Morningstar Equity Research Methodology

Morningstar Equity Research
September 2022

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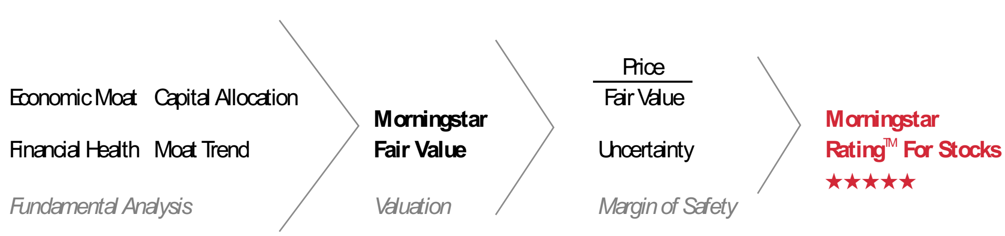
We believe that a company’s intrinsic worth results from the future cash flows it can generate. The Morningstar Rating for stocks identifies stocks trading at a discount or premium to their intrinsic worth--or fair value estimate, in Morningstar terminology. Five-star stocks sell for the biggest risk-adjusted discount to their fair values, whereas 1-star stocks trade at premiums to their intrinsic worth. Four key components drive the Morningstar rating: our assessment of the firm's economic moat; our estimate of the stock's fair value; our uncertainty around that fair value estimate; and the current market price. This process ultimately culminates in our single-point star rating. Underlying this rating is a fundamentally focused methodology and a robust, standardized set of procedures and core valuation tools used by Morningstar's equity analysts, including our Capital Allocation rating. In this document, we provide a detailed overview of how the Morningstar Rating for Stocks is derived, and also outline the analytical work that feeds into our coverage of stocks.

Exhibit 1 Morningstar Research Methodology



Source: Morningstar.

Morningstar's Economic Moat™ Rating

The concept of an economic moat plays a vital role not only in our qualitative assessment of a firm's long-term investment potential, but also in the actual calculation of our fair value estimates. An economic moat is a structural feature that allows a firm to sustain excess profits over a long period of time. We define excess profits as returns on invested capital, or ROICs, above our estimate of a firm's cost of capital, or WACC (weighted average cost of capital). Without a moat, profits are more susceptible to competition. The assumptions that we make about a firm's economic moat play a vital role in determining the how quickly any excess profits are eroded--a topic we will explore in the next section.

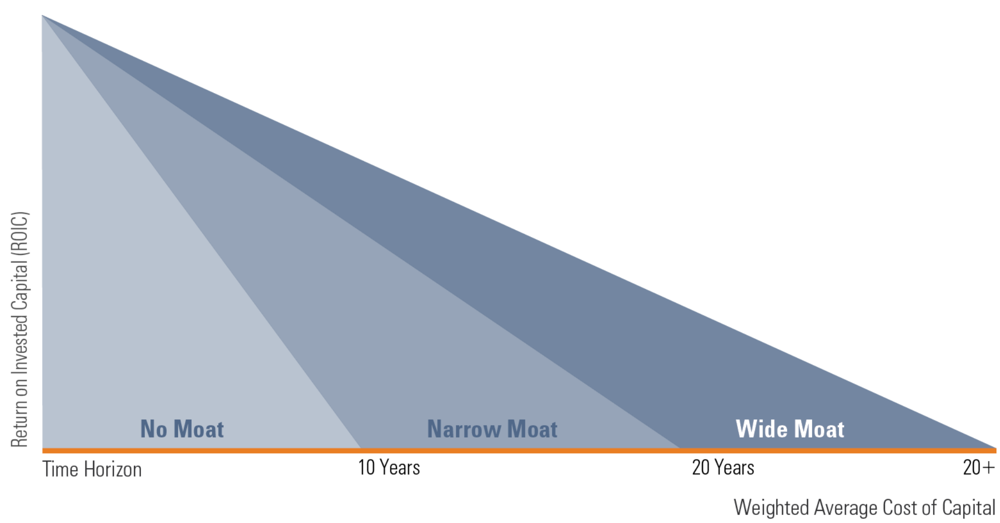
Companies with a narrow moat are those we believe are more likely than not to achieve normalized excess returns for at least the next 10 years. Wide-moat companies are those in which we have very high confidence that excess returns will remain for 10 years, with excess returns more likely than not to remain for at least 20 years. The longer a firm generates economic profits, the higher its intrinsic value. We believe low-quality no-moat companies will see their normalized returns gravitate toward the firm's cost of capital more quickly than companies with moats. We have identified five sources of economic moats: intangible assets, switching costs, network effect, cost advantage, and efficient scale.

