MORNINGSTAR®

Wide Moat Focus Index: The Impact of Moat and Valuation Screens

The most differentiated elements of our portfolio construction process have driven sizable excess returns.

Morningstar Equity Research
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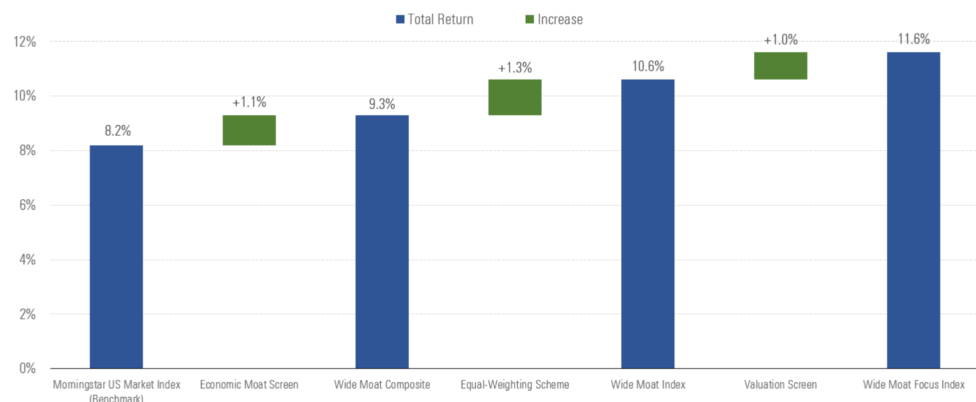
Executive Summary

The Morningstar Wide Moat Focus Index is an equal-weighted portfolio that holds U.S. firms with wide economic moats trading at attractive valuations. Given its multiple inputs, the strategy's impressive long-term performance prompts a key question: what has been the key driver of excess returns--the inclusion of only wide-moat companies, the inclusion of a valuation screen, or the equal-weighting approach? To investigate, we analyzed the performance of the Wide Moat Focus Index relative to three additional Morningstar indexes: an equal-weighted basket of all U.S. wide moat-rated stocks, a market-cap-weighted basket of all U.S. wide moat-rated stocks we cover, and the Morningstar US Market Index. Over the Wide Moat Focus Index's more than 13-year live track record, it has generated the highest total returns of this group. Perhaps more important, the Wide Moat Focus Index has also delivered superior risk-adjusted returns.

Key Takeaways

- A focus on valuation has boosted excess returns for the Wide Moat Focus Index.
- The wide-moat screen has also supported excess returns, but we don't view moat ratings as predictive of performance. Therefore, we wouldn't expect this screen alone to support excess returns in the future.
- Risk-adjusted return metrics also favor the Wide Moat Focus Index versus the equal-weighted and cap-weighted baskets of all wide-moat stocks we cover as well as the broader U.S. equity market.
- The intellectual property provided by Morningstar equity analysts supporting the index's valuation and economic moat screens is the most differentiated and difficult-to-replicate element driving the strategy.

Index Total Returns, Annualized



Source: Morningstar Direct
Data: 2/14/2007 - 6/30/2020
Note: the Morningstar US Market Index is a cap-weighted index that covers 97% of U.S. market capitalization

Important Disclosure
The conduct of Morningstar's analysts is governed by Code of Ethics/Code of Conduct Policy, Personal Security Trading Policy (or an equivalent of), and Investment Research Policy. For information regarding conflicts of interest, please visit: http://global.morningstar.com/equitydisclosures

Performance Data for Related Indexes Highlight the Value of Key Wide Moat Focus Screens

Sizable Excess Returns Highlight the Benefits of a Valuation Screen

The investment landscape has been inundated by strategic beta products in recent years. While there is no shortage of options in what would appear to be a fairly saturated market, the Wide Moat Focus Index represents a unique approach. The index leverages highly differentiated analysis from the Morningstar equity research team. It has delivered impressive excess returns and risk-adjusted returns over a more than thirteen year live track record. This lengthy live track record is far longer than the typical strategic beta strategy, allowing us to observe its historical performance across a variety of market environments.

Comparing Wide Moat Focus Index performance with that of related Morningstar indexes allows us to roughly traingulate the value-add of key portfolio construction rules. These include an economic moat screen, a valuation screen, and an equal-weighting scheme.

Exhibit 1 Key Portfolio Construction Elements: Wide Moat Focus Index vs. Related Indexes

Index Name	Weighting Scheme	Economic Moat Screen	Valuation Screen	Constituent Count
Wide Moat Focus Index	Equal	X	X	49
Wide Moat Index	Equal	X		139
Wide Moat Composite	Market Cap	X		139
Morningstar US Market Index	Market Cap			1402

Source: Morningstar Direct. Data as of June 30, 2020.

1) Wide Moat Index

This equal-weighted index includes all U.S. companies covered by the Morningstar equity research team that have garnered a wide economic moat rating. This strategy does not employ a valuation screen, meaning that it is comprised of both overvalued and undervalued stocks relative to Morningstar analysts' fair value estimates. It is reconstituted and rebalanced quarterly and accounts for coverage changes and moat rating changes over time. It is reconstituted and rebalanced quarterly.

