

Global macro matters

Value versus growth stocks: The coming reversal of fortunes

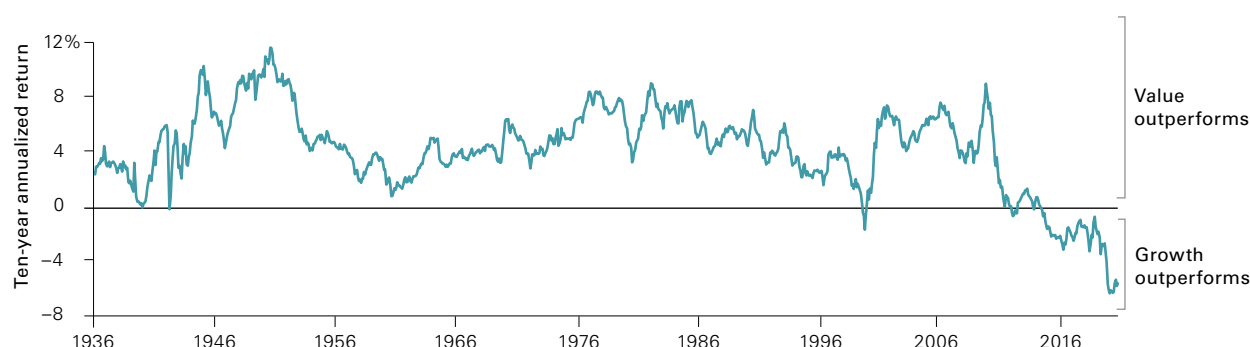
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Over the last ten years, U.S. growth stocks have outperformed U.S. value stocks by an average 7.8% per year.¹ Such eye-watering underperformance of value has been atypical historically. As **Figure 1** illustrates, the value factor as defined by Fama-French has on average outperformed growth over ten-year time horizons going back to 1936. This has led some to question the existence of the value premium. While we believe that the rationale for the premium—which is supported by a deep body of academic literature²—is sound, the depth and persistence of value's recent underperformance is striking.

In order to better understand past results and provide an estimate of future returns, we constructed a fair value model for the ratio of value to growth stocks (value/growth hereafter). Our model suggests that there is a fundamental explanation for some of value stocks' recent woes, such as the inflation and growth environment, but that the narrative has been oversold. We expect value to outperform growth over the next ten-year period by as much as 5% to 7% per year, and perhaps by even more over the next five years.

Figure 1. The unprecedented outperformance of growth over value



Notes: The chart displays annualized ten-year trailing returns of a long-short value versus growth portfolio over the period of June 1936 to January 2021 constructed using Fama-French methodology, available at https://mba.tuck.dartmouth.edu/pages/faculty/ken.french/Data_Library/f-f_5_factors_2x3.html. **Past performance is no guarantee of future returns.**

Source: Fama-French research returns, outlined at http://mba.tuck.dartmouth.edu/pages/faculty/ken.french/data_library.html#Research.

¹ Value and growth are represented by a market-capitalization-weighted index of companies in the bottom and top thirds of the Russell 1000 Index, sorted by price/book ratios and reconstituted monthly. Data are as of February 2021.

² See research by Fama and French (2014), Asness et al. (2013), Grim et al. (2017), and Chan and Lakonishok (2004).

The fair value of value

The underperformance of value over the last decade has led to a proliferation of explanations. They range from the inadequacy of historical measures of value (Arnott et al., 2021) to platform effects and the “winner-take-all” benefits they bestow on the economics of technology companies (Noe and Parker, 2005, and Hand, 2001).³ Our analysis considers these arguments and concludes they have merit, but our research suggests that four key factors drove the underperformance of value and the outperformance of growth over the past decade: inflation, real interest rates, the corporate profits growth rate, and equity market volatility. Further, our findings suggest that modeling the relative performance of value and growth separately offers novel insights into which drivers most influence the behavior of the value/growth ratio.

Figure 2 highlights the rationale for four drivers and their contributions to the explanatory power of three models of past results: growth/market, value/market, and value/growth. An additional fifth driver—R&D expense as a percentage of book value—is included in the growth/market model.⁴ This is consistent with studies such as Arnott et al. (2021), suggesting that adjusting book value to include R&D and intangible assets reduces the relative performance gap between value and growth. Indeed, that driver—which has increased 550% since June 2011—explains most of the 80% run-up in the ratio of growth to the broad market. However, the relationship between R&D expense and the value/growth ratio is not statistically significant when it is combined with the other variables shown in Figure 2.

