor offers you \$800,000 for the property. You accept, repay the \$400,000 mortgage, and keep the remaining \$400,000. While the house appreciated 60% (from \$500,000 to \$800,000), the leverage turned your \$100,000 investment into \$400,000—a 300% return. This illustrates how debt amplifies both gains and losses, and why high leverage leads to greater equity volatility.

This alchemy is also present in the stock market. Let us consider the enterprise value of the retailer Target. Suppose the total enterprise value is \$76.1 billion, with \$19.1 billion in debt and \$1.6 billion in cash. The market capitalization, or equity value, is then $\$76.1 - \$19.1 + \$1.6 = \58.6 billion. Now imagine you believe the fair absolute valuation of Target should be 66% higher, at \$126 billion. Since the debt and cash positions remain unchanged, the new estimated equity value becomes $\$126 - \$19.1 + \$1.6 = \108.5 billion, which is an increase of approximately 85%. This mirrors the real estate analogy: debt magnifies returns to shareholders because bondholders do not share in the upside. They continue receiving fixed interest payments, regardless of changes in the firm's valuation. Therefore, any appreciation in enterprise value accrues disproportionately to equity holders. For highly leveraged companies, even modest changes in firm value can cause significant swings in the share price. As many companies carry debt, this dynamic helps explain why equities are generally more volatile than bonds.

Absolute Valuation Sensitivities

The whole process of absolute valuation has many inputs and moving parts. It therefore has a multitude of sensitivities. Several of the inputs we have seen are quite changeable, and these changes may have nothing to do with the company in question. Therefore, it is not sufficient to be an expert solely on the company and industry specifics in order to have a handle on valuation. This is one of the main reasons for the volatility of equities. You are the owner of residual income in a messy world.

Here are some examples of common sensitivities to be mindful of when valuing a company. Estimates will be affected by the economic cycle; for companies operating around the world, revenue and cost may be in other currencies, which therefore will be buffeted by moves in the FX market. Many companies are affected by the commodity markets—exposure to things like oil, grains, or metals will bring into play factors which affect the prices of those commodities. WACC will be affected by moves in the overall stock market, which change the equity risk premium, and by moves in the ten-year bond yield, which change the risk-free rate. Finally, the share price itself can affect the share price. For example, a company with a rising share price can raise funds for growth more easily, which may improve the company's prospects. Conversely, a company with a sinking share price may spread doubt among investors and make raising additional capital more difficult or expensive. Most analysts do not model these factors, or if they do, assume that the factors are static into the future—by flatlining the oil price, for example. This is why these larger forces endlessly surprise investors, and this is why absolute valuation, with its detailed spreadsheets and precise outputs, can lull analysts into a false sense of confidence. This confidence is misplaced—hence the old joke, “The stock market is 99% confusion, and 1% commission.”

Pros and Cons of Absolute Valuation

To wrap up our discussion of absolute valuation, let's recap the pros and cons. **The pros:** It delivers a precise answer. It is tethered to earnings, making it a useful tool to spot overvaluation. It forces you to think through all the revenues and costs. **The cons:** It is hard to predict the future. Building an absolute valuation model is time-consuming because it is comprehensive. You can easily boost an absolute valuation by slightly raising the long-term growth rate, or slightly reducing the WACC.

Equities: Relative Valuation

Introduction to Relative Valuation

Now let's recap the relative valuation process. To recap, relative valuation is when an analyst compares a company to itself, to another similar company, or to the overall market to divine relative value. You'll be relieved to hear that this process is more intuitive than absolute valuation. It is akin to a shopper in a store comparing one loaf to another to see which is the better buy. The biggest way in which relative valuation is different from absolute valuation is that it is not an effort to calculate an actual fair share price, but rather to determine whether a company is undervalued, overvalued, or fairly valued.

Relative valuation is a two-step process. The first step in the process is to choose a relevant metric with which to conduct the relative valuation. The second step is to compare your chosen metric to something else.

