

Quantitative Primer

Everything you wanted to know about quant*

Quantitative Strategy

*But were too afraid to ask

In our fourteenth edition of the US Quantitative Primer, we include performance of 70+ factors over a time period of ~40 years, over which Cash Flow-based valuation factors have been the best performers to remind readers that valuation matters and that cash is king. We outline the proprietary framework critical to our portfolio strategy work and highlight trends and topics in the quantitative industry.

A generation of investors trained on “price predicts price”

Most investors have seen a period during which momentum and technical factors have driven the largest gains. But outperformance of price momentum factors was likely driven by a liquidity-fueled multi-decade period of falling interest rates, globalization and central bank stimulus that resulted in high serial correlation across price returns. Prior to the Global Financial Crisis (GFC), valuation was a far better signal than using past price returns to predict future price returns.

Surprising strategy for a downturn

Contrary to popular belief, secular growth doesn't outperform value during recessions or “Downturn” regimes. Deep value (Price to Book, Price to Sales) has lagged, but so have growth factors (EPS Momentum, High Long-term Growth, Long Equity Duration). Winners during downturns have one thing in common: cash (outperforming factors have been cash return factors, our DDM valuation factor, and free cash flow-oriented factors).

An alternative route to alpha

The quest for alpha has driven investors beyond traditional sources into the realm of alternative data that can provide insights into the future performance of financial markets on a timely basis. BofA Global Research uses a wide range of data like NLP-based sentiment trackers including news sentiment, BAC aggregated credit and debit card spending data, web scraping, geolocation data as well as proprietary surveys. Many are compiled on a monthly basis in the [BofA Global Proprietary Signals report](#). See inside for more details.

Quant quiz: debunking myths

It's a confusing time to be an investor – macro indicators are flashing mixed signals and there are a multitude of crosscurrents. Here we address and debunk some of the common narratives we hear contributing to investor frustration. Myths include: “Bad breadth is bearish” (in years of mega-cap leadership since 1986, the market was up the subsequent year nearly 75% of the time), “Value underperforms during recessions,” (Value has a 75% hit rate in recessions over the past 40 years), and more.

Eyeballs shifting to the short-term

One of today's greatest market inefficiencies may stem from the shift in capital toward shorter-term strategies and the scarcity of capital devoted to long-term, fundamental investing. Zero-day-to-expiry options, or “OTDEs” have surged and now account for 40-45% of total SPX option volume. Our work suggests that extending one's time horizon has been a reliable recipe for loss avoidance in US stocks.

Trading ideas and investment strategies discussed herein may give rise to significant risk and are not suitable for all investors. Investors should have experience in relevant markets and the financial resources to absorb any losses arising from applying these ideas or strategies.

BofA Securities does and seeks to do business with issuers covered in its research reports. As a result, investors should be aware that the firm may have a conflict of interest that could affect the objectivity of this report. Investors should consider this report as only a single factor in making their investment decision.

Refer to important disclosures on page 310 to 311.

26 June 2023

Quantitative Strategy
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[See Team Page for List of Analysts](#)

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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Dear Reader,

Each year since 2010 we have published an annual primer on techniques in quantitative analysis, as well as exposition on the hundreds of proprietary tools that we regularly update and publish.

- **Trends and hot topics in quantitative finance:** We provide insight from our survey of institutional investors about what factors are popular or unpopular, how alternative data and AI are changing industry dynamics, how to weave signals together to determine an outlook for US equities.
- **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 cyclicalities 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 metrics have driven returns. 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 changes in sector composition of style screens based on an unconstrained approach to running factor models. There is useful information in assessing changes in sector exposures both to determine (1) whether particular sectors are driving returns; and (2) how sectors have changed characteristics.
- **Long-short signals can be asymmetric:** 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.
- **How to pick stocks within sectors:** 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 hope this annual report proves to be helpful, and readily welcome suggestions on how to improve next year's edition.

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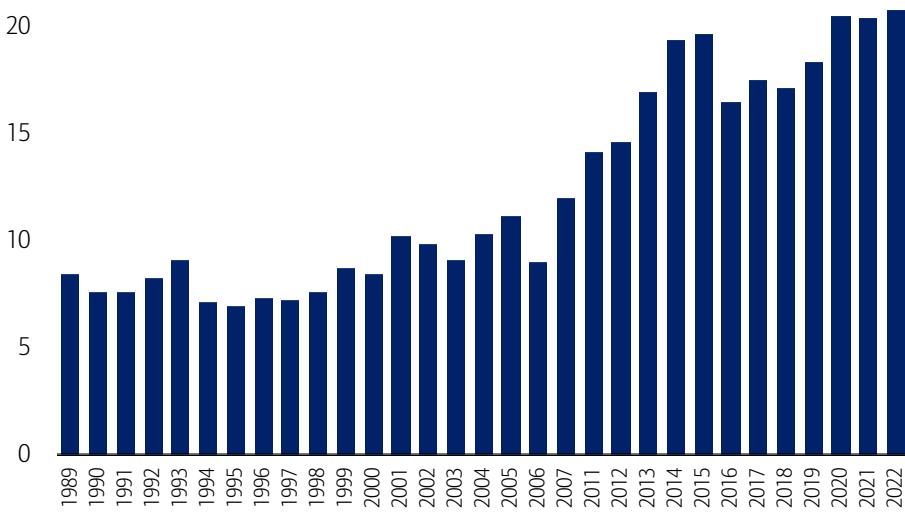
More complicated, more crowded

Our quantitatively oriented clients use 3x the number of factors today than they did 25 years ago (Exhibit 1). Popularity of quantitative investing has increased sharply, potentially 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 14 in 1986 to less than two people today (Exhibit 2). Quants are increasingly focused on real-time data feeds, AI (artificial intelligence), 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 into 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 searched for “factor investing” and for “fundamental investing”

Popularity of “factor investing” continued to rise (6/2012 – 5/2023, 3-mth moving average)



Source: Google Trends, BofA US Equity & Quant Strategy

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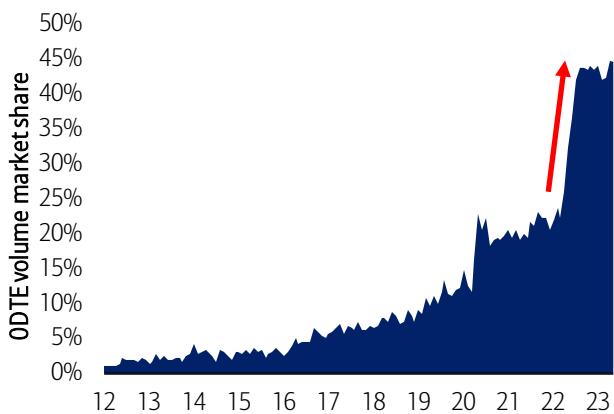
Rise of short-termism

Zero-day-to-expiry options, or “ODTEs” have surged over the past few years and now account for 40-45% of total SPX option volume (see [ODTEs note](#)). In our latest Annual Institutional Factor Survey, 41% of respondents cited the investment community’s short-term focus as the biggest threat to their investment processes, the most of any choice. We have found that the best recipe for loss avoidance is time – the probability of loss drops from 46% to 6% if the time horizon is extended from one day to ten years.

SPX ODTE options have grown from ~10% of total SPX options volume pre-Covid, to ~20% in 2021, to 40-45% in 2022-23.

Exhibit 4: SPX zero-day-to-expiry (ODTE) options volume took off in mid-2022, coinciding with the listing of Tue/Thu expiry weekly options

ODTE contract volume as a portion of total contract volume for SPX options

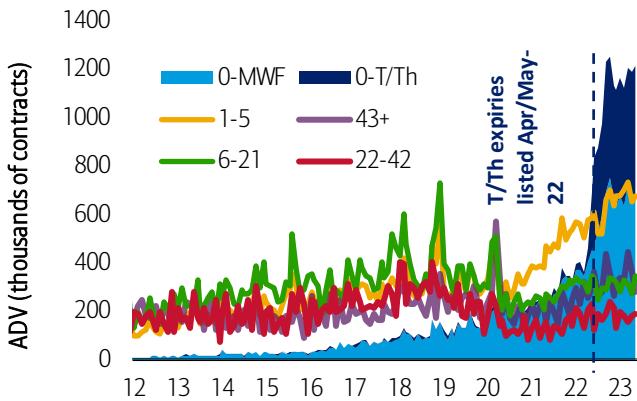


Source: BofA Global Research. Daily data from 01-Jan-12 to 30-May-23.

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Exhibit 5: Surprisingly to many, ODTEs have been additive to SPX option volumes, rather than cannibalizing traditional expiries

Average daily contract volume for SPX options by trading days until expiration, with M/W/F & T/Th contributions split for ODTEs



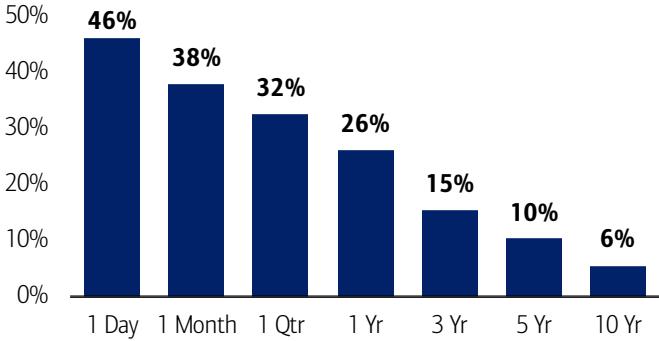
Source: BofA Global Research. Daily data from 01-Jan-12 to 30-May-23.

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The probability of losing money in the S&P 500 over one day is a little worse than a coin-flip but declines to just 6% over a 10-year time horizon (data since 1929).

Exhibit 6: As time horizons increase, equity losses drop

Probability of negative returns, based on S&P 500 total returns from 1929-5/31/2023

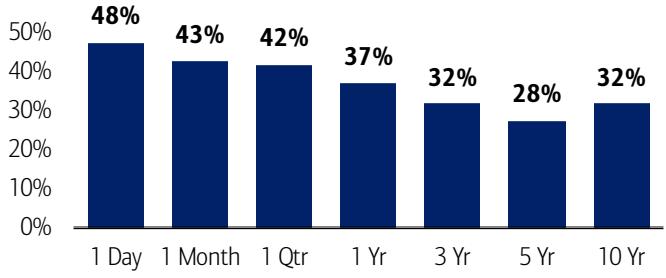


Source: S&P, Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 7: Time is not as compelling for other asset classes (like oil)

Probability of negative returns, based on WTI oil returns from 1929-present for annual/3yr/5yr/10yr, 1974-present for quarterly/monthly and 1986-present for daily



Source: EIA, CME, BofA US Equity & Quant Strategy

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BofA data-driven research

It pays to be different. To this end, BofA Global Research publishes 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 8: BofA Global Research Reports

The most recent BofA data-driven research

Subtitle

[How big is QDTE gamma really?](#)
[EV tracker Apr-23: EU loses significant share; special analysis on premium EVs](#)
[Subdued indicator on weak demand during traditional peak seasons](#)
[April China ACT reading jumped higher against a low base](#)
[Understanding the US market](#)
[Got yield?](#)
[Survey: Brazilians are thirsty for beer](#)
[Bonds & Bubbles](#)
[BofA Industrial Momentum Indicator ticks down – are we about to retest the bottom?](#)
[Spending update through May 20](#)
[EM Fundamentals have peaked. What comes next?](#)
[Neither panic, nor euphoria](#)
[Negative result, but outlook remains soft](#)
[BofA Commercial Aerospace Tracker: WoW North America cycles decline](#)
[US ortho dataset says... cases down -13% M/M in April](#)
[Private client capitulation](#)
[Bearish JPY vs rest of G10 FX](#)
[Golf Industry Tracker: MODG Club sales -12% in April, but see some green shoots](#)
[China pessimism & US debt limit hopes and fears](#)
[Trend Tracker: April slows, Q2 trend est 5.2%; still below trended baseline](#)
[The W&W Indicator is marginally bullish in May](#)
[Survey Says: Demand \(44.3\) stays sub-50; inventory moves further below peak](#)
[RENO Barometer shows April showers \(and 2H flowers\)](#)
[BofA Flight Signals shows unit revenues could decelerate into 2H23](#)
[Watching and waiting](#)
[BofA Japan FA Indicator improves again](#)
[Monthly restaurant spending: spend continues slowdown across segments](#)
[Turned bullish cash](#)
[Small sentiment uptick](#)
[FMS: sell the news?](#)
[State of Play: Assessing the China rebound](#)
[Hoping for a soft landing](#)
[Default and loss pressures in the current default cycle](#)
[April card spending: soft but not slumping](#)
[Real-time Grocery Spending Update: See trade down to value grocery channel](#)
[Survey: Home health vols tracking above Q1, labor costs remain a headwind](#)
[April pool spending and composite decking search trend update](#)
[BofA's assessment of US Mall REITs, 9th edition](#)
[Duration extremes](#)
[Broad based spending slowdown in April](#)
[The BofA Alts EXAMINER: Forecast soft fundamentals in 2Q/3Q but still LT bullish](#)
[Unambiguous trend](#)
[Japan Consumer Survey \(Apr 23\): Continued recovery](#)
[Chemical conditions tool: April makes a fool of recovery hopes](#)
[From "lucky to have me" to "thanks for having me," labor markets loosen](#)
[Apr-23: Street catching up on earnings cuts; further cuts likely](#)
[May 2023 update: Stay positive](#)
[Light at the end of the tunnel](#)
[April app data: Mixed trends continue, travel growth slowing on tougher comps](#)
[CB investors brace for a recession](#)
[1Q23 Pharma Survey: New modules, same old macro](#)
[Bulls are becoming an endangered species](#)

Analyst Name

Analyst Name	Publish Date
Global Equity Derivatives Rsch	5/31/2023
Schneider, Horst	5/30/2023
Zhao, Matty	5/29/2023
Qiao, Helen	5/29/2023
Wallace, Ashley	5/29/2023
Seliger, Yuri	5/26/2023
Simonato, Isabella	5/25/2023
Hartnett, Michael	5/25/2023
Global Industrials	5/25/2023
US Economics	5/25/2023
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Samadhiya, Ritesh	5/24/2023
Beker, David	5/23/2023
Heelan, Benjamin	5/23/2023
Ryskin, Michael	5/23/2023
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Iaralov, Vadim	5/22/2023
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Vamvakidis, Athanasios	5/22/2023
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Khoda, Neha	5/15/2023
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Ohmes, Robert	5/15/2023
Gajuk, Joanna	5/15/2023
Jadrosich, Rafe	5/12/2023
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Hutchinson, Lorraine	5/12/2023
Siegenthaler, Craig	5/10/2023
Nair, Girish	5/10/2023
Devalier, Izumi	5/9/2023
Yates, Matthew	5/5/2023
Thornton, Thomas (T.J.)	5/4/2023
Shah, Amish	5/4/2023
Gee, Nathan	5/2/2023
Luo, Chen	5/2/2023
Post, Justin	5/1/2023
Youngworth, Michael	5/1/2023
Lutz, Allen	5/1/2023
Subramanian, Savita	5/1/2023

Source: BofA Global Research

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Myth-busters

Market narratives abound

Amid a period of "Macro discord" (see Quantitative Profiles) and a year marked by a multitude of economic/market crosscurrents, we have heard a number of myths related to market behavior that we have attempted to address or debunk in our work.

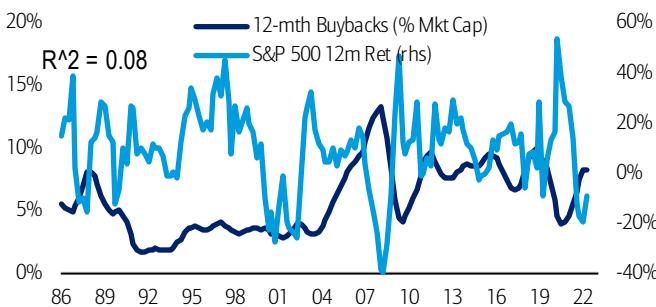


False: buybacks drive performance

Given we expect a shift from buybacks to dividends, does this spell doom for the S&P 500? Actually, the relationship between S&P 500 buybacks and index performance since 1986 is a minimal 0.08 R-squared (Exhibit 9). Furthermore, our weekly BofA corporate client buyback data have a similarly low relationship with future index performance (0.01 R-squared) (Exhibit 10). What we can validate is that companies that repurchase shares at inexpensive valuations tend to outperform (Exhibit 11). In fact, over the past 12 months (as of 4/30/23) cheap buybacks outperformed expensive buybacks by 7.6ppt.

Exhibit 9: Little evidence of share buybacks helping performance

S&P 500 total 12-mth buybacks (as % of mkt cap) vs S&P 500 12-mth return

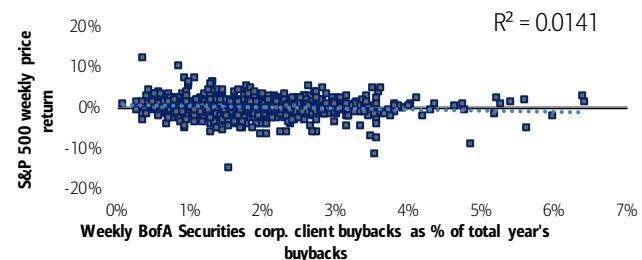


Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 10: BofA corporate 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, 6/2009-present

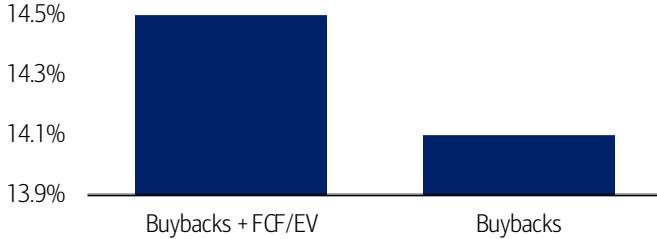


Source: FactSet, BofA Securities

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Exhibit 11: Companies that reduce shares at low valuations tend to outperform

Annualized performance (Jan. 1986 – Apr. 2023)



Source: FactSet, BofA US Equity & Quant Strategy

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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. But our BofA Securities Equity Client Flows suggest the opposite (Exhibit 12). Returns following periods of retail inflows have been above average and returns post-retail selling have been below average, with a similar spread to hedge funds (suggesting the latter was not a better signal). Relatedly, our Low Institutional Ownership factor – which includes high retail ownership stocks – has more consistently outperformed during market drops; during months since 1986 with the index falling 3%+, the screen produced an average alpha of 1ppt.



Exhibit 12: Retail investors have been similar positive indicators to hedge funds

Subsequent 4-week S&P 500 returns when last 4 weeks flows were (+) vs. (-), 2008-present

	Hedge Funds	Institutional	Retail
4wk returns following (+) flow weeks	1.0%	1.5%	0.9%
4wk returns following (-) flow weeks	0.5%	0.3%	0.6%
Spread	0.4%	1.2%	0.3%

Source: FactSet, BofA Securities

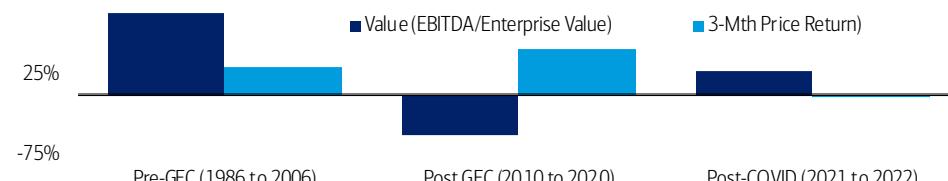
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False: valuation doesn't matter, price is the best predictor of price

The unwavering faith in price momentum investing is likely attributable to a liquidity-fueled decade that saw tremendous serial correlation across price returns. The average portfolio manager (~45 y.o.) has seen a financial crisis during which statistically cheap stocks were traps, followed by a decade during which value factors destroyed alpha almost every year while investing based on past price return turned in hefty alpha. The few value investors left see post-COVID shifts as a sort of come-uppance: Value (proxied by long-short EV/EBITDA) returned 30ppt from 2021-2022, whereas price return produced no alpha. Prior to the GFC, valuation was a far better signal than basing future forecasts on past price returns. And while Growth has outperformed Value YTD, part of this outperformance was driven by a mini bout of QE this year post-SVB (Silicon Valley Bank failure).

Exhibit 13: Valuation matters, it just hasn't for the last 10 years

EBITDA/EV and 3-mth Price Return performance



Source: US Equity & Quant Strategy, FactSet

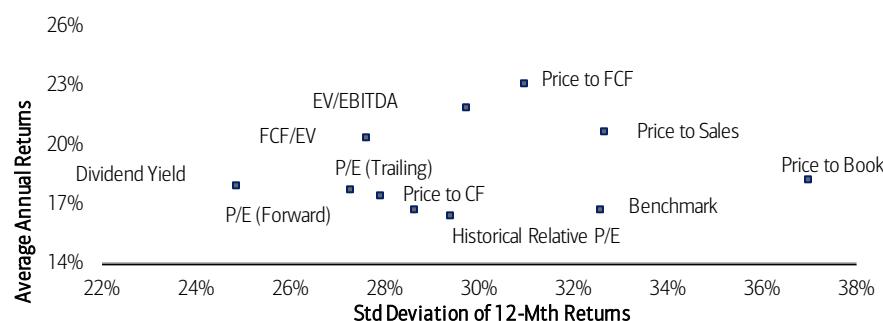
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False: valuation doesn't matter for Tech

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 38 years, companies with low Price to Free Cash Flow and low EV to EBITDA have generated annualized alpha of 6.4ppt and 5.2ppt vs. the sector.

Exhibit 14: Price to Free Cash Flow outperformed the index most

Valuation Strategies for Information Technology: Top Quintile Returns (Jan. 1985 to Apr. 2023)



Source: FactSet, BofA US Equity & Quant Strategy

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False: duration only matters for bonds

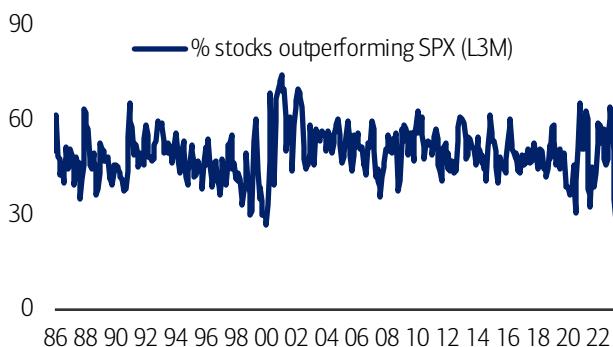
In 2022, as markets repriced assets amid rising real rates (10-yr real yield + 235bp) and an aggressive Fed tightening cycle (fed funds rate + 425bp), the Russell 1000 Growth index (-29.1%) underperformed the Russell 1000 Value (-7.5%). Our Long Equity Duration factor, back-end loaded growth stocks that are more vulnerable to rising cost of capital, suffered a 25.5% loss and ranked among the worst three factors for the year.

False: bad breadth is bearish

Only 23% of stocks outperformed the S&P 500 in May, the lowest of any month in our data history since 1986. Five stocks added 2.4ppt to the index. The other 495 stocks detracted 2.0ppt from the index. But history suggests weak breadth itself isn't a precursor of market weakness: in years of mega-cap leadership since 1986, the market was up the subsequent year nearly 75% of the time (see [US Performance Monitor](#)).

Exhibit 15: Bad breadth usually mean reverts

% of stocks outperforming the S&P 500 over the last three months (1986-5/31/2023)



Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 16: In years of mega-cap leadership since 1986, the market was up the subsequent year nearly 75% of the time

Years when Largest 50 stocks outperformed S&P 500 and subsequent S&P 500 return

Year	Nifty Fifty Perf.	S&P 500 Perf.	Relative Perf.	Subsequent year S&P 500 perf.
1989	33.4	27.3	6.1	-6.6
1990	0.3	-6.6	6.9	26.3
1995	37.8	34.1	3.7	20.3
1996	24.0	20.3	3.8	31.0
1997	34.4	31.0	3.4	26.7
1998	35.2	26.7	8.6	19.5
1999	20.1	19.5	0.6	-10.1
2006	14.3	13.6	0.7	3.5
2011	1.4	0.0	1.4	13.4
2015	2.2	-0.7	3.0	9.5
2017	19.6	19.4	0.1	-6.2
2018	-3.6	-6.2	2.6	28.9
2019	30.1	28.9	1.2	16.3
2020	23.2	16.3	6.9	26.9
2021	28.1	26.9	1.2	-19.4
		Avg:	12.0	
		Median:	16.3	
		Hit Rate:	73%	

Source: Bloomberg, BofA US Equity & Quant Strategy

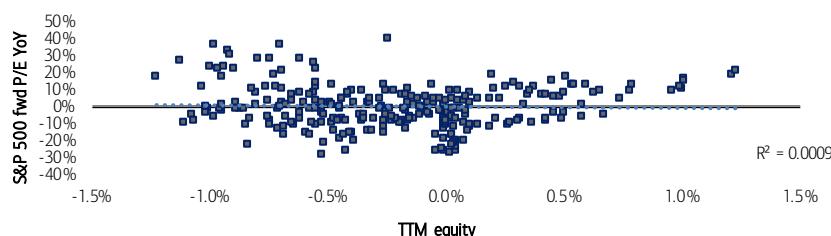
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False: flows into equities push multiples higher

One might intuitively expect multiples to expand with inflows, and compress with outflows. In actuality, the correlation between equity flows and valuations is effectively zero (Exhibit 17). Our work suggests other reasons keeping the S&P 500 at its current lofty snapshot multiples, including the tendency for P/E ratios to rise when earnings decline and years of Quantitative Easing driving multiple expansion (see [Relative Value](#)).

Exhibit 17: No relationship between equity inflows and valuations

S&P 500 fwd P/E YoY vs. TTM equity flows as % of S&P 500 market cap (2000-21)



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

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False: value underperforms during economic recessions

Investors tend to shun Value during periods of economic recession. Our work shows that during NBER recessions over the past almost 40 years, Value along with Quality were most consistently outperforming attributes with a 75% outperformance rate (Exhibit 6). Free cash flow based (High FCF/EV, Price/FCF), as well as Low EV/EBITDA were the best performing Value factors during those periods (Exhibit 19).

Exhibit 18: Value and Quality

Factor relative performance vs equal weighted S&P 500 index during NBER recessions (1986 – present)

	Value	Cash Deployment	Momentum	Growth	Quality	Risk	Misc.	Small
Avg:	0.1%	-1.0%	-3.6%	-3.7%	7.2%	8.8%	0.4%	2.1%
Median:	3.4%	0.4%	-2.5%	-4.2%	6.8%	6.8%	0.6%	3.9%
Hit rate:	75.0%	50.0%	50.0%	25.0%	75.0%	50.0%	50.0%	50.0%

Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 19 Quality and Value tends to outperform during economic recessions

Relative factor performance during NBER defined economic recession (1986 – present)

Factors	Avg:	Median:	Hit rate:
5yr ROE Adj	9.4%	9.3%	100.0%
1yr ROE Adj	6.8%	7.8%	75.0%
ROA	8.0%	6.6%	100.0%
5y ROE	8.1%	6.3%	100.0%
1yr ROE	5.6%	6.1%	75.0%
Free Cash Flow/ EV	6.0%	5.9%	75.0%
Low Price	3.4%	5.8%	75.0%
EV/ EBITDA	2.3%	5.8%	75.0%
ROC	4.9%	4.9%	75.0%
Price/ Free Cash Flow	3.5%	4.3%	75.0%
Earnings Yield	-0.8%	3.6%	75.0%
Price/ Cash Flow	-1.2%	2.1%	75.0%
Forward Earnings Yield	-1.5%	1.7%	75.0%
Positive EPS Surprise	0.5%	1.0%	75.0%
Foreign Exposure	2.1%	0.9%	75.0%

Source: FactSet, BofA US Equity & Quant Strategy

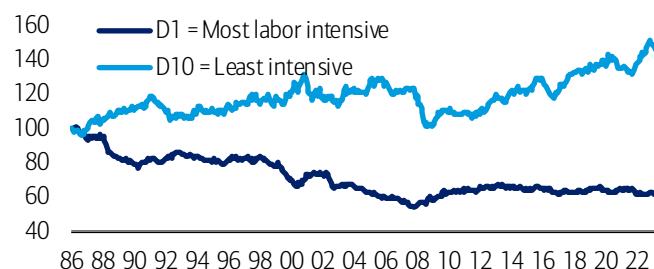
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False: during periods of wage disinflation labor intensive companies outperform

Investors shouldn't own labor-intensive companies under almost any circumstances (Exhibit 20), based on our analysis. Despite the fact that the Fed is keenly focused on cooling wage inflation, which could be a boon to labor-intensive companies' margins, we find that companies with the highest ratio of number of employees per dollar of sales have been almost constant laggards relative to their labor-light counterparts.

Exhibit 20: Most labor intensive companies tend to underperform their least labor intensive peers on a sector neutral basis...

Cumulative relative performance vs. equal weighted S&P 500 index (based on top and bottom sector neutral quintiles by # of employees to sales ratio)



Source: US Equity & Quant Strategy, FactSet

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Exhibit 21: ...as well as on an unconstrained basis

Cumulative relative performance vs. equal weighted S&P 500 index (based on top and bottom unconstrained deciles by # of employees to sales ratio)



Source: US Equity & Quant Strategy, FactSet

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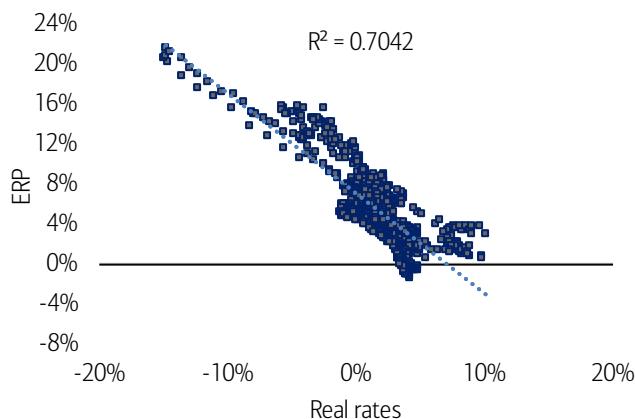


False: ERP needs to rise from here

While it is true that historical downturns have resulted in a much sharper increase in the equity risk premium (ERP) vs. now, we see reasons for the ERP to settle at lower levels. First, upside risk in real rates argues for a lower ERP (correlation between ERP and real rates = -84%). Moreover, ERP has trended lower during periods of strong efficiency gains (avg. of ~200bp from 1986-2006 vs. ~550bp post-GFC when efficiency gains stalled), and we believe Corporate America may be on the cusp of a new efficiency cycle (see [Strategy in Pictures](#)).

Exhibit 22: Higher real rates = lower ERP

Historical relationship between our normalized ERP vs. real rates (1945-5/23)

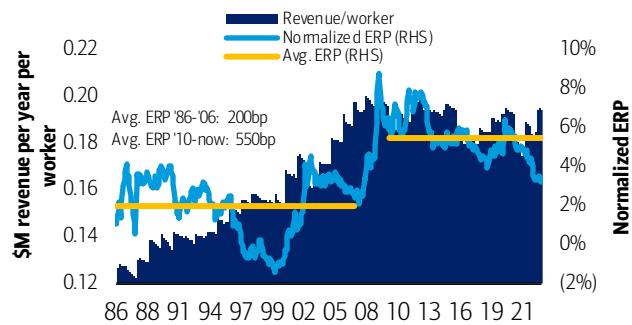


Source: BofA US Equity & Quant Strategy, Global Financial Data, Bloomberg

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Exhibit 23: Higher ERP amid stalled productivity

S&P 500 \$M revenue per year per worker (CPI adjusted) vs. Normalized ERP (1986-5/2023)



Source: BofA US Equity & Quant Strategy, Bloomberg, Haver Analytics, FactSet. Norm. ERP = norm. earnings yield - real risk-free rate, where norm. EPS is based on a log linear regression of a blend of S&P 500 pro-forma EPS and operating EPS. The real rate is the difference between 1) 10-yr Tsy yield and 2) 10-yr breakeven, where prior to 1998, fwd1-yr CPI was used as a proxy, which showed the strongest correlation to the 10-yr breakeven

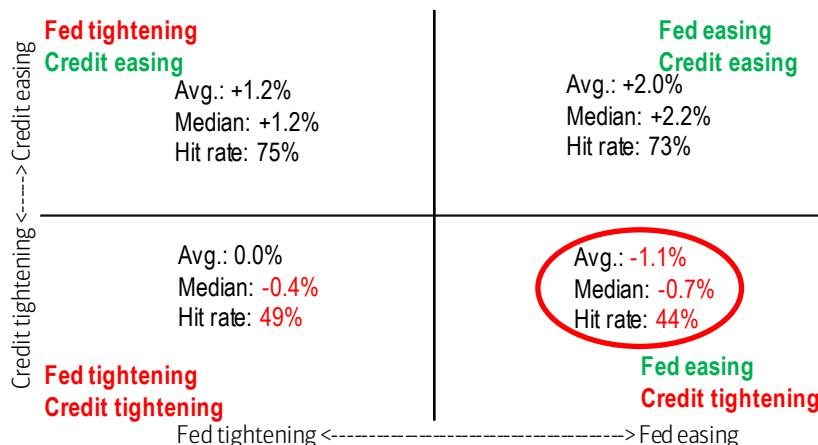
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False: wait for the Fed pivot

Over the past year, investors have been waiting for signs of a Fed pivot to become bullish. But historically, the worst phase for equities has been when the Fed was easing and credit conditions were tightening, a regime that we typically see in a recession. Our economists continue to see resilience in the US economy, forecasting only a mild recession (or “growth recession”) starting next year and no rate cuts until May 2024 (see [Economic Viewpoint](#)).

Exhibit 24: Fed easing/credit tightening sees weakest return

S&P 500 avg., median and positive hit rate of monthly returns based on credit/Fed cycles (1996-5/23)



Source: BofA US Equity & Quant Strategy, Bloomberg

*Fed cycle based on the 2-yr yield. Credit cycle based on the IG credit spread

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Section I: Core Concepts and Methodology

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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

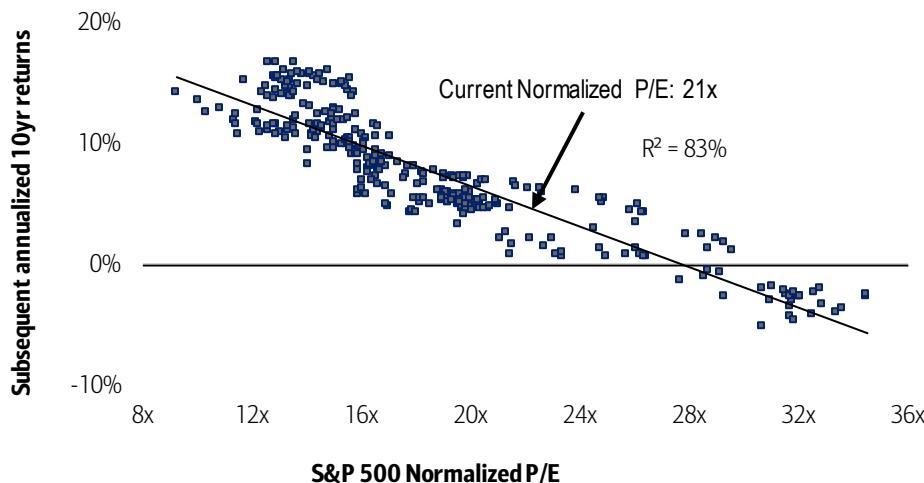
Our work suggests that valuation is generally a poor market timing indicator over short to medium time horizons. However, over longer time horizons valuation may be the most important determinant of market returns. The drawback of most single-period valuation ratios used by investors is that they implicitly 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 inherent cyclicity. We estimate normalized earnings based on a linear log normal regression and our analysis shows that this measure of market valuation explains over 80% of the variability of equity market returns over the next 10 years (Exhibit 25). 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 Global Financial Crisis reached extreme levels far below those seen during the 1980s and 1990s, and were similarly followed by strong equity market returns.

Exhibit 25: Valuations explained ~80% of 10yr returns

S&P 500 Normalized P/E vs. subsequent annualized 10yr returns 1987-4/2023



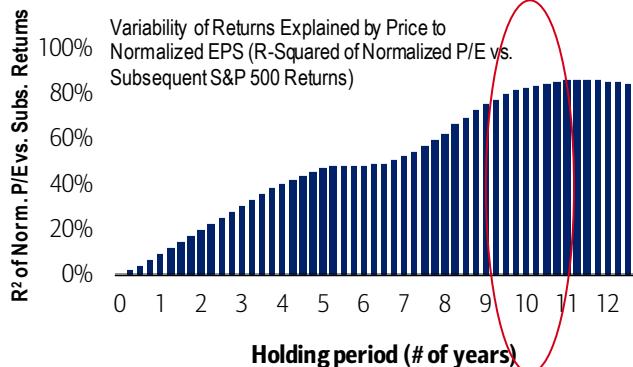
Source: BofA US Equity and US Quant Strategy, FactSet, Haver Analytics

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Exhibit 26: Almost all that matters over the long term

Normalized P/E's predictive power on S&P 500 returns (1987-4/2023)

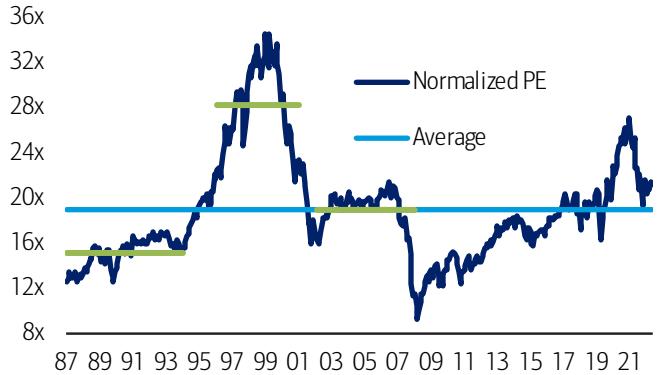


Source: BofA US Equity and US Quant Strategy, FactSet, Haver Analytics

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Exhibit 27: S&P's normalized PE is currently above average

Normalized PE levels over time (1987-4/2023)



Source: BofA US Equity and US Quant Strategy, FactSet, Haver Analytics

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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.

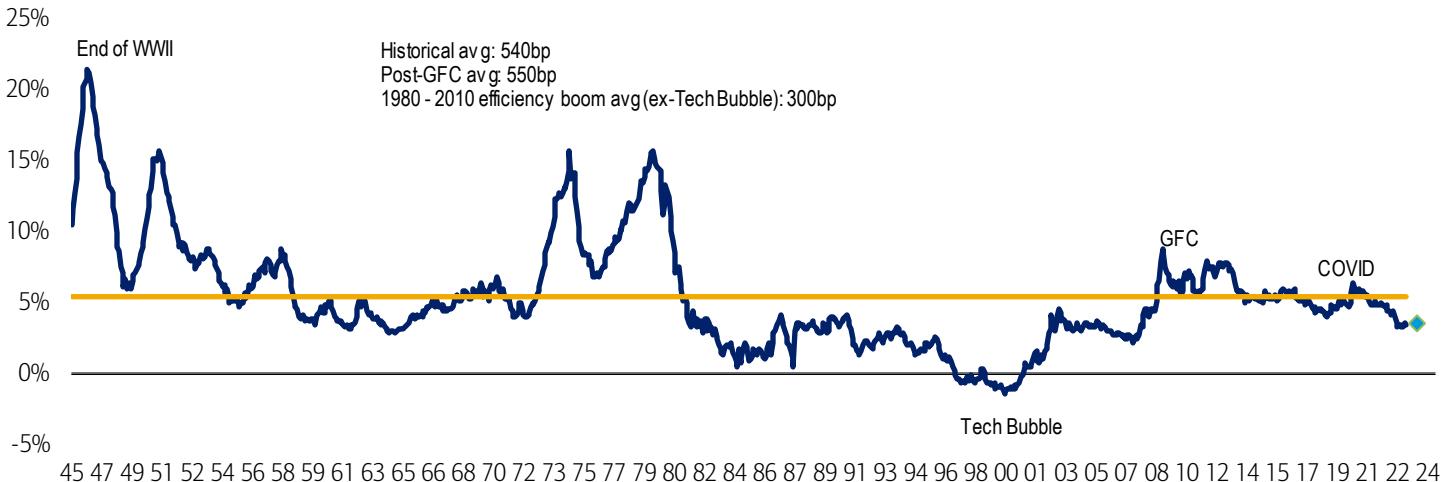
The literature on equity risk premia is vast, but we have distilled it into two methods for evaluating the equity risk premium – a normalized approach and a market-derived approach.

Normalized Equity Risk Premium Framework

We estimate the historical ERP as the normalized EPS yield (normalized EPS ÷ current price) less the real risk-free rate. The real risk-free rate is the difference between 1) the 10-yr Tsy yield; and (2) the 10-yr breakeven. Prior to 1998, fwd 1-yr CPI was used as a proxy for the breakeven (this showed the strongest correlation to the 10-yr breakeven).

Exhibit 28: We expect ERP to normalize at levels lower than the post-Global Financial Crisis era's average of 550bp

Normalized equity risk premium (ERP) with BofA normalized ERP forecast (350bp), 1945-4/23



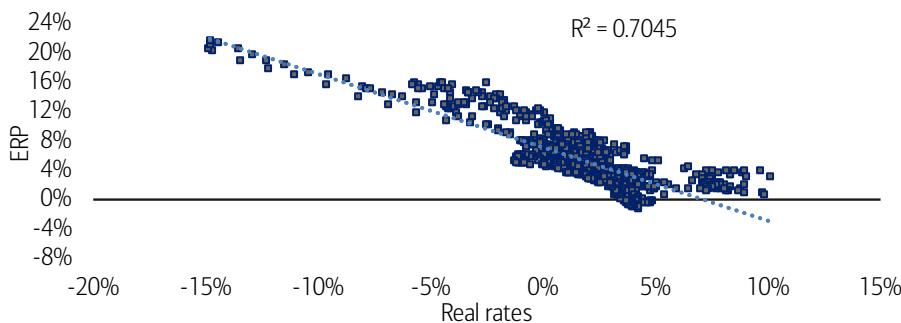
Source: BofA US Equity & Quant Strategy, Global Financial Data, Bloomberg

Note: Normalized ERP is calculated as the spread between the normalized earnings yield and real risk-free rate, where normalized EPS is based on a log linear regression of a blend of S&P 500 pro-forma EPS and operating EPS. The real rate is the difference between 1) 10-yr Tsy yield and 2) 10-yr breakeven, where prior to 1998, fwd 1-yr CPI was used as a proxy, which showed the strongest correlation to the 10-yr breakeven.

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Exhibit 29: Higher real rates =lower ERP

Historical relationship between our normalized ERP vs. real rates (1945-4/23)



Source: BofA US Equity & Quant Strategy, Global Financial Data, Bloomberg. Note: See Methodology for details on calculations

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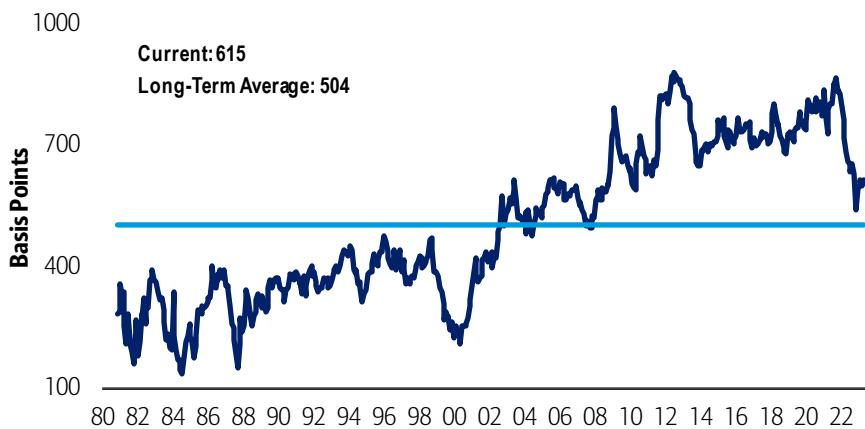
Market-derived Equity Risk Premium Framework

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 30: 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
(11/80 – 4/23)



Source: BofA US Equity & Quant Strategy

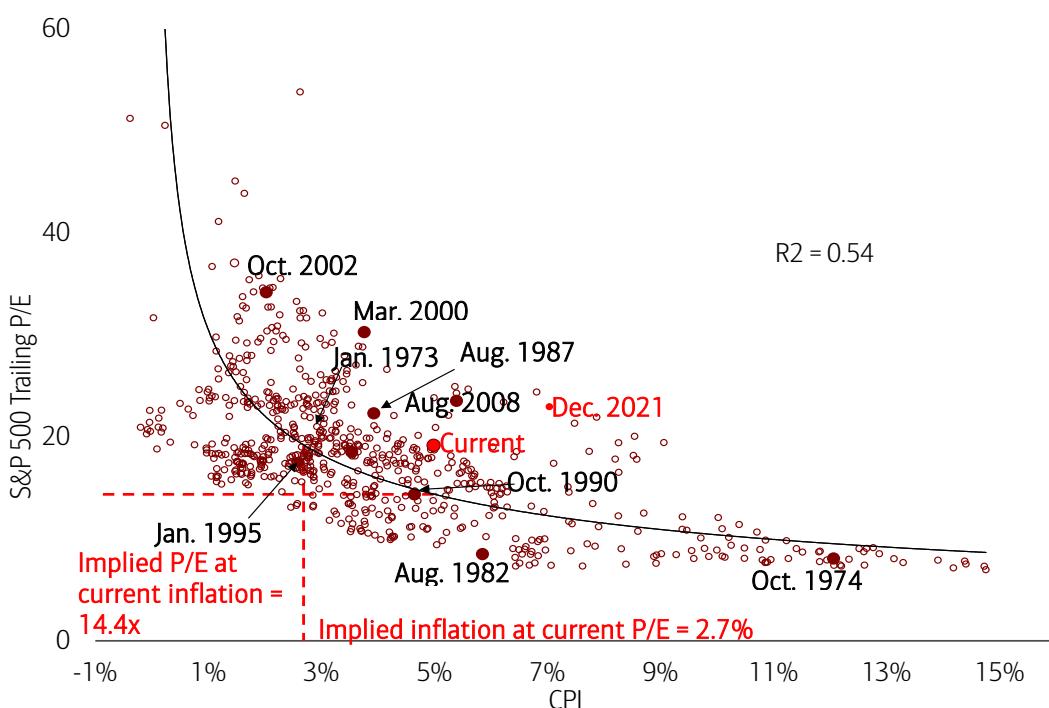
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Inflation vs. P/E Framework

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 31 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 31: 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. 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 32: Sell Side Indicator has high predictive power vs. frameworks like the Fed Model

Predictive Power of Selected Indicators Forecasting 12-Month S&P 500 Returns

Indicator	R2
Sell Side Indicator	24%
<i>Sell Side Indicator at extremes (Buy or Sell)</i>	34%
S&P 500 Dividend Yield	12%
Proforma PE	10%
Adj. Fed Model (EPS Yld - Real 10-Yr Tsy Yld)	4%
M1 Growth	3%
Fed Model (EPS Yield - 10-Yr Treasury)	1%
10-Yr Treasury Yield	0%
3-Mo T-Bill Rate	0%
GAAP PE	0%
M2 Growth	0%
Yield Curve (10-Yr - 3-Mo)	0%
BBB to Treasury Spread	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. Equity allocations have declined dramatically over the past year relative to bond allocations, putting us close to a "Buy" signal based on this indicator.



Exhibit 33: Equity sentiment has declined by over 7ppt from peak levels of bullishness in 2021

Sell Side Indicator, 9/1985-5/2023



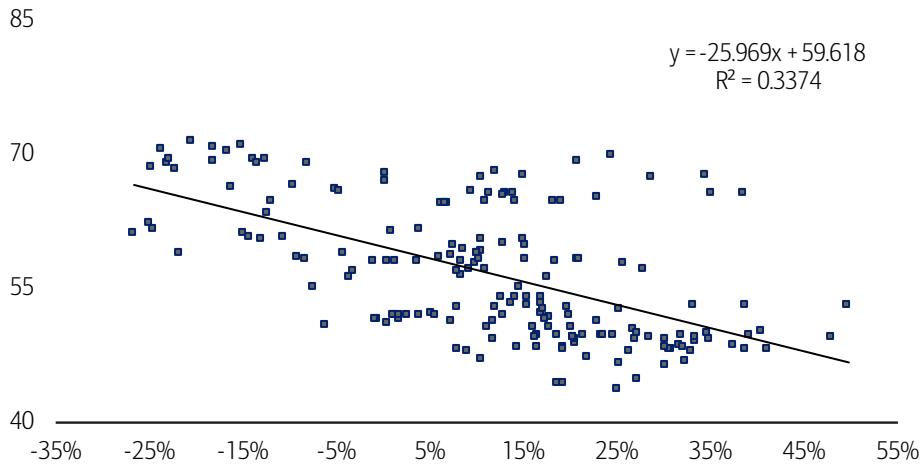
Source: BofA US Equity & Quant Strategy. Note: Buy and Sell signals are based on rolling 15-year +/- 1 standard deviation from the rolling 15-year mean. A reading above the red line indicates a Sell Signal and a reading below the green line indicates a Buy Signal.

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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 34: R² 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

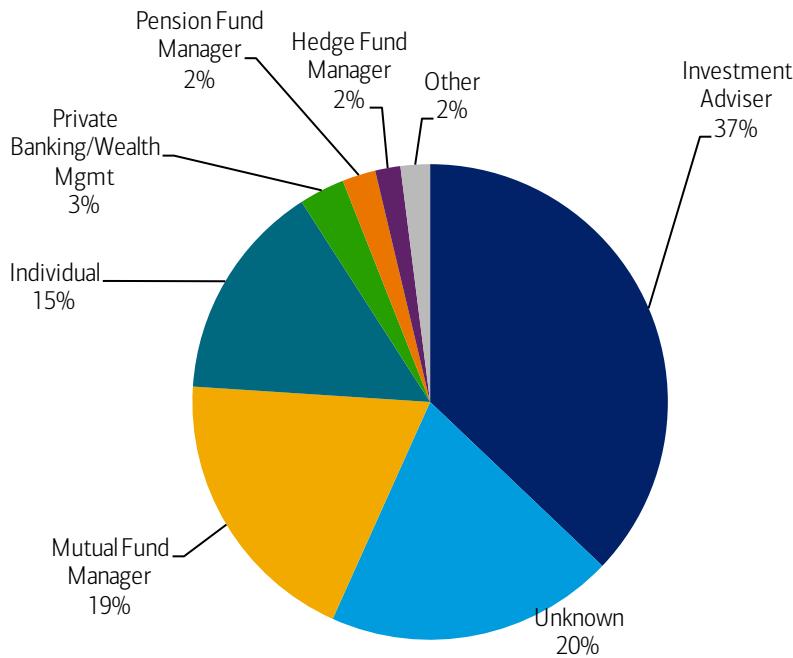
Who owns the S&P 500?

We analyze the ownership of S&P 500 by institutions and individuals, collected by FactSet through various sources (see Exhibit 36). 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 35: S&P 500 ownership breakout by institution type (4/30/2023)

Investment Advisers and Mutual Funds own most of the index



Source: FactSet Ownership

Note: the unknown 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 36: S&P 500 aggregate ownership data sources

Data sources

Source Description

Primary	Primary data source; any investment management institution managing \$100mn+ in US-traded securities
Form 13F	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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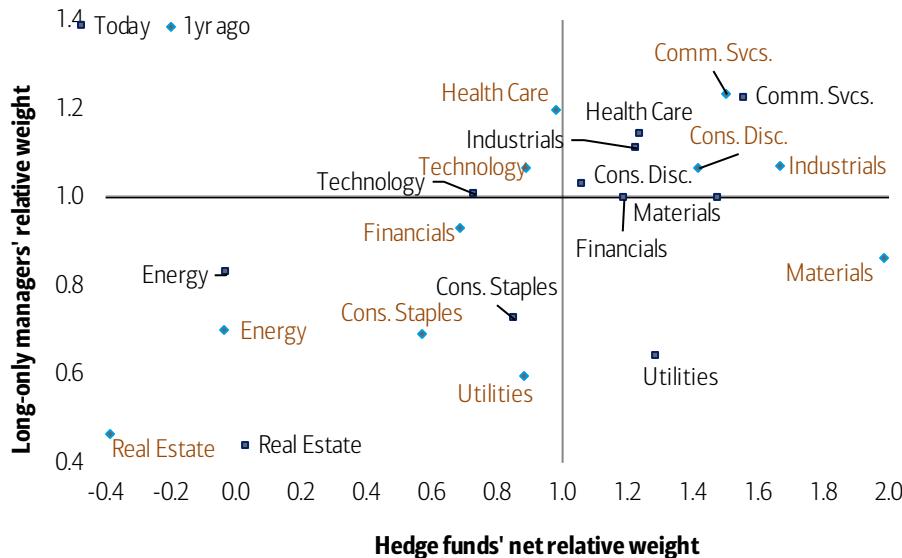
Active managers holdings

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 37: Where do mutual funds and hedge funds agree (and disagree)? (as of 4/2023)

Long-only and hedge funds' net relative positioning by sector today vs. one year ago

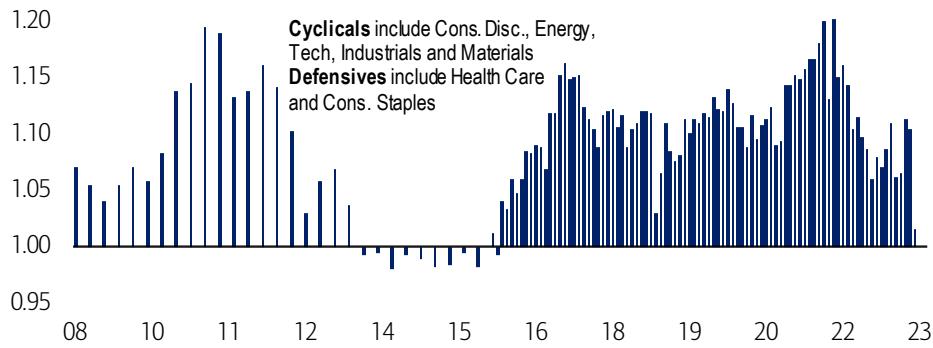


Source: Lipper Analytical Services, BofA US Equity & Quant Strategy, FactSet Ownership

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Exhibit 38: Funds are slightly overweight cyclicals relative to defensives, but relative positioning is lowest since 2015

Large cap mutual fund exposure to cyclical vs. defensive sectors, 9/2008-4/2023

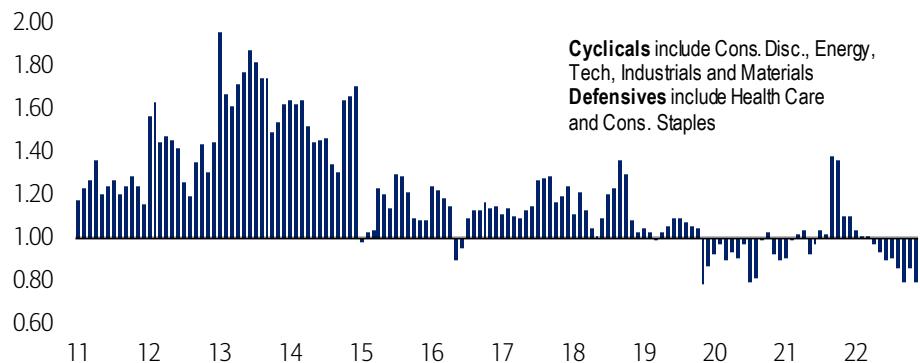


Source: BofA US Equity & Quant Strategy, FactSet Ownership

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Exhibit 39: Hedge funds are underweight cyclicals relative to defensives (relative positioning near historic lows)

Hedge funds' exposure to cyclical vs. defensive sectors, 6/2011-4/2023



Source: BofA US Equity & Quant Strategy, FactSet Ownership

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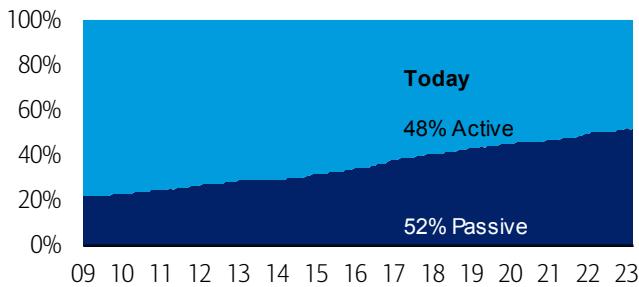


Extracting alpha from positioning

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 41). We believe this should continue, as the main driver of the most crowded stocks' weakness – outflows from active fund into passive vehicles – may not be over (Exhibit 40).

Exhibit 40: Passive now accounts for 52% of all US domiciled fund assets

Active vs. passive funds' assets breakdown



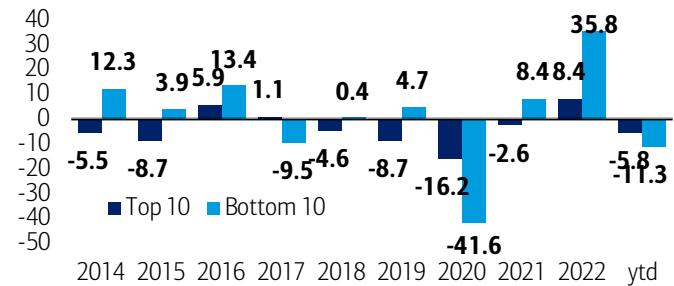
Note: Data through 4/30/2023

Source: BofA US Equity & Quant Strategy, Simfund

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Exhibit 41: Buying the 10 most underweight stocks and selling the 10 most overweight stocks by active funds has generated alpha in most years

10 stock long/short alpha performance vs S&P 500 (5/22/23)

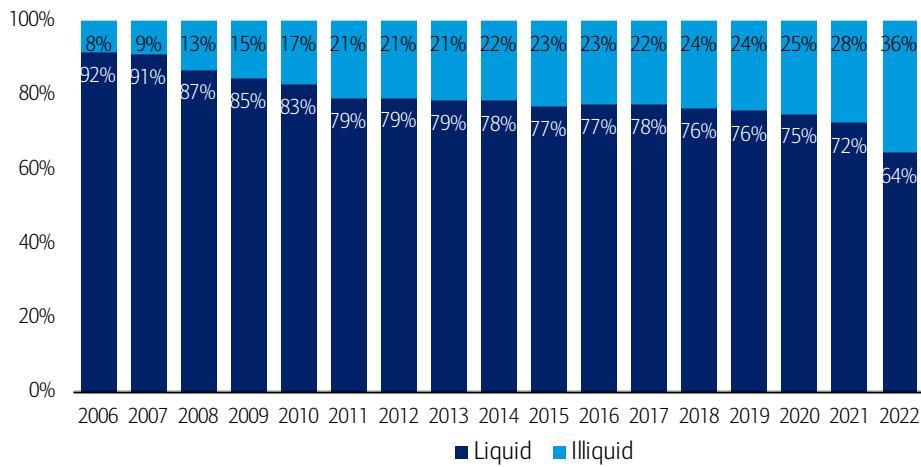


Source: BofA US Equity & Quant Strategy.
ytd performance through 5/22/2023

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Exhibit 42: Pension funds' allocation to illiquid assets has more than quadrupled 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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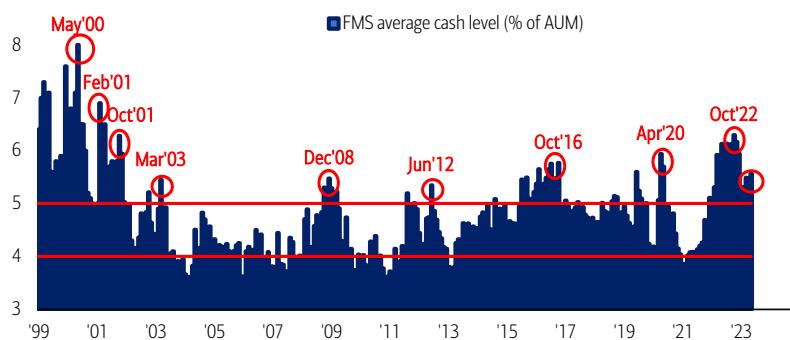
Global Fund Manager Survey cash balances

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 percentage 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 43: Cash drifts up to 5.6% from 5.5% (May 2023)

FMS cash levels % of AUM



How it works

Sell: When the cash balance falls below 4% a contrarian sell signal is generated.