2) Wide Moat Composite

This composite is the same as the Wide Moat Index above but employs a weighting scheme based on market capitalization rather than equal-weighting constituents.

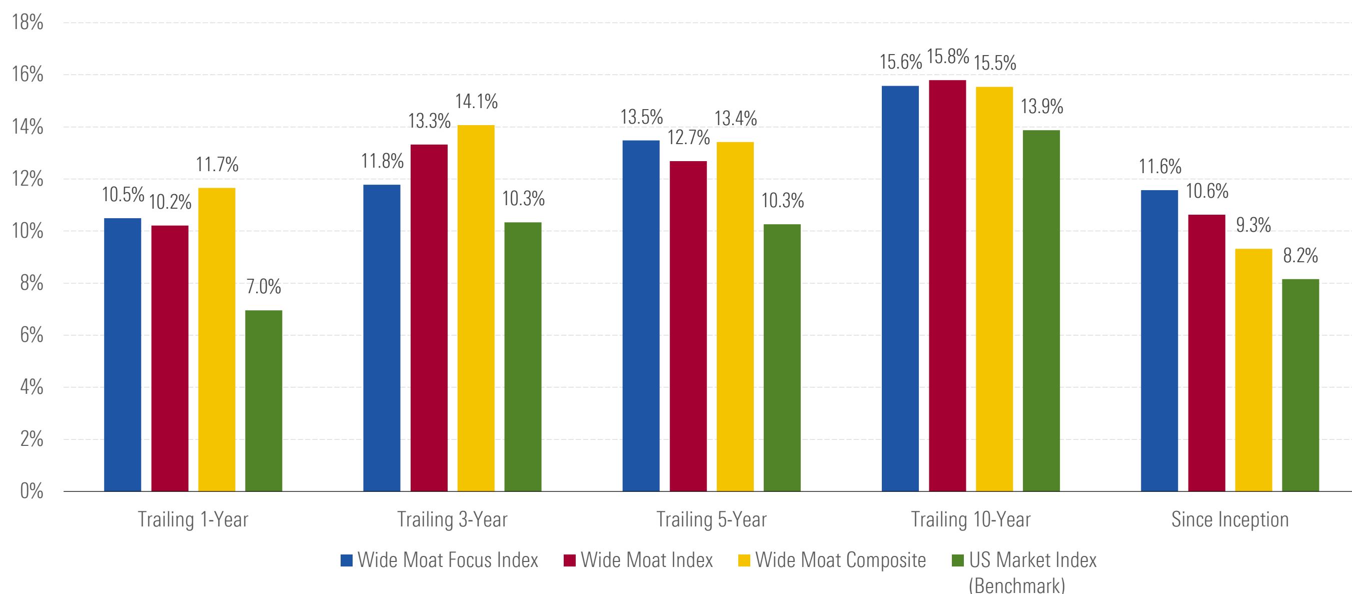
3) Morningstar US Market Index

This index serves as the parent index and official benchmark of the Morningstar Wide Moat Focus Index. Targeting 97% of the market capitalization of the broader U.S. equity market, it is a diversified, broad market index. Its long-term performance is very closely in line with that of the S&P 500 and the Russell 3000. This index involves no consideration of economic moat ratings or valuation.

As a side note, the word "Focus" in the name of the Morningstar Wide Moat Focus Index reflects the use of a valuation screen that focuses the strategy down to a smaller number of stocks trading at the most attractive valuations. The Wide Moat Index and Wide Moat Composite include all U.S. wide-moat-rated companies we cover and do not consider valuation.

The Wide Moat Focus Index has delivered the highest total returns across these four indexes since its Feb. 14, 2007 live inception date, a period spanning more than thirteen years.

Exhibit 2 Annualized Total Returns: Wide Moat Focus Index Versus Related Indexes



Source: Morningstar Direct. Data as of June 30, 2020.