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³ Internet firms compete in an environment where aggressive competition for market share forces high upfront spending on site quality and advertising. The winner of this early, aggressive competition is rewarded with a call option on market leadership—hence “winner-take-all.”

⁴ This metric is calculated as the four-quarter moving average of the sum of R&D expense divided by the four-quarter moving average of the sum of book values for companies in the Russell 1000 Growth Index from October 1989 to May 2020, based on data from Compustat. For the months prior to October 1989, R&D expense is estimated from the relationship between nonresidential fixed investment intellectual property products (as defined by the U.S. Bureau of Economic Analysis) and the cumulative R&D expense from Compustat described above (r-squared: 0.98). Book values are estimated in a similar manner using data from FactSet (r-squared: 0.54).

Figure 2. Explanatory power by factor varies across models

Driver	Description	Growth/Market	Value/Market	Value/Growth
Ten-year trailing inflation	Trailing ten-year annualized changes in the headline Consumer Price Index (CPI). Inflation is a key component of the discount rate used to value equities. A higher discount rate increases the value of cash flows that are nearer in the future—a characteristic of value.	2.7%	27.5%	29.1%
Ten-year real Treasury yield	Month-end nominal ten-year Treasury yield minus trailing one-year annualized inflation. Real yields are the building blocks of the discount rate. Higher real yields increase the discount rate, which increases the relative valuation of value to growth.	3.5%	3.2%	4.3%
Growth of corporate profits	Corporate profits after tax with inventory valuation adjustment (IVA) and capital consumption adjustment (CCAdj) from the U.S. Bureau of Economic Analysis. When growth is plentiful, investors are less willing to pay a premium for it and favor value.	5.8%	16.7%	23.9%
Equity volatility	Trailing ten-year annualized equity volatility represented by the annualized standard deviation of S&P 500 Index total returns. Higher volatility implies a wider range of potential outcomes. Added uncertainty encourages investors to prefer the more immediate cash flows that value offers.	2.7%	14.1%	10.3%
Ratio of R&D expense to book value	Rolling one-year average of the ratio of aggregate R&D expense to total book value for all companies in the Russell 1000 Growth Index, a proxy for market narrative on the impact of intangible assets and R&D on company growth prospects. The theory holds that book value does not adequately capture the sources of 21st-century companies' value.	64.9%	N/A	N/A
Unexplained variance (behavior)	The portion of the changes in the value/growth ratio that is not explained by the fundamental drivers above. Behavioral deviations are expected to revert to fair value over time.	20.4%	38.5%	32.4%

Notes: Values in the table show the historical contribution of each driver (rows) to the variation in the respective valuation measure (columns). Each column sums to 100%. The sum of the first five rows in each column is the r-squared for that model and reflects the proportion of the variance explained by the model. The remaining variance is captured in model residuals.

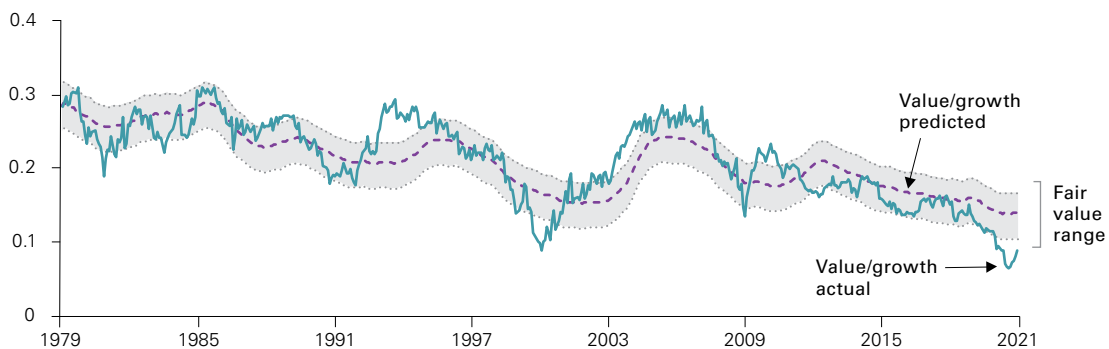
Sources: Robert Shiller's website, U.S. Bureau of Economic Analysis, FactSet, Compustat, and Datastream. Data are as of February 2021.