Buy: When the FMS average cash balance rises above 5% a contrarian buy signal is generated for equities.

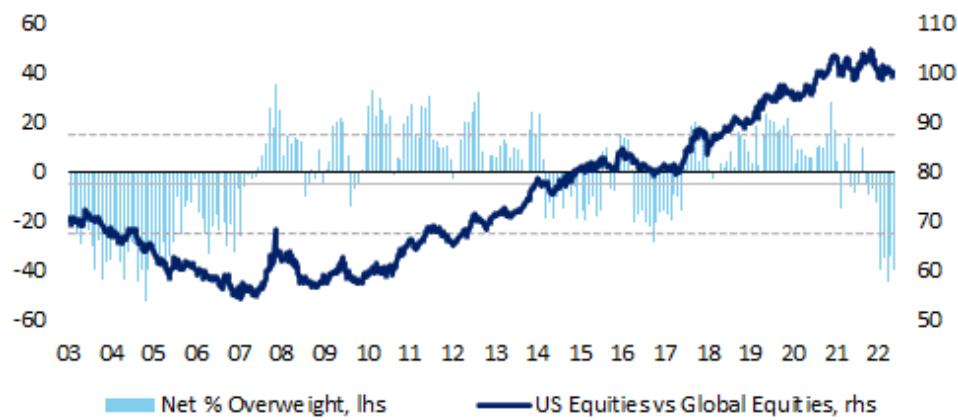
Source: BofA Fund Manager Survey, DataStream. Note: backtested results from Jan '02 to Mar '10. Backtesting is This Performance is backtested and does not represent the actual performance of any account or fund. Backtested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. hypothetical in nature.

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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 have reduced their US stocks allocations to overweight.

Exhibit 44: Net % Asset Allocators Say they are overweight US Equities

Net% of FMS investors overweight US equities (as of 5/2023)



Source: BofA 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 45: Short interest has generally risen in 2023 YTD

Short interest vs. float ratio for total US market (2008-4/2023)



Source: BofA US Equity & Quant Strategy, Bloomberg

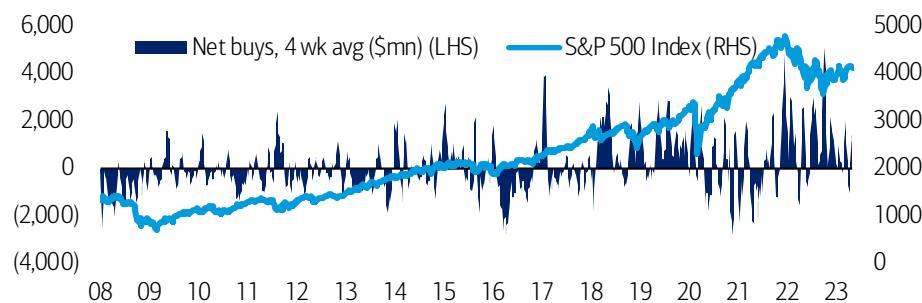
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Flow trends

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 that 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 46: 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 (1/08 – 4/23)



Source: BofA US Equity & Quant Strategy

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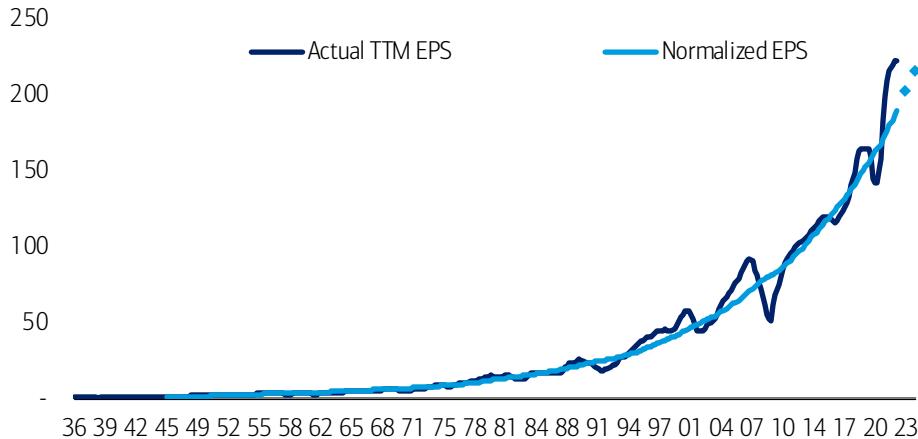
4. Corporate Profits**Normalized earnings**

Earnings are volatile over the course of a cycle, so we adjust earnings by this cyclicity 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 47: Normalized earnings: suggests flat earnings growth over the next two years

Trailing 12-mo. actual EPS* vs. normalized EPS (1936-4Q22; dots = 2023 and 2024 normalized EPS)



Source: BofA US Equity & Quant Strategy, Haver Analytics, FactSet. Pro-forma EPS used since 1988, Operating EPS used between 1977-1988, GAAP EPS (adjusted for write-offs) used from 1936-1977.

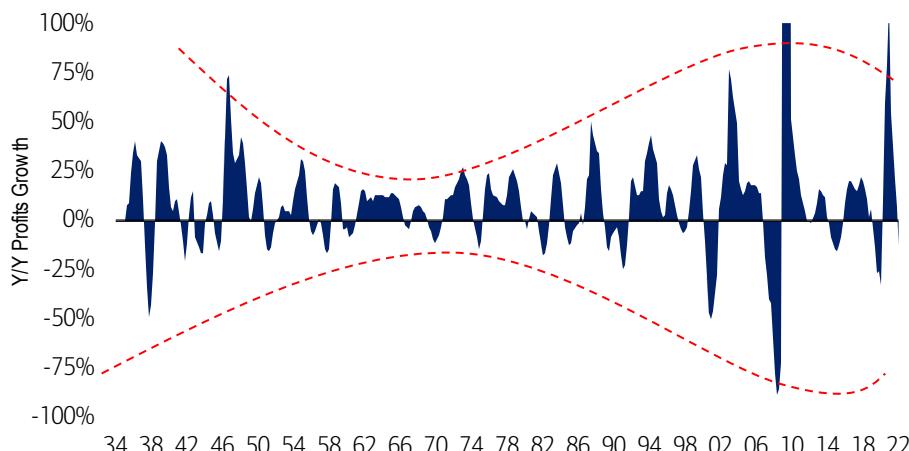
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Profits cycle

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 four-quarter basis. See chart below.

Exhibit 48: 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 macrovariable)



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.



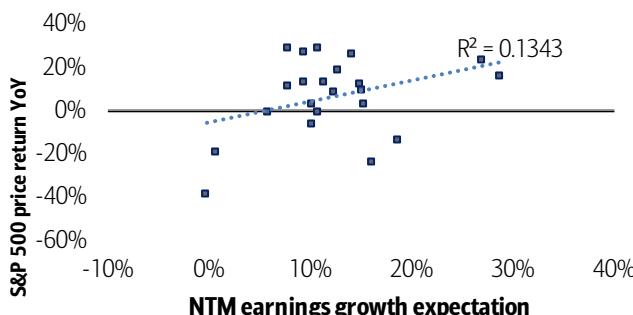
#4: Earnings Surprise

Stocks discount expected growth, but react to surprises

While the earnings revision ratio (discussed below) helps provide a gauge on sentiment and shows what happened in the recent past, we consider earnings surprise direction in our earnings and market outlook based on leading indicators including macroeconomic surprises, BofA analysts vs. consensus and corporate guidance.

Exhibit 49: Returns are positively correlated with growth expectation...

S&P 500 annual price return vs. NTM earnings growth expectation (2001-22)

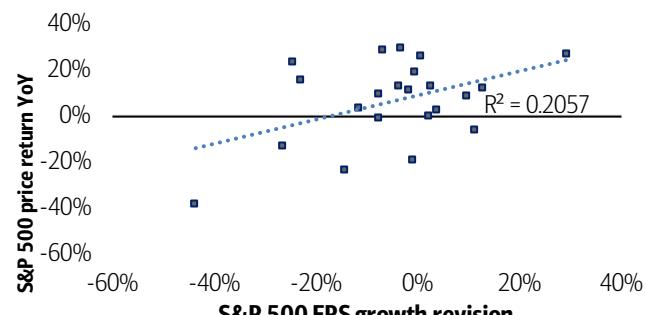


Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 50: ...but are more correlated to growth surprises

S&P 500 annual price return vs. annual EPS growth surprise (2001-22)

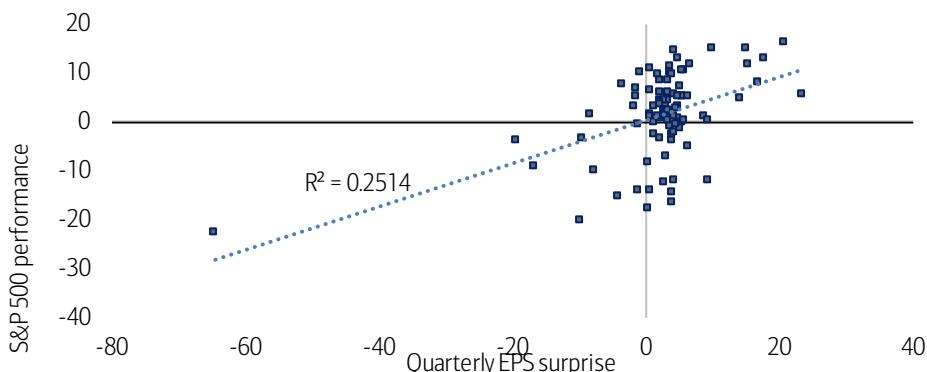


Source: US Equity & Quant Strategy, FactSet

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Exhibit 51: ...as well as quarterly earnings surprises

S&P 500 quarterly price return vs. quarterly EPS surprise (2001-22)

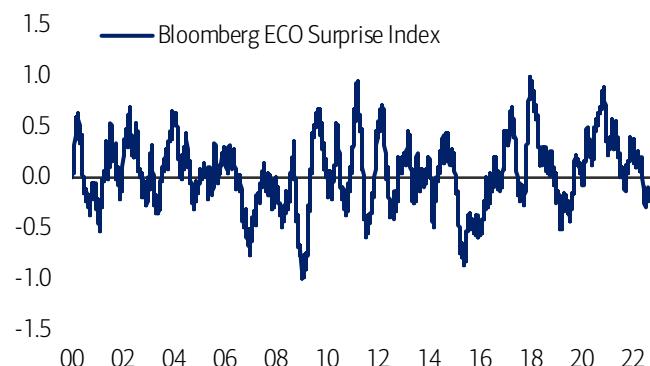


Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 52: More positive surprises in economic data

Bloomberg ECO Surprise Index (2000-present)

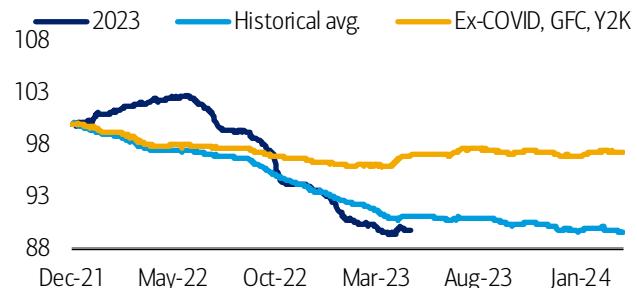


Source: Bloomberg

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Exhibit 53: Consensus 2023 EPS plateauing after sharp decline

S&P 500 historical FY2 EPS revisions vs. 2023 consensus EPS (2023 as of 05/18/23)



Source: BofA US Equity & Quant Strategy, FactSet; Note: historical average based on 2001-2022

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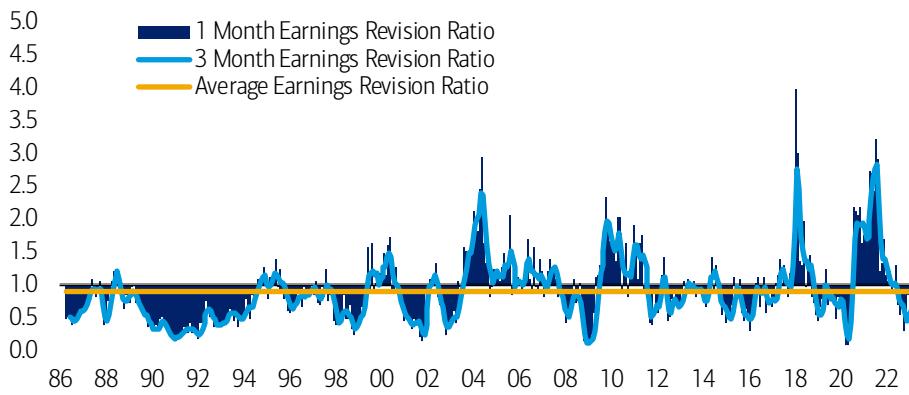


S&P 500 earnings estimate revision ratio

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. The estimate revision ratio can be used as a short-term gauge of sentiment.

Exhibit 54: S&P 500 Earnings Estimate Revision Ratio, 1/1986 - 04/2023

The earnings revision ratio is generally an early indicator of changes in the profits cycle



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

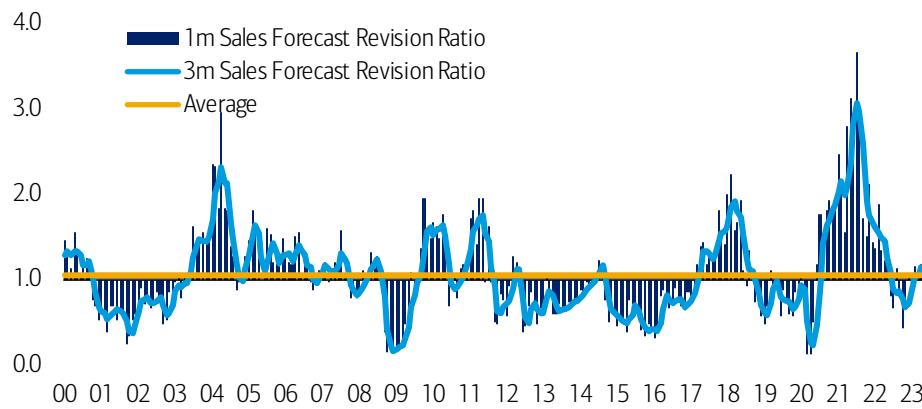
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S&P 500 sales revision ratio

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.

Exhibit 55: 3m Sales Forecast Revisions Ratio has rebounded since Nov. 2022 lows

S&P 500 Sales Forecast Revision Ratio (1/00 – 4/23)



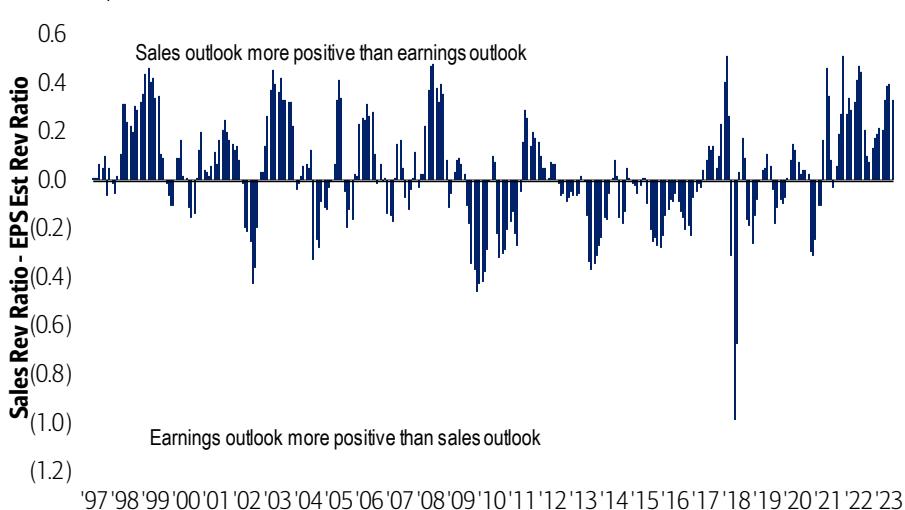
Source: BofA US Equity & Quant Strategy, I/B/E/S

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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 56: Spread: 3-month sales forecast revision ratio vs. 3-month earnings estimate revision ratio

Jan 1997 – April 2023



Source: BofA US Equity & US Quant Strategy

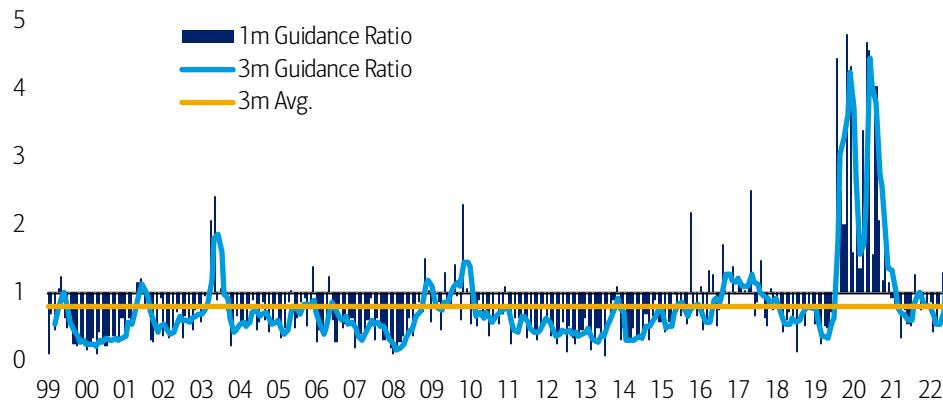
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Management guidance ratio

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 57: S&P 500 Management Guidance Ratio (# Above vs. Below Consensus) – Jan 2000 – April 2023

Guidance ratio is currently above average and has been rising



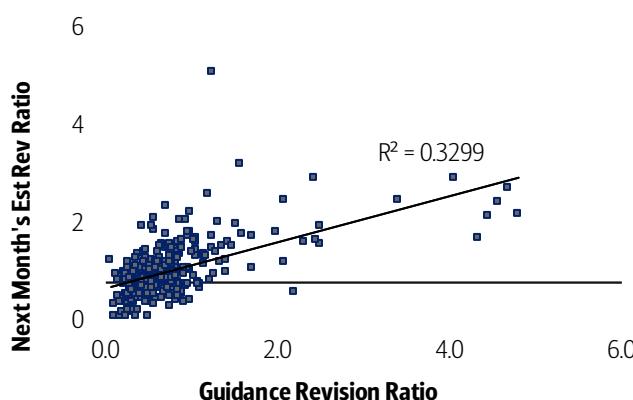
Source: BofA US Equity and Quantitative Strategy

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Exhibit 58: Guidance ratio has historically led the subsequent month's estimate revision ratio....

Guidance Ratio vs. Subsequent Estimate Revision Ratio (2000 to present)



Source: BofA US Equity & Quant Strategy

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Exhibit 59: ...with the relationship back to a high positive correlation after the two had diverged for much of the mid-2010s

Rolling 3yr correlation between guidance ratio and subsequent estimate revision ratio, 2002-present



BofA US Equity & Quant Strategy

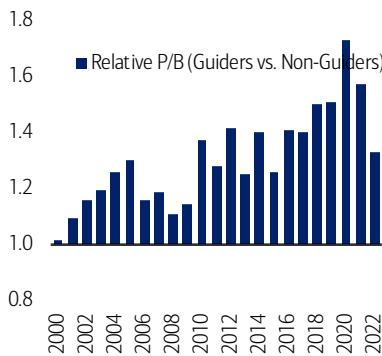
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Evidence of a guidance premium

We have also found some evidence that companies that regularly issue guidance may be rewarded for their apparent transparency. History suggests that beginning in mid-2000, companies that regularly issued profits guidance began to trade at a premium to book value relative 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 60: 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 declined since COVID

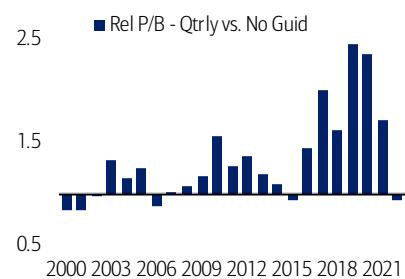


Source: Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 61: 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 declined since COVID

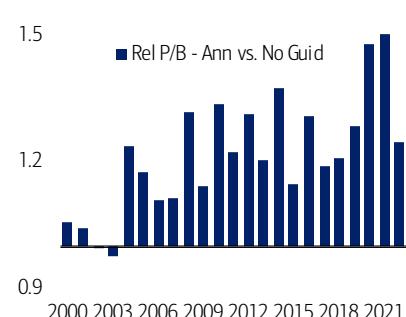


Source: Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 62: Premium (discount) to S&P 500 based on median P/B for companies that issue annual guidance vs those that do not

Premium for annual guidance declined in '22 but has been most consistent than for quarterly guidance

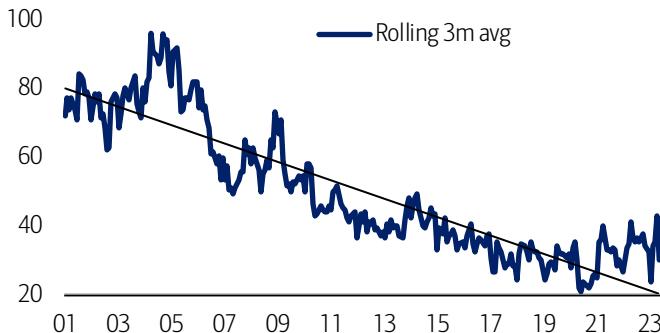


Source: Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 63: S&P 500 quarterly earnings guidance instances

Quarterly EPS guidance have risen since COVID-related lows (Jan 2001 – Apr 2023)

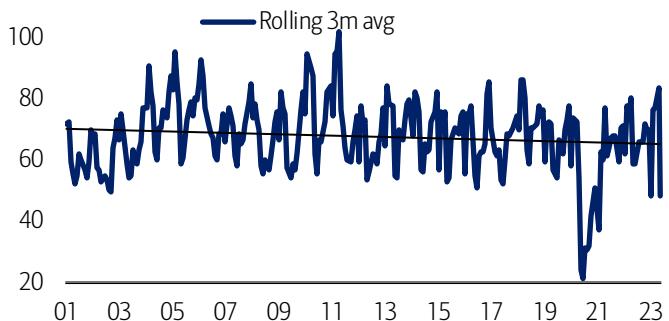


Source: Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 64: S&P 500 annual earnings guidance instances

Annual EPS guidance have risen since COVID-related lows (Jan 2001 – Apr 2023)



Source: Bloomberg, BofA US Equity & Quant Strategy

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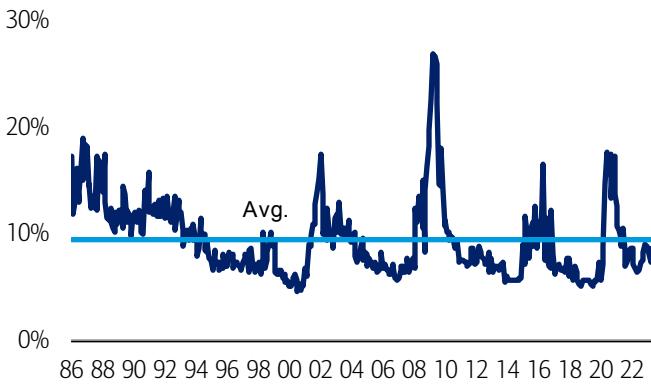
Amid the dearth of guidance during COVID, companies that issued annual outlooks were rewarded with record premiums.

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 65: Average dispersion of FY2 S&P 500 Estimates (Feb 1986 to April 2023)

Average dispersion of estimates has declined below the historic average

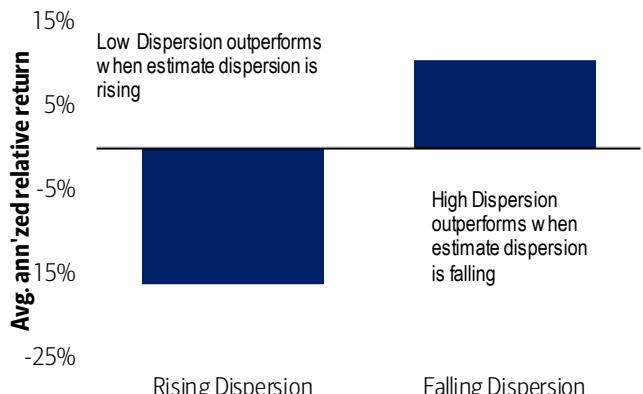


Source: FactSet, US Equity & Quant Strategy

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Exhibit 66: Relative factor performance: High - Low EPS Estimate dispersion (based on 1986 – 2023 performance)

Companies with high estimate dispersion have outperformed when estimate dispersion is falling



Source: FactSet, US Equity & Quant Strategy; FactSet

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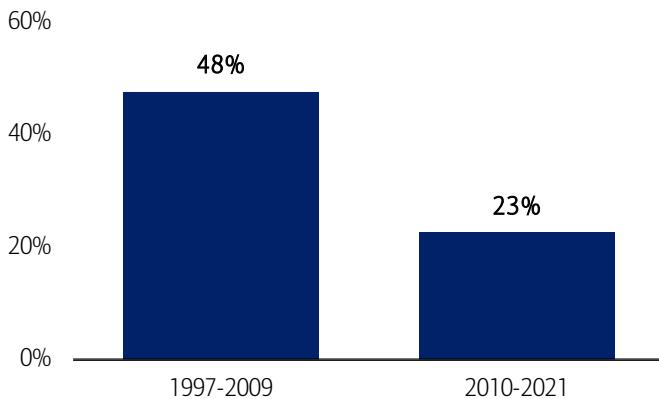
What else has mattered: Central Bank Liquidity

If QE mattered, QT should matter too

Pre-GFC, earnings explained ~50% of S&P 500 returns. Post-GFC, earnings mattered less (23% explanatory power), and Fed balance sheet changes mattered more. Fed liquidity was irrelevant pre-GFC, but drove more than half of non-earnings returns of the S&P 500 post-GFC. NB: the recent strong performance of growth / Tech stocks may be attributable to bank bailout-driven balance sheet expansion in 1Q23.

Exhibit 67: Earnings explained nearly 50% of market returns pre-GFC, but only 23% of post-GFC returns

R-sq of S&P 500 fwd EPS YoY vs. S&P 500 price returns on a monthly basis (5/97-12/21)

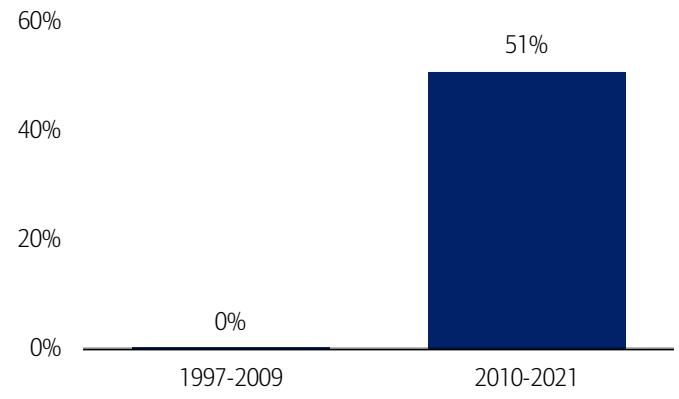


Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 68: Over half of non-earnings driven market cap changes was explained by the Fed balance sheet expansion since GFC

R-sq of Fed balance sheet YoY vs. YoY change in S&P 500 market cap that is not driven by earnings (5/97-12/21)



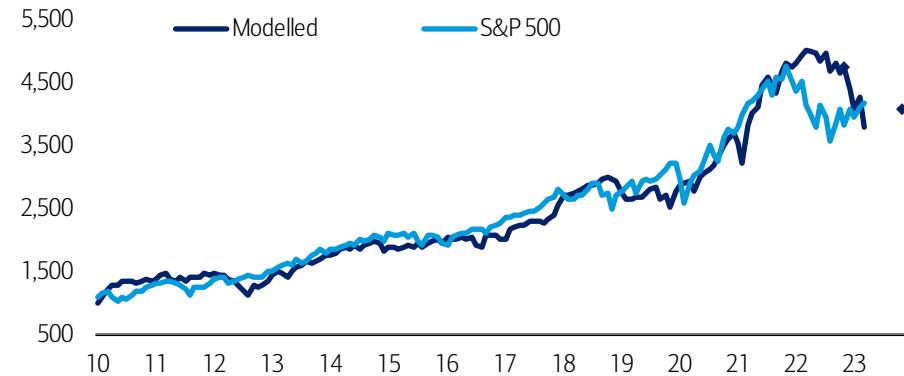
Source: FactSet, BofA US Equity & Quant Strategy

*Non-earnings driven market cap change = [total market cap change] - [historical avg. fwd P/E] x [chg. in fwd EPS]

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Exhibit 69: \$750bn reduction in the Fed balance sheet and trend earnings growth for 2024E EPS could result in the S&P 500 at 4100 in 2023

Modelled S&P 500 based on chg in fwd EPS and YoY chg in Fed balance sheet since 2010 vs. actual S&P 500



Source: BofA US Equity & Quant Strategy, FactSet

Note: 2023 dot assumes \$233 in EPS in 2024 (6% y/y trend earnings growth from consensus 2023 EPS) and BofA Fed balance sheet forecast

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Liquidity risks for the S&P 500

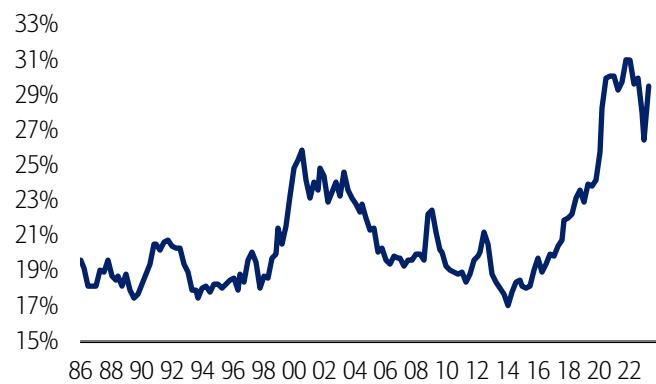
In recent years, we have been highlighting rising liquidity risks for one of the most liquid areas of the market: large cap US equities (the S&P 500). S&P 500 trading volume has grown thinner and thinner, and as a casualty of the momentum- and growth-driven market of recent years, the index has grown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

US stock ownership has eclipsed 50/50 for passive/active (52% of US domiciled funds are passive today), 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 25% today. Private equity AUM (assets under management) continues to rise.

Banks also provide substantially less liquidity today than in prior cycles, with the trading portfolio of large banks half of what it was a decade ago 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 70: S&P 500 increasingly tail-heavy

Market cap of 10 largest S&P 500 companies as a % of total S&P 500 market cap (1986-4/2023)

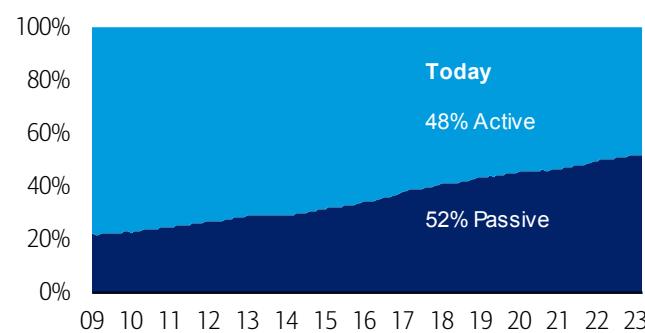


Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 72: Passive now accounts for 52% of all US domiciled fund assets

US domiciled funds: Active vs. passive as a % of AUM, 2009-4/2023

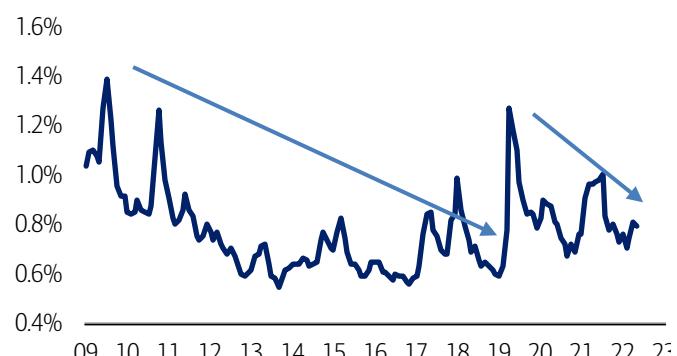


Source: Strategic Insight SimFund, BofA US Equity & Quant Strategy

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Exhibit 71: Prior to COVID, thinner and thinner trading – which has been generally declining again post-COVID

S&P 500 avg. daily trading volume as % of market capitalization (8/2009-4/2023)

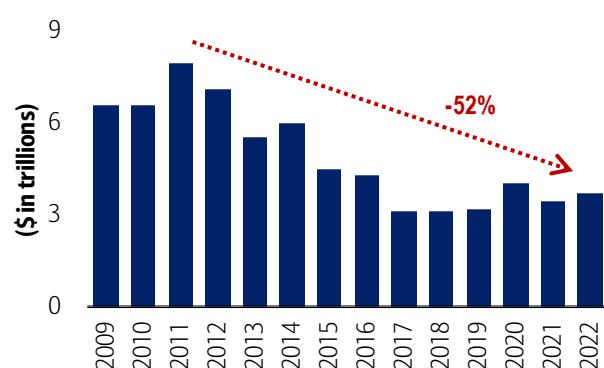


Source: Bloomberg, BofA US Equity & Quant Strategy

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Exhibit 73: 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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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.

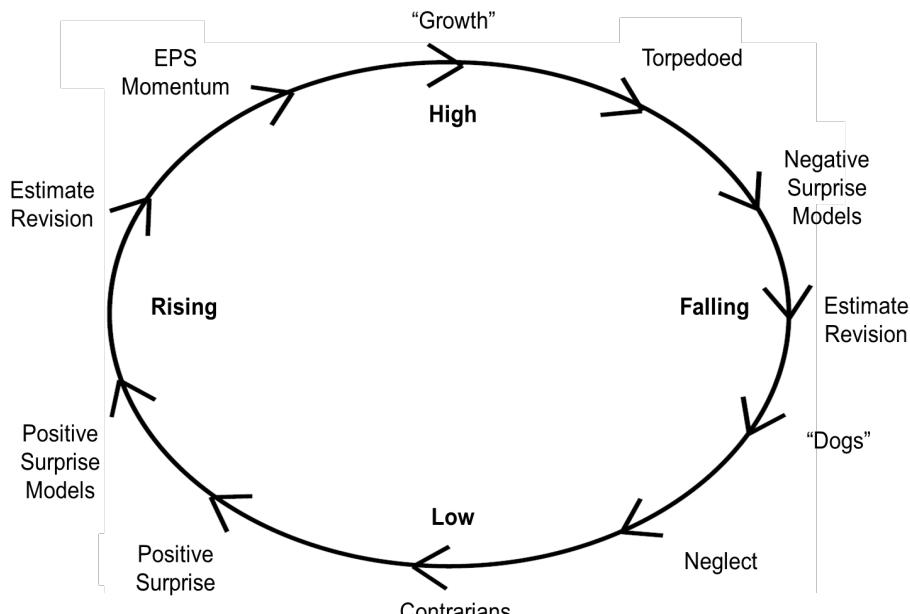
The Earnings Expectation Life Cycle is our proprietary schematic, which portrays investors' changing attitudes towards a stock over time. We believe that a successful investment process should incorporate the notion of changing expectations, because "dogs" often become "stars" and "stars" often become "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 74: 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.



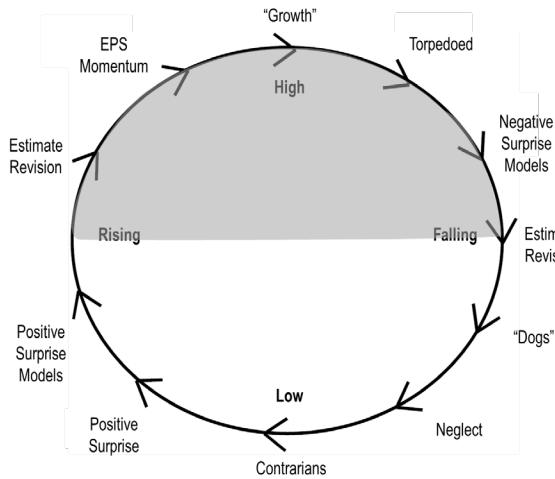
As the diagram below suggests, growth-oriented investment strategies tend to be in the top half of the Life Cycle. The success of these strategies depends on one's ability to realize that a company's earnings momentum is secular and not simply a result of cyclical influences. Thus, the equator of the 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 75: Growth

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

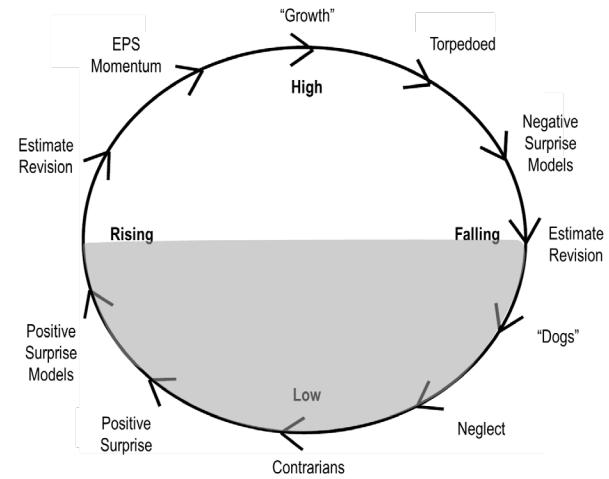


Source: BofA US Equity & Quant Strategy

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Exhibit 76: Value

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

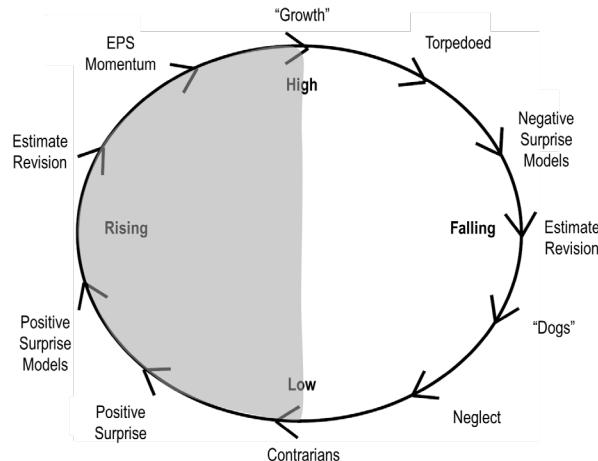


Source: BofA US Equity & Quant Strategy

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Exhibit 77: Rising

The left half of the cycle indicates the period of rising expectations

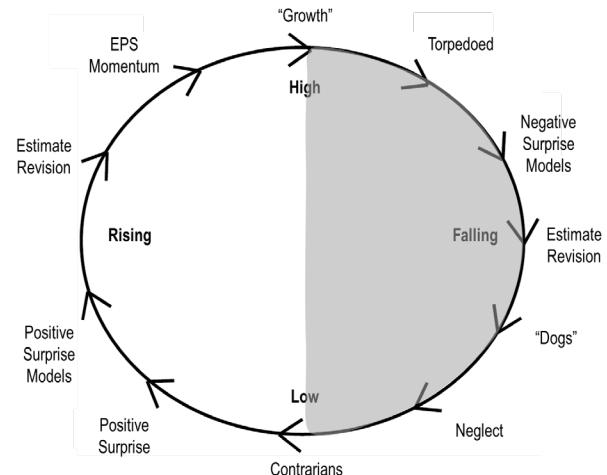


Source: BofA US Equity & Quant Strategy

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Exhibit 78: 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 declined -19.4% in 2022, but the best performing High Dividend Yield factor advanced +3.7%, while 5-yr Debt Adjusted ROE factor declined -27.5%. 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 79: 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 (Exhibit 214) 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.

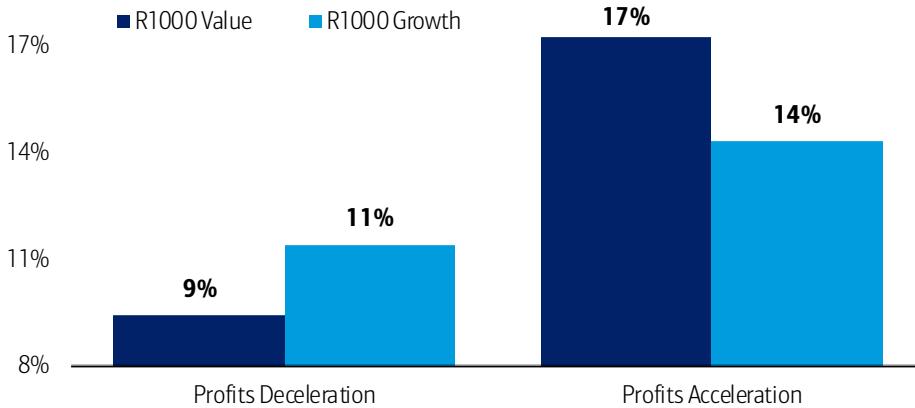
Growth and Value and the Profits Cycle

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 80: Growth vs. Value performance during the profits cycle (1982-present)

Value tends to outperform Growth when profits accelerate



Source: 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 80.

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 Global Financial Crisis and its aftermath led to a period when growth became the scarce resource. On an annual basis, growth has beaten Value in six of the last seven years.

Exhibit 81: Large caps: Relative performance (total return) of Growth vs. Value (1978-present)

Growth has outperformed Value in 2023 so far (12/1978 – 4/2023)



Source: 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), while in 2022, Value led Growth by +22ppt. So far in 2023, Value is trailing Growth by 13ppt. These wider performance spreads follow a period from 2010-2014 when the two benchmarks performed nearly in-line in each year.

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 82).

Exhibit 82: Avg. rel. return of Growth vs. Value in years where Growth outperformed, and avg. rel. return of Value vs. Growth in years where Value Outperformed

Style performance spreads have historically been wider for small caps

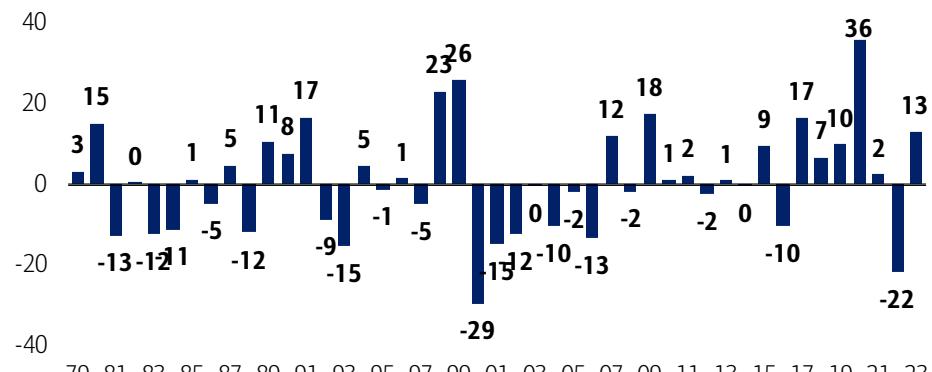
	Russell 1000	Russell 2000
Avg. Growth Outperformance (ppt)	10.0	11.6
Avg. Value Outperformance (ppt)	8.9	13.5

Source: Russell, BofA US Equity & US Quant Strategy

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Exhibit 83: Relative return of the Russell 1000 Growth Index vs. the Russell 1000 Value Index, 1979-2023 YTD

Growth has led Value by 13ppt so far in 2023



Source: Russell, BofA US Equity and Quant Strategy

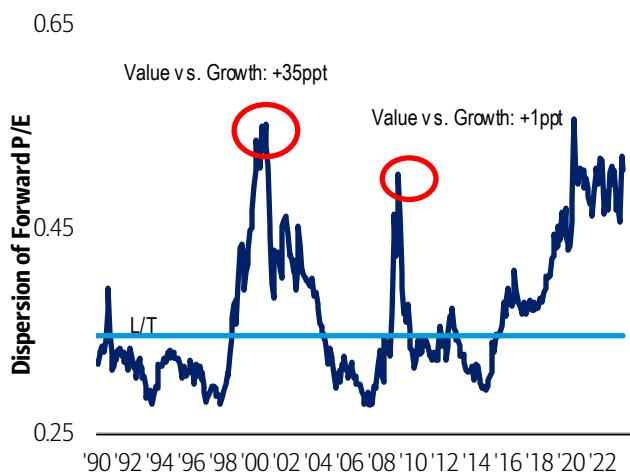
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Value vs. Growth: what's next?

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 84); Value stocks' valuations are historically inexpensive (Exhibit 85); and positioning remains favorable (Exhibit 86, Exhibit 87).

Exhibit 84: Valuations dispersion peaks usually precede Value cycles

S&P 500 valuation dispersion of forward P/E (std. dev / avg, 1990-4/23)

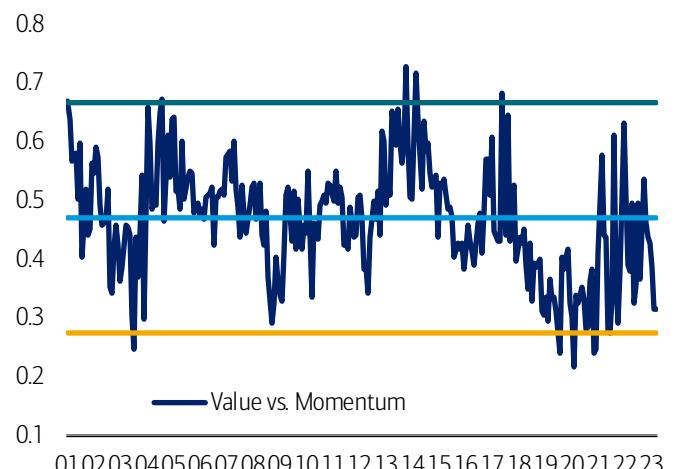


Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 85: 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 – 4/2023



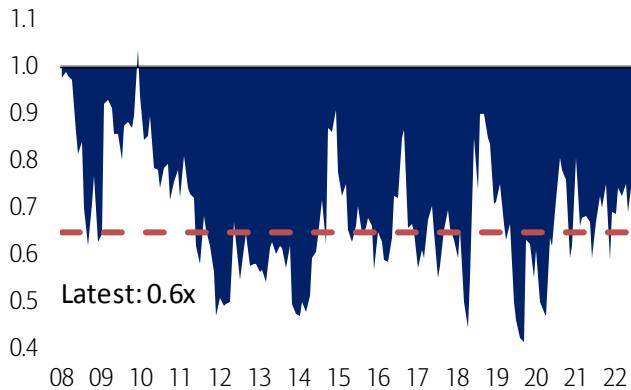
Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 86: Investors are still ~30% underweight Value vs. Growth

Active managers' relative exposure in Low Price to Book vs. High Long-Term EPS Growth (2008-4/23)

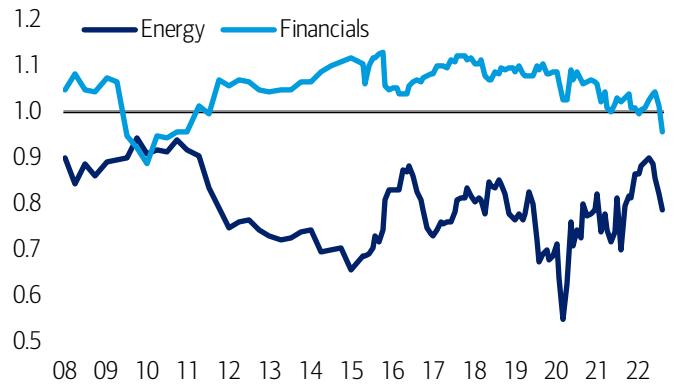


Source: BofA US Equity & Quant Strategy, FactSet Ownership

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Exhibit 87: Financials and Energy are still underweight by investors

Active managers' relative exposure in Energy & Financials vs. S&P 500 (2008-4/23)

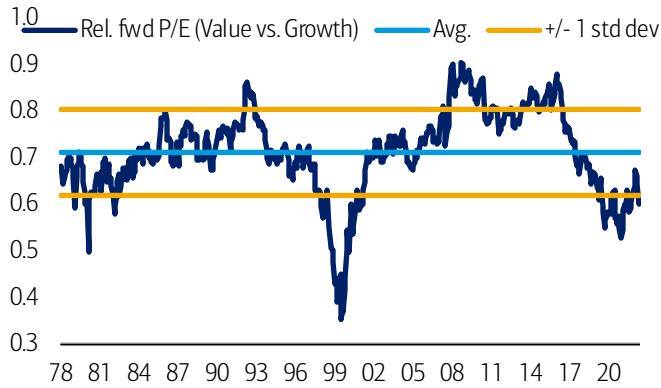


Source: BofA US Equity & Quant Strategy, FactSet Ownership

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Exhibit 88: 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)

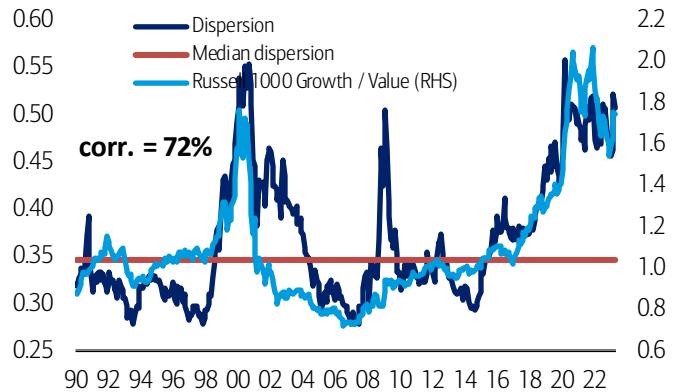


Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 89: Valuations dispersion remains extremely elevated

&P 500 valuation dispersion of forward P/E (std. dev / avg) vs. rel. perf. of Russell 1000 Growth over Value (1990-4/2023)



Source: FactSet, BofA US Equity & Quant Strategy

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Equity duration

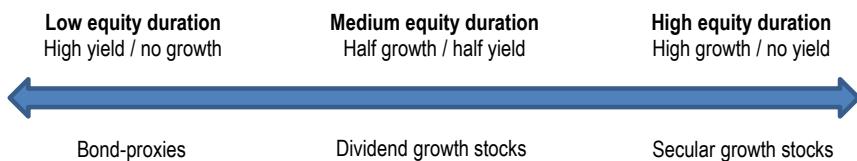
While the Growth and Value benchmarks have not always provided meaningfully differentiated returns, what might be a more important way to differentiate stocks is by equity duration. We have found that since the 2008/09 Global Financial Crisis, both long duration and short duration stocks have grown expensive, 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 90: Equities have duration

Low duration = high yield and no growth, high duration = high growth and no yield



Source: BofA US Equity & Quant Strategy

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Size

We have also examined stock performance according to size, defined by market capitalization. We analyze small- and mid-cap stocks in our Small/Mid Cap Strategy work (led by Jill Hall) 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.

Small Size Screen

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

The Profits Cycle and High Quality vs. Low Quality

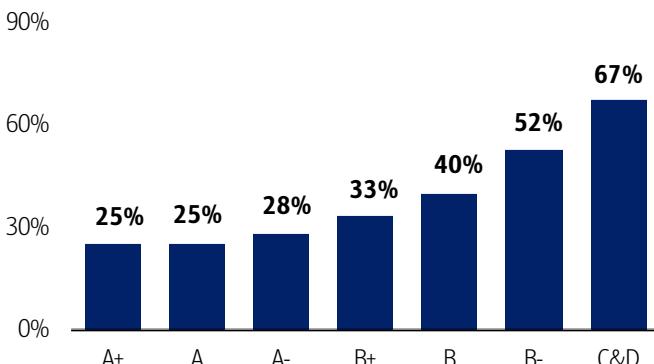
Expansions and contractions in the profits cycle are almost entirely attributable to the cyclical and profitability of lower quality stocks. We define quality using Standard & Poor's quality ranks, essentially a ranking of stocks based on earnings growth stability.

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 issues, and thus tend to outperform.



Exhibit 91: Average Performance by Quality When the Profits Cycle Accelerated (Last Five Cycles, 1986-4/2023)

Low Quality leads when profits accelerate

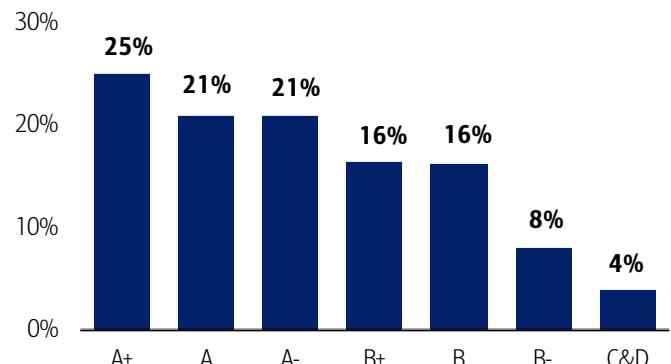


Source: BofA US Equity & Quant Strategy, Standard & Poor's

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Exhibit 92: Average Performance by Quality When the Profits Cycle Decelerated (Last Four Cycles, 1986-4/2023)

High Quality leads when profits decelerate



Source: BofA US Equity & 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 performance.

Volatility

A key driver for risk and quality returns is volatility. Rising volatility typically benefits higher quality, perceived 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 93: 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



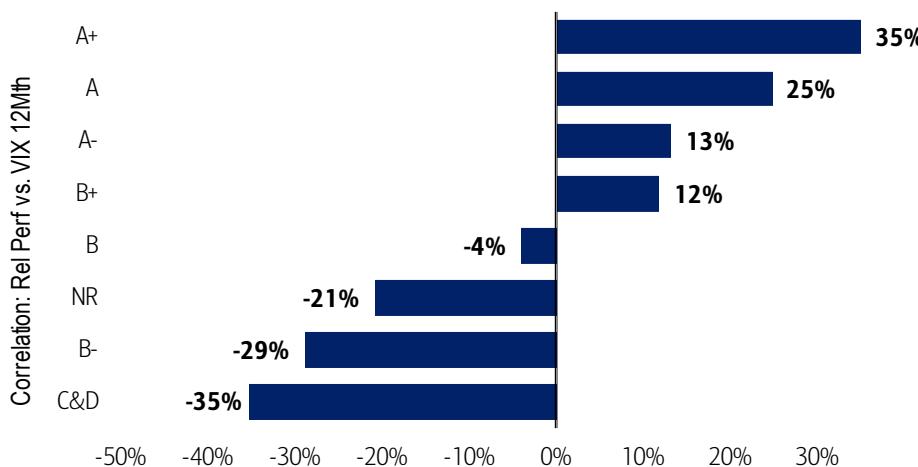
Source: FactSet, Bloomberg, BofA US Equity & Quant Strategy

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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 when volatility is at more "normal levels", fundamental strategies tend to outperform both risk and high quality strategies.

Exhibit 94: BofA Quality Indices 12-Mth Performance Correlation to 12-mth change in CBOE VIX (1986-present)

High Quality tends to outperform when volatility raises



Source: FactSet, BofA US Equity & Quantitative Strategy

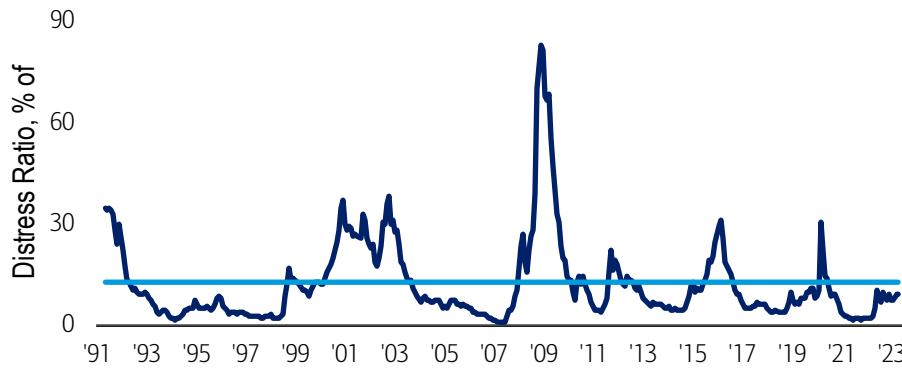
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Distress Ratio

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 95: BofA High Yield Distress Ratio

High Yield Distress Ratio remains below historic average



Source: BofA High Yield Research

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Dividends

Welcome to a total return world

Against a longer-term backdrop of positive but below-average price returns for equities, total returns grow more important. We see multiple reasons (below) why dividends should contribute an increasing share of returns from here. Dividends have contributed 17% of S&P 500 total returns over the past 10 years, but 37% of total returns historically since 1936.