Dividend Yields

A traditional yardstick of relative valuation for equities is dividend yields. Dividends are regular, steady payments to shareholders that are usually paid in cash out of the company earnings. Company management teams are typically loath to cut dividend payments, as many shareholders rely on them as steady income streams when they retire. This regular flow of cash payments looks similar to fixed income, but there are two key differences between dividend yields and bond yields. First, as dividends are carved out of earnings, which are variable, dividends tend to change, whereas fixed income payments do not by definition. This variability of dividends from year to year, therefore, tends to make dividend yields more variable than bond yields. Second, dividend yields are easier to calculate than bond yields. Recall how bond yields were calculated using all future bond repayments up until maturity. There is no concept of maturity for an equity. When you own a share of a company such as Johnson & Johnson, that share can give you dividends for many decades to come. So dividend yields are instead calculated using a one-year or part-year dividend payment as the basis for calculation.

Let's demonstrate the first difference by looking at Coca-Cola. If we type *Coca-Cola* in the command line, select the company, type *dividend* in the command line, and then select the DVD function, we can see Coca-Cola's steadily growing stream of dividend payments over several decades. Selling sugared water has proven to be one of the most successful business ideas of all time. This is a tangible demonstration that equities, unlike most bonds, can last a very long time, and also that dividend payments, unlike ordinary bond coupons, can grow.

Let's demonstrate the second difference. Dividend yields are far easier to calculate than bond yields. A dividend yield is calculated by taking the dividend per share and dividing it by the latest share price. Companies frequently pay dividends twice or four times per year; to ensure the comparability of dividend yields, it is standard practice to take one year's worth of dividends for the calculation. Let's show an example using fast food chain McDonald's. This screen was captured in mid-2023, when McDonald's had just dropped a new meal that highlights iconic McDonald's menu items featured in film, TV, and music over the years. The quarterly dividend was \$1.52 per share. Therefore, on an annualized basis, an owner of one share would have received \$6.08. As the share price was \$282.79 at the time, the dividend yield was 2.15%. This meant that 2.15% of McDonald's share price was supported by annual dividend payments. This is far simpler mathematics than calculating a bond yield.

Recall that shareholders own all the residual earnings of a company, not just the dividend payments. Therefore, another valuation measure investors calculate is the *earnings yield*, which uses the earnings per share (EPS) rather than the dividend as the numerator. This typically boosts the numerator in the yield calculation, and so makes the earnings yield higher than the dividend yield. By looking at the dividend yield and earnings yield side by side, we can see that in this case, the earnings yield, 4.07%, is indeed higher than the dividend yield, 2.15%, because the estimated earnings per share (\$11.53) is greater than the dividend per share (\$6.08).

Price to Earnings Ratio

The reciprocal of the earnings yield is the famous *price-to-earnings* or *P/E ratio*. Let's demonstrate this by starting with the formula for earnings yield. When we divide the \$282.79 share price by the \$11.53 estimated earnings per share, it gives us a P/E ratio of 24.5 times. Note that people refer to P/E ratios verbally as "24.5 times" and write them as "24.5x" in print. The lowercase "x" represents the multiplication symbol, not an algebraic unknown. Since P/E ratios are usually greater than one, they are referred to as *P/E multiples*. In this ratio, share price is the numerator and earnings per share is the denominator.

Given that a P/E ratio is simply the reciprocal of an earnings yield, if we were to plot both on the same chart, we would expect them to be mirror images of each other. Let's demonstrate this using McDonald's and the Graph Fundamentals, or **GF**, function. The earnings yield at the time this screen was captured is 3.98%, and the P/E ratio is 25.11 times. If you examine the time series data of earnings yield and P/E, you will observe that they are indeed mirror images. This illustrates that equity valuation—like bond valuation—is fundamentally based on yields, albeit presented in the form of ratios.

