BofA SECURITIES

Quantitative Primer

Everything you wanted to know about quant

Quantitative Strategy

02 June 2022

Quantitative Strategy
United States

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See Team Page for List of Analysts

Problems with regime changes

1) Forget the last 30 years, which were marked by a falling cost of capital, culminating in ZIRP (zero interest rate policy), disinflation, globalization and hyper-stimulative policy. Leverage, credit sensitivity and risk were rewarded. The next regime could look very different.
2) It's always different, not just this time. While many things rhyme with the past (2000 tech bubble aftermath, 1970s stagflation…) today's environment is different (as is every cycle): an unprecedented Fed asset base, 50% passive share of assets, ambitious and coordinated emission reduction goals, globally intertwined economies, internet of everything are a few things to keep in mind.
3) Factors are more reliable than sectors. Sectors are intuitively more accessible than quant factors, but classifications are arbitrary – one stark example: today, 40%+ of Consumer Discretionary is Amazon and Tesla. 30 years ago it was Wal-Mart and General Motors making up 20% of the sector. Factors like FCF/EV (does poorly in ZIRP, does well when cash yields rise) and equity duration (does well when long rates fall) have more consistent patterns. We included ~70 different factors over 40 years that have exhibited more consistent patterns in different environments - see Exhibit 62 and Exhibit 128.

The average PM is 45 years old

The average money manager is ~45 years old, has seen Growth outperforming Value the majority of the time, and the best performing factor group was price momentum. (S)he doesn't remember the Cold War, gas rationing in the 70s or 13ppt mortgage rates. This is reflected in embedded growth tilts and a lack of emphasis on valuation.

Our fifteenth edition builds on decades of work

We outline the proprietary framework critical to our portfolio strategy work, trends in the quantitative industry for security selection, asset allocation, sector rotation and systematic investing. Our survey indicates that quants use 3x the number of signals vs. few decades ago, but are growing more similar. But value factors still have room to run based on positioning and valuation of factors (Exhibit 372).

What's new: Myth debunking, Fed and factors, ESGMeter

As the market sells off, mythical narratives have proliferated (retail capitulation, buybacks slowing, etc.). We review and debunk the ones we hear most. Our analysis of Fed and factor performance corroborates the importance of cash return when cash yields rise. And after our full launch of ESGMeter™ for US stocks we present an alternative to exclusion-based ESG (see Exhibit 176).

Best index for a regime change: Small cap value

The Russell 2000 trades at the steepest discount to the Russell 1000 in two decades (see inaugural Small Cap Primer) and small cap value represents the cheapest of the bunch. Small cap value can be seen as the opposite of what did well the past decade – oligopolistic share takers, large global multinationals, long duration secular growers, and new economy plays. If we are moving into an environment of rising costs of capital, inflation, more volatile economic cycles, de-globalization, and rumblings of anti-monopolistic rhetoric, this cohort may be precisely what does well (and small cap value has historically enjoyed the highest risk adjusted returns over the long haul).

What's inside:

- For Quants: What's the crowded trade? We include the most and least popular quantitative strategies and trends in factor popularity over time.
- For sector analysts: Different fundamental signals work better within different groups, and we highlight the most predictive stock selection attributes within sectors.
- For equity long-short investors: Certain attributes may matter more for long- only investors, whereas others may be better long-short signals, so we include performance of factors on the long and short side.
- For Growth & Value managers: We include factor performance within the style benchmarks, and also assess the fundamental attributes and attractiveness of the benchmarks themselves over time.
- For macro investors: We include market timing indicators, as well as an analysis of factor performance vis-a-vis macro environments. We also include industry attributes over time.

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Refer to important disclosures on page 288 to 289.
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Dear Reader,

Each year since 2010, we have published our annual Quantitative Primer which highlights various aspects of our quantitative work, and is backed up by hundreds of proprietary tools that we regularly update and publish. We ultimately aim to provide empirical evidence to support or refute the idea that particular stock attributes drive future returns, and how these relationships have evolved over time.

How to use this book

- Trends and hot topics in quantitative finance: We provide insight from our survey of institutional investors as to what factors folks are using/not using, how smart beta strategies have changed the framework for institutional investors, and more. We also include historical charts on industry attributes, on the market, and on other asset classes. We discuss how we weave these signals together to determine our outlook for (and within) the US equity market.

- Factor performance: We highlight the performance of various stock screens, spanning valuation to growth to technical to miscellaneous factors, to determine both long-term efficacy and cyclicality of different investment styles.

- Risk/reward characteristics: We highlight the reward and risk characteristics of each screen versus market benchmarks to indicate how well and how consistently these have performed since inception. We measure risk by both volatility of returns and by probability of loss. For top vs. bottom ranked screens, we also assess consistency of top decile versus bottom decile spreads.

- Sector composition: We highlight the changes in sector composition of style screens. Since we calculate each screen without sector constraints, we have found that there is useful information in assessing changes in sector exposures both to determine a) whether particular sectors are driving returns, and b) how sectors have changed their characteristics over time.

- Long-short performance: Long-only and long-short investors may benefit from knowing not just how the top-ranked stocks have behaved, but also how the bottom-ranked stocks have behaved over time. This is useful in determining which screens to use as overweight or "buy" signals, and which screens to use as underweight or "sell" signals.

- Sector specific approaches: Given that certain screens may be more effective in some sectors than in others, we believe that determining drivers of returns within specific industry groups can add significant value to a screening process.

We are consistently striving to improve the quality, breadth and scope of our proprietary models. We hope this annual report proves to be helpful, and readily welcome suggestions on how to improve next year's edition.

Savita Subramanian
Head of US Equity and Quantitative Strategy

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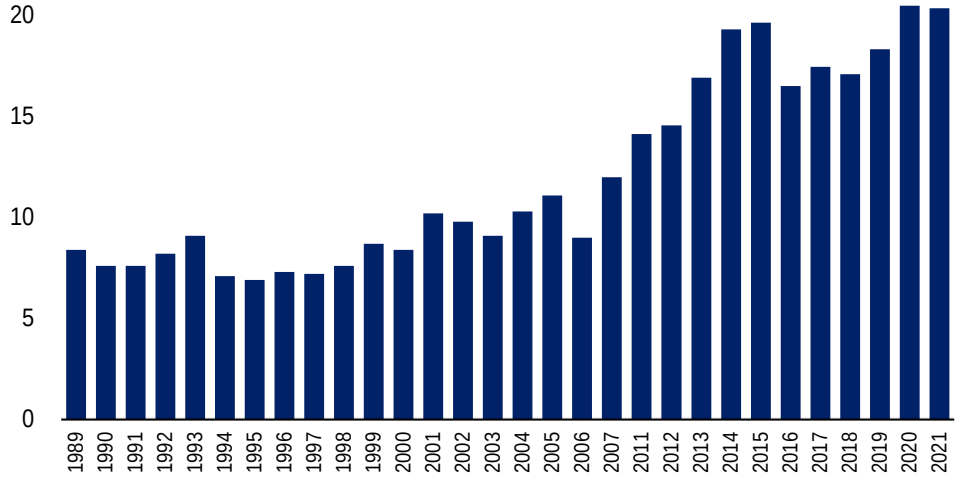
Quant is getting more complicated and more crowded

Our quantitatively oriented clients use three times the number of factors today than they did twenty five years ago. Moreover, the popularity of quantitative investing has increased sharply and seemingly at the expense of fundamental investing. One of today's greatest market inefficiencies may stem from the shift in capital toward shorter-term strategies relying on shorter term data like prices, news and flows, and the scarcity of capital devoted toward long-term, fundamental investing.

We have seen a seismic shift in assets and resources toward data-driven, systematic strategies and shorter-term investment strategies, which tend to rely on access to better, faster and larger stores of data. Jobs advertised for data scientists and quantitative analysts outnumber those for fundamental analysts by a factor of eight, and the number of fundamental analysts covering $1B of market cap has shrunk from fourteen in 1986 to less than two people today (Exhibit 2). Quants are increasingly focused on real-time data feeds, AI, big data and machine learning. The advent of new tools has created a more interesting, but more competitive, landscape. Alternative data and new tools reveal interesting opportunities. But like most of our other work, the "bad back-test graveyard" for alternative data is vast relative to the analyses that make it to print.

Exhibit 1: BofA Institutional Factor Survey: average number of factors used by investors over time
Investors have been increasing the number of factors they use in recent years



Note: 2008-2010 excluded (insufficient responses)
Source: BofA US Equity & Quant Strategy

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Exhibit 2: Average number of analysts per $1 billion market cap of S&P 500 (adjusted for inflation)
The number of fundamental analysts covering $1bn of market cap has shrunk from fourteen in 1986 to less than two people today

Source: BofA US Equity & Quant Strategy

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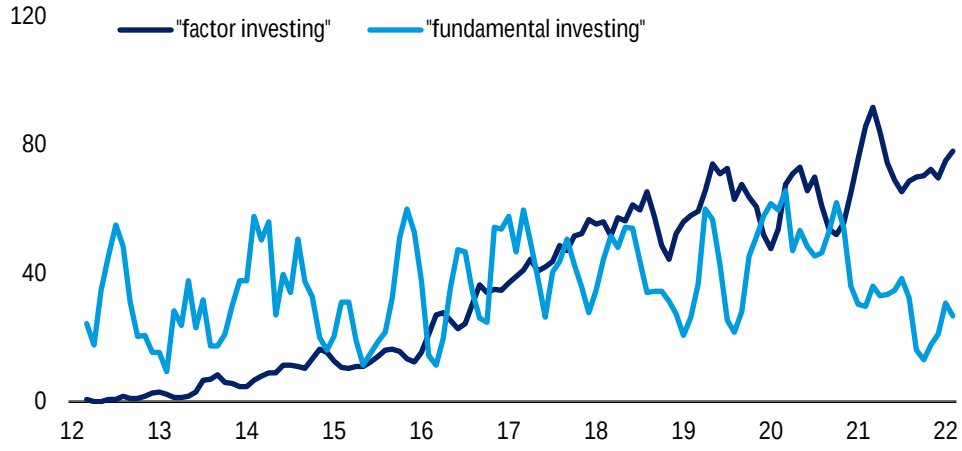
Exhibit 3: Google searches **for "factor investing" and for "fundamental investing"**
Popularity of "factor investing" continued to rise (6/2012 – 5/2022, 3-mth moving average)



Source: Google Trends, BofA US Equity & Quant Strategy

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BofA data-driven research

It pays to be different. To this end, BofA Global Research has been publishing a robust suite of data-driven products. From proprietary surveys of financial advisors, US consumers, millennials, IT spenders, construction dealers etc., to spending barometers like BofA client flows and aggregated BAC credit and debit card data, to sector-specific indicators like Flight Signals and the Industrial Momentum Indicator, to name a few. We showcase the most recent research below.

Exhibit 4: BofA Global Research Reports
The most recent BofA data-driven research

Title	Primary Author	Date Published
Hospital Survey: April vols decelerate m/m on tougher comps	Kevin Fischbeck, CFA	17-May-22
Biggest retail outflows in a year	Jill Carey Hall, CFA	17-May-22
Survey says home health and hospice vols improved in April, labor stabilizing	Joanna Gajuk	17-May-22
Bookings: volumes and pricing improve; BofA conference this week	Andrew G. Didora, CFA	16-May-22

Exhibit 4: BofA Global Research Reports
The most recent BofA data-driven research

Title	Primary Author	Date Published
Monthly restaurant spending: April sees improved 3-yr across all segments	Sara Senatore	13-May-22
Real-time Grocery Spending Update through April 30th	Robert F. Ohmes, CFA	12-May-22
April update to the BofA US transitory and persistent inflation meters	US Economics	12-May-22
Acceleration in spending as we no longer lap stimulus	Lorraine Hutchinson, CFA	12-May-22
US Broker – Cash Sweep Data Scraper; A few brokers started raising sweep rates	Craig Siegenthaler, CFA	11-May-22
Mixed signals point to a choppy market	Stephen Suttmeier, CFA, CMT	11-May-22
Online spending decelerates further to down 5% in April	Justin Post	11-May-22
More buying of the dip	Jill Carey Hall, CFA	10-May-22
Slowdown? What slowdown?	US Economics	9-May-22
Bookings: system net sales steps back for first time in four weeks; pricing still strong	Andrew G. Didora, CFA	9-May-22
Surging wages support resilient spending	Anna Zhou	9-May-22
Paint Contractor Survey: higher prices, strong demand, and lofty backlogs	Steve Byrne, CFA	6-May-22
Wall of worry, no capitulation	Savita Subramanian	3-May-22
BofA Flight Signals indicator shows a smaller sequential improvement in 3Q22	Andrew G. Didora, CFA	3-May-22
Big buyers of last week's dip	Jill Carey Hall, CFA	3-May-22
Volume Intensity Model (VIM): Buyers strike but no selling climax yet	Stephen Suttmeier, CFA, CMT	2-May-22
Bookings: pricing strength remains; international volumes close to domestic	Andrew G. Didora, CFA	2-May-22
Third Opzelura AD survey reveals encouraging trends; Maintain Buy	Tazeen Ahmad	29-Apr-22
Miami Pricing Study: Food prices up +12% y/y on average, +15-20% at dollar stores	Robert F. Ohmes, CFA	29-Apr-22
Money doesn't buy happiness	Ethan S. Harris	26-Apr-22
More confirmation of 2 trends: bottoming Consumer Disc. flows, stalling buybacks	Jill Carey Hall, CFA	26-Apr-22
Trend expectedly higher in annual PBM survey although scale still matters	Michael Cherny	25-Apr-22
Bookings: corporate recovery driving the revenue momentum	Andrew G. Didora, CFA	25-Apr-22
Monthly Labor Monitor: Job posting growth slows; signs of 4Q21 wage inflation peak	Sara Senatore	21-Apr-22
Bottoming Consumer Discretionary flows	Jill Carey Hall, CFA	19-Apr-22
Head and shoulders bottom watch on NDX and SPX	Stephen Suttmeier, CFA, CMT	18-Apr-22
Steady hospital CapEx expectations as we move towards post-Covid world	Michael Cherny	18-Apr-22
Hospital capex and labor survey	Travis Steed	18-Apr-22
Sixth annual home furnishings survey	Curtis Nagle, CFA	18-Apr-22
Bookings: demand remains strong and pricing continues to climb higher	Andrew G. Didora, CFA	18-Apr-22
West Coast Pricing Studies: How much are food prices up from three years ago?	Robert F. Ohmes, CFA	18-Apr-22
Cost/Capital Survey: Supply costs still a pressure, elective disruption lower q/q	Kevin Fischbeck, CFA	18-Apr-22
BNPL Data Tracker – 1Q22	Jason Kupferberg	18-Apr-22

Source: BofA Global Research

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NEW: MYTH DEBUNKING

Market narratives abound

Amid a risk asset selloff so far this year, a Tech bubble redux, big retail activity and a volatile earnings season, we have been hearing unusual explanations about why markets are behaving as they are. While these narratives sound reasonable, validating them is often hard.

False: a resumption of buybacks will save equities

Some expect this earnings season's market volatility to be quelled by the resumption of buybacks after company's blackout periods end. But the relationship between S&P 500 buybacks and index performance since 1986 is a minimal 0.07 R-squared (Exhibit 5). Furthermore, our weekly BofA corporate client buyback data have a similarly low relationship with future index performance (0.02 R-squared) (Exhibit 6). What we can validate is that companies that repurchase shares at inexpensive valuations tend to outperform. So if buybacks pick up, and perhaps they should since close to half of stocks in the S&P 500 trade at 10+% discount to 2021 levels, history suggests that buybacks at low multiples are more likely to outperform (Exhibit 7).

False: retail investors are a contrary indicator

Some claim that institutional investors are the "smart" money and retail investors are better contrary indicators – when retail is buying, it's time to sell, and vice versa. If anything, our BofA Client flows data indicate the opposite (Exhibit 9). Returns following

periods of retail inflows have been above average and returns post-retail selling have been below average. And retail flows have been slightly better positive indicators than hedge fund flows. Relatedly, our Low Institutional Ownership factor – which include high retail ownership stocks- has more consistently outperformed during market drops– during months with the index falling 3%+, the screen produced an average alpha of 1ppt.

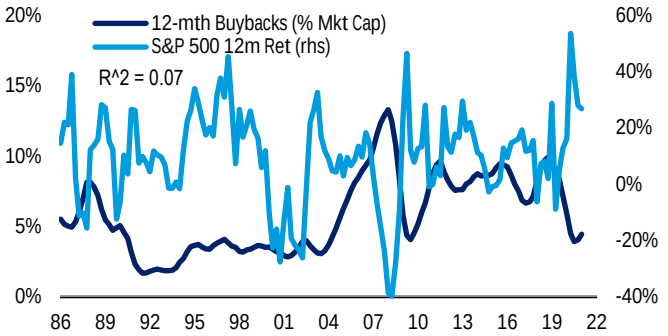
False: valuation doesn't matter for Tech

While the Tech sector has earned a reputation as a valuation-defying high flier, we have found that valuations have mattered for Tech investors selecting stocks within the sector. Over the past 35 years, companies with high Free Cash Flow to EV and low EV to EBITDA have generated annualized alpha of 4.4ppt and 4.0ppt vs. the sector (Exhibit 10).

False: Duration only matters for bonds

As markets repriced assets amid rising real rates and anticipation of more aggressive Fed policy, Growth (-8.5%) underperformed Value factors (-3.1% on avg.) so far this year (as of 4/30/22). More dramatically, Long Equity Duration, back-end loaded growth stocks that are more vulnerable to rising cost of capital, suffered a 20.6% loss and ranked among the worst five factors overall.

Exhibit 5: Little evidence of client buybacks helping performance
S&P 500 total 12-mth buybacks (as % of mkt cap) vs S&P 500 12-mth return



Source: FactSet, BofA US Equity & Quant Strategy

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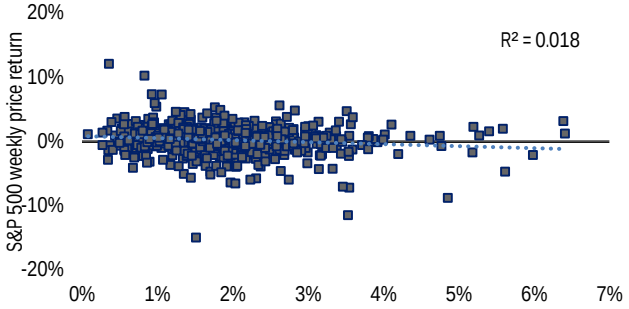
Exhibit 6: BofA client buybacks also appear to have little effect on index performance
Weekly BofA Securities corp. client buybacks as % of total year's buybacks vs index performance



Source: FactSet, BofA US Equity & Quant Strategy

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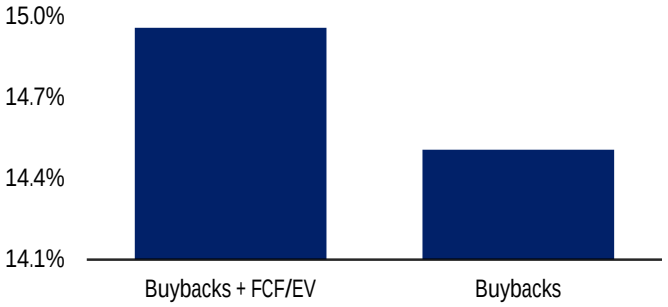
Exhibit 7: Companies that reduce shares at low valuations tend to outperform
Annualized performance (Jan. 1986 – Apr. 2022)



Source: FactSet, BofA US Equity & Quant Strategy

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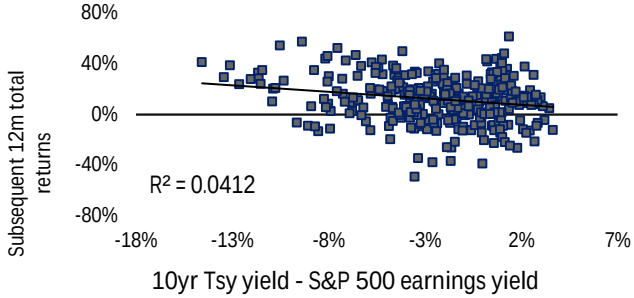
Exhibit 8: **The problem is the "Fed model" doesn't really work**
Subsequent S&P 500 12m total returns based on spread of 10yr Tsy yield and dividend yield (1934-present)



Source: FRB, S&P, BofA US Equity & US Quant Strategy. **Note:** based on quarterly frequency

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Exhibit 9: Retail investors have been slightly better positive indicators than hedge funds
Subsequent 4-week returns when last 4 weeks flows were (=) vs. (-)

	Hedge Funds	Institutional	Retail
Positive Flows	1.0%	1.7%	1.1%
Negative Flows	0.7%	0.4%	0.7%

Source: FactSet, BofA US Equity & Quant Strategy

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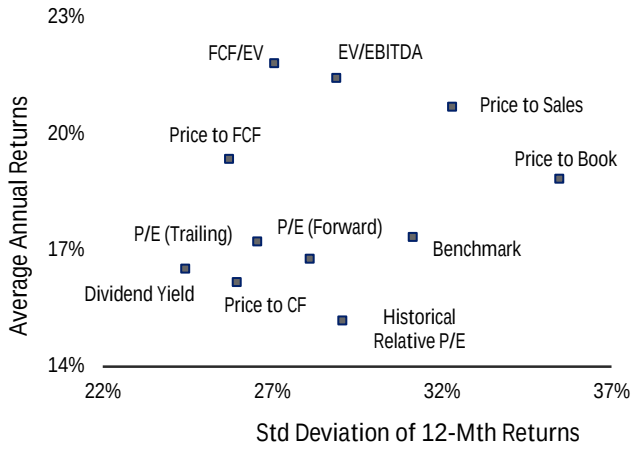
Exhibit 10: FCF/EV outperformed the index most
Valuation Strategies for Information Technology: Top Quintile Returns (Jan. 1985 to Apr. 2022)



Source: FactSet, BofA US Equity & Quant Strategy

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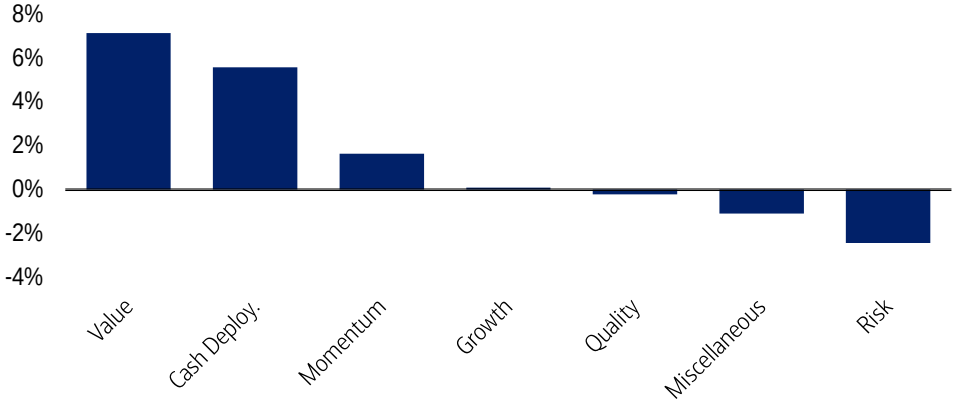
NEW: THE FED AND FACTORS

The Fed remains on course to deliver a sequence of rate hikes in coming months and our economists expect the Fed to raise rates to 3.25% - 3.5% by next May (see the note). During the early stages of a Fed hiking cycle, the factors that lead are Value (+7.1ppt vs. the equal-weighted S&P 500 index), followed by Cash Deployment (+5.6ppt) and Momentum (+1.6ppt). Risk generally lags (-2.4ppt relative return; Exhibit 11) and ROE / ROC / ROA and Growth have performed in line with the benchmark. Low EV/EBITDA and High FCF/EV have outperformed the index in every tightening cycle since the 80s (Exhibit 12).

Exhibit 11: Value factors fared best during first 12m of tightening cycle, outperforming the equal-weighted S&P 500 index by 4ppt
Factor group annualized median relative return when the Fed tightens (1986 – 2017, ex Tech bubble 1999 – 2000 cycle)



Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 12: Low EV/EBITDA and High Free Cash Flow to EV were among the best performing factors in prior Fed tightening cycles
Factor performance in Fed tightening cycles since 1986

Style	Factor	Avg.	Median	Hit Rate
Momentum	30wk/75wk MA	9.0%	7.9%	80%
Value	EV/ EBITDA	8.8%	2.1%	100%
Momentum	Price Ret. – 12m and 1m Reversal	8.3%	5.5%	100%
Value	Price/ Free Cash Flow	8.1%	9.1%	80%
Momentum	10wk/40wk MA	7.6%	2.4%	80%
Value	Free Cash Flow/ EV	7.2%	7.9%	100%
Momentum	Price Return - 11-mth Perf.	7.1%	1.8%	80%
Value	Forward Earnings Yield	6.5%	7.8%	60%
Value	Price/ Cash Flow	6.3%	9.8%	60%
Corp. Cash Deploy.	Share Repurchase	6.1%	6.7%	80%
Momentum	Price Return - 9-mth Perf.	6.0%	1.4%	80%
Value	Price/ Book Value	5.5%	5.4%	80%
Value	Price/ Sales	5.4%	2.9%	60%
Growth	Earning Momentum	5.2%	0.1%	60%
Risk	Estimate Dispersion	4.3%	1.5%	60%
Leverage	High Net Debt / EBITDA	3.8%	4.1%	60%
Quality	1yr ROE Adj	3.3%	-0.4%	40%
Growth	EPS Estimate Revisions	3.2%	1.2%	80%
Quality	1yr ROE	3.1%	2.1%	60%
GARP	P/E-to-Growth	3.0%	8.4%	80%
Momentum	Price Return - 12-mth Perf.	2.9%	2.0%	60%
Momentum	Most Active	2.9%	1.6%	60%
Leverage	Low Net Debt / EBITDA	2.7%	6.1%	60%
Quality	ROC	1.9%	-0.1%	40%
Corp. Cash Deploy.	Dividend Growth	1.7%	5.6%	60%
Miscellaneous	Short Interest	1.6%	2.1%	67%
Quality	ROA	1.5%	-1.1%	40%
Leverage	Low Net Debt / EBITDA (Sector Neutral)	1.4%	1.5%	80%
Momentum	5wk/30wk MA	1.4%	0.6%	60%
Risk	Low Price	1.2%	-3.8%	40%
Value	Earnings Yield	1.2%	6.5%	60%
Leverage	High Net Debt / EBITDA (Sector Neutral)	1.0%	0.4%	60%
Risk	Variability of Earnings	0.4%	-7.2%	40%
Momentum	Price to Moving Average (200 day)	0.1%	1.0%	60%
Quality	5y ROE	0.0%	1.9%	60%

Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 13: Small Size and Beta were among the weakest factors during tightening
Factor performance in Fed tightening cycles since 1986

Style	Factor	Avg.	Median	Hit Rate
Miscellaneous	Size	-6.0%	-7.6%	20%
Momentum	Price Return - 12-mth and 1-mth	-5.6%	-7.2%	20%
Risk	Beta	-3.9%	-1.1%	40%
Corp. Cash Deploy.	Dividend Yield	-3.3%	-0.8%	40%
Growth (Negative)	Earnings Torpedo	-2.9%	-1.2%	40%
Miscellaneous	Neglect - Institutional Ownership	-2.5%	-1.7%	20%
Momentum	Price Return - 3-mth Perf.	-2.2%	-3.1%	20%
Quality	5yr ROE Adj	-0.7%	-4.9%	40%
Miscellaneous	Neglect - Analyst Coverage	-0.5%	-0.5%	50%
Growth	Proj. 5yr EPS Growth	0.0%	-0.5%	40%

Source: FactSet, BofA US Equity & Quant Strategy

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What drives market performance?

Overall stock market performance is largely a function of valuation, sentiment and profits. When an investor buys stocks, he/she is buying a share of the future profits of the company and must decide whether the market is valuing this profits stream correctly. Valuation can be heavily influenced by investor sentiment, scarcity or abundance of other options, visibility, quality, governance, and a host of other factors that are difficult to quantify.

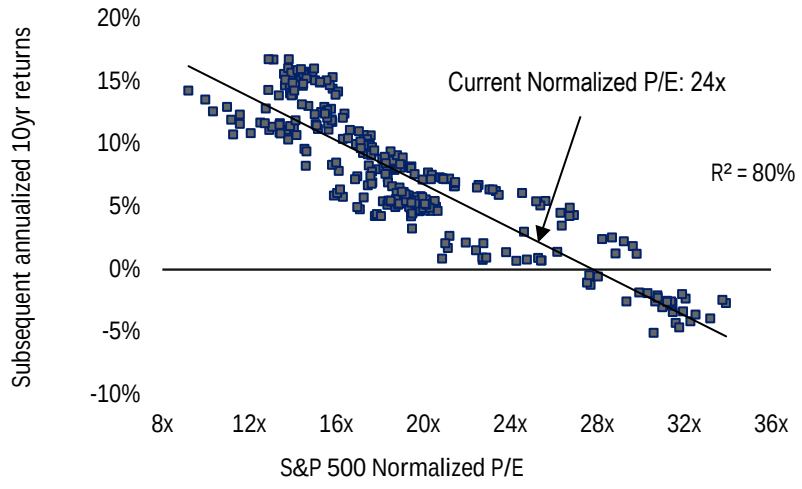
1. Valuation

Our work suggests that valuation is generally a poor market timing indicator over short to medium time horizons. However, over longer time horizons valuation may be the most important determinant of market returns. The drawback of most single-period valuation ratios used by investors is that they implicitly assume that the single period being used – for example, EPS over the next 12 months in the case of forward PE ratios – is representative of the trajectory of future profit growth. Our preferred valuation measures adjust for this single-period bias.

Normalized P/E Framework

One way to adjust for the single-period bias is to estimate the underlying earnings power based on the historical trend, adjusting for the inherent cyclicality. We estimate normalized earnings based on a linear log normal regression and our analysis shows that this measure of market valuation explains almost 80% of the variability of equity market returns over the next 10 years (Exhibit 14, Exhibit 15). In the late-1990s, equity valuations were near peak levels, and we subsequently saw negative returns over the following decade. In contrast, valuations in the wake of the financial crisis reached extreme levels far below those seen during the 1980s and 1990s, and were similarly followed by strong equity market returns (Exhibit 16).

Exhibit 14: S&P 500 Normalized P/E vs. subsequent annualized 10yr returns
1987-4/2022



Source: BofA US Equity and US Quant Strategy

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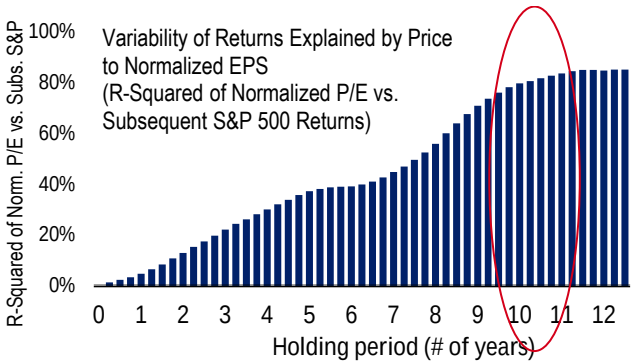
Exhibit 15: **Normalized P/E's predictive power on S&P 500 returns**
1987-4/2022



Source: BofA US Equity & US Quant Strategy

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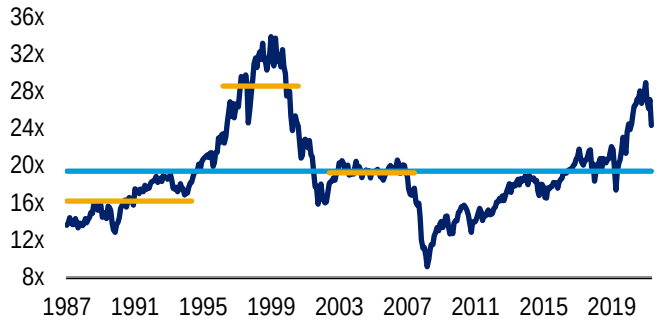
Exhibit 16: Normalized PE levels over time
1987-4/2022



Source: BofA US Equity & US Quant Strategy, S&P

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Equity Risk Premium Frameworks

Whereas normalized P/E ratios adjust for the single-period bias, two criticisms of this framework are that (1) it is backward looking and (2) does not account for changes in the cost of capital. The equity risk premium (ERP) is the amount of additional return beyond the risk-free rate that investors require as compensation for accepting the investment risks and costs associated with owning stocks. When investor fear levels are high, and equities are perceived as being risky, the equity risk premium, or the required return of equities, increases to compensate for that risk. And vice versa.

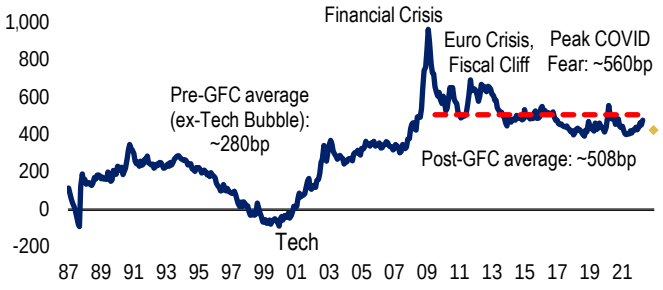
A rising equity risk premium typically coincides with higher quality investments outperforming, and a falling risk premium typically coincides with lower quality, riskier investments outperforming. An alternate interpretation is the idea that as the cost of equity capital (or the discount rate) increases, shorter duration (higher dividend yielding) equities generally outperform, and as the cost of capital falls, longer duration, higher growth and higher beta companies generally outperform.

The literature on equity risk premia is vast, but we distilled it into two methods for evaluating the equity risk premium – a normalized approach, and a market-derived approach.

Normalized Equity Risk Premium Framework

We estimate the historical ERP as the normalized EPS yield (normalized EPS ÷ current price) less the normalized real risk-free rate. In addition to the normalized EPS discussed in the previous section, we also normalize the risk-free rate. We assume that the market's interest rate and inflation expectations are a function of recent history and current market dynamics. As such, to calculate the normalized real risk-free rate, we take (1) the average of the current 30-yr Treasury yield and the rolling five-year average 10-yr Treasury yield and we subtract (2) the average of 10-yr TIPS spread and the rolling five year Consumer Price Index (CPI) inflation rate.

Exhibit 17: Normalized equity risk premium is expected to decline below post-GFC average by year-end
Normalized equity risk premium (1/1987 - 4/2022) with 2022 forecast



Source: BofA US Equity & Quant Strategy, Federal Reserve Board, Standard & Poor's, BLS
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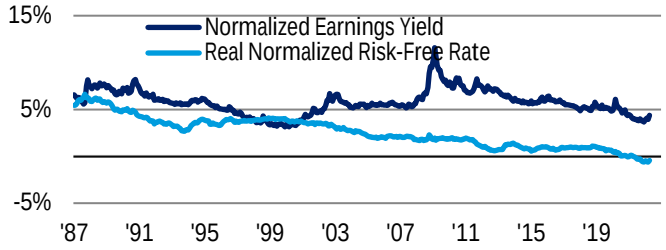
Exhibit 18: Normalized risk-free remains negative
Normalized EPS yield & risk-free rate (1/1987 - 4/2022)



Source: BofA US Equity & Quant Strategy, Federal Reserve Board, Standard & Poor's, BLS
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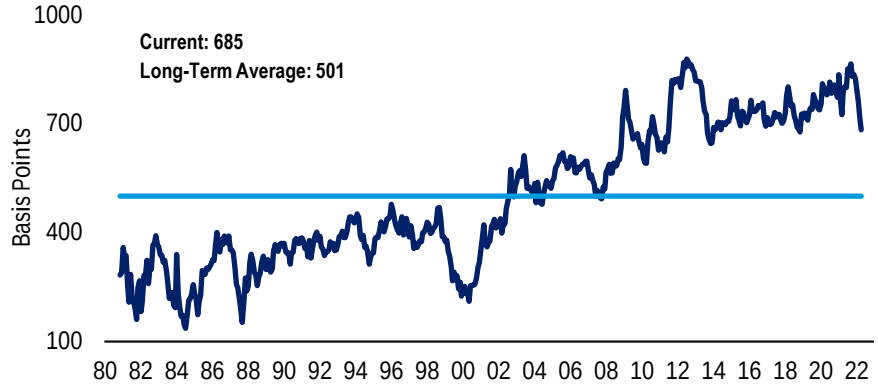
Market-derived Equity Risk Premium Framework

Our market-derived Equity Risk Premium framework is based on our proprietary Dividend Discount Model (DDM), making use of our analysts' forecasts for company earnings and dividends in order to estimate the expected, or required, rate of return of the equity market. For more details on our DDM, see the Appendix. Because our DDM mimics the yield-to-maturity calculation for a bond, we essentially compute the "yield-to-maturity" of equities. The spread between the expected return of the S&P 500 and corporate bond yields (as measured by AAA Long-Term Corporate Bond Rates) estimates the risk premium demanded by the market for taking on equity-specific risk over credit risk.

Exhibit 19: S&P 500 Risk Premium declined in recent months
S&P 500 Market-Based Risk Premium: DDM-Implied Expected Return less AAA Corporate Bond Rate



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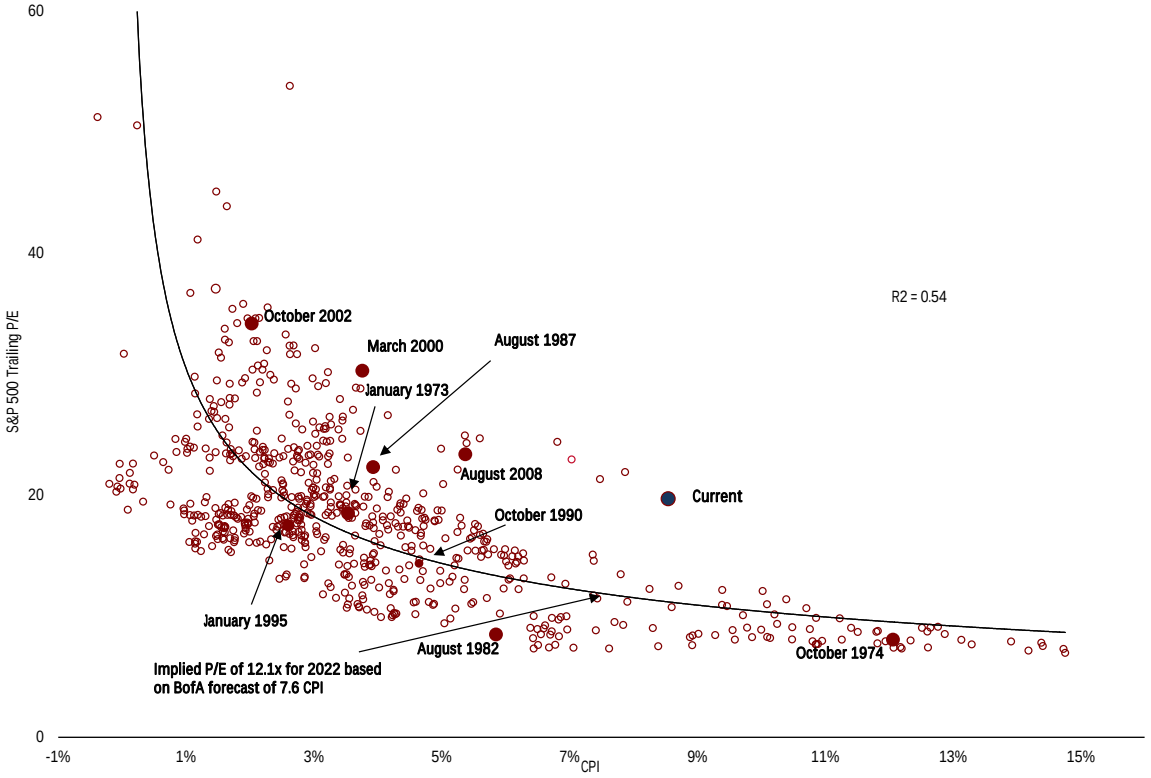
Inflation vs. P/E Framework

The inflation vs. P/E framework is based on the premise behind the "Rule of 21" valuation framework that has been used by traders in the past. The Rule of 21 states that the combination of the S&P 500 P/E and the year-to-year inflation rate (CPI) should be equal to 21. We found that the relationship is well-motivated, and there is a trade-off between inflation and multiples, but not at valuation and inflation extremes. Therefore, a non-linear curve better fits this thesis. Exhibit 20 below highlights the historical relationship between inflation and P/E over time. We quantify this relationship using a least-squares regression model fitted to an equation in the form $y = cx^b$ where b and c are constants.

Exhibit 20: BofA inflation forecast suggests trailing P/E should compress to 12x based on the historical relationship
Inflation vs. P/E Framework 1965-present



Source: BofA US Equity & Quant Strategy, Standard & Poor's, Bureau of Labor Statistics

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2. Sentiment

Returns tend to be greater where capital is scarce. As investors flock to invest in an asset, it pushes up the price and lowers the potential future returns of that asset. Thus, there should be an inverse correlation between investors' willingness to invest in stocks and future equity returns. And this is precisely what we have found.

Sell Side Indicator

The Sell Side Indicator — our proprietary framework that measures Wall Street's bullishness on stocks — is based on the average recommended equity allocation of Wall Street strategists as of the last business day of each month. These equity weightings are from strategists who submit their asset allocation recommendations to us or to Bloomberg — currently there are nine. We have found that Wall Street's consensus equity allocation has historically been a reliable contrary indicator. In other words, it has historically been a bullish signal when Wall Street was extremely bearish, and vice versa.

> Why has sentiment generally been a good contrary indicator? When all of the data, headlines and noise are skewed in one direction, this is likely to be more than priced into the market. Thus, the market is likely to surprise in the opposite direction.

Exhibit 21: Predictive Power of Selected Indicators Forecasting 12-Month S&P 500 Returns
Sell Side Indicator has high predictive power vs. frameworks like the Fed Model

Indicator	R^2
Sell Side Indicator	24%
Sell Side Indicator at extremes (Buy or Sell)	34%
S&P 500 Dividend Yield	10%
Proforma PE	8%
Adj. Fed Model (EPS Yld - Real 10-Yr Tsy Yld)	5%
M1 Growth	3%
Fed Model (EPS Yield - 10-Yr Treasury)	2%
M2 Growth	1%
BBB to Treasury Spread	0%
GAAP PE	0%
10-Yr Treasury Yield	0%
Yield Curve (10-Yr - 3-Mo)	0%
3-Mo T-Bill Rate	0%

Source: BofA US Equity & Quant Strategy, Federal Reserve Board, S&P

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Given secular changes in equity allocation over time, we believe comparing the recommended equity allocation to a moving average may be most effective. Wall Street sentiment appears to go through long-lasting secular phases that can last more than a decade. From the '80s to the mid-90s, the average equity allocation was anchored at a lower level and then grew more aggressive beginning in the late '90s. Today we appear to be settling into a phase of a lower allocation to stocks, possibly attributable, at least in part, to demographics and lower growth expectations – though equity allocations did climb in the last few years, they have now declined for the fourth straight month.

Exhibit 22: The fourth straight month of decline in our Sell Side Indicator
Sell Side Indicator, 9/1985-4/2022

Source: BofA US Equity & Quant Strategy. Note: Buy and Sell signals are based on rolling 15-year +/- 1 standard deviation from the rolling 15-year mean. A reading above the red line indicates a Sell Signal and a reading below the green line indicates a Buy Signal.

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The Sell Side Indicator does not catch every rally or decline in the stock market, but has had reasonably strong predictive capability with respect to subsequent 12-month S&P 500 total returns. Although the r-square of 24% may sound low, it is significantly higher than similar statistics for typical variables used in stock market timing models. In particular, note that such heralded indicators such as the "Fed Model" and money growth have relatively little predictive value. Moreover, at BUY and SELL extremes, the r-square improves to 34%.

Exhibit 23: R^2 of the Sell Side Indicator improves to 34% at BUY and SELL extremes
Sell Side Indicator vs. subsequent 12-month S&P 500 total returns (Nov 1987 - Present)

Source: BofA US Equity & Quant Strategy

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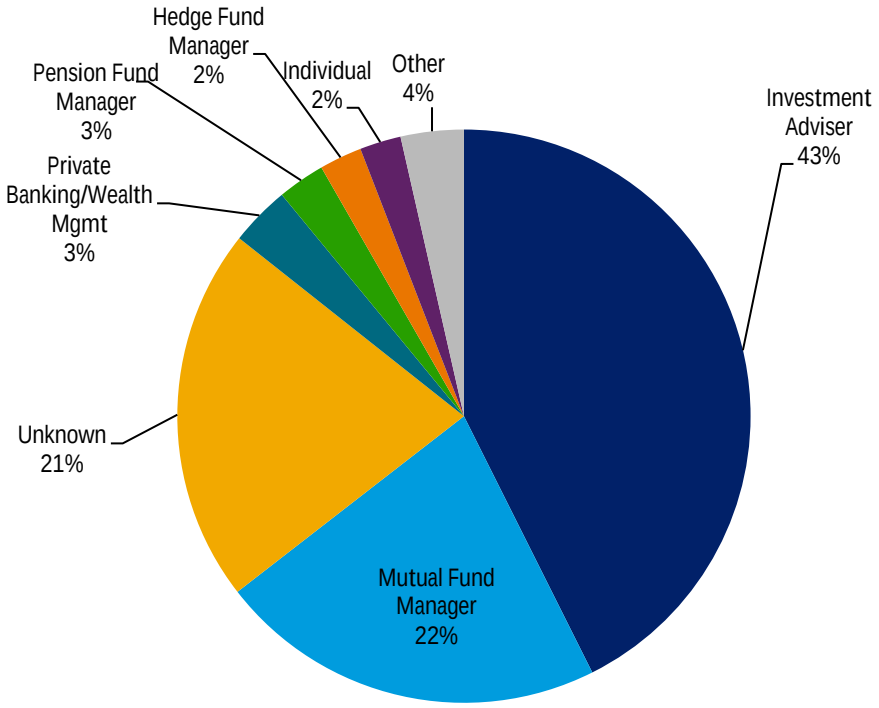
3. Positioning

Who owns the S&P 500?

We analyzed the ownership of S&P 500 by institutions and individuals, collected by FactSet through various sources (see Exhibit 24). For the S&P 500 overall, investment advisers (asset managers) and mutual fund managers own the majority of the market cap of the index. However, this breakout can differ for individual stocks within the S&P 500, where ownership can provide insight on stock performance/volatility.

Exhibit 24: S&P 500 ownership breakout by institution type (4/30/2022)
Investment Advisers and Mutual Funds own most of the index



Source: FactSet Ownership
Note: the unknwon group includes 1) individual investors who have not crossed a disclosure threshold, 2) mutual funds not covered due to non-disclosure laws, 3) institutional investors in US managing less than $100 million and do not file 13F, and/or 4) institutional investors outside the US who disregard 13F requirements or manage less than $100 million
There may be double-counted ownership due to short interest and timing difference between institutions' holdings reporting.

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Exhibit 25: S&P 500 aggregate ownership data sources
Data sources

Source	Description
Form 13F	Primary data source; any investment management institution managing $100mn+ in US-traded securities are required to file on a quarterly basis.
Form 3/4/5	A company's officers, directors and any beneficial owner of more than 10 percent of a class of the company's equity securities.
DEF 14A	Major stockholder ownership is disclosed in proxies.
13D	Individuals with significant ownership (5%+) are required to file the form.
Other	FactSet reaches out to funds/companies directly or pulls data from their reports/websites, particularly for foreign funds that are not required to file any SEC-mandated forms.

Source: SEC, FactSet Ownership

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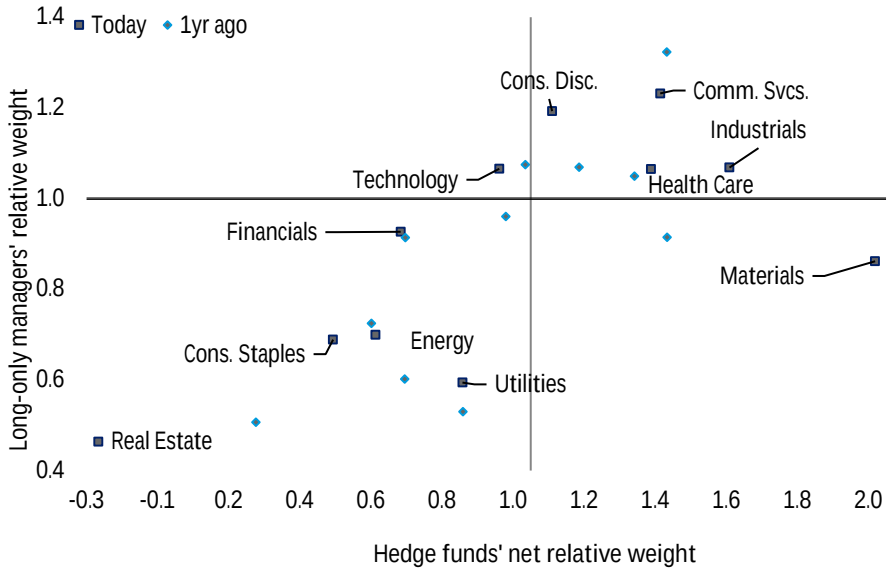
Active managers holdings

At the sector and stock level, as well as for factors, we analyze large cap active managers' positioning on a quarterly basis. Positioning by sector for the latest quarter can be found below. Positioning data allows investors to assess, for example, what stocks are crowded vs. unloved by active managers or how managers' sector exposure has changed from quarter to quarter.

Exhibit 26: oth Long-only (LOs) and Hedge funds (HFs) are O/W Comm. Svcs, Discretionally, Health Care and Industrials. (April 2022). Both LOs and HFs are most U/E Real Estate
Long-only and hedge funds' net relative positioning by sector (4/2022)



Source: Lipper Analytical Services, BofA US Equity & Quant Strategy, FactSet Ownership

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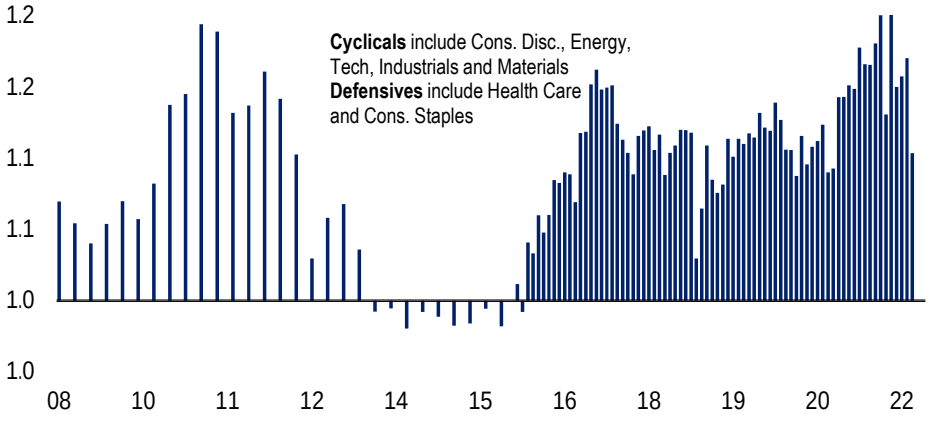
Exhibit 27: Large cap mutual fund exposure to cyclical vs. defensive sectors, (April 2022)
Funds are overweight cyclicals though down from peaks



Source: Lipper Analytical Services, BofA US Equity & Quant Strategy, FactSet Ownership

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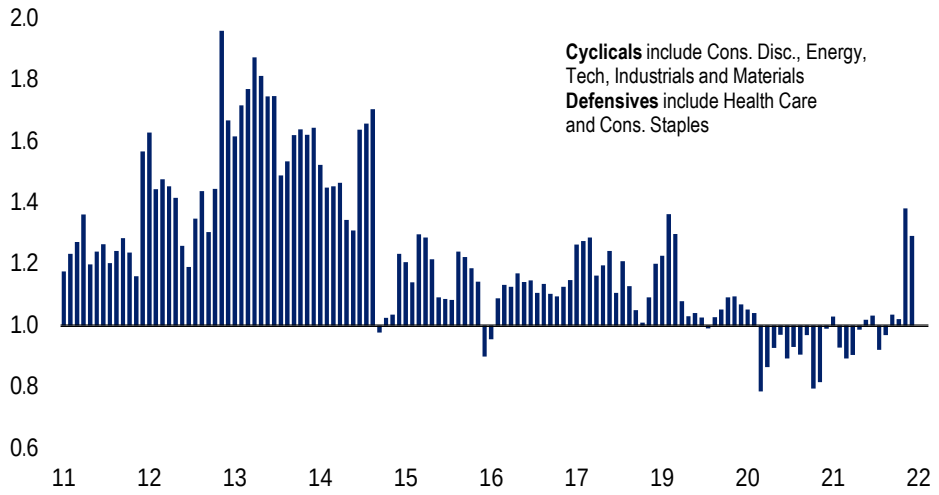
Exhibit 28: **Hedge funds' exposure to cyclical** vs. defensive sectors (April 2022)
Hedge funds are turned overweight cyclicals from underweight vs. 2021



Source: Lipper Analytical Services, BofA US Equity & Quant Strategy, FactSet Ownership

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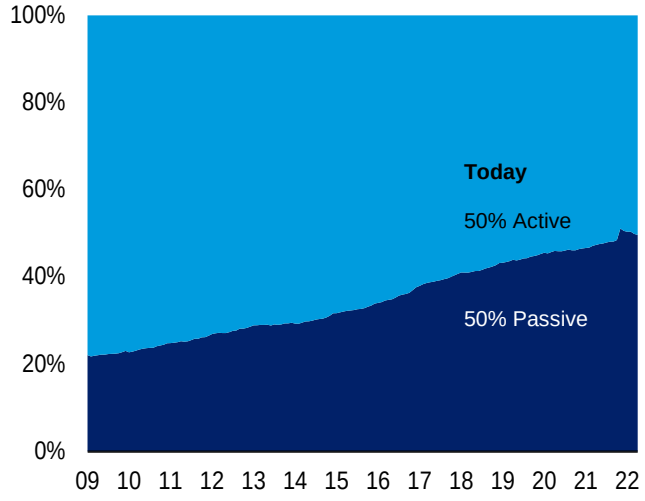
Extracting alpha from positioning

Positioning can add alpha at a stock level. Our work suggests that over the last several years, during which active inflows were weak to negative, but passive inflows were positive and strong, the strategy of buying the 10 most underweight stocks and selling the 10 most overweight stocks each year has generated an average of 5ppt to 18ppt of alpha per year, with the exception of 2017 and 2020 (Exhibit 30). We believe this should continue, as the main driver of the most crowded stocks' weakness – outflows from active funds into passive vehicles – is likely far from over (Exhibit 29).

Exhibit 29: **Active vs. passive funds' assets breakdown**
Passive now accounts for 50% of all US domiciled fund assets



Note: Data through 4/30/2022
Source: BofA US Equity & Quant Strategy, Simfund

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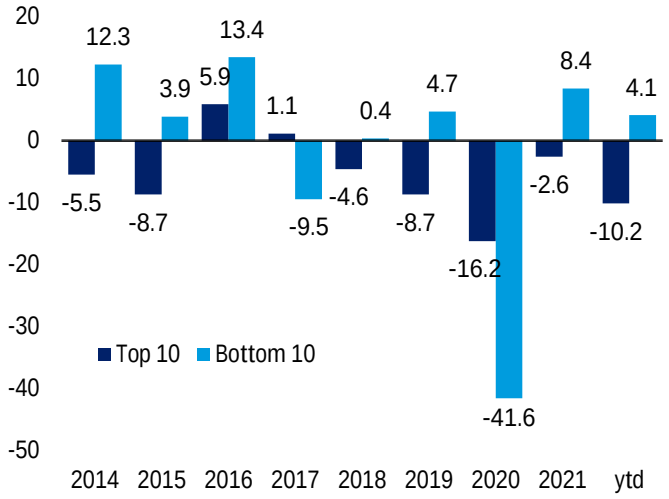
Exhibit 30: Buying the 10 most U/W stocks and selling the 10 most O/W stocks by active funds has generated alpha in most years
Long/Short basket of most U/W and O/W stock performance delivered 14.3ppt. alpha in 2022



Source: Lipper Analytical Services, BofA US Equity & Quant Strategy, FactSet Ownership.
2022 performance through 5/25/2022

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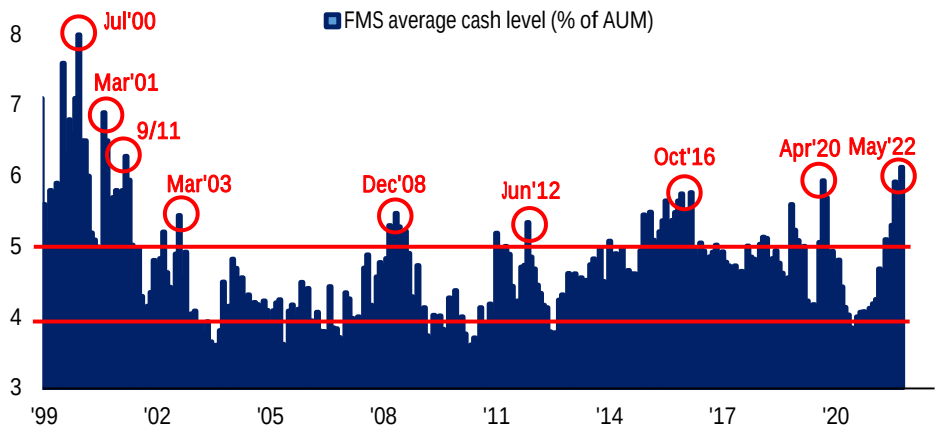
Global Fund Manager Survey cash balances

The BofA Fund Manager Survey (FMS, see note) is a monthly survey of 300-400 primarily long-only investors. One of the key questions in this survey asks for cash balance as % of assets under management. A low cash balance leaves investors vulnerable to negative market shocks, while a high cash balance means investors are under-invested and vulnerable to positive market shocks.

- When the cash balance falls below 4% a contrarian sell signal is generated.
- When the cash balance rises above 5% a contrarian buy signal is generated for equities.

Exhibit 31: FMS cash levels rise to highest since 9/11 (May 2022)
FMS average cash balance, % (Current = 6.1%)



Source: BofA Global Research Fund Manager Survey

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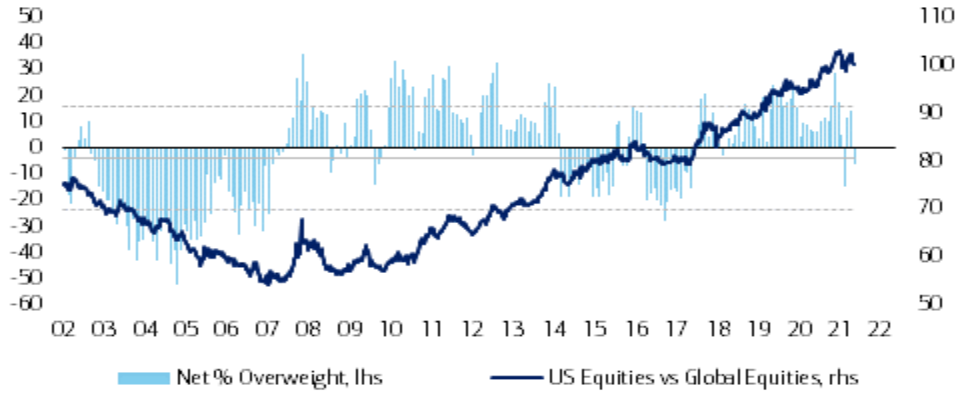
The BofA Fund Manager Survey (FMS) also provides a context for global positioning of fund managers, and today highlights that global investors just reduced their US stocks allocations to underweight.

Exhibit 32: Net % Asset Allocators say they are underweight US Equities
Net% of FMS investors overweight US equities



Source: Bank of America Global Manager Survey

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Short Interest

While short interest is not predictive of market performance in isolation, when used in conjunction with valuation, sentiment and fundamentals, it can be helpful in calling for upside or downside risk to the equity market.

Exhibit 33: Short Interest vs. Float Ratio for Total US Market (2008-4/2022)
Short interest has increased in recent months

Source: BofA US Equity & Quant Strategy, Bloomberg

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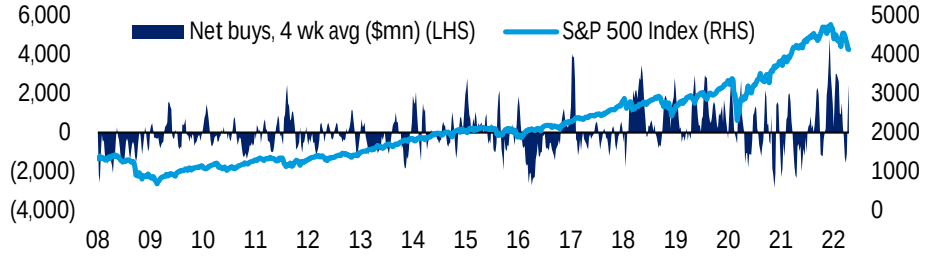
Flow trends

Flows trends are often assessed as another gauge of sentiment, as they can serve as confirmation of a rally or a signal of capitulation when buying or selling activity spikes to extremes or accelerates over a period. We track BofA Securities client trading flows into US single stocks and ETFs which are executed by the cash equities business of the firm, and provide a weekly update on flows by sector, client type, and size segment.

Exhibit 34: BofA client net buys of US equities ($mn) and S&P 500 since 2008
Flows trends often can serve as confirmation of a rally or a signal of capitulation



Source: BofA US Equity & Quant Strategy

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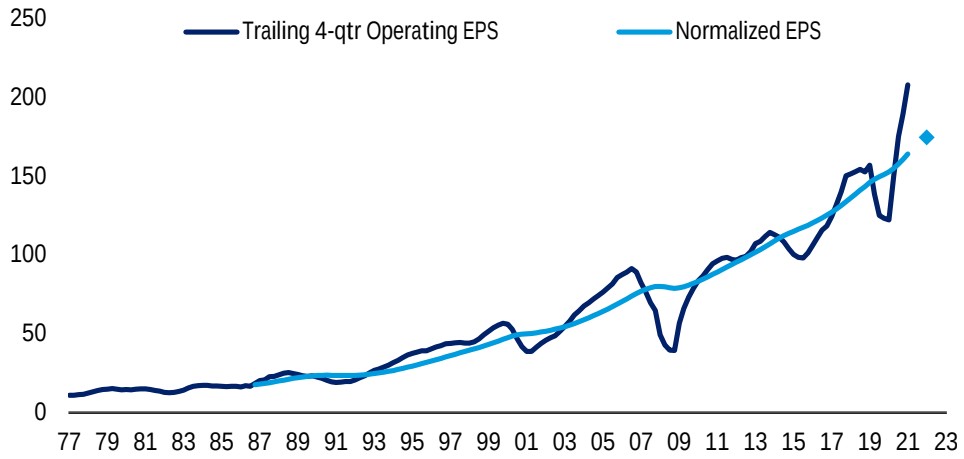
4. Corporate Profits

Normalized earnings

Earnings are volatile over the course of a cycle, so we adjust earnings by this cyclicality to estimate the underlying earnings power of the S&P 500. Without the benefit of hindsight, it is difficult to assess what stage of the cycle we are in, but our best estimate is to normalize earnings based on a trend line of earnings growth using a cumulative linear log normal regression. This normalized earnings is compared to the current price of the S&P 500 to determine the current normalized PE ratio discussed earlier.

Exhibit 35: S&P 500 Normalized earnings are expected to rise by year-end
S&P 500 Operating & Normalized earnings (1978 - 2022 using BofA estimate)



Source: BofA US Equity and Quant Strategy

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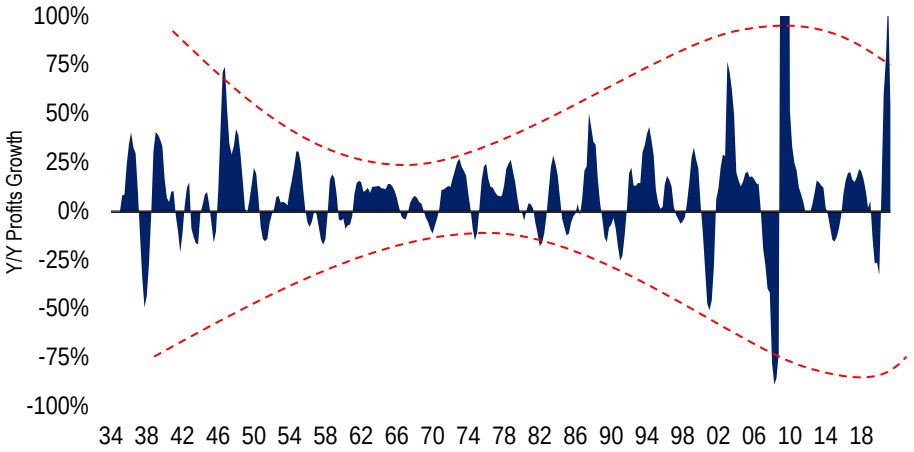
Profits cycle

The profits cycle is a core focus of our research. We feel that profitability moves equity prices (as opposed to GDP or some other macroeconomic variable) and thus we concentrate on the profits cycle when formulating our equity strategies.

We define the profits cycle as the year-to-year percentage change in S&P 500 reported earnings on a trailing 4-quarter basis. See chart below.

Exhibit 36: Profits cycle: YoY EPS Growth for S&P 500, 1935 to present
We feel that profitability moves equity prices (as opposed to GDP or some other macro variable)



Source: BofA US Equity & Quant Strategy

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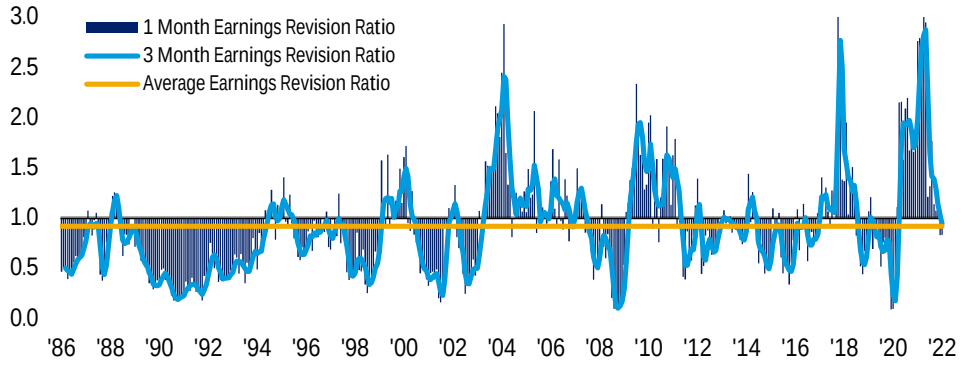
Whereas real earnings growth is possibly a better gauge of economic cycles, nominal earnings growth is a more important factor when examining the equity market. The equity market is a nominal concept because pricing and inflation, and not simply unit growth, influence profitability.

S&P 500 earnings estimate revision ratio

The following chart shows the earnings estimate revision ratio, calculated as the ratio between the number of companies in the S&P 500 for which consensus earnings estimates have been raised versus those that have been lowered over a three month period. As a breadth ratio, the earnings revision ratio is generally an earlier indicator of changes in the profits cycle, as it is more sensitive to changes in earnings expectations than is a market capitalization weighted estimate revision framework. For example, the revision ratio troughed at the end of January '09, about a month before the market recovered, whereas on a cap-weighted basis, earnings expectations troughed in the end of April '09, two months after the market's trough.

Exhibit 37: 3-month Earnings Estimate Revision Ratio declined to historic average
S&P 500 Earnings Estimate Revision Ratio, 1/1986 - 4/2022



Source: BofA US Equity and Quant Strategy, I/B/E/S

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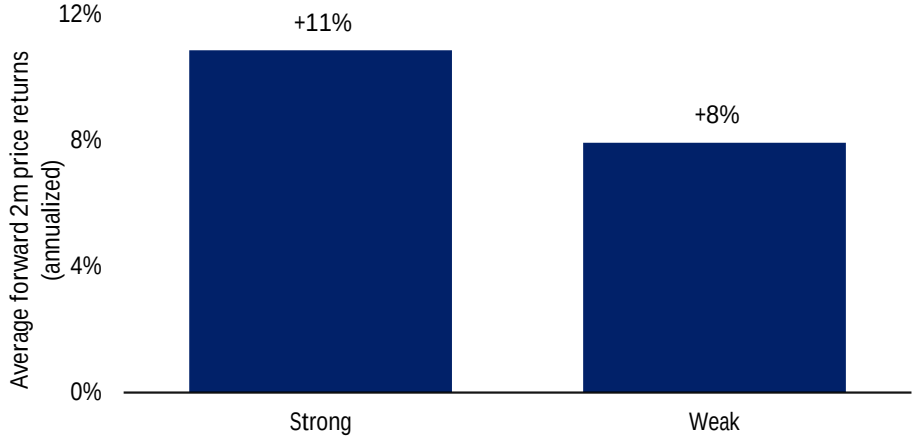
The estimate revision ratio can be used as a short-term gauge of sentiment. The S&P 500 has displayed predictable patterns based on phases of the revision cycle, with the best predictive power over a forward 2-month period. The market has historically had the strongest returns when the ratio is Strong or above average (+11% annualized), and the weakest returns when the ratio is Weak or below average (+8% annualized).

Exhibit 38: ERR vs. annualized forward 2-month returns (1986-present)
The market has historically had the strongest returns when the ratio is Strong



Source: BofA US Equity & US Quant Strategy, FactSet

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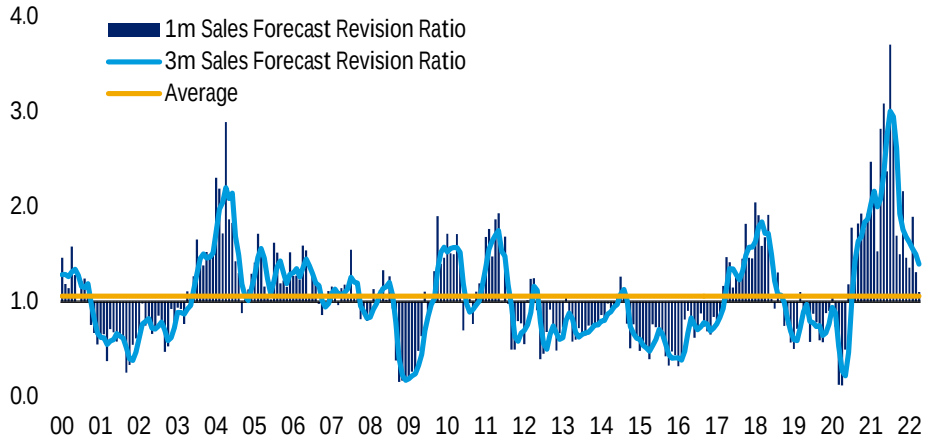
S&P 500 sales revision ratio

Sales forecast revision ratios are defined similarly to earnings estimate revision ratios, but instead of consensus earnings estimates, we use consensus sales forecasts for S&P 500 companies.

We also follow the gap between the top-line vs. bottom line revision ratio. We have found that sales based measures may be more important when the sales revision ratio is not improving as rapidly as the earnings revision ratio, and vice versa. Generally, the scarce resource is the more rewarded and important metric.

Exhibit 39: S&P 500 Sales Forecast Revision Ratio
3m Sales Forecast Revisions Ratio have been declining since August 2021



Source: BofA US Equity & Quant Strategy, I/B/E/S

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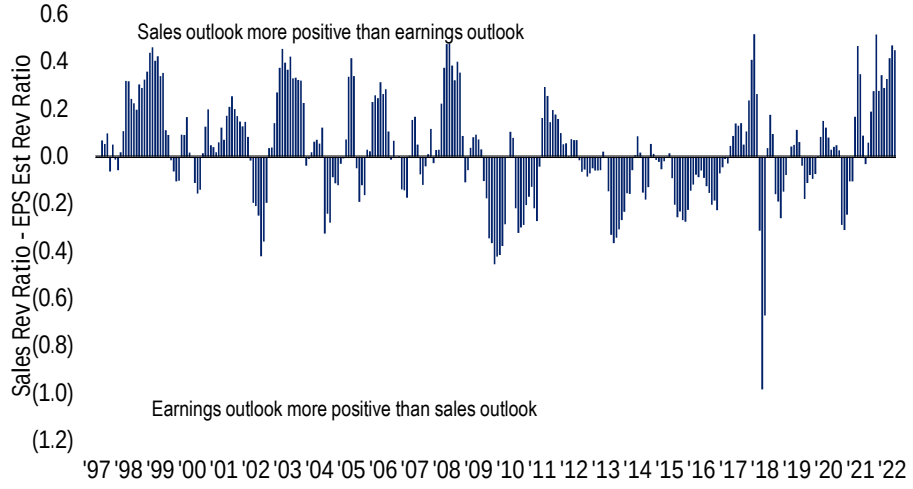
Exhibit 40: The spread between 3-month sales forecast revision ratio vs. EPS revision ratio is near historic highs
Spread: 3-month sales forecast revision ratio vs. 3-month earnings estimate revision ratio, Jan 1997 – April 2022



Source: BofA US Equity & US Quant Strategy

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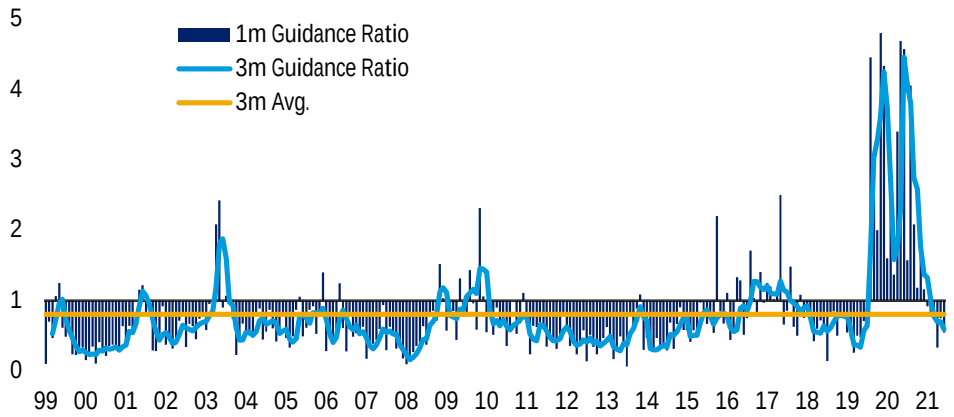
Management guidance ratio

We track the ratio of total instances of above-consensus vs. below-consensus management guidance for S&P 500 companies over a one-month and three-month period, as we have found that guidance is generally a leading indicator of estimate revisions by about one month. Sustained divergences between the estimate revision ratio and management guidance ratio (for example, a rising estimate revision ratio but falling management guidance ratio) may suggest that analysts are being overly optimistic and a downward revision cycle is soon to follow, or conversely that management is being too negative in their outlook.

Exhibit 41: The 3-month Management Guidance Ratio declined below historic average
S&P 500 Management Guidance Ratio (# Above vs. Below Consensus), Jan 2000 – May 26, 2022



Source: BofA US Equity and Quantitative Strategy

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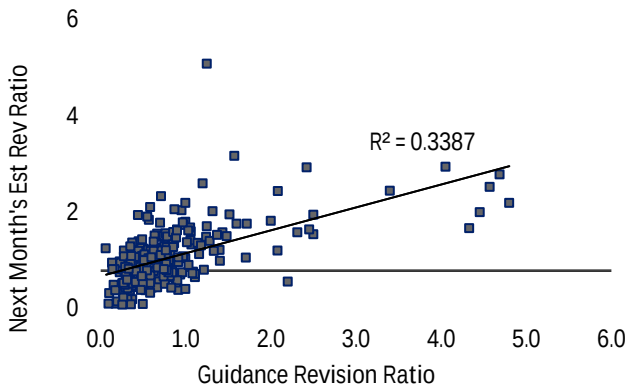
Exhibit 42: Guidance Ratio tends to lead subsequent Estimate Revision Ratio
Guidance Ratio vs. Subsequent Estimate Revision Ratio, 2000 to present



Source: BofA US Equity & US Quant Strategy

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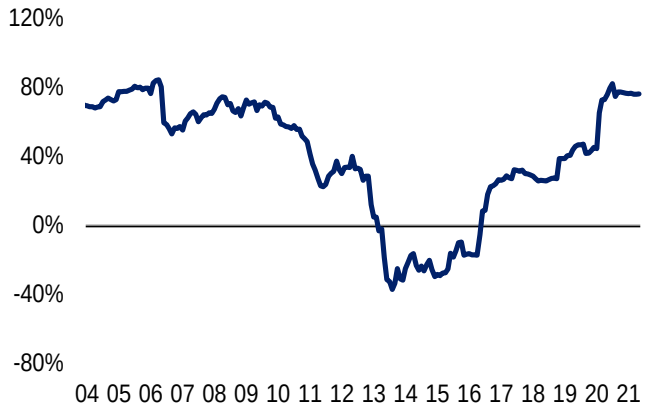
Exhibit 43: Correlation remains near historic highs
Rolling 3yr correlation between guidance ratio and subsequent estimate revision ratio, 2002-present



BofA US Equity & US Quant Strategy

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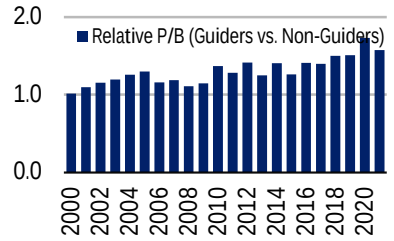
Evidence of a guidance premium

We have also found some evidence that companies who regularly issue guidance may be rewarded for their apparent transparency. History suggests that beginning in mid-2000, companies that regularly issue profits guidance have begun to trade at a premium on book value to those that do not guide at all. This premium may be granted for transparency, and we have found that it is generally most pronounced in cyclical sectors.

Exhibit 44: Premium (discount) to S&P 500 based on median P/B for companies that issue annual or qtrly guidance vs those that do not
Premium for guiders climbed higher amid COVID



Source: Bloomberg, BofA US Equity & Quant Strategy
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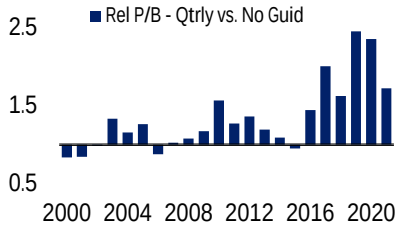
Exhibit 45: Premium (discount) to S&P 500 based on median P/B for companies that issue qtrly guidance vs those that do not
Premium/discount for qtrly guidance has been more mixed – but in 2020 any guidance was rewarded



Source: Bloomberg, BofA US Equity & Quant Strategy
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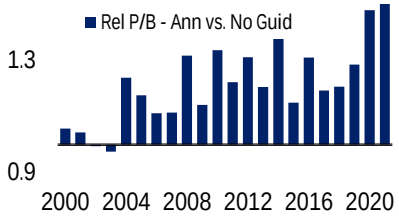
Exhibit 46: Premium (discount) to S&P 500 based on median P/B for companies that issue annual guidance vs those that do not
Generally increasing premium for annual guidance



Source: Bloomberg, BofA US Equity & Quant Strategy
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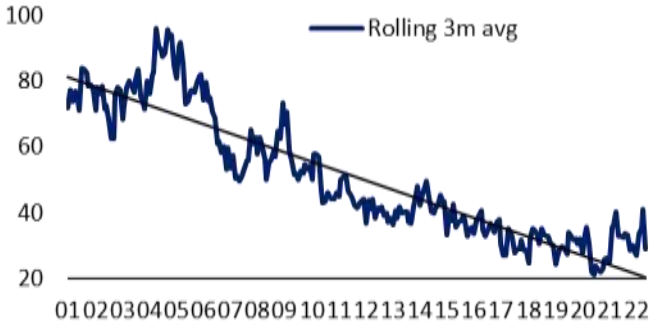
Exhibit 47: S&P 500 quarterly earnings guidance instances
Quarterly EPS guidance instances have been downward trending (Jan 2001 – Apr 2022)



Source: Bloomberg, BofA US Equity & Quant Strategy
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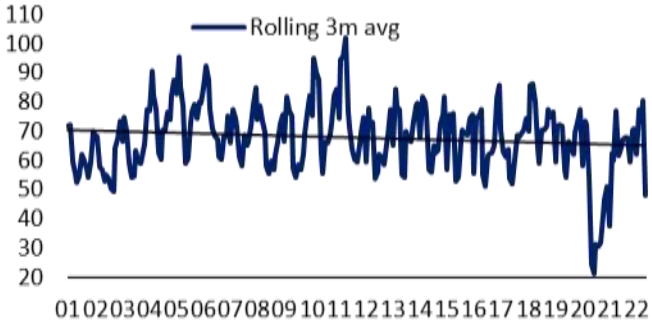
Exhibit 48: S&P 500 annual earnings guidance instances
Annual EPS guidance instances recently dropped after rising from COVID-related lows (Jan 2001 – Apr 2022)



Source: Bloomberg, BofA US Equity & Quant Strategy
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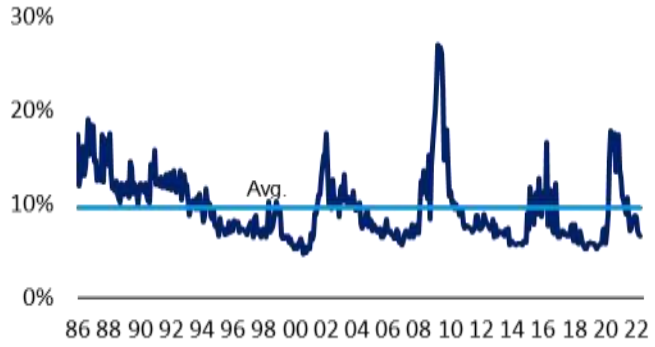
Amid the dearth of guidance during COVID, companies that issued annual outlooks were rewarded with a record premium.

Earnings certainty

Earnings estimate dispersion can be used to gauge the certainty or uncertainty of earnings expectations. When the average dispersion of estimates for a company in the S&P 500 is high, this can suggest earnings are less certain, whereas when dispersion is low, analysts exhibit more agreement or certainty about future earnings. However, in uncertain macroeconomic environments, a low level of dispersion can also reflect an extreme lack of conviction and an unwillingness of analysts to diverge from the pack. We have found that companies with low dispersion tend to outperform when dispersion is rising, and companies with high dispersion tend to outperform when dispersion is falling.

Exhibit 49: Average dispersion of FY2 S&P 500 Estimates (Feb 1986 to April 2022)
Average dispersion declined to below historic average



Source: FactSet, US Equity & Quant Strategy

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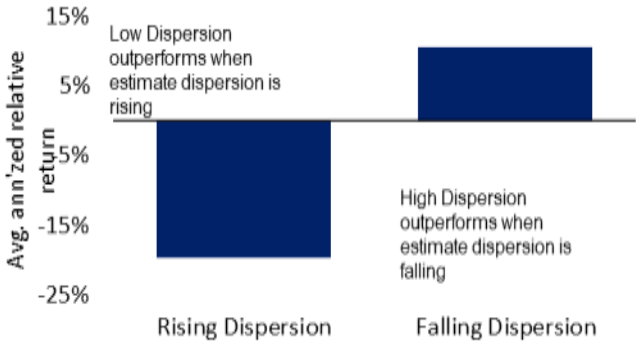
Exhibit 50: Relative factor performance: High - Low EPS Estimate dispersion
Based on 1986 – 2022 performance



Source: FactSet, US Equity & Quant Strategy; FactSet

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Liquidity risks for the S&P 500

In recent years, we have been highlighting rising liquidity risks for one of the most liquid areas of the market: large cap US equities (the S&P 500). S&P 500 trading volume has grown thinner and thinner, and as a casualty of the momentum- and growth-driven market of recent years, the index has grown increasingly tail-heavy with its market cap tilted toward a small number of mega cap companies.

US stock ownership is now 50/50 for active/passive, where passive represents non-fundamental buyers/sellers. And asset allocators have increasingly funneled assets into longer-term illiquid growth – the largest pension funds have growth their exposure in illiquid investments (including private equity) from 8% in 2006 to 28% today. Private equity AUM continues to rise.

Banks also provide substantially less liquidity today than in prior cycles, with the trading portfolio of large banks as of 2021 less than half of what it was 10 years prior following regulatory constraints. Central banks, high frequency traders (HFTs), ETFs and other market participants have picked up some of the slack, but trading dynamics have undeniably changed, as large cap US stocks are increasingly traded by machines (HFT, quants, etc.) rather than humans.

Exhibit 51: S&P 500 increasingly tail-heavy
Market cap of 10 largest S&P 500 companies as a % of total S&P 500 market cap (1986-4/2022)

Source: BofA US Equity & Quant Strategy, FactSet

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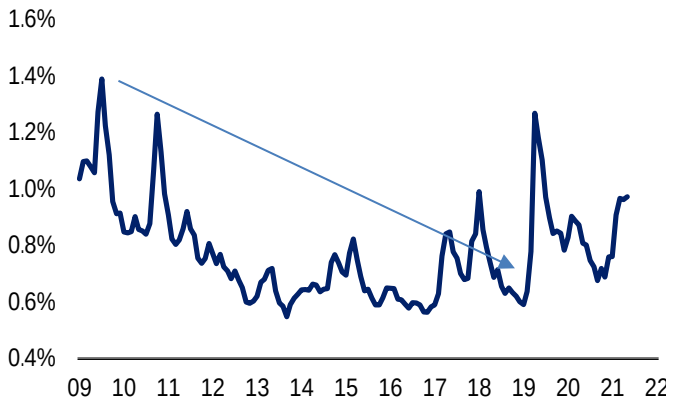
Exhibit 52: Prior to COVID, thinner and thinner trading
S&P 500 avg. daily trading volume as % of market capitalization (8/2009-4/2022)



Source: Bloomberg, BofA US Equity & Quant Strategy

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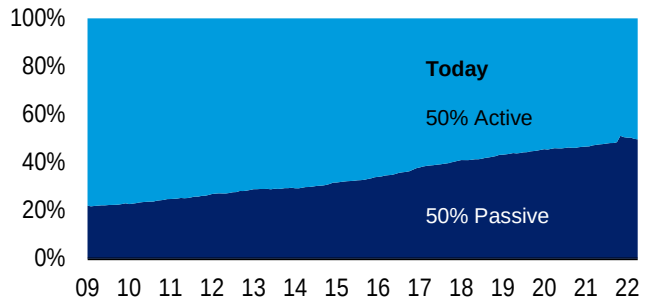
Exhibit 53: Passive now accounts for 50% of all US domiciled fund assets
US domiciled funds: Active vs. passive as a % of AUM, 2009-4/2022



Source: Strategic Insight SimFund, BofA US Equity & Quant Strategy

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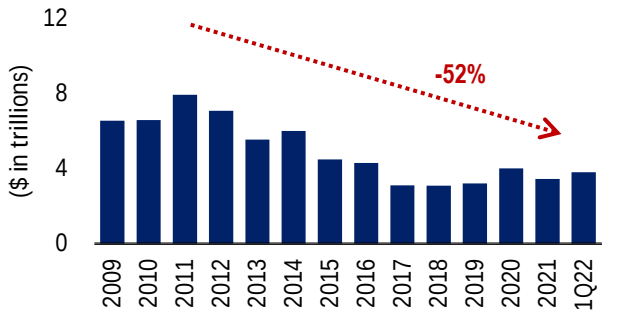
Exhibit 54: Big banks are not the providers of liquidity they once were
Declining trading portfolio of large banks ($M)



Source: S&P Global

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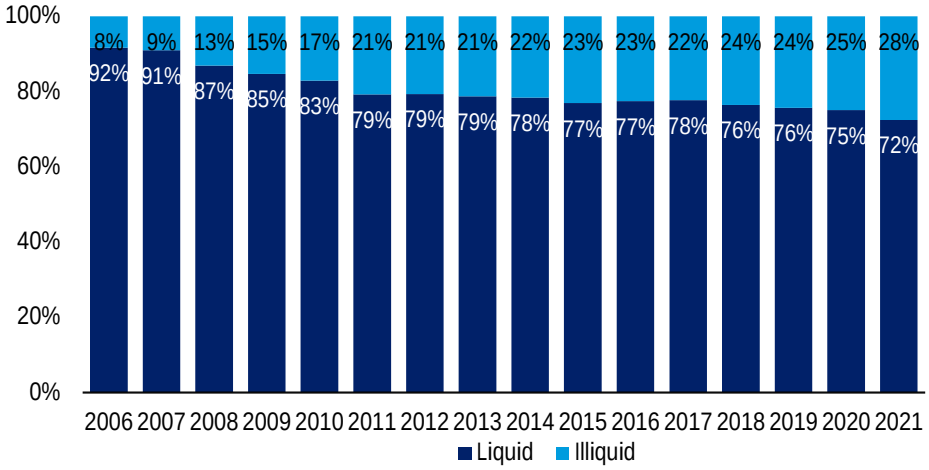
Exhibit 55: **Pension funds' allocation to illiquid assets has more than tripled since 2006**
Pension Plan Asset Allocation (% liquid vs. illiquid assets) – based on US defined benefit pension fund assets within the Top 1000 pension funds with allocation data available



Source: Pensions & Investments, BofA US Equity & US Quant Strategy
Note: Based on US pension funds within the top 1000 that have available asset allocations. Liquid = domestic equity, domestic fixed income, international equity, global equity, global/international fixed income (includes mortgages/credit strategies/leveraged loans) and cash. Illiquid = Private equity, real estate, other alternative investments Published with permission from Pensions & Investments

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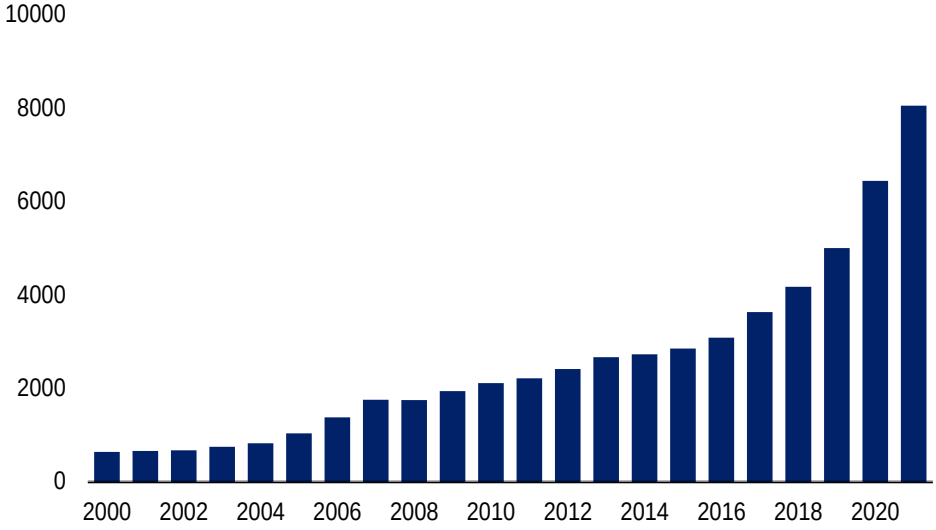
Exhibit 56: Assets in private equity continue to rise
Private equity AUM ($bn)



Source: Preqin

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Earnings Expectation Life Cycle

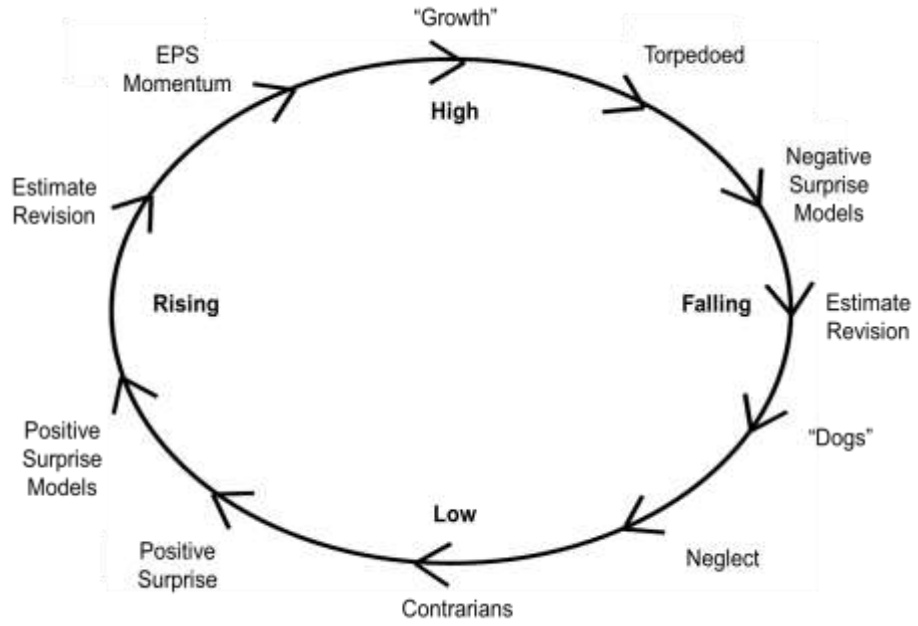
Most stocks' earnings trajectories follow the pattern described by the cycle below, although not every stock will stop at each point, nor will stocks reside in each phase for any regulated amount of time. Stocks can also move backward and forward.

The Earnings Expectation Life Cycle is our proprietary schematic, which portrays investors' changing attitudes towards a stock over time. We believe that a successful investment process should incorporate the notion of changing expectations, because "dogs" often become "stars" and "stars" often become "dogs".

Life Cycle Phases

The Earnings Life Cycle, depicted below, contains eleven positions, with the left half of the cycle portraying the period of rising expectations, and the right half portraying the period of falling expectations.

Exhibit 57: Earnings Expectation Life Cycle
The left half of the cycle indicates the period of rising expectations, and the right half indicates the period of falling expectations



Source: US Equity & Quant Strategy

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The various stages are as follows:

Stage 1: Low Expectations

Investors commonly known as "Contrarians" typically invest in these stocks with lower earnings expectations. Most non-contrarian investors find these stocks unattractive or overly risky.

Stage 2: Positive Surprise

Eventually the low-expectations companies begin to report more optimistic information such as improved earnings significant enough so that the stocks recapture attention. Research coverage of such stocks may begin to increase although it is more likely that this will happen more towards stages 4 and 5.

Stage 3: Positive Surprise Screens

Stock picking screens that search for significant variations between analyst earnings expectations and actual reported earnings begin to highlight these stocks.

We have found that these screens have gained a lot of popularity with investors, thus the screens themselves have grown less effective.

Stage 4: Estimate Revisions

The consensus begins to raise their earnings estimates for these stocks in response to rising earnings expectations following the surprise of stage 3. Analysts' estimate revisions often lag a surprise because analysts are generally reluctant to believe that the superior earnings will last.

Stage 5: EPS Momentum

Investors who follow earnings momentum themes begin to buy these stocks as estimates and reported earnings continue to rise and as year-to-year comparisons begin to improve.

Stage 6: "Growth"/High Expectations

Strong earnings momentum continues for a long enough period that these stocks are termed "growth" stocks by the consensus. These stocks are not "new" growth stocks, for new growth stocks are probably found during stages 4 and 5, nor are they true growth companies that alter the business environment. Rather, this is the point at which most investors agree that the stock is a terrific growth stock. Earnings expectations are very high, which implies that there is a large risk of disappointment at this stage. Contrarian selling would optimally occur at this point in the cycle.

Stage 7: Torpedoed

Earnings disappointment occurs, stocks are "torpedoed" – i.e., their earnings expectations and prices sink.

Stage 8: Negative Earnings Surprise Screens

The same screens from Stage 3 above begin to highlight stocks with lower-than expected earnings as potential sell candidates.

Stage 9: Estimate Revisions

The consensus begins to lower their earnings estimates in response to the earnings disappointment. Again analysts tend to lag because they generally do not believe that the earnings shortfall is a sign of a fundamental problem with the company.

Stage 10: "Dogs"

These stocks, after continuing to report disappointing earnings for a long enough period of time, are shunned by investors. News regarding takeovers, restructuring or bankruptcy may affect the stock price temporarily; however, investors generally avoid or ignore these stocks.

Stage 11: Neglect

Investors have become so disinterested in the stocks or group that general research begins to dissipate. The lack of coverage may set the stage for a renewed cycle.

Growth vs. Value and the Earnings Expectation Life Cycle

The Earnings Expectations Life Cycle can be adapted to help understand investment styles or management techniques. As is indicated by the diagram, value-oriented investment strategies are more likely to fall in the bottom half of the Life Cycle because they tend to be more Contrarian in nature. Value-oriented strategies spend more time attempting to distinguish the true "dogs" – those which might not take another turn around the Life Cycle - from those stocks that are simply out of favor but will rebound.

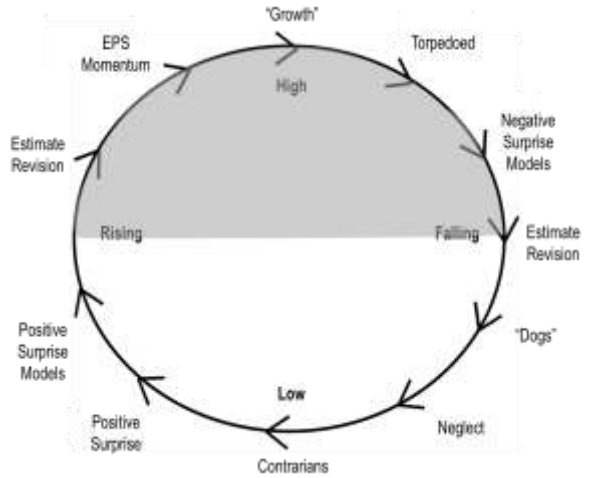
As the diagram below suggests, growth-oriented investment strategies tend to be in the top half of the Life Cycle. The success of these strategies depends on one's ability to realize that a company's earnings momentum is secular and not simply a result of

cyclical influences. Thus, the equator of the earnings expectations life cycle schematically separates the worlds of growth and value investing.

The theory behind the Life Cycle suggests that the hardest thing for a growth manager to do is to time the sale of a stock, whereas the hardest thing for a value manager to do is to time the purchase of a stock. It seems that a good value-oriented manager is likely to be buying stocks later than his peers, whereas a good growth-oriented manager is likely to be selling stocks earlier than his peers

> A good value-oriented manager is likely to be buying stocks later than peers, whereas a good growth-oriented manager is likely to be selling stocks earlier than peers.

Exhibit 58: Growth
Growth-oriented investment strategies tend to be in the top half of the Life Cycle



Source: BofA US Equity & Quant Strategy

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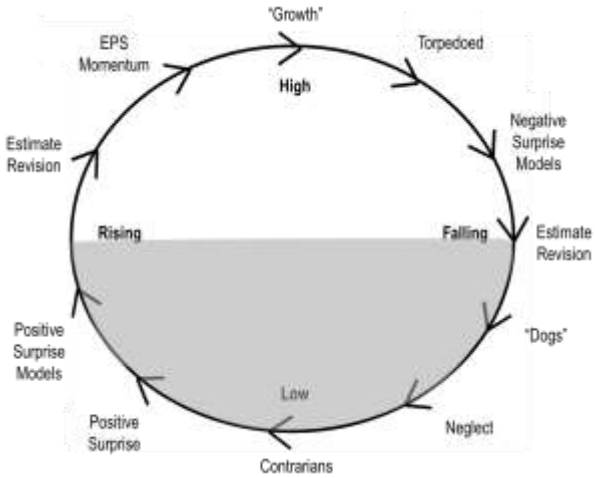
Exhibit 59: Value
Value-oriented investment strategies tend to be in the bottom half of the Life Cycle



Source: BofA US Equity & Quant Strategy

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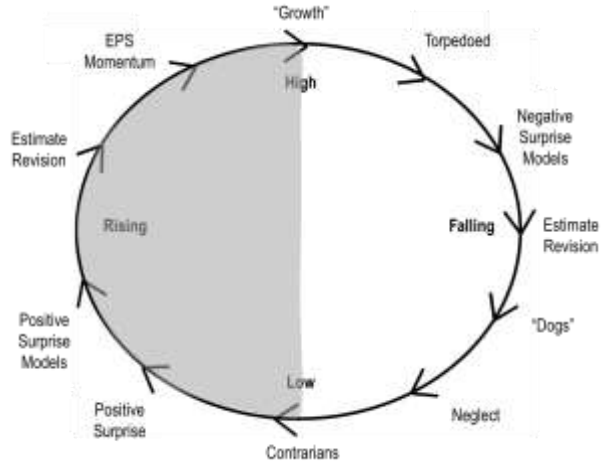
Exhibit 60: Rising
The left half of the cycle indicates the period of rising expectations



Source: BofA US Equity & Quant Strategy

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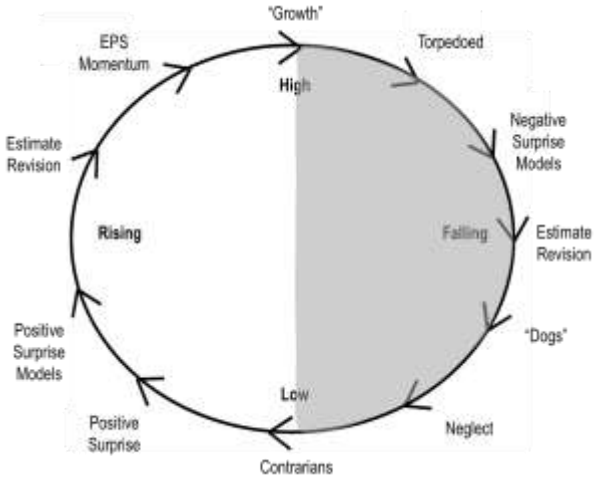
Exhibit 61: Falling
The right half indicates the period of falling expectations



Source: BofA US Equity & Quant Strategy

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Factor timing

The underlying performance of investment styles is often just as important as the aggregate stock market performance. For instance, the S&P 500 index gained 26.9% in 2021, but the best performing High EPS Revisions factor advanced 46.6%, while 11-mth Price Momentum factor gained 15.7%. Just as how investing in Telecom stocks requires consideration as to how dividend stocks will perform in addition to their fundamental profit outlook, investors should consider their portfolios' factor exposures and what drives the performance of those factors.

Exhibit 62: Factor Timing
Factors and their triggers

Factor	Trigger(s)
Beta	Accelerating profits, declining volatility
DDM Alpha	Decelerating profits, rising volatility
Dividend Yld	Negative equity returns, rising volatility (Note that second quintile does better than top quintile)
Dividend Growth	Negative equity returns, rising volatility
Earnings Estimate Revision	Estimate Dispersion falling
Earnings Momentum	Accelerating profits, declining volatility, declining dispersion of estimates
Earnings Yld	Accelerating profits, declining volatility
Equity Duration	ERP falling, Growth expectations rising
Estimate Dispersion	Estimate Dispersion falling
EV/EBITDA	Accelerating profits, declining volatility
Five-Year ROE	Decelerating profits, rising volatility
Five-Year ROE (Adjusted BY Debt)	Decelerating profits, rising volatility
Foreign Exposure	Dollar weakening
Forward Earnings Yield	Accelerating profits, declining volatility
High Variability of Earnings	Accelerating profits, declining volatility
Most Active	Inflection points in VIX (peaks or troughs)
Neglect-Analyst Coverage	Low volatility, large inflows into equities
Neglect-Institutional Ownership	Negative equity returns
One-Year ROE	Decelerating profits, rising volatility
One-Year ROE (Adj for Debt)	Decelerating profits, rising volatility
P/E to Growth	Generally good in most environments
Positive Earnings Surprise	Low dispersion of estimates
Price	Accelerating profits, declining volatility, declining dispersion of estimates
Price/Book	Accelerating profits, declining volatility, declining dispersion of estimates
Price/Cash Flow	Accelerating profits, declining volatility
Price/Free Cash Flow	Accelerating profits, declining volatility
Price/Sales	Accelerating profits, declining volatility
Projected Five-Year EPS Growth	Decelerating profits, rising volatility
Relative Strength	VIX < 25
Return on Assets	Decelerating profits, rising volatility
Return on Capital	Decelerating profits, rising volatility
Share Repurchase	Works better for companies with low valuation
Small Size	Accelerating profits, declining volatility, declining credit spreads, senior loan officer survey net easing
High Quality (A+)	Decelerating profits, rising volatility
Low Quality (C&D)	Accelerating profits, declining volatility

Source: US Equity & Quant Strategy

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Growth and Value

We use a variety of valuation signals (see Valuation Strategies) and growth signals (see Growth Strategies) to determine value and growth stocks, respectively.

Growth and Value and the Earnings Expectations Life Cycle

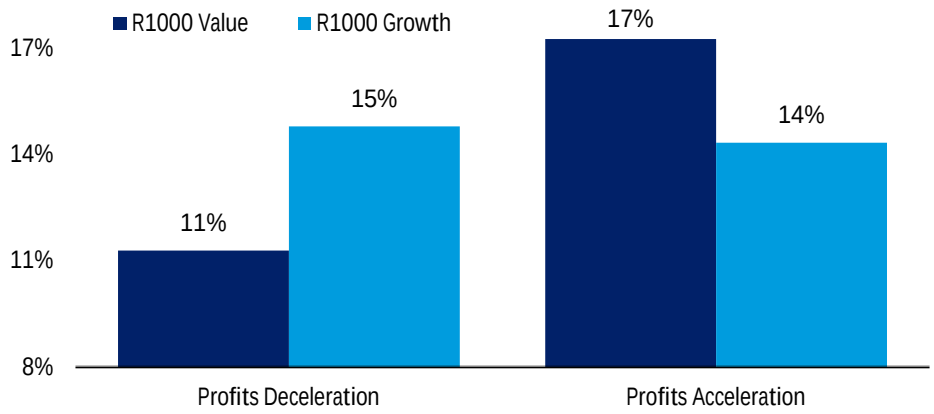
Within the context of the Earnings Expectations Life Cycle, Value managers are defined as investing in "low-expectations" equity since they search for out-of-favor stocks whose equity is priced at a discount. Growth managers are defined as investing in "high-expectations" equity since they search for stocks with a proven track record of success and which are thus priced at a premium.

Growth and Value and the Profits Cycle

Growth and Value appear to be related to the Profits Cycle. We have found that Growth and Value cycles have been historically related to the scarcity or abundance of nominal earnings growth – when nominal earnings growth is scarce, growth (as a scarce resource) outperforms value, since investors tend to bid up the prices of companies that can maintain their earnings growth. Moreover, as earnings growth becomes abundant (as the profits cycle accelerates) investors tend to comparison shop, and pay less for stable earnings growth than they might have during a dearth of earnings growth.

Performance tends to switch off between growth and value: when earnings growth is scarce and investors bid up the valuations of the few stocks that can maintain growth, value managers generally stay out of these stocks. However, growth managers invest in them, and thus can thrive during these phases. Conversely, when reported earnings growth becomes increasingly abundant, investors tend to become comparative shoppers, or value investors. Value managers tend to outperform growth managers when the profits cycle accelerates.

Exhibit 63: Growth vs. Value performance during the profits cycle (1982-present)
Value tends to outperform Growth when profits accelerate



Russell Investment Group, BofA US Equity & US Quant Strategy

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Because one of the factors influencing nominal earnings growth is inflation, we can assume that during inflationary environments, earnings growth tends to be more abundant and thus value outperforms growth. Therefore, during inflationary periods, the yield curve is steep, and future prospects are expected to be superior to current prospects, thus a value cycle is expected to ensue. Likewise, during deflationary periods when the yield curve is inverted, future prospects are thought to be dimmer than current ones, thus earnings growth is expected to be scarcer in the future, implying that a growth cycle lays ahead. But the key driver for value vs. growth is the profit cycle as depicted in Exhibit 63.

Growth vs. Value benchmark performance

Over the long-term (since 1978), the Russell 1000 Value index has outperformed the Russell 1000 Growth index. However, Growth outperformed Value from 2007 to mid-2020, as the Financial Crisis and its aftermath led to a period where growth became the scarce resource. On an annual basis, growth has beaten Value in 6 of the last 7 years.

Exhibit 64: Large caps: Relative performance (total return) of Growth vs. Value (1978-present)
Value has outperformed Growth in recent months (12/1978 – 4/2022)

Russell Investment Group, BofA US Equity & US Quant Strategy

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Style differentiation has come back

Growth outperformed Value in 2017, 2018, 2019, 2020 and 2021 (leading by +17ppt, +7ppt, +10ppt, +36ppt and +2ppt, respectively). But so far in 2022 Value has led Growth by +14ppt.

Style performance spreads have historically been wider for small caps, suggesting that having a style benchmark view may be more important in this size segment (Exhibit 65).

Exhibit 65: **Avg. rel. return of Growth vs. Value in years where Growth O/P'd, and avg. rel. return of Value vs. Growth in years where Value O/P'd**
Style performance spreads have historically been wider for small caps

	Russell 1000	Russell 2000
Avg. Growth Outperformance (ppt)	10.0	11.6
Avg. Value Outperformance (ppt)	8.9	13.5

Russell, BofA US Equity & US Quant Strategy

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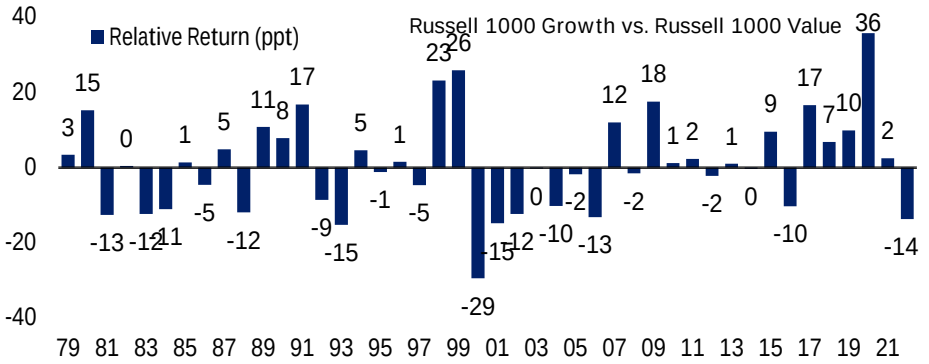
Exhibit 66: Relative return of the Russell 1000 Growth Index vs. the Russell 1000 Value Index, 1979-2022 YTD (as of 4/30/22)
Growth has lagged Value by 14ppt so far in 2022



Source: Russell, BofA US Equity and Quant Strategy

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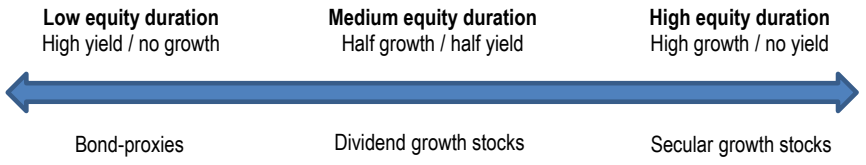
Equity Duration

While the growth and value benchmarks have not always provided meaningfully differentiated returns over the last several years, what might be a more important way to differentiate stocks is by equity duration. We have found that since the 2008/09 credit crisis, both long duration and short duration stocks have grown expensive, where long duration companies can be seen as "delayed gratification" investments, found in younger higher growth industries like Biotechnology. These companies might not generate significant cash flow today, but offer the promise of high growth in the future. Short duration companies are the equivalent of high coupon bonds – these are "cash cows" generally found in mature, ex-growth industries like Utilities or Tobacco.

Since 2008 two attributes have been scarce: growth and yield. Thus the tails of equity duration have both done well, where short duration companies are generally more prevalent in the value benchmark, and long duration companies are generally more prevalent in the growth benchmark.

Exhibit 67: Equities have duration.
Both long- and short-duration stocks are at risk



Source: BofA US Equity & Quant Strategy

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Size

We have also examined stock performance according to size classes defined by market capitalization. We analyze small- and mid-cap stocks in our Small/Mid Cap Strategy work, and incorporate several market capitalization-driven analyses into our research each month.

Nifty Fifty vs. Not-So-Nifty 450

For several years, we have split the S&P 500 index into two distinct groups: the Nifty Fifty (comprised of the top 50 stocks in the S&P 500 by market capitalization) and the Not-So-Nifty 450 (comprised of the S&P 500 excluding the Nifty Fifty stocks.) By examining the performance and characteristics of each group of stocks, we are able to take investment views based on size.

Small vs. Large Stock Performance

Each month we compare small stock versus large stock performance and risk/return characteristics by comparing the Russell 2000 (small) with the S&P 500 (large) and publish the results in the US Performance Monitor.

Size Portfolio

Each month we publish a "small size" screen in Quantitative Profiles that includes the 50 smallest stocks in the S&P 500 by market capitalization.

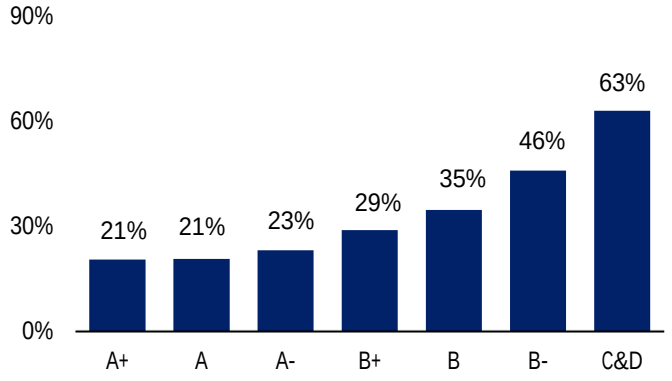
The Profits Cycle and High Quality vs. Low Quality

Expansions and contractions in the profits cycle are almost entirely attributable to the cyclicality and profitability of lower quality stocks. We define quality using Standard & Poor's quality ranks, essentially a ranking of stocks based on earnings growth stability.

Higher quality companies are generally stable companies, and their earnings do not change dramatically enough to alter the entire profits cycle. Moreover, earnings variability is one of the main inputs into the determination of the quality rating assigned

to a company. Therefore, the lower ranked stocks are more variable and, by definition, contribute more to shifts in the profits cycle. When the profits cycle decelerates and earnings growth becomes scarce, relative earnings will begin to favor higher quality companies and high quality should outperform. Likewise, when the profits cycle accelerates and earnings growth becomes more abundant, lower quality companies have better relative earnings than might higher quality companies and thus tend to outperform.

Exhibit 68: Average Performance by Quality When the Profits Cycle Accelerated (Last Five Cycles, 1986-2022)
Low Quality leads when profits accelerate



Source: BofA US Equity and Quant Strategy, Standard & Poor's

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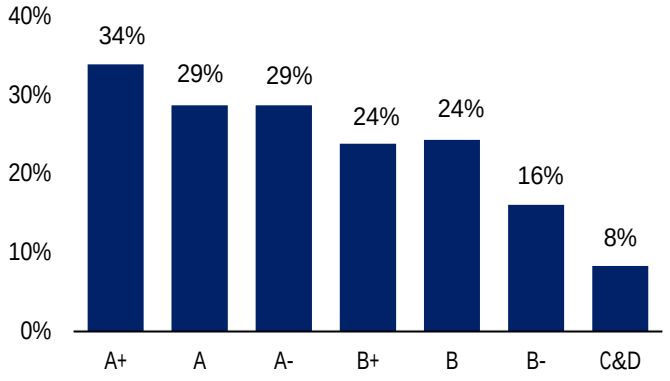
Exhibit 69: Average Performance by Quality When the Profits Cycle Decelerated (Last Four Cycles, 1986-2022)
High Quality leads when profits decelerate



Source: BofA US Equity and Quant Strategy, Standard & Poor's

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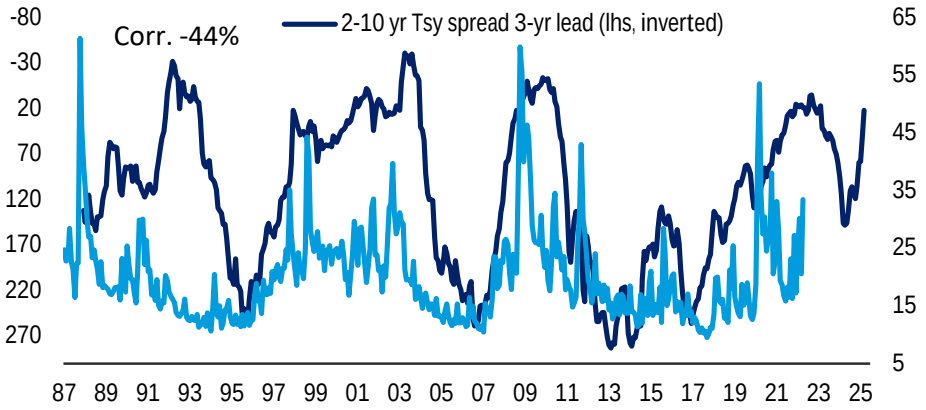
The Profits Cycle and Size

As with lower quality and value investing, small stock investing has historically correlated with levels of nominal growth within the economy. An accelerating profits cycle, therefore, tends to benefit smaller stocks' relative performances.

Volatility

A key driver for risk and quality returns is volatility. Rising volatility typically benefits higher quality, safer companies whereas falling volatility typically benefits lower quality, riskier companies. The yield curve appears to predict volatility, and the rationale for the historical relationship is that volatility may be driven by factors that the yield curve generally forecasts, including growth and risk. A steepening yield curve typically reflects increases in growth expectations and risk appetite, which have a dampening effect on volatility; a flattening yield curve typically reflects decreasing growth expectations and building risk aversion, which tend to have an amplifying effect on volatility.

Exhibit 70: CBOE VIX and Inverted Slope of Yield Curve (Jan 1986 to present)
A flattening yield curve typically reflects decreasing growth expectations and building risk aversion, which tend to have an amplifying effect on volatility



Source: BofA US Equity & Quant Strategy

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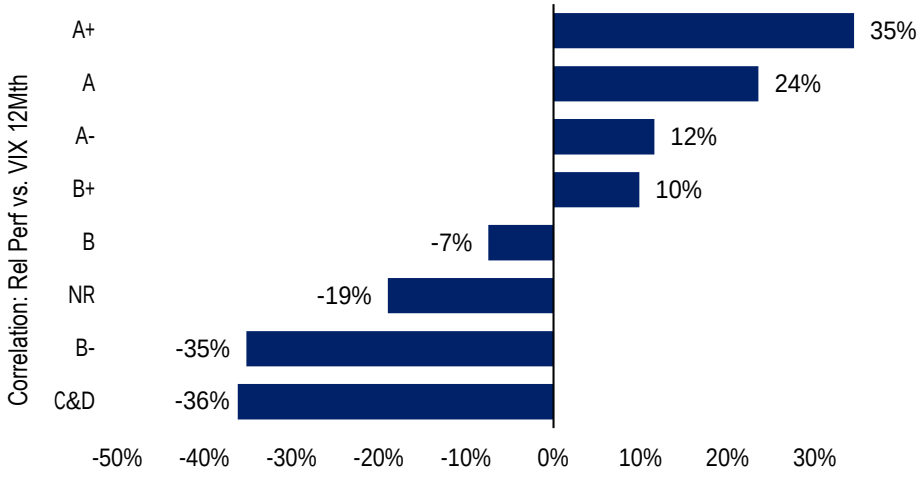
Periods of rising volatility tend to favor higher quality companies, and periods of falling volatility tend to favor lower quality stocks. Moreover, during periods where volatility is at more "normal levels", fundamental strategies tend to outperform both risk and high quality strategies.

Exhibit 71: BofA Quality Indices 12-Mth Performance Correlation to 12-Mth Chg in CBOE VIX (1986-present)
High Quality tends to outperform when volatility raises



Source: BofA US Equity & Quantitative Strategy

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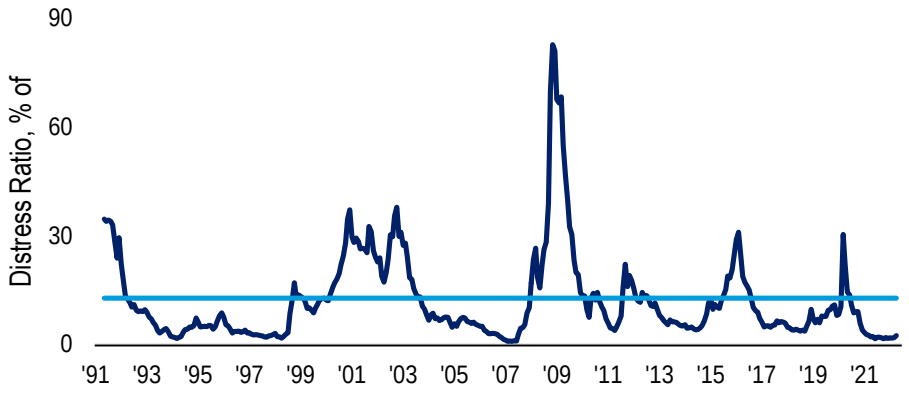
Distress Ratio

The Distress Ratio measures the percentage of bonds in the BofA High Yield universe yielding more than the current 10-yr Treasury note by 1,000 basis points or more on an options adjusted basis. The distress ratio has an established leading relationship to default rates, which tend to be fairly coincident to the profits cycle. In terms of strategy rotation, we have found that companies with high debt to equity ratios tend to outperform when the distress ratio is falling and vice versa.

Exhibit 72: BofA High Yield Distress Ratio
High Yield Distress Ratio is near historic lows



Source: BofA High Yield Research

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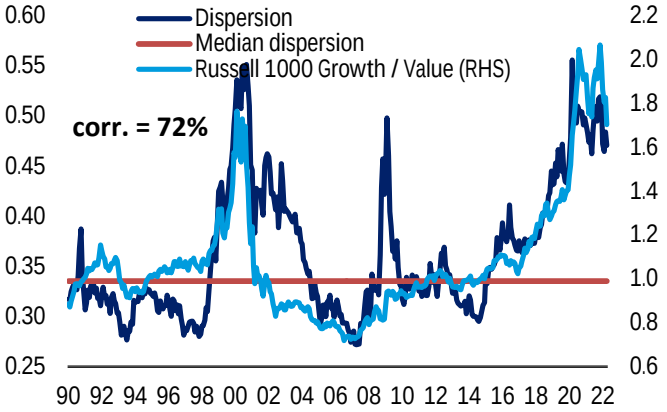
Can the Value rally continue?

Value factors (+30% on avg.) beat Growth factors (+28%) in 2021, with Low Price/Book (+41%) and Low Fwd. P/E (+39%) among the top five factors overall. So far in 2022, Value factors leads Growth by 8.2ppt (as of 5/18/22).

We continue to favor Value over Growth with a focus on Free Cash Flow, where FCF/EV has been the best Value factor during Late Cycle regimes (our Discount Model, which more explicitly incorporates rising rate risks, also fared well). Other reasons to favor Value: valuation dispersion remains near record highs, (Exhibit 73); Value stocks' valuations are historically inexpensive (Exhibit 74, Exhibit 77); and positioning remains favorable (Exhibit 75, Exhibit 76). Value also tends to lead in the first 12 months of Fed tightening cycles (Exhibit 78).

Exhibit 73: Valuations dispersion remains extremely elevated
S&P 500 valuation dispersion of forward P/E (std. dev / avg) vs. rel. perf. of Russell 1000 Growth over Value (1990-4/2022)



Source: FactSet, BofA US Equity & Quant Strategy

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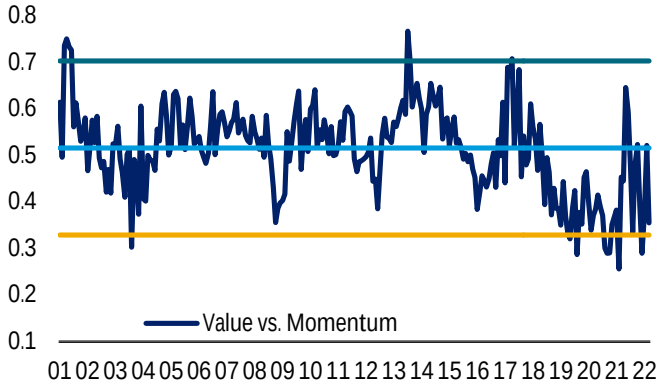
Exhibit 74: Value trades near historic low vs Momentum
Relative Fwd P/E of Value (Forward P/E) vs Momentum (12-mth plus 1-mth), 2/2001 – 4/2022



Source: FactSet, BofA US Equity & Quant Strategy

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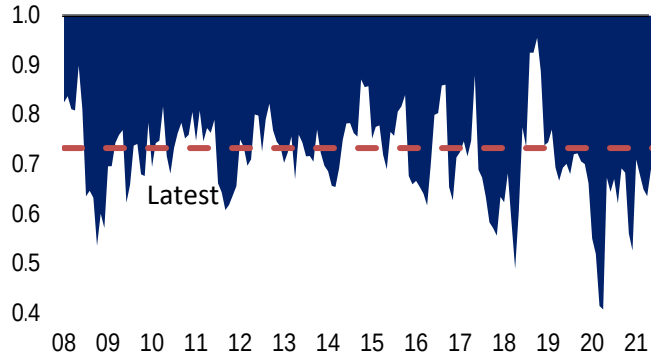
Active funds are still underweight the Value sectors of Energy & Financials

Exhibit 75: Investors are still ~30% underweight Value vs. Growth
Active managers' relative exposure in Low Price to Book vs. High Long-Term EPS Growth (2008-4/22)



Source: BofA US Equity & Quant Strategy, FactSet Ownership

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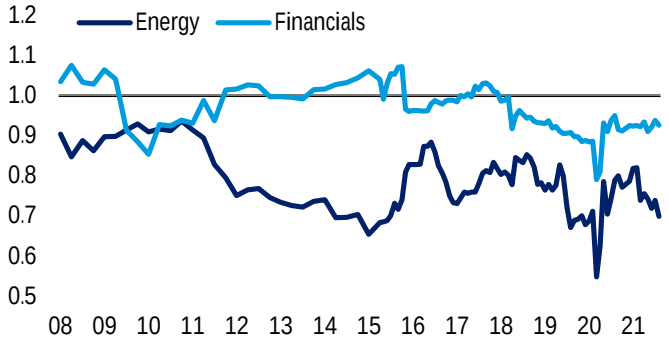
Exhibit 76: Financials and Energy are still underweight by investors
Active managers' relative exposure in Energy & Financials vs. S&P 500 (2008-4/22)



Source: BofA US Equity & Quant Strategy, FactSet Ownership

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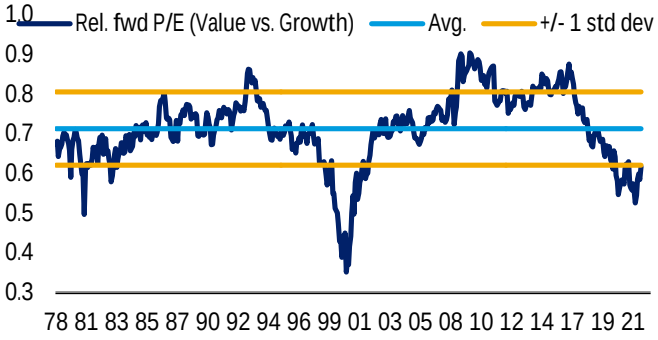
Exhibit 77: Value still trades at a steep discount vs. Growth despite the recent strength
Relative Fwd P/E of Russell 1000 Value vs. Growth (1978-present)



Source: BofA US Equity & Quant Strategy, FactSet

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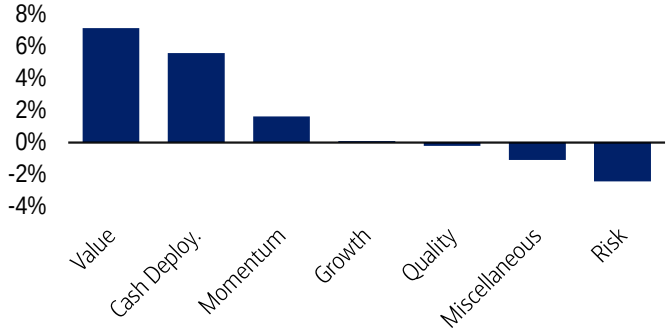
Exhibit 78: Value factors fared best during first 12m of tightening cycle, outperforming the equal-weighted S&P 500 index by 7ppt
Factor group annualized median relative return when the Fed tightens (1986 – 2017, ex Tech bubble 1999 – 2000 cycle)



Source: BofA US Equity & Quant Strategy, FactSet

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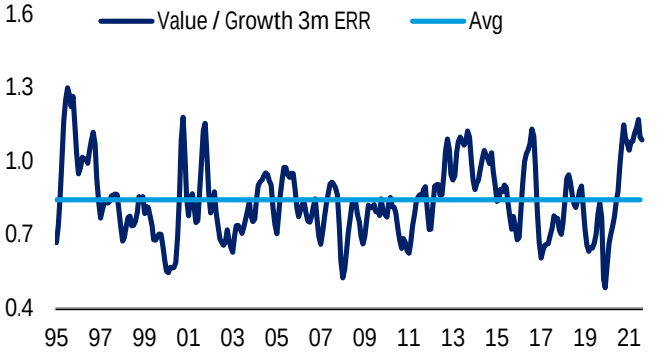
Exhibit 79: Stronger earnings revision breadth in Value
Russell 1000 Value vs Growth relative three-month earnings revision ratio (3m ERR), 1995-4/30/2022



Source: FactSet, BofA US Equity & Quant Strategy

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Six reasons to focus on dividend yield

Welcome to a total return world. In a year for which our S&P 500 target implies the first year of losses since 2018 and a year in which our 10yr outlook for the S&P 500 (note) vacillates between negative and positive low single digit annualized price returns, total return is paramount. Historically (since 1936), dividends have contributed 36% of total returns (Exhibit 80).

Short duration leads amid rising interest rates. As the equity risk premium (ERP) and real interest rates rise, discounted cash flow (DCF) math tells us that short duration stocks should beat long duration stocks (Exhibit 81).

Dividend Yield has scarcity value. The payout ratio is bumping along at a record low after two years during which dividend growth dramatically lagged earnings growth (Exhibit 82).

Dividends = inflation-protected yield. Earnings are nominal. Sectors that are positively correlated to inflation, with growing yields, may be the best option in an environment of still scarce yield and inflation risks looming large. Note that the sectors that have outperformed this year are higher yield inflation beneficiaries like Energy and Materials.

Cash is king in a tightening environment. Short-term rates continue to increase and the Fed Funds target rate is slated to rise by three full percentage points in a short period of time. The opportunity cost for stocks vs. cash has reversed from prior years, and bird-in-the-hand stocks will likely continue to lead (see: 10 reasons for dividend growth).

Regime Indicator says this will continue. High Dividend Yield has performed well during Late Cycle regimes (where we still sit), generating +6.7ppt of alpha with a 75% hit rate (Exhibit 127).

Exhibit 80: S&P 500 price return and dividend contributions to total return
1936 - present

Source: FactSet, BofA US Equity & Quant Strategy

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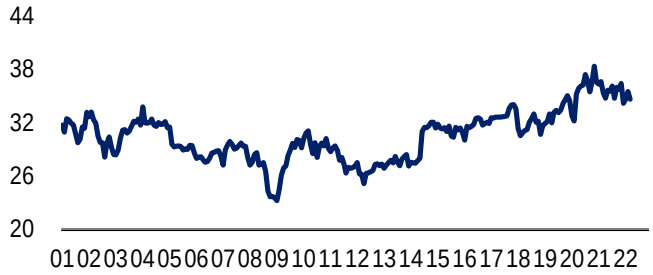
Dividends have contributed 36% of total returns since 1936 but just 14% since 2013.

Exhibit 81: The last time we saw the Fed tighten, duration was three years lower than it is today
S&P 500 equity duration 2001-4/30/22



Source: FactSet, BofA US Equity & Quant Strategy

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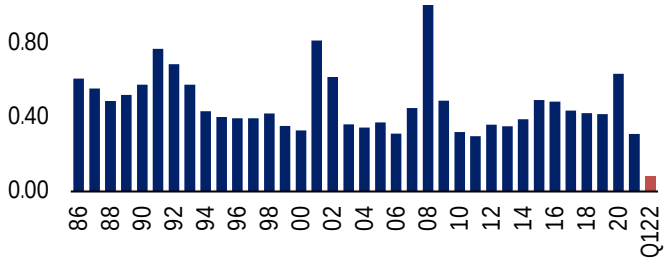
Exhibit 82: S&P 500 dividend payouts have nowhere to go but up, based on history
S&P 500 Dividend Payout ratio 1986-1Q22



Source: FactSet, BofA US Equity & Quant Strategy

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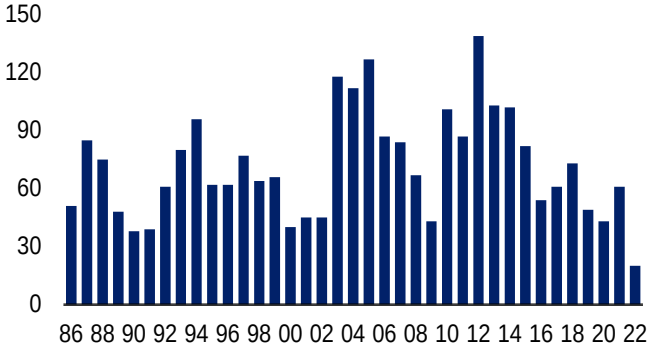
Exhibit 83: New dividends have scarcity value
The number of Russell 3000 companies initiating dividends 1986-YTD'22



Source: FactSet, Bloomberg, BofA US Equity & Quant Strategy

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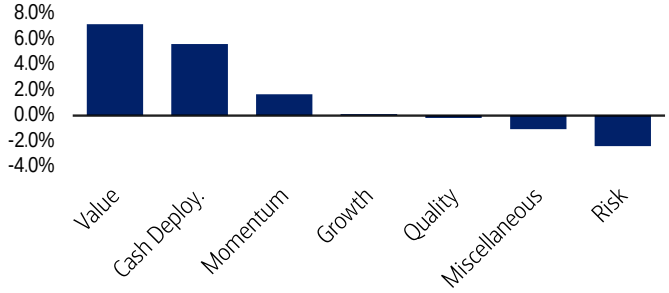
Exhibit 84 Value factors fared best during first 12m of tightening cycle, outperforming the equal-weighted S&P 500 index by 7ppt
Factor group annualized median relative return when the Fed tightens (1986 – 2017, ex Tech bubble 1999 – 2000 cycle)



Source: FactSet, BofA US Equity & Quant Strategy

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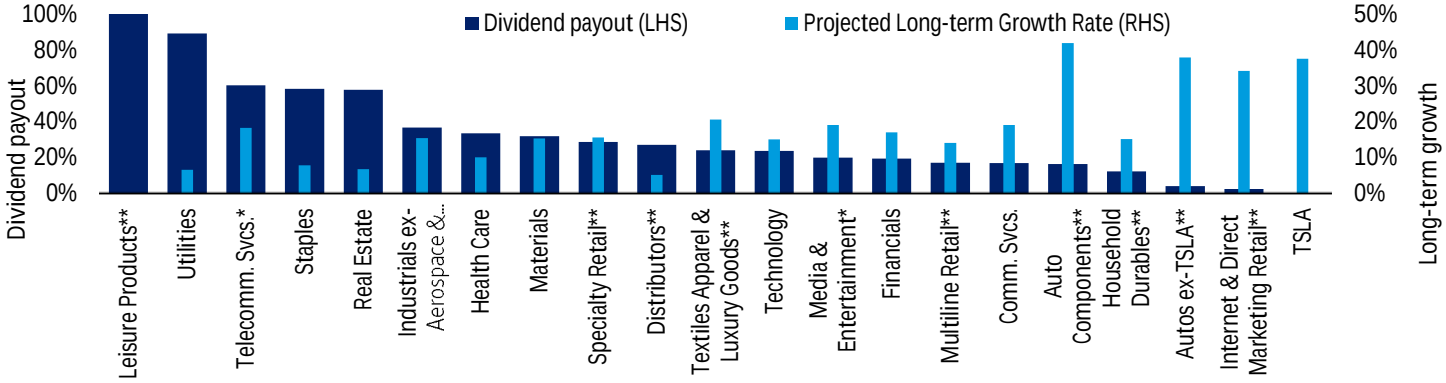
Exhibit 85: Leisure Products and Utilities pay most in dividends and are expected to grow EPS slower than peers
S&P 500 dividend payout ratios and projected long-term growth rates as of 5/6/22



Note: *denotes industry groups in Comm. Svcs.; **denotes industry groups in Cons. Disc.; Energy, Hotels Restaurants & Leisure, and Aerospace and Airlines excluded due to non-earners
Source: BofA US Equity & US Quant Strategy

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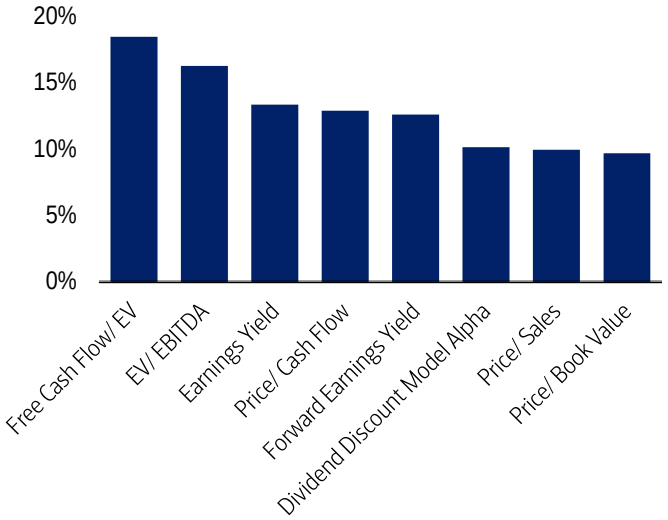
Exhibit 86: High Free Cash Flow to EV was best performing Value factor before the GFC
Factor performance May 1986 – December 2007



Source: BofA US Equity & US Quant Strategy

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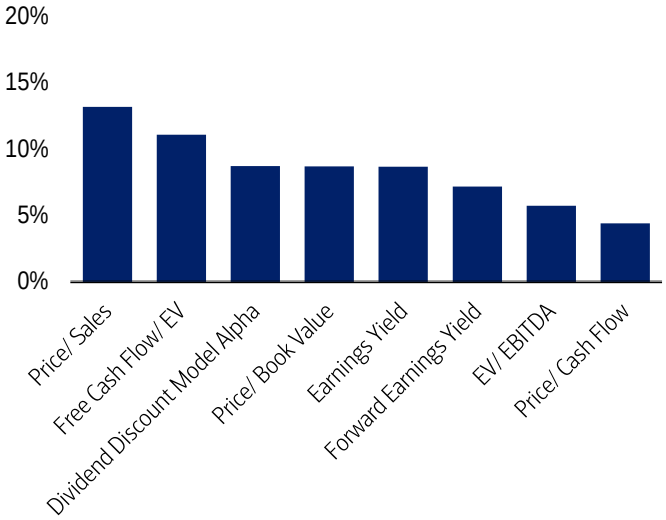
Exhibit 87: Price / Sales was best performing Value factor from 2010 to 2020
Factor performance January 2010 – December 2020



Source: BofA US Equity & US Quant Strategy

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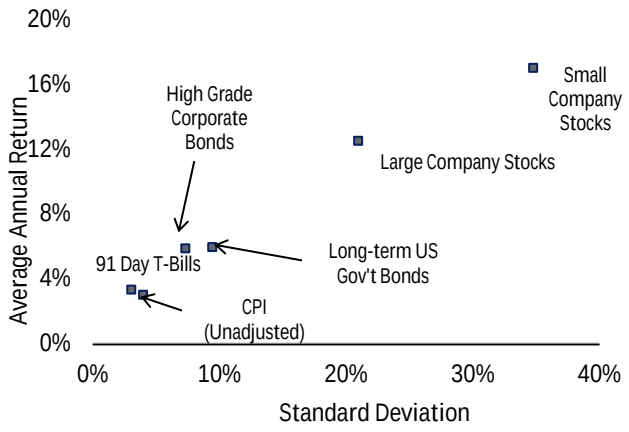
Measuring risk

We believe that there are two basic definitions of risk. The classic or academic definition of risk is the uncertainty of the return of an investment. Standard deviation or volatility of returns is the measurement most often used to quantify this unpredictability.
The other definition of risk is the probability of losing money. Our work suggests that, in practice, investors tend to be more concerned with the probability of losing money than they are with the predictability of return. Therefore, we prefer to define performance risk in much of our work as the probability of a negative return.

