



Equity Research Methodology

Morningstar Research Report
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When we launched the Morningstar Rating for stocks in August 2001, we set out to help investors answer the most difficult question in stock investing: Is a company worth the price that the market asks for its shares?

The Morningstar Rating for stocks identifies stocks trading at a discount or premium to their intrinsic worth—or fair value, in Morningstar's terminology. Five-star stocks are trading at the most attractive prices relative to their fair values, whereas 1-star stocks are trading at premiums to fair value. There are three key components to the Morningstar Rating for stocks: our analysts' estimate of the stock's fair value, our assessment of the firm's business risk, and the stock's current market price. Our fair value estimates are based on our projection of a company's future cash flows and our estimate of the appropriate discount rate to apply to those cash flows. Our analysts follow their companies daily, and if their inputs change, we update our assessment of their stocks' fair values.

Once we determine the fair value of a stock, we then compare it to the stock's current market price. Here we take the business risk of the company into account. In other words, the riskier the company, the more undervalued it has to be to earn a 5-star "buy" rating. There are no predefined distributions of stars—that is, the percentage of stocks earning 5 stars can fluctuate daily—so the star ratings can also be used as a general gauge of the broader market's valuation. When there are many 5-star stocks, the stock market as a whole is more undervalued than when very few companies garner our highest stock star rating.

Determining Fair Value

Our analysts use a standardized, proprietary valuation model to assign fair values. Our model has three distinct periods: the first five years, year six to perpetuity, and perpetuity. By summing the discounted free cash flows from each period, we arrive at an enterprise value for the firm. Then, by subtracting debt and adjusting for any off-balance-sheet assets or liabilities, we arrive at a fair value of the common stock. The model's key features consist of the following:

First Stage

Our analysts make detailed forecasts of each company's performance over the next five years, including revenue growth, profit margins, tax rates, changes in working-capital accounts, and capital spending. This five-year period is the first stage of our model.

Second Stage

The length of the second stage depends on the strength of the company's economic moat. Economic moat is a term used by Warren Buffett to describe the predictability and sustainability of a company's future profits. The competitive forces in a free-market economy will tend to chip away at above-average returns on invested capital (ROICs). If a company earns a high ROIC, it attracts competitors, which then capture a portion of those excess returns. Only companies with wide economic moats—something inherent in their businesses that competitors cannot replicate—can hope to keep these competitive forces at bay for a prolonged period.

We define the second stage of our model as the period it will take for the company's marginal ROIC—the return on capital for the last dollar invested—to decline (or rise) to its cost of capital. We forecast this period to be anywhere from five years (for companies with no economic moat) to 20 years (for wide-moat companies). During this period, we forecast cash flows using three assumptions: an investment rate in year five,

incremental ROIC in year six, and years to perpetuity. The investment rate and marginal ROIC will decline smoothly until the perpetuity year. In the case of firms not earning their cost of capital, we assume marginal ROICs rise to the firm's cost of capital, and we may truncate the second model period.

Perpetuity

Finally, once a company's marginal ROICs hit its cost of capital, we assume it remains in this "perpetuity" state forever. At perpetuity, the return on new investment is set equal to the firm's weighted average cost of capital (WACC), which is our discount rate minus inflation. At this point we believe the firm will no longer be able to earn a profit greater or less than its cost of capital. The company could be generating significant free cash flow—the more free cash flow, the higher the fair value—but any additional capital invested in the business adds no value. Thus, our fair value for a stock is the sum of the cash flows from years 1-5, the cash flows during the interim period, and the perpetuity value, all discounted to present value using the WACC. For financial companies such as banks, insurance firms, and REITs, we use different valuation models. The guiding principles are the same, but the calculations are different.

Discount Rates

In deciding the rate to discount future cash flows, we ignore stock-price volatility (which drives most estimates of beta) because we welcome volatility if it offers opportunities to buy a stock at a discount to its fair value. Instead, we focus on the fundamental risks facing a company's business. Ideally, we'd like our discount rates to reflect the risk of permanent capital loss to the investor.

When assigning a cost of equity to a stock, our analysts score a company in the following areas:

Financial leverage	The lower the debt, the better.
Cyclical	The less cyclical the firm, the better.
Size	We penalize very small firms.
Free cash flows	The higher as a percentage of sales and the more sustainable, the better.