Exhibit 96: S&P 500 price return and dividend contributions to total return, 1936 – present

Dividends have contributed 37% of total returns since 1936 but just 17% since 2010



Source: FactSet, BofA US Equity & Quant Strategy

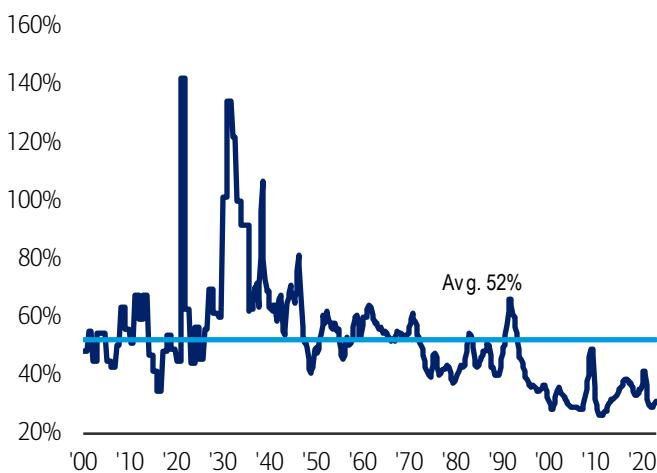
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Dividend Yield has scarcity value; room to raise payouts

The S&P 500 dividend payout ratio is bumping along near a record low after two years during which dividend growth dramatically lagged earnings growth (Exhibit 97)

Exhibit 97: Room to raise dividends

S&P 500 dividend payout ratio 1900-1Q2023

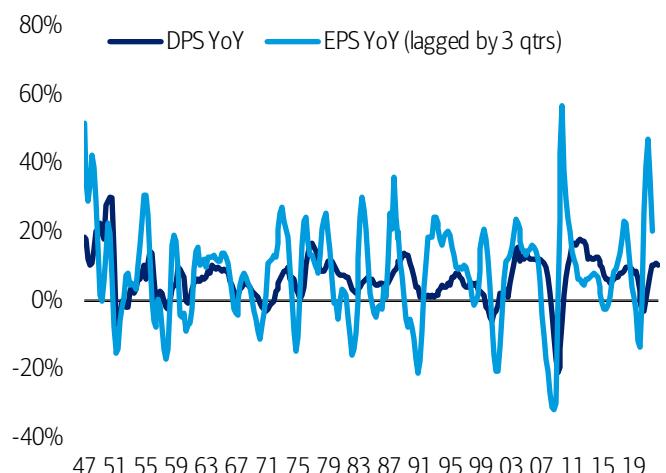


Source: Haver Analytics/S&P, FactSet, BofA US Equity & US Quant Strategy

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Exhibit 98: DPS growth lagged EPS by >40ppt; expect some catch up

S&P 500 TTM div. per share vs. EPS YoY with a 3-qtr lag (1945-present)



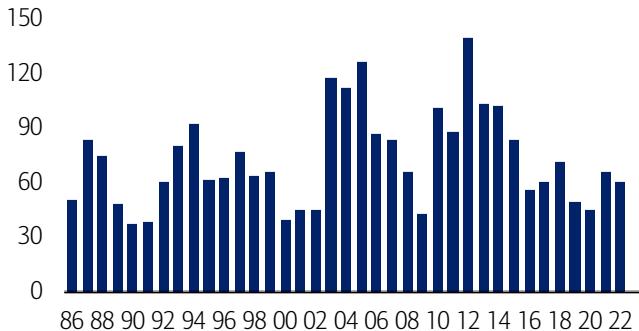
Source: BofA US Equity & Quant Strategy, FactSet, Haver Analytics

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Exhibit 99: New dividends have scarcity value

The number of Russell 3000 companies initiating dividends 1986-2022



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

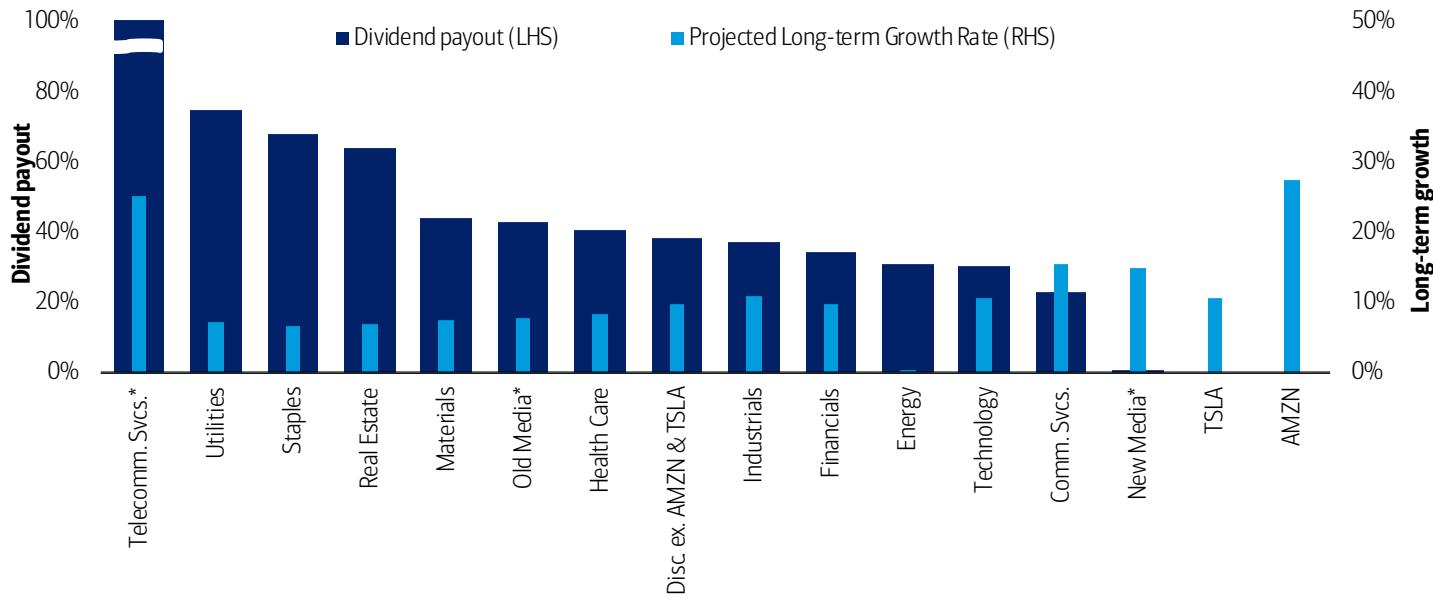
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Short duration leads amid rising interest rates

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 100: Rising rates hit short and long duration stocks but New Media morphing from long duration to cash return (e.g., META buyback)

S&P 500 dividend payout ratios and projected long-term growth rates as of 4/2023



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 101: Equity duration of the S&P 500 is currently 35 years, near record highs

S&P 500 equity duration 2001-4/30/23



Source: FactSet, BofA US Equity & Quant Strategy

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Dividends = inflation-protected yield

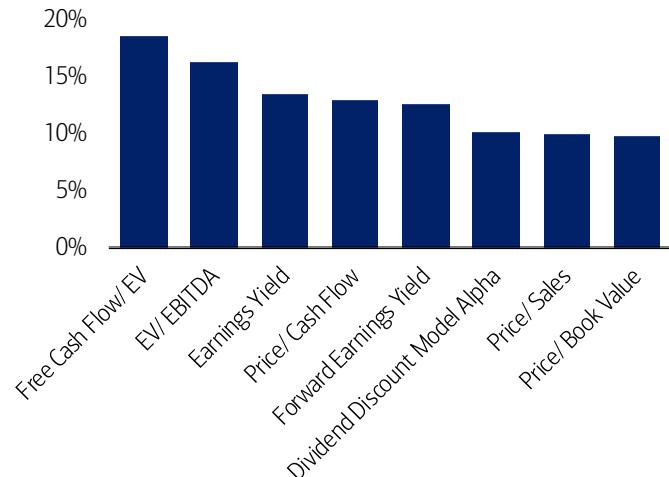
Earnings are nominal. Sectors that are positively correlated to inflation, with growing yields, may be the best option in an environment of still scarce yield and inflation risks.

Cash is king in tightening environments

As short-term rates have continued to increase, the opportunity cost for stocks vs. cash has reversed from prior years, and bird-in-the-hand stocks will likely continue to lead. Free cash flow based valuation factors and our Dividend Discount Model alpha factor have also historically outperformed in “Downturn” regimes of our US Regime Indicator.

Exhibit 102: High Free Cash Flow to EV was best performing Value factor before the GFC

Factor performance May 1986 – December 2007

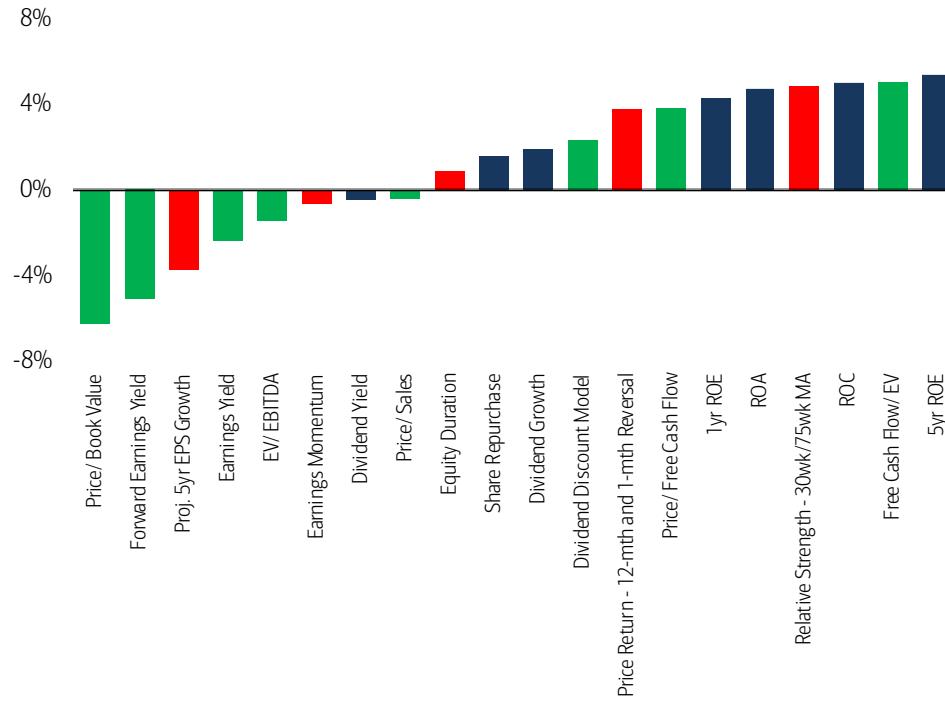


Source: BofA US Equity & US Quant Strategy

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Exhibit 103: Downturn: Growth lags, Value mixed; Cash (ex. Div. Yield) & Quality wins

Top Decile S&P 500 avg. rel. perf. during Downturn regimes



Source: BofA US Equity & US Quant Strategy
(Green = value, red = growth, blue = cash & quality)

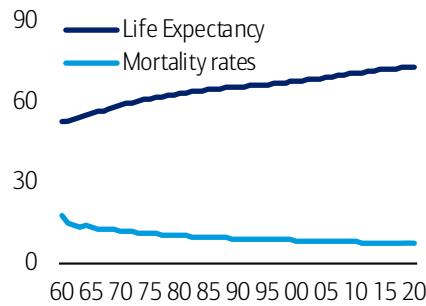
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Demand backdrop skews to income over capital appreciation

Aging demographics and a rising share of actively managed money in income funds suggest dividends are likely to continue to matter.

Exhibit 104: Demographics suggest demand for income will accelerate from here

Life expectancy vs mortality rates, 1960-2021

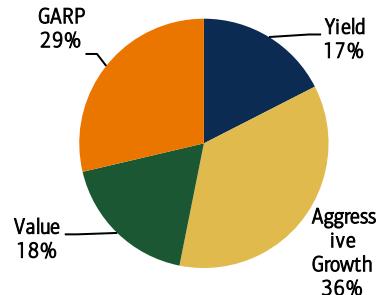


Source: World Bank

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Exhibit 105: Income funds have grown from less than 20% of active AUM in 2010...

Active equity AUM landscape by fund category – Aug 2010

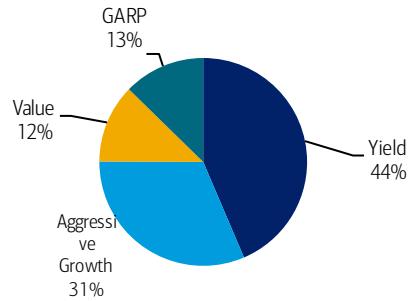


Source: BofA US Equity & US Quant Strategy, FactSet Ownership

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Exhibit 106: ...To over 40% of active funds today

Active equity AUM landscape by fund category – present



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

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Quintile 2: highest dividends aren't always best

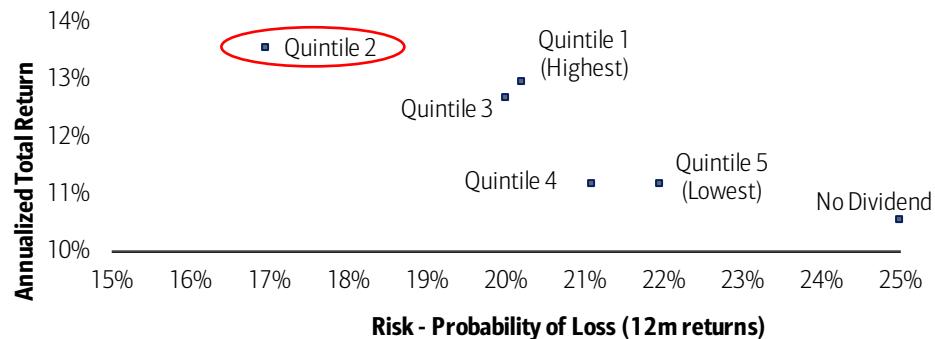
Since 1984, the second quintile (Quintile 2) of the Russell 1000 by trailing dividend yield has exhibited the highest total return and lowest probability of loss (% of negative 12-month returns) of all other dividend quintiles including non-dividend-payers.



Quintile 2 may be a good first-pass screen at seeking out companies with above-market and secure but not stretched dividend yields: it guards against owning distressed companies that migrate into Quintile 1 (highest dividend quintile) if prices fall ahead of potential dividend cuts. It also incorporates a “buy low, sell high” valuation discipline in that if prices rise faster than dividends grow, companies will migrate into Quintile 3.

Exhibit 107: Highest isn't always best

Ann. total return vs. loss risk of Russell 1000 trailing 12m dividend yield quintiles and no yield basket – monthly rebalance (1/31/84-4/30/23)



Source: Note: Performance in the above exhibit is based on back-tested results from 1/31/84 through 9/28/10 and actual performance from 9/28/10 to present. And does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. Disclaimer: The screen identified as Quintile 2 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 relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This screen was not created to act as a benchmark.

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

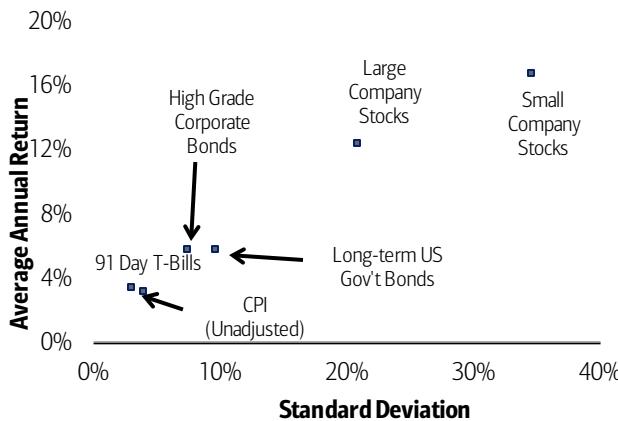
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Measuring risk

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 108: Risk Reward Characteristics (1925 to April 2023)

Small Caps delivered highest returns, but at the highest volatility level...

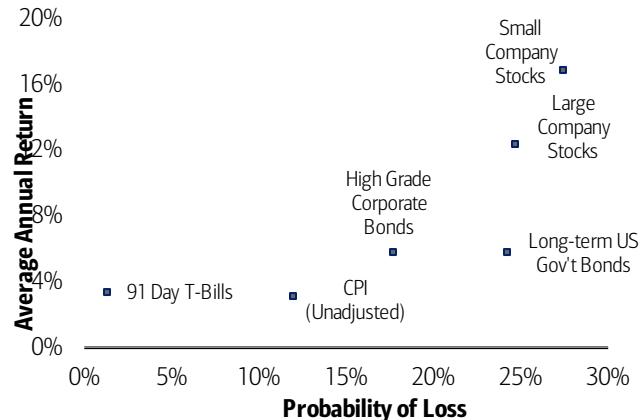


Source: BofA US Equity & Quant Strategy

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Exhibit 109: Downside Risk Reward Characteristics (1925 to April 2023)

...and the highest probability of loss



Source: BofA US Equity & 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 Global Financial Crisis, every risk strategy we follow underperformed its benchmark. For Russell 1000 factor sensitivity, please see the Appendix.



Exhibit 110: 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
Most Active	16.3%	6.0%	0.63	0.44	20.2%	32.1%	22.0%	-62.1%	16.2%
Price/ Free Cash Flow	15.8%	5.2%	0.62	0.51	21.1%	32.1%	21.9%	-62.7%	16.5%
EV/ EBITDA	15.1%	4.5%	0.58	0.39	20.2%	33.5%	22.4%	-59.2%	17.1%
Free Cash Flow / EV	14.9%	3.7%	0.61	0.41	19.7%	34.2%	19.8%	-58.6%	14.6%
Price Return - 12-mth and 1-mth Reversal	14.1%	2.4%	0.59	0.21	15.4%	33.9%	18.8%	-56.7%	15.4%
5yr ROE Adj	14.0%	2.1%	0.60	0.24	16.7%	42.2%	18.0%	-44.3%	13.2%
Share Repurchase	13.9%	2.2%	0.59	0.35	20.0%	39.7%	18.2%	-50.5%	14.7%
Price/ Sales	13.9%	4.4%	0.49	0.25	23.9%	38.3%	24.7%	-69.9%	18.2%
1yr ROE Adj	13.9%	2.0%	0.60	0.21	20.4%	39.9%	17.6%	-50.1%	12.6%
Short Interest	13.8%	2.4%	0.67	0.46	15.2%	36.1%	16.7%	-47.1%	12.6%
1yr ROE	13.8%	1.6%	0.62	0.23	16.3%	38.5%	16.8%	-46.1%	12.4%
Price Return - 9-mth Perf.	13.5%	2.5%	0.55	0.09	19.0%	38.8%	19.4%	-54.1%	14.2%
ROC	13.5%	1.4%	0.59	0.16	21.1%	41.3%	17.1%	-47.3%	12.3%
Earnings Yield	13.4%	3.3%	0.50	0.27	22.7%	42.0%	22.4%	-69.4%	17.4%
5y ROE	13.4%	1.4%	0.59	0.18	17.2%	40.8%	17.0%	-43.7%	12.5%
P/E-to-Growth	13.3%	2.7%	0.48	0.23	26.6%	39.0%	23.6%	-68.0%	17.5%
Forward Earnings Yield	13.2%	3.9%	0.47	0.19	25.5%	41.5%	24.9%	-74.9%	19.0%
Price Return - 11-mth Perf.	13.2%	2.2%	0.52	0.08	22.2%	41.1%	19.9%	-56.5%	15.0%
ROA	13.1%	1.2%	0.55	0.12	21.8%	47.7%	18.1%	-49.8%	12.8%
Price Return - 12-mth Perf.	13.1%	2.0%	0.53	0.05	20.4%	41.3%	19.2%	-53.7%	14.3%
Relative Strength - 10wk/40wk MA	12.7%	1.7%	0.51	0.03	20.2%	44.0%	18.8%	-56.2%	13.5%
Price/ Cash Flow	12.6%	2.2%	0.46	0.14	24.3%	38.8%	23.5%	-60.7%	18.4%
Relative Strength - 30wk/75wk MA	12.5%	1.7%	0.48	0.03	22.9%	46.3%	20.7%	-59.5%	16.1%
Relative Strength - 5wk/30wk MA	12.4%	1.1%	0.51	0.00	18.3%	47.0%	18.1%	-49.2%	12.7%
Dividend Growth	12.3%	0.6%	0.50	0.10	21.8%	45.4%	18.5%	-55.0%	14.1%
Dividend Yield	12.2%	2.2%	0.45	0.03	21.8%	48.4%	21.4%	-78.1%	17.1%
Price to Moving Average (200 day)	12.0%	0.7%	0.49	-0.03	19.7%	50.2%	17.9%	-51.2%	13.0%
EPS Estimate Revisions	12.0%	1.2%	0.46	0.04	24.5%	43.6%	20.5%	-60.9%	15.7%
Eq. Wtd. S&P 500	11.8%	na	0.49	na	19.5%	na	17.3%	-55.7%	13.5%
Size	11.7%	2.0%	0.40	0.09	28.7%	48.4%	26.3%	-68.4%	18.8%
Low Price	11.7%	3.1%	0.39	0.09	27.5%	49.8%	28.9%	-68.5%	20.1%
Price Return - 3-mth Perf.	11.6%	0.4%	0.46	-0.05	22.2%	49.8%	18.4%	-56.2%	13.1%
Neglect - Analyst Coverage	11.4%	0.0%	0.44	-0.02	22.9%	53.0%	19.4%	-63.1%	15.9%
Price Return - 12-mth and 1-mth Performance	11.4%	-0.3%	0.47	-0.09	21.8%	52.3%	17.3%	-52.6%	12.9%
Price/ Book Value	11.3%	2.8%	0.39	0.05	27.3%	43.6%	26.5%	-82.4%	19.9%
Earnings Torpedo	11.3%	0.9%	0.40	0.00	23.6%	50.7%	22.7%	-65.7%	15.9%
Earning Momentum	10.7%	-0.6%	0.41	-0.13	24.5%	56.4%	19.2%	-59.7%	14.9%
Beta	9.8%	1.9%	0.33	0.00	32.6%	54.1%	31.2%	-81.0%	22.3%
Proj. 5yr EPS Growth	9.7%	0.1%	0.33	-0.08	26.1%	56.9%	25.5%	-82.0%	19.2%
Variability of Earnings	9.1%	-1.5%	0.31	-0.24	27.8%	56.7%	22.0%	-64.8%	16.5%
Estimate Dispersion	8.3%	-0.7%	0.27	-0.12	30.3%	54.6%	28.4%	-75.0%	19.9%
Neglect - Institutional Ownership	8.0%	-1.7%	0.35	-0.22	25.5%	69.7%	17.2%	-57.9%	13.5%

Source: BofA US Equity & Quant Strategy

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Macro matters

Exhibit 111: S&P 500 factors: Correlation vs. macro factors

1986-present

Factor	Interest Rates			Currency	Inflatio	Commodity	Market Volatility	Corporate Profits	Credit Quality
	10yr Tsy Nominal Yld	10yr Tsy Real Yield	2s10s Tsy curve		n	Prices			
Earnings Yield	0.30	0.03	0.08	-0.05	0.07	0.11	0.34	-0.47	-0.12
Forward Earnings Yield	0.41	0.16	0.11	-0.12	0.04	0.09	0.30	-0.46	-0.09
Dividend Yield	0.02	-0.23	0.16	-0.10	0.05	0.15	0.30	-0.33	-0.05
Price/ Book Value	0.44	0.09	0.14	-0.18	0.03	0.22	0.31	-0.53	-0.09
Price/ Cash Flow	0.42	0.15	0.00	-0.31	0.22	0.25	0.37	-0.32	0.06
Price/ Free Cash Flow	0.07	-0.07	0.25	-0.15	0.05	0.00	0.34	-0.27	-0.14
Price/ Sales	0.30	-0.03	0.18	-0.16	-0.19	0.08	0.22	-0.33	-0.28
EV/ EBITDA	0.39	0.21	0.02	-0.28	0.25	0.24	0.39	-0.32	-0.01
Free Cash Flow/ EV	-0.04	-0.06	0.18	0.05	-0.03	-0.14	0.30	-0.07	-0.18
Rel. Strength - 30wk/75wk MA	0.20	0.22	-0.35	0.02	0.12	0.16	0.46	0.06	0.14
Rel. Strength - 5wk/30wk MA	0.26	0.24	-0.16	0.06	0.11	0.34	0.46	0.08	0.16
Rel. Strength - 10wk/40wk MA	0.22	0.24	-0.24	0.05	0.04	0.25	0.50	0.10	0.22
Price to MA (200 day)	0.19	0.23	-0.18	0.12	0.07	0.23	0.43	0.18	0.12
Price Return - 12-mth Perf.	0.15	0.24	-0.30	0.13	0.08	0.12	0.48	0.10	0.14
Price Return - 9-mth Perf.	0.20	0.26	-0.29	0.06	0.07	0.18	0.47	0.11	0.20
Price Return - 3-mth Perf.	0.33	0.21	-0.12	-0.02	0.09	0.31	0.39	0.02	0.06
Price Return - 11-mth Perf.	0.16	0.21	-0.30	0.08	0.08	0.14	0.49	0.08	0.13
Price Return - 12-mth and 1-mth	0.08	0.18	-0.19	0.19	0.07	0.09	0.37	0.18	0.07
Price Ret. - 12-m + 1-m Reversal	0.01	0.17	-0.30	0.07	0.02	-0.07	0.51	0.13	0.27
Most Active	0.44	0.22	-0.05	-0.16	0.05	0.30	0.37	-0.21	-0.12
Low Price	0.37	0.06	0.26	-0.18	-0.08	0.17	0.25	-0.40	-0.16
Earning Momentum	0.42	0.35	-0.31	-0.14	0.09	0.15	0.41	-0.07	0.16
Proj. 5yr EPS Growth	0.41	0.22	-0.19	-0.19	0.04	0.31	0.36	-0.08	0.12
Earnings Torpedo	0.25	-0.07	0.07	-0.19	-0.07	0.21	0.22	-0.29	-0.14
EPS Estimate Revisions	0.54	0.39	-0.33	-0.13	0.32	0.41	0.51	-0.12	0.24
Dividend Growth	-0.02	-0.10	-0.11	-0.16	0.28	0.15	0.34	-0.06	0.14
P/E-to-Growth	0.40	0.14	0.05	-0.04	0.11	0.13	0.34	-0.36	0.03
1yr ROE	-0.41	-0.10	0.06	0.04	0.07	-0.15	0.32	0.39	-0.12
5y ROE	-0.34	-0.08	0.03	0.17	-0.07	-0.12	0.32	0.33	-0.02
1yr ROE Adj	-0.12	-0.03	-0.03	-0.09	0.08	-0.01	0.29	0.30	-0.06
5yr ROE Adj	-0.09	-0.02	0.05	0.01	-0.03	0.00	0.28	0.23	-0.10
ROA	-0.04	-0.02	-0.06	-0.04	0.05	0.10	0.31	0.27	-0.06
ROC	-0.20	-0.07	-0.04	-0.04	0.04	-0.03	0.30	0.31	-0.06
Beta	0.52	0.15	0.00	-0.22	0.01	0.36	0.32	-0.36	-0.08
Variability of Earnings	0.46	0.17	0.00	-0.33	0.08	0.25	0.33	-0.35	0.01
Estimate Dispersion	0.53	0.12	0.03	-0.32	0.06	0.43	0.37	-0.44	0.00
Neglect - Analyst Coverage	-0.07	-0.14	-0.08	-0.09	-0.10	-0.07	0.37	-0.12	0.21
Neglect - Institutional Ownership	-0.54	-0.41	0.37	0.12	-0.11	-0.26	0.37	0.18	0.00
Size	0.31	-0.03	0.25	-0.22	-0.11	0.18	0.24	-0.38	-0.20
Share Repurchase	-0.04	0.06	0.29	0.01	0.14	0.03	0.37	-0.03	-0.03
Short Interest	-0.18	-0.07	0.43	-0.07	-0.08	-0.08	0.41	0.10	-0.25

Source: BofA US Equity & Quant Strategy

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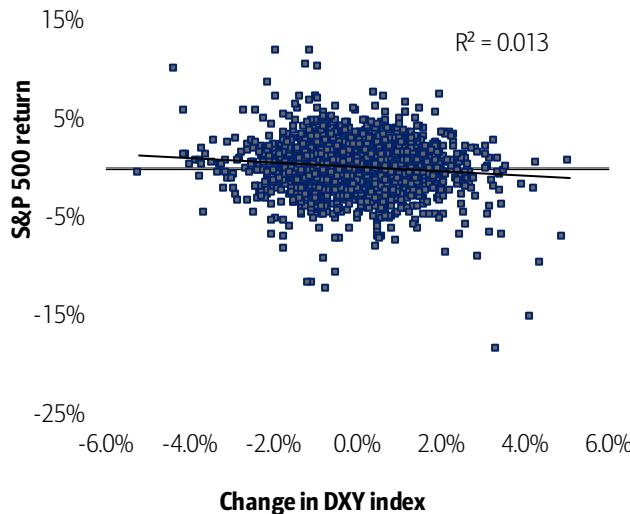


Macro focus: the US Dollar impact

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 20 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 112: 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

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 five 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 113).

Exhibit 113: Performance based on size segment has been inconsistent in secular uptrends for the USD

Dollar strength cycles and small vs. large cap performance, 1978- 9/30/22

	10/78- 3/85	6/95-2/02	6/14-12/16	1/18-3/20	5/21 – 9/22
Small Caps	296.1	64.8	13.8	-26.8	-26.6
Large Caps	159.8	103.2	14.2	-8.5	-14.7
Rel Performance (Small vs Large)	52.5	-18.9	-0.4	-20.0	-14.0

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.

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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

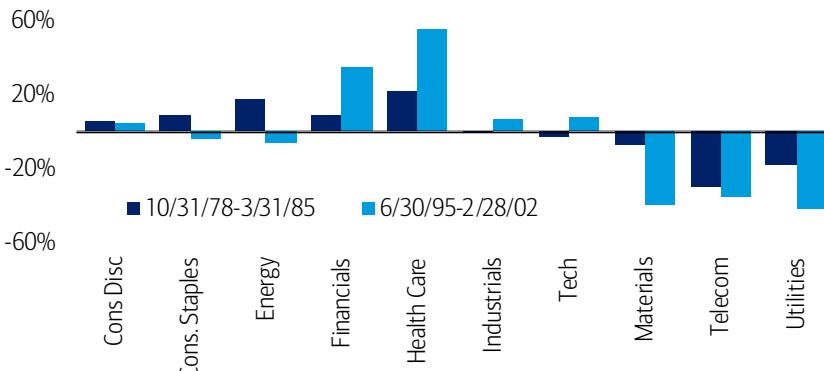
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At the sector level, in the two major periods of secular dollar strength (1978-85 and 1995-2002), Financials outperformed and Materials underperformed the S&P 500 in both periods, which we also found to be true for small caps. We also saw outperformance 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 114: 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



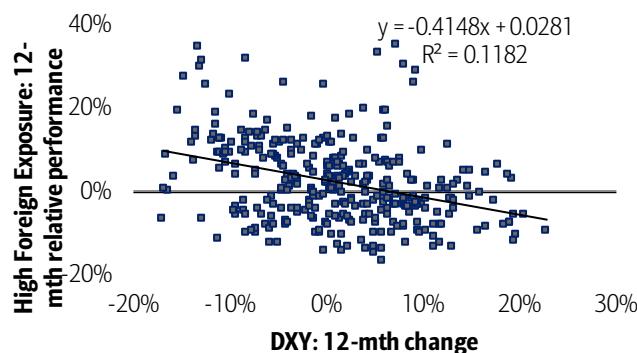
Source: S&P, FactSet, Bloomberg, BofA US Equity & Quant Strategy

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There has been a weak historical negative relationship between foreign-exposed stocks and strong dollar backdrops and a slightly stronger relationship between more domestically oriented stocks and strong dollar backdrops. 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 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 115: High Foreign exposure performance vs. USD (based on 1995 – present performance)

Weak relationship between high foreign exposed stocks' relative performance vs. changes in the USD

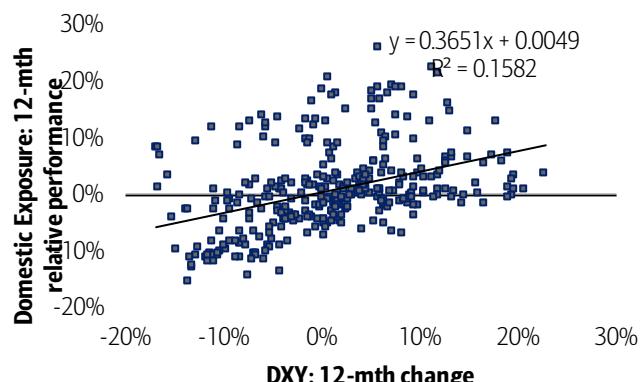


Source: Bloomberg, BofA US Equity and Quant Strategy

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Exhibit 116: Domestic exposure performance vs. USD (Based on 1995 – present performance)

Slightly stronger (positive) relationship between changes in the USD and relative performance of domestically-oriented stocks



Source: Bloomberg, BofA US Equity and Quant Strategy

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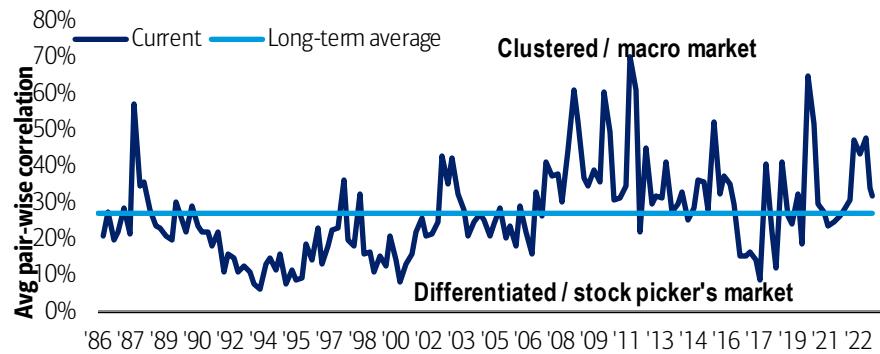
Roadmap to picking stocks

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 117: Correlations remain above historical average

Correlations declined below historical average



Source: BofA US Equity & Quantitative Strategy

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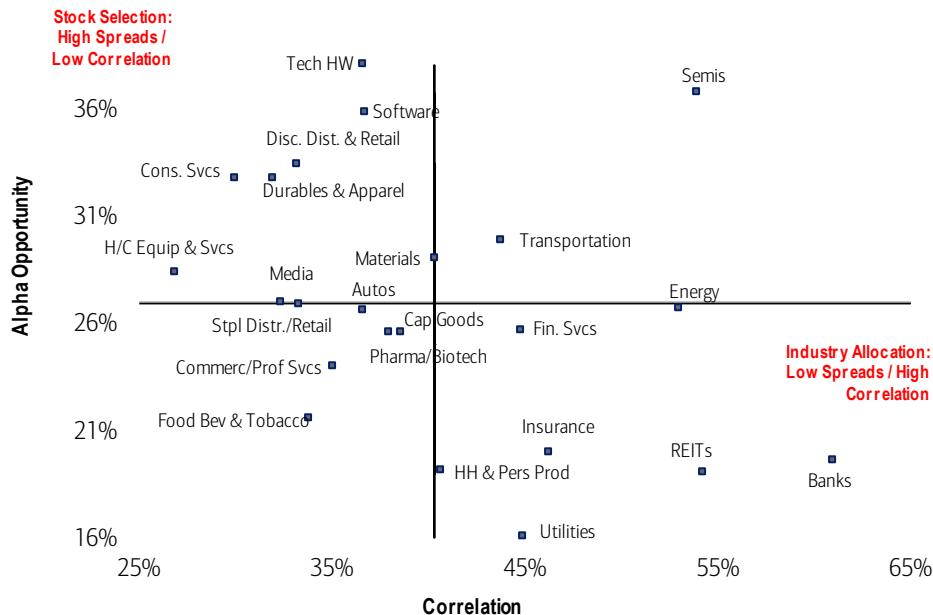
Stock selection within sectors

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 118: Historical Intra-stock correlation vs. performance spread (3Q86 to 1Q23)

Tech Hardware and Software are among best industries for stock selection



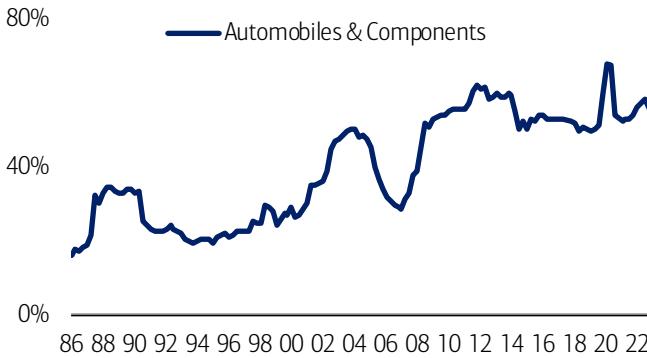
Source: BofA US Equity & US Quant Strategy

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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 119: Automobiles & Components

Correlations declined, but remain elevated

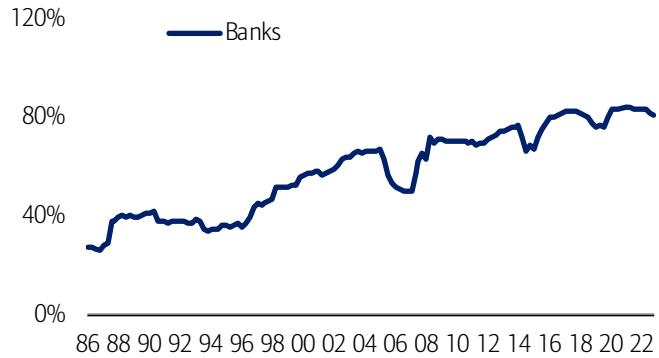


Source: BofA US Equity & Quant Strategy

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Exhibit 120: Banks

Correlations remain near historic highs



Source: BofA US Equity & Quant Strategy

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Exhibit 121: Capital Goods

Correlations remain elevated

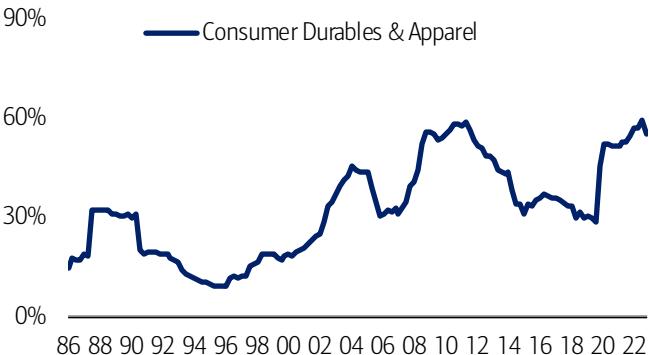


Source: BofA US Equity & Quant Strategy

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Exhibit 123: Consumer Durables & Apparel

Correlations remain elevated

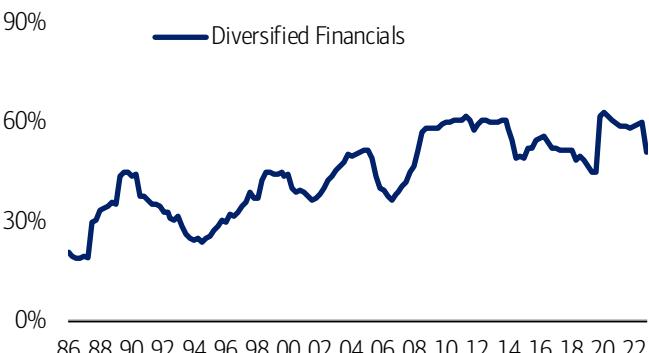


Source: BofA US Equity & Quant Strategy

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Exhibit 125: Diversified Financials

Correlations have edged lower in recent months

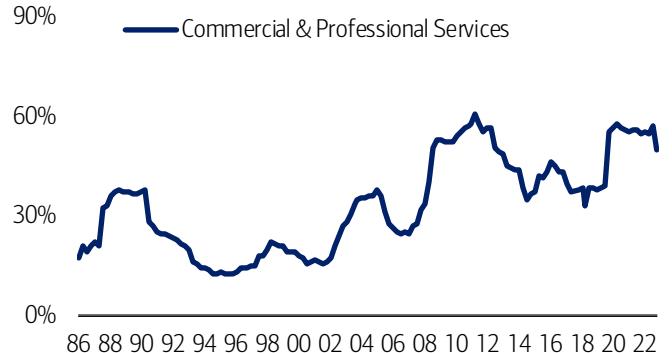


Source: BofA US Equity & Quant Strategy

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Exhibit 122: Commercial & Professional Services

Correlations remain elevated

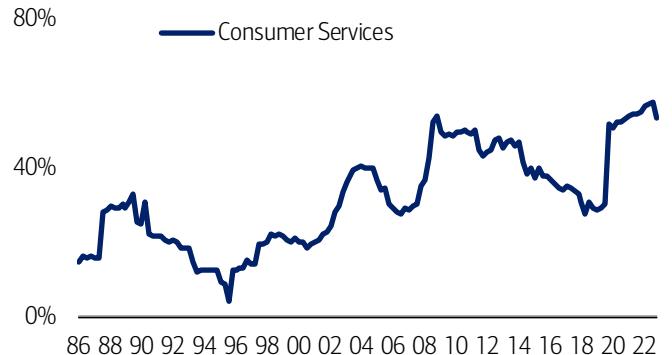


Source: BofA US Equity & Quant Strategy

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Exhibit 124: Consumer Services

Correlations remain elevated

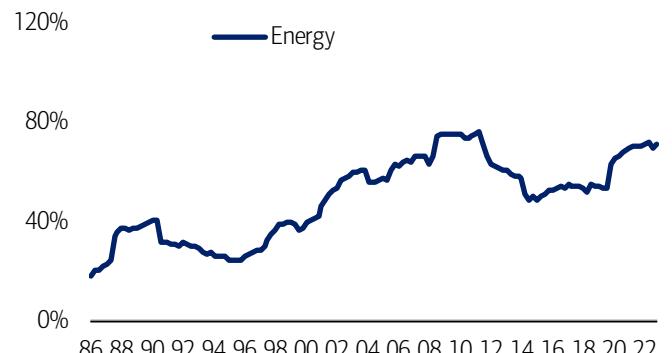


Source: BofA US Equity & Quant Strategy

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Exhibit 126: Energy

Correlations remain elevated



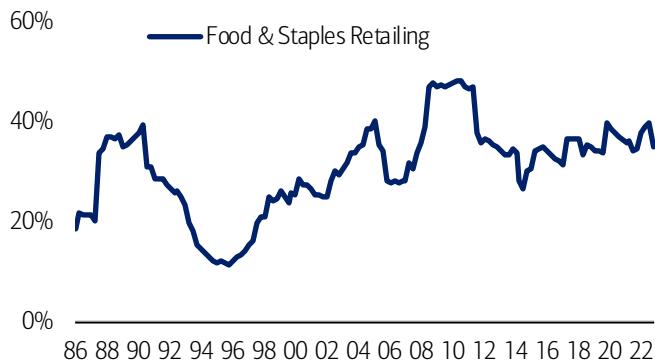
Source: BofA US Equity & Quant Strategy

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Exhibit 127: Food & Staples Retailing

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 129: Health Care Equipment & Services

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 131: Insurance

Correlations have declined in recent months

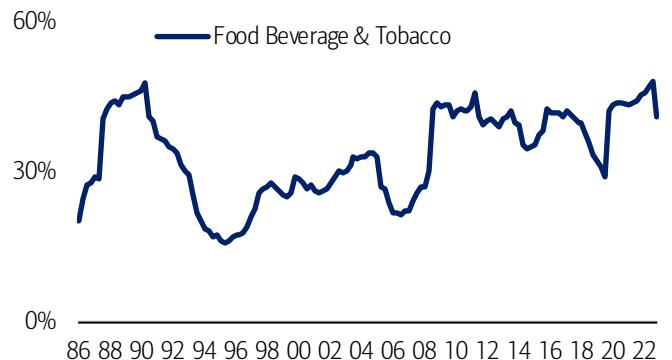


Source: BofA US Equity & Quant Strategy

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Exhibit 128: Food Beverage & Tobacco

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 130: Household & Personal Products

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 132: Materials

Correlations have declined in recent months



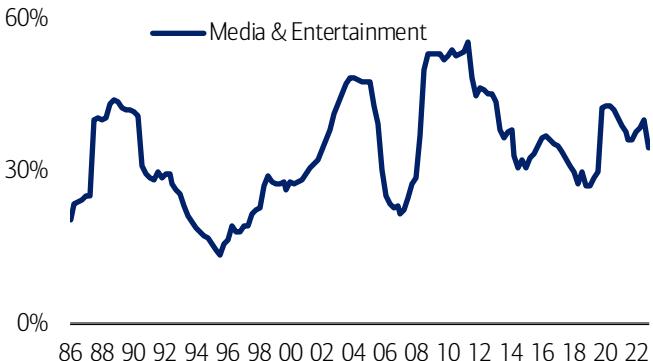
Source: BofA US Equity & Quant Strategy

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Exhibit 133: Media & Entertainment

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 135: Real Estate

Correlations edged lower in recent months

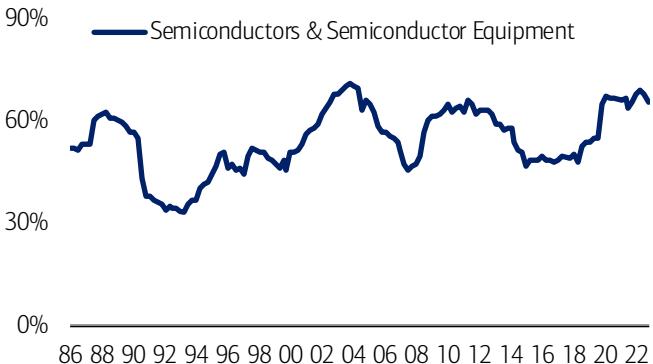


Source: BofA US Equity & Quant Strategy

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Exhibit 137: Semiconductors & Semiconductor Equipment

Correlations edged lower in recent months

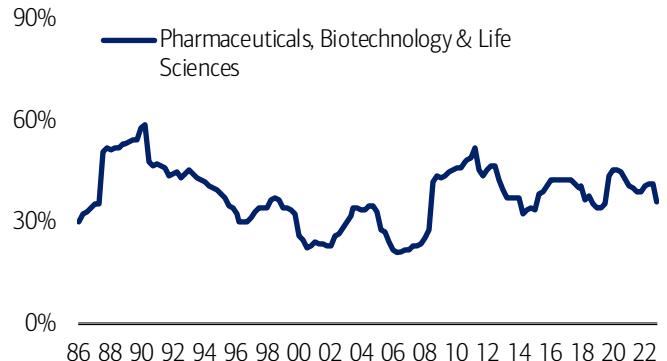


Source: BofA US Equity & Quant Strategy

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Exhibit 134: Pharmaceuticals, Biotechnology & Life Sciences

Correlations have declined in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 136: Retailing

Correlations edged lower in recent months

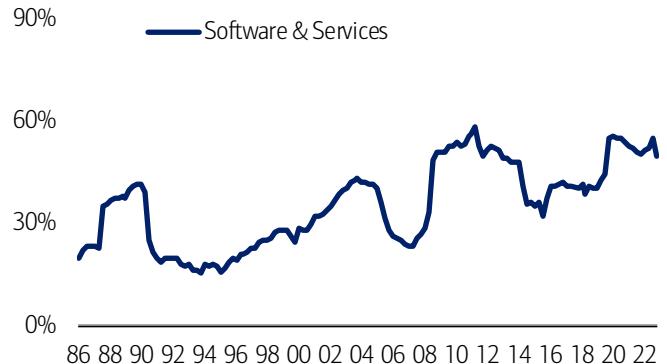


Source: BofA US Equity & Quant Strategy

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Exhibit 138: Software & Services

Correlations edged lower in recent months



Source: BofA US Equity & Quant Strategy

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Exhibit 139: Technology Hardware & Equipment

Correlations remain above long-term average



Source: BofA US Equity & Quant Strategy

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Exhibit 140: Telecommunication Services

Correlations remain near historic average



Source: BofA US Equity & Quant Strategy

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Exhibit 141: Transportation

Correlations edged lower in recent months

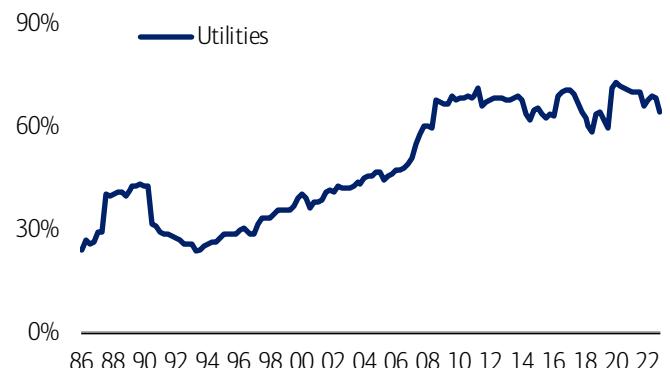


Source: BofA US Equity & Quant Strategy

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Exhibit 142: Utilities

Correlations edged lower in recent months



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 50 best and fifty worst performing stocks remaining near well below average for most of the post-crisis period. In 2007, managers used leverage to offset this scarcity. Today, risk aversion has capped leverage ratios at lower levels.

Exhibit 143: S&P 500 Long-Short Spreads (Alpha), 1986-present

Alpha spread slightly below its long-term average



Source: BofA US Equity & Quantitative Strategy

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

Exhibit 144: Relative performance of C&D vs. A+ ranked stocks by S&P Quality rank, 2007-present

Generally a “risk-off” period post-COVID, but volatile with short risk-on/risk-off reversals



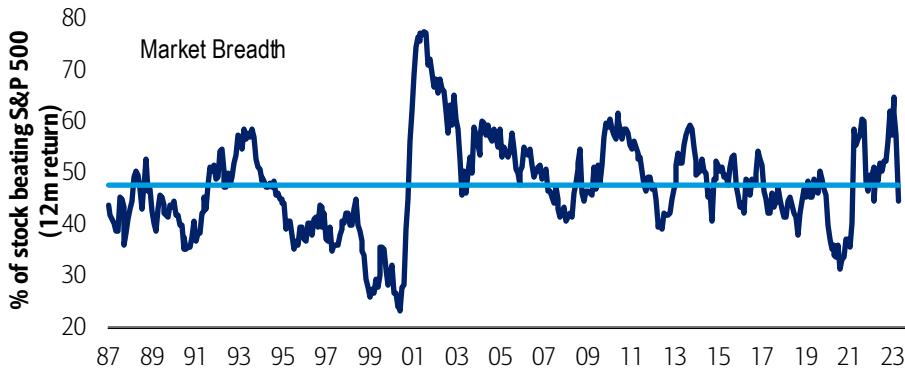
Source: S&P, BofA US Equity & Quant Strategy

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Market breadth: currently above average

Exhibit 145: 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

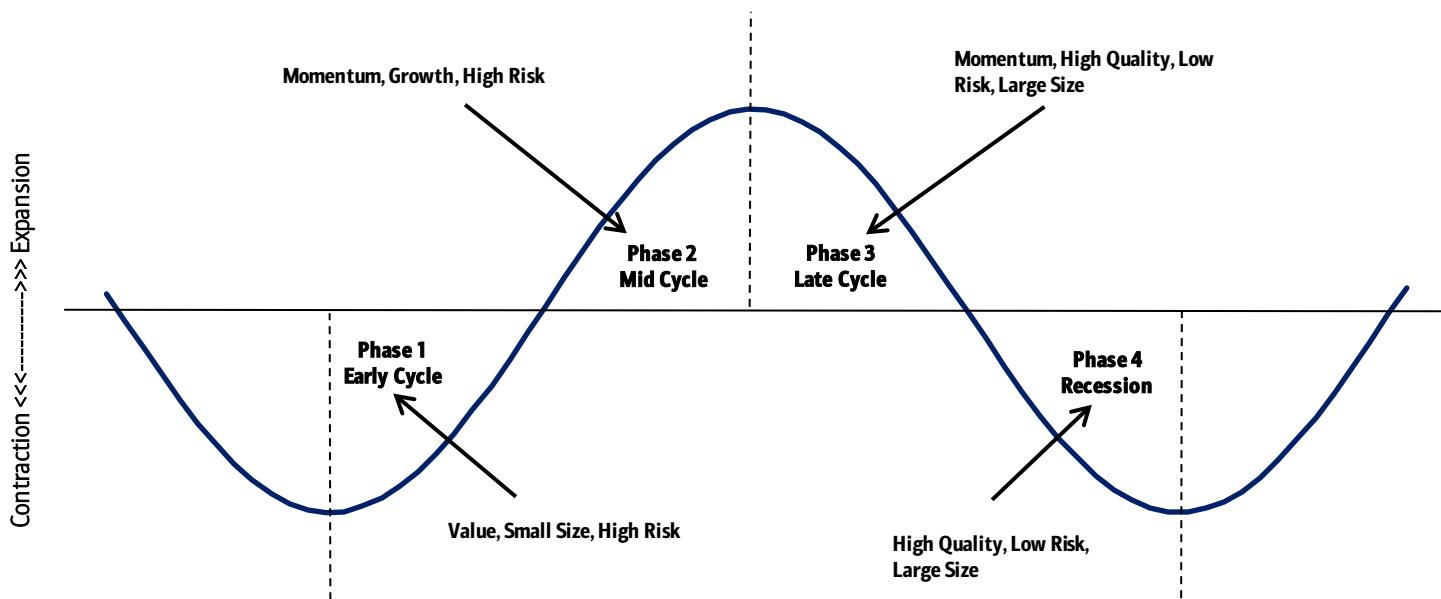
Investment styles like Value, Growth, Momentum, Risk and Size tend to exhibit different performance patterns in different phases of the macroeconomic cycle. For US equities, four regimes generally capture these style shifts. In our quantitative US Regime Indicator, we aggregate top-down variables that 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 146: US Regimes – a heuristic

Early Cycle, Mid Cycle, Late Cycle and Recession/Downturn regimes



Source: BofA US Equity & Quant Strategy

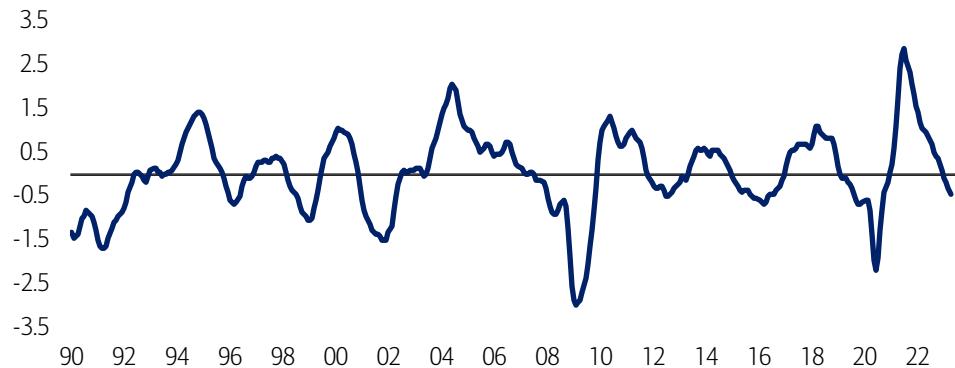
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Current read: Downturn phase

Our US Regime indicator transitioned from “Late Cycle” to “Downturn” in January 2023. The post-GFC economic cycle was untraditional in that, as our economists point out, it was long soft patch with several mini downturns, but we most recently saw a strong Early Cycle followed by a Mid and Late Cycle period post-COVID. most recently, the indicator has fallen into the “Downturn” phase. It fell into “Downturn” territory two times post-GFC without an NBER-official economic recession: in '11 – '12 during the European crisis and in '14 – '15 during the commodity/manufacturing recession. But our economists do expect an economic recession in 2H23-1Q24. In March 2019 the indicator also entered “Recession/Downturn” and declined to near historical lows in June 2020, as the COVID-19-driven economic recession occurred.

Exhibit 147: US Regime indicator (January 1990-April 2023)

US Regime Indicator has been in Downturn since January 2023



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

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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 148: 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 Recovery	Avg:	19.4%	-7.5%	-5.9%	-6.0%	8.4%	18.4%	-10.7%	-8.4%	19.0%	-12.8%	7.0%
	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 Mid Cycle	Avg:	3.8%	10.9%	11.2%	0.8%	3.9%	11.0%	-6.6%	-2.1%	6.0%	-12.6%	-6.7%
	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%
Phase 3 Late Cycle	Avg:	-0.8%	-6.2%	-3.4%	3.5%	-6.9%	-11.4%	8.4%	-1.2%	-7.6%	7.0%	7.5%
	Median:	-0.9%	-1.8%	2.3%	5.8%	-6.6%	-8.9%	9.8%	2.3%	-8.1%	3.2%	3.5%
	Hit Rate:	44.4%	33.3%	55.6%	66.7%	22.2%	11.1%	77.8%	55.6%	11.1%	55.6%	77.8%
Phase 4 Downturn (Current)	Avg:	-0.8%	-0.2%	3.1%	5.2%	-4.7%	-6.1%	4.8%	5.6%	-3.0%	-0.9%	-2.4%
	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 and based on the January 1990 – present time period.

Source: BofA US Equity & Quant Strategy, Refinitiv, ICE Data Indices, LLC, Institute for Supply Management, Bureau of Labor Statistics, Federal Reserve

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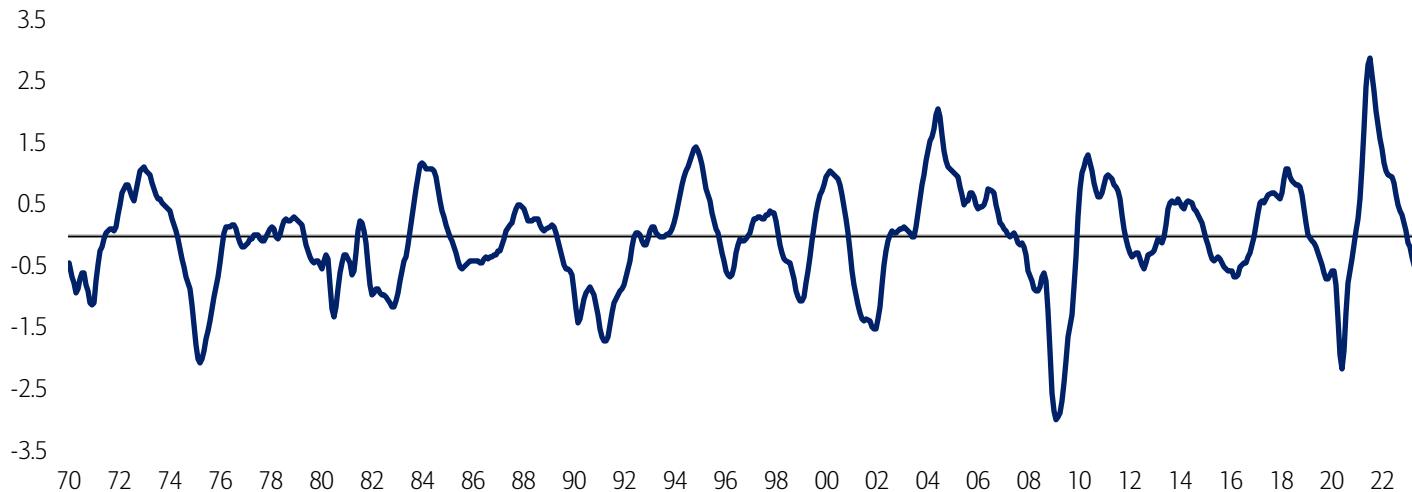
Lessons from the 70s: Value>Growth, Small>Large

We extended the US Regime Indicator history an additional 20 years back to 1970. While not all inputs were available over the additional history (see Appendix), and we continue to present returns of our S&P 500 factors over the original history (on a hypothetical backtested basis since 1990), we use the extended history to analyze size, style and asset class performance in a comparable high inflation environment (based on Fama-French data for size/style).



Exhibit 149: Downturn starts during high inflation era

Extended US Regime Indicator (1970 – present)



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 – Recessions

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.

For the historic period from January 1970 to December 1989, the US Regime Indicator was based on the available inputs, which were:

1/70 to 1/82: 5 inputs: Inflation, 10-yr US Treasury Bond Yield, ISM PMI, Leading Economic Indicators index, US Capacity Utilization;

2/82 to 3/88: 6 inputs: all of the above plus GDP Forecast;

4/88 to 4/89: 7 inputs: all of the above plus the High Yield corporate bond credit spread;

5/89 to 12/89: all 8 inputs: all of the above plus the Earnings Revision Ratio.

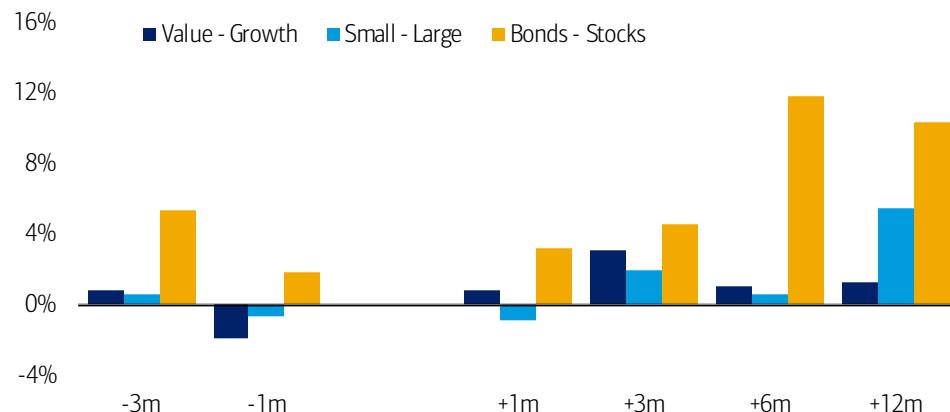
Performance of styles during regimes prior to January 1990 could be impacted by the more limited set of factors used to determine regimes, different definitions for Growth, Value and Size, as well as the different macro backdrop in the earlier period marked by high inflation.

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During Downturn regimes of the 1970s and early 1980s (through '82), Value led Growth in the three months prior to a Downturn, and continued to lead Growth for up to 12 months after the onset of a Downturn (Exhibit 149). Small Caps led Large Caps in the three months before Downturns, and continued to outperform in the three, six and 12 months after the onset of a Downturn. Bonds outperformed stocks in the three months before and three/six/12 months after the onset of a Downturn.