Exhibit 88: Risk Reward Characteristics (1925 to April 2022)
Small Caps delivered highest returns, but at the highest volatility level...



Source: BofA US Equity and Quant Strategy

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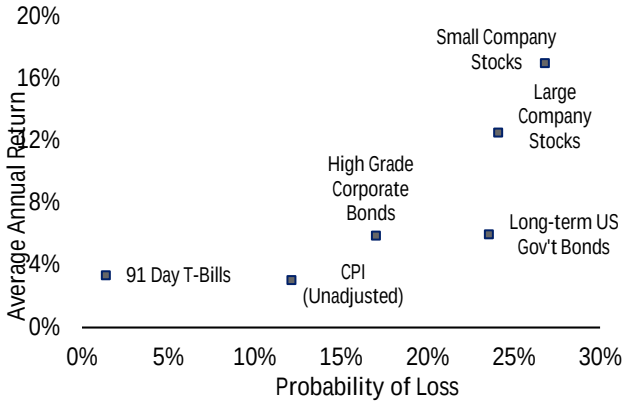
Exhibit 89: Downside Risk Reward Characteristics (1925 to April 2022)
...and the highest probability of loss



Source: BofA US Equity and Quant Strategy

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Long-short risk reward characteristics

For long-short screens, we track the average spread (or absolute return) of the strategy but consider the tradeoff as the consistency of this return being positive. Thus, we assess risk-reward for long short strategies as the average spread in returns versus the probability of the long screen outperforming the short screen, which we gauge as the percentage of periods during which the long-short spread was positive.

Risk-adjusted factor returns

Prudent investors cannot simply consider absolute returns, but must also consider potential returns on a risk-adjusted basis (see Appendix for risk-adjusted returns for the Russell 1000 factors). Contrary to traditional financial theory, taking on excess risk does not generate higher returns when it comes to factor performance. Among the general categories of Growth, Value, Quality, Cash Return and Risk, risk strategies (including high beta, high variability of earnings, and others) comprise the worst performing group based on absolute returns, as well as risk-adjusted returns. In the 22 years leading up to the financial crisis, every risk strategy we follow underperformed its benchmark.

For Russell 1000 factor sensitivity, please see the Appendix.

Exhibit 90: Factor performance 1986 to present
Absolute and risk-adjusted performance and risk characteristics

Factor	Average Annualized Return	Avg. 12m Excess Return vs. S&P 500	Sharpe Ratio vs. 10y Tsy	Sharpe Ratio vs. S&P 500	Probability of loss	Probability of underperforming S&P 500	Volatility (Ann'zed)	Maximum Drawdown	Downside Volatility, Ann'zed
Free Cash Flow/ EV	16.8%	5.1%	0.69	0.62	16.0%	30.7%	20.1%	-56.0%	15.3%
Most Active	16.3%	5.8%	0.63	0.40	19.6%	34.4%	22.0%	-63.6%	16.4%
EV/ EBITDA	15.8%	4.5%	0.61	0.42	19.8%	34.7%	22.1%	-59.5%	16.9%
Price/ Free Cash Flow	14.9%	3.6%	0.58	0.38	19.6%	36.6%	21.6%	-65.2%	17.5%
Share Repurchase	14.6%	2.6%	0.63	0.42	18.2%	38.2%	17.9%	-50.5%	14.7%
Short Interest	14.2%	2.5%	0.70	0.47	12.8%	34.4%	16.5%	-47.6%	12.7%
Price Return - 12-mth and 1-mth Reversal	14.1%	2.3%	0.59	0.18	14.6%	34.4%	18.8%	-56.5%	15.4%
Price/ Sales	14.1%	4.0%	0.50	0.24	24.1%	41.5%	24.6%	-70.0%	18.3%
Earnings Yield	14.0%	3.1%	0.53	0.31	20.0%	40.1%	21.9%	-68.7%	17.4%
5yr ROE Adj	13.8%	2.0%	0.59	0.18	15.3%	43.2%	17.8%	-44.3%	13.2%
Price Return - 9-mth Perf.	13.7%	2.3%	0.56	0.08	18.4%	41.3%	19.2%	-54.2%	14.3%
1yr ROE Adj	13.7%	1.8%	0.60	0.16	18.9%	42.5%	17.3%	-51.0%	12.7%
1yr ROE	13.7%	1.3%	0.61	0.16	15.3%	39.6%	16.6%	-45.8%	12.5%
ROC	13.6%	1.5%	0.60	0.14	19.1%	39.9%	16.9%	-47.1%	12.3%
P/E-to-Growth	13.6%	2.6%	0.50	0.23	25.2%	41.3%	23.0%	-69.6%	17.5%
ROA	13.4%	1.5%	0.57	0.11	18.9%	45.5%	17.8%	-50.2%	12.8%
Price Return - 11-mth Perf.	13.4%	2.3%	0.54	0.07	21.2%	41.7%	19.8%	-56.2%	15.1%
Forward Earnings Yield	13.4%	3.4%	0.48	0.18	25.7%	43.6%	24.6%	-74.1%	19.0%
Price Return - 12-mth Perf.	13.3%	1.9%	0.54	0.05	19.3%	42.9%	19.2%	-53.7%	14.3%
5y ROE	13.2%	1.1%	0.59	0.12	16.3%	41.0%	16.7%	-43.6%	12.6%
Relative Strength - 10wk/40wk MA	13.1%	1.7%	0.53	0.03	19.3%	44.1%	18.7%	-56.1%	13.5%
Price/ Cash Flow	13.0%	1.9%	0.47	0.15	24.1%	40.6%	23.1%	-60.5%	18.2%
Relative Strength - 5wk/30wk MA	12.9%	1.1%	0.54	0.02	17.5%	46.7%	17.9%	-48.8%	12.7%
Relative Strength - 30wk/75wk MA	12.8%	1.8%	0.49	0.03	21.5%	46.9%	20.6%	-59.6%	16.2%
Dividend Yield	12.6%	1.8%	0.48	0.04	22.2%	52.1%	21.0%	-77.7%	17.1%
Price to Moving Average (200 day)	12.4%	0.7%	0.51	-0.03	19.1%	50.5%	17.7%	-51.4%	12.9%
Dividend Growth	12.3%	0.1%	0.50	0.03	22.2%	48.3%	18.2%	-56.1%	14.1%
Price Return - 3-mth Perf.	12.1%	0.5%	0.49	-0.03	20.3%	49.3%	18.2%	-55.7%	13.0%
Size	12.1%	1.8%	0.42	0.09	28.8%	53.3%	25.8%	-68.7%	18.8%
Eq. Wtd. S&P 500	12.1%	na	0.51	na	17.5%	na	17.2%	-55.7%	13.6%
Low Price	12.1%	2.8%	0.40	0.09	27.6%	52.4%	28.8%	-68.8%	20.3%
EPS Estimate Revisions	12.0%	0.8%	0.46	0.01	25.0%	44.6%	20.2%	-60.5%	15.6%
Neglect - Institutional Ownership	12.0%	-0.2%	0.50	-0.05	18.9%	55.7%	17.3%	-55.2%	13.7%
Price/ Book Value	11.9%	2.7%	0.41	0.07	25.7%	44.8%	26.3%	-82.6%	20.0%
Earnings Torpedo	11.9%	1.0%	0.42	0.03	20.8%	50.2%	22.7%	-65.7%	16.0%
Price Return - 12-mth and 1-mth Performance	11.9%	-0.1%	0.50	-0.07	19.8%	50.7%	17.2%	-52.5%	12.9%
Neglect - Analyst Coverage	11.5%	0.2%	0.52	-0.03	20.9%	47.5%	17.5%	-60.2%	13.5%
Earning Momentum	11.2%	-0.4%	0.44	-0.10	23.8%	53.3%	18.9%	-59.6%	15.0%
Beta	10.3%	2.0%	0.34	0.01	31.1%	53.5%	31.1%	-81.0%	22.4%
Proj. 5yr EPS Growth	9.8%	0.0%	0.33	-0.10	24.8%	57.5%	25.3%	-82.0%	19.2%
Variability of Earnings	9.3%	-1.7%	0.32	-0.25	27.8%	57.1%	21.8%	-65.1%	16.7%
Estimate Dispersion	8.3%	-1.0%	0.27	-0.14	30.0%	57.5%	28.1%	-74.5%	19.8%

Source: BofA US Equity & Quant Strategy

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Macro matters

Exhibit 91: S&P 500 factors: Correlation vs. macro factors
1986-present

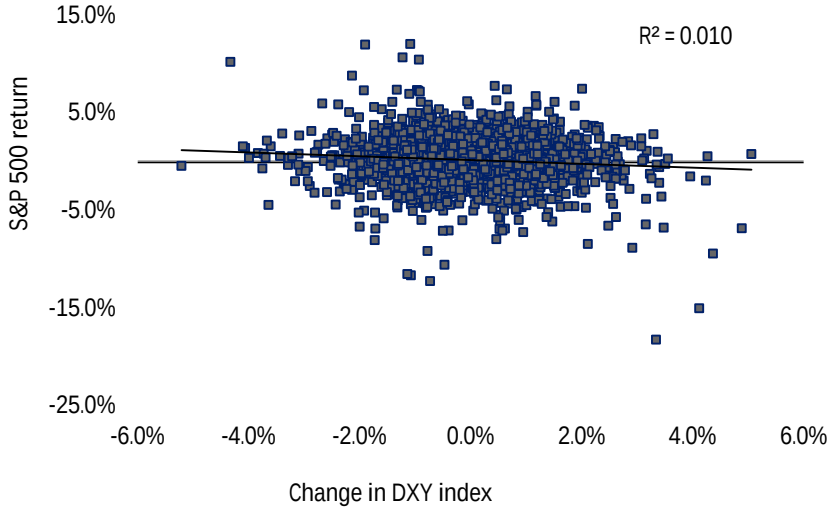
	Interest Rates			Currency	Inflation	Commodity Prices	Economy	Market Volatility	Corporate Profits	Credit Quality
Factor	10yr Tsy Nominal Yld	10yr Tsy Real Yield	2s10s Tsy curve	Trade Wtd. USD	CPI	WTI	GDP Growth	VIX	Profit Cycle	Credit Spread
Earnings Yield	0.29	0.06	0.09	-0.02	0.13	0.10	0.35	-0.46	-0.07	-0.48
Forward Earnings Yield	0.40	0.14	0.12	-0.14	0.07	0.10	0.29	-0.46	-0.09	-0.67
Dividend Yield	0.01	-0.24	0.18	-0.08	0.04	0.16	0.28	-0.32	-0.08	-0.49
Price/ Book Value	0.42	0.09	0.15	-0.15	0.04	0.21	0.31	-0.52	-0.09	-0.72
Price/ Cash Flow	0.38	0.12	0.04	-0.26	0.23	0.21	0.37	-0.32	0.07	-0.26
Price/ Free Cash Flow	0.00	-0.13	0.19	-0.11	0.05	-0.02	0.34	-0.24	0.00	-0.27
Price/ Sales	0.28	-0.03	0.20	-0.13	-0.20	0.07	0.22	-0.31	-0.28	-0.71
EV/ EBITDA	0.34	0.18	0.02	-0.26	0.25	0.19	0.37	-0.30	-0.02	-0.30
Free Cash Flow/ EV	-0.03	-0.08	0.22	-0.09	0.07	0.04	0.34	-0.09	-0.11	-0.10
Relative Strength - 30wk/75wk MA	0.20	0.22	-0.35	0.02	0.13	0.16	0.47	0.05	0.15	0.27
Relative Strength - 5wk/30wk MA	0.26	0.23	-0.15	0.06	0.12	0.34	0.45	0.08	0.15	0.30
Relative Strength - 10wk/40wk MA	0.22	0.24	-0.24	0.04	0.05	0.26	0.50	0.11	0.21	0.27
Price to Moving Average (200 day)	0.19	0.23	-0.18	0.11	0.09	0.23	0.43	0.18	0.12	0.39
Price Return - 12-mth Perf.	0.15	0.24	-0.30	0.13	0.09	0.12	0.48	0.10	0.14	0.36
Price Return - 9-mth Perf.	0.19	0.25	-0.29	0.07	0.07	0.18	0.47	0.11	0.20	0.34
Price Return - 3-mth Perf.	0.32	0.20	-0.11	-0.02	0.09	0.31	0.39	0.03	0.05	0.14
Price Return - 11-mth Perf.	0.16	0.21	-0.29	0.08	0.08	0.14	0.49	0.08	0.13	0.30
Price Return – 12m and 1m Perf.e	0.08	0.18	-0.18	0.18	0.07	0.08	0.37	0.18	0.07	0.45
Price Return – 12m and 1m Reversal	0.01	0.17	-0.30	0.08	0.02	-0.07	0.51	0.13	0.27	0.34
Most Active	0.43	0.20	-0.06	-0.18	0.08	0.30	0.39	-0.22	-0.10	-0.27
Low Price	0.37	0.06	0.25	-0.17	-0.10	0.17	0.25	-0.40	-0.16	-0.63
Earning Momentum	0.42	0.33	-0.28	-0.14	0.09	0.17	0.41	-0.10	0.15	0.00
Proj. 5yr EPS Growth	0.40	0.22	-0.19	-0.19	0.04	0.31	0.36	-0.08	0.13	-0.10
Earnings Torpedo	0.24	-0.08	0.07	-0.19	-0.06	0.21	0.21	-0.28	-0.15	-0.62
EPS Estimate Revisions	0.53	0.39	-0.33	-0.12	0.32	0.41	0.51	-0.12	0.22	-0.01
Dividend Growth	-0.01	-0.10	-0.13	-0.16	0.26	0.15	0.34	-0.03	0.15	-0.16
P/E-to-Growth	0.41	0.13	0.04	-0.08	0.15	0.14	0.36	-0.37	0.08	-0.49
1yr ROE	-0.40	-0.06	0.08	0.04	0.09	-0.15	0.32	0.39	-0.11	0.59
5y ROE	-0.37	-0.08	0.05	0.17	-0.08	-0.14	0.32	0.34	-0.04	0.51
1yr ROE Adj	-0.10	0.01	-0.03	-0.07	0.11	0.00	0.29	0.30	-0.05	0.36
5yr ROE Adj	-0.10	-0.03	0.05	0.01	-0.04	0.00	0.29	0.23	-0.12	0.33
ROA	-0.03	0.00	-0.04	-0.02	0.07	0.09	0.32	0.27	-0.09	0.35
ROC	-0.18	-0.03	-0.02	-0.01	0.04	-0.05	0.30	0.31	-0.07	0.41
Beta	0.52	0.15	0.00	-0.22	0.02	0.36	0.32	-0.36	-0.08	-0.52
Variability of Earnings	0.48	0.17	0.01	-0.32	0.08	0.27	0.33	-0.36	0.00	-0.53
Estimate Dispersion	0.53	0.12	0.03	-0.31	0.06	0.43	0.36	-0.44	0.00	-0.57
Neglect - Analyst Coverage	-0.08	-0.05	0.20	-0.04	-0.17	-0.22	0.34	-0.01	-0.11	-0.16
Neglect - Institutional Ownership	-0.32	-0.18	0.04	0.17	-0.02	-0.18	0.32	0.12	-0.07	0.13
Size	0.31	-0.03	0.24	-0.23	-0.11	0.20	0.23	-0.38	-0.20	-0.67
Share Repurchase	-0.02	0.05	0.28	0.00	0.18	0.05	0.37	-0.04	-0.02	0.08
Short Interest	-0.17	-0.07	0.42	-0.08	-0.08	-0.08	0.41	0.09	-0.24	0.20

Source: BofA US Equity & Quant Strategy

Macro focus: the US Dollar impact

Regressing weekly returns of the S&P 500 vs. the US dollar (DXY index) since 1979 reveals that moves in the dollar have virtually no explanatory power on returns over the long-term (R^2 of zero). This is partly due to the fact that—much like with interest rates—the relationship between equities and the dollar has changed over time. For example, US stocks are much more global today than twenty years ago. Another reason is that the growth backdrop may be more important: some periods of a strengthening dollar have been accompanied by weakening growth, where the dollar strength may have been driven by a flight to safety. Other periods of dollar strengthening may have been accompanied by more robust growth.

Exhibit 92: Change in DXY index vs. S&P 500 (weekly) since 1979
The dollar has virtually no explanatory power on returns over the long-term



Source: Bloomberg, S&P, BofA US Equity & Quant Strategy

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Dollar cycles can be persistent

Exhibit 93: Performance based on size segment has been inconsistent in secular uptrends for the USD
Dollar strength cycles 1978-present as of 4/30/22

	10/78-3/85	6/95-2/02	6/14-12/16	1/18-3/20	5/21-present
Small Caps	296.1	64.8	13.8	-26.8	-17.8
Large Caps	159.8	103.2	14.2	-8.5	-1.7
Rel Performance (Small vs Large)	52.5	-18.9	-0.4	-20.0	-16.4

Based on performance of Russell 2000 vs. S&P 500 for more recent three periods and CRSP for 1078-85 period
'Source of historical returns: CRSP®, Center for Research in Security Prices. Graduate School of Business, The University of Chicago. Used with permission. All rights reserved. www.crsp.uchicago.edu
The performance has been calculated by BofA US Equity & Quant Strategy. All rights reserved.
Source: CRSP; Bloomberg, Federal Reserve Bank; BofA US Equity & Quant Strategy

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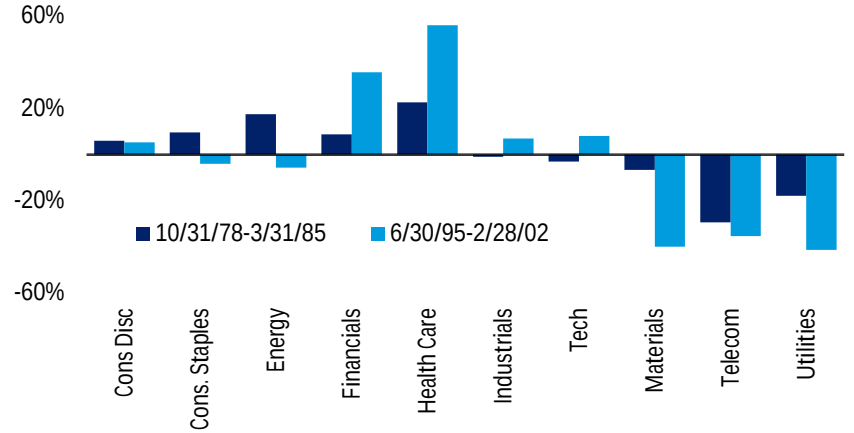
One notable observation with the USD is the persistence of its secular tendency - a trend, once started, can last for many years. In fact, the USD has completed only four major cycles in the last 40+ years. Both the 1978-1985 and the 1995-2002 cycles lasted 16 years. So what works in these secular dollar uptrends?

One common misconception is that because small caps are more tied to the US economy and have lower foreign exposure, they should outperform large caps in a rising dollar environment. But this has not always been the case. Small caps outperformed large caps during the '78-'85 dollar uptrend, but underperformed during the last several dollar uptrends (Exhibit 93).

At the sector level, in the two major periods of secular dollar strength (1978-85 and 1995-2002), Financials outperformed and Materials underperformed the S&P 500 in both periods, which we also found to be true for small caps. We also saw outperformance from Health Care and Discretionary and underperformance from Telecom and Utilities in both periods within the S&P 500, with the largest outperformance from Health Care in both periods. The consistent underperformance of both a globally-oriented sector (Materials) and domestically-oriented sectors (Telecom and Utilities) suggests that the economic backdrop may be a more important determinant of performance.

Exhibit 94: Within the S&P 500, Discretionary, Financials and Health Care outperformed in both rising dollar time periods, while Materials, Telecom and Utilities underperformed
Sector performance in the two major periods of secular dollar strength



Source: S&P, FactSet, Bloomberg, BofA US Equity & Quant Strategy

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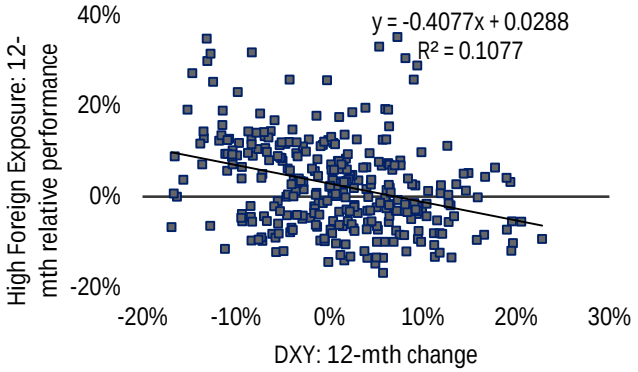
There has been a weak historical negative relationship between foreign exposed stocks and strong dollar backdrops (Exhibit 95) and a slightly stronger relationship between more domestically oriented stocks and strong dollar backdrops (Exhibit 96). But the relationship has not been strong enough to justify a uniform penalty or reward assigned to stocks based on this attribute. Many companies with foreign exposure have natural or financial hedges in place to offset currency risk, and also tend to be larger and more defensive businesses, thus may be likely to withstand a downturn better than their smaller counterparts, where downturns are generally accompanied by a flight to quality mentality which tends to bolster the US dollar. Moreover, domestic companies may not disclose their foreign sales, or may have a large chunk of revenue associated with multinational companies that supply overseas and thus carry indirect currency risk based on end user demand weakening.

Exhibit 95: High Foreign exposure performance vs. USD
Based on 1995 – present performance



Source: Bloomberg, BofA US Equity and Quant Strategy

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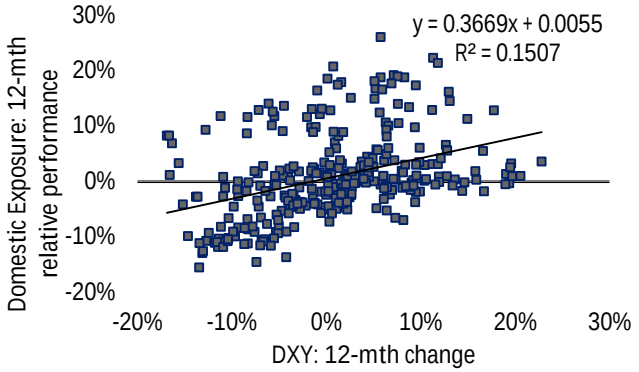
Exhibit 96: Domestic exposure performance vs. USD
Based on 1995 – present performance



Source: Bloomberg, BofA US Equity and Quant Strategy

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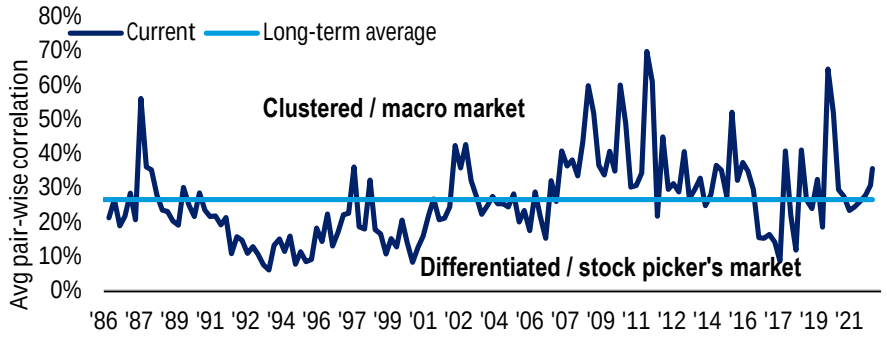
Roadmap to picking stocks

Stock differentiation

The following chart includes our measure of clustered versus differentiated equity markets. We measure this by the average correlation of every pair of companies' daily price returns each quarter within the S&P 500. A high correlation implies that stocks are more clustered, whereas a low correlation implies that companies are more differentiated. This measure serves as a gauge of the potential opportunity for stock selection to generate excess returns.

Exhibit 97: Avg. pair-wise stock correlations based on 90-day periods, daily frequency
Correlations above historic average



Source: BofA US Equity and Quant Strategy

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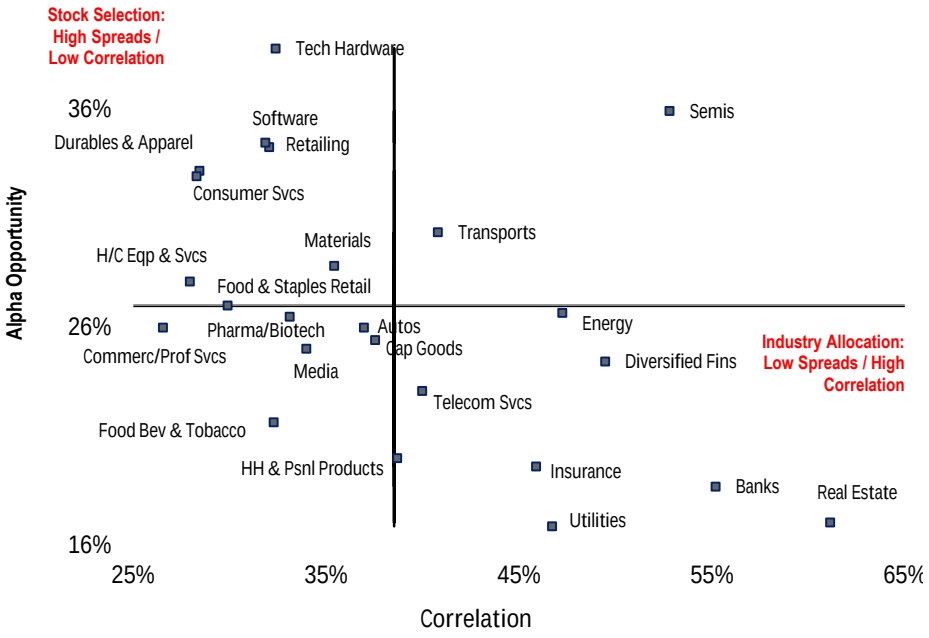
Stock selection within sectors

When correlations are high, we believe fundamental analysis can still be rewarded by focusing on industries that may offer better stock selection opportunity. When stocks within an industry are highly correlated, it is likely that performance is attributable to some external factor rather than company specifics. In these cases, making an industry call may be more important than a stock call. For example, the high correlation among Energy stocks can be explained by oil prices; for Banks and Insurance, correlations may be explained by rates or the yield curve; and for Semis, global GDP may be a key driver of correlations.

Similarly, when a stock has a very low level of dispersion in returns, the amount of alpha or excess return that can be generated from pair trades is capped at a lower level. Thus, fundamental analysis may be more fruitful when focusing on industries with low intra-stock correlations and high dispersion of returns. For example, groups with brand differentiation (Retail) or secular stories (Tech) have offered lower correlation and higher dispersion of returns historically.

Exhibit 98: Historical Intra-stock correlation vs. performance spread (3Q86 to 1Q22)
Tech Hardware and Software are among best industries for stock selection



Source: BofA US Equity & US Quant Strategy

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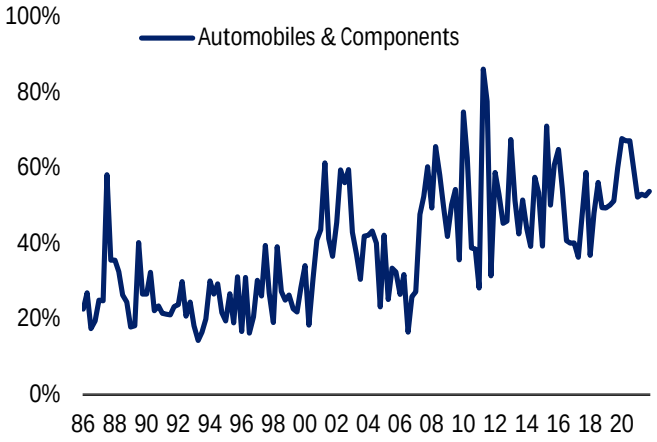
Below we provide historical charts of correlations within industry groups, which illustrate where stocks are most clustered or differentiated and how these relationships have changed over time. For example, Banks have exhibited an increase in correlations over the last two decades, while correlations among Telecom stocks have remained more stable. All charts are based on the average daily pair-wise correlation of all stock combinations within the group each quarter.

Exhibit 99: Automobiles & Components
Correlations declined, but remain elevated



Source: BofA US Equity & Quant Strategy

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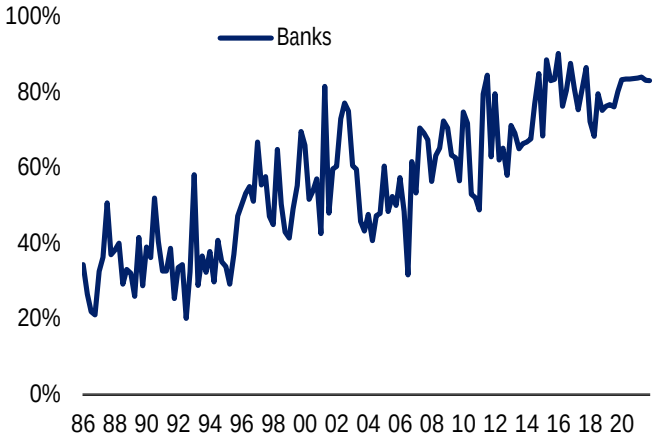
Exhibit 100: Banks
Correlations remain near historic highs



Source: BofA US Equity & Quant Strategy

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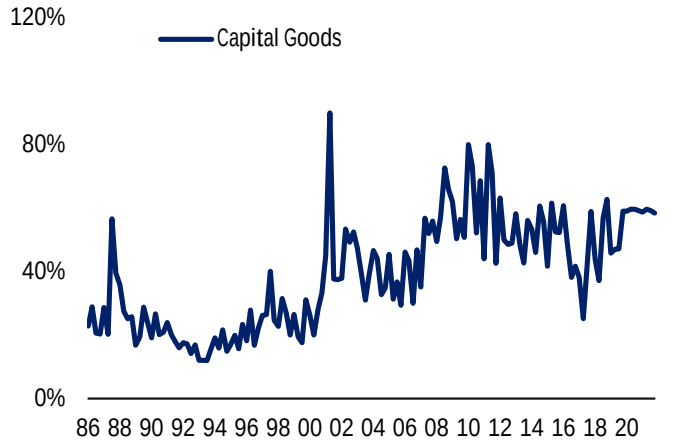
Exhibit 101: Capital Goods
Correlations remain elevated



Source: BofA US Equity & Quant Strategy

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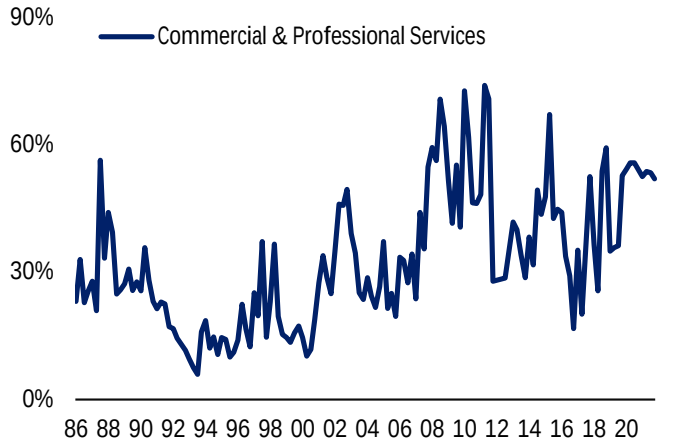
Exhibit 102: Commercial & Professional Services
Correlations remain elevated but edged lower in recent months



Source: BofA US Equity & Quant Strategy

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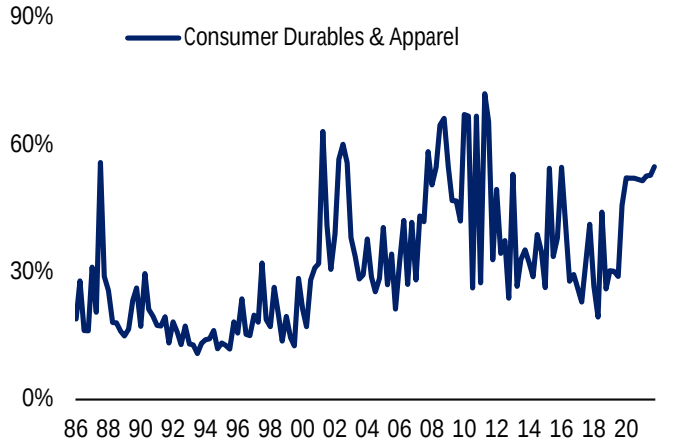
Exhibit 103: Consumer Durables & Apparel
Correlations remain elevated and edged higher in recent months



Source: BofA US Equity & Quant Strategy

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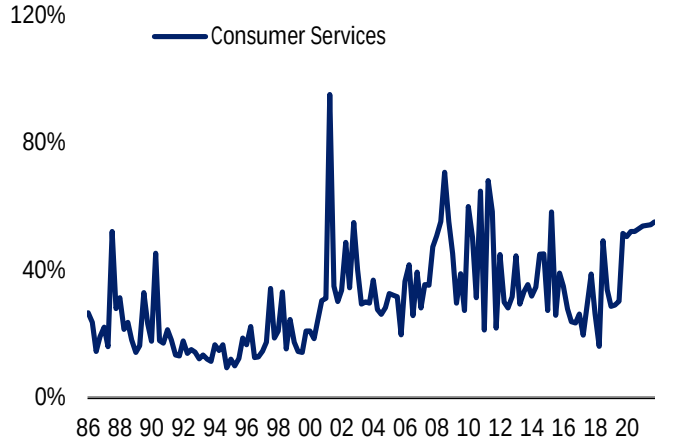
Exhibit 104: Consumer Services
Correlations remain elevated and edged higher in recent months



Source: BofA US Equity & Quant Strategy

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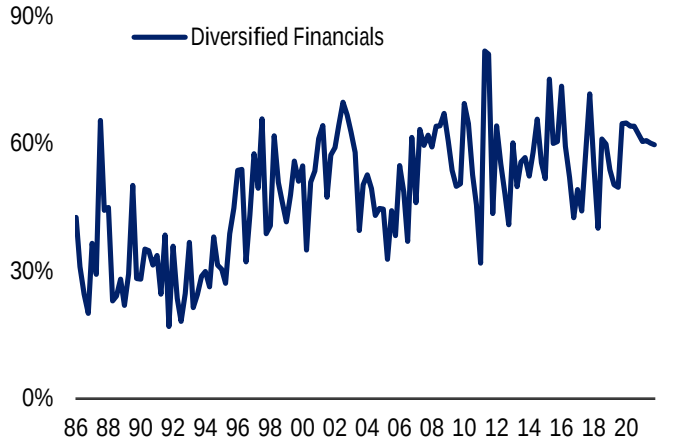
Exhibit 105: Diversified Financials
Correlations have edged lower in recent months



Source: BofA US Equity & Quant Strategy

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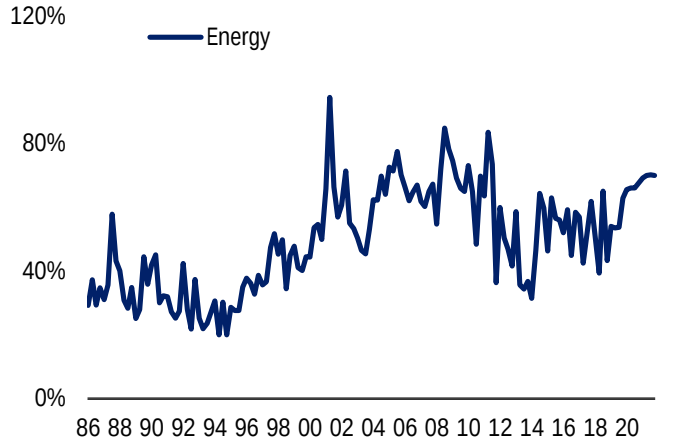
Exhibit 106: Energy
Correlations have risen in recent months



Source: BofA US Equity & Quant Strategy

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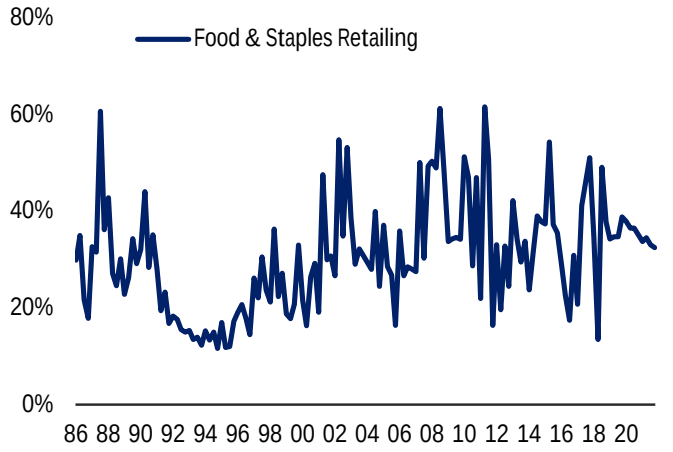
Exhibit 107: Food & Staples Retailing
Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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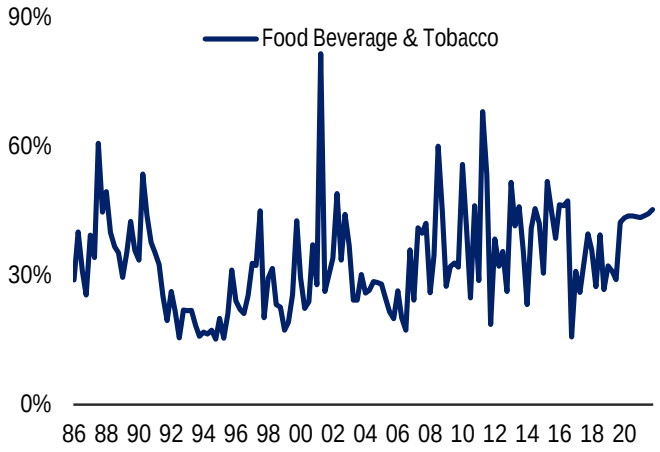
Exhibit 108: Food Beverage & Tobacco
Correlations have edged higher in recent months



Source: BofA US Equity & Quant Strategy

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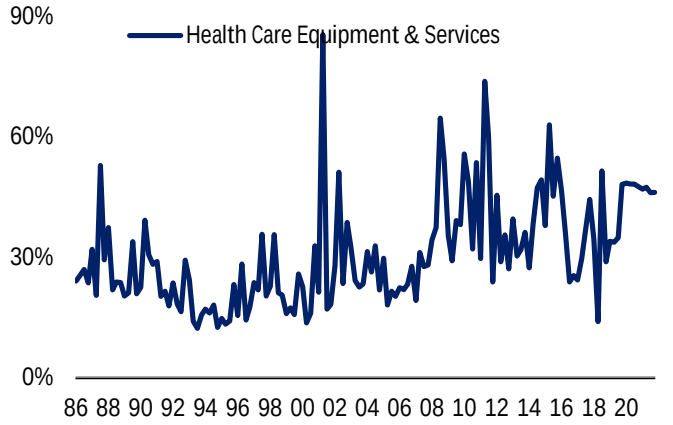
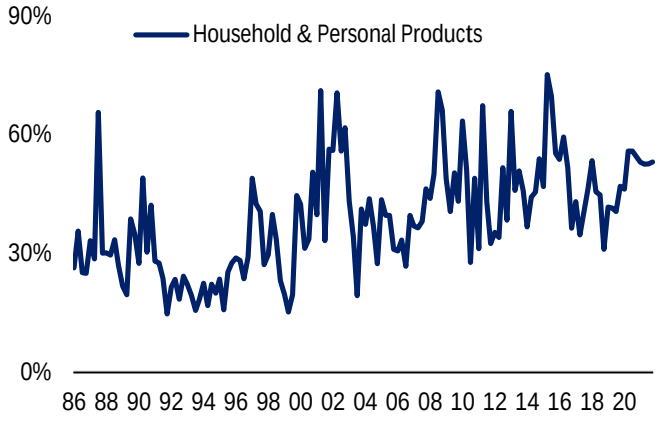
Exhibit 109: Health Care Equipment & Services
Correlations have declined recently after uptick



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 110: Household & Personal Products
Correlations have declined in recent months after uptick



Source: BofA US Equity & Quant Strategy

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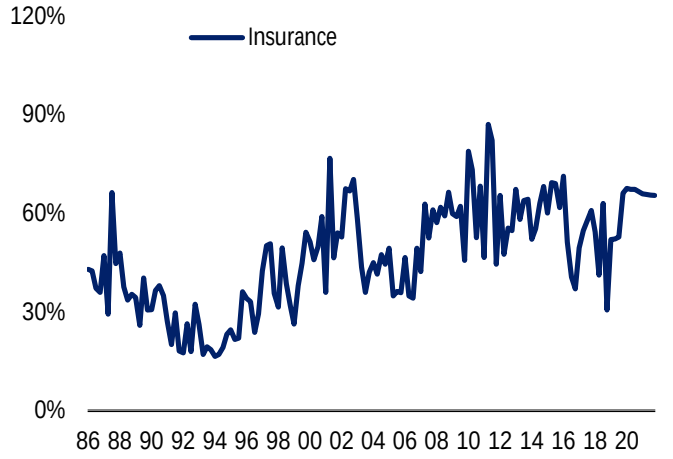
Exhibit 111: Insurance
Correlations declined recently after uptick



Source: BofA US Equity & Quant Strategy

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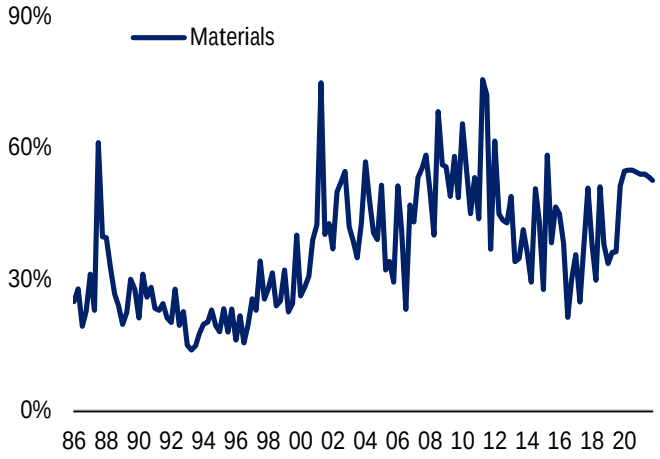
Exhibit 112: Materials
Correlations are near long-term average



Source: BofA US Equity & Quant Strategy

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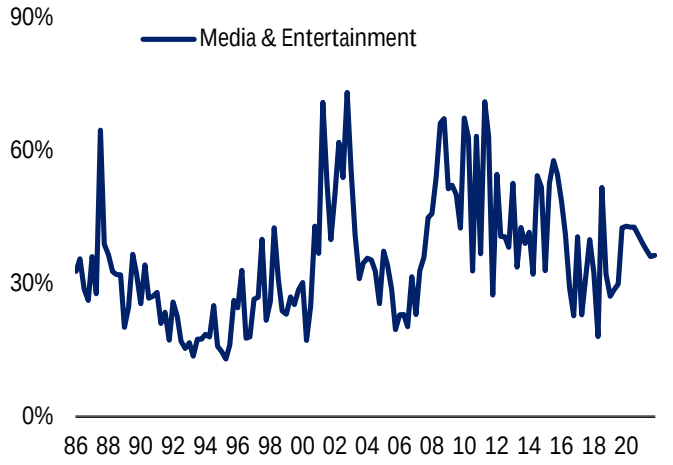
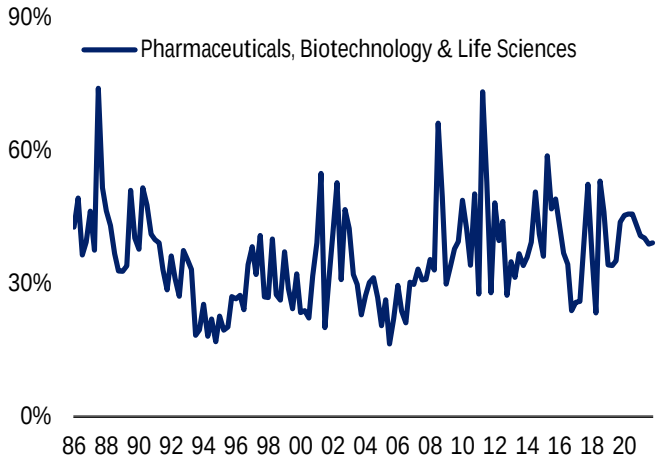
Exhibit 113: Media & Entertainment
Correlations are near long-term average



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 114: Pharmaceuticals, Biotechnology & Life Sciences
Correlations are near long-term average



Source: BofA US Equity & Quant Strategy

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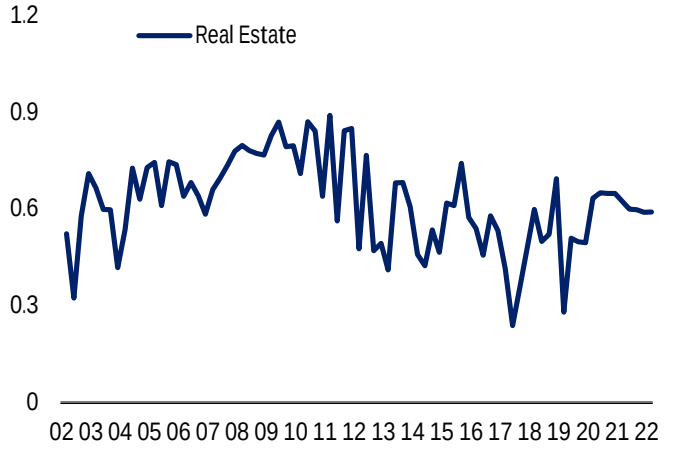
Exhibit 115: Real Estate
Correlations have edged lower in recent months



Source: BofA US Equity & Quant Strategy

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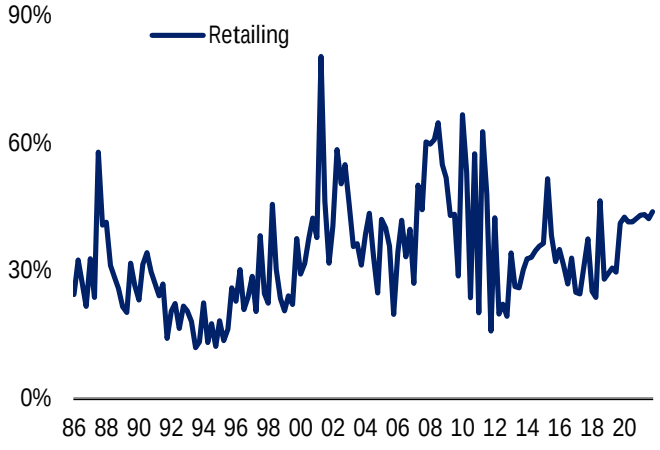
Exhibit 116: Retailing
Correlations are near long-term average



Source: BofA US Equity & Quant Strategy

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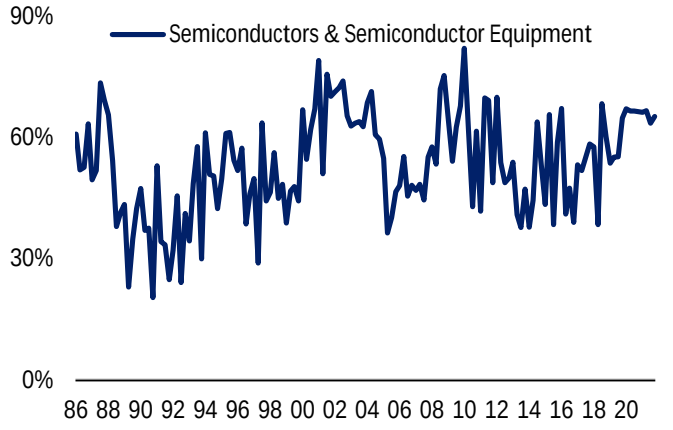
Exhibit 117: Semiconductors & Semiconductor Equipment
Correlations have been relatively flat recently



Source: BofA US Equity & Quant Strategy

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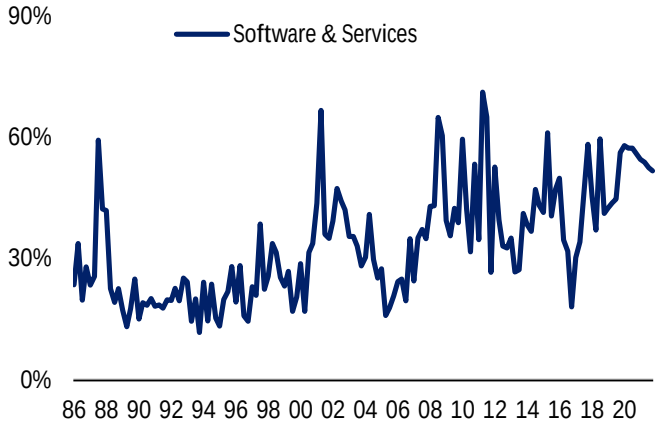
Exhibit 118: Software & Services
Correlations have edged lower in recent months



Source: BofA US Equity & Quant Strategy

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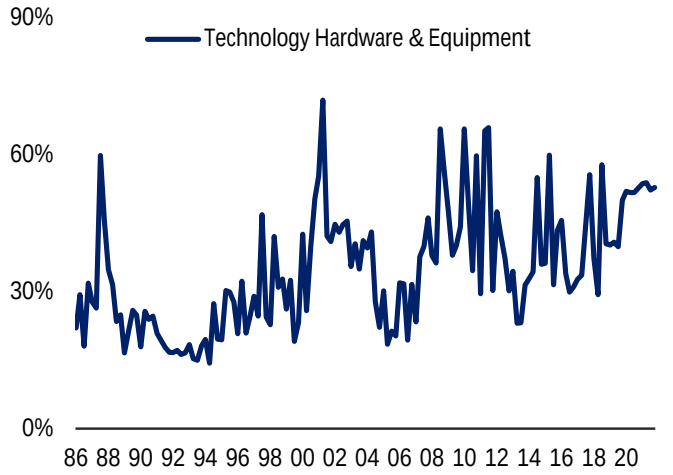
Exhibit 119: Technology Hardware & Equipment
Correlations remain above long-term average



Source: BofA US Equity & Quant Strategy

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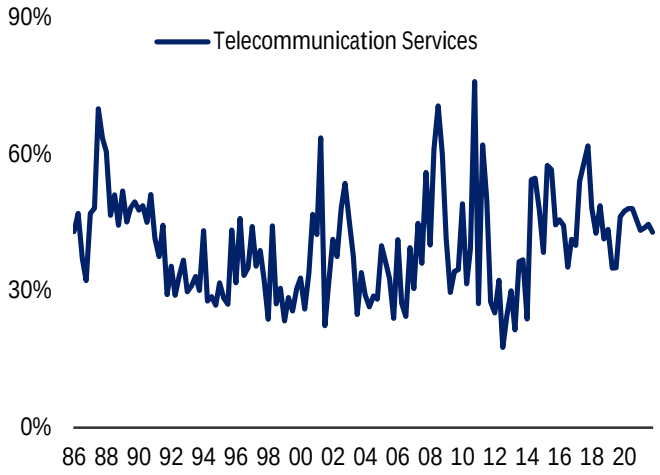
Exhibit 120: Telecommunication Services
Correlations have edged lower in recent months



Source: BofA US Equity & Quant Strategy

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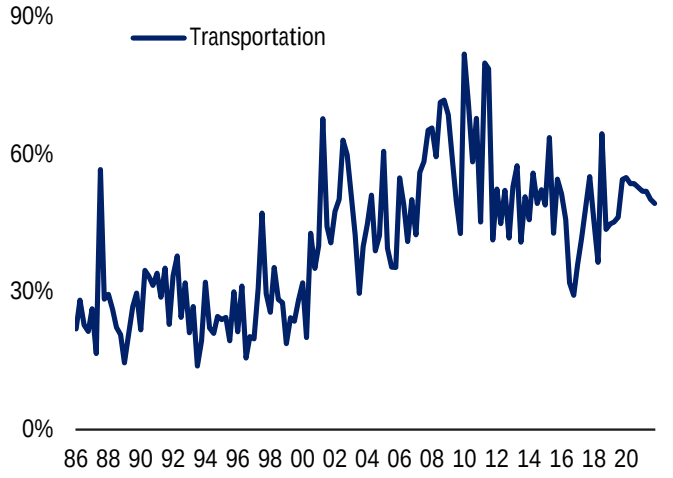
Exhibit 121: Transportation
Correlations are above long-term average but edged lower



Source: BofA US Equity & Quant Strategy

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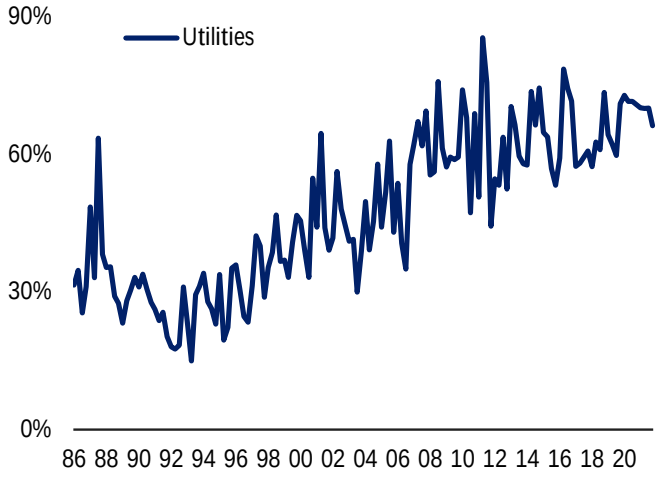
Exhibit 122: Utilities
Correlations remain elevated



Source: BofA US Equity & Quant Strategy

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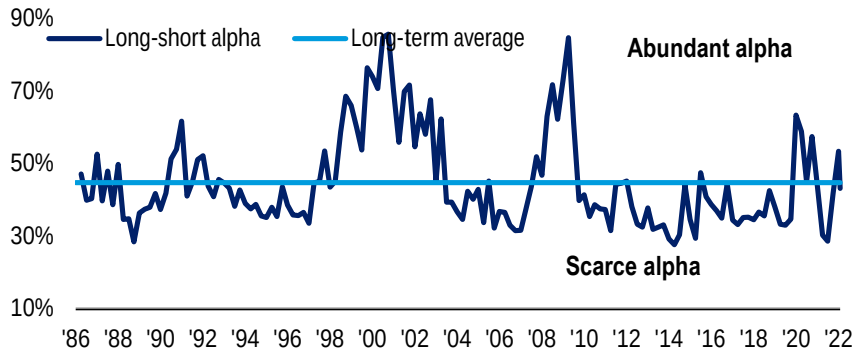
Scarce alpha has been a headwind

The scarcity of alpha opportunities (spreads) has been one headwind to active managers, with the spread between the fifty best and fifth worst performing stocks remaining near well below average for most of the post-crisis period, but finally rising this year. In 2007, managers used leverage to offset this scarcity. Today, risk aversion has capped leverage ratios at lower levels.

Exhibit 123: S&P 500 Long-Short Spreads (Alpha)
Alpha spread reverted to its long-term average



Source: BofA US Equity and Quant Strategy

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High Quality vs. Low Quality performance can highlight risk-on/risk-off

Exhibit 124: Relative performance of C&D vs. A+ ranked stocks by S&P Quality rank, 2007-present
2007-present

Source: S&P, BofA US Equity & US Quant Strategy

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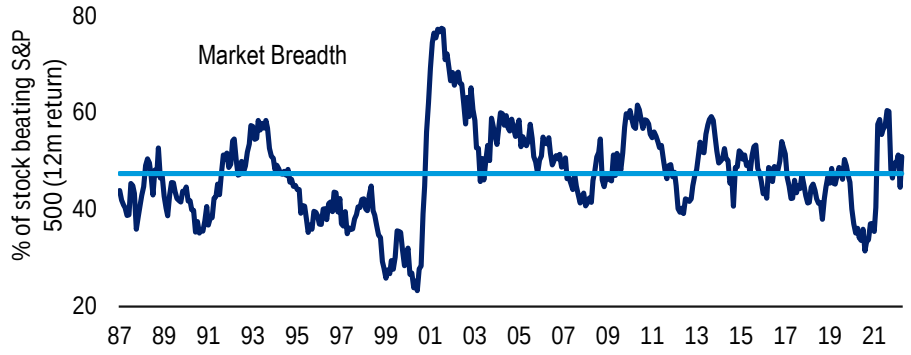
Market breadth: currently near neutral

Exhibit 125: Market Breadth: % of S&P 500 stocks beating the benchmark (12-month return), 1987-present
Market breadth has been near neutral levels recently



Source: BofA US Equity and Quant Strategy, FactSet

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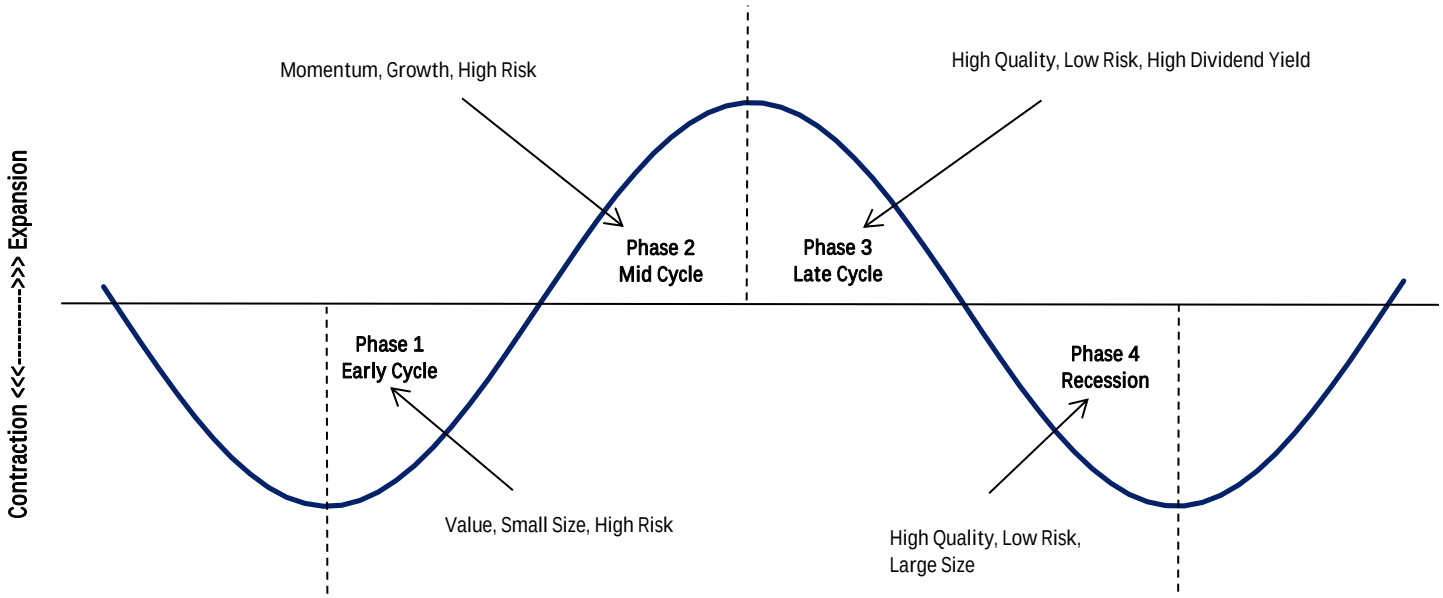
US Regime Indicator

Investment styles like Value, Growth, Momentum, Risk and Size tend to exhibit different performance patterns in different phases of the macroeconomic cycle. For US equities, four regimes generally capture these style shifts. In our quantitative US Regime Indicator, we aggregate top-down variables that capture earnings and economic growth expectations, inflation, credit conditions and other variables, to yield the following four signals. See our Methodology section for details.

- Phase 1: Early Cycle/Recovery – below-average but improving trends in macro indicators
- Phase 2: Mid Cycle – above-average and improving trends in macro indicators
- Phase 3: Late Cycle – above-average but deteriorating trends in macro indicators
- Phase 4: Recession/Downturn – below-average and deteriorating trends in macro indicators

Exhibit 126: US Regimes – a heuristic
Early Cycle, Mid Cycle, Late Cycle and Recession/Downturn regimes



Source: BofA US Equity & Quant Strategy

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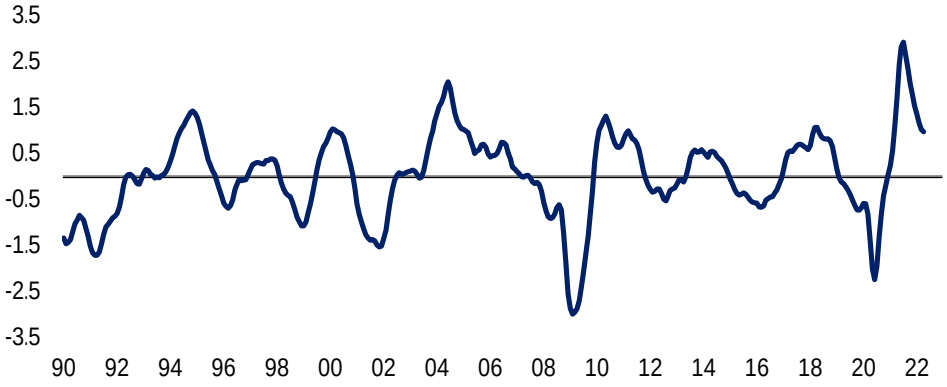
Current read: Firmly in Late Cycle

Our US Regime indicator transitioned from "Mid Cycle" to "Late Cycle" in August 2021. Today, the indicator is well off its peak nine month ago, but remains near historically elevated levels. The post-GFC economic cycle was untraditional in that, as our economists point out, it was long soft patch with several mini downturns. Our indicator fell into "Recession/Downturn" territory two times during that cycle without an NBER-official economic recession: in '11 – '12 during the European crisis and in '14 – '15 during the commodity/manufacturing recession. In March 2019 the indicator also entered "Recession/Downturn" and declined to near historic lows in June 2020, as the COVID-19-driven economic recession occurred.

Exhibit 127: US Regime indicator (January 1990-April 2022)
US Regime Indicator has been in Late Cycle since August 2021



Source: BofA US Equity & Quant Strategy, Refinitiv, ICE/BofA,, Institute for Supply Management, Bureau of Labor Statistics, Federal Reserve
Note: Phase 1 – Early Cycle; Phase 2 – Mid Cycle; Phase 3 – Late Cycle; Phase 4 – Recession

BofA GLOBAL RESEARCH

How to use the US Regime Indicator to factor invest

We have found that factor behavior is relatively predictable during different phases of the US Regime Indicator. For example, High Quality and Large Cap tend to outperform during the "Recession/Downturn" phase of the cycle, whereas Value, High Risk and Small Size tend to outperform during the "Early Cycle/Recovery". Value also tends to fare well in Mid Cycle and historically had better outperformance rates than Growth, excluding the Tech Bubble period.

Exhibit 128: Style performance in the four US Regime indicator phases
Relative performance vs. equal-weighted S&P 500

		Value	Growth	Momentum	High Quality	Low Quality	High Risk	Low Risk	Large Cap	Small Cap	Low Beta	High Div. Yield
Phase 1	Avg:	19.4%	-7.5%	-5.9%	-6.0%	8.4%	18.4%	-10.7%	-8.4%	19.0%	-12.8%	7.0%
Recovery	Median:	14.9%	-5.3%	-1.7%	-6.5%	10.7%	12.9%	-12.5%	-7.8%	11.2%	-13.4%	7.8%
	Hit Rate:	100.0%	12.5%	50.0%	25.0%	75.0%	75.0%	25.0%	12.5%	75.0%	12.5%	87.5%
Phase 2	Avg:	3.8%	10.9%	11.2%	0.8%	3.9%	11.0%	-6.6%	-2.1%	6.0%	-12.6%	-6.7%
Mid Cycle	Median:	4.3%	2.3%	4.0%	-0.7%	2.2%	10.3%	-4.9%	-6.6%	9.1%	-12.1%	-7.1%
	Hit Rate:	77.8%	66.7%	77.8%	44.4%	66.7%	77.8%	22.2%	33.3%	77.8%	0.0%	11.1%
Hit Rate ex. Tech Bubble:		*87.5%*	*62.5%*	*75.0%*	*37.5%*	*75.0%*	*75.0%*	*25.0%*	*25.0%*	*87.5%*	*0.0%*	*12.5%*
Phase 3	Avg:	-0.9%	-7.5%	-4.9%	4.5%	-8.1%	-13.9%	8.9%	-0.6%	-8.2%	6.9%	6.7%
Late Cycle	Median:	-1.6%	-2.9%	0.3%	5.9%	-7.4%	-12.1%	9.9%	3.2%	-8.6%	0.3%	2.5%
(Current)	Hit Rate:	37.5%	25.0%	50.0%	75.0%	12.5%	0.0%	75.0%	62.5%	12.5%	50.0%	75.0%
Phase 4	Avg:	-0.8%	-0.2%	3.1%	5.2%	-4.7%	-6.1%	4.8%	5.6%	-3.0%	-0.9%	-2.4%
Downturn	Median:	-6.3%	0.4%	0.9%	3.7%	0.0%	-4.5%	4.3%	6.5%	-7.5%	0.9%	-5.9%
	Hit Rate:	28.6%	57.1%	57.1%	71.4%	28.6%	42.9%	85.7%	85.7%	14.3%	57.1%	28.6%

Note: Performance is calculated as price return relative to equal-weighted S&P 500, for all styles except High Dividend Yield, where total return for the style and the index are used. Hit rate = % of months in phase where style outperformed equal-weighted S&P 500.
Source: BofA US Equity & Quant Strategy, Refinitiv, ICE Data Indices, LLC, Institute for Supply Management, Bureau of Labor Statistics, Federal Reserve

BofA GLOBAL RESEARCH

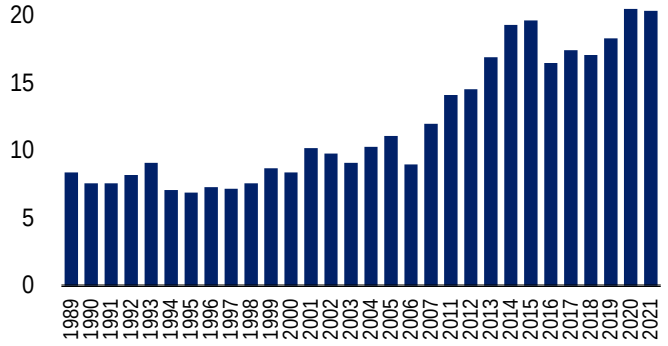
What are quants doing?

Each year, we survey institutional investors to monitor which factors, characteristics, attributes and indicators they use in their stock selection processes. These include valuation factors, quality and growth factors, risk factors, technical and price factors, risk factors and other factors.

2021: Models still just as complex in the hunt for alpha

Since 2007, investors have increasingly used a broader array of signals in their models in a quest for alpha – the average number of factors used jumped to new high of 20.5 in our 2020 survey and remained little changed in 2021 at 20.4. Multi-factor models are more complex/diverse today than in the 1990s, when investors used an average of just 7-8 factors. And correlations between clients have generally decreased since 2014 in recent years, as clients are using different factors than their peers, but saw an uptick in 2021.

Exhibit 129: Average number of factors used by respondents, 1989-2021
The number of factors remains near all-time high



Source: BofA US Equity & US Strategy. Note: Does not include data for 2008-10 due to lack of sufficient responses

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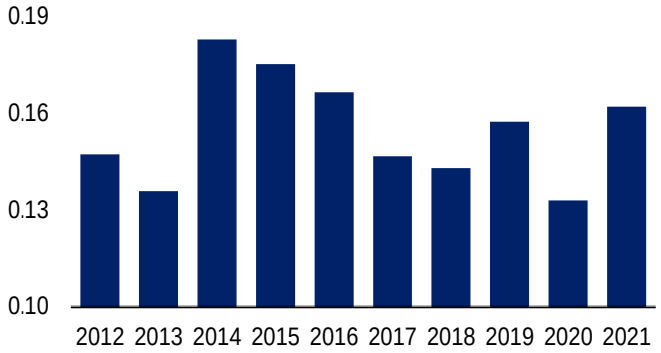
Exhibit 130: Correlations between clients have generally decreased since 2014, but saw an uptick in 2021
Avg. pair-wise correlations between survey respondents' factor usage by year



Source: BofA US Equity & US Strategy

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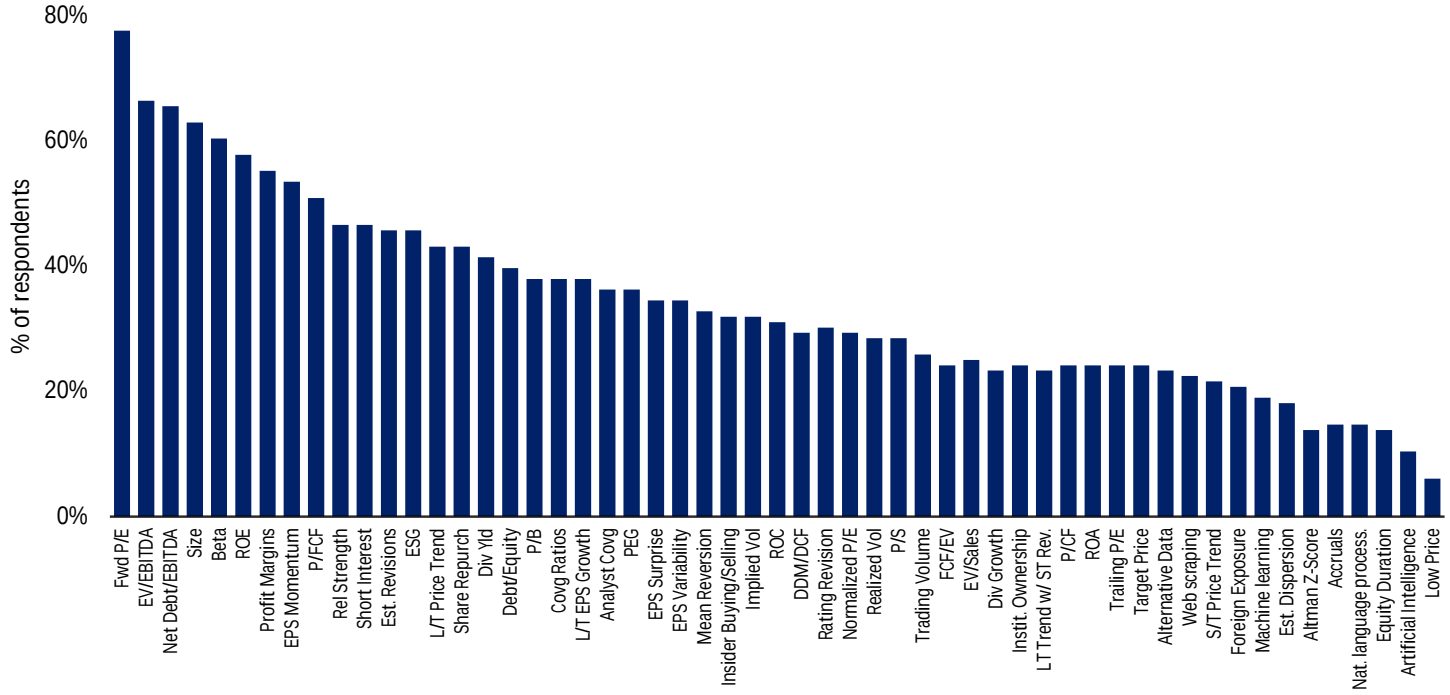
Quants are increasingly focused on new factors, real-time data feeds, artificial intelligence, big data, machine learning, etc., as new alpha signals tend to be exploited quickly and arbitraged away.

Price to Forward Earnings is still the most-used factor

78% of survey respondents use Forward P/E as factor in their investment processes, remaining the most popular factor for the 14th year running. While cash-flow based valuation measures were more popular pre-crisis, Forward P/E has topped the list every year since the Financial Crisis. EV/EBITDA and Net Debt / EBITDA also remained popular (second- and third-most cited factors). Low Price was the least-used factor.

Exhibit 131: Percentage of 2021 survey respondents using various factors
Investors have been increasing the number of factors they use in recent years



Source: BofA US Equity & Quant Strategy

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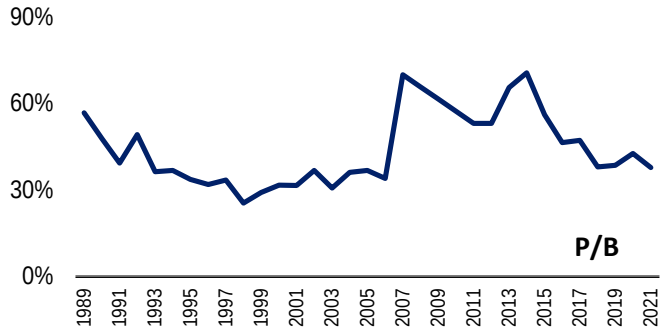
Select valuation factors

Exhibit 132: Percentage of Respondents using P/B
Percentage of respondents using price to book declined in recent years



Source: BofA US Equity & Quant Strategy

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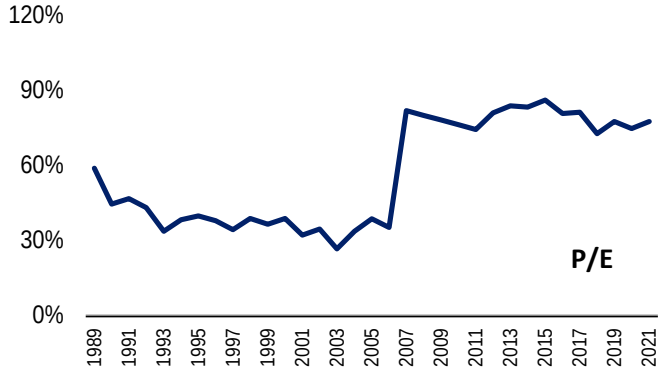
Exhibit 133: Percentage of Respondents using P/E
Percentage of respondents using forward P/E remained consistently high in recent years



Source: BofA US Equity & Quant Strategy

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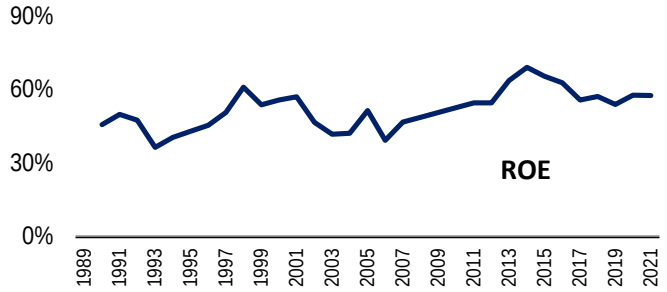
Select growth and quality factors

Exhibit 134: Percentage of Respondents using ROE
Percentage of respondents using ROE declined slightly in recent years



Source: BofA US Equity & Quant Strategy

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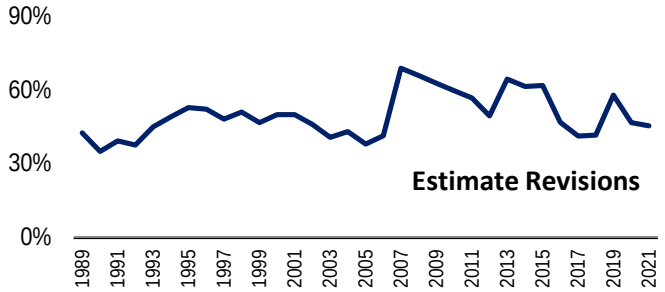
Exhibit 135: Percentage of Respondents using Estimate Revisions
Percentage of respondents using Estimate Revisions edged lower recently



Source: BofA US Equity & Quant Strategy

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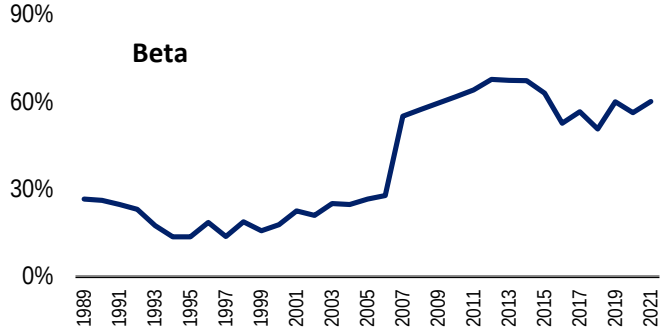
Select risk factors

Exhibit 136: Percentage of Respondents using Beta
Percentage of respondents using Beta factor edged higher recently



Source: BofA US Equity & Quant Strategy

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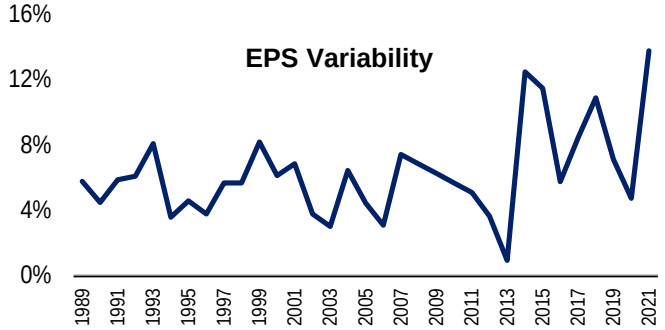
Exhibit 137: Percentage of Respondents using EPS Variability
Percentage of respondents using EPS Variability jumped to historic highs



Source: BofA US Equity & Quant Strategy

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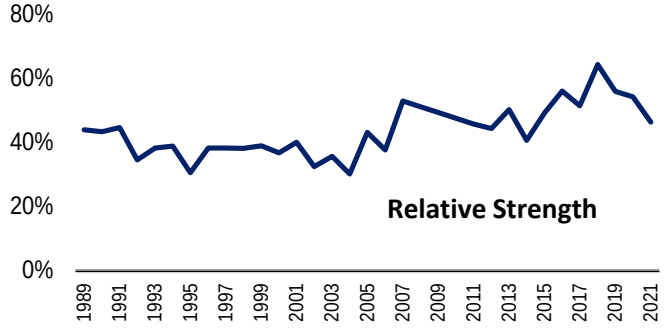
Select price trend and technical factors

Exhibit 138: Percentage of Respondents using Relative Strength
Percentage of respondents using Relative Strength decreased in recent years



Source: BofA US Equity & Quant Strategy

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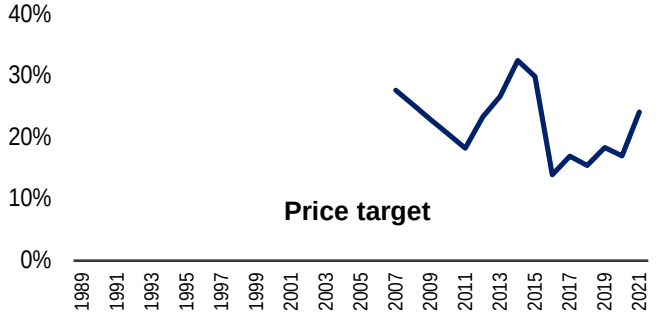
Exhibit 139: Percentage of respondents using Sell Side Price Targets
Percentage of respondents using Sell Side Price Targets increased in recent years



Source: BofA US Equity & Quant Strategy

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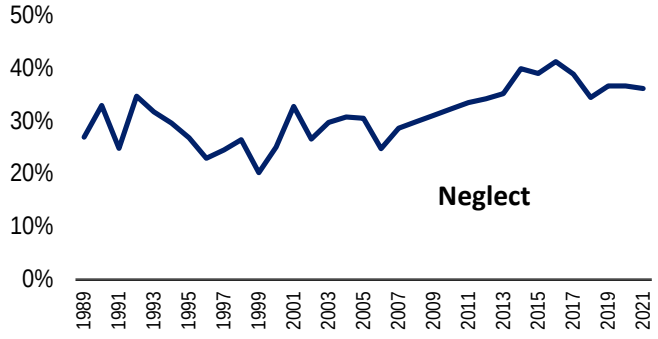
Select other (miscellaneous) factors

Exhibit 140: Percentage of respondents using Analyst Neglect
Percentage of respondents using Analyst Neglect factor has been relatively flat in recent years



Source: BofA US Equity & Quant Strategy

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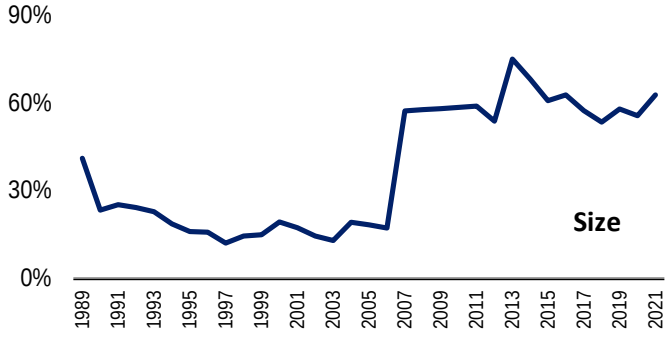
Exhibit 141: Percentage of respondents using Size (Market Cap)
Percentage of respondents using size market cap increased in recent years



Source: BofA US Equity & Quant Strategy

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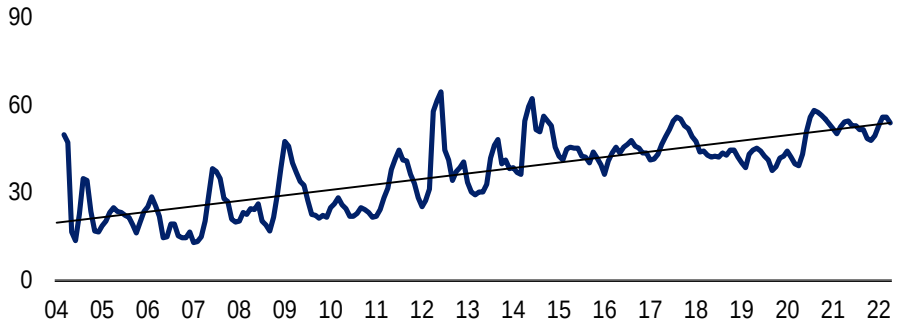
The lowdown on Smart Beta

What is smart beta?

Smart Beta emerged as a line of investment products seeking to rival traditional popular index tracking funds and ETFs in their transparency, performance and cost efficiency. The investment rationale hinges on a simple premise – market capitalization weighted indices skew performance towards largest and likely more expensive companies, inadvertently subjecting investors to undesired sources of risk. Alternative weighing schemes emerged, such as fundamental weighing (book value, sales, cash flow, dividends), equal weighting or volatility weighting.

Whereas the traditional market cap weighted index tracking products represent a reasonable proxy to the overall equity market exposure, or "beta", the alternative index tracking products received the name of "Smart Beta". The "smart" component may be misleading in implying virtuous qualities that may not necessarily exist. Hence, a wide array of alternative names emerged - alternative beta, strategic beta, scientific beta or strategic indexing, among others. It appears, however, that the term "smart beta" took deep roots in the investment community's vernacular and will be difficult to unseat.

Exhibit 142: **Google searches for "Smart Beta" saw a consistent rise right after the** financial crisis
Jan 2004 – Apr 2022



Source: Google Trends; US Equity & Quant Strategy

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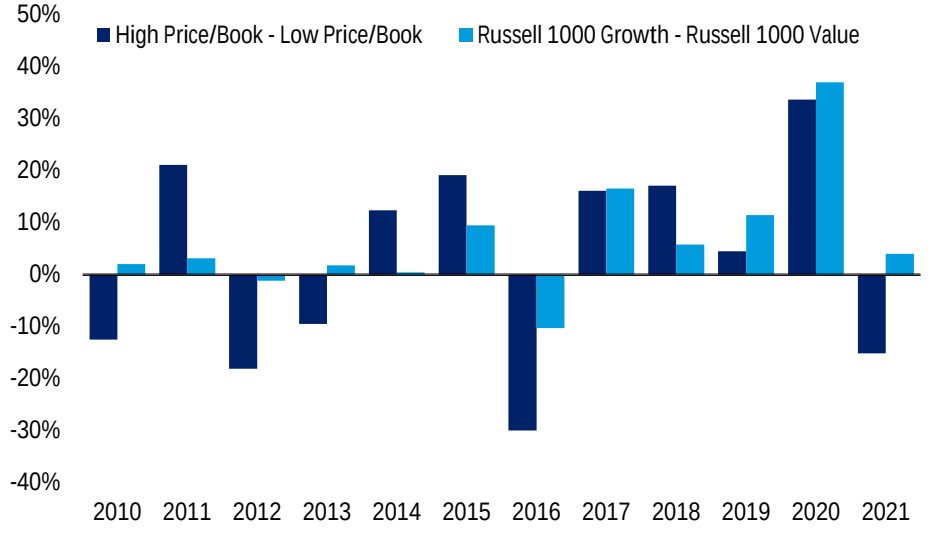
As smart beta grew in popularity, the concept expanded from alternative weighting index tracking to various rule-defined investment vehicles with properties of both active and passive investment styles – more active than passive cap weighted index tracking but less active than active portfolio management with day-to-day investment decision making. The costs thus reflect the passive/active positioning: the management fees exceed those traditional index tracking, but remain considerably below actively managed portfolio charges. Examples of this type of smart beta funds include Low Volatility products, various factor tilts (Quality, Beta, Shares Buybacks, High Dividend Yield, High Dividend Growth), multifactor exposures, commodity based ETFs, thematic exposure (demographics, geography), multi-strategy ETFs. Despite a wide range of the smart beta variety, the largest share of smart beta assets is in the simplest forms of High Dividends, Growth and Value products.

Alternative weighting is not new in quant space

Quants have been applying equal weighting to remove size bias in their work without much fanfare for decades. After all, quants seek to identify various factor exposures in their purest form, be it large or small size, low or high price/book, or high dividend yielding stocks or dividend nonpayers. The starting point is the "clean" benchmark – i.e. equal weighted to rid it of the size bias. For the same reason, quant factor performance is usually calculated on an equally weighted basis.

Arbitrage Pricing Theory (APT) stipulates that stock return is a function of multiple sources of systemic risk (betas) in addition to the idiosyncratic risk. APT, however, does not identify what the multiple betas are. In the Quant framework the quant factors are considered the sources of risk, or the multiple betas, that drive performance. While alternative index weighting removes the unwanted market cap bias and introduces the desired fundamental biases, quant factors represent alternative beta exposure in its purest form – typically a small subset (a decile or quintile) of an investable universe (the index or otherwise defined investable space) with the specified characteristics. Quant factors span across investment styles, such as Value, Growth, Momentum, Quality, Size and Risk. As an example, while the Russell 1000 Growth and the Russell 1000 Value indices frequently saw little performance divergence in recent years, Growth / Value performance differential as measures by High Price/Book and Low Price/Book factors was quite pronounced (Exhibit 143).

Exhibit 143: Quant factors generally deliver more style differentiation than fundamentally weighted indices
Annual performance (2010 – 2021)



Source: US Equity & Quant Strategy

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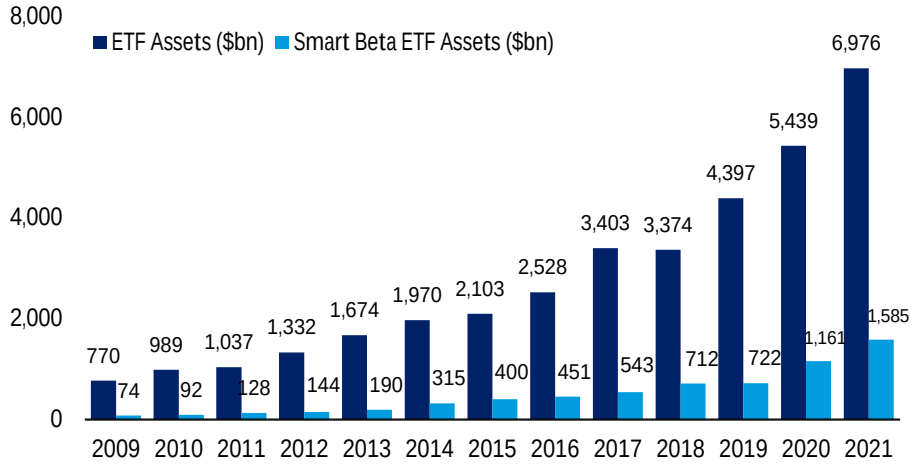
How much money is currently tracking smart beta strategies

Smart beta strategies have experienced a rapid growth in assets under management in recent years. According to the data compiled by Bloomberg (Exhibit 144), smart beta funds grew from under $100bn in 2009 to over $1.5tn today Since 2009, smart beta funds grew at a 29% annualized rate, well above the 20% growth rates for the ETF assets overall.

Exhibit 144: Growth in Smart Beta vs. all ETFs
Since 2009 ETFs and Smart Beta AUM grew by respective annualized 20% and 29%



Source: Bloomberg, BofA US Equity & Quant Strategy

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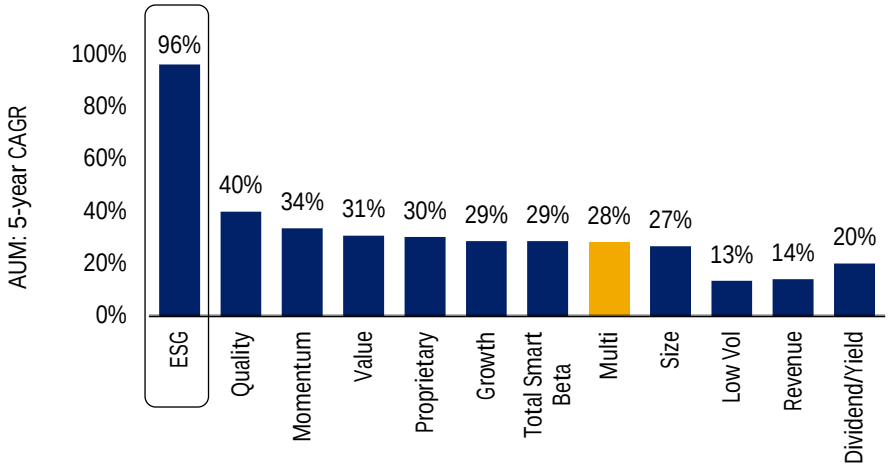
A major influx of factor- or risk premium-based ETFs has yielded atypical swings in the market driven by risk attributes rather than stocks. Low volatility equity products have seen astronomical growth, followed by quality, momentum and dividend strategies.

ESG ETFs saw a particularly strong asset base growth: as these vehicles grew at a 97% annualized rate, faster than any other smart beta category.

Exhibit 145: ESG: the fastest-growing smart beta strategy
5-year CAGR in AUM growth (2016-2021) of smart beta ETF categories in Bloomberg



Source: BofA US Equity & Quant Strategy

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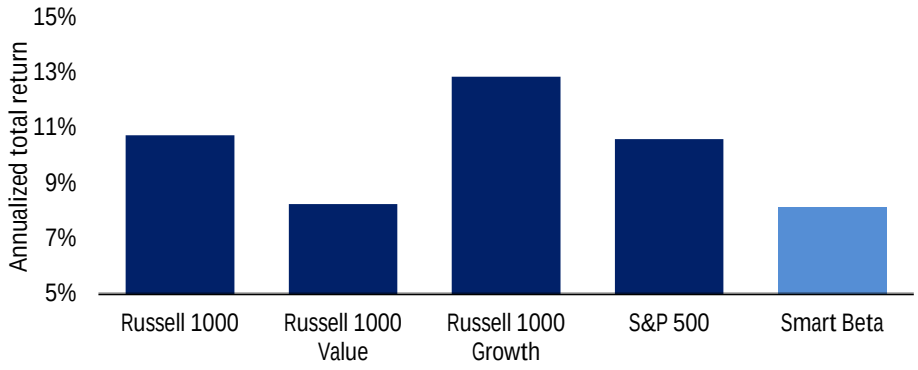
Is smart beta all that smart?

With all the attention surrounding the Smart Beta concept, the performance of Smart Beta ETFs has been remarkably unexciting in recent years – since 2005 this group of products mostly lagged major large cap indices by 0.6ppt to 3.4ppt per annum.

Exhibit 146: Smart beta has lagged the benchmarks (12/2004 – 12/2021)
The performance of Smart Beta ETFs has been remarkably unexciting in recent years (annualized returns)



Source: BofA US Equity and Quant Strategy, FactSet

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The ABC's of ESG

See our Global ESG Primer for more on this topic, as well as our other ESG Primers: US ESG Primer, SMID Cap ESG Primer, ESG Fixed Income Primer, Diversity & Inclusion Primer, Climate Wars Primer, Climate Change Primer, Plastics Sustainability Primer.

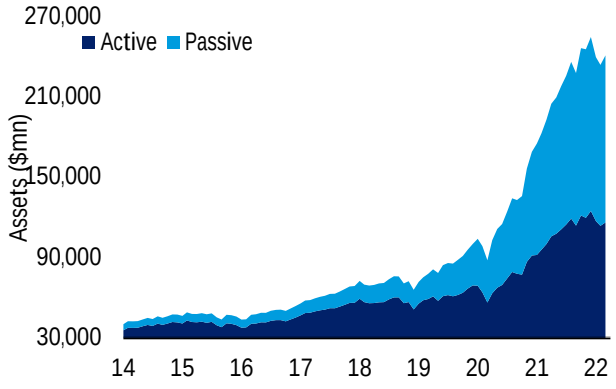
What is ESG?

ESG investing captures the notion of using non-financial factors that incorporate the environmental impact (E), social impact (S) and governance attributes (G) of a corporation. Another related vein of investing is Thematic Investing, which delves into themes that impact the global economy/investment landscape and are often environmental or social in nature (climate change, education, obesity, etc.) "Green" investing is another related category, focusing explicitly on companies that better the environment by employing/supporting "green" initiatives like clean energy, resource conservation, etc. Impact Investing refers to investments that look to generate measurable social or environmental impact along with a level of financial return. All of these terms can fall under the broad umbrella of sustainability or sustainable investing.

In this report, we focus on the first aspect (ESG investing). The data we examine can help evaluate whether companies run themselves responsibly. We consider environmental impacts (such as emissions or resource use), social impacts (such as employee training or diversity policies), and governance attributes (such as board structure or shareholder rights).

Trends in the US investment landscape indicate that trillions of dollars could be allocated to ESG-oriented equity investments, and thus to stocks that are attractive on ESG metrics. We conservatively estimate that inflows into ESG type strategies over the next few decades could be roughly equivalent to the size of the S&P 500 today. 2022 so far has been marked by shrinking assets and interest, but in our view reveals pitfalls of exclusion-based ESG – we see the case for a shift from exclusion to inclusion (see: Is the ESG love affair over?).

Exhibit 147: ESG fund flows started slowing down this year
Assets under management ($mn) in US-domiciled ESG equity funds: passive vs. active (1/2014-4/2022)



Source: BofA US Equity & Quant Strategy, ISS Market Intelligence Simfund Enterprise
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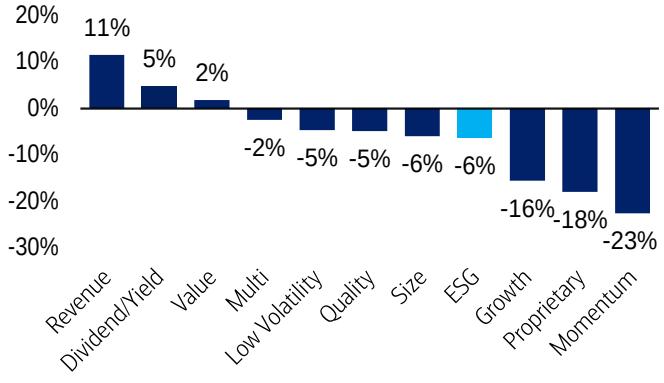
Exhibit 148: ESG is no longer the fastest-growing smart-beta strategy this year YTD
Year-over-year growth in AUM (2022 YTD vs. 2021)



Soruce: Bloomberg Intelligence, BofA US Equity & Quant Strategy
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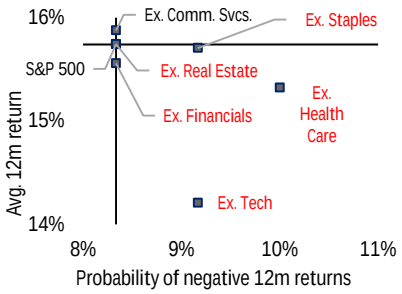
ESG exclusion strategy hurts: Since 1990, the exclusion of every sector (except Utilities) hurt, rather than helped, for at least one of the last three decades.

Exhibit 149: Ex. Tech was the worst exclusion strategy in the 1990s
The worst exclusion strategies in the 1990s



Source: FactSet, US Equity & Quant Strategy
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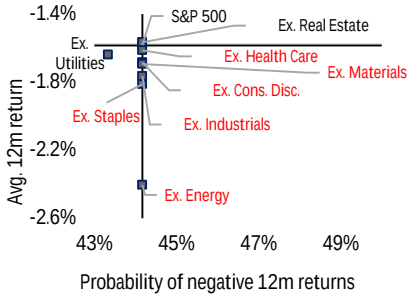
Exhibit 150: Ex. Energy was the worst exclusion strategies in the 2000s
The worst exclusion strategies in the 2000s



Source: FactSet, US Equity & Quant Strategy
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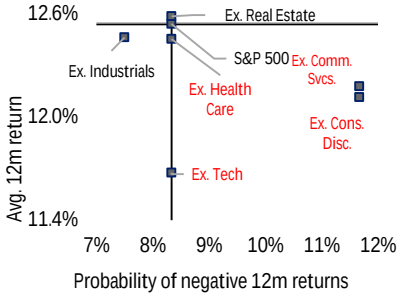
Exhibit 151: Ex. Tech was the worst exclusion strategies in the 2010s
The worst exclusion strategies in the 2010s



Source: FactSet, US Equity & Quant Strategy
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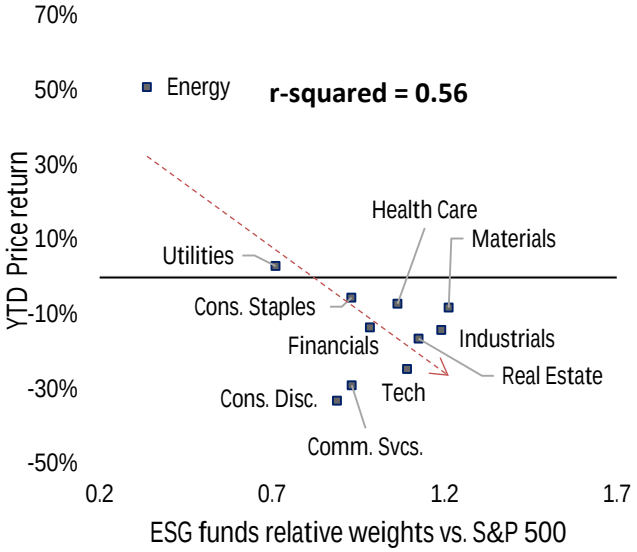
Exhibit 152: Active ESG overweights have underperformed in 2022.
Correlation between S&P 500 sector index price returns YTD and ESG funds' relative weight vs. S&P 500



Source: FactSet, BofA US Equity & Quant Strategy
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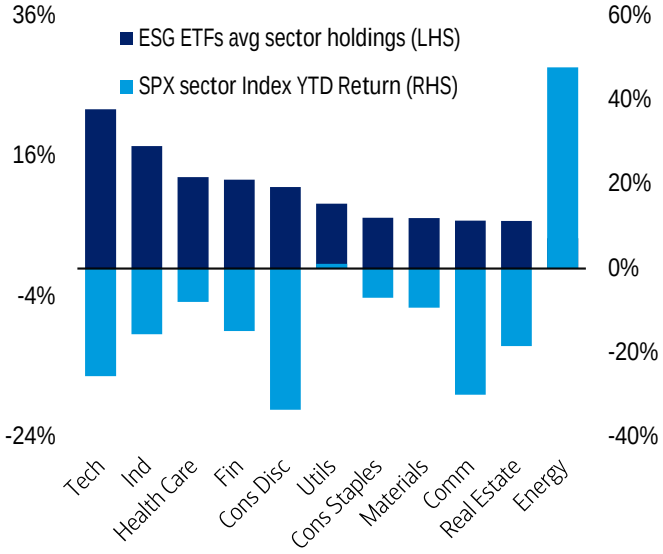
Exhibit 153: Passive ESG underperforming from OW in "new-economy" vs. "old-economy"
Average ESG ETFs sector holdings (left axis) and SPX Sector Index YTD price return (right axis)



Source: Bloomberg Intelligence, BofA US Equity & Quant Strategy
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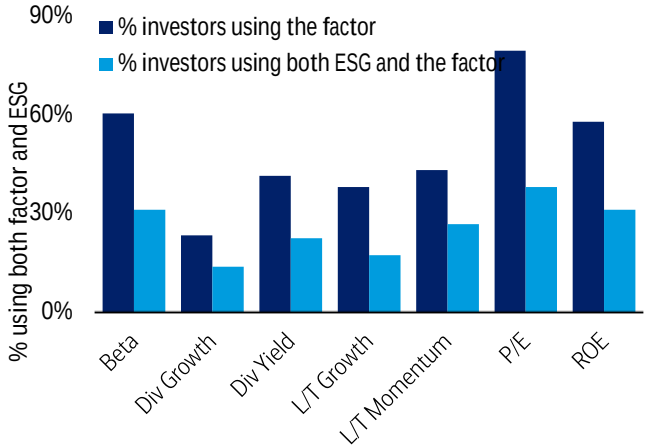
Exhibit 154: Still limited overlap between ESG and factor-based investing
Percent of survey respondents using each factor, based on 2021 BofA Institutional Factor Survey



Source: BofA US Equity & Quant Strategy

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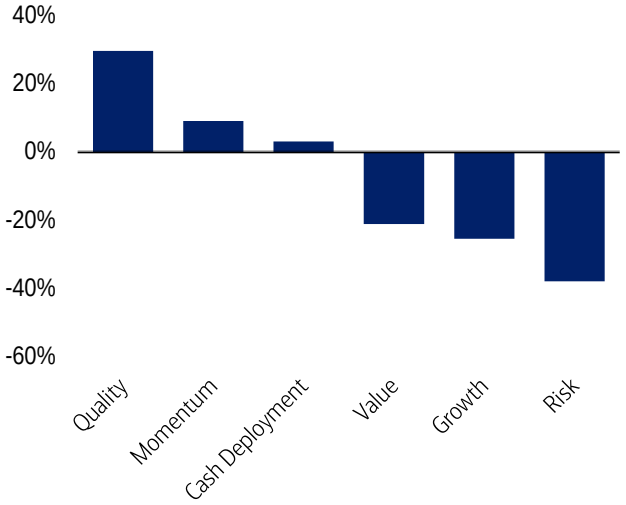
Few are blending fundamental factor investing with ESG
There's still a limited overlap between investors who pick stocks based on fundamental factors such as valuation, growth or yield, and those who use ESG as a stock-selection factor.

ESG + Quant = Alpha

Whereas our backtest suggests that ESG signals alone generally usually require a multi-year time horizon to generate alpha, adding an ESG factor to many traditional shorter-term fundamental factors enhanced returns and reduced risk in all factors we examined in our backtest. ESG strategies have one of the lowest correlations with other quant factors we track, suggesting that ESG adds new information to a traditional factor-based technique.

Exhibit 155: ESG is negatively correlated with most fundamental factors
Performance correlation between top quintile S&P 500 stocks based on Sustainalytics ESG ranks vs. fundamental equity factors (8/2009-present)



Source: BofA US Equity & Quant Strategy, Sustainalytics

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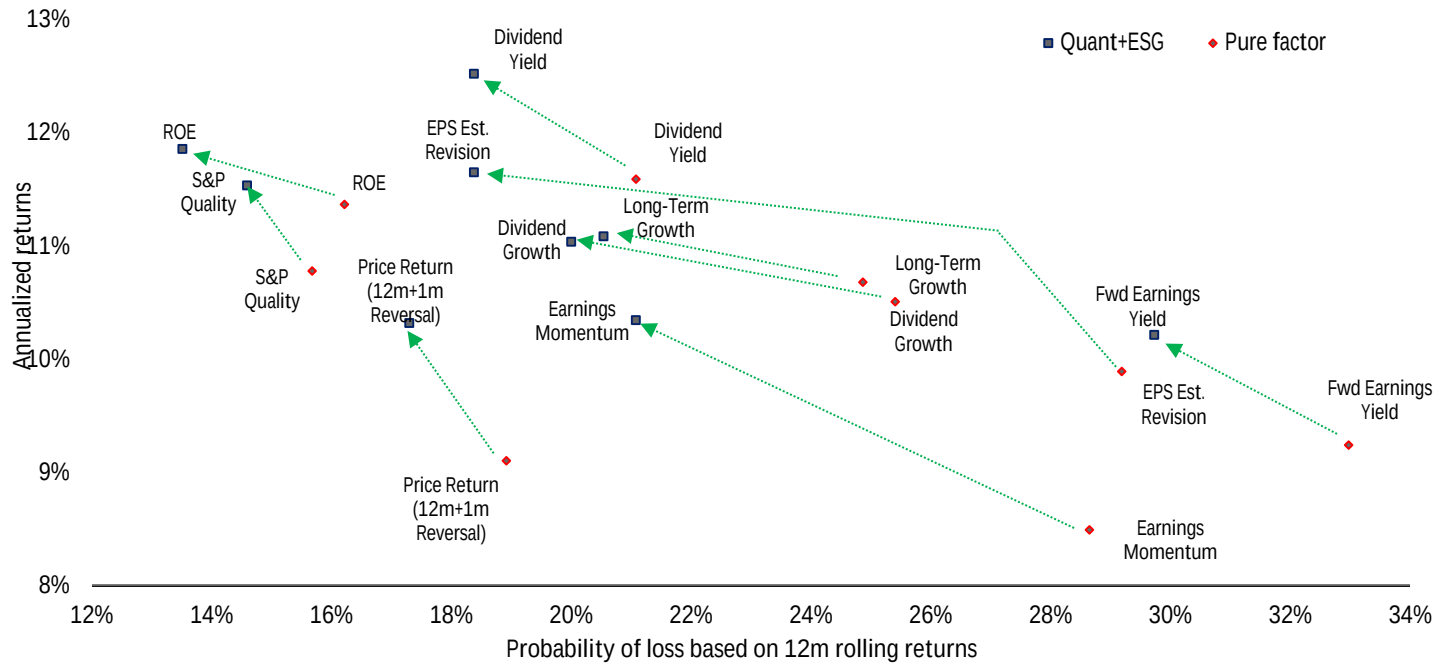
According to our backtested data, all nine factors would have exhibited more attractive risk-adjusted returns (based on information ratios) when blended with our ESG factor. The improvement stands out most for EPS Revisions and Earnings Momentum.

Exhibit 156: Annualized returns of pure quant factors and ESG blended quant factors vs. probability of loss
12/2005-3/2022



Source: BofA US Equity & Quant Strategy based on Refinitiv data

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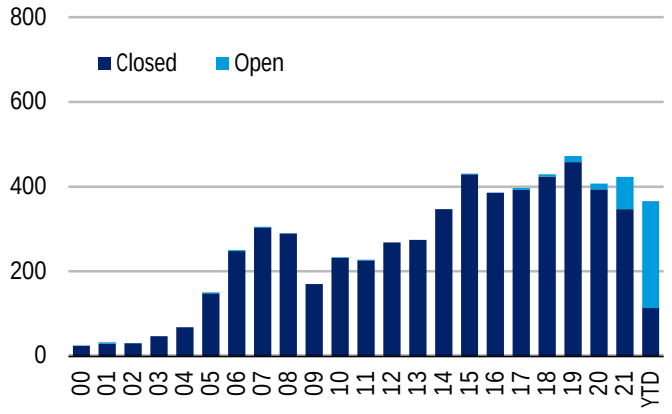
Activists could play matchmaker

Activist campaigns targeting Russell 3000 companies' corporate governance reached record levels in 2019. Companies saw greater improvement in their ESG scores post-engagement relative to the universe (both based on their corporate governance scores as well as their overall scores) over the subsequent one, two and three years.

Exhibit 157: Secular uptrend in activist engagement
Activist campaigns targeting Russell 3000 companies (1/2002-2022 YTD)



Source: FactSet, BofA US Equity & Quant Strategy

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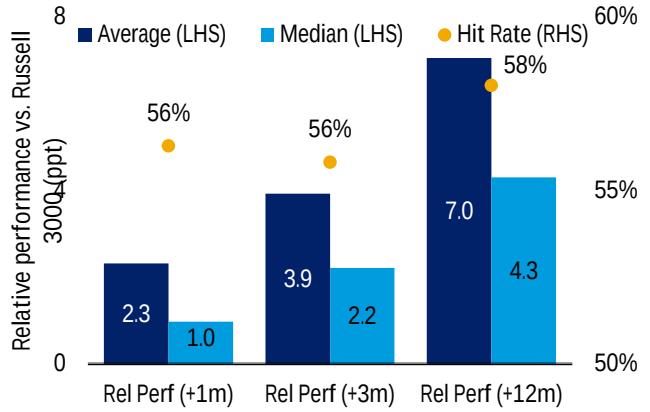
Exhibit 158: Activist campaigns have historically driven future outperformance
Subsequent relative performance of Russell 3000 companies targeted by corporate governance campaigns(1994-present)



Source: FactSet, BofA US Equity & Quant Strategy

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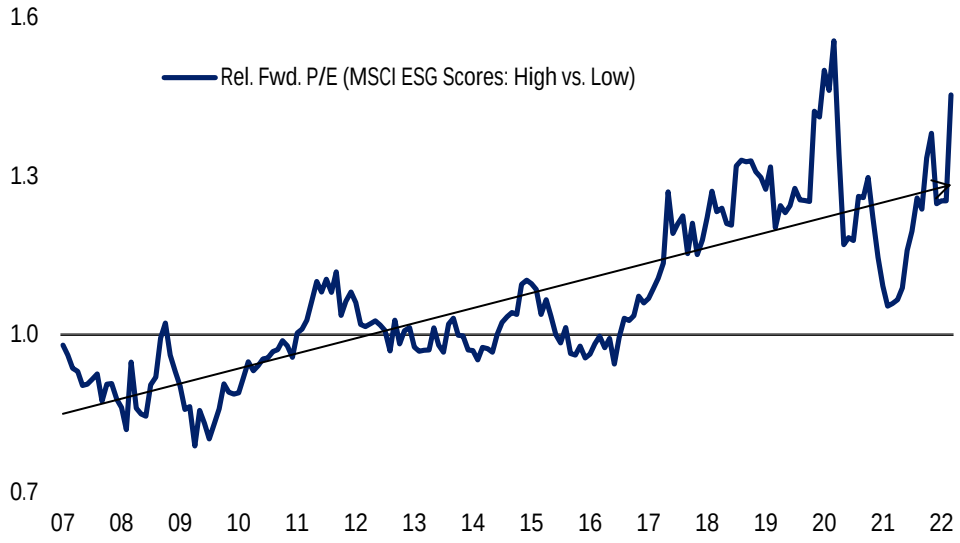
A rising ESG premium

Possibly driven by asset flows into ESG funds, companies with high ESG ranks appear to have re-rated relative to low ranked companies over the last decade. Highly ranked stocks traded at a 20-30% premium to the market several years ago and as high as 50%

during the onset of COVID-19. While that premium valuation declined to 5% in early 2021, today ESG premium (+45%) is near historic highs once again (Exhibit 159).

Exhibit 159: Companies re-rated in 2022
Relative forward P/E of S&P 500 companies in top vs. bottom quintile by MSCI ESG score, 1/2007-3/2022



Source: MSCI, FactSet, BofA US Equity & Quant Strategy

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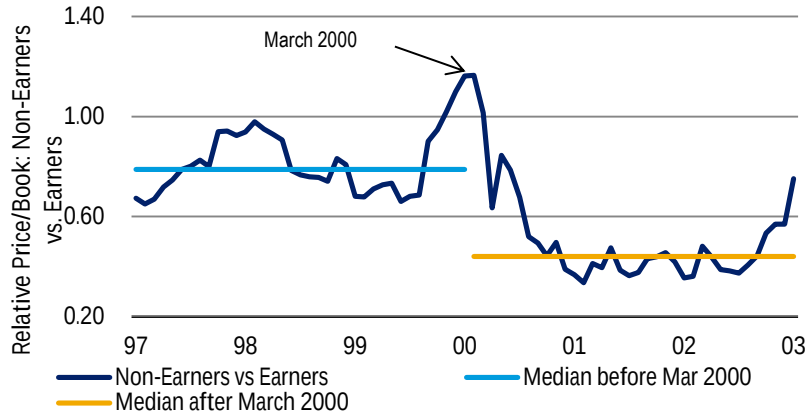
Recency bias in ESG

Tech Bubble aftermath penalized speculative stocks

Investors tend to reward characteristics most important in the prior crisis over the subsequent market cycle, a classic recency bias. An example of this was the period following the Tech Bubble of 2000. The Tech Bubble, which was characterized by investors assigning a speculative premium to companies with no earnings but strong perceived growth potential, was followed by a multi-year market environment in which companies with no earnings were generally more penalized than prior to the bubble by virtue of lower multiples.

Exhibit 160: Speculative companies de-rated by 35% following the Tech Bubble
Relative Price to Book Value of S&P 500 companies without earning vs those with earnings



Source: BofA US Equity & Quant Strategy

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Governance earned a premium post Global Financial Crisis

Poor governance played a key role in the 2008-2009 Global Financial Crisis (GFC) and governance factors assumed a greater importance among ESG attributes in the wake of

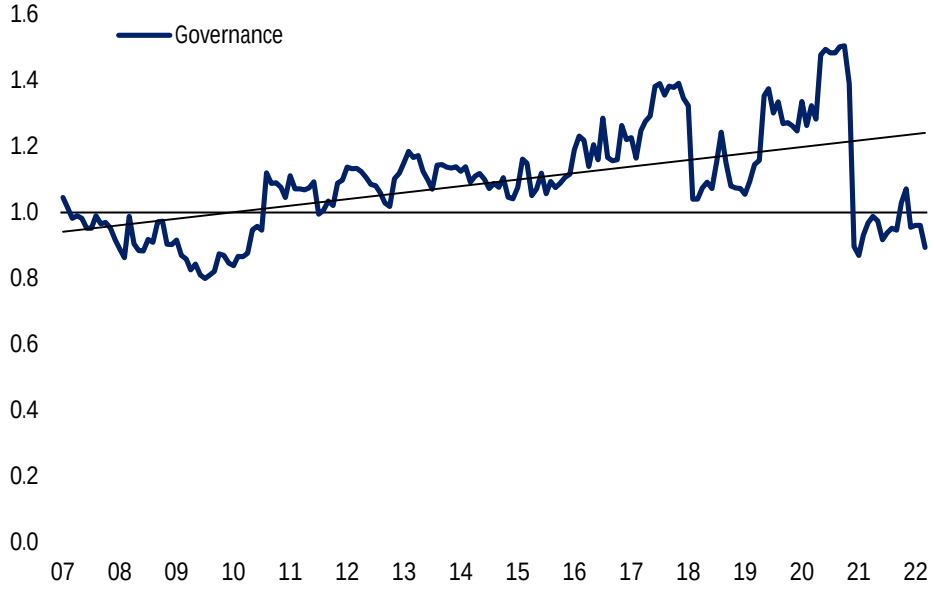
the crisis. According to MSCI data, companies with higher governance scores have traded at a growing premium to lower-ranked companies from 2010 until recently.

S factors were strong during 2020 bear market, but now E is the theme

The COVID-19 pandemic has highlighted the importance of social factors, previously overshadowed by environmental and governance considerations. In fact, during the COVID-related sell-off, social factors – such as employee relations, product safety, and workforce policies (including aspects like leave and childcare)—were most likely to drive alpha, even more so than governance factors, which were most critical during the 2008-2009 financial crisis.

Exhibit 161: Good governance has historically been rewarded with higher multiples until 2020 COVID Pandemic

Relative forward P/E of companies in top vs. bottom quintile by MSCI ESG scores, 3/2007-3/2022



Source: MSCI, BofA US Equity & Quant Strategy, FactSet

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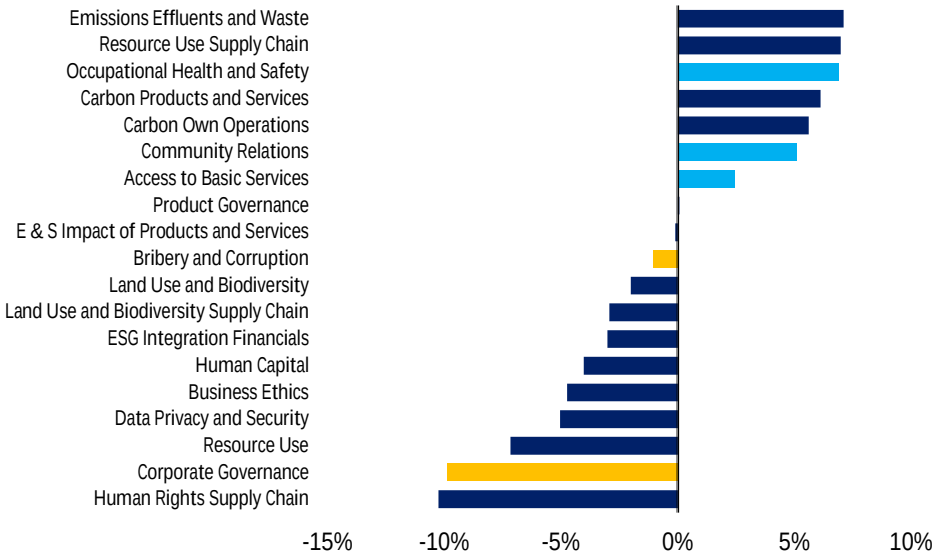
Exhibit 162: "S" factors like health and safety and community relations have driven strong alpha year to date but "G" factors are waning, "E" started to pick up
Top vs bottom quintile price performance YTD (%, USD currency, equally weighted), as of 4/30/2022



Source: BofA US Equity Quant Strategy, Sustainalytics. Note: Universe based on Global stocks covered by Sustainalytics with market capitalization > 10mn USD. Each category needs to have at least 10 stocks to calculate the performance, if there is less than 10 stocks the performances are not calculated. ESG factors categorized into E (dark blue), S (light blue), and G (yellow) dimensions by BofA US Equity & Quant Strategy for illustrative purposes and may overlap with multiple pillar dimensions

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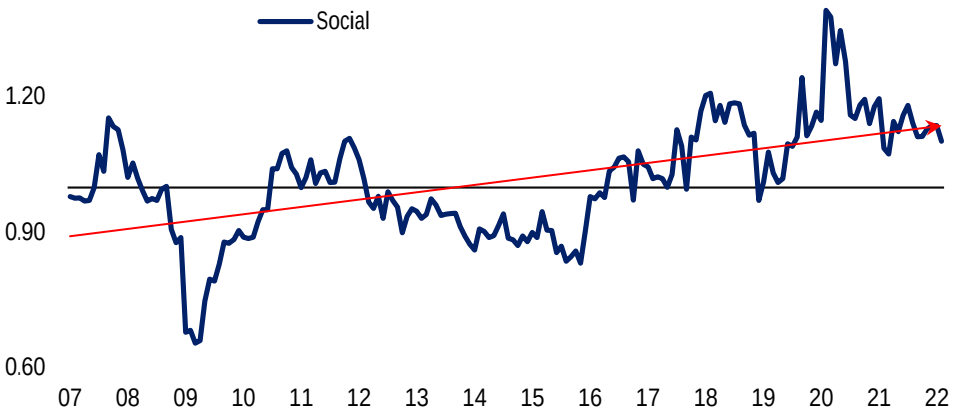
Investors are rewarding S factors amidst COVID-19 crisis

We see evidence that investors are now rewarding companies that have higher scores on Social factors. Since the start of the COVID-19 crisis, the relative premium for companies with better Social scores jumped notably to as much as a 40ppt and is now nearly 10ppt, still well above the 10-year average of 1ppt.

Exhibit 163: Companies with high Social scores are being rewarded with higher multiples
Relative forward P/E of companies in top vs. bottom quintile by MSCI ESG scores, 3/2007-3/2022



Source: MSCI, BofA US Equity & Quant Strategy, FactSet

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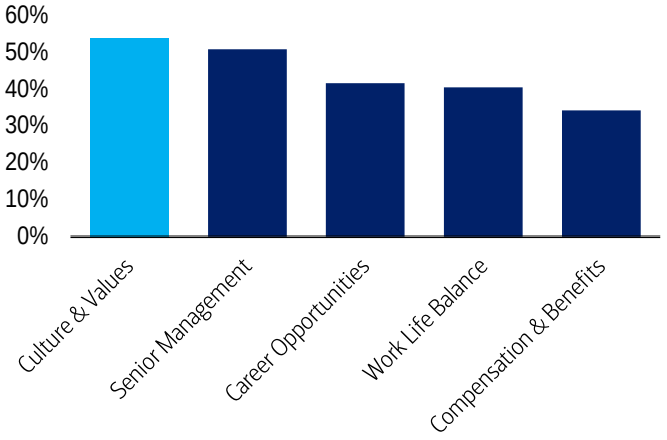
Quantifying the "S": Culture is key

Considering company culture can help investors avoid potential ESG controversy risk and can act as a barometer of healing for a controversy stock. The concept defies quantification, but our analysis of Glassdoor "culture and values" ranks as a proxy show deterioration in the wake of controversies, taking years to bottom. Why? Culture is more correlated with overall satisfaction than any other factor tracked by Glassdoor. And

culture signals performance: top quintile stocks outperformed bottom stocks by >6ppt p.a. since 2012, with 15%+ p.a. since 2018 as the "S" in ESG gained importance.

Exhibit 164: Culture & Values = biggest determinant of satisfaction - 3X more important than compensation
R-sq of specific ranks on overall company rank, Glassdoor data as of 03/2022 for US public companies



Source: Glassdoor.com, BofA US Equity & Quant Strategy, BofA Global Research
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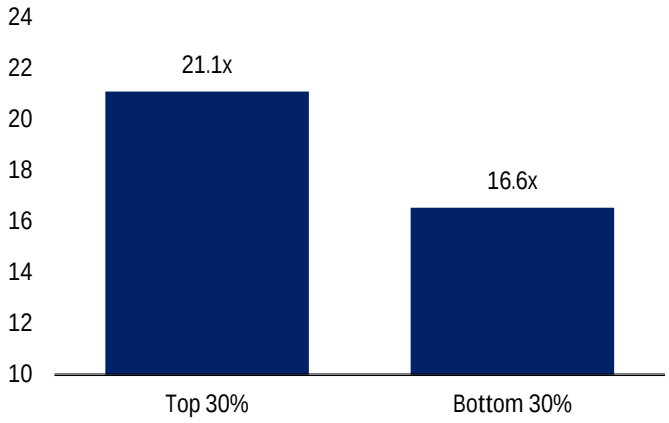
Exhibit 165: Top 30% trades 4 P/E multiple points higher than Bottom 30% Culture & Value
Median forward 12-month P/E for companies within top 30% (highest) and bottom 30% (lowest) of Culture & Values scores as of 1Q2022



Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy
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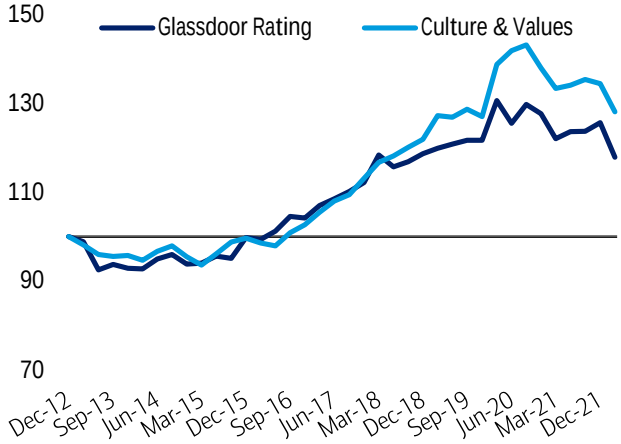
Exhibit 166: Culture generates more alpha than overall satisfaction
Cumulative returns of portfolio that longs high-rated quintile and shorts the low-rated quintile within S&P 500 (12/2012-3/2022)



Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy
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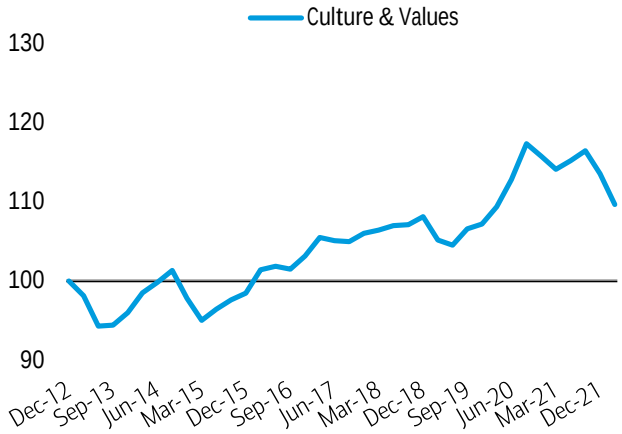
Exhibit 167: Good culture outperforms poor culture within sectors
Cumulative relative returns of high culture-ranked companies vs. bottom-ranked peers after adjusting for sector bias (12/2012-3/2022)



Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy
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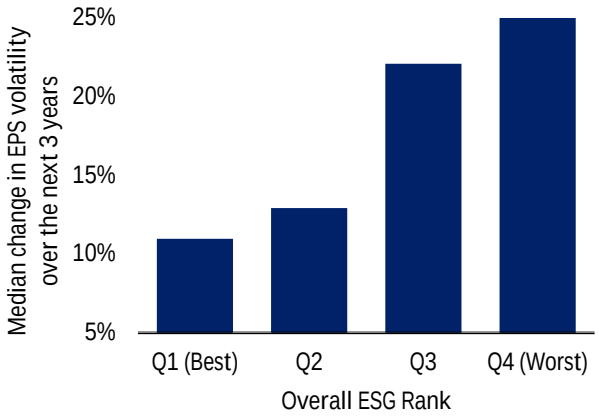
ESG as a signal of future risk

The best signal we've found for earnings risk

Prior to our work on ESG, we found scant evidence of fundamental measures reliably predicting earnings quality. But ESG appears to isolate non-fundamental attributes that have real earnings impact: these attributes have been a better signal of future earnings volatility than any other measure we have found. We find consistent results across three different ESG ratings providers — MSCI, Sustainalytics and Refinitiv.

Exhibit 168: Best predictor of earnings risk: worse ESG ranks signaled more earnings deterioration

Median change in 3-yr EPS volatility over subsequent three years based on Refinitiv Overall ESG score from 12/2005-12/2018 (with volatility through 12/2021)



Source: Refinitiv, BofA US Equity & Quant Strategy

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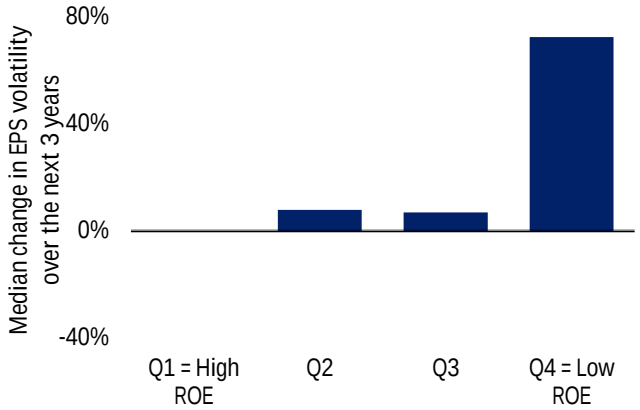
Exhibit 169: Other quality measures like Return on Equity have relatively weaker predictive power over future changes in earnings volatility

Median change in forward 3-yr EPS volatility over subsequent three years by quartile based on 1-yr ROE from 12/2005 through 12/2018 (with volatility through 12/2021)



Source: FactSet, BofA US Equity & US Quant Strategy
Based on the S&P 500 universe

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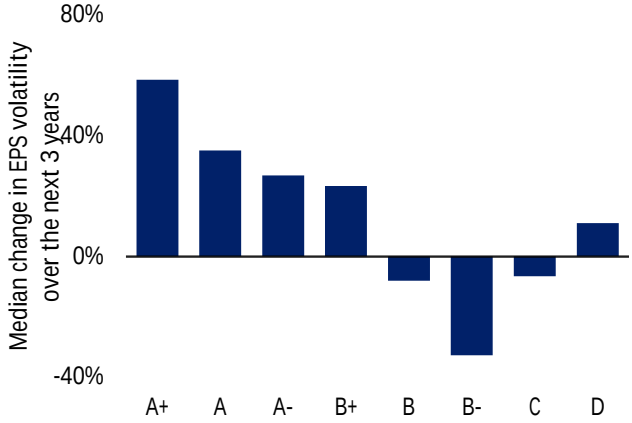
Exhibit 170: S&P Quality Ranks have no apparent predictive power over future changes in earnings quality

Median change in forward 3-yr EPS volatility over subsequent three years by quartile based on S&P Quality Rank from 12/2005 through 12/2018 (with volatility through 12/2021)



Source: FactSet, BofA US Equity & US Quant Strategy
Based on the S&P 500 universe

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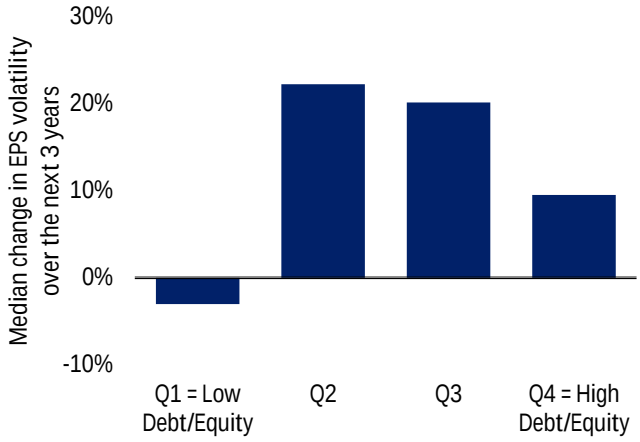
Exhibit 171: Even Debt to Equity falls short in predicting changes in earnings risk

Median change in forward 3-yr EPS volatility over subsequent three years by quartile based on debt-to-equity ratio from 12/2005 through 12/2018 (with volatility through 12/2021)



Source: FactSet, BofA US Equity & US Quant Strategy
Based on the S&P 500 universe

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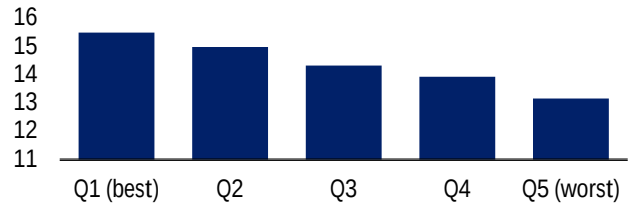
An effective signal of future price volatility risk

ESG has also been a strong signal of future price volatility and returns on equity. Companies with high ESG scores saw lower future price volatility and higher return on equity compared to their counterparts with low ESG scores.

Exhibit 172: Median forward 1-yr ROE by overall Refinitiv ESG score quintile*
12/2005-12/2020



Source: Refinitiv, FactSet, BofA US Equity & Quant Strategy
*Q1 includes companies with the highest ratings; Q5 includes companies with the lowest ratings
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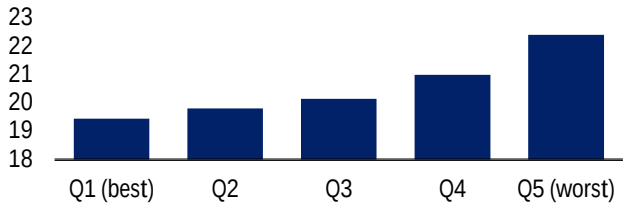
Exhibit 173: Median forward 1-yr price volatility by overall Refinitiv ESG score quintile*
12/2005-12/2020



Source: Refinitiv, FactSet, BofA US Equity & Quant Strategy
*Q1 includes companies with the highest ratings; Q5 includes companies with the lowest ratings
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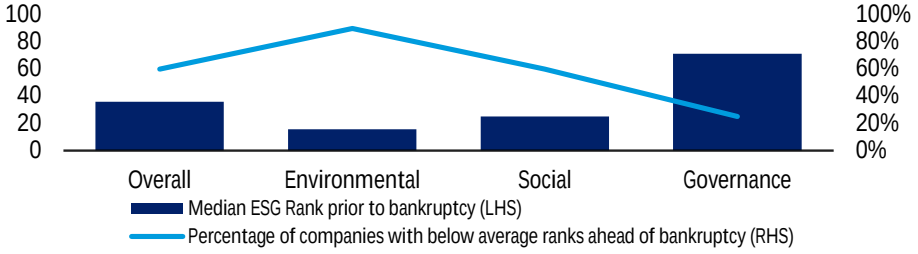
Bankruptcy risk

Between 2005 and 2015, seventeen companies within our universe that were ranked on ESG scores at least five years earlier filed for bankruptcy. If an investor had observed ESG scores of stocks five years prior to the bankruptcy, and only bought stocks with above average scores on Environmental and Social metrics, the investor would have avoided fifteen of the seventeen companies that filed for bankruptcy.

Moreover, the average ESG scores one year prior to the date that the company filed for bankruptcy were quite low (sub-40) driven by effective forecasting from the Environmental and Social scores; again, similar to price decline risk, Corporate Governance was not a particularly effective forecasting tool for bankruptcy likelihood (Exhibit 174). A topic for future research would be to explore the generally weaker results in this dataset for the governance score, and identify a superior method for assessing corporate governance as a tool for forecasting volatility, price decline risk and bankruptcy risk.

Exhibit 174: Environmental and Social ranks have been good signals of future bankruptcy risk
ESG ranks one year prior to bankruptcy of US stocks that filed for bankruptcy between 2008-2015



Note: Overall ESG rank based on average of Environmental, Social and Governance scores. Sample is based on 20 US companies in BofA US universe with ESG ranks that filed for bankruptcy between 2008-2015
Source: Refinitiv , BofA Global Research

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Implementation guide for sectors

What we did: we drilled down to more granular levels of data for each data vendor and split the universe of stocks in the sector into halves based on each ESG metric: above vs. below median score per sector (we used halves instead of quintiles due to the limited number of companies within sectors). We then analyzed the spread between top and bottom half ESG companies in terms of future 1) return on equity, 2) earnings risk (volatility), 3) price volatility and 4) performance.

Sector takeaways

Our analysis yielded interesting conclusions that warrant further exploration. The factors that have historically been the most effective signals of earnings risk for companies within each sector are highlighted below, where we assessed both the magnitude of

difference in future fundamental attributes between above- and below- median companies, as well as the consistency of the signal in yielding stronger and weaker results over time.

Exhibit 175: Materiality over morality
ESG Signals that have been the most effective of future earnings volatility

Sector	US	Europe	Asia
Communication Services	Environmental: Resource Use, Opportunities in Clean Tech Social: Human Capital Development, Supply Chain Standards	Environment: Carbon Emissions, Toxic Emissions & Waste Social: Access to Communications Governance: Anti-Competitive Practices	Governance: Board structure, Compensation, Audit, Accounting, Voting, Diversity, Fraud Environment: Raw materials Social: Product safety
Consumer Discretionary	Social: Product Safety / Quality / Responsibility, Supply Chain Standards, Workforce / Society & Community Incidents Environmental: Raw Material Sourcing, Resource Use, Emissions	Environment: Raw Material Sourcing, Toxic Emissions & Waste, Water Stress Social: Product Safety & Quality, Chemical Safety, Privacy & Data Security, Health & Safety, Human Capital Development, Supply Chain Labour Standards Governance: Corporate Governance	Governance: Board structure, Compensation, Audit, Accounting, Voting, Risk, Fraud Environment: Green building, Water stress, E-waste, Clean tech Social: Privacy and data security
Consumer Staples	Environmental: Packaging Material & Waste, Green Supplier / Outsourcing Logistics Social: Supply Chain Labor Standards, Health / Chemical Safety	Environment: Product Carbon Footprint, Packaging Materials & Waste, Carbon Emissions, Toxic Emissions & Waste Social: Opportunities in Nutrition and Health, Health & Safety, Labour Management, Supply Chain Labour Standards, Chemical Safety Governance: Corporate Governance Issue	Governance: Board structure, Audit, Accounting, Voting, Risk, Controlling shareholders, Fraud Environment: Clean tech, Water stress Social: Health and safety
Energy	Environmental: Biodiversity & Land Use, Oil Spill Disclosure & Performance, Emissions, Environmental Innovation, Opportunity in Clean Tech	Environment: Water Stress, Carbon Emissions Social: Health & Safety Governance: Corruption & Instability	Governance:Compensation, Audit, Accounting, Diversity
Financials	Governance: Compensation Policy, Anticompetitive Practices, Business Ethics and Fraud, Shareholder Rights Social: Product Safety / Quality, Community, Responsible Marketing	Environment: Financing Environment Impact, Toxic Emissions & Waste, Opportunities in Green Building, Carbon Emissions, Climate Change Vulnerability, Water Stress Social: Insuring Health & Demographic, Labour Management, Product Safety & Quality Governance: Financial System Instability, Corporate Governance	Governance: Board structure, Compensation, Accounting, Voting, Diversity, Related Party Transactions, Cross Shareholdings Environment: Clean tech
Health Care	Governance: Business Ethics and Fraud, Clinical Trial Standards Social: Human Capital Development, Product Safety, Human Rights, Privacy & Data Security	Environment: Carbon Emissions, Water Stress, Toxic Emissions & Waste Social: Access to Healthcare, Health & Safety, Human Capital Development, Labour Management Governance: Corruption & Instability	Governance: Board structure, Compensation, Audit, Accounting, Voting, Risk, Cross shareholdings, Fraud Environment: Clean tech
Industrials	Environmental: Raw Material Sourcing, Carbon Emissions, Waste Intensity, Environmental Fines & Penalties Social: Chemical Safety, Health and Safety Management	Environment: Toxic Emissions & Waste, Water Stress, Carbon Emissions Social: Health & Safety, Labour Management Governance: Corporate Governance	Governance: Compensation, Audit, Accounting, Voting, Diversity, Fraud, Bankruptcy Environment: E-waste Social: Supply chain labour, Human capital development, Privacy and data security
Information Technology	Governance: Corruption & Instability, Disclosure, Shareholder Rights Social: Supply Chain Standards, Data Privacy Policy, Human Rights	Environment: Toxic Emissions & Waste Social: Human Capital Development, Labour Management, Privacy & Data Security	Governance: Board structure, Compensation, Audit, Accounting, Voting, Fraud Social: Human capital development, Supply chain labour
Materials	Environmental: Water Stress, Toxic / Carbon Emissions, Waste, Environmental Innovation	Environment: Biodiversity & Land Use, Water Stress, Toxic Emissions & Waste, Carbon Emissions, Opportunities in Clean Tech Social: Health & Safety, Labour Management Governance: Corruption & Instability	Governance: Board structure, Accounting, Voting, Risk Environment: Raw material sourcing
Real Estate	Environmental: Biodiversity & Land Use, Opportunities in Green Building, Waste Governance: Anticompetitive Practices, Business Ethics Incidents		Governance: Board structure, Compensation, Controlling shareholders Environment: Financing for environment impact, Green buildings Social: Supply chain labour, Product safety
Utilities	Environmental: Opportunities in Renewable Energy, Water Intensity, Emissions / Waste Social: Labor Management, Health & Safety, Corporate Foundation	Environment: Toxic Emissions & Waste, Water Stress, Carbon Emissions, Opportunities in Renewable Energy Social: Human Capital Development, Labour Management, Health & Safety Governance: Corporate Governance	Governance: Board structure, Compensation, Audit, Accounting, Voting, Diversity

Source: Source: MSCI ESG Research LLC, Refinitiv, Sustainalytics, BofA Global Research

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Introducing ESGMeter™, a proprietary ESG score

ESGMeter assesses financial stability using an ESG lens

Building on our analysis of environmental, social and governance (ESG) factors that began in 2016, we launched ESGMeter, a proprietary metric based on quantitative and fundamental inputs that reflect our assessment of a company's ESG-related attributes. ESGMeter is intended to indicate a company's likelihood of experiencing stronger Financial Stability (which we define as higher return on equity, lower earnings volatility, and lower price volatility) over the next three years relative to its peer group.