Figure 3 shows our assessment of fair value for value/growth (panel a), value/market (panel b), and growth/market (panel c) based on the four drivers described above as well as the actual ratio.⁵

Together, these models highlight four points about our fair value estimates. First, the decline in the fair value of value/growth has more to do with a large increase in the fair value of growth/market than with a large decrease in that of value/market. Second, as described in Figure 2, value stocks are much more sensitive to cyclical drivers such as market volatility and corporate profits than are growth stocks. Third, growth and value appear to be at the upper and lower bounds of their respective fair value to market estimates.

Figure 3. Secular trends are driving fair values, but the market may have overreacted

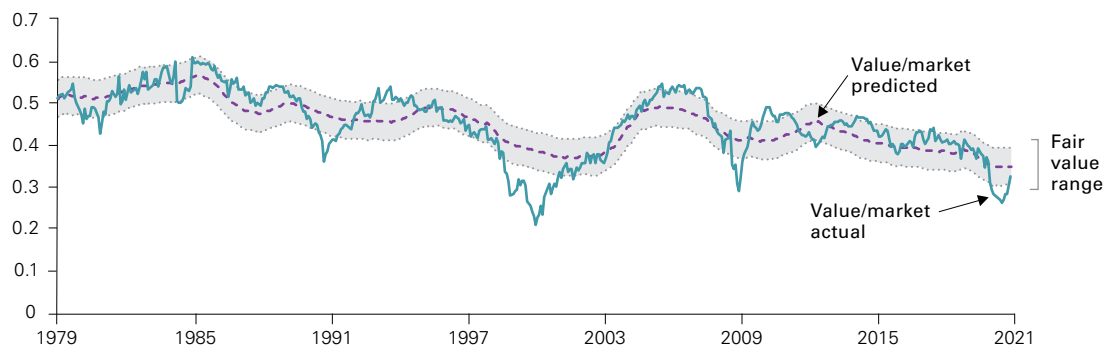
a. Value stock price/book divided by growth stock price/book



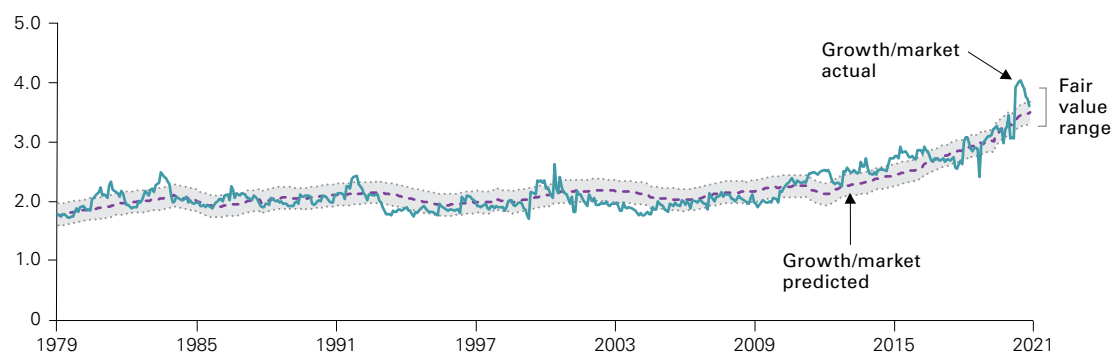
⁵ We use a Vector Error Correction Model (VECM) to describe the statistical relationship between cointegrated time series. The VECM is a dynamic model of the first differences of the variables used in the cointegrating regression that includes a disequilibrium term to correct deviations from the long-term equilibrium.

Figure 3. Secular trends are driving fair values, but the market may have overreacted (continued)

b. Value price/book relative to market price/book



c. Growth price/book relative to market price/book



Note: The statistical model specification is a seven-variable vector error correction (VEC) that includes the following variables: prior-period ratio of price/book, ten-year trailing inflation, ten-year real Treasury yield, equity volatility, growth of corporate profits, and ratio of R&D expense/book value estimated over the period January 1979 to February 2021.