It is customary to use the estimated earnings per year to calculate the so-called prospective price-to-earnings (P/E) ratio. This is done by dividing the current share price by the estimated earnings per share for the upcoming calendar year. For example, in September 2023, McDonald's had a share price of \$280.94 and estimated earnings per share of \$11.53, resulting in a P/E ratio of approximately 24.36 times. Alternatively, one could divide the company's total market capitalization by its total earnings, which yields the same result. This is because multiplying both the numerator (share price) and the denominator (earnings per share) by the number of shares outstanding does not change the value of the fraction. Therefore, the P/E ratio reflects how much investors are willing to pay for each dollar of a company's expected earnings.

Use of P/E Ratios in Valuation

Price-to-earnings (P/E) ratios are the mainstay of relative equity valuation. To illustrate how they are used in practice, recall from the Delta Airlines example how analysts estimate earnings. If one has an earnings estimate and a sense of what a fair P/E ratio should be, then equity valuation becomes straightforward. You simply multiply the earnings by the P/E ratio, effectively canceling out the earnings terms and leaving you with a price. For example, suppose you believed that better burger joints were going to take market share from McDonald's. You might estimate that McDonald's earnings would decline from \$8.4 billion to \$7.6 billion, and that its P/E ratio would fall from 24.36 times to 8.0 times. Under these assumptions, the market capitalization would be \$60.8 billion. Given one billion shares outstanding, this would translate to a share price of \$60.80, a significant drop from the original price of \$280.94.

This framework provides two core reasons why share prices may increase. First, if the P/E ratio remains constant while earnings (E) increase, then the price (P) must increase accordingly. This scenario reflects share price growth driven by earnings growth. Second, if earnings remain the same but the P/E ratio rises, then the price will also rise. This is known as multiple expansion as the valuation multiple itself increases. Although the underlying mathematics is straightforward, both components—projecting future earnings and determining a fair P/E ratio—are extremely challenging to estimate. As we have already seen, making defensible assumptions about future company performance is inherently difficult. Moreover, estimating earnings is not a one-time task; it requires ongoing revision in light of new data and changing circumstances.

Estimating the P/E ratio hinges on one's belief in the growth of earnings (E). A company can effectively grow into a high P/E ratio, meaning that strong expected growth in earnings may justify a higher multiple. For example, consider Apple in 2003, when the iPod music player was gaining traction. With the benefit of hindsight, we now know that Apple's earnings were set to grow rapidly for the next twelve years, eventually plateauing in 2015. If one had foreseen the rollout of Steve Jobs' planned innovations—such as the iPhone and iPad—owning Apple's future earnings stream would have seemed highly attractive. Consequently, an investor would have been willing to pay a premium for each dollar of earnings, awarding Apple a high P/E ratio. In other words, investors would have assigned Apple a higher valuation multiple not based solely on current earnings, but on expectations of future growth. This can be visualized by plotting Apple's earnings

(E), price-to-earnings ratio (P/E), and market capitalization (P) across the period of explosive earnings growth.

Remember, earnings multiplied by the price-to-earnings (P/E) ratio equals market capitalization. For instance, when Apple's earnings plateaued, its \$99.8 billion in earnings multiplied by a P/E ratio of 30.96 resulted in Apple's \$3 trillion market capitalization in late 2023. In 2003, Apple's P/E ratio peaked at 136 times. From that point, Apple's earnings skyrocketed until plateauing in 2015. Over that same period, the P/E ratio declined into the mid-teens. However, the initial 136x P/E in 2003 was more than justified by the subsequent earnings growth—the earnings (E) grew faster than the P/E contracted. As a result, Apple's share price soared. While it may not have been obvious at the time, the high 136x multiple in 2003 turned out to be a bargain. Rapidly growing companies can grow into very high P/E ratios, so investors should not automatically assume that a high P/E means a stock is overpriced. In summary, valuing a company is difficult because estimating both earnings and the appropriate P/E ratio is complex, especially during periods of rapid growth. Even mature companies can experience unpredictable cycles of multiple expansion, when the P/E increases, and multiple contraction, when it decreases.