Exhibit 150: 70s / early 80s Downturn phases saw Value outperform Growth, Small outperform Large (3-mth, 6-mth and 12-mth) and Bonds outperform Stocks

Factor performance prior and after entering Downturn during period of high inflation in the 70s / 80s



Source: US Equity & Quant Strategy, Dartmouth University data library; Fama-French definition of Value, Growth, Small Cap and Large Cap

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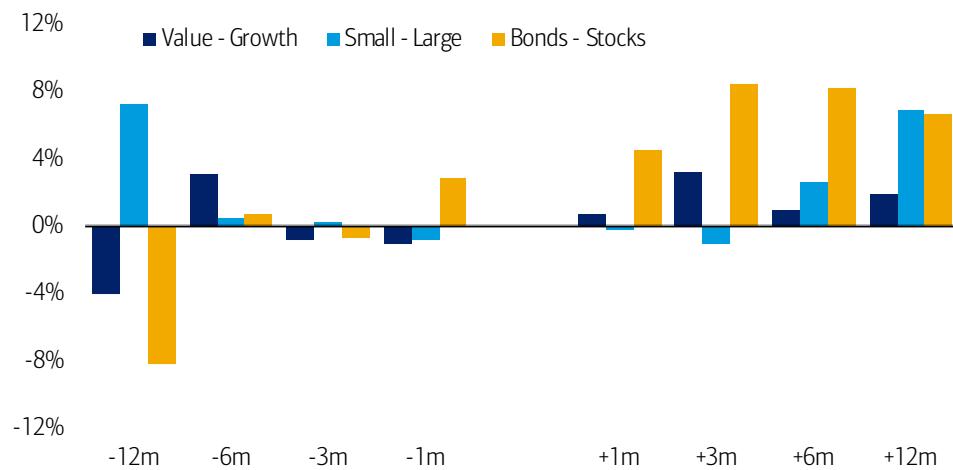


Value led even after hiking stopped

When the Fed fought inflation in the 70s, it took several hike cycles to get inflation in check. Even after the Fed was done, Value consistently led Growth for the next 12 months (Exhibit 150). Small Caps mostly led Large before the last hike (except for the last month), stumbled in the three months after last hike, but subsequently led Large Caps in the six months and 12 months periods. Bonds generally led equities before the last hike, and consistently led after (supporting our overweight of the bond-like Utilities sector).

Exhibit 151: After the last Fed hike in the 70s / early 80s Value led Growth, Small led Large (6-mth and 12-mth) and bonds led stocks

Factor performance prior and after the last Fed hike during period of high inflation in the 70s / 80s



Source: Bloomberg, US Equity & Quant Strategy; Dartmouth university data library; Fama-French definition of Value, Growth, Small Cap and Large Cap

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What are quants doing?

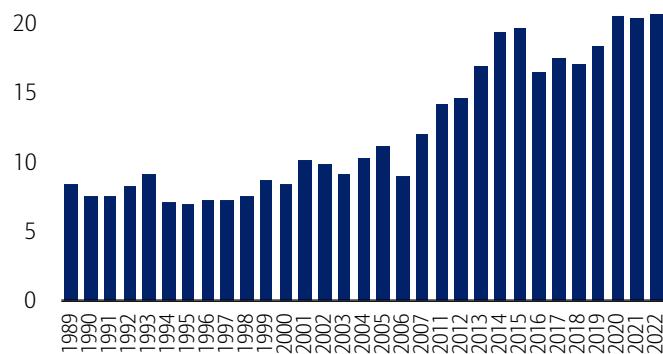
Each year, we survey institutional investors to monitor which factors, characteristics, attributes and indicators they use in their stock selection processes. These include valuation factors, quality and growth factors, risk factors, technical and price factors, risk factors and other factors.

2022: 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 a new high of 20.7 in our 2022 survey. Multi-factor models are more complex/diverse today than in the 1990s, when investors used an average of just seven or eight factors.

Exhibit 152: Average number of factors used by respondents, 1989-2022

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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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.

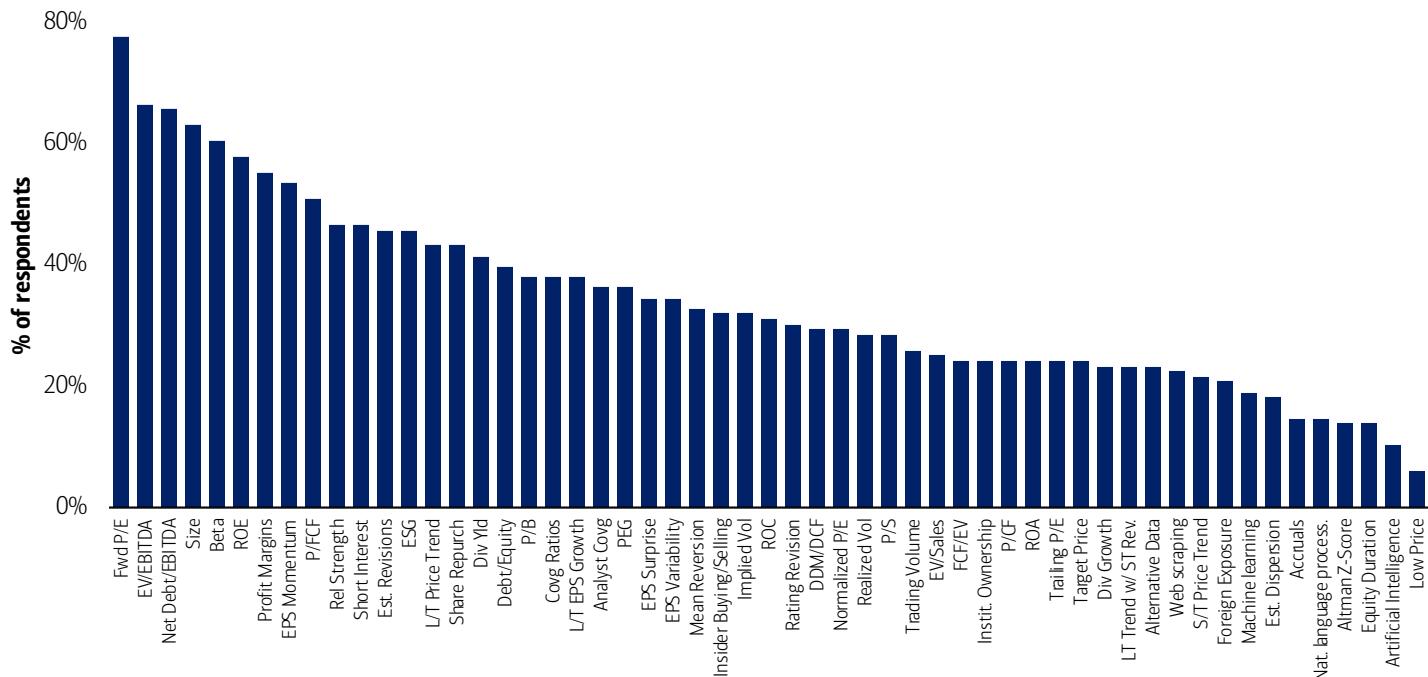
Price to Forward Earnings is still the most-used factor

78% of survey respondents use Forward P/E as a factor in their investment processes, remaining the most popular factor for the 15th year running. While cash-flow based valuation measures were more popular pre-crisis, Forward P/E has topped the list every year since the Global 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 153: Percentage of 2022 survey respondents using various factors

Forward P/E remained the most popular factor, Low Price was the least popular factor



Source: BofA US Equity & Quant Strategy

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Select valuation factors

Below we show a time series of our availability survey data on the percentage of respondents using various factors back in time.

Exhibit 154: Percentage of Respondents using P/B

Percentage of respondents using price to book rose in recent years

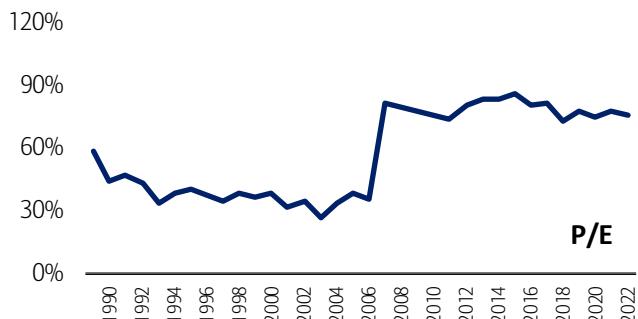


Source: BofA US Equity & Quant Strategy

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Exhibit 155: Percentage of Respondents using P/E

Percentage of respondents using forward P/E remained consistently high in recent years



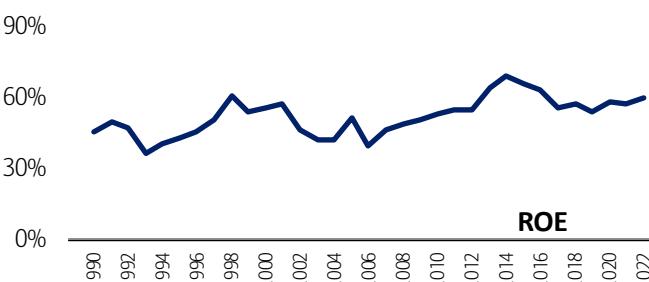
Source: BofA US Equity & Quant Strategy

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Select growth and quality factors

Exhibit 156: Percentage of Respondents using ROE

Percentage of respondents using ROE rose in recent years

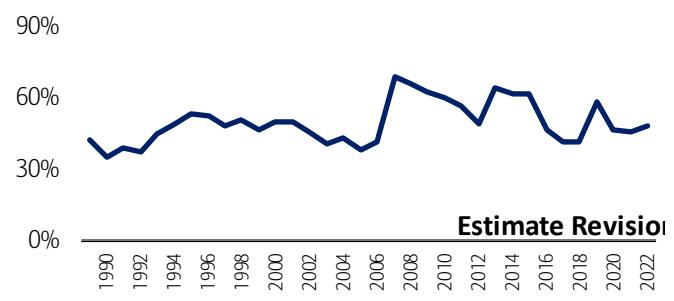


Source: BofA US Equity & Quant Strategy

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Exhibit 157: Percentage of Respondents using Estimate Revisions

Percentage of respondents using Estimate Revisions edged higher recently



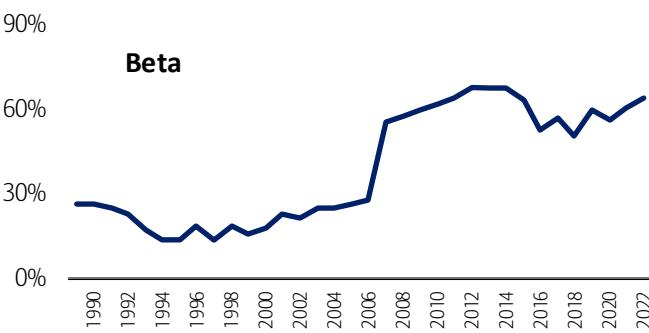
Source: BofA US Equity & Quant Strategy

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Select risk factors

Exhibit 158: Percentage of Respondents using Beta

Percentage of respondents using Beta factor increased recently

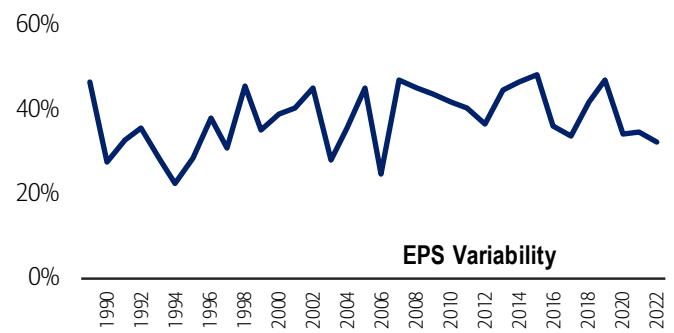


Source: BofA US Equity & Quant Strategy

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Exhibit 159: Percentage of Respondents using EPS Variability

Percentage of respondents using EPS Variability declined recently



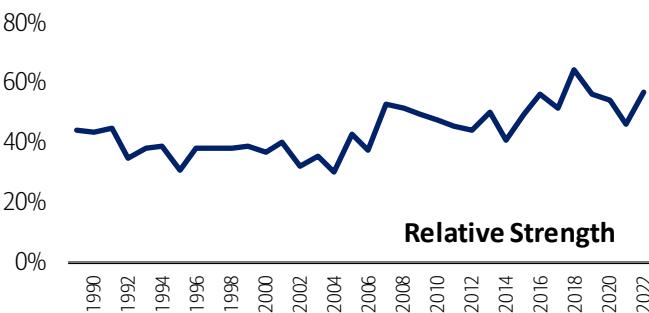
Source: BofA US Equity & Quant Strategy

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Select price trend and technical factors

Exhibit 160: Percentage of Respondents using Relative Strength

Percentage of respondents using Relative Strength rose in 2022

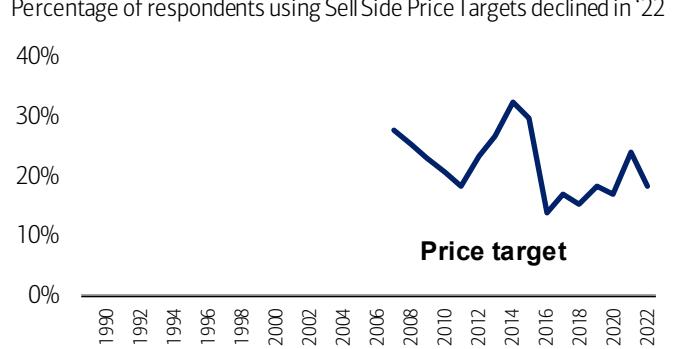


Source: BofA US Equity & Quant Strategy

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Exhibit 161: Percentage of respondents using Sell Side Price Targets

Percentage of respondents using Sell Side Price Targets declined in '22



Source: BofA US Equity & Quant Strategy

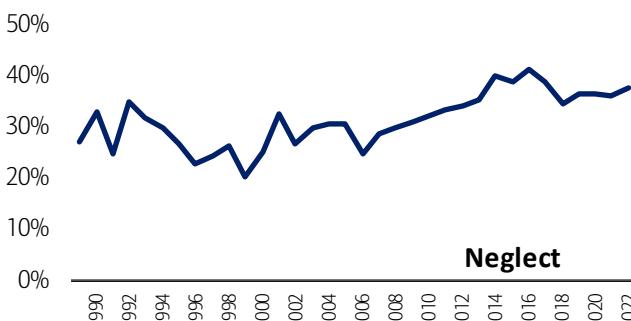
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Select other (miscellaneous) factors

Exhibit 162: Percentage of respondents using Analyst Neglect

Percentage of respondents using Analyst Neglect factor increased in recent years



Source: BofA US Equity & Quant Strategy

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Exhibit 163: Percentage of respondents using Size (Market Cap)

Percentage of respondents using size market cap declined in '22



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 have 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 – though popularity has declined post-COVID.

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 of the traditional index tracking products, 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

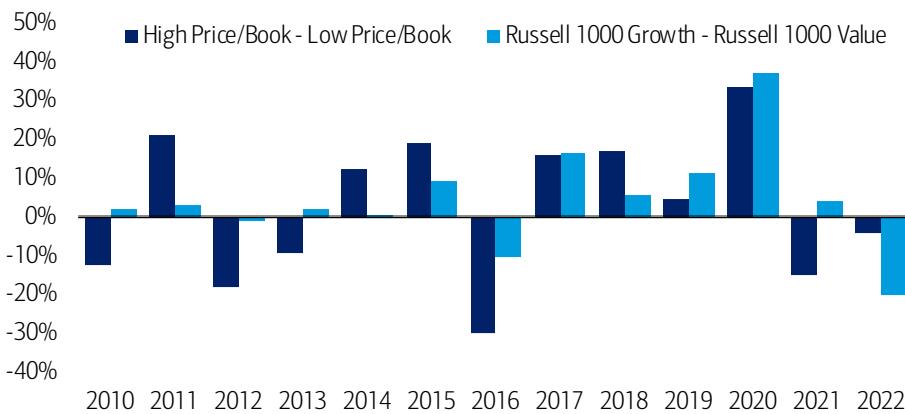
Quants have been applying equal weighing to remove size bias in their work without much fanfare for decades. After all, quants seek to identify various factor exposures in their purest form, be it large or small size, low or high price/book, or high dividend yielding stocks or dividend nonpayers. The 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 from 2010-2014, Growth / Value performance differential as measures by High Price/Book and Low Price/Book factors was quite pronounced (Exhibit 163).

Exhibit 164: Quant factors generally deliver more style differentiation than fundamentally weighted indices

Annual performance (2010 – 2022)



Source: US Equity & Quant Strategy

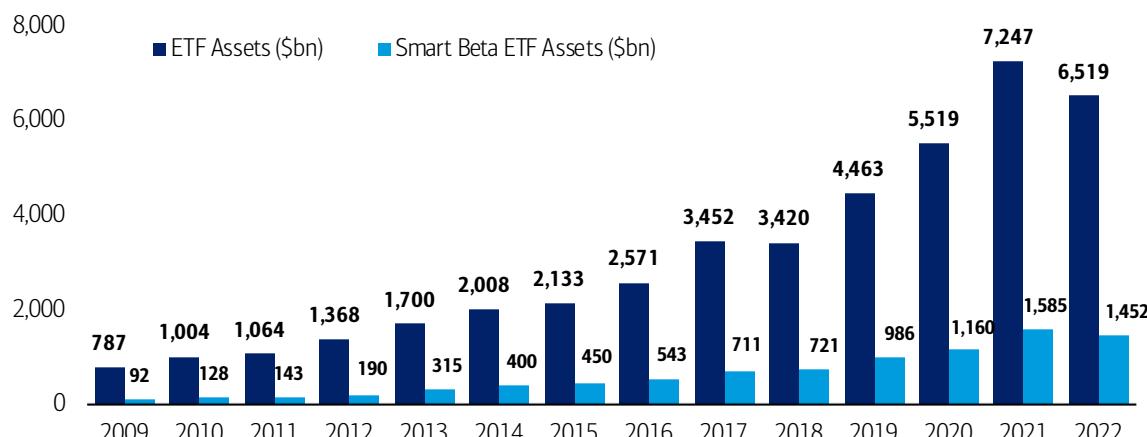
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How much money is currently tracking smart beta strategies

Smart beta strategies have experienced rapid growth in assets under management in recent years. According to the data compiled by Bloomberg (Exhibit 164), smart beta funds grew from under \$100bn in 2009 to nearly \$1.6tn in 2021 before falling to \$1.5tn in 2022, which represents a 24% annualized rate, well above the 18% growth rates for the ETF assets overall.

Exhibit 165: Growth in Smart Beta vs. all ETFs

Since 2009 ETFs and Smart Beta AUM grew by respective annualized 18% and 24% (2009-2022)



Source: Bloomberg, BofA US Equity & Quant Strategy

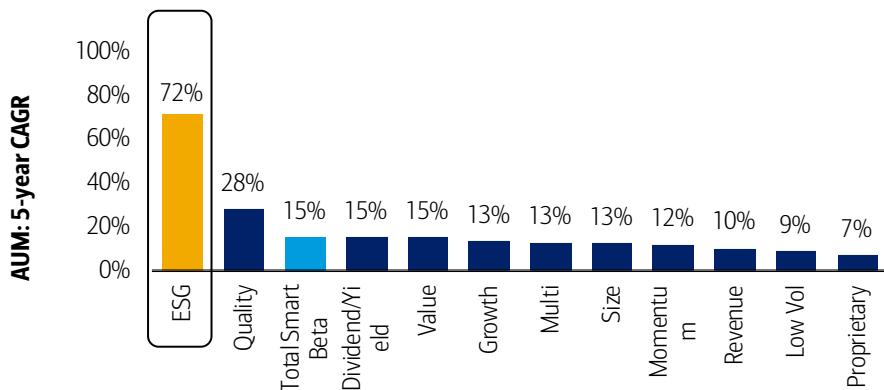
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ESG ETFs saw a particularly strong asset base growth: as these vehicles grew at a 72% annualized rate, faster than any other smart beta category.

Exhibit 166: ESG: the fastest-growing smart beta strategy

5-year CAGR in AUM growth (2015-2022) of smart beta ETF categories in Bloomberg



Source: BofA US Equity & Quant Strategy

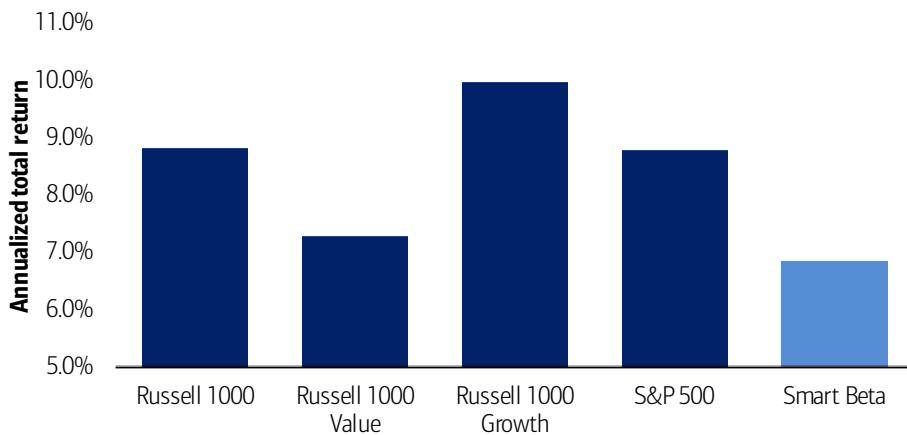
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Is smart beta all that smart?

Despite attention surrounding the Smart Beta concept, the performance of Smart Beta ETFs has been remarkably unexciting – since 2005 this group of products mostly lagged major large cap indices by 0.5ppt to 3.1ppt per annum.

Exhibit 167: Smart beta has lagged the benchmarks (12/2004 – 12/2022)

The performance of SmartBeta ETFs has been remarkably unexciting in recent years (annualized returns)



Source: BofA US Equity and Quant Strategy, FactSet

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Alternative Data

Alternative data can be broadly defined as information outside of traditional sources, such as corporate filings, that can provide insights into the future performance of financial markets. They are typically available on a more timely basis, offer a differentiated perspective and are less readily accessible, providing opportunities to extract alpha if used effectively. A wide range of alternative data is available today – from online search trends to social media activity, from transactions data to satellite imagery to geo-location data. We highlight some of our work below.

Natural Language Processing

Natural Language Processing (NLP) refers to the use of computers to process and analyze text and spoken words. Sentiment analysis is one of the many uses of NLP that allows a computational assessment of sentiment towards events, topics, issues, products, etc. In its simplest form, NLP-based sentiment trackers can be defined as the count of positive words relative to negative words as per the definition of a lexicon. More sophisticated models use contextual or aspect analysis to assess sentiment with the help of custom lexicon that are better suited to the problem at hand. At BofA Global Research, we use NLP to delineate corporate as well as policymaker sentiment.

US Corporate Sentiment Indicator

Our [Corporate Sentiment Indicator \(see note\)](#) scans through the earnings calls transcripts of the S&P 500 universe of companies to get an early read on US corporate sentiment. The sentiment score, computed as the count of unique positive words *less* the count of unique negative and uncertainty words, uses three different filters: the full transcript, management discussion and answers of CEO/CFO from Q/A section.

We use the Loughran McDonald's financial dictionary to calculate sentiment scores. In total, the lexicon has 2,355 negative words, 354 positive words, and 297 words of uncertainty, as for example:

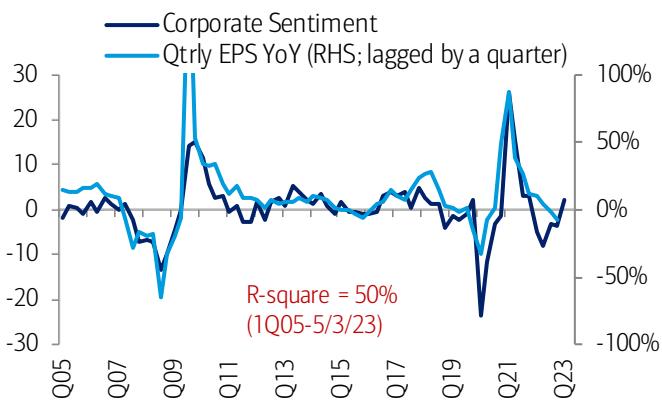
1. Positive words: accomplish, achieve, outperform, stabilize, strength
2. Negative words: abandon, abnormal, downturn, evade, failing, stagnate
3. Uncertain words: almost, ambiguity, hidden, fluctuate, doubts, unclear

Corporate Sentiment improved YoY for the first time in the first quarter of the year since 4Q2021, pointing to a potential earnings recovery. However, mentions of weak demand soared, highlighting companies' cautious outlook over the near term.



Exhibit 168: US Corporate Sentiment vs. quarterly EPS YoY with 1q lag

Sentiment score is up YoY for the first time since 4Q21, pointing to potential earnings recovery ahead

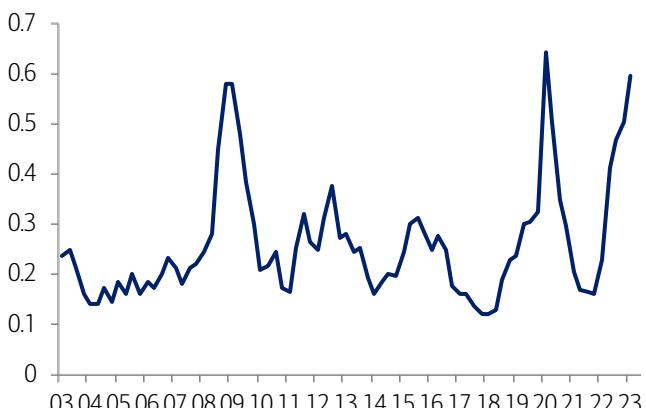


Source: BofA Global Research, FactSet

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Exhibit 169: Mentions of weak demand soared near a record level

Average mention of weak demand per S&P 500 company (2003-5/3/23)
Mentions include "lower," "softer," "moderating," "weaker"



Source: BofA Global Research

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BofA Petrochemical Sentiment Indicator

Similarly, the [BofA Petrochemical Sentiment Indicator \(see note\)](#) tracks the sentiment on petrochemicals based on NLP-based analysis of all S&P Global Platts' Polymerscan reports – a leading publication on global plastic and resins including polyethylene, polypropylene, and polyvinyl chloride (PVC) – published since 2004. The smoothed version of the indicator has a correlation above 0.70 with 15 out of 28 stocks under our coverage over the last five years, including 11 with a correlation of 0.80+.

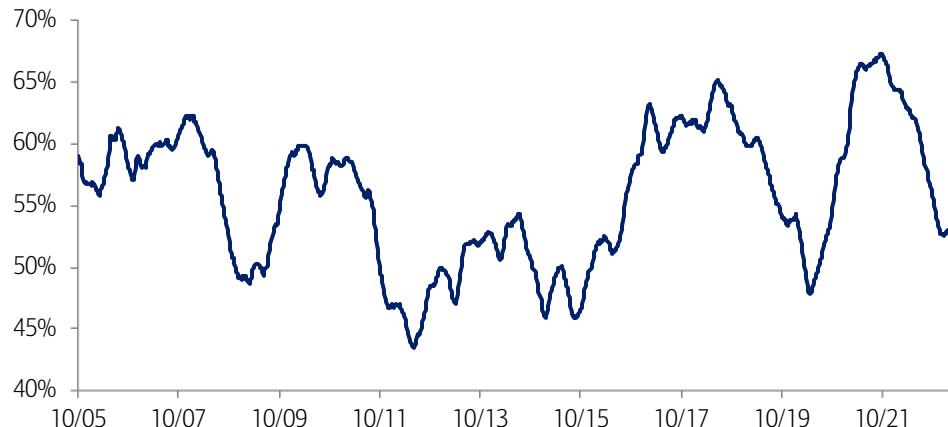
We used Natural Language Processing to scan every Platts Polymerscan report ever published from October 27, 2004 and counted the number of positive and negative words as defined by a comprehensive proprietary dictionary created using a Deep Learning based Word2Vec model. Word2Vec converts words into numeric form such that words used in similar context are closer to each other in numeric vector space. The model was trained on ~400K financial documents to ensure we only selected the words used in financial/market context to express positive or negative sentiment. We calculate a score for each published report based on the percentage of positive words picked up by our proprietary dictionary, which only picks up negative or positive words.

Word2vec is a group of related models that are used to produce word embeddings. These models are generally two-layer neural networks that are trained to reconstruct linguistic contexts of words. Word2vec takes as input a large corpus of text and produces a vector space, typically of several hundred dimensions, with each unique word in the corpus being assigned a corresponding vector in the space. Word vectors are positioned in the vector space such that words that share common contexts are located close to one another in the space.

The latest update of the indicator reveals that it continues its downward trend, as the data has decelerated since flipping negative in May 2022, providing a bearish signal for commodity stock performance. Historically, on average, it takes eight months for the indicator to trough once it has flipped to bearish and another six months, on average, to flip bullish again. Thus, while history would tell us we are closer to a bottom, and the anecdotal data on pricing may support this, we may be ways away from a sustained bull cycle in commodity chemical stocks, if this indicator is a guide.

Exhibit 170: BofA Petrochemical Sentiment Indicator

Global petrochemical sentiment continues its bearish trend though history would tell us that a bottom is increasingly near



Source: BofA Global Research

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Central Banks Mood Indicators

We have also developed NLP models to quantify the degree of hawkishness in central banks' communications – [Bank of England Mood Indicator \(BoEMI\) \(see note\)](#), RBA Sentiment Indicator (see Australia Rates Alpha, 1 June 2023), [Riksheard \(see note\)](#), [NORBI \(see note\)](#) and Emerging Markets Mood Indicator (EMMI), 15 February 2021 (see note). These 'mood' indicators tend to provide a leading signal for changes in central banks' policies.

To compile the master dictionary of pre-identified hawkish/dovish keywords/phrases, we started with the list from the widely cited ECB paper (<https://www.ecb.europa.eu/pub/pdf/scpwps/ecb.wp2085.en.pdf>). We added terms that we believe represent the specific way central banks communicate their policy views.

To account for the context, we created a list of contravening words whose presence in a clause flips it into the opposite category. For example, "increase interest rates" vs. "increase quantitative easing". The presence of "quantitative easing" flips the original hawkish nature of the word "increase" into the dovish category. We calculate a hawkishness score between 0 and 1, representing the fraction of clauses that our algorithm determines are 'hawkish'. We can represent this with the following formula:

$$\text{Hawkishness} = (\#\text{hawkish} + \#\text{dovish}_{\text{contra}})/(\#\text{hawkish} + \#\text{dovish} + \#\text{dovish}_{\text{contra}} + \#\text{hawkish}_{\text{contra}})$$

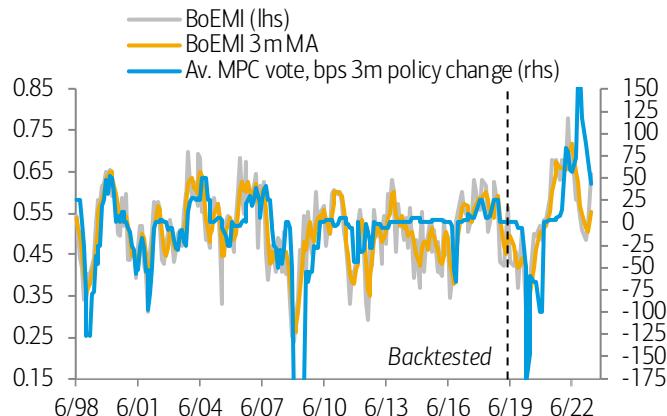
Specifically, for **BoEMI**, we run the exercise on the minutes of Monetary Policy Committee (MPC) meetings, the BoE's Quarterly Inflation Report (QIR), and transcripts of press conferences that follow the QIR publication. The minutes are available monthly until 2016 and then 8 times a year. The QIR and transcripts are available quarterly. In the latest update, the BoEMI rose to its most hawkish since June 2022, although the shortened minutes create a structural break in our Mood indicator, making it harder to interpret.

The **EMMI**, on the other hand, captures the percentage of hawkish terms in over 4000+ publications of 13 central banks. In aggregate, EM central banks are less hawkish than in Q4 but still very hawkish. The most hawkish central banks are those in Czechia, India, Indonesia, Mexico and Thailand. No central bank is outright dovish yet, but the relatively least hawkish is Poland, followed by Brazil, Hungary, Korea and South Africa.



Exhibit 171: Bank of England Mood Indicator (BoEMI)

Much more hawkish BoE

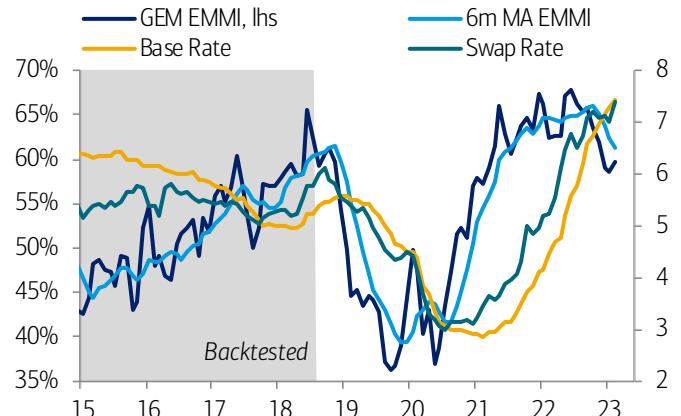


Source: BofA Global Research, Bank of England. **Notes:** BoEMI is scaled from 0 to 1, and reflects the proportion of 'hawkish' sentences in the minutes of the BoE's monetary policy meeting. A score of 0.5, for instance, means half of the sentences were hawkish

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Exhibit 172: Emerging Markets Mood Indicator (EMMI)

Hawkishness past the peak but still very high



Source: Bloomberg, Haver, BofA Global Research

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NewsAlpha: quantifying the impact of news on returns

News is, perhaps, the best example of an alternative data set, sourced globally from a combination of structured and unstructured data sources in multiple languages, that can be a differentiator of returns. Contrary to popular belief, our analysis of five billion news events over the last 15 years shows there is information in news that appears to provide alpha-generating opportunities over the short term and long term.

We use Ravenpack's big data set to quantify the impact of news on share prices. The process involves employing Natural Language Processing techniques to classify stock-related news and then collating them into the Global News Pulse, which quantifies whether significant news globally is trending positively or negatively. It has a 79% correlation with global equity markets over the last 15 years. The latest update shows that despite uncertainty in the direction of macro data and equity markets, the trend in Global News Pulse is unambiguously positive, improving in all regions and sectors.

Exhibit 173: Global News Pulse and YoY Change in MSCI AC World Index

The Global News Pulse improved again last month from -15% to -6%



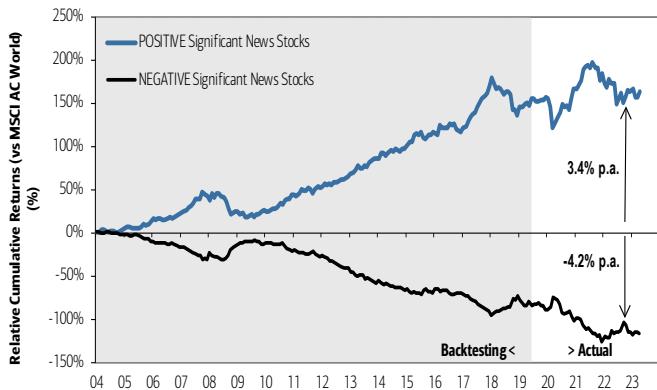
Source: BofA Global Quantitative Strategy, MSCI, ExShare, RavenPack

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Exhibit 174: Relative cumulative returns of Global POSITIVE Significant & NEGATIVE Significant News Stocks

Positive Significant News outperformed ACWI by 3.4% p.a.



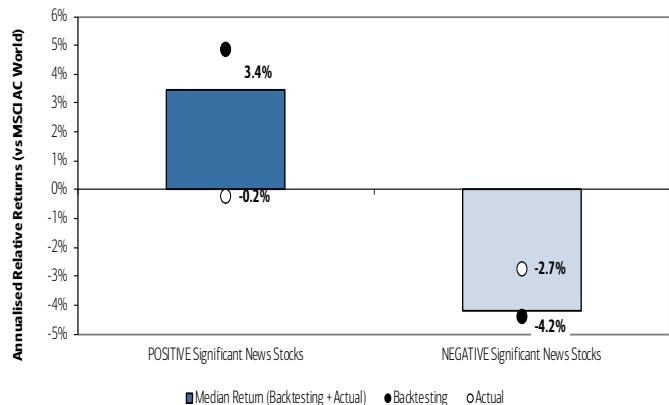
Source: BofA Global Quantitative Strategy, MSCI, ExShare, RavenPack

Back-tested results are from Jan-04 to May-19. Actual performance is from Jun-19. This performance is backtested and does not represent the actual performance of any account or fund. Backtested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

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Exhibit 175: Annualised returns of Global POSITIVE Significant & NEGATIVE Significant News Stocks

Positive Significant News outperformed ACWI by 3.4% p.a.



Source: BofA Global Quantitative Strategy, MSCI, ExShare, RavenPack

Back-tested results are from Jan-04 to May-19. Actual performance is from Jun-19.

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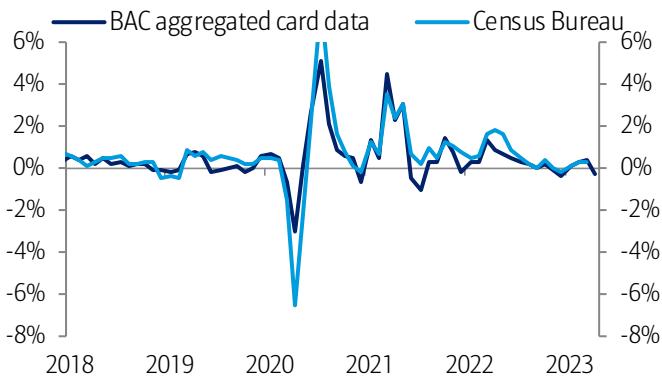
BAC Aggregated Card Data

Transactions data for various spending categories from payment processors or credit/debit cards, is another example of alternative data that can give us a potential preview of revenue growth at a higher frequency and with minimum delay vis-à-vis quarterly earnings release and GDP prints that come with delays of weeks or months.

BofA Global Research analysts leverage our proprietary BAC aggregated credit and debit card spending data to gauge the health of the US consumer. Our US economists quantify the trends in consumer spending in their weekly publication [BofA on USA](#) and also provide forecast on retail sales ahead of the monthly print by the Census Bureau. The latest report continues to suggest card spend has been soft but stable, as durable goods spending remains weak, while leisure service might have peaked. See the note for an explanation of the methodology, disclaimers and limitations with aggregated credit and debit BAC card data.

Exhibit 176: Retail sales ex auto: Census Bureau vs. BAC card data (%month/month, Seasonally Adjusted (SA), 3-month moving average (ma))

Spending on Retail sales ex auto, based on BAC aggregated card data

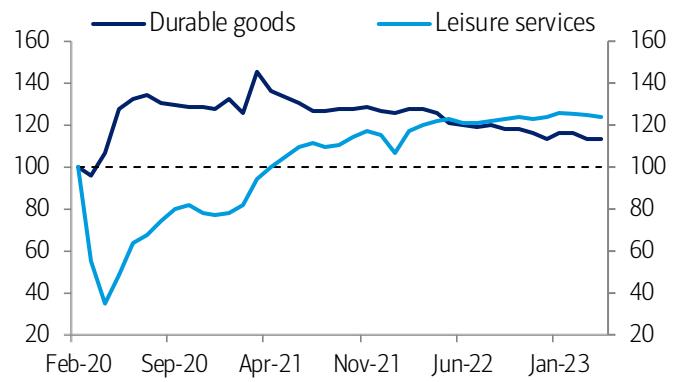


Source: BAC internal data, Census Bureau

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Exhibit 177: Monthly card spending per household on durable goods vs leisure services (Index, Feb 2020 = 100, SA)

Leisure services spending has dropped 1.0% over the last three months



Source: BAC internal data. Leisure services include airline, lodging and restaurant spending. Durable goods include furniture, electronics and building materials.

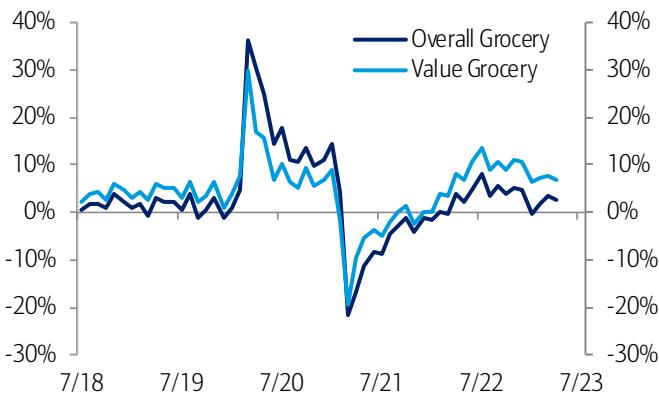
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BofA Fundamental Equity Research analysts use segment-specific BAC card data to offer a differentiated view on their coverage sectors and companies. In May, Robby Ohmes launched a new BAC card series to track spending at value grocery stores ([see report](#)). He believes its outperformance to overall grocery reflects a trade down from higher-income consumers, in line with commentary from value retailers.



Exhibit 178: Value vs. Overall Grocery Stores, according to BAC aggregated credit & debit card data (y/y chg.)

Spending at value grocery stores (+6.9% y/y in April) is meaningfully outpacing overall grocery (+2.5%)

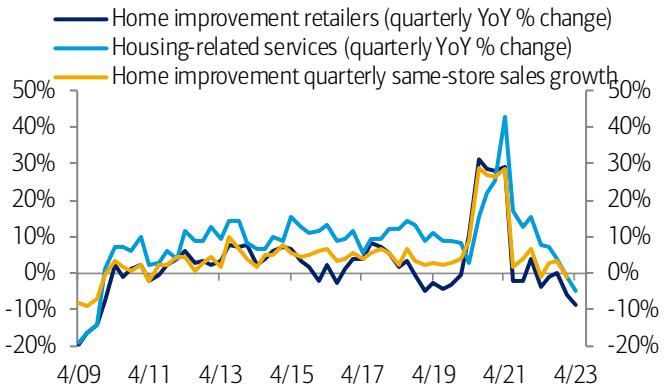


Source: BAC internal data Note: Value grocery includes discount grocery stores that offer quality products at a discounted price to deliver customer value,

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Exhibit 179: Reported home improvement quarterly same-store sales growth (average of HD and LOW) vs. BAC aggregated card data at home improvement retailers and housing related services

Average same-store sales growth for Home Depot and Lowe's has generally tracked in line with home improvement retail and services growth.



Source: BAC internal data, Company reports

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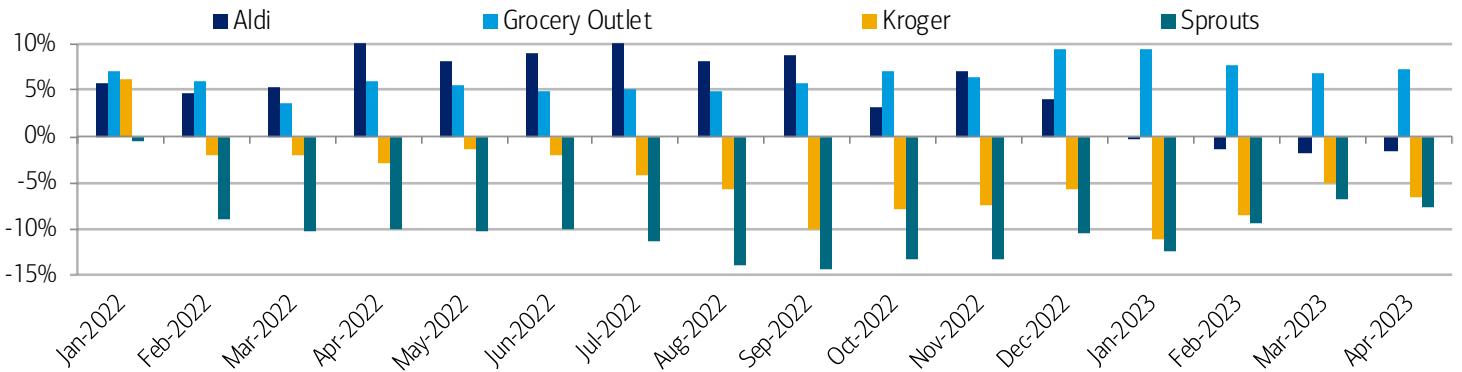
Similarly, Liz Suzuki uses the data to monitor consumer spending in [hardline retail categories \(see report\)](#). She finds that home improvement spending is tracking in line with same-store sales growth for Home Depot and Lowe's, with April seeing a continuation of the broad-based slowdown experienced from January through March.

Geolocation Data

The trade down from conventional to value grocers was validated by yet another type of alternative data, viz. geolocation data. Placer.ai provides foot traffic analytics by observing mobile location data that is aggregated, normalized and extrapolated to generate insights in retail, CRE (commercial real estate), hospitality and other industries. We compared the same store foot-traffic data since 2021 for value chains vis-à-vis conventional grocers and noticed the same migration to value chains as observed in the BAC card data for spending in the value grocery stores category.

Exhibit 180: Average Foot Traffic YoY change for grocers

Placer data implies stronger foot traffic trends for value grocers including Aldi & GO



Source: Placer.ai

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Web Scraping

Web scraping has emerged as a crucial tool for extracting and analyzing relevant information from websites that could provide investors with insights to better understand and analyze the health of businesses. We present a selection of trackers at work in BofA Global Research that utilize data obtained through web scraping.

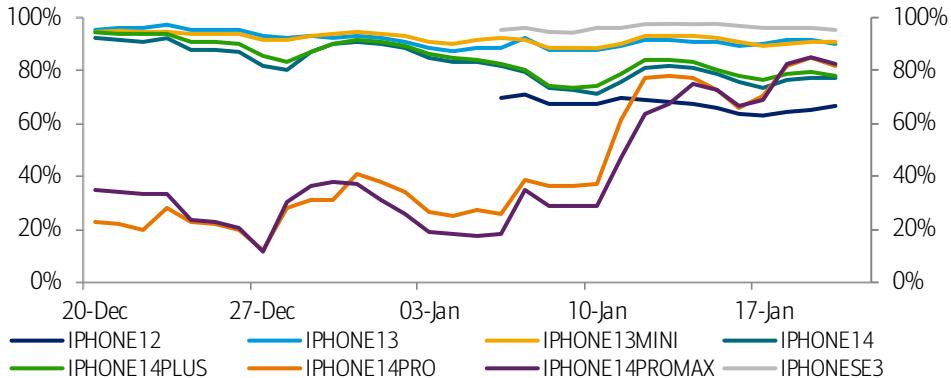


iPhone Availability Tracker

The [iPhone availability tracker \(see note\)](#) maps the pickup availability of every iPhone configuration (combinations based on model, storage and color) at every Apple retail store that allows in-store pickups across 500+ stores globally. COVID lockdown in China hampered the production of iPhone 14 Pro/Pro Max at the Hon Hai factory in Zhengzhou.

Exhibit 181: Availability of various iPhone models at Apple stores in the US

Availability of the iPhone Pro/Pro Max increased to 87%/87% as of January 24 2023



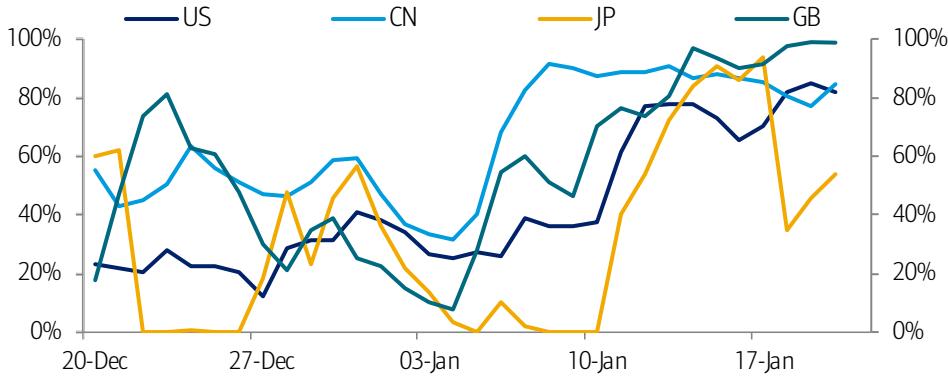
Source: BofA Global Research, Apple company websites

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However, our tracker was able to capture the significant improvement in availability of iPhone 14 models at Apple stores in the US and other countries starting mid-January in real time. Over a 1-month period starting late December 2022, the availability of SKUs for iPhone 14 Pro and Pro Max went from 23%/35% on December 20 to 87%/87% as of January 24. The increase in availability, even during a seasonally strong demand period (Christmas and New Year's shopping days), pointed to weak overall iPhone demand.

Exhibit 182: iPhone 14 Pro availability in the US, China, Japan, and the UK

In China, availability of iPhone 14 Pro/Pro Max SKUs went from 55%/67% on Dec 20th to 84%/95% on Jan 24



Source: BofA Global Research, Apple company websites

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Surveys

In contrast to the burgeoning fields of AI/ML and big data, surveys have been in existence since yore. Yet, they are still as relevant today for financial research as any other sources, providing investors with an early read of the health of the broader economy as well as niche sectors. We, at BofA Research, use proprietary surveys to glean out the trends in financial markets.

Global Fund Manager Survey

The [Global Fund Manager Survey \(FMS\) \(see note\)](#) informs investors about the expectations built into the market price. The panel consists of a healthy mix of real money and hedge fund investors across regions with close to a trillion-dollar AUM.

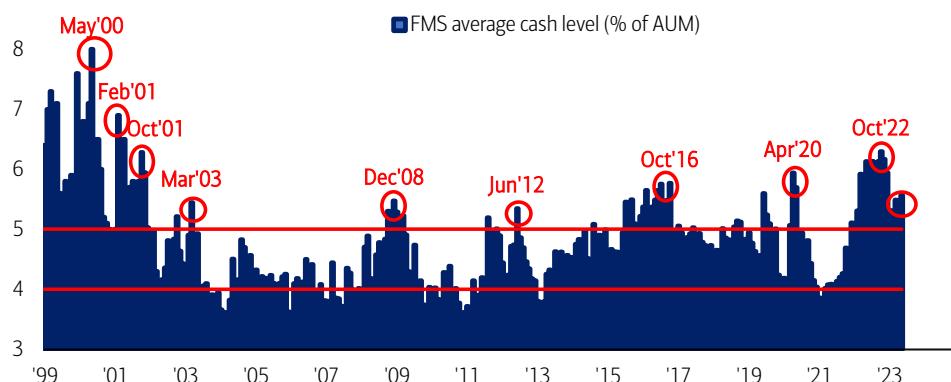


Michael Hartnett calculates a weighted average of the cash balance professed by FMS participants to create the BofA Global FMS Cash Rule, a contrarian trading signal for global equity markets – **buy** equities when the FMS average cash balance rises to 5% or higher, and **sell** equities when the FMS average cash balance falls to 4% or lower. A low cash balance indicates investors could be vulnerable to negative market shocks, while a high cash balance means investors could be under-invested and vulnerable to positive market shocks.

The BofA Global FMS Cash Rule has shown predictive power for long and short equity index trades as expressed via the S&P 500 Index. Since 2011, the average “Buy” signal would have returned +1.3% in 1 month, +4.0% in 3 months, and +6.5% in 6 months after the signal was triggered. On the other hand, the average “Sell” signal would have seen returns of -3.2% in 1 month and -0.2% in 3 months after the signal was triggered, although it is less significant in the 6 months after (+1.6%). The BofA Global FMS average cash balance rose from 5.5% in April to 5.6% in May, keeping the allocation above the 5.0% tactical “buy” signal since November 2021.

Exhibit 183: Cash drifts up to 5.6% in May from 5.5% in April

FMS average cash level % of AUM



Source: BofA Global Fund Manager Survey

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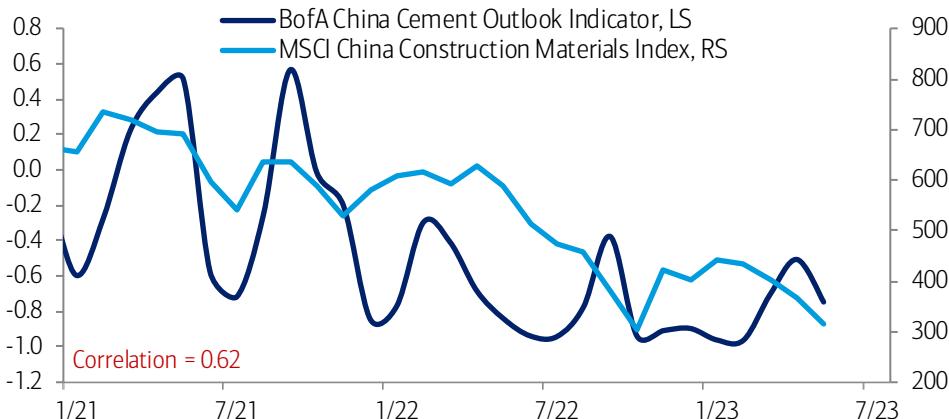
BofA China Cement Outlook Indicator

The Purchasing Managers’ Index (PMI) is one of the most widely followed economic indicators in tracking the health of any economy. The [BofA China Cement Outlook Indicator \(see note\)](#) is akin to the PMI for the more niche cement sector in China, the largest producer of cement in the world. It tracks the market sentiment on cement based on a monthly proprietary survey of 150 cement producers (accounting for c.18% of the national capacity) and 50 concrete stations across China about their three-month price outlook and the relative cement inventory level. The respondents are usually the plant managers or sales managers who oversee the plant’s operation in general. The indicator is found to move in tandem with construction materials stock prices in China.

In May, the indicator dug deeper in the negative territory, with three-fourths of producers staying pessimistic on the three-month market outlook irrespective of the traditional peak season in 1H. Meanwhile, cement inventory is hovering at a high level at 70%+, up 5ppt YoY. Cement producers expect prices to decline in May as they expect property and infrastructure cement demand to stay flattish on a sequential basis – a continuation of the trend year-to-date.

Exhibit 184: BofA China Cement Outlook Indicator

The indicator dug deeper in the negative territory in May, with 75% of producers staying pessimistic on the 3-month market outlook



Source: BofA Global Research

This indicator 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 relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This indicator was not created to act as a benchmark.

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Truck Shipper Survey

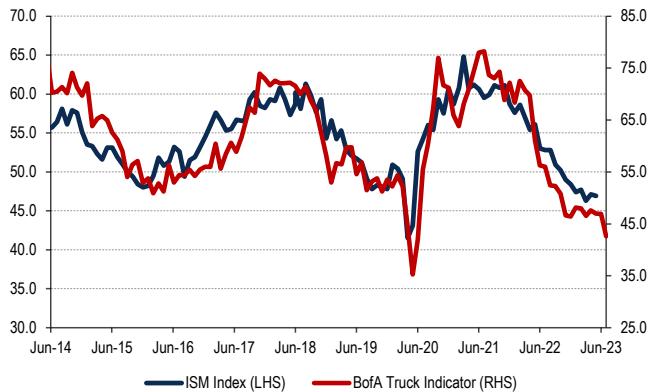
The bi-weekly [Truck Shipper Survey \(see note\)](#) looks to discern the trends in the Transportation sector, given that trucking represents two-thirds of all tonnage moved in the US and more than 80% of all revenue spent on transportation. The result is the BofA Truckload Demand Indicator – a sentiment indicator focused on shippers' outlook for demand over the next 0-3 months. It is an effective barometer of industrial activity in the US, leading the ISM Manufacturing PMI Index by 1 month with a correlation of 0.81 since the survey inception. The latest edition pegged the indicator to its fifth lowest level (42.6) on record, considerably lower than even the freight recession average of 54.2. It remains sub-50 for the sixteenth time in the past eighteen issues, reflecting the malaise in the freight economy.

The survey also tracks shipping managers' opinions on truck pricing, supply, and inventory levels. The Truck Capacity Indicator for shippers' views of available truckload capacity increased to 74.5 in the latest survey from 68.8 in the prior edition, as shippers see more available truck capacity. The Rate Indicator for shippers' views on truck rates increased to 33.0 from 31.3, in-line with spot rate moves as rate expectations rose after the end of March-May bid season (when annual contracts renew). The Inventory Indicator ticked up to 62.8 from 61.5 as shippers see slightly higher inventory levels.



Exhibit 185: BofA Truck Indicator and ISM Index

Two data sets have shown correlation since survey inception (0.81 on a one-month leading basis)



Source: BofA Global Research estimates, ISM Index

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Exhibit 187: Shippers' view of rates over next three months

Rate Indicator at 33.0, +1.7 pts sequentially

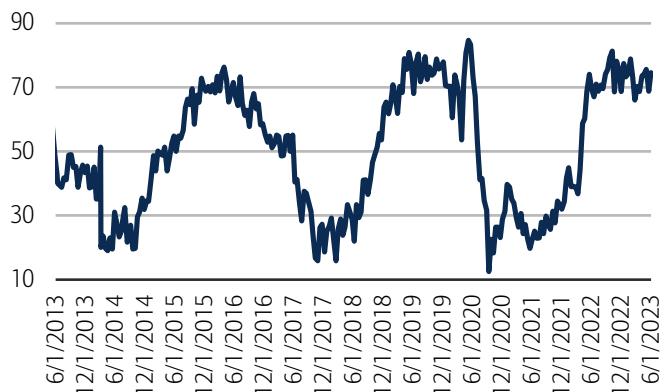


Source: BofA Global Research

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Exhibit 186: Shippers' view of available capacity

Capacity Indicator increased to 74.5, above its historic 50 avg



Source: BofA Global Research

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Exhibit 188: Shippers' view of inventory levels

Inventory Indicator at 62.8, up from 61.5 last issue



Source: BofA Global Research

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The ABC's of ESG

See our [ESG Primer](#) and [Follow the numbers, not the naysayers](#) for more on this topic.

What is ESG?

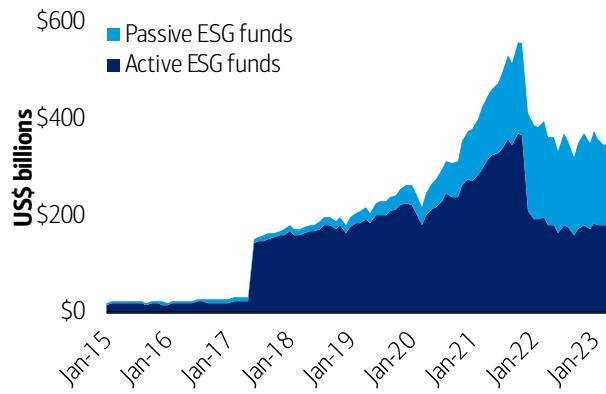
ESG investing captures the notion of using non-financial factors that incorporate the environmental impact (E), social impact (S) and governance attributes (G) of a corporation. Another related vein of investing is Thematic Investing, which delves into themes that impact the global economy/investment 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.

Exhibit 189: AUM in US ESG funds has plateaued in last year

Assets under management in US ESG equity funds, US\$ billions (1/2015-4/2023)

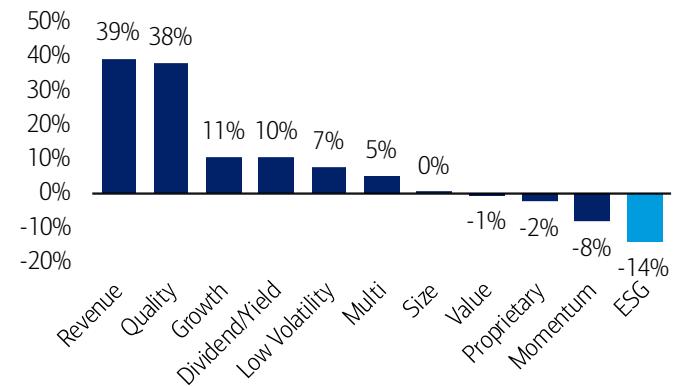


Source: EPFR Informa Financial Intelligence, BofA US Equity & Quant Strategy

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Exhibit 190: ESG smart beta ETF AUM declined YoY

AUM growth of smart beta ETF categories in Bloomberg, 4/30/2023 vs. 4/30/2022



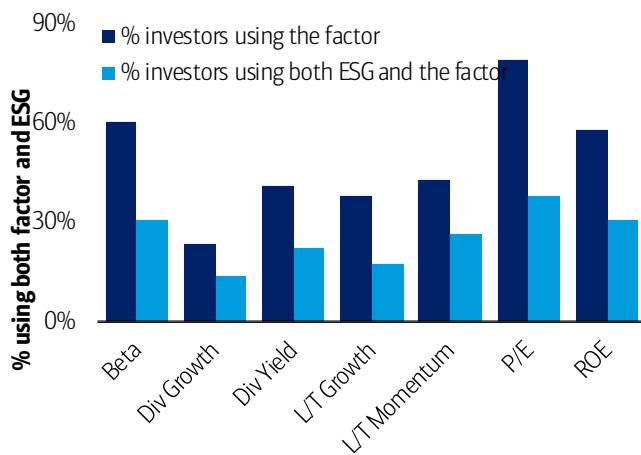
Source: Bloomberg Intelligence, BofA US Equity & Quant Strategy

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Exhibit 191: 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

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.