When considering a company's moat, we also assess if there is a substantial threat of value destruction, stemming from risks related to ESG, industry disruption, financial health, or other idiosyncratic issues. In this context, a risk is considered potentially value destructive if its occurrence would eliminate a firm's economic profit on a cumulative or midcycle basis. If we deem the probability of occurrence sufficiently high, we will rate the firm no-moat.

To gauge the sustainability of excess profits, analysts perform ongoing assessments of what we call the moat trend. A firm's moat trend is positive in cases where we think its sources of competitive advantage are growing stronger; stable where we don't anticipate changes to competitive advantages over the next several years; or negative when we see signs of deterioration.

Morningstar's moat rating is central to our investment philosophy. It encapsulates our thinking on business competition, influences our valuation process, and is used prominently in many of the products and services Morningstar provides. As such, moat ratings for all initiations and any proposed changes must go through the global moat committee, which comprises senior members of Morningstar's equity research department.

Exhibit 2 Measuring a Moat



Source: Morningstar.

Determining Fair Value

At the heart of our valuation system is a detailed projection of a company's future cash flows, resulting from our analysts' independent primary research. Analysts create custom industry and company assumptions to feed income statement, balance sheet, and capital investment assumptions into our globally standardized, proprietary discounted cash flow, or DCF, modeling templates. We use scenario analysis, in-depth competitive advantage analysis, and a variety of other analytical tools to augment this process.

We believe this bottom-up long-term, fundamentally based approach offers several advantages over other valuation techniques. The granularity in a multiyear, cash-flow forecast with many key inputs allows for more-detailed scenario analysis. It also helps us to identify potential future trends, and presents an opportunity to closely analyze returns on invested capital--all critical tenets to our economic moat framework and uncertainty ratings. Furthermore, it focuses analyst efforts on long-term business drivers, which have the greatest valuation impact, rather than short-term market noise that has little impact on intrinsic value.

Moreover, we think analyzing valuation through discounted cash flows presents a better lens for viewing cyclical companies, high-growth firms, businesses with finite lives (such as mines), or companies expected to generate negative earnings over the next few years. That said, we don’t dismiss multiples altogether but rather use them as supporting cross-checks for our DCF-based fair value estimates. We also acknowledge that DCF models offer their own challenges (including a potential proliferation of estimated inputs and the possibility that the method may miss short-term market-price movements), but we believe these negatives are mitigated by deep analysis and our long-term approach.

Applying the same valuation framework across our entire global coverage universe facilitates the comparison of investment opportunities across industries and around the globe on an apples-to-apples basis. Combining our analysts’ financial forecasts with the moat rating helps us determine how long returns on invested capital are likely to exceed the firm’s cost of capital. Returns of firms with a wide economic moat rating are assumed to fade to the perpetuity period over a longer period than the returns of narrow-moat firms, and both will fade slower than no-moat firms, increasing our estimate of their intrinsic value.

As a result of this methodology, our model is divided into three distinct stages. Here is how the system works in practice for operating companies:

Stage I: Explicit Forecast

In the first stage, which can last five to 10 years, analysts make full financial statement forecasts, including items such as revenue, profit margins, tax rates, changes in working-capital accounts, and capital spending. Based on these projections, we calculate earnings before interest, after taxes (EBI) and the net new investment (NNI) to derive our annual free cash flow forecast.

Stage II: Fade

We define the second stage of our model as the period it will take the company's return on new invested capital--the return on capital of the next dollar invested ("RONIC")--to decline (or rise) to its cost of capital. During the Stage II period, we use a formula to approximate cash flows in lieu of explicitly modeling the income statement, balance sheet, and cash flow statement as we do in Stage I.