Relative Valuation Versus Self

Now that we know some of the typical metrics used for relative valuation, let's demonstrate how they are applied in practice. In simple terms, an investor will compare their preferred metric to one of three benchmarks to gauge relative value: (1) the same metric over the company's own history—how has the company's metric trended over time? (2) the same metric for similar companies—how does the company's metric compare to the average of its peer group? and (3) the same metric for the overall market—how does the company's metric compare to that of the market as a whole? Imagine, once more, that it is mid-2023. An investor has taken note of several emerging fast food chains and a consumer movement away from established brands. He is skeptical about the durability of some of the newer chains and believes that consumers will eventually return to McDonald's. Accordingly, he wants to conduct a relative valuation of McDonald's using its price-to-earnings (P/E) ratio to determine whether the stock is a good buy.

He begins by comparing McDonald's to itself, looking at the historic level of its P/E ratio. First, he pulls up the share price of McDonald's since the pandemic crisis starting in 2020. He sees that shares rose from \$60 to \$275. What happened to the P/E ratio? He may guess that it went up because the price went up, but he doesn't really know unless he knows what happened to the earnings. If the earnings went up more than the price, the P/E may very well have gone down. To get smarter on the P/E, he types **PE bands** into the command line and selects the Equity Relative Valuation Price BS function. The white line represents McDonald's share price, while the colored lines show the levels of certain P/E ratios over time. For example, the blue line at the top shows where McDonald's share price would have been over

After looking at the hypothetical P/E ratios of McDonald's, he turns to the **GF** function to show how the actual P/E ratio trended over a very long time. Then he layers on the earnings and the share price. The earnings rose steeply from the early 2000s, while the P/E stayed the same. This explains why the shares went up sixfold. If the P/E remains stable, as it has done over many years, and the recent dip in earnings reverses as people return to buying burgers, then a resurgence in McDonald's earnings will lead to a rise in McDonald's share price. If his hypothesis about the faddish nature of the fast food industry is correct, and McDonald's reignites earnings growth, then McDonald's is a buy.

Relative Valuation Versus Peers

To do so, he gauges where the P/E ratio and growth rates are compared to its peer group. He will measure the premium or discount to the peer group average P/E ratio. This is a very common technique and is what people classically understand by relative valuation. The artistry of peer group valuation comes in the selection of which companies are truly peers. Investors commonly choose peers that operate in the same industry and region, ideally direct competitors. For example, an investor in Tiffany would look at other publicly listed jewelers, while an investor in Coca-Cola would look at archrival Pepsi. This is because direct

competitors face the same environment and risk. If one has a much lower P/E than the other, it may pique the investor's interest. One snag of peer group selection is that a peer company may be part of a conglomerate, which operates in multiple industries, making direct comparisons more complex.

He selects McDonald's and types **relative valuation** into the Bloomberg command line. The RV function suggests a list of relevant peers, including fast food chains such as Wendy's, Jack in the Box, and Domino's Pizza. This output is referred to as a table of comparables, commonly known among bankers as a "comps table." When investors "spread comps" and generate such a table, it yields valuation insights. Within the RV screen, he examines the "EPS growth" column to see the consensus forecast for earnings growth, and the adjacent "P/E" column to view the current valuation multiples. These two columns are used together to evaluate whether a valuation appears justified. As we saw with Apple in 2003, a rapidly growing "E" can justify a high "P/E" multiple. In September 2023, the company with the highest expected earnings growth in this peer group is Yum China Holdings Inc., with a forecasted 105% increase in EPS. Meanwhile, Domino's Pizza trades at the highest multiple—30 times earnings. McDonald's is projected to grow earnings at 14.19%, suggesting that despite competition, consumer interest in burgers remains strong.