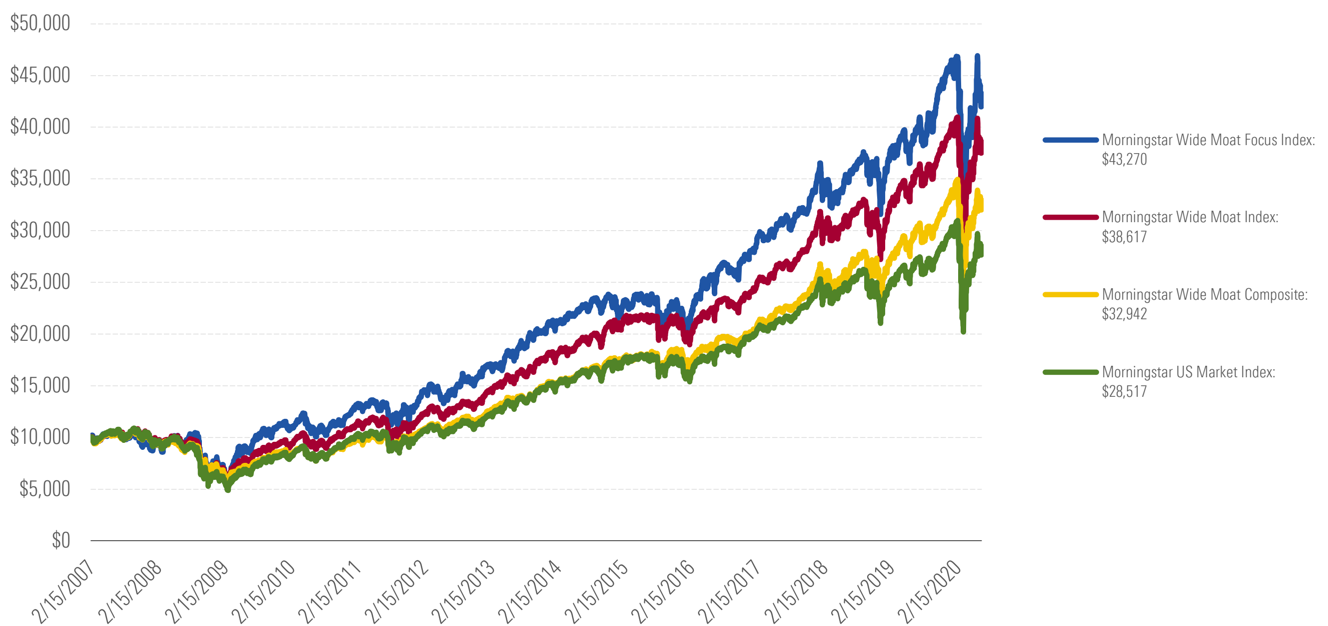
We don't view economic moat ratings, in and of themselves, as being predictive of performance. Even though the wide moat screen has augmented excess returns for the Wide Moat Focus Index, we wouldn't expect a portfolio of wide moat-rated stocks to outperform a portfolio or narrow-moat or no-moat stocks over a full market cycle. The wider a company's moat, the higher the multiple at which its stock already trades, on average. Phrased differently, it is difficult to find wide-moat stocks "on sale". However, we contend that the rigorous fundemental analysis required by our economic moat methodology helps us more accurately forecast long-term cash flows. We wouldn't necessarily expect excess returns from the wide economic moat screen alone to persist. However, we do believe that the underlying economic moat analysis conducted by Morningstar equity analysts helps us more accurately forecast cash flows over the long term.

Overall, total returns since inception suggest that the valuation and economic moat overlays, as well as the equal-weighting scheme, have each helped increase returns. At a high level, comparing the total returns of the Wide Moat Focus Index and the Wide Moat Index indicates that the Wide Moat Focus Index's valuation overlay has generated better performance. Comparing the total returns of the Wide Moat Composite with those of the US Market Index suggests that a focus on wide moats has also added value although, once again, we wouldn't contend that this dynamic alone should be relied upon to

deliver excess returns into the future. Finally, comparing the performance of the Wide Moat Index with that of the Wide Moat Composite suggests that the equal-weighting scheme has also proven beneficial.

Although the relative outperformance figures since inception might appear modest, the fact that this outperformance has been compounded over many years leads to very favorable returns in dollar terms from a $10,000 base. The Wide Moat Focus Index's dollar returns were more than 50% above those of the Morningstar US Market Index benchmark since its live inception date.

Exhibit 3 Indexed Returns From a $10,000 Base: Wide Moat Focus Index Versus Related Indexes



Source: Morningstar Direct. Data as of June 30, 2020.

While pure total return data is reflective of the historical investor experience, it doesn't tell the whole story as to whether these criteria have added value on a risk-adjusted basis. We explore risk-adjusted returns in the following section.

Risk-Adjusted Returns Indicate That Economic Moat and Valuation Screens Have Added Value

The Wide Moat Focus Index Has Delivered Favorable Sharpe and Sortino Ratios

Total returns, in and of themselves, are less informative about the value-add of individual portfolio construction rules than risk-adjusted return metrics. However, the Wide Moat Focus Index stacks up favorably in this regard as well. Sticking with the four indexes examined in the previous section of this report, we now compare their Sharpe and Sortino ratios.

The Sharpe ratio reflects total returns in excess of the risk-free rate per unit of total risk. Phrased differently, for each incremental unit of portfolio risk, it determines the magnitude of excess returns that have been delivered.

$$Sharpe\ ratio = \frac{R_p - R_f}{\sigma_p} = \frac{Portfolio\ Return - Risk\ Free\ Rate}{Standard\ Deviation\ of\ Excess\ Return}$$

The Sortino ratio treats risk as only downside volatility, whereas the Sharpe ratio penalizes both upside and downside volatility equally. The Sortino ratio is sometimes viewed as more informative because it excludes beneficial upside volatiltiy, instead focusing only on risk associated with undesirable outcomes. Wild swings of outperformance in the positive direction would be penalized by the Sharpe ratio but not by the Sortino ratio.

$$Sortino\ ratio = \frac{R_p - R_f}{\sigma_d} = \frac{Portfolio\ Return - Risk\ Free\ Rate}{Standard\ Deviation\ of\ Negative\ Returns}$$

For the Wide Moat Focus Index, risk-adjusted return metrics since inception over an annual data frequency surface an attractive Sharpe ratio of 0.78 and an attractive Sortino ratio of 2.36. These figures sit well above the ratios of the other three comparison indexes we consider.