There are three ESGMeter levels – Low, Medium, and High – with High indicating that a company has attributes we expect to be most likely to translate into superior financial stability. This framework is based on two elements: (1) a quantitative analysis incorporating a wide array of ESG attributes to determine which have been effective signals of financial stability historically within each industry group, and (2) a fundamental overlay, where our analysts provide qualitative industry-group level input on the importance of particular ESG attributes.

ESGMeter focuses on value, not values

Whereas ESG investing often connotes a values-driven framework, we instead use a financial lens to drive our ESGMeter. In our view, ESG characteristics are too critical to ignore from an investment perspective, and can be important signals of fundamental prowess, volatility, and even bankruptcy risk. In our previous research, we analyzed the efficacy of these metrics within sectors as a signal of financial results.

Now we develop a framework for determining company-specific scores. Importantly, our analysis is focused on attributes that have been, and are likely to be, drivers of superior financial results from an ROE and risk management perspective, rather than drivers of alpha. Why? We believe alpha from ESG factors may have been driven by the significant flows into ESG-related investments that we've seen over the lifespan of most ESG datasets. See our ESGMeter Methodology report for more information about the ESGMeter framework and important disclosures.

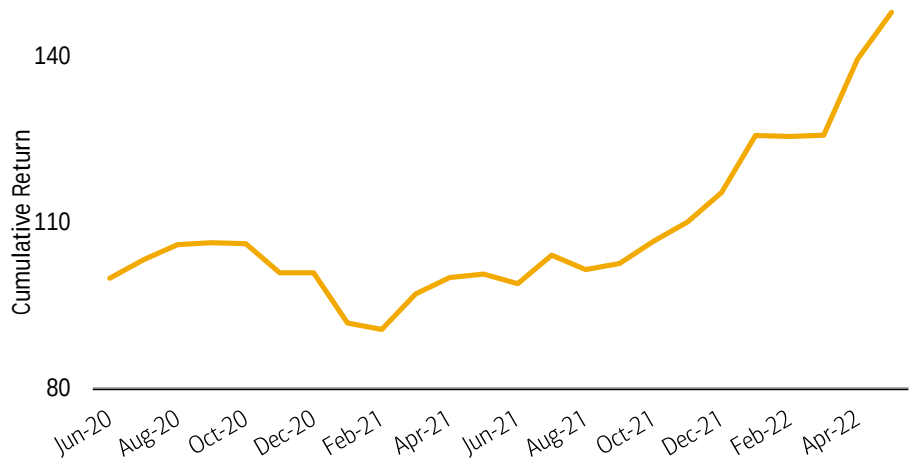
11 ESGMeter sectors

We have rolled out ESGMeter across our US equity coverage, where we have launched on 11 sectors covering more than 1,000 stocks to date. We include links to each sector launch or refresh report below.

- US Communication Services
- US Consumer Discretionary
- US Consumer Staples
- US Energy
- US Financials
- US Health Care
- US Industrials
- US Information Technology
- US Materials
- US Real Estate
- US Utilities

ESGMeter long-short strategy = 28ppt alpha YTD

Exhibit 176: Inclusion: BofA ESGMeter alpha of 48ppt since inception
Cumulative returns of High ESGMeter stocks vs. Low ESGMeter stocks within ESGMeter universe, as of 5/24/2022



Source: FactSet, ICE Data Services, BofA US Equity & Quant Strategy

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Section II: Stock Strategies within the S&P 500

GARP Strategies	82
Valuation Strategies	85
Cash Deployment Strategies	95
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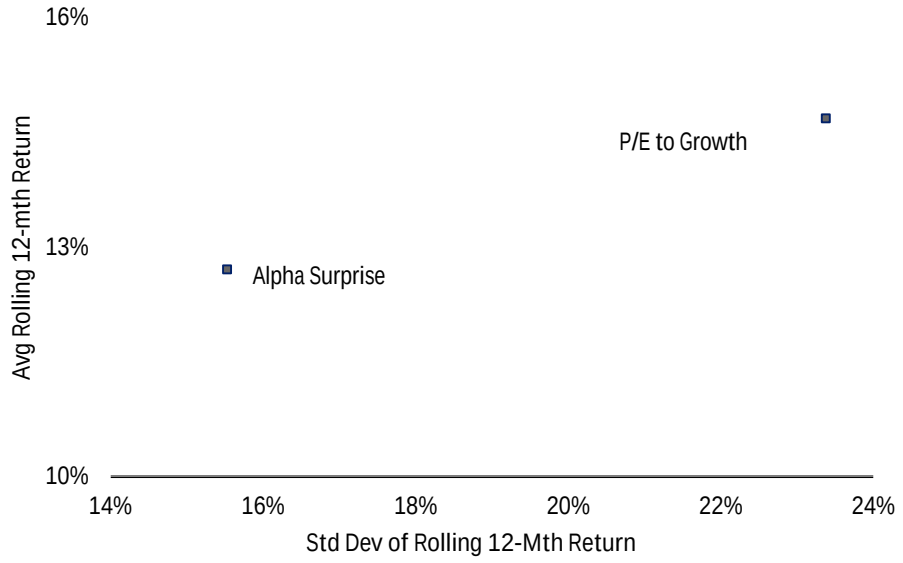
Note: All scatter plot charts in this section are based on actual performance after the screens were introduced, except where noted.

GARP Strategies

Exhibit 177: GARP Strategies
P/E to Growth fared best



Source: BofA US Equity and Quant Strategy

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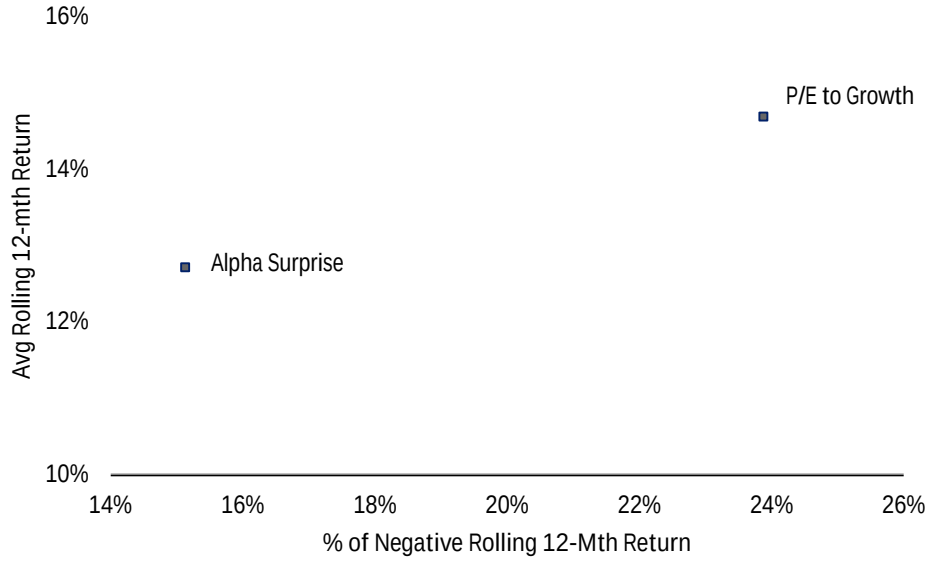
Exhibit 178: GARP Strategies
P/E to Growth fared best

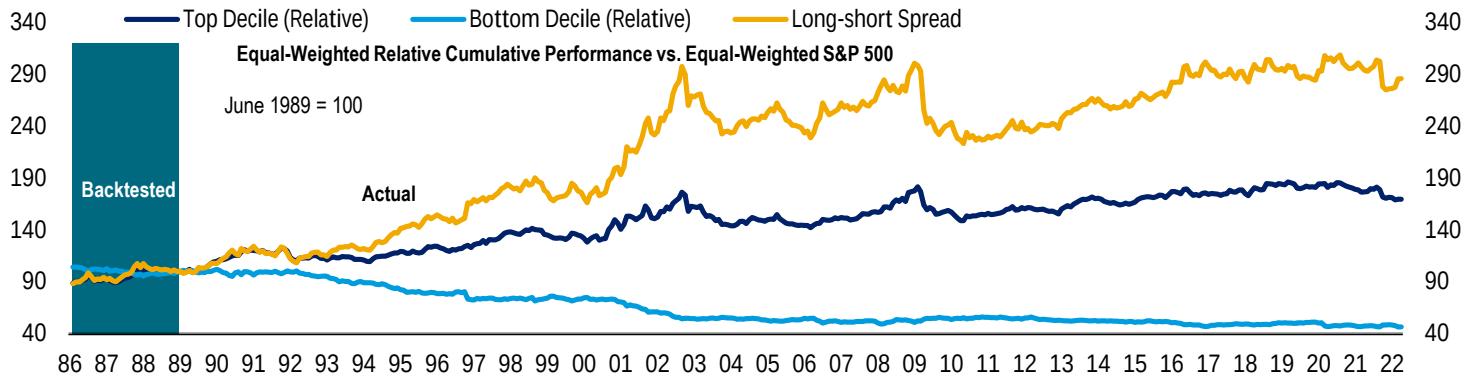


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Alpha Surprise Strategy

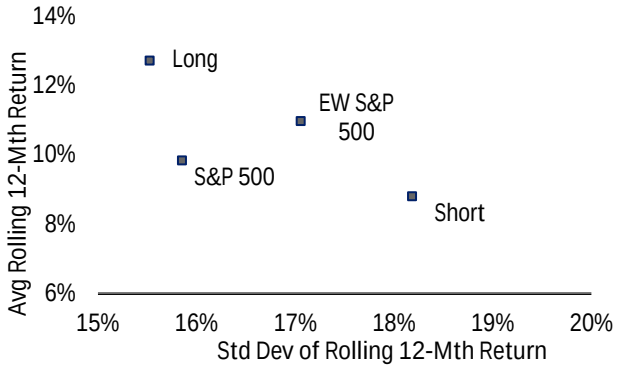
Exhibit 179: Performance of Top Decile, Bottom Decile and Long-Short Spread
Alpha Surprise has outperformed the index since inception



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

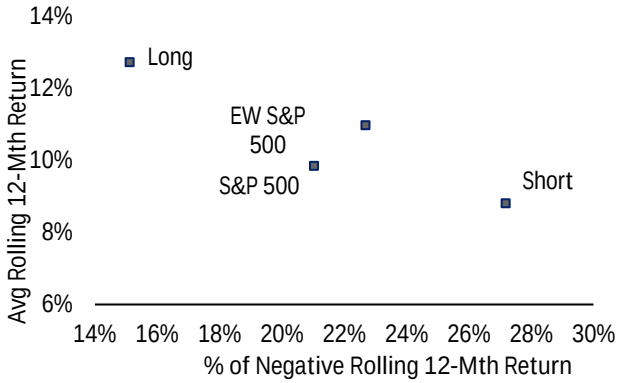
Exhibit 180: Alpha Surprise Model Risk Reward Characteristics
ASM achieved higher returns with lower risk



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

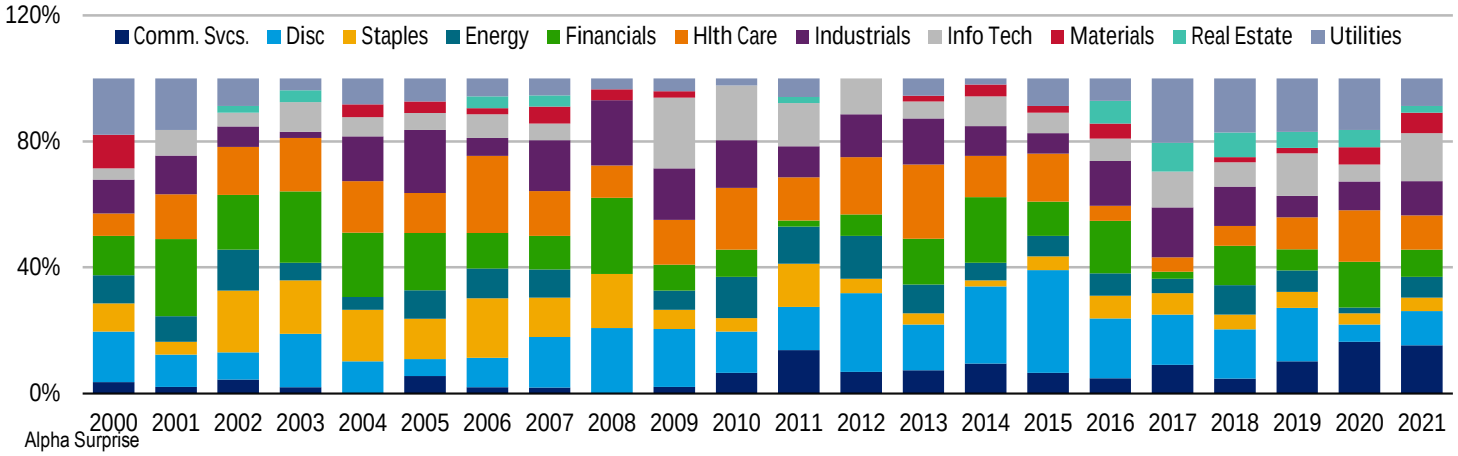
Exhibit 181: Alpha Surprise Model Downside Risk Reward
ASM achieved higher returns with lower risk



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 182: Alpha Surprise Model Sector Concentration (Top Decile)
ASM has most weight in Tech and Communication Services

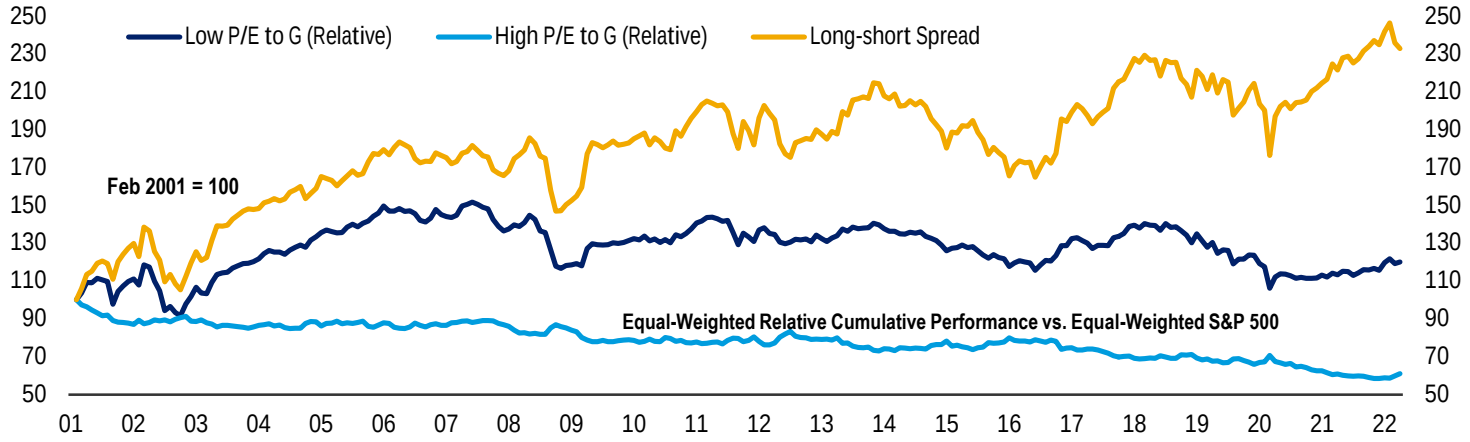


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

P/E-to-Growth

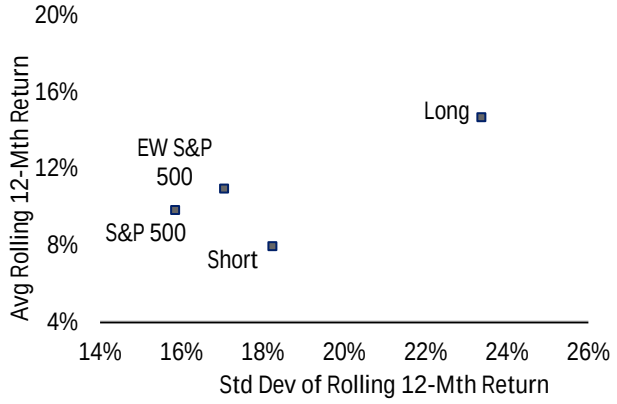
Exhibit 183: Performance of Low P/E to Growth, High P/E to Growth and Long-Short Spread
The factor has outperformed the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

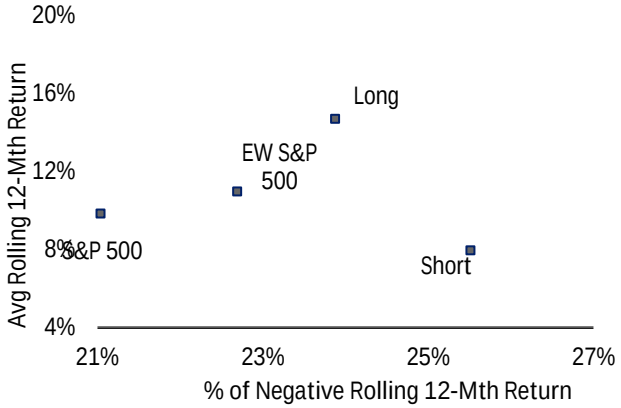
Exhibit 184: Low P/E to Growth Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

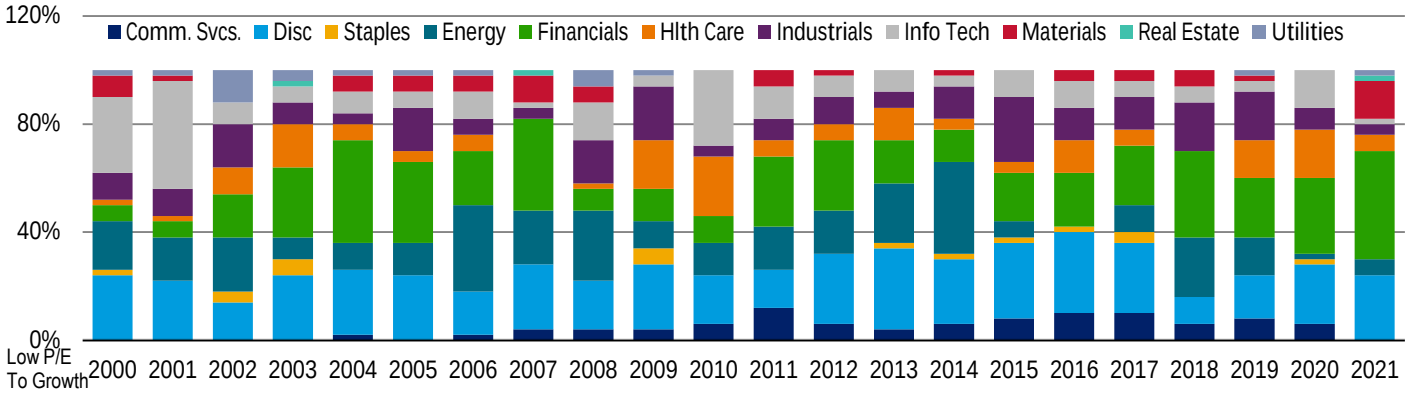
Exhibit 185: Low P/E to Growth Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 186: P/E to Growth Sector Concentration (Low Decile)
The factor has most weight in Financials

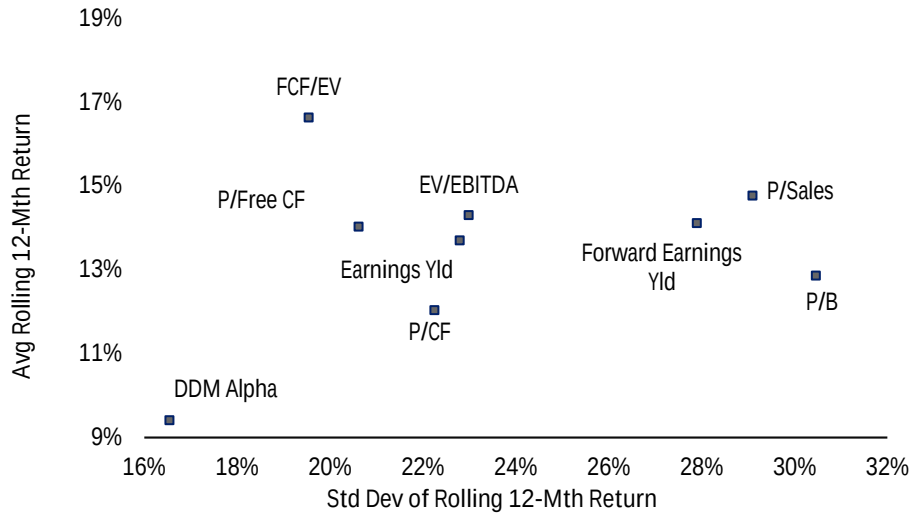


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Valuation Strategies

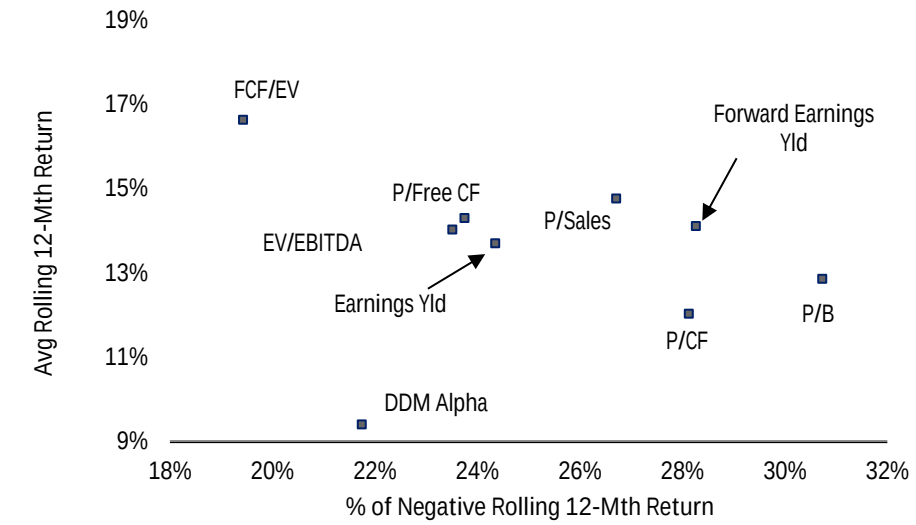
Exhibit 187: Valuation Strategies
FCF/EV fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 188: Valuation Strategies
FCF/EV fared best

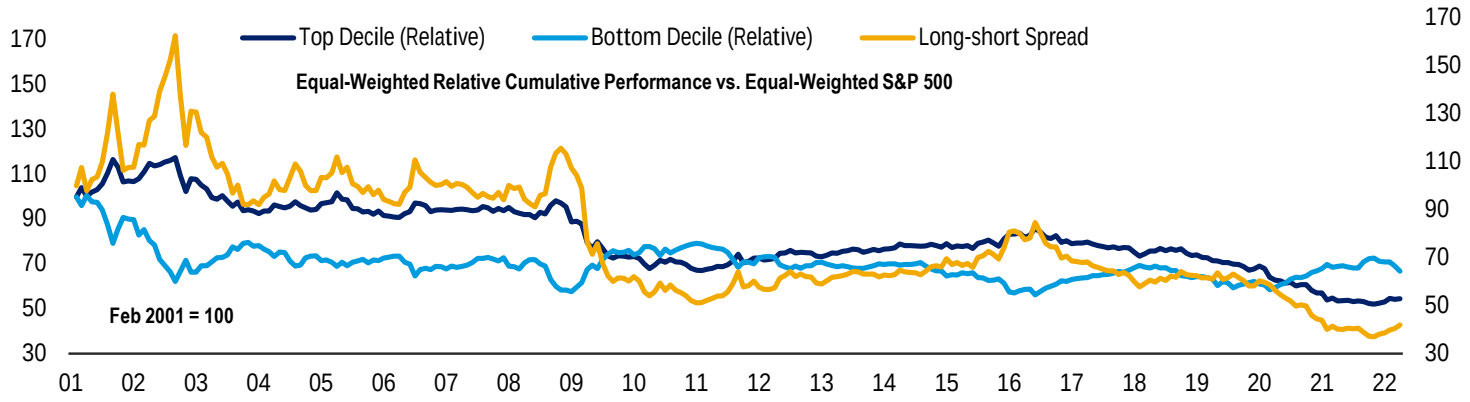


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

DDM Alpha

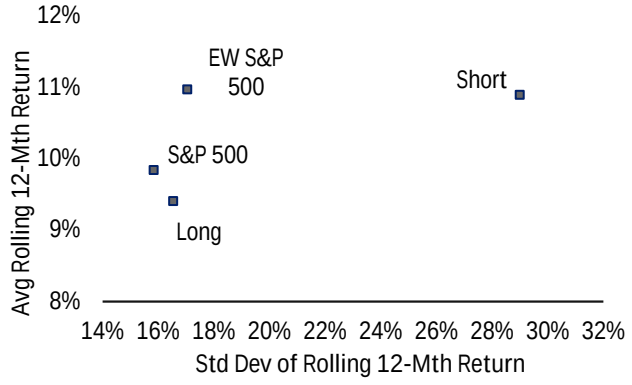
Exhibit 189: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

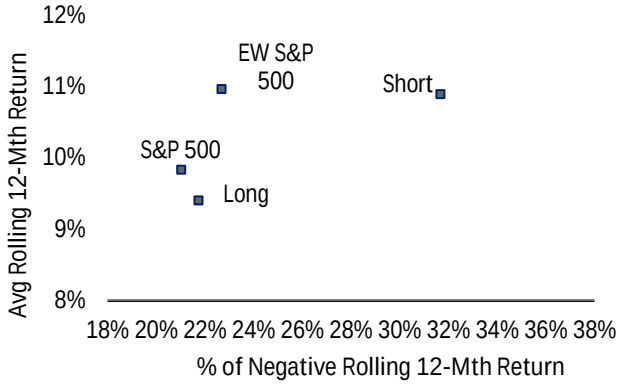
Exhibit 190: DDM Risk Reward Characteristics
The factor has underperformed the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

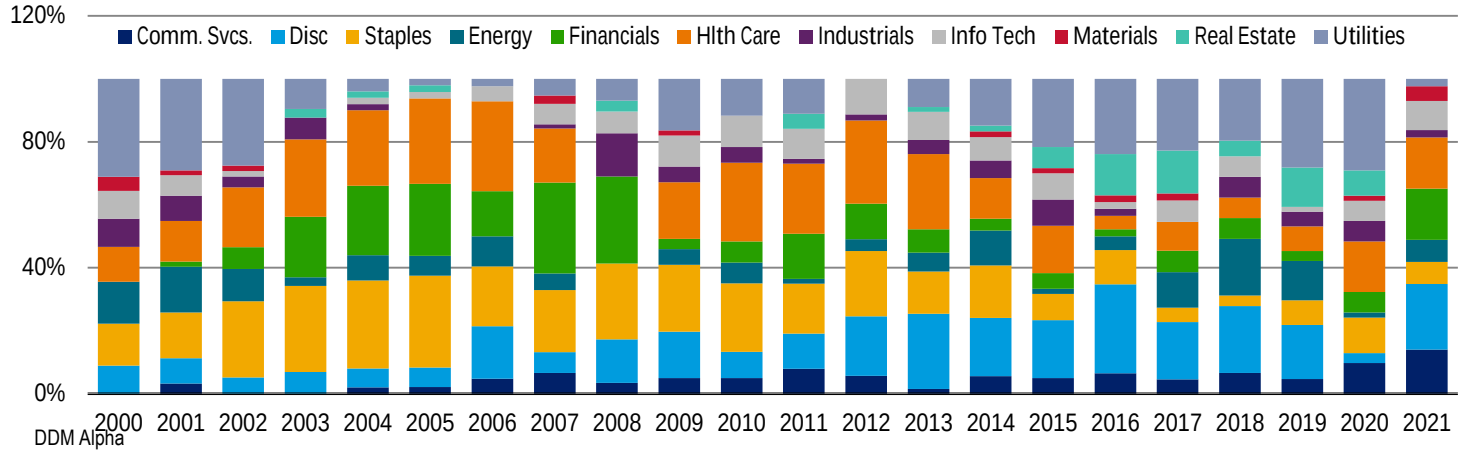
Exhibit 191: DDM Downside Risk Reward
The factor has underperformed the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 192: DDM Sector Concentration (Top Decile)
The factor has most weight in Discretionary

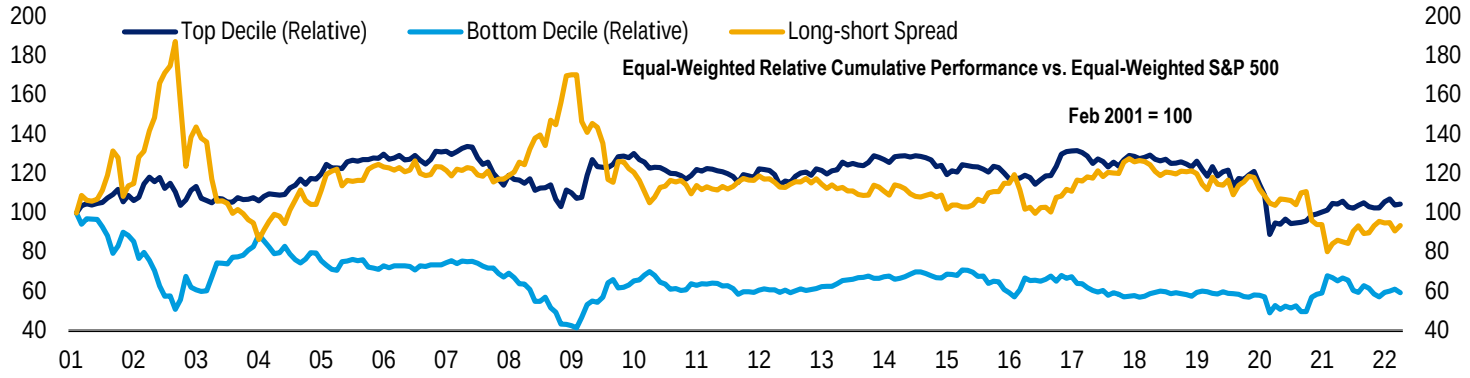


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Earnings Yield

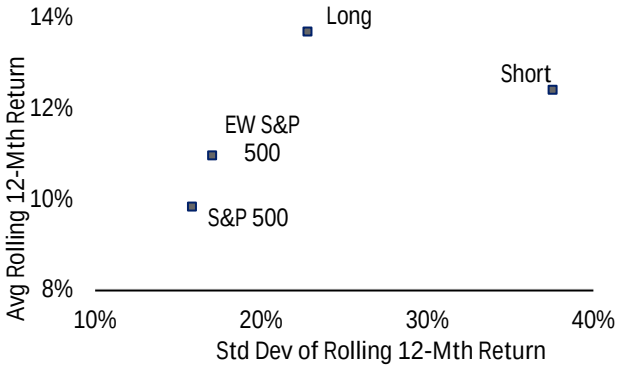
Exhibit 193: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index since 2020



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

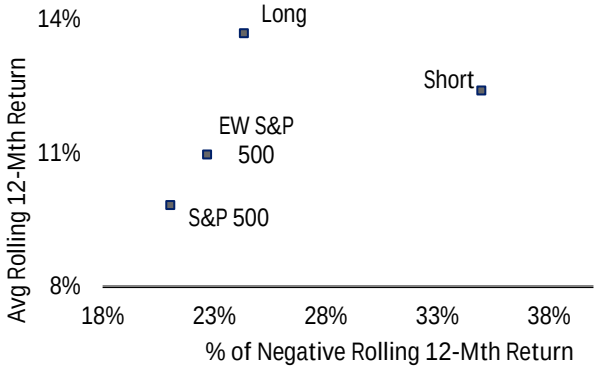
Exhibit 194: High Earnings Yield Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

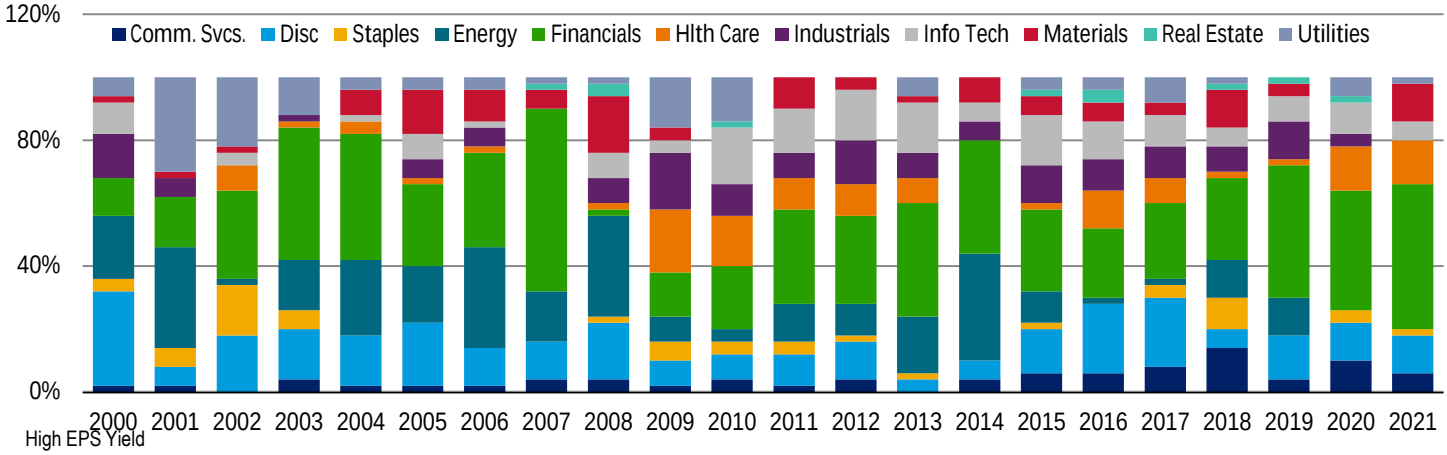
Exhibit 195: High Earnings Yield Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 196: High Earnings Yield Sector Concentration (Top Decile)
The factor has most weight in Financials

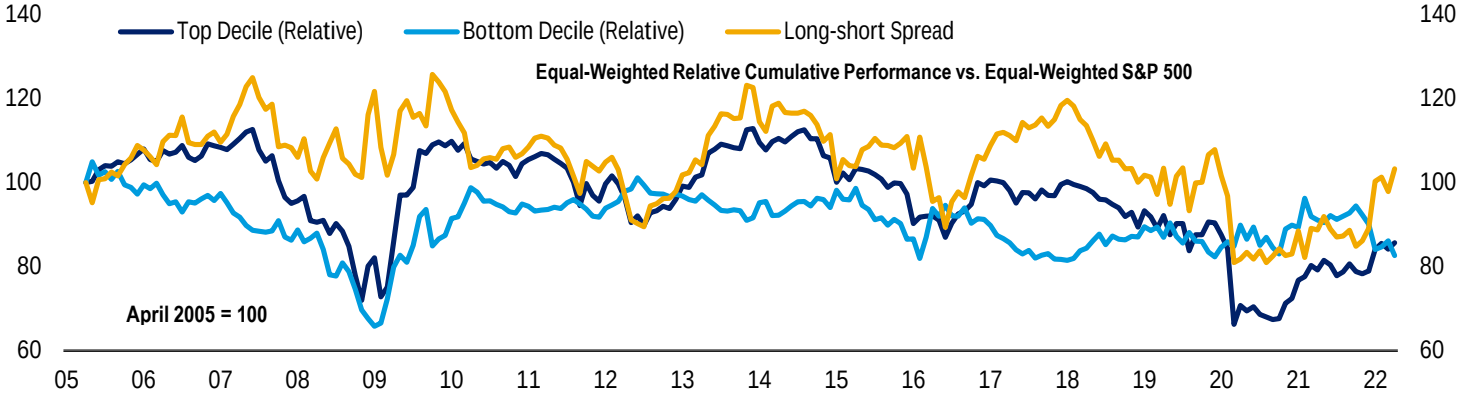


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Forward Earnings Yield

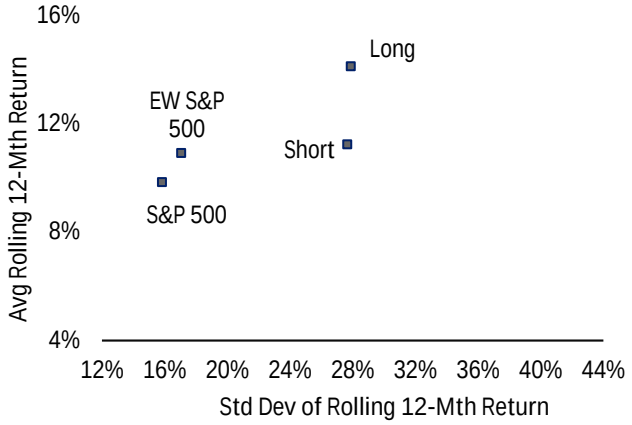
Exhibit 197: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent since 2020



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

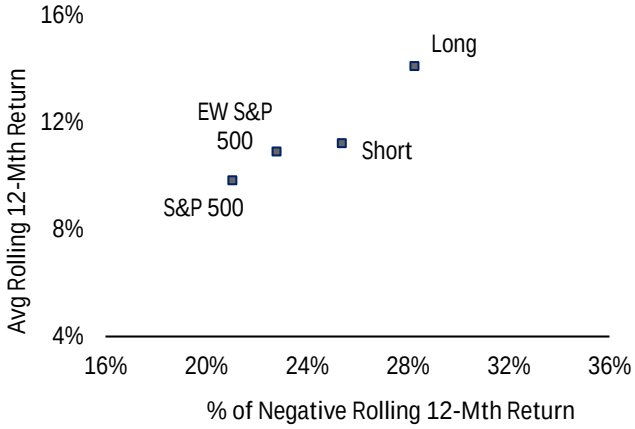
Exhibit 198: High Forward Earnings Yield Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

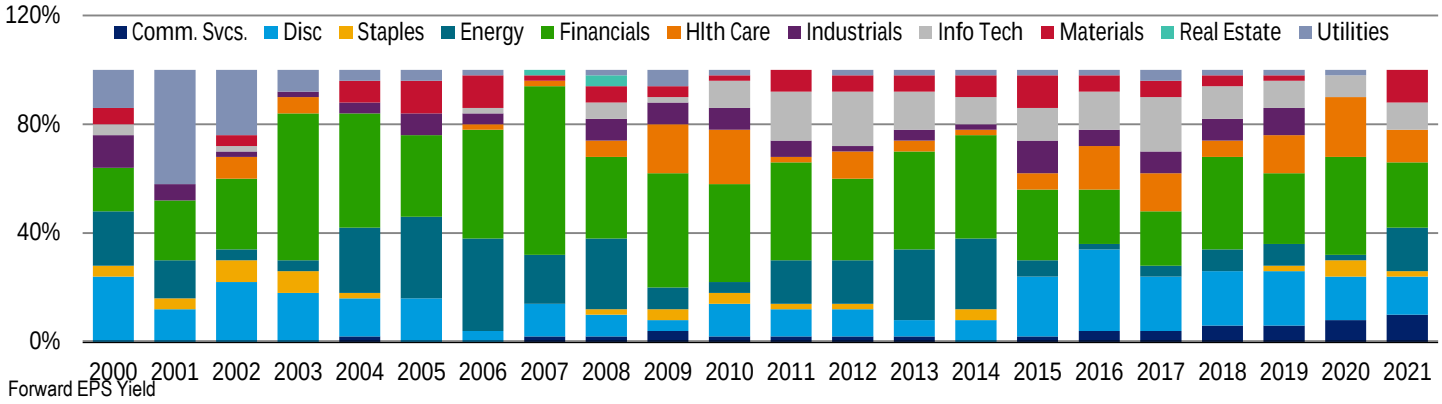
Exhibit 199: High Forward Earnings Yield Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 200: High Forward Earnings Yield Sector Concentration (Top Decile)
The factor has most weight in Financials

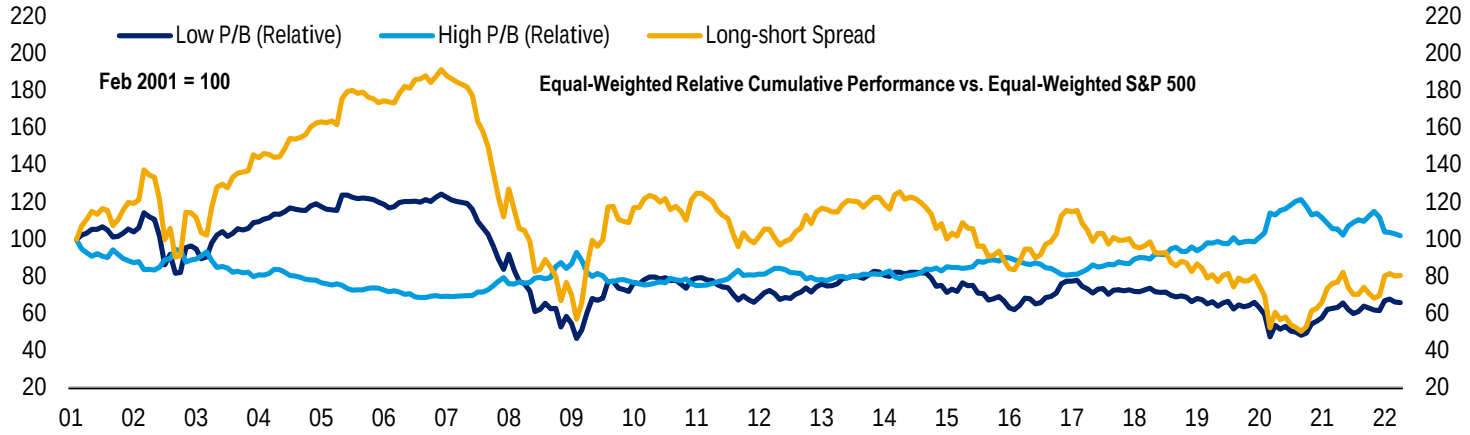


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price/Book Value

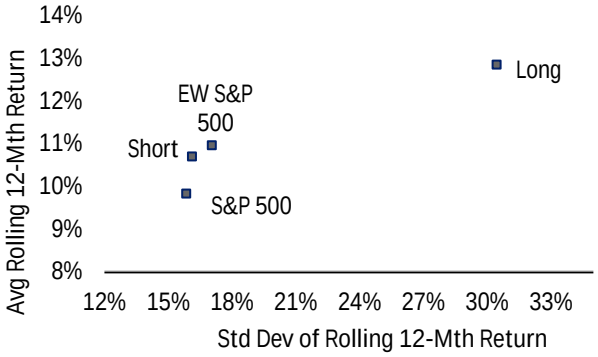
Exhibit 201: Performance of Low P/B, High P/B and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

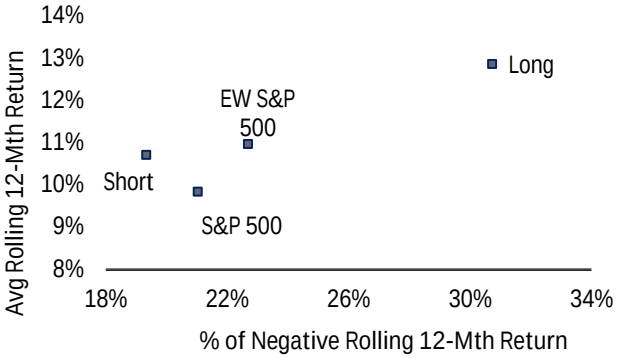
Exhibit 202: Low Price/Book Value Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

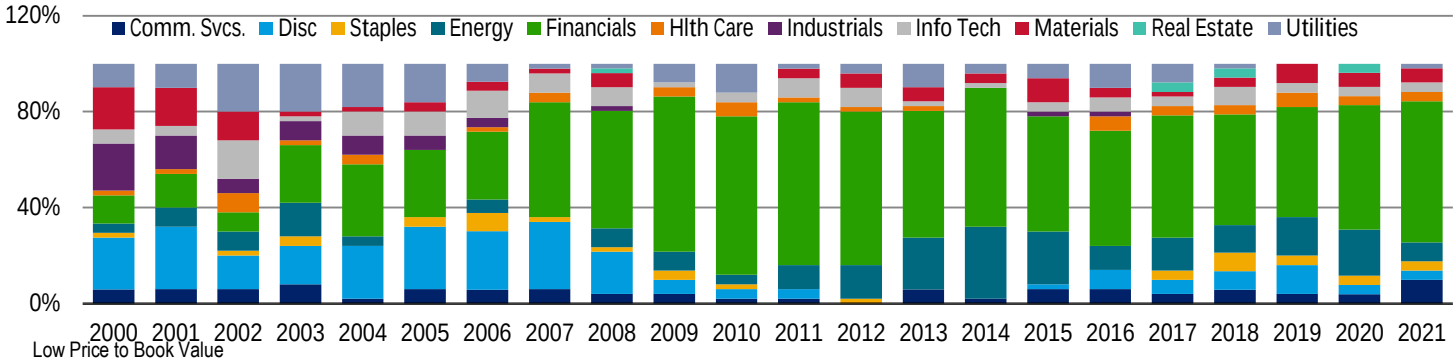
Exhibit 203: Low Price/Book Value Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 204: Low Price/Book Value Sector Concentration (Low Decile)
The factor has most weight in Financials

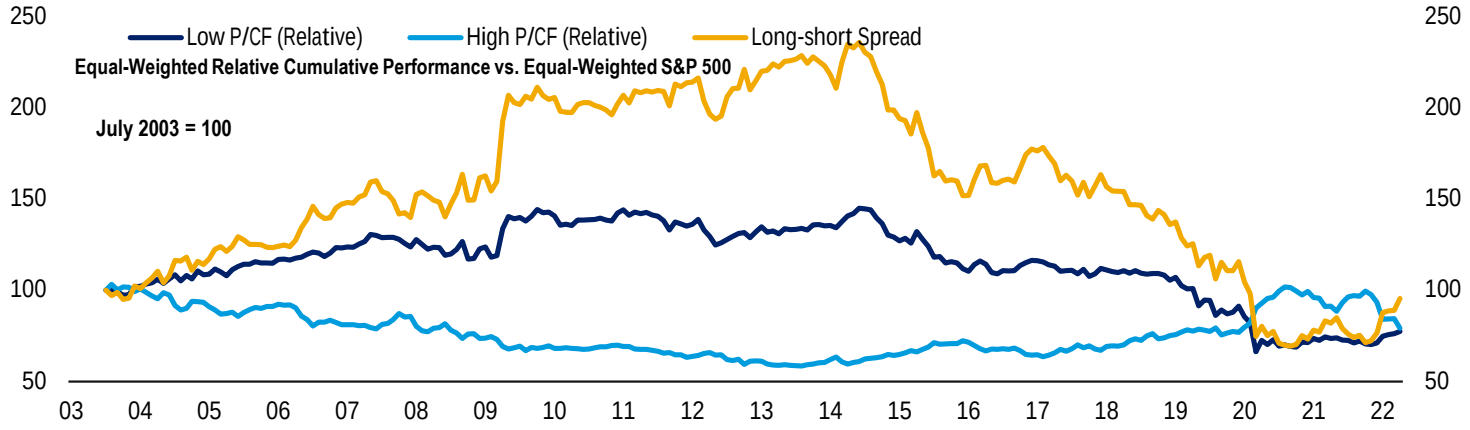


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price/Cash Flow

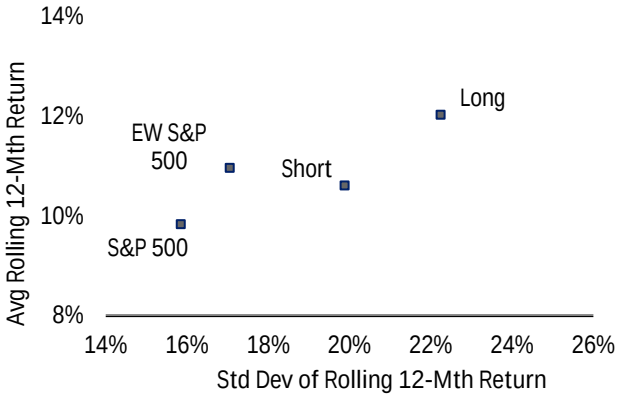
Exhibit 205: Performance of Low P/CF, High P/CF and Long-Short Spread
The factor outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

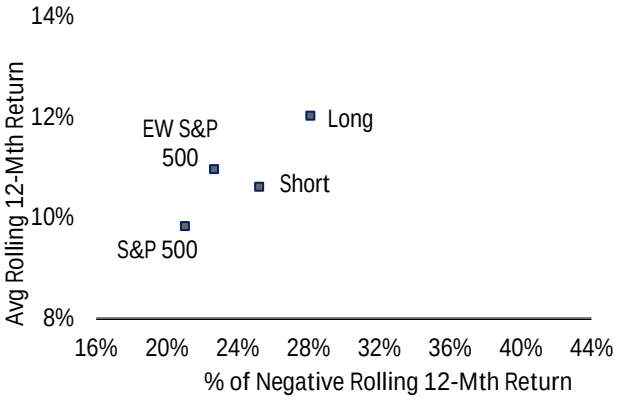
Exhibit 206: Low Price/Cash Flow Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

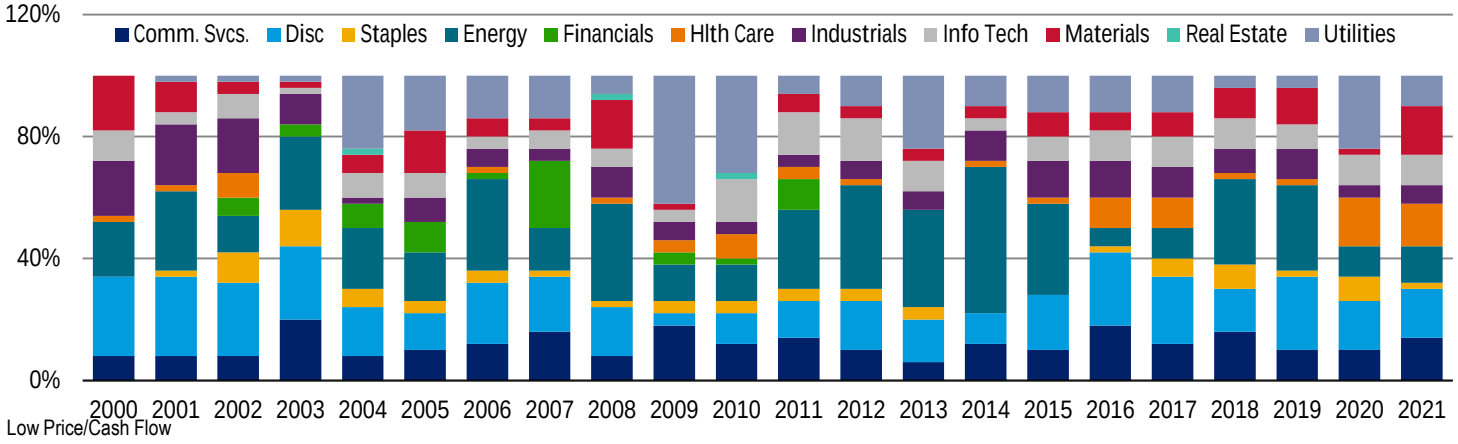
Exhibit 207: Low Price/Cash Flow Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 208: Low Price/Cash Flow Sector Concentration (Low Decile)
The factor has most weight in Discretionary

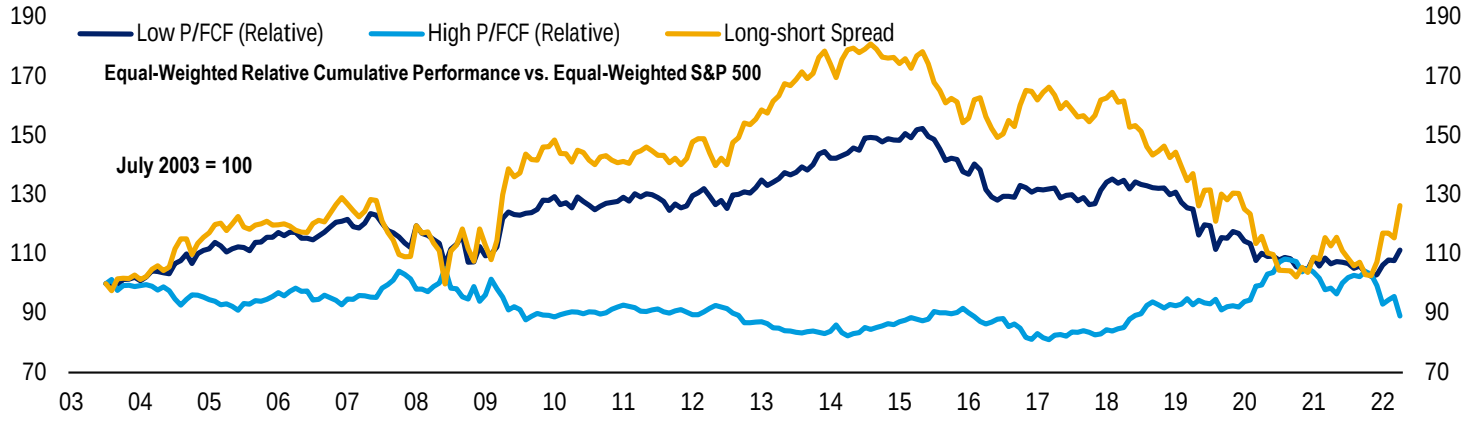


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price/Free Cash Flow

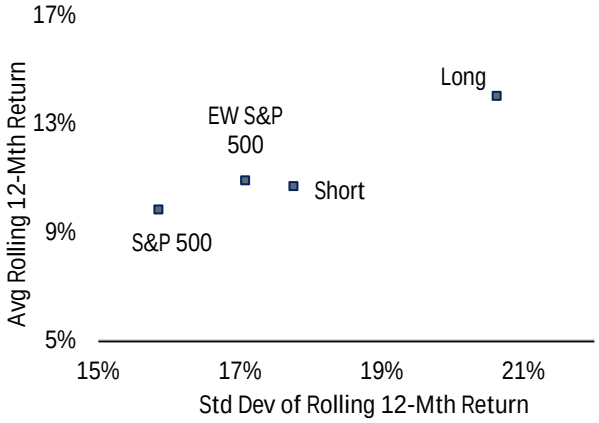
Exhibit 209: Performance of Low P/FCF, High P/FCF and Long-Short Spread
The factor underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

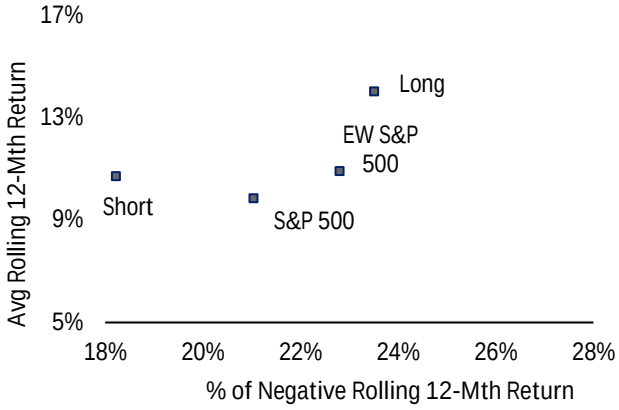
Exhibit 210: Low Price/Free Cash Flow Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

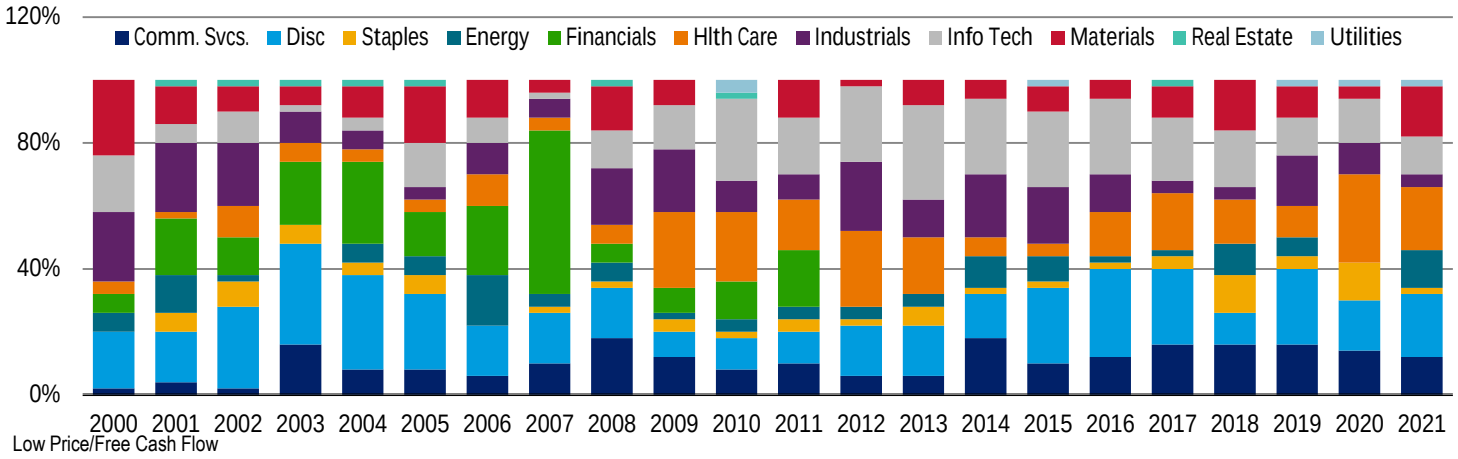
Exhibit 211: Low Price/Free Cash Flow Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 212: Low Price/Free Cash Flow Sector Concentration (Low Decile)
The factor has most weight in Health Care and Discretionary

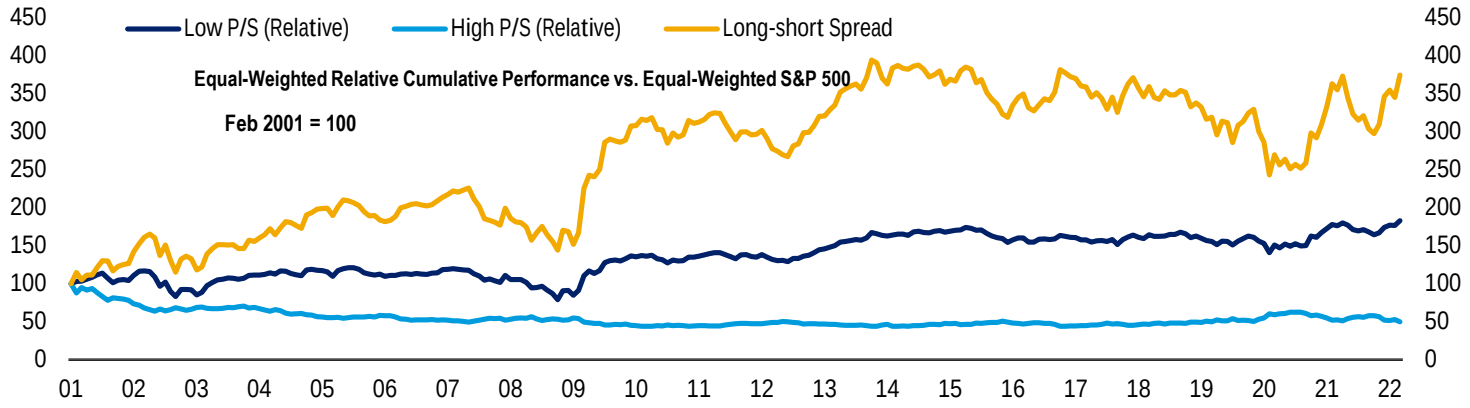


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price/Sales

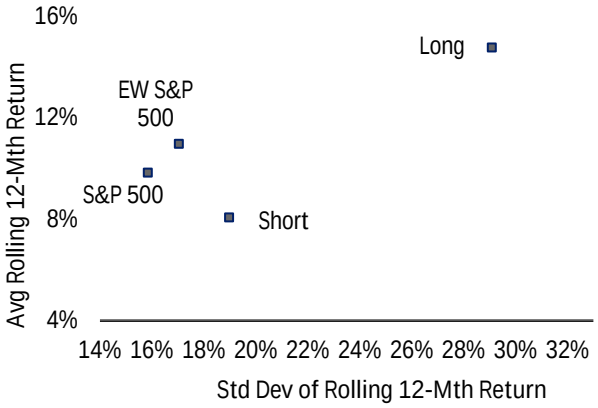
Exhibit 213: Performance of Low P/S, High P/S and Long-Short Spread
The factor outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

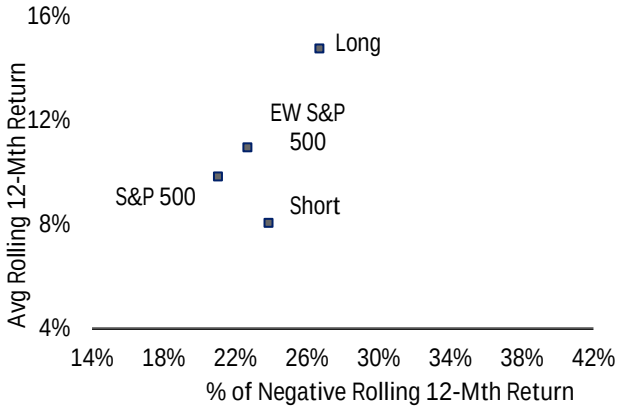
Exhibit 214: Low Price/Sales Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

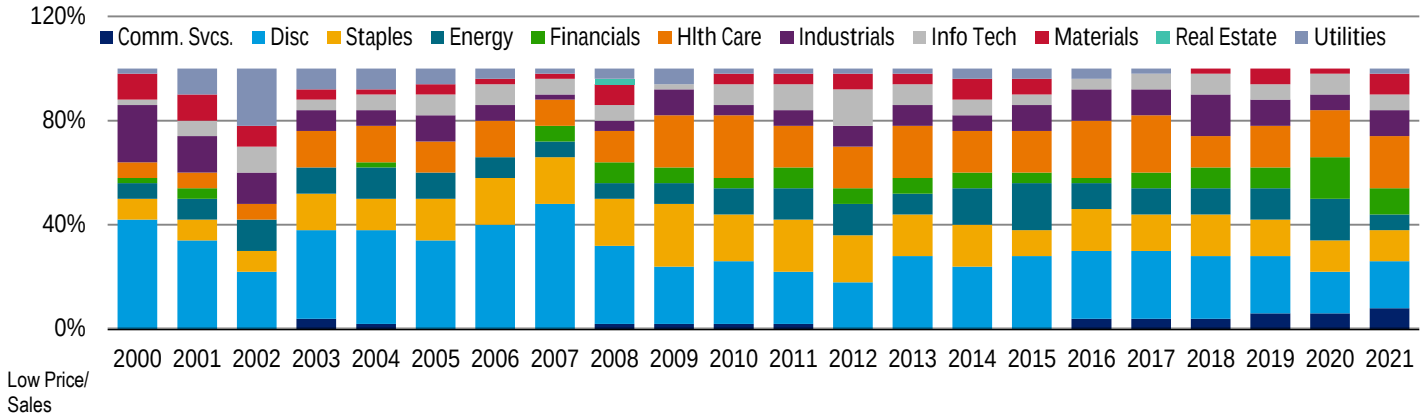
Exhibit 215: Low Price/Sales Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 216: Low Price/Sales Sector Concentration (Low Decile)
The factor has most weight in Health Care

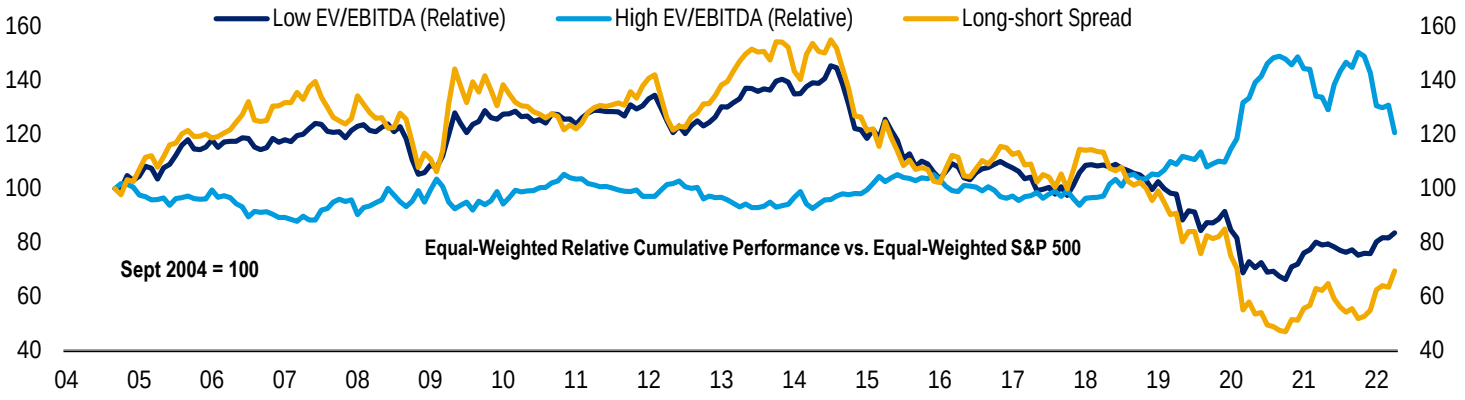


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

EV/EBITDA

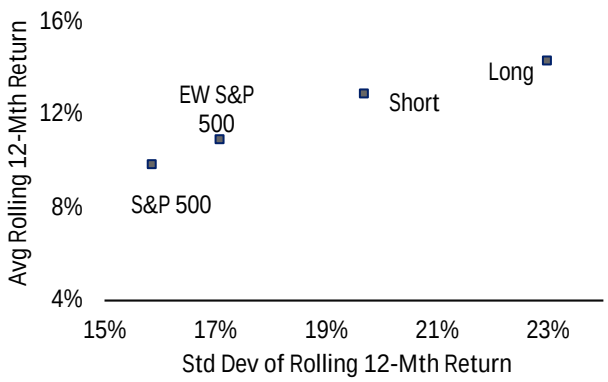
Exhibit 217: Performance of Low EV/EBITDA, High EV/EBITDA and Long-Short Spread
The factor outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

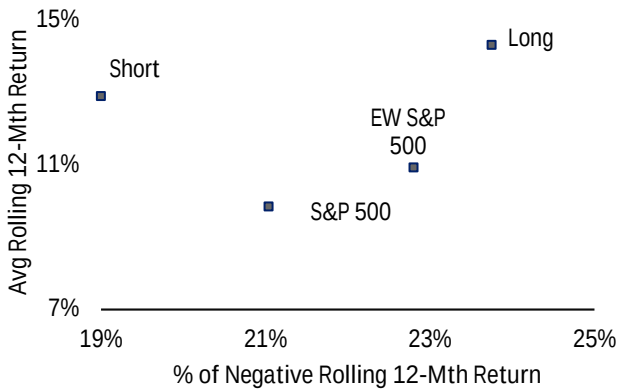
Exhibit 218: Low EV/EBITDA Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

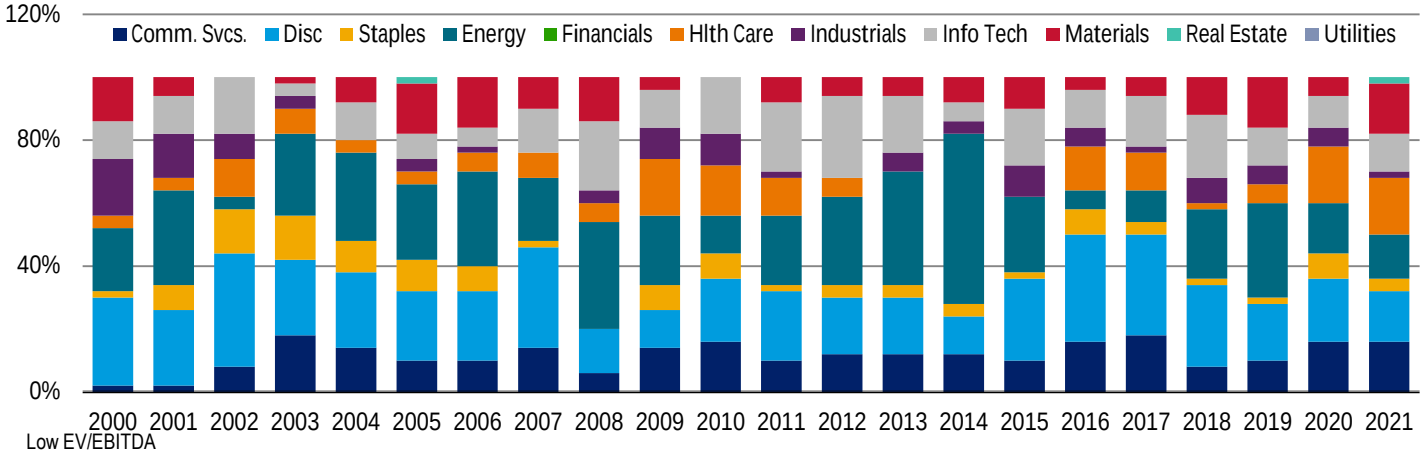
Exhibit 219: Low EV/EBITDA Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 220: Low EV/EBITDA Sector Concentration (Low EV/EBITDA)
The factor has most weight in Health Care and Cons. Discretionary

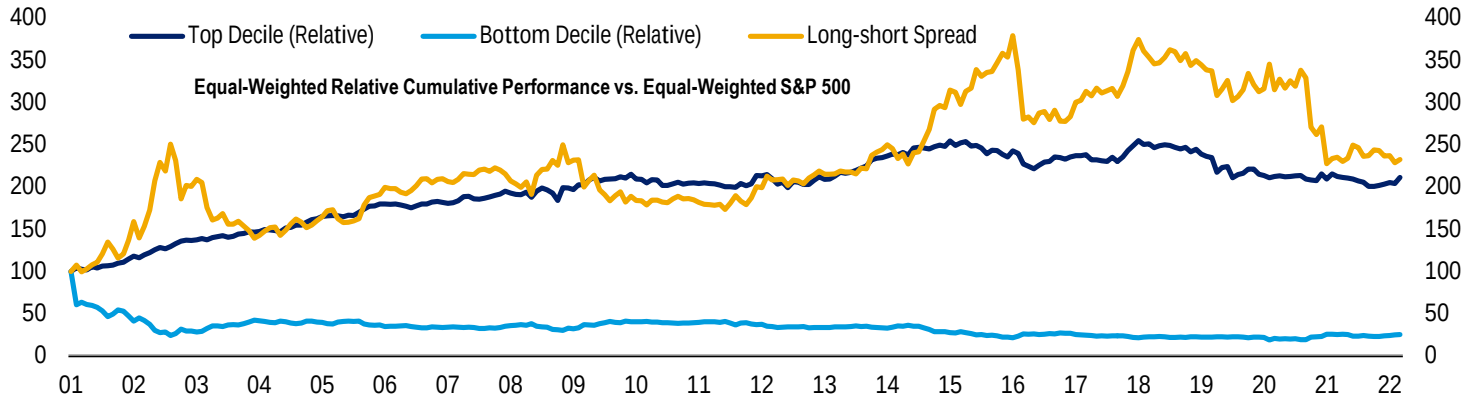


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Free Cash Flow/Enterprise Value

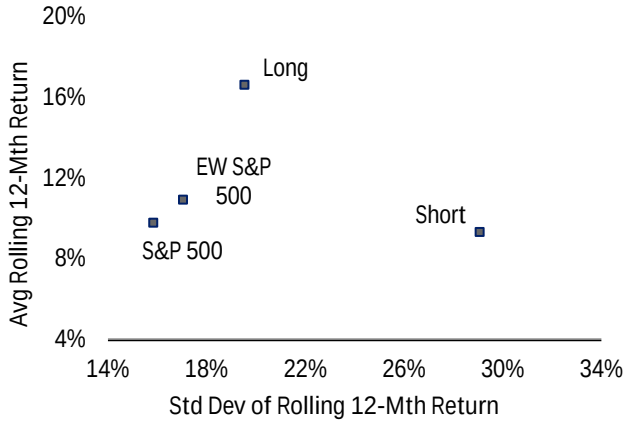
Exhibit 221: Performance of High FCF/EV, Low FCF/EV and Long-Short Spread
The factor underperformed the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

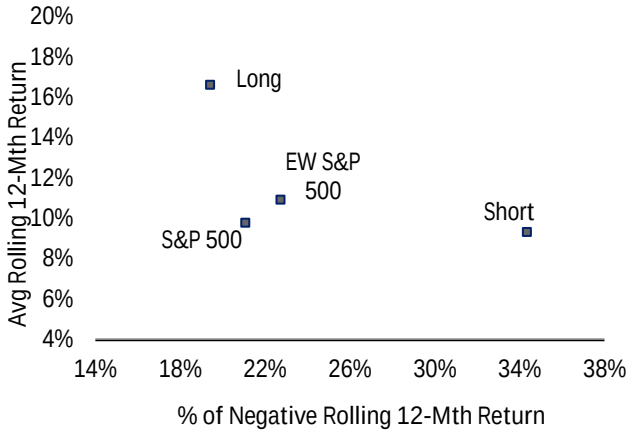
Exhibit 222: High FCF/EV Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

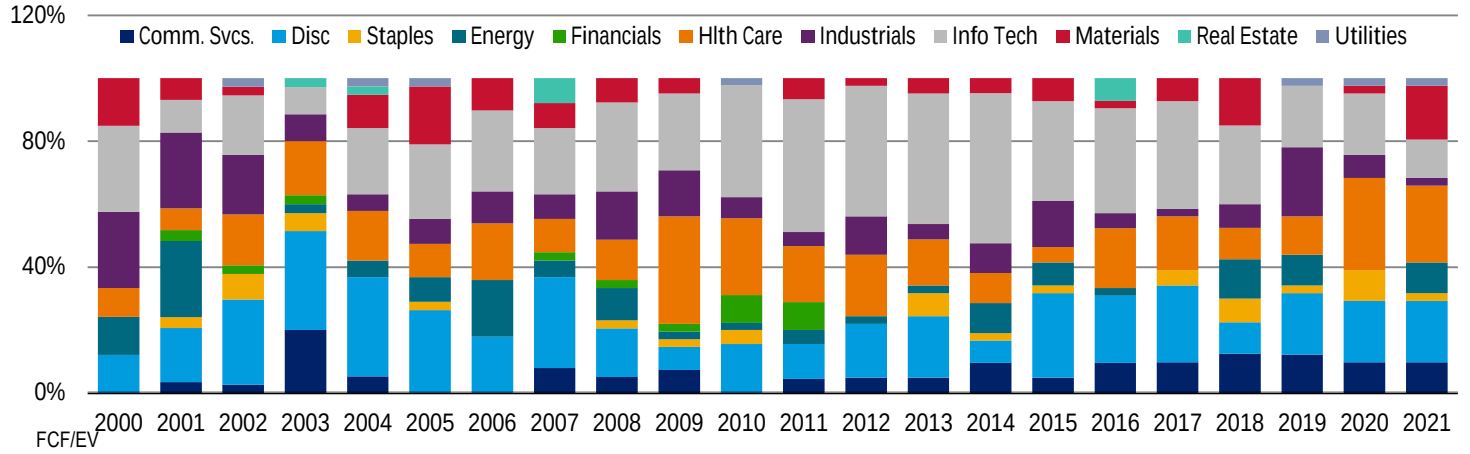
Exhibit 223: High FCF/EV Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 224: Low FCF/EV Sector Concentration (Low FCF/EV)
The factor has most weight in Health Care

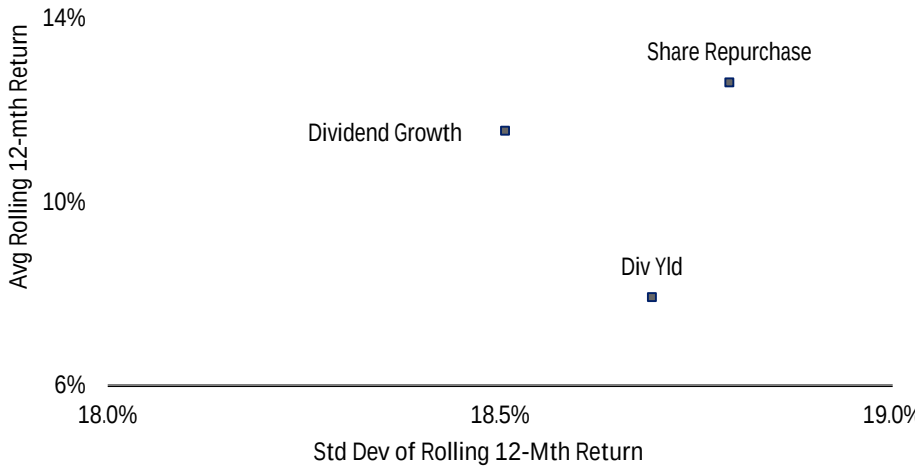


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Cash Deployment Strategies

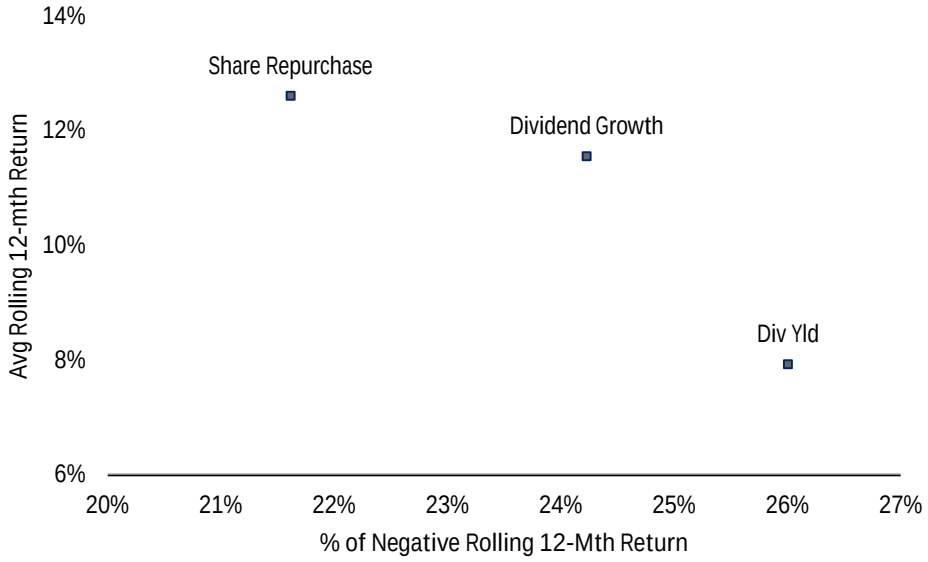
Exhibit 225: Cash Deployment Strategies
Share Repurchase fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 226: Cash Deployment Strategies
Share Repurchase fared best

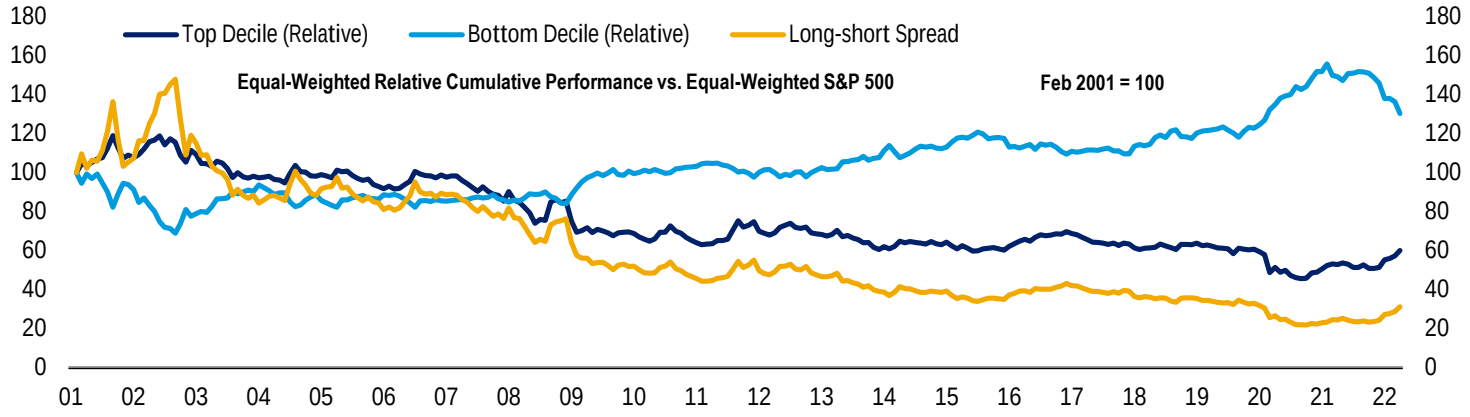


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Dividend Yield

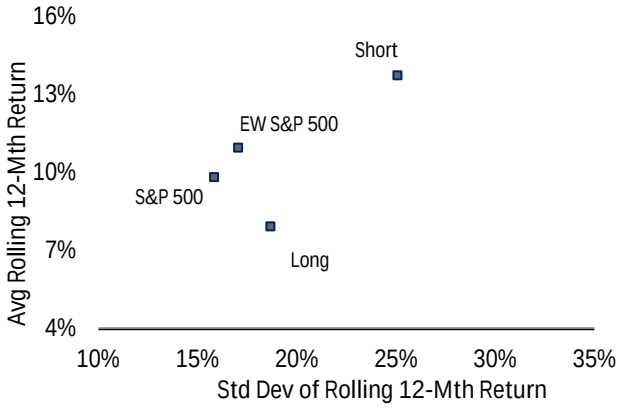
Exhibit 227: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

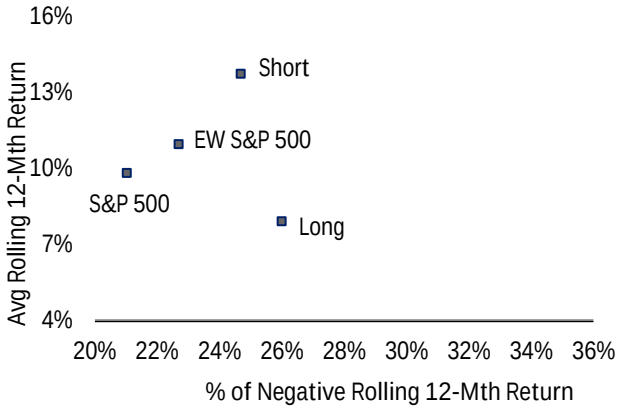
Exhibit 228: High Dividend Yield Risk Reward Characteristics
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

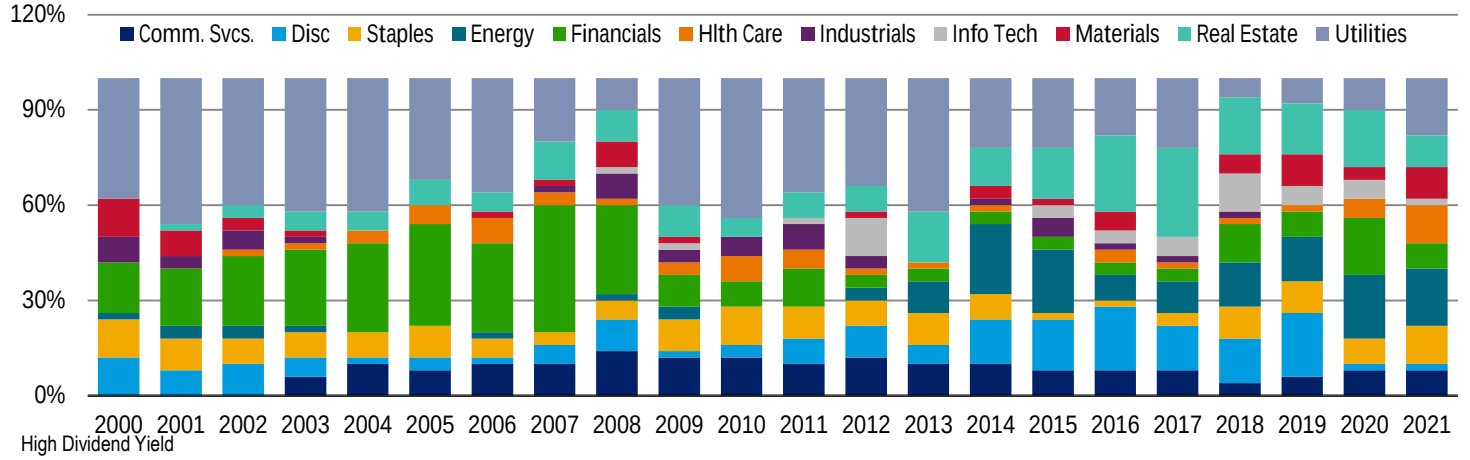
Exhibit 229: High Dividend Yield Downside Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 230: High Dividend Yield Sector Concentration (Top Decile)
The factor has most weight in Energy and Utilities

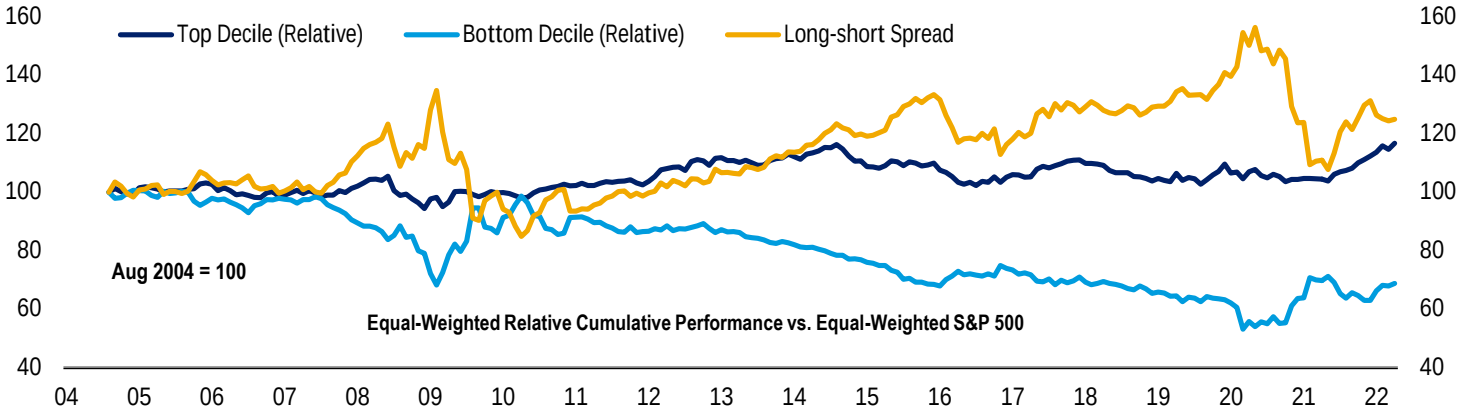


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Dividend Growth

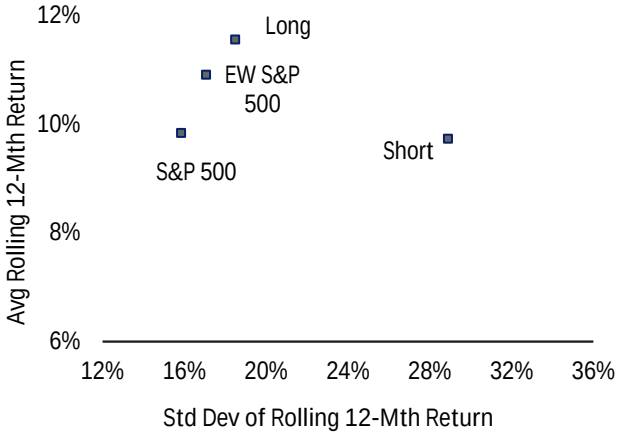
Exhibit 231: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

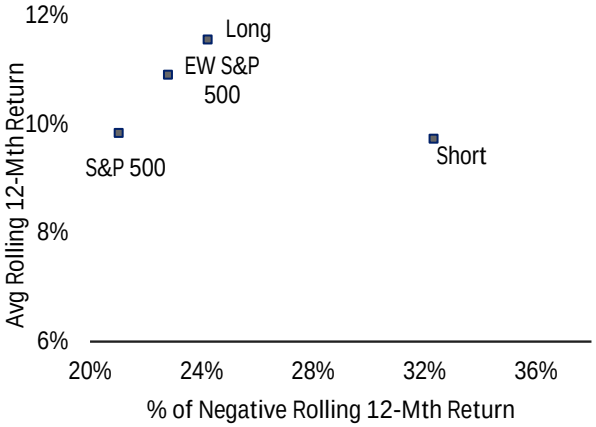
Exhibit 232: High Dividend Growth Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

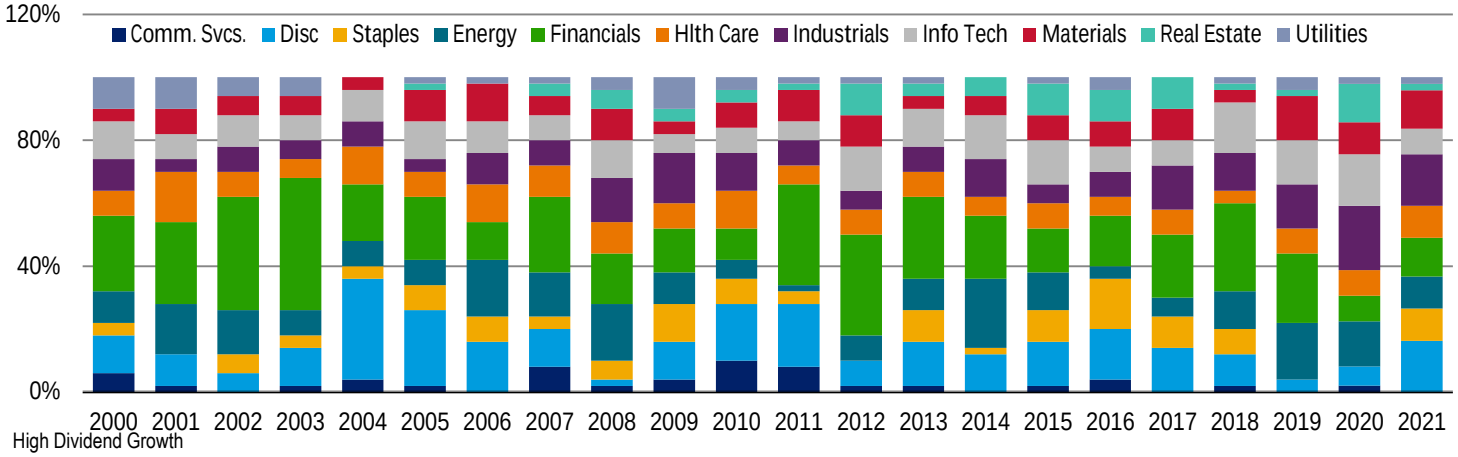
Exhibit 233: High Dividend Growth Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 234: High Dividend Growth Sector Concentration (Top Decile)
The factor has most weight in Industrials and Discretionary

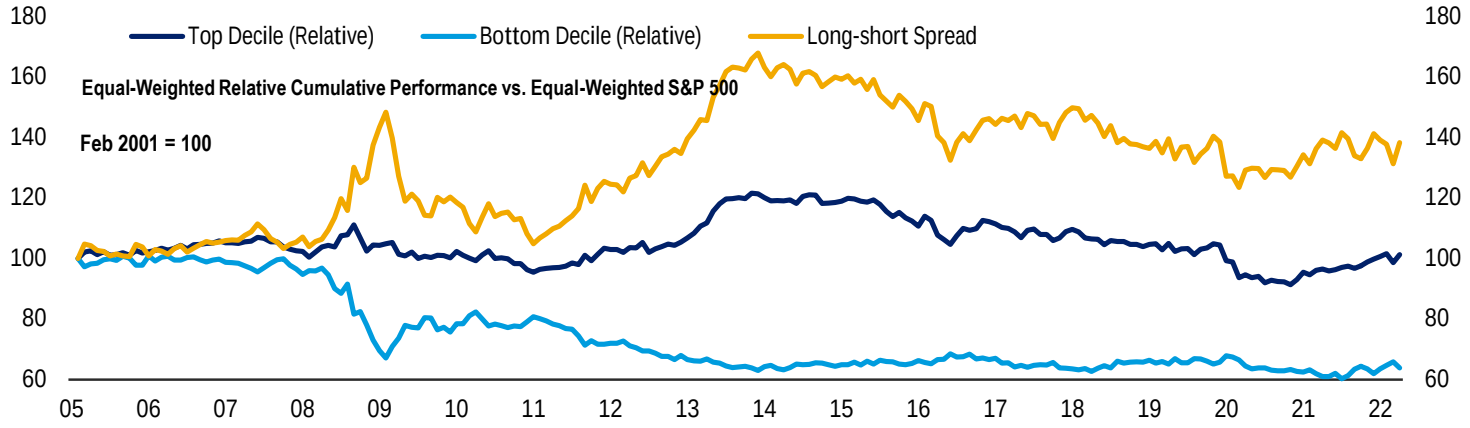


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Share Repurchase

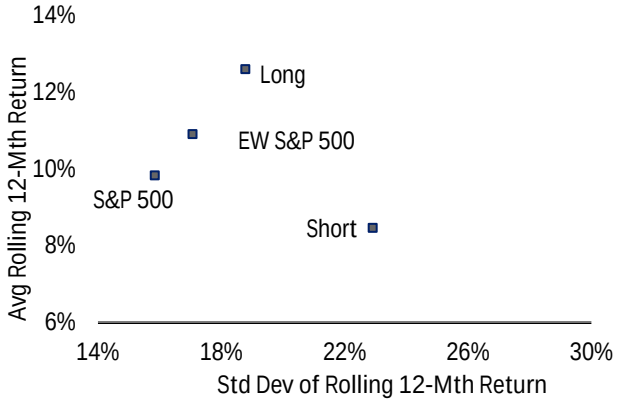
Exhibit 235: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

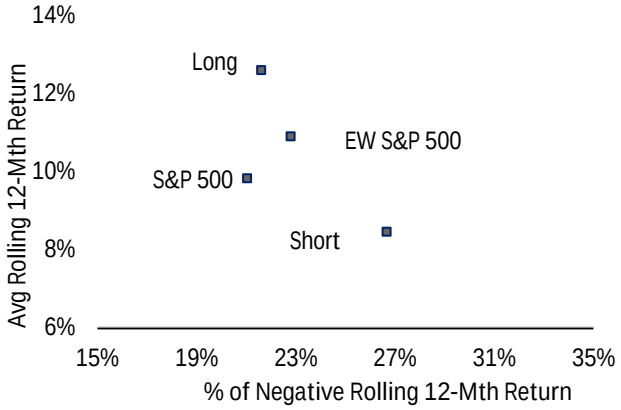
Exhibit 236: High Share Repurchase Risk Reward Characteristics
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

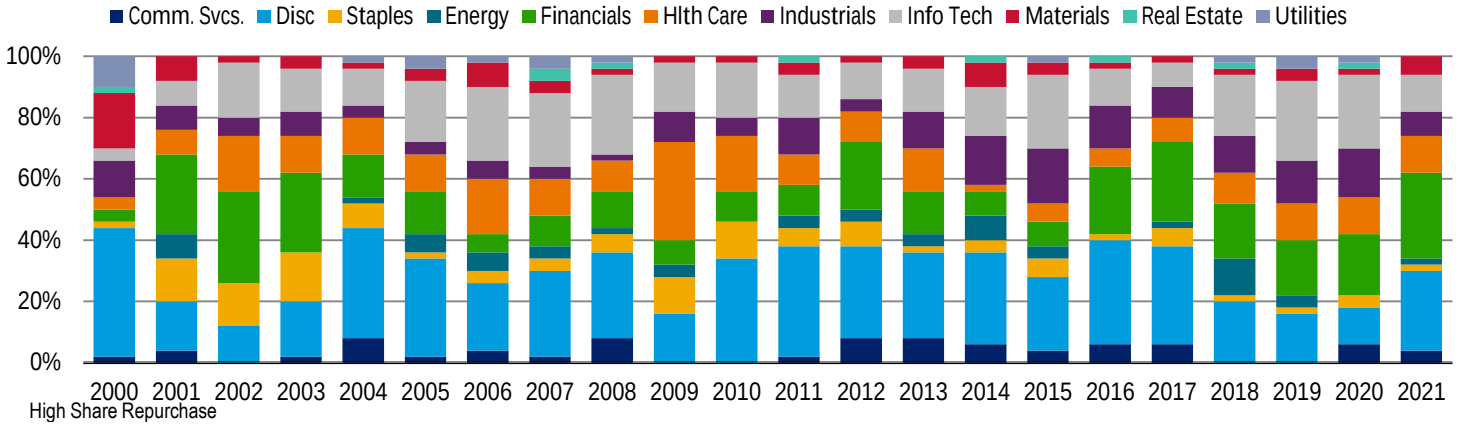
Exhibit 237: High Share Repurchase Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 238: High Share Repurchase Sector Concentration (Top Decile)
The factor has most weight in Financials

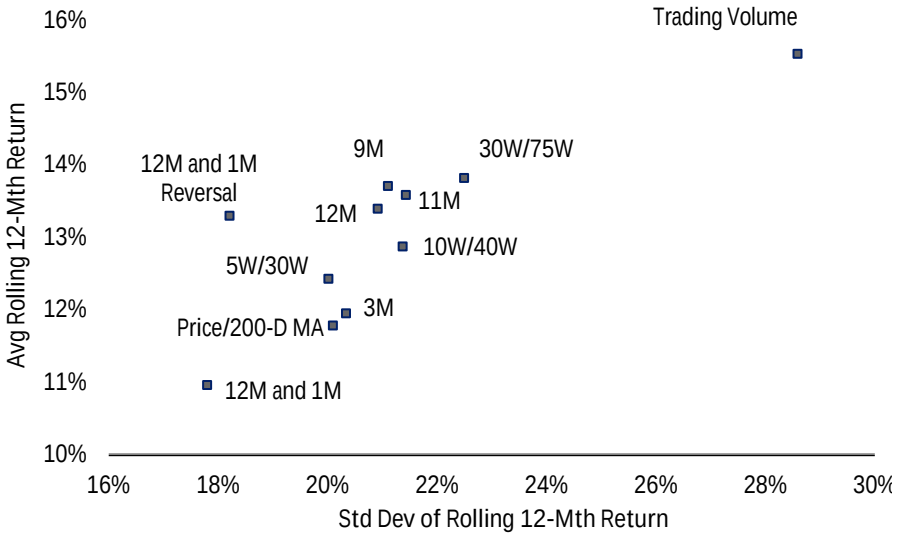


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Momentum Strategies

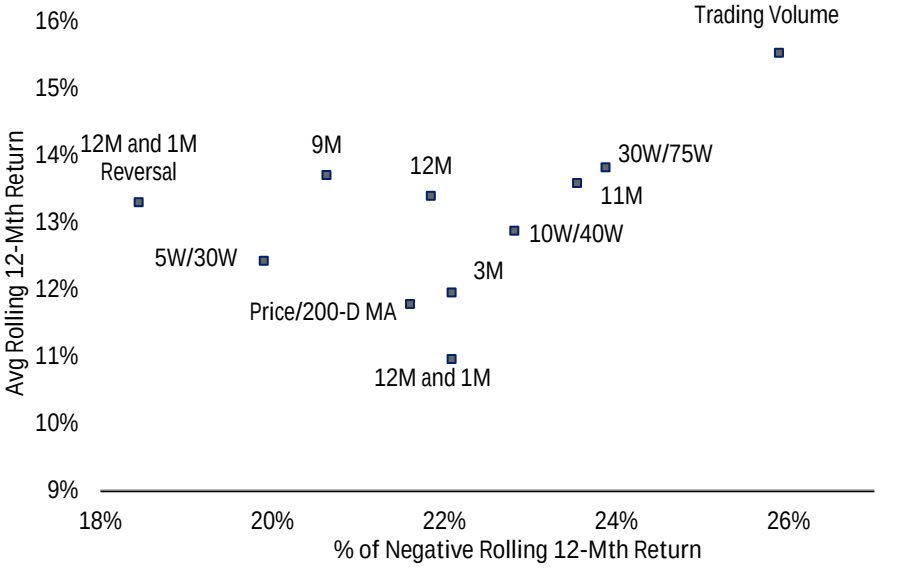
Exhibit 239: Momentum Strategies
High Trading Volume fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 240: Momentum Strategies
High Trading Volume fared best

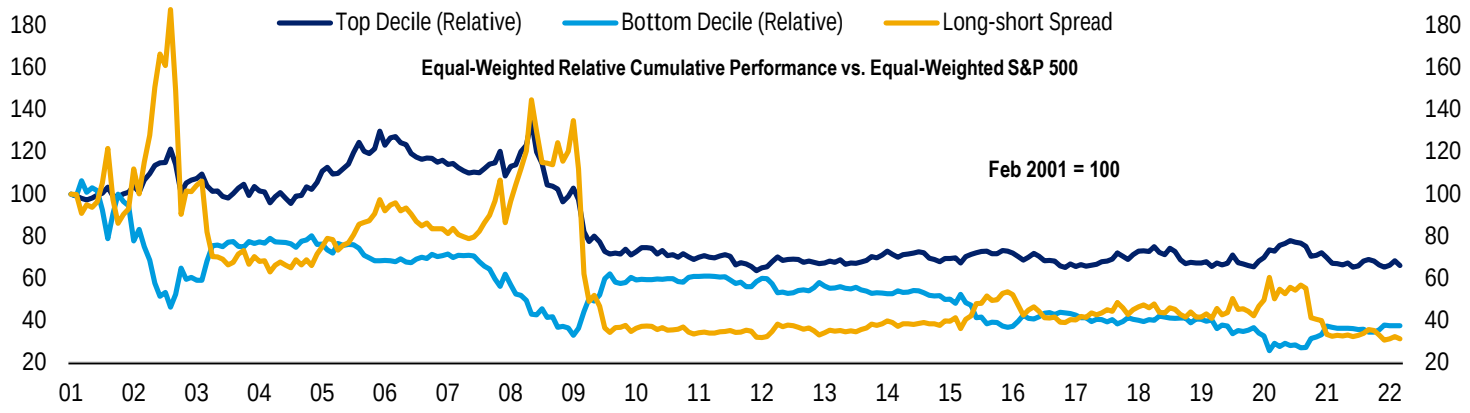


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Relative Strength – 30wk/75wk

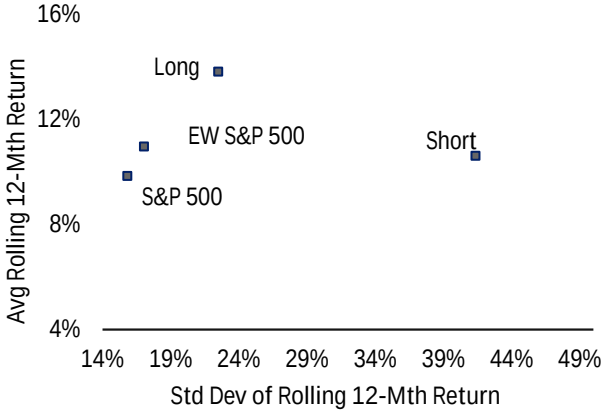
Exhibit 241: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

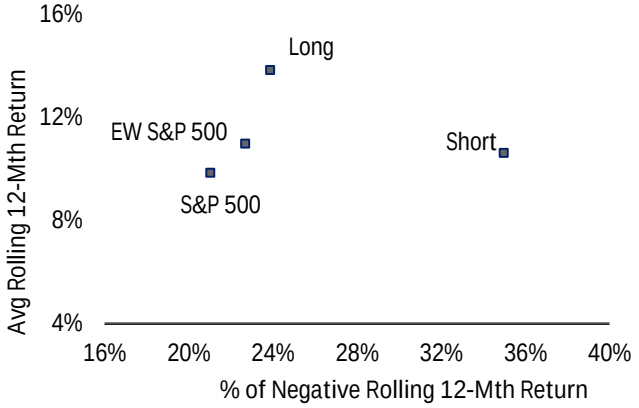
Exhibit 242: High Relative Strength – 30wk/75wk Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

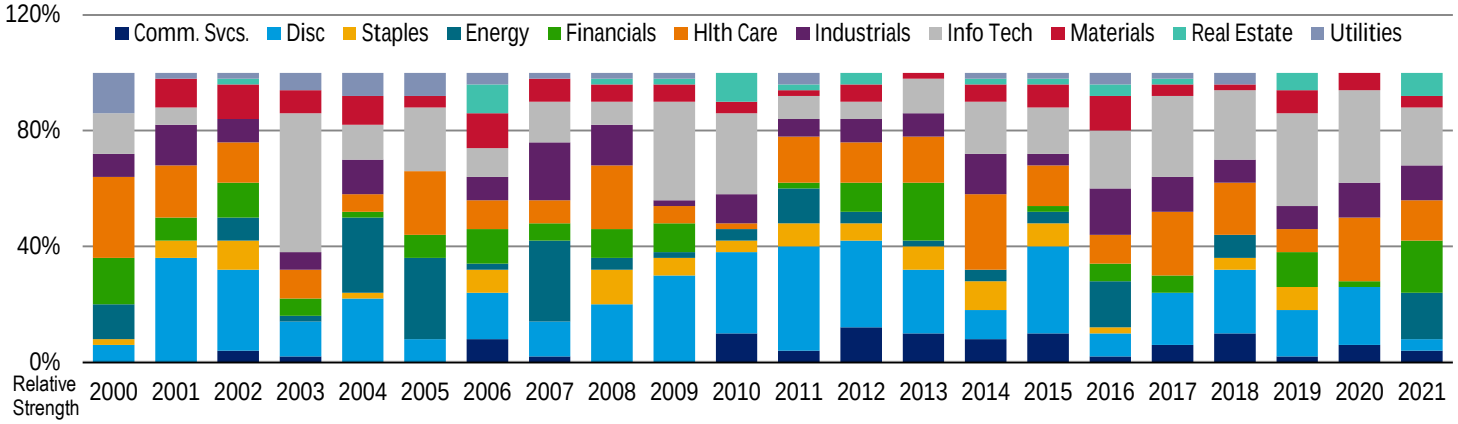
Exhibit 243: High Relative Strength – 30wk/75wk Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 244: High Relative Strength (30wk/75wk) Sector Concentration (Top Decile)
The factor has most weight in Info Tech

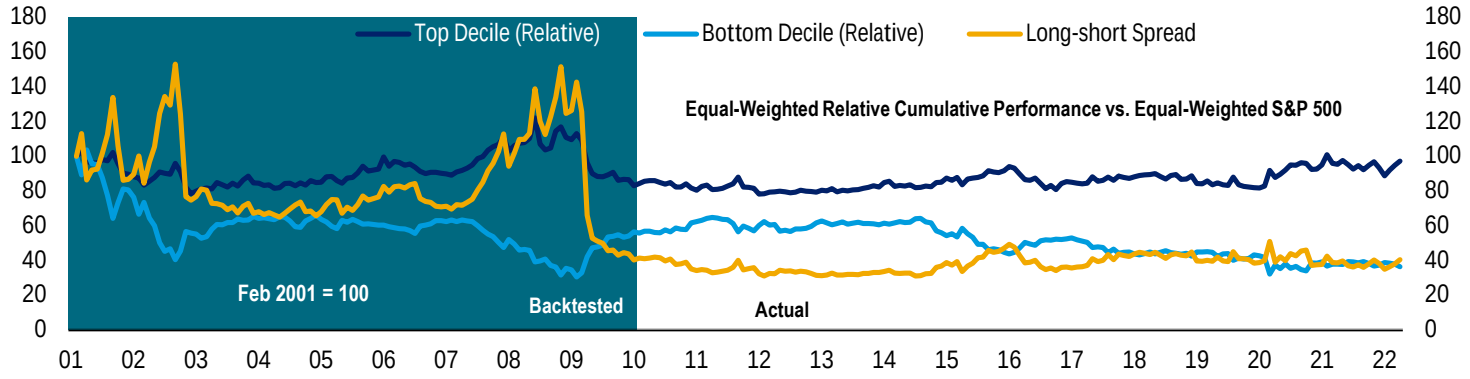


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price to Moving Average (200-Day)

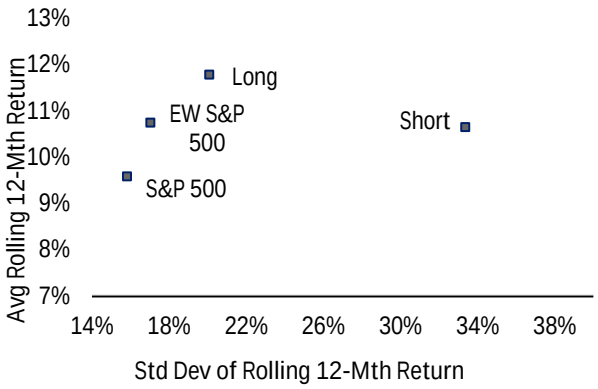
Exhibit 245: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index recently



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

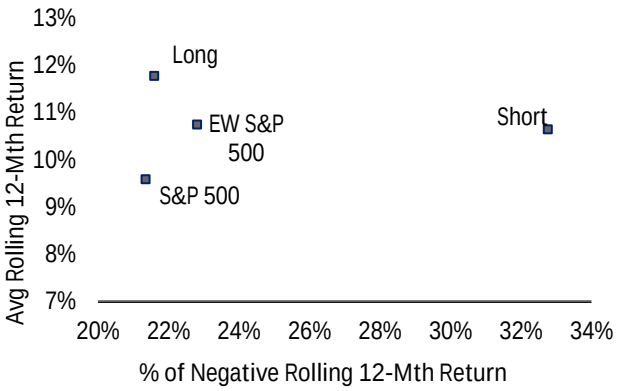
Exhibit 246: High Price/200D MA Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

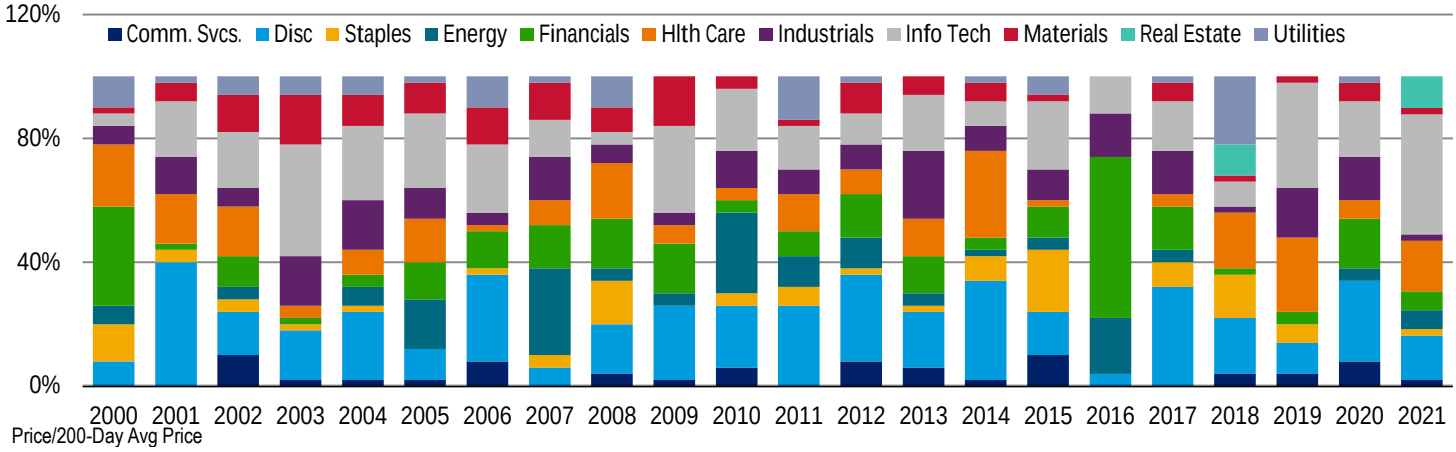
Exhibit 247: High Price/200D MA Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 248: High Price/200D MA Sector Concentration (Top Decile)
The factor has most weight in Info. Tech.

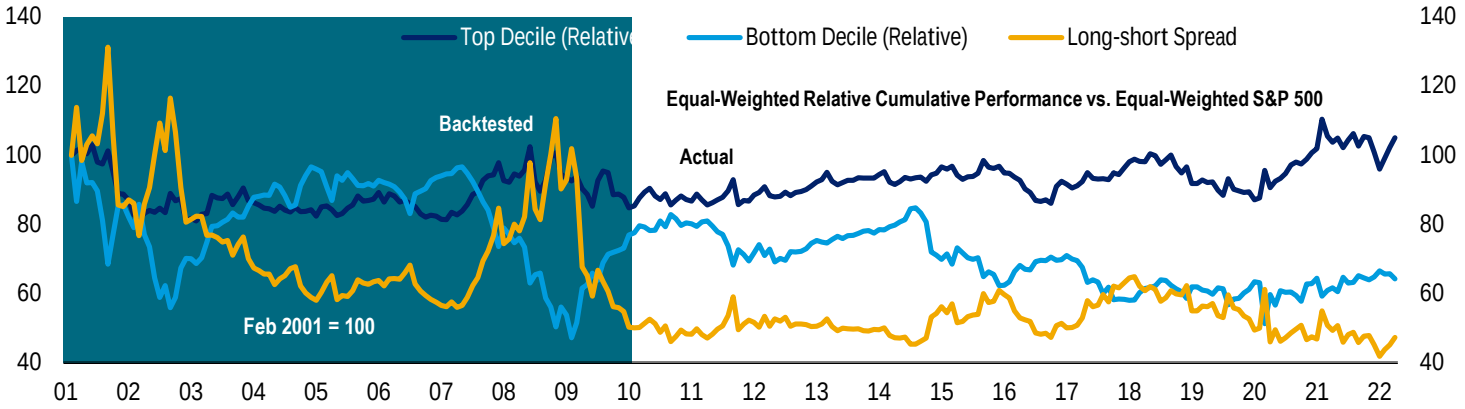


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price Return – 3-Month Performance

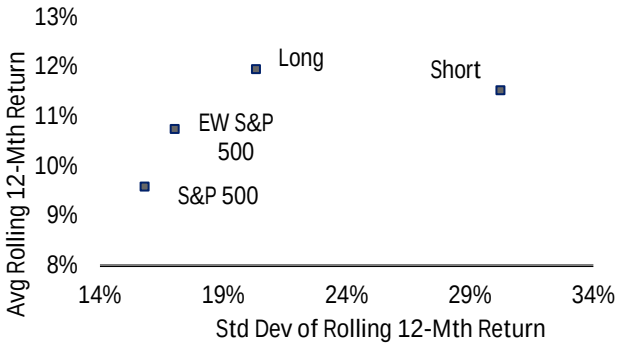
Exhibit 249: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index recently



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

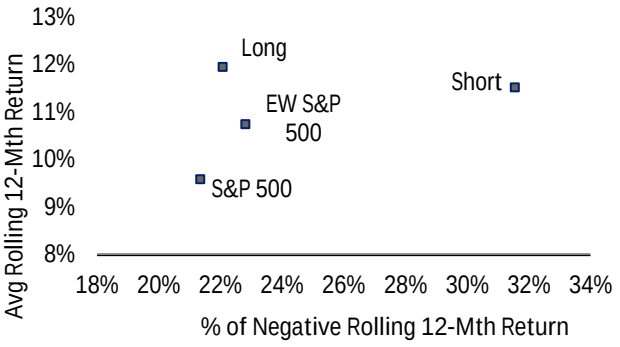
Exhibit 250: High Price Return – 3M Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

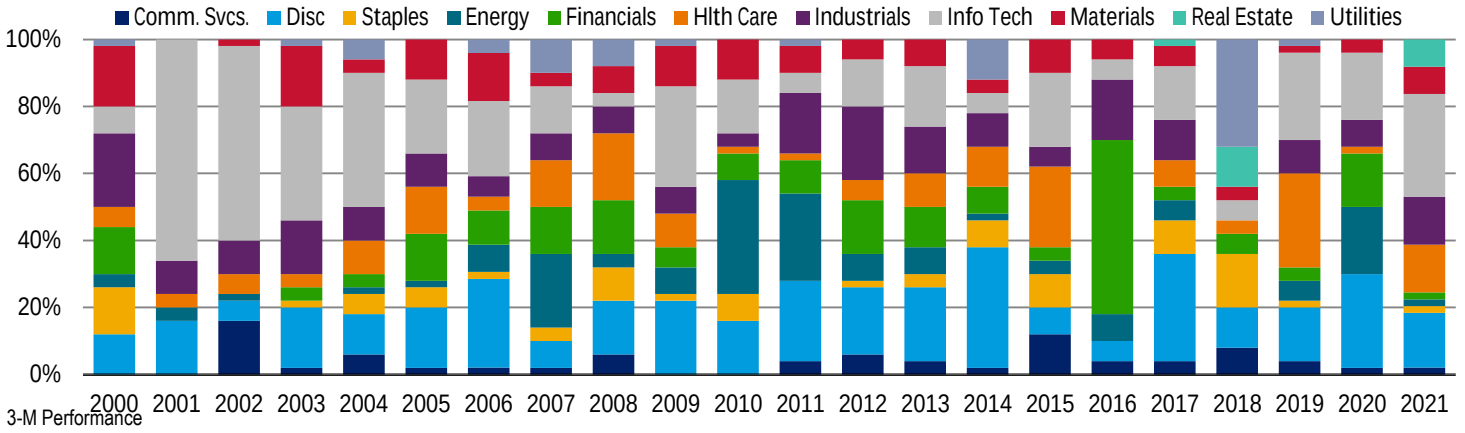
Exhibit 251: High Price Return – 3M Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 252: High Price Return (3M) Sector Concentration (Top Decile)
The factor has most weight in Info. Tech.

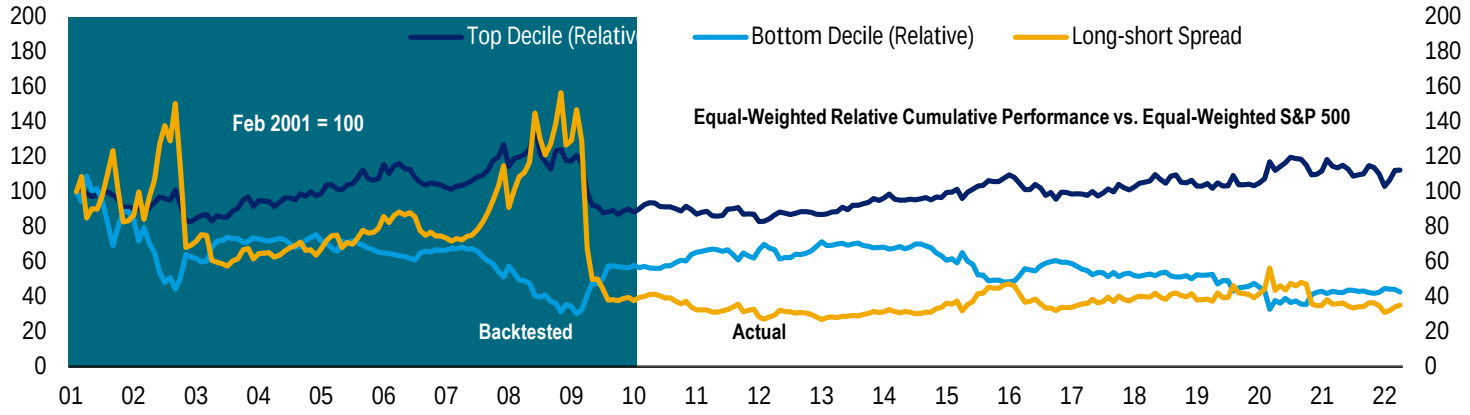


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price Return – 9-Month Performance

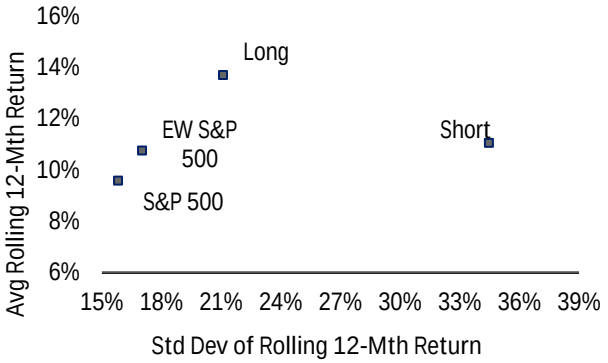
Exhibit 253: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index recently



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

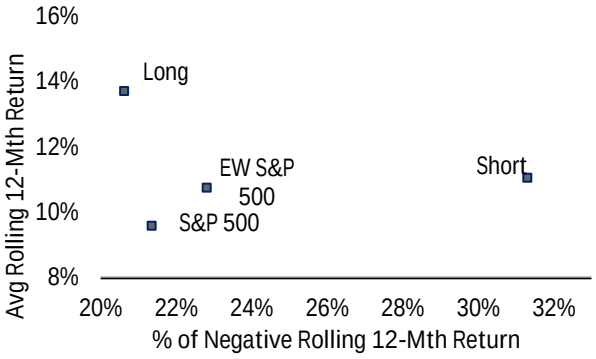
Exhibit 254: High Price Return – 9M Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

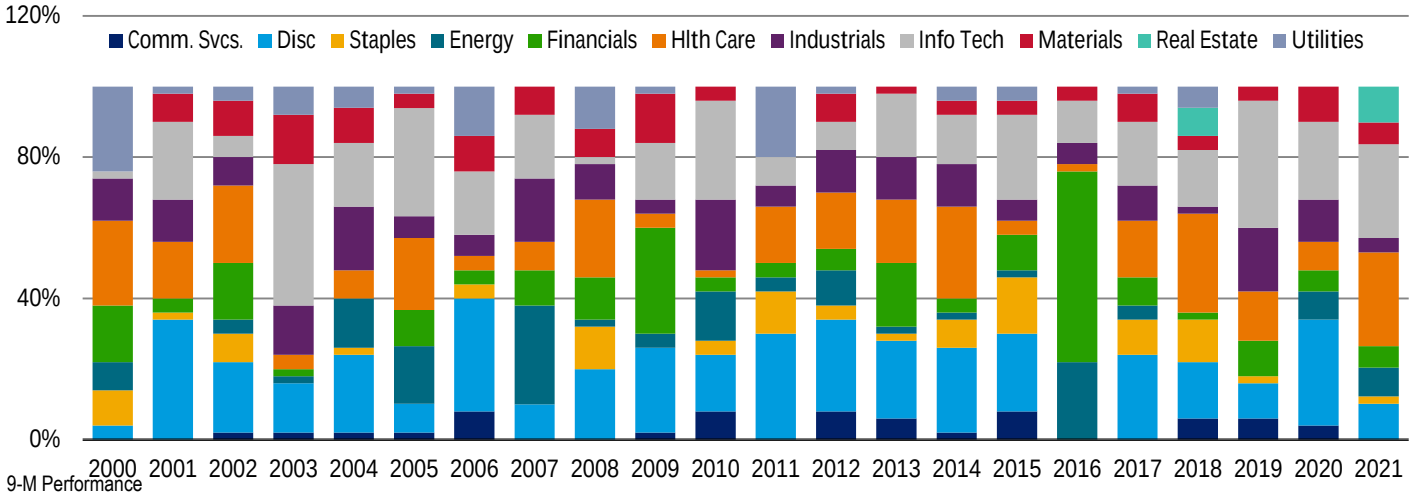
Exhibit 255: High Price Return – 9M Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 256: High Price Return (9M) Sector Concentration (Top Decile)
The factor has most weight in Health Care and Info. Tech.