It's not politics, it's money

ESG has recently come under fire in the US, where it has been cast as marketing gimmickry to gather assets, as concessionary or anti-performance, as anti-populist or elitist, and as politically rather than financially motivated.

The landscape for professional investors is riddled with conflicting messages. ESG funds are criticized for including "bad actors" like oil or defense (see [note](#)). On the other hand, ESG funds with strict exclusion rules are criticized for lagging markets recently led by commodities, defense and other less ESG-friendly themes.

Our approach within ESG research has always been motivated by generating, rather than conceding returns. We have also tried to avoid a more exclusionary framework, leaving that capital allocation decision to individuals based on their individual value systems.

But we fear that US investors are throwing out the baby with the bathwater, ignoring the benefits we have found from incorporating ESG considerations into investment frameworks beyond political or moral inclinations. We here delineate the investment case for ESG, which like most things, is nuanced and the devil is in the details. We address the following questions primarily from the seat of a US equity investor, using mostly an empirical data-driven approach, to try to de-politicize this issue:

- The cost of ignoring ESG;
- ESG as a signal of superior fundamentals;
- Alpha from ESG + fundamental strategies;
- Best practices (dynamic nature, inclusion over exclusion).

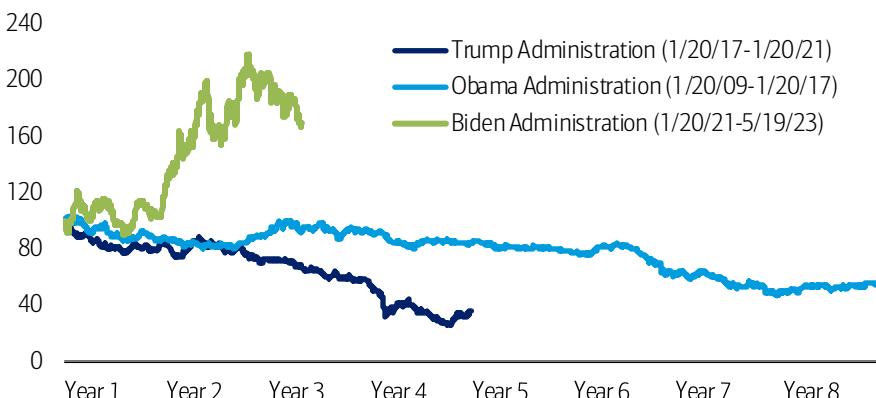
Do politics matter?

In Europe, which is considered to be ahead of the US and APAC, ESG has been driven by coordinated policy. In the US, it's less top down, and corporates and investors have done a lot of the work to push ESG to the forefront. One would imagine that dropping out of and then re-joining the Paris Accord, the Inflation Reduction Act, pipeline decisions and other fossil fuel related legislation would have a strong impact on performance of sustainable strategies. But performance has been more driven by supply and demand

than by legislation. Energy on a relative basis performed worst under the most friendly administration, but better amid more environmentally stringent administrations.

Exhibit 192: The Energy sector has underperformed under both the Obama and Trump Administrations, suggesting secular not policy-related headwinds

S&P 500 Energy Index relative performance (vs. S&P 500)



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

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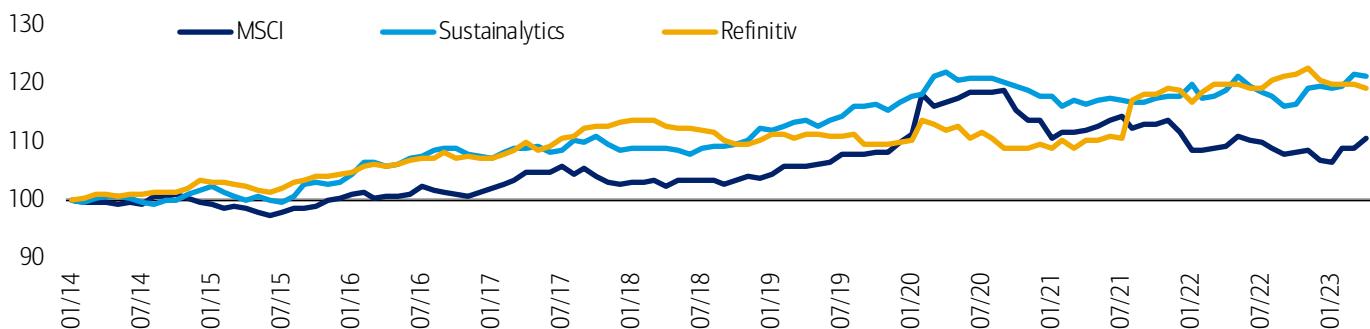
ESG + Quant = Alpha

We have shied away from the argument that investing purely based on ESG is a route to alpha. Why? (1) Returns can be conflated with sectors or styles - some argue high ESG ranks are most prevalent for asset-light growth stocks, or for large companies with more disclosure. (2) Returns on a shorter-term basis can capture inflows / outflows or popularity, rather than fundamental attributes. And (3) as we have seen for companies with other fundamentally attractive characteristics, like quality or growth potential, the scarcity of that attribute and the entry point valuation are more important determinants of future returns.

Don't use ESG in a vacuum. "Good" companies that trade at excessive premia often underperform "bad" companies that trade at excessive discounts. Valuation matters for any type of investing, including ESG.

Exhibit 193: Companies with top ranked ESG scores have been outperforming

Relative performance of top quintile companies by ESG scores vs. equal-weighted universe, 01/2014-4/2023



Source: MSCI ESG Research LLC, Sustainalytics, Refinitiv, FactSet, BofA US Equity & Quant Strategy

This performance is backtested and does not represent the actual performance of any account or fund. Backtested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein.

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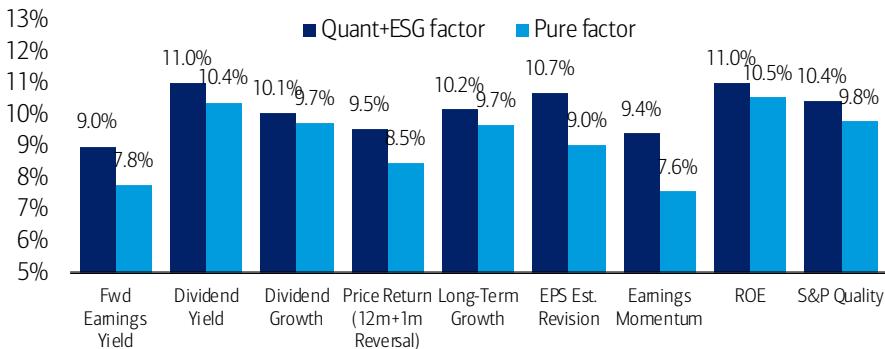


Our work on environmental social and governance components as a signal for superior ROE and lower earnings risk within sectors (see section Implementation guide for sectors) incorporate a multi-year time horizon. But in the short-term, adding an ESG factor to traditional fundamental styles has enhanced returns and reduced risk. Using the popular investment styles we track in our quantitative work (see [Institutional Factor Survey](#) for details) we found that adding ESG as a second equal-weighted factor to each screen would have improved performance both on an absolute and on a risk-adjusted basis. The improvement stood out most for earnings measures but was also effective for Dividend, Value, Momentum and Quality screens.

Adding ESG to fundamental investment techniques would have improved alpha and risk adjusted returns.

Exhibit 194: ESG has consistently augmented alpha when added to fundamental investment screens

Annualized total returns (backtested) of top quintile stocks by factor vs. ESG-blend factor (12/2005-4/2023)



Source: BofA US Equity & Quant Strategy

This performance is backtested and does not represent the actual performance of any account or fund. Backtested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein

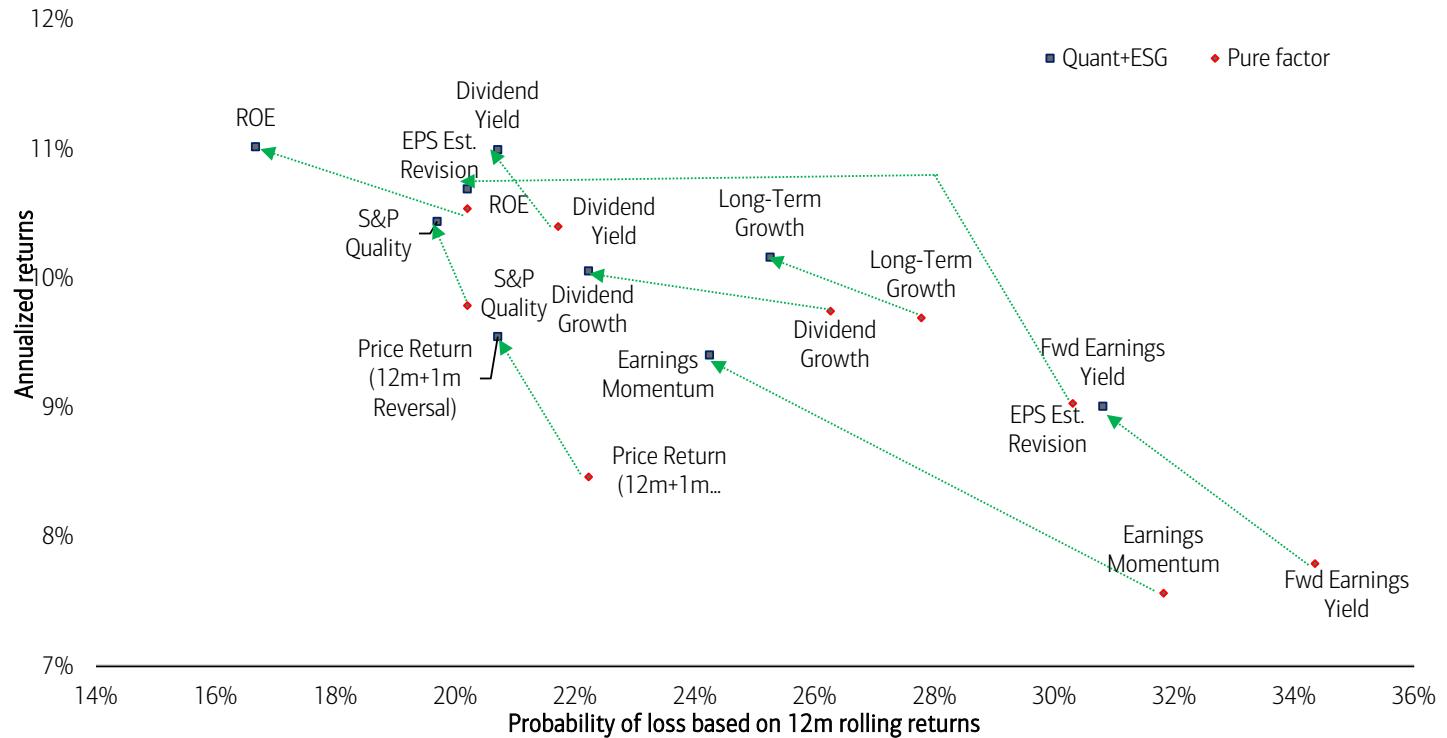
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Moreover, the performance of top-ranked stocks by ESG scores exhibited lower correlations with those of popular investment styles like Value, Growth and Income, suggesting that ESG adds more differentiated information to traditional investment approaches than does mingling fundamental investment styles (Exhibit 195). This makes intuitive sense, as attributes like carbon emissions, employee turnover and shareholder rights are not easily captured in current earnings, growth or payout measures.

ESG adds new information to traditional investment approaches. Its performance is less correlated with Growth, Value and Income style investing than these styles are with one another.

Exhibit 195: Annualized returns of pure quant factors and ESG blended quant factors vs. probability of loss

12/2005-4/2023

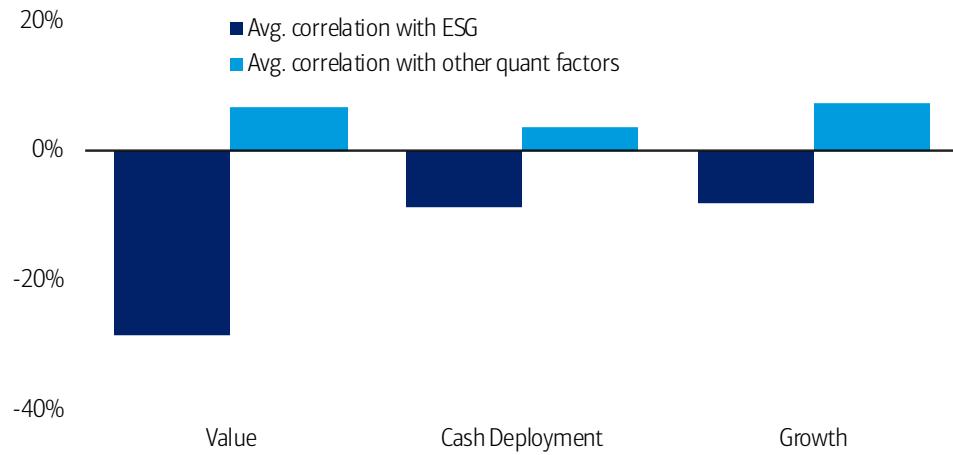


Source: BofA US Equity & Quant Strategy based on Refinitiv data

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Exhibit 196: ESG is negatively correlated with fundamental factors

Performance correlation between top decile S&P 500 stocks based on Sustainalytics ESG ranks vs. fundamental equity factors (2010-4/2023)



Source: BofA US Equity & Quant Strategy, Sustainalytics. Note: "Other quant factors" included in analysis were Risk, Value, Cash Deployment, Technical, Growth, and Quality factors.

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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 197: Secular uptrend in activist engagement

Activist campaigns targeting Russell 3000 companies* (2002-2023 YTD, as of 4/2023)



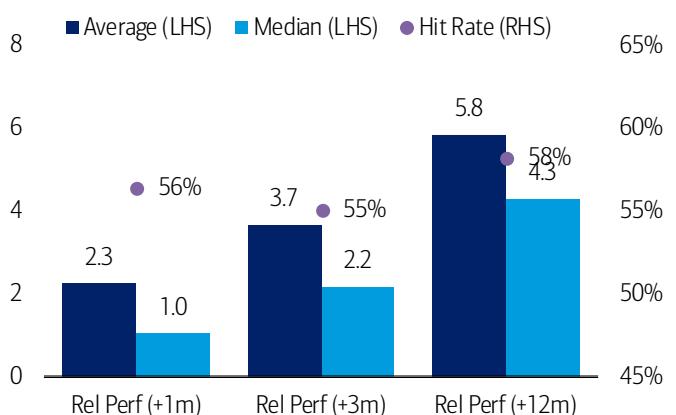
Source: FactSet, BofA US Equity & Quant Strategy

* in order to capture a sufficient number of data points, we used the Russell 3000 index as our universe

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Exhibit 198: Activist campaigns have historically driven future outperformance

Subsequent relative performance of Russell 3000 companies targeted by corporate governance campaigns (1994-4/2023)



Source: FactSet, BofA US Equity & Quant Strategy

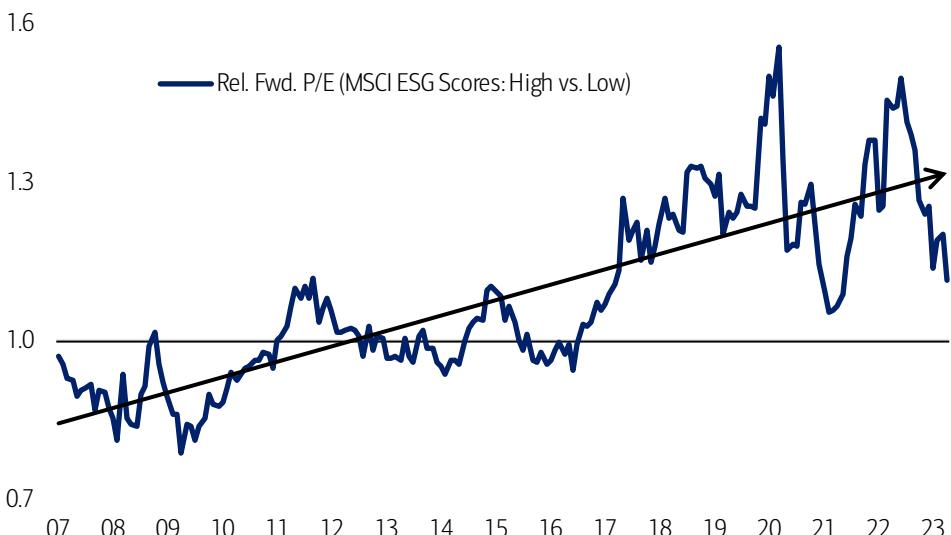
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A narrowing ESG premium

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. Whereas 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, today that premium valuation has shrunk to 12%. We find the learning curve has advanced and looking at a company's ESG ranks alone is no longer enough.

Exhibit 199: MSCI: 'Good' companies trade at a 12% premium to 'bad'

Relative forward P/E of S&P 500 companies in top vs. bottom quintile by MSCI ESG score, 1/2007-4/2023



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

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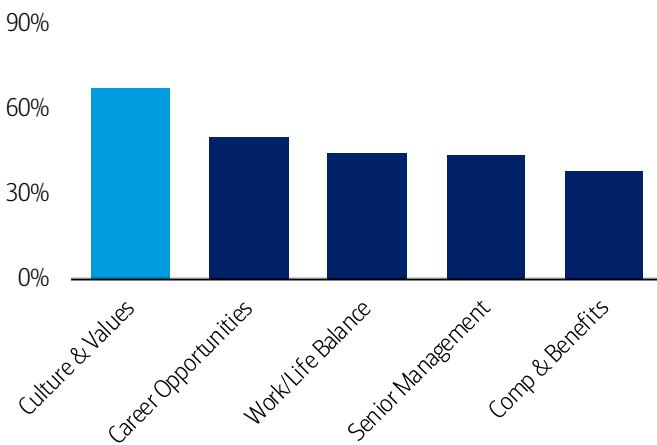


Quantifying the “S”: Culture is key

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 (Exhibit 200). 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 200: Culture & Values = 2x as important as compensation

R-sq of specific ranks on overall company Glassdoor score for US public companies, 1Q23 Glassdoor data

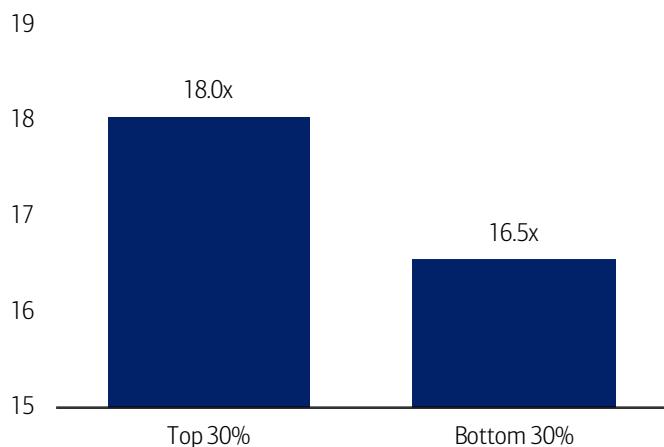


Source: Glassdoor, BofA US Equity & Quant Strategy

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Exhibit 201: Strong culture drives lower cost of capital

Median forward 12-month P/E for companies within top 30% (highest) and bottom 30% (lowest) of Culture & Values scores (Culture as of 1Q 2023; P/E as of 5/19/2023)

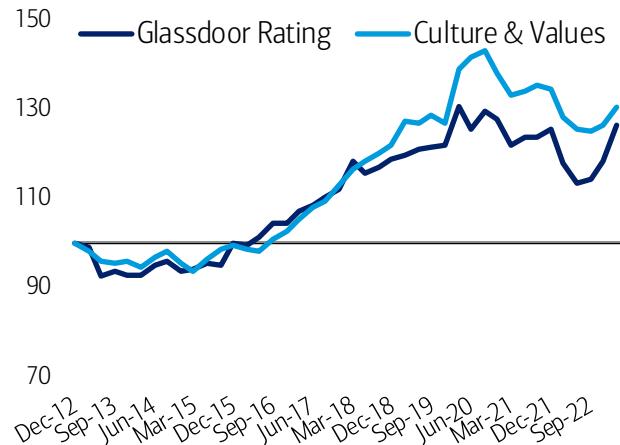


Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy

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Exhibit 202: Culture can be a more alpha-generative factor than overall Glassdoor rating

Cumulative returns of portfolio that longs high-rated quintile and shorts the low-rated quintile within S&P 500 (Glassdoor data as of 12/31/2022, returns as of 3/31/2023)

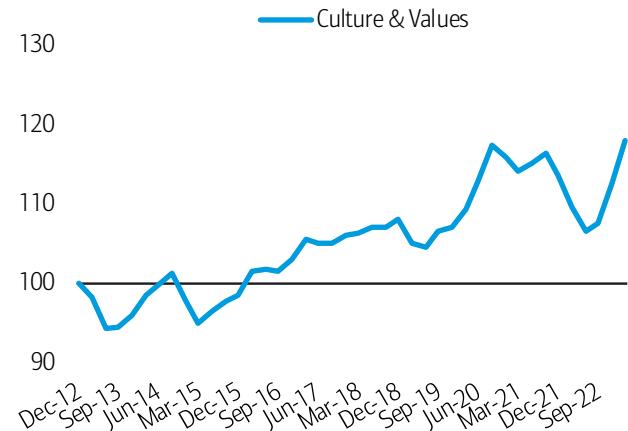


Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy

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Exhibit 203: Culture still results in 18% outperformance vs. bottom-ranked peers after adjusting for sector bias

Cumulative relative returns of high culture-ranked companies vs. bottom-ranked peers after adjusting for sector bias (Glassdoor data as of 12/31/2022, returns as of 3/31/2023)



Source: Glassdoor.com, FactSet, BofA US Equity & Quant Strategy

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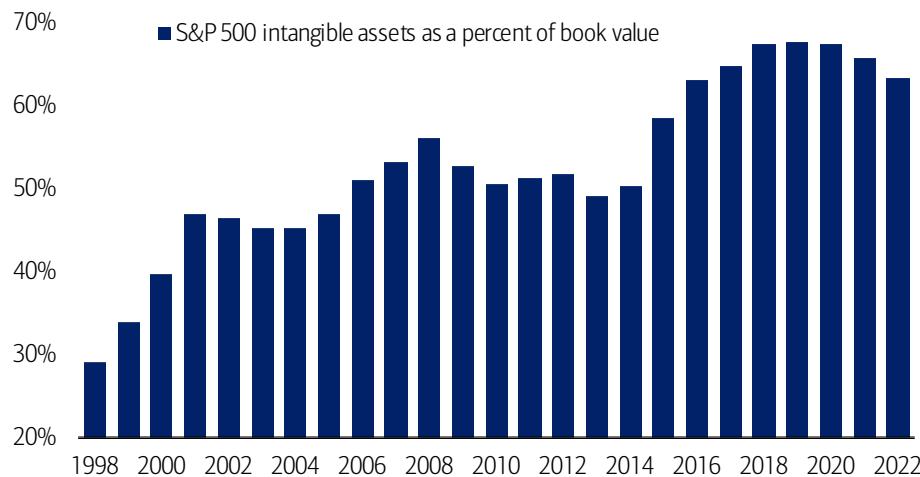
The cost of ignoring ESG

Secular forces are driving the imperative to incorporate ESG characteristics into ones asset allocation and investment decisions. These include:

- **Intangibles:** A large and growing chunk of assets on the average US company's balance sheet is attributable to brand, reputation, intellectual property, talent pool and intangible factors (Exhibit 203).
- **Climate:** Within the last decade, major weather and climate disasters totaled over \$1 trillion (Exhibit 204) where tropical cyclones have contributed most.
- **ESG controversies:** Stocks involved in major ESG controversies (like product safety, data breaches, workplace harassment, accounting scandals, etc.) drove \$600bn+ of lost S&P 500 market cap over the last decade and downdrafts lasted one year (Exhibit 206). It took over two years for employees' perception of culture to begin to improve.
- **Existential risk:** Average Environmental and Social scores ahead of an S&P 500 company filing for bankruptcy between 2008 and 2015 were consistently lower (Exhibit 205). If an investor had observed E and S scores five years prior to bankruptcy and had only bought stocks with above average scores, (s)he would have avoided 90% (15 of 17) of the bankruptcies that occurred.

Exhibit 204: Asset opacity in the US is near an all-time high

S&P 500 intangible assets as a percent of book value, 1998-2022

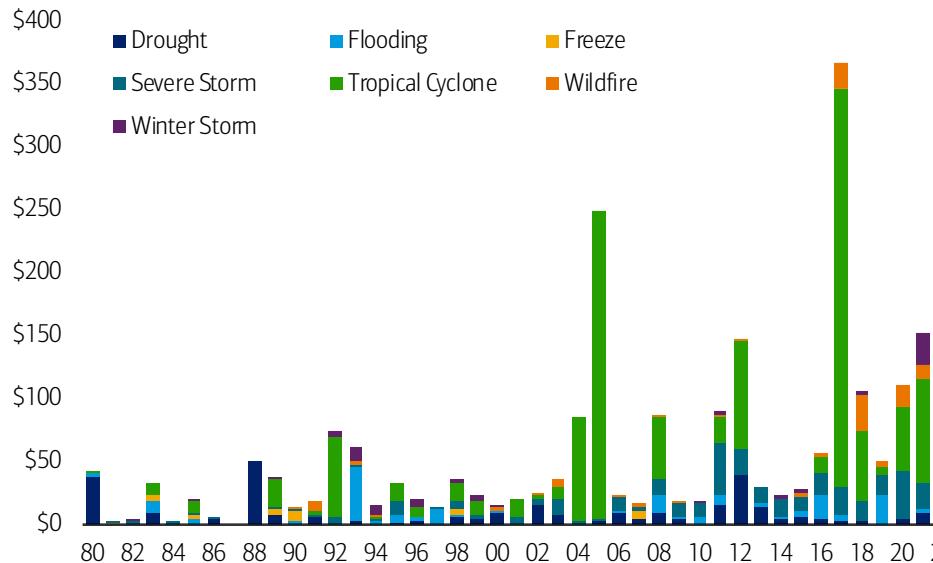


Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 205: 2022 was the third most expensive year of disasters within the last 4 decades

Costs of Billion-Dollar Weather and Climate Disasters in U.S. (1980-2022)



Source: NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022).

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Exhibit 206: Tropical cyclones have accounted for the majority of disaster costs in recent years

Billion-dollar weather and climate disasters in U.S. by decade

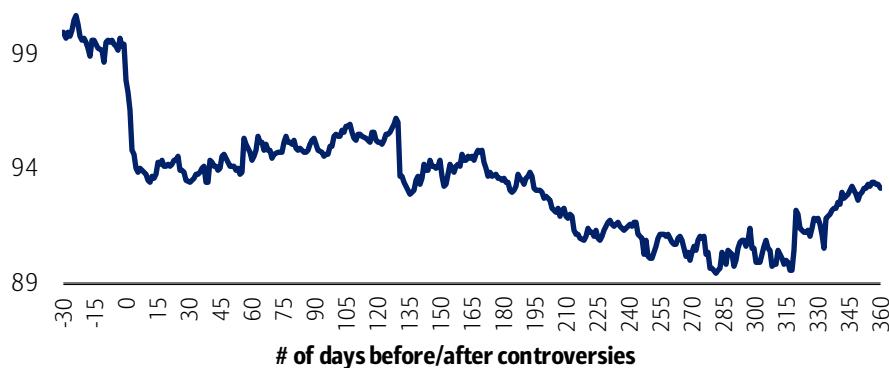
Decade	# of Bn-Dollar Disasters	Cost (\$Bn, CPI-adj.)	% of Total Cost						
			Drought	Flooding	Freeze	Severe Storm	Tropical Cyclone	Wildfire	Winter Storm
1980s	31	\$201.5	54.2%	7.7%	7.9%	5.8%	21.4%	0.0%	3.0%
1990s	55	\$307.7	8.2%	22.1%	4.0%	12.0%	37.8%	4.2%	11.7%
2000s	67	\$576.1	10.8%	3.2%	0.9%	11.4%	70.2%	3.3%	0.2%
2010s	128	\$918.8	9.7%	7.5%	0.1%	19.8%	54.2%	7.1%	1.6%

Source: NOAA National Centers for Environmental Information (NCEI), BofA US Equity & Quant Strategy

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Exhibit 207: Major ESG controversies drove >\$600bn losses, avg. downdraft of >one year

Performance of ESG controversy stocks relative to the S&P 500 (market cap weighted, 30 days prior to through 360 days post controversy)



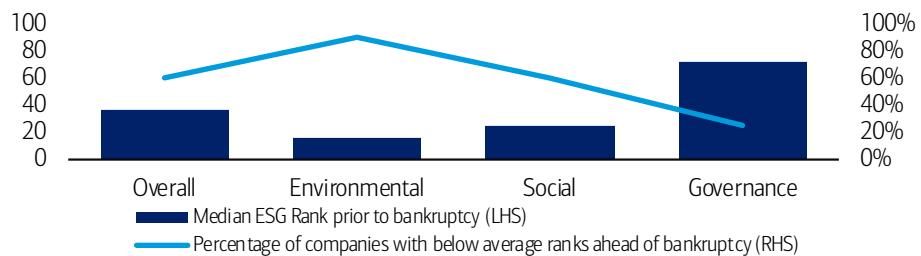
Source: FactSet, BofA US Equity & Quant Strategy. Includes 34 major controversies related to data breaches, accounting scandals, customer safety, sexual harassment, and other ESG topics. See Appendix for list of companies.

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Exhibit 208: 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

The factors that have historically been the most effective signals of future return on equity and 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. Some key highlights:

- In commodity-oriented sectors (Energy/Industrials/Materials), Environmental factors (such as emissions or waste) were unsurprisingly among the best signals of future ROE and earnings risk. Chemical Safety Exposure (a Social factor) was also key in Materials, and Opportunities in Renewables/CleanTech were important signals in both Energy and Utilities.
- In Consumer Discretionary – the most labor-intensive sector – Social factors including Labor Management were among the best signals of future ROE.
- Governance factors were among the best signals of future ROE or earnings risk in Tech and Financials – unsurprising given the heightened number of ESG controversies within Tech and our findings around the importance of Governance scores ahead of the Global Financial Crisis.



Table 1: MSCI ESG metrics that have been the most effective signals of future return on equity and earnings risk

Materiality Map: factors that have historically been the most effective signals of future return on equity (5-yr) and earnings risk (3-yr) for each sector

Return on Equity	Earnings Risk
Social: Labor Management, Product Safety Theme score Governance: Compensation Policy	Environmental: Packaging and Waste Material
Social: Opportunities in Nutrition & Health	Governance: Governance ranks and Accounting policies
Environmental: Carbon Emission exposure/ Opportunities in Renewable energy	Environmental: Energy Efficiency Exposure Governance: Ownership
Environmental: Toxic Emissions and Waste Score Governance: Corporate Governance score and Social: Labor management	Governance: Financial System Instability/ Board Ranks/ Responsible Investing Exposure
Environmental: Electronic waste/ CleanTech exposure	Environmental: Packaging Material & Waste exposure Social: Access to finance exposure
Environmental: Packaging Materials and Waste exposure Governance: Ownership & Accounting practices	Environmental: Carbon Emissions Governance: Business ethics, Corruption & Instability and Compensation
Social: Product Safety Governance: Privacy & Data security/ Business Ethics	Governance: Ownership & control
Governance: Controversy exposure scores and Ownership & Control	Social: Access to Communications, Human Capital Governance: Business Ethics
Social: Chemical safety exposure Environmental: Climate change, water management	Social: Chemical safety exposure
Social: Health & Safety scores, Labor management Environmental: Toxic Emissions & Waste	Social: Access to Finance exposure Governance: Accounting policies
Governance: Board Ranks	Environmental: Natural Resource Use, Opportunities in CleanTech Social: Human Capital

Source: MSCI ESG Research LLC, BofA US Equity & Quant Strategy

Backtesting is hypothetical in nature and reflects application of the analytical approach prior to its introduction. It is not actual performance and is not intended to be indicative of future performance.

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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 (see ESG: From A to Z, 8 November 2019) 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.



Section II: Stock Strategies within the S&P 500

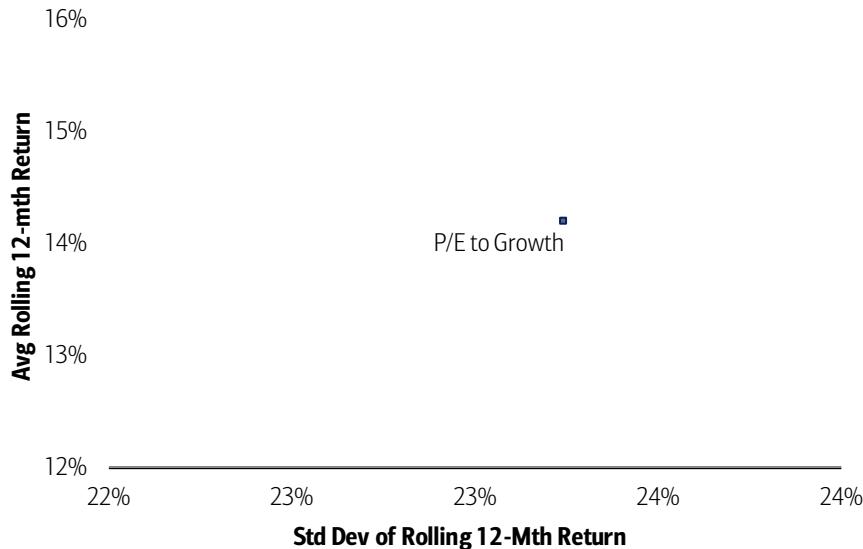
GARP Strategies	104
Valuation Strategies	106
Cash Deployment Strategies	116
Momentum Strategies	120
Growth Strategies	130
Quality Strategies	137
Risk Strategies	144
Miscellaneous Strategies	149

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

GARP Strategies

Exhibit 209: GARP Strategy

P/E to Growth historically returned 14.2% over 12-month rolling period

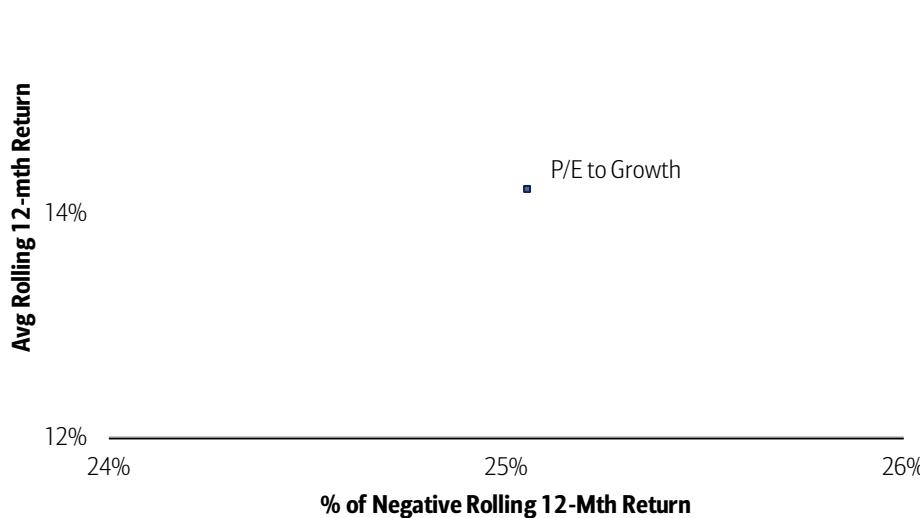


Source: BofA US Equity and Quant Strategy

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Exhibit 210: GARP Strategy

P/E to Growth historically returned 14.2% over 12-month rolling period



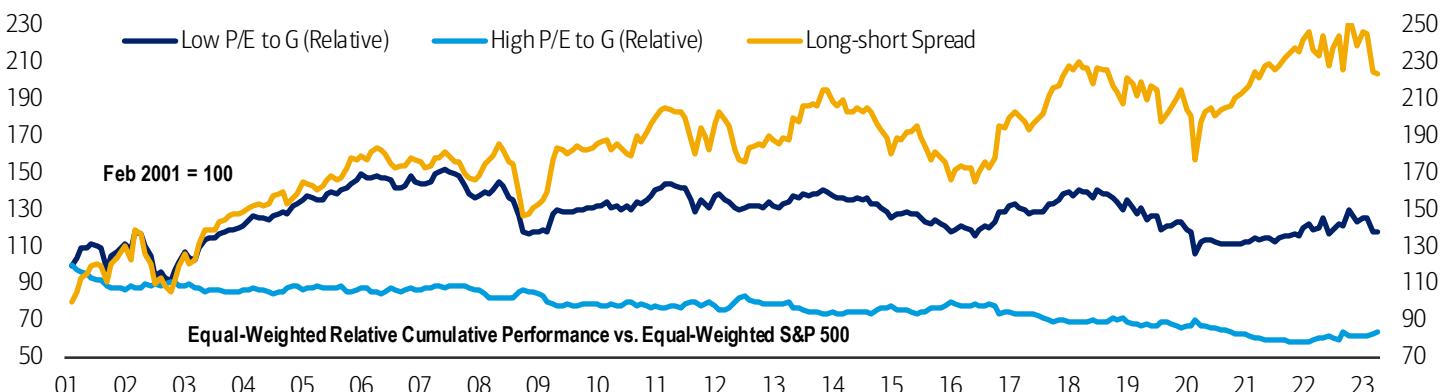
Source: BofA US Equity and Quant Strategy

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P/E-to-Growth

Exhibit 211: Performance of Low P/E to Growth, High P/E to Growth and Long-Short Spread

The factor has underperformed the index YTD

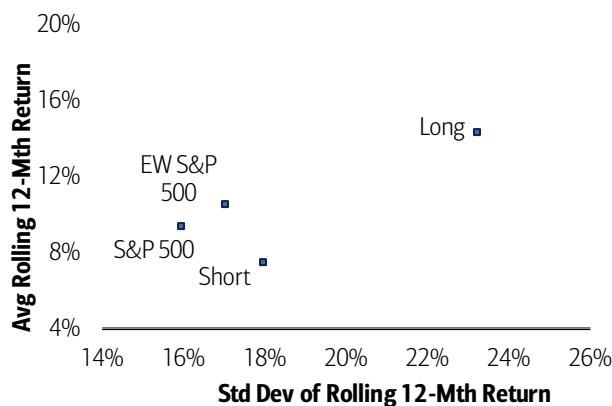


Source: BofA US Equity and Quant Strategy

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Exhibit 212: Low P/E to Growth Risk Reward

The factor has historically outperformed the index

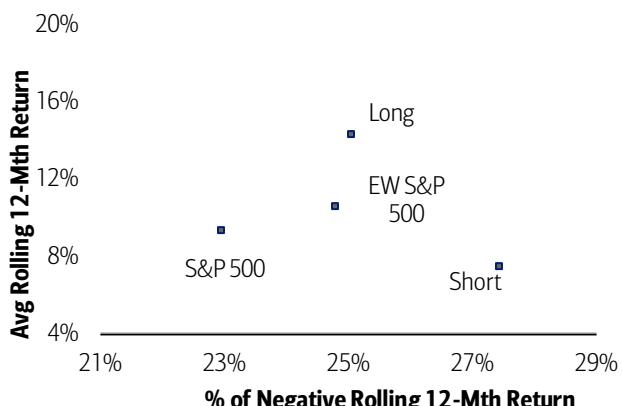


Source: BofA US Equity and Quant Strategy

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Exhibit 213: Low P/E to Growth Downside Risk Reward

The factor has historically outperformed the index

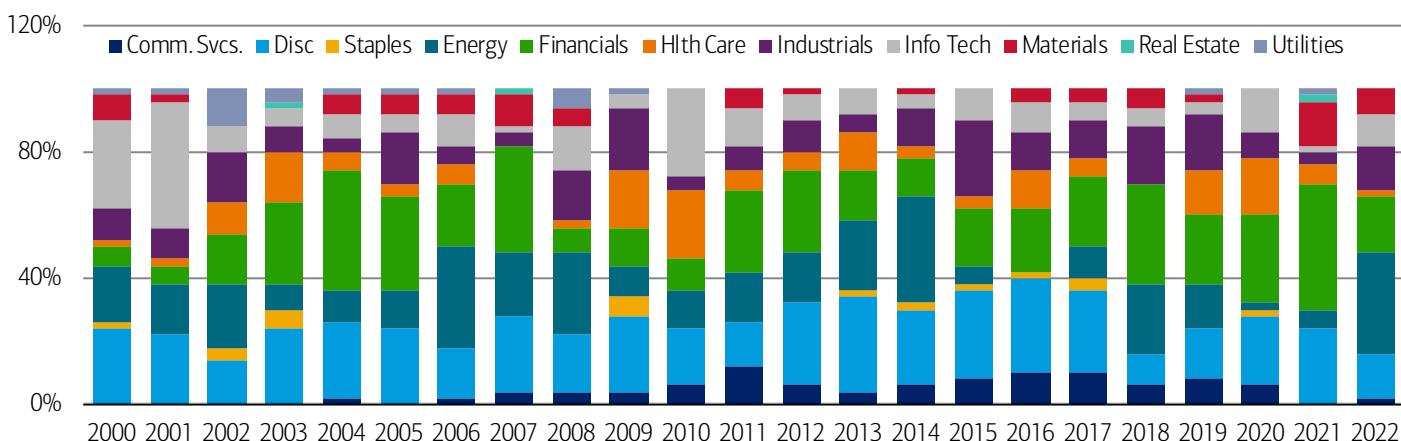


Source: BofA US Equity and Quant Strategy

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Exhibit 214: P/E to Growth Sector Concentration (Low Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

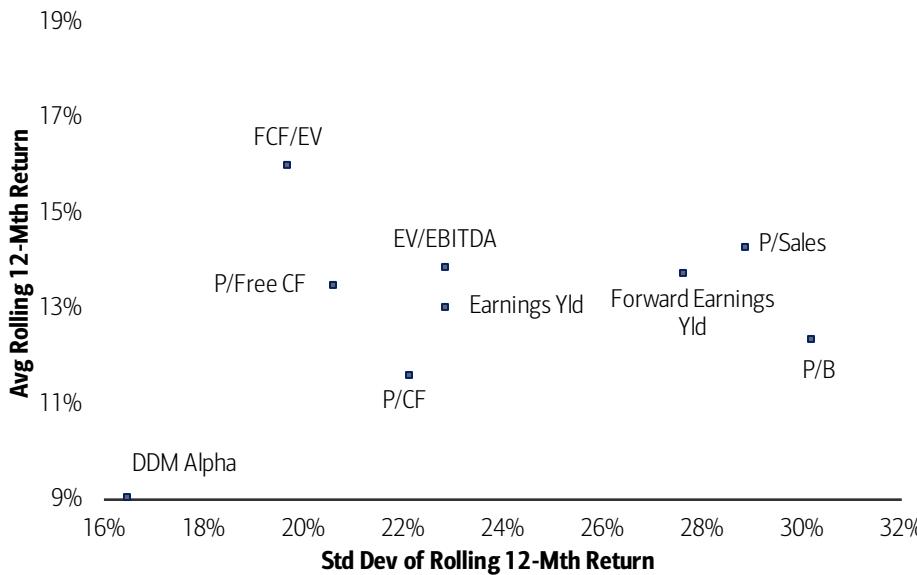
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Valuation Strategies

Exhibit 215: Valuation Strategies

FCF/EV fared best

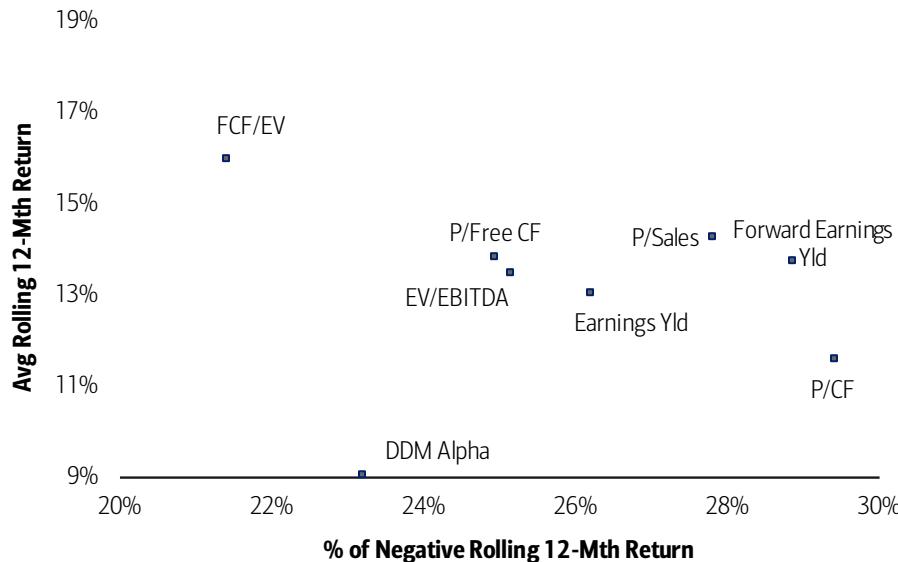


Source: BofA US Equity and Quant Strategy

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Exhibit 216: Valuation Strategies

FCF/EV fared best



Source: BofA US Equity and Quant Strategy

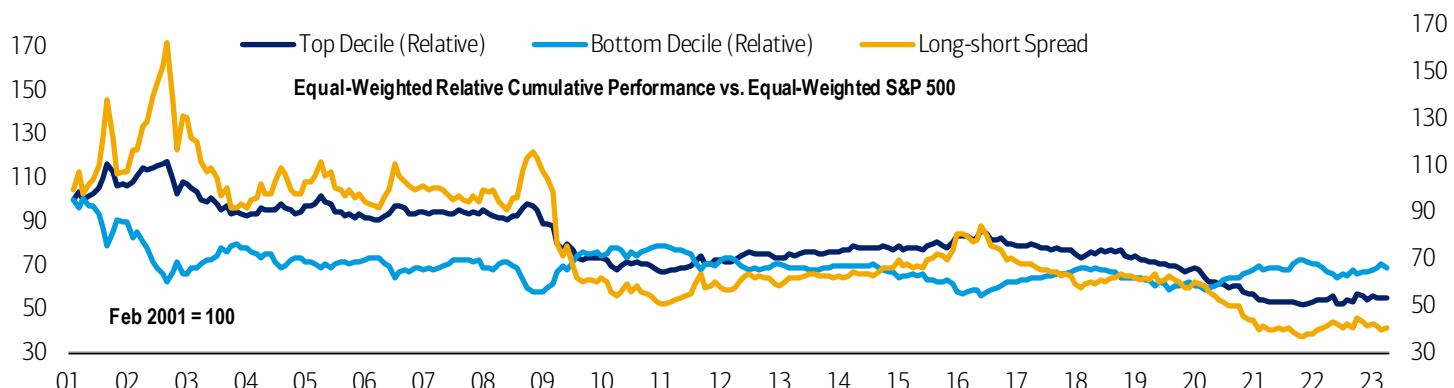
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DDM Alpha

Exhibit 217: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

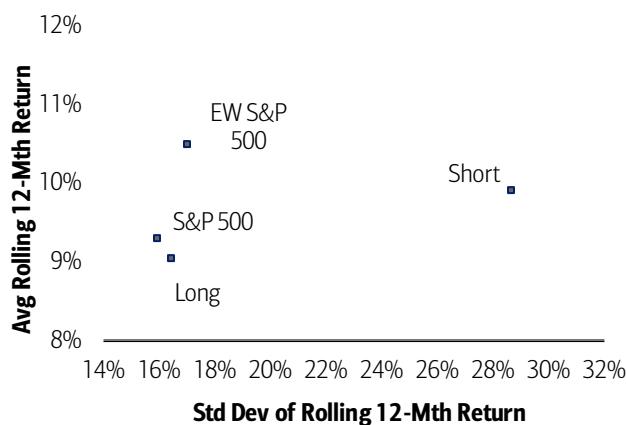


Source: BofA US Equity and Quant Strategy

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Exhibit 218: DDM Risk Reward Characteristics

The factor has outperformed the index YTD

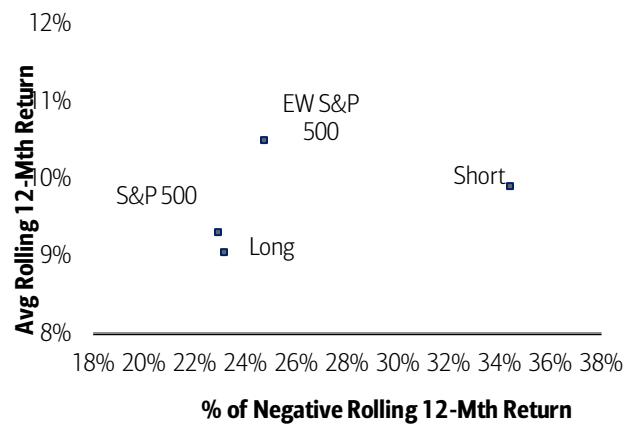


Source: BofA US Equity and Quant Strategy

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Exhibit 219: DDM Downside Risk Reward

The factor has outperformed the index YTD

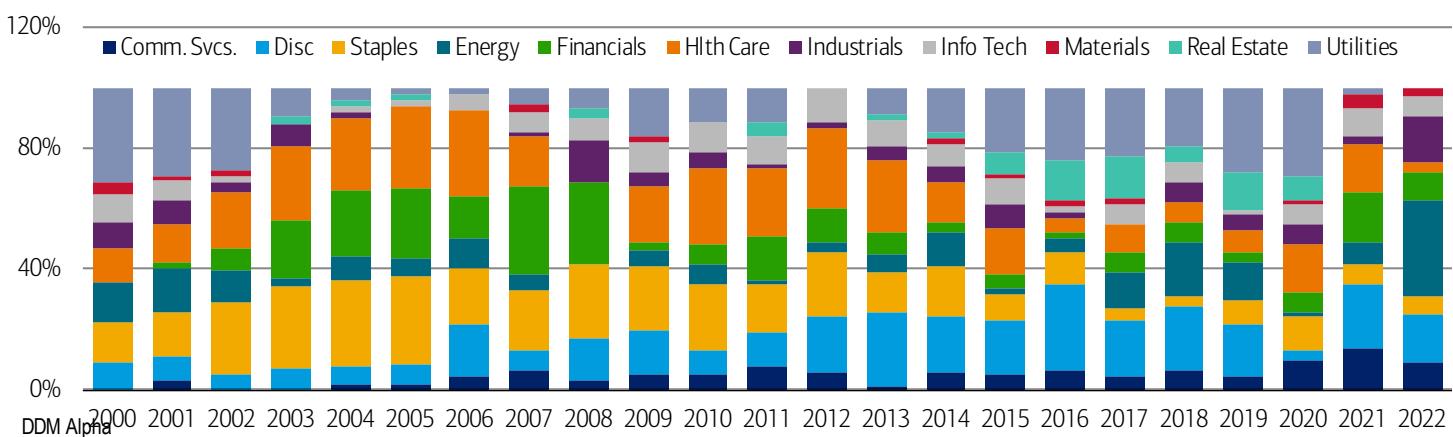


Source: BofA US Equity and Quant Strategy

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Exhibit 220: DDM Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

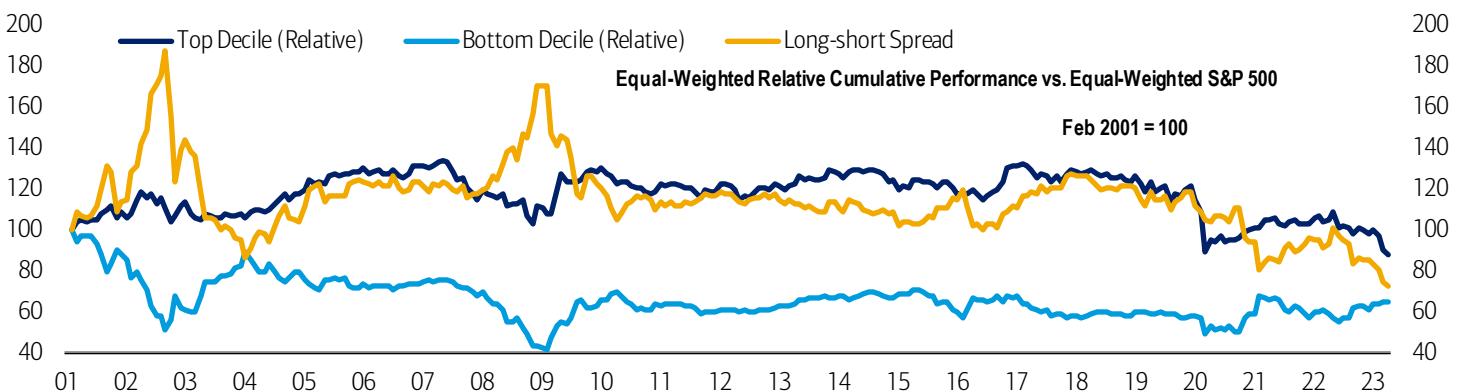
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Earnings Yield

Exhibit 221: Performance of Top Decile, Bottom Decile and Long-Short Spread

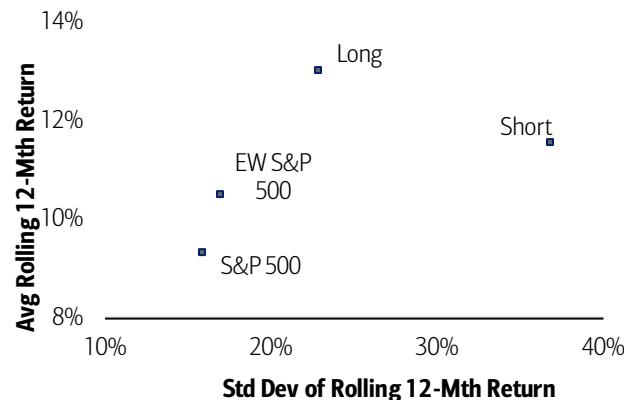
The factor has underperformed the index YTD



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Exhibit 222: High Earnings Yield Risk Reward Characteristics

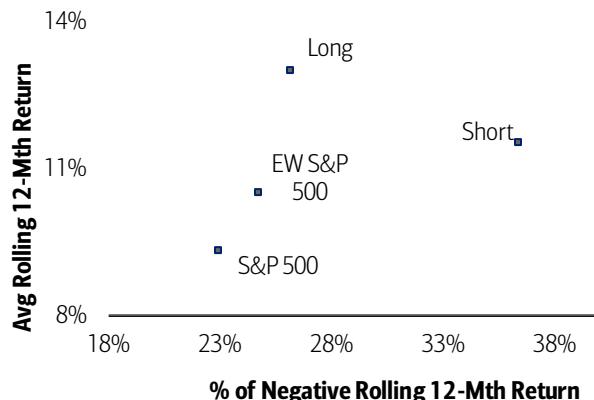
The factor has historically outperformed the index



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Exhibit 223: High Earnings Yield Downside Risk Reward

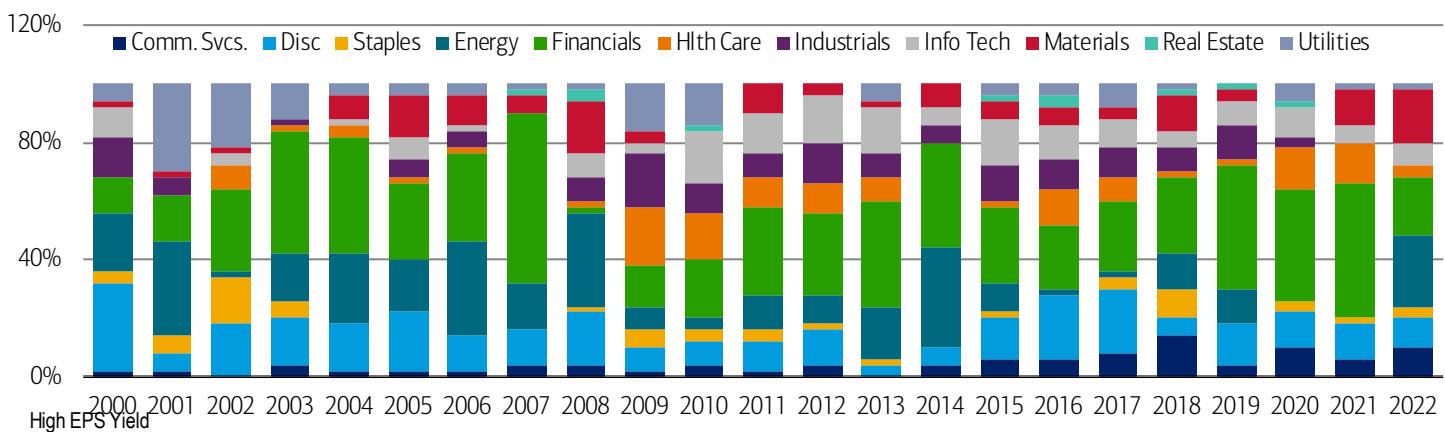
The factor has historically outperformed the index



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Exhibit 224: High Earnings Yield Sector Concentration (Top Decile)

The factor has most weight in Energy



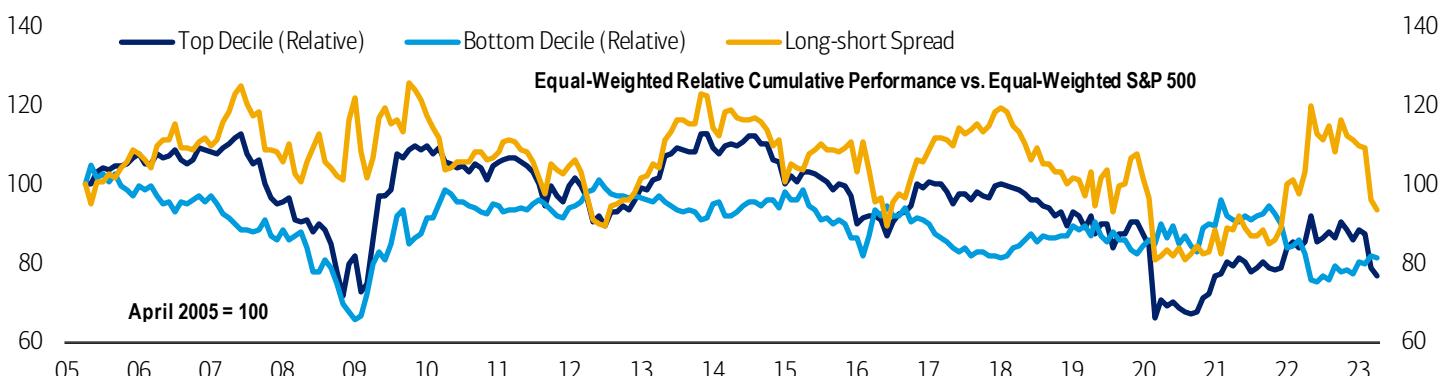
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Forward Earnings Yield