Exhibit 4 Risk-Adjusted Return Metrics: Wide Moat Focus Index Versus Related Indexes (Annual Data Frequency)

Index	Return (Annualized)	Std. Deviation (Annualized)	Beta	Sharpe Ratio (Annualized)	Sortino Ratio (Annualized)
Morningstar Wide Moat Focus Index	13.95	18.81	0.88	0.78	2.36
Morningstar Wide Moat Index	11.75	18.13	0.92	0.69	1.43
Morningstar Wide Moat Composite	10.31	15.97	0.79	0.67	1.27
Morningstar US Market Index	9.19	19.40	1.00	0.53	0.92

Source: Morningstar Direct. Data frequency: annual. Data from Jan. 1 2008 to Dec. 31, 2019.

The Wide Moat Focus Index was designed in hopes that it could be representative of a core, long-term equity portfolio holding rather than a tactical trading strategy. We'd contend that the results shown above might be the most representative of what the investor experience has been.

However, even when employing a daily data frequency, the Wide Moat Focus Index's Sharpe and Sortino ratios are still superior. Admittedly, they are only superior by a very slim margin.

Exhibit 5 Risk-Adjusted Return Metrics: Wide Moat Focus Index Versus Related Indexes (Daily Data Frequency)

Index	Return (Annualized)	Std. Deviation (Annualized)	Beta	Sharpe Ratio (Annualized)	Sortino Ratio (Annualized)
Morningstar Wide Moat Focus Index	11.58	27.63	1.02	0.67	0.784
Morningstar Wide Moat Index	10.63	24.66	0.95	0.66	0.777
Morningstar Wide Moat Composite	9.32	23.61	0.91	0.61	0.712
Morningstar US Market Index	8.15	25.62	1.00	0.52	0.600

Source: Morningstar Direct. Data frequency: daily. Data from Feb. 14, 2007 to June 30, 2020.

Risk-adjusted return metrics also indicate that the equal-weighting scheme utilized by the Wide Moat Focus Index has likely added value as well, compared with what performance would look like if we had instead employed a market cap-weighted scheme.

Regardless, the key takeaway is that the Wide Moat Focus Index has delivered the highest risk-adjusted return profile. Perhaps more important, it seems that the valuation overlay, wide-moat screen, and equal-weighting scheme have each been integral in supporting a risk-adjusted return profile well above that of the Morningstar US Market Index benchmark.

Up and Down Capture Ratios Also Reflect Favorably on the Wide Moat Focus Index

The analysis of up and down capture ratios surfaces interesting findings about how the various portfolio construction inputs support performance in different market environments. Up and down capture ratios don't account for risk in nearly as granular a manner as the Sharpe and Sortino ratios. Instead, they simply indicate how a portfolio has performed in a given period when the benchmark has moved higher and when the benchmark has moved lower. However, in our meetings with clients, the down capture ratio of the Morningstar Wide Moat Focus Index is often inquired about because it reflects how effectively the strategy has achieved the common mandate of capital preservation.

$$Up\ Capture\ ratio = \frac{PR}{BR_{UM}} * 100 = \frac{Portfolio\ Total\ Return\ in\ Up\ Market}{Benchmark\ Total\ Return\ in\ Up\ Market} * 100$$

$$Down\ Capture\ ratio = \frac{PR}{BR_{DM}} * 100 = \frac{Portfolio\ Total\ Return\ in\ Down\ Market}{Benchmark\ Total\ Return\ in\ Down\ Market} * 100$$

An up capture ratio above 100 indicates that a portfolio has outperfomed in a given period during which the benchmark moved higher. For example, an up capture ratio of 115 would indicate that a portfolio outperfomed its benchmark by 15% in a given period. An up capture ratio of 90 would indicate that a portfolio underperformed its benchmark by 10% in a given period.

On the other side of the coin, a down capture ratio below 100 indicates that a portfolio has outperfomed in a given period during which the benchmark moved lower. For example, a down capture ratio of 80 would indicate that a portfolio declined only 80% as much as its benchmark in a given period. A down capture ratio of 105 would indicate that a portfolio declined 105% as much as its benchmark in a given period.

In short, up capture ratios above 100 and down capture ratios below 100 are desirable. Investment strategies that exhibit both characteristics over an extended period of time are hard to find. Typically, the stronger a portfolio's up capture ratio, the weaker its down capture ratio and vice versa. Via these two metrics, the Wide Moat Focus Index really stands out when considering an annual data frequency, as reflected by an up capture ratio of 116 and a down capture ratio of only 47. Across all four indexes highlighted in this report, both of these metrics are superior by a wide margin. Based on this result, it's not surprising that the Wide Moat Focus Index has also sustained the smallest max drawdown at negative 19.58. This means that the single-largest observed loss from a total return perspective in a given calendar year was negative 19.58%. This took place amid the global financial crisis in 2008, a year in which total returns for its Morningstar US Market benchmark were negative 37.03%.