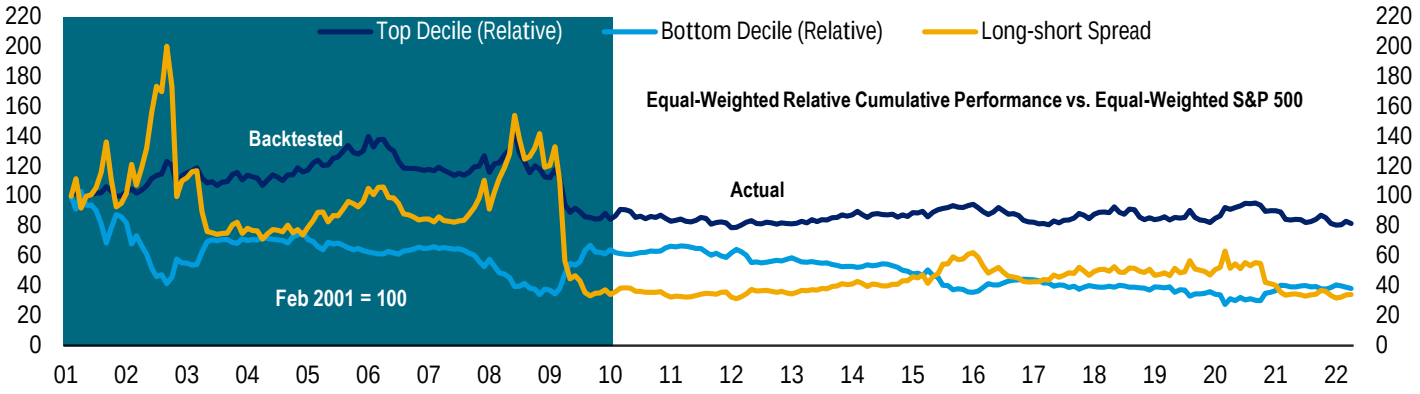


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Price Return – 11-Month Performance

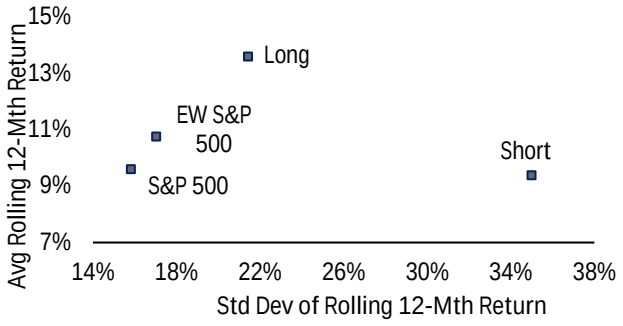
Exhibit 257: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

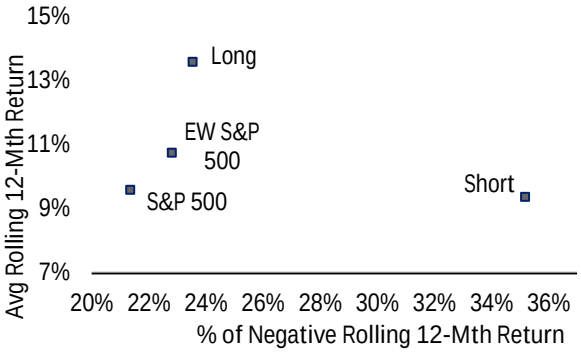
Exhibit 258: High Price Return – 11M Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

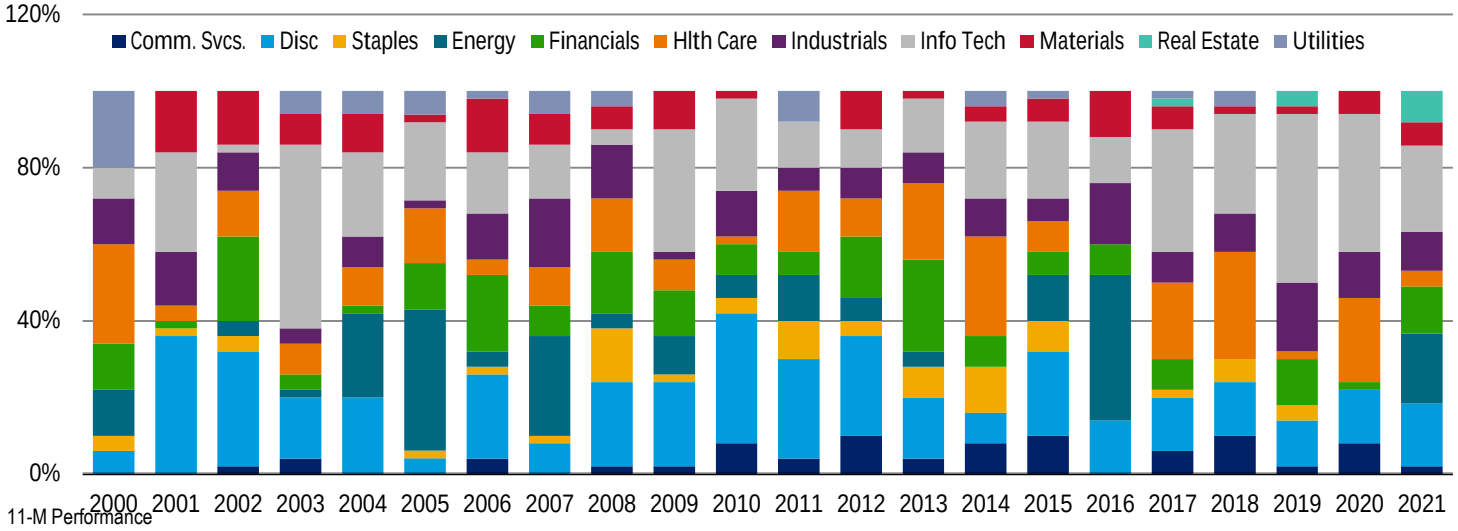
Exhibit 259: High Price Return – 11M Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 260: High Price Return (11M) Sector Concentration (Top Decile)
The factor has most weight in Info Tech

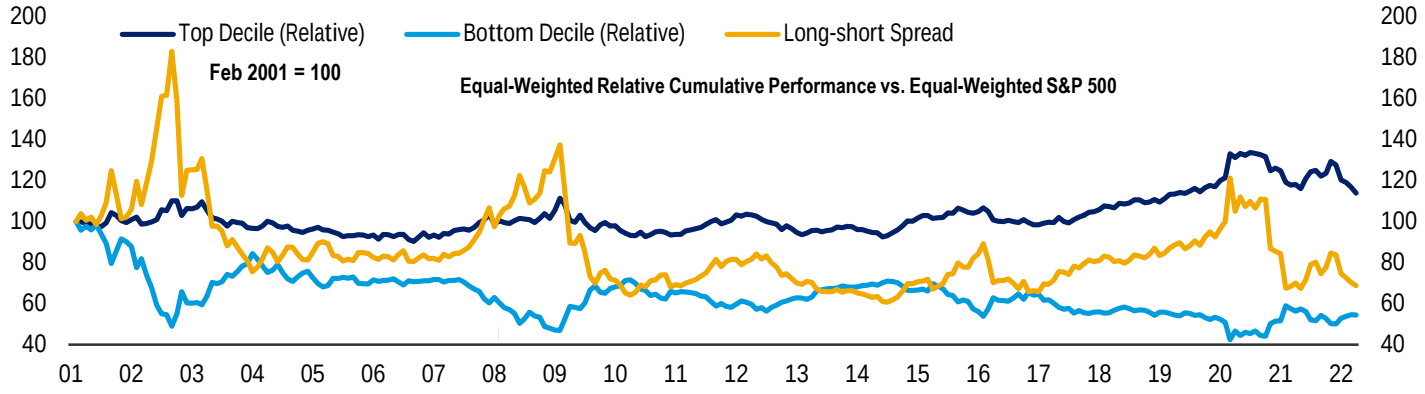


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price Return – 12-Month Performance

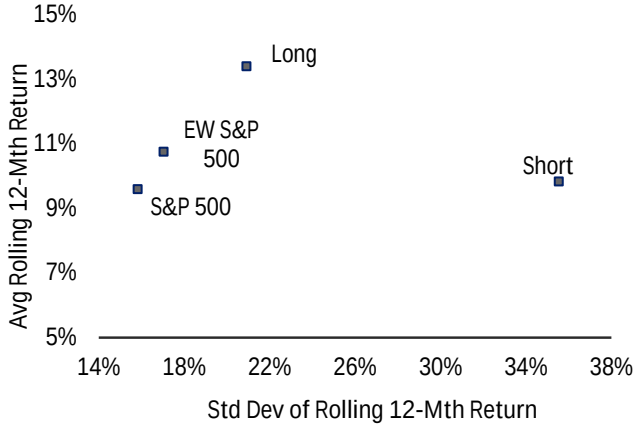
Exhibit 261: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

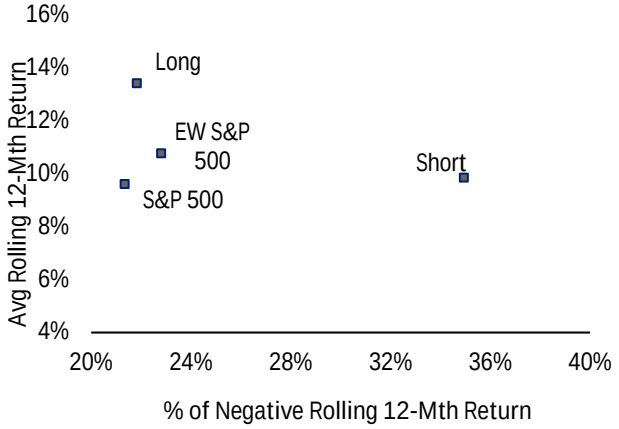
Exhibit 262: High Price Return – 12M Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

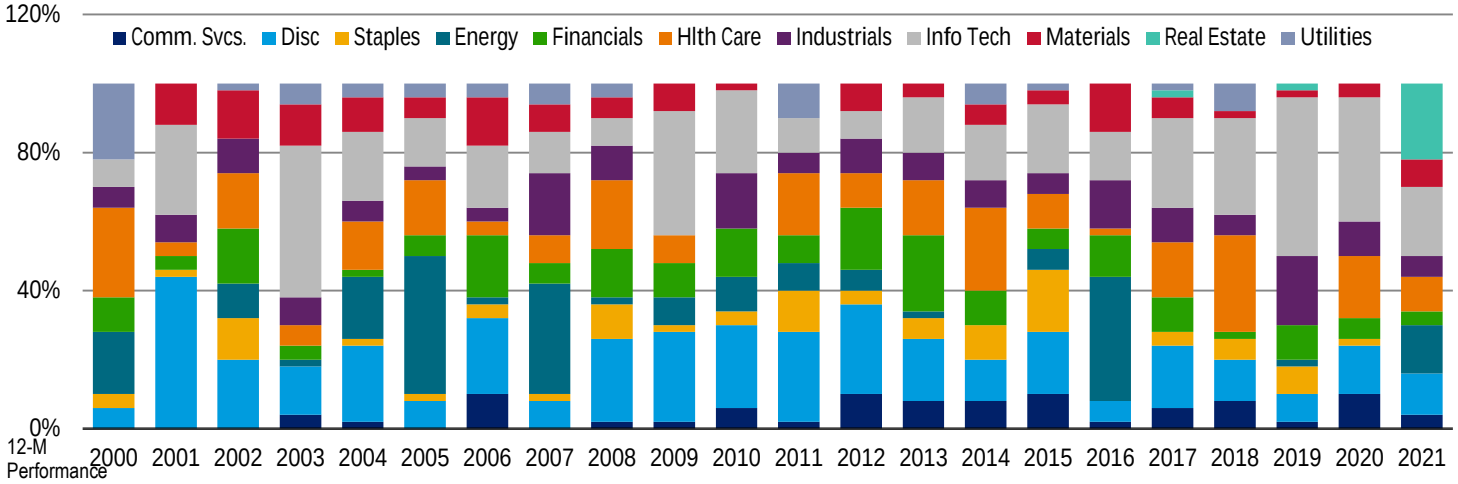
Exhibit 263: High Price Return – 12M Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 264: High Price Return (12M) Sector Concentration (Top Decile)
The factor has most weight in Real Estate

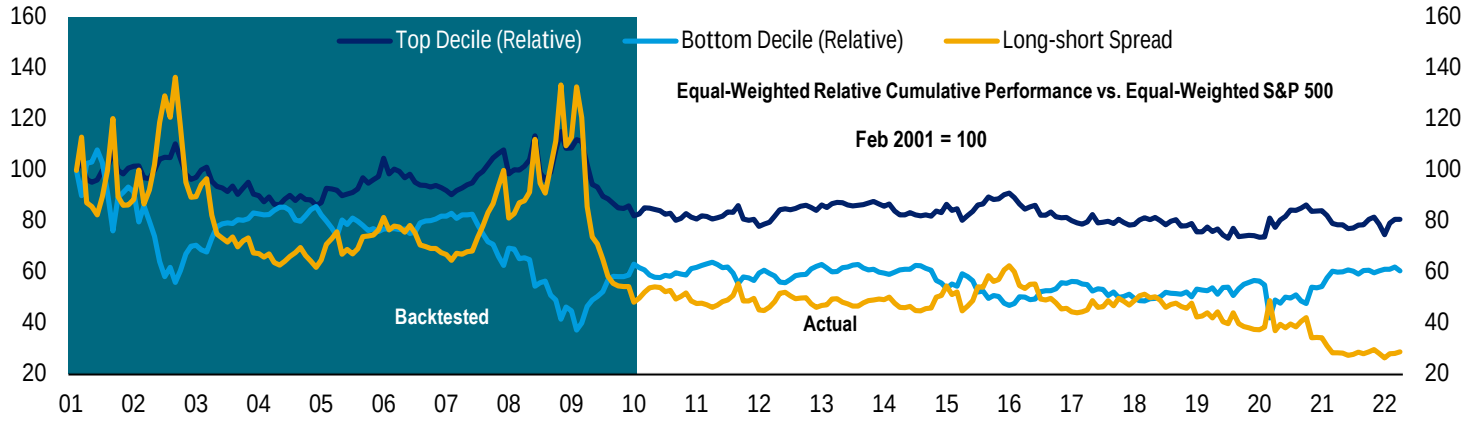


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price Return – 12-Month and 1-Month Performance

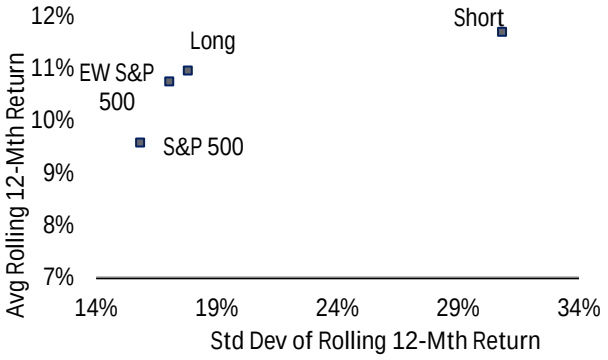
Exhibit 265: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

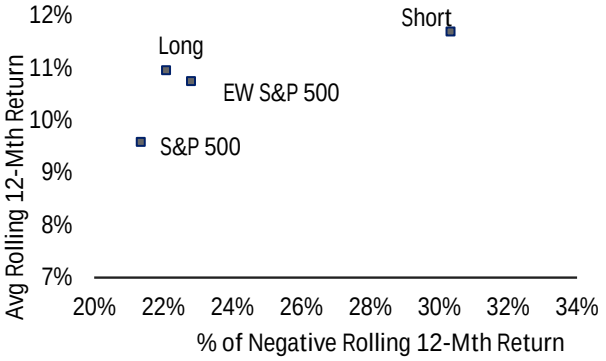
Exhibit 266: High Price Return – 12M and 1M Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

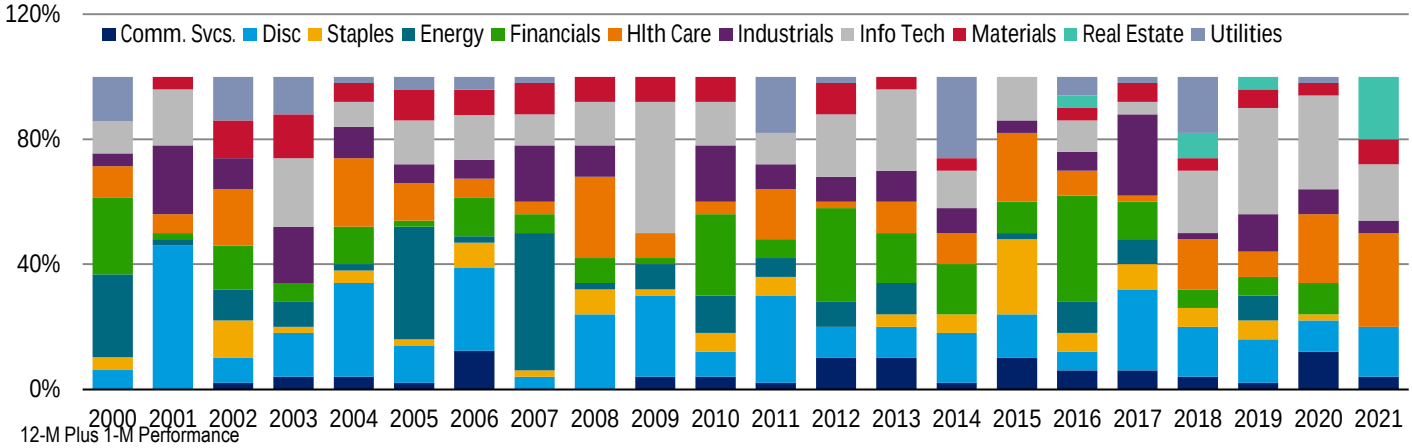
Exhibit 267: High Price Return – 12M and 1M Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 268: High Price Return (12M and 1M) Sector Concentration (Top Decile)
The factor has most weight in Health Care

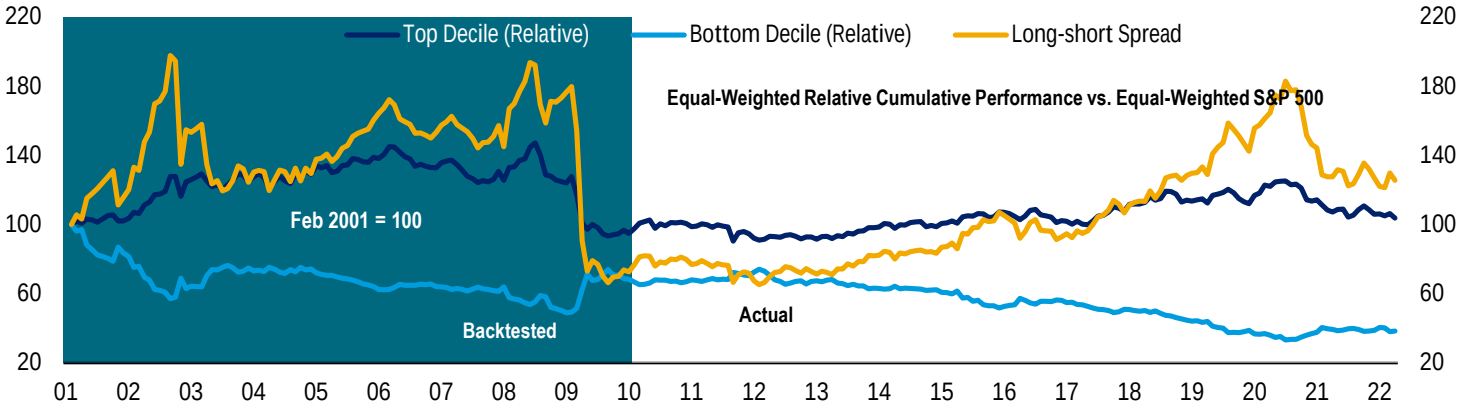


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price Return – 12-Month and 1-Month Reversal

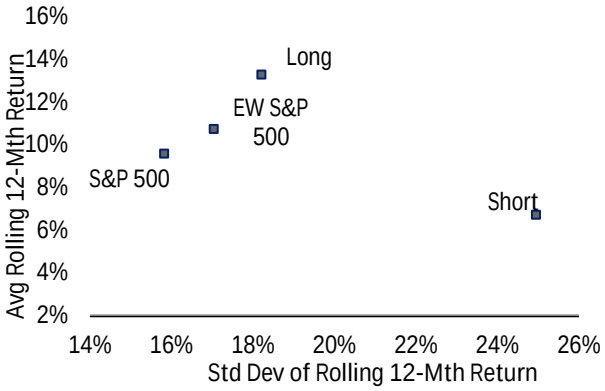
Exhibit 269: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from January 2001 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

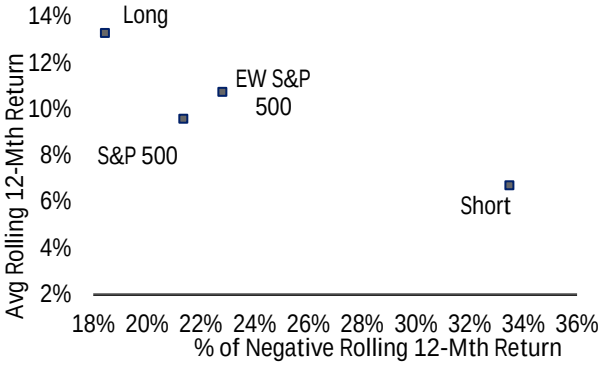
Exhibit 270: High Price Return – 12M and 1M Reversal Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

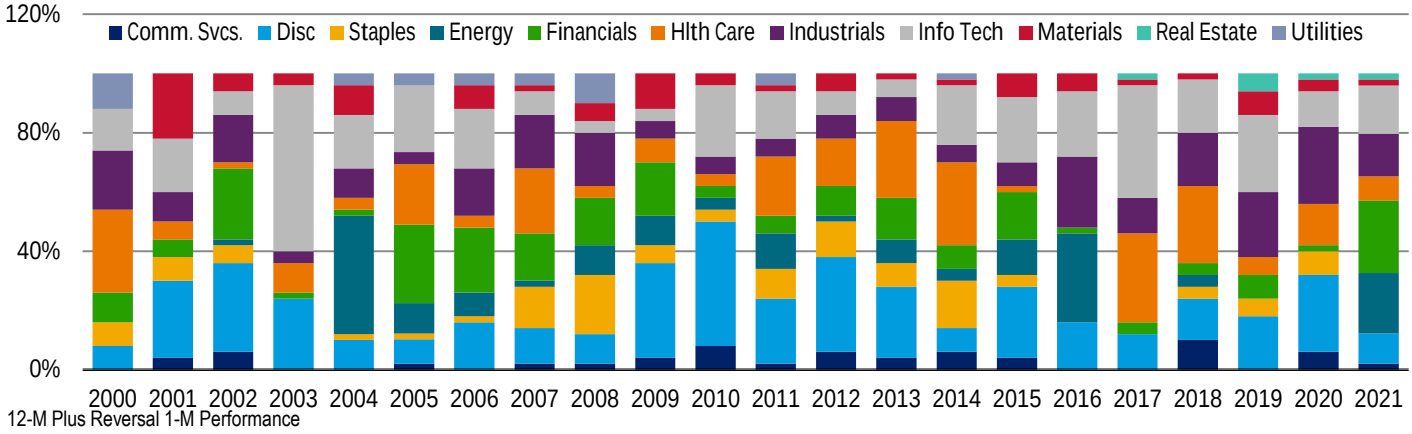
Exhibit 271: High Price Return – 12M and 1M Reversal Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 272: High Price Return (12M and 1M Reversal) Sector Concentration (Top Decile)
The factor has most weight in Consumer Discretionary and Industrials

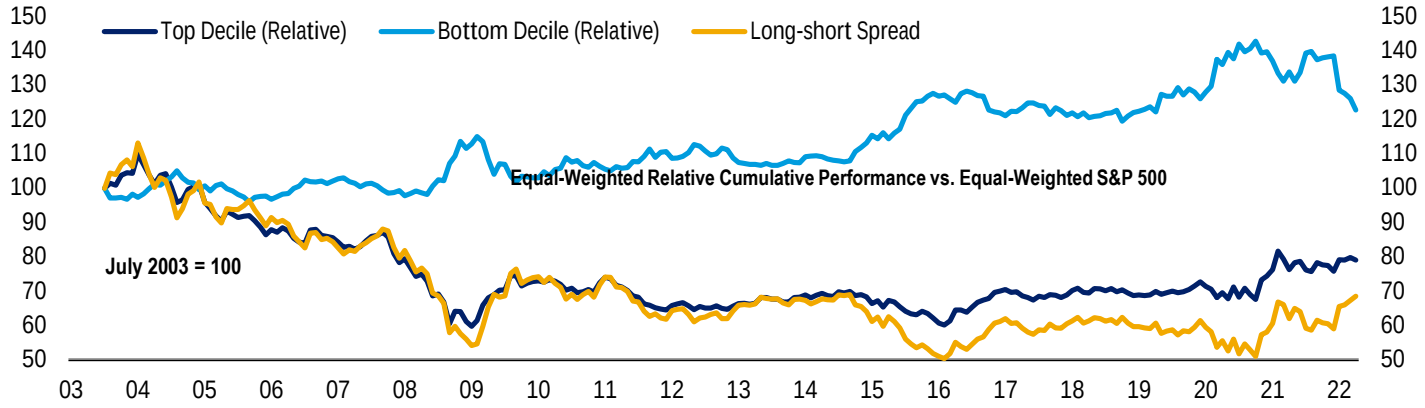


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Trading Volume

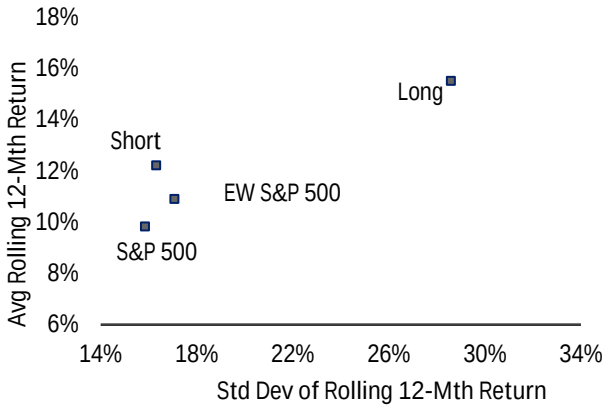
Exhibit 273: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index since October 2020



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

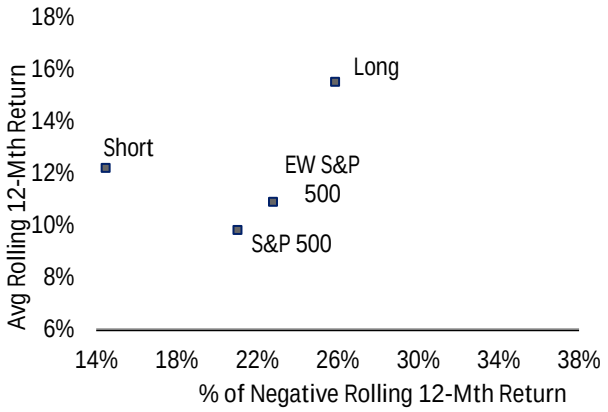
Exhibit 274: High Trading Volume Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

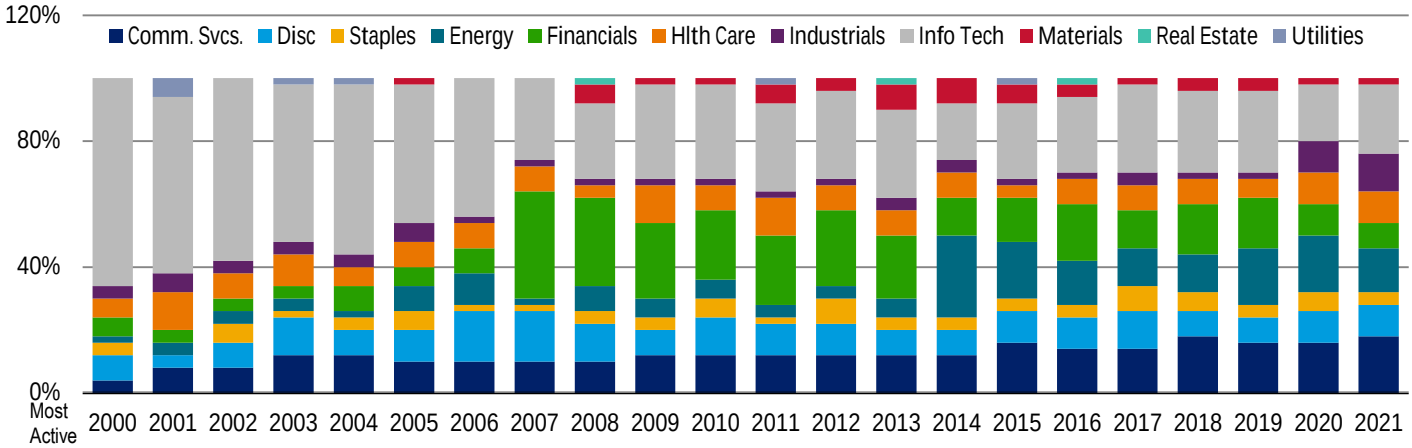
Exhibit 275: High Trading Volume Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 276: High Trading Volume Sector Concentration (Top Decile)
The factor has most weight Info Tech

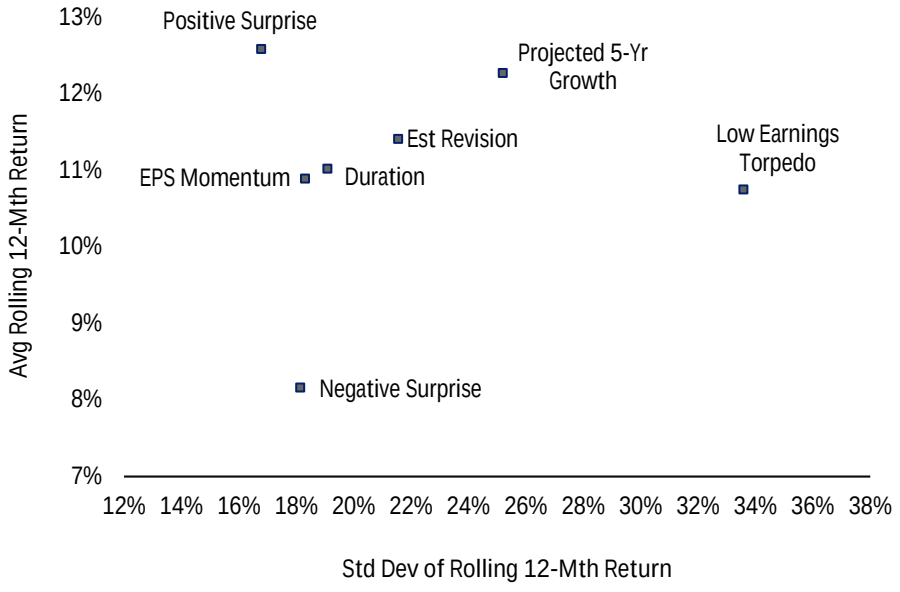


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Growth Strategies

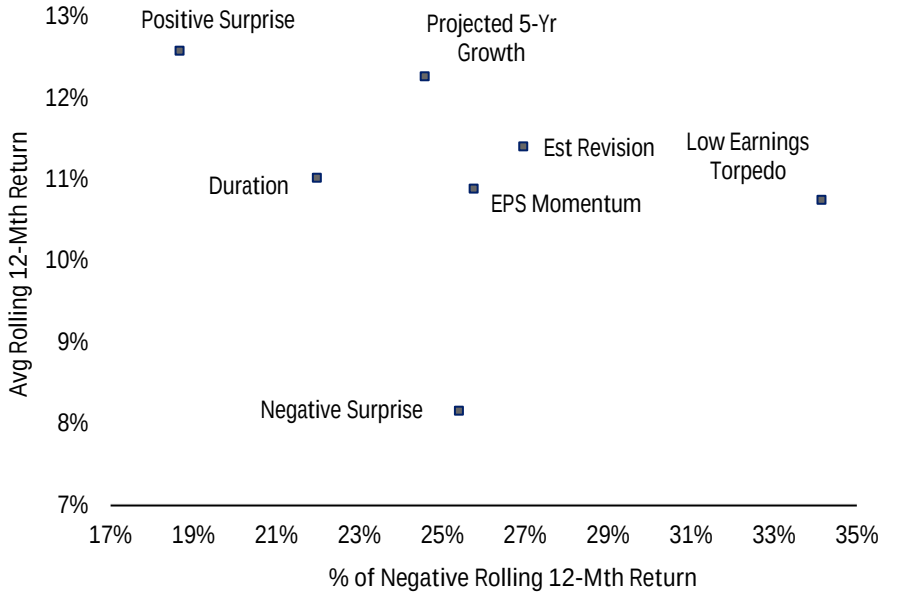
Exhibit 277: Growth Strategies
Positive EPS Surprise fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 278: Growth Strategies
Positive EPS Surprise fared best

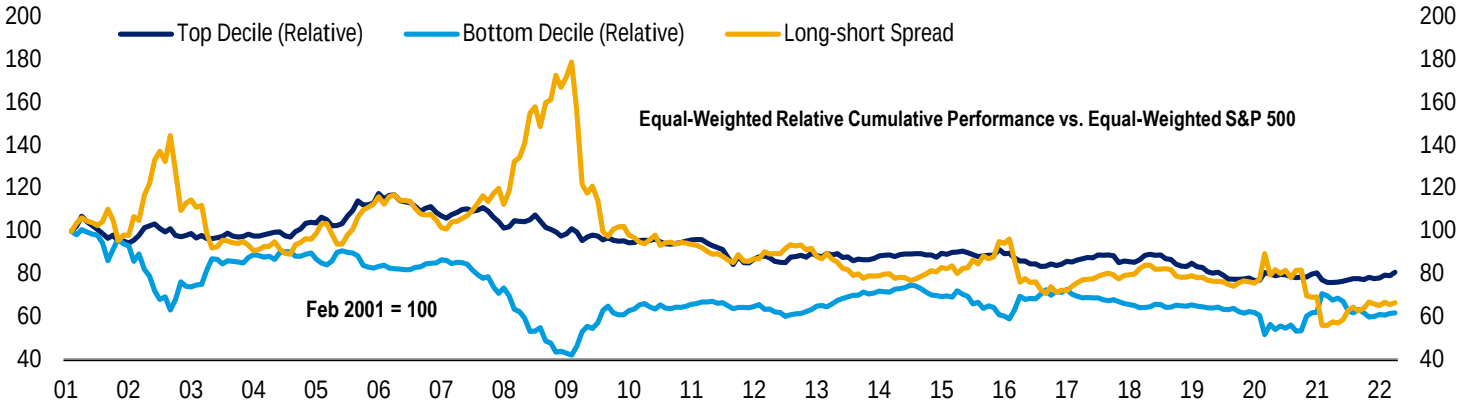


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Earnings Momentum

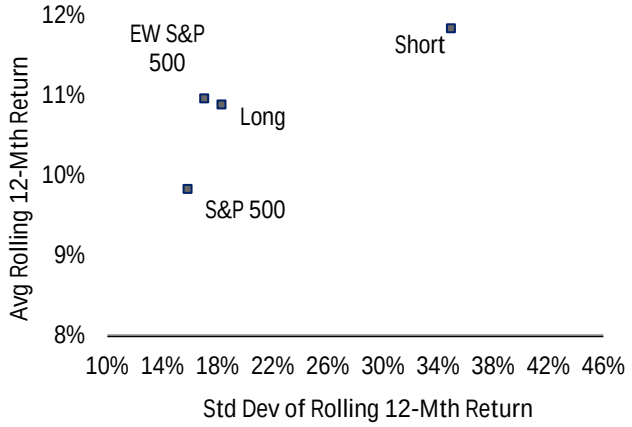
Exhibit 279: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

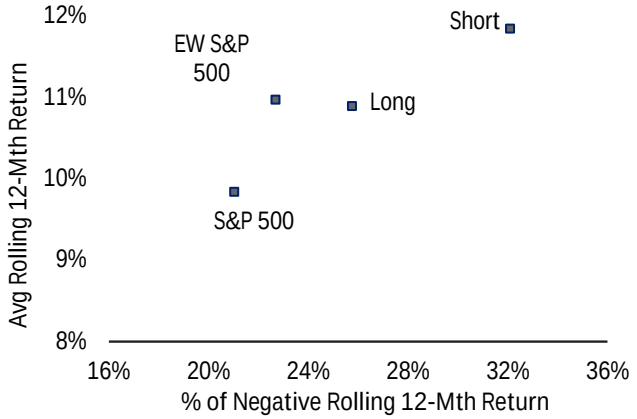
Exhibit 280: High Earnings Momentum Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

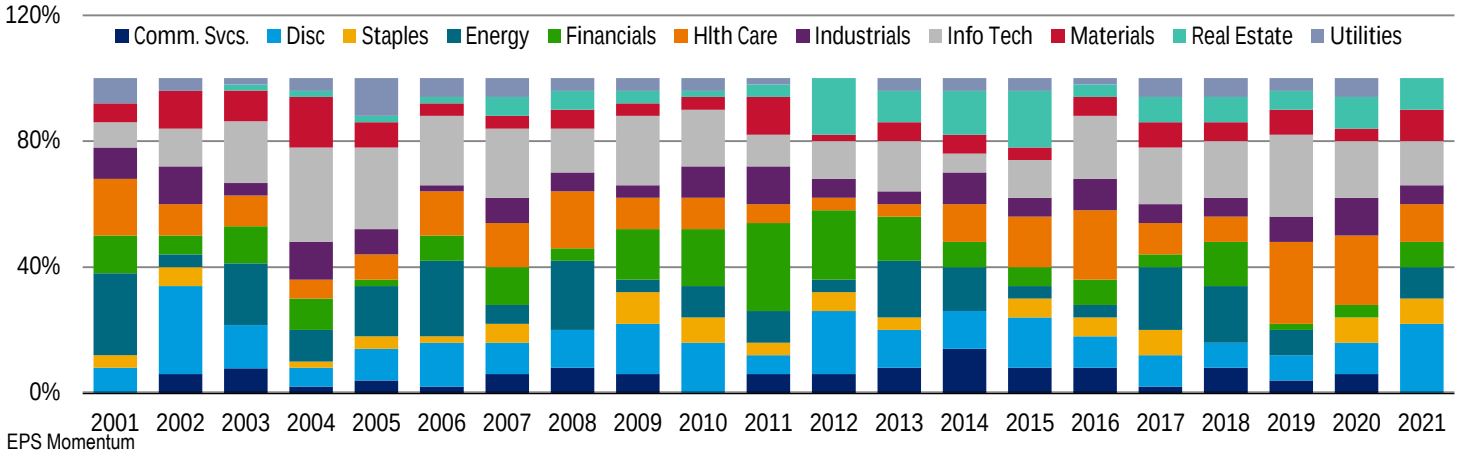
Exhibit 281: High Earnings Momentum Downside Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 282: High Earnings Momentum Sector Concentration (Top Decile)
The factor has most weight in Discretionary

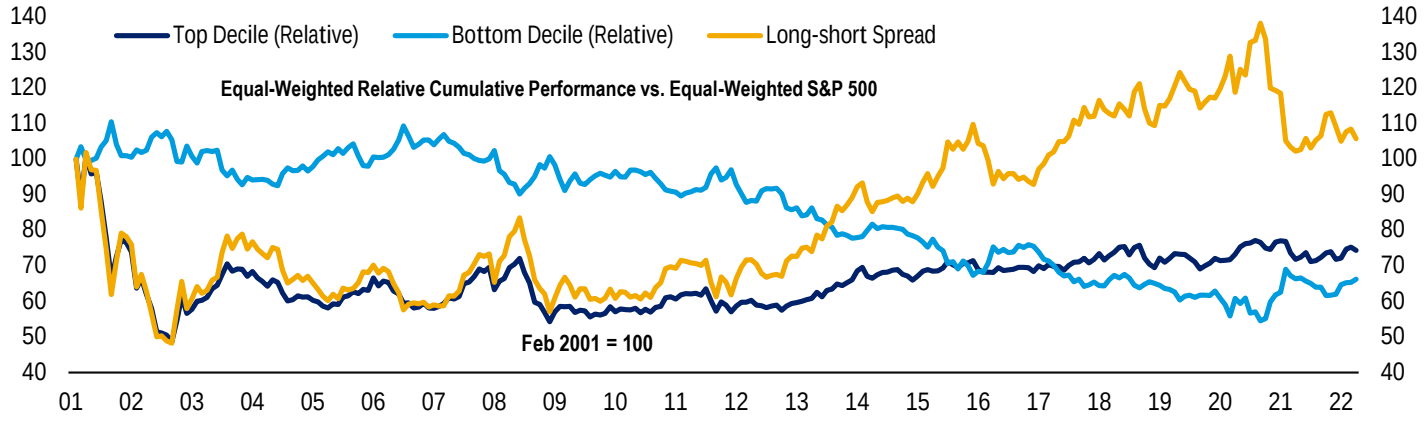


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Projected Five-Year EPS Growth

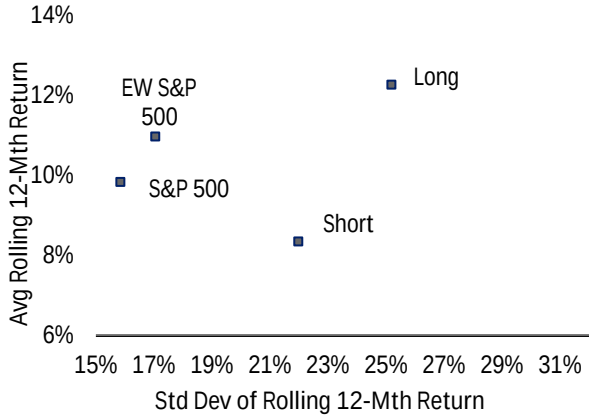
Exhibit 283: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index recently



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

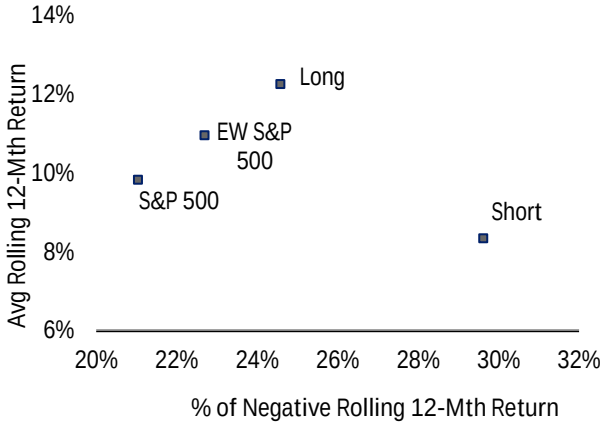
Exhibit 284: High Projected 5-Yr EPS Growth Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

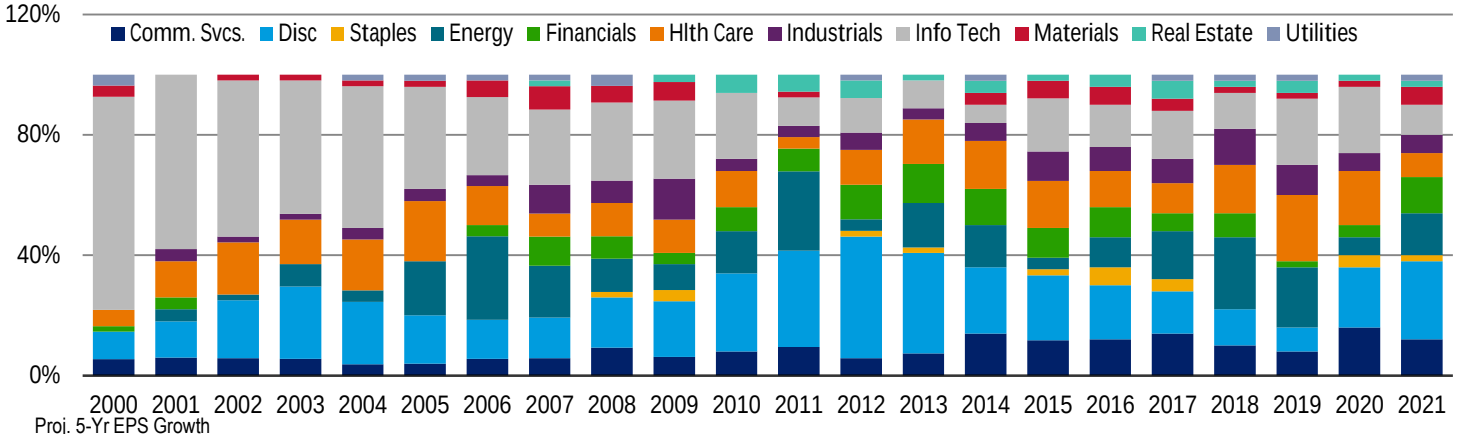
Exhibit 285: High Projected 5-Yr EPS Growth Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 286: High Projected 5-Yr EPS Growth Sector Concentration (Top Decile)
The factor has most weight in Discretionary

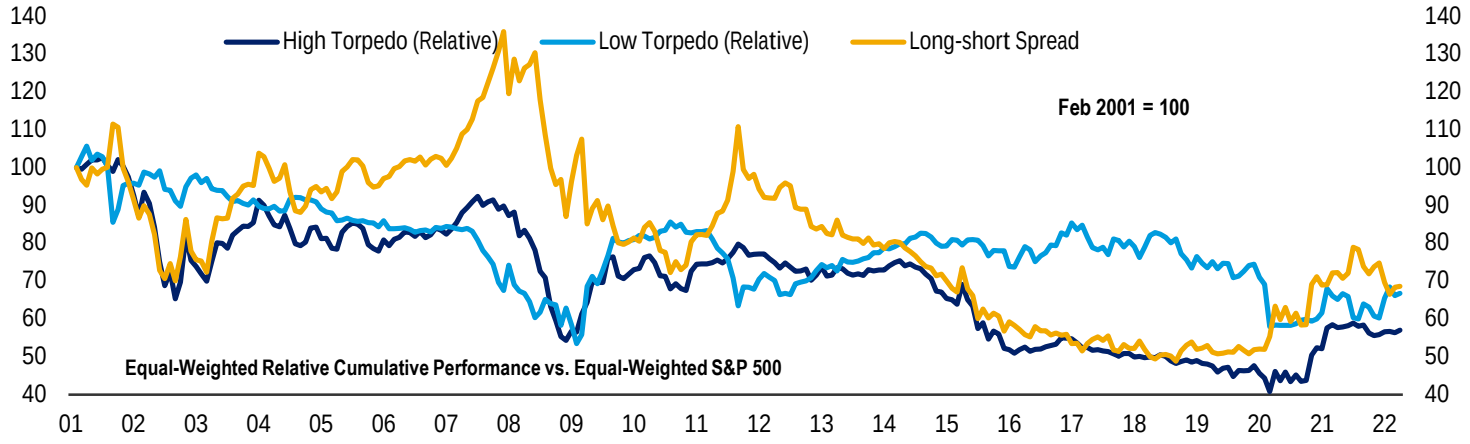


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Earnings Torpedo

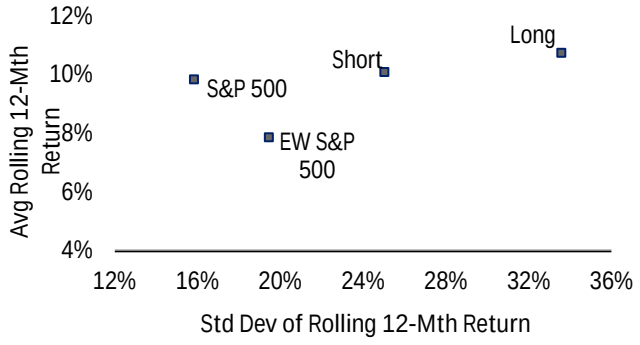
Exhibit 287: Performance of High Earnings Torpedo, Low Earnings Torpedo and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

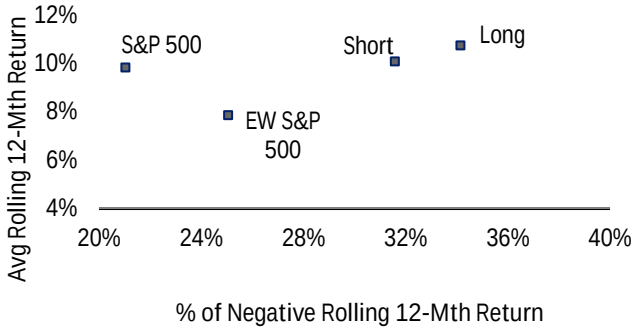
Exhibit 288: Low Earnings Torpedo Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

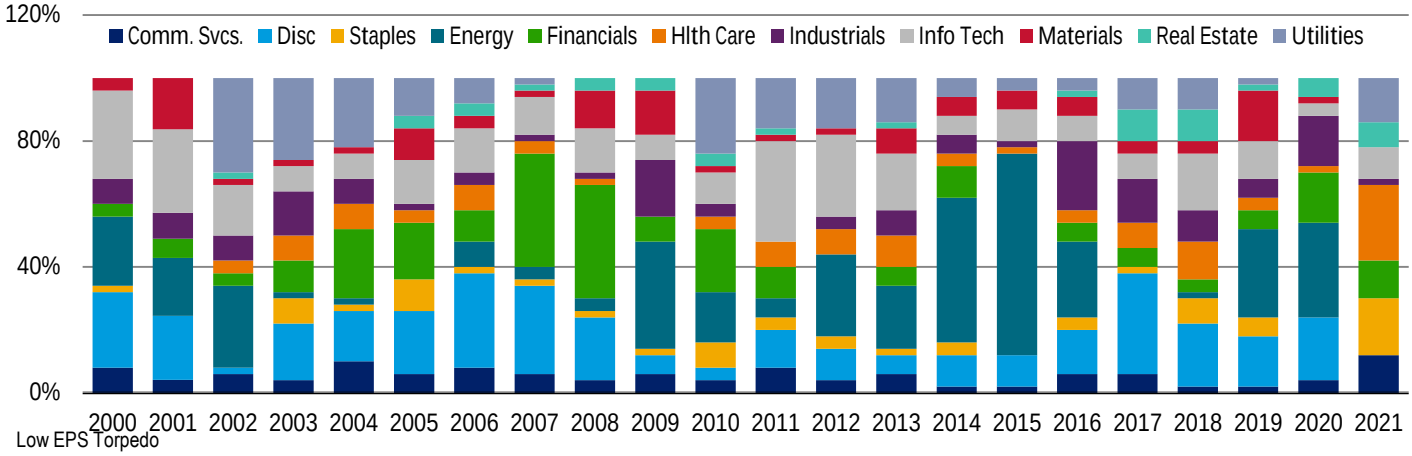
Exhibit 289: Low Earnings Torpedo Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 290: Low Earnings Torpedo Sector Concentration (Low Decile)
The factor has most weight in Health Care

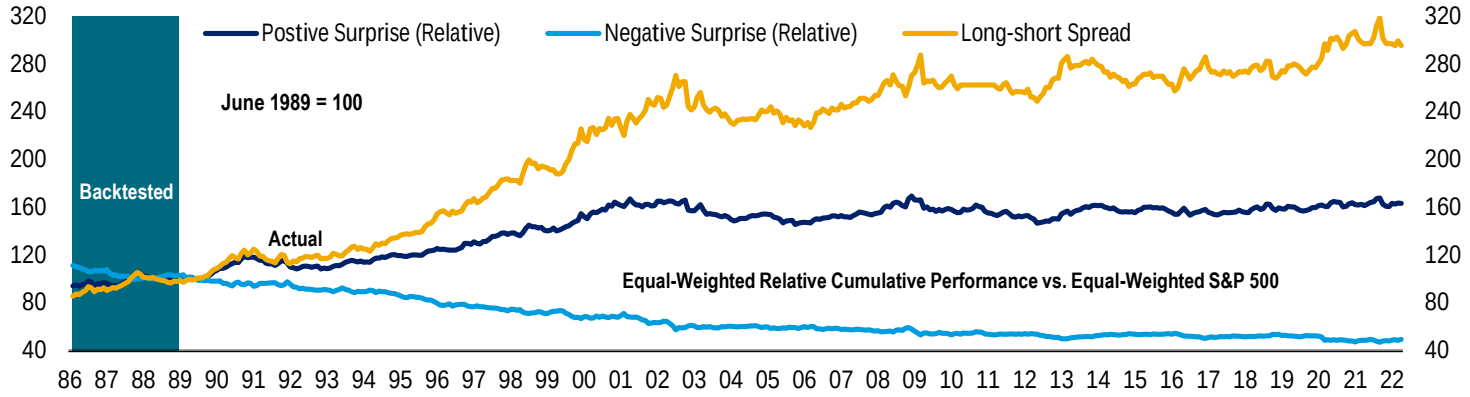


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Earnings Surprise

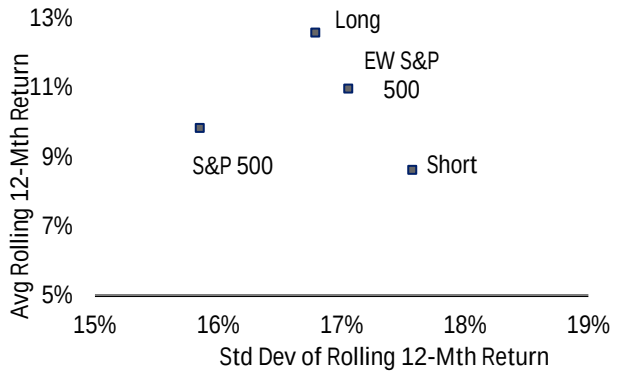
Exhibit 291: Performance of Positive Surprise, Negative Surprise and Long-Short Spread
The factor has outperformed the index in recent years



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

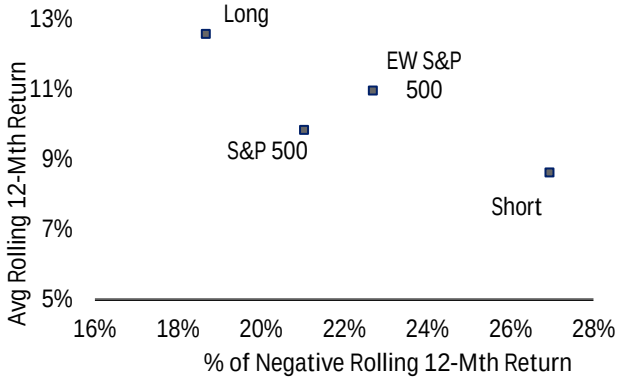
Exhibit 292: Earnings Surprise Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

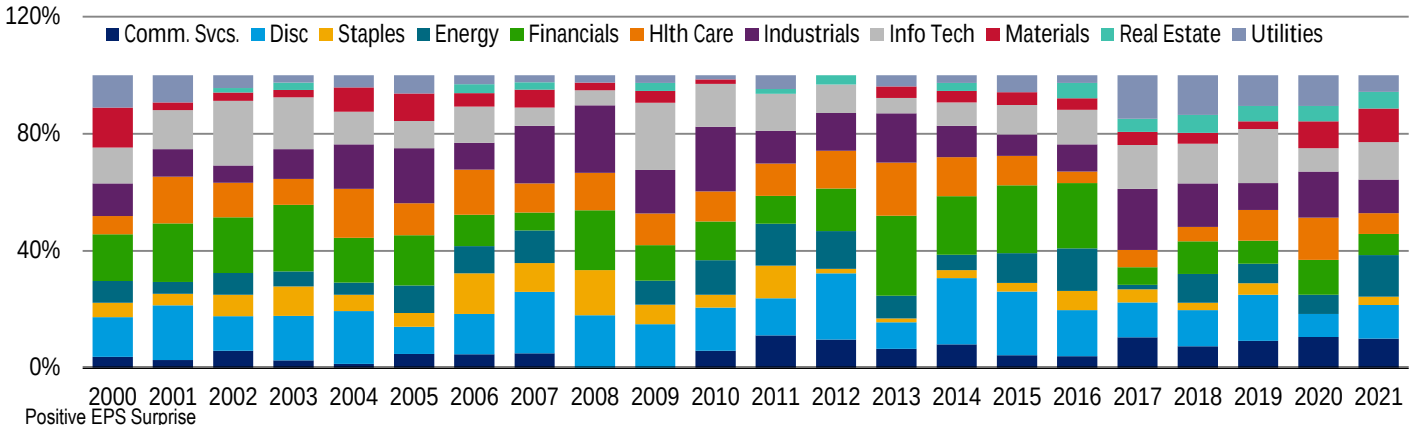
Exhibit 293: Earnings Surprise Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 294: Positive Earnings Surprise Sector Concentration (Top Decile)
The factor has most weight in Energy

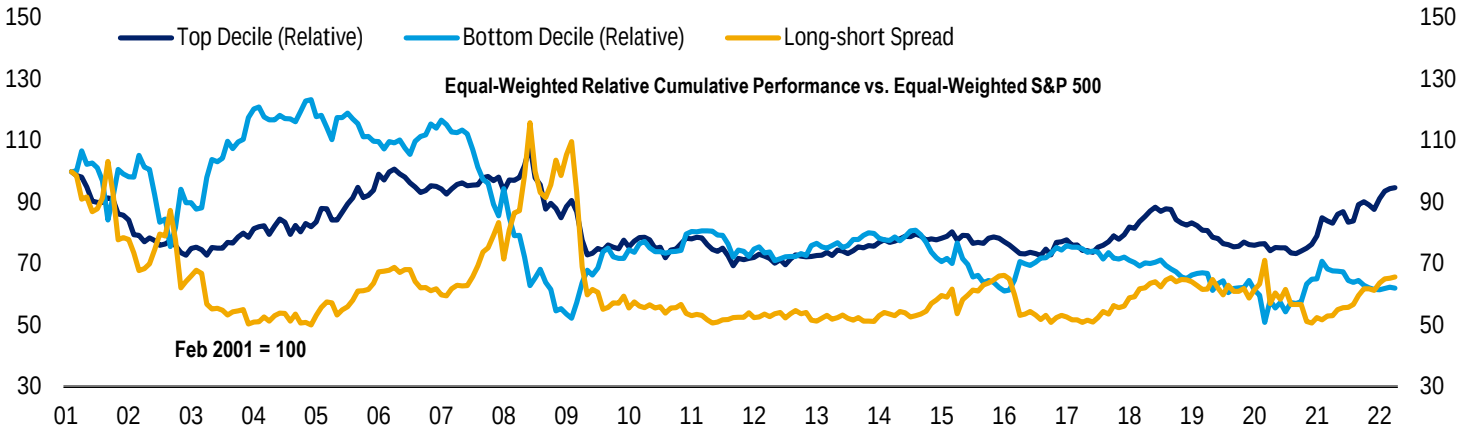


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Earnings Estimate Revision

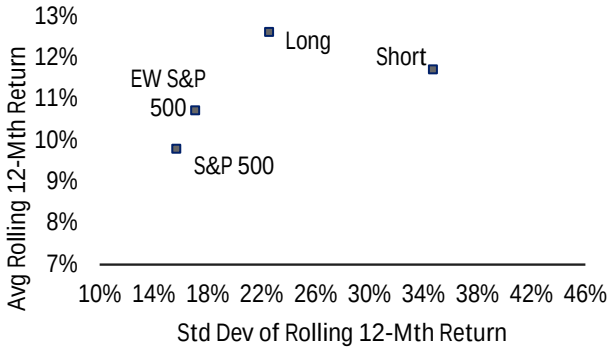
Exhibit 295: Performance of High EPS Estimate Revisions, Low EPS Estimate Revisions and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

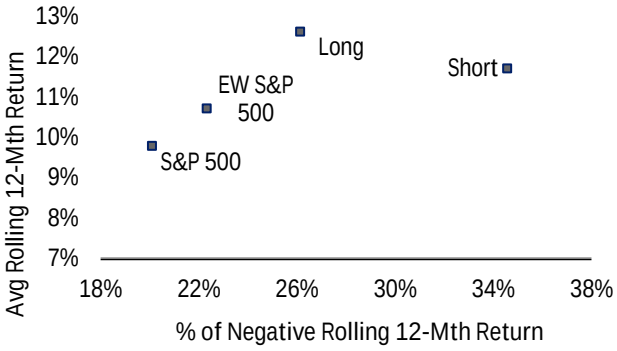
Exhibit 296: Estimate Revisions Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

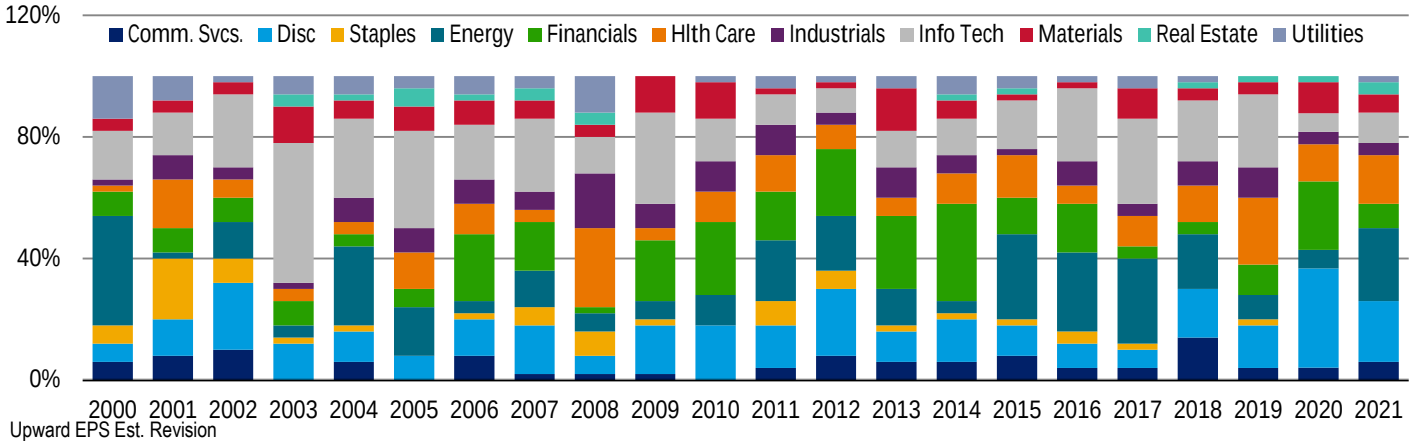
Exhibit 297: Estimate Revisions Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 298: Estimate Revisions Sector Concentration (Top Decile)
The factor has most weight in Energy

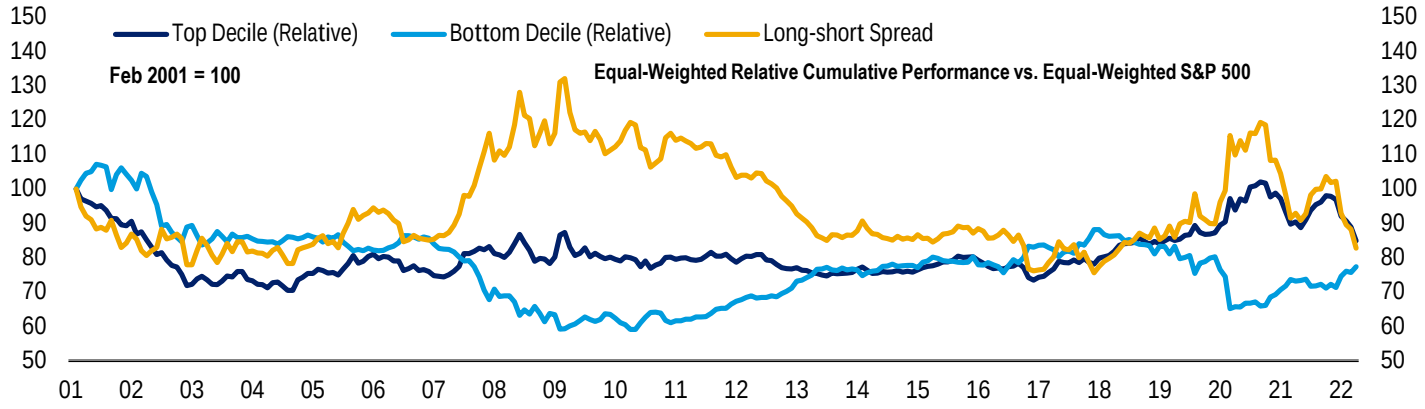


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Equity Duration

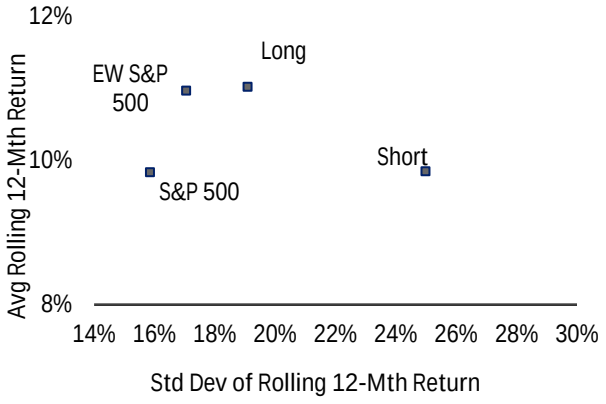
Exhibit 299: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

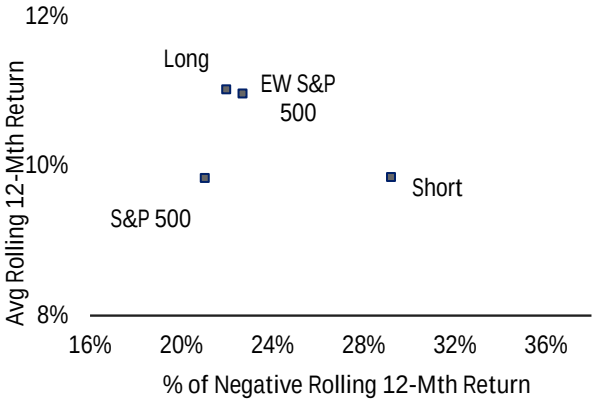
Exhibit 300: High Duration Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

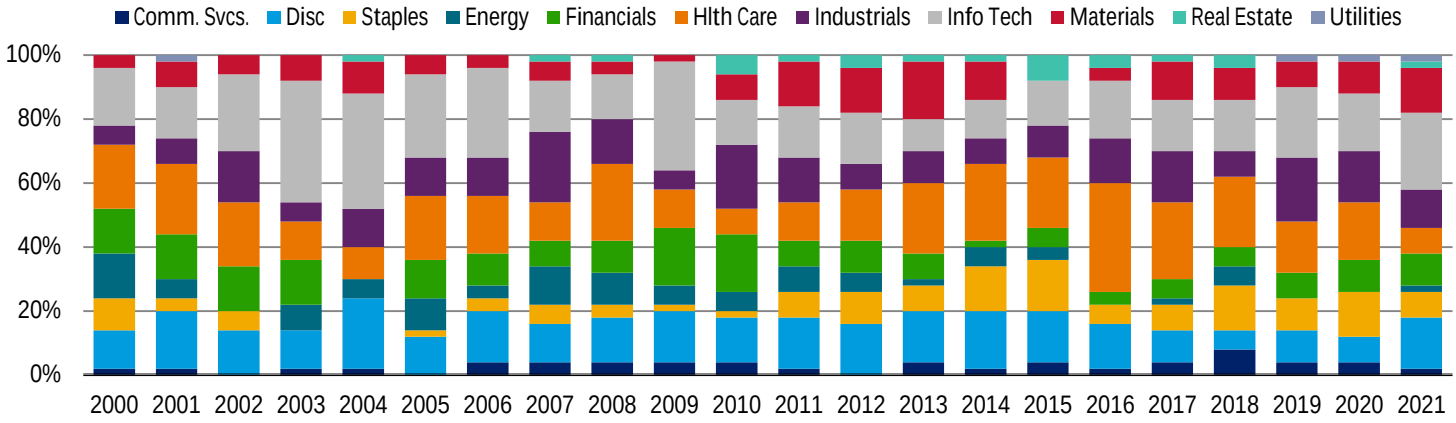
Exhibit 301: High Duration Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 302: High Duration Sector Concentration (Top Decile)
The factor has most weight in Info Tech

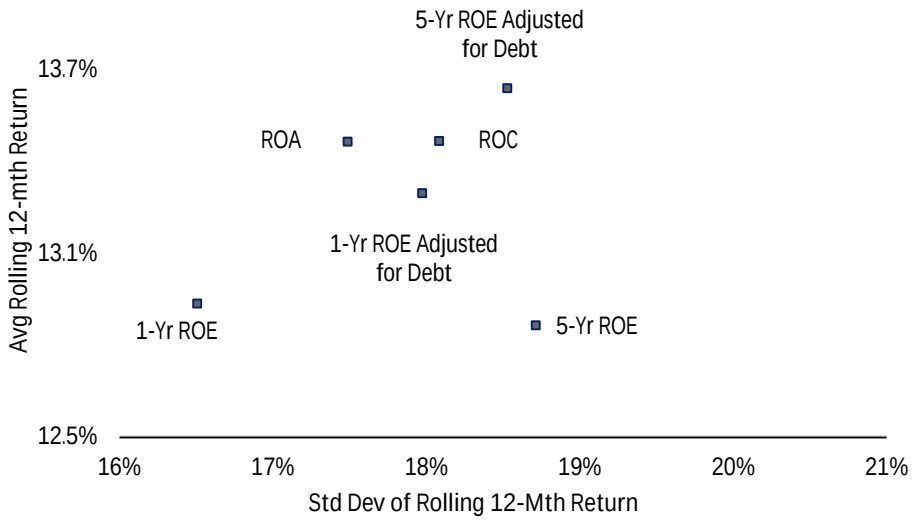


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Quality Strategies

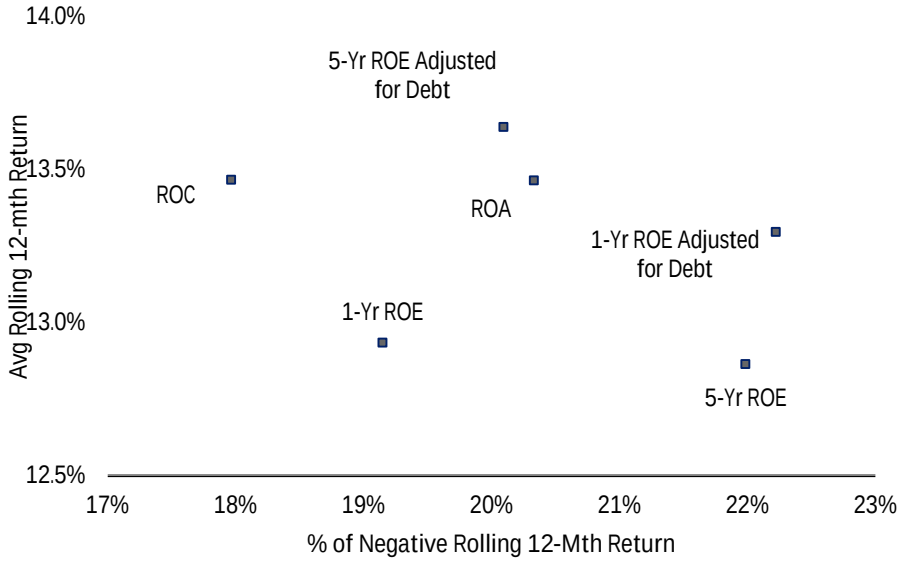
Exhibit 303: Quality Strategies
High 5-yr Debt Adjusted ROE Fared Best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 304: Quality Strategies
High 5-yr Debt Adjusted ROE Fared Best

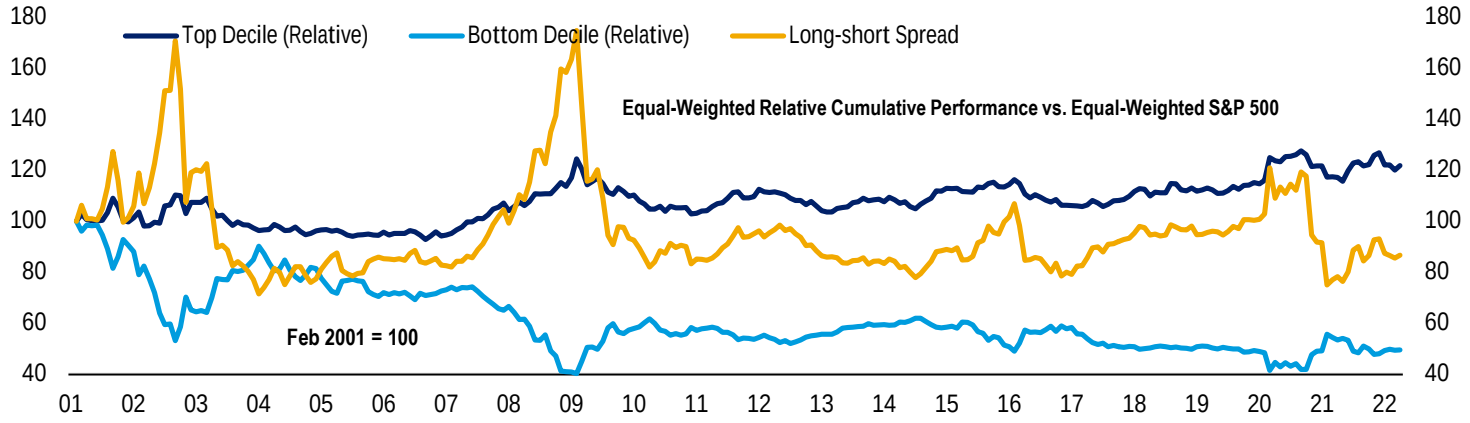


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

One-Year Return on Equity

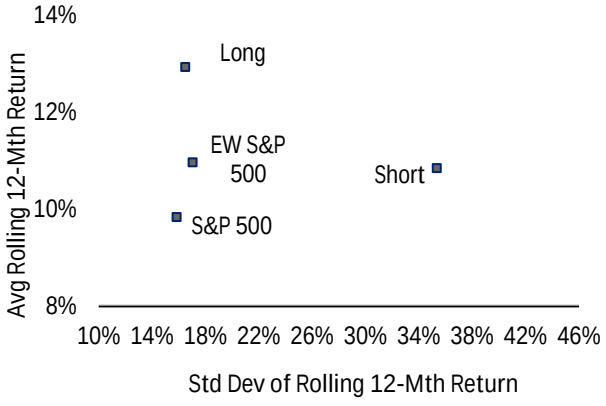
Exhibit 305: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index since March 2021



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

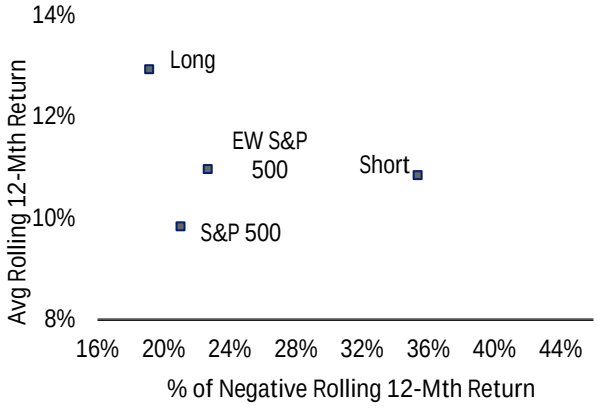
Exhibit 306: High 1-Yr Return on Equity Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

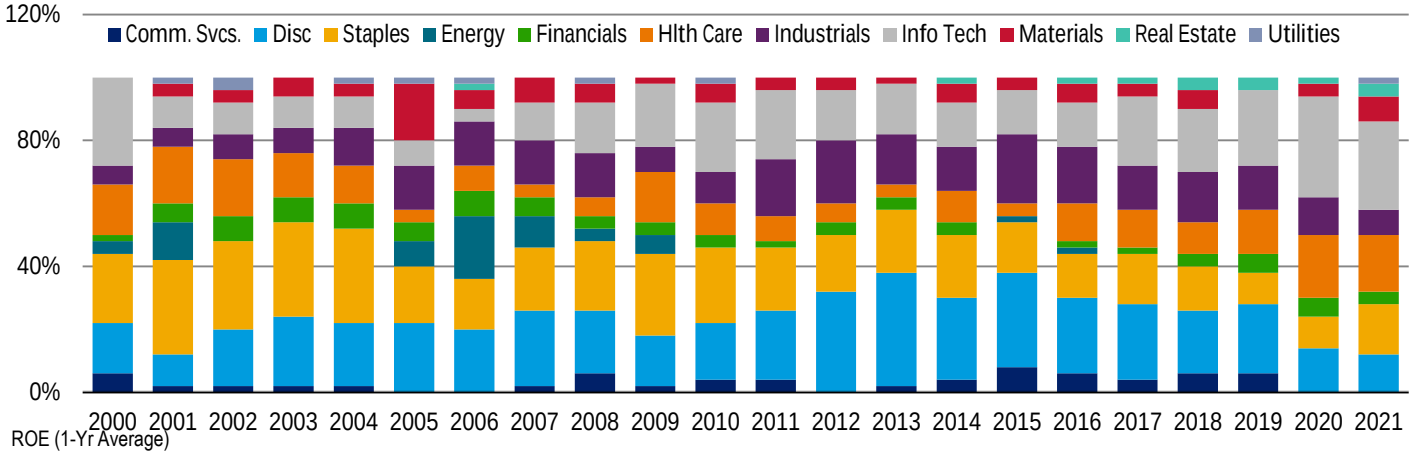
Exhibit 307: High 1-Yr Return on Equity Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 308: High 1-Yr Return on Equity Sector Concentration (Top Decile)
The factor has most weight in Info Tech

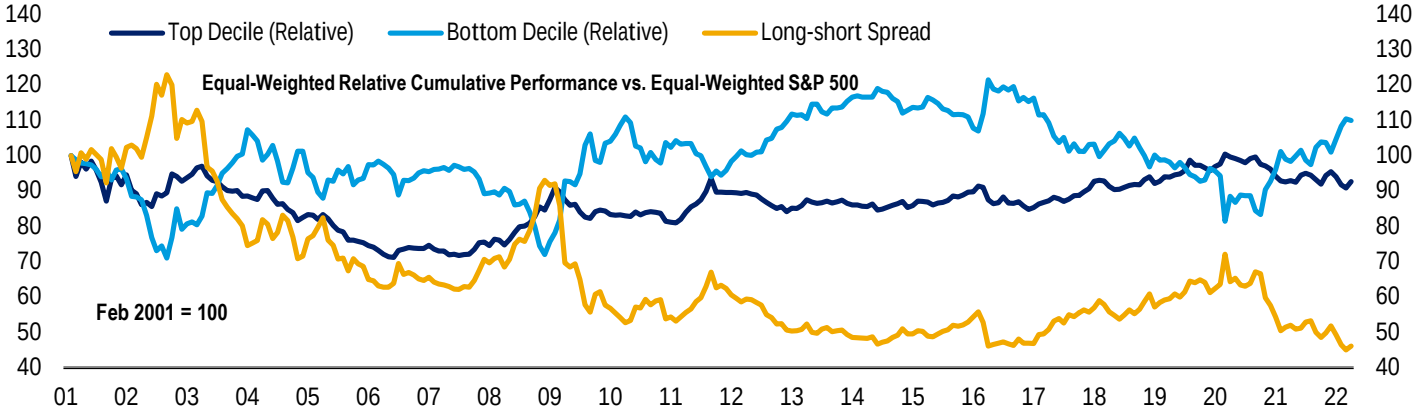


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Five-Year Return on Equity

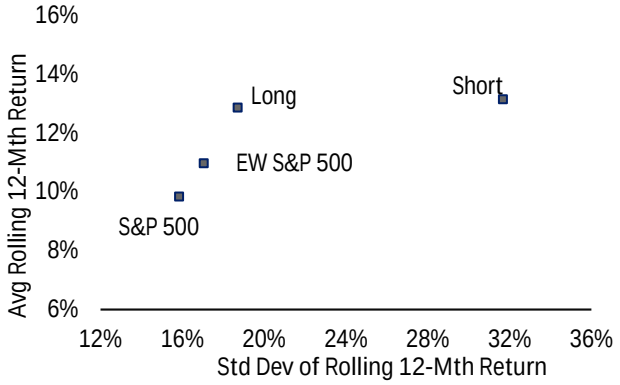
Exhibit 309: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index recently



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

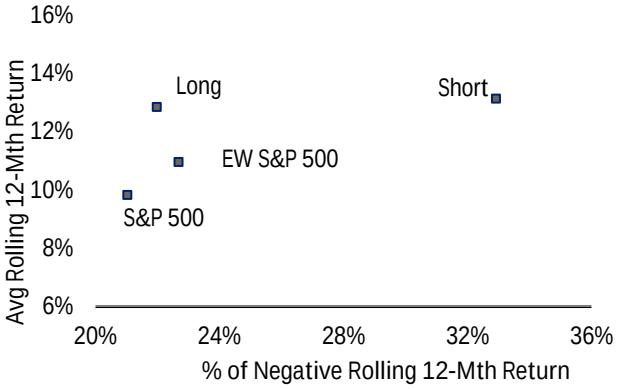
Exhibit 310: High 5-Yr Return on Equity Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

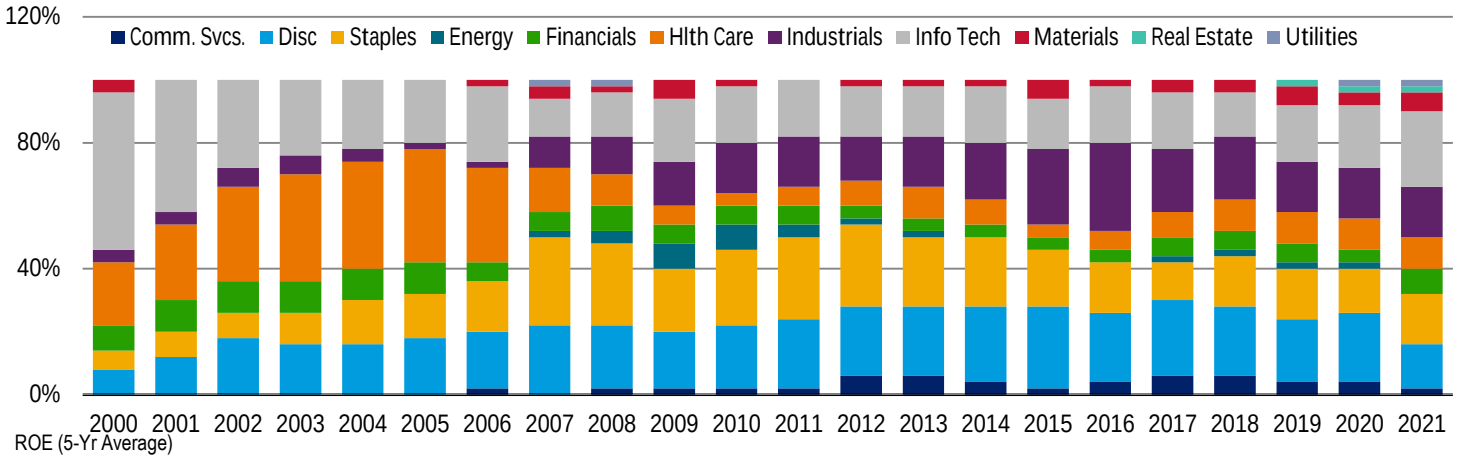
Exhibit 311: High 5-Yr Return on Equity Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 312: High 5-Yr Return on Equity Sector Concentration of (Top Decile)
The factor has most weight in Info. Tech.

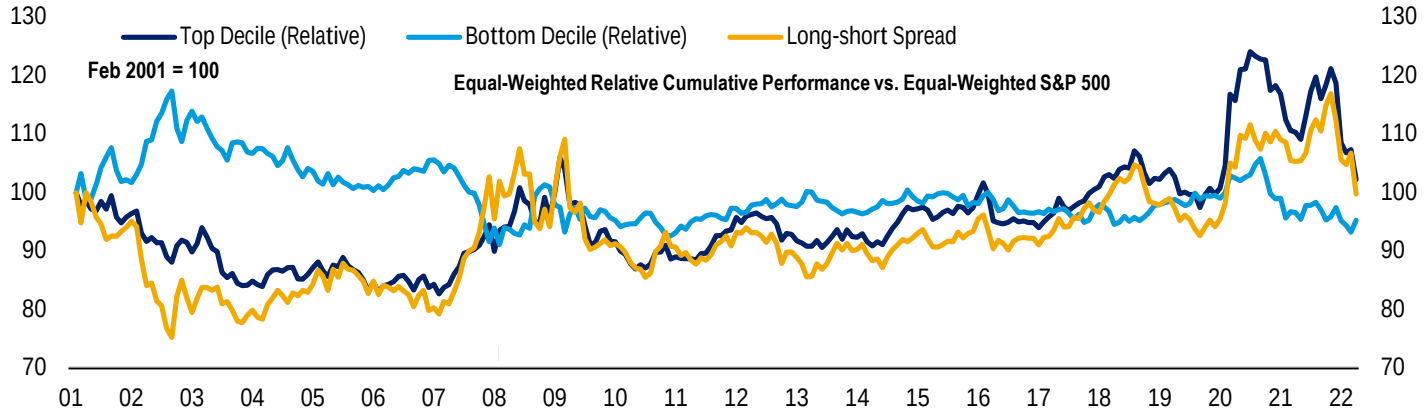


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

One-Year Return on Equity (Adjusted for Debt)

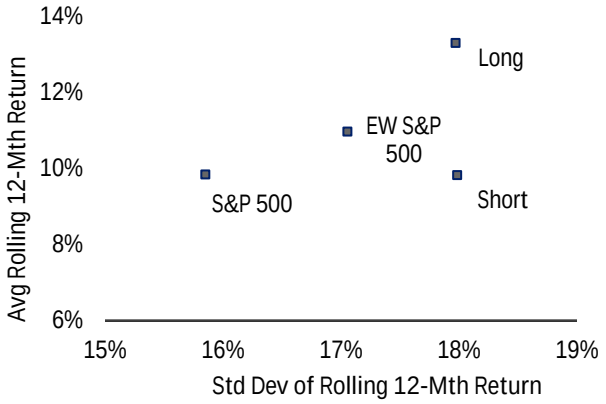
Exhibit 313: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

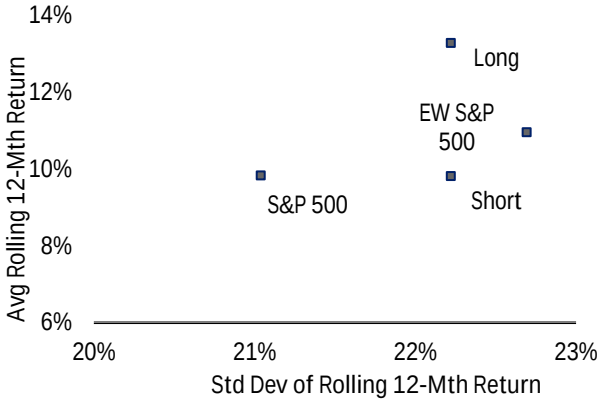
Exhibit 314: High 1-Yr ROE Adjusted for Debt Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

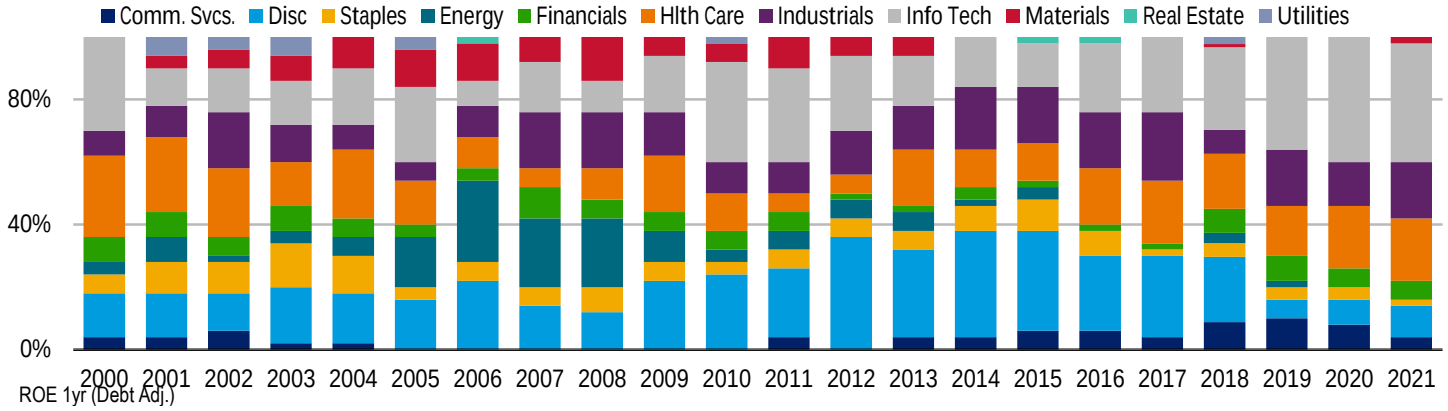
Exhibit 315: High 1-Yr ROE Adjusted for Debt Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 316: High 1-Yr ROE Adjusted for Debt Sector Concentration (Top Decile)
The factor has most weight in Info Tech

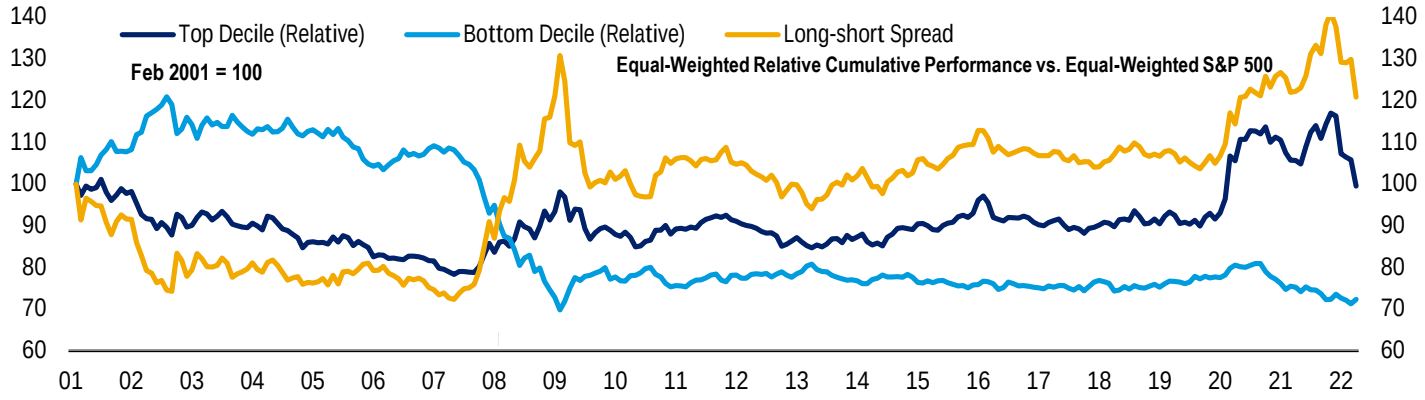


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Five-Year Return on Equity (Adjusted for Debt)

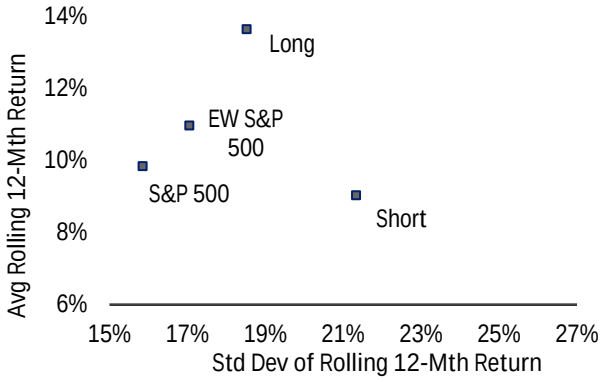
Exhibit 317: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

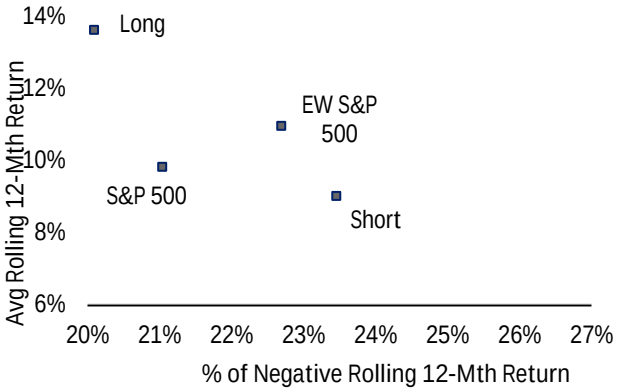
Exhibit 318: High 5-Yr ROE Adjusted for Debt Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

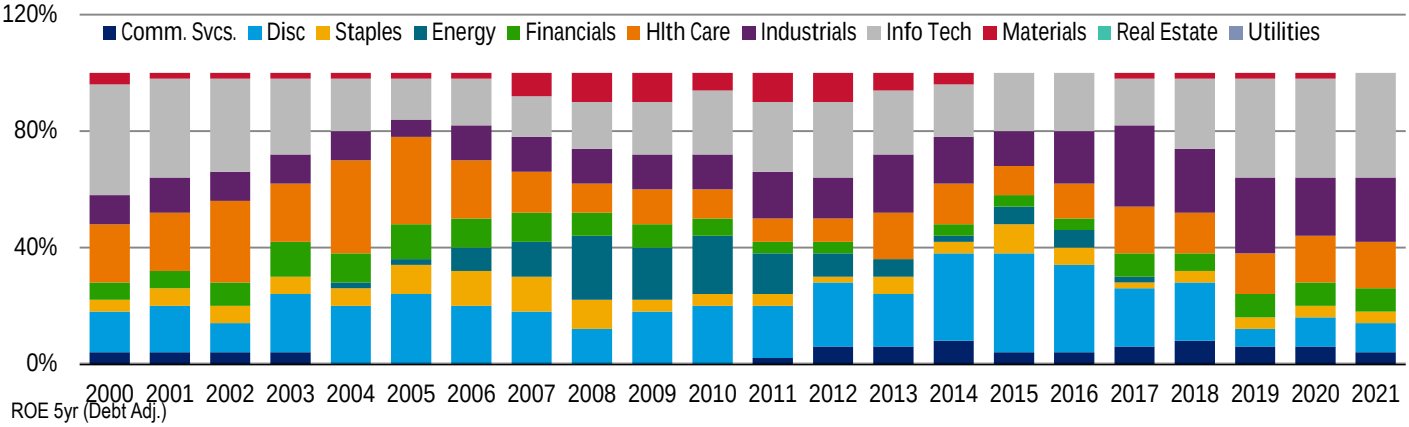
Exhibit 319: High 5-Yr ROE Adjusted for Debt Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 320: High 5-Yr ROE Adjusted for Debt Sector Concentration (Top Decile)
The factor has most weight in Info Tech

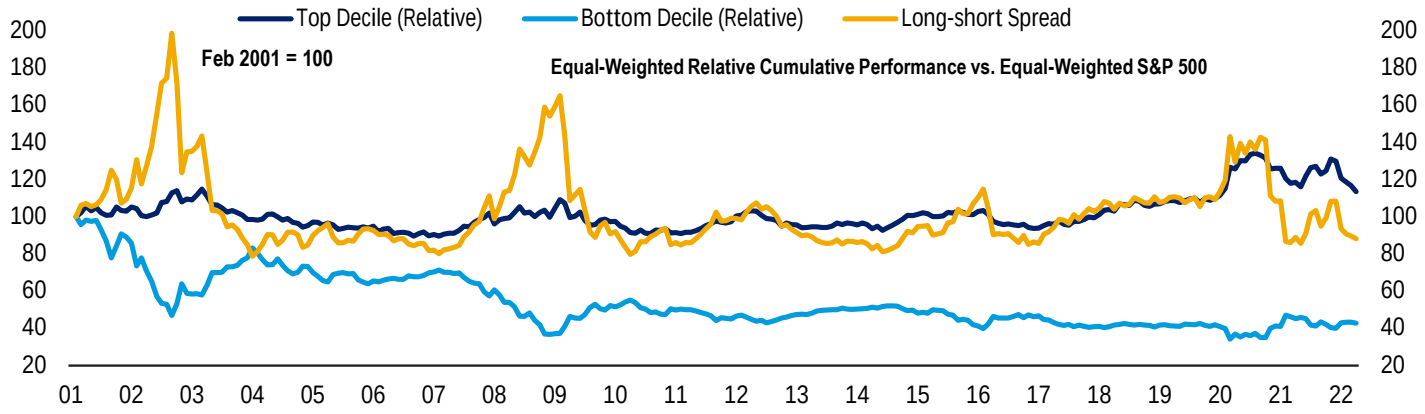


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Return on Assets

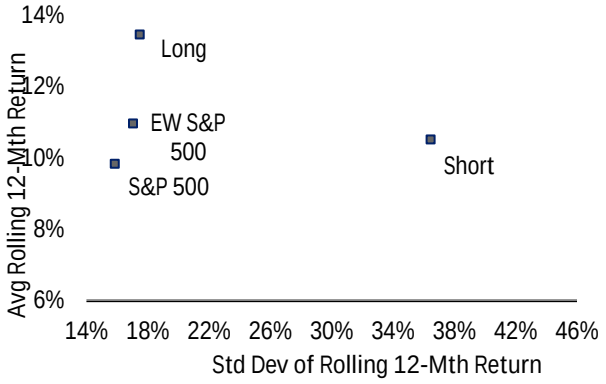
Exhibit 321: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

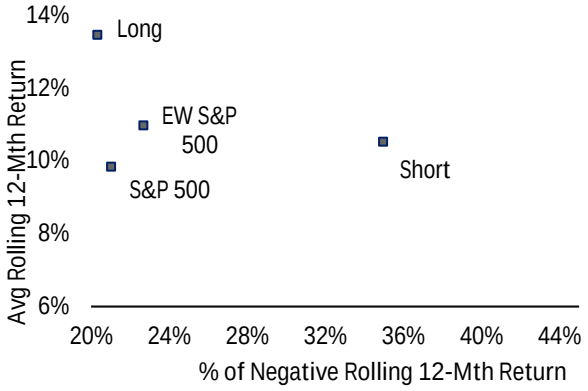
Exhibit 322: High Return on Assets Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

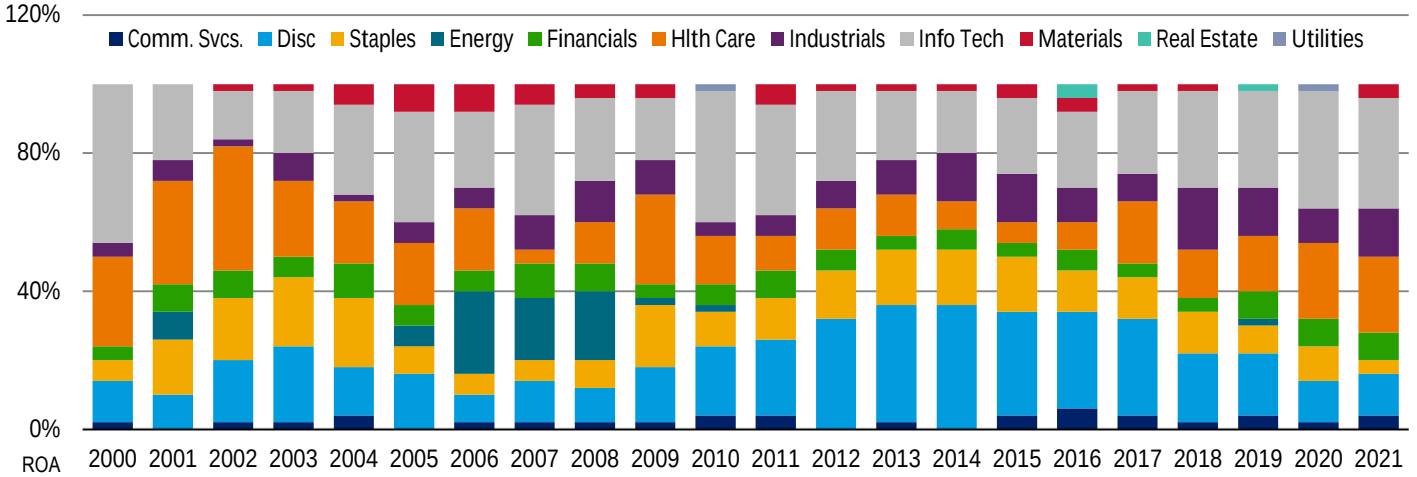
Exhibit 323: High Return on Assets Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 324: High Return on Assets Sector Concentration (Top Decile)
The factor has most weight in Info Tech

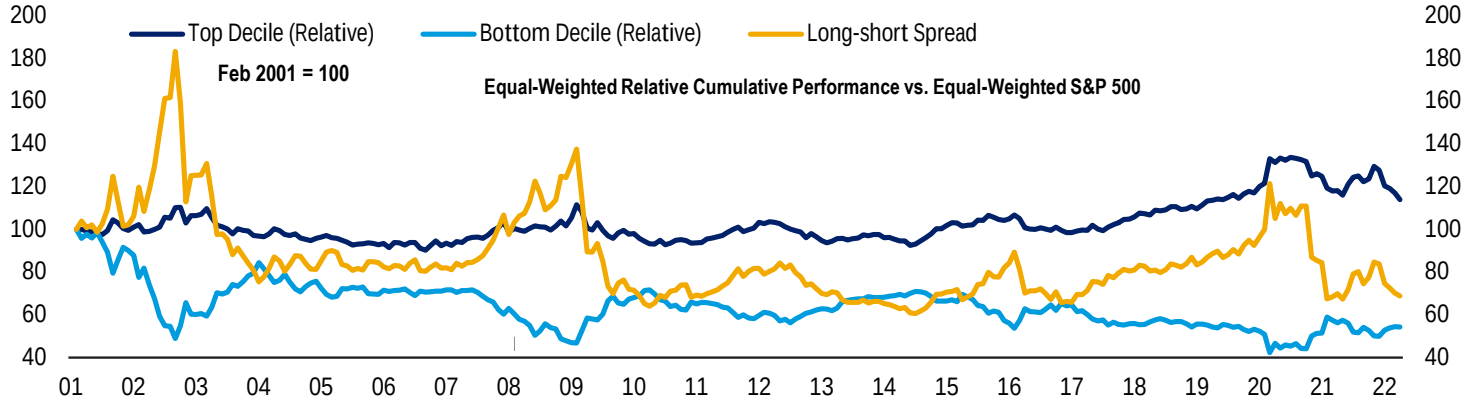


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Return on Capital

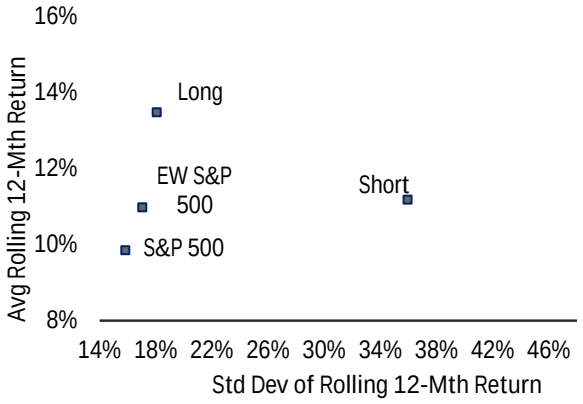
Exhibit 325: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

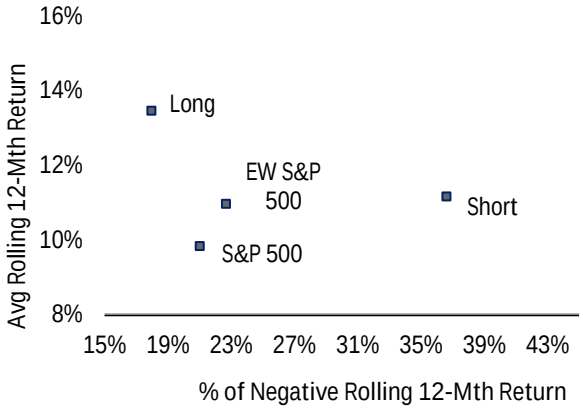
Exhibit 326: High Return on Capital Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

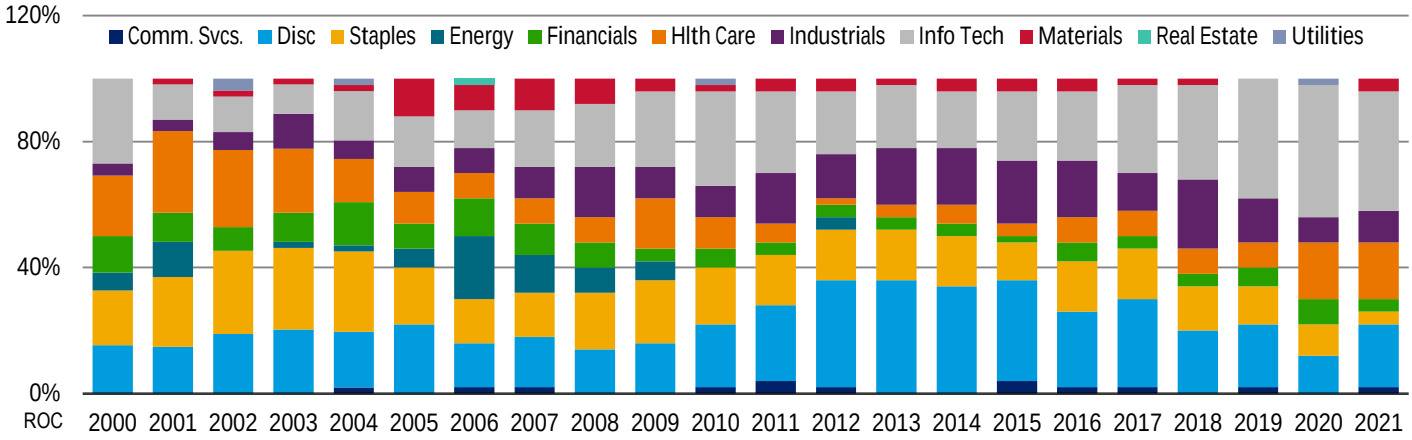
Exhibit 327: High Return on Capital Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 328: High Return on Capital Sector Concentration (Top Decile)
The factor has most weight in Info Tech

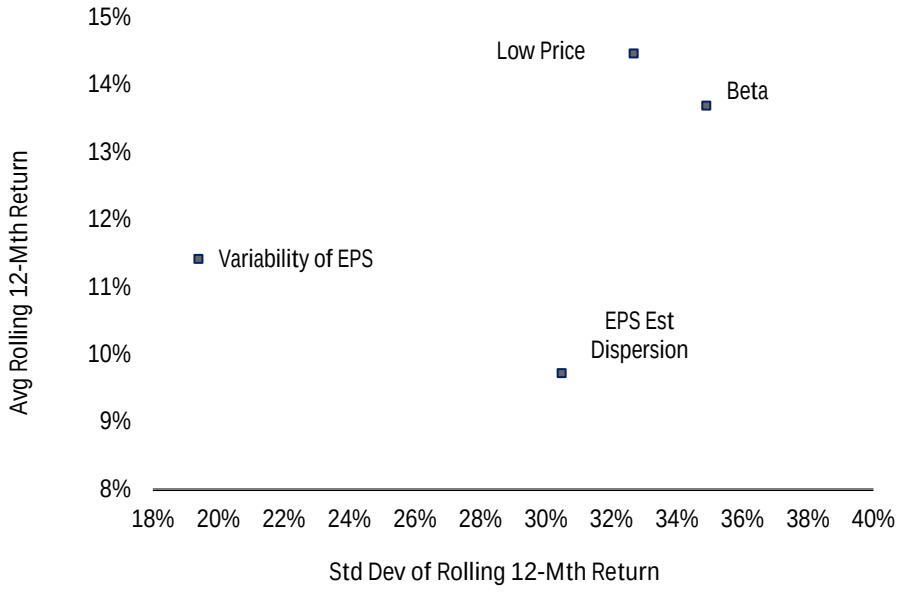


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Risk Strategies

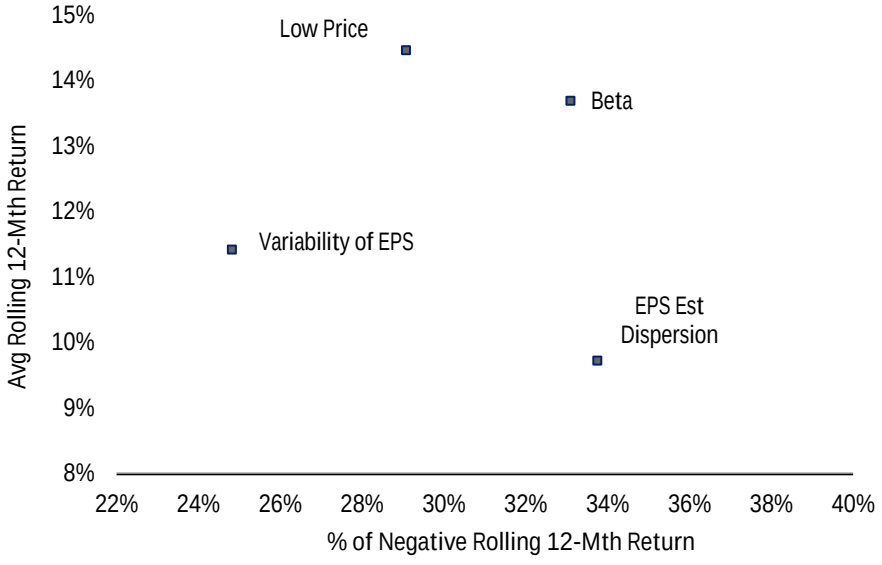
Exhibit 329: Risk Strategies
Low Price fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 330: Risk Strategies
Low Price fared best

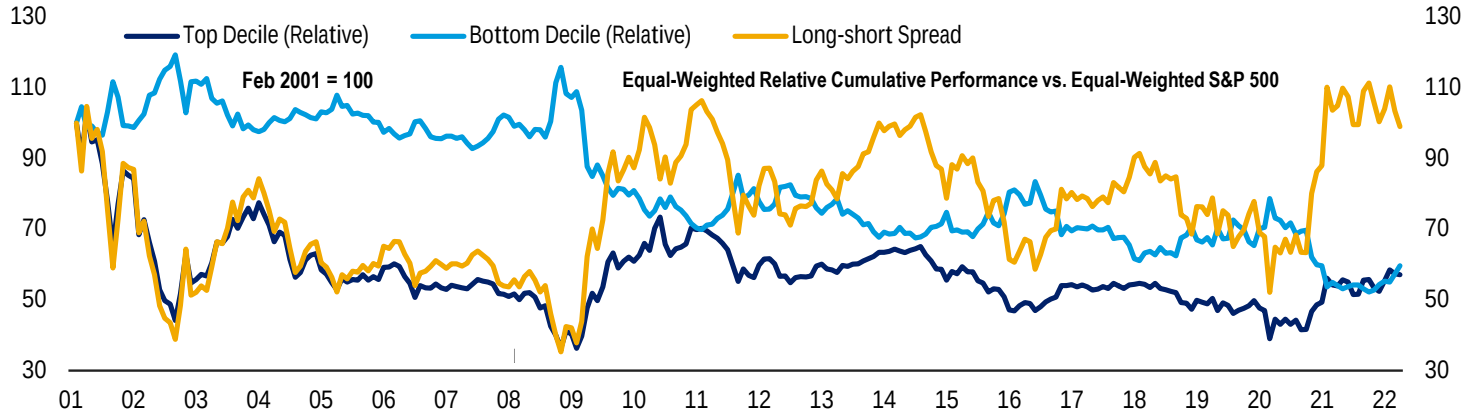


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Beta

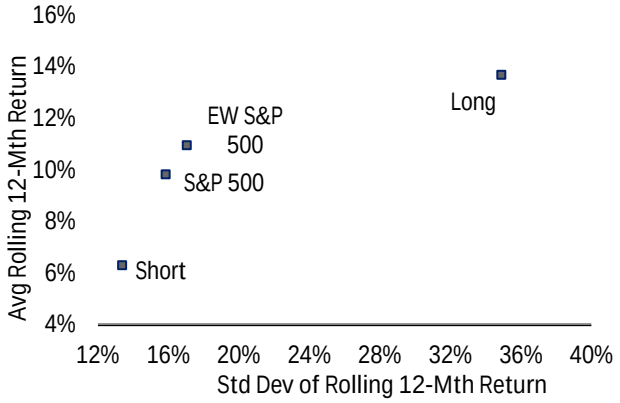
Exhibit 331: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

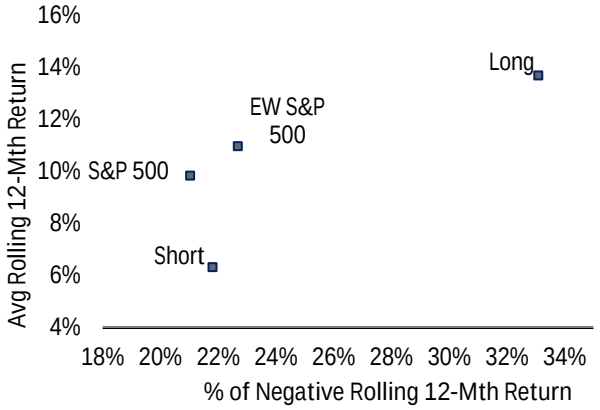
Exhibit 332: High Beta Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

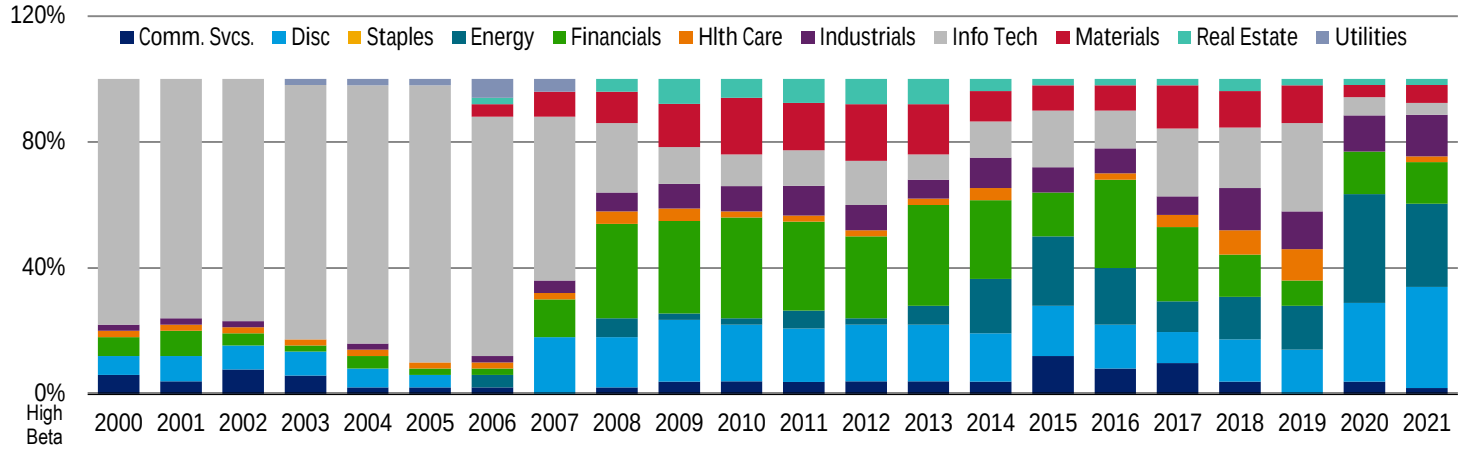
Exhibit 333: High Beta Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 334: High Beta Sector Concentration of (Top Decile)
The factor has most weight in Discretionary

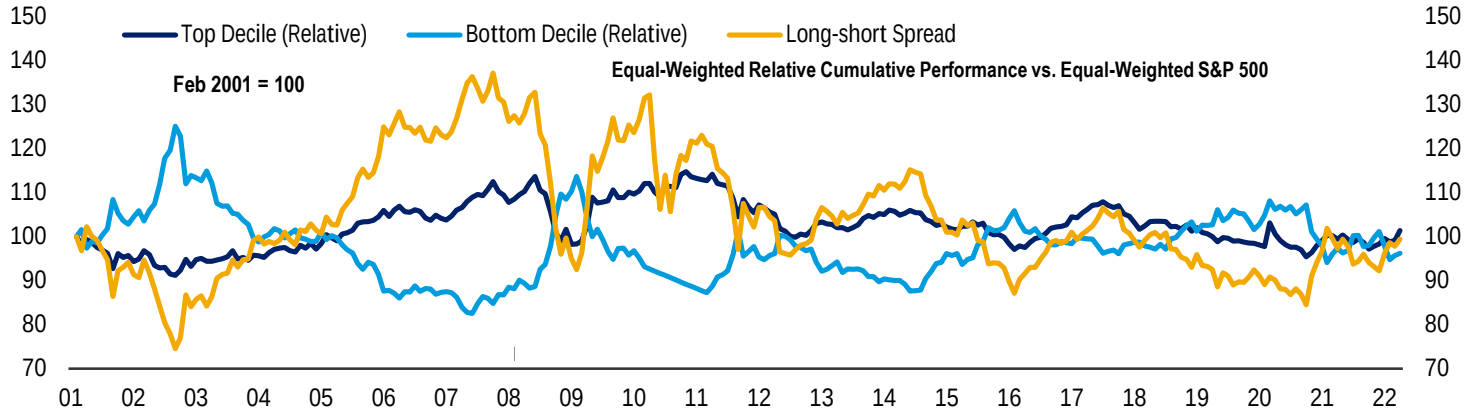


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Variability of Earnings

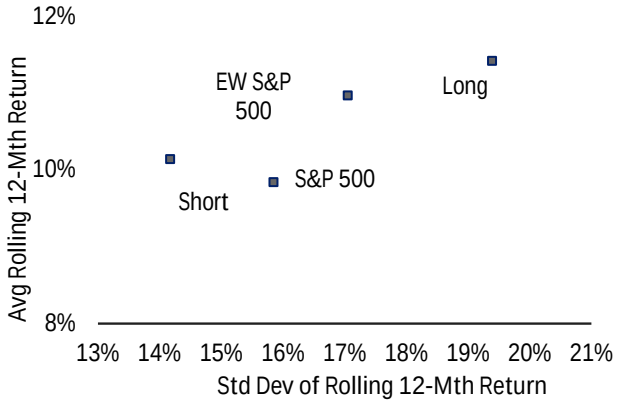
Exhibit 335: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

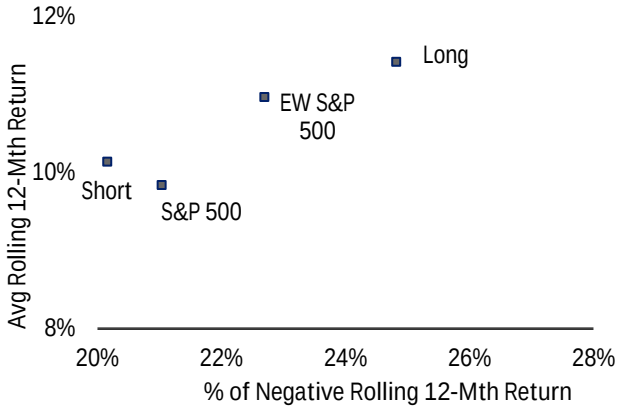
Exhibit 336: High EPS Variability Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

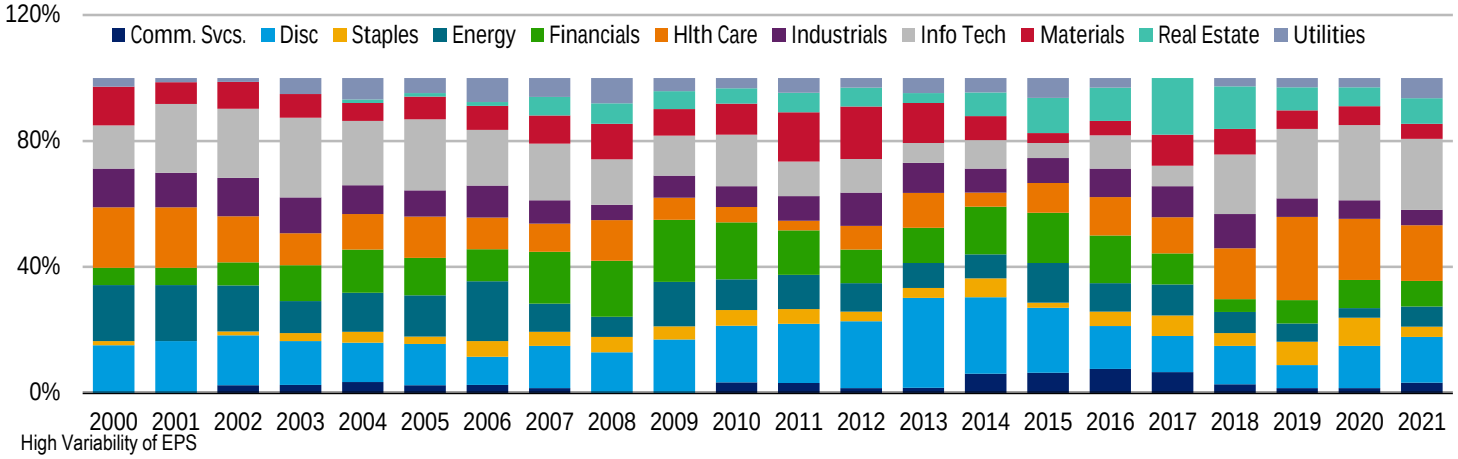
Exhibit 337: High EPS Variability Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 338: High EPS Variability Sector Concentration (Top Decile)
The factor has most weight in Info Tech

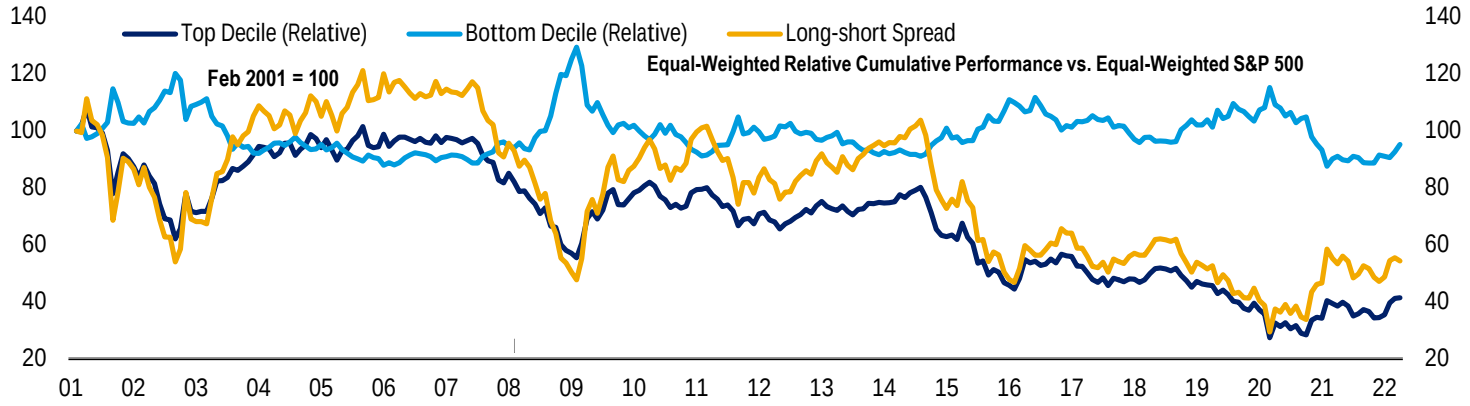


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Estimate Dispersion

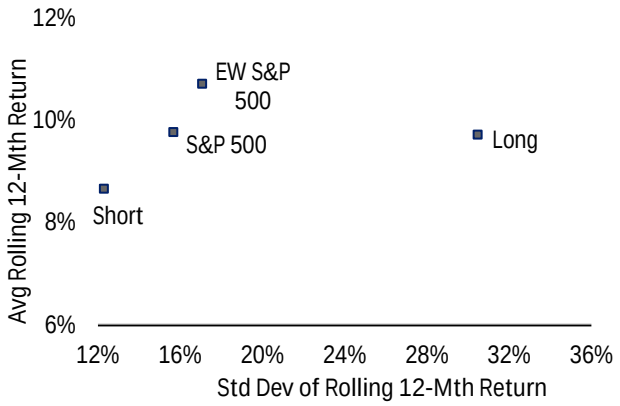
Exhibit 339: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

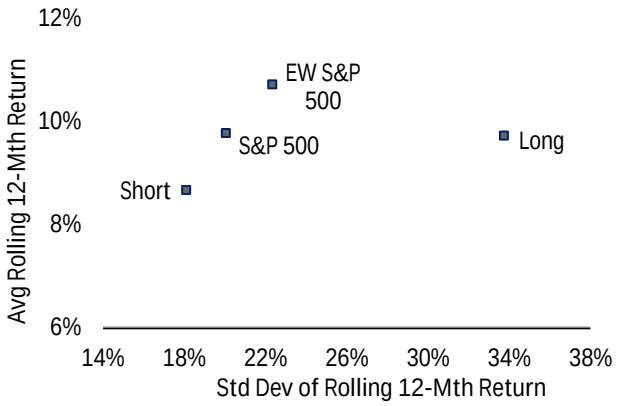
Exhibit 340: High EPS Dispersion Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

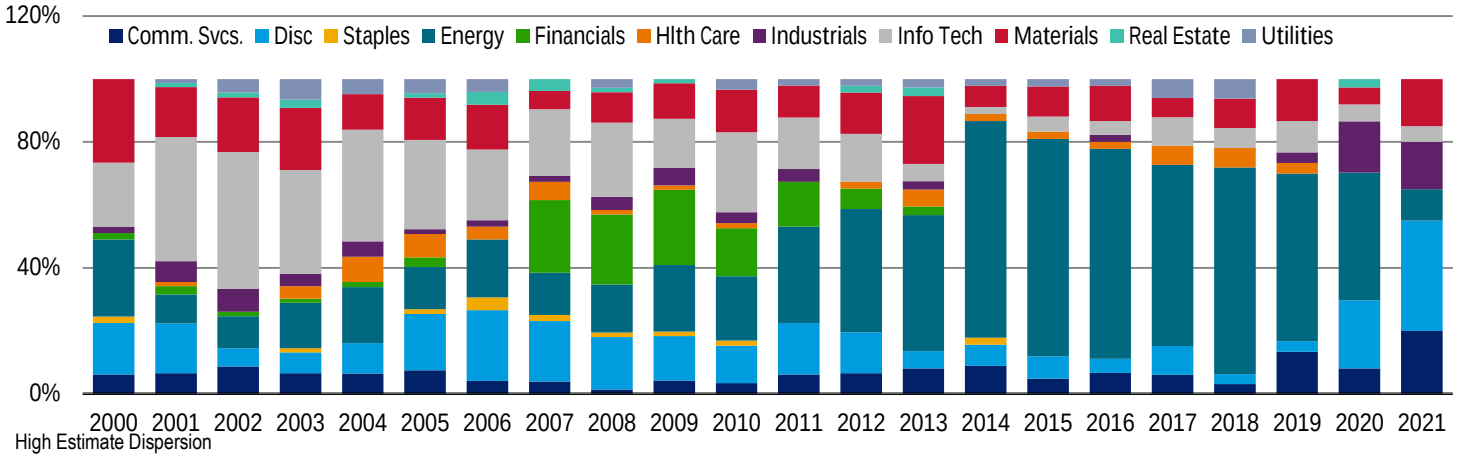
Exhibit 341: High EPS Dispersion Downside Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 342: High EPS Dispersion Sector Concentration (Top Decile)
The factor has most weight in Discretionary

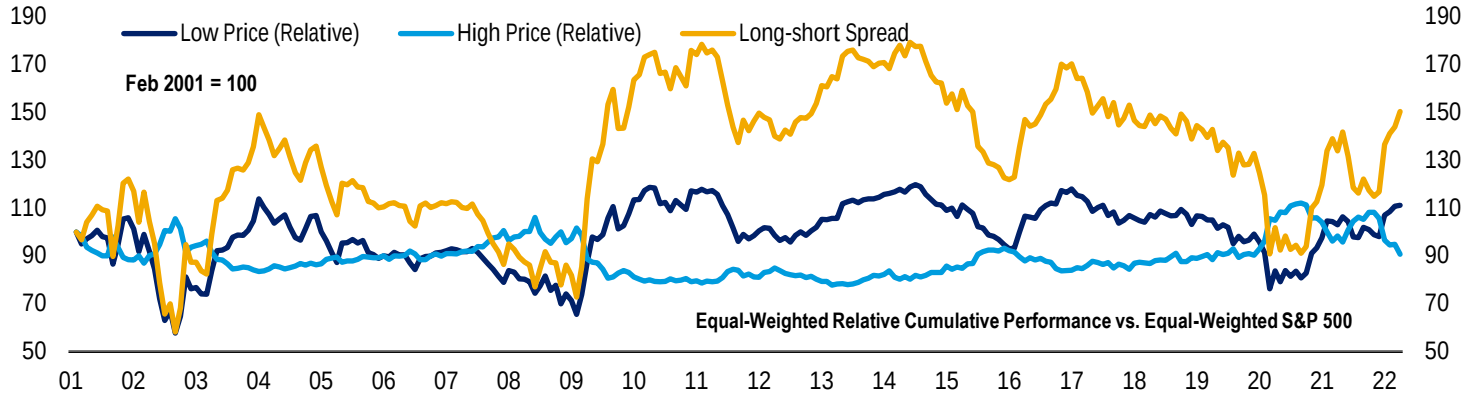


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Price

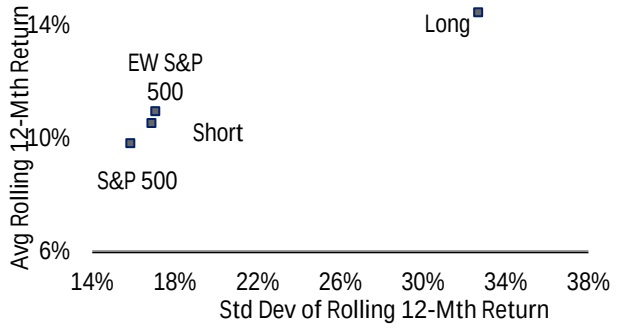
Exhibit 343: Performance Low Price, High Price and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

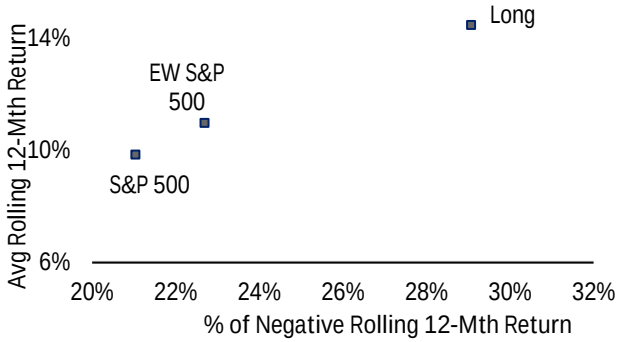
Exhibit 344: Low Price Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

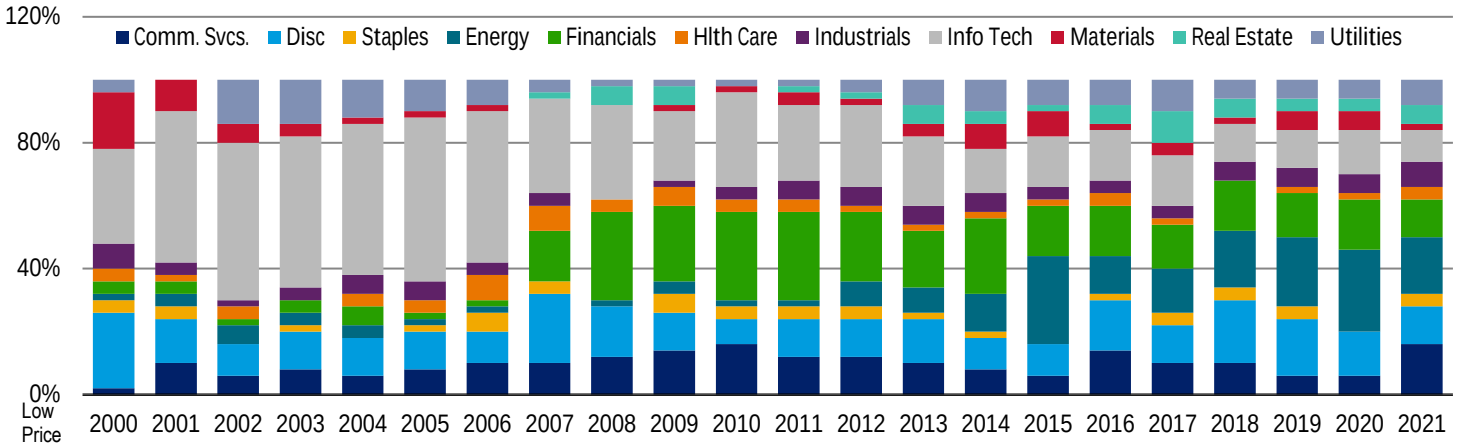
Exhibit 345: Low Price Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 346: Price Sector Concentration (Low Decile)
The factor has most weight in Energy

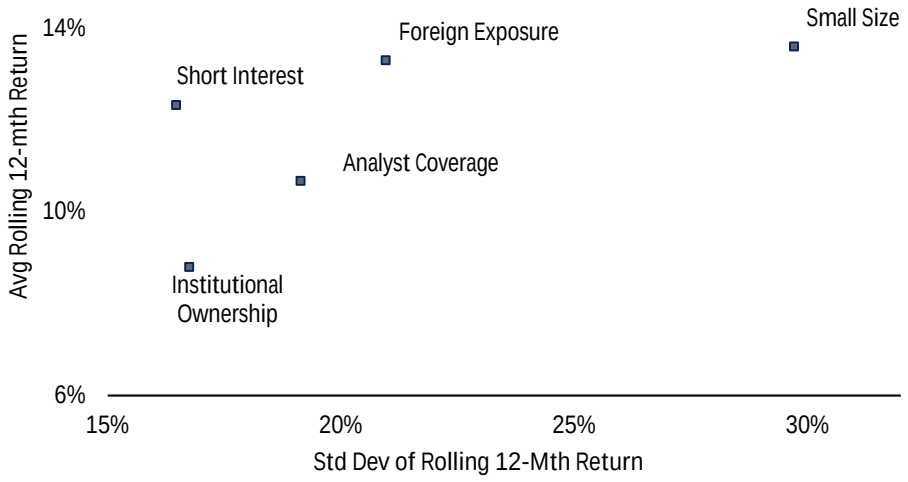


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

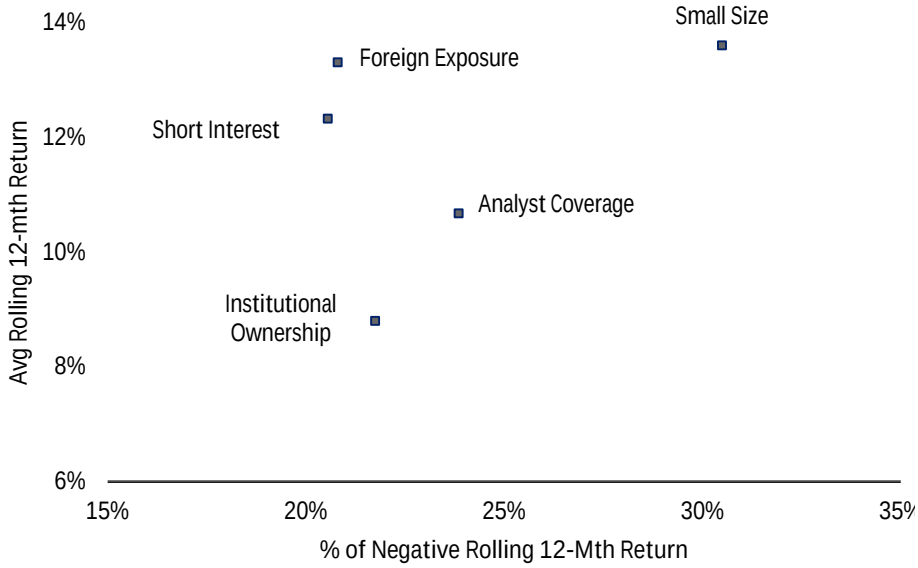
Miscellaneous Strategies

Exhibit 347: Miscellaneous Strategies
Small Size fared best



Source: BofA US Equity and Quant Strategy , FactSet
Note: the performance timeframe for each factor corresponds to the time series chart shown on each of the subsequent pages
BofA GLOBAL RESEARCH

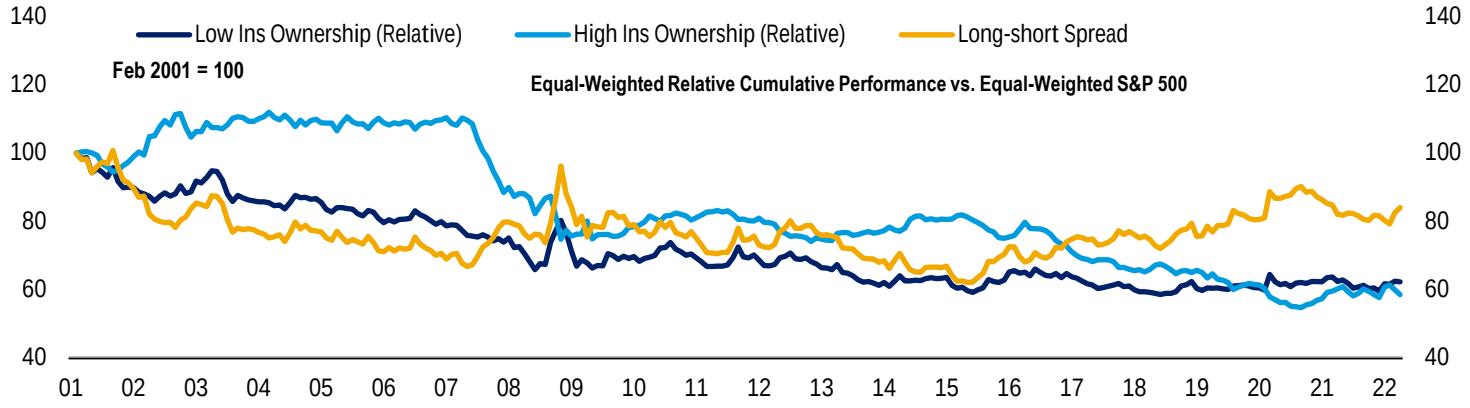
Exhibit 348: Miscellaneous Strategies
Small Size fared best



Source: BofA US Equity and Quant Strategy , FactSet
Note: the performance timeframe for each factor corresponds to the time series chart shown on each of the subsequent pages
BofA GLOBAL RESEARCH

Institutional Ownership

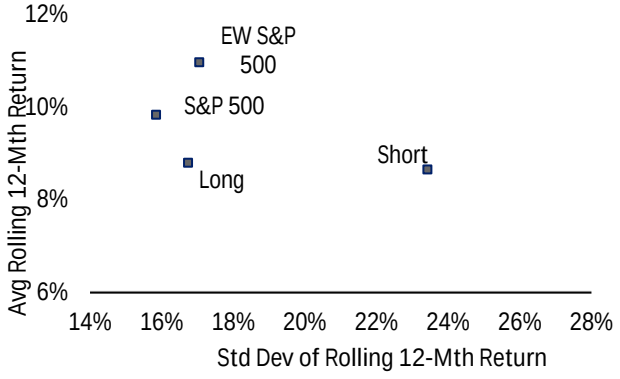
Exhibit 349: Performance of Low Institutional Ownership, High Institutional Ownership and Long-Short Spread
The factor performed in line with the index in recent years



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

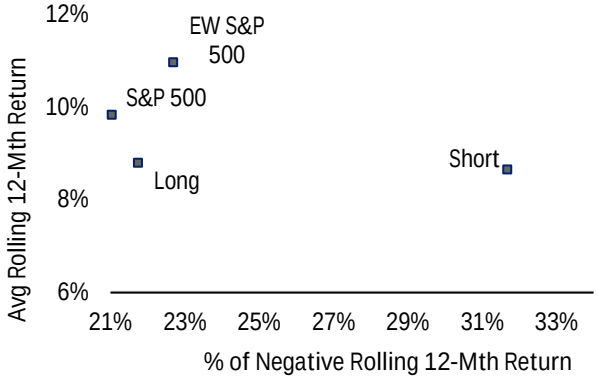
Exhibit 350: Low Institutional Ownership Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

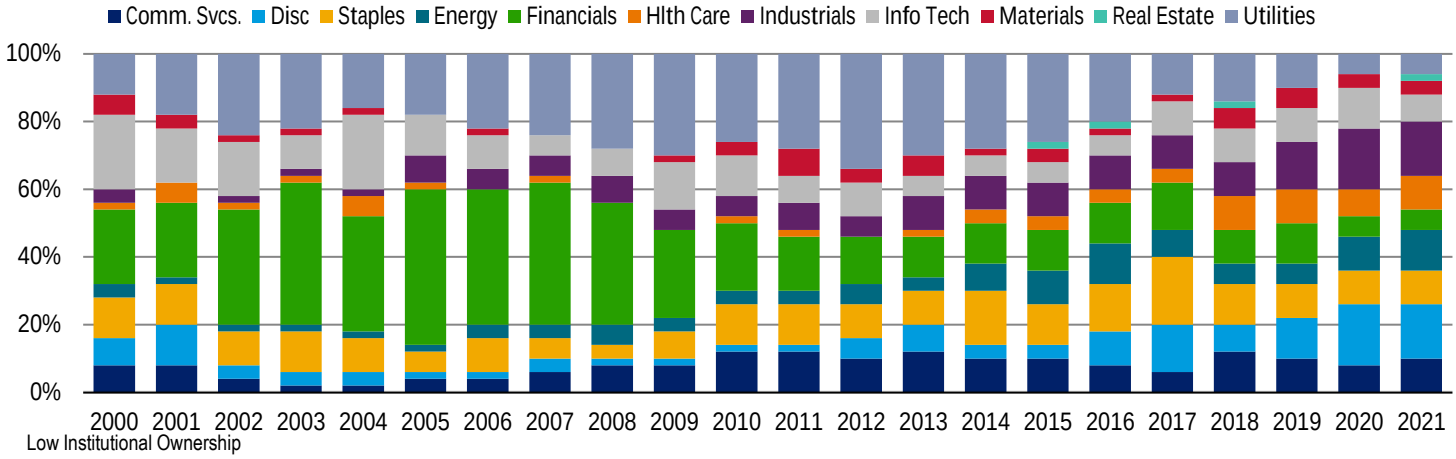
Exhibit 351: Low Institutional Ownership Downside Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 352: Low Institutional Ownership Sector Concentration (Low Decile)
The factor has most weight in Consumer Discretionary and Industrials

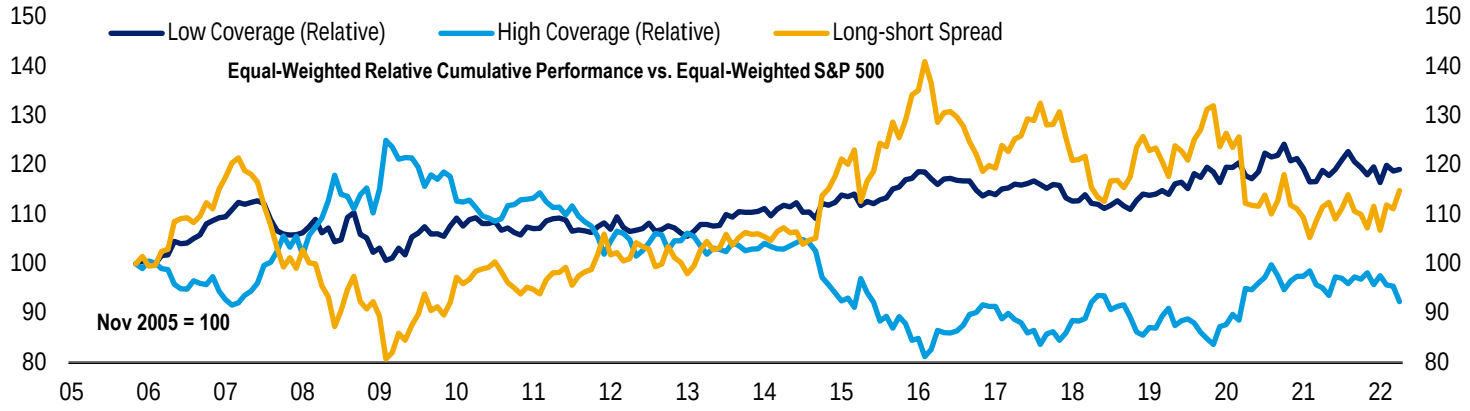


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Analyst Coverage

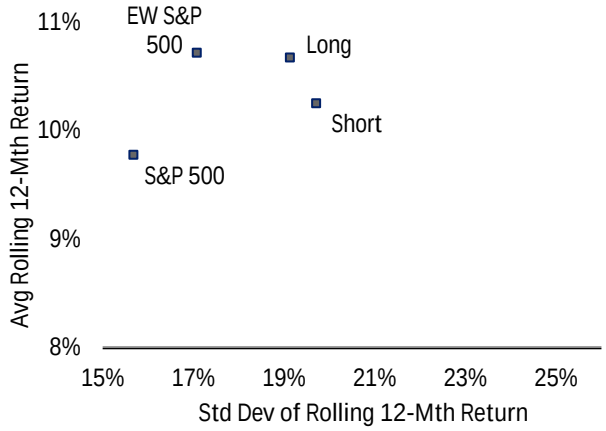
Exhibit 353: Performance of Low Coverage, High Coverage and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

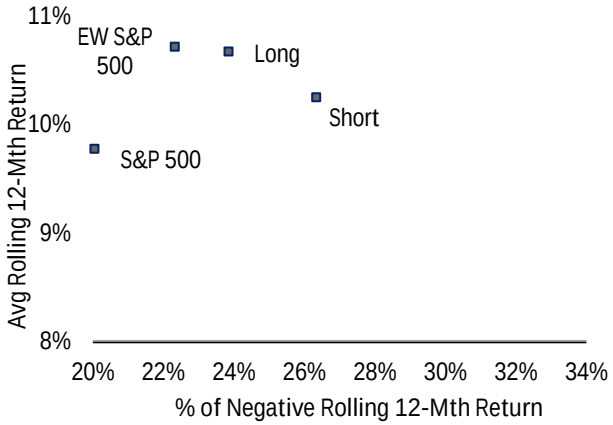
Exhibit 354: Low Analyst Coverage Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

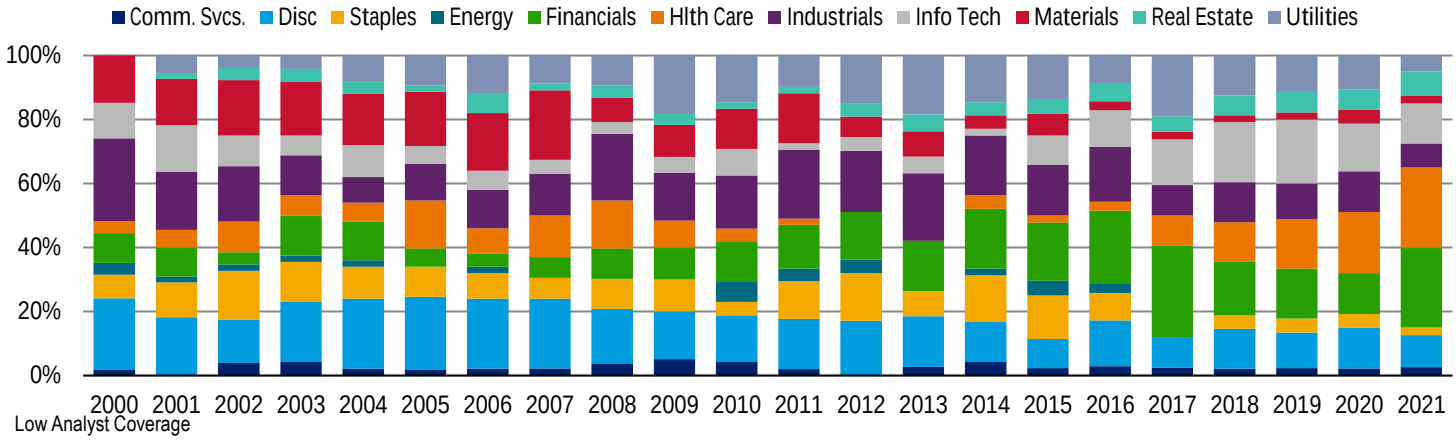
Exhibit 355: Low Analyst Coverage Downside Risk Reward
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 356: Low Analyst Coverage Sector Concentration (Low Decile)
The factor has most weight in Health Care

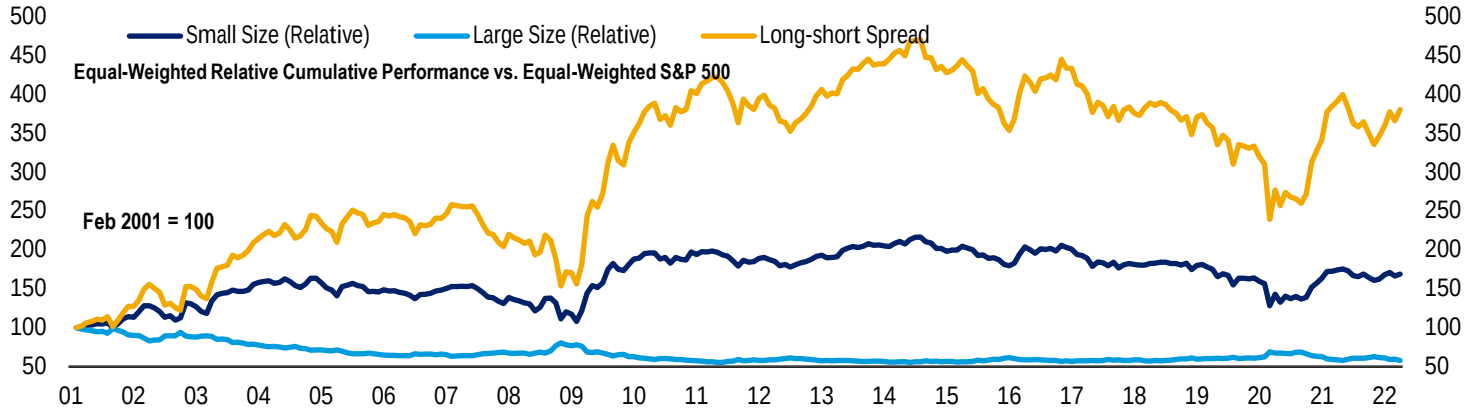


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Size

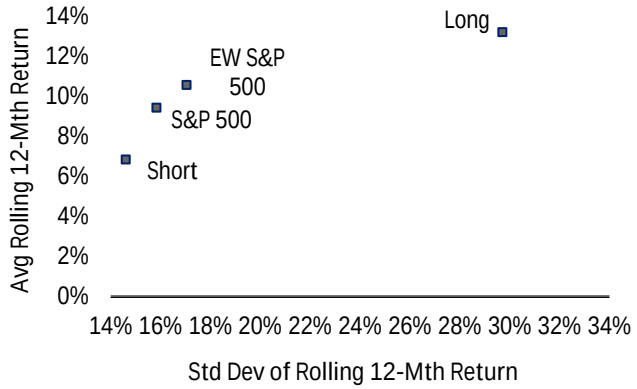
Exhibit 357: Performance of Small Size, Large Size and Long-Short Spread
The factor has outperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

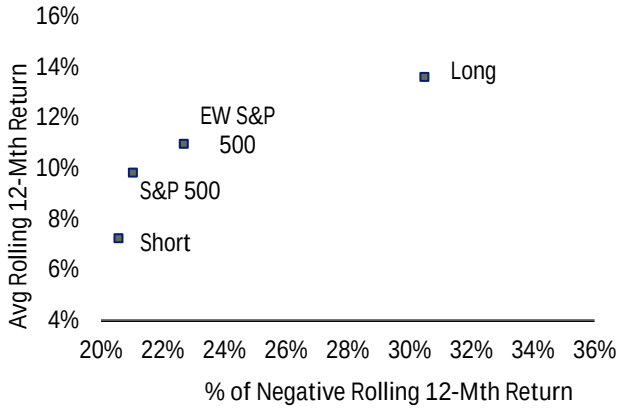
Exhibit 358: Small Size Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

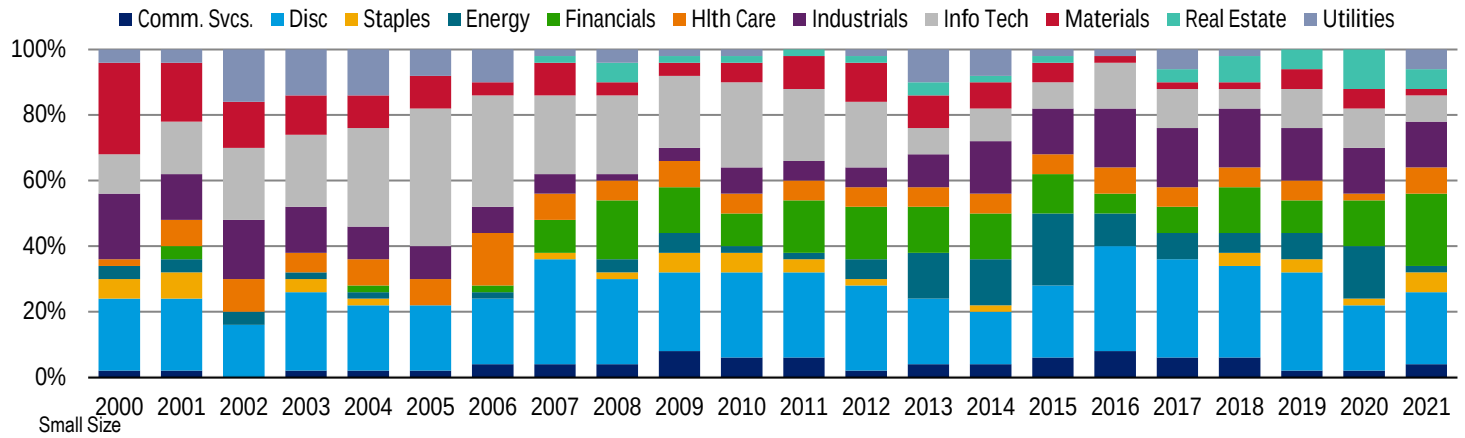
Exhibit 359: Small Size Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 360: Small Size Sector Concentration (Low Decile)
The factor has most weight in Financials