Sources: Vanguard calculations, based on data from FactSet, U.S. Bureau of Labor Statistics, Federal Reserve Board, Thomson Reuters, and Global Financial Data.

Finally, the secular decline in inflation over the past 40 years explains a majority of the decline in the fair value of value/growth since 1979, as highlighted in **Figure 4**.⁶

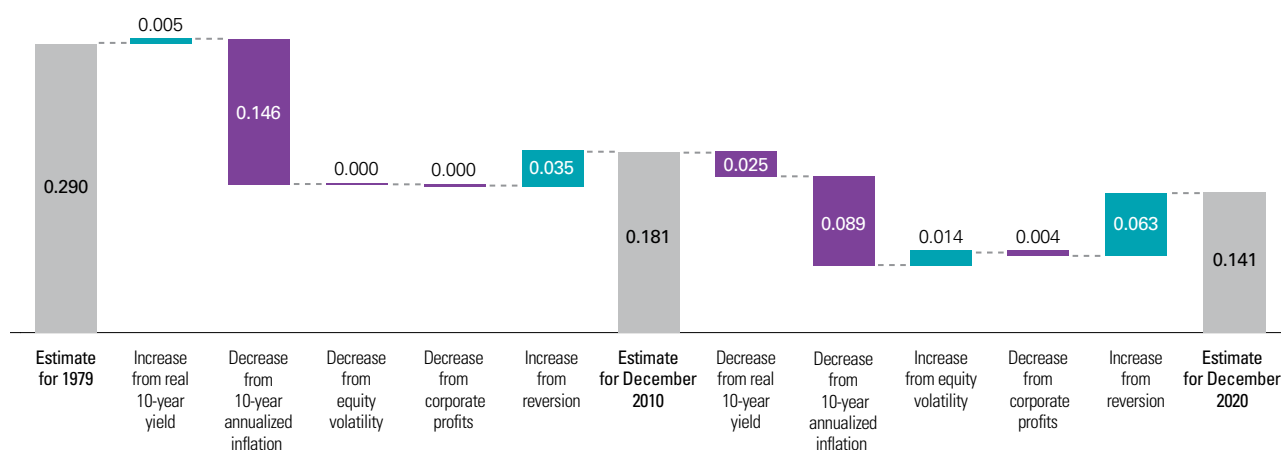
Two sources of return: reversion to and changes in fair value

Our framework for assessing the current state of value/growth allows us to make projections about future returns, which will come from two primary sources. First, based on the historical performance of the models, deviations from fair value typically revert to fair value over time.

The relationship between the deviations and future relative returns is inverse and statistically significant over both five- and ten-year time horizons, suggesting that, on average, deviations from fair value in which value is considered undervalued are associated with higher value returns relative to growth, and vice versa.⁷ Although the range of relative returns implied by this historical relationship may not be precisely representative of what an investor should expect in the future, since it also captures the changes in fair value that occurred historically, it does provide evidence that deviations from fair value tend to revert to fair value over time—a core component of our outlook.

Figure 4. Inflation is primarily responsible for the decline in fair value

Value price to book/growth price to book



Notes: The size of each bar represents that variable's contribution to changes in the predicted ratio of value and growth price/book ratios from our fair value model. Reversion refers to the statistical properties of a Vector Error Correction Model—as estimates of fair value decline, the model forecasts a return to equilibrium. Numbers may differ slightly because of rounding.

Source: Vanguard.