It's noteworthy that each of the first three indexes shown in Exhibit 5 delivered a down capture ratio well below 100, indicating that all of them have, on average, preserved capital during calendar years in which the benchmark moved lower. For the Wide Moat Composite, however, this has come at the expense of failing to outperform when the benchmark has risen. The Wide Moat Focus Index and the Wide Moat Index, have achieved up capture ratios above 100 and down capture ratios below 100.

Exhibit 6 Up/Down Capture: Wide Moat Focus Index Versus Related Indexes (Annual Data Frequency)

Index	Return (Annualized)	Max Drawdown	Up Capture Ratio	Down Capture Ratio
Morningstar Wide Moat Focus Index	13.95	-19.58	115.53	46.98
Morningstar Wide Moat Index	11.75	-28.80	108.54	72.50
Morningstar Wide Moat Composite	10.31	-28.16	95.27	65.78
Morningstar US Market Index	9.19	-37.03	100.00	100.00

Source: Morningstar Direct. Data frequency: annual. Data from Jan. 1 2008 to Dec. 31, 2019.

If we employ a daily data frequency rather than an annual data frequency, the results look quite different. While the Wide Moat Focus Index still maintains a superior up capture ratio, its down capture ratio actually becomes least attractive across the four indexes shown and moves above 100. Additionally, the largest peak-to-trough drawdown for the Wide Moat Focus Index worsens versus the annual data frequency results.

Exhibit 7 Up/Down Capture: Wide Moat Focus Index Versus Related Indexes (Daily Data Frequency)

Index	Return (Annualized)	Max Drawdown	Up Capture Ratio	Down Capture Ratio
Morningstar Wide Moat Focus Index	13.95	-49.57	104.22	101.46
Morningstar Wide Moat Index	11.75	-48.57	97.50	95.11
Morningstar Wide Moat Composite	10.31	-48.90	90.67	88.95
Morningstar US Market Index	9.19	-55.18	100.00	100.00

Source: Morningstar Direct. Data frequency: daily. Data from Feb. 14, 2007 to June 30, 2020.

For the Wide Moat Index and Wide Moat Composite, up capture ratios are below 100 but so are down capture ratios. In other words, both indexes have preserved capital when the benchmark has moved lower but both have also underperformed when the benchmark has moved higher. The inclusion of the valuation overlay for the Wide Moat Focus Index adds a forward-looking element of valuation (in addition to the forward-looking assessment driving the economic moat rating). The valuation overlay dilutes the portfolio's loading to quality as a factor and causes it to behave a bit differently than either of the Wide Moat Indexes. In our next white paper on the Wide Moat Focus Index, we'll examine performance through the lens of factor exposure in greater detail.

Which Data Frequency Should Be Considered to Best Reflect the Investor Experience?
The differing results across the two data frequencies (annual and daily) that we include in this report prompts the question: which data frequency has been most representative of the investor experience? In short, it depends on how an investor would intend to use this index. For someone viewing it as representative of a tactical strategy to be actively traded, resulting in short holdings periods, the daily data frequency is probably most informative. Additionally, the annual data frequency calculations eliminate return data for a portion of 2007 and the first half of 2020 in order to include only full calendar-year periods. This reduces the live track record to 12 years from roughly 13.5 years.

However, for someone who views the Wide Moat Focus Index as representative of a core equity strategy that would be held for many years, the annual data frequency might prove more appropriate. While some of the observed return data is omitted from the annual data frequency calculations, the analysis period is still a full 12 calendar years, a sufficiently lengthy period to simulate the investor experience while also smoothing out some of the noise that is otherwise propagated by a daily data frequency.

Both data frequencies indicate outperformance when the benchmark has risen but the results differ as it pertains to down capture. To further consider the true investor experience, we've included the annual return data below for the Wide Moat Focus Index versus the Morningstar US Market Index benchmark. Since early 2007, the benchmark has only suffered negative total returns in two calendar years, 2008 and 2018. In both years, the Wide Moat Focus Index delivered substantial relative outperformance.

Exhibit 8 Annualized Total Returns Percent: Wide Moat Focus Index Versus Morningstar US Market Index Benchmark

	2007*	**2008**	**2009**	**2010**	**2011**	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**
Morningstar Wide Moat Focus Index	-5.39%	-19.58%	46.93%	8.57%	6.61%	24.50%	31.46%	9.68%	-4.28%	22.37%	23.79%	-0.74%	35.65%
Morningstar US Market Index	2.47%	-37.03%	28.45%	16.80%	1.58%	16.27%	33.13%	12.85%	0.69%	12.44%	21.47%	-5.05%	31.22%
Out/Underperformance vs. Benchmark	*-7.86%*	*17.45%*	*18.48%*	*-8.23%*	*5.03%*	*8.23%*	*-1.67%*	*-3.17%*	*-4.97%*	*9.93%*	*2.32%*	*4.31%*	*4.43%*

Source: Morningstar Direct. Data from Feb. 14, 2007 to Dec. 31, 2019.