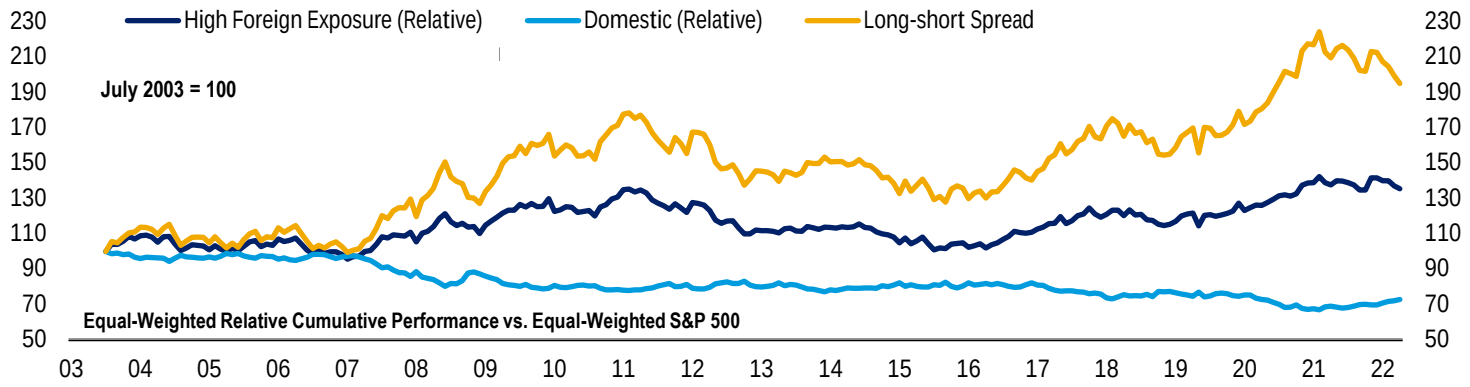


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Foreign Exposure

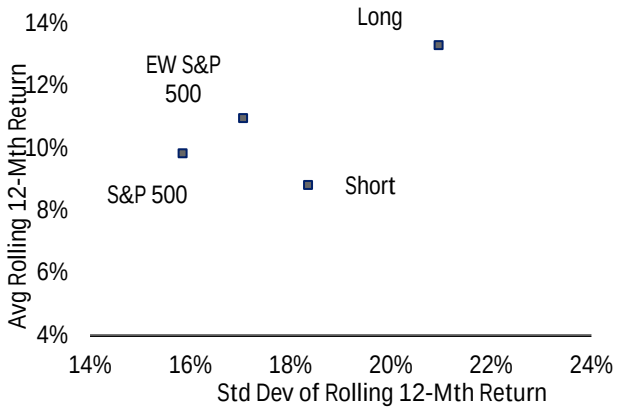
Exhibit 361: Performance of High Foreign Exposure, Domestic Companies and Long-short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

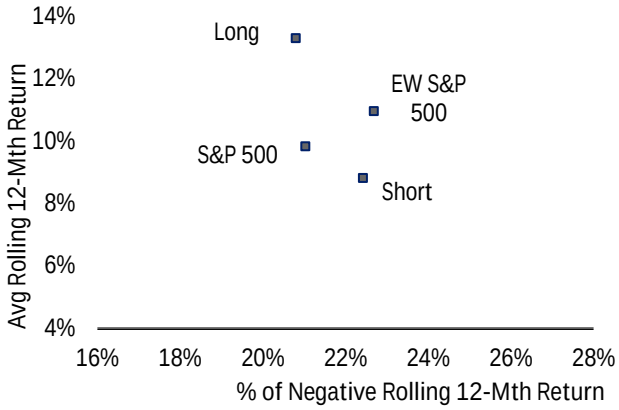
Exhibit 362: High Foreign Exposure Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

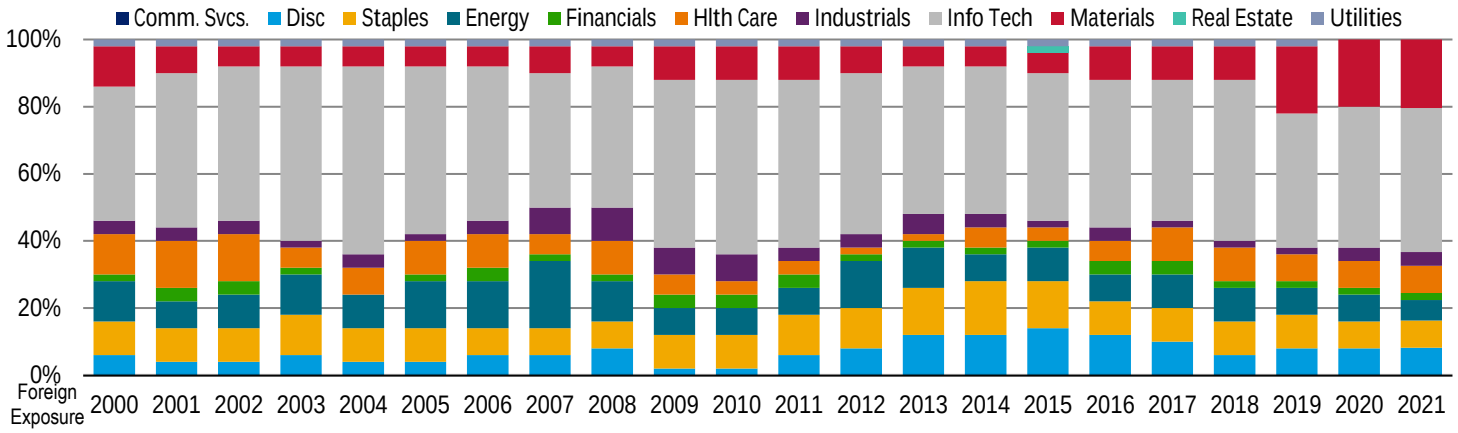
Exhibit 363: High Foreign Exposure Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 364: High Foreign Exposure Sector Concentration (Top Decile)
The factor has most weight in Info Tech

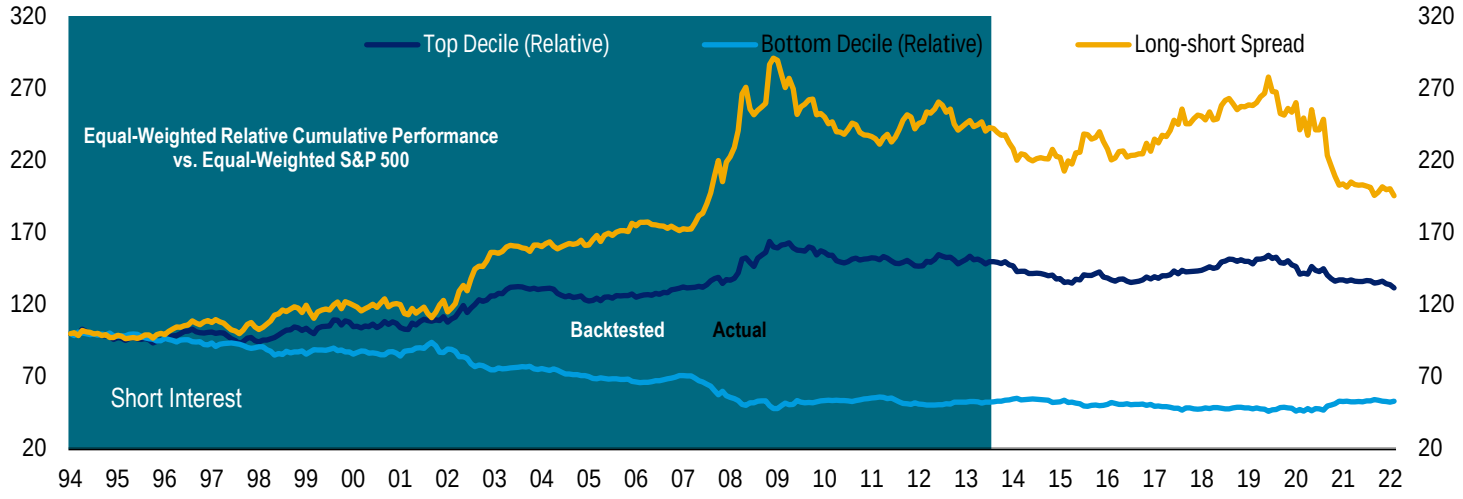


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Short Interest

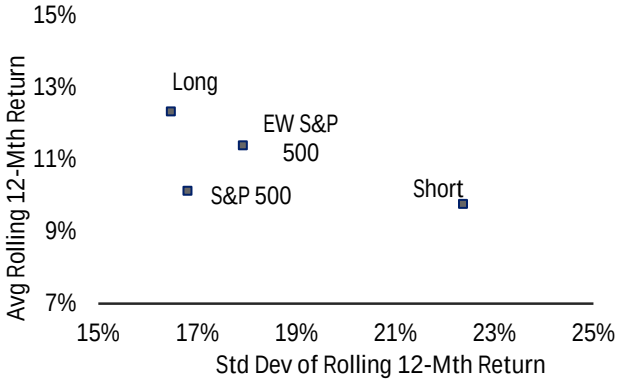
Exhibit 365: Performance of Top Decile, Bottom Decile and Long-Short Spread
The factor has underperformed the index in recent months



Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1994 to month end September 2013. The unshaded portion represents actual performance since October 2013. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance

BofA GLOBAL RESEARCH

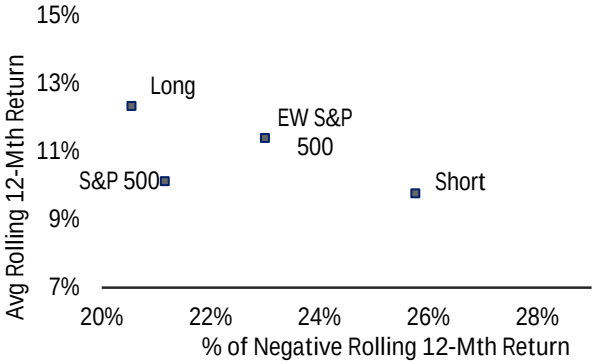
Exhibit 366: Declining Short Interest Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

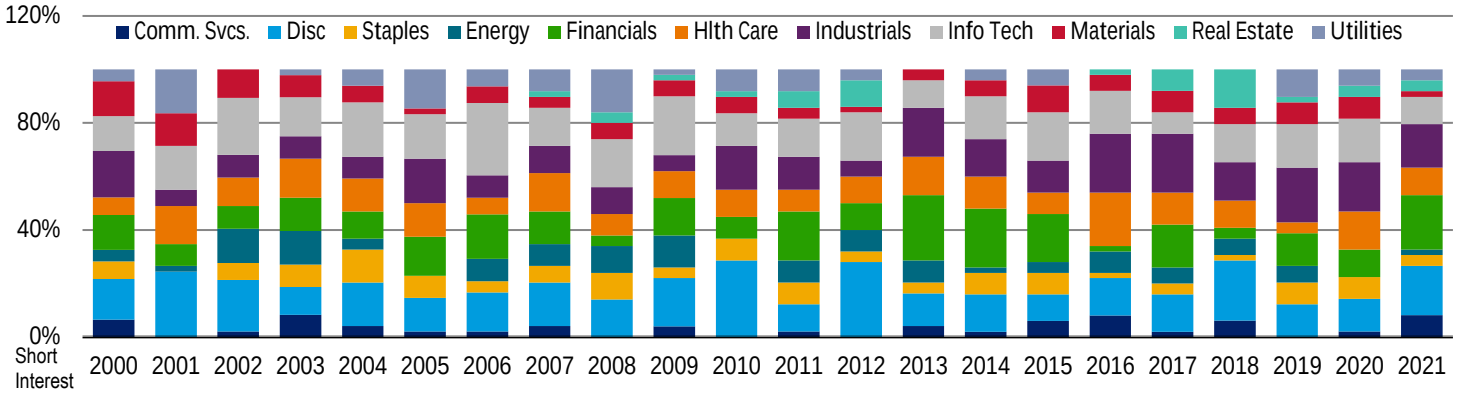
Exhibit 367: Declining Short Interest Downside Risk Reward
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 368: Short Interest Sector Concentration (Top Decile)
The factor has most weight in Financials



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 369: Annual Performance of BofA US Quantitative Strategies: Top Decile of S&P 500 except where noted Boldface font indicates that the strategy outperformed the benchmark. Price returns except where noted
1987 - 2021

Factor	'21	'20	'19	'18	'17	'16	'15	'14	'13	'12	'11	'10	'09	'08	'07	'06	'05	'04	'03	'02	'01	'00	'99	'98	'97	'96	'95	'94	'93	'92	'91	'90	'89	'88	'87	Rwd to Risk
EPS Est. Revisions	47	10	18	-6	19	11	-4	15	40	16	-10	21	32	-49	2	16	22	21	50	-31	-15	14	33	15	25	24	24	-3	25	8	30	-11	na	na	na	0.56
Price/ Book Value	40	-7	27	-17	9	31	-15	2	48	29	-17	30	78	-59	-33	19	7	26	57	-26	22	11	4	9	21	20	30	-1	20	23	51	-35	3	30	5	0.42
Div. Yield (TR)	40	-6	27	-5	11	37	-4	22	24	11	18	19	25	-38	-10	27	5	21	29	-13	18	19	-2	9	33	17	34	-2	19	18	42	-18	24	22	4	0.7
Forward EPS Yield	39	-12	29	-19	17	15	-12	5	57	16	-10	15	96	-51	-14	17	17	31	51	-23	27	-2	2	0	33	31	32	-1	23	20	57	-25	10	37	-2	0.5
Beta	38	7	34	-21	17	20	-17	4	43	22	-21	29	119	-54	-5	10	-6	0	86	-48	-22	-6	60	33	30	13	38	0	16	16	49	-26	9	17	0	0.39
Div. Growth (TR)	37	4	34	-15	23	8	-5	10	36	26	1	27	57	-44	4	11	13	21	34	-13	-9	17	7	15	29	25	42	1	8	12	44	-11	27	22	-2	0.72
Share Repurchase	37	-3	28	-14	13	13	-9	10	54	17	6	15	39	-41	-4	19	9	12	36	-9	16	18	11	8	36	15	37	4	6	9	35	-13	19	19	4	0.67
EPS Torpedo	36	20	25	-13	8	19	-26	3	36	7	2	23	86	-46	-20	14	-1	15	31	-18	4	2	14	-2	34	16	22	-4	17	23	36	-24	7	10	-3	0.39
EV/ EBITDA	35	-14	17	-15	13	16	-17	-2	48	11	2	20	71	-49	3	16	19	27	42	-6	44	4	15	9	34	17	19	6	21	20	29	-9	14	30	9	0.62
Low Price	34	3	22	-13	7	39	-19	9	50	19	-17	31	110	-45	-15	18	-11	18	91	-41	38	1	15	13	28	19	11	2	18	24	57	-33	8	26	3	0.44
5yr ROE Adj	33	33	27	-7	15	10	0	15	34	9	2	19	40	-38	4	10	5	11	39	-25	-6	-1	37	27	35	17	35	19	-4	5	56	13	24	13	-2	0.74
1yr ROE	33	16	30	-7	20	6	-3	15	37	11	5	12	39	-38	12	14	4	14	26	-13	-2	9	10	26	31	24	42	16	-5	1	51	9	23	11	-3	0.78
Price/ Sales	32	9	28	-10	16	15	-10	15	58	19	-1	22	112	-48	-12	17	0	24	67	-29	22	-6	-1	13	38	19	16	0	26	21	51	-36	4	28	4	0.51
P/E-to-Growth	32	-1	21	-15	25	19	-10	4	39	18	-6	25	61	-50	-7	14	16	28	64	-25	33	13	6	1	22	23	41	10	14	20	36	-7	15	21	17	0.63
Size	32	5	20	-13	4	26	-14	10	44	19	-8	30	118	-47	-13	17	-5	21	66	-7	25	-5	6	-2	31	17	22	-2	20	15	50	-32	3	27	1	0.46
Earnings Yield	31	-10	25	-14	15	23	-7	9	40	19	-2	11	66	-43	-14	17	16	26	34	-17	25	21	8	-2	33	15	39	-1	22	19	52	-21	18	33	-2	0.6
ROA	31	26	31	-3	23	5	-4	17	34	13	5	12	41	-43	12	10	5	12	25	-14	1	-6	35	23	32	18	35	17	-8	1	56	15	29	10	1	0.77
Foreign Exposure	30	19	40	-13	25	19	-7	7	36	6	-8	21	70	-42	12	9	7	11	66	-25	-1	0	40	10	12	23	35	7	17	6	38	-13	16	7	10	0.64
Most Active	30	12	35	-10	15	27	-13	12	39	17	-12	19	72	-54	-9	13	-9	12	61	-44	-26	-18	74	59	39	31	41	6	14	19	47	3	37	15	9	0.54
ROC	29	18	35	-4	24	7	-1	15	35	10	6	15	39	-43	11	14	3	14	27	-13	-3	6	15	27	35	21	38	17	2	19	79	-11	18	20	-18	0.75
5wk/30wk Rel. Str.	29	16	17	-5	18	9	4	16	37	13	0	22	20	-40	19	8	11	19	53	-27	-18	15	62	16	25	18	24	1	18	3	36	-11	24	1	na	0.62
Price/200D MA)	29	24	18	-8	19	5	3	16	39	12	-2	13	13	-42	22	12	16	16	50	-29	-17	15	56	21	28	16	29	2	17	2	34	-11	20	-1	na	0.59
High Debt/Equity	29	11	30	-10	9	12	-4	16	34	16	1	20	53	-40	0	15	-2	16	34	-13	14	5	-5	-2	29	13	18	-2	19	19	18	-21	14	10	11	0.56
1yr ROE Adj	28	30	24	-8	23	10	-4	18	33	14	4	16	38	-41	12	15	3	18	28	-22	-4	-5	29	23	38	18	42	19	-7	1	47	13	28	10	-1	0.74
Variability of EPS	28	9	24	-12	19	16	-7	10	37	12	-9	24	56	-46	4	14	14	17	43	-21	-5	21	13	7	19	14	31	-1	22	12	17	-15	17	16	4	0.59
Price Return - 3M	28	23	18	-9	21	8	-2	14	37	21	-2	19	34	-44	18	8	10	12	49	-26	-20	1	49	11	24	16	30	1	19	16	41	-15	17	16	na	0.59
Price Return -9M	28	16	24	-4	18	4	7	14	46	15	-5	20	10	-46	21	10	17	24	54	-26	-19	8	51	38	29	22	28	5	22	2	37	-12	29	8	na	0.65
S&P 500	28	9	27	-9	16	13	-4	12	34	15	-2	20	44	-42	-1	15	6	16	39	-19	0	8	10	11	26	17	29	-2	12	12	32	-15	22	16	2	0.64
Price/ Cash Flow	28	-15	10	-15	12	17	-17	7	37	12	-7	19	68	-42	-1	23	12	23	37	-3	28	-7	22	-7	33	16	21	-1	11	21	42	-23	13	34	8	0.54
Est Dispersion	27	-4	12	-15	-1	36	-29	-5	36	26	-15	23	89	-59	-16	16	3	23	78	-35	-3	3	53	5	10	12	19	-1	22	23	31	-37	na	na	na	0.33
5y ROE	27	10	30	-6	24	7	1	11	38	8	8	16	44	-35	1	12	-3	8	33	-18	-15	1	45	29	32	19	41	17	-5	5	59	2	24	10	-4	0.69
Neglect - Analyst Coverage	26	14	30	-9	15	10	0	14	39	13	-1	20	52	-44	-4	25	0	19	42	-18	16	4	-1	-2	29	20	23	2	14	10	39	-29	na	na	na	0.58
Price/ Free Cash Flow	26	-2	14	-11	17	7	-11	15	46	21	-3	20	64	-42	-8	20	11	26	45	0	33	5	6	12	35	21	24	3	15	18	38	-19	13	26	12	0.68
Short Interest	25	1	26	-5	21	9	-3	6	32	15	-2	14	47	-34	5	18	7	11	48	-9	3	9	11	20	21	25	23	na	na	na	na	na	na	na	na	0.75
Equity Duration	25	24	31	-2	24	3	1	12	32	11	-2	20	48	-45	8	8	13	18	43	-35	-17	-1	33	20	25	16	18	2	16	15	45	-30	14	14	11	0.58
Positive EPS Surprise	25	12	27	-8	15	14	-4	9	44	14	-1	19	35	-36	1	18	1	18	35	-21	-1	14	21	14	34	21	34	2	18	8	26	-5	27	12	10	0.76
Low Debt/Equity	25	30	27	-8	17	13	-4	13	28	13	2	24	52	-41	2	11	5	13	60	-29	-19	-10	48	26	26	18	24	2	0	12	39	-2	18	9	5	0.59
EPS Momentum	24	12	19	-12	18	4	0	13	30	21	-12	20	41	-45	-5	10	15	22	40	-17	-5	-4	24	15	23	17	28	1	15	12	33	-15	17	18	10	0.59
Free Cash Flow/ EV	24	3	17	-10	22	10	-8	20	50	17	-2	16	53	-39	4	18	17	27	49	0	29	26	4	10	36	24	27	6	21	21	36	-2	26	28	3	0.86
10wk/40wk Rel. Str.	23	17	19	-4	21	10	5	13	44	9	-5	20	16	-49	20	9	14	21	51	-24	-15	22	58	27	36	17	29	1	17	-6	32	-20	27	5	na	0.61

Exhibit 369: Annual Performance of BofA US Quantitative Strategies: Top Decile of S&P 500 except where noted Boldface font indicates that the strategy outperformed the benchmark. Price returns except where noted
1987 - 2021

Factor	'21	'20	'19	'18	'17	'16	'15	'14	'13	'12	'11	'10	'09	'08	'07	'06	'05	'04	'03	'02	'01	'00	'99	'98	'97	'96	'95	'94	'93	'92	'91	'90	'89	'88	'87	Rwd to Risk
Institutional Own.	22	13	24	-8	10	16	-5	16	22	11	-2	22	30	-39	-9	13	-1	17	35	-20	-7	2	12	17	23	10	30	1	17	6	24	-24	27	11	1	0.52
ASM	21	9	25	-6	18	14	1	9	46	11	3	17	30	-35	3	19	4	19	24	-12	3	18	8	9	41	16	36	3	11	5	31	-6	33	14	12	0.82
Price Ret. 12M and 1M	20	24	20	-9	12	2	4	8	38	20	-3	14	14	-41	15	9	20	10	31	-22	-17	6	40	16	25	17	28	0	25	16	38	-1	24	6	na	0.61
Proj. 5yr EPS Grth	20	16	32	-12	22	8	4	12	49	20	-8	26	56	-55	18	6	9	6	65	-40	-33	-18	61	24	23	14	29	-1	10	3	32	-7	30	6	15	0.49
30/75wk Rel. Str.	20	18	23	-11	23	1	3	9	38	18	-8	14	11	-53	3	9	26	19	31	-15	-8	-7	64	45	27	26	34	-1	28	12	39	6	18	15	-9	0.61
Price Ret. 12M + 1M Rev.	19	11	25	-4	23	7	4	13	42	13	-7	25	12	-44	-3	10	14	20	39	-1	3	2	24	29	37	24	36	-1	22	10	37	-20	32	12	na	0.73
Price ZRet. 12M	18	18	19	-7	16	0	8	14	45	15	-2	15	10	-45	12	3	23	18	33	-12	-14	-7	60	39	31	23	26	1	30	18	41	-9	30	7	na	0.64
DDM Alpha	17	-8	17	-13	12	12	0	15	38	16	5	12	11	-41	-2	15	6	17	21	-18	22	12	4	10	30	20	36	5	6	1	30	-15	21	15	2	0.57
Price Return 11M	16	20	23	-9	19	0	4	12	42	14	-5	15	13	-48	7	3	19	21	36	-8	-9	-7	61	43	35	29	27	0	27	18	39	-13	38	1	na	0.64

Source: BofA US Equity & Quant Strategy
Reward to Risk is calculated as the average annual return divided by the standard deviation of annual returns

BofA GLOBAL RESEARCH

Performance and Calculation Methodology

Exhibit 370: Quantitative Strategies Performance (Top Decile)
As of 4/30/2022

							2 Yr Perf.		3 Yr Perf.		5 Yr Perf.		
Strategies (based on the S&P 500)		1 M	3 M	6 M	12 M	YTD	Gross	Anlzd	Gross	Anlzd	Gross	Anlzd	Inception Date
Dividend Yield (Total Return)	Corp Cash Deployment	-1.8	4	12.8	18.1	7.3	99.7	41.3	54.8	15.7	88.3	13.5	12/31/1988
Dividend Yield (Price Return)	Corp Cash Deployment	-2	2.9	10.3	12.9	5.9	79.4	33.9	31.1	9.5	47.3	8.1	12/31/1988
Relative Strength (5wk/30wk)	Technical	-2.8	6.4	-3.5	2.8	-3.2	74.2	32	50.4	14.6	87.7	13.4	1/31/2010
Low Price to Sales	Value	-3	-0.4	1.8	3.2	-0.7	85.9	36.4	59.8	16.9	87.4	13.4	12/31/1988
High Free Cash Flow to EV	Value	-3.2	-1.6	-1.4	-1.2	-5.1	52.6	23.5	22.3	6.9	43	7.4	7/31/2010
Low Price to Free Cash Flow	Value	-3.4	-0.8	0.5	3.7	-2.1	55	24.5	20.9	6.5	35.6	6.3	7/30/2003
Relative Strength (10wk/40wk)	Technical	-3.6	1	-10.2	-8.3	-8.6	48.4	21.8	39.4	11.7	77.4	12.1	1/31/2010
Price Returns (3-Month)	Technical	-3.9	3.7	-6.8	0.6	-5.6	77.9	33.4	55	15.7	83.3	12.9	1/31/2010
Share Repurchase	Corp Cash Deployment	-3.9	-4.7	-2.8	4.4	-7.9	64.4	28.2	31.3	9.5	50.2	8.5	12/31/2004
Relative Strength (Price/200-Day Moving Avg)	Technical	-4	3.8	-4	1.3	-5.6	70	30.4	58.1	16.5	85.4	13.1	1/31/2010
Low EV/EBITDA	Value	-4.2	-1.3	3.8	5	-0.1	75.9	32.6	16.1	5.1	29.3	5.3	9/30/2001
High Variability of EPS	Risk	-4.3	-3.6	-2.4	1.3	-6.6	54.6	24.4	37.8	11.3	53.9	9	12/31/1988
ROE (5-Yr Average)	Quality	-4.5	-6.6	-5.6	-0.9	-12	42.8	19.5	34.2	10.3	71.2	11.4	4/30/1997
EPS Momentum	Growth	-4.6	-2	-2.3	5.7	-6	54.9	24.4	35.4	10.6	49.6	8.4	12/31/1988
Forward Earnings Yield	Value	-4.8	-3.5	1.7	7.5	-1.6	85.9	36.3	26.4	8.1	40.7	7.1	12/31/1988
High Dividend Growth (Total Return)	Corp Cash Deployment	-4.8	-2.7	-0.7	11	-5.8	67.5	29.4	49.1	14.2	78.8	12.3	12/31/2004
High Dividend Growth (Price Return)	Corp Cash Deployment	-4.9	-3.3	-1.8	8.7	-6.5	60.5	26.7	39.3	11.7	60	9.9	12/31/2004
ROE (1-Yr Average)	Quality	-5	-5.4	-6.6	3.4	-12.9	51.2	23	47.7	13.9	84.6	13.1	4/30/1997
Small Size	Miscellaneous	-5	-4.7	-3.9	-3.8	-5.8	81.2	34.6	31.1	9.4	43.9	7.6	12/31/1988
Low Price to Cash Flow	Value	-5.1	-2.1	2.6	4.6	-1.4	63.8	28	4.3	1.4	10.1	1.9	12/31/1988
Forecast Negative Earnings Surprise	Growth (Negative)	-5.1	-4.7	-3.9	0.7	-7.3	53.6	23.9	28	8.6	54.9	9.1	12/31/1988
Low EPS Torpedo	Growth (Negative)	-5.3	-4.6	-5.1	-1.7	-7.4	89.8	37.8	63.1	17.7	75.4	11.9	12/31/1988
Low PE to GROWTH	GARP	-5.8	-5	-3	5.3	-5.9	64.3	28.2	25.1	7.8	48.9	8.3	12/30/1988
High EPS Estimate Dispersion	Risk	-5.9	10.7	6.2	7	8.9	95.5	39.8	23.2	7.2	33.1	5.9	12/31/1988
DDM Valuation	Value	-6	-2.8	-2.6	1.2	-5.9	33	15.3	3.6	1.2	10	1.9	12/31/1988
Earnings Yield	Value	-6	-6.4	-5.3	-0.7	-7.7	69	30	14.9	4.7	30.6	5.5	12/31/1988
Low Price	Risk	-6	-1.5	3.1	7.2	2.9	103.8	42.8	44	12.9	59.1	9.7	12/31/1988
Analyst Coverage Neglect	Miscellaneous	-6.2	-3.1	-6.7	-0.4	-9.7	55.2	24.6	42	12.4	65.3	10.6	6/30/1989
Upward Estimate Revisions	Growth	-6.2	-1.6	-1.7	13.1	-2	95.9	40	59.5	16.8	105.5	15.5	12/31/1988
Price Returns (9-Month)	Technical	-6.3	3.3	-8.5	-1.8	-7.5	53.7	24	49.9	14.5	84.9	13.1	1/31/2010
S&P 500 Equal Weighted (Total Return)	Benchmark	-6.4	-4.8	-5.6	1.1	-8.9	59.3	26.2	44.5	13	78.2	12.3	
Price Returns (12-Month plus 1-Month)	Technical	-6.4	2.3	-6.4	2	-7.3	59.6	26.3	44.4	13	63.2	10.3	1/31/2010
S&P 500 Equal Weighted (Price Return)	Benchmark	-6.4	-5.3	-6.4	-0.6	-9.4	53.5	23.9	36	10.8	61.2	10	
Forecast Positive Earnings Surprise	Growth	-6.5	-5.3	-6.1	0.6	-7.9	56	24.9	38.5	11.5	71.2	11.4	12/31/1988
Institutional Neglect	Miscellaneous	-6.7	-4.4	-3.3	-0.8	-5.2	53.7	24	40.3	12	62.9	10.3	12/31/1988
Price Returns (12-Month)	Technical	-6.8	2.3	-6.2	3.9	-4	50.8	22.8	38.9	11.6	68	10.9	1/31/2010
High Beta	Risk	-6.9	-2.3	-4.2	5.1	-1.3	96.7	40.2	54	15.5	71.6	11.4	12/31/1988
Low Price to Book Value	Value	-7	-6.7	-2	3.5	-3.1	88	37.1	34.8	10.5	44.9	7.7	12/31/1988
Most Active	Technical	-7.3	-5.4	-4.7	3	-5.5	74.5	32.1	53.8	15.4	85.6	13.2	8/31/2003
High Foreign Exposure	Miscellaneous	-7.6	-8.3	-5.9	-2.2	-13.3	64.8	28.4	51.2	14.8	88.4	13.5	12/31/1988
High Projected 5-Yr Growth	Growth	-7.6	-2.4	-5.4	2.8	-6.2	55.8	24.8	37.7	11.2	71.6	11.4	12/31/1988
Short Interest	Miscellaneous	-7.9	-8.4	-9.7	-4	-11.9	43.2	19.7	20.7	6.5	53.6	9	10/31/2013
Price Returns (11-Month since 1 year ago)	Technical	-8.1	-4	-12.3	-3.4	-9.3	37.6	17.3	32.4	9.8	63	10.3	1/31/2010
S&P 500 Index (Price Return)	Benchmark	-8.8	-8.5	-10.3	-1.2	-13.3	41.9	19.1	40.3	11.9	73.3	11.6	
Price Returns (12-Month plus 1-Month Reversal)	Technical	-8.8	-7.5	-12.4	-3.9	-11.2	30.4	14.2	25.4	7.8	66.9	10.8	1/31/2010
ROC	Quality	-8.9	-10.3	-13.8	-4.1	-19.2	33.2	15.4	36.5	10.9	84.5	13	4/30/1997
ROA	Quality	-9.1	-11	-14.8	-4.8	-20.8	38.6	17.7	41.9	12.4	90.9	13.8	4/30/1997
Relative Strength (30wk/75wk)	Technical	-9.5	-4.3	-10.3	-2	-9.9	39.2	18	36.8	11	61.9	10.1	8/31/1995
High Duration	Growth	-10.6	-12.6	-18.9	-6.6	-20.6	39	17.9	35.9	10.8	78.6	12.3	12/31/1988
ROE (1-Yr Avg. Adj. by Debt)	Quality	-10.9	-10.8	-19.2	-7.9	-22	35.5	16.4	35.3	10.6	70.7	11.3	4/30/1997
ROE (5-Yr Avg. Adj. by Debt)	Quality	-12	-12.1	-18.6	-6.4	-22.4	44.7	20.3	46.3	13.5	75.9	12	4/30/1997

Source: BofA US Equity and Quant Strategy, FactSet

The performance does not reflect transaction costs or tax withholdings or any applicable advisory fees. Had these costs been reflected, the performance would have been lower. Performance is calculated on the basis of price return unless noted. Total return performance calculations assume that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date, and are not reinvested. Please see Performance Calculation methodology on page 60 for a full explanation.

[1]For screens that have less than 5 years history, the performance is since inception.

Past performance should not and cannot be viewed as an indicator of future performance. A complete performance record is available upon request

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Exhibit 371: Quantitative Strategies Performance (Bottom Decile)
As of 4/30/2022

Strategies (Universe based on the S&P 500)		1 M	3 M	6 M	12 M	YTD	2 Yr Perf. Gross	2 Yr Perf. Anlzd	3 Yr Perf. Gross	3 Yr Perf. Anlzd	5 Yr Perf. Gross	5 Yr Perf. Anlzd	Inception Date
High EV/ EBITDA	Value	-13.7	-12.5	-24.9	-10.3	-23.4	38.8	17.8	50.7	14.6	99.9	14.9	10/30/2004
High Price/ Free Cash Flow	Value	-12.9	-9.3	-19.9	-10.1	-18.8	37.3	17.2	30.4	9.2	73.9	11.7	8/1/2003
High Price/ Cash Flow	Value	-12.3	-10.9	-25.5	-13.8	-23.2	30.9	14.4	38.6	11.5	94.6	14.2	8/1/2003
Relative Strength (10wk/40wk)	Technical	-11.9	-13.4	-11.3	-7.3	-14	45.9	20.8	11.7	3.8	24.1	4.4	2/27/1987
High Price/ Sales	Value	-11.6	-9	-19.5	-5.9	-20.1	29	13.6	35.6	10.7	78.5	12.3	3/31/2001
Relative Strength (5wk/30wk)	Technical	-10.7	-12	-10.5	-3	-13.4	45.6	20.6	21.4	6.7	26.9	4.9	2/27/1987
Low Dividend Yield	Cash Deployment	-10.6	-10.6	-19.3	-13.2	-19.1	48.2	21.7	45.2	13.2	88.1	13.5	36951
High Price	Risk	-10.5	-11	-21.6	-8.3	-22.2	32.7	15.2	39.4	11.7	69.9	11.2	7/30/1986
Low Forward Earnings Yield	Value	-10.2	-6.9	-18.1	-9.9	-16.9	41.1	18.8	29.2	8.9	55.4	9.2	5/31/2005
Relative Strength (Price/200-Day Moving Avg)	Technical	-10.2	-11.2	-11	-4.5	-11.6	49.8	22.4	10.6	3.4	16.3	3.1	2/27/1987
Dividend Discount Model Alpha	Value	-9.5	-10.8	-13.6	-3.7	-15	72.5	31.4	43.4	12.8	68.4	11	3/30/2001
High Analyst Coverage	Miscellaneous	-9.5	-10.3	-10.8	-3.5	-12.6	49.3	22.2	38	11.3	67.9	10.9	3/1/2001
Price Returns (9-Month)	Technical	-9.4	-9.4	-5.7	-0.1	-8.9	73.2	31.6	10	3.2	25.2	4.6	2/27/1987
Low Share Repurchase	Cash Deployment	-9.3	-4.8	-7.2	4.1	-6.6	52	23.3	33.3	10	60.4	9.9	3/31/2005
Low Earnings Yield	Value	-9.1	-5.4	-9.8	-9.7	-6	72.4	31.3	36.8	11	54.6	9.1	3/30/2001
Large Size	Miscellaneous	-9	-10.6	-12.3	-2.3	-15	31.5	14.7	30.4	9.3	61.8	10.1	3/1/2001
Most Active	Technical	-8.9	-9.6	-16.7	-8.9	-19.7	38.6	17.7	36.6	10.9	60.4	9.9	8/31/2003
S&P 500 Index (Price Return)	Benchmark	-8.8	-8.5	-10.3	-1.2	-13.3	41.9	19.1	40.3	11.9	73.3	11.6	
Price Returns (12-Month plus 1-Month)	Technical	-8.7	-6.3	-6.8	0.1	-9.5	89.1	37.5	52.6	15.1	76.8	12.1	2/27/1987
High Institutional Ownership	Miscellaneous	-8.6	-8.8	-7.8	-3.3	-8.1	57.6	25.5	23.2	7.2	37	6.5	3/1/2001
Price Returns (3-Month)	Technical	-8.5	-8.5	-6.7	3.6	-10.1	65	28.5	43.8	12.9	53.2	8.9	2/27/1987
Price Returns (11-Month since 1 year ago)	Technical	-8.5	-10.9	-6.1	-3.7	-11.2	86.3	36.5	32	9.7	46.8	8	2/27/1987
Low ROA	Quality	-7.6	-5.5	-4.9	-5.9	-2.9	78.4	33.6	41.1	12.2	59.9	9.8	3/1/2001
Price Returns (12-Month)	Technical	-7.4	-8.2	-4.6	-2.1	-9.3	94.4	39.4	35.4	10.6	57.4	9.5	2/27/1987
High Price/ Book Value	Value	-7.4	-7.2	-15.1	-4.1	-17.4	38.4	17.6	41.6	12.3	96	14.4	3/30/2001
Low Estimate Revisions	Growth	-6.9	-4.6	-7.8	-8.9	-8.8	63.9	28	26.2	8.1	33.5	5.9	3/1/2001
Low ROE (5-Yr Average)	Quality	-6.8	-0.5	-0.9	11.1	-1.3	90.6	38.1	52.3	15	62.1	10.1	3/1/2001
Low ROC	Quality	-6.7	-2.6	-3.3	-4.1	-1.6	79	33.8	36	10.8	45.7	7.8	3/1/2001
Relative Strength (30wk/75wk)	Technical	-6.6	-6.1	1.4	2.6	-4.7	96.5	40.2	26.7	8.2	46.3	7.9	3/1/2001
S&P 500 Equal Weighted (Price Return)	Benchmark	-6.4	-5.3	-6.4	-0.6	-9.4	53.5	23.9	36	10.8	61.2	10	
S&P 500 Equal Weighted (Total Return)	Benchmark	-6.4	-4.8	-5.6	1.1	-8.9	59.3	26.2	44.5	13	78.2	12.3	
Low ROE (1-Yr Average)	Quality	-6.2	-4.6	-7.1	-7.8	-6.4	70.2	30.4	34	10.2	48.2	8.2	3/31/1986
Low EPS Momentum	Growth	-6.1	-4.2	-6.5	-9.5	-7	68	29.6	30.8	9.4	44.7	7.7	3/1/2001
Low Variability of Earnings	Risk	-5.9	-6.8	-8.1	-1.8	-13.8	39	17.9	27.4	8.4	55.9	9.3	3/1/2001
Price Returns (12-m plus 1-m Reversal)	Technical	-5.6	-10.1	-5.7	-2.8	-10.2	63.6	27.9	19.1	6	15.7	3	2/27/1987
Rising Short Interest	Miscellaneous	-5.4	-5.3	-6.9	-0.9	-10.7	71.6	31	50.7	14.6	71.8	11.4	4/30/1994
Low Foreign Exposure	Miscellaneous	-5.4	-2.5	-2.7	5	-5.4	53.6	23.9	32.6	9.9	50.5	8.5	1/31/1995
Earnings Torpedo	Growth	-5.3	-4.6	-5.1	-1.7	-7.4	89.7	37.7	63.1	17.7	75.4	11.9	
Low Dividend Growth	Cash Deployment	-5.2	-1.7	-0.4	-2	-1.1	89.4	37.6	44.9	13.2	54.5	9.1	9/30/2004
Forecast Negative Earnings Surprise	Growth	-5.1	-4.7	-3.9	0.7	-7.3	53.6	23.9	28	8.6	54.9	9.1	3/31/1986
Low Projected 5-Yr Growth	Growth	-5.1	-2.9	0.6	-0.7	-3.2	67.2	29.3	43.7	12.9	52.3	8.8	3/1/2001
Low ROE (5-Yr Avg. Adj. by Debt)	Quality	-5	-5.6	-6.3	-4.5	-10.9	37.8	17.4	28.4	8.7	55	9.2	3/1/2001
Low Free Cash Flow/ EV	Value	-5	-0.2	0.1	-1.2	-1.1	87.6	37	53.3	15.3	66.6	10.7	3/1/2001
High P/E-to-Growth	GARP	-4.5	-1.5	-3	-0.3	-5.4	39	17.9	22.7	7.1	33	5.9	3/30/2001
Low ROE (1-Yr Avg. Adj. by Debt)	Quality	-4.4	-5.2	-6.4	-2	-11.4	42.7	19.5	31.1	9.4	58.8	9.7	3/1/2001
Low Duration	Growth	-4.3	-1.6	1.9	5.2	-1.7	80.8	34.5	26.3	8.1	51.6	8.7	3/1/2001
Low EPS Estimate Dispersion	Risk	-3.8	-0.9	0.5	4	-5.7	33.9	15.7	27.9	8.5	48.1	8.2	2/28/1989
Low Beta	Risk	-2.6	2.2	6.8	9.6	-0.5	25.1	11.9	23.6	7.3	37.2	6.5	7/30/1986

Source: BofA US Equity and Quant Strategy, FactSet

The performance does not reflect transaction costs or tax withholdings or any applicable advisory fees. Had these costs been reflected, the performance would have been lower. Performance is calculated on the basis of price return unless noted. Total return performance calculations assume that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date, and are not reinvested. Please see Performance Calculation methodology on page 60 for a full explanation.

[1]For screens that have less than 5 years history, the performance is since inception.

Past performance should not and cannot be viewed as an indicator of future performance. A complete performance record is available upon request.

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The table below includes factors ranked by the most expensive and crowded long factors relative to least expensive and cheapest short factors. Long-short factors toward the top of the table could have more downside risk on valuations/positioning, all else being equal.

Exhibit 372: Factor valuations and crowdedness as of 4/30/2022
Long-short factors listed from most to least expensive & crowded using a multi-indicator ranking

	Long Factors (S&P 500 top decile)				Short Factors (S&P 500 bottom decile)				
Factor	Price to Book (Relative) Relative multiple vs. history (>1 = expensive vs. history)	Forward P/E (Relative) Relative multiple vs. history (>1 = expensive vs. history)	Crowdedness Long Only Funds' Relative Wt.	Long Rank Rank for Long Factor (1=most expensive / most crowded)	Price to Book (Relative) Relative multiple vs. history (>1 = expensive vs. history)	Forward P/E (Relative) Relative multiple vs. history (>1 = expensive vs. history)	Crowdedness Long Only Funds' Relative Wt.	Short Rank Rank for Short Factor (1=least expensive / least crowded)	Rank for long-short factor (1=most downside risk)
High (Low) Duration	1.22	1.04	0.92	8	0.98	0.66	0.81	2	1
High (Low) Dividend Growth	1.13	0.79	1.38	3	0.83	0.91	0.96	4	2
High (No) Foreign Exposure	1.19	0.92	1.08	2	0.93	1.02	0.91	8	3
Forecast Positive (Negative) EPS Surprise	0.88	0.99	1.26	5	0.83	0.91	1.01	7	4
Low EPS Torpedo	na	na	0.82	26	0.67	0.57	0.82	1	5
High (Low) Price Ret.s (12-m + 1-m Reversal)	1.6	1.08	0.89	5	1.43	0.9	0.91	12	6
Low (High) Institutional Ownership	1.22	0.98	0.72	15	0.51	0.74	1.07	3	7
Low (High) PE to GROWTH	0.97	0.78	1	12	1.04	1.12	0.87	10	8
High (Low) ROE (5-Yr Avg. Adj. by Debt)	1.05	1.16	1.23	1	2.23	1.17	0.78	28	9
High (Low) Beta	1.05	0.6	1.03	18	0.93	1.14	0.68	4	10
High (Low) ROA	1.09	0.87	1.06	7	1.35	1.19	0.85	23	11
High (Low) ROE (1-Yr Avg. Adj. by Debt)	0.97	0.98	1.18	4	1.97	1.15	0.78	25	12
High (Low) Projected 5-Yr Growth	0.78	0.73	0.95	21	0.78	0.63	1.08	4	13
High (Low) ROC	1.02	0.86	0.96	11	0.98	1.8	0.86	19	14
High (Low) ROE (5-Yr Average)	1.81	1.06	0.85	9	1.49	0.95	1.05	24	15
High (Low) Variability of EPS	0.81	0.85	1	13	1.05	1.16	0.9	13	16
High (Low) ROE (1-Yr Average)	1.39	1.09	0.8	10	na	1.18	0.95	26	17
High (Low) EPS Estimate Dispersion	1.1	0.36	1.01	19	0.79	1.16	0.97	11	18
Falling (Rising) Short Interest	0.91	0.91	0.83	16	1.38	1.01	0.88	16	19
High (Low) Price Returns (12-Month)	0.76	0.69	1.03	20	1.11	0.82	1.23	17	20
High (Low) Price Ret. (11-m since 1 y ago)	0.72	0.71	0.97	26	1.22	0.86	1.13	17	21
High (Low) Relative Strength (30wk/75wk)	0.68	0.77	0.82	32	1	0.94	0.99	9	22
High (Low) Price Returns (3-Month)	0.75	0.77	0.87	24	1.14	0.89	1.19	19	23
Low (High) Analyst Coverage	1.42	1.07	0.44	14	1.51	1.02	1.07	31	24
High (Low) Share Repurchase	0.55	0.7	1.03	29	0.82	1.14	1.07	13	25
High (Low) EPS Momentum	0.77	0.7	0.95	23	1.11	1.07	1.09	22	26
Low (High) DDM Valuation	0.69	0.79	0.77	31	1.27	1.09	0.87	15	27
High (Low) Price Returns (12-m plus 1-m)	0.88	0.87	0.86	17	1.37	1.08	1.24	35	28
High (Low) Free Cash Flow to EV	0.78	0.69	0.7	41	1.23	1.17	0.84	19	29
Small (Large) Size	0.92	0.75	0.55	28	1.29	1.2	0.99	30	30
High (Low) Forward Earnings Yield	0.72	0.76	0.89	24	1.22	3.32	1.05	35	31
High (Low) Relative Strength (5wk/30wk)	0.6	0.67	0.92	38	1.19	0.92	1.31	27	32
Low (High) Price to Book Value	0.81	0.67	0.7	42	1.27	1.5	0.95	28	33
Most (Least) Active	0.71	0.64	0.91	34	1.7	1.36	0.83	32	34
Low (High) Price to Sales	0.71	0.72	0.88	30	1.15	2.38	1.18	40	35
High (Low) Rel. Strength (Price/200D MA)	0.66	0.68	0.87	38	1.4	1.02	1.21	32	36
High (Low) Dividend Yield	0.91	0.68	0.54	36	1.17	1.23	1.15	34	37
High (Low) Price Returns (9-Month)	0.56	0.67	1.01	33	1.56	0.98	1.23	37	38
Low (High) EV/EBITDA	0.81	0.67	1.02	22	1.6	2.04	1.16	43	39
High (Low) Relative Strength (10wk/40wk)	0.63	0.72	0.73	44	1.49	0.99	1.36	38	40
High (Low) Earnings Yield	0.61	0.75	0.72	43	1.36	2.45	1.02	39	41
Low (High) Price to Free Cash Flow	0.68	0.73	0.81	36	1.5	1.76	1.13	42	42
High (Low) Upward Estimate Revisions	0.74	0.62	0.82	44	1.5	1.15	1.24	41	43
Low (High) Price to Cash Flow	0.71	0.69	0.85	34	1.57	1.9	1.23	45	44
Low (High) Price	0.88	0.64	0.74	38	1.54	1.35	1.32	44	45

Source: BofA US Equity and Quant Strategy, FactSet. Based on data since February 2001.For the following short factors valuation data are available as indicated: Fwd EPS Yield since 4/05; Price/ Cash Flow and Price / Free Cash Flo since 7/03; EV/EBITDA since 9/04; FCF/EV since 9/12; Dividend Growth since 8/04; Share Repurchase since 2/05; Most Active since 7/03; Analyst Coverage since 11/05; Foreign Exposure since 7/03. Relative multiple vs. history is based on relative valuation the factor versus the S&P 500 and calculated as the latest value dividend by historic average. Long Only Funds' Relative Wt. (Avg.) is calculated as the average of individual factor constituents' relative weight in funds vs. weight in the index. Long Rank is calculated as the average of ranks of Price / Book, Fwd P/E and Long Only Funds' relative ownership with rank =1 indicating most expensive and most crowded long factor. Short Rank is based on the average of ranks of Price / Book, Fwd P/E and Long Only Funds' relative ownership with rank =1 indicating least expensive and least crowded short factor. Long/Short Rank is based on the average of Long Rank and Short Rank with rank = 1 indicating long / short factor with most downside risk. Fund holdings data as of 12/31/2021

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Exhibit 373: Advances and Declines (Top Decile)
As of 4/30/2022

	1M		3M		6M		12M		YTD		2Yr		3Yr		5Y	
Quantitative Strategies	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.
Dividend Yield (Price Return)	20	30	85	65	178	121	330	269	118	81	720	477	1013	783	1671	1325
Relative Strength (5wk/30wk)	14	36	82	68	138	162	311	289	86	114	722	478	1011	785	1716	1276
Low Price to Sales	19	31	77	73	160	140	304	296	102	98	685	515	982	818	1646	1353
High Free Cash Flow to EV	13	28	54	69	121	125	237	255	69	95	547	430	784	679	1301	1131
Low Price to Free Cash Flow	18	32	70	80	149	151	294	306	91	109	662	537	950	849	1589	1409
Relative Strength (10wk/40wk)	15	35	71	79	127	173	282	318	77	123	679	521	978	818	1688	1306
Price Returns (3-Month)	13	37	76	74	129	171	299	301	79	121	714	486	1014	783	1708	1286
Share Repurchase	14	36	66	84	150	150	317	283	84	116	721	477	1018	779	1677	1319
Relative Strength (Price/200D MA)	12	38	77	73	139	161	310	290	81	119	713	487	1020	778	1713	1282
Low EV/EBITDA	15	35	64	86	155	145	298	302	91	109	680	519	961	838	1595	1404
High Variability of EPS	18	42	85	99	181	184	376	364	108	138	883	684	1317	1101	2191	1808
ROE (5-Yr Average)	16	34	62	88	142	158	300	300	73	127	676	523	995	804	1717	1281
EPS Momentum	15	35	69	81	147	153	311	289	84	116	685	514	981	818	1630	1368
Forward Earnings Yield	13	37	60	90	153	147	303	297	92	108	690	508	986	812	1626	1371
High Dividend Growth (Price Return)	11	39	61	89	147	153	326	274	80	120	707	493	1013	787	1671	1328
ROE (1-Yr Average)	13	37	57	93	133	167	306	294	67	133	693	507	1019	781	1736	1263
Small Size	13	37	61	89	146	154	294	306	84	116	703	495	978	819	1620	1373
Low Price to Cash Flow	14	36	67	83	153	147	291	309	91	109	648	551	923	876	1559	1439
Forecast Negative Earnings Surprise	23	54	89	124	200	226	426	434	119	167	983	779	1437	1194	2441	1975
Low EPS Torpedo	12	38	65	85	146	154	297	303	86	114	674	525	974	824	1609	1388
Low PE to GROWTH	10	40	61	89	145	155	310	290	87	113	717	482	994	805	1644	1353
High EPS Estimate Dispersion	9	29	53	43	85	81	163	159	61	55	421	354	579	538	1032	927
DDM Valuation	13	29	56	60	128	130	303	289	71	88	705	590	1096	952	1774	1559
Earnings Yield	12	38	61	89	147	153	315	285	89	111	718	481	1010	789	1654	1344
Low Price	12	38	68	82	147	152	294	305	95	104	688	507	973	821	1605	1387
Analyst Coverage Neglect	7	37	58	71	120	140	278	272	67	102	705	471	1005	738	1623	1185
Upward Estimate Revisions	9	41	67	83	134	166	315	285	85	115	744	455	1044	753	1731	1265
Price Returns (9-Month)	8	42	79	71	137	163	299	301	84	116	684	516	998	800	1676	1320
Price Returns (12-Month plus 1-Month)	8	42	80	70	137	163	311	289	84	116	714	485	1015	783	1692	1303
Forecast Positive Earnings Surprise	18	62	92	128	204	239	416	405	116	178	977	701	1426	1081	2419	1803
Institutional Neglect	16	34	70	80	149	150	308	291	92	107	683	517	992	807	1680	1339
Price Returns (12-Month)	7	43	72	78	130	170	305	294	81	119	673	526	970	828	1642	1355
High Beta	9	42	71	82	148	164	319	295	97	109	719	513	1014	835	1682	1412
Low Price to Book Value	7	43	63	87	162	142	322	285	104	97	738	477	1034	788	1685	1352
Most Active	10	40	64	86	139	161	301	299	85	115	648	551	963	835	1606	1391
High Foreign Exposure	10	40	45	105	129	170	289	310	58	141	697	500	1010	785	1680	1314
High Projected 5-Yr Growth	12	38	71	79	143	157	301	299	87	113	677	526	979	823	1661	1353
Short Interest	7	41	51	94	122	170	276	311	68	126	659	516	968	779	1674	1266
Price Returns (11-Month since 1 year ago)	4	46	59	91	118	182	284	315	72	128	651	548	952	846	1624	1374
Price Returns (12-m plus 1-m Reversal)	3	47	54	96	119	181	281	318	70	130	653	546	964	834	1678	1319
ROC	5	45	45	105	118	182	291	309	51	149	679	521	1015	785	1746	1253
ROA	6	44	45	105	119	181	300	300	49	151	695	505	1027	773	1746	1254
Relative Strength (30wk/75wk)	4	46	59	91	125	175	292	308	73	127	655	546	975	827	1642	1362
High Duration	5	45	42	108	110	190	290	310	51	149	672	528	999	801	1711	1288
ROE (1-Yr Avg. Adj. by Debt)	4	46	56	94	122	178	309	291	61	139	699	501	1011	789	1687	1312
ROE (5-Yr Avg. Adj. by Debt)	2	48	53	97	120	180	302	298	59	141	700	500	1017	783	1690	1310

Source: BofA US Equity and Quant Strategy, FactSet

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Exhibit 374: Advances and Declines (Bottom Decile)
As of 4/30/2022

	1M		3M		6M		12M		YTD		2Yr		3Yr		5Yr	
Quantitative Strategies	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.	Adv.	Dec.
High EV/ EBITDA	5	45	56	94	111	189	295	305	62	138	681	519	1012	787	1713	1286
High Price/ Free Cash Flow	5	45	69	81	124	176	286	314	75	125	678	522	989	810	1712	1287
High Price/ Cash Flow	7	43	59	91	107	193	279	321	60	140	664	536	985	814	1720	1278
Relative Strength (10wk/40wk)	4	46	52	98	138	162	289	311	77	123	640	559	935	864	1584	1413
High Price/ Sales	4	46	57	93	118	182	305	295	62	138	672	528	1004	795	1733	1265
Relative Strength (5wk/30wk)	6	44	49	101	135	165	302	298	73	127	648	550	959	839	1591	1405
Low Dividend Yield	14	96	125	206	264	398	647	716	142	300	1574	1235	2110	1693	3334	2579
High Price	2	48	57	93	113	187	301	299	58	142	690	510	1031	768	1716	1282
Low Forward Earnings Yield	5	45	65	85	125	175	295	305	72	128	638	561	948	850	1639	1355
Relative Strength (Price/200-Day Moving Avg)	7	43	50	100	133	167	290	310	74	126	636	562	936	862	1556	1440
Dividend Discount Model Alpha	7	60	67	130	148	232	349	379	86	176	789	540	1131	908	1923	1536
High Analyst Coverage	8	44	58	98	138	186	313	344	76	136	735	587	1079	888	1826	1449
Price Returns (9-Month)	10	40	57	93	149	151	294	306	85	115	656	542	938	860	1568	1428
Low Share Repurchase	4	46	63	87	136	164	313	287	83	117	664	533	989	807	1661	1334
Low Earnings Yield	8	41	67	82	138	161	285	314	90	109	663	534	958	837	1603	1388
Large Size	12	38	56	94	127	173	308	292	69	131	675	525	1008	792	1707	1293
Least Active	5	45	58	92	127	173	302	298	61	139	696	504	1026	774	1709	1290
Price Returns (12-Month plus 1-Month)	11	39	59	91	137	163	292	308	79	121	674	526	986	814	1623	1377
High Institutional Ownership	4	45	49	100	130	169	294	305	80	119	703	496	1005	794	1677	1378
Price Returns (3-Month)	9	41	58	92	149	151	318	282	85	115	681	518	997	802	1625	1371
Price Returns (11-Month since 1 year ago)	12	38	54	96	148	152	288	312	83	117	668	530	957	841	1588	1409
Low ROA	8	41	64	85	147	152	292	307	95	104	670	528	958	839	1618	1375
Price Returns (12-Month)	13	37	55	95	145	155	285	315	82	118	666	532	953	844	1588	1408
High Price/ Book Value	10	40	53	97	119	181	296	304	60	140	670	530	996	804	1736	1266
Low EPS Estimate Revisions	10	39	67	82	144	155	284	315	87	112	664	534	953	845	1588	1408
Low 5y ROE	11	38	69	80	148	151	315	284	92	107	687	512	985	812	1625	1369
Low ROC	10	39	73	76	153	146	297	302	99	100	667	530	951	845	1588	1404
Relative Strength - 30wk/75wk MA	13	36	63	86	159	140	296	303	93	106	685	512	968	830	1613	1385
Low 1yr ROE	13	36	65	84	139	160	285	314	85	114	660	538	954	843	1610	1385
Low Earning Momentum	15	35	71	79	143	157	276	324	88	112	648	551	938	861	1605	1391
Low Variability of Earnings	10	44	62	103	140	191	346	337	70	151	770	570	1071	840	1900	1290
Price Returns (12-Month plus 1-Month Reversal)	13	37	57	93	150	150	306	294	83	117	708	489	990	807	1607	1390
Short Interest	14	36	62	87	132	166	296	302	75	124	683	514	997	790	1651	1328
Low Foreign Exposure	22	93	156	199	340	381	747	699	207	271	1675	1217	2477	1894	4078	3138
Low Dividend Growth	13	37	73	77	150	150	287	313	96	104	679	520	963	835	1628	1369
Negative EPS Surprise	23	54	89	124	200	226	426	434	119	167	983	779	1437	1194	2441	1975
Low Proj. 5yr EPS Growth	13	37	70	81	158	143	294	307	96	105	665	536	962	838	1606	1391
Low 5yr ROE Adj	15	35	62	88	135	165	289	311	74	126	670	529	987	812	1689	1310
FCF / EV	7	33	55	65	120	120	240	240	76	84	525	430	774	658	1316	1063
High P/E-to-Growth	13	37	75	75	151	149	299	301	92	108	672	526	983	815	1638	1358
Low 1yr ROE Adj	17	33	62	88	135	165	292	308	72	128	674	525	989	810	1683	1316
Low Equity Duration	16	34	73	77	157	143	316	284	96	104	722	478	1012	787	1665	1333
Low Estimate Dispersion	24	63	120	138	261	263	534	492	149	194	1131	854	1693	1286	2824	2087
Low Beta	16	35	77	75	164	141	321	294	100	105	665	573	1009	840	1720	1342

Source: BofA US Equity and Quant Strategy, FactSet

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Russell 1000 factor efficacy

Exhibit 375: Russell 1000 factors: Sharpe Ratio
As of 4/30/2022
Boldface font indicates quintiles with the highest Sharpe ratio for each factor.
Shaded cells indicate the quintile with the lowest Sharpe ratio for each factor.
Factor performance 1986 to April 2020 (Analyst Coverage since 1994; Institutional Ownership since 1999, Short Interest since 1993).

Factor	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Earnings Yield	0.56	0.56	0.51	0.46	0.23
Forward Earnings Yield	0.31	0.45	0.45	0.43	0.71
Dividend Yield	0.53	0.62	0.54	0.47	0.46
Price/ Book Value	0.50	0.51	0.41	0.42	0.44
Price/ Cash Flow	0.55	0.52	0.50	0.41	0.30
Price/ Free Cash Flow	0.61	0.60	0.46	0.40	0.27
Price/ Sales	0.53	0.55	0.52	0.41	0.27
EV/ EBITDA	0.66	0.58	0.49	0.40	0.22
Free Cash Flow/ EV	0.69	0.59	0.45	0.37	0.27
Relative Strength - 30wk/75wk MA	0.57	0.56	0.53	0.45	0.24
Relative Strength - 5wk/30wk MA	0.59	0.44	0.57	0.50	0.25
Relative Strength - 10wk/40wk MA	0.56	0.47	0.58	0.51	0.24
Price to Moving Average (200 day)	0.53	0.49	0.57	0.49	0.27
Price Return - 12-mth Perf.	0.59	0.56	0.52	0.44	0.26
Price Return - 9-mth Perf.	0.54	0.56	0.53	0.46	0.26
Price Return - 3-mth Perf.	0.52	0.51	0.51	0.49	0.32
Price Return - 11-mth Perf.	0.60	0.57	0.52	0.44	0.24
Price Return - 12-mth and 1-mth Performance	0.49	0.48	0.50	0.51	0.35
Price Return - 12-mth and 1-mth Reversal	0.57	0.56	0.49	0.44	0.25
Most Active	0.59	0.44	0.49	0.43	0.37
Low Price	0.39	0.47	0.47	0.50	0.51
Earning Momentum	0.45	0.55	0.56	0.54	0.31
Proj. 5yr EPS Growth	0.29	0.50	0.53	0.54	0.54
Earnings Torpedo	0.39	0.58	0.60	0.51	0.33
EPS Estimate Revisions	0.47	0.56	0.57	0.44	0.31
Dividend Growth	0.50	0.52	0.63	0.55	0.51
P/E-to-Growth	0.51	0.56	0.61	0.53	0.42
1yr ROE	0.58	0.58	0.54	0.47	0.28
5y ROE	0.52	0.54	0.53	0.51	0.30
1yr ROE Adj	0.58	0.59	0.48	0.50	0.27
5yr ROE Adj	0.55	0.52	0.52	0.50	0.29
ROA	0.55	0.53	0.53	0.53	0.28
ROC	0.59	0.58	0.50	0.49	0.27
Beta	0.34	0.43	0.53	0.59	0.51
Variability of Earnings	0.39	0.41	0.47	0.50	0.64
Estimate Dispersion	0.30	0.46	0.47	0.53	0.64
Neglect - Analyst Coverage	0.50	0.49	0.51	0.53	0.44
Neglect - Institutional Ownership	0.54	0.64	0.62	0.53	0.43
Size	0.42	0.51	0.45	0.50	0.47
Share Repurchase	0.66	0.57	0.51	0.42	0.23
Short Interest	0.73	0.64	0.44	0.37	0.27

Source: BofA US Equity & Quant Strategy
Sharpe ratio is calculated as the average annualized monthly excess return vs. 10-yr Treasury yield divided by the annualized volatility (standard deviation) of monthly excess returns.

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Performance Calculation Methodology

For each of the strategies, rebalancing and performance calculations are conducted each month, using data and closing prices corresponding to the market's close on the last business day of each month. The performance of each strategy is computed on the basis of price return. The performance is presented relative to the benchmark which consists of the equal weighted price performance of stocks in the S&P 500 as of the last business day of each month. For the Alpha Surprise model, the performance is also represented as relative to the market capitalization-weighted S&P 500 benchmark.

The results of quantitative strategies presented here may differ from the S&P 500 in that they are significantly less diversified, and, as such, their performance is more exposed to specific stock or sector results. Therefore investors following these strategies may experience greater volatility in their returns.

The performance results do not reflect transaction costs, tax withholdings or any investment advisory fees. Had these costs been reflected, the performance would have been lower. The performance results of individuals following the strategies presented here will differ from the performance contained in this report for a variety of reasons, including differences related to incurring transaction costs and/or investment advisory fees, as well as differences in the time and price that securities were acquired and disposed of, and differences in the weighting of such securities. The performance results of individuals following these strategies will also differ based on differences in treatment of dividends received, including the amount received and whether and when such dividends were reinvested.

Dividend Yield and Dividend Growth Strategies

We also provide total returns for dividend oriented strategies (high dividend yield strategy and high dividend growth strategy). The total return performance calculation assumes that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date, and are not reinvested. The performance is presented relative to the equal weighted total returns index of stocks in the S&P 500 as of the last business day of each month.

This report includes strategies for informational or descriptive purposes, and inclusion here is not equivalent to a recommendation of the strategy or portfolio.

Past performance should not and cannot be viewed as an indicator of future performance. A complete performance record is available upon request.

The analysis of various strategies in this report is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the hypothetical back-tested performance of a particular strategy over the time period indicated. In future periods, market and economic conditions will differ and the same strategy will not necessarily produce the same results. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. In fact, there are frequently sharp differences between back-tested returns and the actual results realized in the actual management of a portfolio. Back-tested performance results are created by applying an investment strategy or methodology to historical data and attempts to give an indication as to how a strategy might have performed during a certain period in the past if the product had been in existence during such time. Back-tested results have inherent limitations including the fact that they are calculated with the full benefit of hindsight, which allows the security selection methodology to be adjusted to maximize the returns. Further, the results shown do not reflect actual trading or the impact that material economic and market factors might have had on a portfolio manager's decision-making under actual circumstances. Back-tested returns do not reflect advisory fees, trading costs, or other fees or expenses.

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Note: All scatter plot charts in this section are based on actual performance after the screens were introduced, except where noted.

Sector Specific Overview

Exhibit 376: Most predictive long-short factors within industry groups.
Analysis spans 1985 to Apr 2022, Historical Russell 1000 Constituents

	Valuation Measure	Momentum Measure	Growth Measure	Quality Measure
Communication Services				
Media & Entertainment	Price to Sales, EV/EBITDA	12-Mth Return and 1-Mth Reversal, Trading Volume	PEG Ratio	ROE (1-Yr)
Telecommunication Services	Dividend Yield	12-Mth Return and 1-Mth Reversal	PEG Ratio	ROC
Consumer Discretionary				
Retailing	P/Sales, EV/EBITDA	Relative Strength - 10W/40W	Estimate Revision	ROC
Other Discretionary (Autos, Durables, Services)	Price to Book	12-Mth Return and 1-Mth Reversal, 11-Mth Return	Estimate Revision	ROC, ROE
Consumer Staples	Historical Relative P/E, EV/EBITDA	Trading Volume, 12-Mth Return and 1-Mth Reversal	PEG Ratio	ROC
Energy	Price to Book, Fwd P/E	Trading Volume	Estimate Revisions	ROC
Financials				
Banks	Historical Relative P/E, Fwd P/E, Trailing P/E	12-Mth Return and 1-Mth Reversal	EPS Momentum, PEG Ratio	ROC
Insurance	Historical Relative P/E	Trading Volume,12-Mth Return and 1-Mth Reversal	PEG Ratio	ROC
Diversified Financials	Fwd P/E, Trailing P/E	Relative Strength - 30W/75W, 12-Mth Return and 1-Mth Reversal	EPS Momentum	ROE (1-Yr), ROC
Health Care				
Health Care Equipment & Services	FCF/EV, Price to Free Cash Flow	12-Mth Return and 1-Mth Reversal	PEG Ratio, Estimate Revision	ROC
Pharmaceuticals, Biotech & Life Sciences	Price to Sales	Trading Volume	Estimate Revision	ROE (5-Yr, Debt Adj)
Industrials				
Capital Goods	EV/EBITDA, Price to Book	12-Mth Return and 1-Mth Reversal	Earnings Torpedo, PEG Ratio	ROE (5-Yr), ROE (5-Yr, Debt Adj)
Other Industrials (Services, Transports)	EV/EBITDA	12-Mth Return and 1-Mth Reversal	PEG Ratio	ROC, ROA
Information Technology	EV/EBITDA, FCF/EV	Trading Volume	Estimate Revision	ROA
Materials	EV/EBITDA, Dividend Yield	12-Mth Return and 1-Mth Reversal	PEG Ratio, Long-Term Growth	ROE (1-Yr, Debt Adj), ROE (5-Yr, Debt Adj)
Real Estate	Price to Cash Flow, EV/EBITDA	12-Mth Return and 1-Mth Reversal	Long Term Growth	ROC
Utilities	Price to Sales, Historical Relative P/E, Fwd P/E	Relative Strength - 10W/40W, Relative Strength - 30W/75W	PEG Ratio, Estimate Revision	ROE (1-Yr)

Source: BofA US Equity & Quant Strategy
Note: Historical Relative P/E is calculated as the relative forward P/E of a stock versus the market compared to its long-term average relative P/E.

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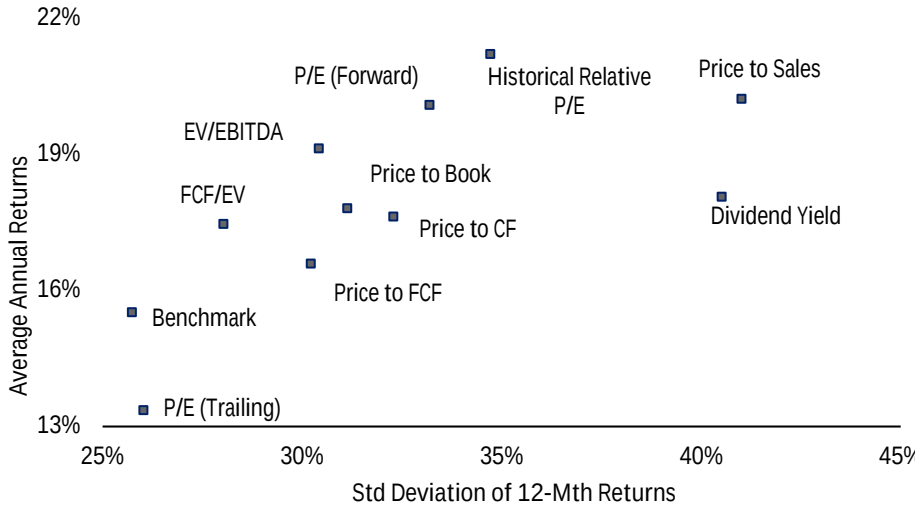
Communication Services: Media & Entertainment

Long only: Top Quintile Performance

Exhibit 377: Valuation Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

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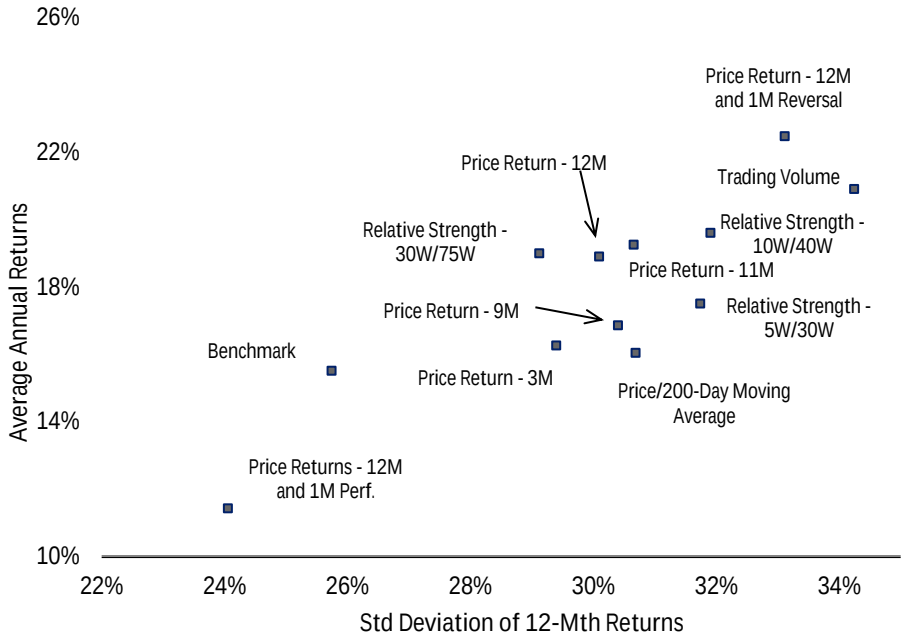
Exhibit 378: Momentum Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

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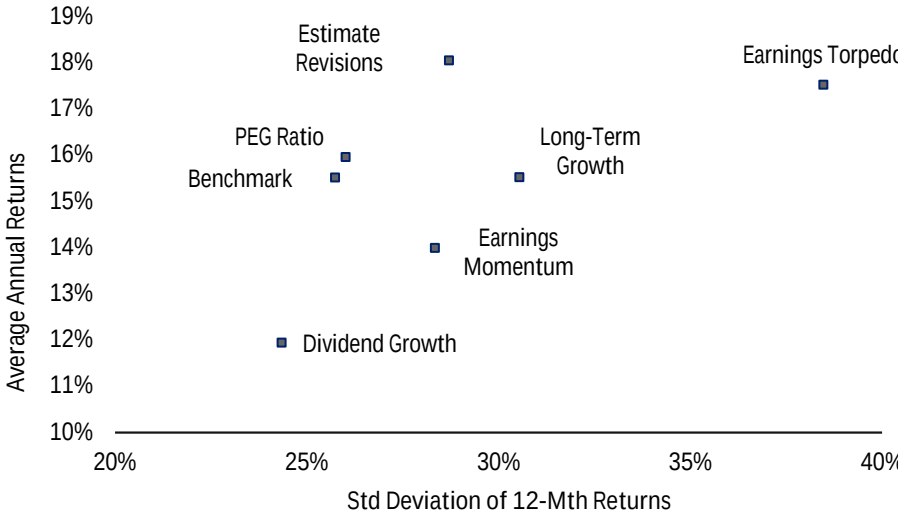
Exhibit 379: Growth Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2022)
Estimate Revisions outperformed the index most



Source: BofA US Equity & Quant Strategy

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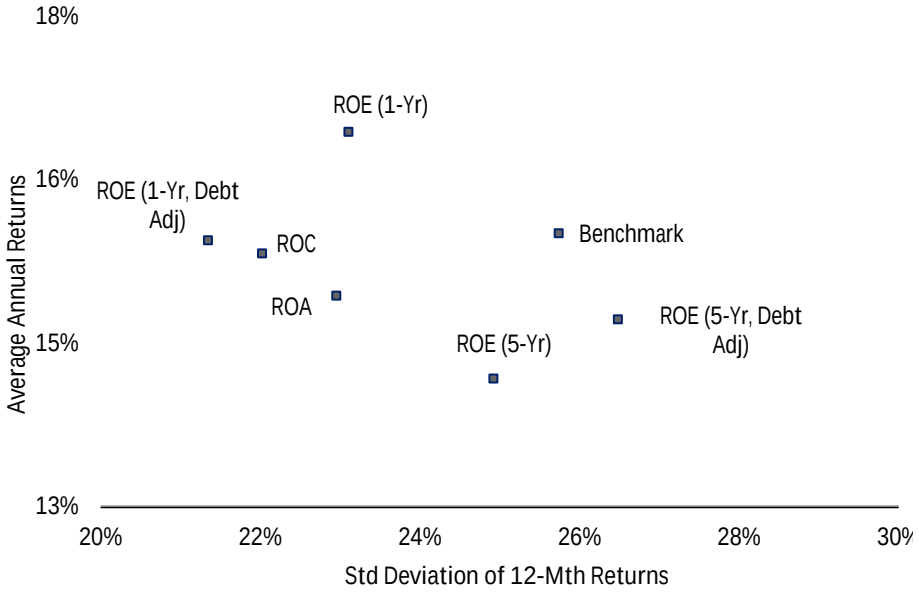
Exhibit 380: Quality Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most



Source: BofA US Equity & Quant Strategy

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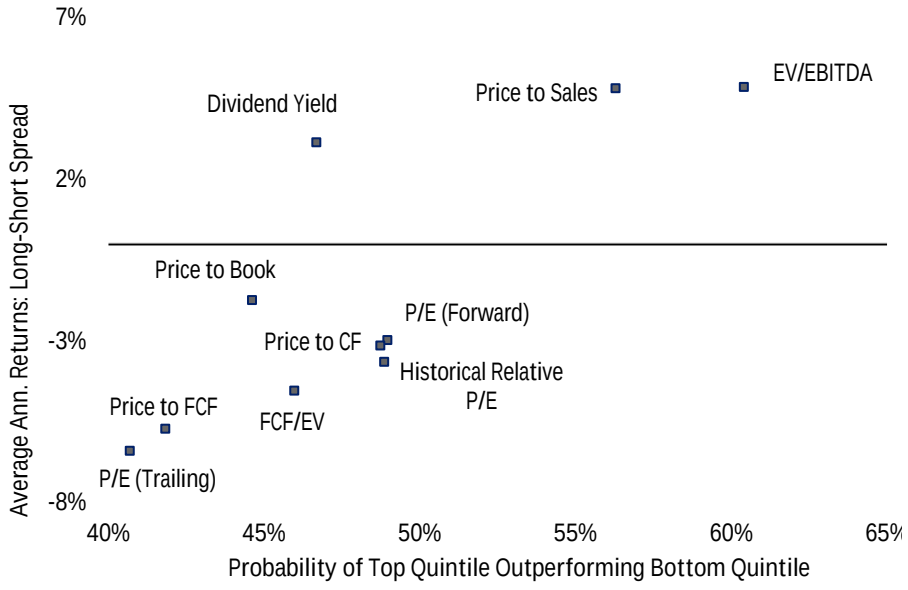
Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 381: Valuation Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EV/EBITDA performed best



Source: BofA US Equity & Quant Strategy

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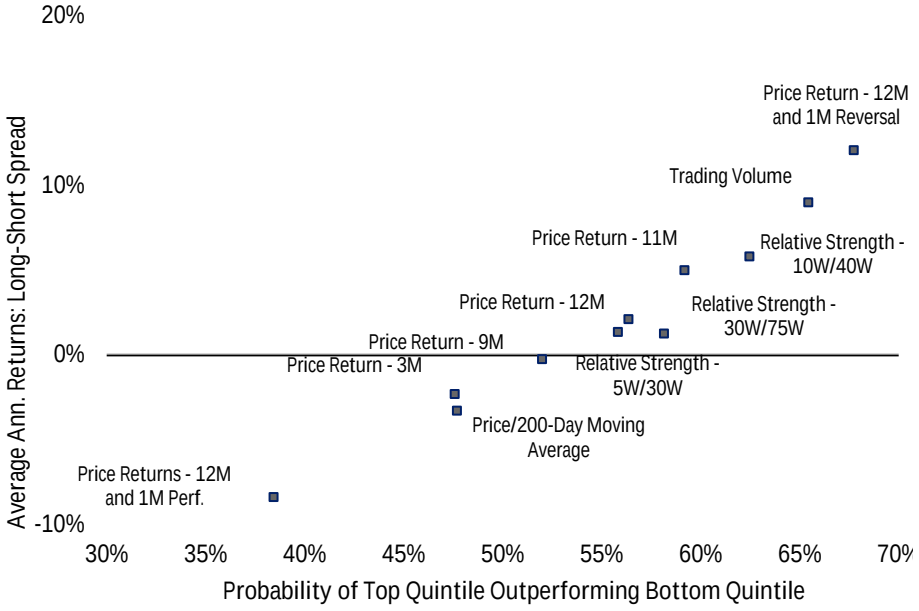
Exhibit 382: Momentum Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal performed best



Source: BofA US Equity & Quant Strategy

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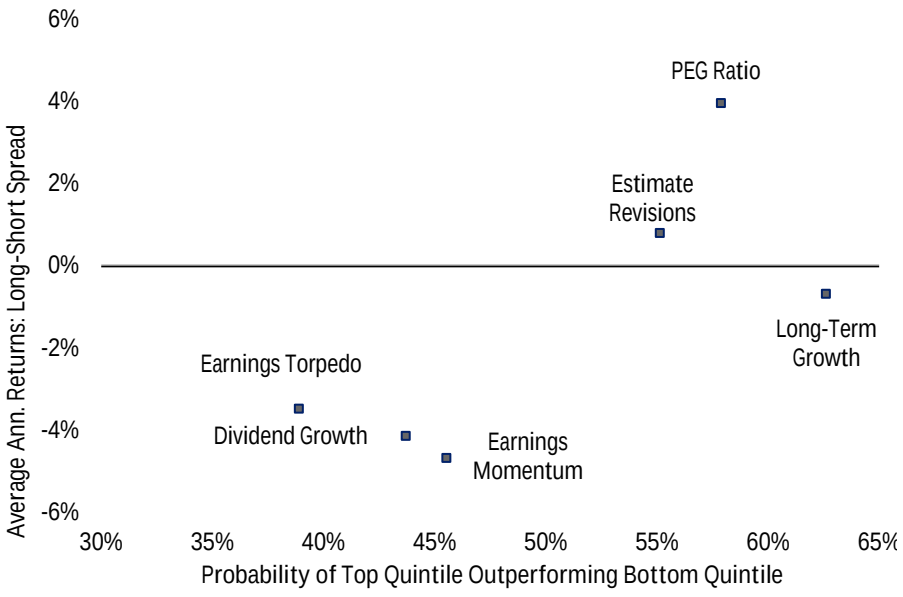
Exhibit 383: Growth Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio performed best



Source: BofA US Equity & Quant Strategy

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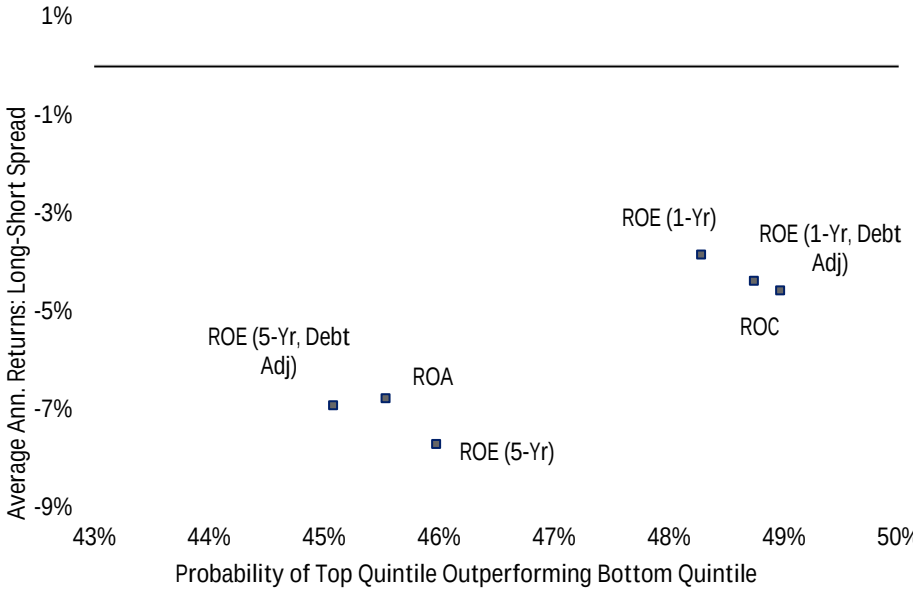
Exhibit 384: Quality Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
1-yr ROE performed best



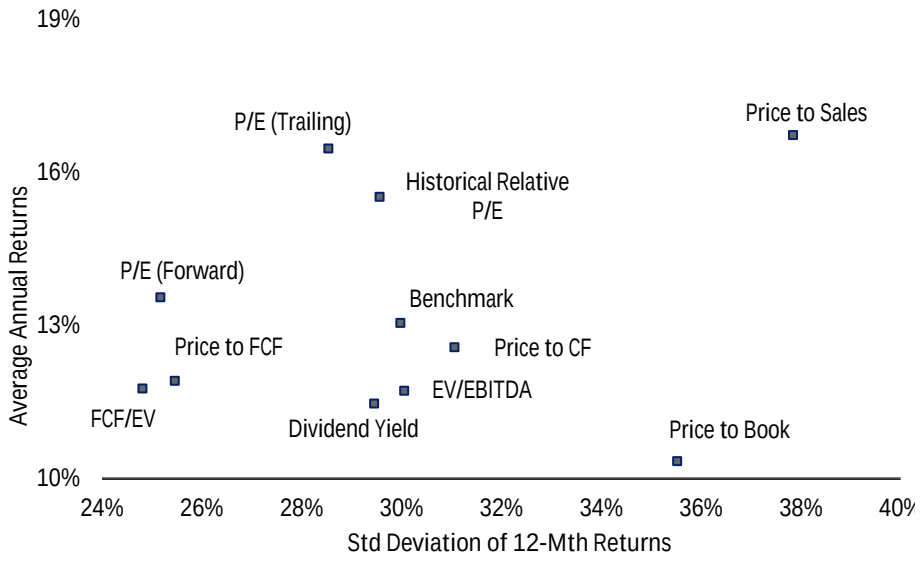
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Communication Services: Telecommunication Services

Long only: Top Quintile Performance

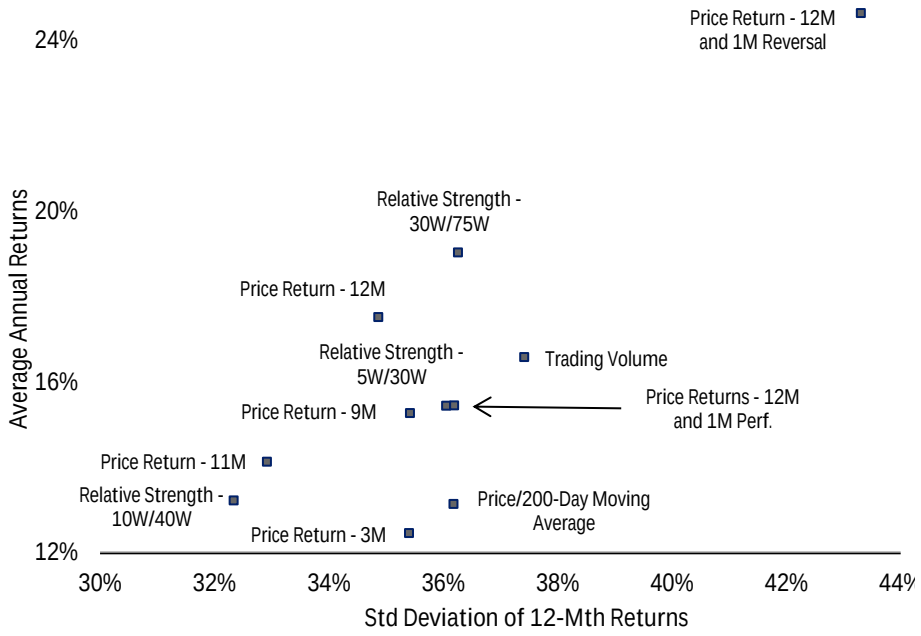
Exhibit 385: Valuation Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2022)
Price / Sales outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

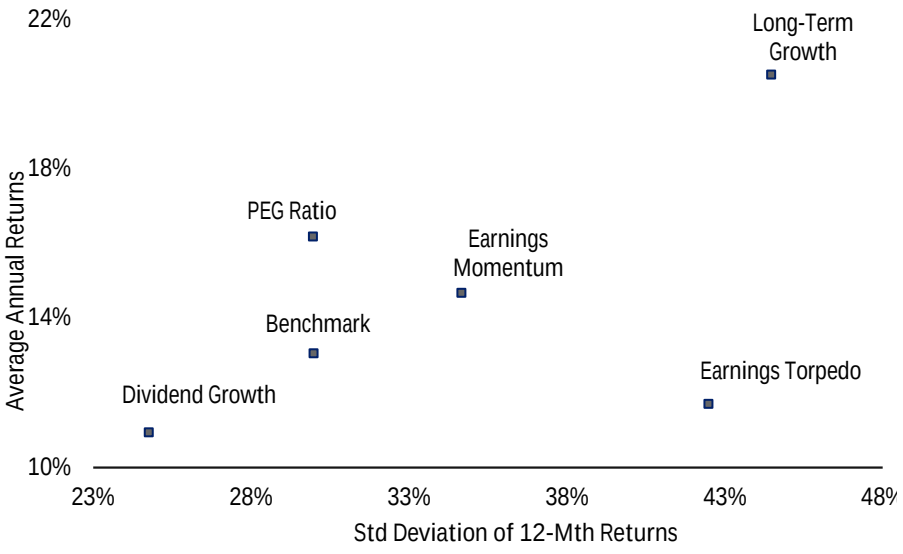
Exhibit 386: Momentum Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

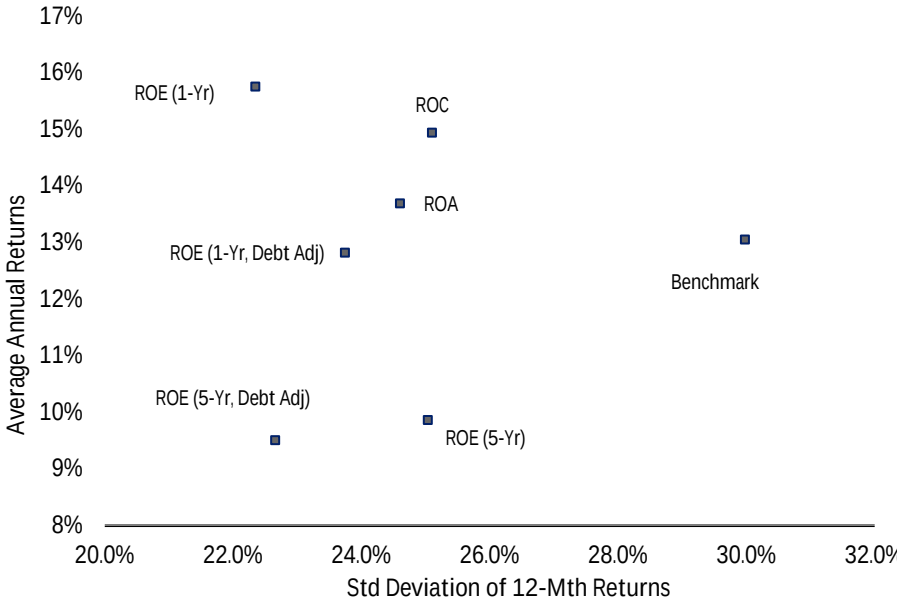
Exhibit 387: Growth Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2022)
Long-Term Growth fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 388: Quality Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most

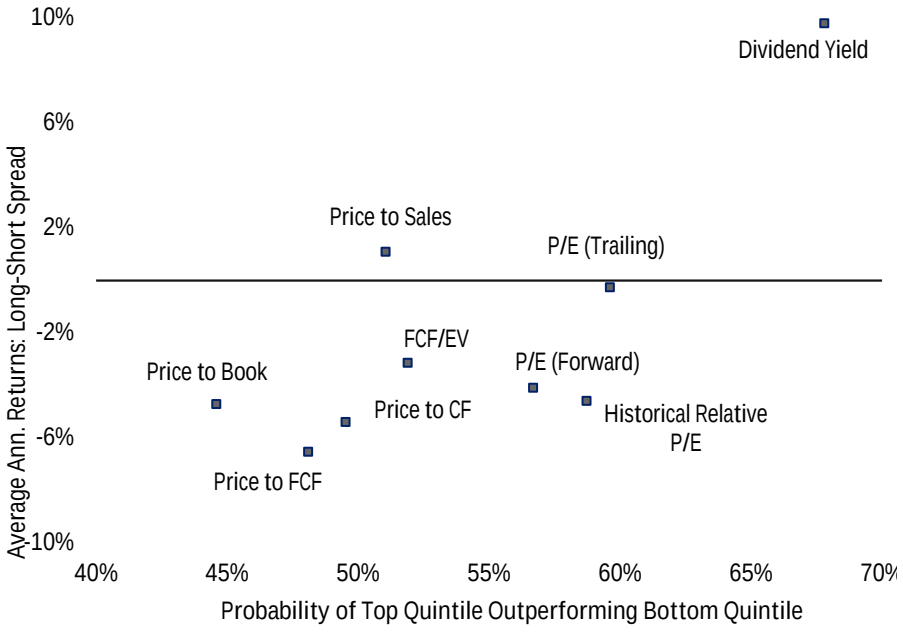


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

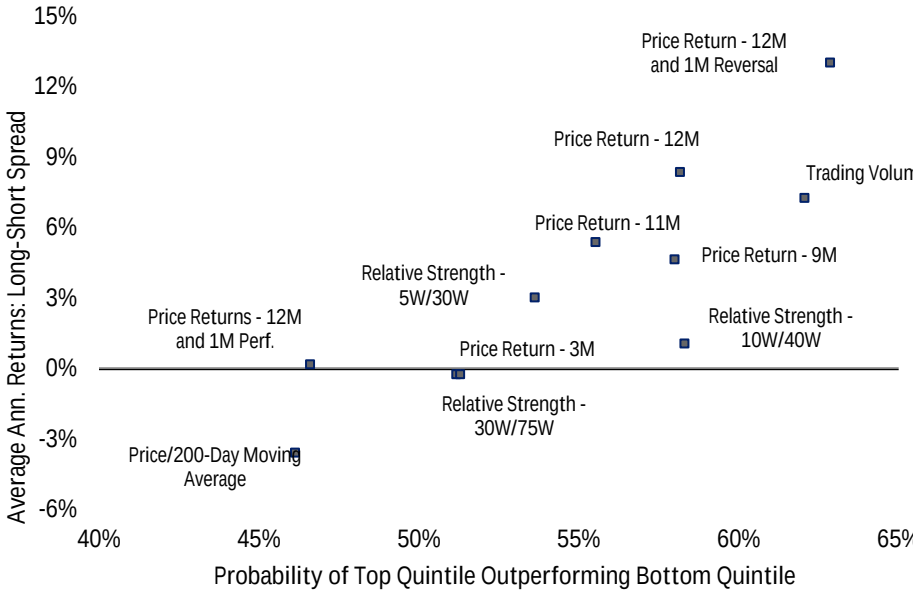
Exhibit 389: Valuation Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Dividend Yield fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

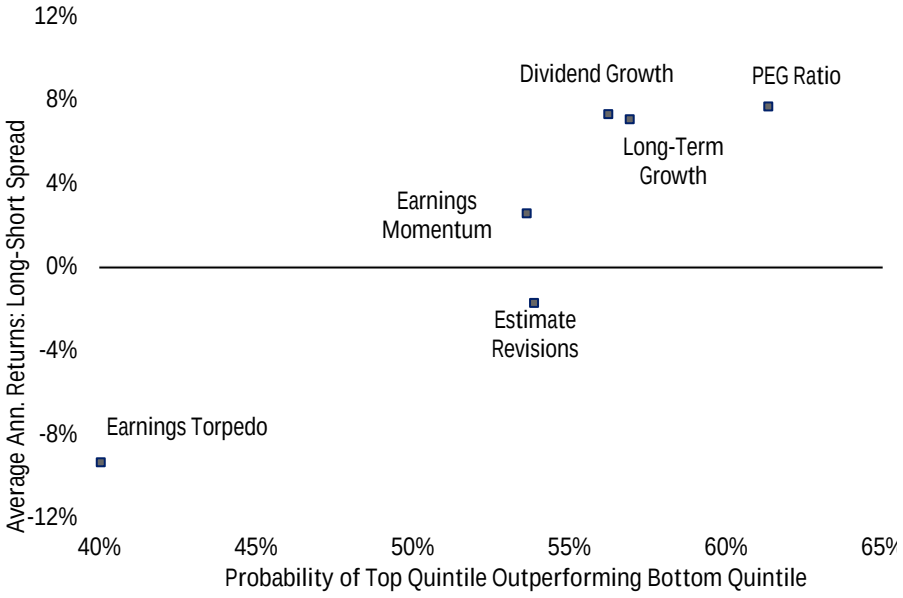
Exhibit 390: Momentum Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 391: Growth Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 392: Quality Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC fared best

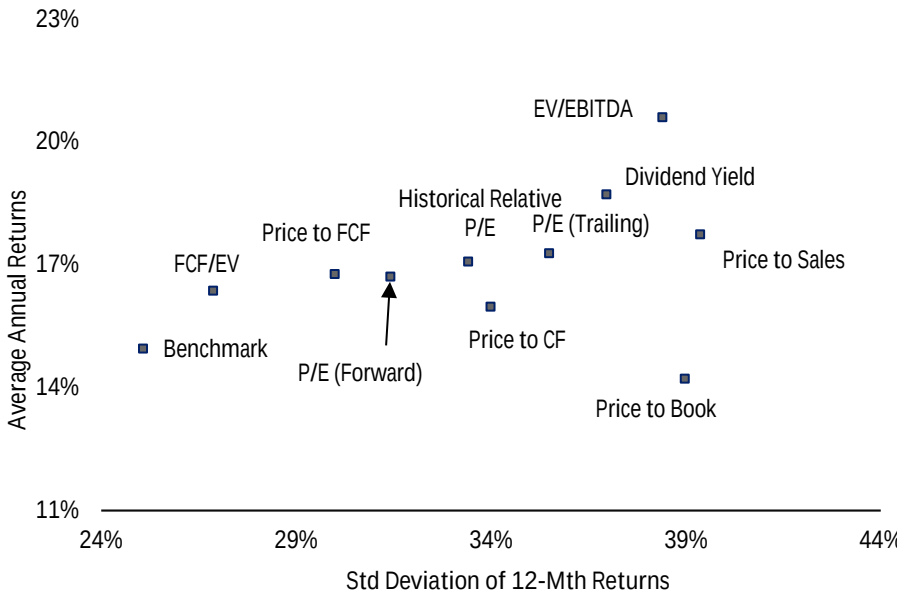
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Consumer Discretionary: Retailing

Long only: Top Quintile Performance

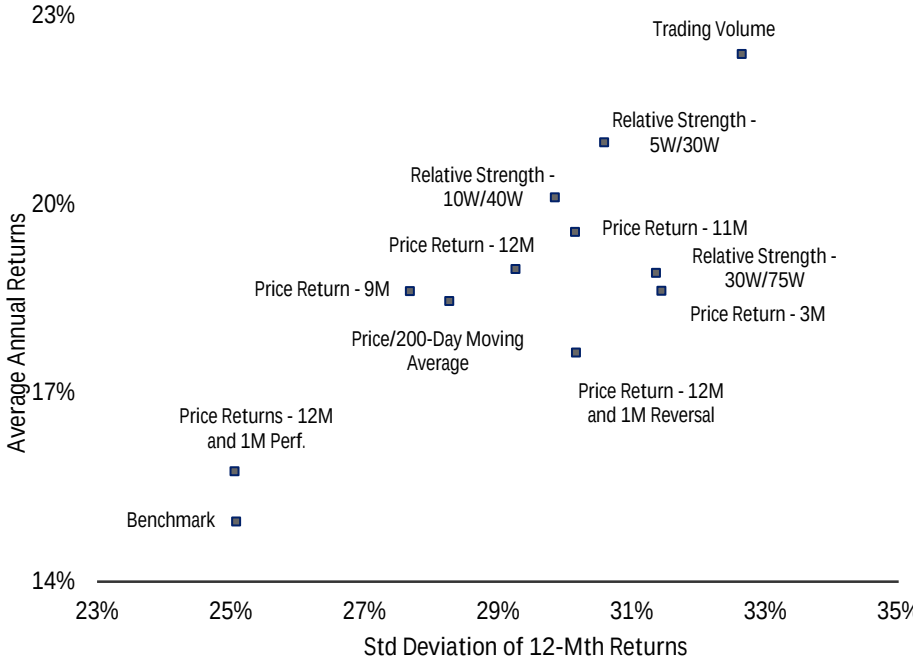
Exhibit 393: Valuation Strategies for Retailing: Top Quintile Returns (1985 to 2022)
EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

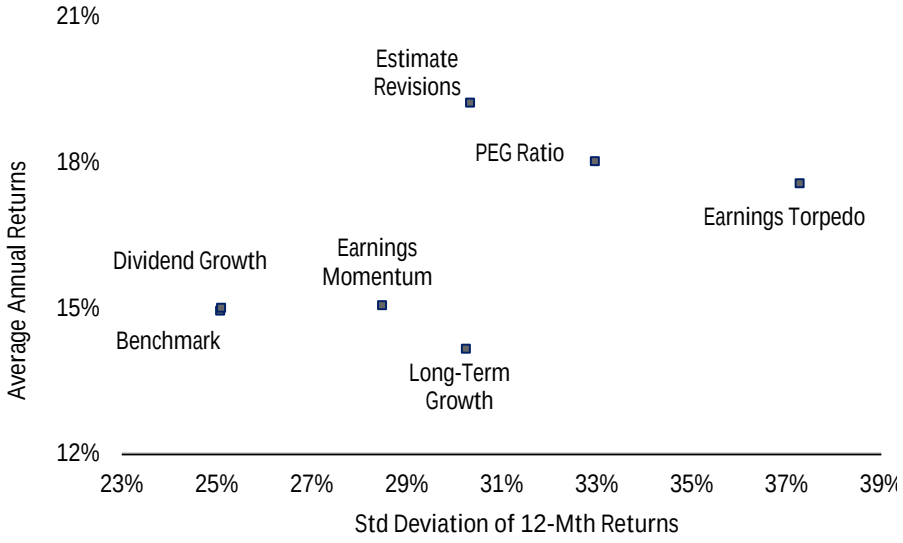
Exhibit 394: Momentum Strategies for Retailing: Top Quintile Returns (1985 to 2022)
Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

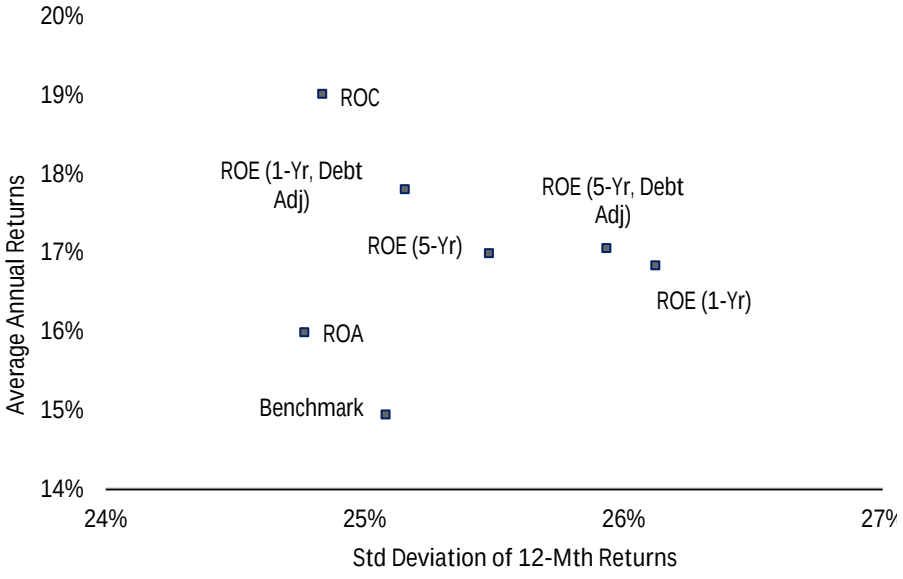
Exhibit 395: Growth Strategies for Retailing: Top Quintile Returns (1985 to 2022)
EPS Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 396: Quality Strategies for Retailing: Top Quintile Returns (1985 to 2022)
Return on Capital fared best

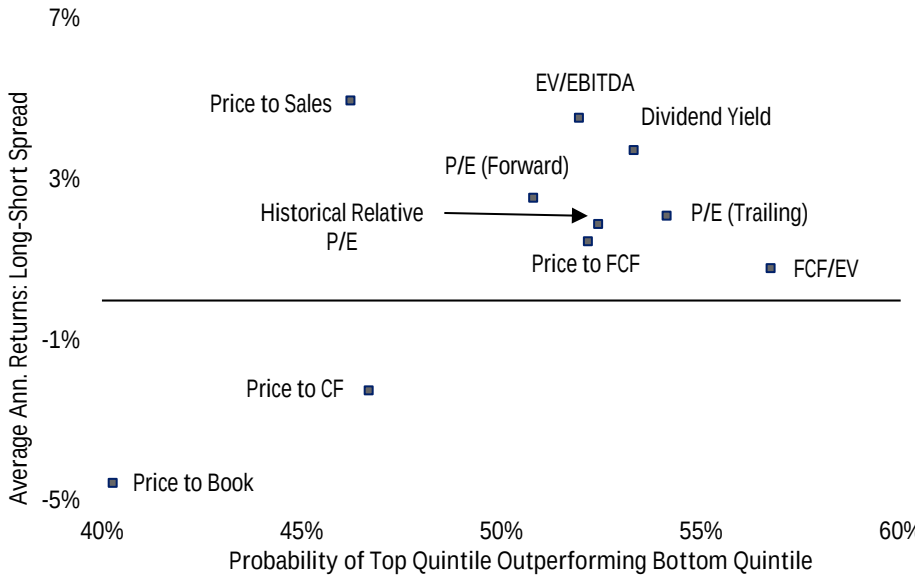


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

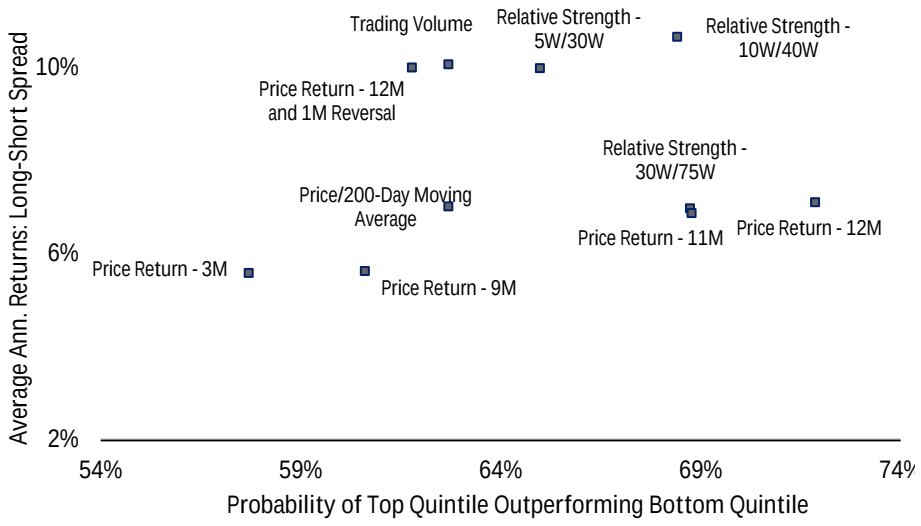
Exhibit 397: Valuation Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price to Sales and EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

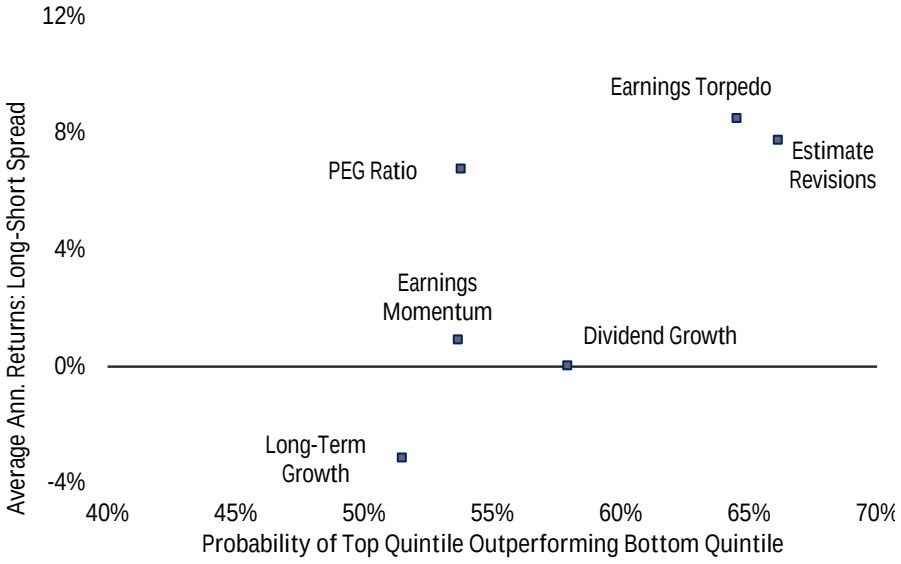
Exhibit 398: Momentum Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
10W/40W Relative Strength fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

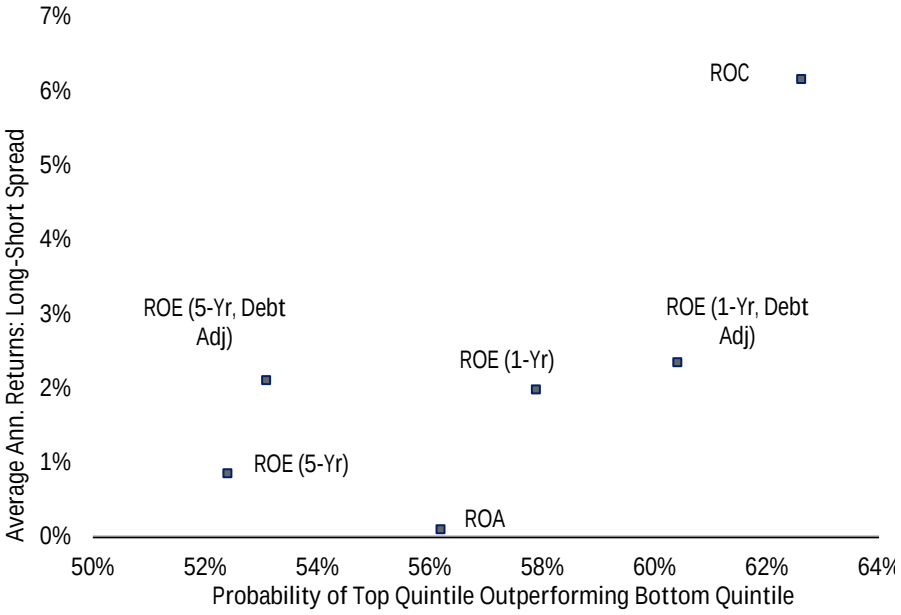
Exhibit 399: Growth Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Earnings Torpedo fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 400: Quality Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
High Return on Capital fared best



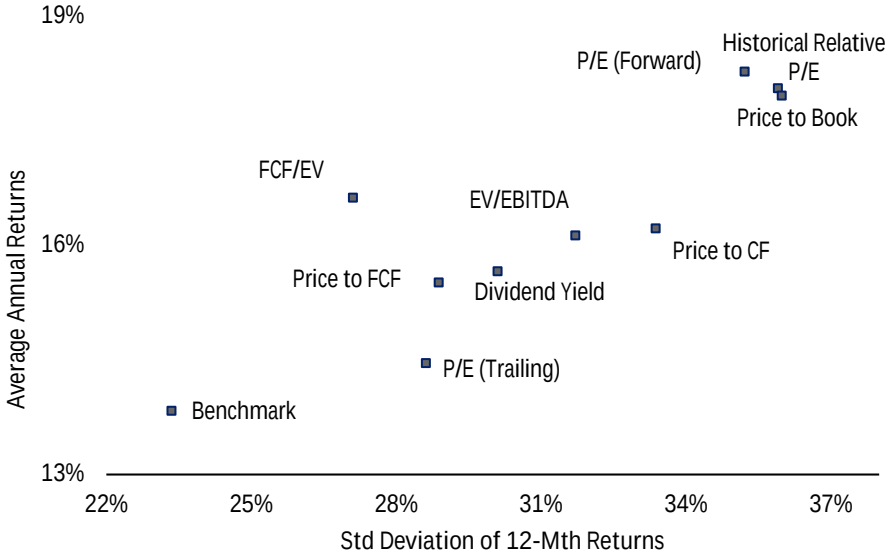
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Other Disc. (Autos, Durables, Services)

Long only: Hypothetical Top Quintile Performance

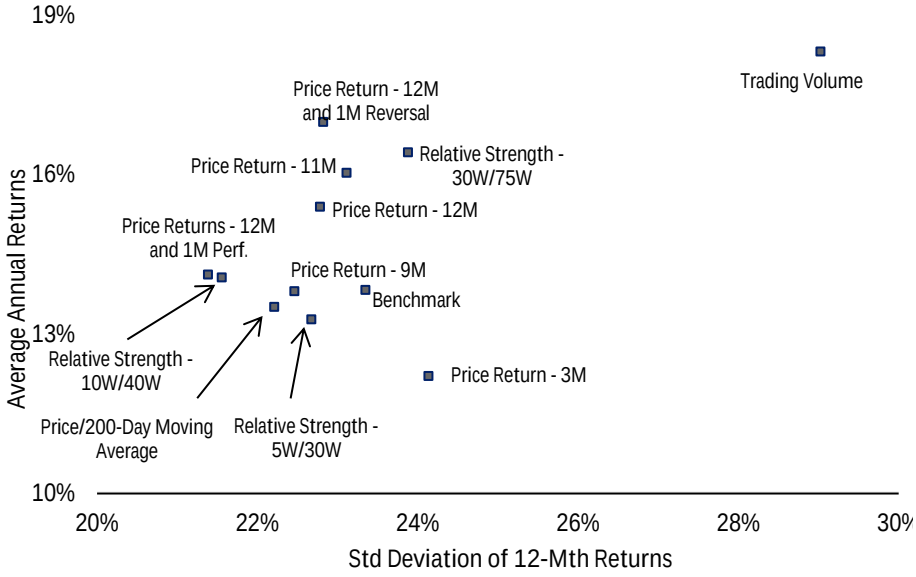
Exhibit 401: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2022)
Forward P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

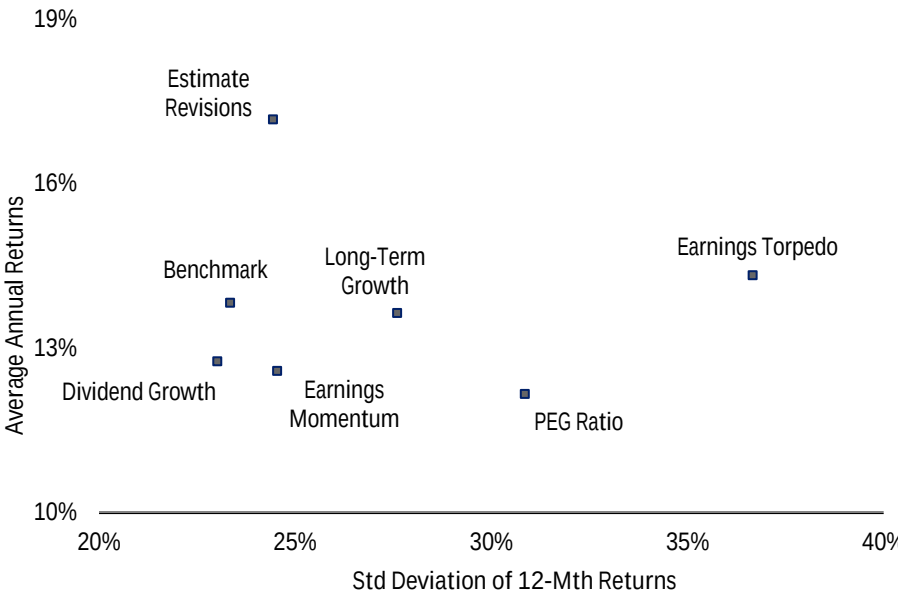
Exhibit 402: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2022)
Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

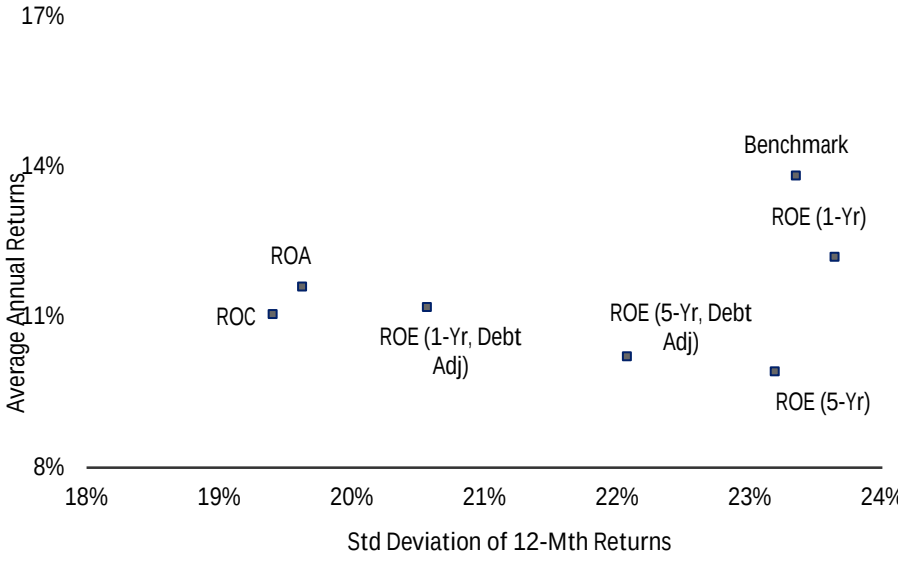
Exhibit 403: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2022)
EPS Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 404: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2022)
1-yr ROE underperformed least

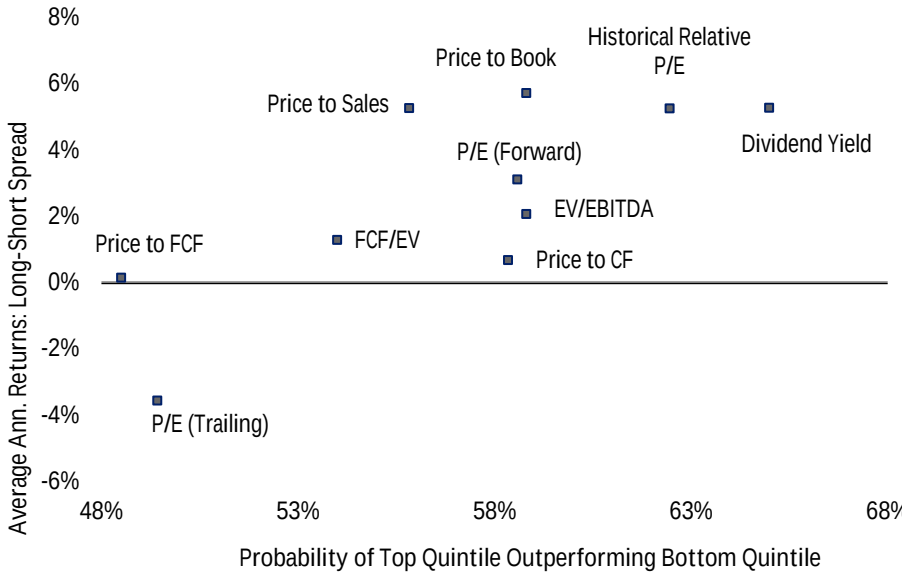


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

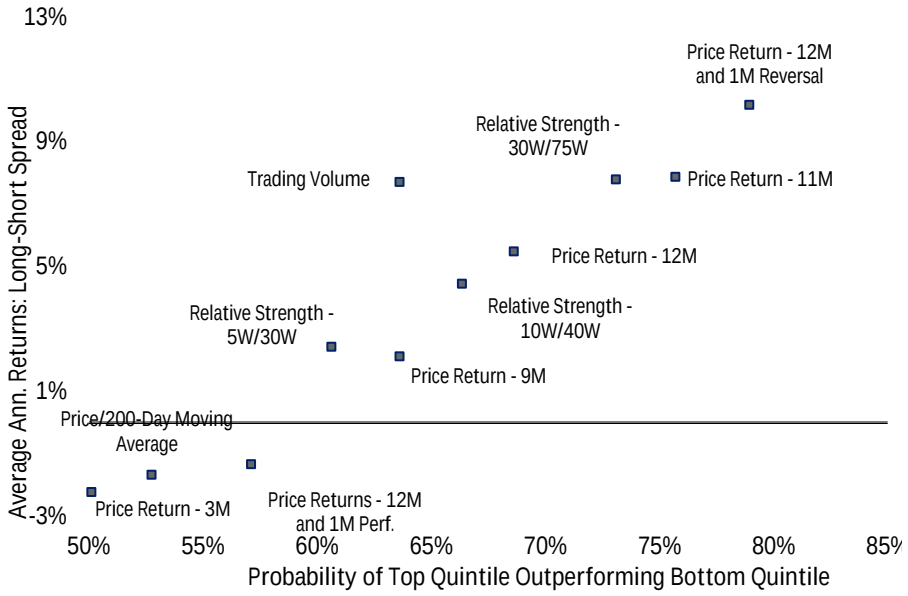
Exhibit 405: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price to Book fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

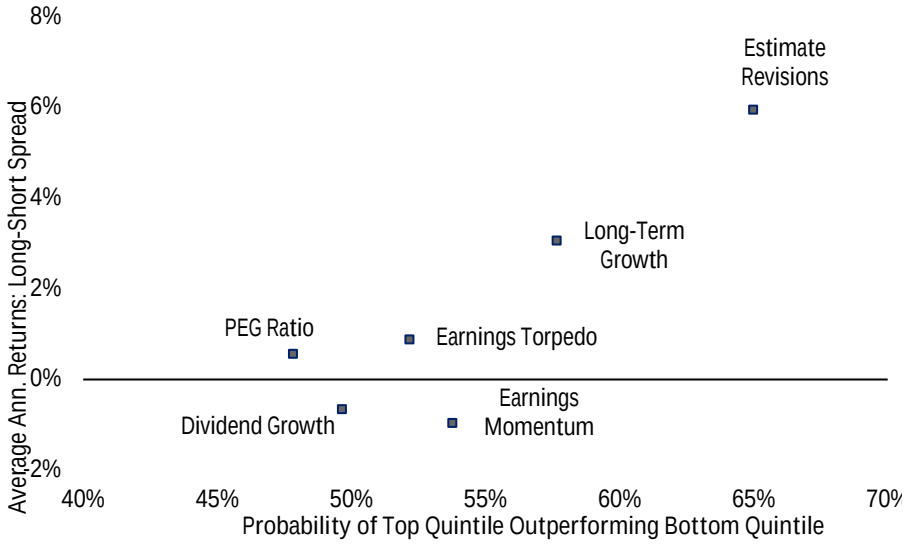
Exhibit 406: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

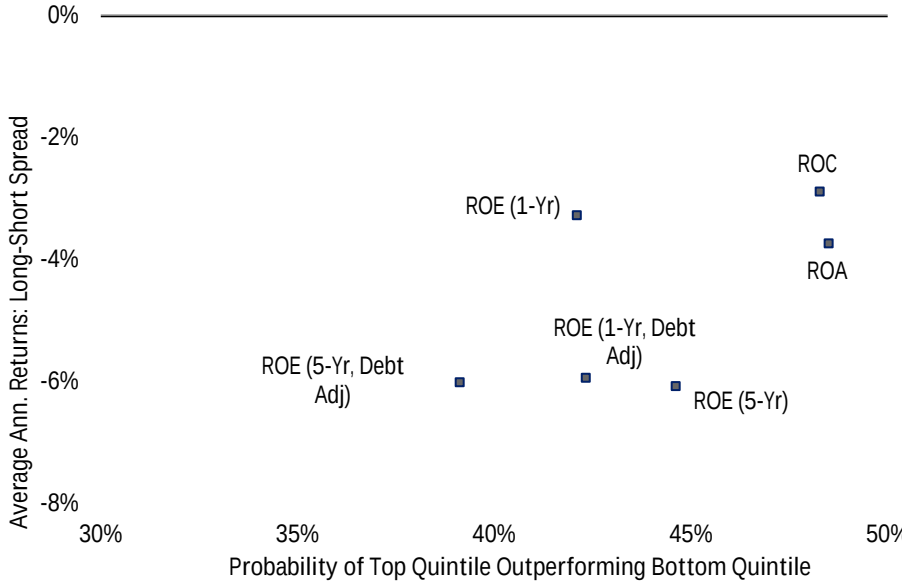
Exhibit 407: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EPS Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 408: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC underperformed least



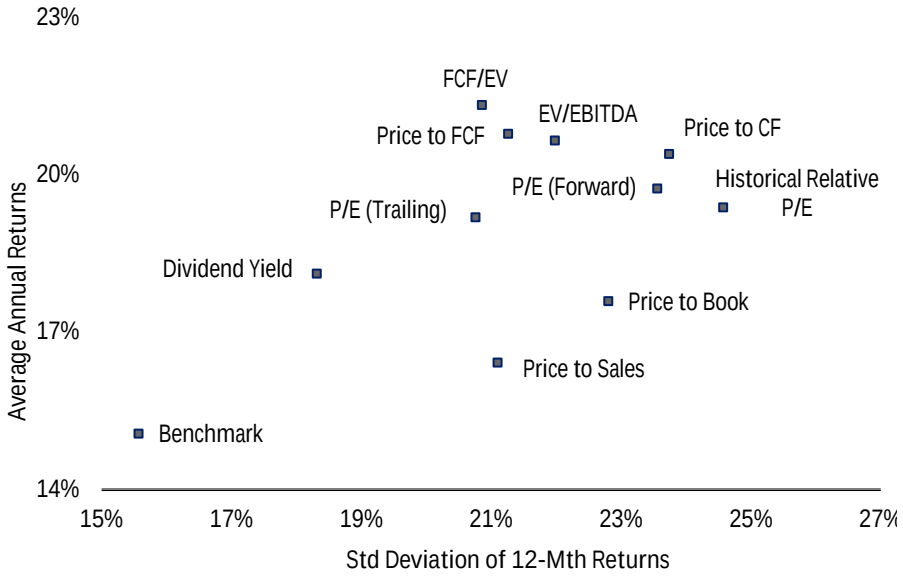
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Consumer Staples

Long only: Top Quintile Performance

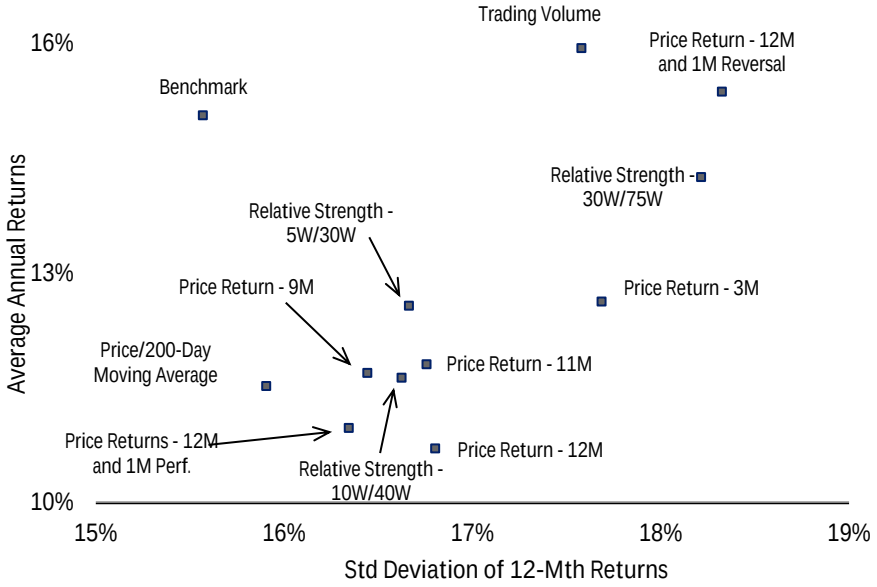
Exhibit 409: Valuation Strategies for Consumer Staples: Top Quintile Returns (1985 to 2022)
FCF/EV fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

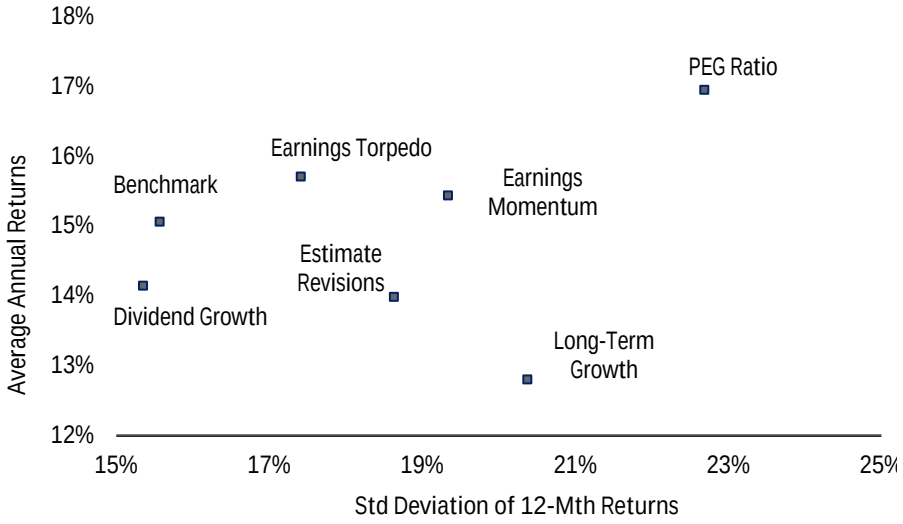
Exhibit 410: Momentum Strategies for Consumer Staples: Top Quintile Returns (1985 to 2022)
Trading Volume outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

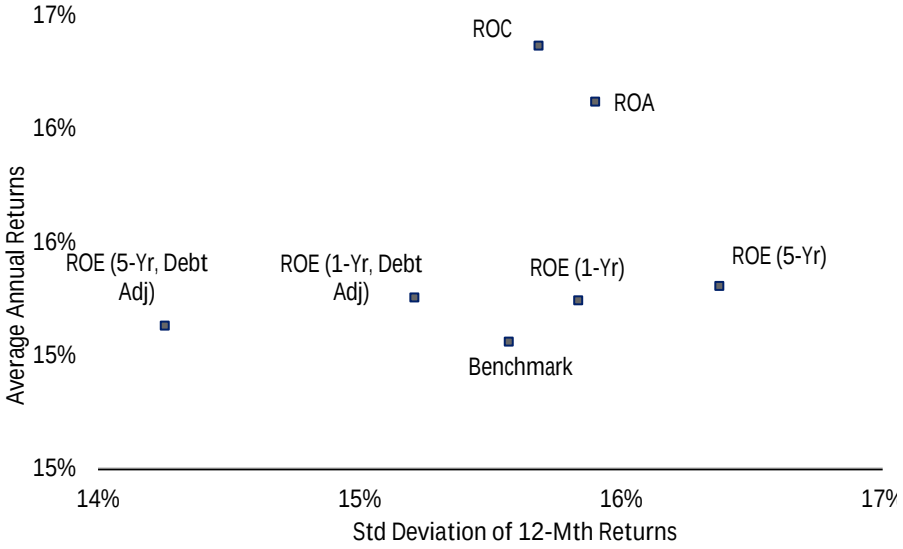
Exhibit 411: Growth Strategies for Consumer Staples: Top Quintile Returns (1985 to 2022)
PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 412: Quality Strategies for Consumer Staples: Top Quintile Returns (1985 to 2022)
ROC outperformed the index most

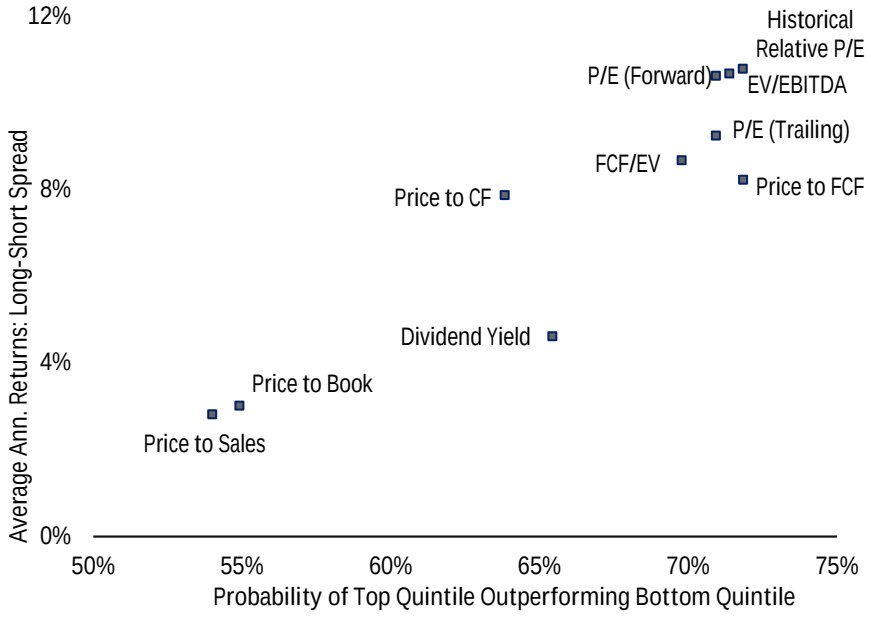


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

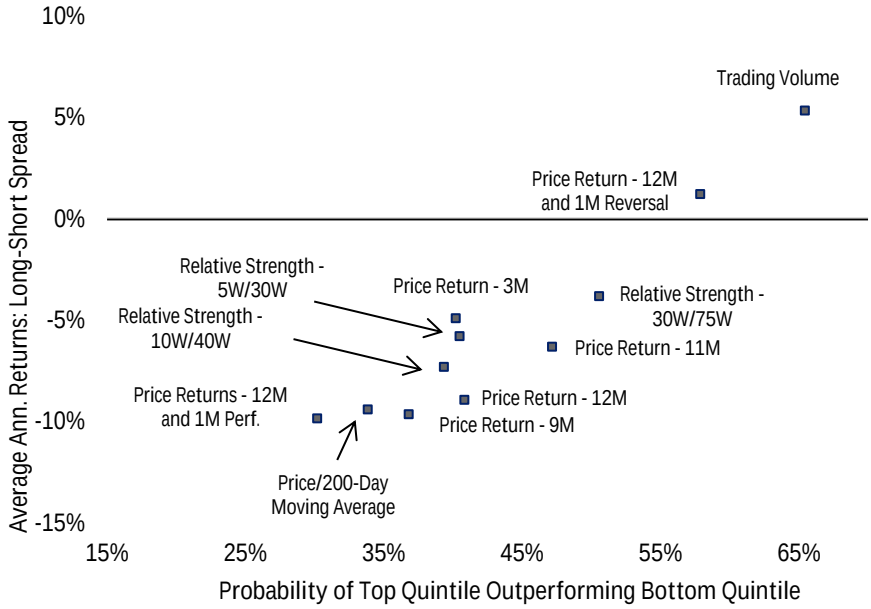
Exhibit 413: Valuation Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Historical Relative P/E and EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

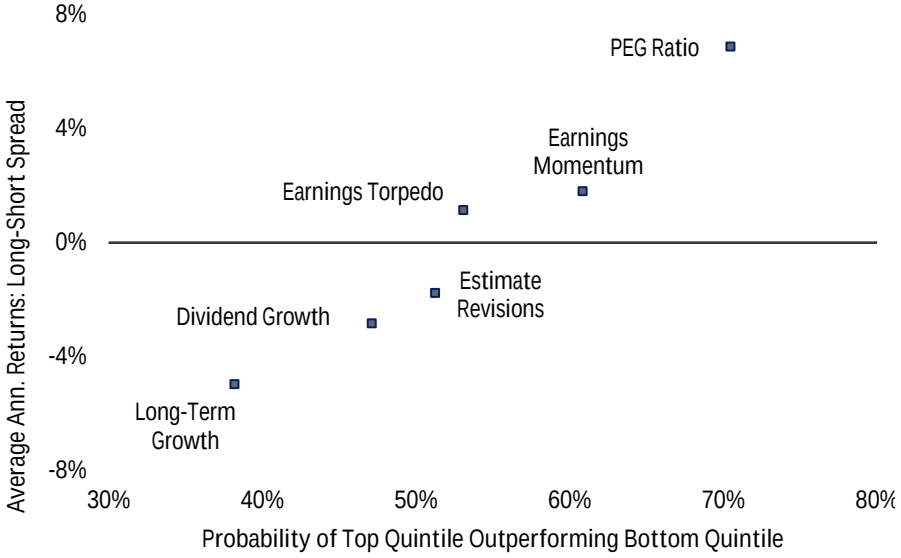
Exhibit 414: Momentum Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

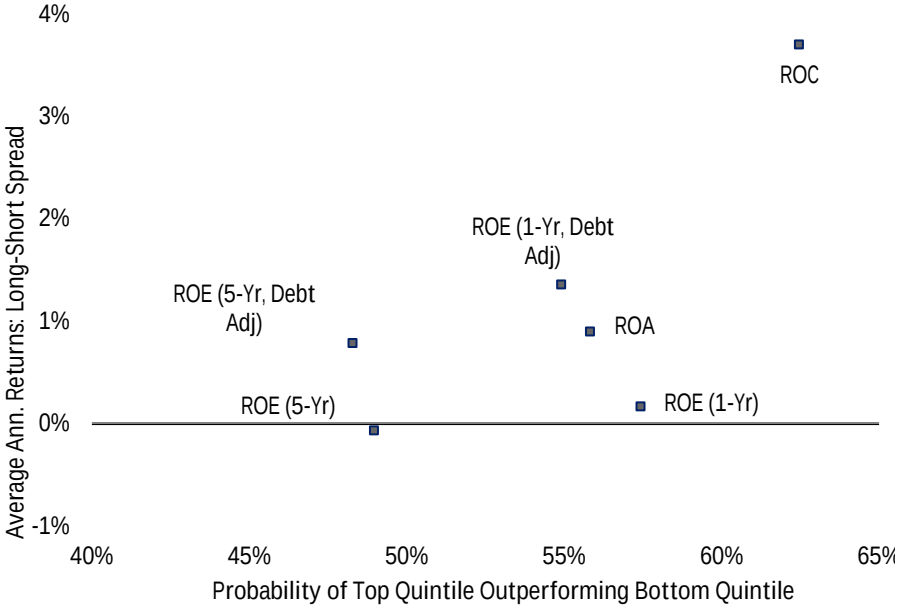
Exhibit 415: Growth Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 416: Quality Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Return on Capital fared best



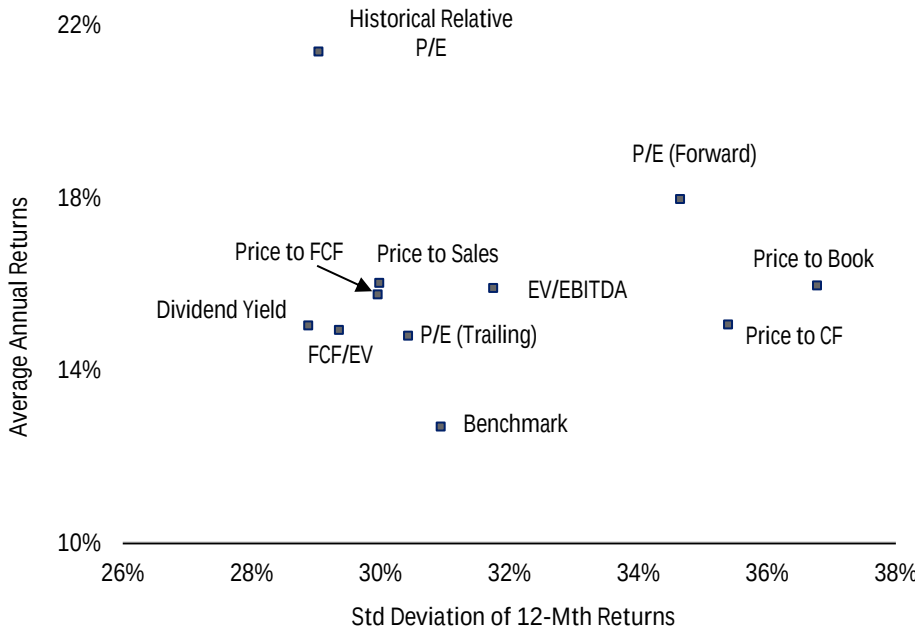
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Energy