The length of the second stage depends on the strength of the company's economic moat. We forecast this period to last anywhere from one year (for companies with no economic moat) to 10–15 years or more (for wide-moat companies). During this period, cash flows are forecast using four assumptions: an average growth rate for EBI over the period, a normalized investment rate, average return on new invested capital (RONIC), and the number of years until perpetuity, when excess returns cease. The investment rate and return on new invested capital decline until a perpetuity value is calculated. In the case of firms that do not earn their cost of capital, we assume marginal ROICs rise to the firm's cost of capital (usually attributable to less reinvestment), and we may truncate the second stage.

Stage III: Perpetuity

Once a company's marginal ROIC hits its cost of capital, we calculate a continuing value, using a standard perpetuity formula. At perpetuity, we assume that any growth or decline in revenue is an NPV= 0 proposition. Stated differently, in the perpetuity period, we assume that any growth or decline or investment in the business neither creates nor destroys value and that any new investment provides a return in line with estimated WACC.

Discount Rates

Because a dollar earned today is worth more than a dollar earned tomorrow, we discount our projections of cash flows in stages I, II, and III to arrive at a total present value of expected future cash flows.

Because we are modeling free cash flow to the firm--representing cash available to provide a return to all capital providers--we discount future cash flows using the WACC, which is a weighted average of the costs of equity, debt, and preferred stock (and any other funding sources), using expected future proportionate long-term, market-value weights. For mainly financial companies, we use a fee cash flow to equity model and discount free cash flows by the company's cost of equity.

Cost of Equity

A company's cost of equity represents the average, annualized, nominal total return expected by shareholders. For most companies, COE is the dominant factor in the company's WACC and therefore holds sizable influence in the valuation process. However, in contrast to fixed-rate forms of capital, the COE is not a contractual return. It cannot be observed directly, and considerable controversy persists in theoretical finance as to how the COE is best estimated.

Morningstar's process for estimating COE is inspired and informed by the logic of the capital asset pricing model (CAPM) even as we take a largely qualitative and forward-looking approach. Our goal is to provide reasonable distinctions between the risk characteristics and expected returns of different companies while minimizing the effects of recency bias, false precision, and market noise.

We use a building block approach to derive COE estimates for individual companies:

Cost of Equity = Market Average Real Return Expectation (6.5%–7.0% based on what we observe as a mean-reverting real return of the S&P 500 over long rolling time horizons—this is not a forecast, but rather what we believe shapes investor expectations)

+	Inflation Expectation (2.0%–2.5% based principally on stable 10- to 30-year inflation expectations derived from TIPS spreads as well as actual CPI over the last decade)
+/ ,	Country Risk Premium (for non-USD reporting firms; this will reflect differentials in inflation and real risk-free rate expectations outside the U.S. as well as political risks)
+/ ,	Systematic Risk Premium (four categories; ranges from -1.5% to +4.5%)

Exhibit 3 Systematic Risk Premium Categories

Category	Equity Risk Premium (%)	X Implied Beta	+ Risk-Free Rate (%)	= Total COE (%)	– Average COE	Systematic Risk = Premium (%)
Below Average	4.50	0.67	4.50	7.50	9.00	-1.50
Average	4.50	1.00	4.50	9.00	9.00	—
Above Average	4.50	1.44	4.50	11.00	9.00	2.00
Very High	4.50	2.00	4.50	13.50	9.00	4.50

Source: Morningstar.

Importantly, because the fair value estimate reflects the present value of expected future cash flows, it should rise by the company's estimated cost of equity (net of the shareholder return allocated to dividends) over time, all else equal.

Cost of Debt

In estimating the cost of debt, we use a similar building-block approach as our cost of equity. We use the same assumed risk-free rate and level of inflation, while layering on a corporate credit spread, which varies according to the company's credit risk. We also adjust for the tax benefit of the deductibility of interest expenses.

Once we have these inputs, we weight them in terms of the implied value of each as a proportion of total estimated enterprise value to come up with our overall WACC estimate.