Appendix

The Valuation and Economic Moat Screens Are Inextricably Linked

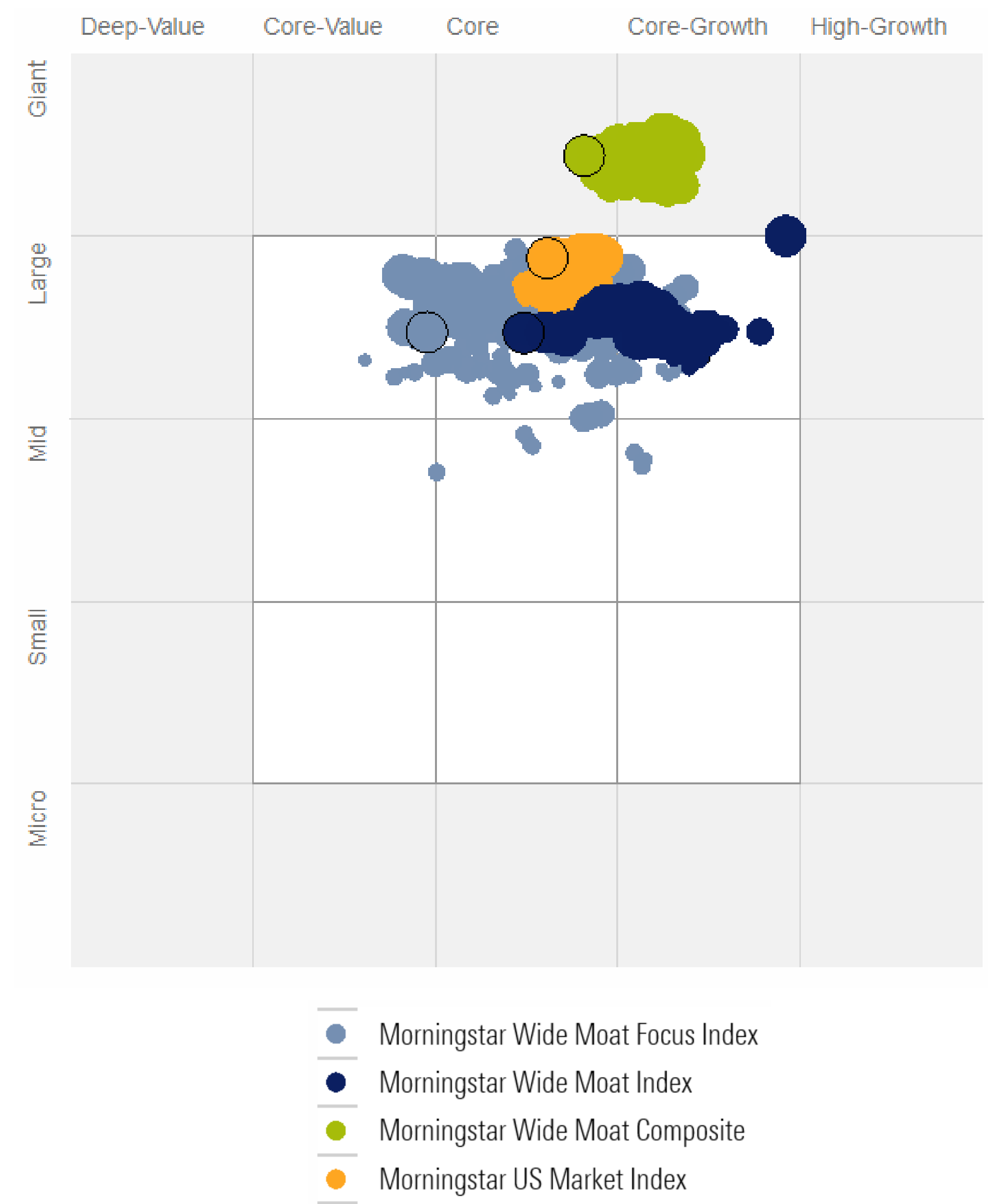
Analyzing the four indexes highlighted in this report helps us roughly triangulate the impact various portfolio construction rules have had on the performance of the Wide Moat Focus Index. However, the fact that our economic moat and valuation methodologies are inextricably linked muddies the water to some degree.

The economic moat rating we assign to a given company has a direct impact on how we value that company. Our analysis of competitive advantage not only helps to inform forecasting decisions over our explicit forecast period, but also helps to determine the length of time over which we'd expect a moaty company to sustain economic profit generation. Accordingly, if we were to change the moat rating we assign to a company, our fair value estimate would also change, all else equal. In either vein, we believe that our economic moat analysis helps us more accurately forecast cash flows than would be possible via a more cursory review of a company's competitive positioning. The linkages between our economic moat ratings and our valuation work make it more difficult to determine the individual impacts of the economic moat screen and the valuation screen. As such, it might be more appropriate to consider these two screening criteria as a singular overlay.