Long only: Top Quintile Performance

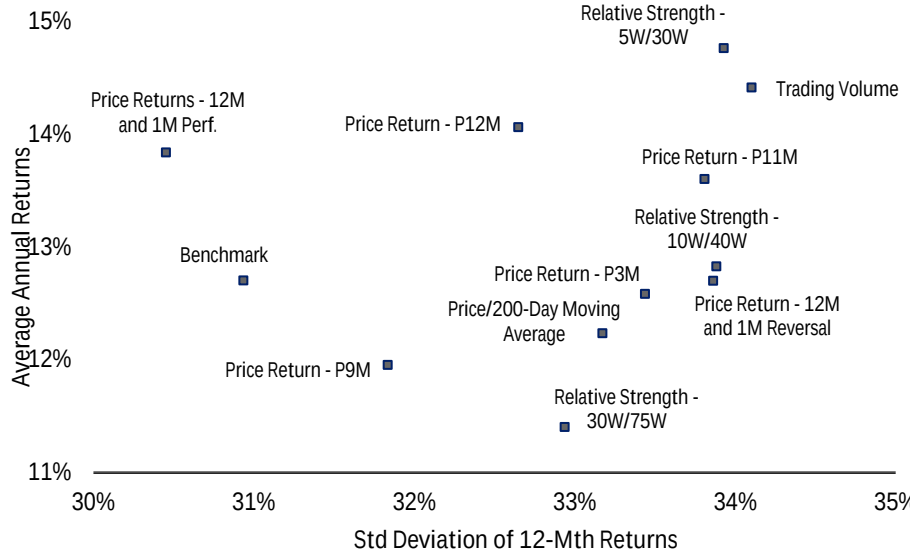
Exhibit 417: Valuation Strategies for Energy: Top Quintile Returns (1985 to 2022)
Historical Relative P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

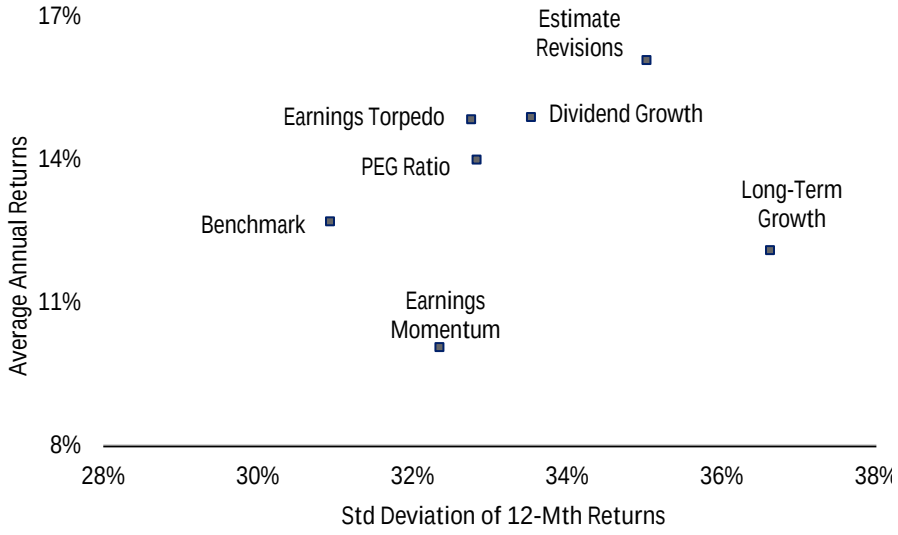
Exhibit 418: Momentum Strategies for Energy: Top Quintile Returns (1985 to 2022)
Relative Strength 5W/30W fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

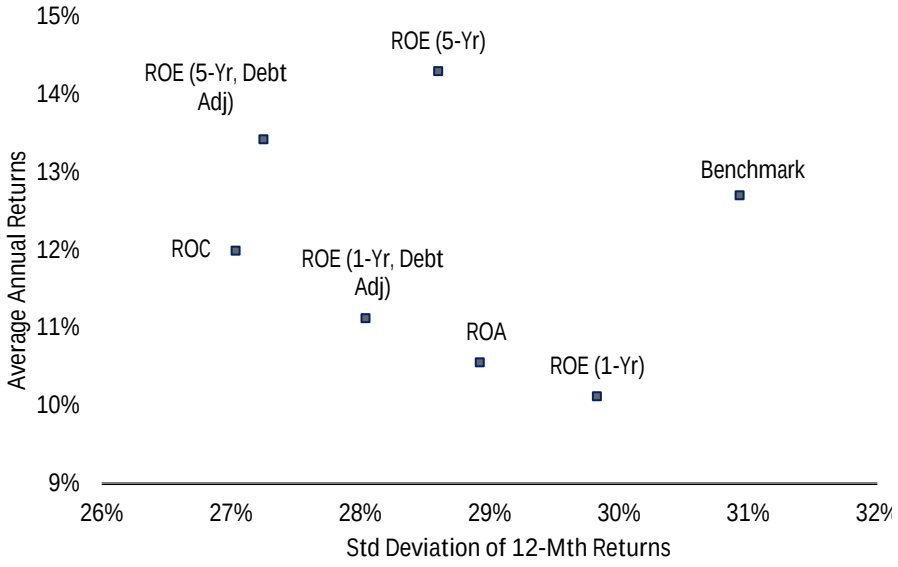
Exhibit 419: Growth Strategies for Energy: Top Quintile Returns (1985 to 2022)
High EPS Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 420: Quality Strategies for Energy: Top Quintile Returns (1985 to 2022)
5-yr ROE fared best

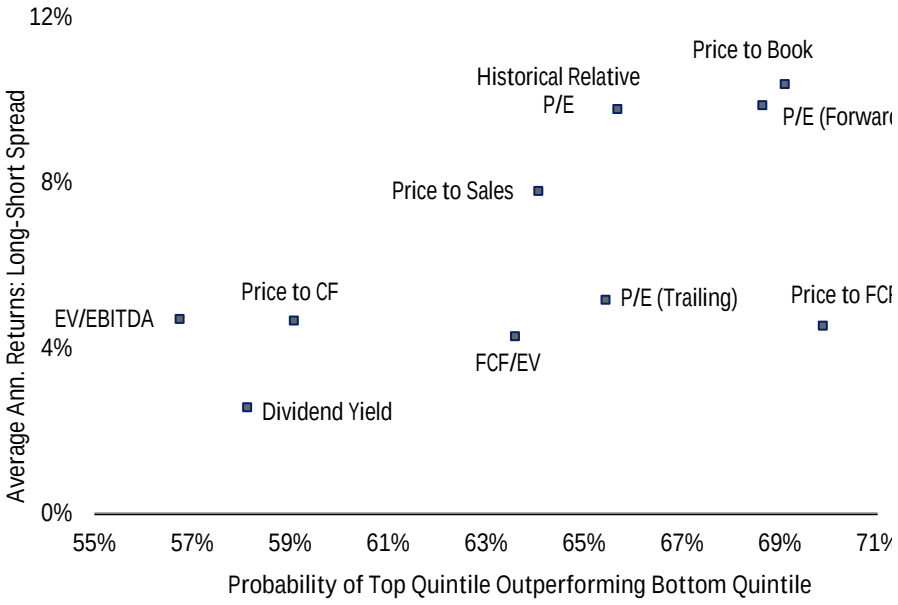


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

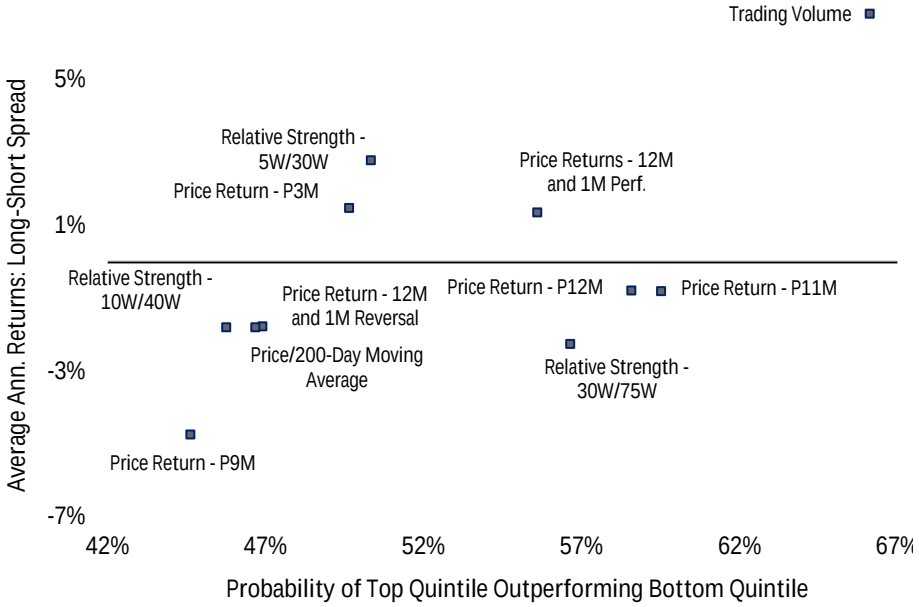
Exhibit 421: Valuation Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price / Book fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

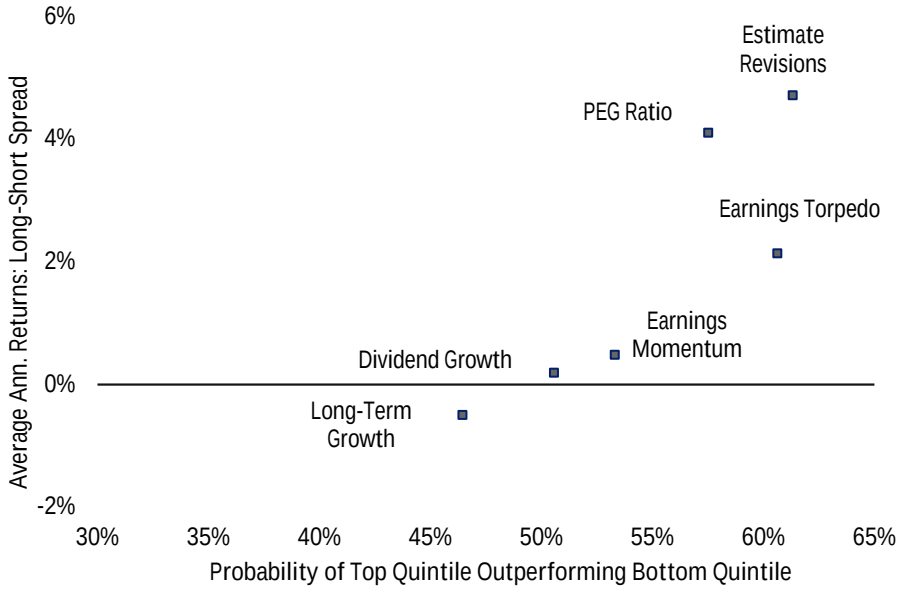
Exhibit 422: Momentum Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

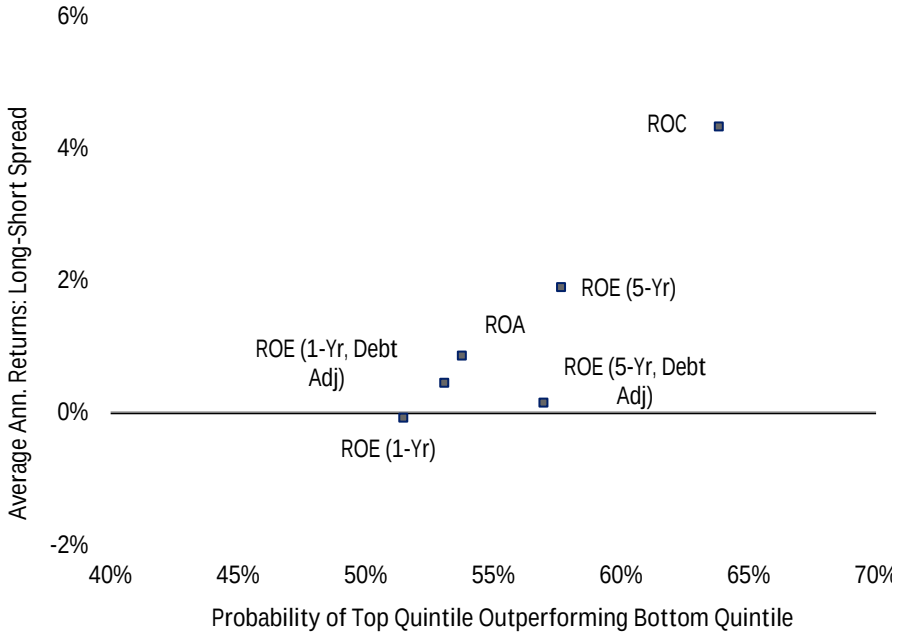
Exhibit 423: Growth Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 424: Quality Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Return on Capital fared best



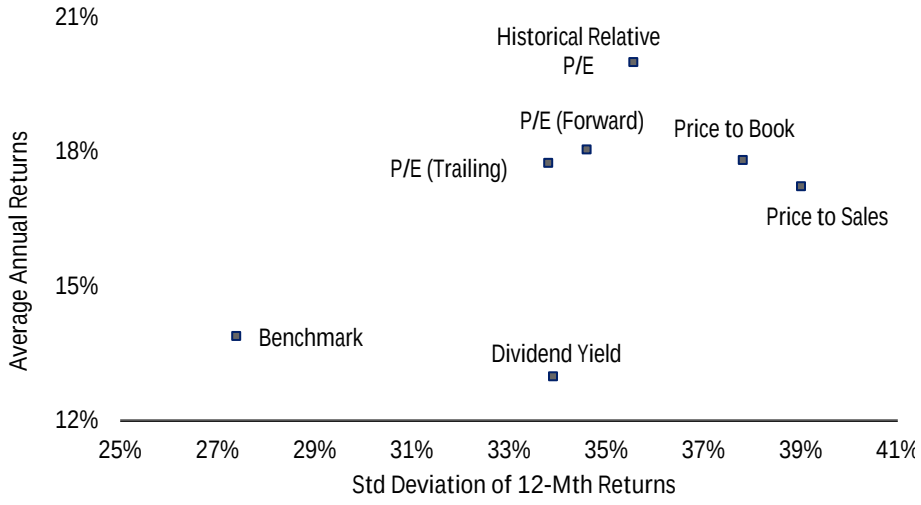
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Financials: Banks

Long only: Top Quintile Performance

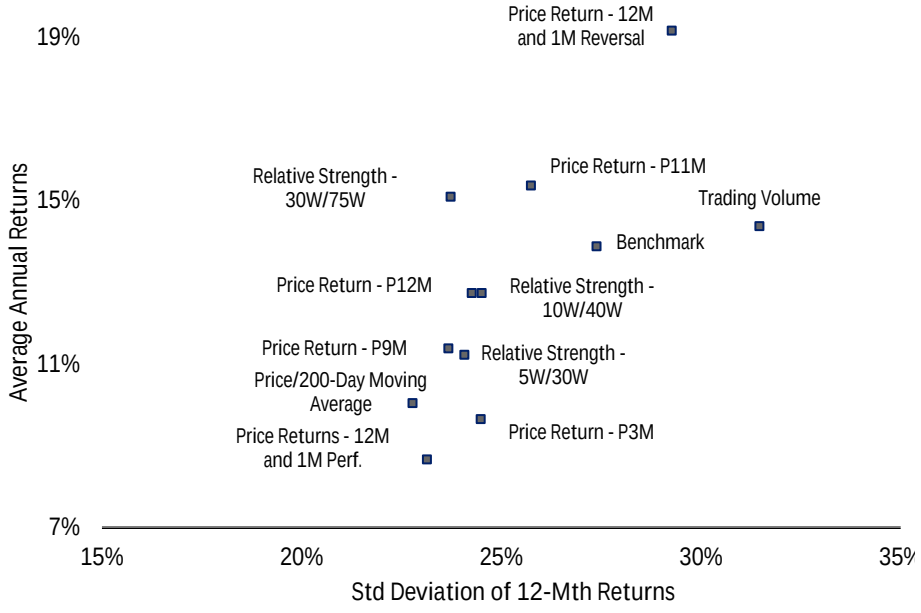
Exhibit 425: Valuation Strategies for Banks: Top Quintile Returns (1985 to 2022)
Historical Relative P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

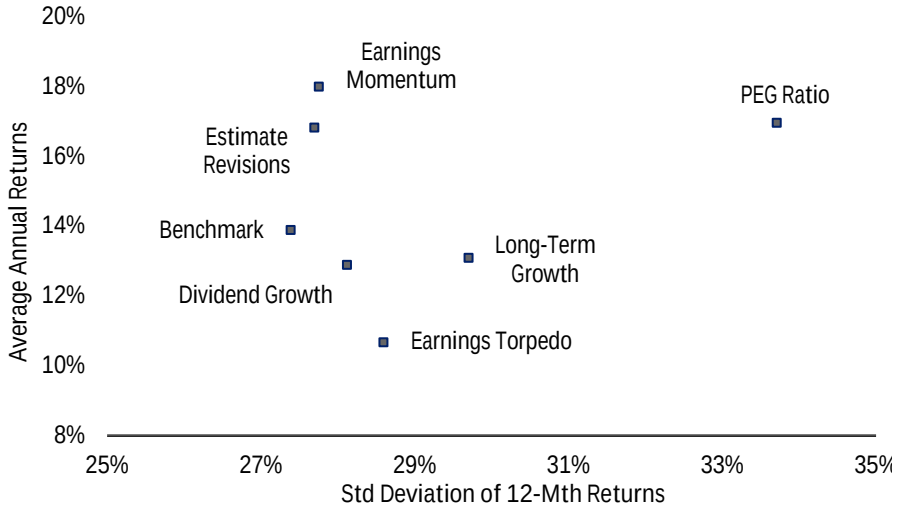
Exhibit 426: Momentum Strategies for Banks: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

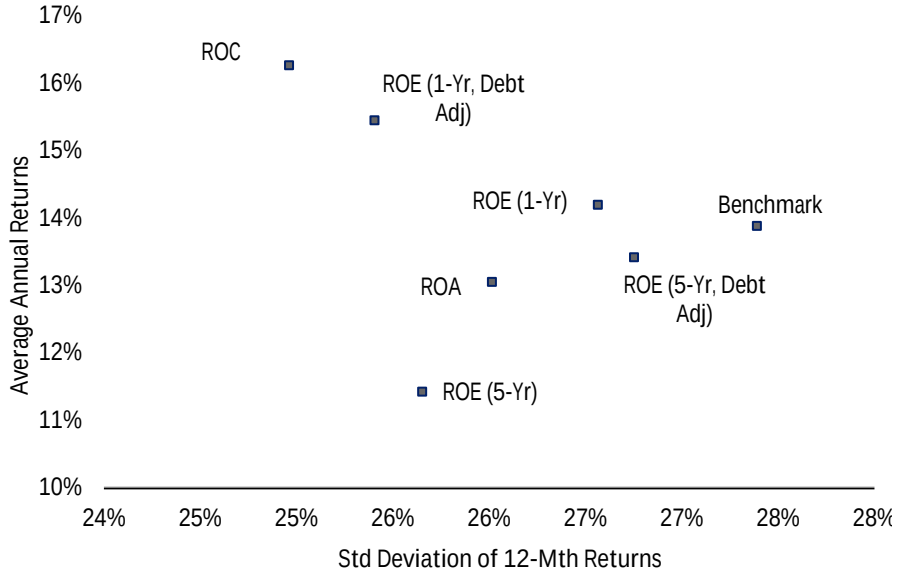
Exhibit 427: Growth Strategies for Banks: Top Quintile Returns (1985 to 2022)
EPS Momentum outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 428: Quality Strategies for Banks: Top Quintile Returns (1985 to 2022)
Return on Capital outperformed the index most

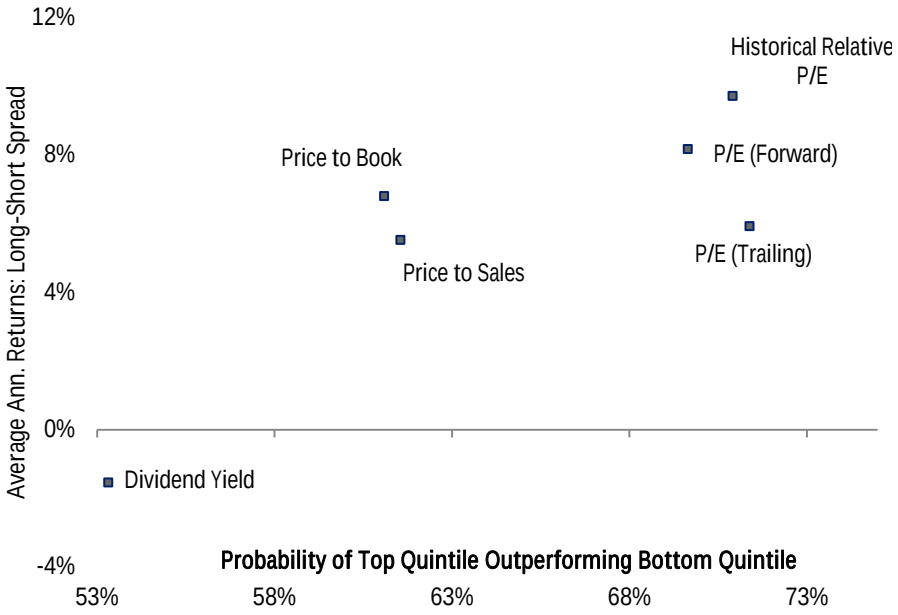


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

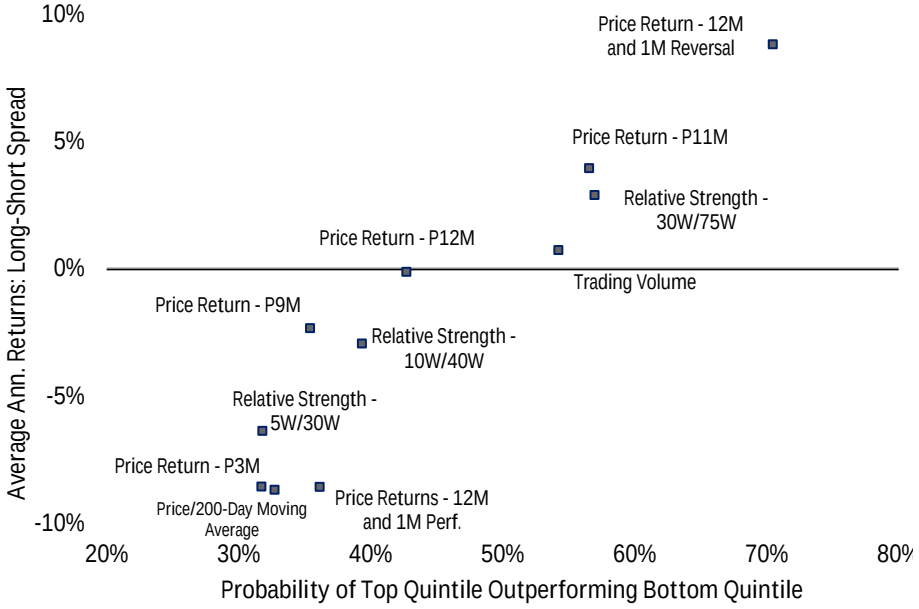
Exhibit 429: Valuation Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Historical Relative P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

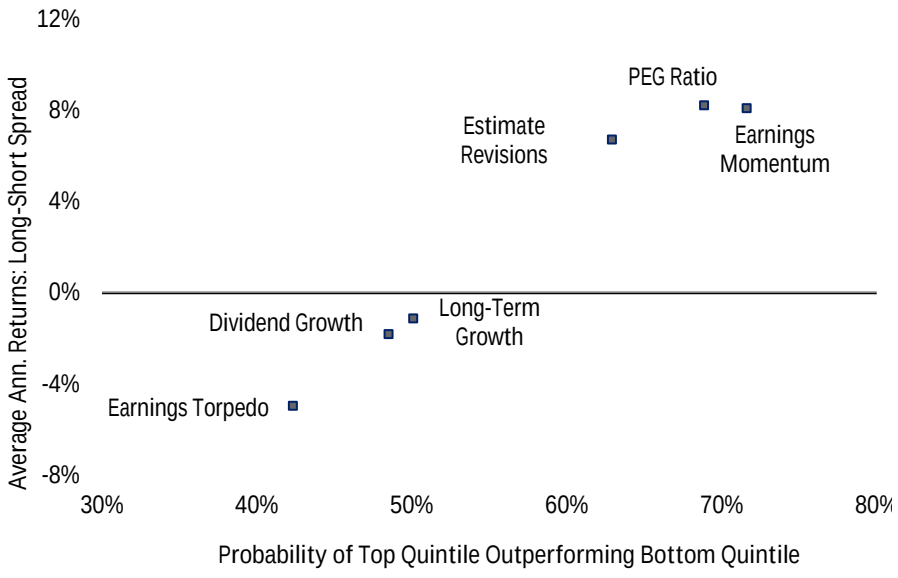
Exhibit 430: Momentum Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

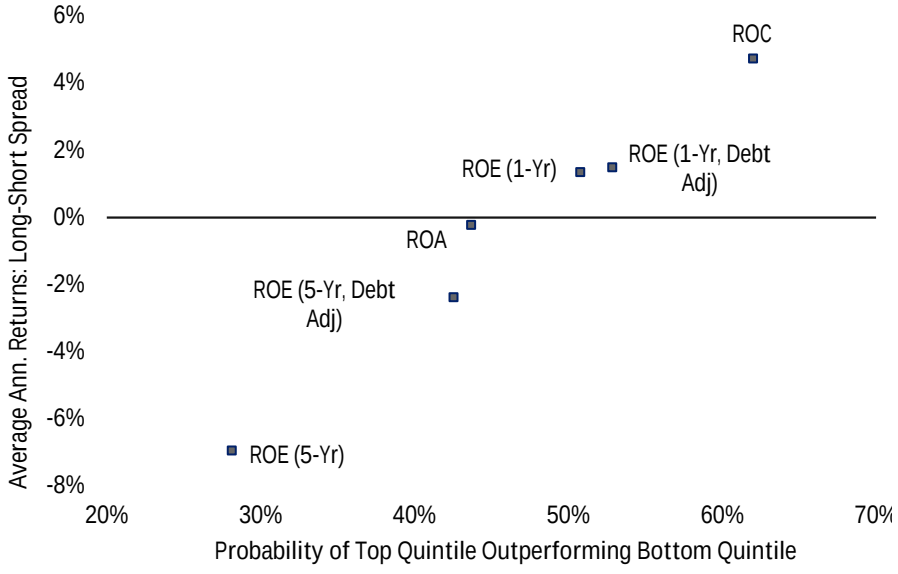
Exhibit 431: Growth Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Low PEG ratio and EPS Momentum fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 432: Quality Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Return on Capital fared best



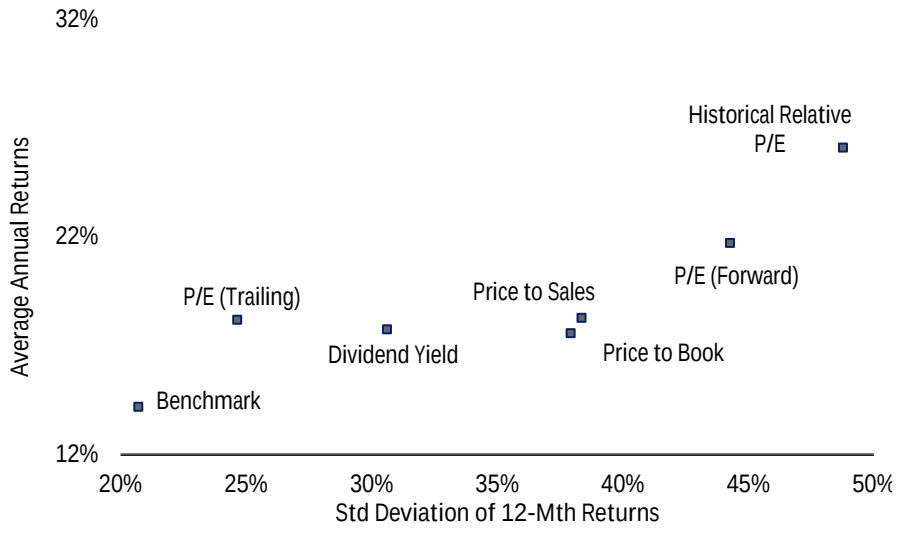
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Financials: Insurance

Long only: Top Quintile Performance

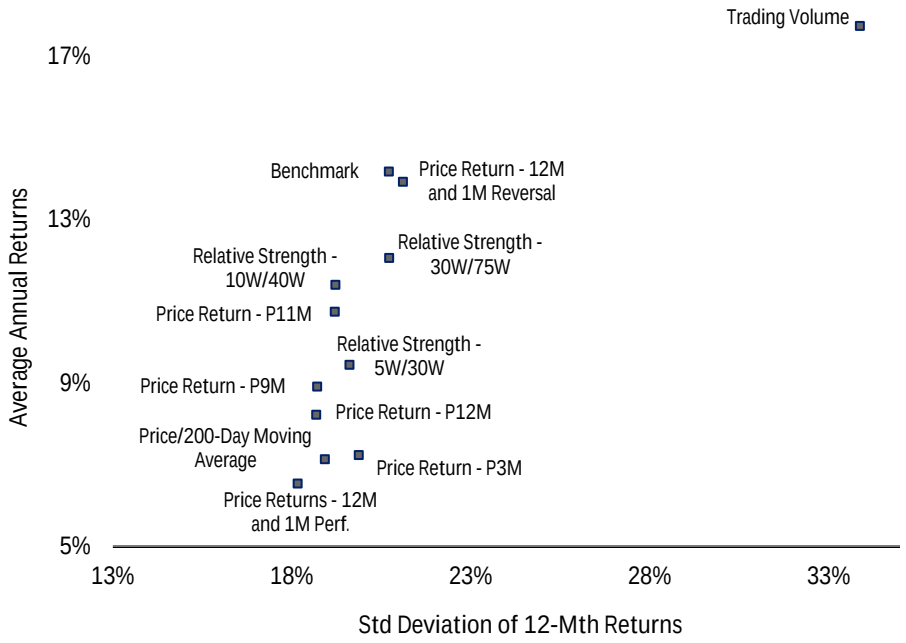
Exhibit 433: Valuation Strategies for Insurance: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

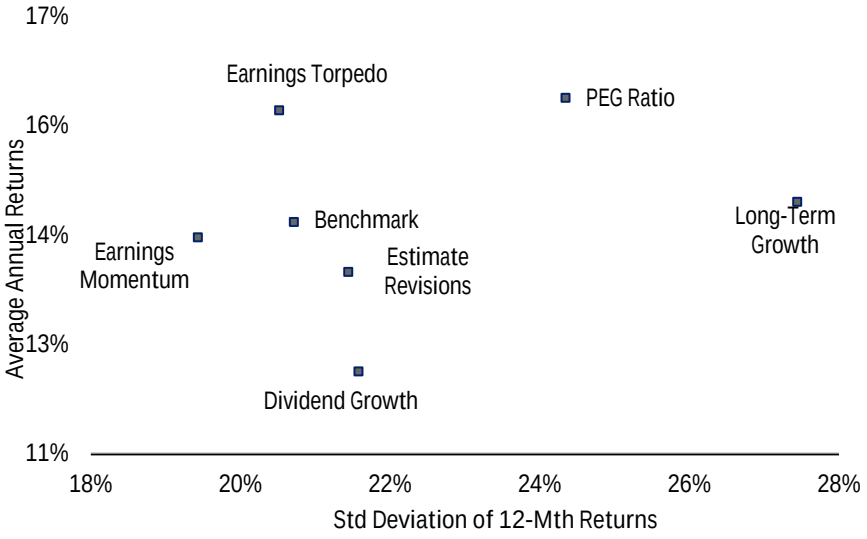
Exhibit 434: Momentum Strategies for Insurance: Top Quintile Returns (1985 to 2022)
High Trading Volume outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

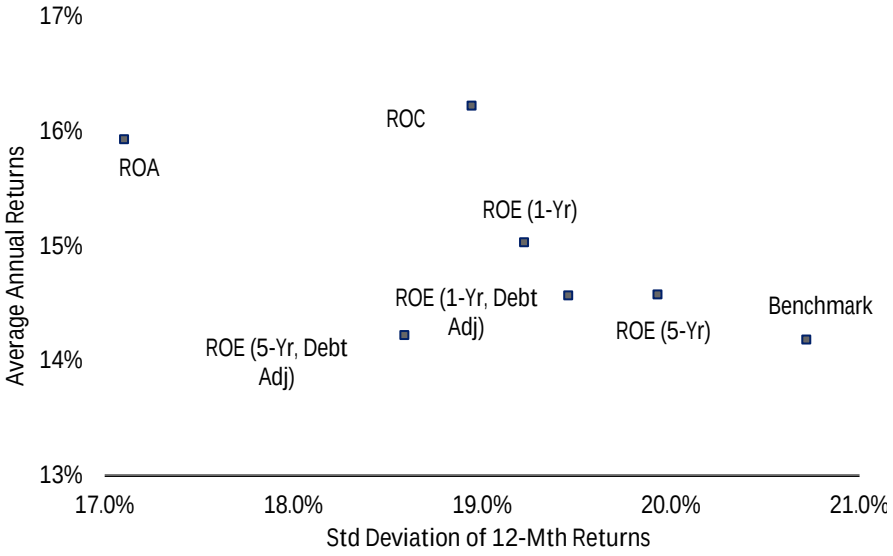
Exhibit 435: Growth Strategies for Insurance: Top Quintile Returns (1985 to 2022)
PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 436: Quality Strategies for Insurance: Top Quintile Returns (1985 to 2022)
ROC outperformed the index most

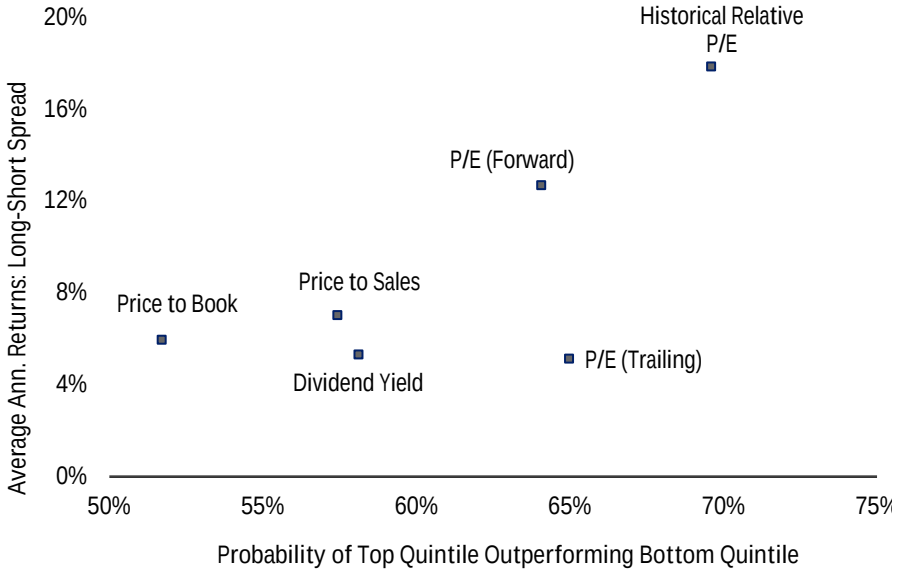


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

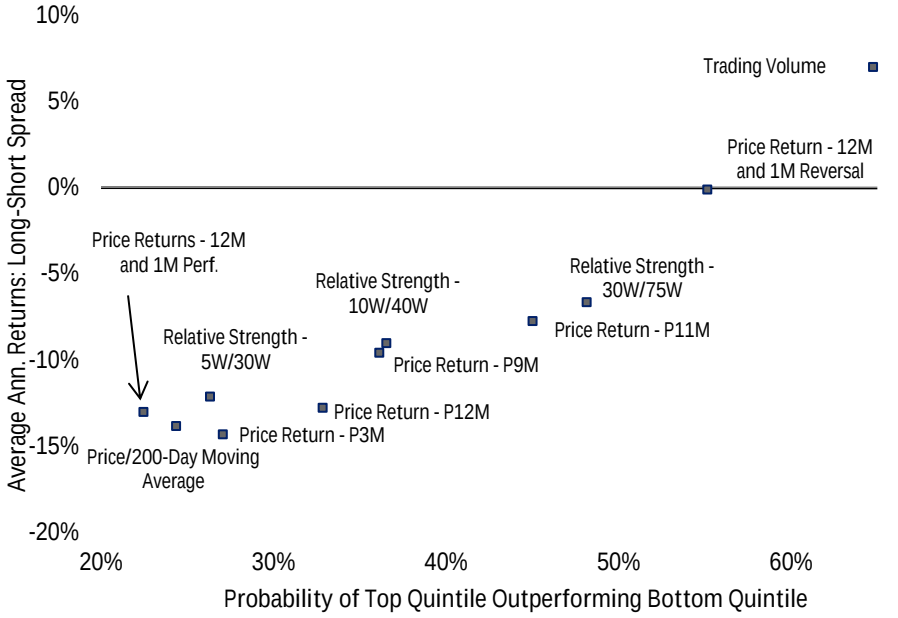
Exhibit 437: Valuation Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Historical Relative P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

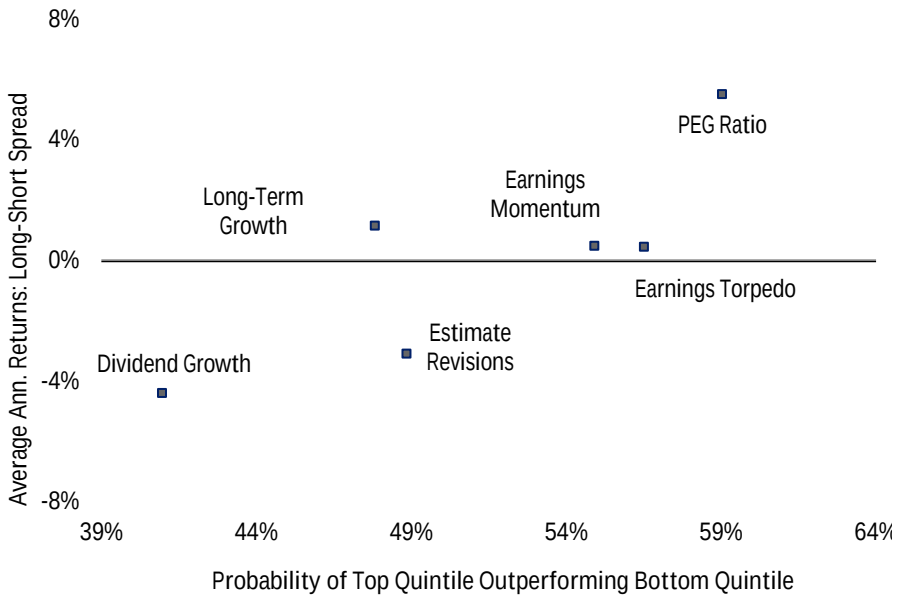
Exhibit 438: Momentum Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
High Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

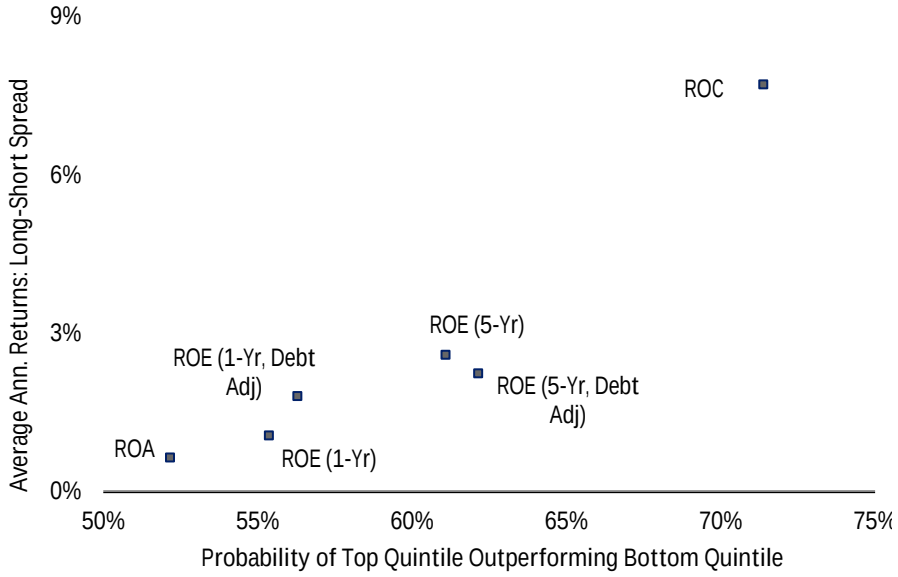
Exhibit 439: Growth Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 440: Quality Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC fared best



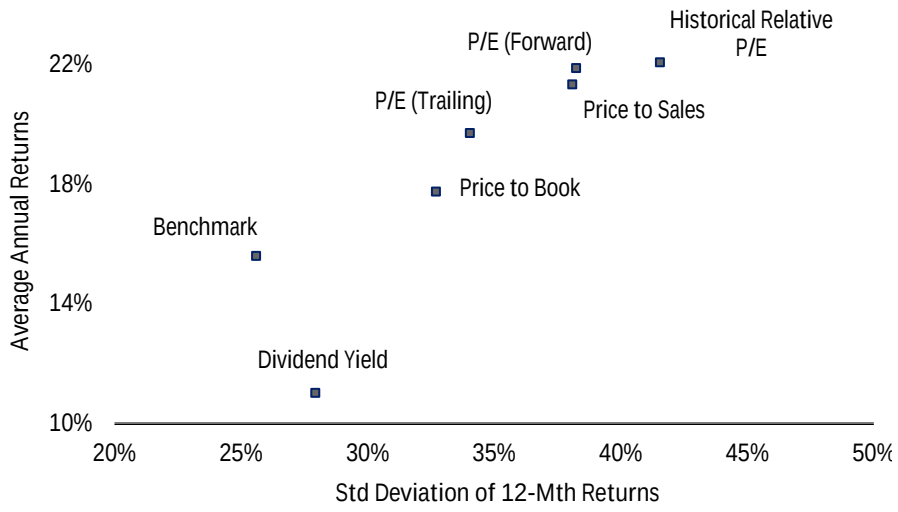
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Financials: Diversified

Long only: Top Quintile Performance

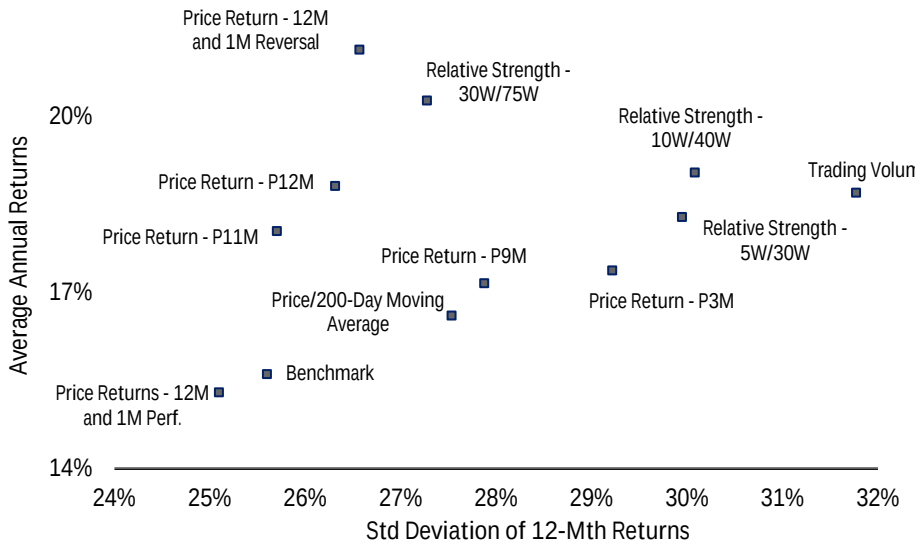
Exhibit 441: Valuation Strategies for Diversified Financials: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

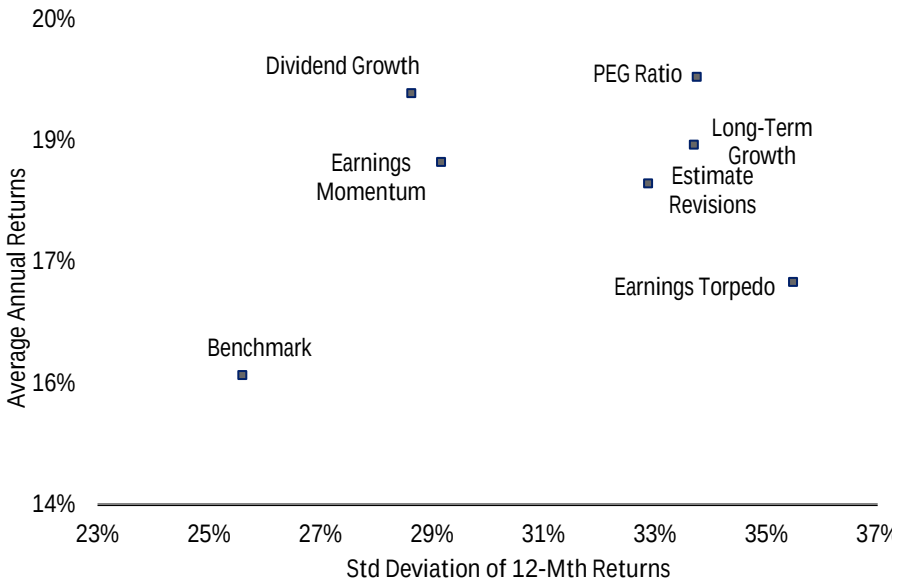
Exhibit 442: Momentum Strategies for Diversified Financials: Top Quintile Returns (1985 to 2022)
12M and 1M Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

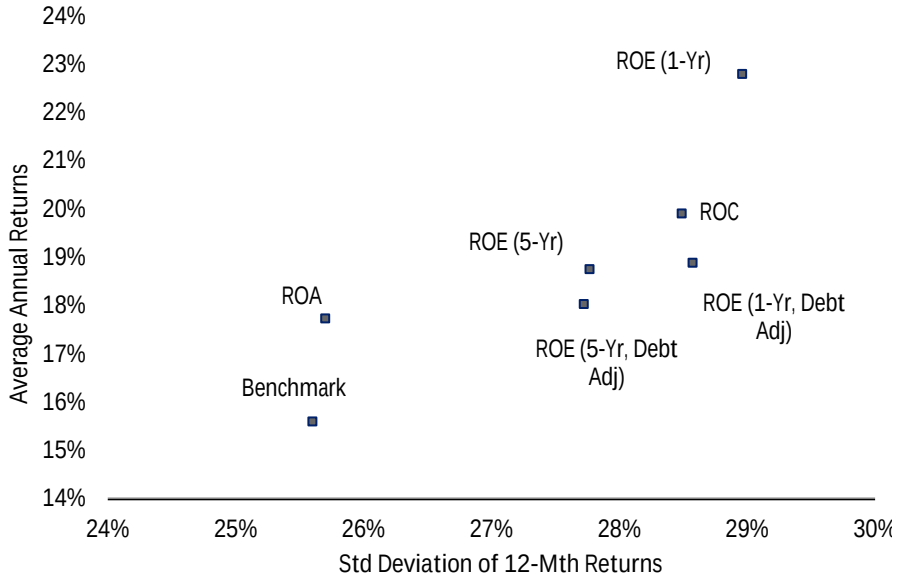
Exhibit 443: Growth Strategies for Diversified Financials: Top Quintile Returns (1985 to 2022)
Dividend Growth and PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 444: Quality Strategies for Diversified Financials: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most

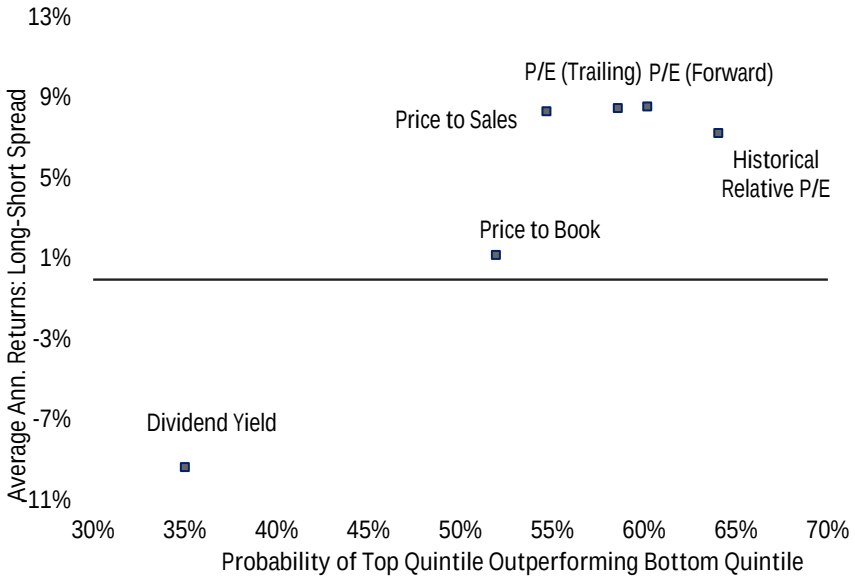


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

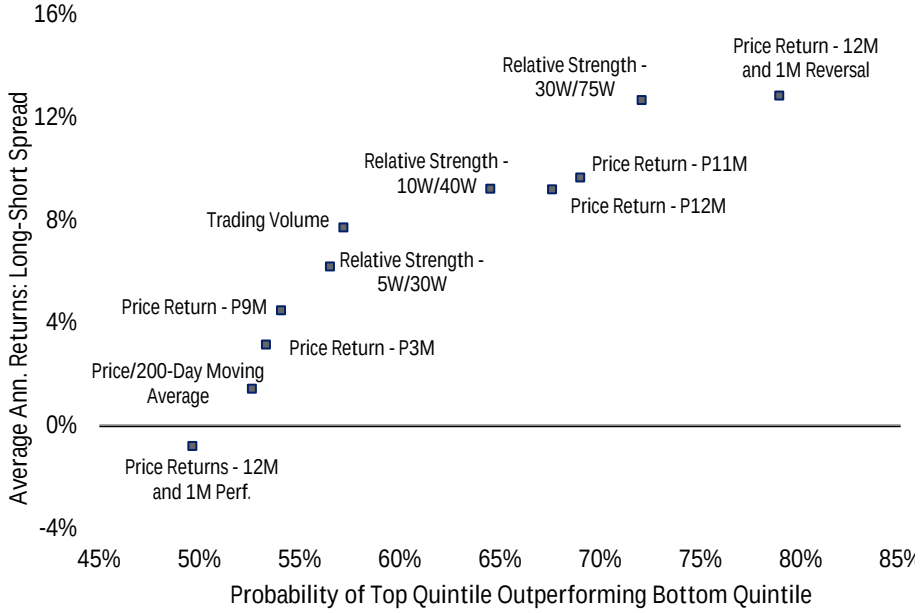
Exhibit 445: Valuation Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Forward and Trailing P/E fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

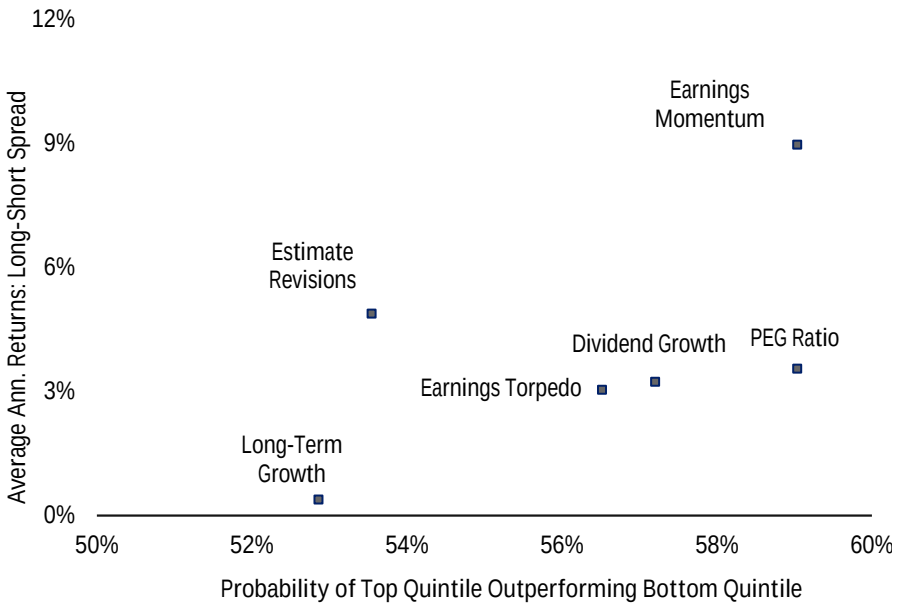
Exhibit 446: Momentum Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12M and 1M Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

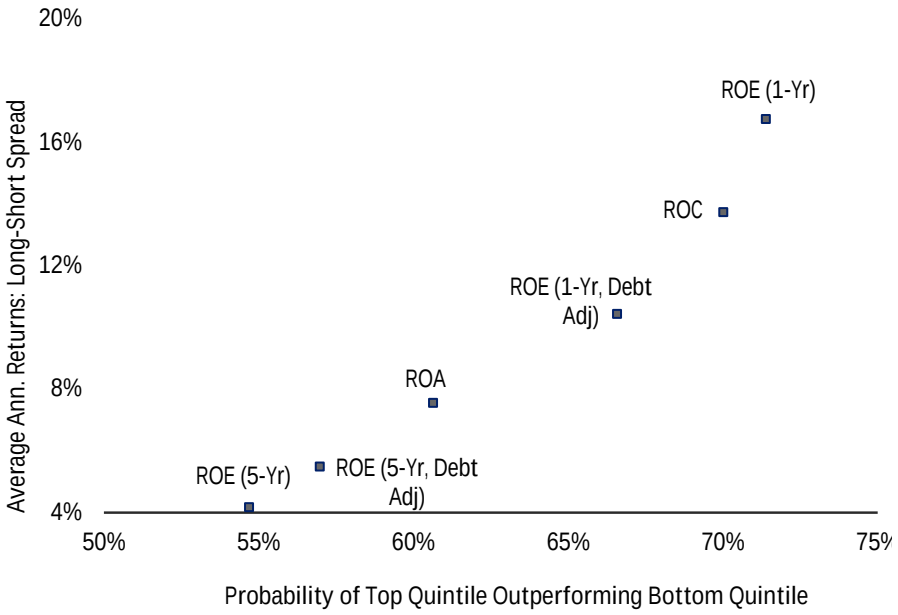
Exhibit 447: Growth Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EPS Momentum fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 448: Quality Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
1-yr ROE fared best



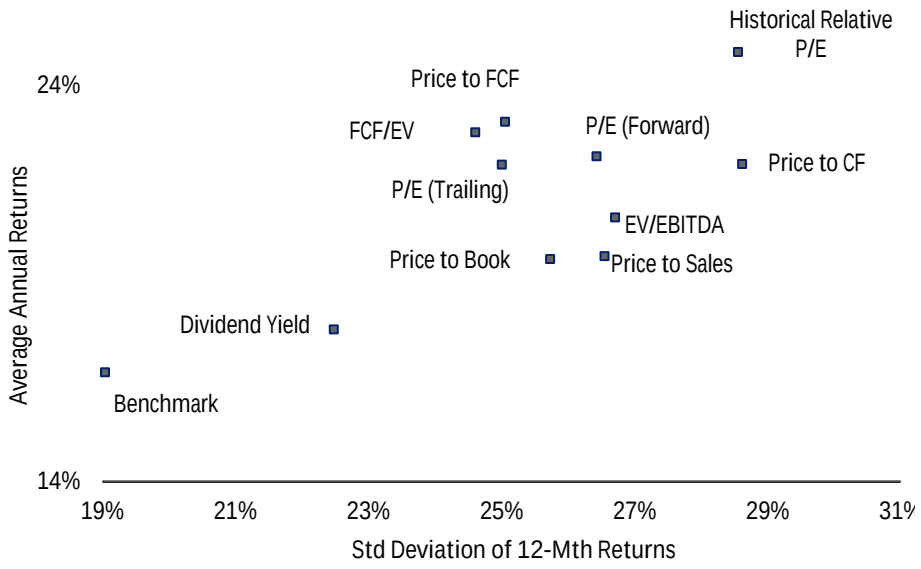
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Health Care: Health Care Equipment & Svcs

Long only: Top Quintile Performance

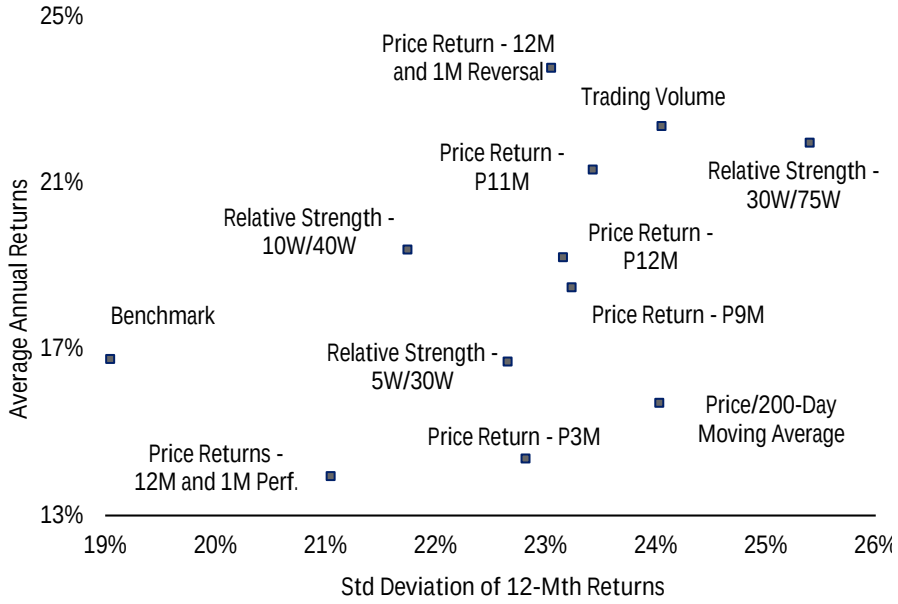
Exhibit 449: Valuation Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

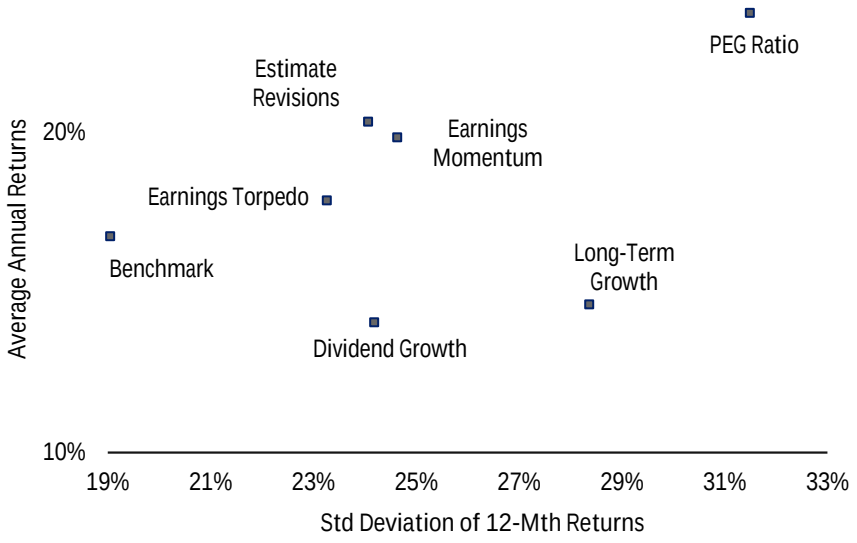
Exhibit 450: Momentum Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

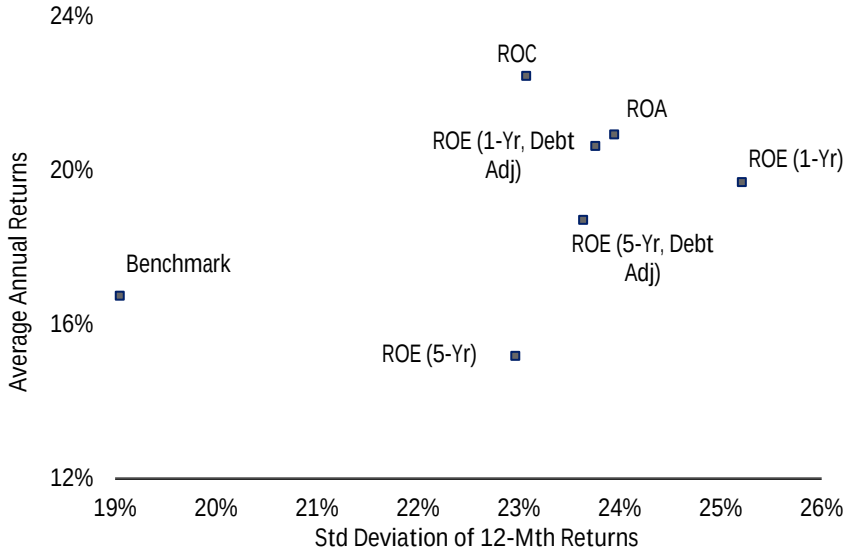
Exhibit 451: Growth Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2022)
PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 452: Quality Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2022)
ROC outperformed the index most

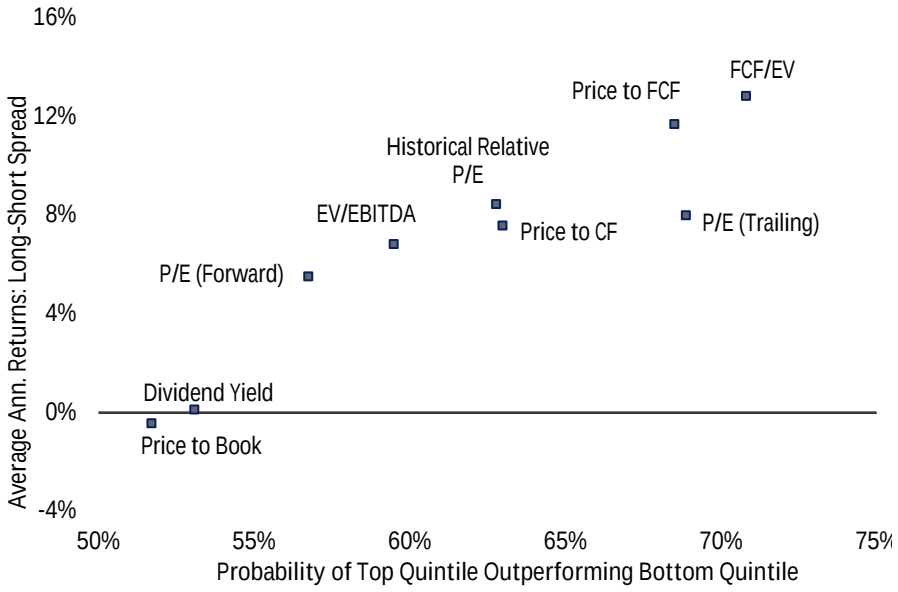


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

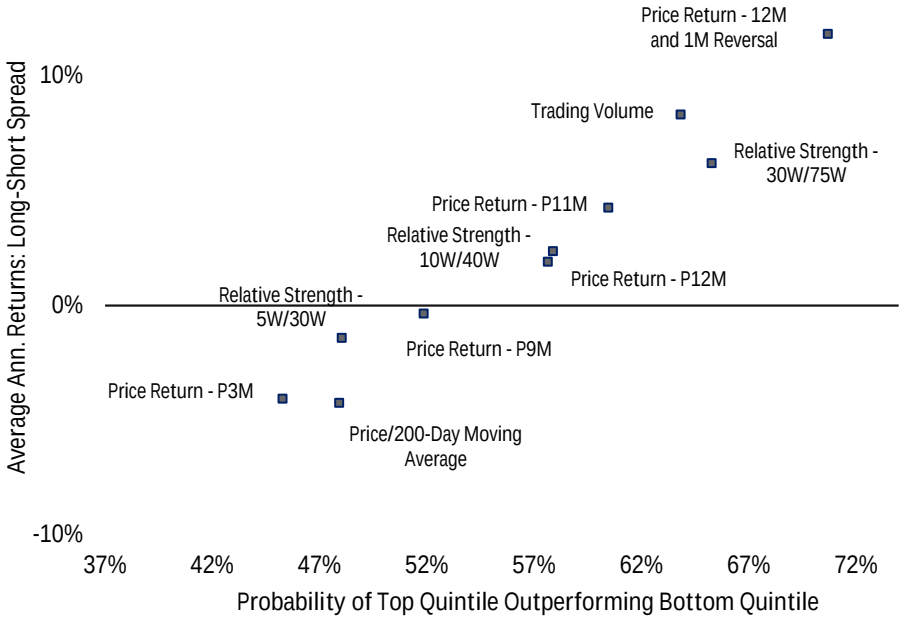
Exhibit 453: Valuation Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
FCF/EV fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

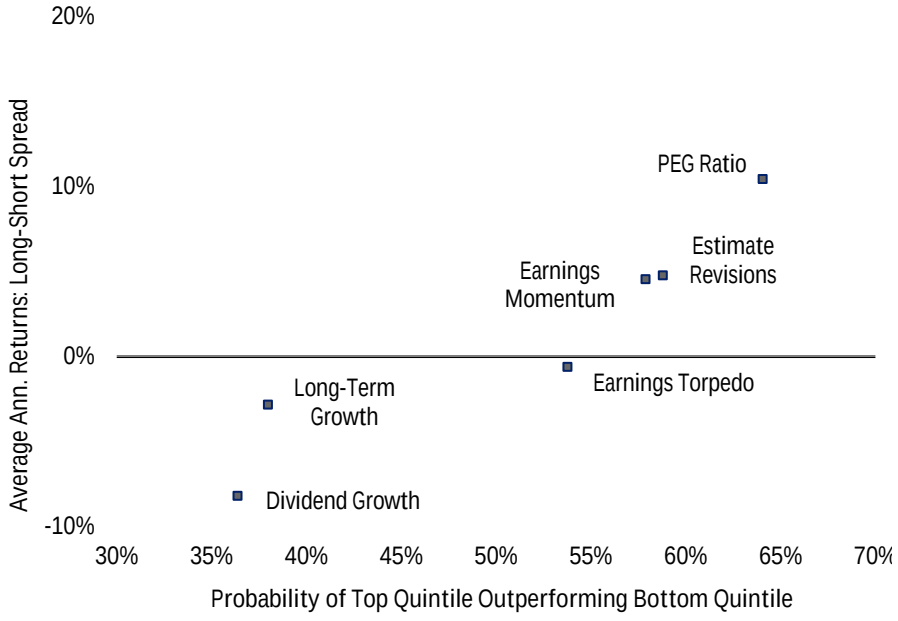
Exhibit 454: Momentum Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

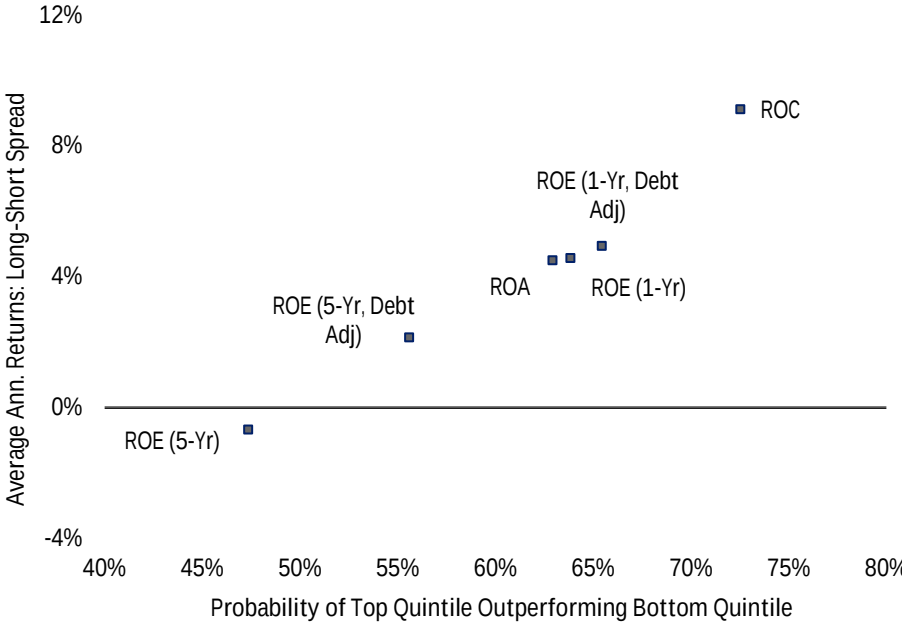
Exhibit 455: Growth Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 456: Quality Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC fared best



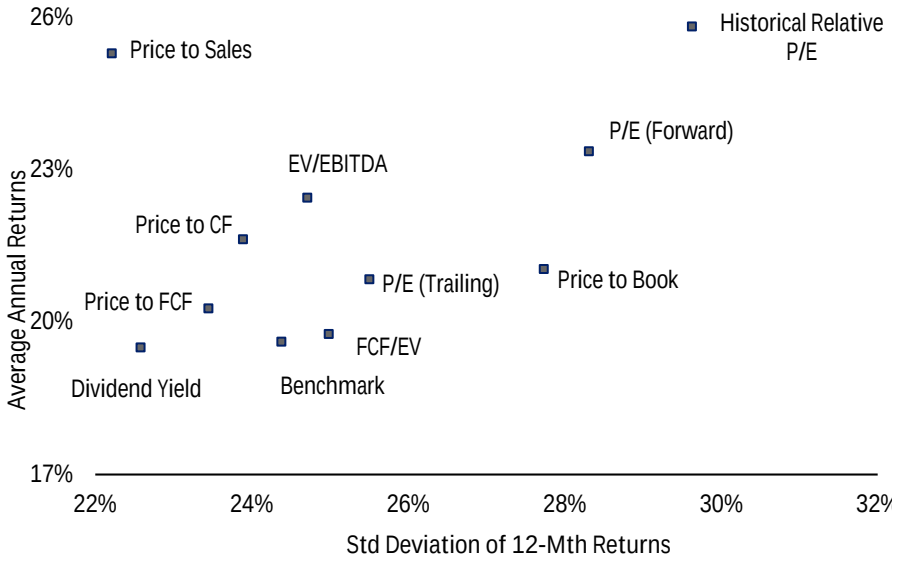
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Health Care: Pharmaceuticals Biotechnology & Life Sciences

Long only: Top Quintile Performance

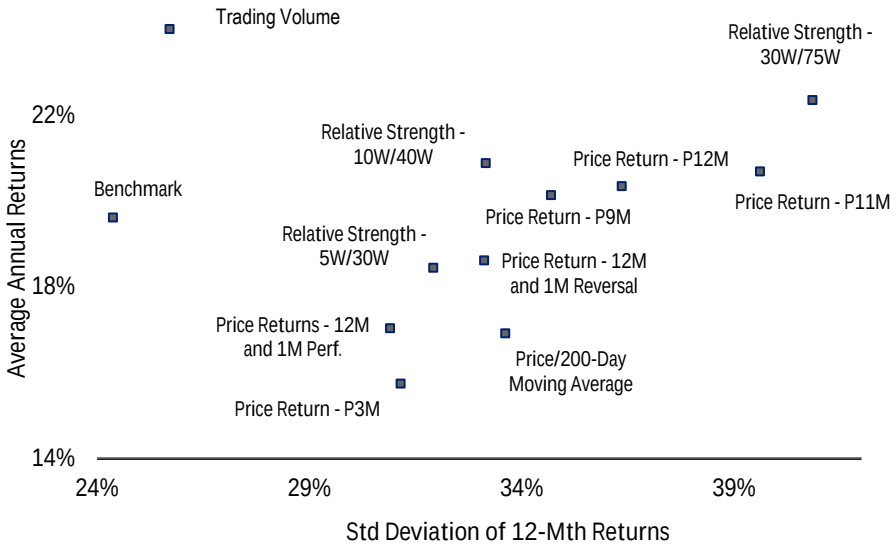
Exhibit 457: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

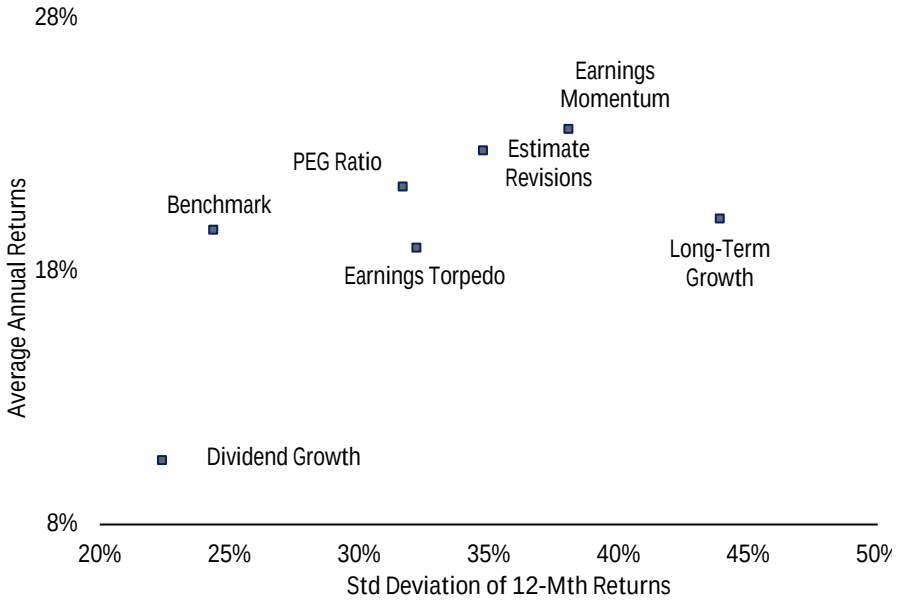
Exhibit 458: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2022)
Trading Volume and 30W/75W Relative Strength outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

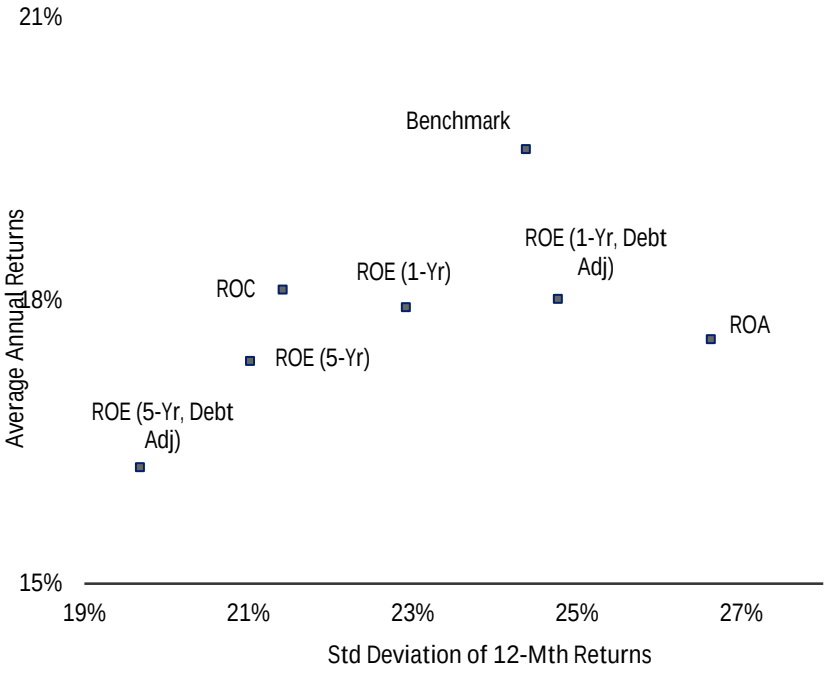
Exhibit 459: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2022)
EPS Momentum outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 460: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2022)
ROC and 1-yr Debt Adj. ROE underperformed the index least

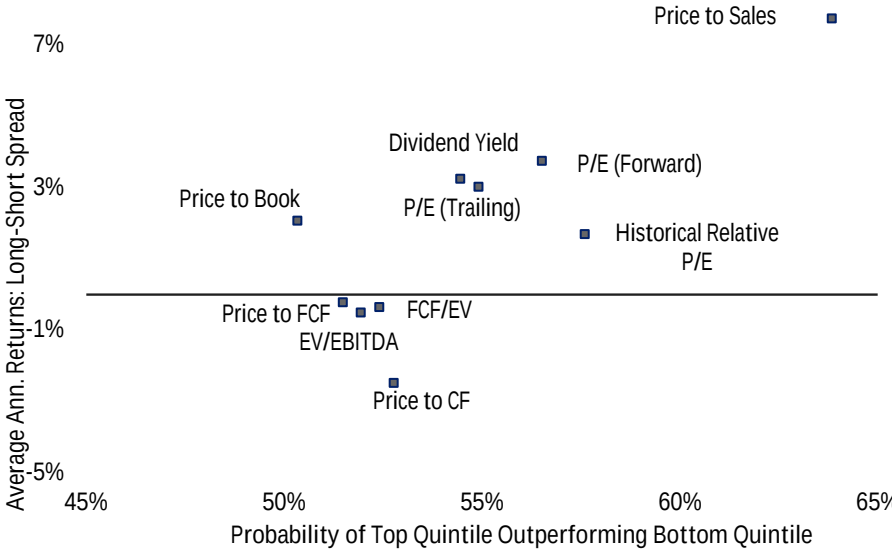


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

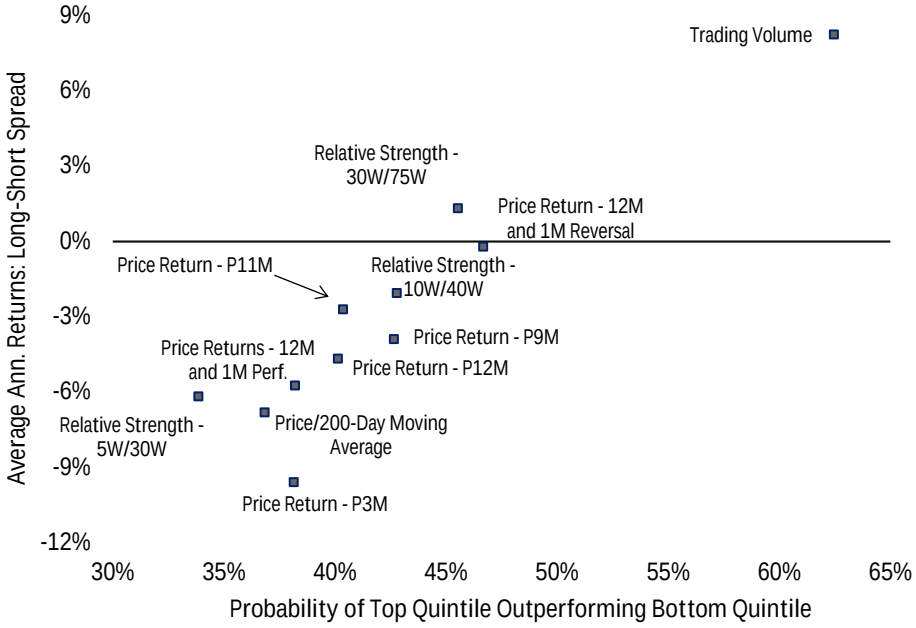
Exhibit 461: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price to Sales fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

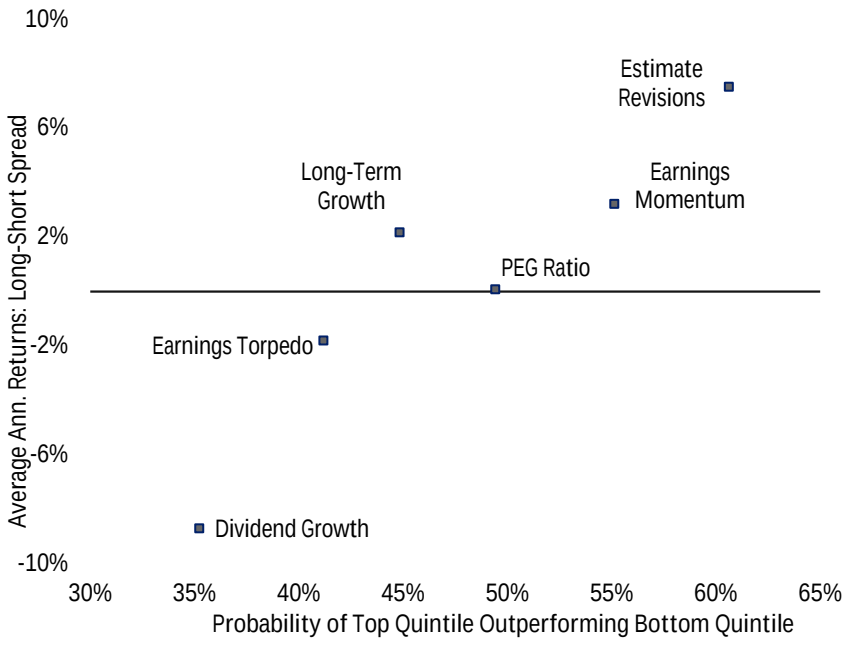
Exhibit 462: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
High Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

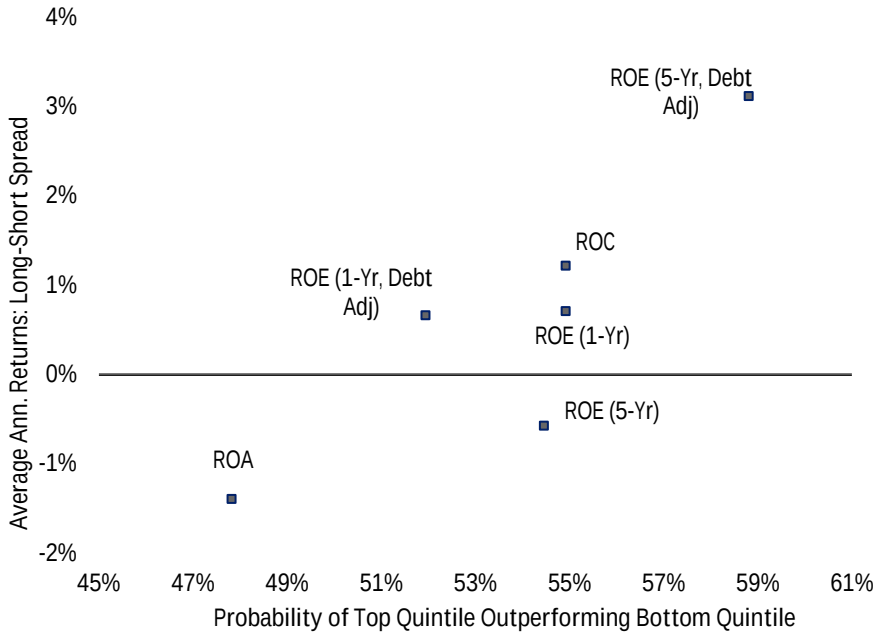
Exhibit 463: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EPS Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 464: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
5-yr Deb Adj. ROE fared best



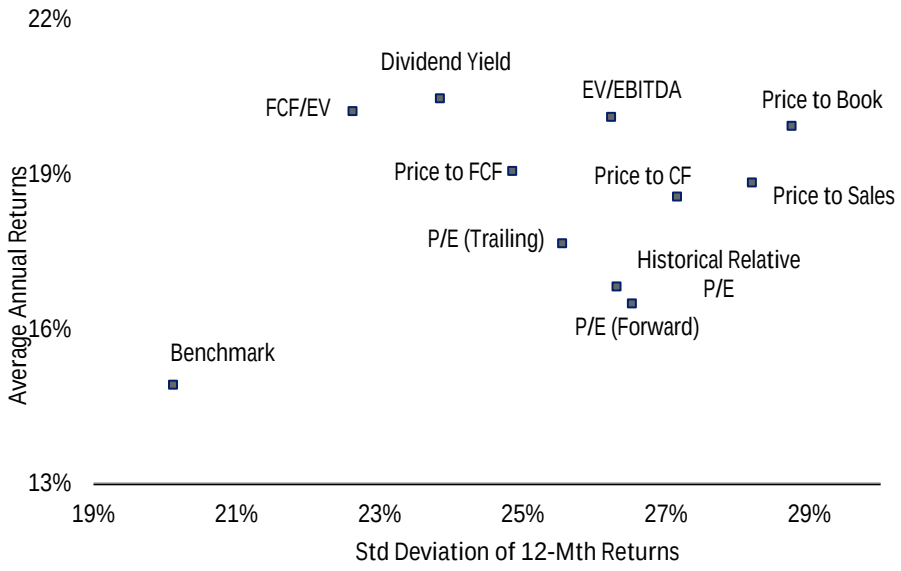
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Industrials: Capital Goods

Long only: Top Quintile Performance

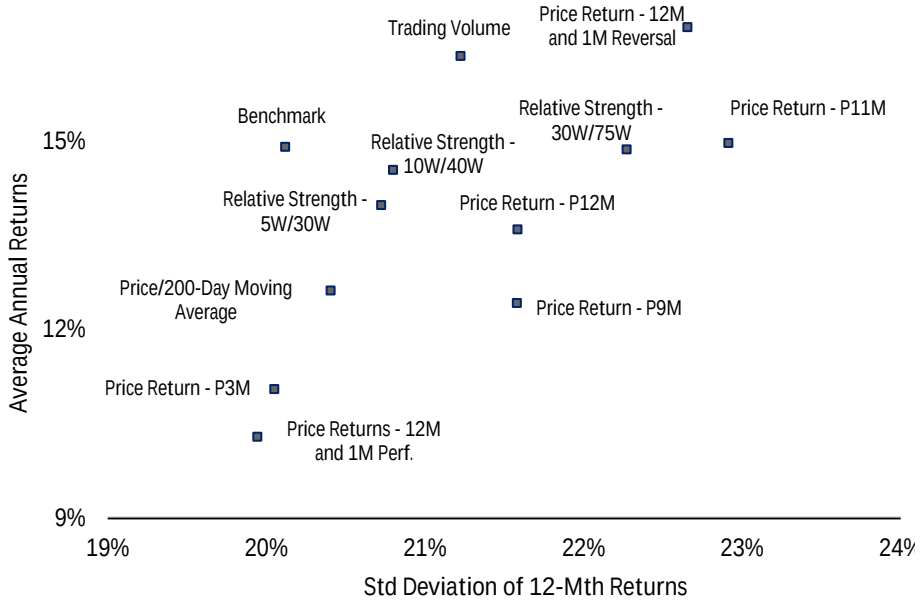
Exhibit 465: Valuation Strategies for Capital Goods: Top Quintile Returns (1985 to 2022)
Dividend Yield outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

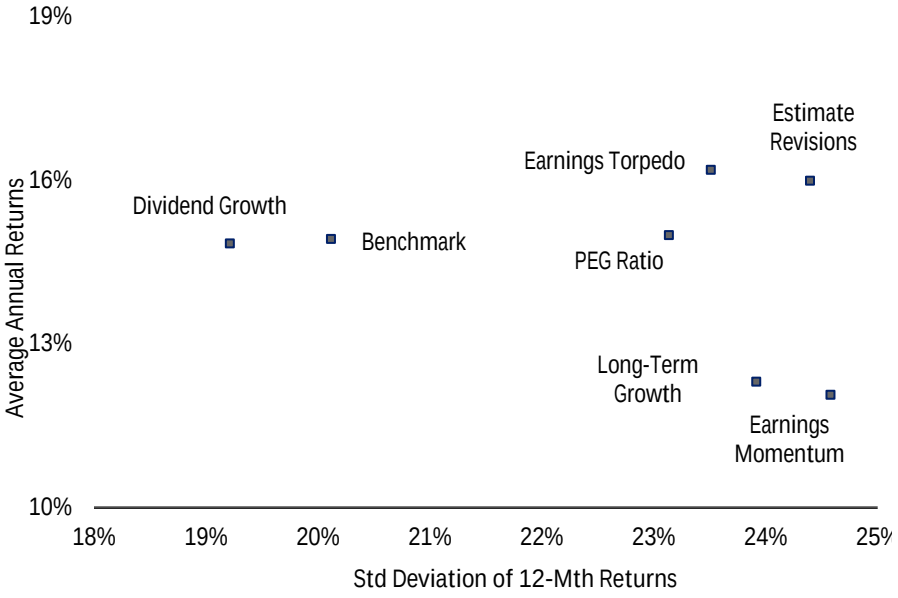
Exhibit 466: Momentum Strategies for Capital Goods: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

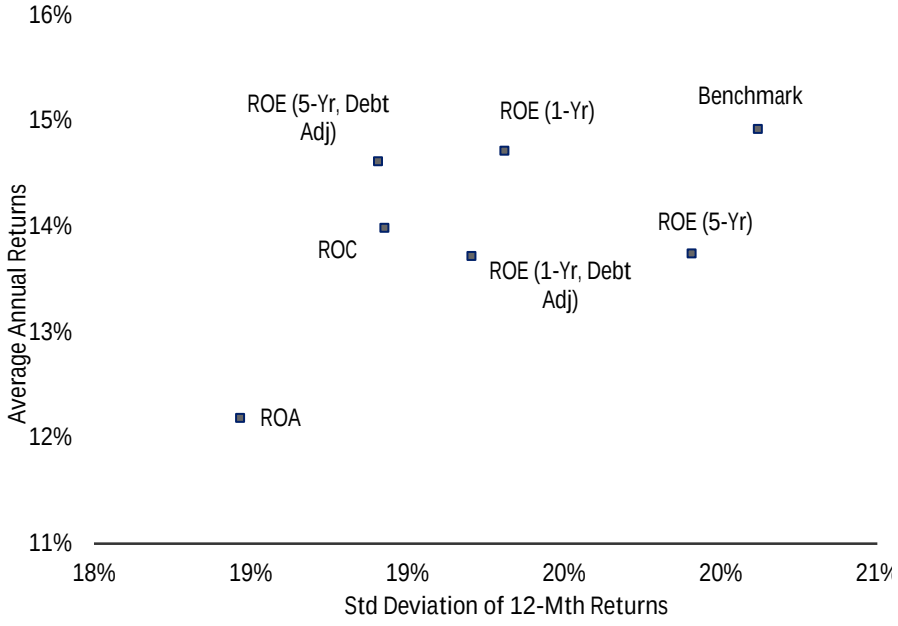
Exhibit 467: Growth Strategies for Capital Goods: Top Quintile Returns (1985 to 2022)
EPS Torpedo outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 468: Quality Strategies for Capital Goods: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most

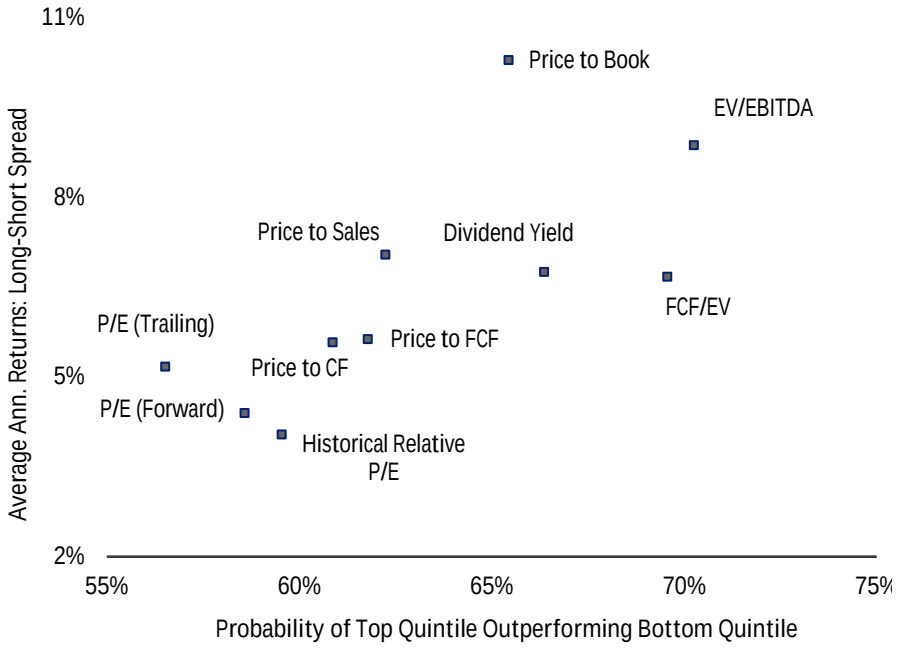


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

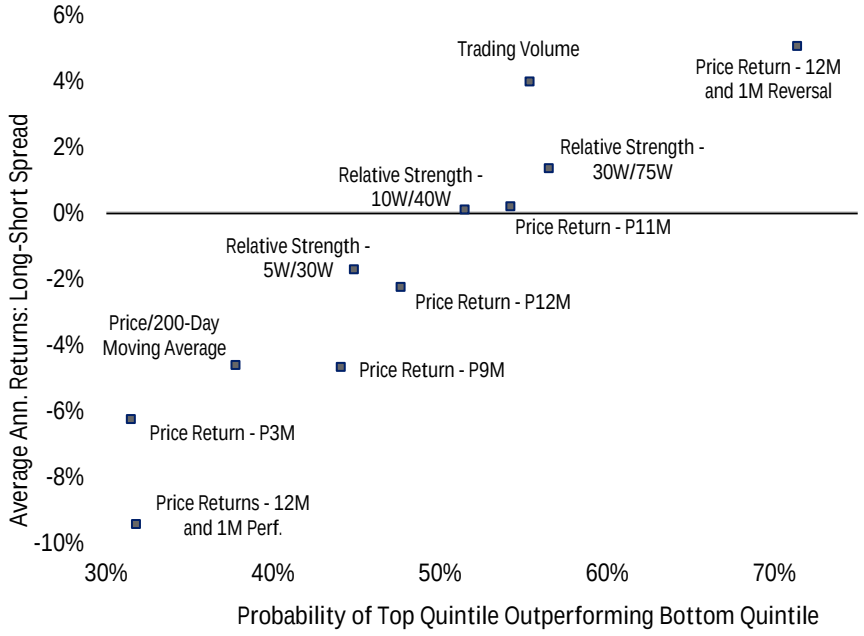
Exhibit 469: Valuation Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price to Book and EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

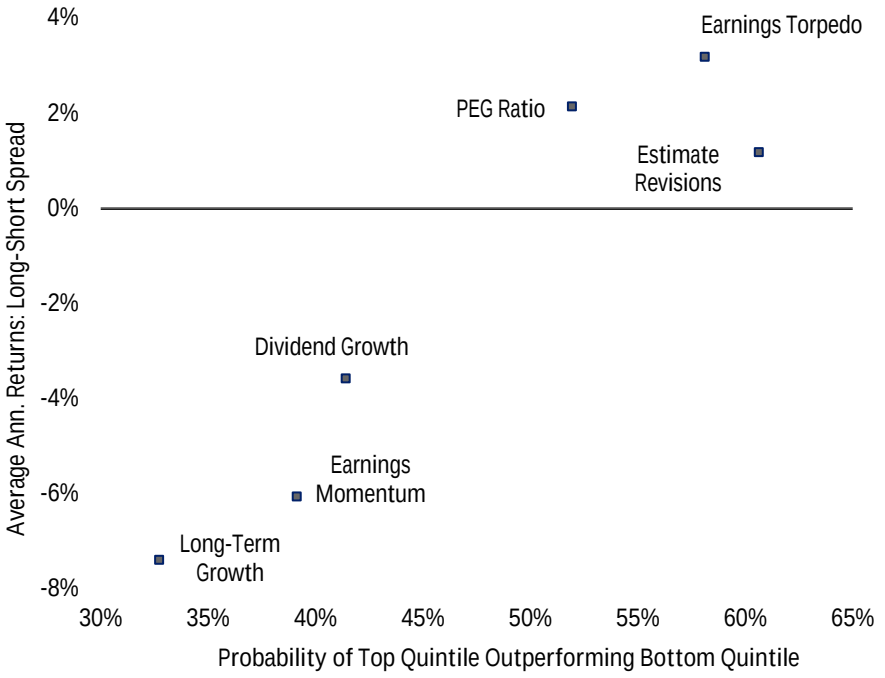
Exhibit 470: Momentum Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

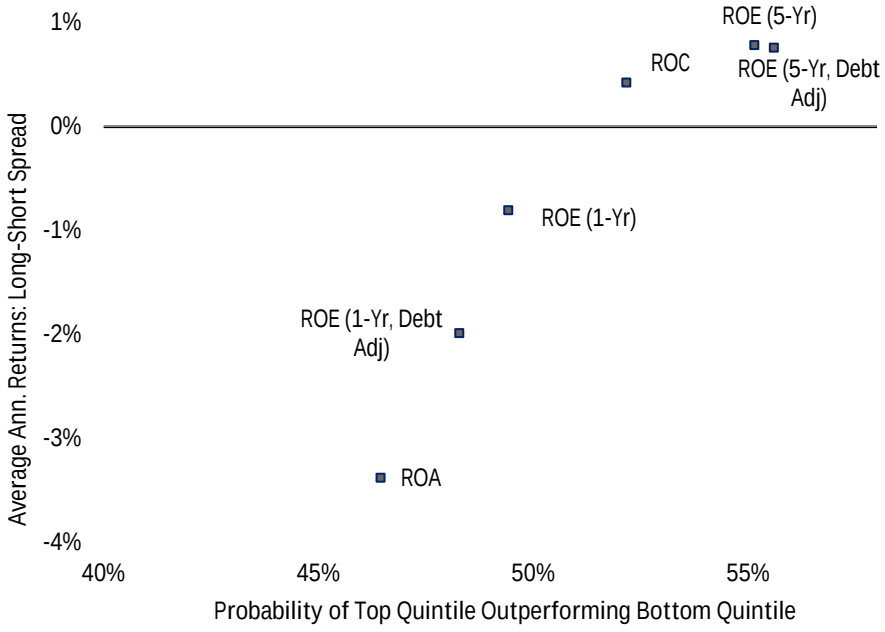
Exhibit 471: Growth Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EPS Torpedo fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 472: Quality Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
5-yr ROE fared best



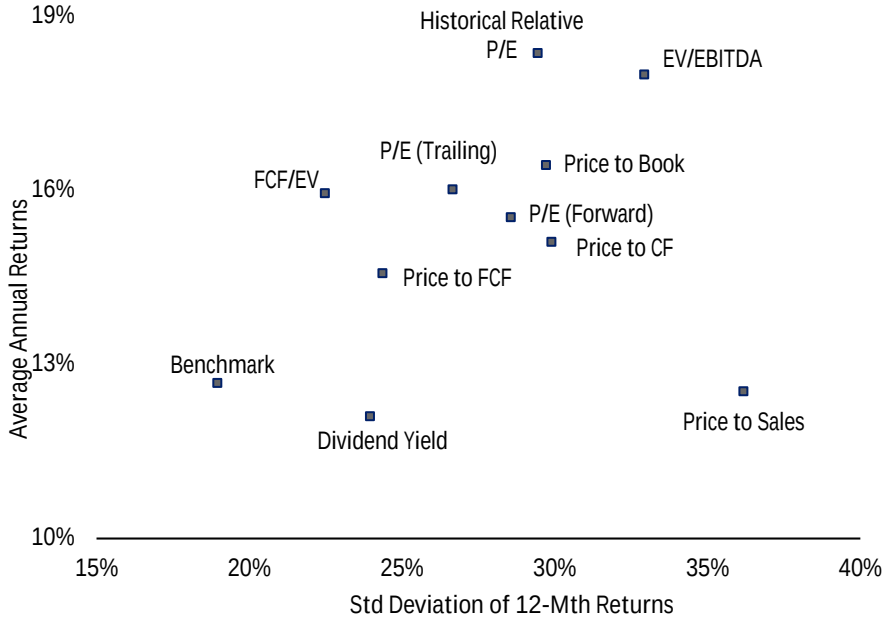
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Other Industrials (Services, Transports)

Long only: Top Quintile Performance

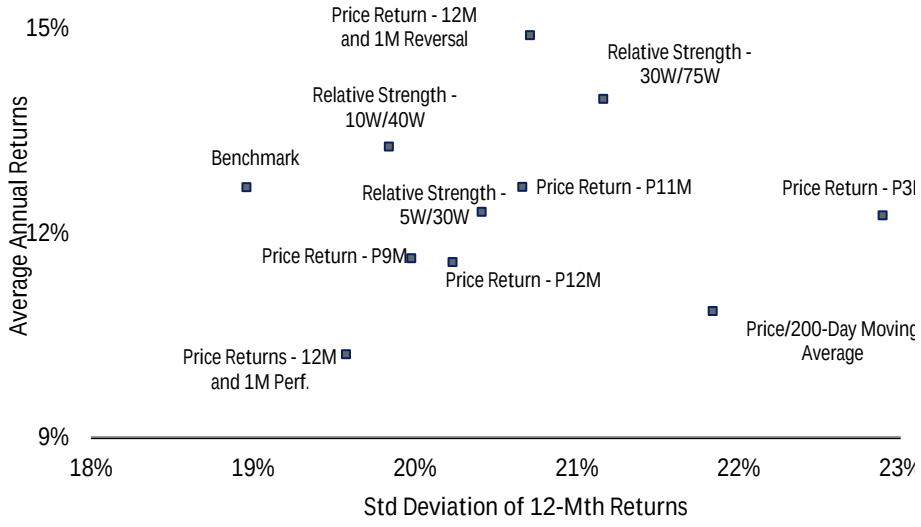
Exhibit 473: Valuation Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2022)
Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

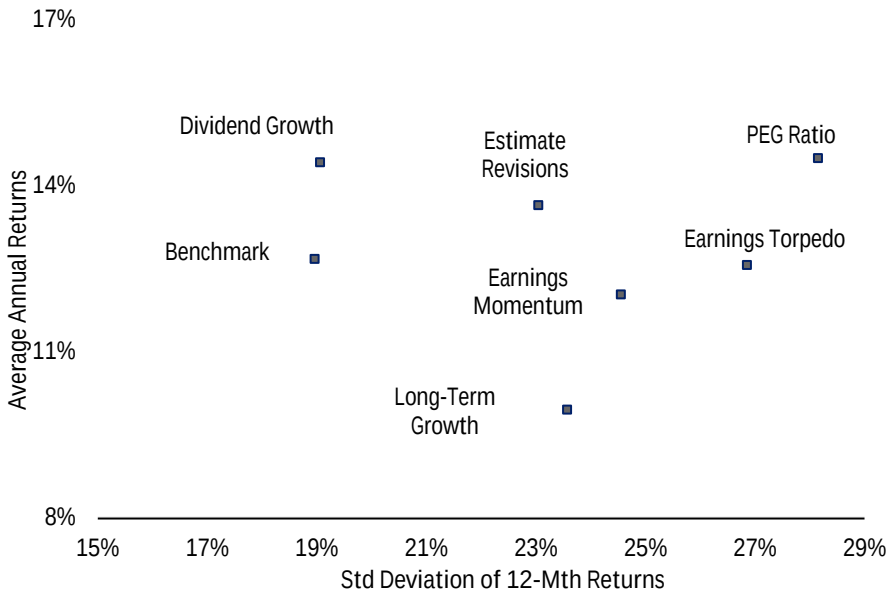
Exhibit 474: Momentum Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

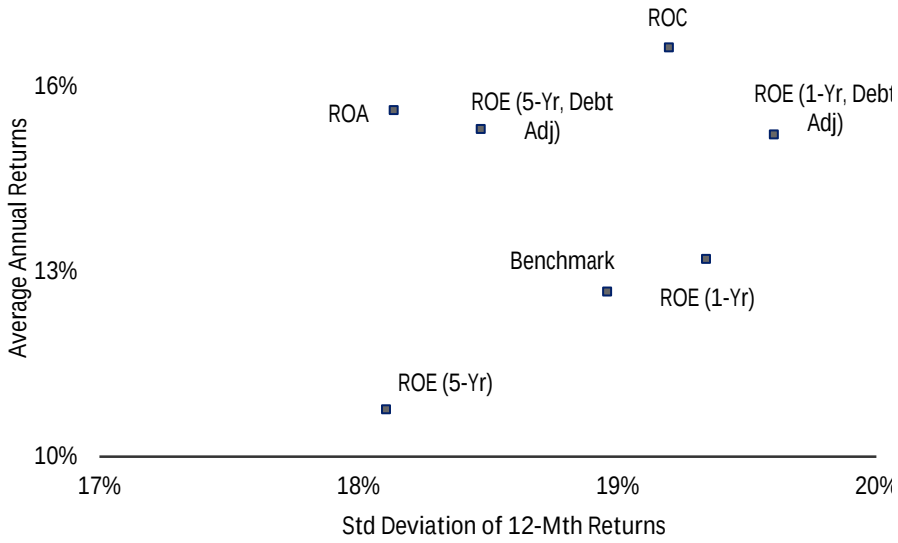
Exhibit 475: Growth Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2022)
PEG Ratio and Dividend Growth outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 476: Quality Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2022)
ROC outperformed the index most

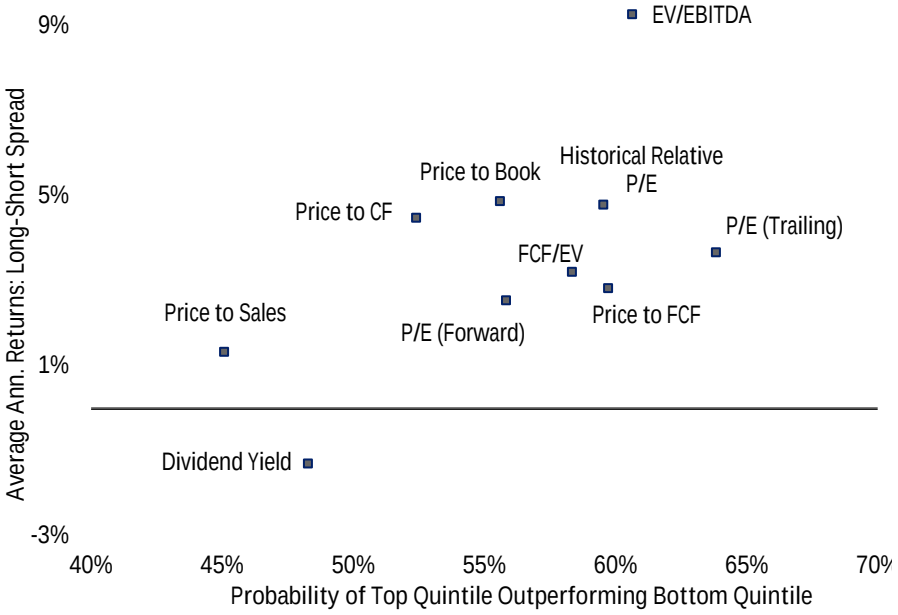


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

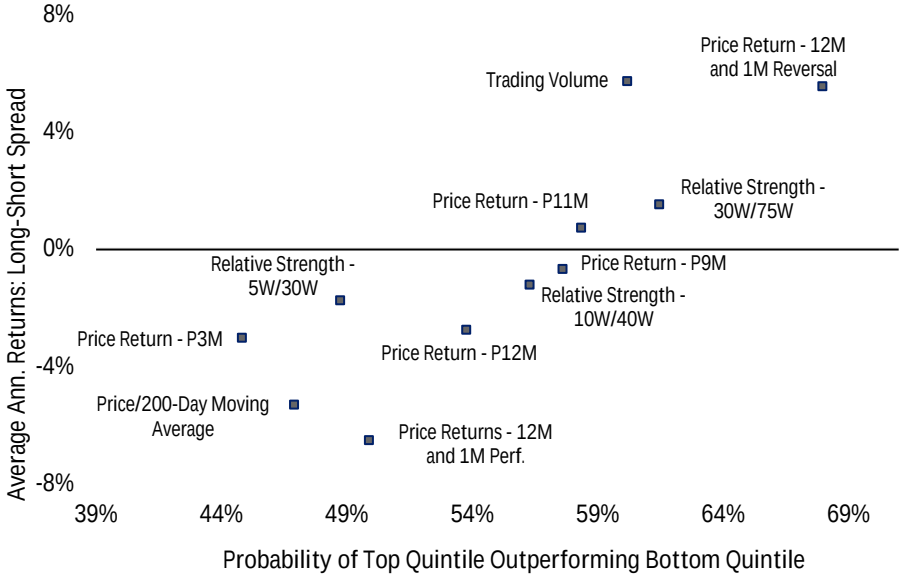
Exhibit 477: Valuation Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

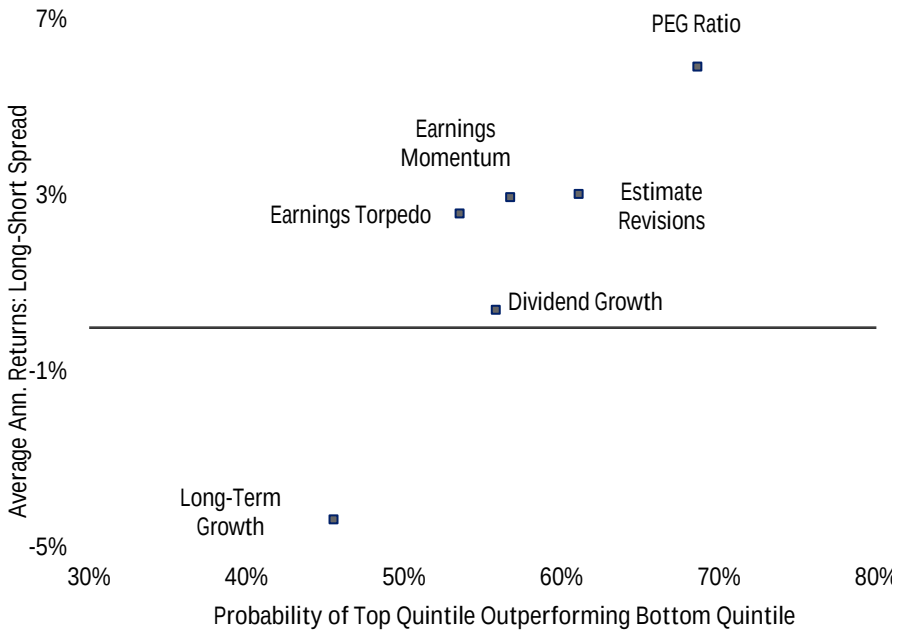
Exhibit 478: Momentum Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Trading Volume and 12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

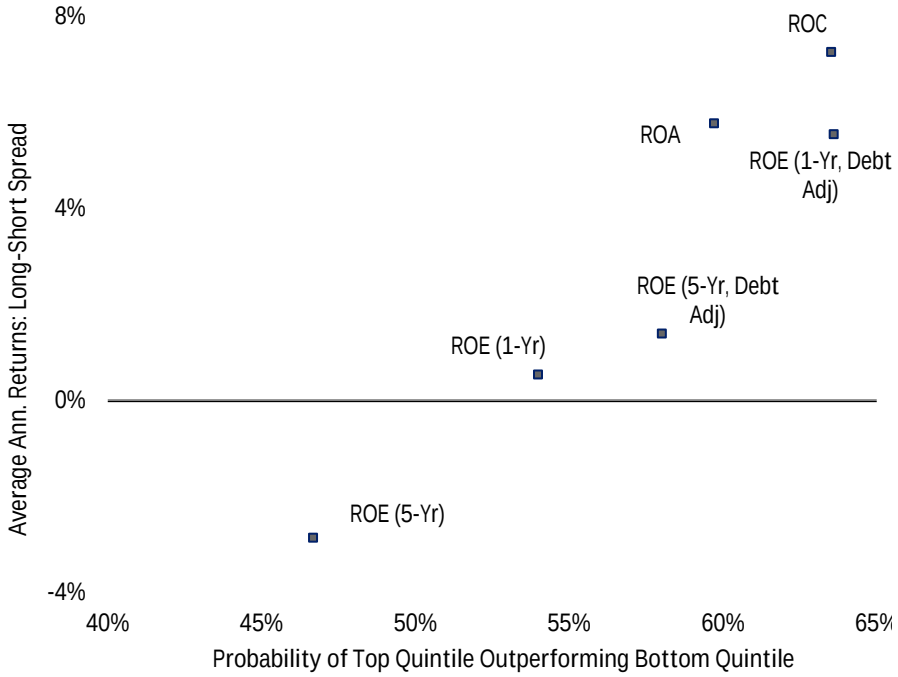
Exhibit 479: Growth Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 480: Quality Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC fared best



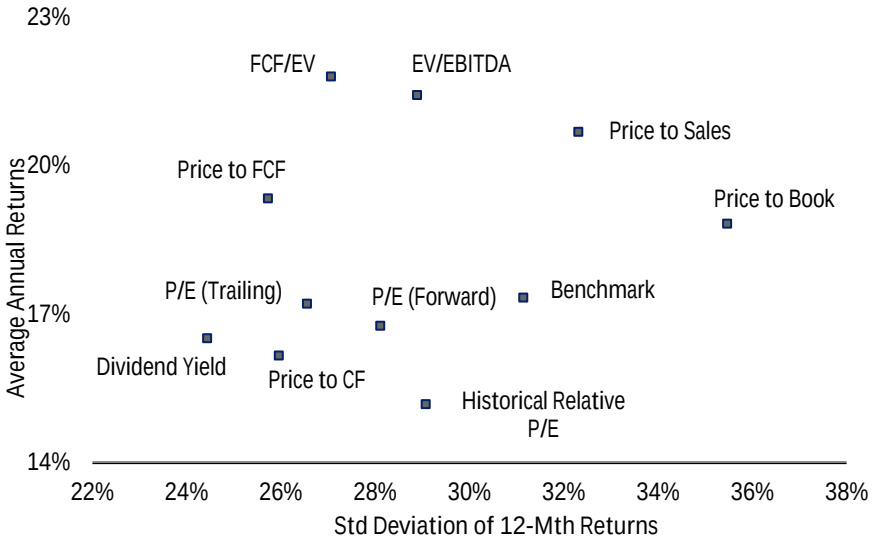
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Information Technology

Long only: Top Quintile Performance

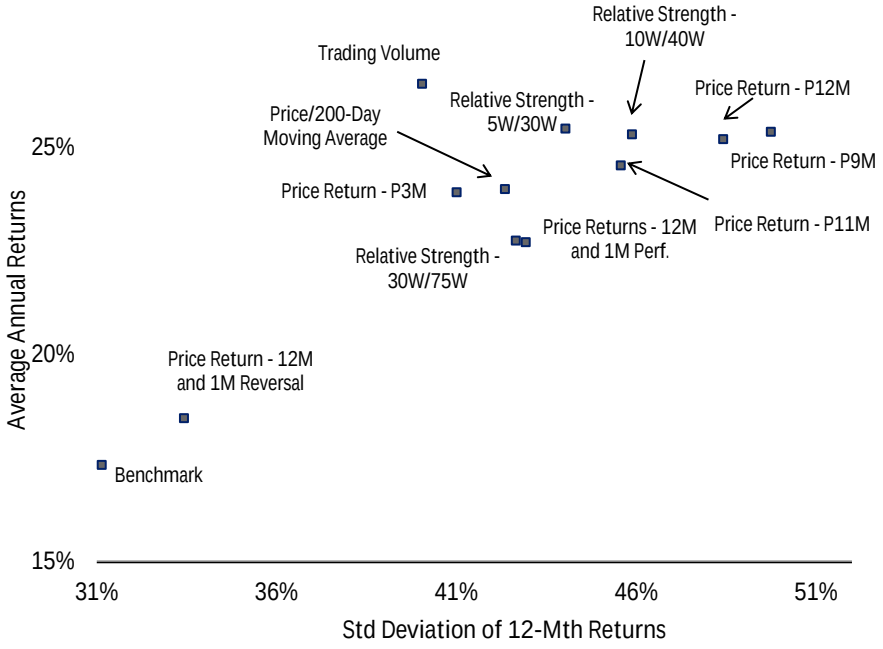
Exhibit 481: Valuation Strategies for Information Technology: Top Quintile Returns (1985 to 2022)
FCF/EV outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

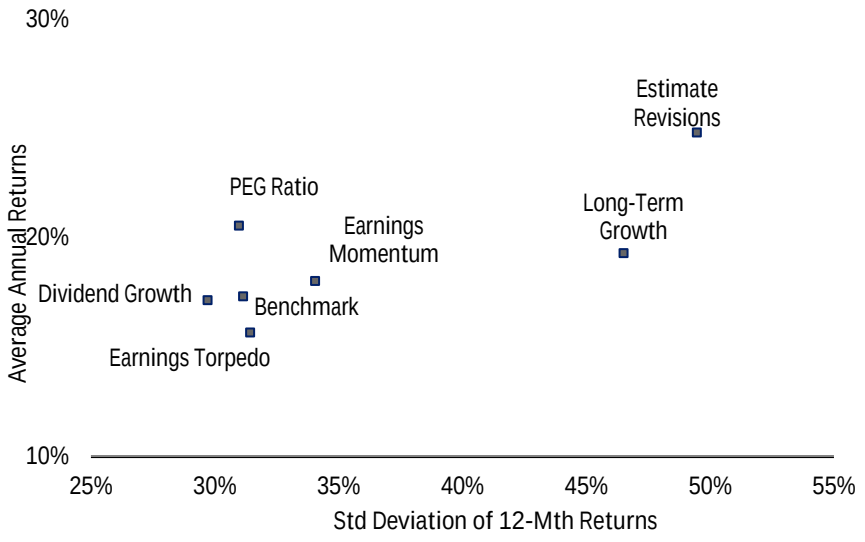
Exhibit 482: Momentum Strategies for Information Technology: Top Quintile Returns (1985 to 2022)
Trading Volume outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

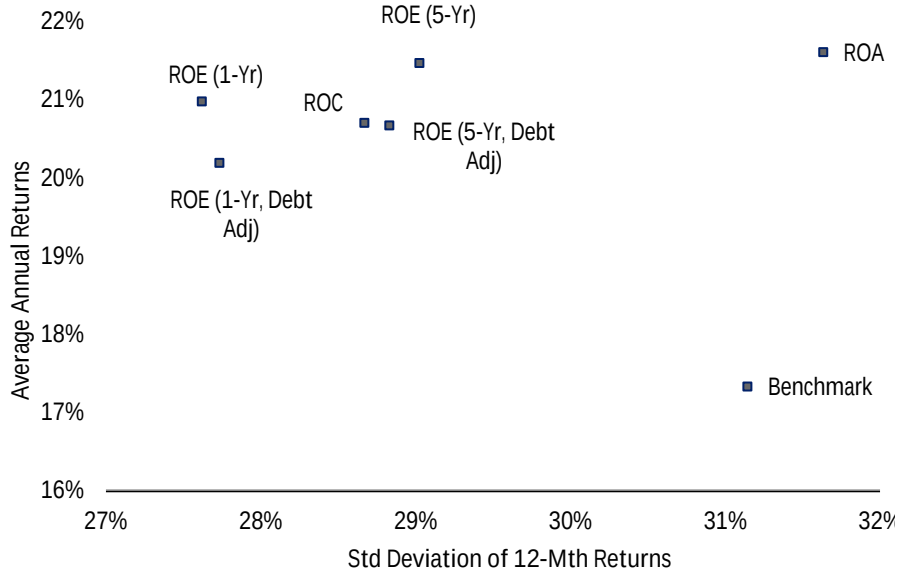
Exhibit 483: Growth Strategies for Information Technology: Top Quintile Returns (1985 to 2022)
EPS Revisions outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 484: Quality Strategies for Information Technology: Top Quintile Returns (1985 to 2022)
ROA outperformed the index most

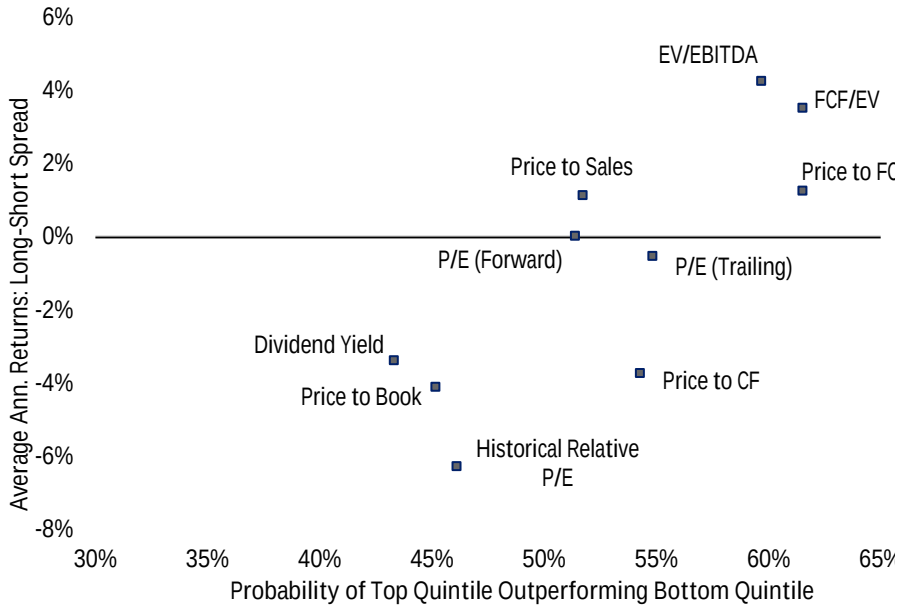


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

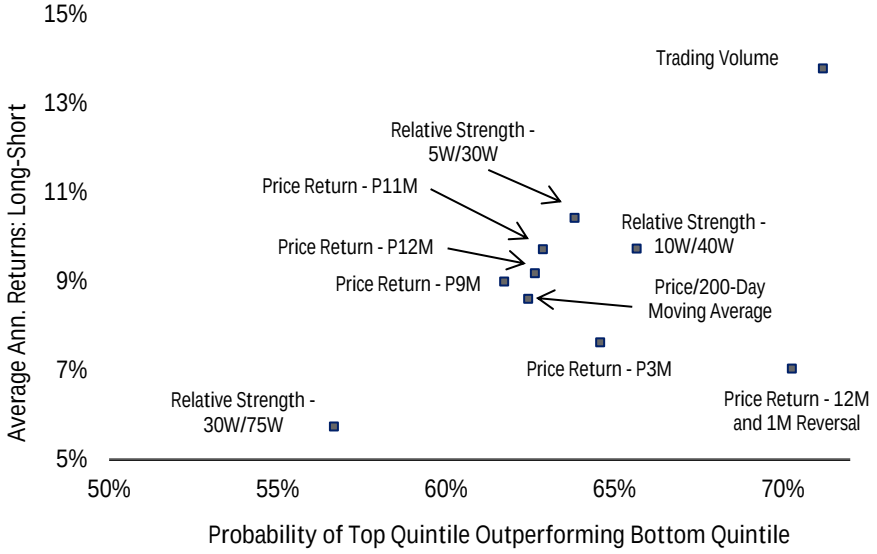
Exhibit 485: Valuation Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EV/EBITDA and FCF/EV fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

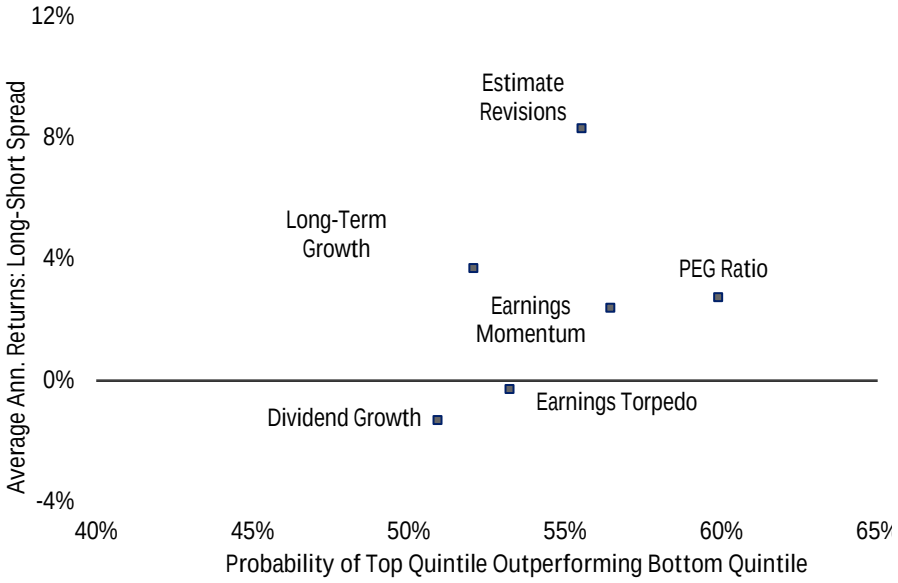
Exhibit 486: Momentum Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
High Trading Volume fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

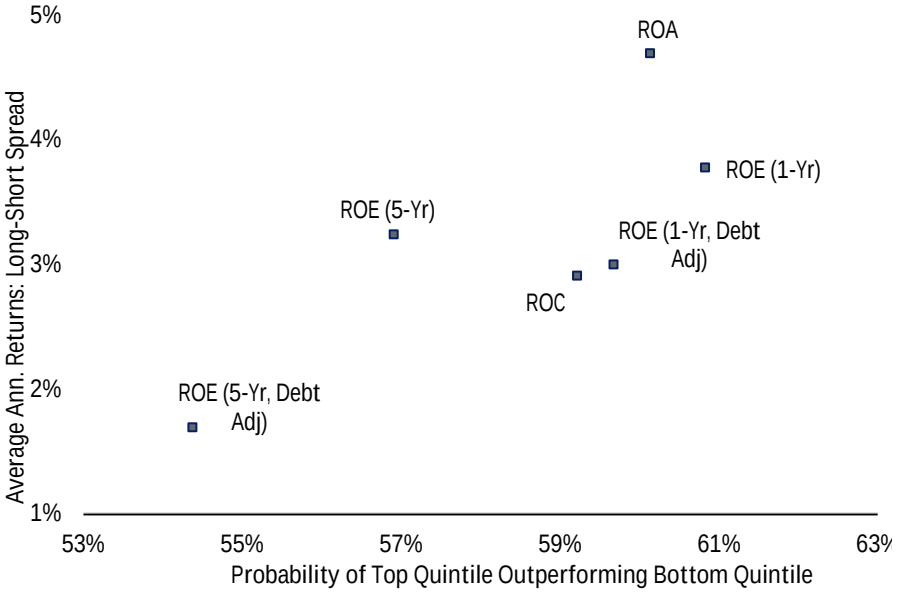
Exhibit 487: Growth Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EPS Estimate Revisions fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 488: Quality Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROA fared best



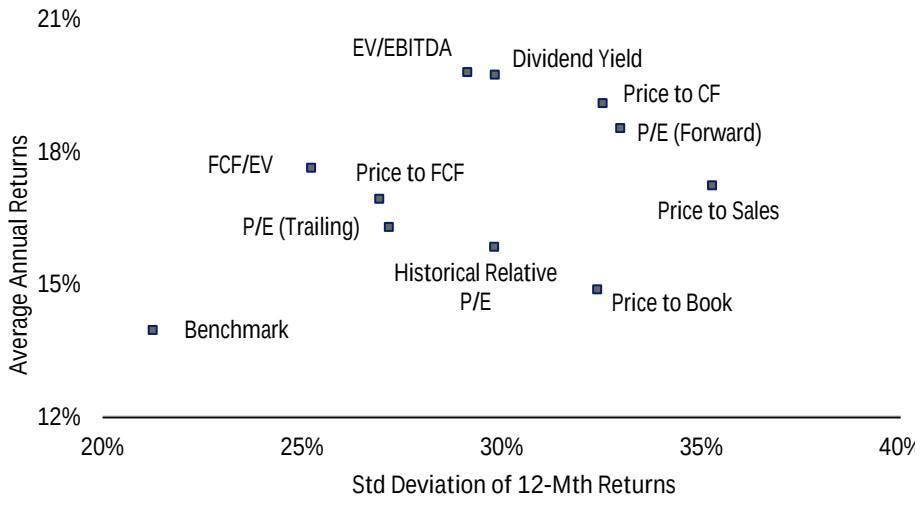
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Materials

Long only: Top Quintile Performance

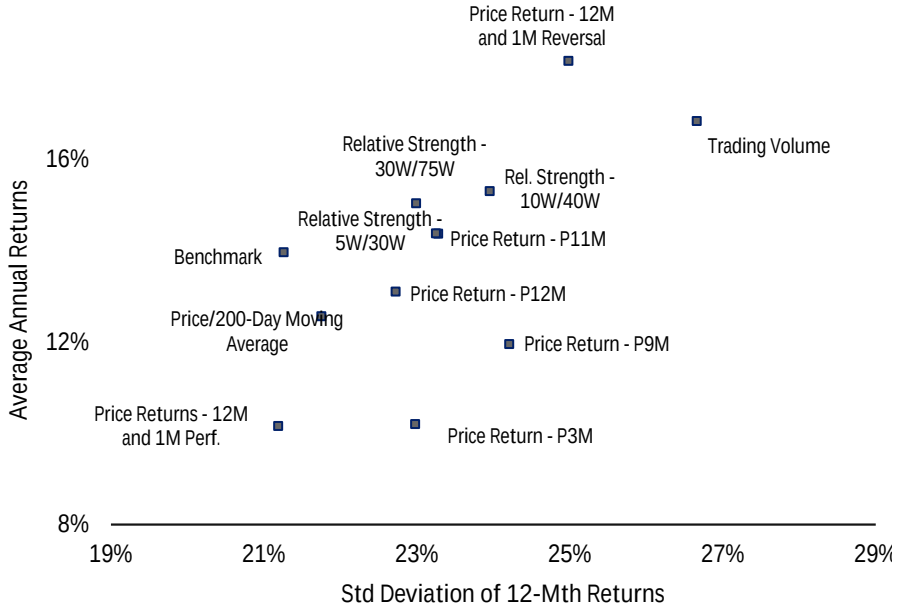
Exhibit 489: Valuation Strategies for Materials: Top Quintile Returns (1985 to 2022)
EV/EBITDA outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

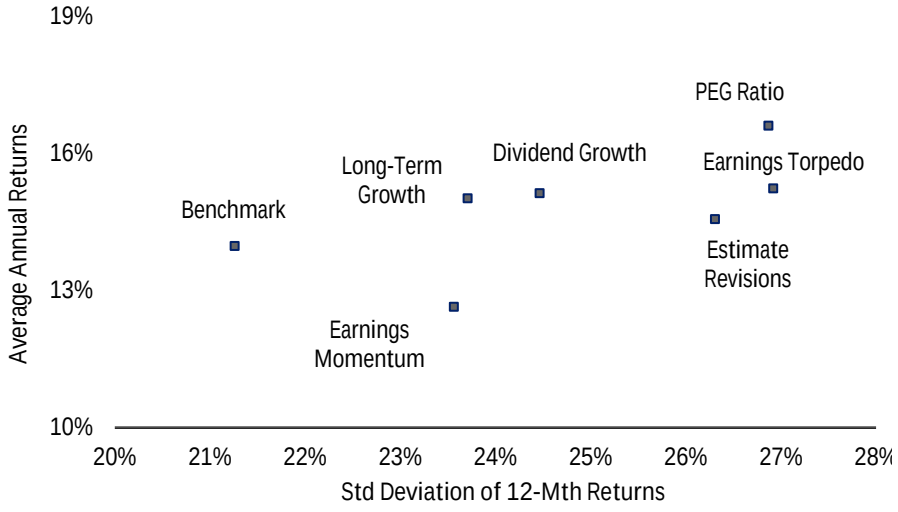
Exhibit 490: Momentum Strategies for Materials: Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

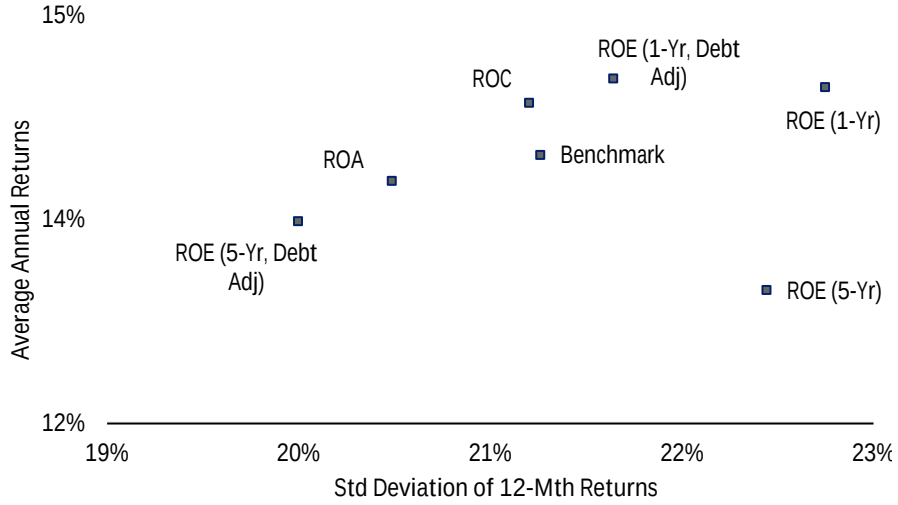
Exhibit 491: Growth Strategies for Materials: Top Quintile Returns (1985 to 2022)
PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 492: Quality Strategies for Materials: Top Quintile Returns (1985 to 2022)
1-yr Deb Adj. ROE outperformed the index most

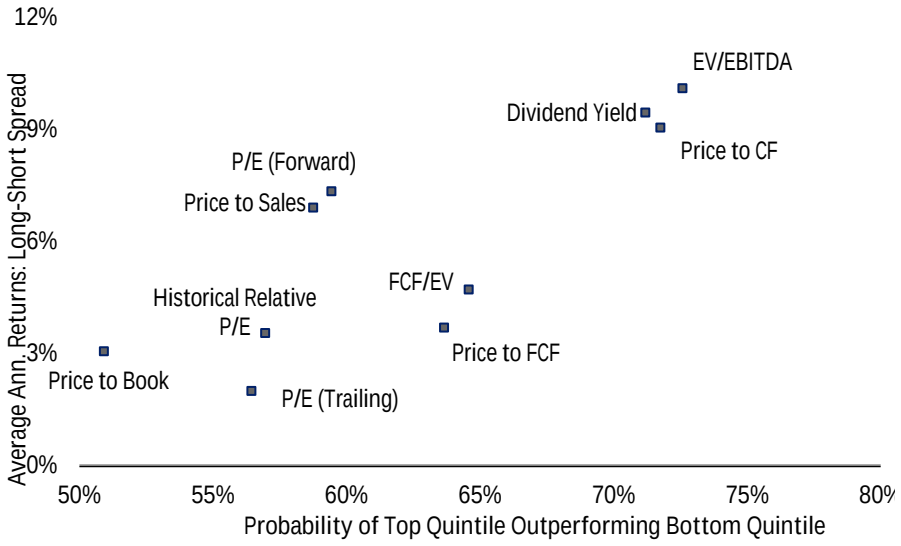


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

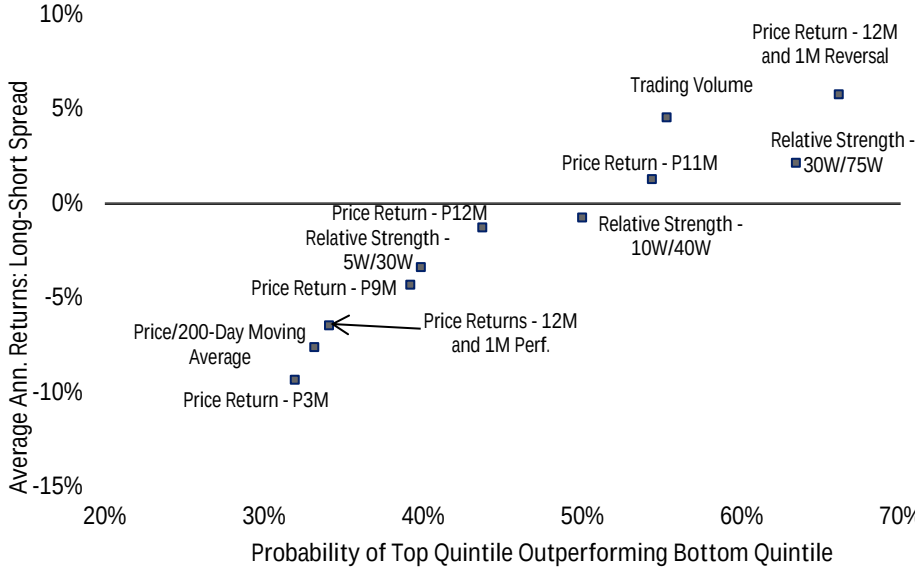
Exhibit 493: Valuation Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
EV/EBITDA outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

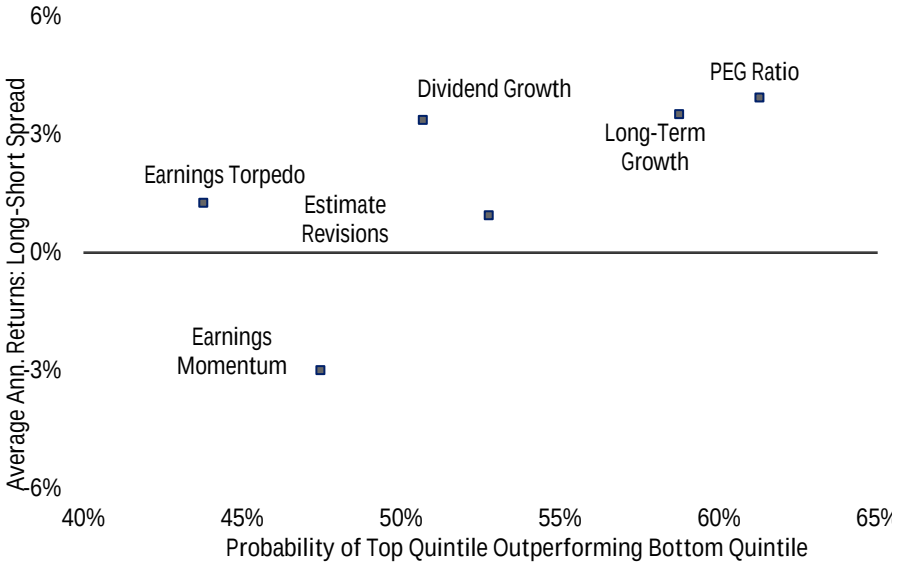
Exhibit 494: Momentum Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

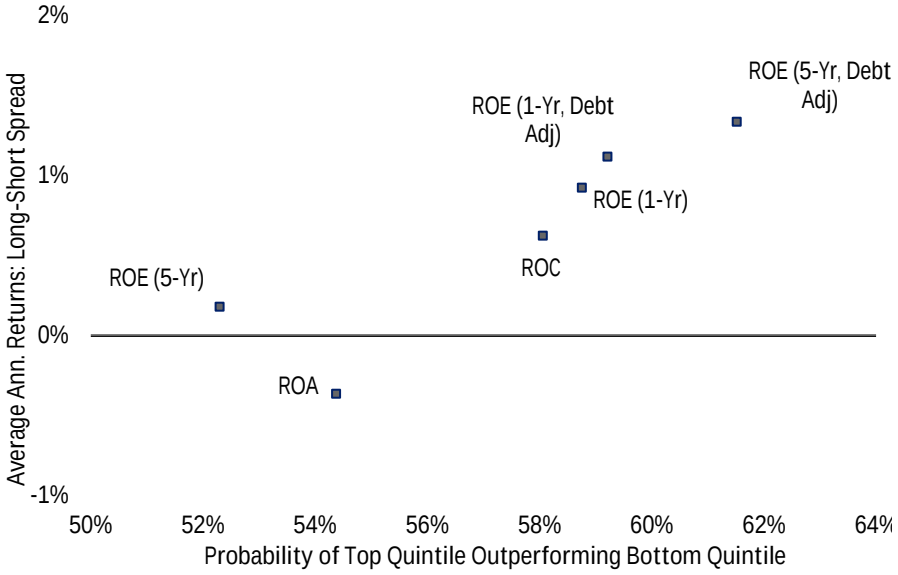
Exhibit 495: Growth Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio and Long-Term Growth outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 496: Quality Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
5-yr Debt Adj. ROE outperformed the index most