A significant percentage of our coverage includes firms domiciled outside the United States, and there are those that call the U.S. home but have considerable non-U.S. operations. Depending on the systematic risk of a country relative to the U.S., we may incorporate a country risk premium into our discount rate. Some characteristics that we consider are differences in local real risk-free rate, expected inflation, financial disclosure, and other specific operating-market differences that could cause equivalent businesses to be more or less risky in one national economy versus another. In assigning country risk premia, we have developed a set of country-specific standardized scores that are reviewed at least once annually.

Hidden Assets/Liabilities

Once we have an estimated present value of expected future cash flows, we must also consider any other items that affect value not specifically included within our cash-flow projections. We refer to these special items as hidden assets and hidden liabilities, and they might include items that occur frequently across our coverage universe, such as the estimated value of outstanding option grants or underfunded/overfunded pensions, or items that tend to be very company-specific in nature, such as minority ownership positions in other companies, underutilized land or other balance sheet assets that could be sold without changing the cash-flow prospects of the business, or an expected future litigation settlement. It is impractical to list all the possible hidden assets and liabilities we find across our coverage, but we think about these hidden assets and liabilities as anything that affects value that is handled outside of our cash-flow forecasts.

	PV of Stage I Estimated Cash Flows
+	PV of Stage II Estimated Cash Flows
+	PV of Stage III Estimated Cash Flows (i.e., Residual Value)
+	Estimated Value of Excess Balance Sheet Cash Average
	Enterprise Value
,	Estimated Value of Debt, Preferred, and Any Other Funding Sources
+/ ,	Estimated Value of Hidden Assets/Liabilities
	Estimated Value of Equity
	Divided by # of shares
	Estimated Equity Value per Share or Fair Value Estimate

The Uncertainty Rating

Morningstar's Uncertainty Rating is designed to capture the range of potential outcomes for a company's intrinsic value. This rating is used to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The Uncertainty Rating is aimed at identifying the confidence we should have in assigning a fair value estimate for a given stock.

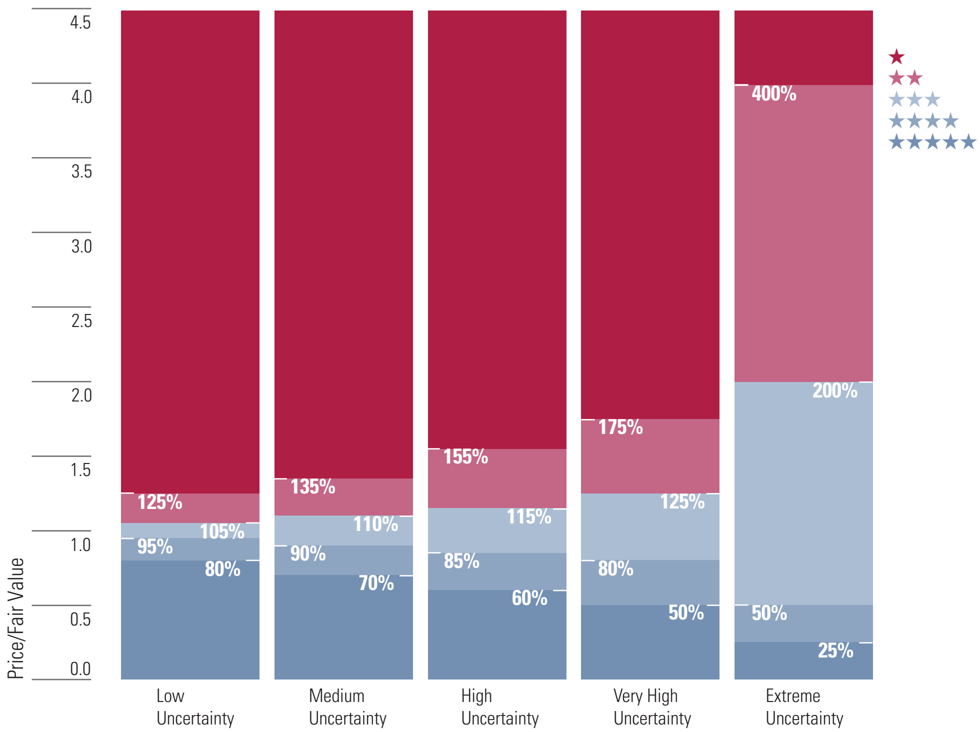
Our Uncertainty Rating is meant to take into account anything that can increase the potential dispersion of future outcomes for the intrinsic value of a company, and anything that can affect our ability to accurately predict these outcomes. The rating begins with a suggested rating produced by a quantitative process based on the trailing 12-month standard deviation of daily stock returns. An analyst overlay is then applied, with analysts using the suggested rating, historical rating data, and their own knowledge of the company to inform them as they make the final Uncertainty Rating decision. Ultimately, the rating decision rests with the analyst. Analysts take into account many characteristics when making their final decision, including cyclical factors, operational and financial factors such as leverage, company-specific events, ESG risks, and anything else that might increase the potential dispersion of future outcomes and our ability to estimate those outcomes.