Exhibit 225: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

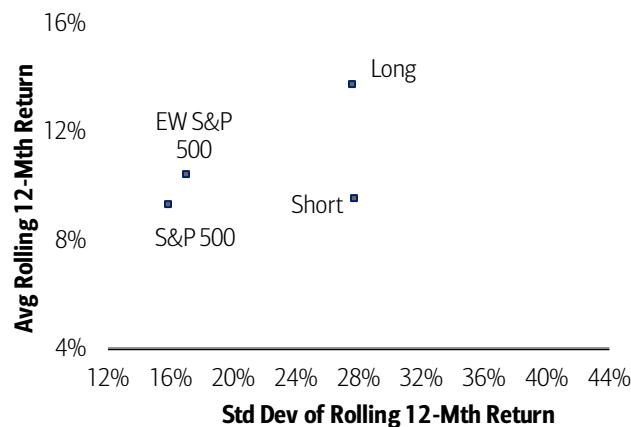


Source: BofA US Equity and Quant Strategy

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Exhibit 226: High Forward Earnings Yield Risk Reward Characteristics

The factor has historically outperformed the index

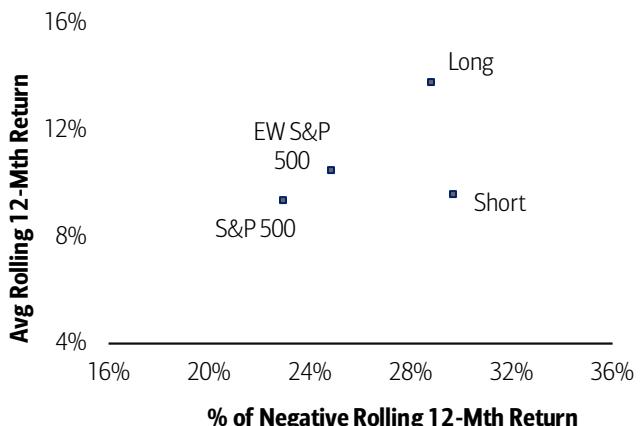


Source: BofA US Equity and Quant Strategy

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Exhibit 227: High Forward Earnings Yield Downside Risk Reward

The factor has historically outperformed the index

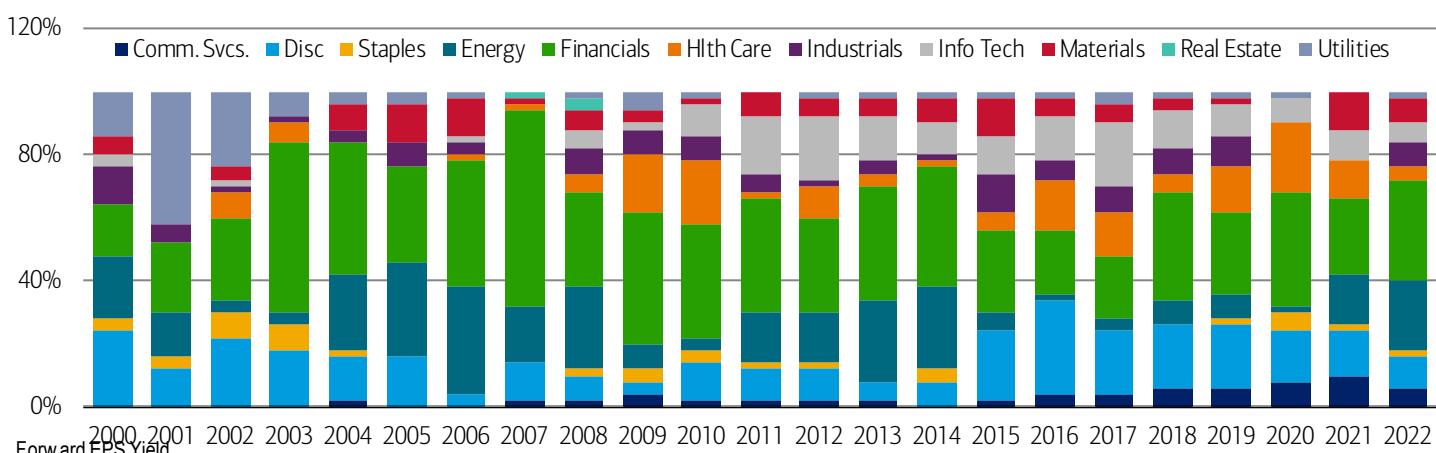


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 228: High Forward Earnings Yield Sector Concentration (Top Decile)

The factor has most weight in Financials



Source: BofA US Equity and Quant Strategy

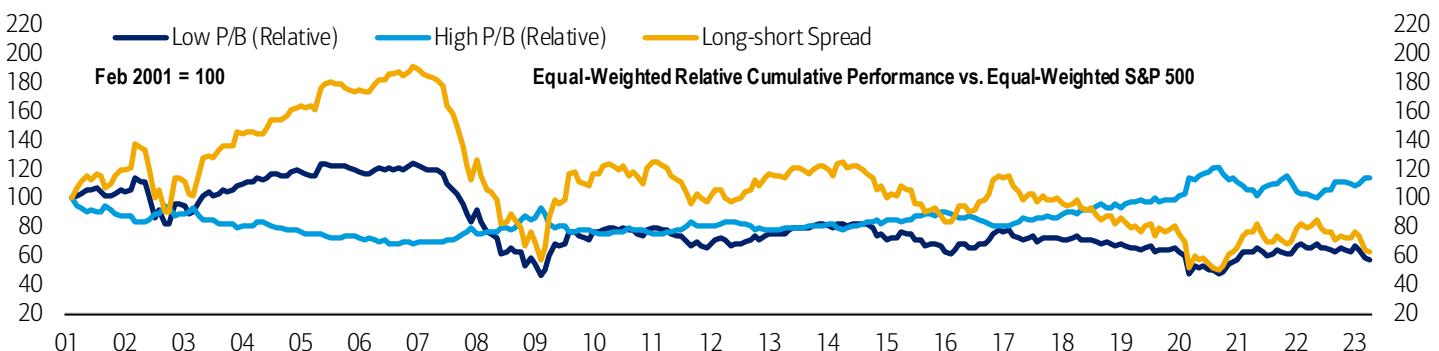
BofA GLOBAL RESEARCH



Price/Book Value

Exhibit 229: Performance of Low P/B, High P/B and Long-Short Spread

The factor has underperformed the index YTD

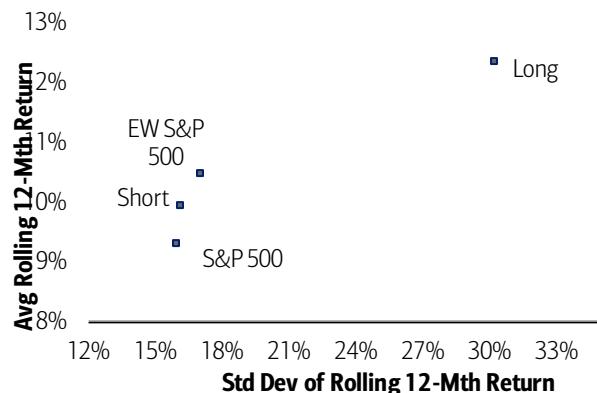


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 230: Low Price/Book Value Risk Reward Characteristics

The factor has historically outperformed the index

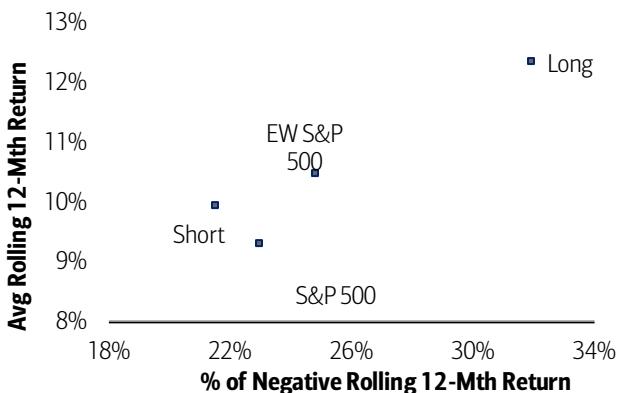


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 231: Low Price/Book Value Downside Risk Reward

The factor has historically outperformed the index

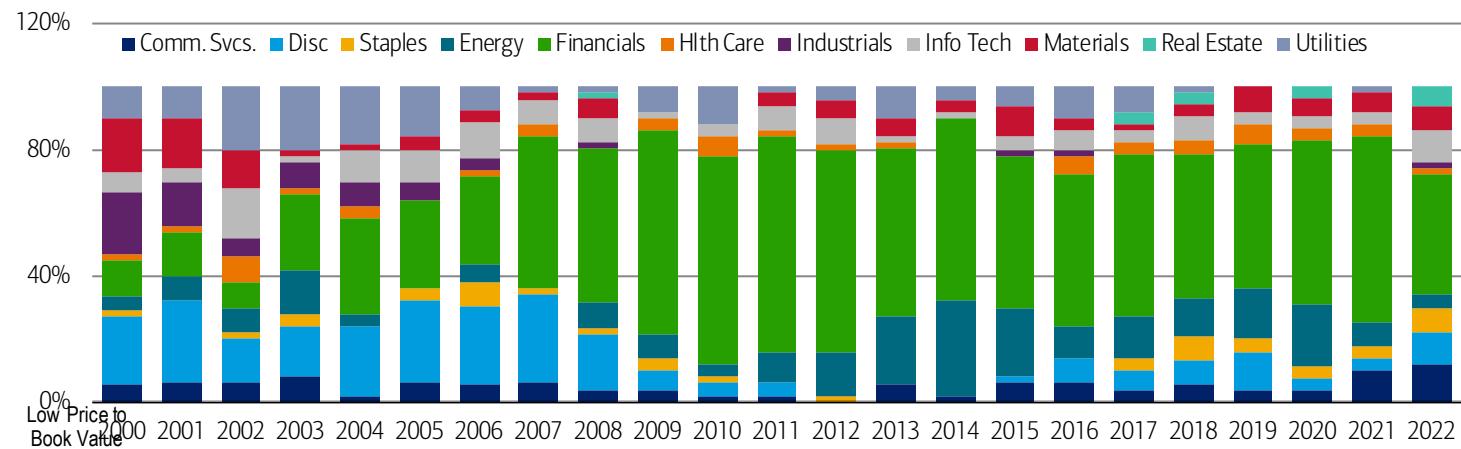


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 232: Low Price/Book Value Sector Concentration (Low Decile)

The factor has most weight in Financials



Source: BofA US Equity and Quant Strategy

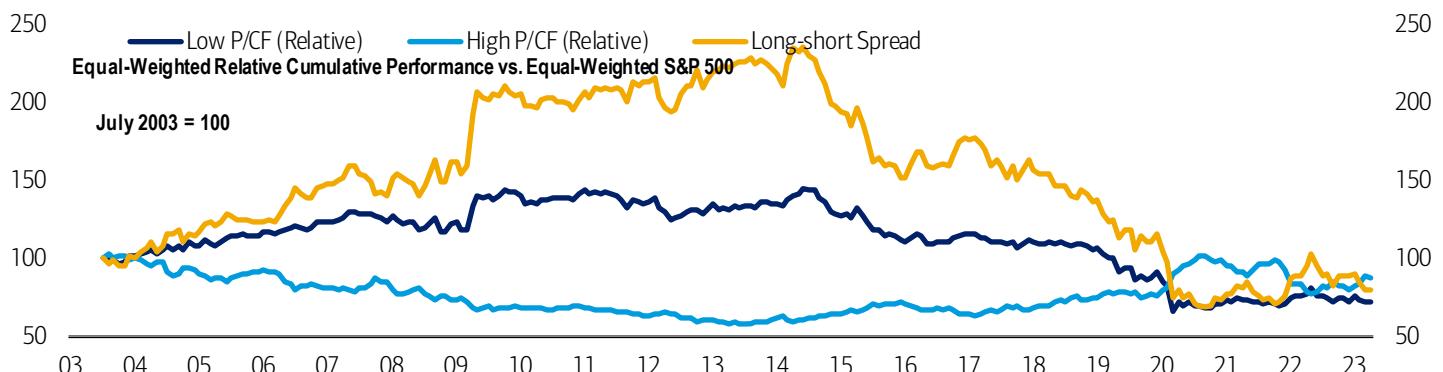
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Price/Cash Flow

Exhibit 233: Performance of Low P/CF, High P/CF and Long-Short Spread

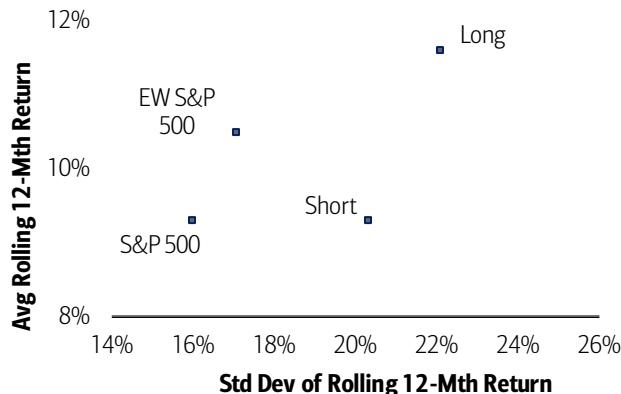
The factor has underperformed the index YTD



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Exhibit 234: Low Price/Cash Flow Risk Reward Characteristics

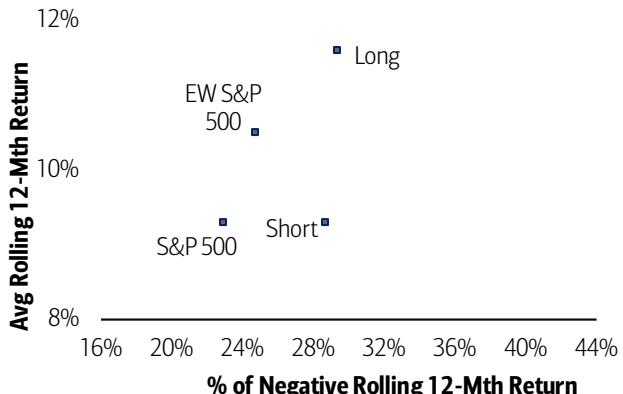
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 235: Low Price/Cash Flow Downside Risk Reward

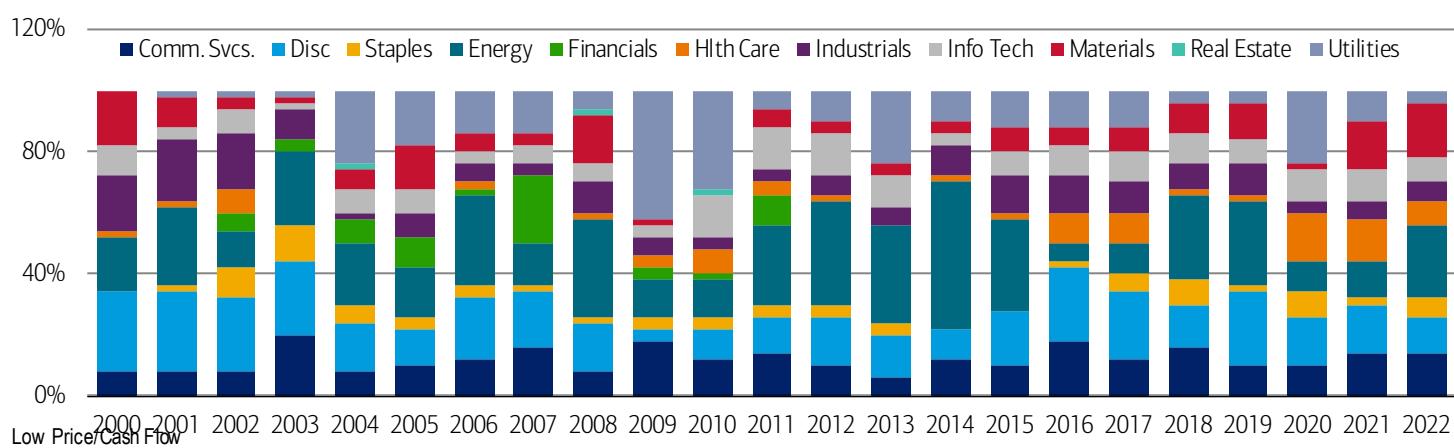
The factor has historically outperformed the index



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Exhibit 236: Low Price/Cash Flow Sector Concentration (Low Decile)

The factor has most weight in Energy



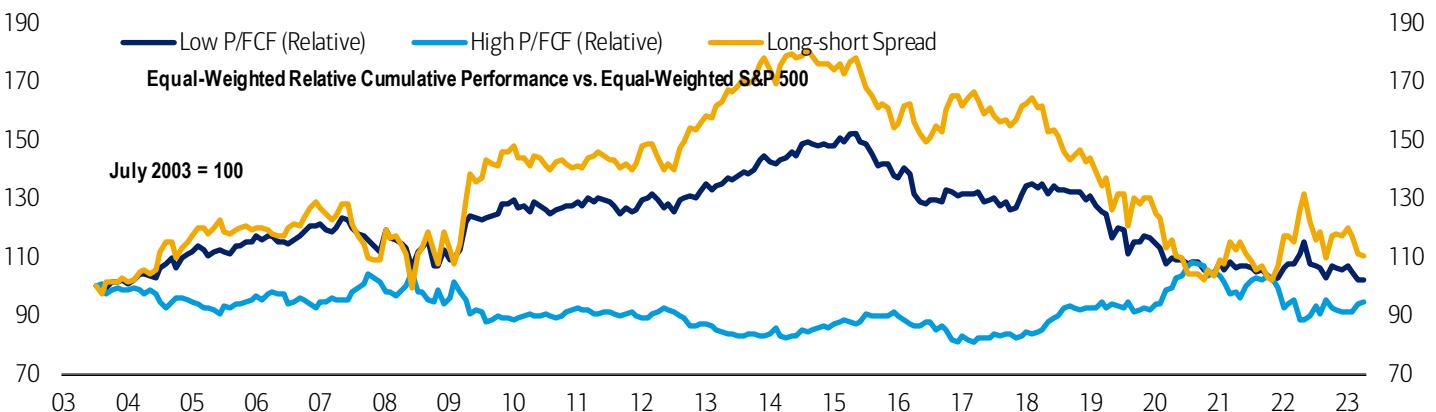
BofA GLOBAL RESEARCH



Price/Free Cash Flow

Exhibit 237: Performance of Low P/FCF, High P/FCF and Long-Short Spread

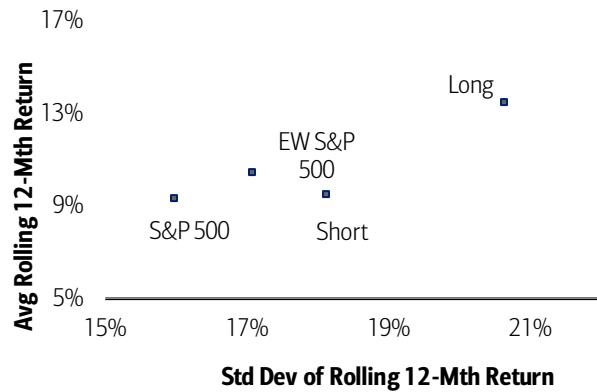
The factor has underperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 238: Low Price/Free Cash Flow Risk Reward Characteristics

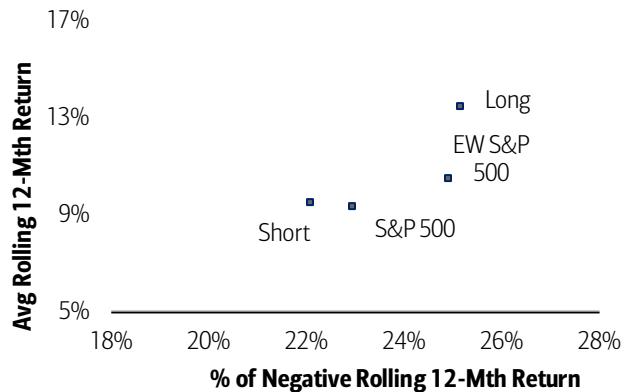
The factor has historically outperformed the index



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Exhibit 239: Low Price/Free Cash Flow Downside Risk Reward

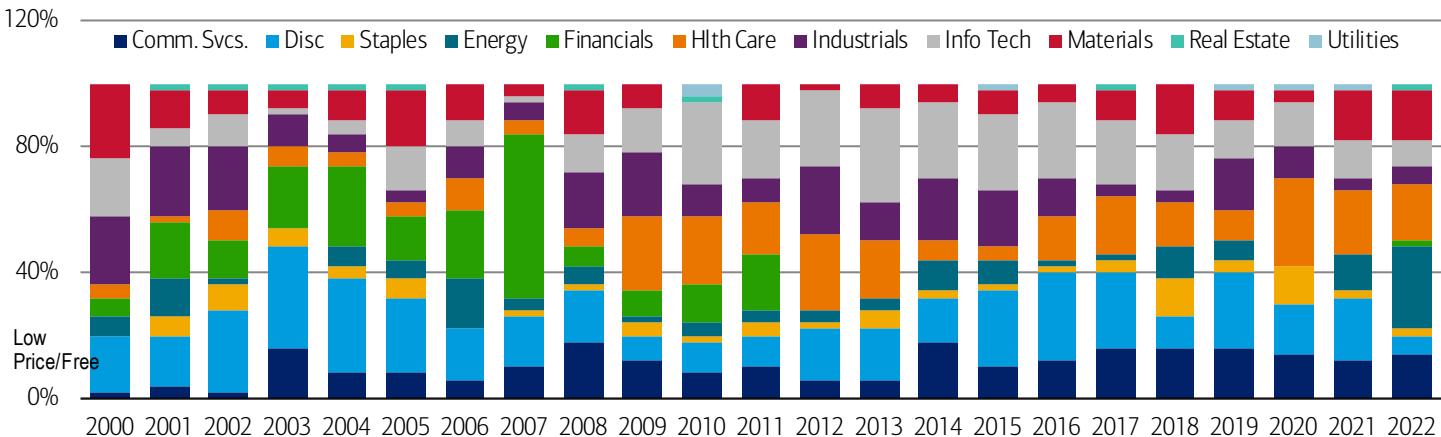
The factor has historically outperformed the index



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Exhibit 240: Low Price/Free Cash Flow Sector Concentration (Low Decile)

The factor has most weight in Energy



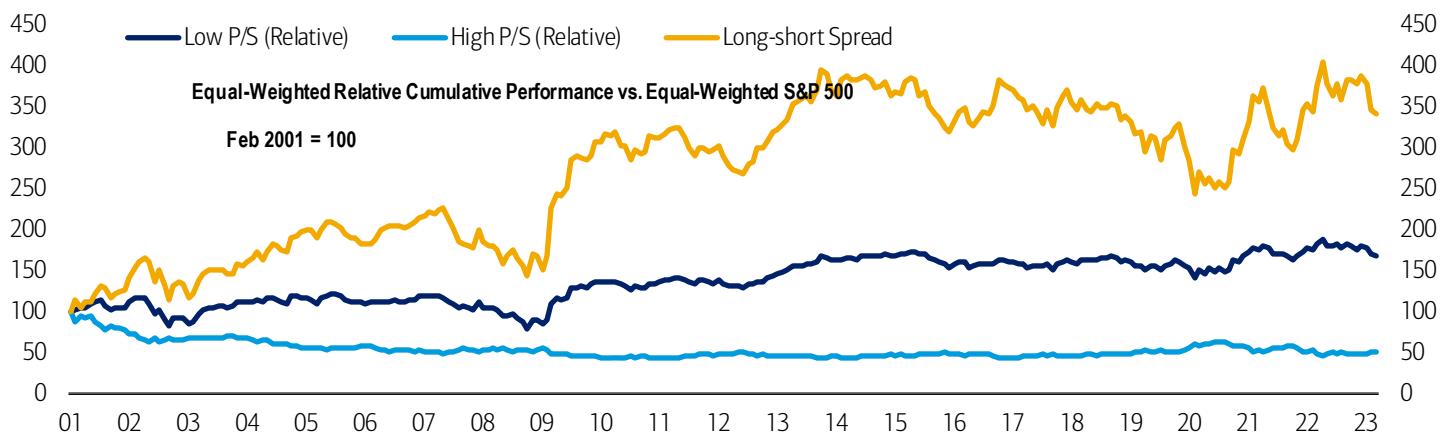
BofA GLOBAL RESEARCH



Price/Sales

Exhibit 241: Performance of Low P/S, High P/S and Long-Short Spread

The factor has underperformed the index YTD

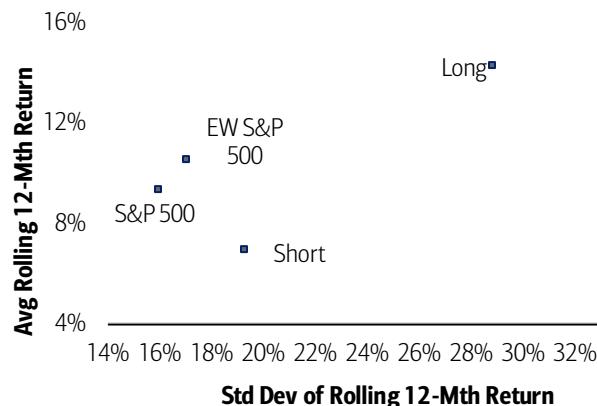


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 242: Low Price/Sales Risk Reward Characteristics

The factor has historically outperformed the index

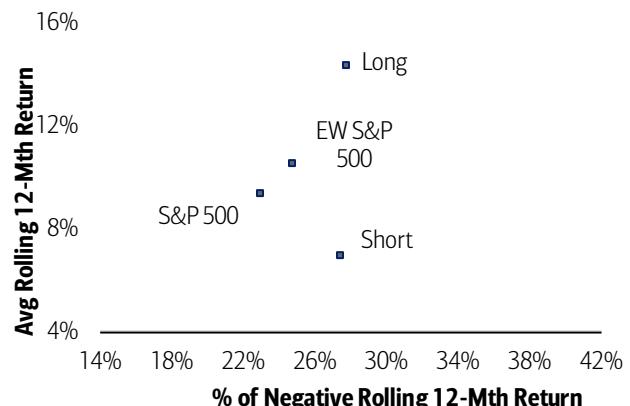


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 243: Low Price/Sales Downside Risk Reward

The factor has historically outperformed the index

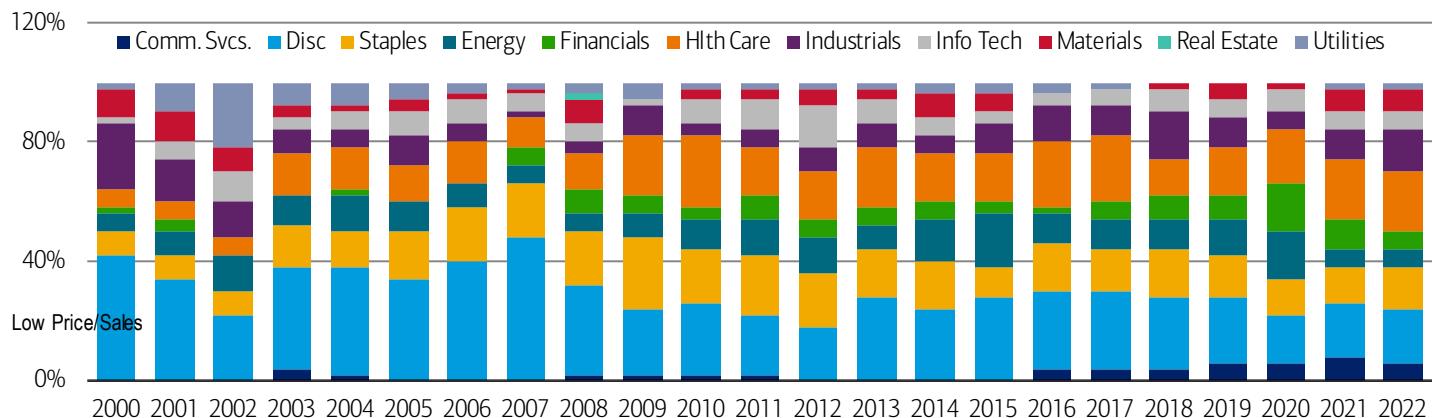


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 244: Low Price/Sales Sector Concentration

The factor has most weight in Health Care



Source: BofA US Equity and Quant Strategy

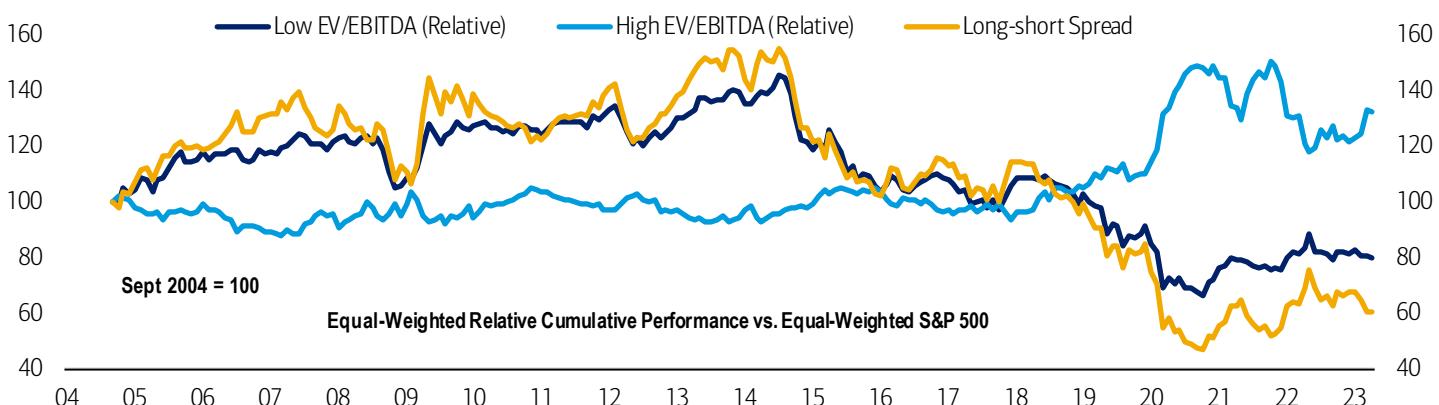
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EV/EBITDA

Exhibit 245: Performance of Low EV/EBITDA, High EV/EBITDA and Long-Short Spread

The factor has underperformed the index YTD

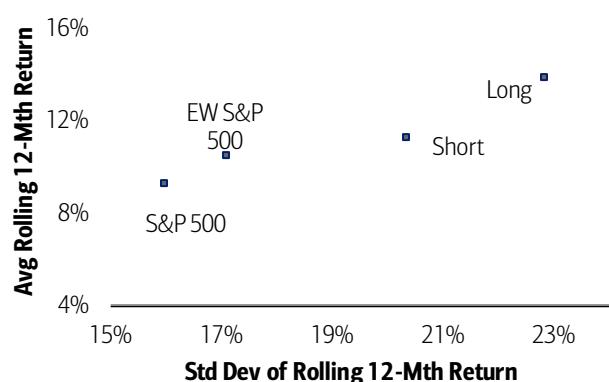


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 246: Low EV/EBITDA Risk Reward Characteristics

The factor has historically outperformed the index

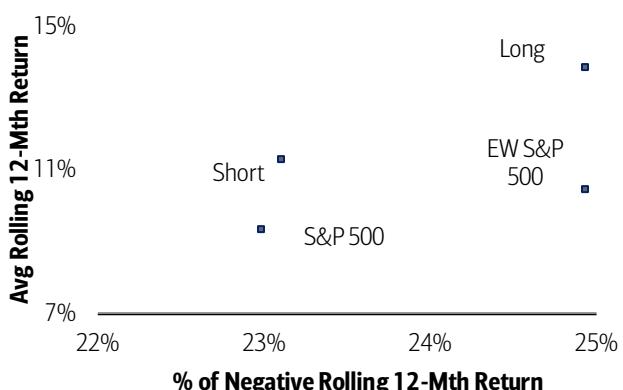


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 247: Low EV/EBITDA Downside Risk Reward

The factor has historically outperformed the index

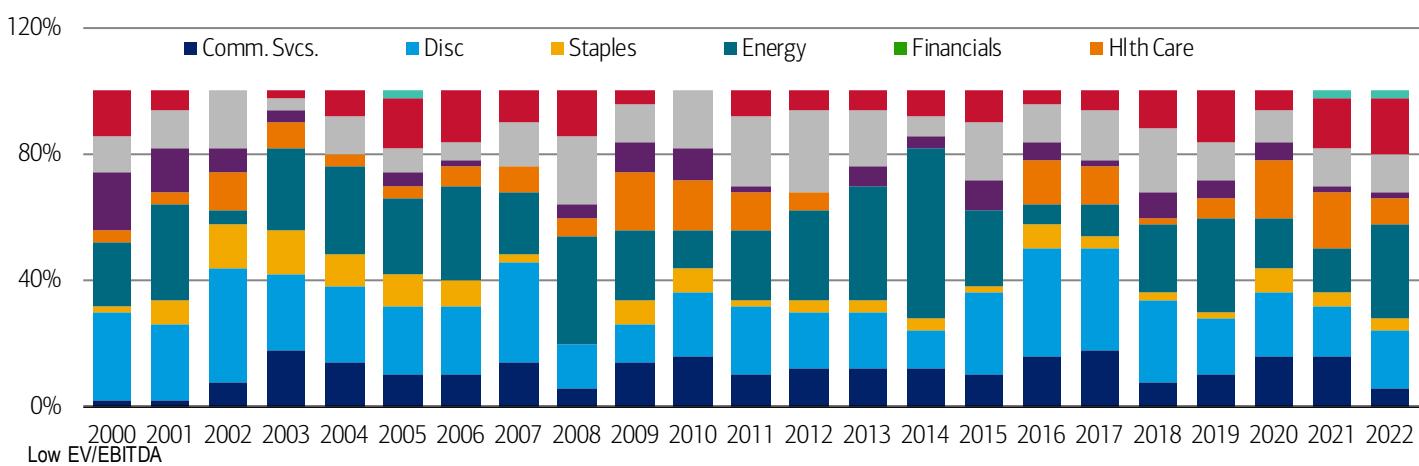


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 248: Low EV/EBITDA Sector Concentration (Low EV/EBITDA)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

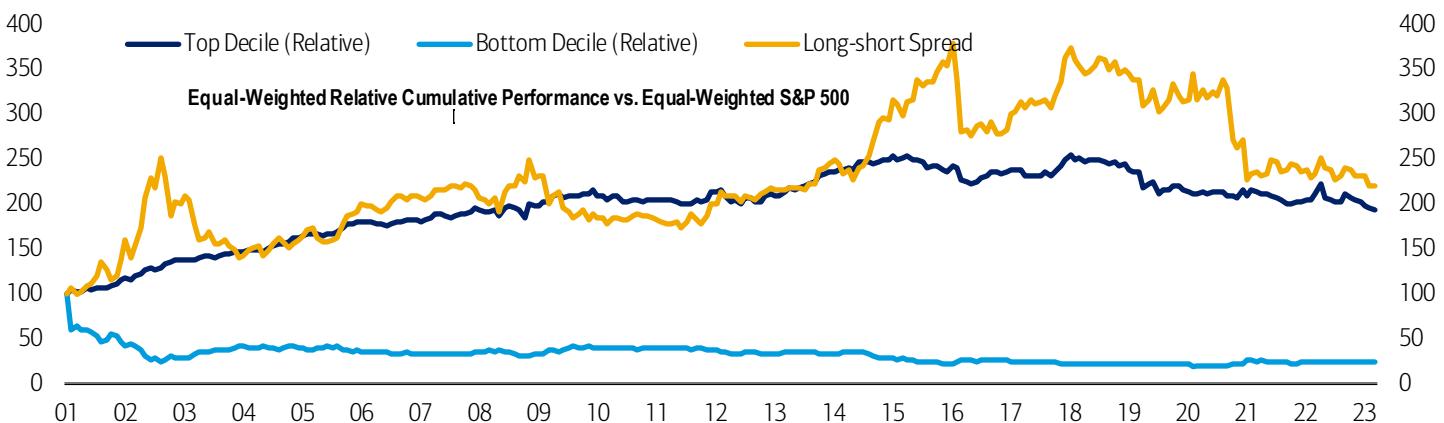
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Free Cash Flow/Enterprise Value

Exhibit 249: Performance of Low FCF/EV, High FCF/EV and Long-Short Spread

The factor has underperformed the index YTD

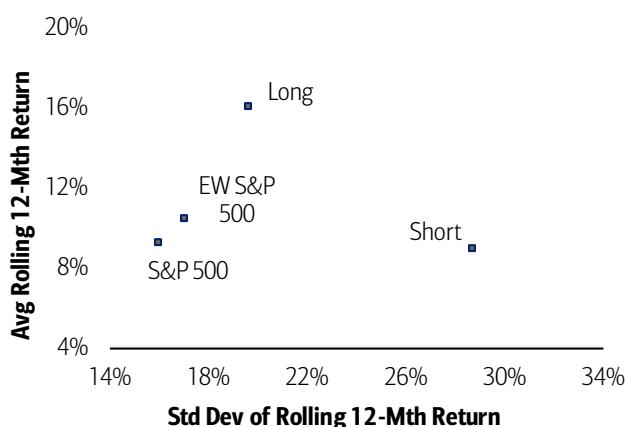


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 250: High FCF/EV Risk Reward Characteristics

The factor has historically outperformed the index

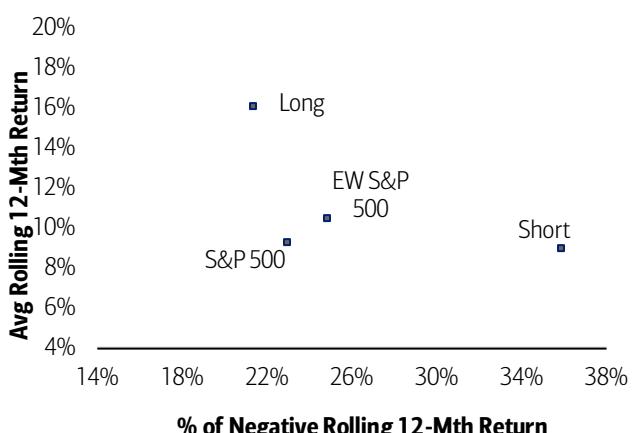


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 251: High FCF/EV Downside Risk Reward

The factor has historically outperformed the index

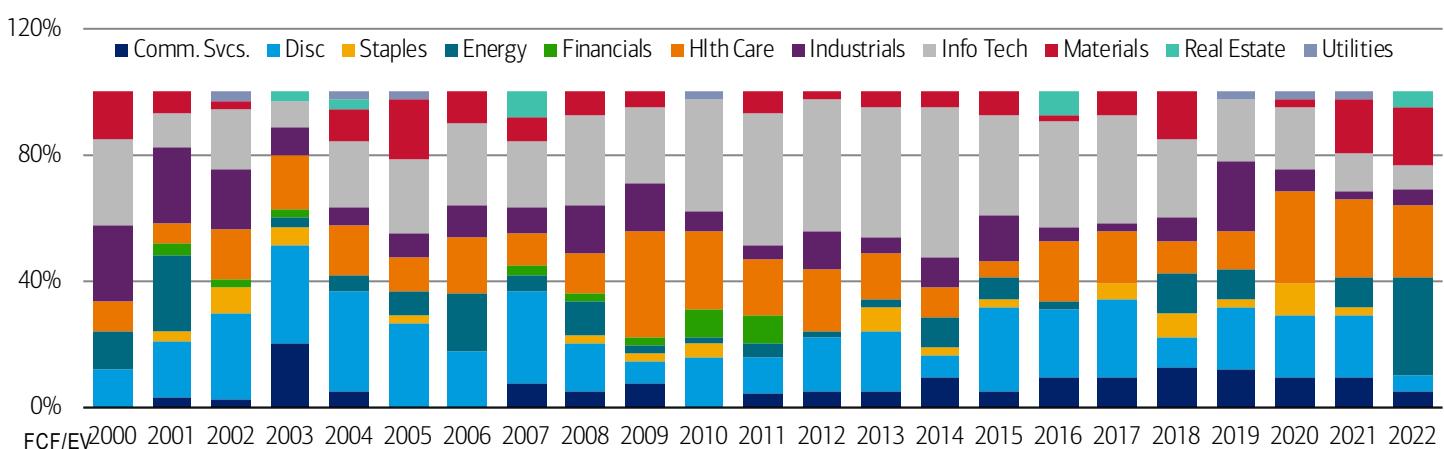


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 252: Low FCF/EV Sector Concentration (Low FCF/EV)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

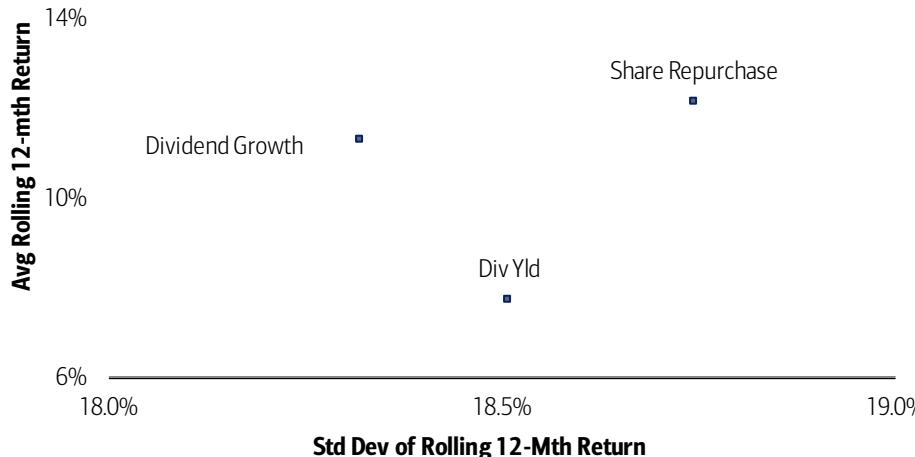
BofA GLOBAL RESEARCH



Cash Deployment Strategies

Exhibit 253: Cash Deployment Strategies

Share Repurchase fared best

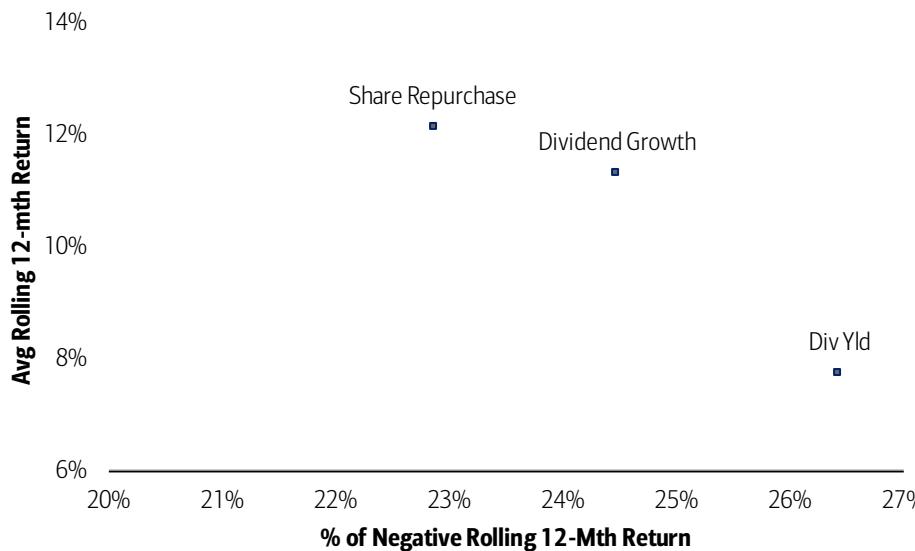


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 254: Cash Deployment Strategies

Share Repurchase fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Dividend Yield

Exhibit 255: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

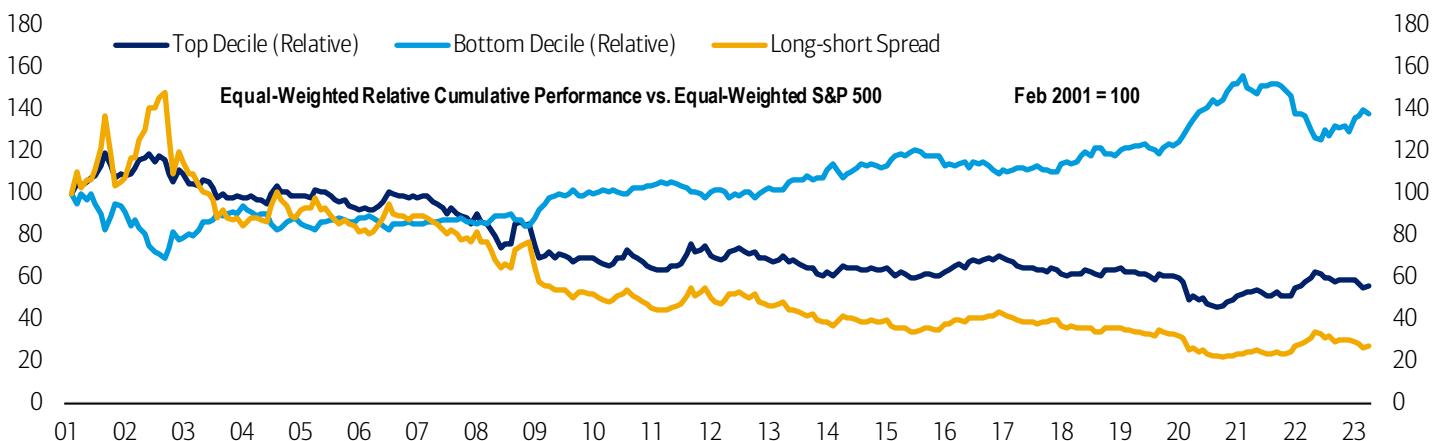
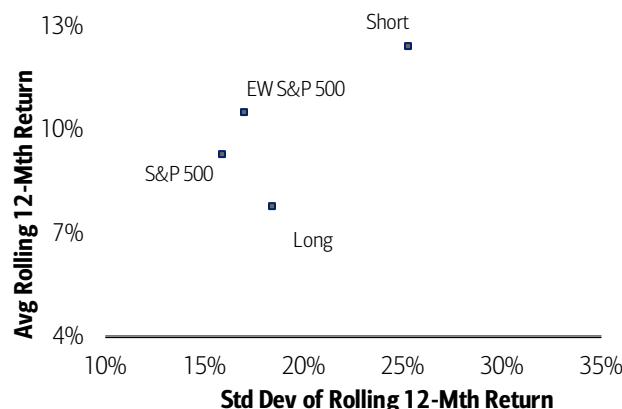


Exhibit 256: High Dividend Yield Risk Reward Characteristics

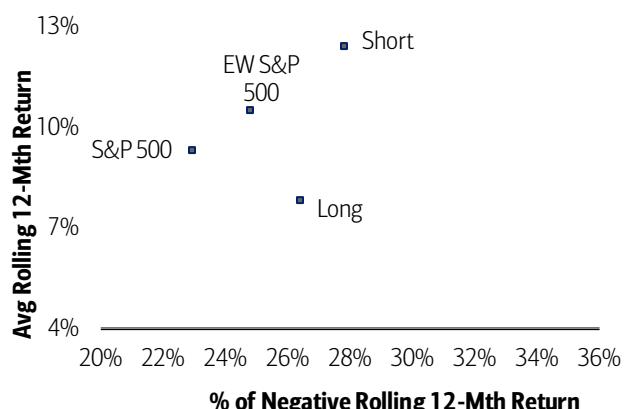
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 257: High Dividend Yield Downside Risk Reward

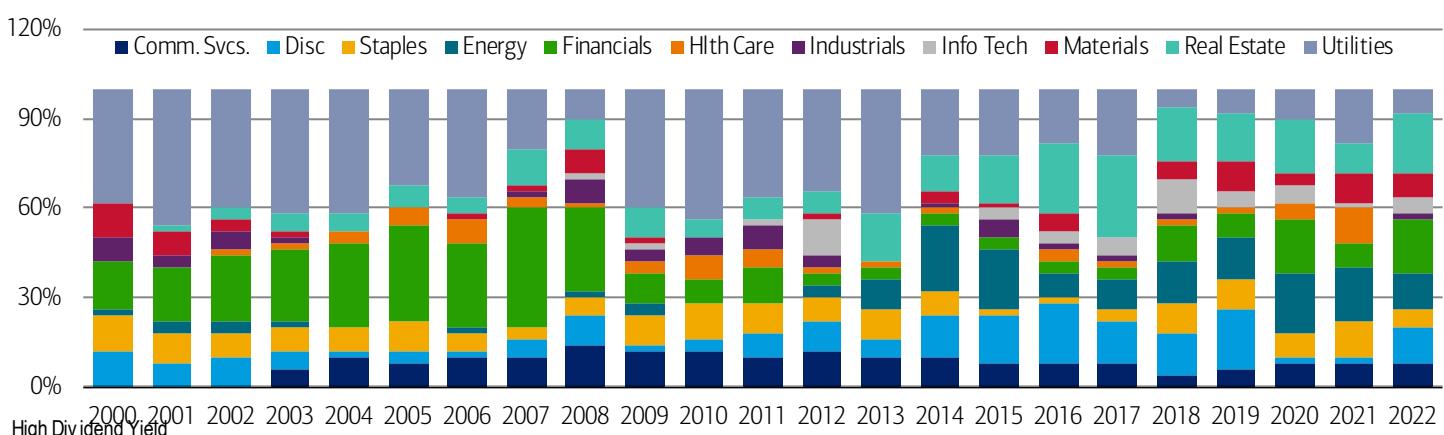
The factor has historically underperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 258: High Dividend Yield Sector Concentration (Top Decile)

The factor has most weight in Real Estate

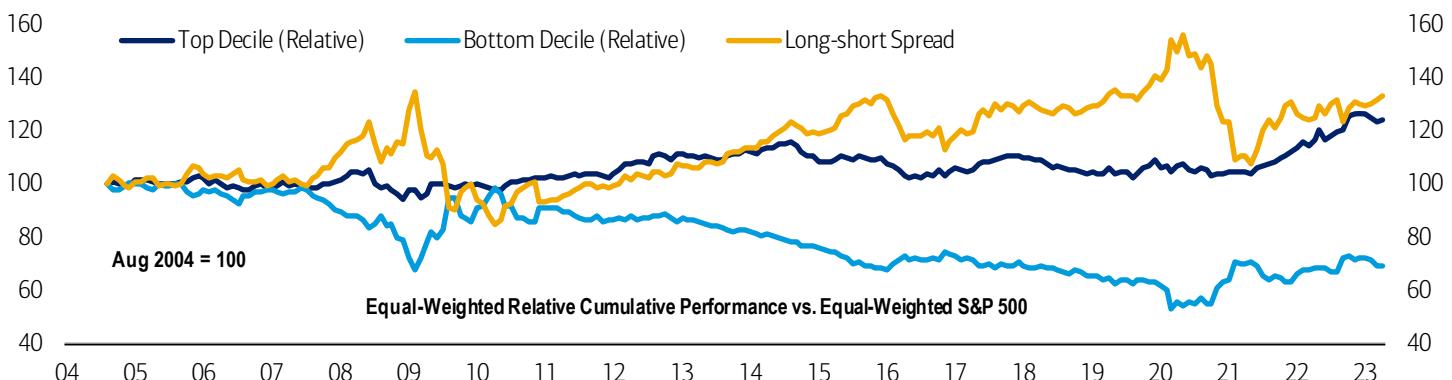


Source: BofA US Equity and Quant Strategy

Dividend Growth

Exhibit 259: Performance of Top Decile, Bottom Decile and Long-Short Spread

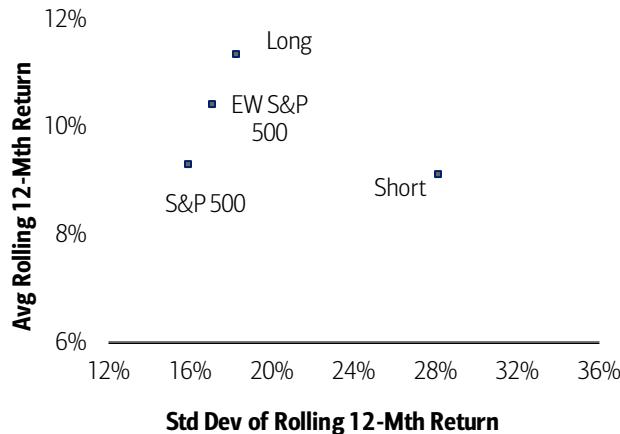
The factor has underperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 260: High Dividend Growth Risk Reward

The factor has historically outperformed the index

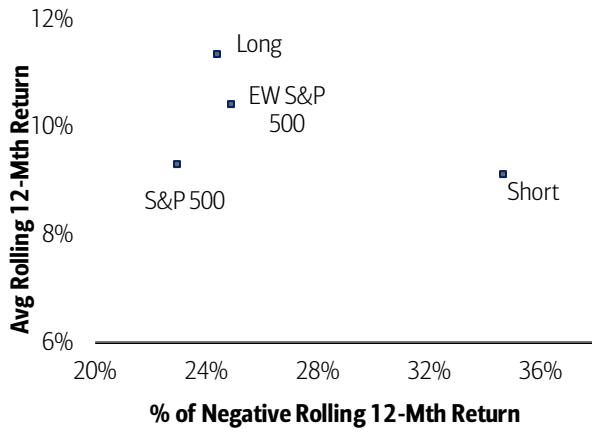


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 261: High Dividend Growth Downside Risk Reward

The factor has historically outperformed the index

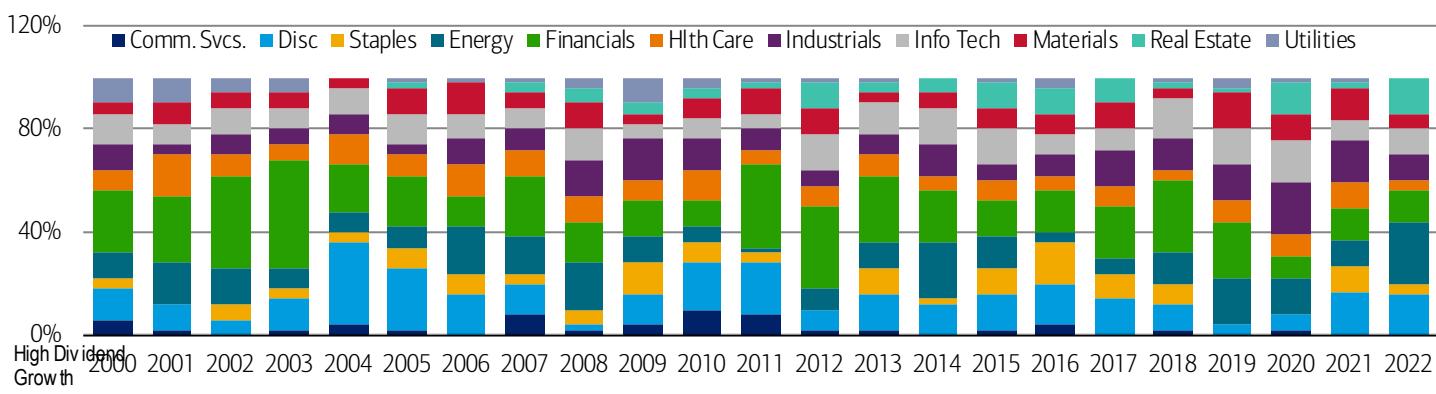


Source: BofA US Equity and Quant Strategy

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Exhibit 262: High Dividend Growth Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH



Share Repurchase

Exhibit 263: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

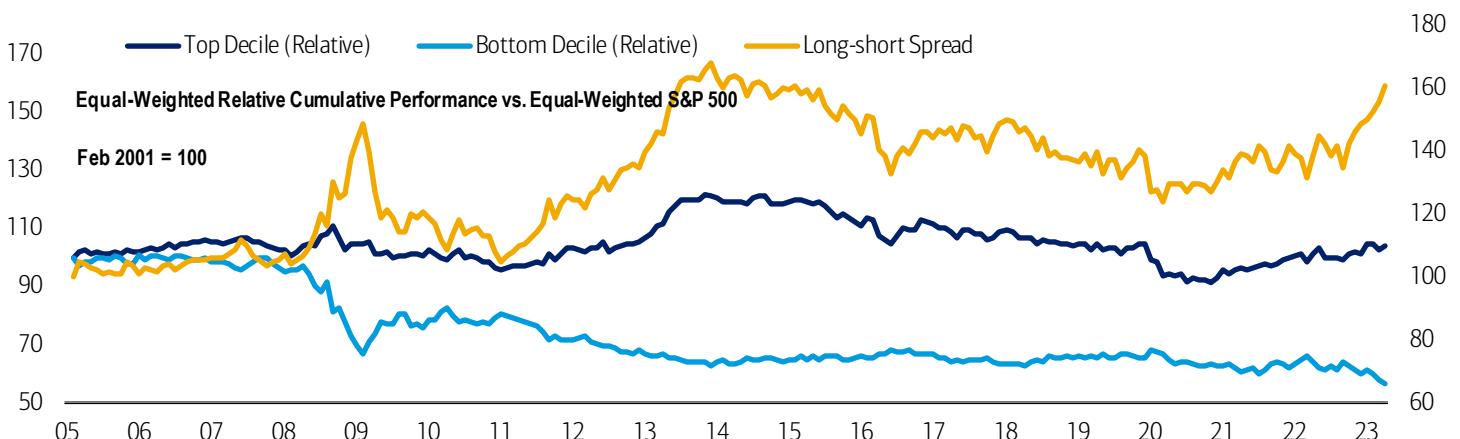
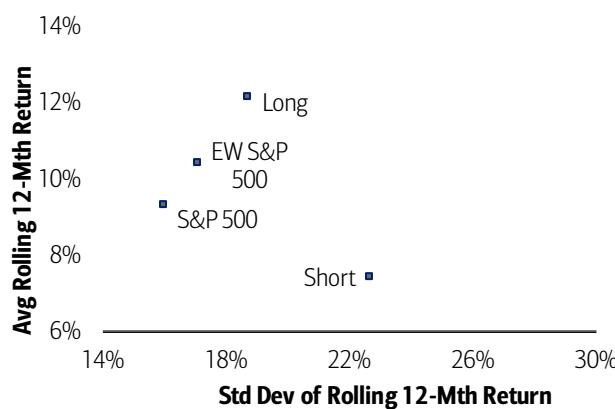


Exhibit 264: High Share Repurchase Risk Reward Characteristics

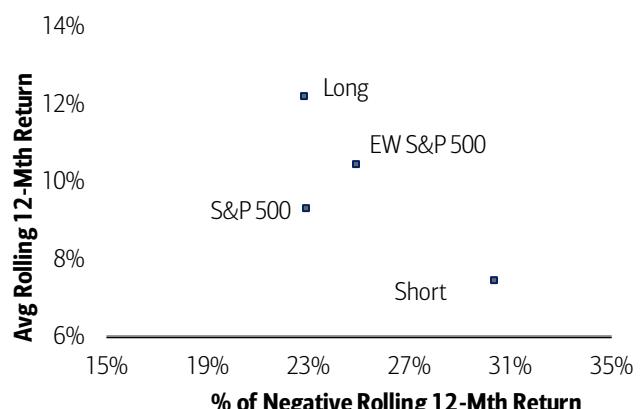
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 265: High Share Repurchase Downside Risk Reward

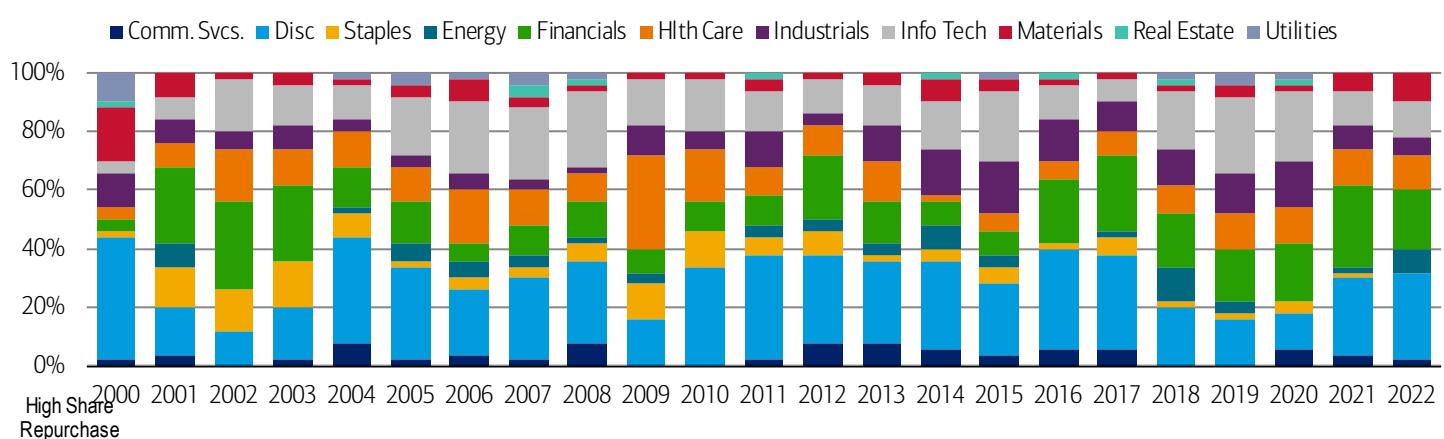
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 266: High Share Repurchase Sector Concentration (Top Decile)