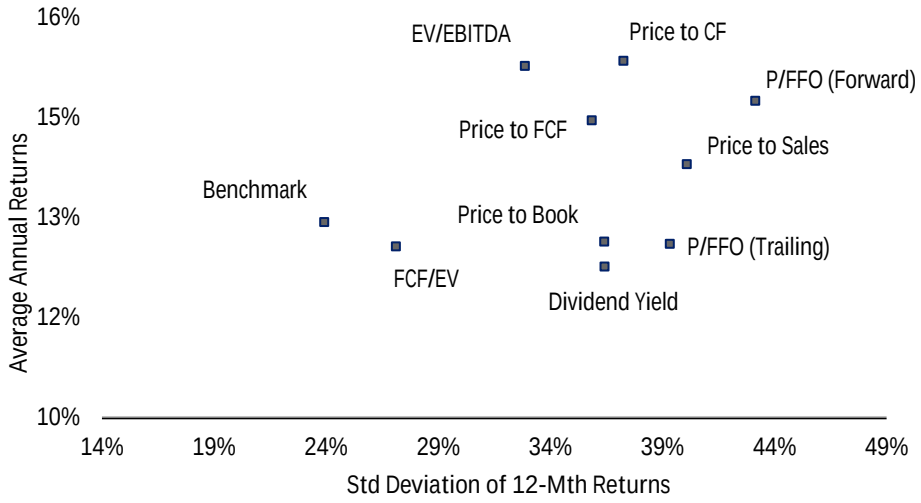
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Real Estate

Long only: Top Quintile Performance

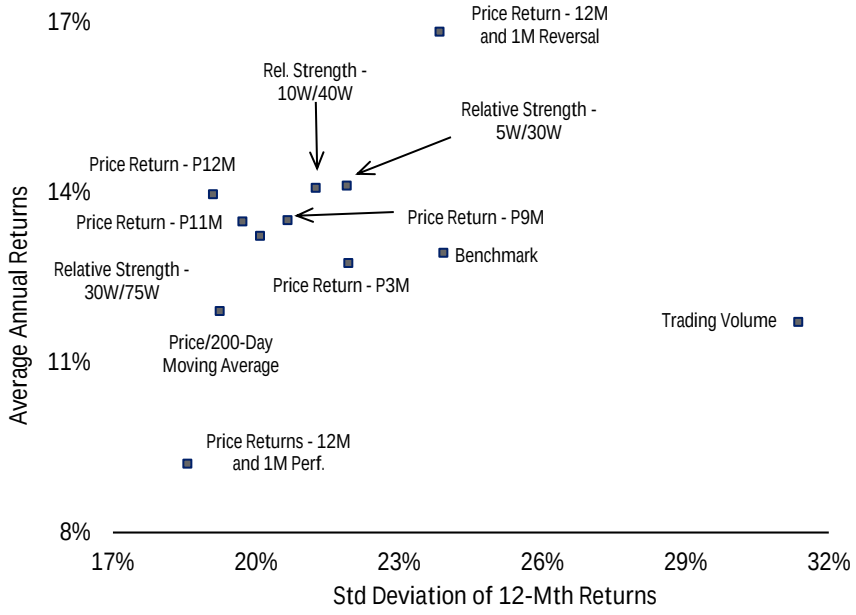
Exhibit 497: Valuation Strategies for Real Estate Top Quintile Returns (1985 to 2022)
Price to Cash Flow outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

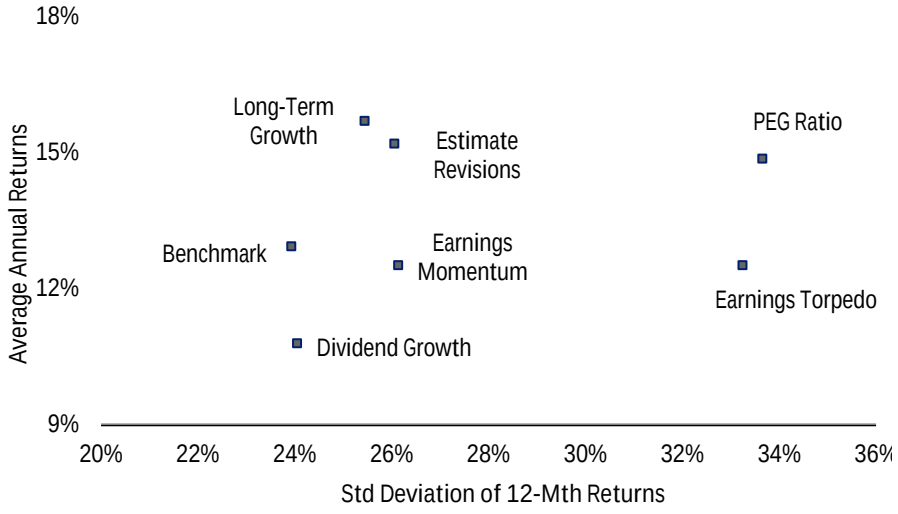
Exhibit 498: Momentum Strategies for Real Estate Top Quintile Returns (1985 to 2022)
12-mth and 1-mth Reversal outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

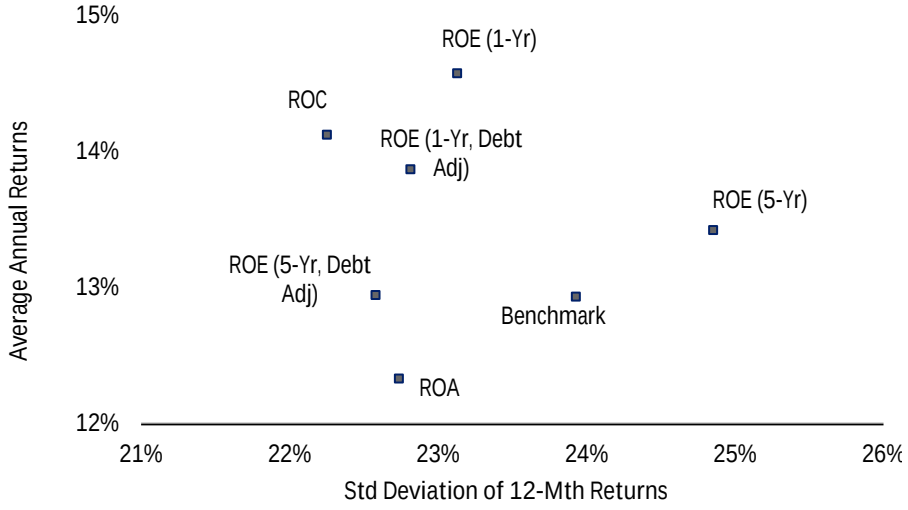
Exhibit 499: Growth Strategies for Real Estate: Top Quintile Returns (1985 to 2022)
Long-Term Growth outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 500: Quality Strategies for Real Estate: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most

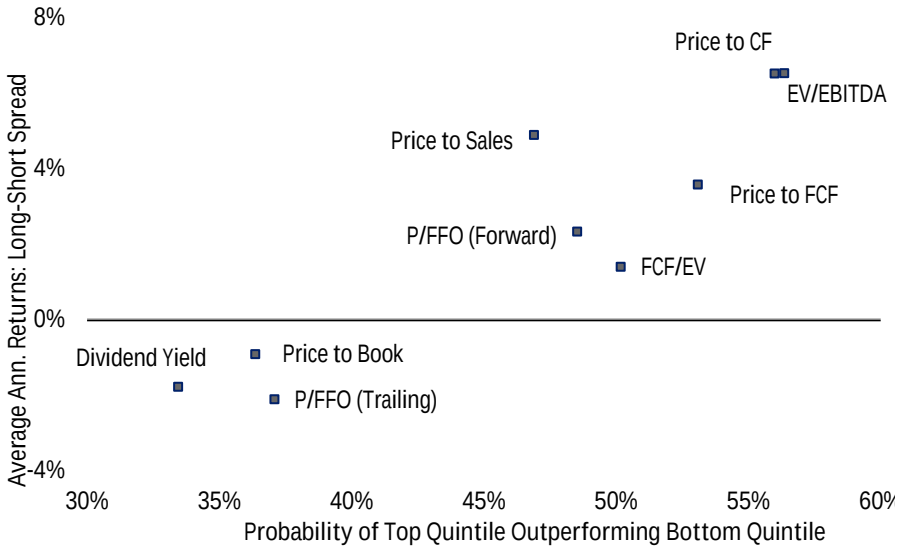


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

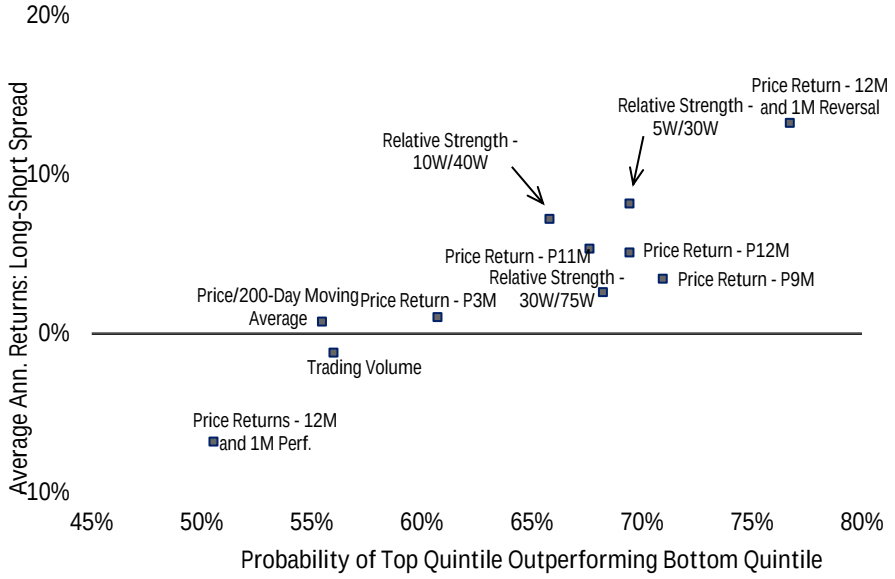
Exhibit 501: Valuation Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price to Cash Flow and EV/EBITDA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

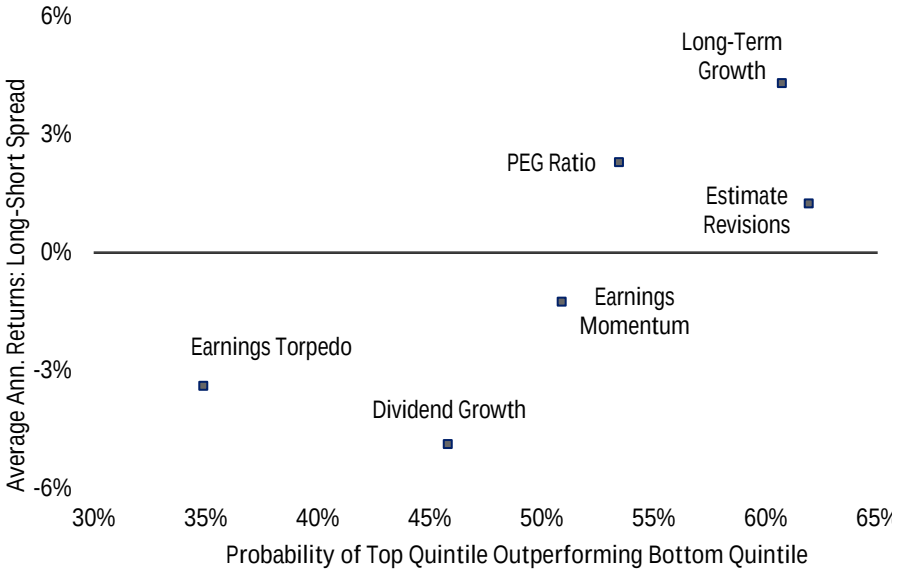
Exhibit 502: Momentum Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
12-mth and 1-mth Reversal fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

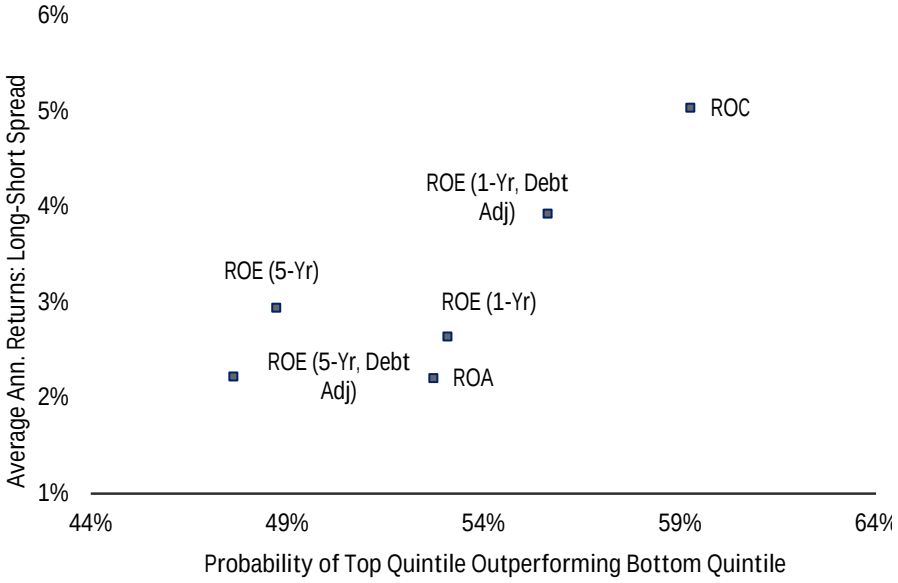
Exhibit 503: Growth Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Long Term Growth fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 504: Quality Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
ROC fared best



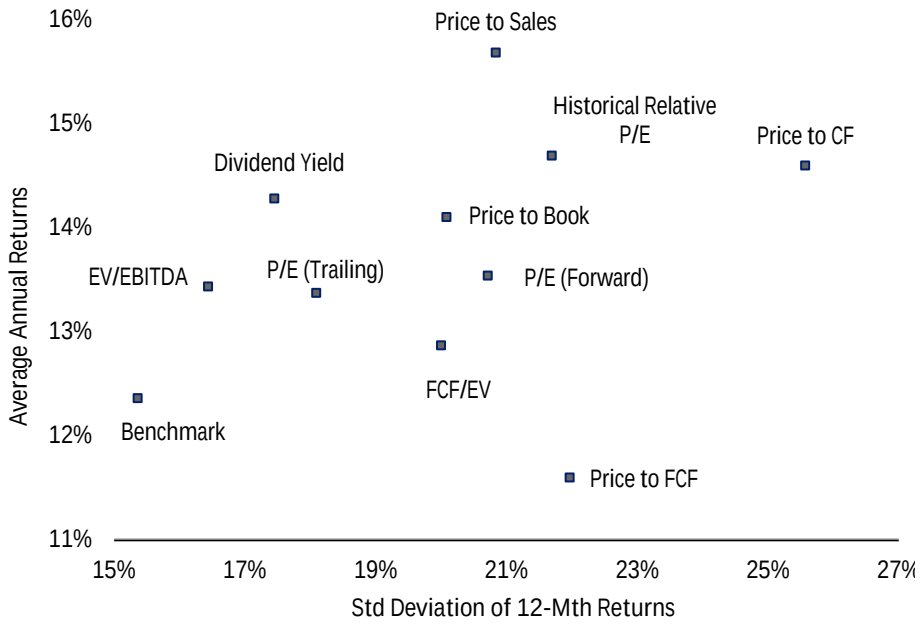
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Utilities

Long only: Top Quintile Performance

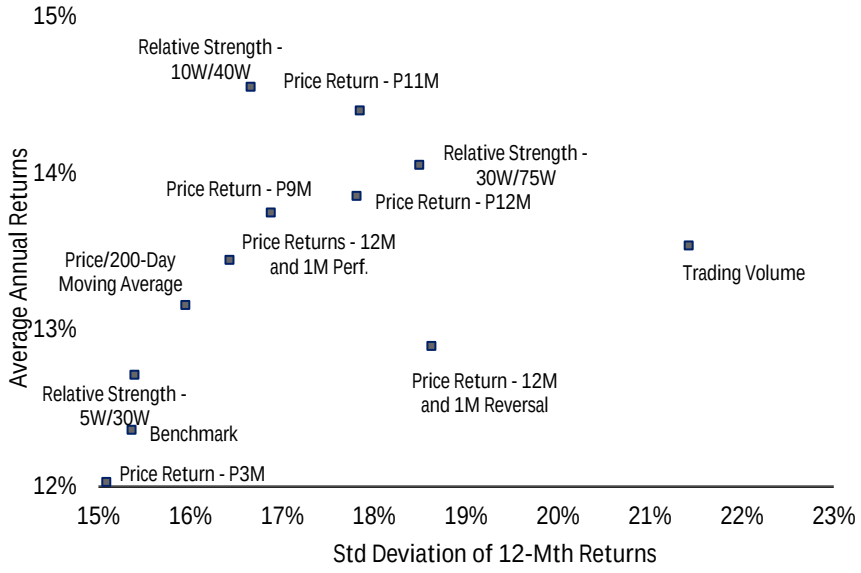
Exhibit 505: Valuation Strategies for Utilities: Top Quintile Returns (1985 to 2022)
Price to Sales outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

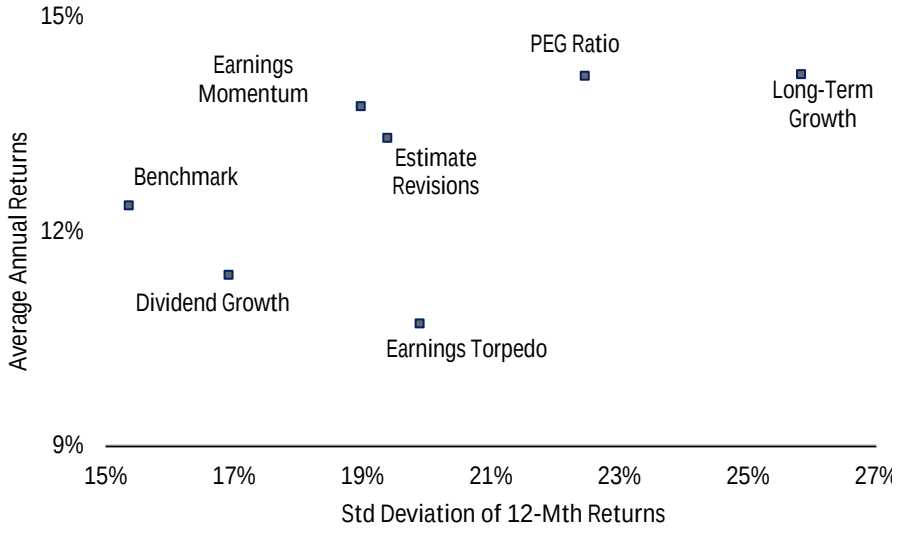
Exhibit 506: Momentum Strategies for Utilities: Top Quintile Returns (1985 to 2022)
10W/40W Relative Strength outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

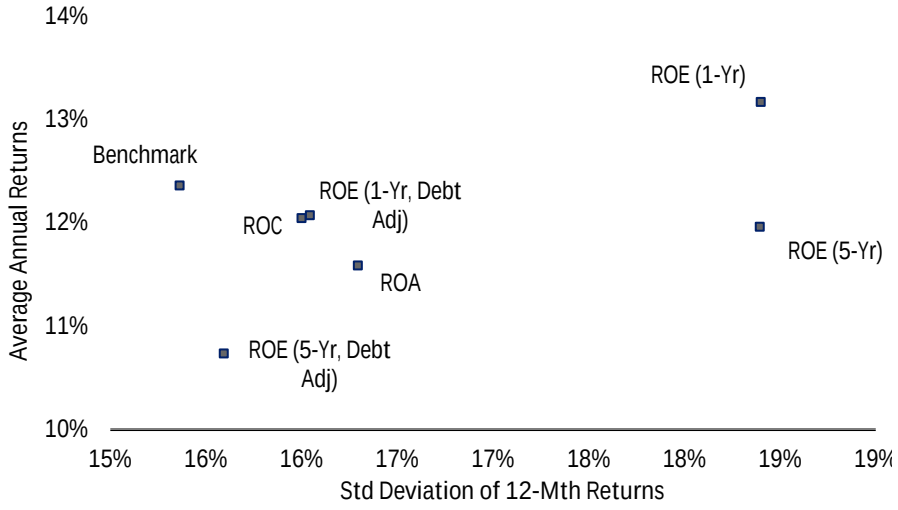
Exhibit 507: Growth Strategies for Utilities: Top Quintile Returns (1985 to 2022)
PEG Ratio outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 508: Quality Strategies for Utilities: Top Quintile Returns (1985 to 2022)
1-yr ROE outperformed the index most

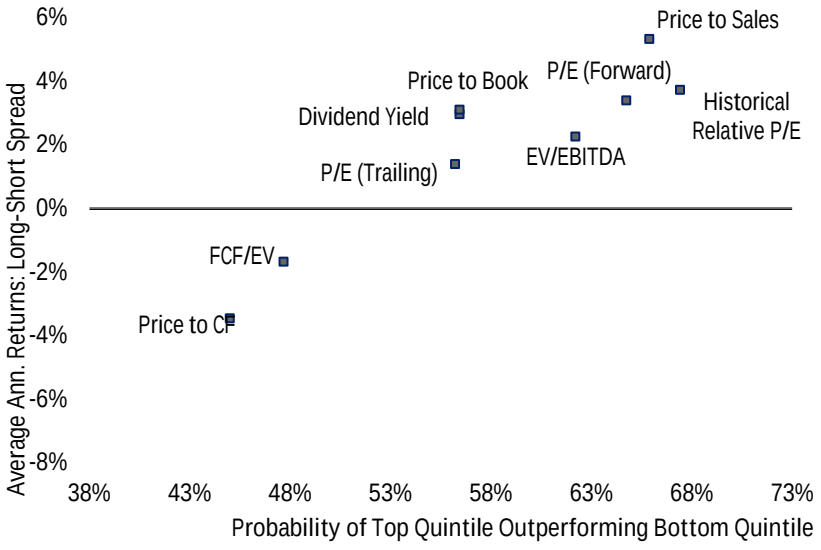


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

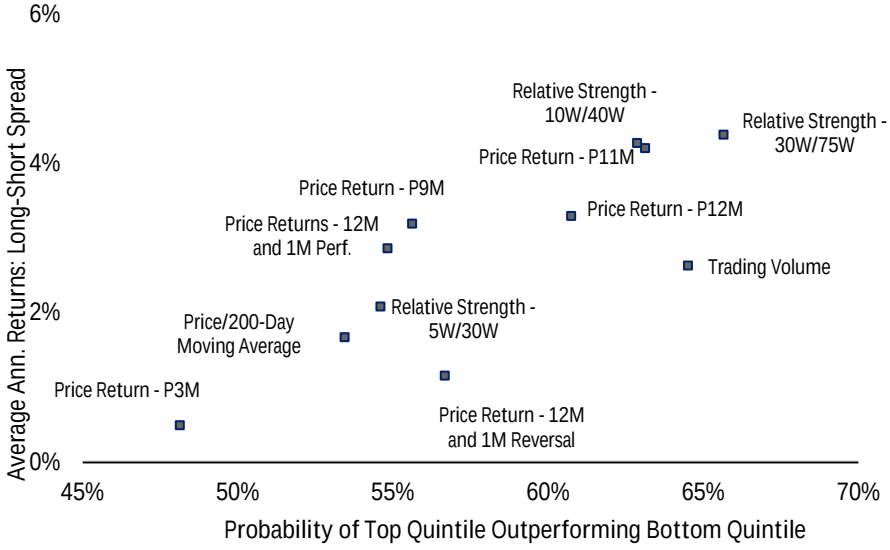
Exhibit 509: Valuation Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Price / Sales fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

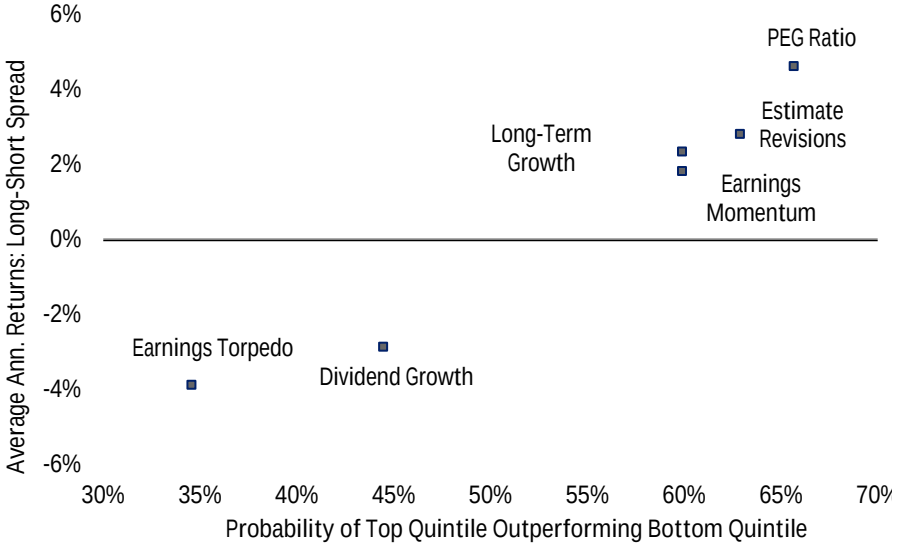
Exhibit 510: Momentum Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
Relative Strength 10W/40W and 30W/75W fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

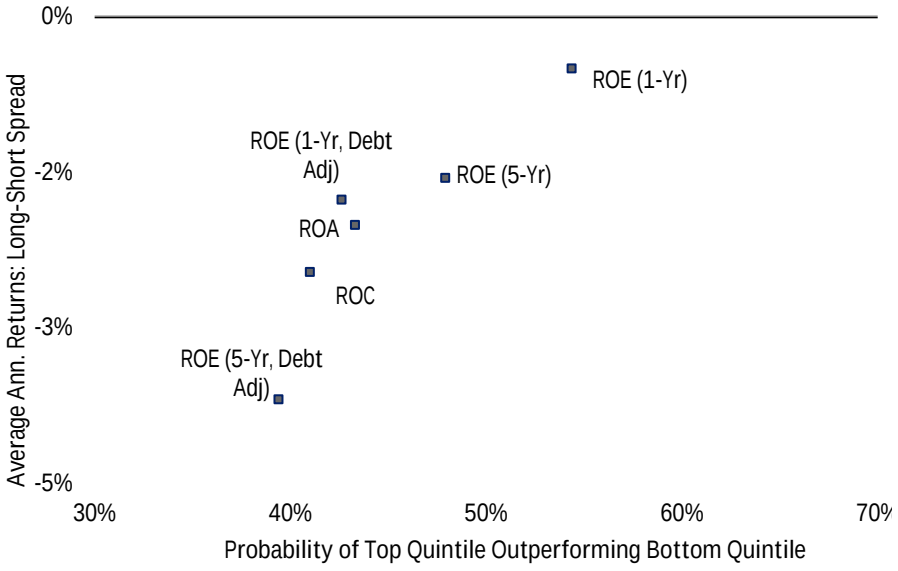
Exhibit 511: Growth Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 512: Quality Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)
1-yr ROE fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Backtesting Methodology

We created top and bottom decile stock screens for various factors that we follow for companies in the Russell 1000 Growth Index and Russell 1000 Value index. The backtesting methodology for stock screens is identical for each factor except where noted. At the end of each month, each of our factors was applied to the index. Companies for which there was either no data or insufficient data were excluded from the analysis. We then created two screens showing stocks in the top and bottom deciles. We tracked the output of these screens for the subsequent month.

Note that no adjustment was made to remove stocks that were on the firm's restricted list from our backtest analysis.

Returns Calculation

For each of the factors analyzed, rebalancing and performance calculations for the backtesting were conducted each month, using data and closing prices corresponding to the market's close on the last business day of each month. The results of each screen were computed on the total return basis. The hypothetical total return performance calculation assumes that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date, and are not reinvested.

The results of the quantitative screens used in our analysis may differ from the historical Russell 1000 Growth index and the Russell 1000 Value index in that they are significantly less diversified, and, as such, are more exposed to specific stock or sector results. Because of this, the performance of the screens may be more volatile.

Our backtest results do not reflect transaction costs, tax withholdings or any investment advisory fees. Had these costs been reflected, the results would have been lower. The results of individuals replicating the analysis presented here may differ from the results contained in this report for a variety of reasons, including different assumptions related to incurring transaction costs and/or investment advisory fees, as well as differences in pricing of securities that were acquired and disposed of, and differences in the weighting of such securities. The results may also differ based on differences in assumptions of treatment of dividends received, including the amount received and whether and when such dividends were reinvested.

Backtesting is hypothetical in nature and reflects application of the screen at a time when it did not exist. It is not indicative of how the screen would perform if it is used going forward. Past performance should not and cannot be viewed as an indicator of future performance.

Section IV: Stock Strategies for Growth and Value Managers

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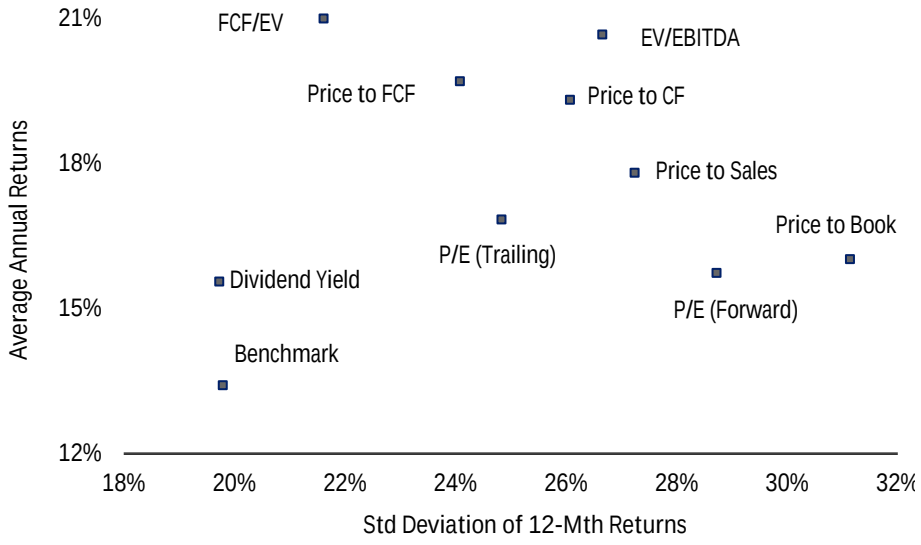
Note: All charts in this section are based on backtested results during the period from month end Jan 1986 to month end March Mar 2018. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

Growth

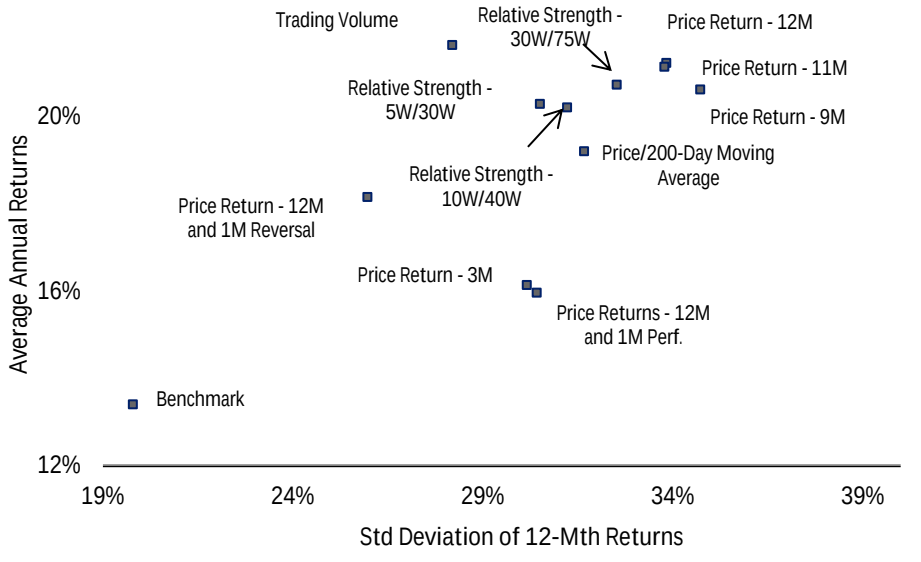
Exhibit 513: Value Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
FCF/EV fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

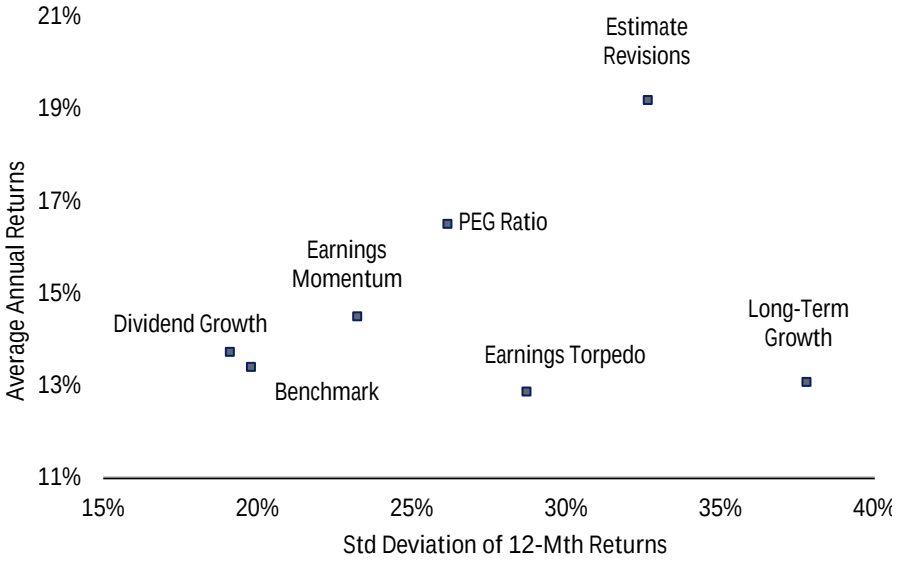
Exhibit 514: Momentum Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
High Trading Volume fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

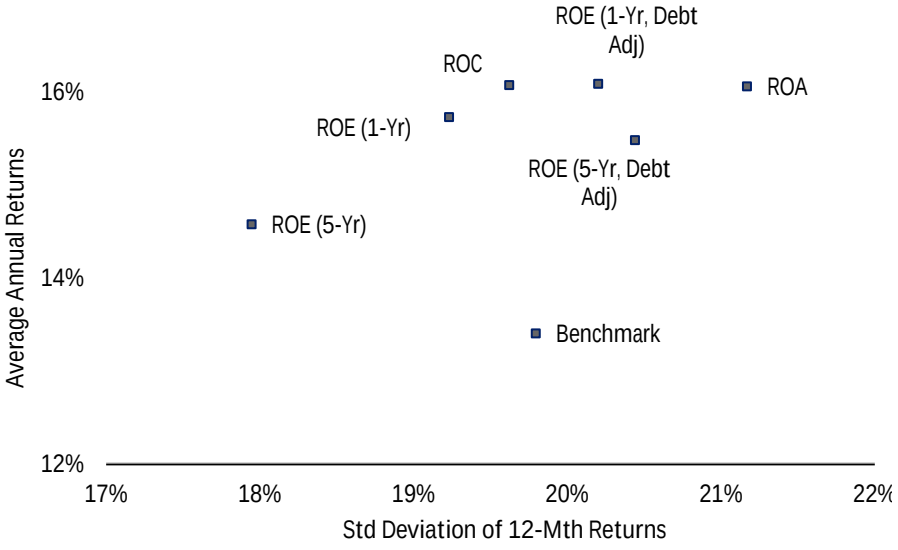
Exhibit 515: Growth Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
Estimate Revisions fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

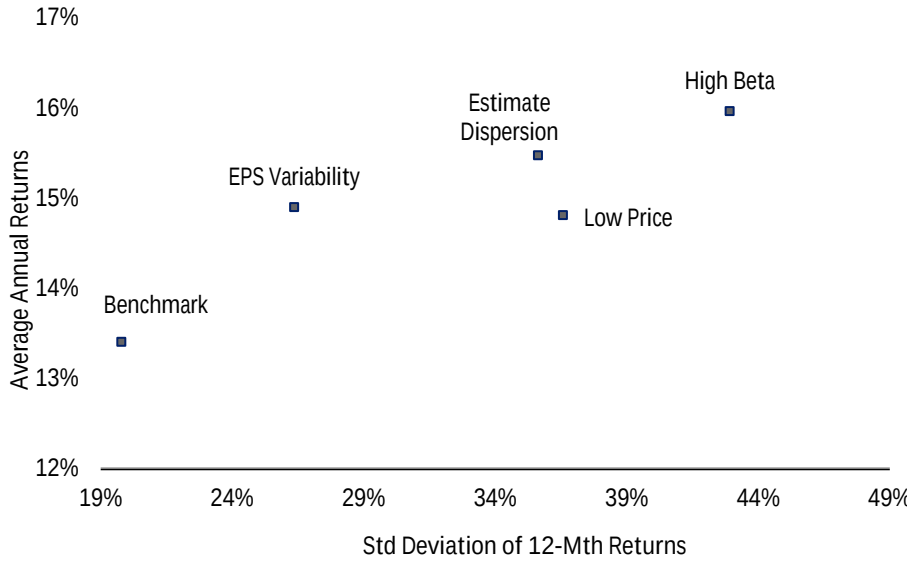
Exhibit 516: Quality Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
Debt Adjusted 1-yr Debt Adj'd ROE and ROC fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

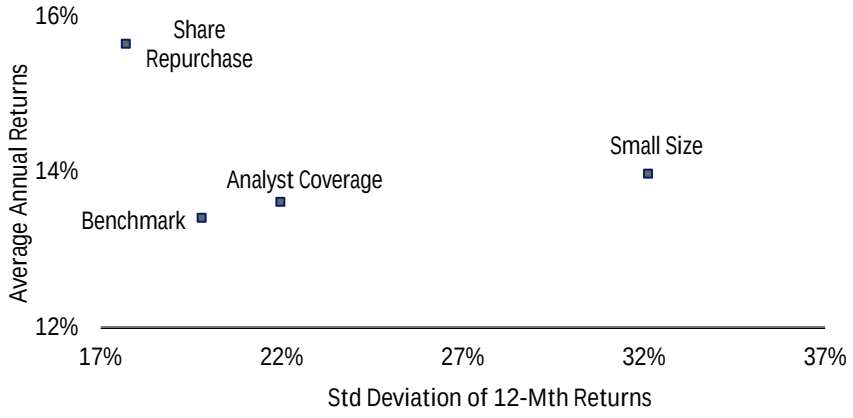
Exhibit 517: Risk Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
High Beta and Estimate Dispersion fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 518: Miscellaneous Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2022
Share Repurchase fared best

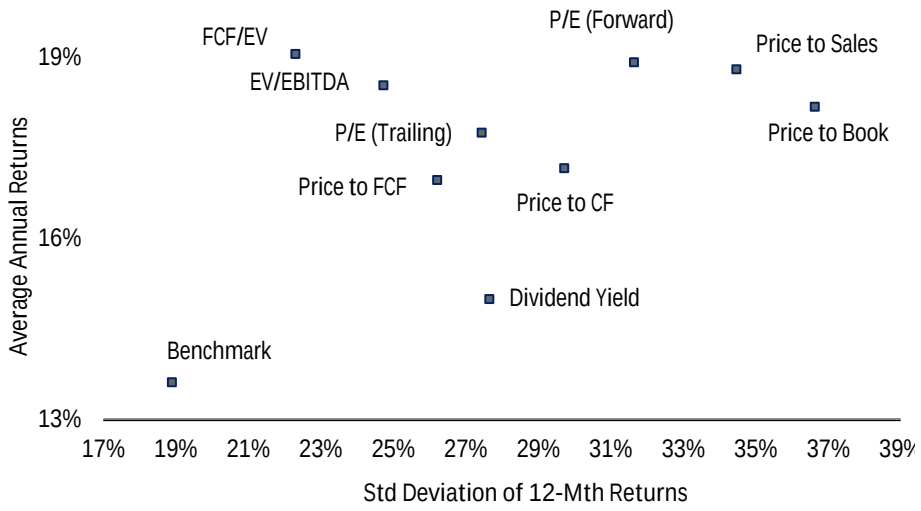


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Value

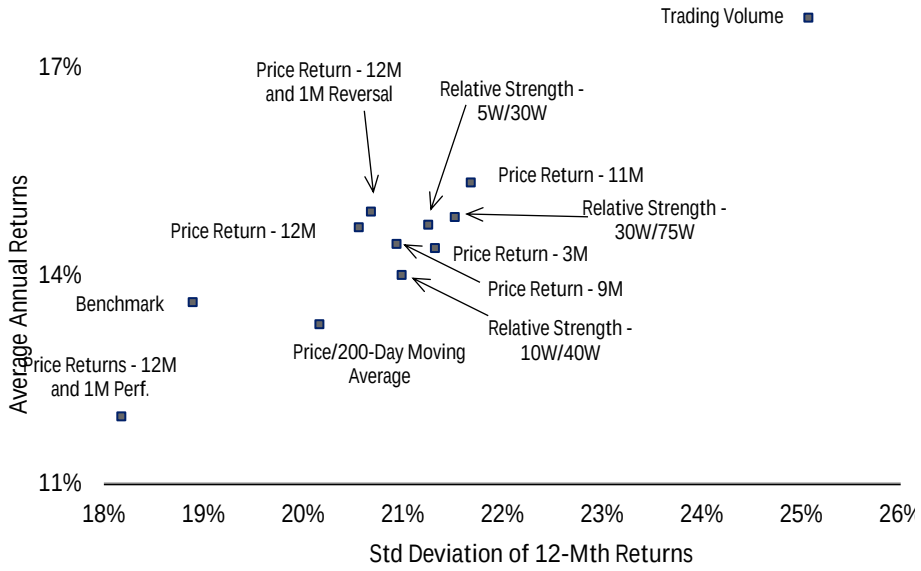
Exhibit 519: Value Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
FCF/EV fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

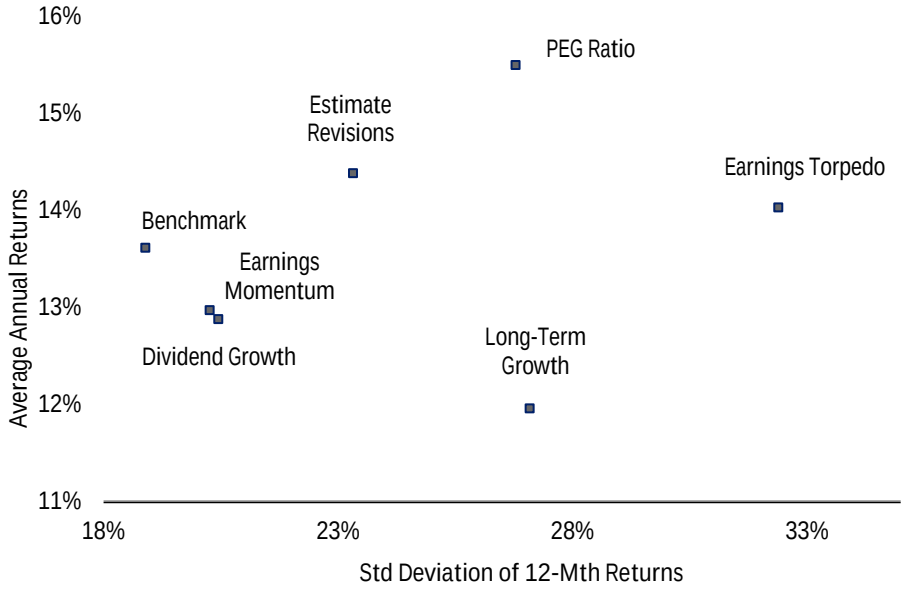
Exhibit 520: Momentum Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
High Trading Volume fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

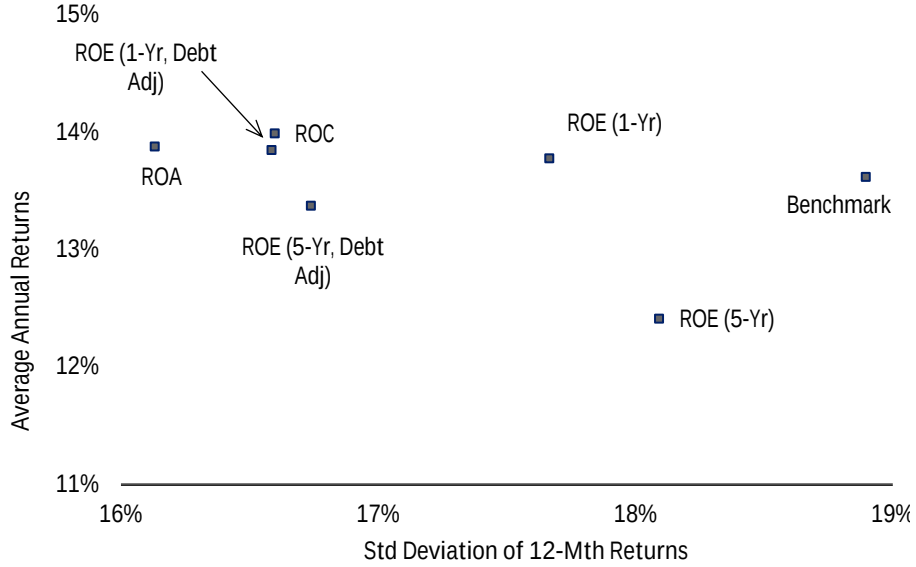
Exhibit 521: Growth Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

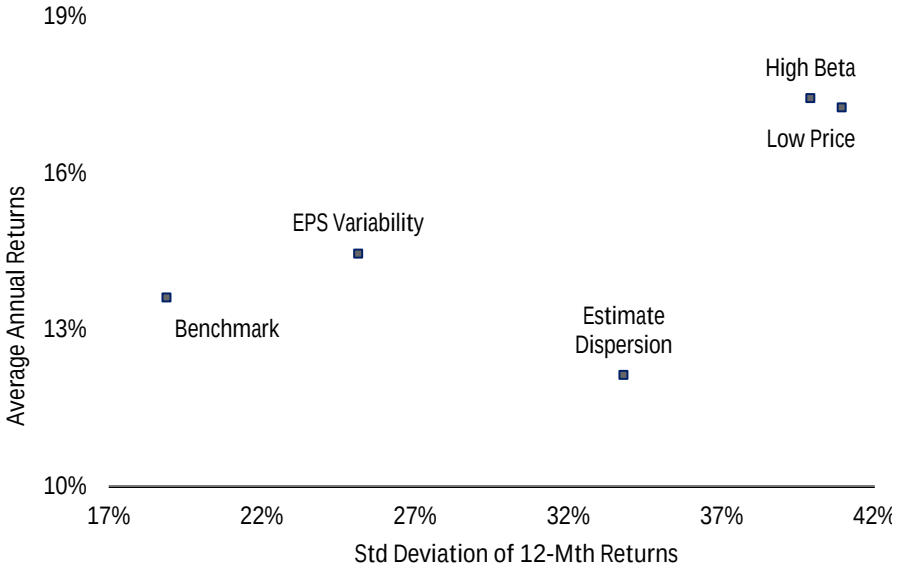
Exhibit 522: Quality Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
ROC fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

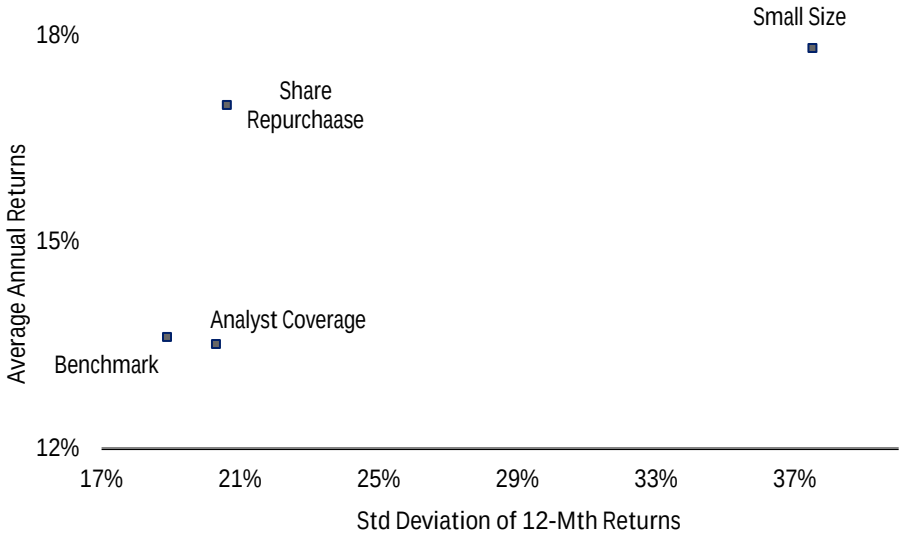
Exhibit 523: Risk Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
High Beta and Low Price fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 524: Miscellaneous Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2022
Small Size fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Backtesting Methodology

We created top and bottom decile stock screens for various factors that we follow for companies in the Russell 1000 Growth Index and Russell 1000 Value index. The backtesting methodology for stock screens is identical for each factor except where noted. At the end of each month, each of our factors was applied to the index. Companies for which there was either no data or insufficient data were excluded from the analysis. We then created two screens showing stocks in the top and bottom deciles. We tracked the output of these screens for the subsequent month.

Note that no adjustment was made to remove stocks that were on the firm's restricted list from our backtest analysis.

Returns Calculation

For each of the factors analyzed, rebalancing and performance calculations for the backtesting were conducted each month, using data and closing prices corresponding to the market's close on the last business day of each month. The results of each screen were computed on the total return basis. The hypothetical total return performance calculation assumes that dividends paid on securities in a portfolio are deposited in a cash account on the ex-dividend date, and are not reinvested.

The results of the quantitative screens used in our analysis may differ from the historical Russell 1000 Growth index and the Russell 1000 Value index in that they are significantly less diversified, and, as such, are more exposed to specific stock or sector results. Because of this, the performance of the screens may be more volatile.

Our backtest results do not reflect transaction costs, tax withholdings or any investment advisory fees. Had these costs been reflected, the results would have been lower. The results of individuals replicating the analysis presented here may differ from the results contained in this report for a variety of reasons, including different assumptions related to incurring transaction costs and/or investment advisory fees, as well as differences in pricing of securities that were acquired and disposed of, and differences in the weighting of such securities. The results may also differ based on differences in assumptions of treatment of dividends received, including the amount received and whether and when such dividends were reinvested.

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Section V: BofA Quality Strategies

Quality: an attractive entry point	223
Deep dive on Quality fundamentals	235
Quality within sectors	237
Performance Charts	240

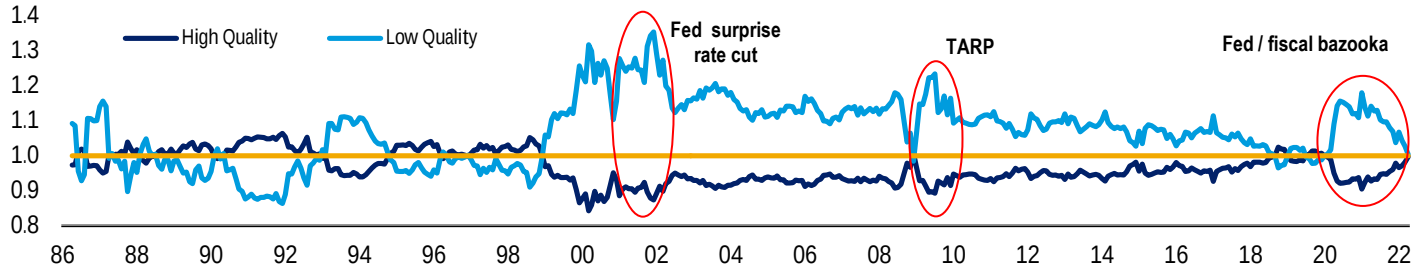
Note: The shaded area in performance charts shows back tested results during the period from month end Jan 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance. All scatter plots in this section are based on actual performance data after the screens were introduced.

Quality: an attractive entry point

We provide an updated investor's guide to Quality in this section.

Fiscal and monetary stimulus has buoyed risk assets for over two decades. Today, as the Fed started tightening monetary policy, valuation gap closed. But the Fed has long ways to go to raise rates and to implement Quantitative Tightening, which should bode well for High Quality performance and boost its valuations well above Low Quality. We believe today's valuations remain an attractive entry point for High Quality investors.

Exhibit 525: Moral hazard created irrational market – premium for risk, discount for safety
B+ or Better vs. B or Worse Fwd. P/E relative to BofA Universe (1986-4/30/22)



Source: FactSet, BofA US Equity & Quant Strategy

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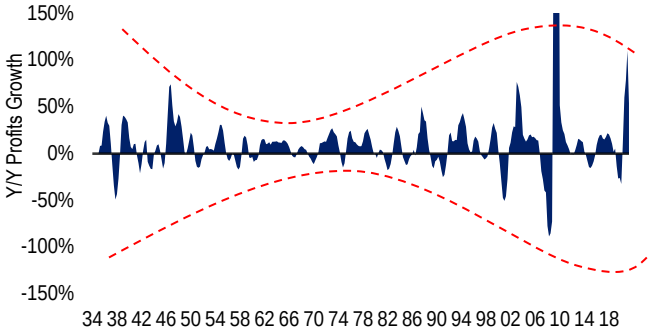
The S&P 500 has more quality – based on our definition, (see below) - than most other equity benchmarks. Earnings volatility has decreased, and the magnitude of swings from booms to busts - even amid COVID-19 - has meaningfully compressed.

Exhibit 526: The amplitude of the COVID-19 earnings recession **pales in comparison to the '08 Global Financial Crisis & '00 Tech** Bubble
YoY EPS Growth for S&P 500, 1935 to 1Q22



Source: BofA US Equity & Quant Strategy, S&P

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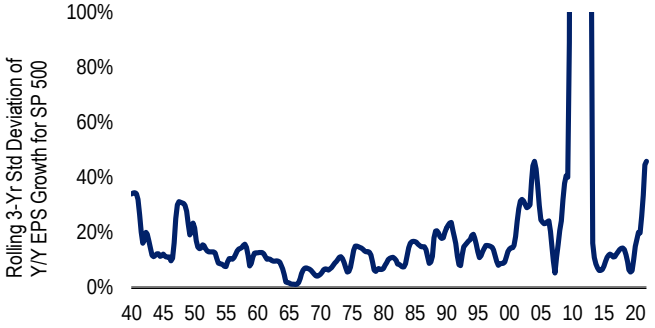
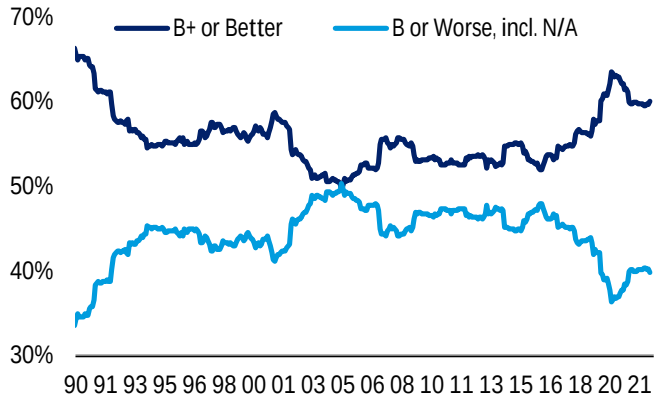
Exhibit 527: But earnings volatility is still slightly elevated following COVID
Rolling 3yr standard deviation of S&P 500 12m EPS growth (2Q40-1Q22)



Source: BofA US Equity & Quant Strategy, S&P

BofA GLOBAL RESEARCH

Exhibit 528: Higher Quality stocks make up ~60% of the S&P 500
% of High Quality (B or Better S&P Quality Rank) vs. Low Quality (B or Worse S&P Quality Rank, including N/A) S&P 500 stocks, 1990-present



Source: FactSet, BofA US Equity & US Quant Strategy

BofA GLOBAL RESEARCH

The S&P 500 has grown higher quality since 2016. The proportion of stable earners has increased and the proportion of volatile earners have decreased.

What is Quality?

Quality can mean many different things for equity investors. Our preferred measure of Quality is based on the S&P Common Stock quality rankings, which are different from their debt ratings, but are simply a gauge of the stability and growth of a company's earnings and dividends. We have found that this measure tends to behave predictably depending upon where we are in the economic cycle and where we are in the behavioral cycle, i.e., how much risk aversion or gain-seeking is driving investor preferences, and how plentiful or scarce growth is. We have also tracked other measures of Quality, including return on equity (ROE), earnings certainty (low dispersion of EPS estimates), size and beta. Each of these captures certain elements of Quality, but performance and characteristics are not as well behaved as when defining risk using earnings stability.

Definitions:

- "A+" vs. "C&D": Highest vs. lowest Quality stocks within the BofA US coverage universe based on the S&P Common Stock Quality Rankings. These rankings are based on a quantitative assessment of long-term growth and the stability of a company's earnings and dividends over a 10-year period. (Note: we also sometimes define High Quality vs. Low Quality in our work as "B+ or Better" vs. "B or Worse" ranked stocks when a broader sample of stocks is needed.)
- ROE: Top and bottom deciles of the S&P 500 on Trailing 4-quarter return on equity where return is measured as trailing twelve month earnings; equity is measured by book value.
- Beta: Top and bottom deciles of the S&P 500 based on five-year (60-month) adjusted beta vs. S&P 500.
- Earnings Certainty: Bottom decile of the S&P 500 based on dispersion of next year's consensus estimates, where low dispersion or clustered estimates suggest a higher level of certainty. Earnings Uncertainty: Top decile of the S&P 500 based on dispersion of next year's consensus estimates, where most dispersed estimates suggest a lower level of certainty.
- Nifty 50 / Small Size: Top and bottom deciles of the S&P 500 based on current market capitalization.

Exhibit 529: Strategies of investing in Quality by various measures have generally behaved similarly over time
Correlation between High-Low Quality Performance Spreads (1989 to 4/30/2022)

	High ROE vs. Low ROE	Low Beta vs. High Beta	Certain vs. Uncertain Earnings	Nifty 50 vs. Small Size	"A+" vs. "C&D"
High vs. Low ROE	100.0%				
Low vs. High Beta	65.7%	100.0%			
Certain vs. Uncertain Earnings	59.6%	62.9%	100.0%		
Nifty 50 vs. Small Size	67.6%	53.4%	51.9%	100.0%	
"A+" vs. "C&D"	58.1%	64.0%	62.8%	41.9%	100.0%

Source: BofA US Equity and Quant Strategy, FactSet
Note: While we track the performance of Debt to Equity and Altman Z-Scores, which may be considered Quality measures as well, we excluded them from this analysis as they behave quite differently from the other measures we examine, and appear to have different drivers for returns. Moreover, Altman Z-Scores exclude Financials, making the factor less comparable.

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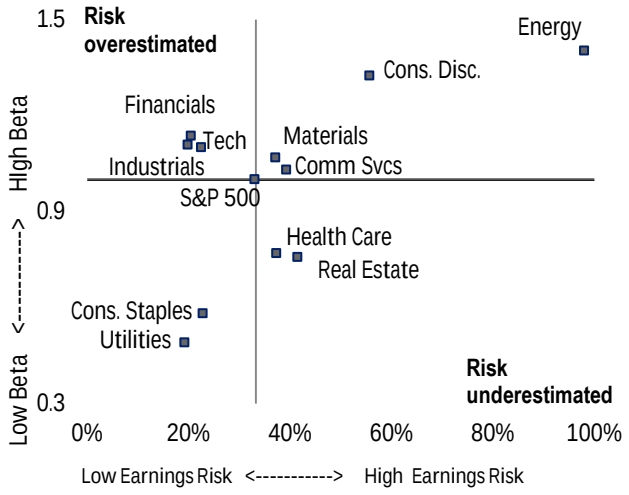
Baskets of high and Low Quality stocks corresponding to each of these measures generally behave similarly over time based on correlations of monthly returns. Although some strategies are more similar than others, most display reasonably high correlations in returns.

Mispricing **of risk: high quality ≠ low beta**

Exhibit 530: **Mispricing of risk: High Quality doesn't** equal low beta
Price Risk (5-year beta) vs. Earnings Risk (cap-weighted proportion of stocks ranked B or worse by S&P Quality rank) of S&P 500 GICS sectors, as of 4/30/22



Source: BofA US Equity & Quant Strategy, FactSet
Note: Financials excludes BRK.B which is 15% of the sector.

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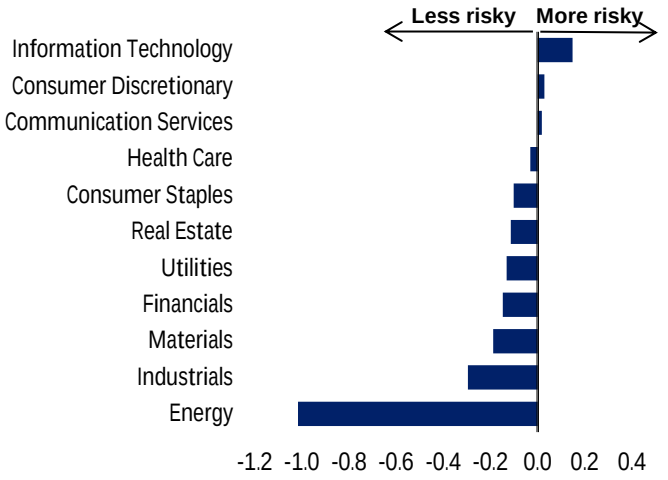
Low beta is often used as a measure of safety but we prefer assessing earnings volatility ("fundamental beta") instead of price volatility. When classifying a stock as "safe", we think investors should care more about the underlying earnings risk, as well as balance sheet quality, sustainability of dividends, and other factors that play into the safety of an investment.

Investors that equate low beta with earnings stability may be surprised to find that some of the highest beta sectors exhibit the most stable earnings (e.g., Financials – which we are Overweight), while some of the lowest beta sectors exhibit above-market earnings volatility (e.g., Real Estate).

Exhibit 531: 1yr vs. 5yr beta for S&P 500 sectors
1yr vs. 5yr beta for S&P 500 sectors, spread as of 4/30/2022



Source: Factset, BofA US Equity & US Quant Strategy

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Tech, Discretionary, and Communication Services have recently seen their betas rise while Energy and Industrials' betas have declined the most.

Exhibit 532: Low beta generally lags
Equal-Weighted Relative Cumulative Performance of Low Beta S&P 500 stocks vs. Equal-Weighted S&P 500, June 1989=100, as of 4/30/2022

Source: BofA US Equity & Quant Strategy

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Low beta strategies have underperformed for decades.

Exhibit 533: Low beta fundamentally differs from Quality and not in a good way
Low Beta (price stability) vs Quality (fundamental stability) by various financial measures, as of 4/30/22

Metric	Beta (Lowest Decile Median)	B+ or Better (Median)	Diff (spread)
EPS Volatility	48.6%	38.3%	10.3%
EPS Stability (lower = more stable)	17.5	15.7	1.8
DPS Vol	2.4%	5.3%	-2.9%
Max 5-yr EPS Decline	20.8%	3.3%	-17.5%
Max 5-yr Price Decline	15.7%	20.1%	4.3%
Net Debt/EBITDA	3.7	1.8	1.9
ROIC	7.4%	11.8%	-4.5%
ROE	16.1%	22.1%	-6.0%
Beta	0.6	1.0	-0.4
Quality Score (lower = higher quality)	4.0	3.0	1.0

Source: BofA US Equity & Quant Strategy, FactSet

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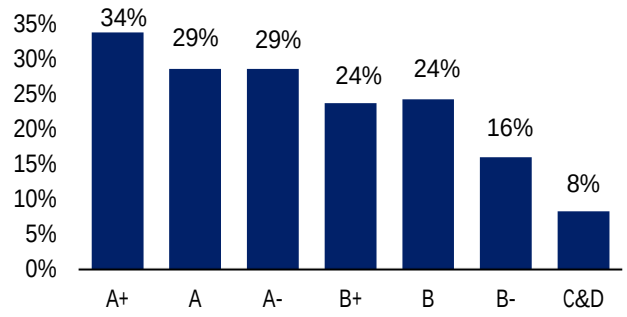
Stocks with the lowest price beta tend to have higher earnings volatility, more leverage and lower returns on investment than those based on "fundamental beta" (Quality).

What drives quality? The profits cycle

Exhibit 534: High Quality stocks (A+) have outperformed when the **profits cycle decelerates…**
Average performance by S&P 500 Quality Ranks when the profits cycle decelerated (last seven cycles, 1988-present)



Source: BofA US Equity and Quant Strategy, S&P

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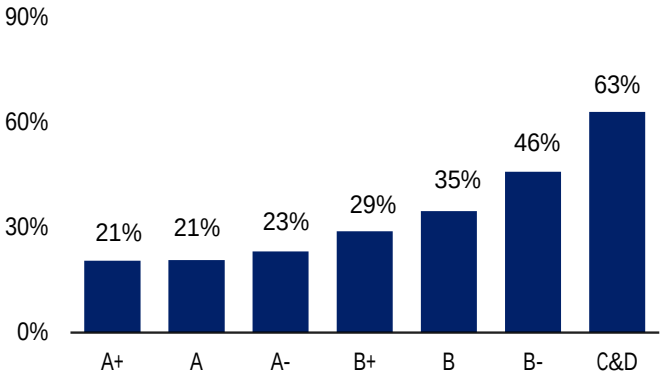
A reason to be selective on quality: quality works when profits decelerate

When profit growth is scarce, investors tend to pay up for stable earnings growth. High Quality stocks have historically outperformed when profits have decelerated.

Exhibit 535: **…and have underperformed when the profits cycle** accelerates
Average performance by S&P Quality Ranks when the profits cycle accelerated (last seven cycles, 1988-present)



Source: BofA US Equity and Quant Strategy, S&P

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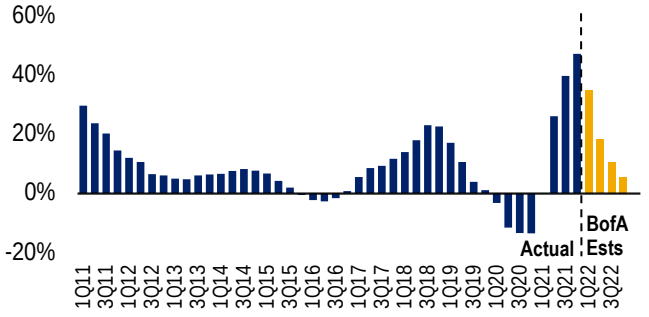
But accelerating profits favor Low Quality

When profits growth is abundant, investors prefer cyclical stocks with gearing to the economy. Low Quality/risky stocks have historically thus outperformed during periods of accelerating profits/risk-on sentiment.

Exhibit 536: We expect earnings to decelerate in 2022
S&P 500 trailing 12-mo YoY profit growth, 1Q11-4Q21 and BofA forecasts for 1Q11-4Q22



Source: BofA US Equity & Quant Strategy, Haver Analytics, FactSet

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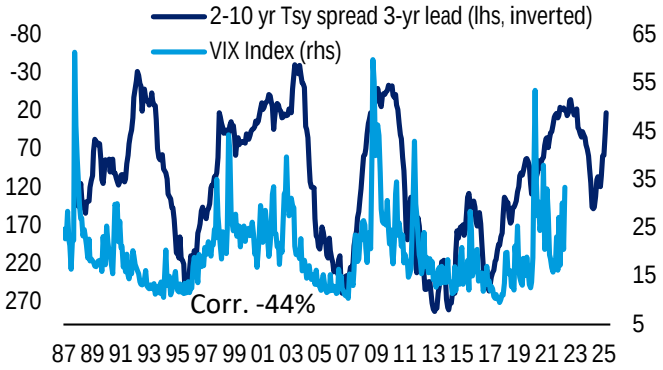
We expect profit growth to decelerate from here, which would favor High Quality stocks, all else equal.

Volatility likely to increase

Exhibit 537: The yield curve suggests volatility is likely to increase from current levels
CBOE VIX and Inverted Slope of Yield Curve (1986-present)



Source: CBOE, BEA, BofA US Equity & Quant Strategy

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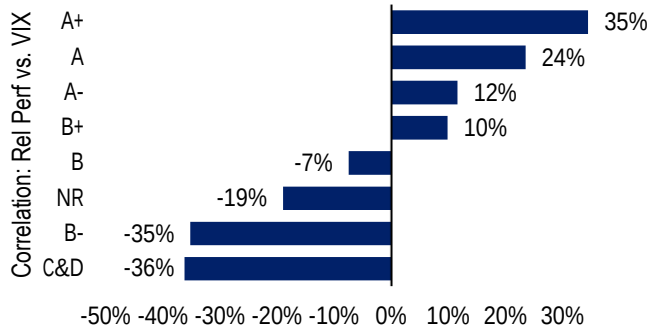
The slope of the yield curve has been a good long-lead (3-year) predictor for changes in the VIX. Currently, it suggests that volatility is likely to increase over the next few years.

Exhibit 538: High Quality tends to outperform when volatility rises
BofA Quality Indices 12m Performance Correlation to 12m Changes in CBOE VIX (1986-4/30/2022)



Source: BofA US Equity and Quant Strategy, Standard & Poor's

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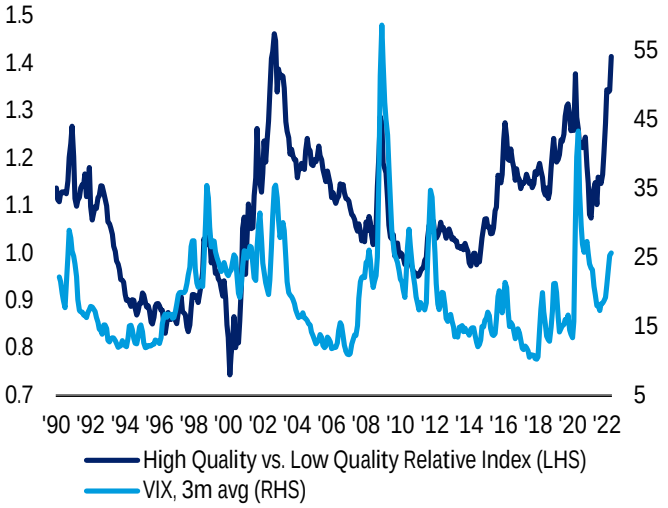
High quality stocks' relative performance is positively correlated with changes in the VIX. Low quality stocks' relative performance is most negatively correlated with changes in the VIX.

Exhibit 539: Nearly every spike in volatility has coincided with the outperformance of higher Quality stocks
B+ or Higher vs. B or Lower relative index and 3m avg VIX, 1990-4/30/22



Source: BofA US Equity & Quant Strategy, S&P, FactSet, CBOE

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Exhibit 540: The positive relationship between High Quality stock outperformance and volatility has been strong over the last ten years
High Quality vs. Low Quality and 3-month average VIX correlation, as of 4/30/22

	Correlation
Since 1990	19.8%
Last 10 years	43.5%
Last 5 years	33.5%

Source: BofA US Equity & Quant Strategy, S&P, FactSet, CBOE

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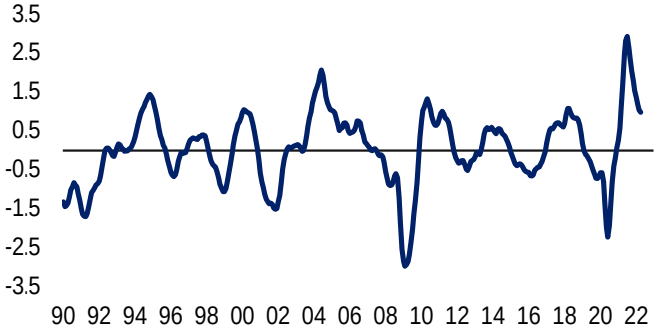
Quality and Regimes

Exhibit 541: US Regime Indicator advanced further into Late Cycle
(January 1990-April 2022)



Source: BofA US Equity & Quant Strategy, Refinitiv, ICE Data Indices, LLC, Institute for Supply Management, Bureau of Labor Statistics, Federal Reserve. **Note:** Phase 1 – Early Cycle; Phase 2 – Mid Cycle; Phase 3 – Late Cycle; Phase 4 – Recession. Disclaimer: The indicator identified as the US Regime Indicator above is intended to be an indicative metric only and may not be used for reference purposes or as a measure of performance for any financial instrument or contract, or otherwise be relied upon by third parties for any other purpose, without the written consent of BofA Global Research. This indicator was not created to act as a benchmark.

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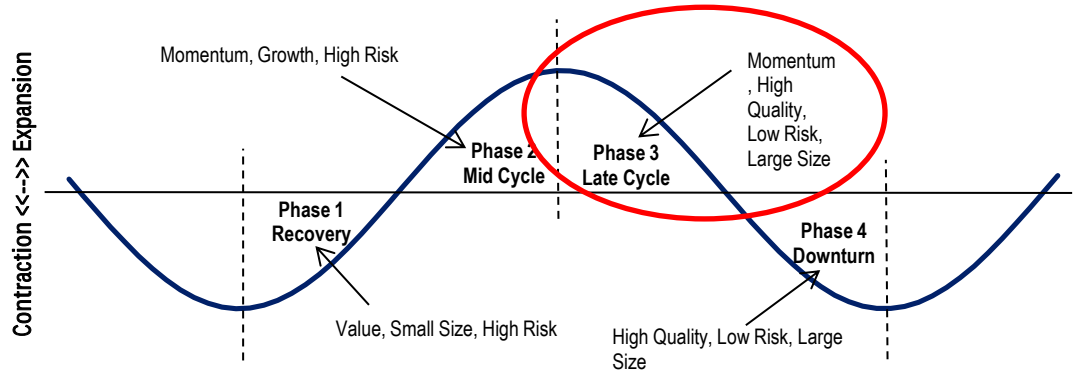
Our US Regime indicator aggregates top-down variables that capture earnings and economic growth expectations, inflation, credit conditions and other variables, to yield four phases (Exhibit 542).

Presently, our Regime Indicator is in Late Cycle, where High Quality historically generated 4.5ppt of alpha (on average).

Exhibit 542: Late cycle favors quality
US Regimes – a heuristic



Source: BofA US Equity & US Quant Strategy

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Exhibit 543: Quality outperforms in bear markets
High vs. Low Quality price performance during prior bear markets/major market corrections

Period	B + or Better (annualized)	B or Worse (annualized)	Rel Perf of B+ or Better vs B or worse (annualized)
Aug '87 - Nov '87	-74.9%	-79.2%	4.3%
Jun '90 - Oct '90	-53.1%	-61.7%	8.6%
Mar '00 - Sep '02	2.8%	-20.8%	23.6%
Oct '07 - Feb '09	-42.2%	-48.2%	6.0%
Sep '18 - Dec '18	-41.2%	-60.7%	19.5%
Jan '20 - Mar '20	-84.8%	-90.7%	5.9%
Average	-48.9%	-60.2%	11.3%
Median	-47.7%	-61.2%	7.3%

Note: Sept.– Dec. 18 was not an official bear market
Source: BofA US Quant Strategy, Standard & Poor's

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High Quality stocks have consistently outperformed in each of the last six bear markets/big market correction.

Positioning in quality has neutralized

Exhibit 544: High Quality stocks still slightly underweight although positioning has neutralized
Relative long-only fund positioning of stocks ranked B+ or better vs. B or Worse (2008-4/30/22)

Source: BofA US Equity & Quant Strategy, Lionshares, Standard & Poor's

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Positioning within the Quality spectrum has shifted from Low Quality to mostly neutral on Quality.

Returns to risk assets from policy have waxed and waned

Exhibit 545: Diminishing returns from policy put
Low Quality vs. High Quality performance over periods with easy monetary policy (i.e., QE)

From	To	Low Quality vs. High Quality performance	B+ or Better	B or Worse
Mar-09	Jul-09	19.20%	35.50%	54.70%
Aug-10	Feb-11	4.20%	28.70%	32.90%
Dec-11	Mar-12	3.30%	10.70%	14.00%
May-13	Dec-13	1.10%	13.60%	14.70%
Mar-20	Mar-22	-9.79%	51.44%	41.65%

BofA US Equity & Quant Strategy, S&P

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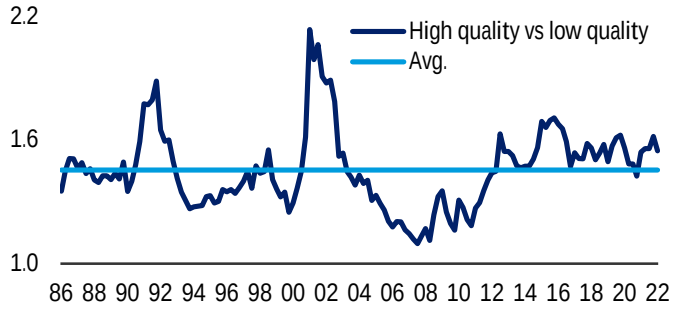
Since the Global Financial Crisis, each policy response seems to have been met with a smaller response by riskier stocks, suggesting diminishing returns.

Exhibit 546: How does Quality look on price to book? Slightly expensive
Relative Price/Book of High (B+ or Better) vs Low Quality (B or Worse), 1986-1Q22



Source: FactSet, BofA US Equity & Quant Strategy

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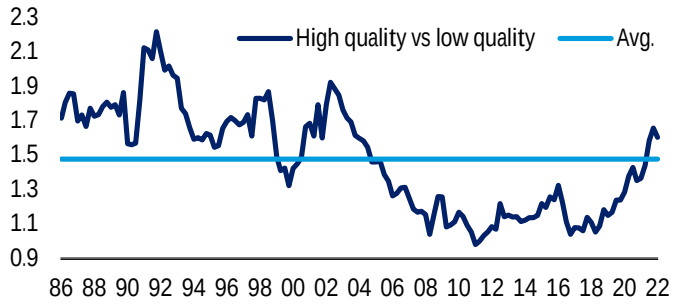
While Exhibit 525 indicates that High Quality trades at a slight discount to Low Quality on forward earnings, High Quality trades at a slight premium to Low Quality relative its historical average on book value.

Exhibit 547: High Quality is also slightly expensive on price to sales
Relative Price/Sales of High (B+ or Better) vs Low Quality (B or Worse), 1986-1Q22



Source: FactSet, BofA US Equity & US Quant Strategy

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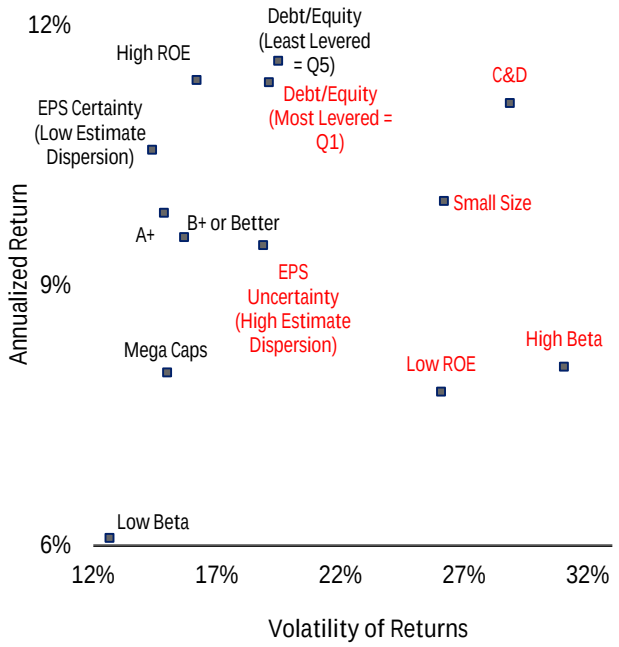
On price to sales, High Quality stocks are more expensive than Low Quality stock relative to history.

Risk / reward of high vs. low quality

Based on an analysis of risk to reward, using two measures of risk (volatility of returns and probability of loss), stocks with a high return on equity, those with lower earnings estimate dispersion, and those with low leverage have tended to offer superior performance characteristics than their lower Quality counterparts. To a lesser extent, "A+" ranked stocks have also offered superior risk-adjusted returns to "C&D"s.

Low Beta stocks have offered the lowest returns at the lowest volatility, but this basket's downside risk, as measured by probability of loss, rivals other Low Quality factors.

Exhibit 548: High and Low Quality Strategies Reward vs. Risk
Average annual return vs. annualized volatility (standard deviation) of returns (3/31/86-4/30/22)



Source: BofA US Equity and Quant Strategy

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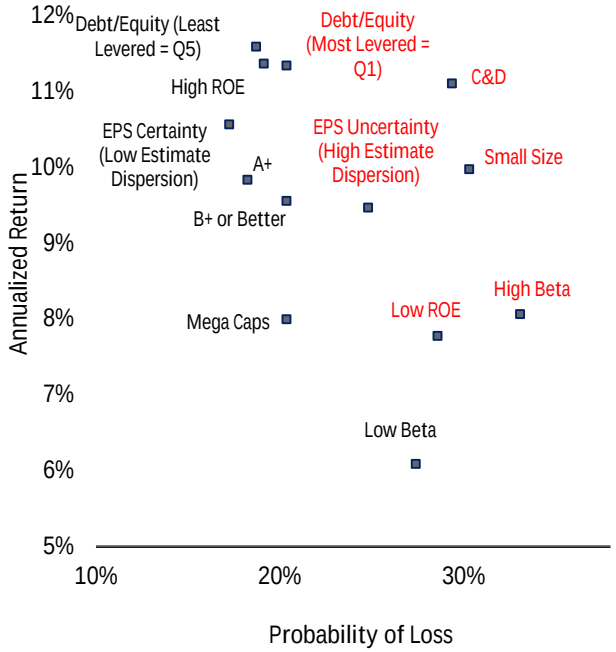
Exhibit 549: High and Low Quality Strategies Reward vs. Downside
Average annual return vs. probability of loss (3/31/86-4/30/22)



Source: BofA US Equity and Quant Strategy

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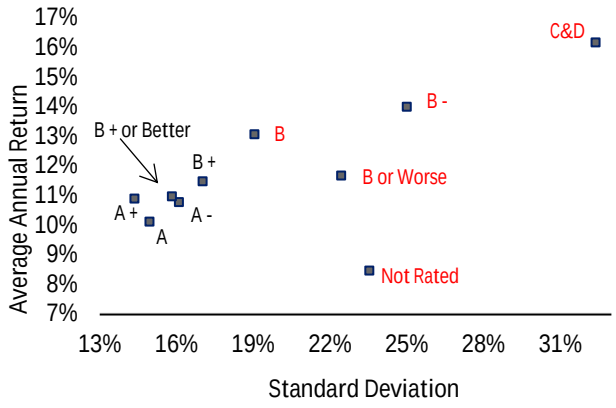
Exhibit 550: **A+ and "B+ or Better" ranked stocks tend to offer the best risk-adjusted returns…**
Risk Reward Characteristics for S&P 500 Quality rankings (1986-4/30/22)



Source: BofA US Equity and Quantitative Strategy

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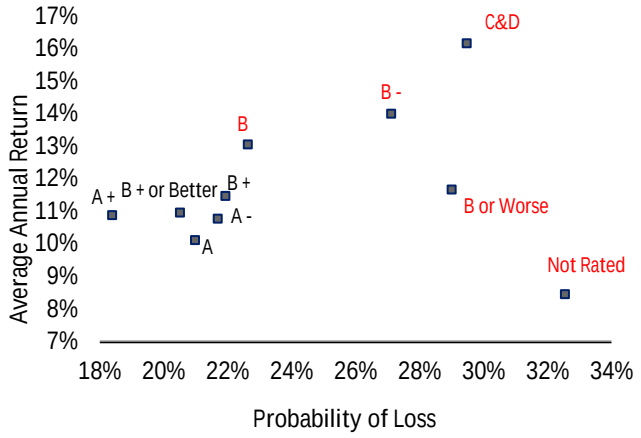
Exhibit 551: **…As well as the lowest probability of loss**
Downside Risk Reward Characteristics for S&P 500 Quality rankings (1986-4/30/22)



Source: BofA US Equity and Quantitative Strategy

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Quality outperforms over the near-term and the long-term

Exhibit 552: Quality for the near- and long-term
Relative price performance of B+ or Better vs. B or Worse stocks, as of 4/30/22

Period	Performance Spread (ppt)
1 month	5.0
3 months	4.8
6 months	17.1
12 months	19.8
Year to date	9.3
2 years	14.6
3 years	20.8
5 years	31.8
10 years	78.4
15 years	79.5

Source: BofA US Quantitative Strategy, Standard & Poor's

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High Quality (B+ or Better) stocks have outperformed Low Quality (B or Worse) stocks over the past 10 (+78ppt) and 15 years (+80ppt) in addition to recent outperformance.

Exhibit 553: Long-term winner
High quality stocks (B+ or Better S&P Quality rank) 10-yr rolling price returns, 1996-4/30/22

Source: BofA US Equity & Quant Strategy, S&P

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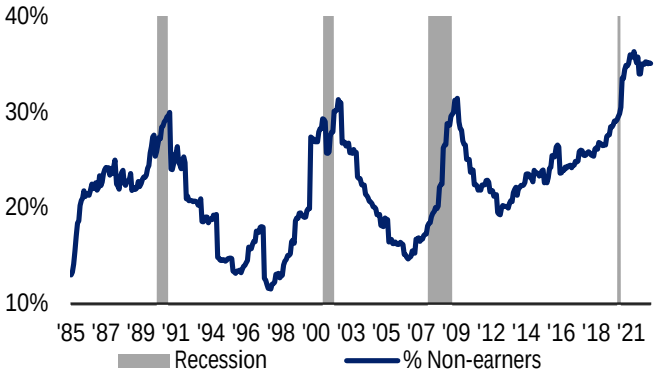
High quality stocks have never had a negative 10-yr return in our data history (back to 1986), even excluding dividends

Smaller companies tend to be lower quality

Exhibit 554: Risk to small cap outlook: % of small caps that are non-earners still near record levels
% of Russell 2000 index that is non-earners, 1985-4/30/22



Source: FactSet, BofA US Equity & US Quant Strategy

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The percent of non-earners had been rising in small cap and was exacerbated by the COVID-19 pandemic to record levels.

Deep dive on Quality fundamentals

Exhibit 555: **Quality has grown more "Quality" (but some puts/takes)**
B+ or Higher median fundamental attributes vs. historical average, since July 1990

	B+ or Better	Historical Avg	Spread
EPS Volatility	38%	27%	11.7%
EPS Stability (lower = more stable)	15.7	16.4	-0.7
DPS Vol	5.3%	6.2%	-0.9%
Max 5-yr EPS Decline	3%	9%	-5.2%
Max 5-yr Price Decline	20%	23%	-3.1%
Net Debt/EBITDA	1.8	1.2	0.6
ROIC	12%	11%	0.9%
ROE	22%	17%	4.9%
Beta	1.0	0.9	0.0
5-yr Proforma vs. GAAP EPS	11.2%	6.2%	5.0%
5-yr Proforma vs. FCF/Sh	9.4%	27.3%	-17.9%
Quality Score (lower = higher quality)	3.0	3.2	-0.2

Source: BofA US Equity & Quant Strategy, FactSet

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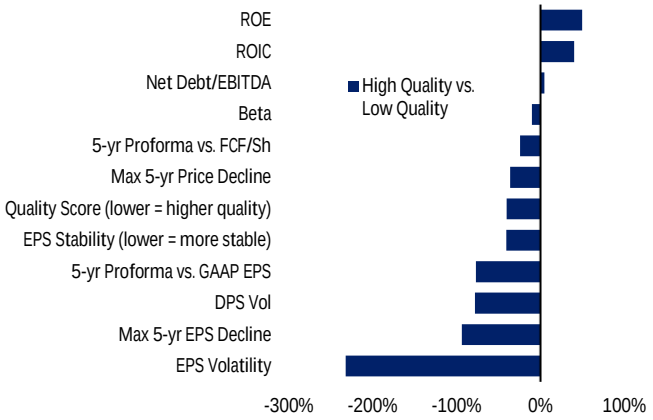
Relative to its historical average (since 1990), the median ROE for High Quality (B+ or Better) stocks has increased. EPS stability as well as Free Cash Flow Quality (spread between proforma and GAAP Free Cash Flow) have also improved.

Meanwhile, EPS Volatility and leverage has increased, while EPS Quality (spread between proforma and GAAP EPS) has fallen slightly.

Exhibit 556: High Quality vs. Low Quality: more EPS & div stability
Current B+ or Higher vs. B or Lower fundamental attributes (median % difference), as of 4/30/2022



Source: BofA US Equity and Quant Strategy, FactSet, Compustat, IBES, S&P

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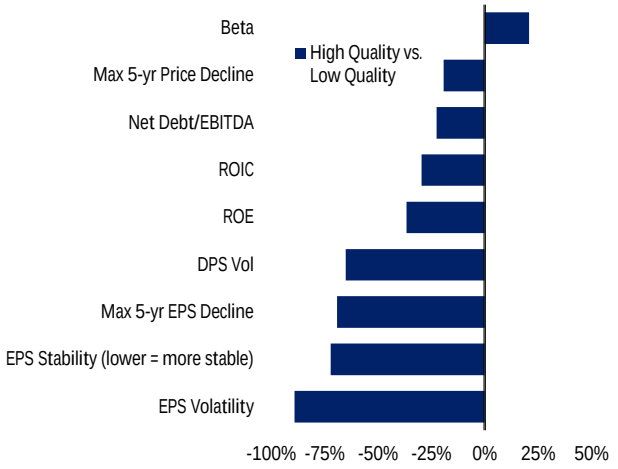
Relative to Low Quality stocks, High Quality stocks have higher returns on investment, lower EPS and dividend volatility, slightly lower beta and similar leverage.

Exhibit 557: The standard deviation of various fundamental metrics for High Quality stocks tends to be lower compared to Low Quality stocks
B+ or Higher vs. B or Lower standard deviation of median attributes (% diff.), 7/31/1990 – 4/30/2022



Source: BofA US Equity and Quant Strategy, FactSet, Compustat, IBES, S&P

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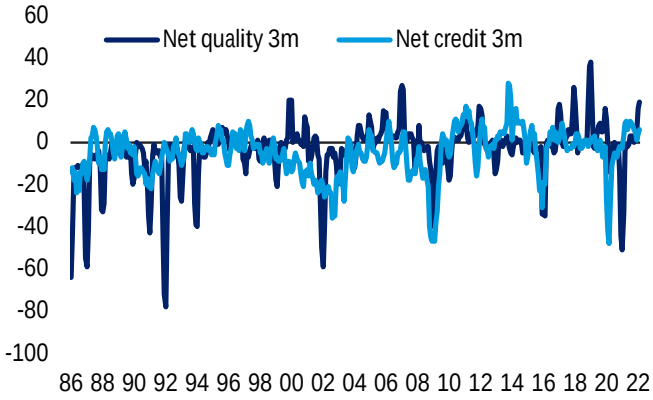
Most importantly, the characteristics of the High Quality basket have been remarkably consistent over time, particularly relative to the lower Quality basket, which sees its earnings volatility, earnings Quality, and dividends fluctuate significantly over the course of the cycle.

Exhibit 558: Net quality upgrades outpacing net credit upgrades
Net Quality and credit rating upgrades/downgrades on a rolling 3-month basis within the S&P 500 (1986 – 4/30/22)



Source: BofA US Equity & Quant Strategy, S&P

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In examining the relationship between credit and Quality ratings, we found that there is a coincident relationship in that both are impacted by the underlying fundamentals of the companies. As profits decline meaningfully, this reduces earnings and dividend stability of the company as well as the company's ability to meet their financial obligations.

Quality within sectors

Below we include more details on the Quality composition of S&P 500 GICS sectors.

Exhibit 559: High vs Low Quality P/B is cheap vs history in five of eleven sectors
Relative P/B of High & Low Quality stocks vs. sector, and relative P/B of High vs. Low Quality stocks, 1Q86-1Q22

	B+ or Better		B or Worse		Relative (B+ or Better vs. B or Worse)		B+ or Better	B or Worse	Relative (B+ or Better vs. B or Worse)
	Latest	L-T Average	Latest	L-T Average	Latest	L-T Average	vs avg.	vs avg.	vs avg.
Comm Svcs	1.29	1.04	0.46	1.08	2.80	1.15	24%	-57%	144%
Discretionary	1.27	1.20	0.94	0.89	1.35	1.45	6%	7%	-7%
Energy	2.55	1.08	1.01	0.99	2.52	1.14	137%	2%	121%
Financials	1.16	1.12	0.76	0.74	1.53	2.11	4%	3%	-27%
Health Care	0.98	1.00	0.93	1.56	1.05	1.04	-2%	-40%	2%
Industrials	1.11	1.07	0.76	0.81	1.46	1.41	4%	-6%	4%
Materials	1.19	1.18	0.91	0.85	1.31	1.44	1%	6%	-9%
Real Estate	1.10	1.09	1.06	7.64	1.04	1.07	0%	-86%	-3%
Staples	1.29	1.06	0.90	1.43	1.44	1.48	22%	-37%	-3%
Technology	1.32	1.07	0.48	0.85	2.76	1.32	24%	-43%	109%
Utilities	1.09	0.86	0.87	0.97	1.25	1.04	26%	-10%	20%

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 560: High vs Low Quality P/Sales is cheap vs history in six of eleven sectors
Relative P/S of High or Low Quality stocks vs. sector, and relative P/S of High vs. Low Quality stocks, 1Q86-1Q22

	B+ or Better		B or Worse		Relative (B+ or Better vs. B or Worse)		B+ or Better	B or Worse	Relative (B+ or Better vs. B or Worse)
	Latest	L-T Average	Latest	L-T Average	Latest	L-T Average	vs avg.	vs avg.	vs avg.
Comm Svcs	1.34	1.03	0.38	0.97	3.56	1.31	31%	-61%	171%
Discretionary	0.72	1.21	1.31	0.72	0.55	1.90	-40%	82%	-71%
Energy	1.64	1.00	1.06	1.11	1.55	1.01	63%	-5%	54%
Financials	1.13	1.14	0.80	0.72	1.41	2.49	-2%	11%	-43%
Health Care	0.99	1.00	0.80	1.97	1.25	0.98	0%	-59%	28%
Industrials	1.13	1.18	0.65	0.65	1.72	1.86	-5%	0%	-8%
Materials	1.05	1.23	1.07	0.86	0.97	1.49	-15%	24%	-34%
Real Estate	0.97	1.26	1.25	10.11	0.78	1.41	-23%	-88%	-45%
Staples	1.22	1.06	0.72	0.83	1.71	2.27	16%	-14%	-25%
Technology	1.22	1.12	0.63	0.79	1.94	1.48	10%	-20%	32%
Utilities	1.33	0.92	0.55	0.88	2.39	1.23	45%	-37%	95%

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 561: High vs Low Quality Fwd P/E is cheap vs history in five of eleven sectors
Relative P/E of High or Low Quality stocks vs. sector, and relative P/E of High vs. Low Quality stocks, as of 1Q22

	B+ or Better		B or Worse		Relative (B+ or Better vs. B or Worse)		B+ or Better	B or Worse	Relative (B+ or Better vs. B or Worse)
	Latest	L-T Average	Latest	L-T Average	Latest	L-T Average	vs avg.	vs avg.	vs avg.
Comm Svcs	1.12	0.81	0.55	1.48	2.03	0.69	38%	-63%	195%
Discretionary	0.59	1.01	1.50	1.02	0.40	1.11	-42%	47%	-64%
Energy	1.58	0.94	0.96	0.99	1.64	0.89	68%	-3%	84%
Financials	0.98	1.02	1.05	0.93	0.93	1.11	-4%	14%	-16%
Health Care	1.01	0.96	0.98	1.39	1.02	0.80	5%	-29%	28%
Industrials	0.96	1.02	0.97	1.00	1.00	1.07	-5%	-3%	-7%
Materials	1.13	1.06	0.90	1.02	1.25	1.07	7%	-11%	17%
Real Estate	0.91	0.85	1.43	0.82	0.63	0.68	7%	75%	-6%
Staples	1.00	0.99	1.01	1.37	0.99	1.01	1%	-26%	-2%
Technology	1.01	0.96	0.71	1.02	1.43	0.97	6%	-31%	48%
Utilities	1.08	0.83	0.80	1.02	1.34	0.94	30%	-21%	43%

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 562: Annual Quality performance (green = best performing group, red = worst)
Quality performance by year

	B+ or Better	B or Worse	A+	A	A-	B+	B	B-	C&D	Not Rated
1987	-3.9%	-2.1%	-3.2%	-4.3%	-3.3%	-4.5%	0.5%	1.5%	20.1%	-9.5%
1988	15.8%	22.5%	14.7%	13.1%	16.4%	17.4%	26.0%	21.3%	22.6%	9.7%
1989	18.5%	7.7%	23.4%	20.5%	23.5%	11.3%	16.8%	11.7%	-2.0%	-20.6%
1990	-12.7%	-20.8%	-10.7%	-11.0%	-9.7%	-17.2%	-18.5%	-22.5%	-20.1%	-26.6%
1991	38.9%	49.6%	42.5%	34.0%	34.6%	44.8%	43.2%	36.5%	91.3%	49.5%
1992	11.7%	20.3%	7.5%	12.3%	11.0%	14.7%	16.9%	22.5%	23.0%	18.8%
1993	6.2%	25.4%	-1.4%	-0.1%	7.7%	11.7%	23.0%	24.3%	33.0%	24.1%
1994	-5.8%	-0.7%	-2.3%	-7.5%	-7.1%	-5.2%	-1.8%	1.9%	6.3%	-6.2%
1995	28.2%	28.2%	30.6%	27.6%	29.6%	26.5%	29.0%	25.6%	21.4%	28.4%
1996	16.7%	21.9%	19.2%	18.5%	15.5%	15.9%	25.5%	23.2%	21.8%	18.6%
1997	30.1%	21.9%	36.9%	37.0%	31.6%	24.7%	24.4%	22.5%	17.2%	20.6%
1998	9.1%	-4.7%	19.8%	12.1%	9.3%	4.9%	8.5%	-10.9%	-4.4%	-7.5%
1999	0.5%	24.2%	-1.6%	-6.5%	-5.1%	7.1%	12.3%	20.5%	71.4%	26.2%
2000	16.6%	-9.3%	22.4%	17.6%	12.9%	16.2%	13.2%	-2.8%	0.1%	-17.2%
2001	8.6%	3.2%	2.3%	5.7%	8.9%	11.2%	8.0%	6.5%	3.8%	0.3%
2002	-10.8%	-28.1%	-9.9%	-9.0%	-11.9%	-11.4%	-18.1%	-17.8%	-42.8%	-31.3%
2003	30.8%	52.7%	26.3%	27.4%	28.2%	34.8%	40.9%	49.6%	80.9%	51.8%
2004	15.9%	17.1%	11.5%	15.8%	16.0%	16.7%	21.9%	24.0%	6.6%	14.5%
2005	5.5%	9.4%	-0.3%	1.9%	4.3%	8.8%	11.0%	15.1%	6.1%	6.8%
2006	11.9%	15.0%	9.2%	10.4%	14.6%	11.8%	16.6%	15.6%	10.6%	14.1%
2007	-5.6%	3.1%	-9.4%	-8.6%	-9.7%	-1.8%	2.1%	3.6%	-1.7%	4.3%
2008	-32.7%	-46.5%	-25.1%	-30.7%	-34.2%	-34.3%	-40.6%	-42.8%	-56.9%	-49.6%
2009	34.8%	75.1%	27.9%	22.9%	34.2%	41.0%	58.9%	78.7%	123.0%	76.1%
2010	20.3%	25.1%	20.5%	18.0%	21.3%	20.5%	22.1%	28.5%	40.1%	22.3%
2011	2.9%	-8.3%	8.7%	2.2%	2.8%	2.1%	-1.5%	-12.0%	-25.8%	-5.8%
2012	12.2%	15.2%	10.4%	10.4%	14.0%	12.2%	12.4%	18.9%	25.3%	12.5%
2013	31.5%	36.7%	26.5%	30.4%	31.5%	32.7%	32.1%	37.1%	48.3%	37.0%
2014	13.1%	5.5%	12.3%	13.9%	12.6%	13.1%	9.6%	10.0%	9.7%	1.9%
2015	-3.4%	-11.6%	-4.1%	1.0%	-1.0%	-5.6%	-8.3%	-5.5%	0.4%	-15.8%
2016	13.4%	14.6%	9.9%	11.0%	12.8%	14.5%	15.9%	25.5%	10.2%	11.3%
2017	16.0%	14.8%	14.8%	18.7%	17.4%	14.9%	13.7%	14.8%	19.4%	14.7%
2018	-7.0%	-12.9%	4.4%	-4.0%	-6.5%	-9.3%	-12.8%	-16.1%	-10.4%	-12.4%
2019	27.6%	25.8%	21.7%	27.9%	26.7%	28.5%	26.5%	21.1%	24.9%	26.7%
2020	10.5%	21.7%	13.9%	11.8%	6.6%	11.6%	11.5%	9.8%	12.1%	30.2%
2021	26.9%	13.8%	27.5%	22.7%	30.0%	26.6%	29.3%	51.4%	22.4%	-1.5%
2022	-2.5%	-22.3%	-0.8%	-2.7%	-0.1%	-3.8%	-4.1%	7.2%	-5.2%	-35.7%

*Note: 2022 reflects 12-month return as of 4/30/22.
Source: BofA US Equity and Quant Strategy

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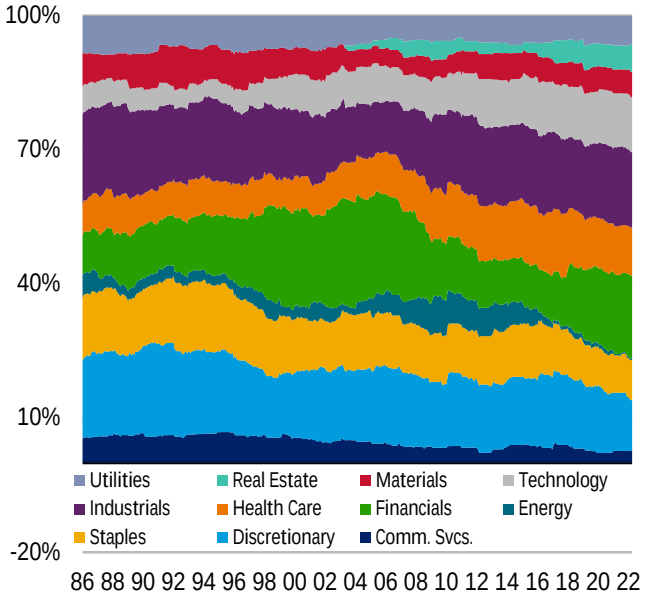
Quality composition within sectors

Since the Financial Crisis we have seen a substantial shift in the sector composition of stocks rated B+ or higher. In particular, the percentage of High Quality Technology stocks is at the highest in our data history (13%), and the percentage of Financials stocks (18%) is at a post-crisis high and the biggest share of High Quality stocks of all the sectors. Other shifts? Communication Services and Consumer Discretionary and Consumer Staples have been declining in Quality since 2017 and the proportion of High Quality stocks is near a record lows. Today, only 0.3% of High Quality stocks are in Energy vs 8% in 2008. Overall, Financials, Industrials, Discretionary and Tech are the sectors with the most High Quality stocks.

Exhibit 563: Trends in Quality composition by sector
B+ or Better sector exposure over time based on number of co.'s (as of 4/30/22)



Source: BofA US Equity and Quant Strategy, FactSet, S&P

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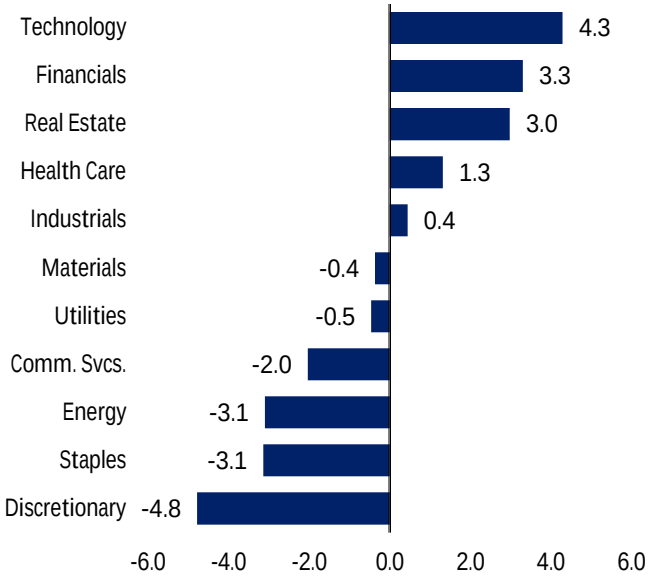
Exhibit 564: Tech, Financials and Real Estate are the sectors with the biggest increase in quality composition by # of co. vs hist.
B+ or Better current sector weight vs. historical avg (ppt), as of 4/30/22



Note: based on equal weight (number of companies)
Source: BofA US Equity and Quant Strategy, FactSet, S&P

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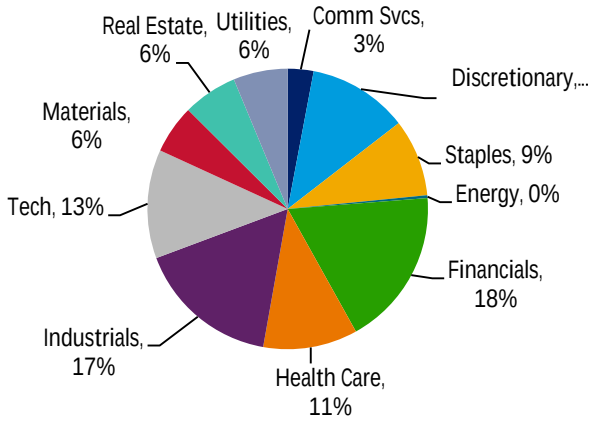
Exhibit 565: Fins and Industrials comprise bulk of the High Quality stocks today
S&P 500 Sector distribution for "B+ or Better" stocks, as of 4/30/22



Source: S&P, BofA US Equity and Quant Strategy

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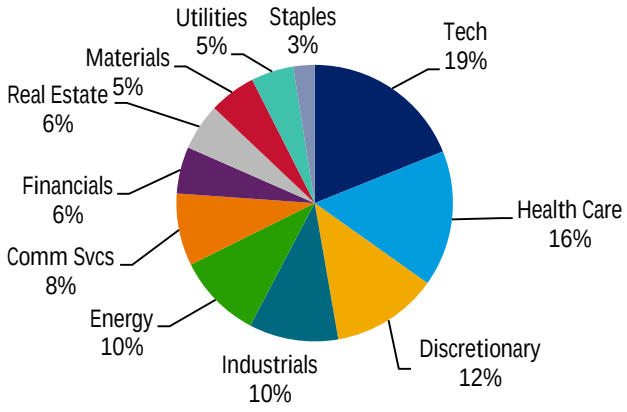
Exhibit 566: Tech and Health Care have the highest composition in Low Quality
S&P 500 Sector distribution for "B or Worse" stocks, as of 4/30/22



Source: S&P, BofA US Equity and Quant Strategy

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Performance Charts

Exhibit 567: Highest quality stocks (A+) have underperformed the lowest quality stocks (C&D)
A+ vs C&D relative performance, 1986-4/30/22

Source: BofA US Equity and Quantitative Strategy

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Exhibit 568: But B+ or Better stocks have outperformed B or Worse stocks
B+ or Better vs B or Worse relative performance, 1986-4/30/22

Source: BofA US Equity and Quantitative Strategy

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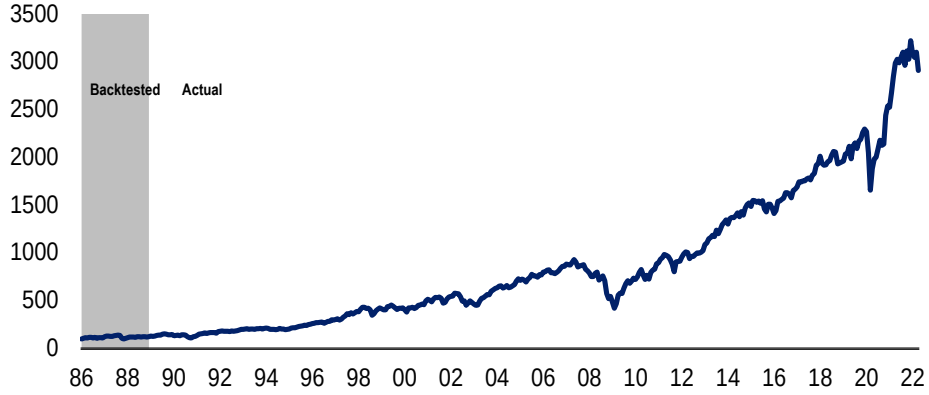
Exhibit 569: B+ or Better stock performance jumped amid the COVID-19 pandemic
B+ or Better cumulative index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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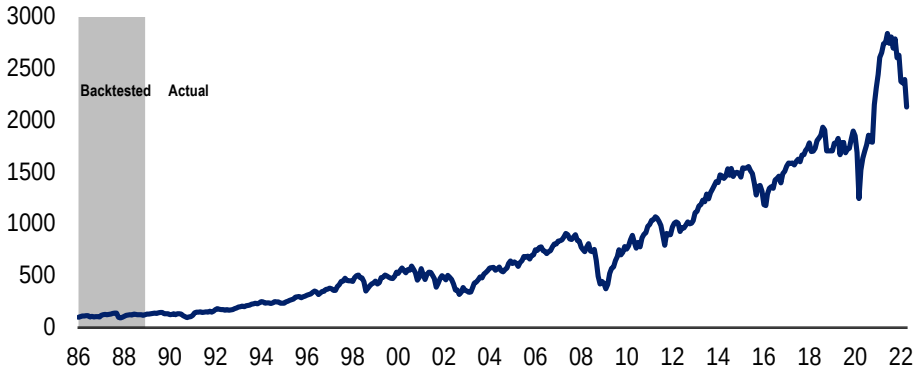
Exhibit 570: B or Worse stocks have dropped in recent months following a pandemic surge
B or Worse cumulative index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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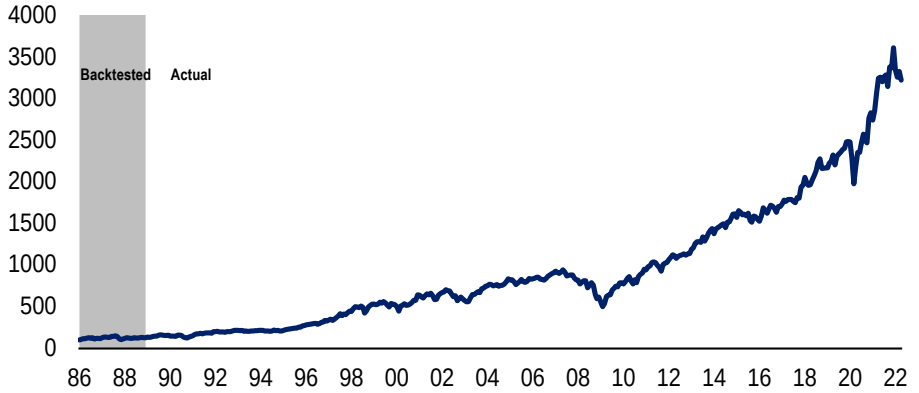
Exhibit 571: A+ stocks have seen a steady rise in price performance throughout history
A+ index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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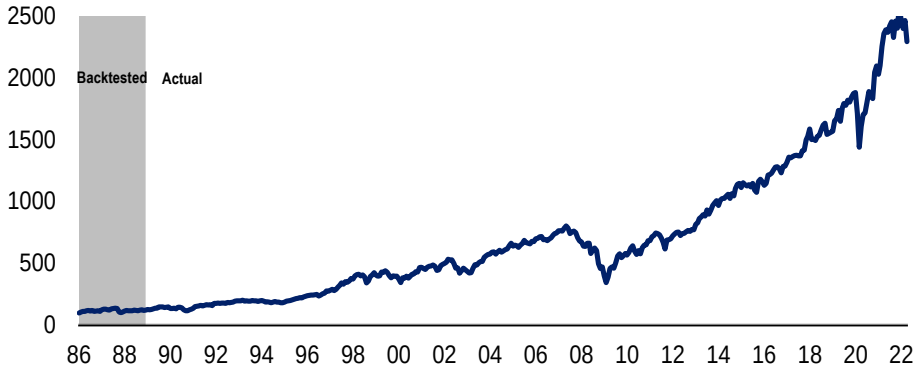
Exhibit 572: A rated stocks have also held a steady upward trend in performance
A index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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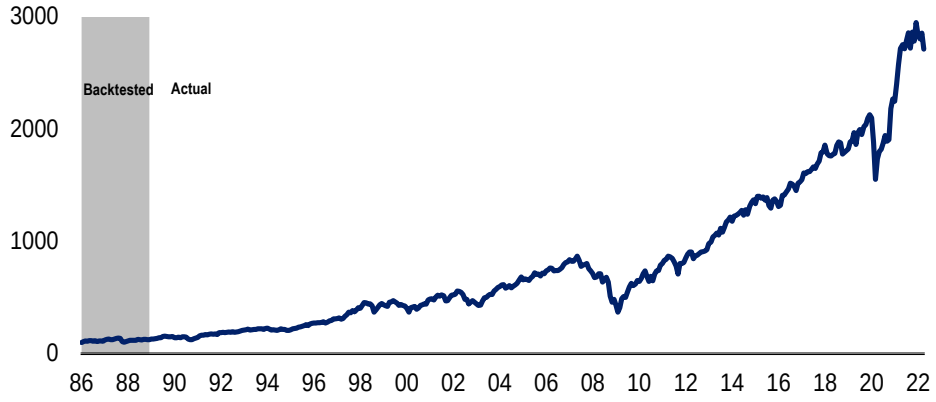
Exhibit 573: A- rated stocks have similarly held a steady upward trend in performance
A- index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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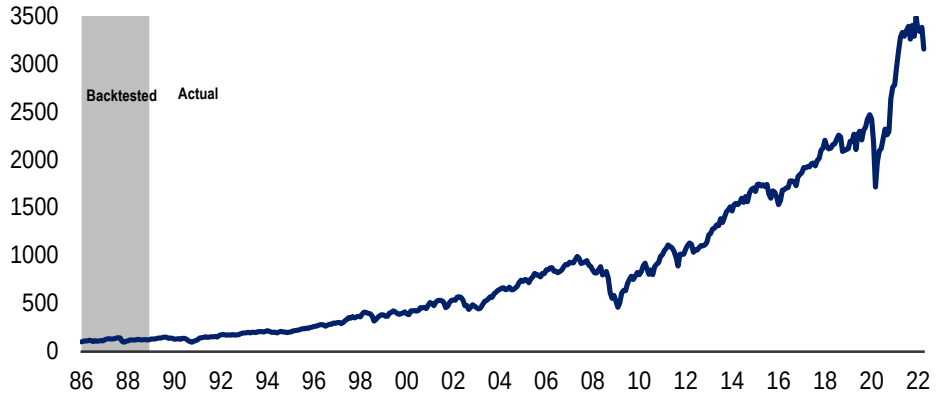
Exhibit 574: B+ rated stock performance jumped amid the COVID-19 pandemic
B+ index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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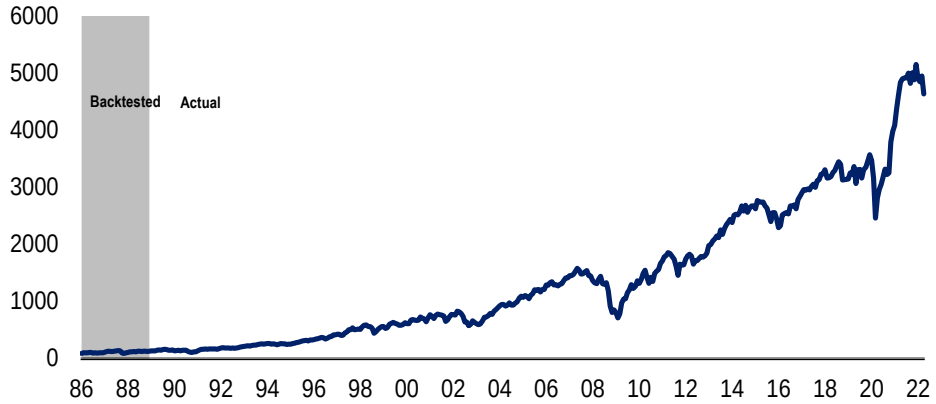
Exhibit 575: B rated stock performance similarly jumped amid the COVID-19 pandemic
B index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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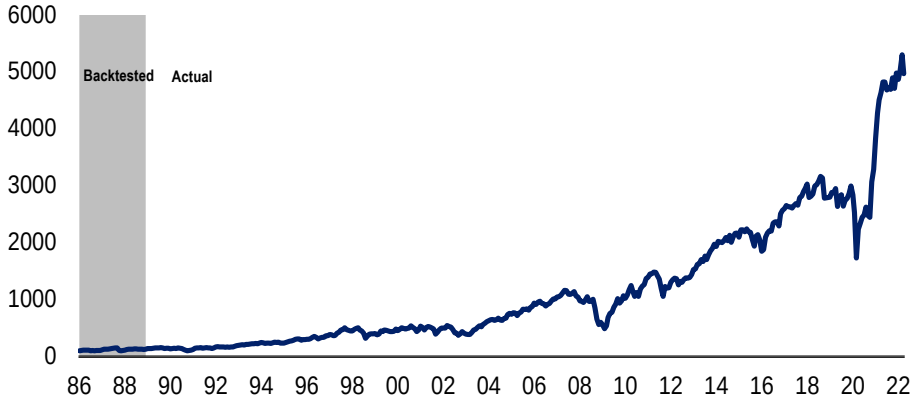
Exhibit 576: B- rated stock performance saw pause before taking off following the pandemic
B- index performance (100=1986), as of 4/30/22



Source: BofA US Equity and Quantitative Strategy

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Exhibit 577: C&D rated stock performance has been the most volatile throughout history vs other quality ranks
C&D index performance (100=1986), as of 4/30/22

Source: BofA US Equity and Quantitative Strategy

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Methodology

For the BofA Quality indices, we created stock screens by using Standard and Poor's quality ranking for companies in the BofA research coverage. At the end of each month, the companies in the universe are grouped by their quality rankings. We then created quality ranking screens showing stocks in quality rank. We tracked the output of these screens for the subsequent month.

Note that no adjustment was made to remove stocks that were on the firm's restricted list from our backtest analysis.

Returns Calculation

For each of the factors analyzed, rebalancing and performance calculations were conducted each month, using data and closing prices corresponding to the market's close on the last business day of each month. The results of each screen were computed on the basis of price return.

Our backtest results do not reflect transaction costs, tax withholdings or any investment advisory fees. Had these costs been reflected, the results would have been lower. The results of individuals replicating the analysis presented here may differ from the results contained in this report for a variety of reasons, including different assumptions related to incurring transaction costs and/or investment advisory fees, as well as differences in the time and price that securities were acquired and disposed of, and differences in the weighting of such securities. The results may also differ based on differences in assumptions of treatment of dividends received, including the amount received and whether and when such dividends were reinvested.

Past performance should not and cannot be viewed as an indicator of future performance. A complete performance record is available upon request.

Section VI: Relative Valuation for Industries

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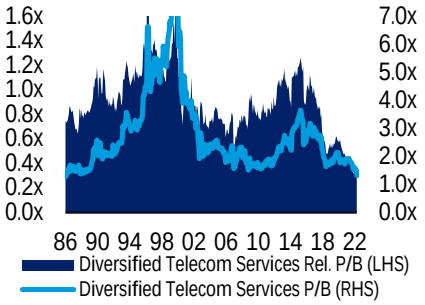
Relative Valuation for Industries

The below charts illustrate the absolute and relative Price/Book, Price/Operating Cash Flow, and Forward (NTM) P/E of the S&P 500 industries from 1986-April 2022. Industries with less than 10 years of valuation history are excluded.