We set the minimum cost of equity at 8.0%, which corresponds to a risk-free rate of 5.5% (the 10-year rolling average yield on the 10-year Treasury Note) and an equity-risk premium of 2.5%. Based on each company's score on the fundamental risk factors outlined above, we assign it a higher cost of equity. As of September 2004, our cost of equity for domestic, non-financial companies ranged from 8% to 16%, with the median at 11%.

Because we are valuing the cash flows to both equity and debt holders, we use the weighted average cost of capital (WACC) for our discount rate. For the cost of debt, we typically use the higher of a) current yields on the firm's outstanding bonds; and b) our estimate of the company's marginal cost to borrow.

Hidden Assets/Liabilities: Options, Pensions, Etc.

In arriving at our fair value estimate, we also add back any hidden assets and subtract out hidden liabilities. Hidden assets might include real estate that's undervalued on the firm's books. Hidden liabilities mainly include underfunded pension obligations and the cost of stock-option grants. We believe that employee stock options represent a real cost to existing shareholders and must be deducted from fair value.

The Morningstar Rating for Stocks

In addition to a fair value estimate, we also incorporate a risk rating when assigning a star rating to a stock. Our analysts assign stocks to one of four "business risk" groupings—below average, average, above average, and speculative—by scoring each firm on two factors.

Economic moat	Our measure of a company's competitive strength and the predictability of its free cash flows.
Event risk	Our assessment of how vulnerable the firm is to "shocks" with outcomes that are difficult to incorporate into our cash flow forecasts, such as litigation, single-product risk, regulatory changes, etc.

For example, if a company has a wide economic moat and low event risk, it falls in the "below average" business risk group. Likewise, a company with no moat and high event risk falls in the "above average" group. The table below shows, for each risk group, the expected three-year annualized returns that we associate with each star rating. Notice that for riskier stocks, we expect a higher three-year return than for less-risky stocks. These are the returns we expect from each risk group on average—not necessarily for each individual stock within each group. When we ascertain a significant risk of permanent capital loss to the investor, or when scenario analysis results in a wide distribution of outcomes, we assign the speculative rating.

3-Year Annualized Expected Returns

Business Risk	5 stars	4 stars	3 stars	2 stars	1 star
Below Average	>15.5%	14.25%	9.5%	3.0%	<0.0%
Average	>20.5%	17.75%	10.5%	4.25%	<2.5%
Above Average	>30.5%	24.25%	12.5%	6.25%	<5.5%
Speculative	>40.5%	35.25%	18.5%	6.25%	<5.5%

To calculate these expected returns, we started by centering a three-star rating around the average cost of equity for firms within each risk group. Currently those averages are about 9.5% for the below-average group, 10.5% for the average-risk group, and 12.5% for the above-average-risk group. If a stock trades near our fair value estimate, the stock's future return will, by definition, closely match its cost of equity (assuming our fair value estimate is correct). In other words, the stock will offer a return that compensates investors for the risk of owning the stock. We define this "fair return" as 3 stars and build out from there.

We set the maximum expected return for a 1-star stock at 5.5%, which is our risk-free rate. We feel this is a common-sense way to define our 1-star band: We don't think investors will likely even earn the risk-free rate if they invest in 1-star stocks. Thus, they will not be compensated for the risks inherent in owning equities.

For example, suppose a stock with above-average business risk trades for \$20, and we think its fair value is \$35. To calculate the three-year expected return, we first estimate what the fair value will be in three years. We define the future fair value as:

$$\text{Future Fair Value} = \text{Current Fair Value} * (1 + \text{Average Cost of Equity})^3$$

In our example, this would be $\$35 * (1.125^3)$, or \$49.83. We then assume that the stock will migrate to this fair value over the three-year period. We can then solve the following equation for the expected annualized return:

$$\text{Current Stock Price} * (1 + \text{expected return})^3 = \text{Future Fair Value}$$

Plugging in the current stock price of \$20 and the future fair value of \$49.83 gives us an expected three-year annualized return of 36%. Glancing at the table above, this return is high enough to qualify for 5 stars.

We update our star ratings daily, based on the closing price of each stock. The star rating can change because the analyst changes the fair value or the business risk of the stock, or because the price of the stock changes. Our rating is unique in that a sudden price change immediately triggers a rating change. (If the analyst needs time to incorporate new information into the valuation model, we put the rating "under review" until the new fair value is published.)

In order to reduce the number of rating changes due to small fluctuations in the stock price, we have a small buffer around the cutoffs between any two ratings. The buffer prevents the rating from flip-flopping back and forth between adjacent star ratings based simply on very small fluctuations in the price.