The factor has most weight in Discretionary



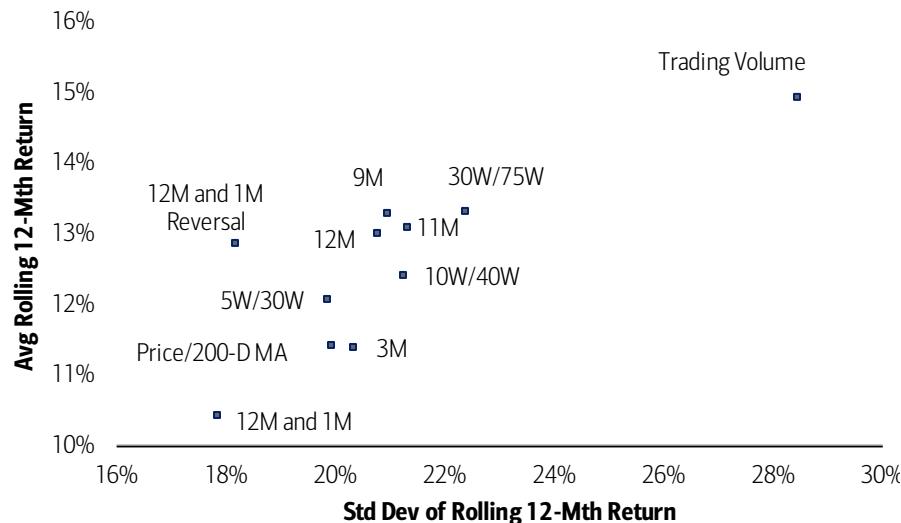
Source: BofA US Equity and Quant Strategy



Momentum Strategies

Exhibit 267: Momentum Strategies

High Trading Volume fared best

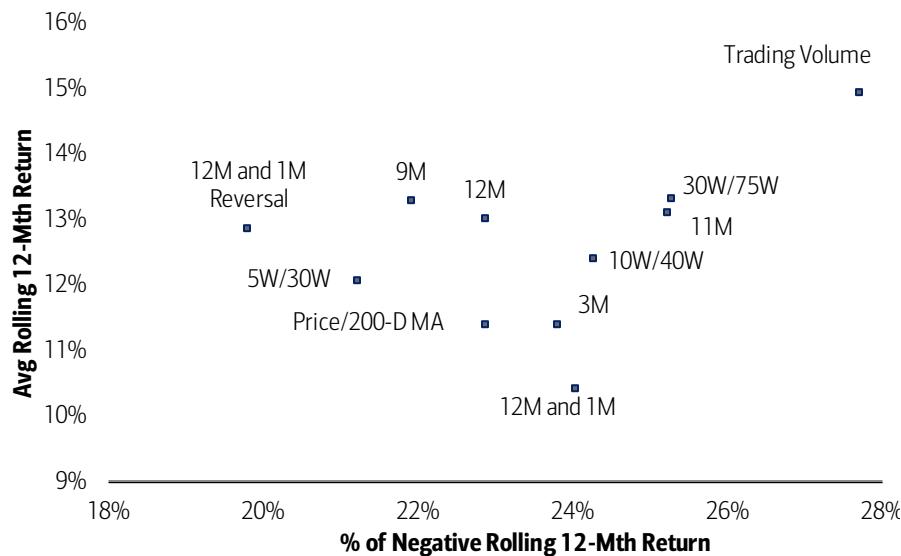


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 268: Momentum Strategies

High Trading Volume fared best



Source: BofA US Equity and Quant Strategy

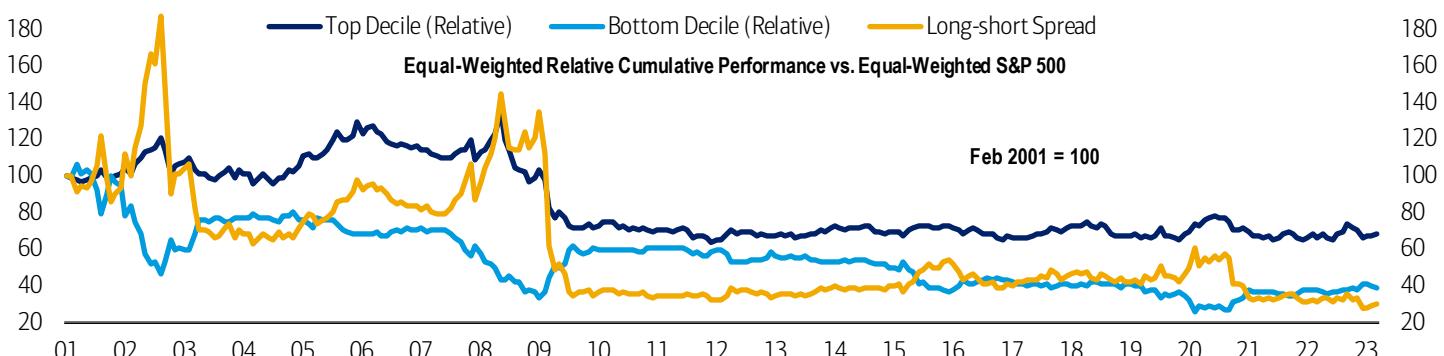
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Relative Strength – 30wk/75wk

Exhibit 269: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

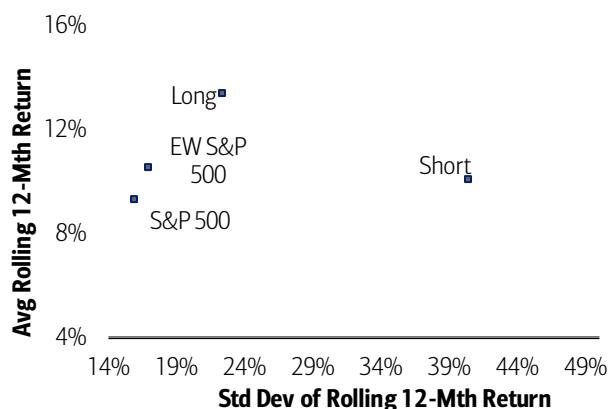


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 270: High Relative Strength – 30wk/75wk Risk Reward

The factor has historically outperformed the index

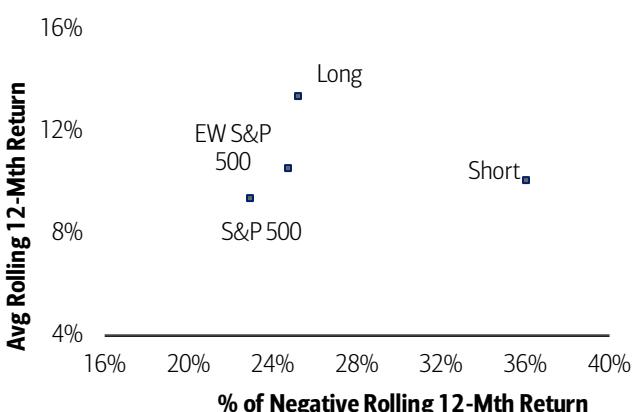


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 271: High Relative Strength – 30wk/75wk Downside Risk Reward

The factor has historically outperformed the index

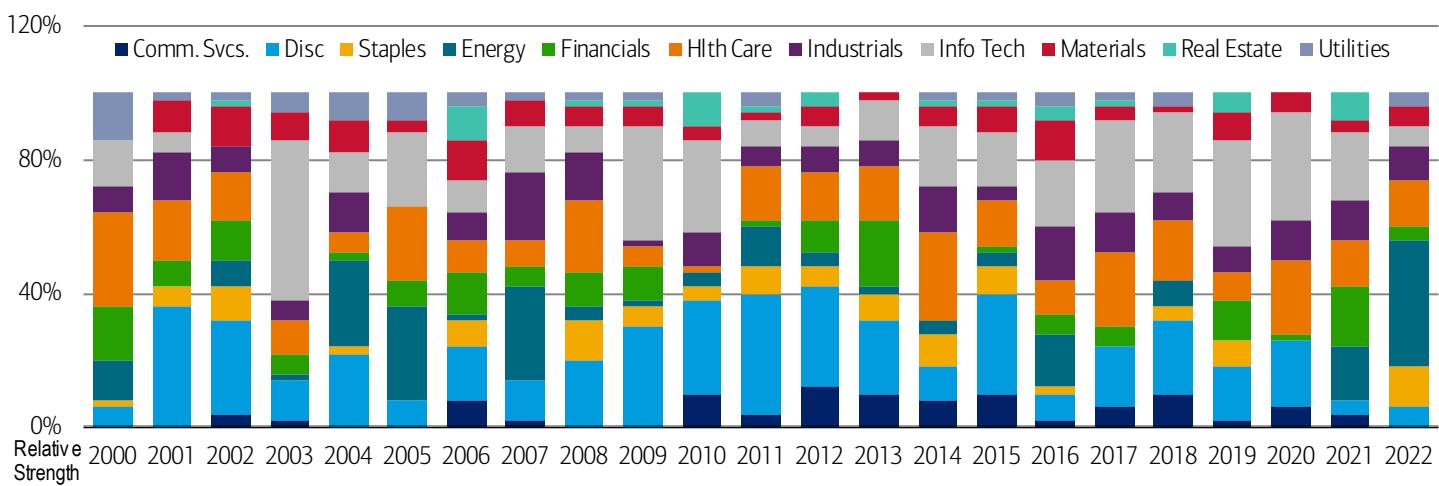


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 272: High Relative Strength (30wk/75wk) Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

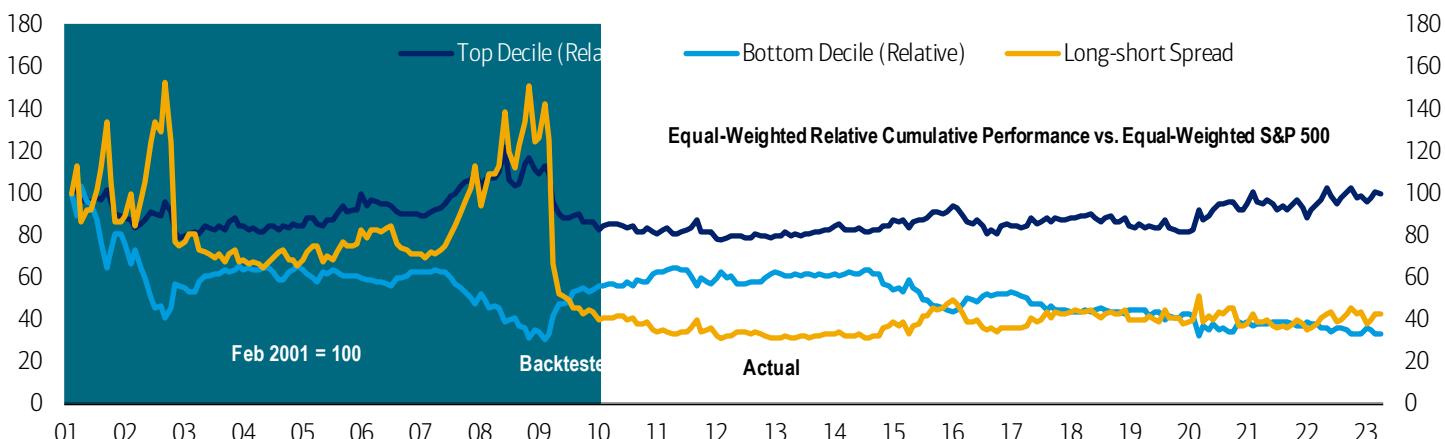
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Price to Moving Average (200-Day)

Exhibit 273: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

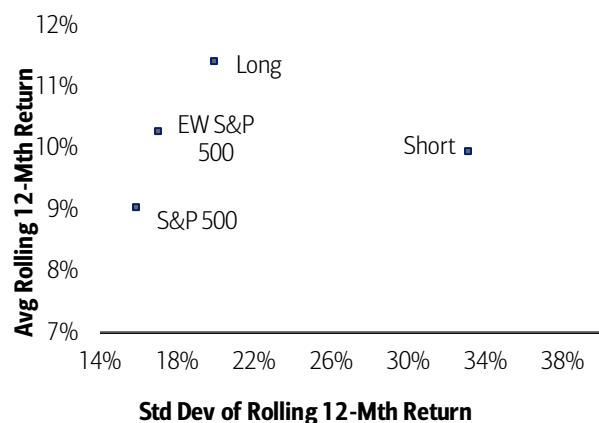


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

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Exhibit 274: High Price/200D MA Risk Reward

The factor has historically outperformed the index

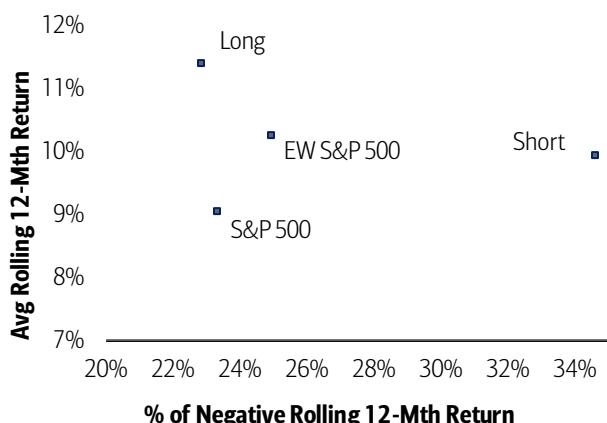


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 275: High Price/200D MA Downside Risk Reward

The factor has historically outperformed the index

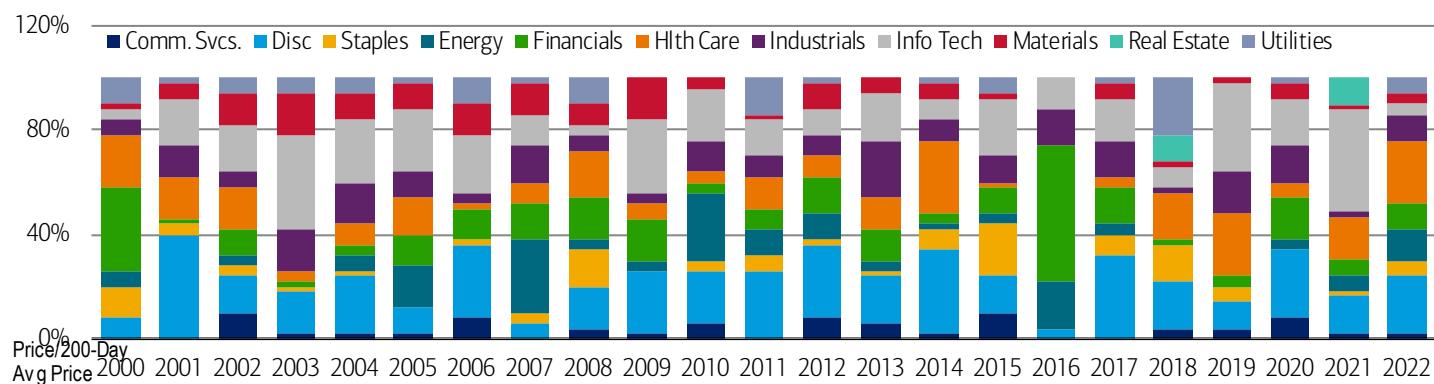


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 276: High Price/200D MA Sector Concentration (Top Decile)

The factor has most weight in Health Care.



Source: BofA US Equity and Quant Strategy

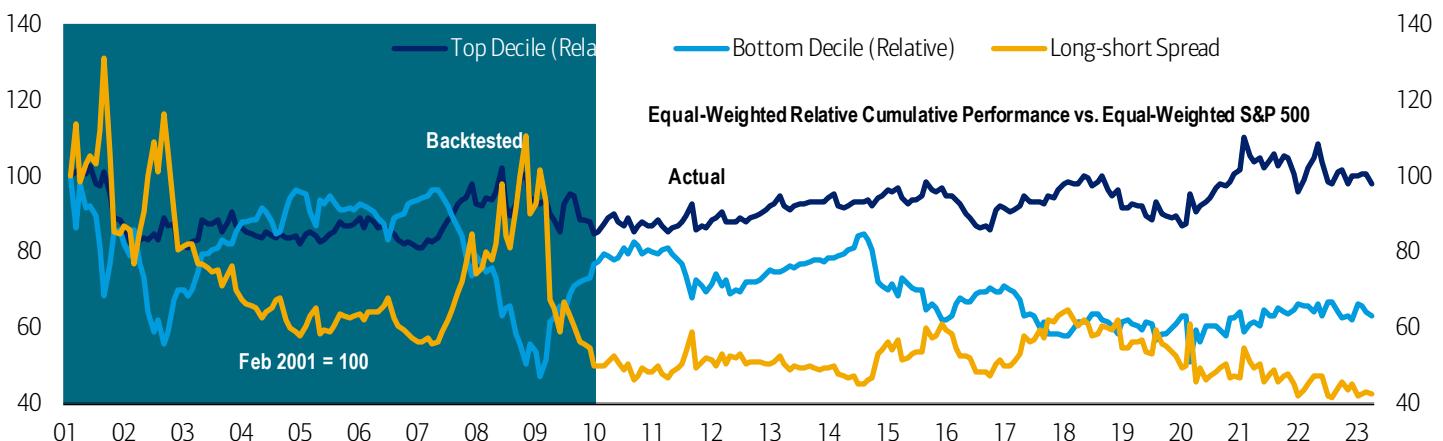
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Price Return – 3-Month Performance

Exhibit 277: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

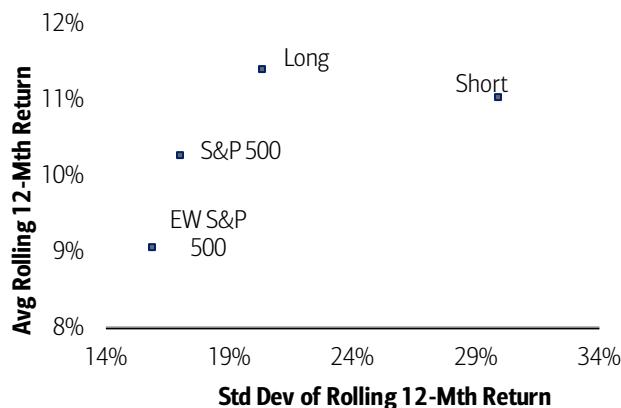


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

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Exhibit 278: High Price Return – 3M Risk Reward

The factor has historically outperformed the index

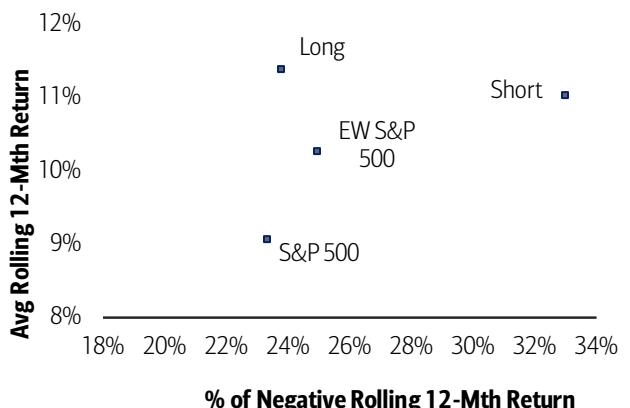


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 279: High Price Return – 3M Downside Risk Reward

The factor has historically outperformed the index

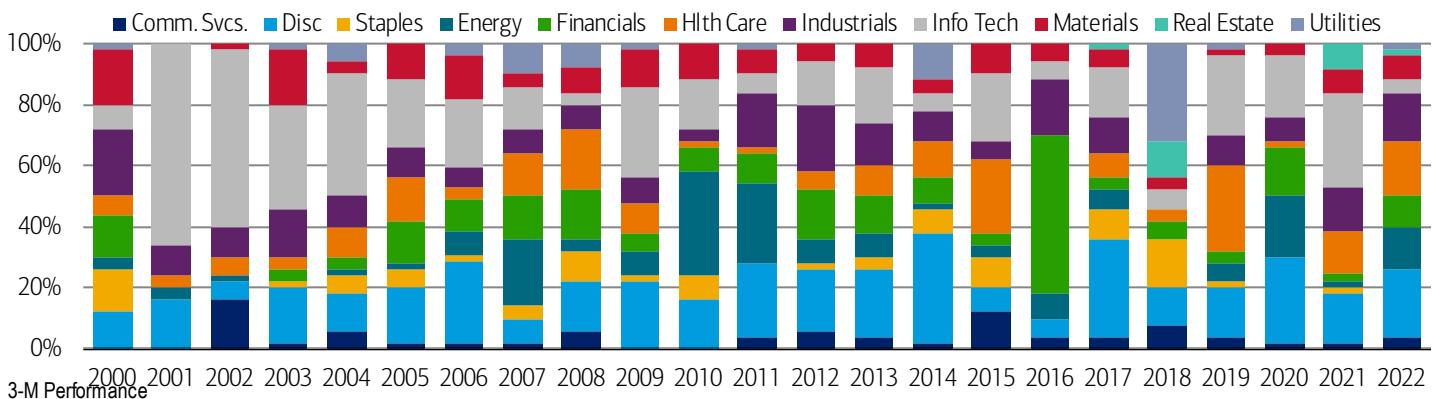


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 280: High Price Return (3M) Sector Concentration (Top Decile)

The factor has most weight in Discretionary



Source: BofA US Equity & Quant Strategy

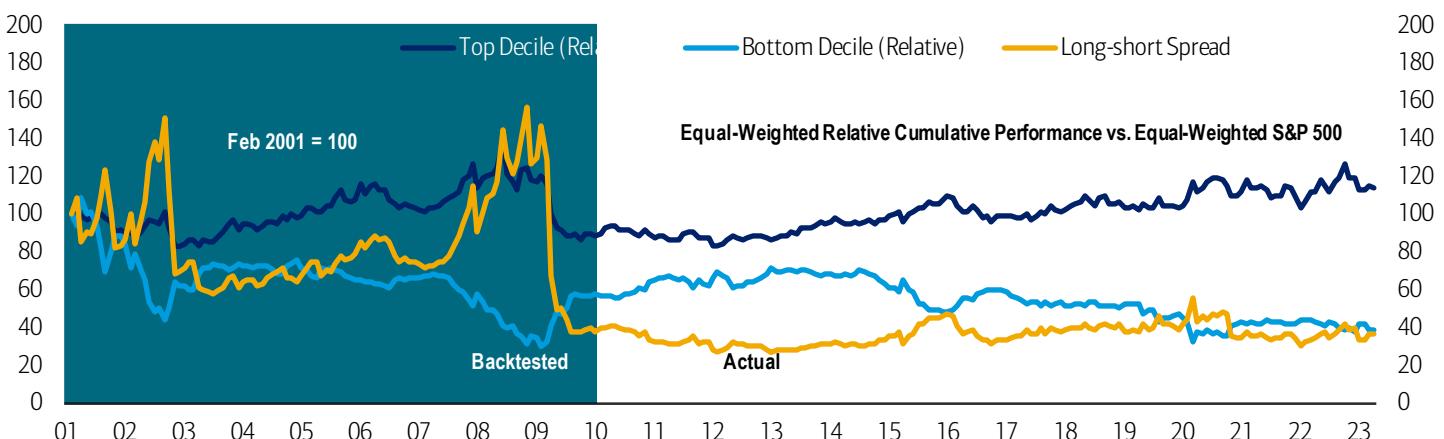
BofA GLOBAL RESEARCH



Price Return – 9-Month Performance

Exhibit 281: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

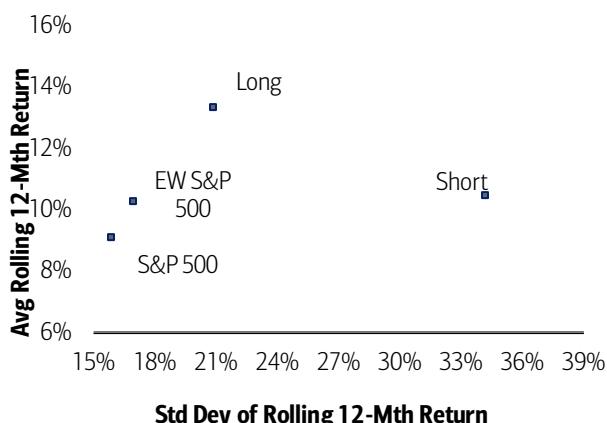


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

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Exhibit 282: High Price Return – 9M Risk Reward

The factor has historically outperformed the index

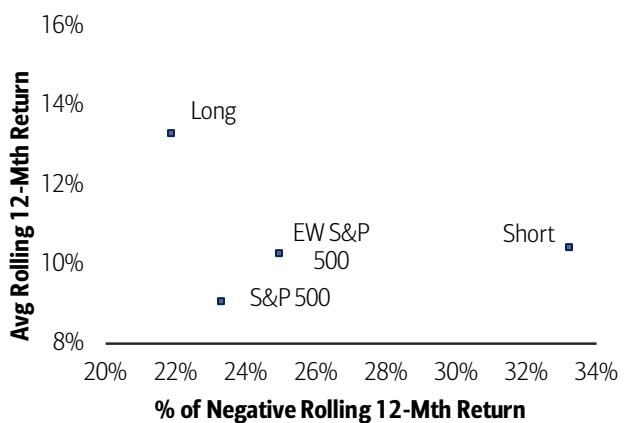


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 283: High Price Return – 9M Downside Risk Reward

The factor has historically outperformed the index

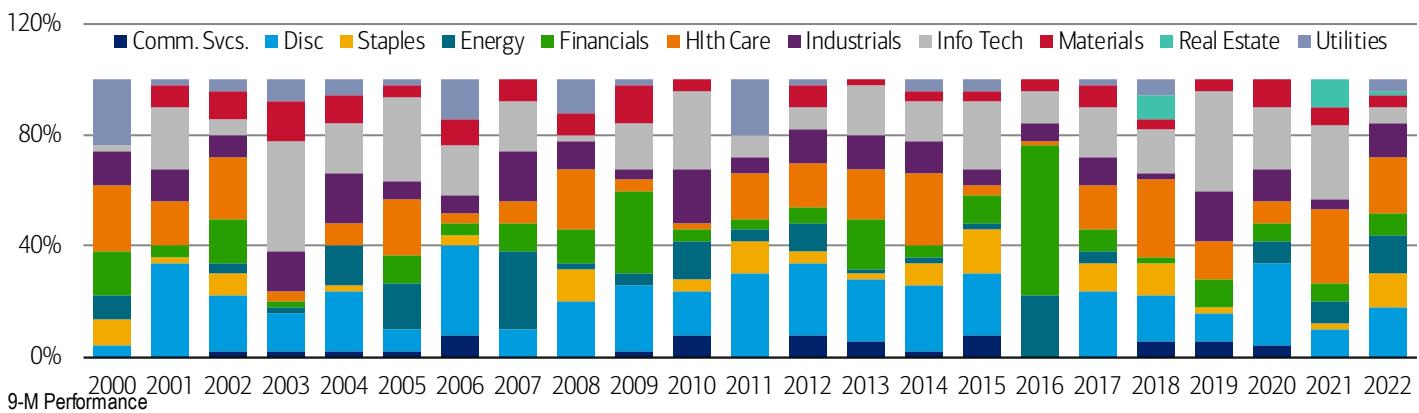


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 284: High Price Return (9M) Sector Concentration (Top Decile)

The factor has most weight in Health Care



Source: BofA US Equity and Quant Strategy.

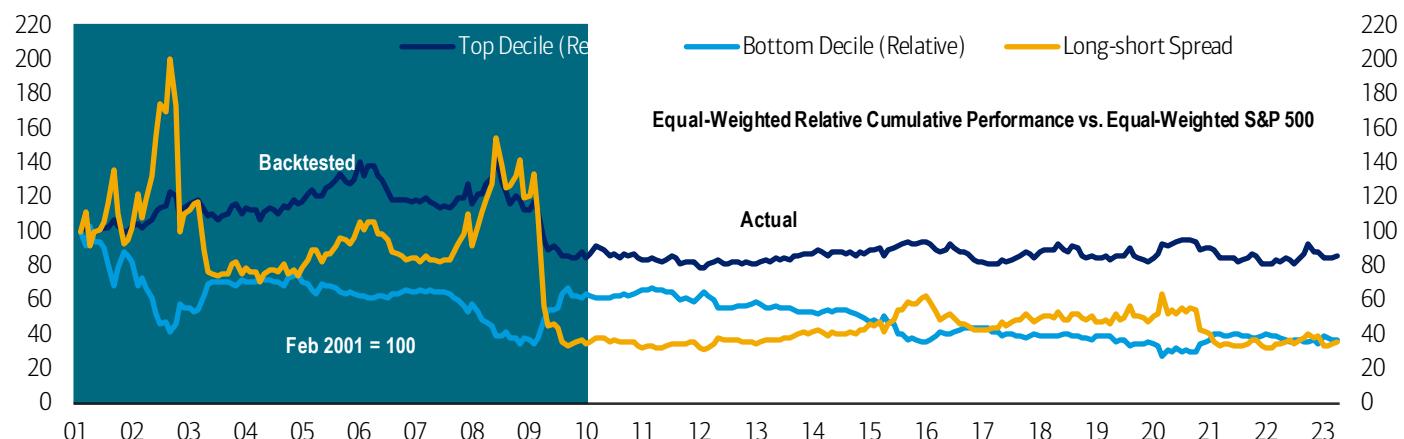
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Price Return – 11-Month Performance

Exhibit 285: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

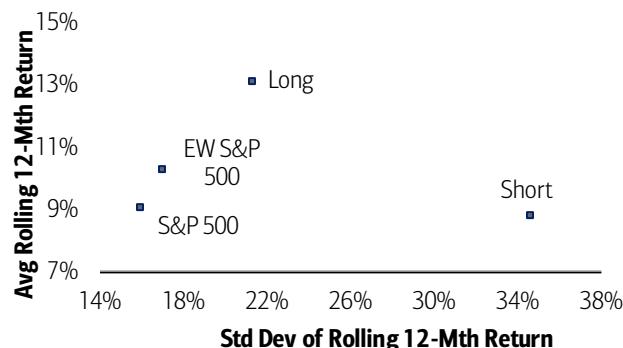


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

Exhibit 286: High Price Return – 11M Risk Reward

The factor has historically outperformed the index

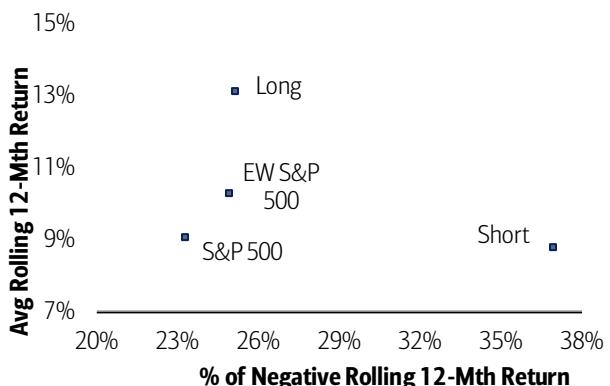


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 287: High Price Return – 11M Downside Risk Reward

The factor has historically outperformed the index

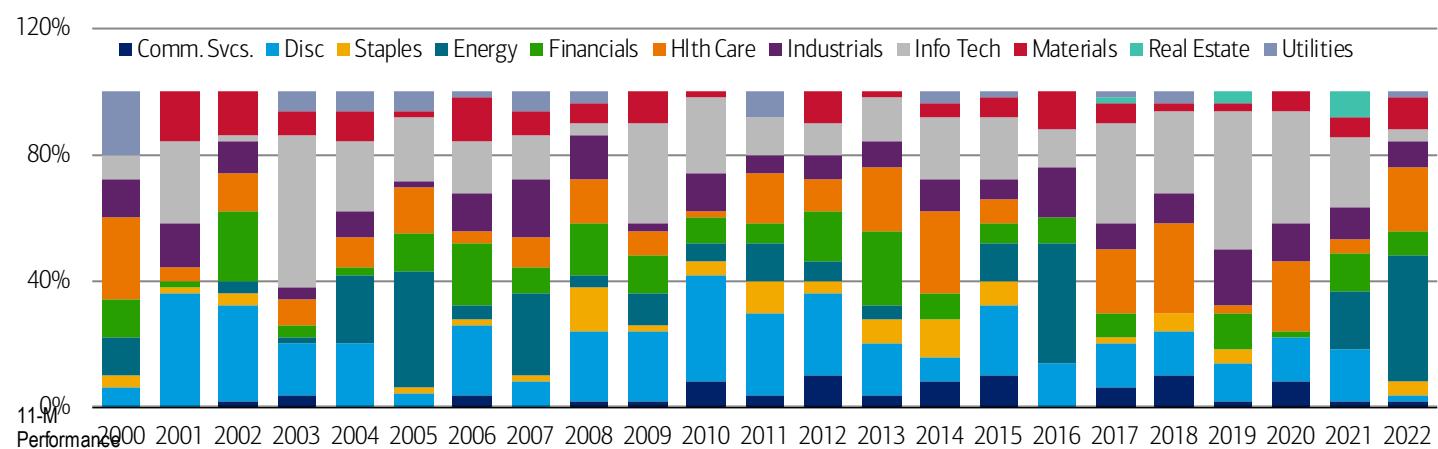


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 288: High Price Return (11M) Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

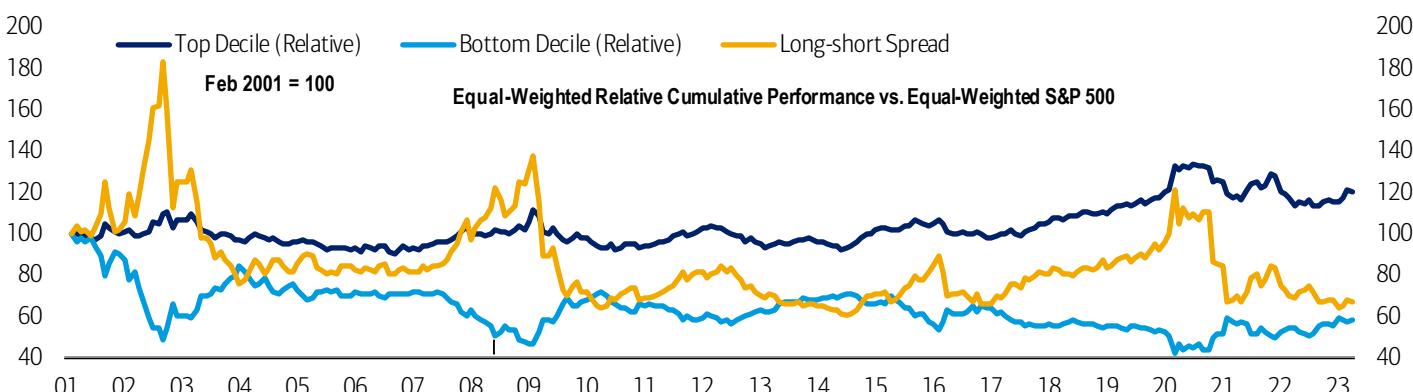
BofA GLOBAL RESEARCH



Price Return – 12-Month Performance

Exhibit 289: Performance of Top Decile, Bottom Decile and Long-Short Spread

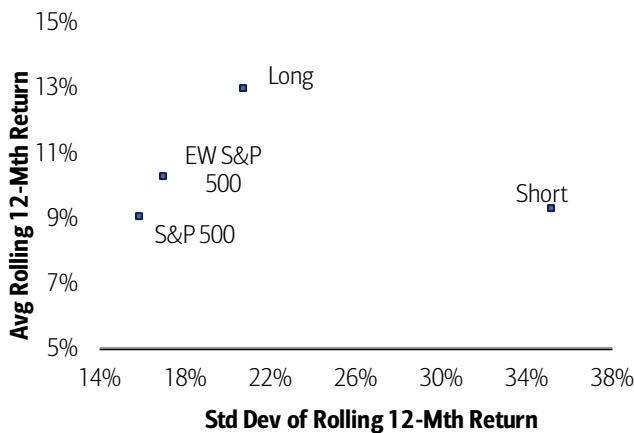
The factor has underperformed the index YTD



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Exhibit 290: High Price Return – 12M Risk Reward

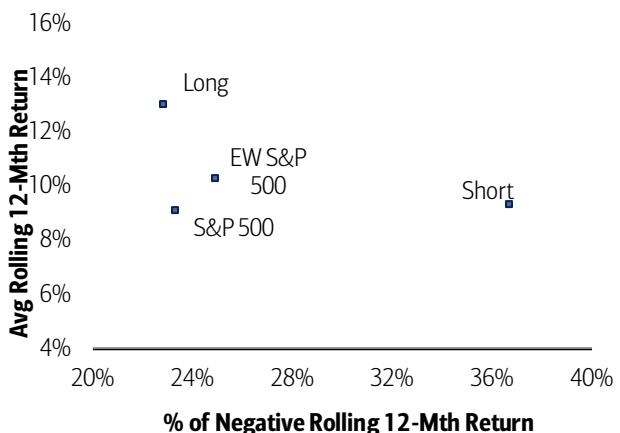
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 291: High Price Return – 12M Downside Risk Reward

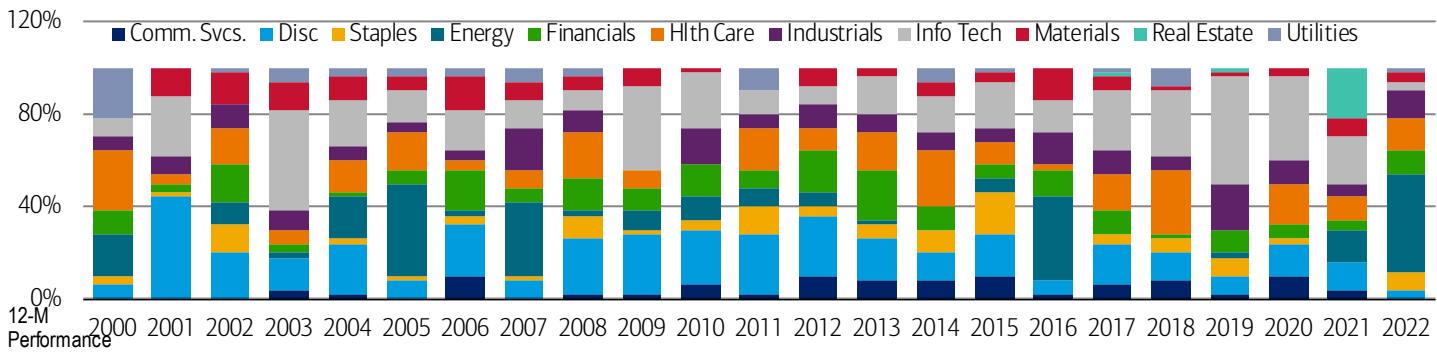
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 292: High Price Return (12M) Sector Concentration (Top Decile)

The factor has most weight in Energy



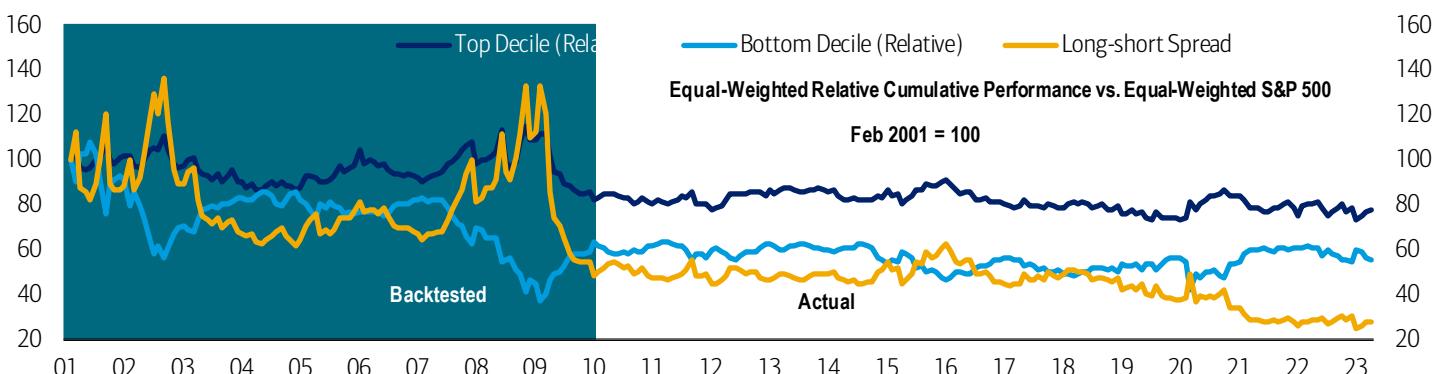
BofA GLOBAL RESEARCH



Price Return – 12-Month and 1-Month Performance

Exhibit 293: Performance of Top Decile, Bottom Decile and Long-Short Spread

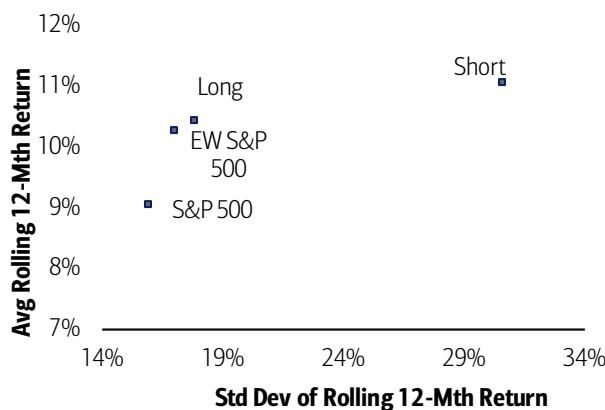
The factor has outperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 294: High Price Return – 12M and 1M Risk Reward

The factor has historically outperformed the index

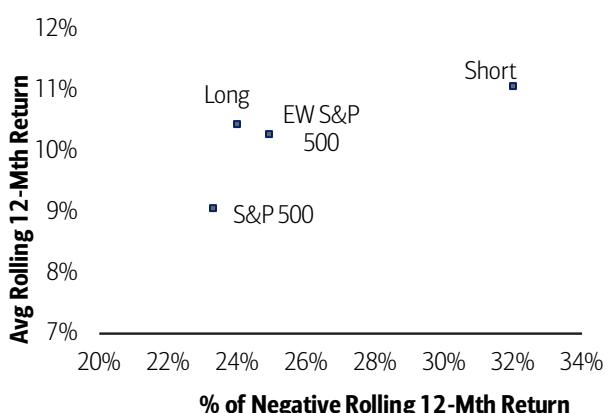


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 295: High Price Return – 12M and 1M Downside Risk Reward

The factor has historically outperformed the index

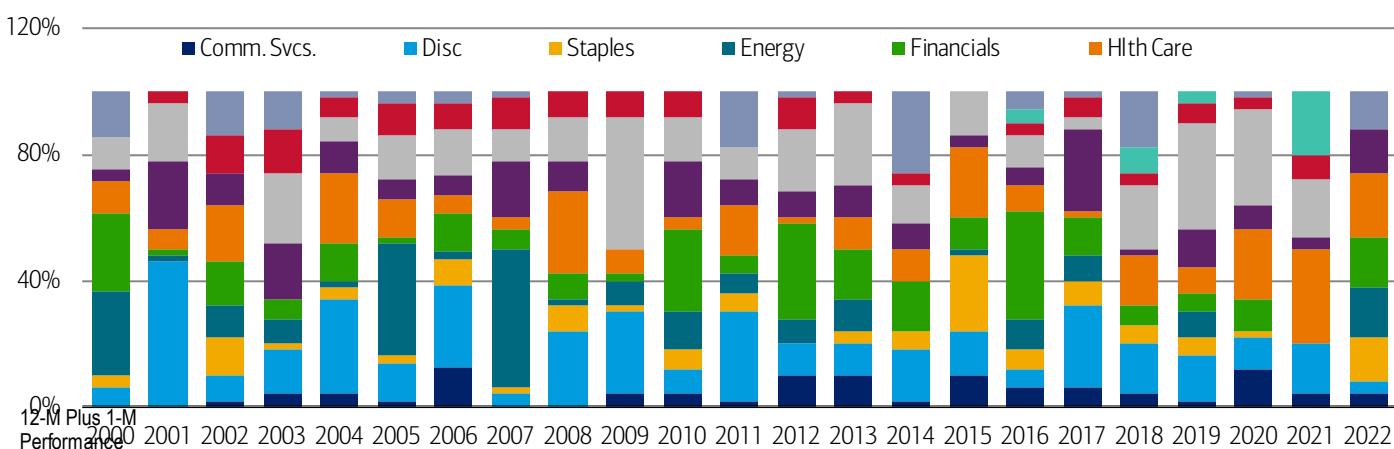


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 296: 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

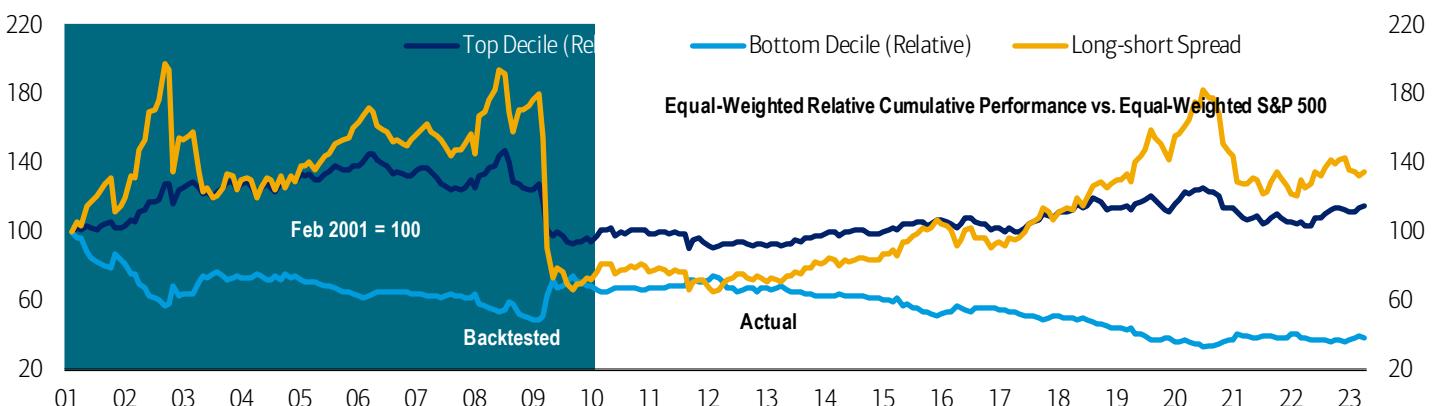
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Price Return – 12-Month and 1-Month Reversal

Exhibit 297: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

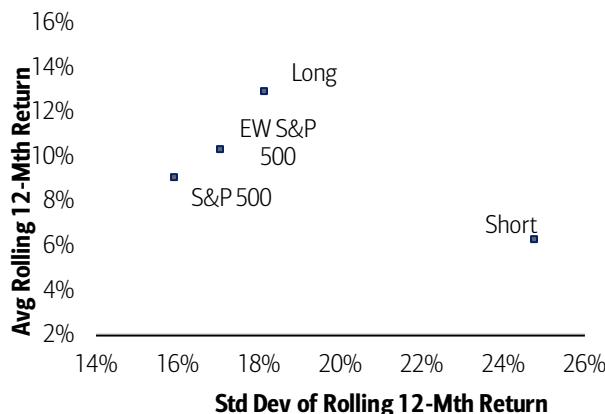


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

BofA GLOBAL RESEARCH

Exhibit 298: High Price Return – 12M and 1M Reversal Risk Reward

The factor has historically outperformed the index

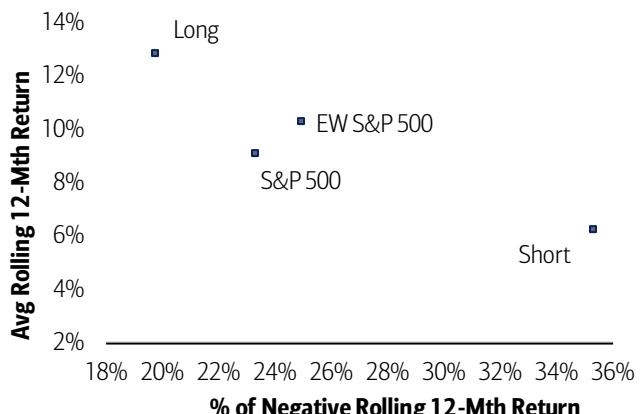


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 299: High Price Return – 12M and 1M Reversal Downside Risk Reward

The factor has historically outperformed the index

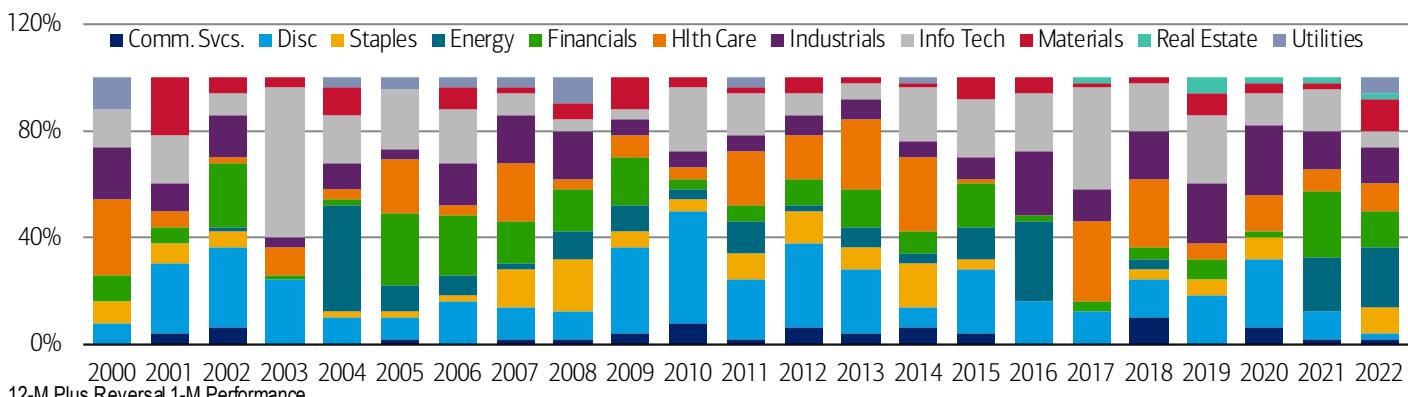


Source: BofA US Equity and Quant Strategy.

BofA GLOBAL RESEARCH

Exhibit 300: High Price Return (12M and 1M Reversal) Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH



Trading Volume

Exhibit 301: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

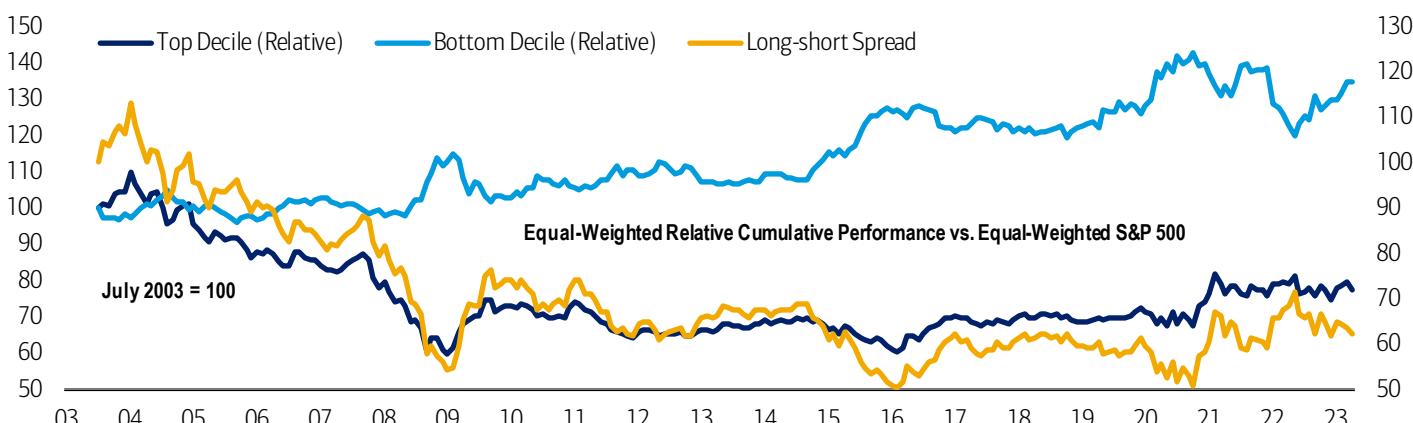


Exhibit 302: High Trading Volume Risk Reward

The factor has historically outperformed the index

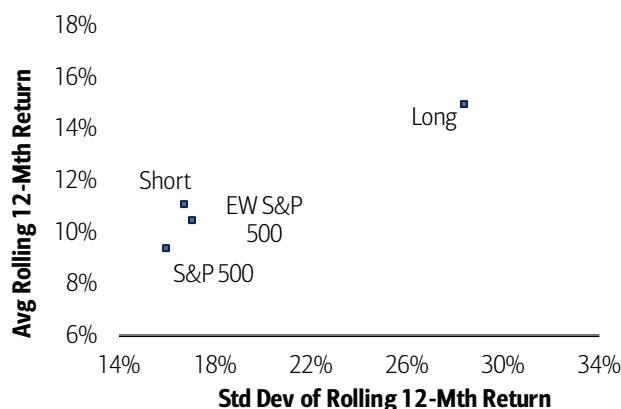


Exhibit 303: High Trading Volume Downside Risk Reward

The factor has historically outperformed the index

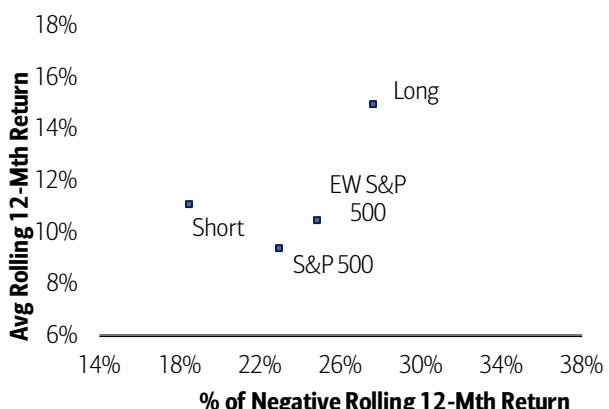
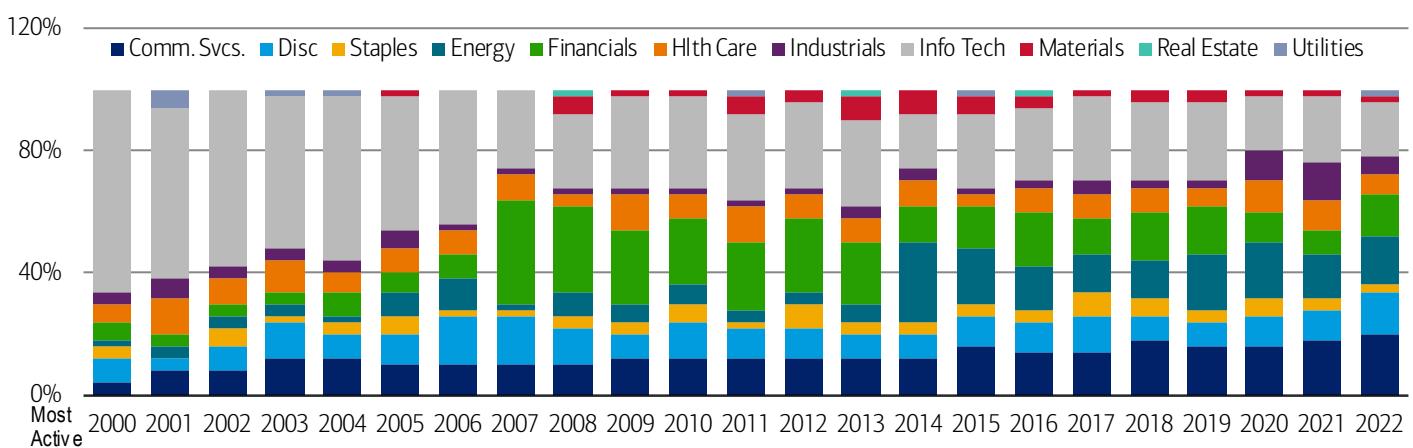


Exhibit 304: High Trading Volume Sector Concentration (Top Decile)

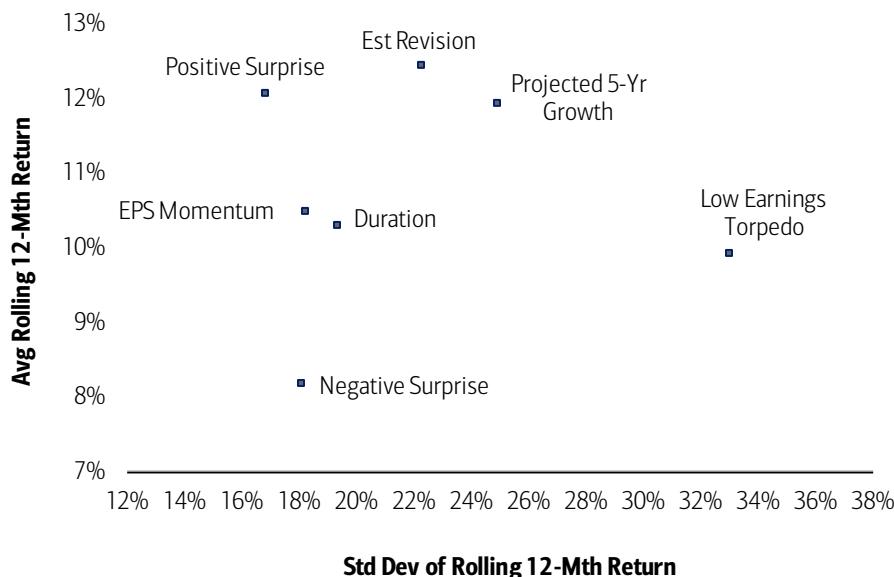
The factor has most weight Comm. Svcs.