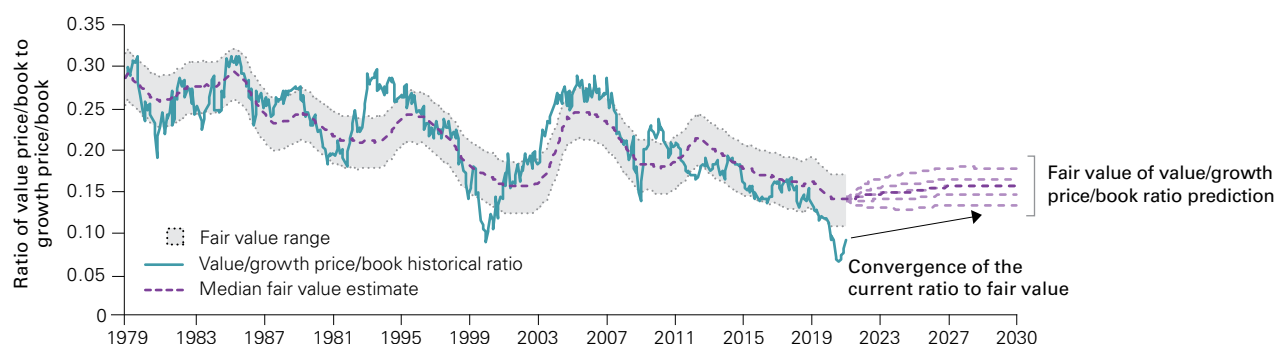
⁶ Over the past decade, a continued, albeit slower, downtrend in long-term inflation, falling real rates, and a lack of material strength in corporate profits further depressed relative valuations.

⁷ The ten-year horizon is consistent with the primary horizon featured in the latest *Vanguard Economic and Market Outlook* (2021). The five-year horizon was also selected after our analysis showed that deviations from fair value decay to zero over a four- to six-year period on average.

In addition to reversion to fair value, returns can also come from changes in fair value itself. Forecasting the evolution of fair value requires forecasts for the systematic drivers that we have previously detailed. We estimate a system of regression models for our five drivers. We then use Monte-Carlo simulation techniques to project a probability distribution of outcomes.⁸ The medians of this distribution are consistent with Vanguard's long-term macroeconomic view that inflation and real rates will stay below their historical averages despite a modest reflation (Davis et al., 2020). **Figure 5** illustrates the range of fair value projections for value/

growth. We expect a gradual rise in fair value over the next five to ten years as long-term inflation measures begin to normalize to our 2% target, real interest rates rise, and corporate profit growth rates increase amid the COVID-19 recovery. Although we expect the medians to converge to their long-term targets over the next five to ten years, they will fail to reach their historical norms based on our forward-looking view that inflation, interest rates, and growth will remain below historical averages. If the recovery were to stall meaningfully (or reverse) and neither inflation nor corporate profits accelerated, there is a risk that growth could continue to outperform.

Figure 5. Returns from changes in fair value are possible but likely won't look like the past



Note: The valuation ratio is projected based on the VECM model described in footnote 5 and using a VAR(5)—a five-lag vector autoregression model—to project the systematic drivers detailed in Figure 2.

Sources: Vanguard calculations, based on data from FactSet.

⁸ A Monte-Carlo simulation randomly samples values for an independent variable based on the uncertainty of the estimate, the distribution of residuals, and the correlation with other independent variables in the model. The resulting distribution can then be used to make a probabilistic prediction of the dependent variable.

Future returns: a five- and ten-year look

On an average annualized basis, our forecast suggests value should outperform growth by between 9% and 13% over the next five years and 5% to 7% over the next ten years. Investors who allocate their entire equity portfolio to value can expect average annualized returns of 4.3% to 7.3% over the next decade, versus 3% to 5% for the broad U.S. equity market.⁹