The Wide Moat Focus Index's Size and Style Biases Differ From Those of Its Comparable Indexes

The Wide Moat Focus Index's size and style biases have tended to drift a great deal more than those of the other three indexes we highlight in this report. This is largely due to the notion that those other three indexes have more constituents because they don't employ a valuation screen. It's noteworthy that the valuation overlay introduces a greater proportion of stocks with a value orientation, on average, than the other indexes. Of course, size and style biases have also had an impact on performance relative to the other indexes assessed in this report. We will examine this dynamic in greater detail in our next white paper on factor analysis.

Exhibit 9 Size and Style Bias: Wide Moat Focus Index Versus Related Indexes (Monthly Data Frequency)

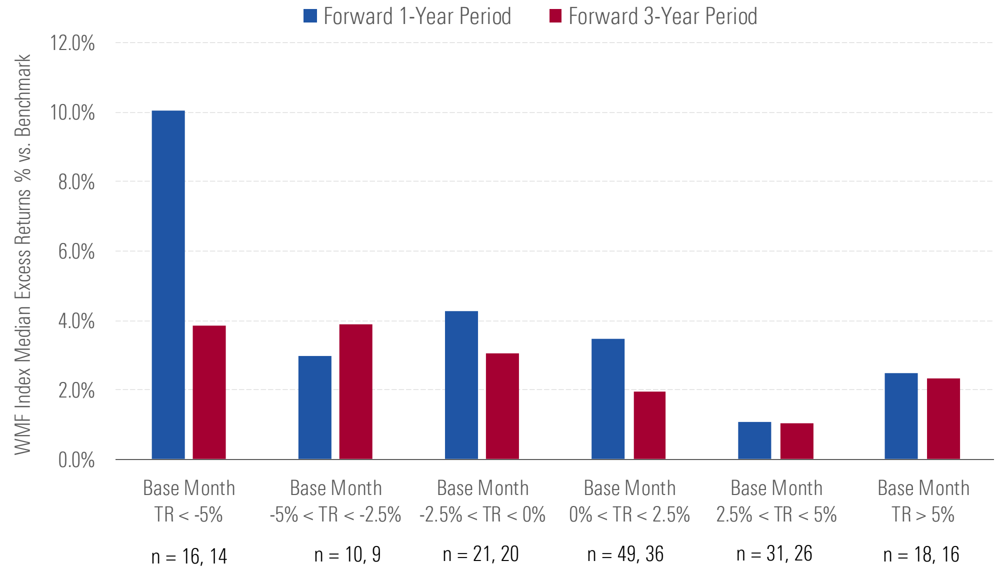


Source: Morningstar Direct. Data frequency: monthly. Data as of June 30, 2020.

Historical Forward Returns Following Various Market Environments Should Also Be Considered

For more analysis on the strategy's performance following different monthly return profiles for the benchmark, please reference our recent report titled "Wide Moat Focus Index: Strong Performance After Market Declines." There are two key takeaways from Exhibit 10. First, the relative performance of the Wide Moat Focus Index has been best in the one- and three-year periods after the benchmark has suffered large down months. Second, the index has outperformed over the following one- and three-year periods no matter how the benchmark performed in a given base month.

Exhibit 10 Sizable U.S. Equity Market Declines Have Preceded Elevated Excess Returns (Median)



Source: Morningstar Direct. Data frequency: monthly. Data as of March 31, 2020.

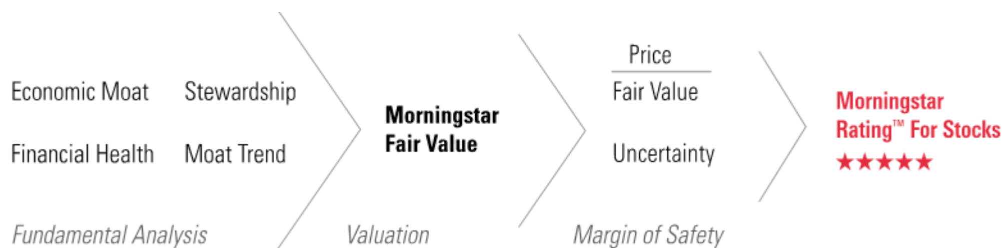
Research Methodology for Valuing Companies

Overview

At the heart of our valuation system is a detailed projection of a company's future cash flows, resulting from our analysts' 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. Moreover, we think analyzing valuation through discounted cash flows presents a better lens for viewing cyclical companies, high-growth firms, businesses with finite lives (for example, 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.

Morningstar's equity research group ("we," "our") believes 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.

Morningstar Research Methodology



Source: Morningstar.

Four key components drive the Morningstar rating: 1) our assessment of the firm's economic moat, 2) our estimate of the stock's fair value, 3) our uncertainty around that fair value estimate and 4) the current market price. This process ultimately culminates in our single-point star rating.

Economic Moat

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 economic profits as returns on invested capital (or ROIC) over and above our estimate of a firm's cost of capital, or weighted average cost of capital (or WACC). Without a moat, profits are more susceptible to competition. We have identified five sources of economic moats: intangible assets, switching costs, network effect, cost advantage, and efficient scale.

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.

To assess the sustainability of excess profits, analysts perform ongoing assessments of 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.