Our recommended margin of safety—the discount to fair value demanded before we'd recommend buying or selling the stock—widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the potential dispersion of outcomes, the greater the discount we require relative to our estimate of the value of the firm before we would recommend the purchase of the shares. In addition, the Uncertainty Rating provides guidance in portfolio construction based on risk tolerance.

Our Uncertainty Ratings are: Low, Medium, High, Very High, and Extreme. With each uncertainty rating is a corresponding set of price/fair value ratios that we use to assign star ratings, as shown in the graph.

The actual price/fair value cutoffs are determined using a combination of a) empirical data from the historical performance of our uncertainty rating, and b) option pricing theory based on the implied volatility of stocks with commonly agreed-upon uncertainty characteristics. Our empirical data show that appropriate 1-star and 5-star prices fall approximately at the midpoint between a log-normal relationship and a symmetrical relationship. A log-normal relationship would mean that a stock would post the same return between the 5-star price and the fair value as it would between the fair value and the 1-star price, while a symmetrical relationship would mean that the same percentage discount to a stock price for a 5-star rating would be assigned as a premium to the stock price for a 1-star rating. For low-, medium-, high-, and very-high-uncertainty stocks we formally assign our 1-star prices as the midpoint between the symmetrical and the log-normal relationship. We then round these prices to fair value relationships to the nearest 5 percentage points for simplicity. For extreme uncertainty stocks we assign the 1-star price using the log-normal relationship only. Typically, a significant portion of an extreme uncertainty company's capital structure is composed of debt. Using the lognormal relationship to set the 1-star price accounts for the fact that a small improvement in the forecast for free cash flows will have an outsize upside impact to the equity value for any highly-indebted company.

Exhibit 4 Morningstar Equity Research Star Rating Methodology



Generating the Star Rating

Once we determine the fair value estimate of a stock, we compare it with the stock's current market price on a daily basis, and the star rating is automatically re-calculated at the market close on every day the market is open.

Our analysts keep close tabs on the companies they follow, and, based on thorough and ongoing analysis, raise or lower their fair value estimates as warranted. Furthermore, as mentioned earlier, we would expect our fair value estimates to generally rise over time, due to the time value of money. Specifically, over the course of a year, barring major changes to analyst assumptions, we would expect our fair value estimates to increase at the level of our estimate of a firm's cost of equity (net of shareholder returns attributed to dividends). So, for a stock that pays no dividends with a \$100 fair value estimate today and an estimated 10% cost of equity, we would expect our fair value estimate to rise to \$110 in 12 months, all else equal.

It is also worth noting that there is no predefined distribution of stars. That is, the percentage of stocks that earn 5 stars can fluctuate daily, so the star ratings, in the aggregate, can serve as a gauge of the broader market's valuation. When there are many 5-star stocks, the stock market as a whole is more undervalued, in our opinion, than when very few companies garner our highest rating.