Communication Services

Exhibit 578: Diversified Telecommunication Services: P/B
On a Price/Book basis valuations have declined in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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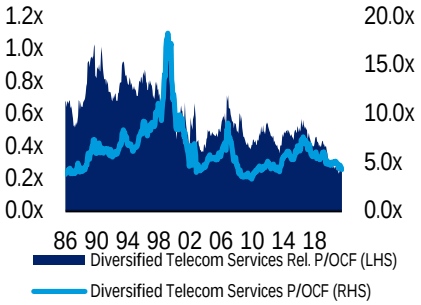
Exhibit 579: Diversified Telecommunication Services: P/OCF
On a Price/OCF basis valuations have declined in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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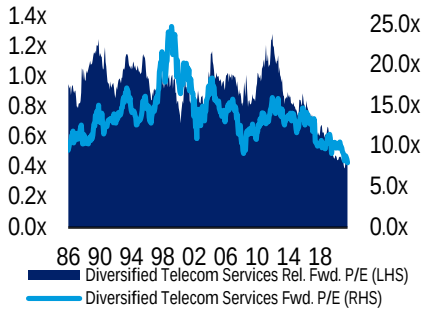
Exhibit 580: Diversified Telecommunication Services: Fwd. P/E
On a Forward P/E basis valuations have declined in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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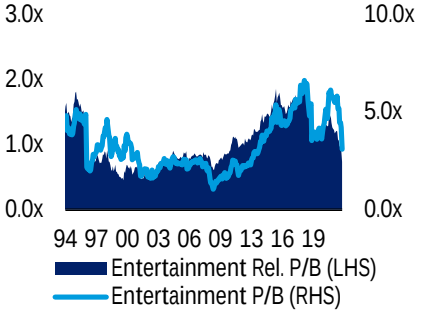
Exhibit 581: Entertainment: P/B
On a Price/Book basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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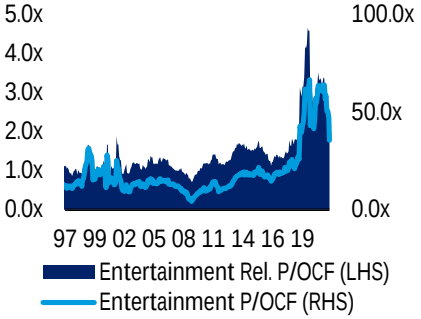
Exhibit 582: Entertainment: P/OCF
On a Price/OCF basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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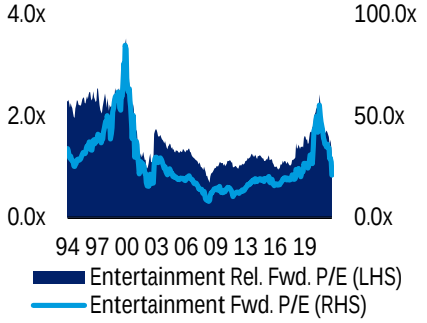
Exhibit 583: Entertainment: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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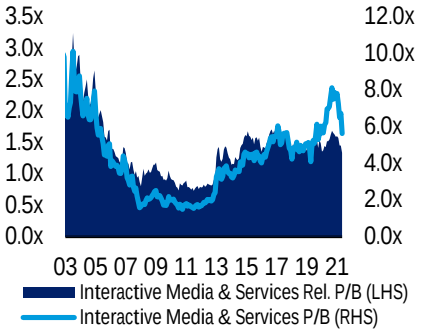
Exhibit 584: Interactive Media & Services: P/B
On a Price/Book basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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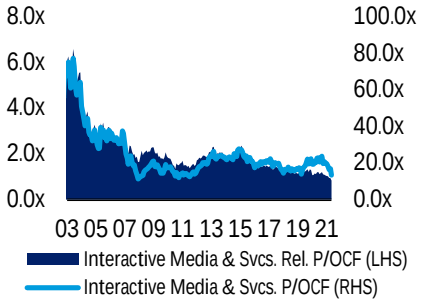
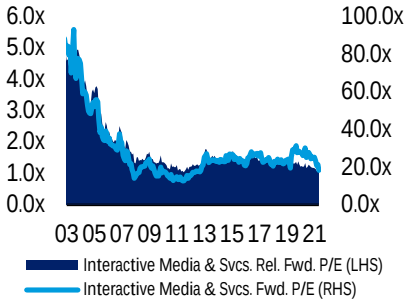
Exhibit 585: Interactive Media & Services: P/OCF
On a Price/OCF basis valuations have declined recently



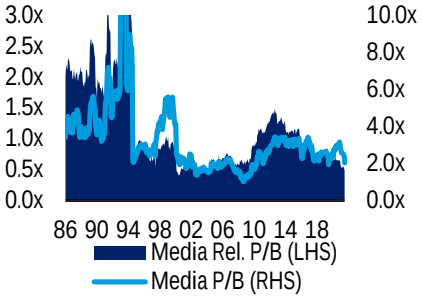
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 586: Interactive Media & Services: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



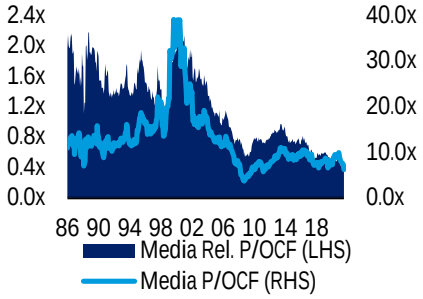
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 587: Media: P/B
On a Price/Book basis valuations have declined recently



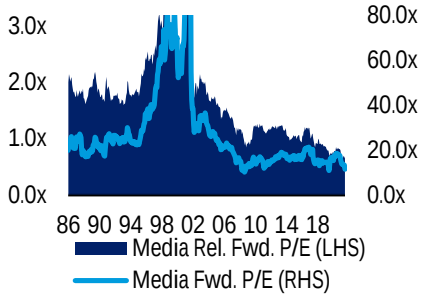
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 588: Media: P/OCF
On a Price/OCF basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

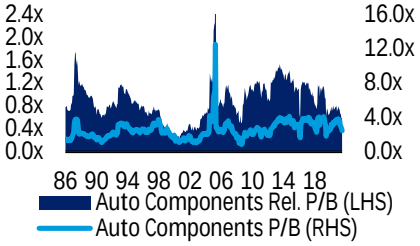
Exhibit 589: Media: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

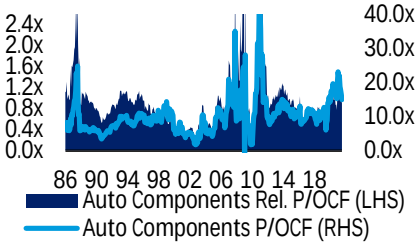
Consumer Discretionary

Exhibit 590: Auto Components: P/B
On a Price/Book basis valuations have edged lower recently



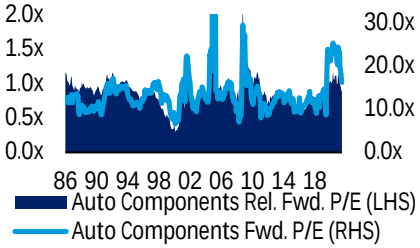
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 591: Auto Components: P/OCF
On a Price/OCF basis valuations have declined recently



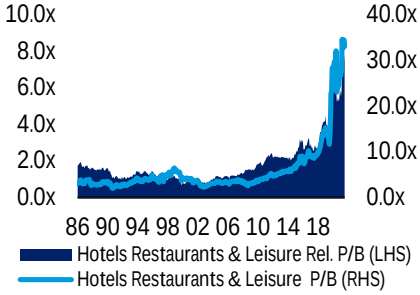
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 592: Auto Components: Fwd. P/E
On a Forward P/E basis valuations have declined recently



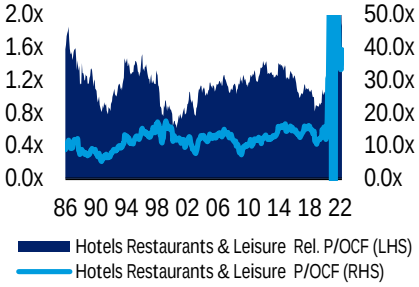
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 593: Hotels Restaurants & Leisure: P/B
On a Price/Book basis valuations have risen to all-time highs



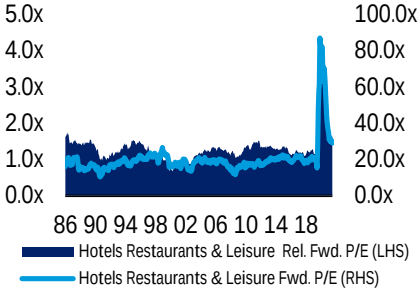
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 594: Hotels Restaurants & Leisure: P/OCF
On a Price/OCF basis valuations have declined sharply recently



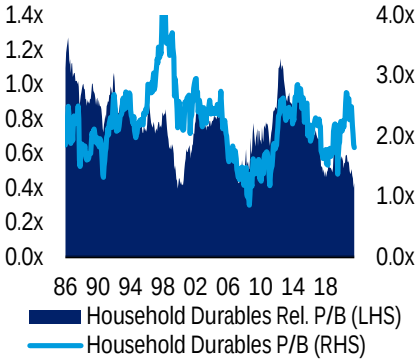
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 595: Hotels Restaurants & Leisure: Fwd. P/E
On a Forward P/E basis valuations have declined from all-time highs



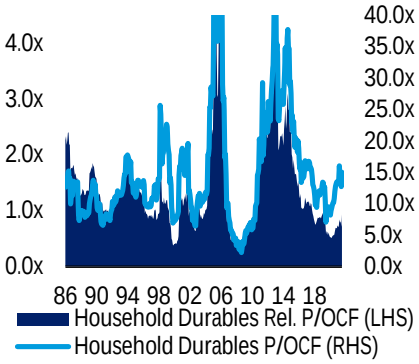
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 596: Household Durables: P/B
On a Price/Book basis valuations have declined recently



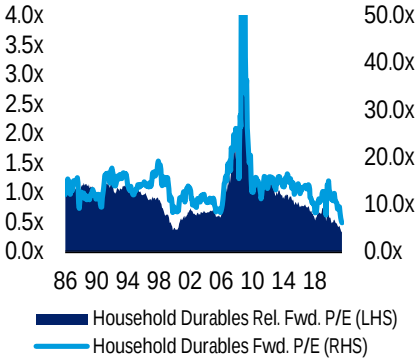
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 597: Household Durables: P/OCF
On a Price/OCF basis valuations have risen in recent years



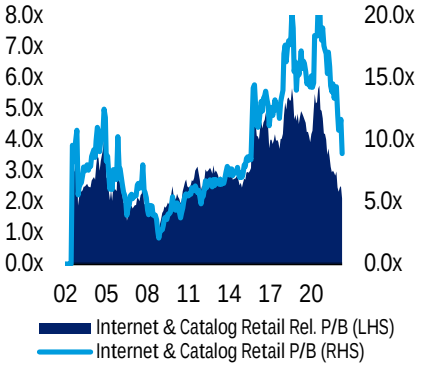
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 598: Household Durables: Fwd. P/E
On a Forward P/E basis valuations have declined recently



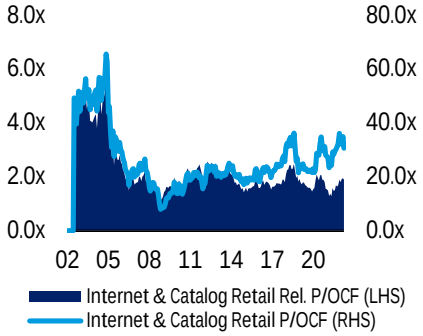
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 599: Internet & Catalog Retail: P/B
On a Price/Book basis valuations have edged lower recently



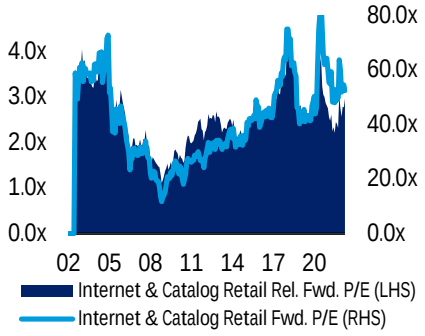
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 600: Internet & Catalog Retail: P/OCF
On a Price/OCF basis valuations have risen recently



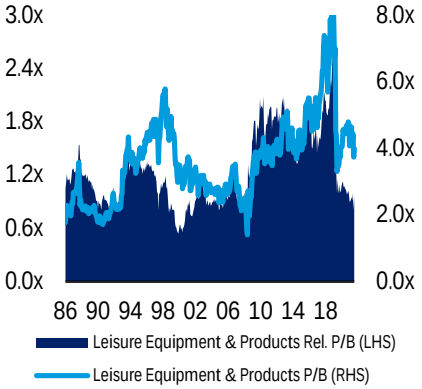
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 601: Internet & Catalog Retail: Fwd. P/E
On a Forward P/E basis valuations have declined from all-time highs



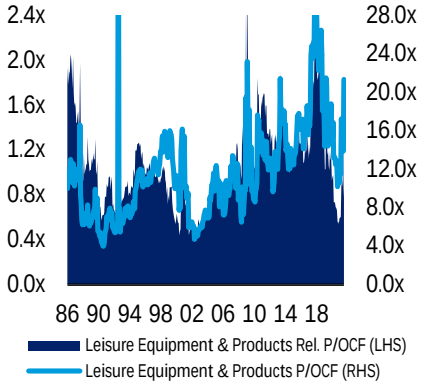
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 602: Leisure Equipment & Products: P/B
On a Price/Book basis valuations have declined recently



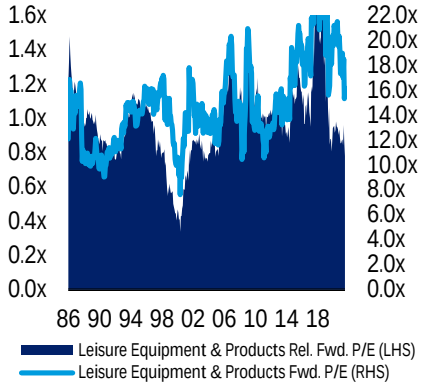
Source: I/B/E/S, BofA US Equity & US Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 603: Leisure Equipment & Products: P/OCF
On a Price/OCF basis valuations have risen sharply recently



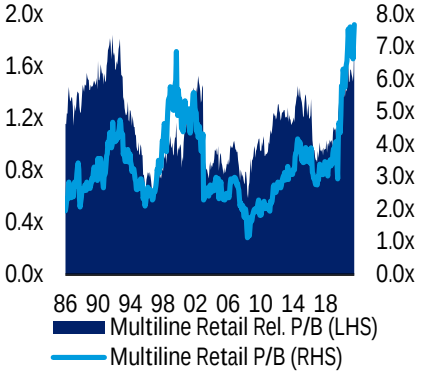
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 604: Leisure Equipment & Products: Fwd. P/E
On a Forward P/E basis valuations have declined recently



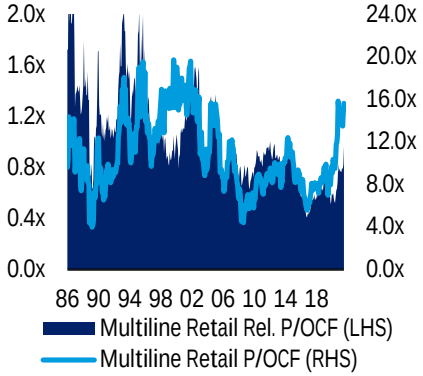
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 605: Multiline Retail: P/B
On a Price/Book basis valuations have risen in recent years



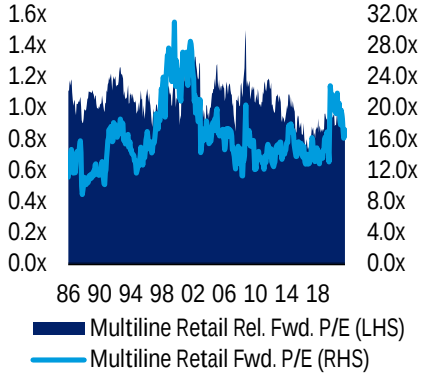
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 606: Multiline Retail: P/OCF
On a Price/OCF basis valuations have edged higher recently



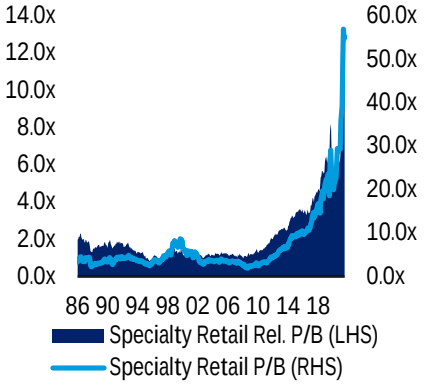
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 607: Multiline Retail: Fwd. P/E
On a Forward P/E basis valuations have declined recently



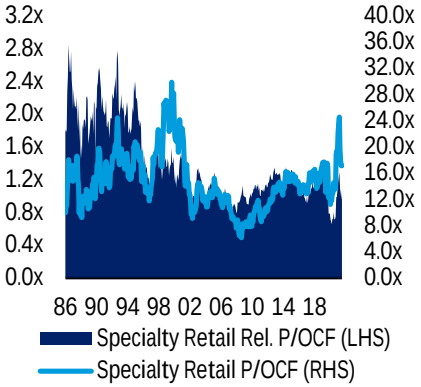
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 608: Specialty Retail: P/B
On a Price/Book basis valuations have risen sharply in recent years



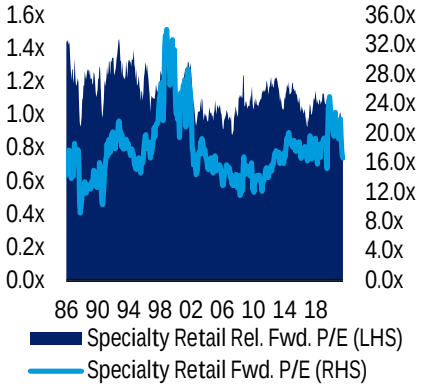
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 609: Specialty Retail: P/OCF
On a Price/OCF basis valuations have edged lower recently



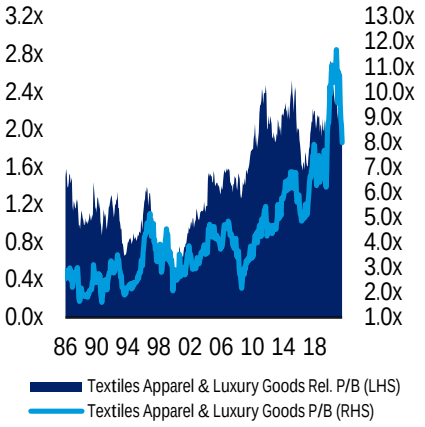
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 610: Specialty Retail: Fwd. P/E
On a Forward P/E basis valuations have declined recently



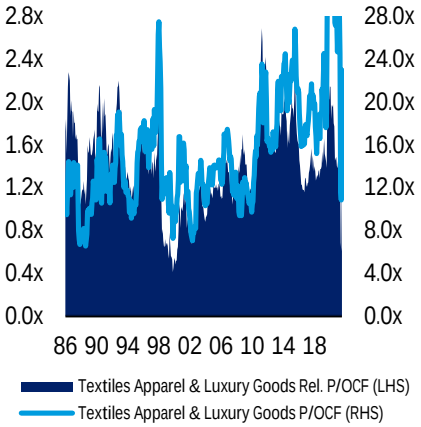
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 611: Textiles Apparel & Luxury Goods: P/B
On a Price/Book basis valuations have declined recently from all-time highs



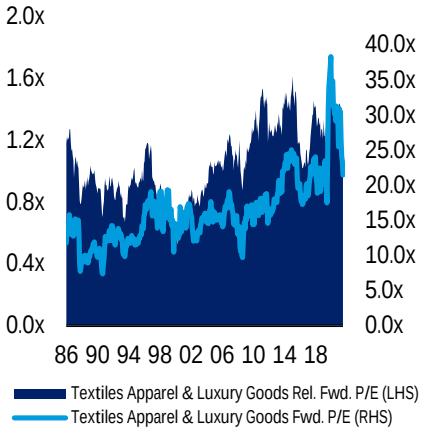
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 612: Textiles Apparel & Luxury Goods: P/OCF
On a Price/OCF basis valuations have declined recently from all-time highs



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

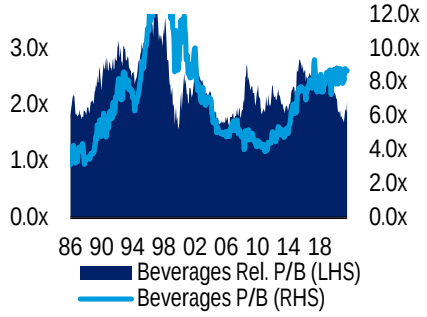
Exhibit 613: Textiles Apparel & Luxury Goods: Fwd. P/E
On a Forward P/E basis valuations have declined from all-time highs



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

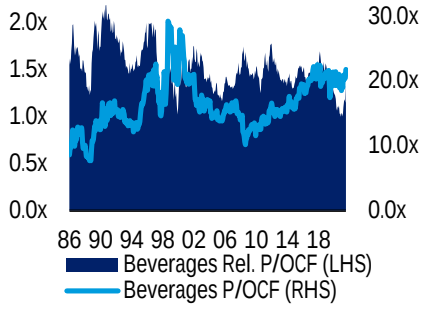
Consumer Staples

Exhibit 614: Beverages: P/B
On a Price/Book basis valuations have edged higher recently



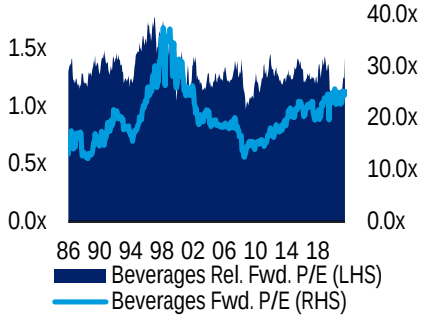
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 615: Beverages: P/OCF
On a Price/OCF basis valuations have risen in recent years



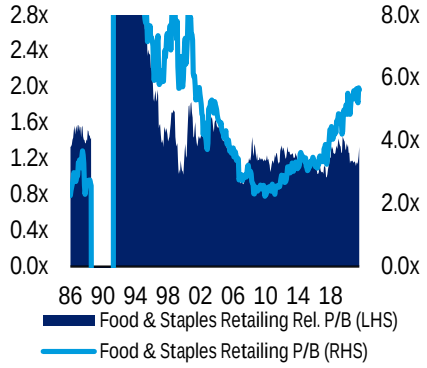
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 616: Beverages Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



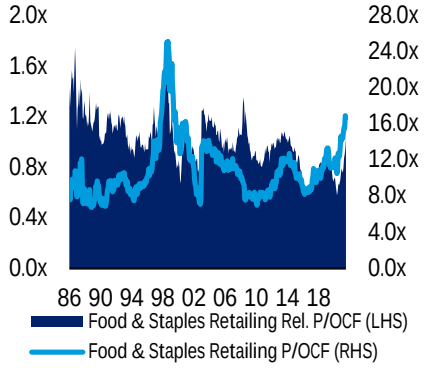
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 617: Food & Staples Retailing: P/B
On a Price/Book basis valuations have risen in recent years



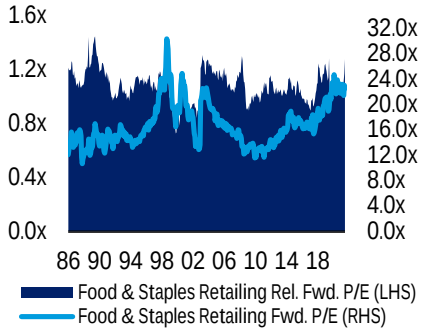
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 618: Food & Staples Retailing: P/OCF
On a Price/OCF basis valuations have edged higher recently



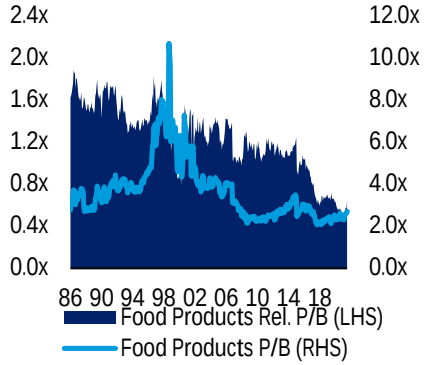
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 619: Food & Staples Retailing: Fwd. P/E
On a Forward P/E basis valuations have risen in recent years



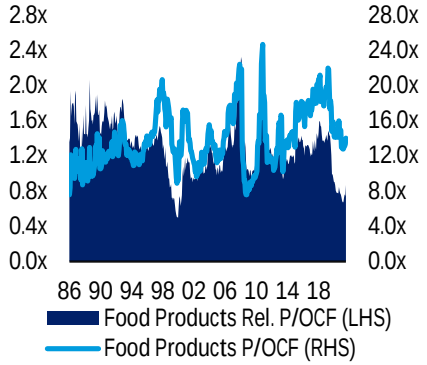
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 620: Food Products: P/B
On a Price/Book basis valuations have edged higher recently



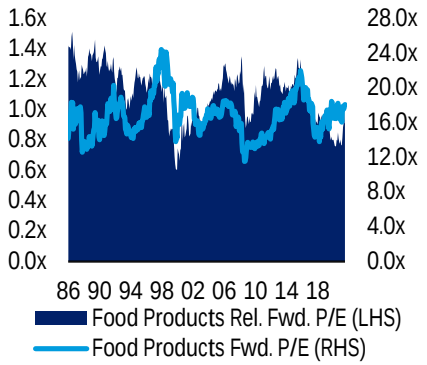
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 621: Food Products: P/OCF
On a Price/OCF basis valuations have edged lower recently



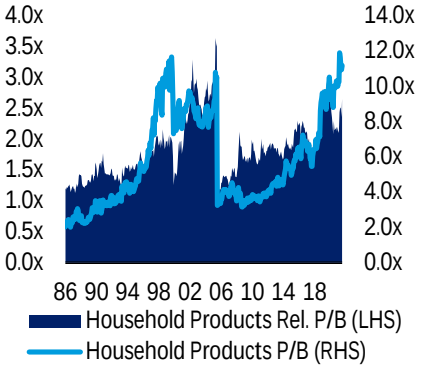
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 622: Food Products: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



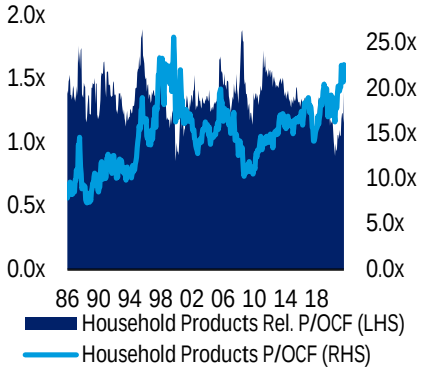
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 623: Household Products: P/B
On a Price/Book basis valuations have risen in recent years



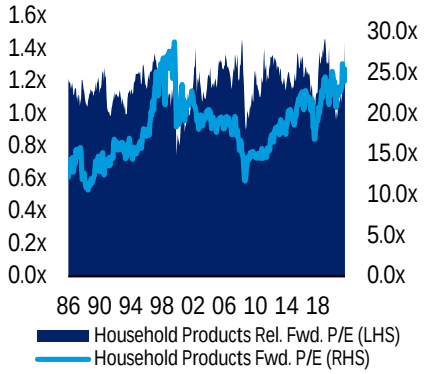
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 624: Household Products: P/OCF
On a Price/OCF basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 625: Household Products: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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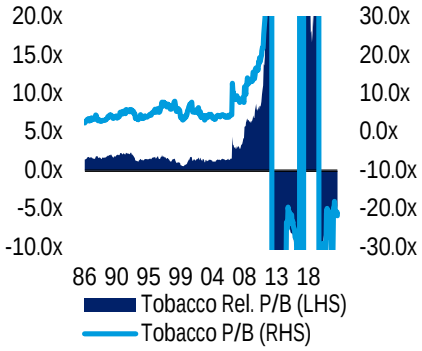
Exhibit 626: Tobacco: P/B
Book value has been negative in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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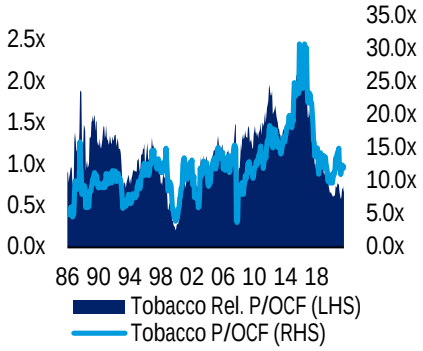
Exhibit 627: Tobacco: P/OCF
On a Price/OCF basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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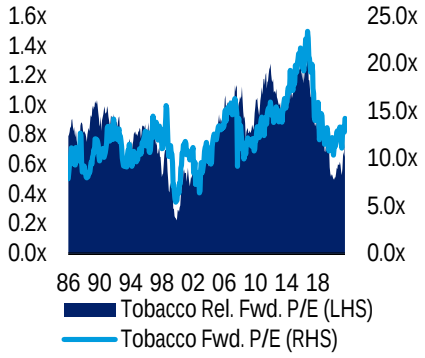
Exhibit 628: Tobacco: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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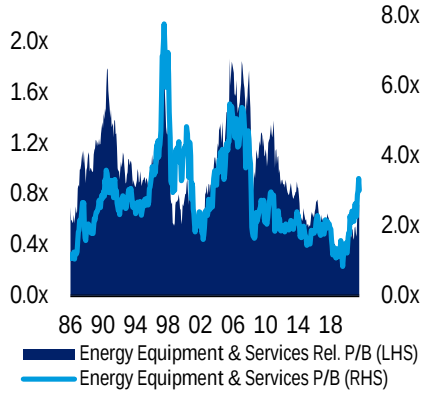
Energy

Exhibit 629: Energy Equipment & Services: P/B
On a Price/Book basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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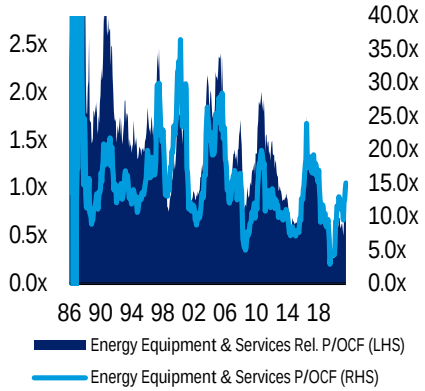
Exhibit 630: Energy Equipment & Services: P/OCF
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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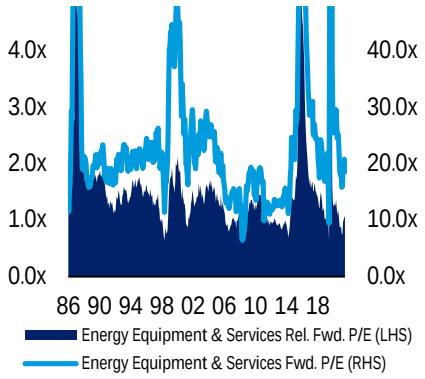
Exhibit 631: Energy Equipment & Services: Fwd. P/E
On a Forward P/E basis valuations have declined from all-time highs



Source: I/B/E/S, BofA US Equity & Quant Strategy
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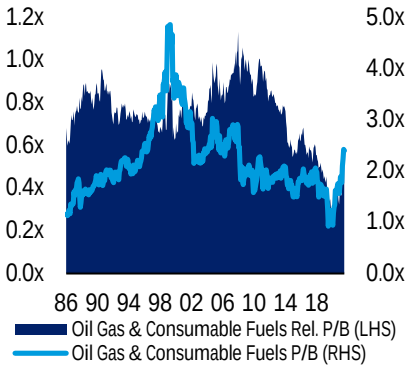
Exhibit 632: Oil Gas & Consumable Fuels: P/B
On a Price/Book basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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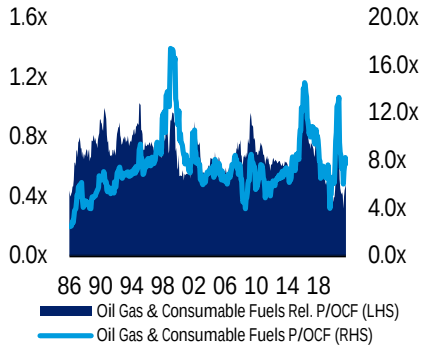
Exhibit 633: Oil Gas & Consumable Fuels: P/OCF
On a Price/OCF basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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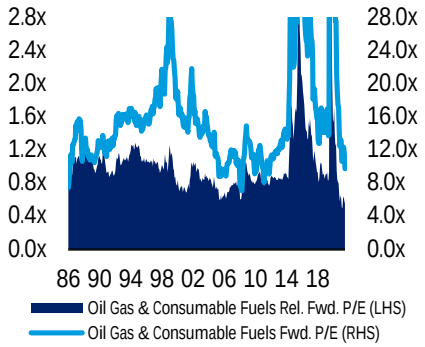
Exhibit 634: Oil Gas & Consumable Fuels: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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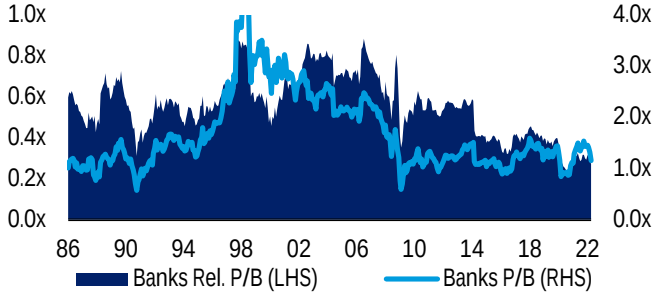
Financials

Exhibit 635: Banks: P/B
On a Price/Book basis valuations have edged lower recently



Source: Compustat, BofA US Equity & US Quant Strategy

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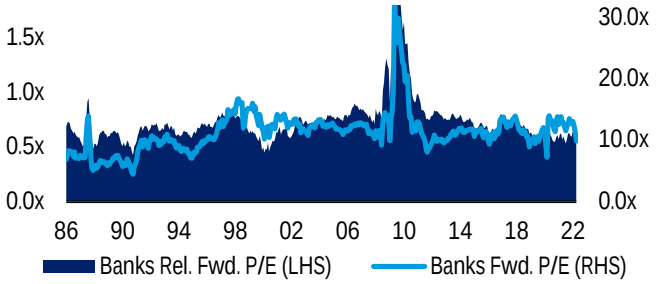
Exhibit 636: Banks: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



Source: Compustat, BofA US Equity & US Quant Strategy

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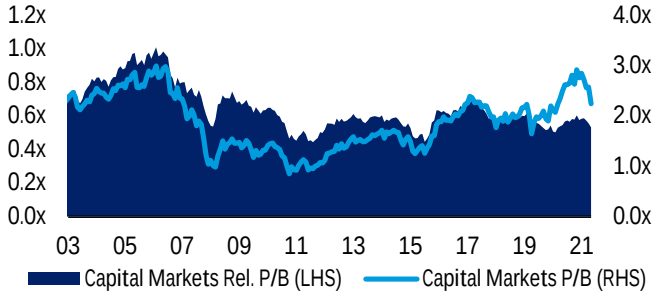
Exhibit 637: Capital Markets: P/B
On a Price/Book basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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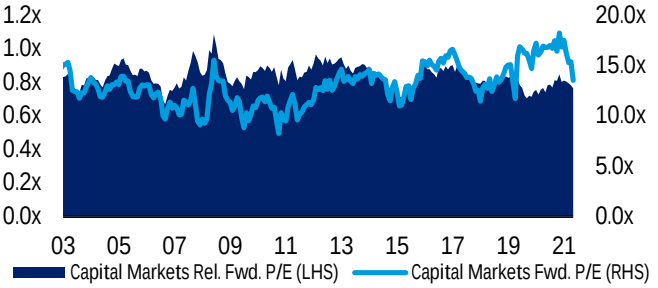
Exhibit 638: Capital Markets: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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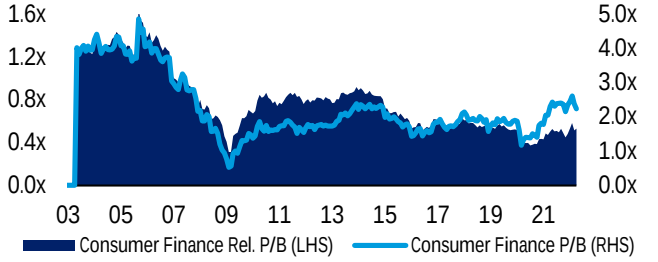
Exhibit 639: Consumer Finance: P/B
On a Price/Book basis valuations have edged lower recently



Source: Compustat, BofA US Equity & US Quant Strategy

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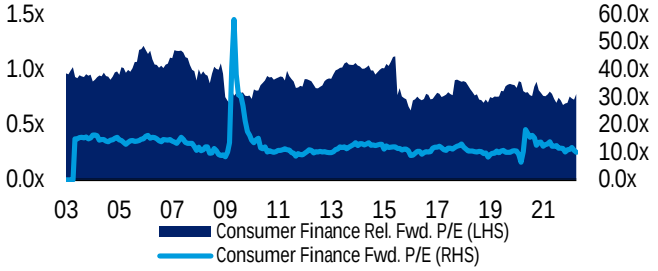
Exhibit 640: Consumer Finance: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



Source: Compustat, BofA US Equity & US Quant Strategy

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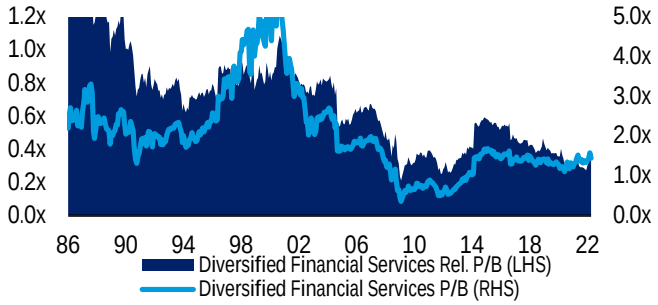
Exhibit 641: Diversified Financial Services Consumer Finance: P/B
On a Price/Book basis valuations have edged higher recently



Source: Compustat, BofA US Equity & US Quant Strategy

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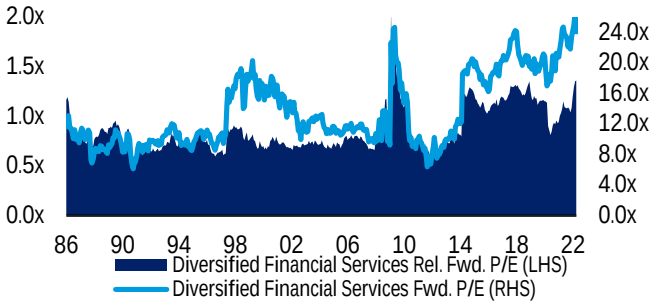
Exhibit 642: Diversified Financial Services: Fwd. P/E
On a Forward P/E basis valuations have risen recently



Source: Compustat, BofA US Equity & US Quant Strategy

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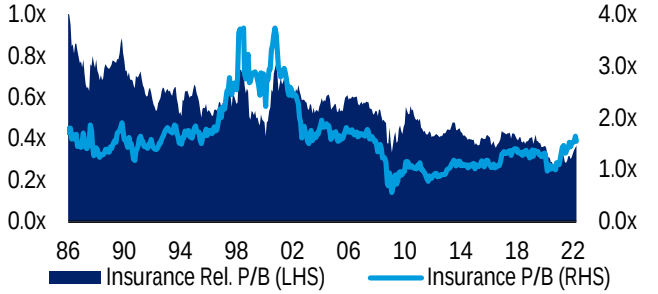
Exhibit 643: Insurance: P/B
On a Price/Book basis valuations have edged higher recently



Source: Compustat, BofA US Equity & US Quant Strategy

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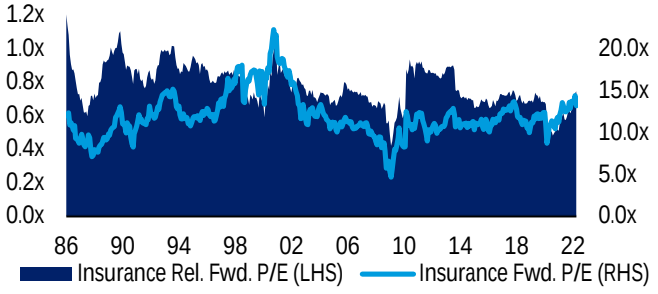
Exhibit 644: Insurance: Fwd. P/E
On a Forward P/E basis valuations have risen recently



Source: Compustat, BofA US Equity & US Quant Strategy

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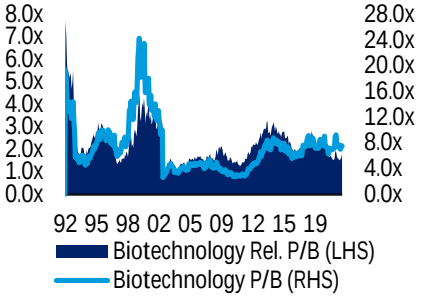
Health Care

Exhibit 645: Biotechnology: P/B
On a Price/Book basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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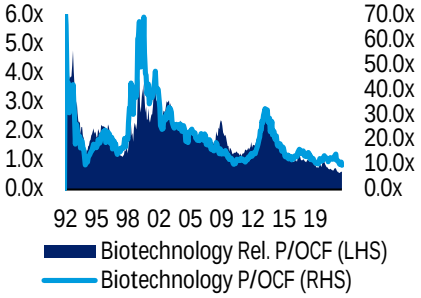
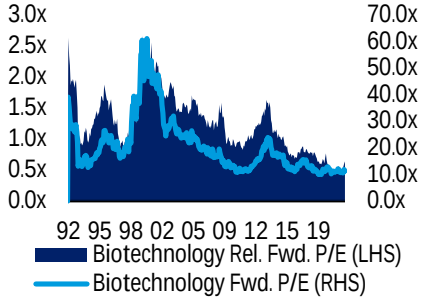
Exhibit 646: Biotechnology: P/OCF
On a Price/OCF basis valuations have declined in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 647: Biotechnology: Fwd. P/E
On a Forward P/E basis valuations have declined in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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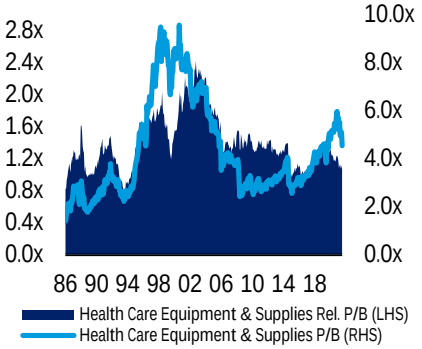
Exhibit 648: Health Care Equipment & Supplies: P/B
On a Price/Book basis valuations have risen in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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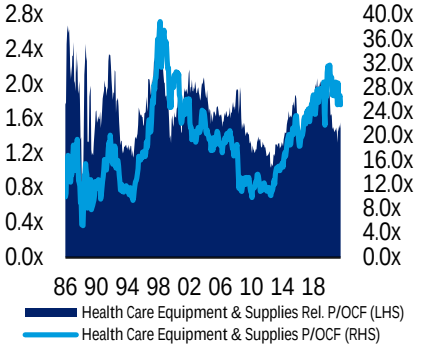
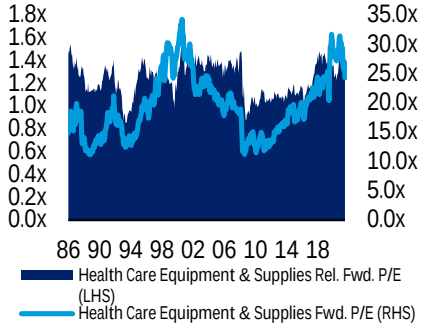
Exhibit 649: Health Care Equipment & Supplies: P/OCF
On a Price/OCF basis valuations have risen in recent years



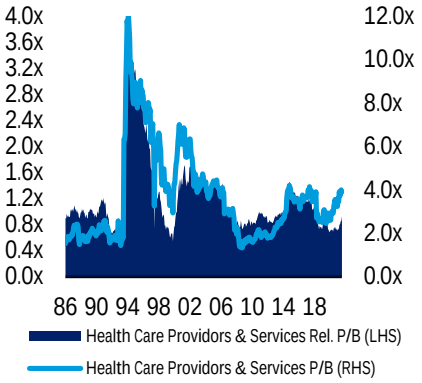
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 650: Health Care Equipment & Supplies: Fwd. P/E
On a Forward P/E basis valuations have declined recently



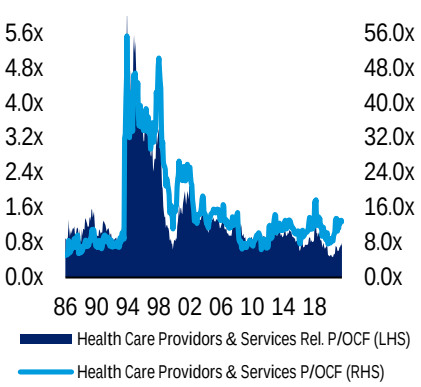
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 651: Health Care providers & Services: P/B
On a Price/Book basis valuations have edged higher recently



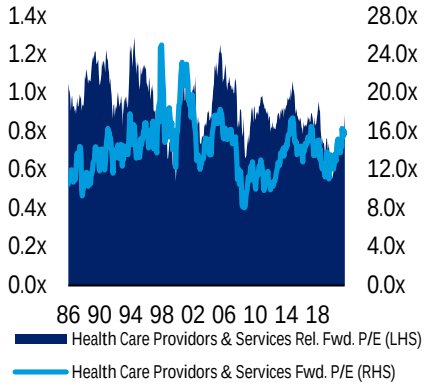
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 652: Health Care providers & Services: P/OCF
On a Price/OCF basis valuations have risen recently



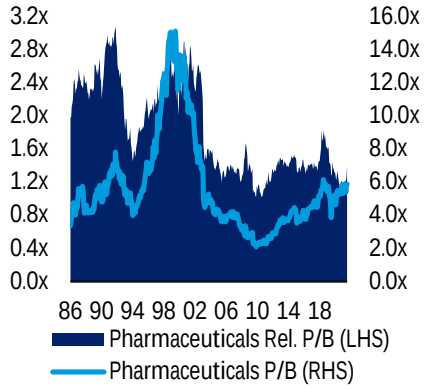
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 653: Health Care providers & Services: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



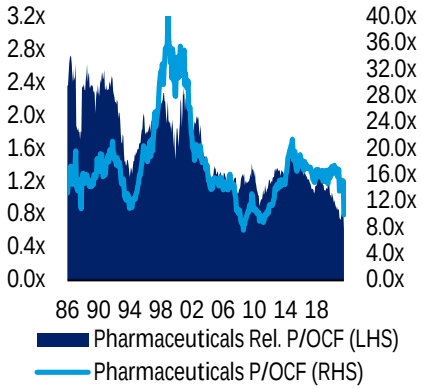
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 654: Pharmaceuticals: P/B
On a Price/Book basis valuations have edged higher recently



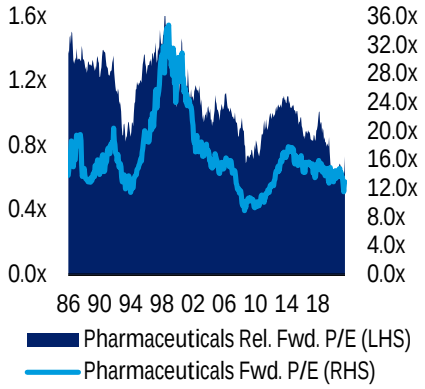
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 655: Pharmaceuticals: P/OCF
On a Price/OCF basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

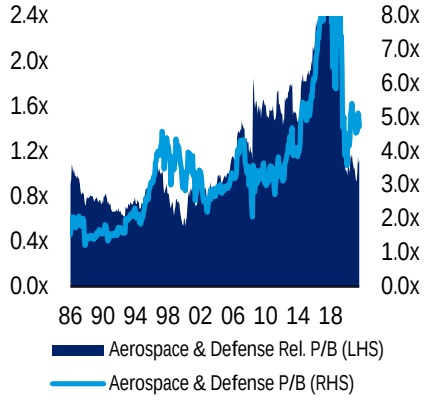
Exhibit 656: Pharmaceuticals: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

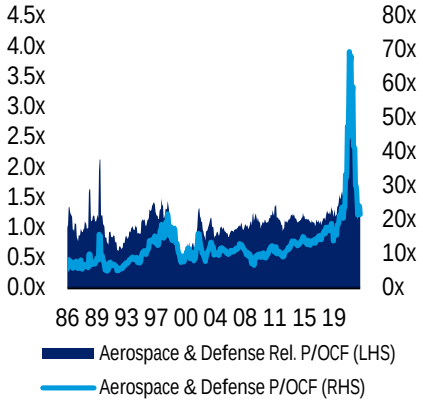
Industrials

Exhibit 657: Aerospace & Defense: P/B
On a Price/Book basis valuations have edged higher recently



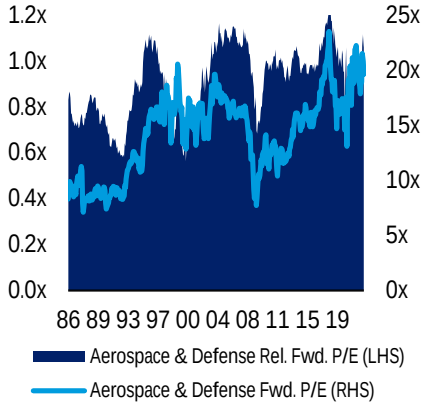
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 658: Aerospace & Defense: P/OCF
On a Price/OCF basis valuations have declined from all-time highs



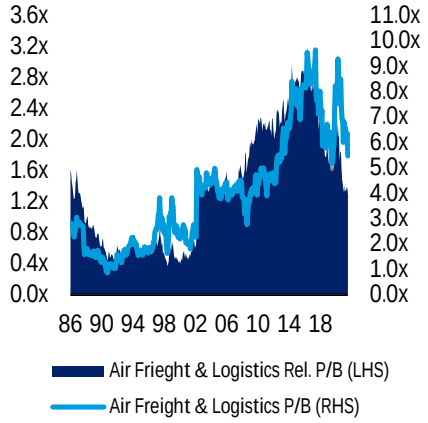
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 659: Aerospace & Defense: Fwd. P/E
On a Forward P/E basis valuations have risen recently



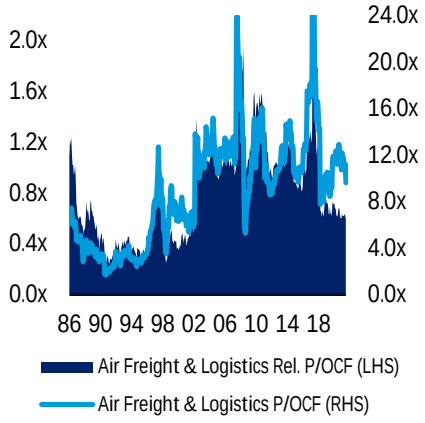
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 660: Air Freight & Logistics: P/B
On a Price/Book basis valuations have declined recently



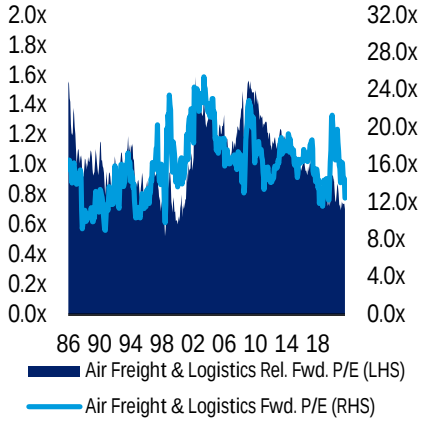
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 661: Air Freight & Logistics: P/OCF
On a Price/OCF basis valuations have edged lower recently



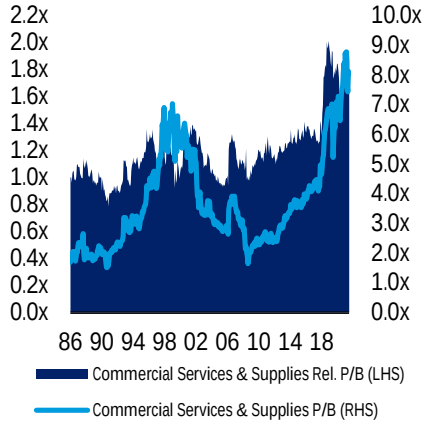
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 662: Air Freight & Logistics: Fwd. P/E
On a Forward P/E basis valuations have declined recently



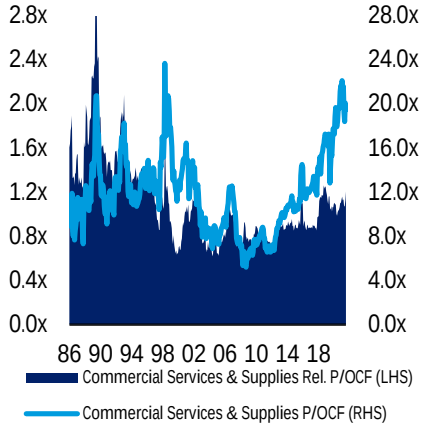
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 663: Commercial Services & Supplies : P/B
On a Price/Book basis valuations are near all-time highs



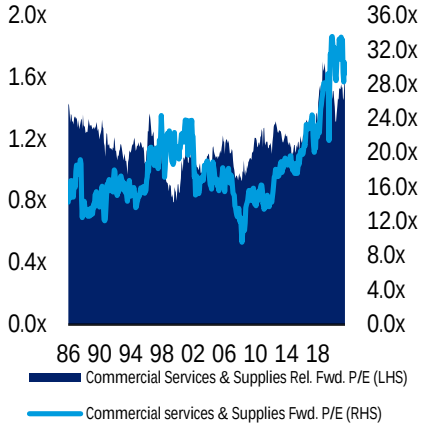
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 664: Commercial Services & Supplies : P/OCF
On a Price/OCF basis valuations have risen in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 665: Commercial Services & Supplies : Fwd. P/E
On a Forward P/E basis valuations have risen in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
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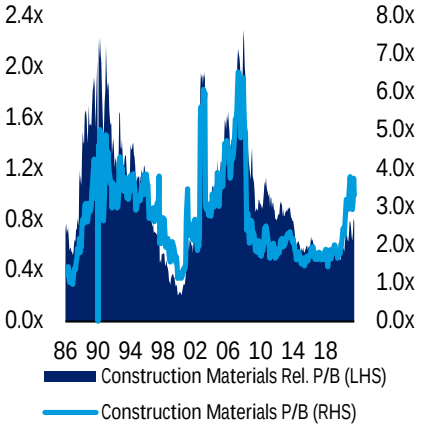
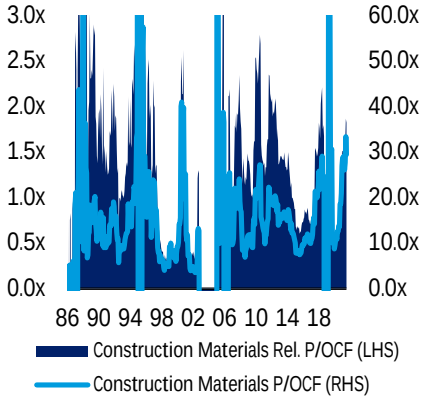
Exhibit 666: Construction & Engineering: P/B
On a Price/Book basis valuations have edged higher recently



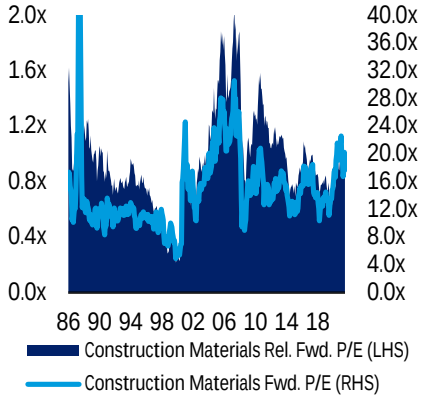
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 667: Construction & Engineering: P/OCF
On a Price/OCF basis valuations have risen recently



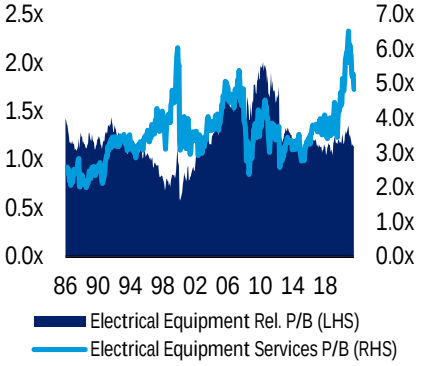
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 668: Construction & Engineering: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



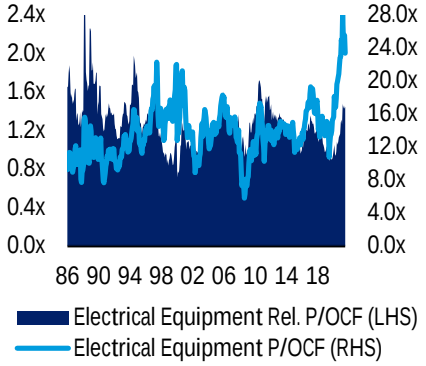
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 669: Electrical Equipment: P/B
On a Price/Book basis valuations have declined recently from all-time highs



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 670: Electrical Equipment: P/OCF
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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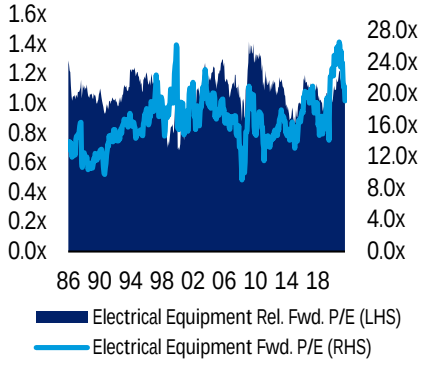
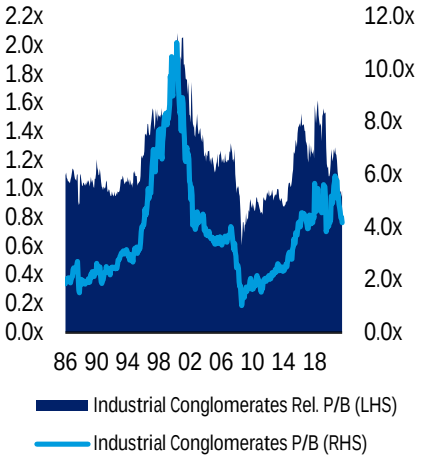
Exhibit 671: Electrical Equipment: Fwd. P/E
On a Forward P/E basis valuations have declined recently



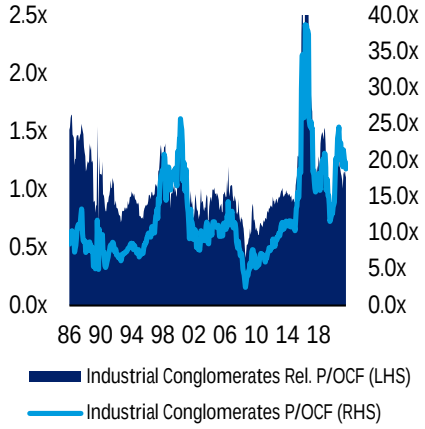
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 672: Industrial Conglomerates: P/B
On a Price/Book basis valuations have risen in recent years



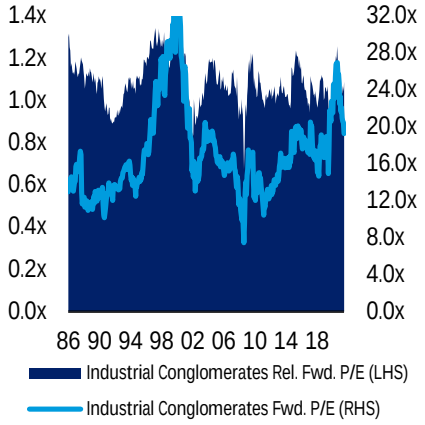
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 673: Industrial Conglomerates: P/OCF
On a Price/OCF basis valuations have declined recently



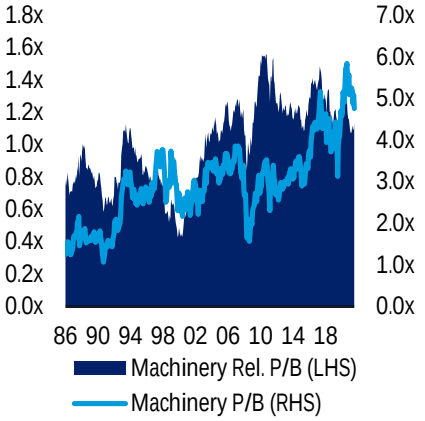
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 674: Industrial Conglomerates: Fwd. P/E
On a Forward P/E basis valuations have declined recently



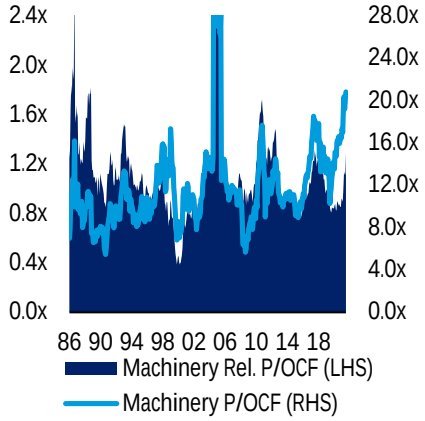
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 675: Machinery: P/B
On a Price/Book basis valuations have declined recently



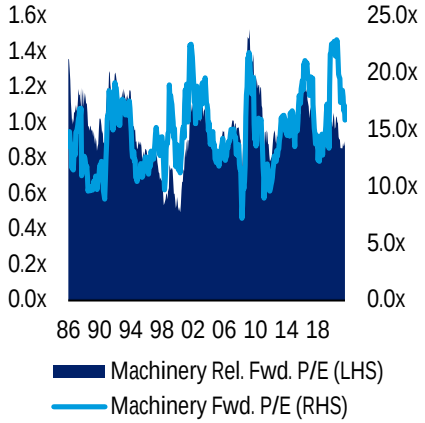
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 676: Machinery: P/OCF
On a Price/OCF basis valuations have risen recently



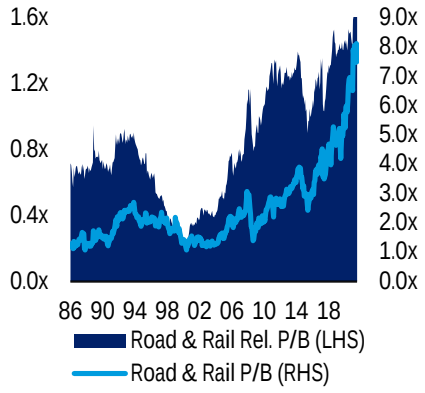
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 677: Machinery: Fwd. P/E
On a Forward P/E basis valuations have declined recently



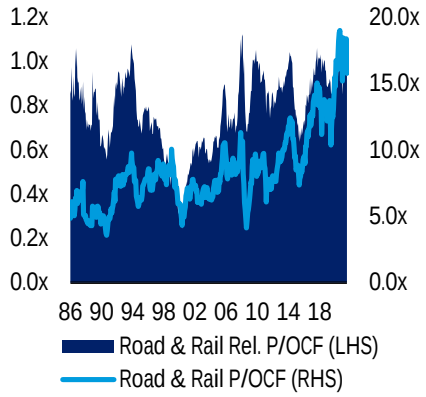
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 678: Road & Rail: P/B
On a Price/Book basis valuations have risen in recent years



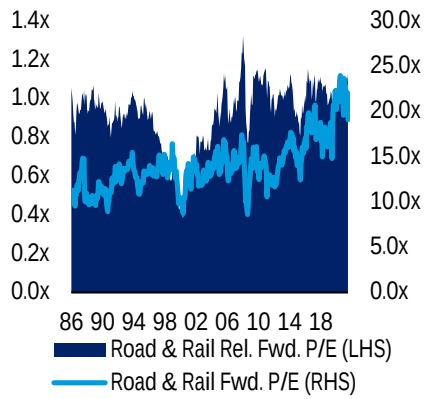
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 679: Road & Rail: P/OCF
On a Price/OCF basis valuations have risen in recent years



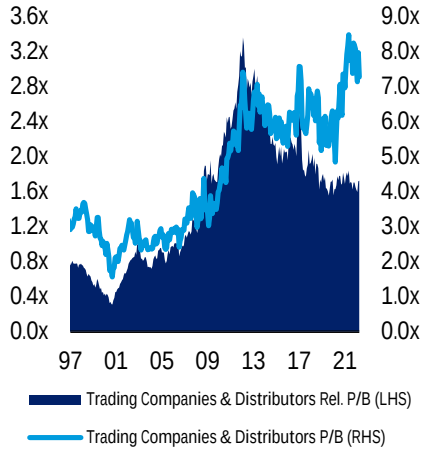
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 680: Road & Rail: Fwd. P/E
On a Forward P/E basis valuations have risen in recent years



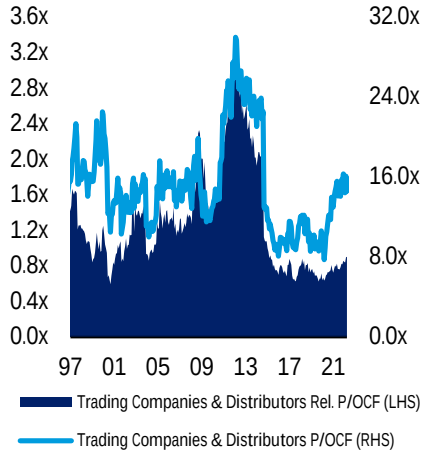
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 681: Trading Companies & Distributors: P/B
On a Price/Book basis valuations have declined recently from all-time highs



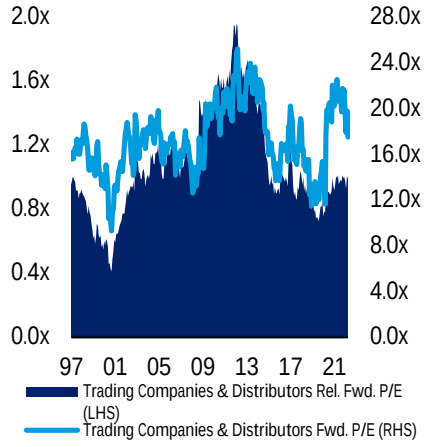
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 682: Trading Companies & Distributors: P/OCF
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

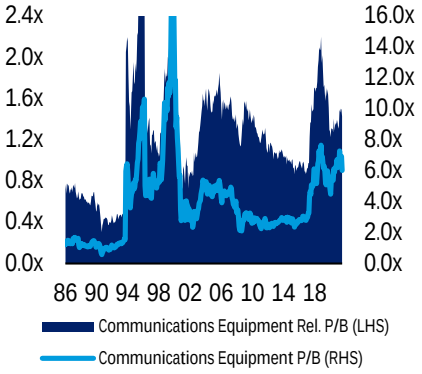
Exhibit 683: Trading Companies & Distributors: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

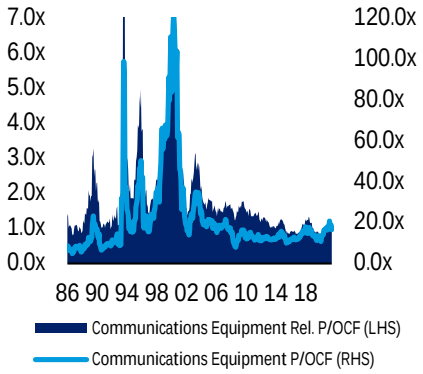
Information Technology

Exhibit 684: Communication Equipment: P/B
On a Price/Book basis valuations have risen recently



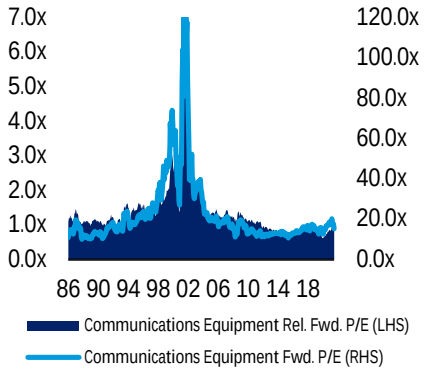
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 685: Communication Equipment: P/OCF
On a Price/OCF basis valuations have edged higher recently



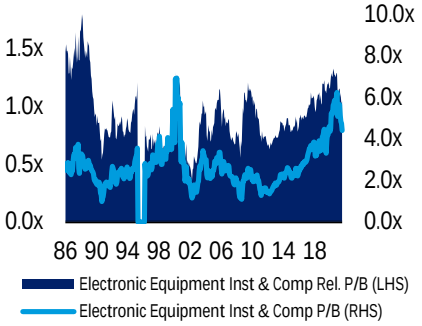
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 686: Communication Equipment: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



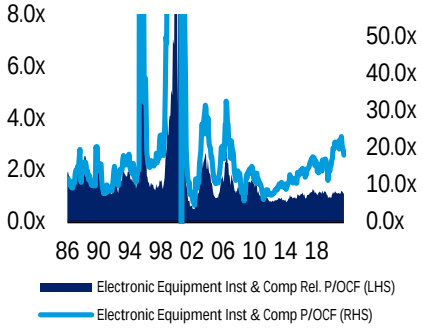
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 687: Electronic Equipment Instruments & Components: P/B
On a Price/Book basis valuations have declined recently



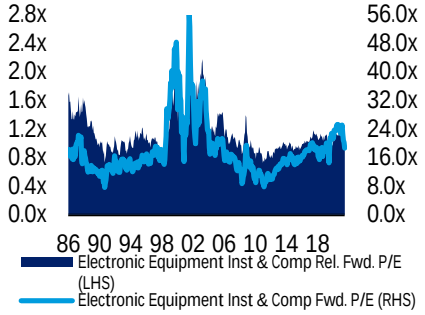
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 688: Electronic Equipment Instruments & Components: P/OCF
On a Price/OCF basis valuations have risen in recent years



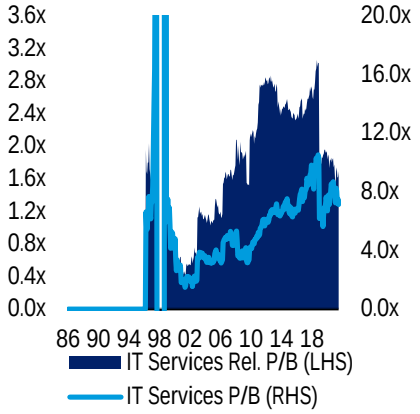
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 689: Electronic Equipment Instruments & Components: Fwd. P/E
On a Forward P/E basis valuations have declined recently



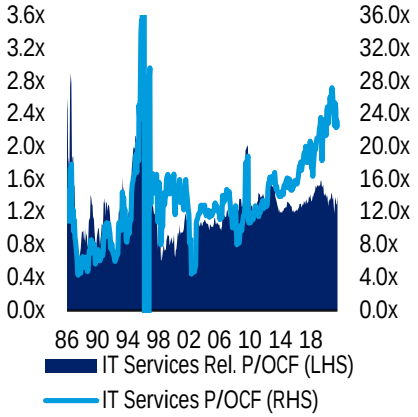
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 690: IT Services: P/B
On a Price/Book basis valuations have edged higher recently



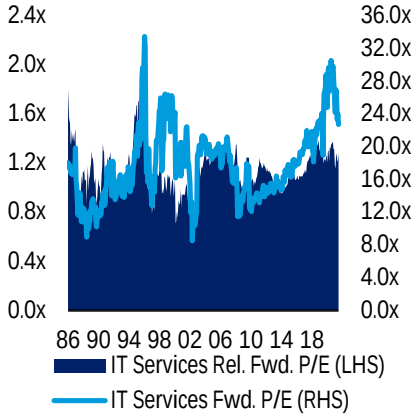
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 691: IT Services: P/OCF
On a Price/OCF basis valuations have risen in recent years



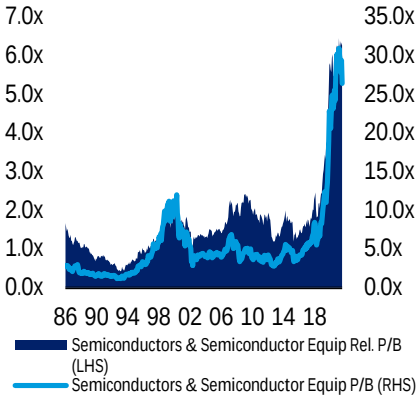
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 692: IT Services: Fwd. P/E
On a Forward P/E basis valuations have declined recently



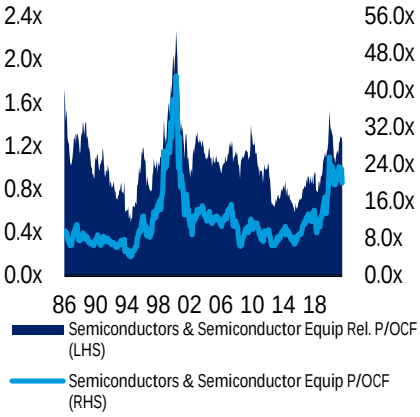
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 693: Semiconductors & Semiconductor Equipment: P/B
On a Price/Book basis valuations have risen to all-time highs



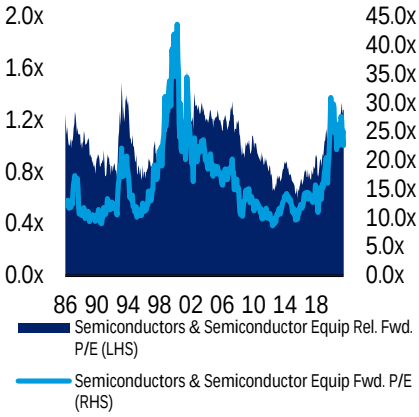
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 694: Semiconductors & Semiconductor Equipment: P/OCF
On a Price/OCF basis valuations have risen in recent years



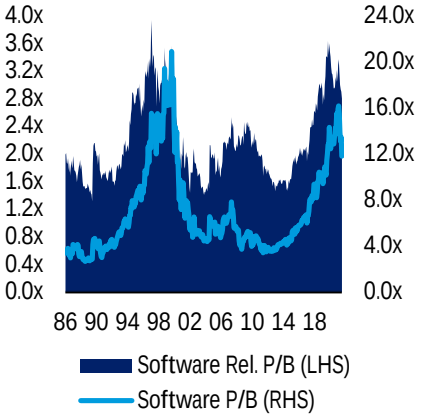
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 695: Semiconductors & Semiconductor Equipment: Fwd. P/E
On a Forward P/E basis valuations have risen in recent years



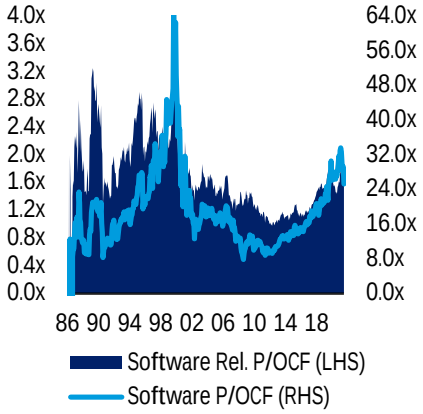
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 696: Software: P/B
On a Price/Book basis valuations have declined recently



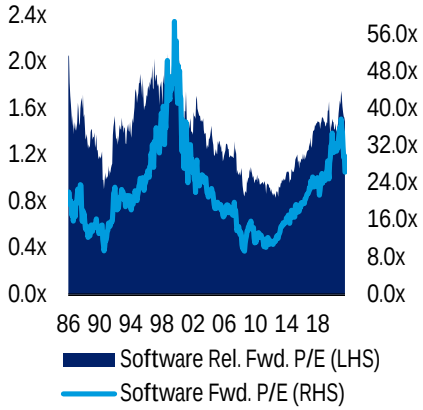
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 697: Software: P/OCF
On a Price/OCF basis valuations have declined recently



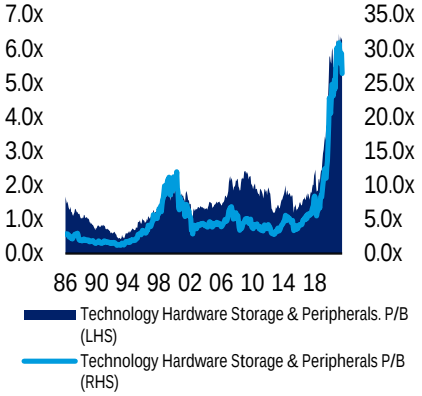
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 698: Software: Fwd. P/E
On a Forward P/E basis valuations have declined recently



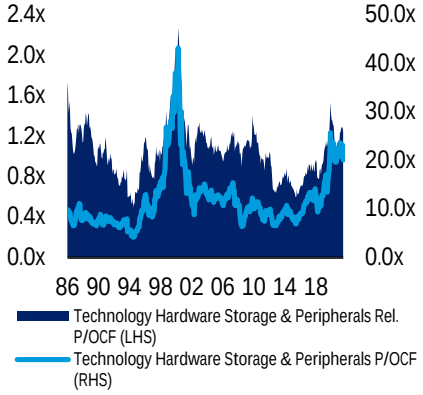
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 699: Technology Hardware Storage & Peripherals: P/B
On a Price/Book basis valuations have declined recently from all-time highs



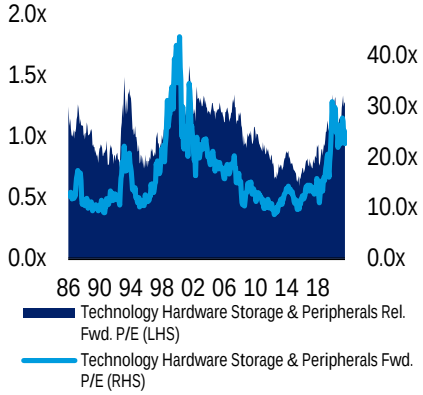
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 700: Technology Hardware Storage & Peripherals: P/OCF
On a Price/OCF basis valuations have risen in recent years



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

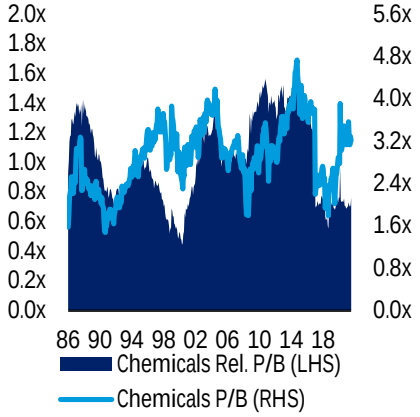
Exhibit 701: Technology Hardware Storage & Peripherals: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

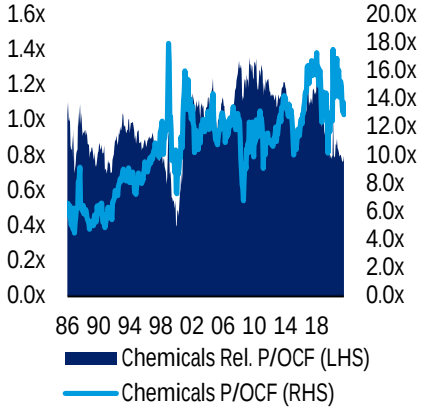
Materials

Exhibit 702: Chemicals: P/B
On a Price/Book basis valuations have declined recently



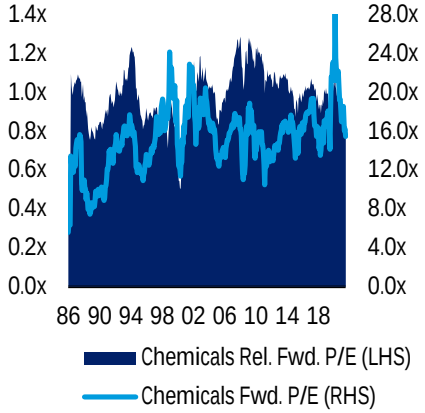
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 703: Chemicals: P/OCF
On a Price/OCF basis valuations have declined recently



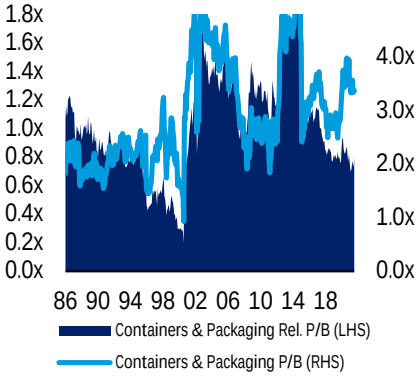
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 704: Chemicals: Fwd. P/E
On a Forward P/E basis valuations have declined recently from all-time highs



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 705: Containers & Packaging: P/B
On a Price/Book basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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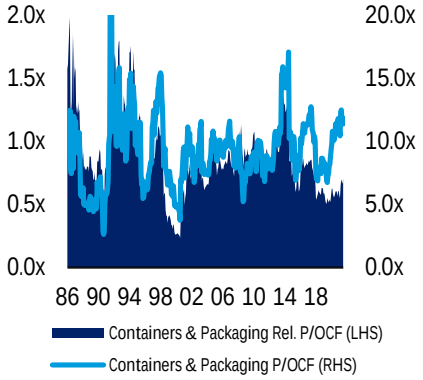
Exhibit 706: Containers & Packaging: P/OCF
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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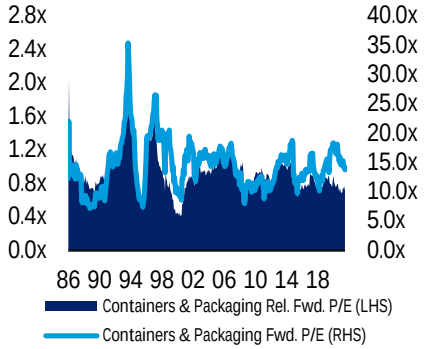
Exhibit 707: Containers & Packaging: Fwd. P/E
On a Forward P/E basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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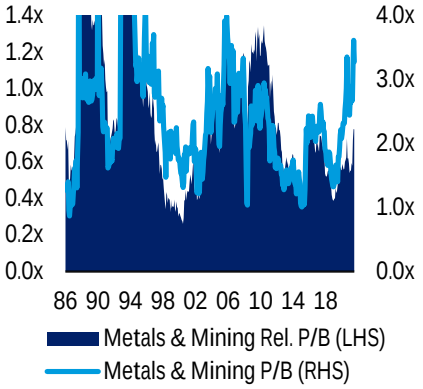
Exhibit 708: Metals & Mining: P/B
On a Price/Book basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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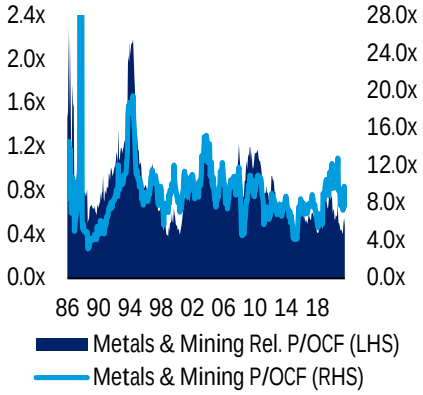
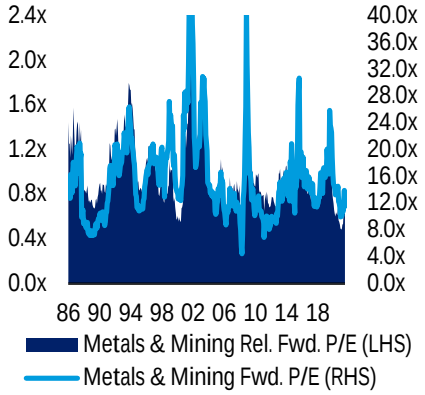
Exhibit 709: Metals & Mining: P/OCF
On a Price/OCF basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 710: Metals & Mining: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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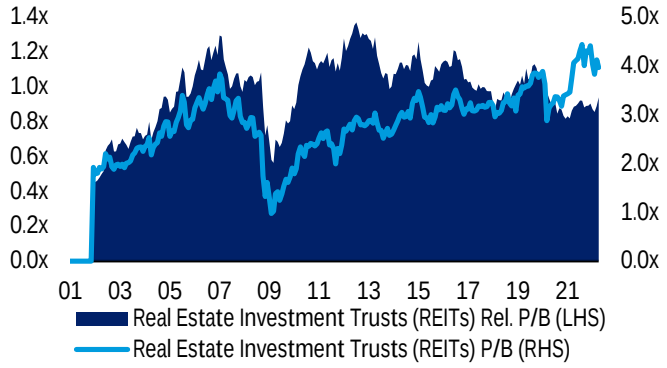
Real Estate

Exhibit 711: Real Estate Investment Trusts (REITs): P/B
On a Price/Book basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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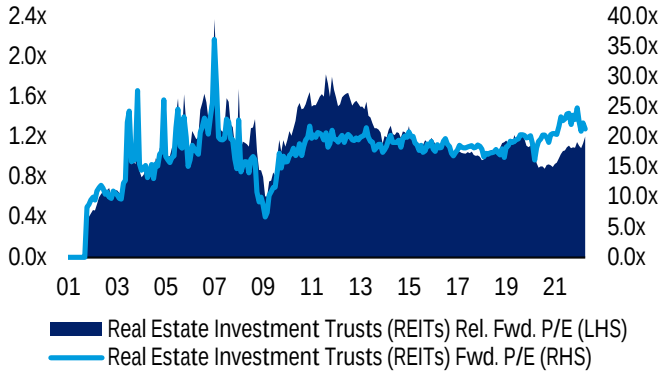
Exhibit 712: Real Estate Investment Trusts (REITs): Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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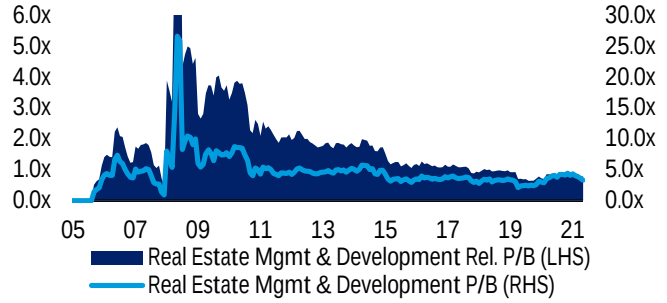
Exhibit 713: Real Estate Management & Development: P/B
On a Price/Book basis valuations have edged lower recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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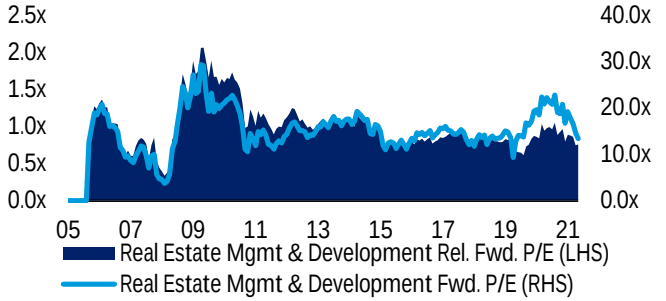
Exhibit 714: Real Estate Management & Development: Fwd. P/E
On a Forward P/E basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy

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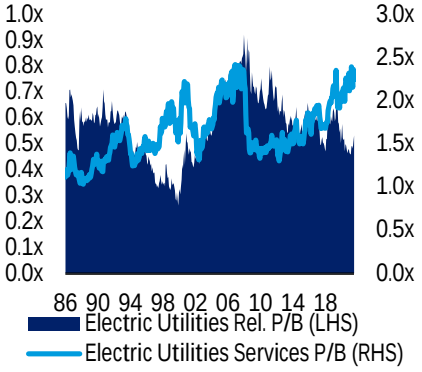
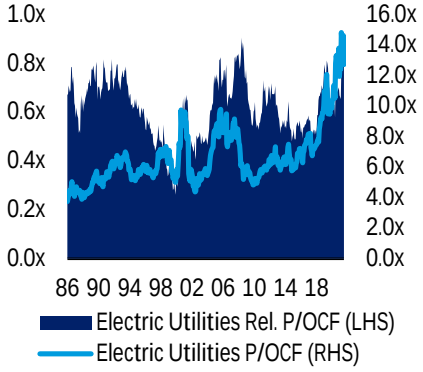
Utilities

Exhibit 715: Electric Utilities: P/B
On a Price/Book basis valuations have risen in recent years



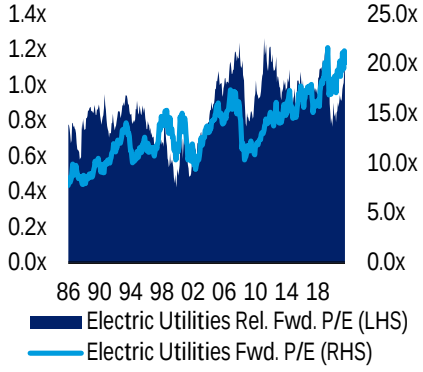
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 716: Electric Utilities: P/OCF
On a Price/OCF basis valuations have edged higher recently



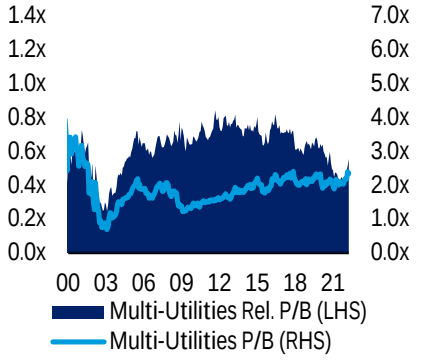
Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 717: Electric Utilities: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Exhibit 718: Multi-Utilities: P/B
On a Price/Book basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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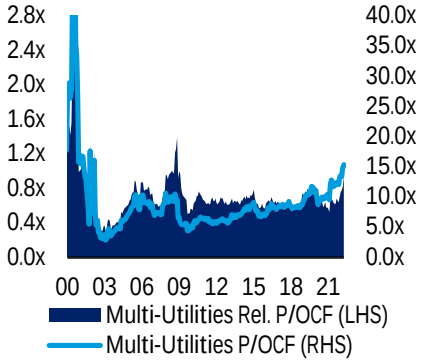
Exhibit 719: Multi-Utilities: P/B
On a Price/OCF basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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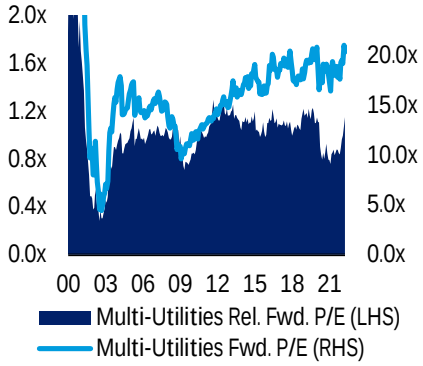
Exhibit 720: Multi-Utilities: Fwd. P/E
On a Forward P/E basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
BofA GLOBAL RESEARCH

Section VII: Relative Valuation between Growth and Value Benchmarks

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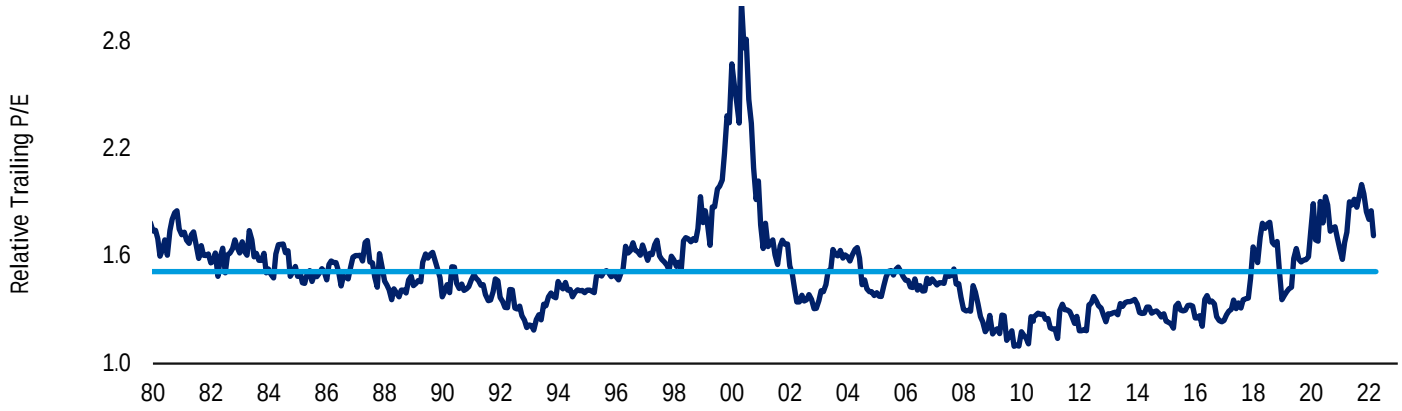
Fundamental Valuation

Exhibit 721: Russell 1000 Growth vs. Value Trailing P/E (1978 – 4/30/22)
On a Trailing P/E basis relative valuations are still above the long-term average



Source: BofA US Equity & Quant Strategy, FactSet

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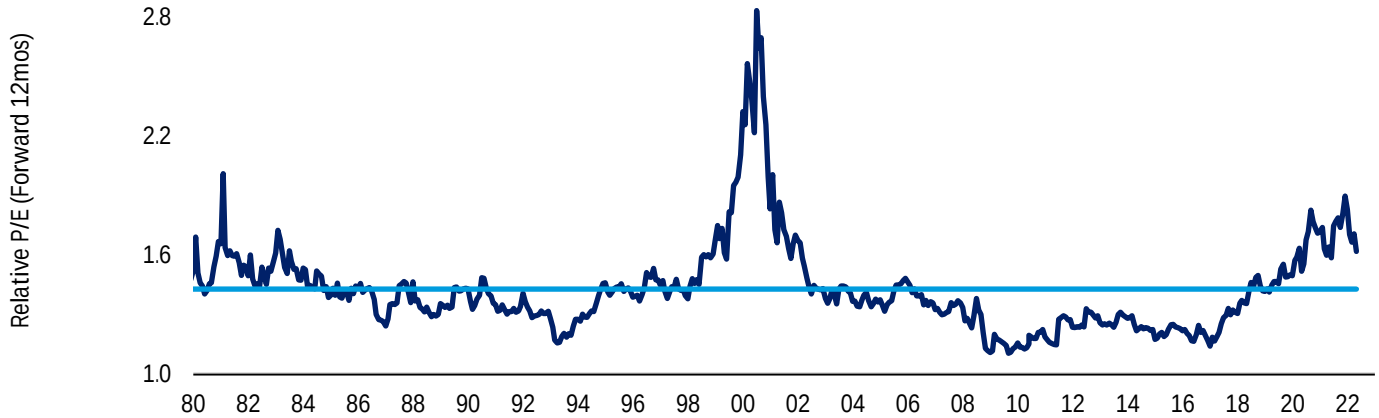
Exhibit 722: Russell 1000 Growth vs. Value Forward P/E (1978 – 4/30/22)
On a Forward P/E basis Growth valuations relative to Value remain above historic average



Source: BofA US Equity & US Quant Strategy

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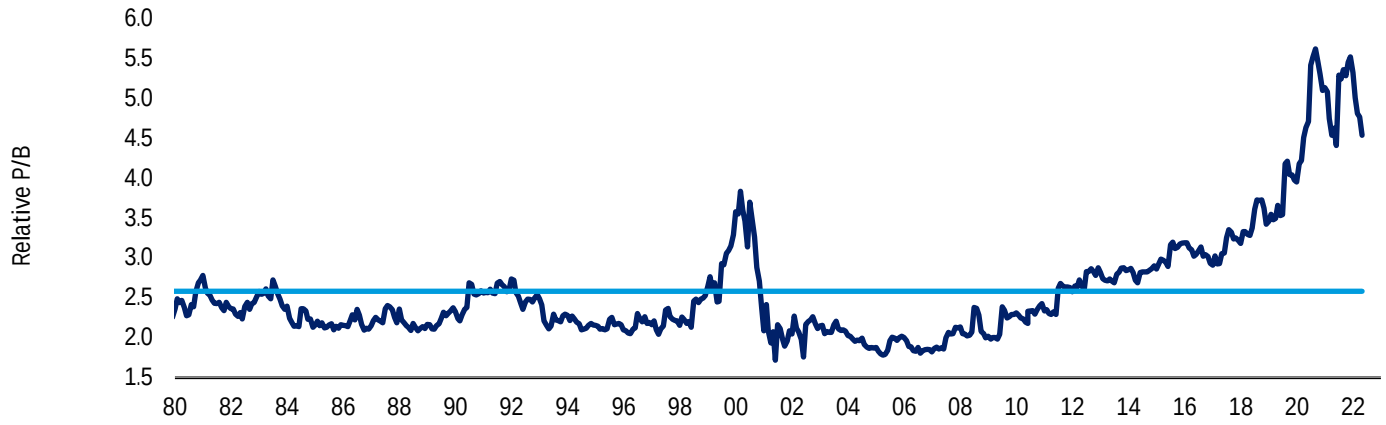
Exhibit 723: Russell 1000 Growth vs. Value Price/Book Value (1978 – 4/30/22)
On a Price/Book Value basis Growth valuations relative to Value still elevated



Source: BofA US Equity & Quant Strategy, Russell Investment Group, FactSet

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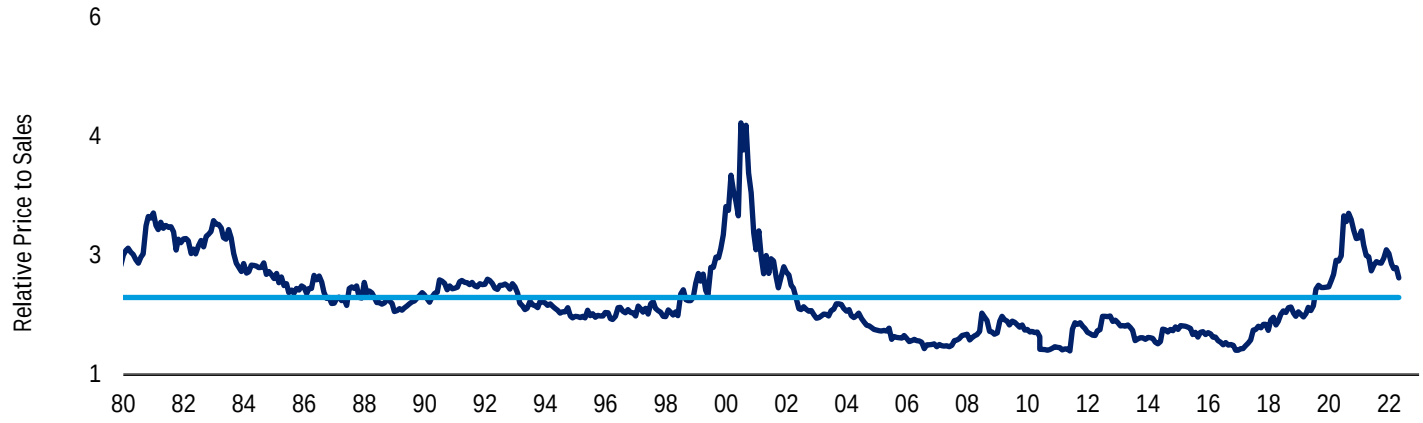
Exhibit 724: Russell 1000 Growth vs. Value Price/Sales (1978 – 4/30/22)
On a Price to Sales basis Growth valuations relative to Value remain slightly above average



Source: BofA US Equity & Quant Strategy, Russell Investment Group, FactSet

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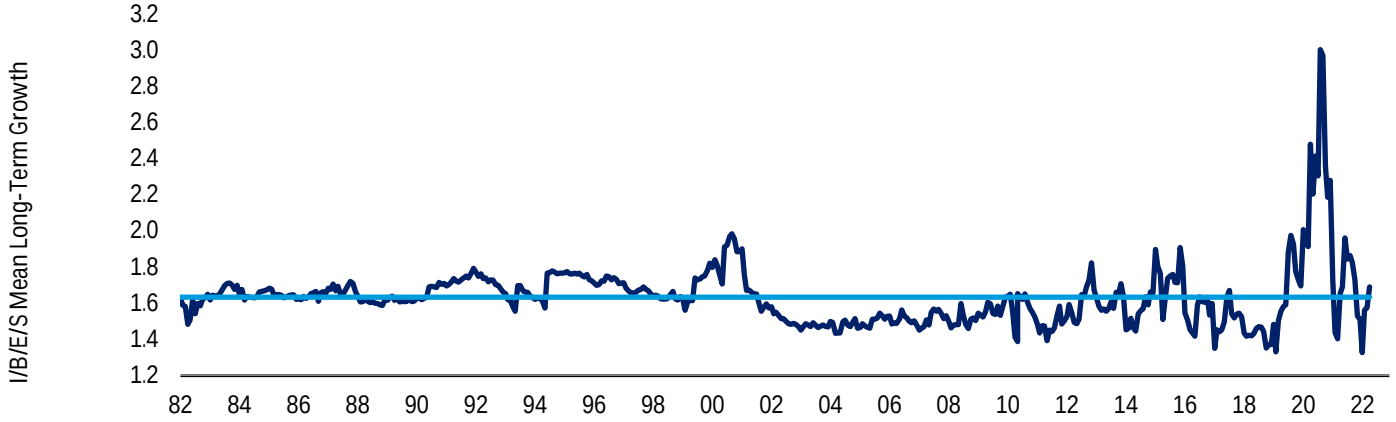
Growth Characteristics

Exhibit 725: Russell 1000 Growth vs. Value Long-term Growth (1982 – 4/30/22)
Long-Term EPS Growth of Growth index reverted to average levels vs Value index



Source: BofA US Equity & Quant Strategy, FactSet

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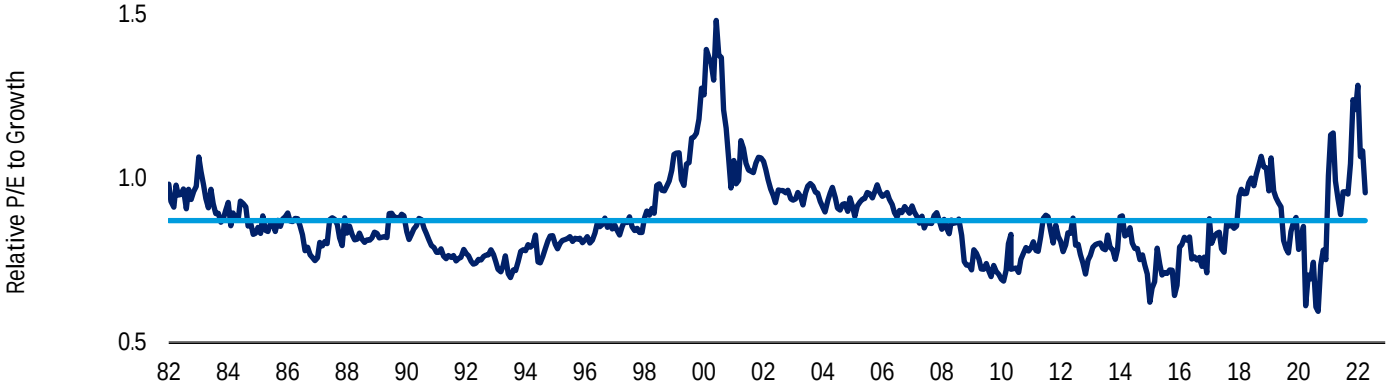
Exhibit 726: Russell 1000 Growth vs. Value P/E to Growth (1978 – 4/30/22)
On a P/E to Growth ratio basis Growth remains expensive relative Value



Source: BofA US Equity & Quant Strategy, FactSet

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Section VIII: ADR Strategies

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Note: All charts in this section are based on actual performance data after the screens were introduced except where noted.

BofA US Equity & Quant Strategy ADR Indices

Exhibit 727: Monthly price performance by different regions of the world
BofA Quant Strategy ADR Index Performance as of 04/30/2022

	Price Index 4/30/2022	Price Performance % Change (US$) 1 M	3 M	6 M	12 M	YTD	3yr	5yr	10yr	ADR vs. MSCI™ 1M Rel Ret	Weights
ADR COMPOSITE	1,607	-10.2	-16.4	-29.3	-37.8	-20.0	-7.5	-3.8	1.8		100.0%
ADR COMPOSITE (ex Latin America)	778	-10.2	-19.0	-33.7	-43.0	-23.8	-8.1	-4.1	2.1		88.2%
ADR Latin America	424	-9.9	1.7	6.6	5.7	8.9	-4.9	-3.2	-1.0		11.8%
ADR Asia (ex Japan)	238	-10.4	-19.7	-42.4	-57.5	-26.8	-17.4	-9.1	1.0		32.5%
ADR Europe (non - EMU)	361	-10.9	-16.7	-25.4	-30.3	-21.4	-5.3	-1.0	2.7		16.7%
ADR EMU	263	-8.5	-16.4	-23.7	-27.3	-19.4	-1.3	0.1	3.8		22.2%
ADR Emerging Europe	302	-16.2	-49.3	-61.1	-58.0	-52.6	-19.4	-20.2	-11.5		3.8%
MSCI EAFE ® (re-indexed to 12/86)	331	-6.8	-8.5	-12.9	-10.4	-12.9	1.9	2.1	3.0		
S&P 500	4,132	-8.8	-8.5	-10.3	-1.2	-13.3	11.9	11.6	11.4		
EUROPE											
ADR France	715	-8.8	-16.8	-20.7	-26.5	-19.7	-3.2	-2.9	2.7	-2.1	6.7%
ADR Germany	238	-10.3	-17.9	-28.2	-37.3	-21.7	-5.7	-4.2	0.7	-1.7	6.4%
ADR Ireland	2,171	-5.8	-14.1	-33.5	-35.3	-21.1	-2.2	-0.1	5.4	-1.4	1.2%
ADR Italy	273	-8.5	-22.7	-22.3	-16.0	-26.6	16.0	4.4	5.6	-0.7	1.2%
ADR Netherlands	952	-9.1	-19.0	-27.8	-25.2	-22.4	-2.4	4.5	6.2	1.5	2.3%
ADR Norway	1,272	-12.3	-6.8	-3.5	-4.7	-12.7	0.6	6.4	6.7	-4.6	0.9%
ADR Spain	495	-4.3	-8.2	-13.2	-13.9	-7.7	-5.8	-6.6	-2.3	-0.8	2.0%
ADR Sweden	1,473	-7.6	-16.4	-25.1	-39.4	-21.5	-4.2	-0.7	-1.3	0.6	2.4%
ADR Switzerland	430	-11.6	-19.0	-19.1	-18.4	-19.2	1.6	1.4	4.6	-6.0	2.7%
ADR United Kingdom	1,354	-11.0	-16.8	-25.8	-32.6	-21.5	-7.7	-2.6	1.6	-7.0	9.0%
LATIN AMERICA											
ADR Argentina	135	-10.4	5.0	-1.1	29.9	9.1	-17.1	-21.4	3.3	2.9	2.1%
ADR Brazil	530	-10.5	3.8	17.7	0.8	14.1	-4.2	0.9	-3.7	4.4	5.3%
ADR Chile	205	-13.2	-10.9	-13.0	-28.4	-2.0	-19.4	-12.4	-8.4	-0.5	1.5%
ADR Mexico	372	-7.4	1.8	2.5	18.9	0.6	7.6	1.5	2.4	3.8	2.0%
ASIA											
ADR China	264	-10.7	-21.2	-48.0	-64.6	-29.0	-24.5	-13.7	-1.0	-6.6	24.6%
ADR Hong Kong	21	-12.3	-25.2	-31.6	-49.1	-30.5	-11.6	-8.1	-4.4	-7.2	2.7%
ADR Indonesia	95	5.9	16.9	25.0	45.5	19.9	9.7	3.2	5.9	2.3	0.3%
ADR India	1,544	-9.4	-13.7	-16.4	2.3	-17.0	20.1	15.0	10.7	-7.7	1.2%
ADR Japan	633	-8.2	-11.9	-15.2	-16.3	-13.7	1.5	1.5	5.3	0.6	8.6%
ADR Korea	236	-6.6	-7.5	-17.6	-22.5	-9.0	0.2	4.5	6.3	-0.3	1.5%
ADR Philippines	138	1.2	-2.8	8.3	35.7	-0.4	14.6	0.0	-5.5	9.2	0.2%
ADR Taiwan	959	-10.0	-11.9	-7.4	-14.2	-20.8	27.5	13.9	14.0	-0.2	1.1%
OTHER											
ADR Australia	571	-14.4	-13.4	-24.5	-31.2	-15.3	11.7	5.9	2.3	-8.5	2.4%
ADR Israel	195	-18.3	-16.6	-35.5	-39.1	-22.1	-6.7	-14.2	-7.1	-10.2	3.0%
ADR Russia	16	0.0	-91.1	-93.4	-88.2	-92.1	-50.0	-37.9	-24.0	-8.2	0.5%
ADR South Africa	551	-12.9	-0.2	7.6	-4.5	4.0	31.3	19.7	1.4	0.3	1.4%

Source: FactSet, BofA US Equity and Quant Strategy

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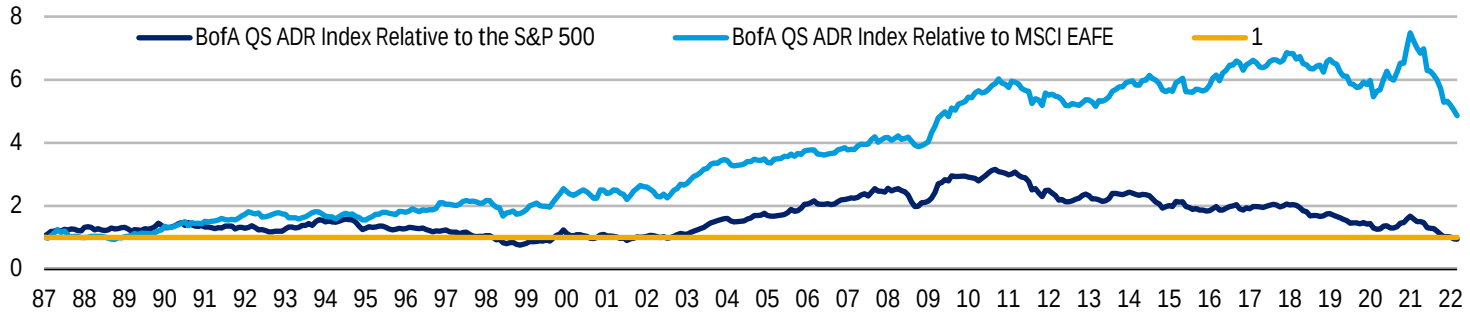
Exhibit 728: Monthly relative performance based on ADR index
BofA USQS ADR Composite Relative to S&P 500 and MSCI™ EAFE (04/30/2022)



Source: FactSet, BofA US Equity and Quant Strategy

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Russell 1000 factor performance	**284**
Russell 1000 factor correlations vs. macro factors	**285**
S&P 500 factor efficacy	**286**

BofA Proprietary Models

BofA versus Consensus (Positive and Negative Earnings Surprise Models)

The BofA vs. Consensus Model is designed to identify stocks with significant variations between analyst earnings expectations and actual reported earnings. Our model compares the annual earnings estimate made by BofA Fundamental Equity Research with that of the consensus.

We look for instances in which our analysts differ from consensus in a statistically significant manner. Moreover, we tend to place less value on the consensus view, since whatever recommendation the aggregate of evidence points to is likely to have already been priced into the market.

The formula for the model is:

$$\text{Surprise} = \frac{\text{(BofA Estimate} - \text{I/B/E/S Mean Estimate)}}{\text{Standard Deviation of I/B/E/S Estimates}}$$

We use FY1 (the current unreported year) estimates throughout the initial nine months of the fiscal year and FY2 (the next unreported year) estimates during the remaining three months of the year. The results from the above formula are then used to rank the universe into deciles, where 1 represents companies where BofA analysts are most optimistic about earnings while 10 represents companies where BofA analysts are most pessimistic about earnings.

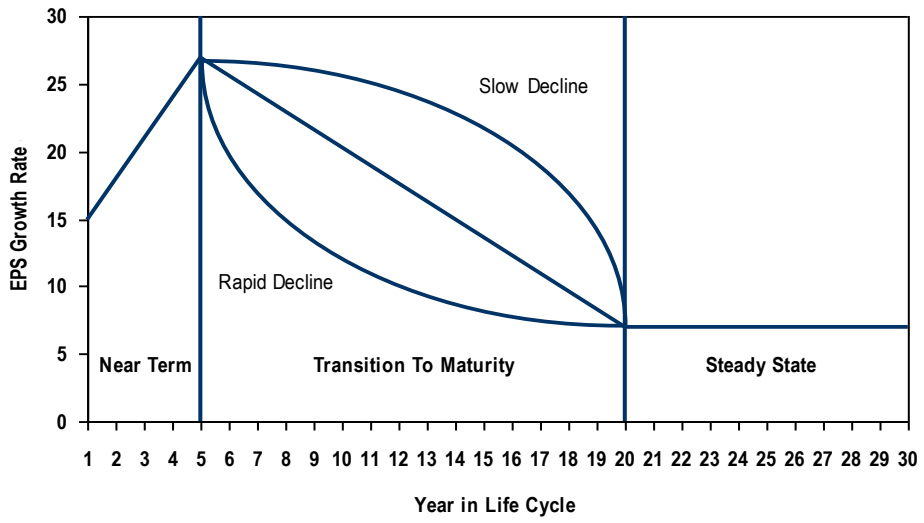
Dividend Discount Model

Our three-stage (Near Term, Transition to Maturity, and Maturity or Steady State) Dividend Discount Model (DDM) computes the discount rate that equates the current stock price to the projected stream of dividends. Data from our analysts' estimates provide the information to construct this stream. This discount rate is the "implied" or "expected" return. Since the DDM solves for the implied rate of return based on today's stock price rather than computing the discount rate as the risk-free rate plus a risk premium, the implied return must be risk-adjusted. We use the Capital Asset Pricing Model to risk-adjust the implied returns, using the 5-Year Treasury Note Yield as a proxy for the risk-free rate.

The Near-Term focuses on the next 5 years of earnings and dividend growth for the company. Estimates are needed for 5 Year EPS Growth Rate, 5th Year EPS Growth Rate and the Payout Ratio in the 5th Year. The growth rates and payout ratio allow the model to interpolate earnings and dividend estimates for this period beyond the time frame for which analysts typically provide estimates.

An additional estimate is required for companies with wide variations in earnings or for which deficits may influence growth patterns. The 5-Year Secular/Normalized EPS Growth Rate should be the analyst's estimate for log-linear or trend-line growth rate.

Exhibit 729: Transition to Maturity Within Valuation Model
The model achieves steady growth by year 20



Source: BofA US Equity and Quant Strategy

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The Transition to Maturity phase of the valuation model approximates a company's slowing earnings growth rate as it gets larger. The period can be as long as the analyst believes is reasonable for the company, but the period always starts in the fifth year of the life cycle. The first piece of necessary data is how many years this portion of the life cycle will last (Years to Maturity/Steady State).

For example, if an analyst expected this portion to last 15 years, then he would outline the dividend parameters for years 6 to 20. The second data item measures how quickly growth decreases (Transition to Maturity). In general, larger and more mature companies are likelier to have more rapid deceleration in growth, whereas younger, faster growing companies tend to have slower deceleration in growth.

The Maturity or Steady State phase is the period during which after growing at an above average rate, a company begins to mature. This is initiated when the bulk of a company's business begins to materially decelerate, and then meaningful market penetration is maximized. One should assume a growth rate close to the long-term growth rate of nominal GDP. Two projections are required for this period: EPS Growth Rate at Maturity and Payout Ratio at Maturity.

The DDM Alpha of a stock is the difference between the stock's DDM-calculated discount rate and the required rate of return calculated for each stock using a plain-vanilla Capital Asset Pricing Model.

Alpha Surprise Model

The Alpha Surprise score is a 25%/75% weighted combination of the decile scores from two proprietary models, our Dividend Discount Model (the value or "alpha" portion of the model) and our BofA vs. Consensus Forecast Earnings Surprise Model (the growth or "surprise" portion of the model). A decile rank of 1 is most attractive, and a decile rank of 10 is least attractive.

- Model rank calculation example

As an example, if a stock received a decile rank of 1 (most attractive) in the Dividend Discount Model, but a decile rank of 10 (least attractive) in the BofA vs. Consensus Forecast Earnings Surprise Model, the Alpha Surprise model score would be 7.75, which is simply 0.25 × 1 + 0.75 × 10.

- Screening universe

BofA current coverage universe of the S&P 500 for which analysts also have estimates for earnings, dividends, long-term growth rates, dividend growth rates that are used in the BofA vs. Consensus model as well as the Dividend Discount Models. Stocks in the firm's restricted list at the time of the month-end analysis are excluded from the analysis.

- Alpha Surprise Model screen results

To generate the screen, we select top stocks with the most attractive (lowest) score. The cutoff score is 2.75, above which the stocks are not included in the screen. This results in the number of stock close to 50.

High Quality & Dividend Yield

The screen seeks to quantitatively screen for stocks that are of higher quality and have a relatively secure dividend yield. The stocks are selected from the S&P 500 using the following criteria, and exclude Financials stocks due to metric incomparability with other sectors.

1. S&P Common Stock Rank of A+, A, or A-. The S&P Common Stock Rankings are our main measure of quality. These rankings are based primarily on the growth and stability of earnings and dividends over a 10-year period.

2. Return on Equity (ROE) greater than that of the S&P 500 ROE.

3. Debt/Equity lower than that of the S&P 500.

4. Dividend Yield greater than that of the S&P 500.

5. BofA opinion indicates “Buy” or “Neutral” as well as the likelihood that the dividend will remain the same or be increased (i.e., a dividend rating of “7”).

6. The ratio of the last 12-months’ free cash flow to dividends (FCF/Div) must be greater than 1.0.

The High Quality Dividend Yield screen is not a diversified portfolio, and thus, should be considered only within the context of a well-diversified investment strategy.

Growth 10 and Value 10

The portfolios are quantitatively generated and are based on our proprietary BofA vs. Consensus Earnings Surprise Model plus three additional screening criteria. The universe we use is the S&P 500.

As their names imply, the Growth 10 portfolio includes the ten most attractive growth stocks according to our screening methodology, while the Value 10 portfolio includes the ten most attractive value stocks according to our screening methodology. A review of the screening criteria used to formulate these portfolios is below. For the Growth 10 portfolio, if one of the four sell criteria is triggered, the stock is replaced by one that satisfies the first three buy criteria and has highest 5-Yr Proj. EPS growth rate. For the Value 10 portfolio, the stock is replaced by one that satisfies the first three buy criteria and has lowest trailing 12-Month P/E.

Note that no changes are made to the portfolios after the 15th of a month, with new additions/deletions then being added at the beginning of the following month. The Growth 10 and Value 10 portfolios are not diversified portfolios, and thus, should be considered only within the context of a well-diversified investment strategy.

Exhibit 730: Stock Selection Criteria
Growth 10 and Value 10

"Growth 10"	"Value 10"
Buy Criteria:	Buy Criteria:
(1) BofA vs. Cons. EPS Surprise Rating of "1"	(1) BofA vs. Cons. EPS Surprise Rating of "1"
(2) BofA "BUY" Opinion	(2) BofA "BUY" Opinion
(3) Must be rated "1 or 2" by BofA vs. Cons. EPS Surprise Model for < 10 mos.	(3) Must be rated "1 or 2" by BofA vs. Cons. EPS Surprise Model for < 10 mos.
(4) Select 10 Stocks with highest 5-Yr. Proj. EPS growth rate	(4) Select 10 Stocks with lowest trailing 12-Month P/E
Sell Criteria:	Sell Criteria:
(1) BofA vs. Cons. EPS Surprise Rating falls below 5	(1) BofA vs. Cons. EPS Surprise Rating falls below 5
(2) BofA QRQ falls below "BUY" Opinion	(2) BofA QRQ falls below "BUY" Opinion
(3) Stocks removed from the S&P 500	(3) Stocks removed from the S&P 500
(4) Stock no longer covered by BofA research	(4) Stock no longer covered by BofA research

Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

US Regime Indicator

Inputs for the US regime model include the following eight macroeconomic or top-down variables:

- Earnings Revision ratio: Calculated as the ratio between the number of companies in the S&P 500 for which Refinitiv consensus earnings estimates have been raised versus those that have been lowered. A rising ratio indicates an improving economic cycle.
- ISM PMI: ISM PMI Institute for Supply Management Manufacturing Purchasing Managers Index, represented as the Z-Score. The ISM Manufacturing Index monitors economic activity as reported by 300 supply management professionals. The reading of the index above (below) 50 indicated economic expansion (contraction).
- Inflation: The 12-month change in the BofA Inflation Composite (see methodology further below), represented as the Z-Score. Rising inflation indicates improving economic conditions.
- GDP Forecast: The next 12-month US GDP growth forecast from the Federal Reserve Bank of Philadelphia Survey, represented as the Z-Score.
- Leading Economic Indicators index: The 12-month change in the Conference Board US Leading Index of Ten Economic Indicators, represented as a Z-Score. A rising Z-Score indicates improving economic conditions.
- US Capacity Utilization: The 12-month change in US capacity utilization, represented as the Z-score. The capacity utilization rate indicates the percentage of total economic capacity currently utilized. Rising capacity utilization implies improving economic conditions. Rising capacity utilization suggests more expanding economic cycle and potentially rising inflationary pressure.
- 10-yr US Treasury Bond Yield: The 12-month change in the bond yield, represented as the Z-Score. Rising yields indicate improving economic conditions.
- High Yield corporate bond credit spread: The 12-month change in the US High Yield credit spread of the ICE BofA US High Yield Index, represented as a Z-score. Falling spreads indicate improving economic conditions.

Styles

Using the phases identified by the US Regime Indicator, we assess performance of broad style categories using the following factors based on top decile S&P 500 stocks (please see our Quantitative Profiles publication for full factor definitions).

Value: an equal-weighed combination of the following factors: Trailing EPS Yield, Forward EPS Yield, Price/Book, Price/Cash Flow, Price/Free Cash Flow, Price/Sales, EV/EBITDA, FCF/EV.

Growth: an equal-weighed combination of the following factors: EPS Momentum, Projected 5-year Growth and EPS Estimate Revisions.

Momentum: 12-month Price Momentum.

High Quality: an equal-weighed combination of the following factors: 1-year Return on Equity, 5-year Return on Equity, Debt Adjusted 1-year Return on Equity, Debt Adjusted 5-year Return on Equity, Return on Capital, Return on Assets.

High Risk: an equal weighed combination of the following factors: Beta, EPS Variability, EPS Estimate Dispersion, Price.

Small / Large Size: Market capitalization.

BofA ADR Strategy

The ADR Composite Strategy consists of ADRs currently listed on national exchanges (NYSE, NASD or AMEX). The basket is equal-weighted and re-balanced monthly. The strategy was first introduced in December 1993 but was reconstituted going back to December 31, 1986. The charts are in Section VIII of this book.

The country and regional indices are formed based on their claim to a significant weight in the BofA Composite. Country and regional indices are created as of the earliest date based on data availability. Country and regional indices are equal-weighted, rebalanced monthly, and benchmarked against their corresponding MSCI counterpart indices:

The charts depicted are representative of our strategy offerings. They consist of the ADR Composite and its regional and individual country models. Each screen's equal-weighted price performance versus the appropriate local market index is shown, using U.S. dollars as the common currency, along with the correlation between the BofA ADR strategy and its MSCI counterpart. Each of the BofA ADR baskets is updated on a monthly basis.

BofA Factor Descriptions

Each month, we publish performance statistics, sector weights and stock lists for almost forty factors that we follow. These factors are listed and defined below. The methodology for these factors are identical except where noted. At the end of each month, for each factor, we form an equal-weighted portfolio of the top 50 stocks in the S&P 500 according to their factor values. We track the performance of these portfolios for the subsequent month versus that of the equal-weighted S&P 500. We then rebalance at the end of the subsequent month. Most of the factors that we follow have been running out of sample since 1989. The charts are in Section II of this book.

Absolute return: Calculated based on monthly returns and reflects simple price appreciation (depreciation) over the stated period of the screened stocks. For purposes of this calculation, the stocks in the screen are assumed to be equally weighted. Returns do not reflect dividends or costs.

Dividend Discount Model Alpha: The implied return from the BofA Quantitative Strategy three-stage dividend discount model less the required return from a Capital Asset Pricing Model. Presented as a decile rank.

Dividend Yield: Indicated dividend divided by month-end price.

Price/Book Value: Month-end price divided by latest reported book value per share.

Price/Cash Flow: Month-end price divided by latest reported cash flow. Cash flow is defined as earnings post extraordinary items plus depreciation.

Price/Free Cash Flow: Month-end price divided by latest reported free cash flow. Free Cash flow is defined as earnings post extraordinary items plus depreciation minus capital expenditures.

Price/Sales: Month-end market value divided by reported sales.

EV/EBITDA: Enterprise Value (Equity Market Capitalization + Long Term Debt + Short Term Debt + Preferred Stock + Minority Interest – Cash & Cash Equivalents) divided by EBITDA (Reported Net Income + Special Items – Minority Interest + Interest Expense + Income Tax Expense + Depreciation and Amortization).

Relative Strength: The ratio of the 30-week moving average of price to the 75-week moving average.

Most Active: Stocks have the highest monthly share trading volume.

Low Price: Absolute price level of the stock at month-end.

5Wk/30-Week Moving Average: The ratio between the average daily closing price of a stock over five weeks versus that over thirty weeks.

10-Week/40-Week Moving Average: The ratio between the average daily closing price of a stock over ten weeks versus that over forty weeks.

Price/200-Day Moving Average: A ratio between month-end closing price and average closing price over the last 200 days.

Price Return – 12Mth: Absolute price return over the last twelve months.

Price Return – 11Mth: Absolute price return from one year ago, ignoring the most recent month.

Price Return – 9Mth: Absolute price return over the last nine months.

Price Return – 3Mth: Absolute price return over the last three months.

Price Return – 12th and 1Mth: Equal weighted rank of stocks by (1) highest price return over the last twelve months and (2) highest price return over the most recently ended month.

Price Return – 12th and 1Mth Reversal: Equal weighted rank of stocks by (1) highest price return over the last twelve months and (2) lowest price return over the last one month.

Earnings Momentum: The difference between 12-month trailing EPS and year-ago 12-month trailing EPS divided by year-ago 12-month trailing EPS.

Projected 5-Year EPS Growth: The five-year EPS growth rate estimated by BofA Fundamental Equity Research. If a BofA estimate does not exist, the I/B/E/S Mean Long Term Growth Estimate is used.

Earnings Torpedo: I/B/E/S FY2 estimate less latest actual annual EPS divided by month-end price.

Earnings Surprise: A forecast earnings surprise variable which compares BofA Lynch estimates to those of the consensus after adjusting for the range of estimates. Stocks are ranked from 1 to 10, with 1 being among the most optimistic, BofA relative to the consensus, 10 being among the most pessimistic, BofA. Consensus estimated earnings data are courtesy of I/B/E/S.

EPS Estimate Revision: The difference between the I/B/E/S FY1 estimate and that of three months ago divided by the absolute value of I/B/E/S FY1 estimate of three months ago.

Beta: A measure of non-diversifiable risk. It is calculated using a regression strategy incorporating 60 months of price performance versus that of the S&P 500.

Variability of EPS: The degree of variability in quarterly EPS over the past 5 years. Stocks are ranked from 10 to 1, with 10 being the most variable.

EPS Estimate Dispersion: The coefficient of variation among I/B/E/S FY2 estimates. Presented as a decile rank.

Dividend Growth: The growth between trailing 4-quarter total common dividends and year-ago trailing 4-quarter total common dividends.

Neglect-Institutional Ownership: Those companies with the lowest proportions of float-adjusted shares held by institutional owners are considered more neglected.

Neglect-Analyst Coverage: Those companies with the lowest number of analysts submitting ratings to FirstCall.

Firm Size: Month-end market value.

Foreign Exposure: The ratio of foreign sales to total sales.

Equity Duration: An adaptation of our Dividend Discount Model which measures the interest-rate sensitivity of a stock. Longer durations (higher numbers) suggest more interest-rate sensitivity.

P/E-to-Growth: Trailing twelve months P/E divided by the five-year EPS growth rate estimated by BofA Fundamental Equity Research. If a BofA estimate does not exist, then the I/B/E/S Mean Long Term Growth Estimate is used.

Return on Equity One-Year Average: Net income divided by average equity provided.

Return on Equity Five-Year Average: Five-year average return on equity.

Return on Assets: Net income plus interest and taxes as a percent of average total assets.

Return on Capital: The sum of net income, interest expense and minority interest, as a percent of average total invested capital which is inclusive of long-term debt, preferred stock, common equity, and minority interest.

Return on Equity One-Year Average (Adjusted for Debt): The ROE of companies with higher debt levels are considered lower than those of companies with lower debt levels based on their debt-to-equity ratios.

Return on Equity Five-Year Average (Adjusted for Debt): The average five year ROE of companies with higher debt levels are considered lower than those of companies with lower debt levels based on their debt-to-equity ratios.

Short Interest 12-mth Z-Score: (Most recent number of short shares – 12mth average of short shares)/ 12-mth standard deviation of short shares.

Russell 1000 factor performance

Exhibit 731: Russell 1000 factor performance
Factor performance 1986 to present (Analyst Coverage since 1994; Institutional Ownership since 1999, Short Interest since 1993).

Factor	Average Annualized Return	Avg. 12m Excess Return vs. Russell 1000	Sharpe Ratio vs. 10y Tsy	Sharpe Ratio vs. Russell 1000	Probability of loss	Probability of underperforming Russell 1000	Volatility (Ann'zed)	Max Drawdown	Downside Volatility, Ann'zed
EV/ EBITDA	16.6%	5.4%	0.60	0.59	18.8%	29.9%	21.3%	-62.1%	16.0%
Free Cash Flow/ EV	16.4%	4.4%	0.64	0.82	16.0%	28.5%	19.3%	-57.4%	15.1%
Price/ Free Cash Flow	15.2%	3.6%	0.56	0.53	17.6%	32.0%	20.3%	-62.9%	16.7%
Most Active	15.1%	4.3%	0.55	0.50	21.9%	33.4%	21.3%	-57.5%	15.6%
Short Interest	15.0%	3.7%	0.69	0.96	12.8%	17.5%	16.9%	-51.1%	13.4%
Share Repurchase	14.7%	2.6%	0.60	0.40	15.5%	32.2%	17.1%	-55.1%	14.3%
Earnings Yield	14.6%	3.9%	0.49	0.34	22.6%	40.9%	22.0%	-70.3%	17.8%
Price/ Sales	14.6%	4.1%	0.47	0.29	22.4%	37.9%	23.4%	-67.0%	17.5%
Price Return - 11-mth Perf.	14.6%	3.3%	0.57	0.23	19.3%	33.6%	19.3%	-55.3%	15.2%
Price/ Cash Flow	14.4%	3.2%	0.50	0.32	21.6%	37.9%	21.6%	-61.0%	17.2%
Price Return - 12-mth Perf.	14.1%	2.6%	0.55	0.16	18.8%	37.2%	18.7%	-50.9%	14.4%
Relative Strength - 30wk/75wk MA	14.1%	2.8%	0.53	0.20	19.5%	40.2%	19.8%	-56.2%	15.6%
Price Return - 12-mth and 1-mth Reversal	14.0%	2.4%	0.55	0.28	16.9%	32.0%	19.1%	-58.1%	16.2%
Relative Strength - 5wk/30wk MA	13.8%	2.3%	0.53	0.09	17.9%	39.1%	17.7%	-46.6%	13.2%
Price/ Book Value	13.7%	3.4%	0.44	0.20	21.6%	40.2%	23.0%	-71.7%	17.2%
ROC	13.6%	1.5%	0.55	0.30	16.0%	39.3%	17.5%	-50.8%	13.2%
1yr ROE Adj	13.6%	1.5%	0.55	0.29	17.2%	39.5%	17.7%	-50.6%	13.4%
1yr ROE	13.6%	1.4%	0.54	0.34	16.7%	35.3%	17.6%	-53.5%	13.6%
Relative Strength - 10wk/40wk MA	13.6%	2.0%	0.50	0.08	20.0%	40.9%	18.4%	-51.0%	14.2%
P/E-to-Growth	13.5%	2.5%	0.47	0.32	21.4%	44.9%	22.1%	-67.7%	16.7%
ROA	13.2%	1.3%	0.52	0.25	16.7%	44.9%	18.1%	-50.6%	13.4%
5yr ROE Adj	13.2%	1.2%	0.52	0.26	19.1%	41.9%	17.9%	-48.1%	13.5%
Price Return - 9-mth Perf.	13.0%	1.7%	0.49	0.06	20.9%	41.6%	18.4%	-52.2%	14.4%
Dividend Yield	12.9%	1.2%	0.45	-0.02	18.8%	53.2%	18.6%	-68.3%	15.7%
Neglect - Institutional Ownership	12.8%	0.9%	0.52	0.23	19.5%	43.3%	17.5%	-51.7%	13.4%
Price to Moving Average (200 day)	12.6%	1.1%	0.47	-0.02	21.2%	49.2%	17.5%	-47.8%	13.1%
5y ROE	12.5%	0.4%	0.47	0.12	19.1%	39.5%	17.8%	-51.4%	13.8%
Price Return - 3-mth Perf.	12.4%	0.8%	0.44	-0.05	20.7%	52.2%	17.6%	-48.4%	12.8%
EPS Estimate Revisions	12.2%	1.3%	0.41	0.04	23.5%	38.4%	20.3%	-63.7%	16.8%
Size	12.1%	1.7%	0.38	0.11	25.2%	57.6%	24.6%	-65.0%	17.6%
Dividend Growth	12.0%	-0.3%	0.44	-0.06	23.1%	49.4%	17.2%	-56.1%	13.9%
Eq. Wtd. Russell 1000	11.8%	na	0.43	na	20.5%	na	17.9%	-56.3%	14.3%
Earning Momentum	11.8%	0.2%	0.41	0.03	24.0%	48.9%	19.8%	-60.3%	15.7%
Price Return - 12-mth and 1-mth Performance	11.6%	-0.2%	0.43	-0.10	19.5%	50.8%	16.9%	-50.0%	13.0%
Low Price	11.6%	2.1%	0.35	0.06	24.9%	52.0%	26.7%	-69.1%	18.9%
Neglect - Analyst Coverage	11.3%	0.4%	0.45	0.08	20.5%	45.3%	18.1%	-57.1%	13.7%
Variability of Earnings	10.9%	0.3%	0.34	-0.04	25.6%	51.8%	22.6%	-66.2%	17.7%
Earnings Torpedo	10.7%	-0.4%	0.34	-0.13	22.8%	59.1%	20.8%	-62.3%	15.0%
Beta	10.4%	2.1%	0.30	0.01	28.0%	50.4%	29.6%	-81.8%	21.9%
Forward Earnings Yield	9.4%	0.1%	0.23	-0.14	33.2%	54.6%	31.5%	-58.9%	20.9%
Estimate Dispersion	9.1%	-0.2%	0.28	-0.10	28.9%	56.5%	25.9%	-70.8%	18.9%
Proj. 5yr EPS Growth	8.6%	-0.7%	0.26	-0.15	24.7%	56.2%	25.8%	-83.7%	20.6%

Source: BofA US Equity & Quant Strategy, FactSet

BofA GLOBAL RESEARCH

Russell 1000 factor correlations vs. macro factors

Exhibit 732: Russell 1000 factor correlations vs. macroeconomic factors
Based on relative factor performance vs the index

	Interest Rates			Currency	Inflation	Commodity Prices	Economy	Market Volatility	Corporate Profits	Credit Quality
Factor	10yr Tsy Nominal Yld	10yr Tsy Real Yield	2s10s Tsy curve	Trade Wtd. USD	CPI	WTI	GDP Growth	VIX	Profit Cycle	Credit Spread
Earnings Yield	0.15	-0.04	0.25	0.00	0.10	0.06	0.31	-0.35	-0.06	-0.45
Forward Earnings Yield	0.28	0.05	-0.02	-0.27	0.59	0.69	0.40	-0.10	0.19	0.03
Dividend Yield	-0.18	-0.26	0.17	0.04	0.04	0.03	0.31	-0.20	-0.06	-0.25
Price/ Book Value	0.26	-0.03	0.16	-0.09	0.02	0.11	0.30	-0.44	-0.14	-0.65
Price/ Cash Flow	0.08	-0.11	0.26	-0.15	0.17	0.18	0.28	-0.23	-0.04	-0.32
Price/ Free Cash Flow	-0.08	-0.19	0.23	-0.13	0.09	-0.01	0.32	-0.20	-0.04	-0.27
Price/ Sales	0.17	-0.09	0.24	-0.07	-0.05	0.10	0.23	-0.30	-0.20	-0.63
EV/ EBITDA	0.12	-0.04	0.31	-0.19	0.16	0.11	0.29	-0.26	-0.08	-0.34
Free Cash Flow/ EV	-0.11	-0.14	0.27	-0.10	0.09	-0.05	0.32	-0.09	-0.10	-0.10
Rel. Strength - 30wk/75wk MA	0.09	0.11	-0.19	0.05	0.10	0.13	0.38	0.11	0.16	0.33
Relative Strength - 5wk/30wk MA	0.20	0.20	-0.06	0.07	0.16	0.36	0.38	0.16	0.13	0.37
Relative Strength - 10wk/40wk MA	0.20	0.21	-0.12	0.08	0.15	0.31	0.42	0.17	0.22	0.35
Price to Moving Average (200 day)	0.18	0.21	-0.08	0.08	0.12	0.30	0.36	0.19	0.14	0.42
Price Return - 12-mth Perf.	0.11	0.18	-0.17	0.10	0.07	0.12	0.38	0.15	0.18	0.41
Price Return - 9-mth Perf.	0.17	0.22	-0.16	0.08	0.07	0.19	0.40	0.15	0.22	0.38
Price Return - 3-mth Perf.	0.21	0.14	0.03	-0.01	0.17	0.37	0.32	0.12	0.05	0.27
Price Return - 11-mth Perf.	0.10	0.14	-0.19	0.10	0.06	0.11	0.41	0.12	0.20	0.35
Price Return - 12-mth and 1-mth Performance	0.05	0.16	-0.11	0.11	0.08	0.15	0.31	0.23	0.07	0.51
Price Return - 12-mth and 1-mth Reversal	-0.07	0.06	-0.24	0.07	0.02	-0.11	0.46	0.11	0.29	0.33
Most Active	0.42	0.27	-0.05	-0.11	0.14	0.30	0.37	-0.18	-0.05	-0.09
Low Price	0.39	0.03	0.18	-0.23	-0.05	0.22	0.23	-0.42	-0.23	-0.70
Earning Momentum	0.36	0.24	-0.15	-0.23	0.28	0.25	0.38	-0.10	0.25	0.09
Proj. 5yr EPS Growth	0.39	0.21	-0.15	-0.18	0.05	0.28	0.26	-0.07	0.08	-0.05
Earnings Torpedo	0.37	0.06	-0.09	-0.17	-0.15	0.26	0.26	-0.25	-0.17	-0.55
EPS Estimate Revisions	0.39	0.28	-0.34	-0.11	0.34	0.33	0.45	-0.05	0.24	0.14
Dividend Growth	-0.39	-0.19	0.00	0.21	0.12	-0.23	0.33	0.13	0.07	0.15
P/E-to-Growth	0.14	-0.02	0.19	0.01	0.05	0.02	0.30	-0.28	0.01	-0.36
1yr ROE	-0.34	-0.12	0.07	0.09	0.08	-0.09	0.31	0.33	-0.05	0.50
5y ROE	-0.48	-0.23	0.14	0.06	-0.03	-0.09	0.30	0.30	-0.03	0.44
1yr ROE Adj	-0.20	-0.02	0.10	0.01	0.05	-0.06	0.28	0.37	-0.07	0.54
5yr ROE Adj	-0.22	-0.06	0.13	-0.02	0.01	-0.01	0.30	0.33	-0.08	0.50
ROA	-0.21	-0.08	0.07	-0.05	0.00	-0.04	0.27	0.30	-0.08	0.48
ROC	-0.27	-0.06	0.06	0.08	0.01	-0.12	0.28	0.36	-0.08	0.54
Beta	0.52	0.14	0.00	-0.29	0.05	0.40	0.26	-0.34	-0.09	-0.50
Variability of Earnings	0.60	0.22	-0.15	-0.28	0.15	0.36	0.33	-0.33	0.03	-0.55
Estimate Dispersion	0.56	0.15	0.00	-0.31	-0.02	0.43	0.29	-0.33	-0.07	-0.53
Neglect - Analyst Coverage	-0.20	-0.26	0.25	-0.10	-0.23	-0.16	0.37	-0.10	-0.18	-0.12
Neglect - Institutional Ownership	-0.32	-0.17	0.37	0.06	-0.03	-0.22	0.30	0.22	-0.27	0.23
Size	0.32	-0.06	0.27	-0.27	-0.10	0.22	0.18	-0.40	-0.28	-0.72
Share Repurchase	-0.16	-0.01	0.22	0.17	0.09	-0.08	0.38	0.04	0.03	0.14
Short Interest	-0.22	-0.17	0.31	-0.02	0.04	-0.02	0.43	0.06	-0.09	0.14

Source: BofA US Equity & Quant Strategy, FactSet
Interest rates data since 1998. WTI Oil, Trade Weighted US Dollar data since 1986. GDP data since 1985. VIX data since 1991. CPI data since 1986. Profit Cycles data since 1987. Credit Spreads (Investment Grade) data since 1997.
Factor performance since1986 (Analyst Coverage since 1994; Institutional Ownership since 1999, Short Interest since 1993).

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S&P 500 factor efficacy

Exhibit 733: S&P 500 factor Sharpe Ratio
Boldface font indicates quintiles with the highest Sharpe ratio for each factor.
Shaded cells indicate the quintile with the lowest Sharpe ratio for each factor.
Factor performance 1986 to present (Analyst Coverage since 1994; Institutional Ownership since 1999, Short Interest since 1993).

Factor	Decile 1	D2	D3	D4	D5	D6	D7	D8	D9	D10
Earnings Yield	0.54	0.50	0.56	0.56	0.59	0.53	0.42	0.49	0.39	0.30
Forward Earnings Yield	0.48	0.57	0.53	0.62	0.51	0.53	0.49	0.54	0.32	0.29
Dividend Yield	0.47	0.57	0.57	0.59	0.61	0.52	0.45	0.45	0.42	0.39
Price/ Book Value	0.40	0.54	0.55	0.52	0.46	0.48	0.43	0.43	0.50	0.49
Price/ Cash Flow	0.47	0.52	0.54	0.57	0.56	0.52	0.47	0.49	0.40	0.37
Price/ Free Cash Flow	0.58	0.61	0.61	0.63	0.59	0.40	0.48	0.38	0.28	0.36
Price/ Sales	0.50	0.50	0.49	0.51	0.53	0.56	0.56	0.38	0.47	0.31
EV/ EBITDA	0.60	0.62	0.48	0.63	0.54	0.51	0.42	0.45	0.41	0.25
Free Cash Flow/ EV	0.70	0.60	0.61	0.65	0.49	0.40	0.44	0.42	0.31	0.33
Relative Strength - 30wk/75wk MA	0.50	0.57	0.58	0.54	0.52	0.55	0.56	0.45	0.37	0.25
Relative Strength - 5wk/30wk MA	0.54	0.47	0.40	0.43	0.58	0.64	0.55	0.55	0.45	0.24
Relative Strength - 10wk/40wk MA	0.54	0.43	0.44	0.52	0.57	0.61	0.55	0.53	0.46	0.23
Price to Moving Average (200 day)	0.52	0.43	0.49	0.47	0.55	0.60	0.54	0.51	0.48	0.27
Price Return - 12-mth Perf.	0.54	0.58	0.50	0.61	0.52	0.52	0.48	0.50	0.36	0.26
Price Return - 9-mth Perf.	0.57	0.50	0.50	0.51	0.51	0.55	0.47	0.50	0.42	0.29
Price Return - 3-mth Perf.	0.49	0.48	0.48	0.52	0.53	0.50	0.58	0.49	0.46	0.33
Price Return - 11-mth Perf.	0.54	0.60	0.52	0.56	0.54	0.55	0.50	0.48	0.40	0.21
Price Return - 12-mth and 1-mth Performance	0.50	0.49	0.55	0.55	0.39	0.49	0.54	0.51	0.49	0.34
Price Return - 12-mth and 1-mth Reversal	0.59	0.53	0.60	0.51	0.43	0.55	0.51	0.51	0.43	0.21
Most Active	0.63	0.56	0.57	0.51	0.52	0.44	0.49	0.44	0.38	0.27
Low Price	0.40	0.45	0.50	0.46	0.54	0.58	0.47	0.55	0.42	0.52
Earning Momentum	0.44	0.48	0.55	0.57	0.55	0.53	0.57	0.50	0.41	0.33
Proj. 5yr EPS Growth	0.33	0.43	0.48	0.55	0.48	0.48	0.57	0.51	0.54	0.55
Earnings Torpedo	0.43	0.47	0.57	0.57	0.64	0.62	0.53	0.46	0.40	0.31
EPS Estimate Revisions	0.46	0.55	0.53	0.52	0.60	0.53	0.50	0.49	0.45	0.27
Dividend Growth	0.50	0.49	0.45	0.46	0.56	0.62	0.51	0.55	0.52	0.46
P/E-to-Growth	0.50	0.50	0.49	0.51	0.53	0.58	0.64	0.50	0.48	0.38
1yr ROE	0.62	0.59	0.50	0.52	0.56	0.51	0.40	0.51	0.42	0.32
5y ROE	0.58	0.48	0.55	0.52	0.52	0.48	0.48	0.45	0.49	0.36
1yr ROE Adj	0.60	0.55	0.55	0.54	0.50	0.47	0.44	0.52	0.48	0.30
5yr ROE Adj	0.59	0.47	0.51	0.52	0.57	0.46	0.43	0.52	0.47	0.36
ROA	0.57	0.50	0.55	0.48	0.49	0.52	0.54	0.50	0.47	0.28
ROC	0.60	0.56	0.56	0.52	0.53	0.43	0.48	0.50	0.46	0.29
Beta	0.34	0.40	0.47	0.47	0.55	0.49	0.57	0.62	0.54	0.45
Variability of Earnings	0.32	0.40	0.44	0.51	0.45	0.56	0.54	0.49	0.63	0.62
Estimate Dispersion	0.27	0.46	0.50	0.48	0.51	0.48	0.50	0.54	0.58	0.68
Neglect - Analyst Coverage	0.52	0.63	0.49	0.56	0.50	0.59	0.55	0.52	0.43	0.46
Neglect - Institutional Ownership	0.50	0.70	0.71	0.57	0.64	0.52	0.58	0.46	0.47	0.35
Size	0.42	0.59	0.47	0.45	0.58	0.46	0.52	0.47	0.43	0.48
Share Repurchase	0.63	0.64	0.59	0.51	0.49	0.48	0.51	0.44	0.42	0.22
Short Interest	0.70	0.67	0.73	0.56	0.56	0.48	0.48	0.38	0.41	0.29

Source: BofA US Equity & Quant Strategy, FactSet
Sharpe ratio is calculated as the average annualized monthly excess return vs. 10-yr Treasury yield divided by the annualized volatility (standard deviation) of monthly excess returns.

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Exhibit 734: S&P 500 factor correlations
Based on monthly returns from January 1990 to present

	Alpha Surprise Model	P/E-to-Growth	DDM Alpha	Earnings Yield	Forward EPS Yield	Price/ Book Value	Price/ Cash Flow	Price/ Free Cash Flow	Price/ Sales	EV/ EBITDA	Free Cash Flow/ EV	Dividend Yield	Dividend Growth	Share Repurchase	30wk/75wk MA	5wk/30wk MA'	10wk/40wk MA	Price / 200d MA	Price Return (12-mth)	Price Return (9-mth)	Price Return (3-mth)	Price Return (11-mth)	Price Return (12m and 1m)	Price Ret. (12m and 1m Rev.)	Most Active	Earning Momentum	Proj. 5yr EPS Growth	Positive EPS Surprise	EPS Estimate Revisions	Equity Duration	1yr ROE	5y ROE	1yr ROE Adj	5yr ROE Adj	ROA	ROC	Beta	Variability of Earnings	Estimate Dispersion	Low Price	Low Institutional Ownership	Low Analyst Coverage	Size	Foreign Exposure
P/E-to-Growth	0.87																																												
DDM Alpha	0.91	0.88																																											
Earnings Yield	0.89	0.94	0.89																																										
Forward EPS Yield	0.85	0.94	0.87	0.97																																									
Price/ Book Value	0.79	0.89	0.82	0.93	0.94																																								
Price/ Cash Flow	0.85	0.93	0.86	0.95	0.94	0.92																																							
Price/ Free Cash Flow	0.87	0.93	0.88	0.94	0.93	0.90	0.95																																						
Price/ Sales	0.81	0.90	0.83	0.92	0.93	0.94	0.92	0.92																																					
EV/ EBITDA	0.85	0.93	0.85	0.93	0.93	0.90	0.96	0.94	0.91																																				
Free Cash Flow/ EV	0.88	0.92	0.88	0.93	0.91	0.88	0.92	0.96	0.89	0.93																																			
Dividend Yield	0.83	0.81	0.87	0.88	0.86	0.87	0.86	0.84	0.84	0.83	0.82																																		
Dividend Growth	0.92	0.91	0.88	0.93	0.91	0.86	0.89	0.91	0.87	0.90	0.91	0.83																																	
Share Repurchase	0.92	0.90	0.91	0.93	0.91	0.87	0.90	0.93	0.88	0.91	0.94	0.85	0.93																																
30wk/75wk MA	0.62	0.63	0.61	0.58	0.58	0.51	0.58	0.60	0.57	0.62	0.62	0.45	0.68	0.62																															
5wk/30wk MA'	0.70	0.65	0.64	0.64	0.62	0.58	0.62	0.64	0.63	0.65	0.65	0.56	0.73	0.69	0.82																														
10wk/40wk MA	0.68	0.63	0.63	0.61	0.60	0.55	0.59	0.61	0.60	0.63	0.63	0.52	0.71	0.66	0.86	0.97																													
Price / 200d MA	0.67	0.63	0.63	0.61	0.60	0.55	0.60	0.62	0.61	0.62	0.63	0.53	0.71	0.66	0.84	0.97	0.96																												
Price Return (12-mth)	0.65	0.61	0.61	0.58	0.57	0.51	0.58	0.61	0.57	0.61	0.62	0.48	0.69	0.63	0.93	0.90	0.93	0.92																											
Price Return (9-mth)	0.65	0.61	0.62	0.59	0.58	0.52	0.57	0.60	0.58	0.60	0.61	0.49	0.69	0.64	0.89	0.94	0.97	0.96	0.96																										
Price Return (3-mth)	0.73	0.71	0.67	0.70	0.69	0.67	0.69	0.70	0.71	0.71	0.71	0.62	0.77	0.72	0.76	0.93	0.88	0.92	0.83	0.86																									
Price Return (11-mth)	0.67	0.63	0.64	0.61	0.60	0.54	0.60	0.63	0.59	0.63	0.64	0.50	0.72	0.65	0.93	0.89	0.93	0.90	0.99	0.94	0.81																								
Price Return (12m and 1m)	0.70	0.64	0.65	0.63	0.61	0.57	0.62	0.65	0.62	0.64	0.67	0.55	0.74	0.68	0.84	0.90	0.89	0.94	0.92	0.92	0.89	0.89																							
Price Ret. (12m and 1m Rev.)	0.81	0.77	0.78	0.75	0.74	0.67	0.73	0.77	0.71	0.75	0.78	0.64	0.83	0.79	0.85	0.79	0.83	0.77	0.85	0.82	0.72	0.90	0.75																						
Most Active	0.72	0.81	0.71	0.76	0.75	0.78	0.77	0.78	0.77	0.79	0.79	0.65	0.80	0.76	0.73	0.75	0.72	0.72	0.72	0.72	0.80	0.73	0.73	0.75																					
Earning Momentum	0.88	0.92	0.86	0.89	0.88	0.84	0.89	0.90	0.86	0.89	0.91	0.77	0.92	0.88	0.76	0.77	0.76	0.76	0.77	0.75	0.80	0.79	0.77	0.86	0.84																				
Proj. 5yr EPS Growth	0.71	0.81	0.69	0.73	0.72	0.71	0.74	0.75	0.73	0.77	0.77	0.58	0.79	0.75	0.79	0.78	0.77	0.76	0.78	0.77	0.81	0.79	0.78	0.79	0.93	0.86																			
Positive EPS Surprise	0.96	0.91	0.88	0.91	0.88	0.86	0.89	0.91	0.87	0.90	0.91	0.82	0.94	0.93	0.71	0.77	0.74	0.74	0.73	0.72	0.80	0.74	0.77	0.85	0.84	0.93	0.83																		
EPS Estimate Revisions	0.83	0.83	0.78	0.81	0.80	0.75	0.80	0.81	0.78	0.82	0.82	0.69	0.86	0.83	0.83	0.86	0.86	0.85	0.85	0.85	0.84	0.87	0.83	0.89	0.83	0.91	0.86	0.89																	
Equity Duration	0.81	0.81	0.78	0.78	0.76	0.74	0.78	0.81	0.78	0.78	0.81	0.65	0.85	0.81	0.81	0.83	0.83	0.82	0.84	0.82	0.85	0.85	0.84	0.85	0.86	0.89	0.89	0.88	0.89																
1yr ROE	0.84	0.92	0.80	0.89	0.90	0.90	0.88	0.87	0.89	0.89	0.87	0.77	0.88	0.87	0.73	0.76	0.75	0.74	0.72	0.73	0.82	0.74	0.74	0.79	0.91	0.89	0.89	0.89	0.89	0.86															
5y ROE	0.88	0.85	0.85	0.83	0.81	0.75	0.81	0.86	0.78	0.82	0.88	0.73	0.91	0.88	0.73	0.74	0.73	0.73	0.73	0.72	0.77	0.75	0.76	0.82	0.79	0.88	0.80	0.90	0.82	0.85	0.83														
1yr ROE Adj	0.78	0.82	0.77	0.77	0.75	0.73	0.77	0.81	0.76	0.79	0.82	0.67	0.84	0.81	0.74	0.75	0.73	0.72	0.73	0.72	0.78	0.74	0.75	0.78	0.91	0.84	0.90	0.86	0.80	0.89	0.84	0.90													
5yr ROE Adj	0.83	0.85	0.81	0.79	0.77	0.72	0.79	0.83	0.76	0.80	0.85	0.65	0.87	0.84	0.76	0.74	0.73	0.74	0.75	0.74	0.77	0.76	0.77	0.81	0.84	0.88	0.86	0.88	0.83	0.88	0.83	0.94	0.91												
ROA	0.82	0.84	0.79	0.78	0.76	0.73	0.78	0.82	0.77	0.80	0.84	0.65	0.86	0.83	0.76	0.76	0.74	0.74	0.75	0.74	0.78	0.76	0.77	0.81	0.87	0.87	0.89	0.88	0.83	0.89	0.84	0.92	0.94	0.97											
ROC	0.79	0.81	0.77	0.75	0.72	0.67	0.74	0.79	0.70	0.76	0.82	0.60	0.84	0.79	0.80	0.76	0.76	0.75	0.78	0.77	0.77	0.79	0.78	0.81	0.85	0.85	0.88	0.85	0.81	0.88	0.80	0.93	0.94	0.96	0.95										
Beta	0.86	0.83	0.82	0.81	0.78	0.72	0.78	0.82	0.76	0.78	0.84	0.69	0.88	0.84	0.75	0.75	0.75	0.74	0.76	0.74	0.76	0.77	0.77	0.83	0.79	0.87	0.81	0.88	0.82	0.88	0.81	0.95	0.90	0.93	0.91	0.93									
Variability of Earnings	0.72	0.85	0.70	0.81	0.82	0.84	0.82	0.82	0.83	0.83	0.83	0.69	0.82	0.79	0.68	0.71	0.69	0.69	0.68	0.68	0.79	0.69	0.70	0.73	0.94	0.85	0.92	0.85	0.83	0.85	0.92	0.76	0.87	0.80	0.84	0.80	0.76								
Estimate Dispersion	0.90	0.92	0.86	0.91	0.90	0.88	0.90	0.91	0.89	0.91	0.91	0.81	0.93	0.91	0.70	0.76	0.74	0.73	0.72	0.71	0.80	0.73	0.75	0.83	0.84	0.94	0.85	0.95	0.89	0.88	0.92	0.87	0.84	0.86	0.86	0.82	0.85	0.87							
Low Price	0.77	0.87	0.75	0.85	0.85	0.90	0.89	0.85	0.87	0.90	0.83	0.79	0.83	0.81	0.60	0.69	0.66	0.65	0.62	0.63	0.76	0.63	0.65	0.71	0.85	0.85	0.81	0.86	0.82	0.79	0.91	0.74	0.77	0.74	0.76	0.71	0.72	0.89	0.88						
Low Institutional Ownership	0.75	0.89	0.78	0.87	0.88	0.93	0.90	0.88	0.92	0.90	0.87	0.79	0.82	0.83	0.55	0.62	0.59	0.59	0.55	0.56	0.71	0.58	0.59	0.69	0.85	0.84	0.81	0.85	0.78	0.79	0.94	0.75	0.79	0.76	0.79	0.72	0.73	0.91	0.88	0.92					
Low Analyst Coverage	0.84	0.83	0.83	0.84	0.82	0.85	0.83	0.85	0.84	0.82	0.85	0.85	0.86	0.85	0.60	0.71	0.67	0.68	0.63	0.65	0.78	0.64	0.69	0.74	0.83	0.84	0.77	0.89	0.78	0.80	0.84	0.82	0.83	0.80	0.81	0.77	0.79	0.83	0.87	0.83	0.85				
Size	0.88	0.89	0.88	0.88	0.87	0.85	0.88	0.91	0.89	0.87	0.89	0.81	0.90	0.91	0.67	0.71	0.69	0.69	0.68	0.68	0.75	0.70	0.72	0.81	0.77	0.90	0.77	0.91	0.83	0.86	0.86	0.87	0.82	0.85	0.85	0.81	0.85	0.80	0.90	0.81	0.85	0.87			
Foreign Exposure	0.81	0.89	0.82	0.91	0.91	0.95	0.92	0.92	0.95	0.92	0.89	0.85	0.87	0.89	0.56	0.63	0.60	0.60	0.57	0.57	0.72	0.59	0.61	0.72	0.79	0.86	0.75	0.87	0.78	0.78	0.91	0.78	0.77	0.76	0.77	0.71	0.75	0.86	0.90	0.91	0.95	0.86	0.90		
Short Interest	0.83	0.89	0.80	0.84	0.84	0.82	0.86	0.87	0.83	0.87	0.87	0.73	0.88	0.86	0.73	0.77	0.75	0.75	0.74	0.73	0.82	0.75	0.76	0.80	0.88	0.91	0.90	0.91	0.88	0.89	0.90	0.86	0.87	0.88	0.89	0.86	0.85	0.90	0.93	0.87	0.87	0.84	0.87	0.86	

Source: BofA US Equity & Quant Strategy

Disclosures

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