Relative valuation becomes more intuitive when the data is visualized. The investor types **relative valuation correlation** into the Bloomberg terminal and selects the RVC function. This produces a bubble chart that plots the expected sales growth of the peer companies on the X-axis and their corresponding P/E ratios on the Y-axis. Each bubble represents a company, with the size of the bubble proportional to that company's market capitalization. The chart includes a purple bubble that denotes the average sales growth, P/E ratio, and market cap for the entire peer group, serving as a benchmark. McDonald's is represented by a blue bubble, allowing the investor to quickly assess how it compares visually to its industry peers in terms of growth expectations and valuation.

Let's recap where we are by comparing McDonald's valuation metrics to its historical levels. The investor suspects that if consumer preferences swing back toward established fast food restaurants, then McDonald's earnings will rebound. If the P/E ratio remains at current levels, the share price would likely increase in tandem with earnings. By comparing McDonald's valuation metrics to its peers, the investor concludes that the current P/E ratio is justified by the revenue growth outlook. Should McDonald's resume strong growth, there is a chance the P/E ratio could even expand, further boosting the share price. However, one must remember a key drawback of relative valuation—it assumes the peer group is, in aggregate, fairly valued. If the entire industry is overvalued, then peer comparisons could lull the investor into a false sense of security. To guard against this, the investor compares McDonald's valuation metrics to those of the overall market, ensuring that McDonald's is not trading at a dramatically higher multiple than the broader market.

Relative Valuation Versus Market

The World Equity Index Function displays both the P/E ratio and the dividend yield of the S&P 500, which is the main equity index in McDonald's domestic market, the United States. The P/E ratio of the index is 22.24 times, while McDonald's stands at 24.63 times, indicating that it is trading roughly in line with the broader U.S. market. The dividend yield of the S&P 500 is 1.55%, whereas McDonald's offers a more attractive yield of 2.15%, making its shares appear particularly appetizing in comparison. On every relative valuation metric the analyst has examined—historical, peer-based, and market-wide—McDonald's looks like a buy. As a result, the investor proceeds to purchase shares of McDonald's, hoping that their value will increase over the following year.

Valuation of the Market

You will now appreciate the power of the framework we used to explore the valuations of Apple, Microsoft, and McDonald's. Remember, earnings multiplied by the P/E ratio gives you the price, and thus variation in either earnings or the P/E ratio explains movement in the price. One can glean a wealth of valuation insights by simply plotting earnings, P/E, and share price on a single chart. As we conclude the equities module, this same framework helps illuminate why the overall stock market is so volatile. The very same

forces at work for Apple, Microsoft, and McDonald's also govern the broader market. In short, corporate earnings drive the overall stock market. We can demonstrate this by running an analysis over the 20-year period referenced at the beginning of the equities module—when the stock market tripled, halved, doubled, halved again, and tripled once more. Applying this framework to the S&P 500 involves using aggregate earnings in place of a single company's earnings, the overall P/E of the index in place of a single company's multiple, and total market capitalization instead of a single stock price. This effectively treats the S&P 500 as if it were a single company.

Conclusion

To sum up, the five key takeaways from this module are as follows. First, equity index movements are summaries of the movements of an ever-changing list of individual member stocks. As such, major movements in heavily weighted stocks exert a strong pull on the index. Second, the volatility of company earnings leads to both the volatility and the high potential upside of share prices. Third, market sizing, market share analysis, and mastering the interplay between industry and company performance are crucial for generating accurate earnings estimates. Fourth, absolute valuation involves forecasting company performance far into the future and valuing the resulting cash flows. However, it is hamstrung by the need to predict multiple unknowns, making its output extremely sensitive to its estimated inputs. Fifth, relative valuation involves hand-picking comparable companies and using the average valuation of that peer basket to assess the company in question. While it demands less clairvoyance than absolute valuation, it remains highly sensitive to expectations of earnings growth. When J.P. Morgan was once asked what the stock market would do, he wisely replied, "It will fluctuate." Now you understand that the stock market behaves like a roller coaster because company earnings do the same, which in turn reflects the cyclical nature of the broader economy. As established in the first module, predicting the economy is notoriously difficult. The stock market is considered a mystery for the same reason the economy is—because the future is inherently unknowable.