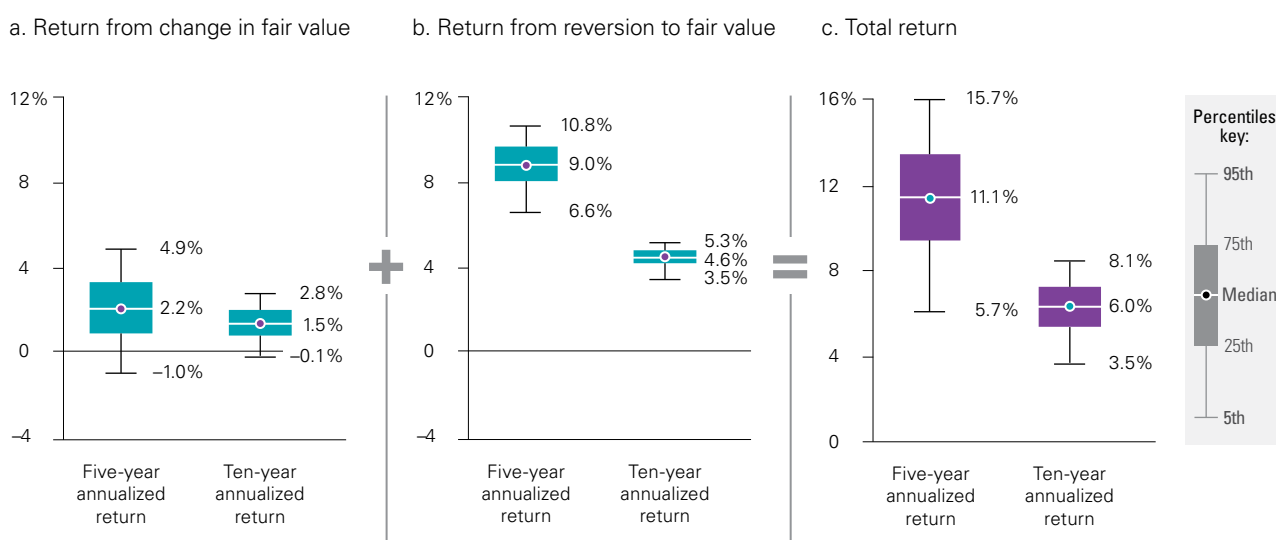
Figure 6 shows the full distribution of our outlook based on the two sources of returns described above. Returns from changes in fair value also account for differences in other key components of equity performance such as dividend yields and growth in fundamentals.¹⁰

Within the probability distribution, the upside scenario for value is associated with long-term inflation and real interest rate levels overshooting our targets and ending at 2.5% and 3.25%, respectively, with earnings growth reaching levels last seen in 2011. The downside for

value would be associated with a recessionary scenario in which long-term inflation declines to 1.4%, real rates remain near 0%, and corporate profits decline.

A significant risk to this outlook is the relationship we have identified between growth valuations and R&D spending. Participants in that market are rewarding such corporate behavior with increases in valuation multiples. While we do not have an informed view on the expectation for future R&D spending by growth companies, we can say that current valuations of growth relative to the broad market are already priced to reflect the most optimistic corners of the distribution.¹¹ Therefore, it is not unreasonable to believe that, even if investors continue to reward this behavior, less upside potential remains.

Figure 6. Reversion to fair value will be the primary driver of value outperformance over the next five- and ten-year periods



Note: Returns are calculated based on a modeled reversion to fair value and a projection of the fair value ratio of value/growth price/book, as detailed in Figure 5. Total return in panel c is the sum of the return components in panels a and b at each percentile. Note that numbers may differ slightly because of rounding.

Sources: Vanguard calculations, based on data from FactSet.

⁹ These ranges reflect the middle 50 percent of projected excess return outcomes in our distribution and capture a broad range of likely outcomes. Excess returns to value (1.3% to 2.3%) are added to a +/- 1 percentage-point median range of broad U.S. equity market return expectations (3% to 5%) for the next ten years. Excess returns are additive, resulting from zero correlation between value returns in excess of the market and broad market returns historically.

¹⁰ Relative value to growth returns are calculated as $\text{diff}(\text{div yield}) + \text{change in relative valuation} + \text{diff}(\text{growth in book value})$, in which dividend yields and book values are constant ten-year averages and relative valuations are forecasted in the VAR.

¹¹ Our median forecast for R&D expense assumes that the metric stays at current levels. Considering this constant median, the market is currently trading at the upper end of the fair value projection over the next decade.

Conclusion

The past ten years have been tremendous for growth stocks, but, as we highlighted in the *Vanguard Economic and Market Outlook for 2021: Approaching the Dawn*, we do not expect the trends that defined the last decade to persist through the next. Growth's recent outperformance is likely sowing the seeds for value's resurgence on a relative basis. This resurgence should be further supported by a broadening economic recovery and a modest reflation in the years ahead. Investors who

maintain a portfolio diversified across sectors and styles can expect value's outperformance to be a cushion against possible negative returns in the growth portion. In that sense, they would be advised to stay the course. However, for U.S. investors with the appropriate risk budget, time horizon, and patience, we believe an overweight to value stocks commensurate with these factors could help overcome a lower-return environment over the next decade.

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