Estimated Fair Value

Combining our analysts' financial forecasts with the firm's economic moat helps us assess 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 of time than the returns of narrow-moat firms, and both will fade slower than no-moat firms, increasing our estimate of their intrinsic value.

Our model is divided into three distinct stages:

Stage I: Explicit Forecast
In this 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, or EBI, and the net new investment, or NNI, to derive our annual free cash flow forecast.

Stage II: Fade
The second stage of our model is the period it will take the company's return on new invested capital—the return on capital of the next dollar invested, or 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 or investment in the business neither creates nor destroys value and that any new investment provides a return in line with estimated WACC.

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.

Uncertainty Around That Fair Value Estimate
Morningstar's Uncertainty Rating captures a range of likely potential intrinsic values for a company and uses it to assign the margin of safety required before investing, which in turn explicitly drives our stock star rating system. The Uncertainty Rating represents the analysts' ability to bound the estimated value of the shares in a company around the Fair Value Estimate, based on the characteristics of the business underlying the stock, including operating and financial leverage, sales sensitivity to the overall economy, product concentration, pricing power, and other company-specific factors.

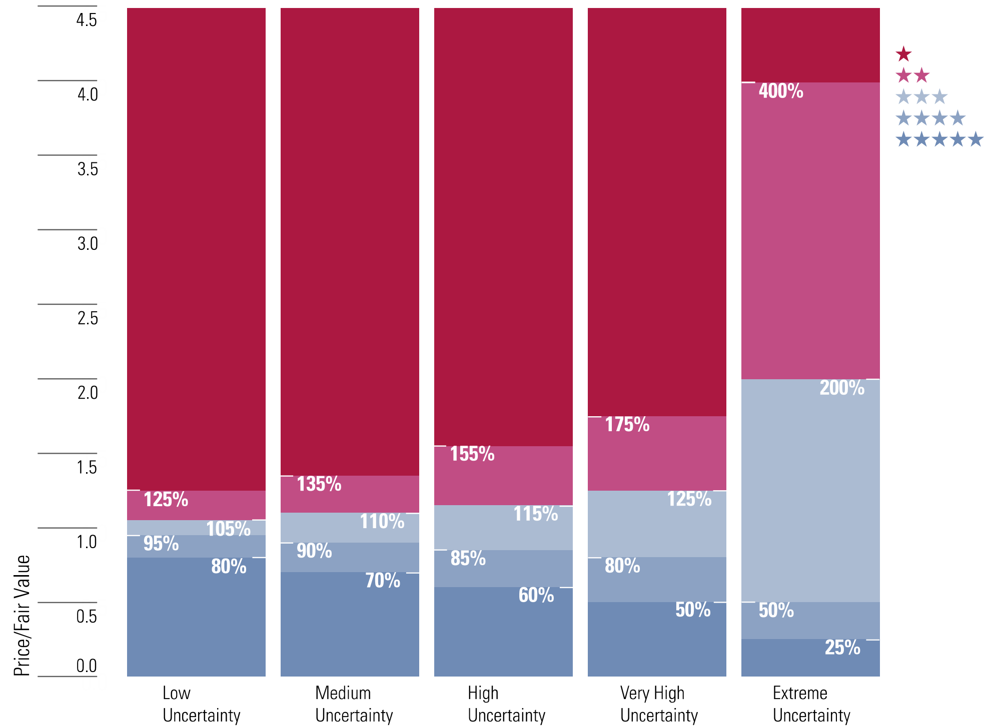
Analysts consider at least two scenarios in addition to their base case: a bull case and a bear case. Assumptions are chosen such that the analyst believes there is a 25% probability that the company will perform better than the bull case, and a 25% probability that the company will perform worse than the bear case. The distance between the bull and bear cases is an important indicator of the uncertainty underlying the fair value estimate.

Our recommended margin of safety widens as our uncertainty of the estimated value of the equity increases. The more uncertain we are about the estimated value of the equity, 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 for our qualitative analysis are low, medium, high, very high, and extreme.

- Low–margin of safety for 5-star rating is a 20% discount and for 1-star rating is 25% premium.
- Medium–margin of safety for 5-star rating is a 30% discount and for 1-star rating is 35% premium.
- High–margin of safety for 5-star rating is a 40% discount and for 1-star rating is 55% premium.
- Very High–margin of safety for 5-star rating is a 50% discount and for 1-star rating is 75% premium.
- Extreme– margin of safety for 5-star rating is a 75% discount and for 1-star rating is 300% premium.

Morningstar Equity Research Star Rating Methodology



Market Price

The market prices used in this analysis and noted in the report come from exchange on which the stock is listed which we believe is a reliable source.

For more details about our methodology, please go to https://shareholders.morningstar.com.

Morningstar Star Rating for Stocks

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 on which the stock is listed 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.

Please note, 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).

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.

The Morningstar Star Ratings for stocks are defined below:

★★★★★ 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.

★★★★ We believe appreciation beyond a fair risk-adjusted return is likely.

★★★ Indicates our belief that investors are likely to receive a fair risk-adjusted return (approximately cost of equity).

★★ We believe investors are likely to receive a less than fair risk-adjusted return.

★ 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.

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