We expect that if our base-case assumptions are true the market price will converge on our fair value estimate over time, generally within three years (although it is impossible to predict the exact time frame in which market prices may adjust). If you bought a company's stock at exactly our fair value estimate today, we would expect that you should achieve total returns in line with our assumed cost of equity for the next three years, absent a change in business prospects relative to our base-case expectations. A stock price lower than our fair value estimate suggests that there is a higher probability than not that investors should expect returns at a greater rate than COE over a three-year period (i.e., we would expect the investment to produce abnormal returns or alpha). Conversely, a price above our fair value estimate implies lower-than-COE expected returns (or negative alpha). In some cases, we believe investors should expect negative absolute returns, if the price/fair value estimate ratio is sufficiently high.

Our star ratings are guideposts to a broad audience and individuals must consider their own specific investment goals, risk tolerance, tax situation, time horizon, income needs, and complete investment portfolio, among other factors.

★★★★★ We believe appreciation beyond a fair risk-adjusted return is highly likely over a multiyear time frame. Scenario analysis developed by our analysts indicates that the current market price represents an excessively pessimistic outlook, limiting downside risk and maximizing upside potential. This rating encourages investors to consider an overweight position in the security relative to the appropriate benchmark.

★★★★ Appreciation beyond a fair risk-adjusted return is likely, in our opinion. This rating encourages investors to own the firm's shares, possibly overweight relative to the appropriate benchmark after fully considering more attractively priced alternatives, such as our 5-star recommendations.

★★★ Indicates that we believe investors are likely to receive a fair risk-adjusted return (approximately cost of equity). Concentrated portfolios might consider exiting these positions if more attractively priced alternatives are available.

★★ We believe investors are likely to receive a less than fair risk-adjusted return and should consider directing their capital elsewhere. Securities with this recommendation should generally be underweight, assuming less expensive alternatives are available for the portfolio strategy being employed.

★ Indicates a high probability of undesirable risk-adjusted returns from the current market price over a multiyear time frame, based on our analysis. Scenario analysis by our analysts indicates that the market is pricing in an excessively optimistic outlook, limiting upside potential and leaving the investor exposed to Capital loss. This rating encourages investors to strongly consider exiting portfolio positions in the security in nearly all strategies.

Capital Allocation

While not directly impacting our Star Rating, our Capital Allocation (or Stewardship) Rating represents our assessment of the quality of management's capital allocation, with particular emphasis on the firm's balance sheet, investments, and shareholder distributions. Analysts consider companies' investment strategy and execution, balance sheet management, as well as dividend and share buyback policies. Corporate governance factors are only considered if they are likely to materially impact shareholder value, through either the balance sheet, investment, or shareholder distributions. Analysts assign one of three ratings: "Exemplary", "Standard", or "Poor". Analysts judge Capital Allocation from an equity holder's perspective. Ratings are determined on a forward looking and absolute basis. The Standard rating is most common as most managers will exhibit neither exceptionally strong nor poor capital allocation.

For a company's balance sheet, we consider the current position and how it is likely to evolve, whether a firm has reasonable or excessive leverage, and if a company will generate sufficient cash flow to make meaningful improvement if necessary. For investment, we consider if a firm is likely to invest to fortify or enhance its competitive position in future, and if it is likely to do so at the right price - that is, generating attractive rates of return above the estimated cost of capital. We also consider execution and if material missteps or successes are likely. For shareholder distributions, we consider if future dividends and/or share buybacks are likely of the appropriate size and form. Cash should be distributed to shareholders unless better uses exist and the opportunity cost of foregoing investment or strengthening the balance sheet is considered.

Capital Allocation (or Stewardship) analysis published prior to Dec. 9, 2020, was determined using a different process. Beyond investment strategy, financial leverage, and dividend and share buyback policies, analysts also considered execution, compensation, related party transactions, and accounting practices in the rating.

Risk Warning

Please note that investments in securities are subject to market and other risks and there is no assurance or guarantee that the intended investment objectives will be achieved. Past performance of a security may or may not be sustained in future and is no indication of future performance. A security investment return and an investor's principal value will fluctuate so that, when redeemed, an investor's shares may be worth more or less than their original cost. A security's current investment performance may be lower or higher than the investment performance noted within the report. Morningstar's Uncertainty Rating serves as a useful data point with respect to sensitivity analysis of the assumptions used in our determining a fair value price.

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