Growth Strategies

Exhibit 305: Growth Strategies

Positive EPS Estimate Revisions fared best

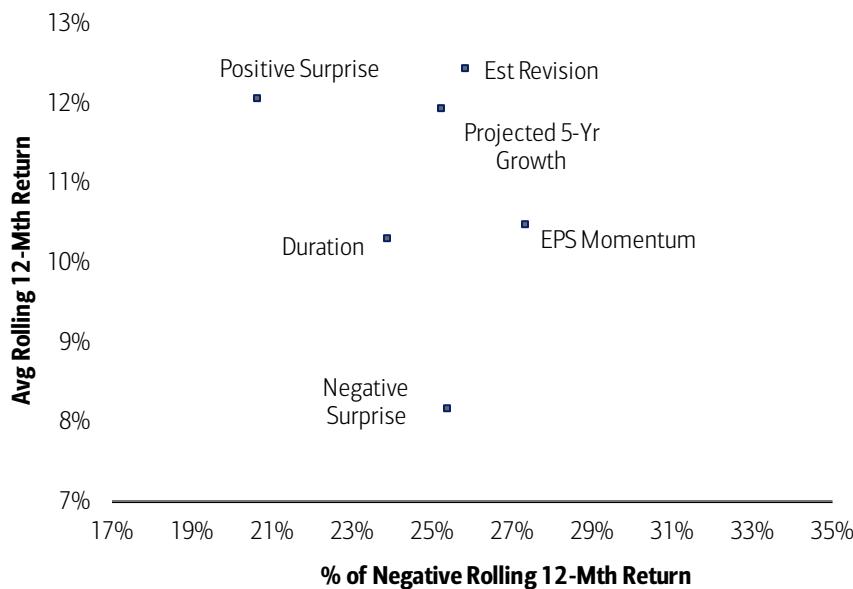


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 306: Growth Strategies

Positive EPS Estimate Revisions fared best



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH



Earnings Momentum

Exhibit 307: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

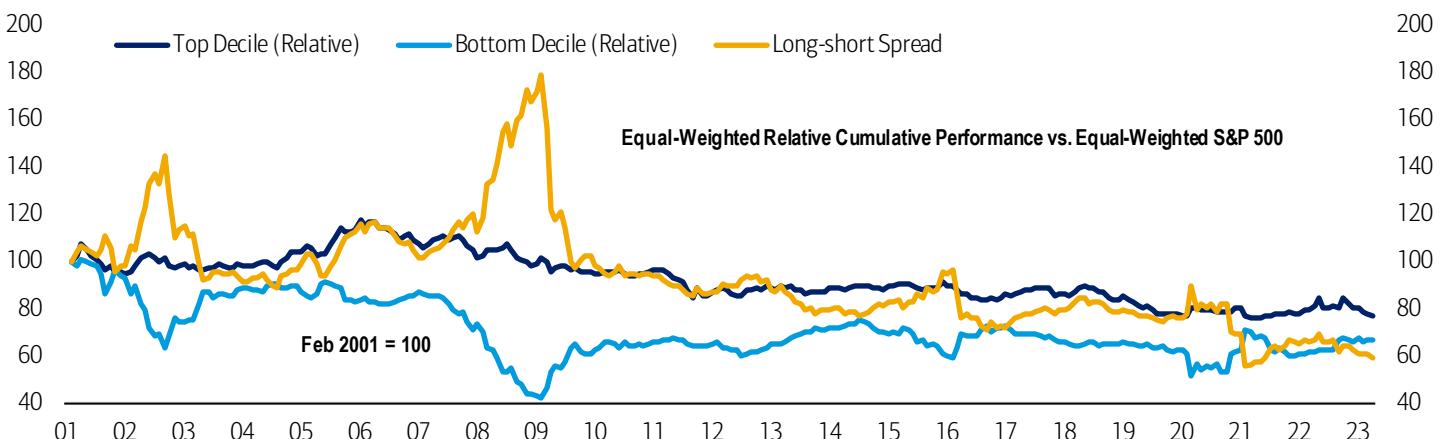


Exhibit 308: High Earnings Momentum Risk Reward

The factor has historically performed in-line with the index

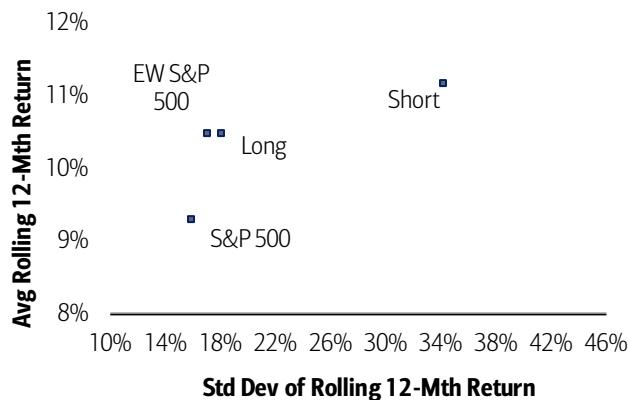


Exhibit 309: High Earnings Momentum Downside Risk Reward

The factor has historically performed in-line with the index

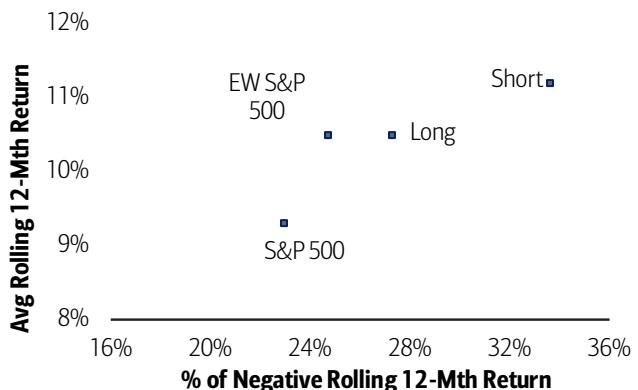
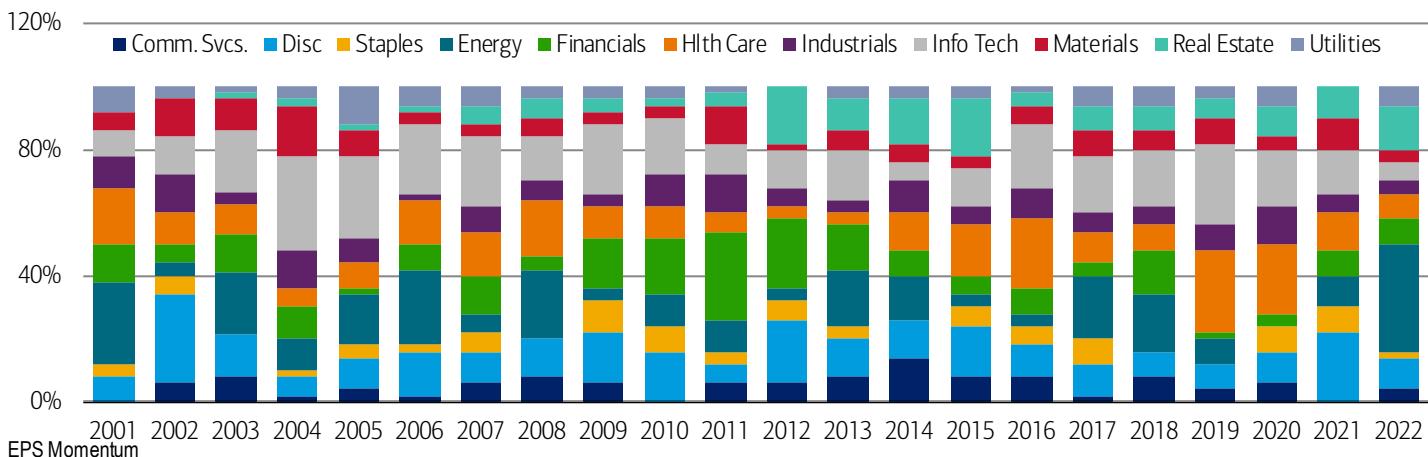


Exhibit 310: High Earnings Momentum Sector Concentration (Top Decile)

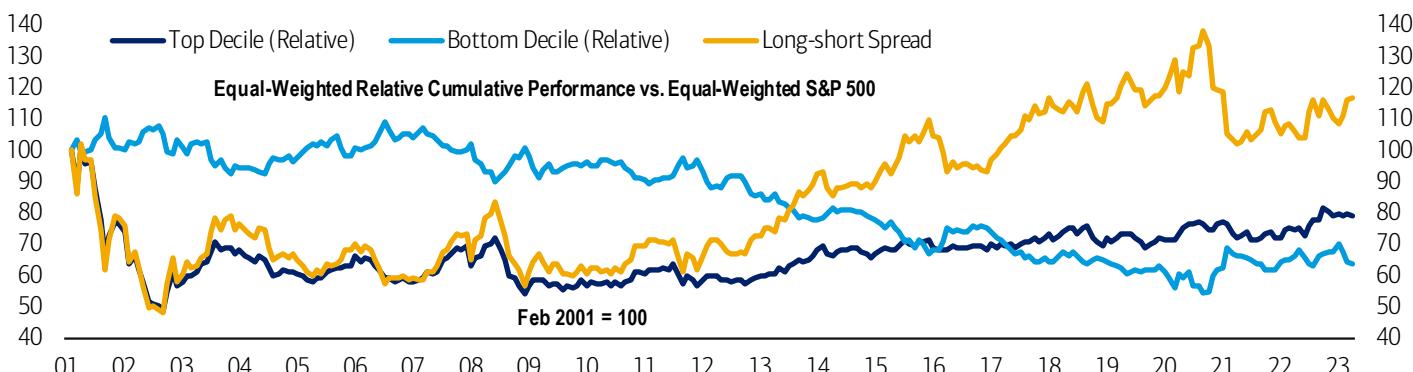
The factor has most weight in Energy



Projected Five-Year EPS Growth

Exhibit 311: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

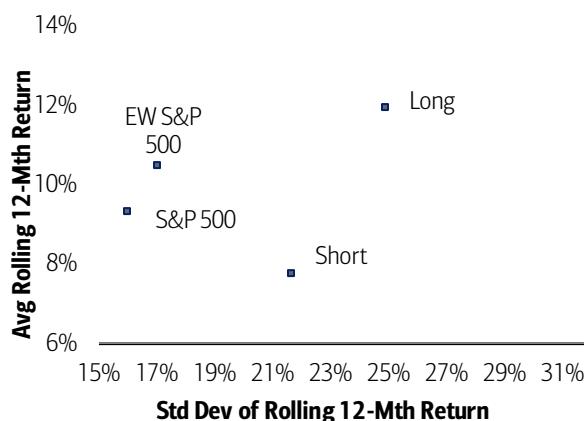


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 312: High Projected 5-Yr EPS Growth Risk Reward

The factor has historically outperformed the index

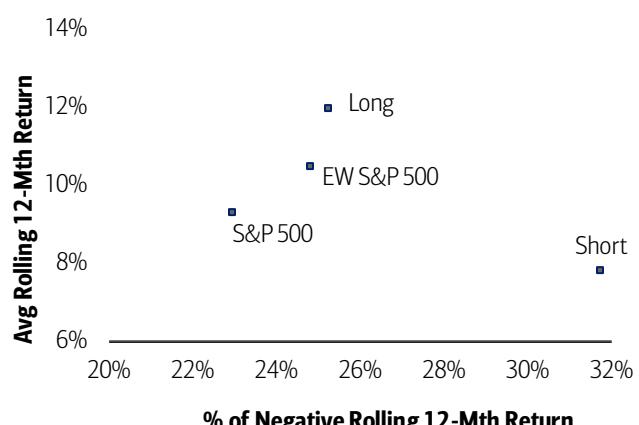


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 313: High Projected 5-Yr EPS Growth Downside Risk Reward

The factor has historically outperformed the index

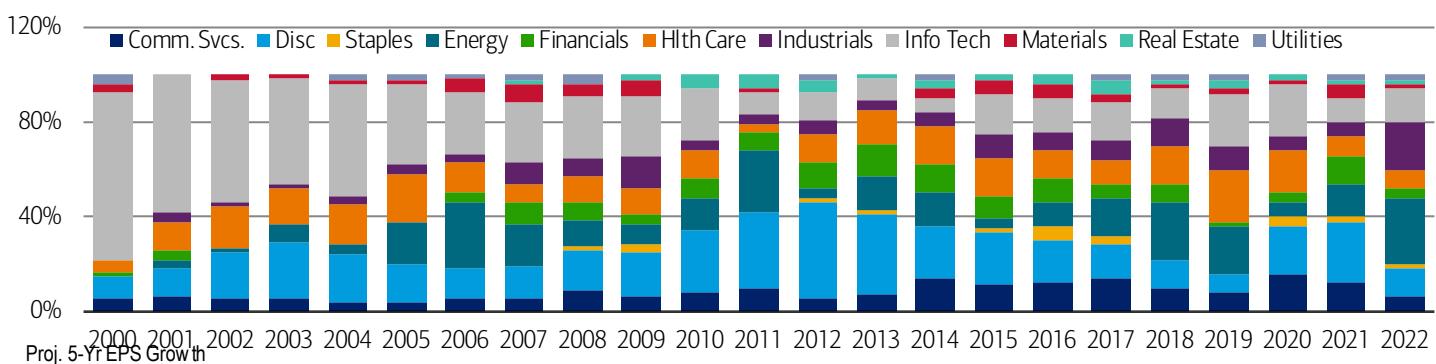


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 314: High Projected 5-Yr EPS Growth Sector Concentration (Top Decile)

The factor has most weight in Energy



Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH



Earnings Torpedo

Exhibit 315: Performance of High Earnings Torpedo, Low Earnings Torpedo and Long-Short Spread

The factor has underperformed the index YTD

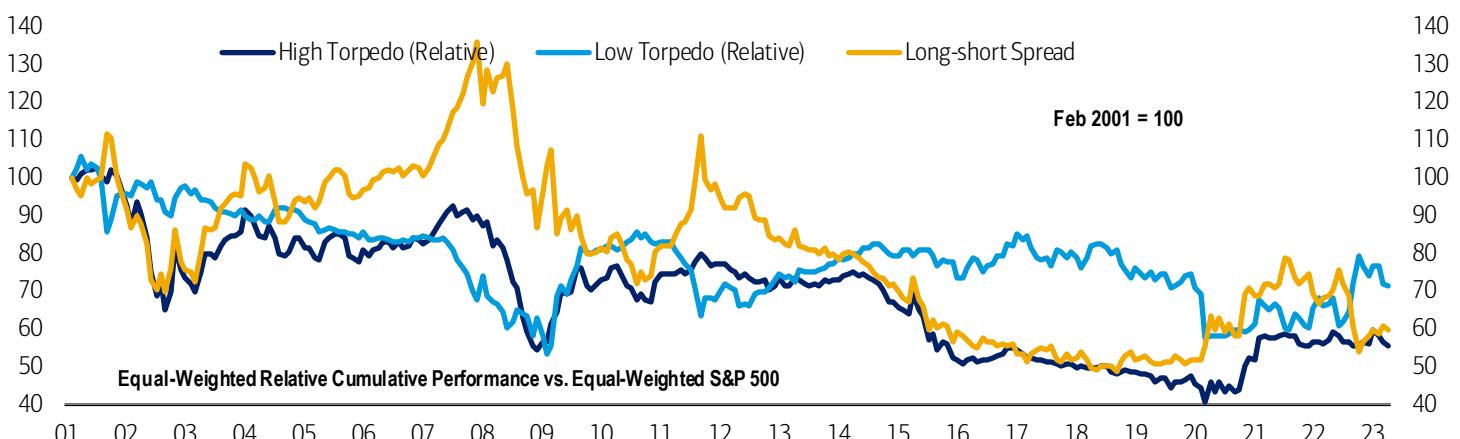
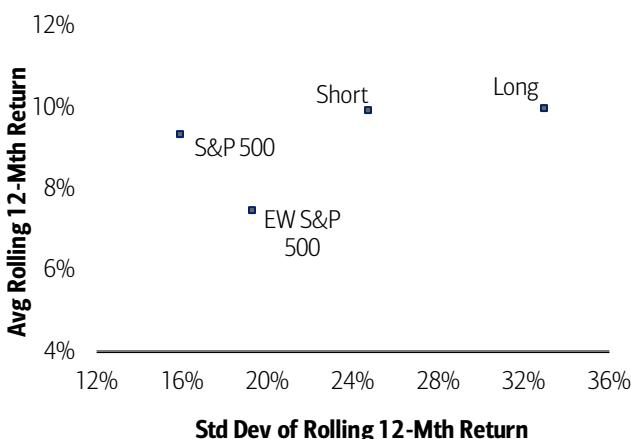


Exhibit 316: Low Earnings Torpedo Risk Reward

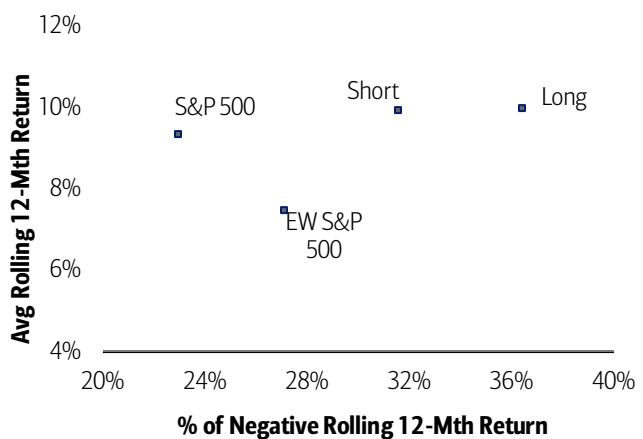
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 317: Low Earnings Torpedo Downside Risk Reward

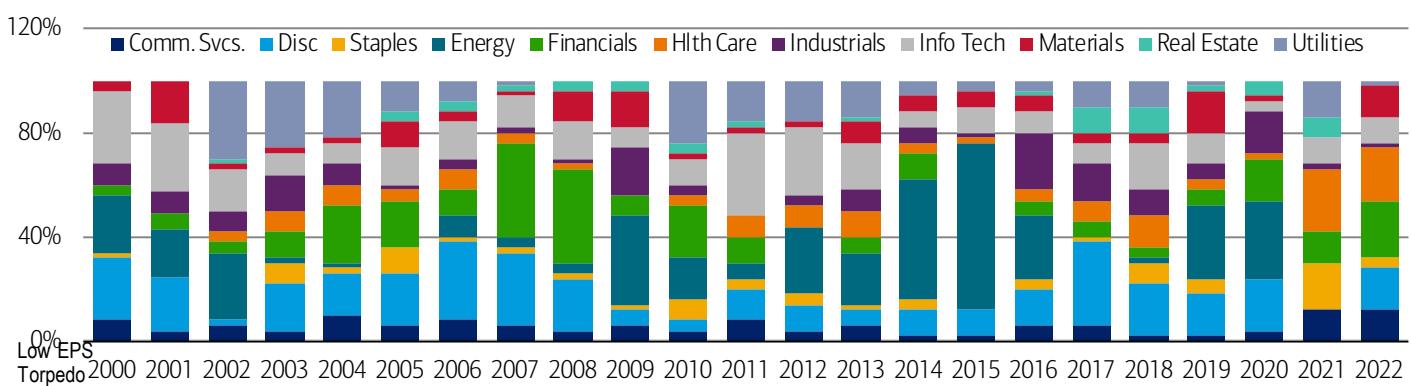
The factor has historically outperformed the index



Source: BofA US Equity and Quant Strategy

Exhibit 318: Low Earnings Torpedo Sector Concentration (Low Decile)

The factor has most weight in Financials



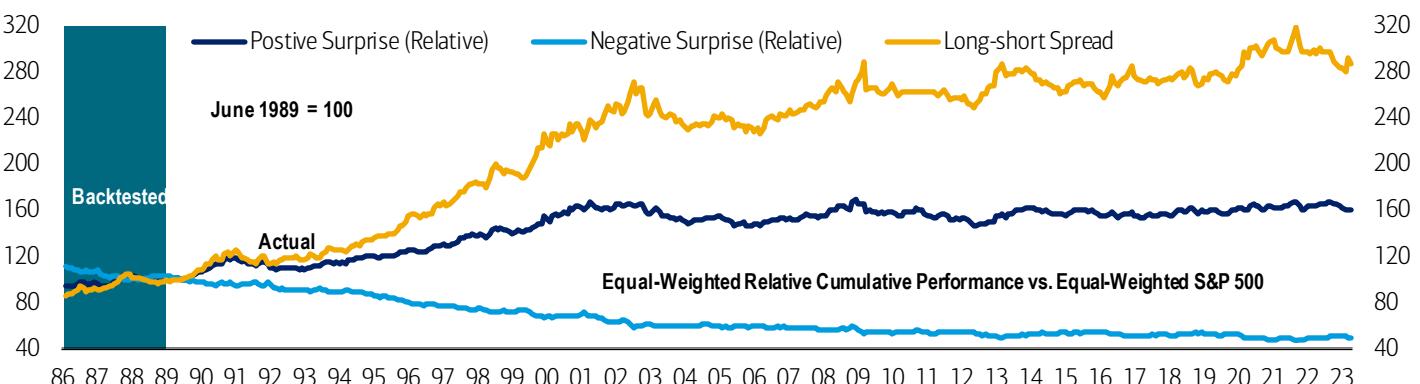
Source: BofA US Equity and Quant Strategy



Earnings Surprise

Exhibit 319: Performance of Positive Surprise, Negative Surprise and Long-Short Spread

The factor has underperformed the index YTD

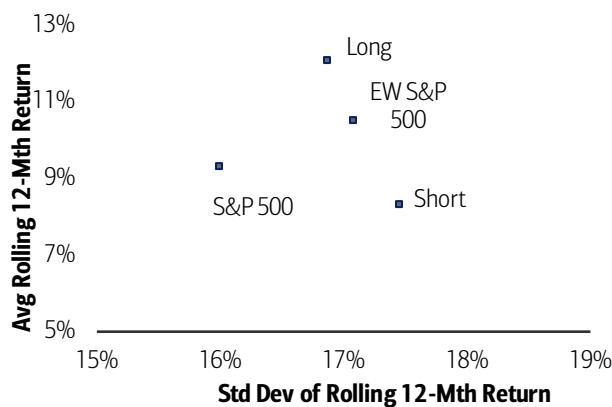


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application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

BofA GLOBAL RESEARCH

Exhibit 320: Earnings Surprise Risk Reward

The factor has historically outperformed the index

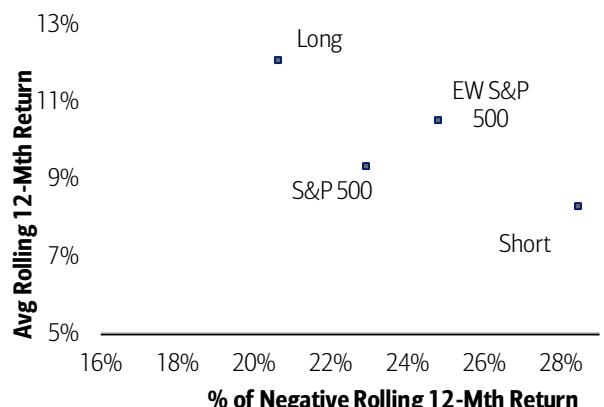


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 321: Earnings Surprise Downside Risk Reward

The factor has historically outperformed the index

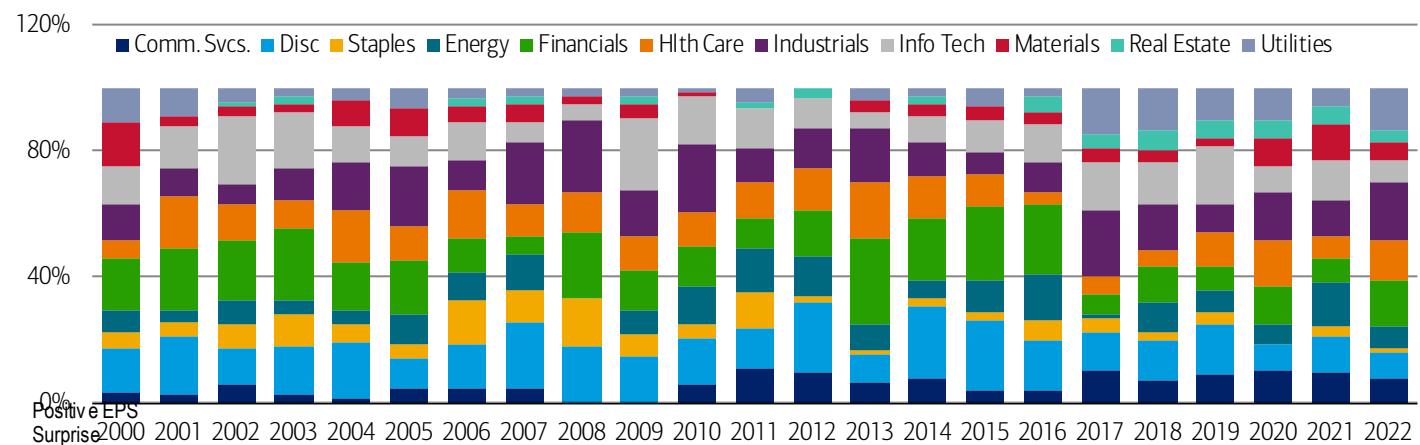


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 322: Positive Earnings Surprise Sector Concentration (Top Decile)

The factor has most weight in Industrials



Source: BofA US Equity and Quant Strategy

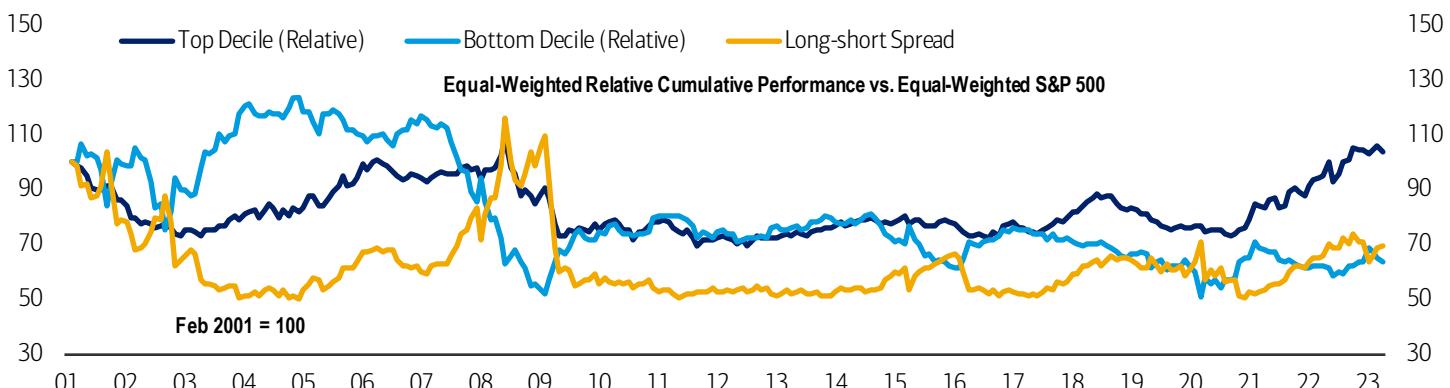
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Earnings Estimate Revision

Exhibit 323: Performance of High EPS Estimate Revisions, Low EPS Estimate Revisions and Long-Short Spread

The factor has underperformed the index YTD

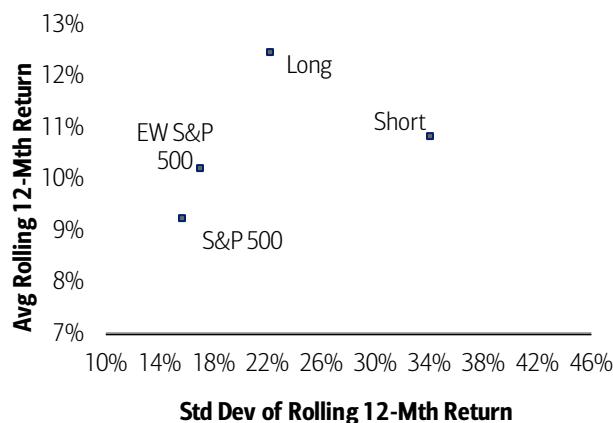


Source: BofA US Equity and Quant Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and reflects application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

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Exhibit 324: Earnings Surprise Risk Reward

The factor has historically outperformed the index

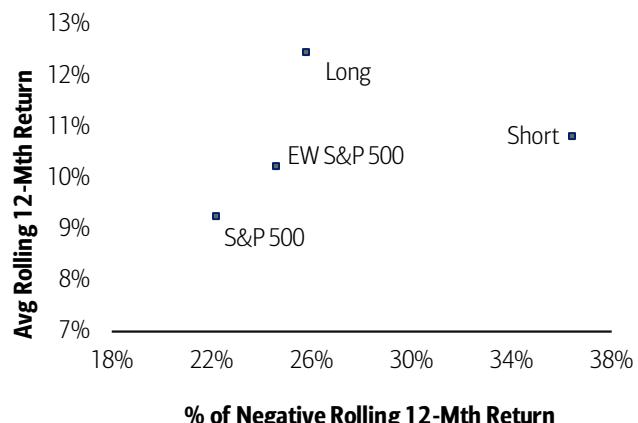


Source: BofA US Equity & Quant Strategy

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Exhibit 325: Estimate Revisions Downside Risk Reward

The factor has historically outperformed the index

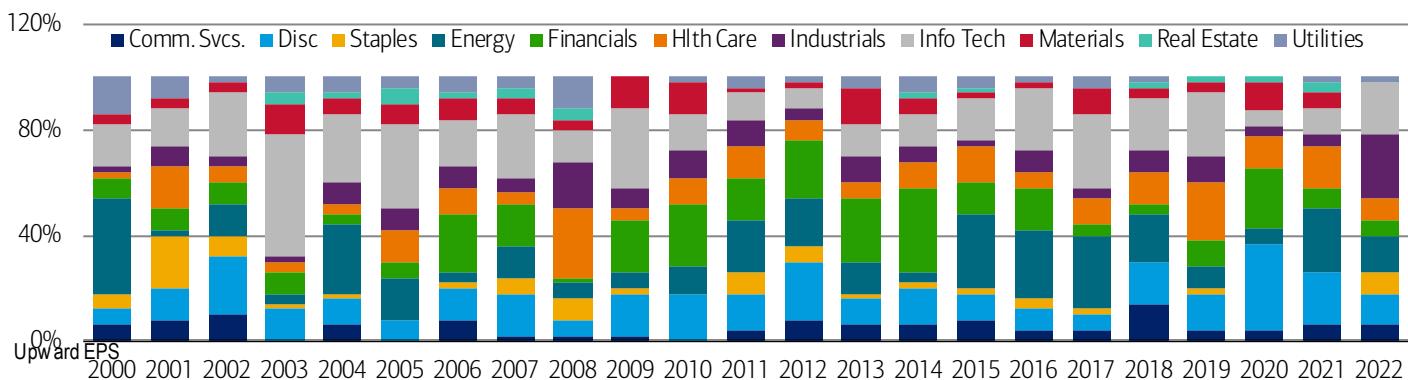


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 326: Positive Earnings Surprise Sector Concentration (Top Decile)

The factor has most weight in Industrials



Source: BofA US Equity & Quant Strategy

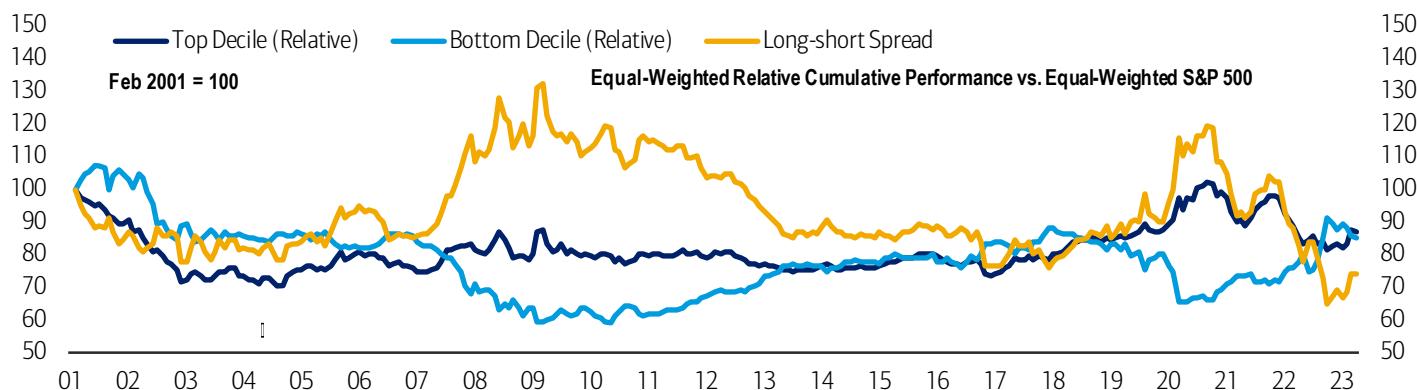
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Equity Duration

Exhibit 327: Performance of Top Decile, Bottom Decile and Long-Short Spread

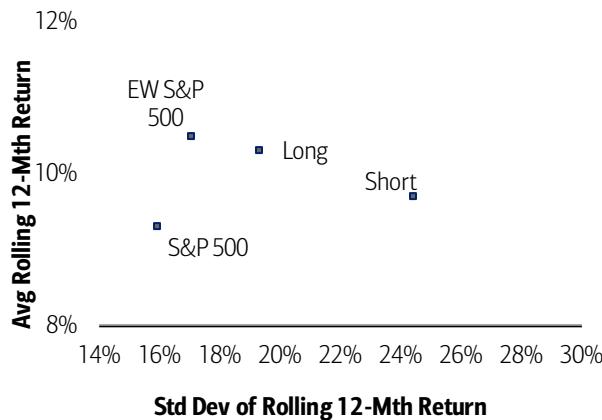
The factor has outperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 328: High Duration Risk Reward

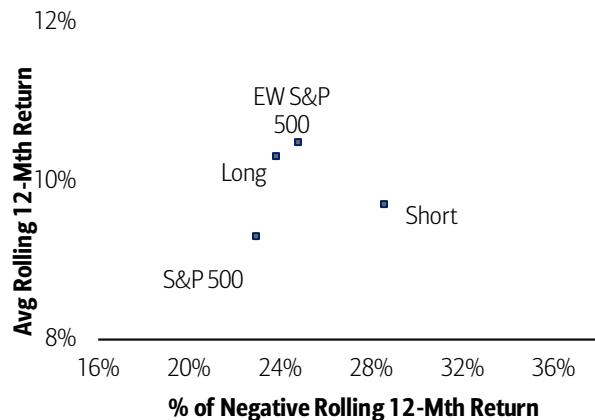
The factor has historically underperformed the index



BofA GLOBAL RESEARCH

Exhibit 329: High Duration Downside Risk Reward

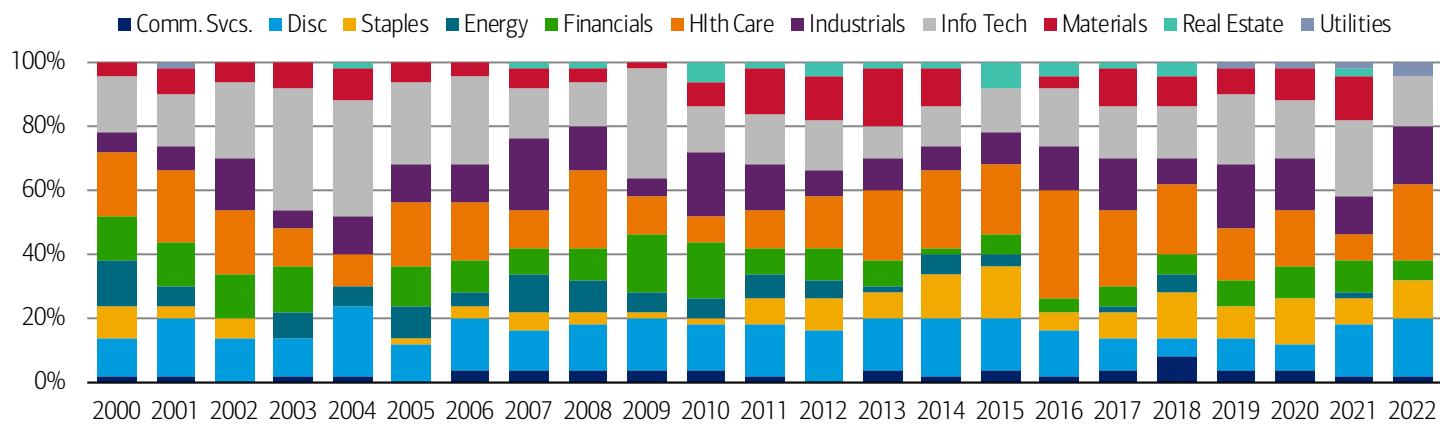
The factor has historically underperformed the index



BofA GLOBAL RESEARCH

Exhibit 330: High Duration Sector Concentration (Top Decile)

The factor has most weight in Health Care



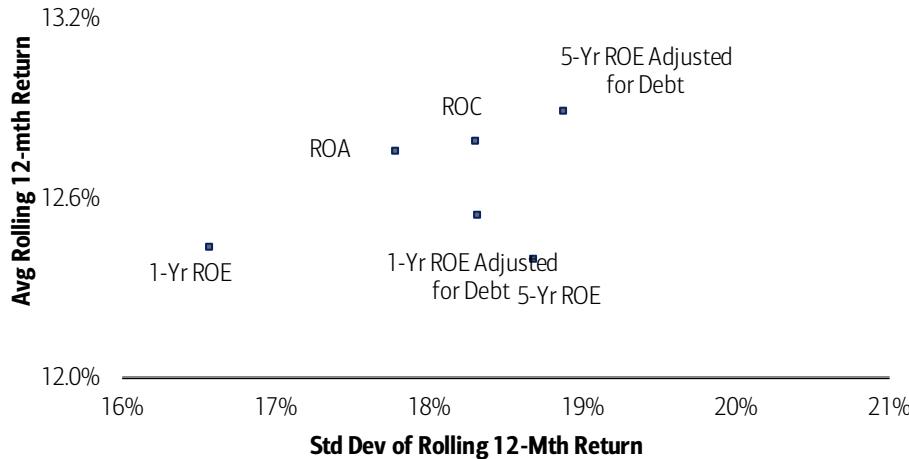
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Quality Strategies

Exhibit 331: Quality Strategies

High 5-yr Debt Adjusted ROE Fared Best

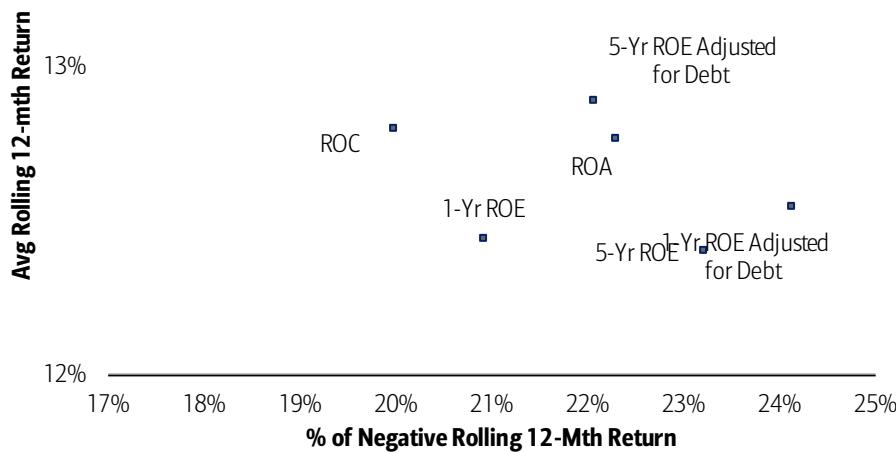


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 332: Quality Strategies

High 5-yr Debt Adjusted ROE Fared Best



Source: BofA US Equity and Quant Strategy

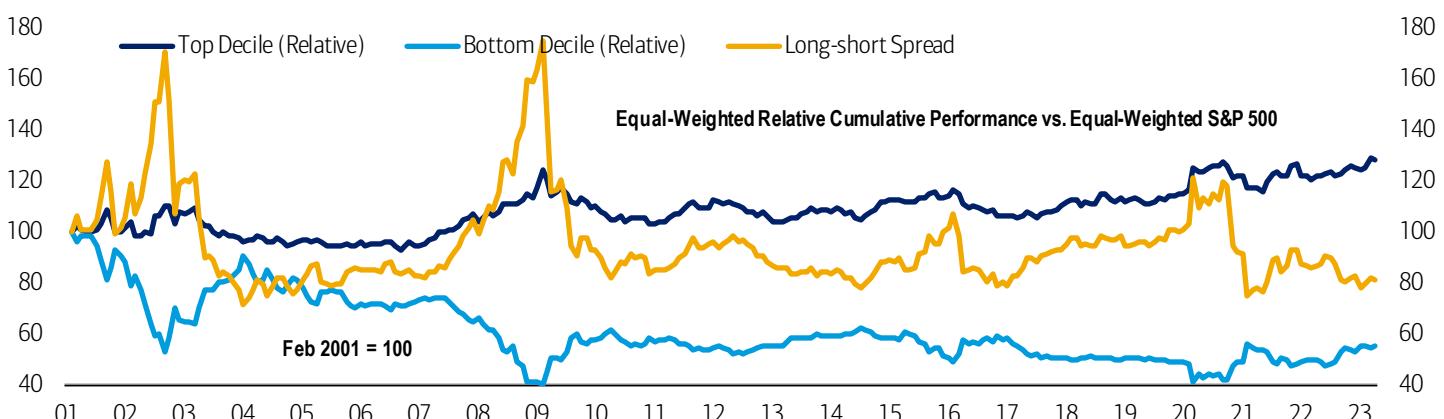
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One-Year Return on Equity

Exhibit 333: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

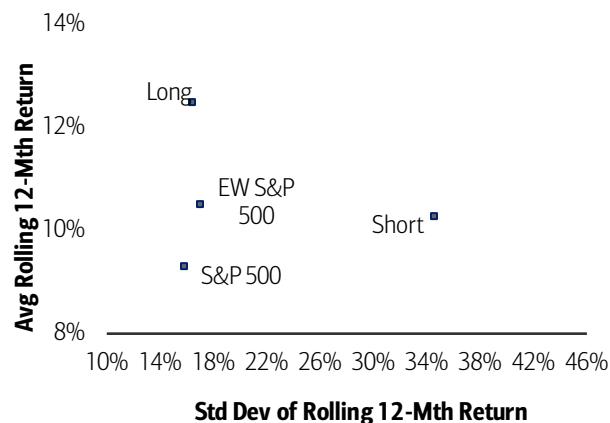


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 334: High 1-Yr Return on Equity Risk Reward

The factor has historically outperformed the index

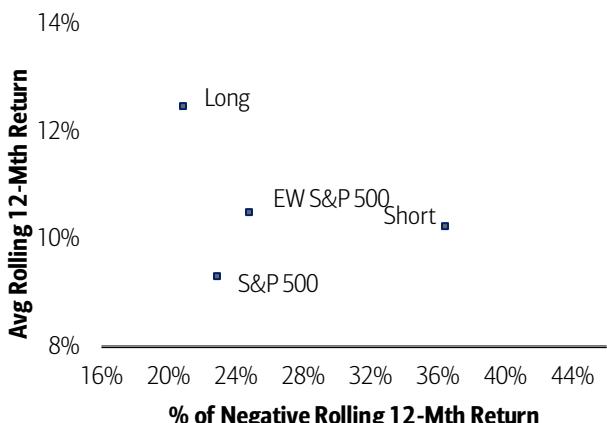


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 335: High 1-Yr Return on Equity Downside Risk Reward

The factor has historically outperformed the index

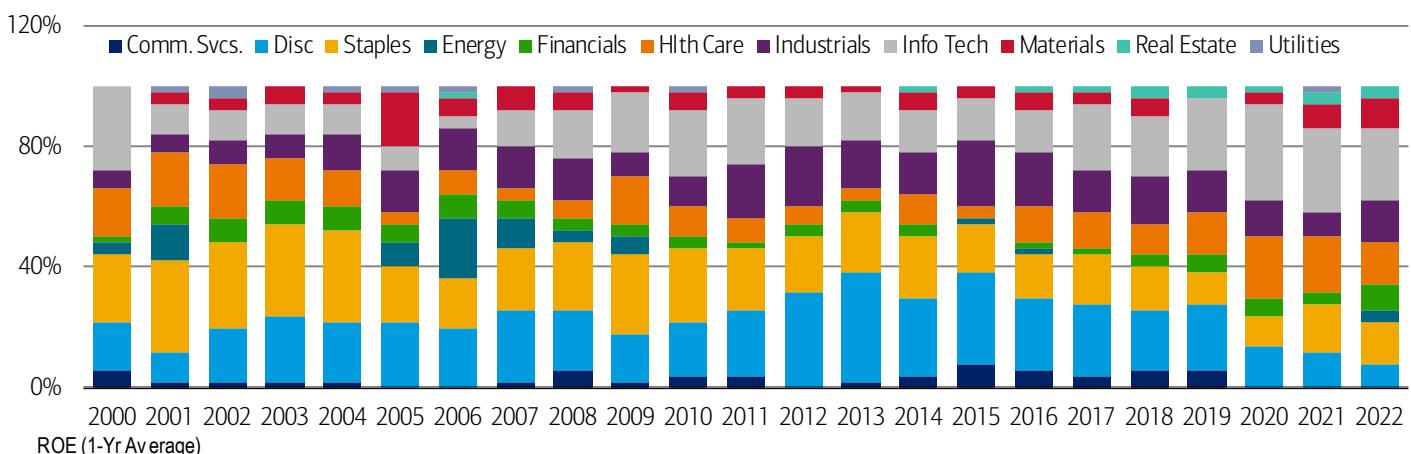


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 336: 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 337: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

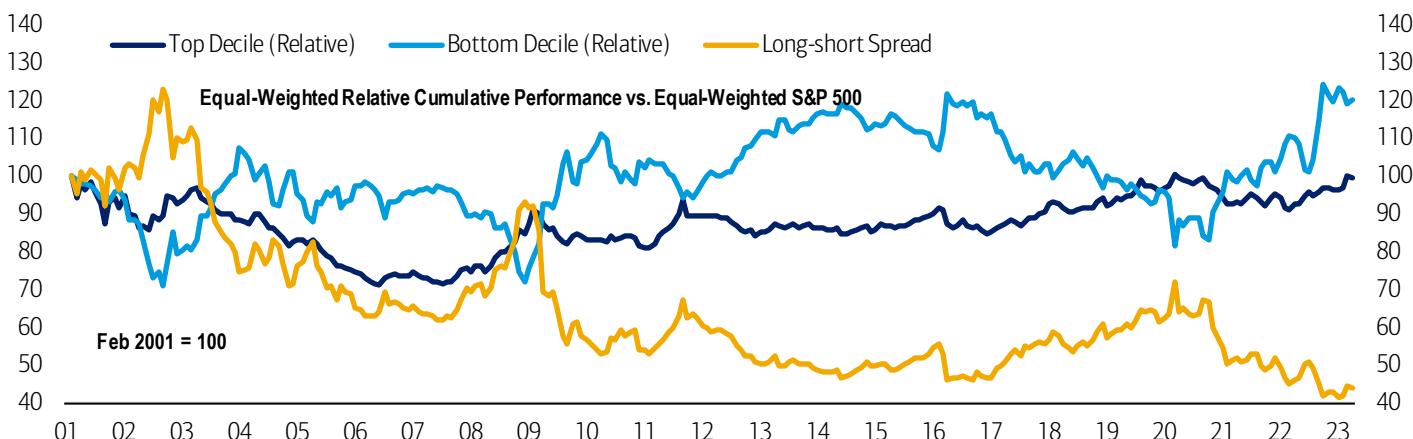


Exhibit 338: High 5-Yr Return on Equity Risk Reward

The factor has historically outperformed the index

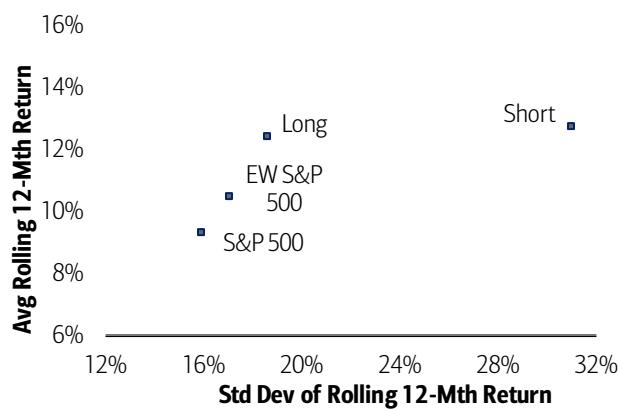


Exhibit 339: High 5-Yr Return on Equity Downside Risk Reward

The factor has historically outperformed the index

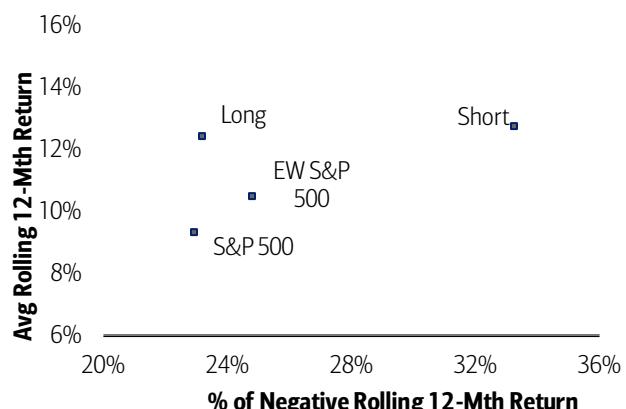
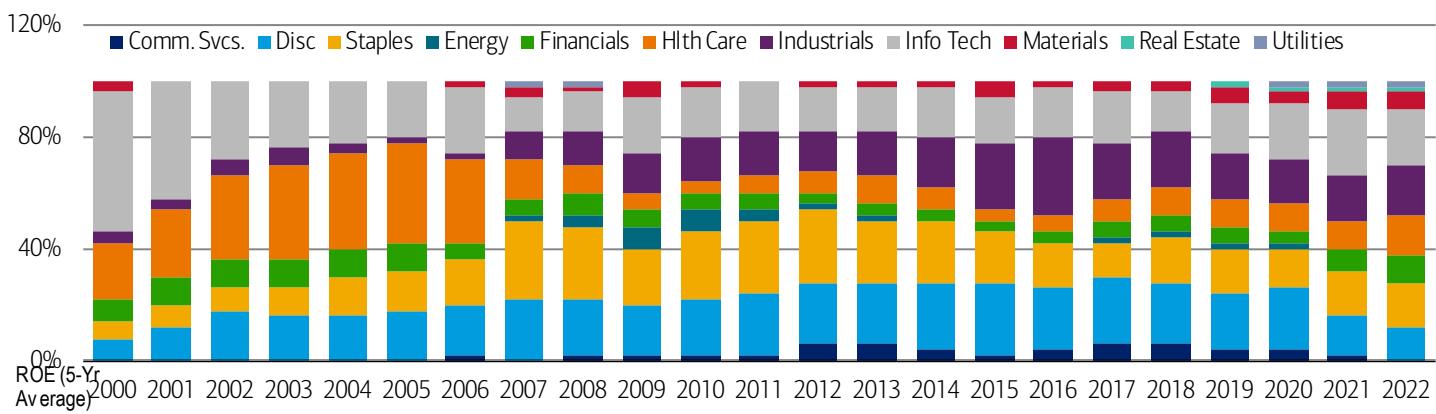


Exhibit 340: High 5-Yr Return on Equity Sector Concentration of (Top Decile)

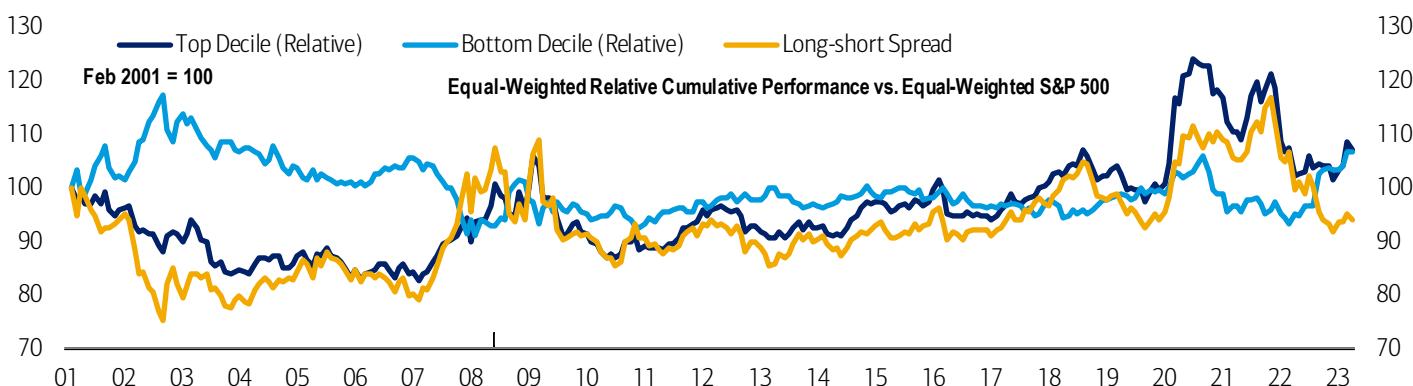
The factor has most weight in Info. Tech.



One-Year Return on Equity (Adjusted for Debt)

Exhibit 341: Performance of Top Decile, Bottom Decile and Long-Short Spread

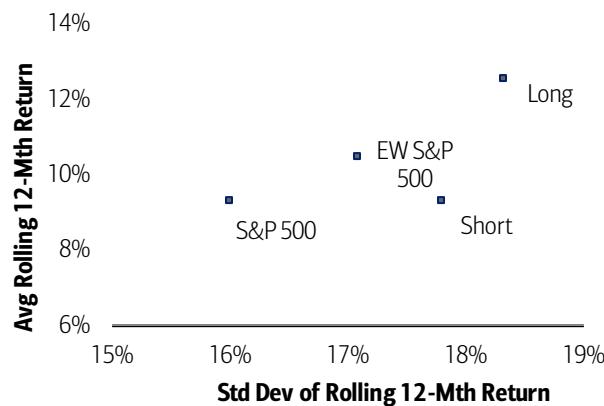
The factor has outperformed the index YTD



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Exhibit 342: High 1-Yr ROE Adjusted for Debt Risk Reward

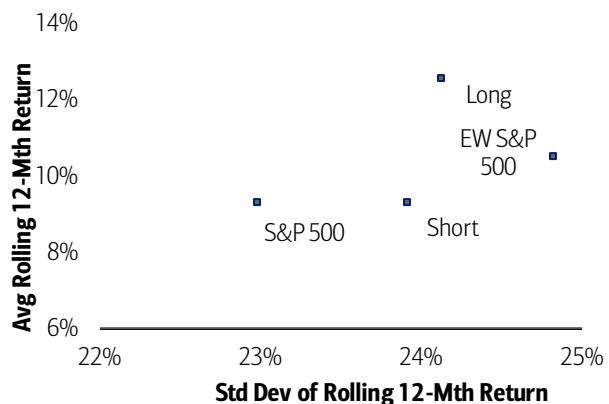
The factor has historically outperformed the index



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Exhibit 343: High 1-Yr ROE Adjusted for Debt Downside Risk Reward

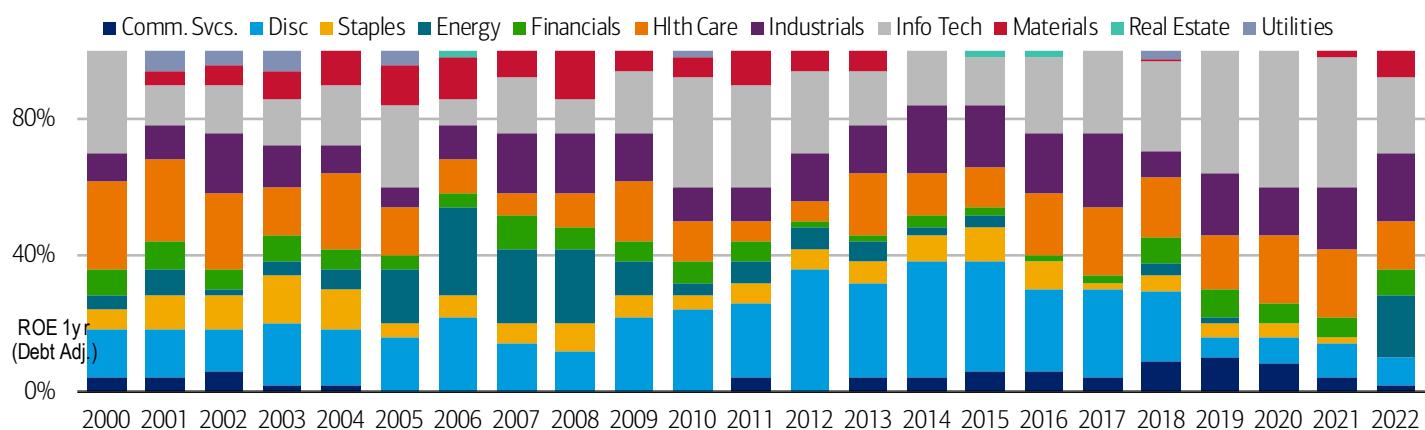
The factor has historically outperformed the index



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Exhibit 344: High 1-Yr ROE Adjusted for Debt Sector Concentration (Top Decile)

The factor has most weight in Info Tech



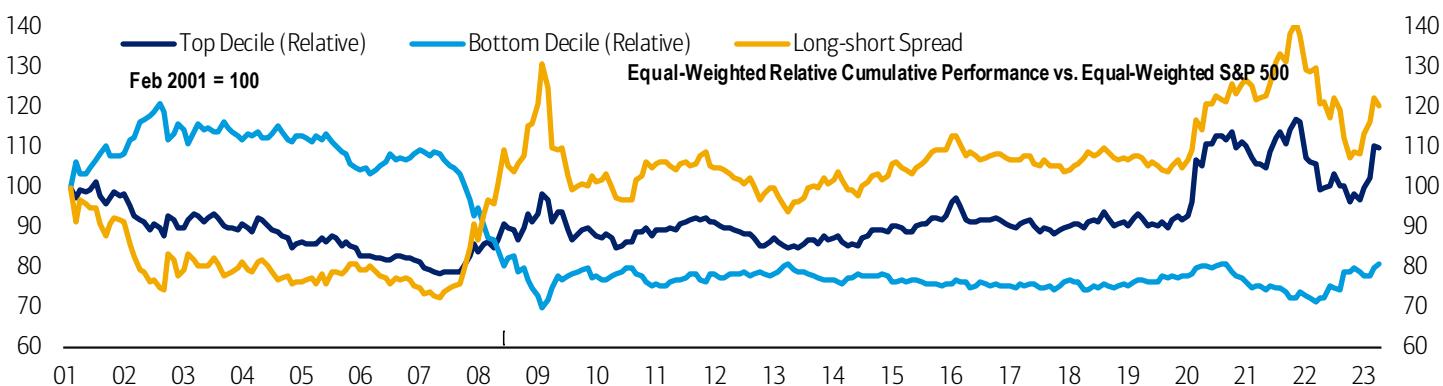
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Five-Year Return on Equity (Adjusted for Debt)

Exhibit 345: Performance of Top Decile, Bottom Decile and Long-Short Spread

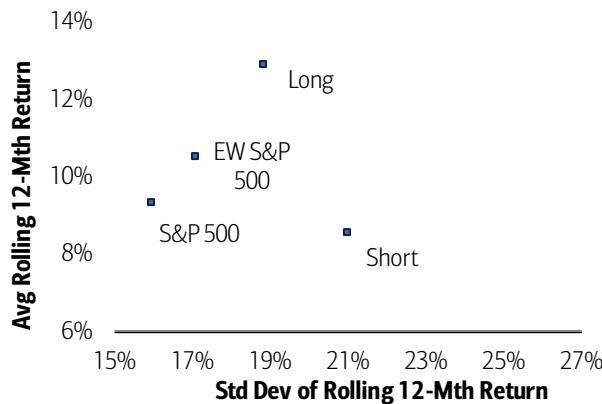
The factor has outperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 346: High 5-Yr ROE Adjusted for Debt Risk Reward

The factor has historically outperformed the index

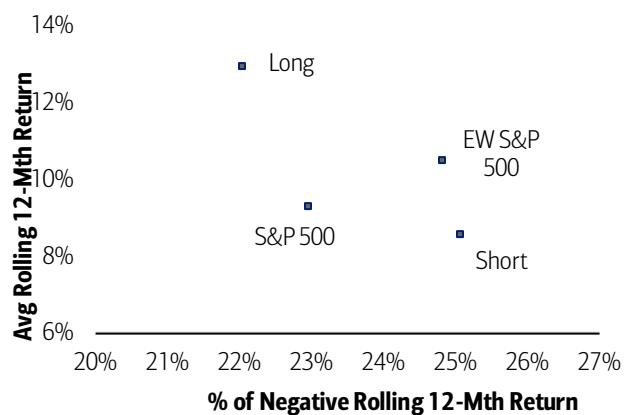


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 347: High 5-Yr ROE Adjusted for Debt Downside Risk Reward

The factor has historically outperformed the index

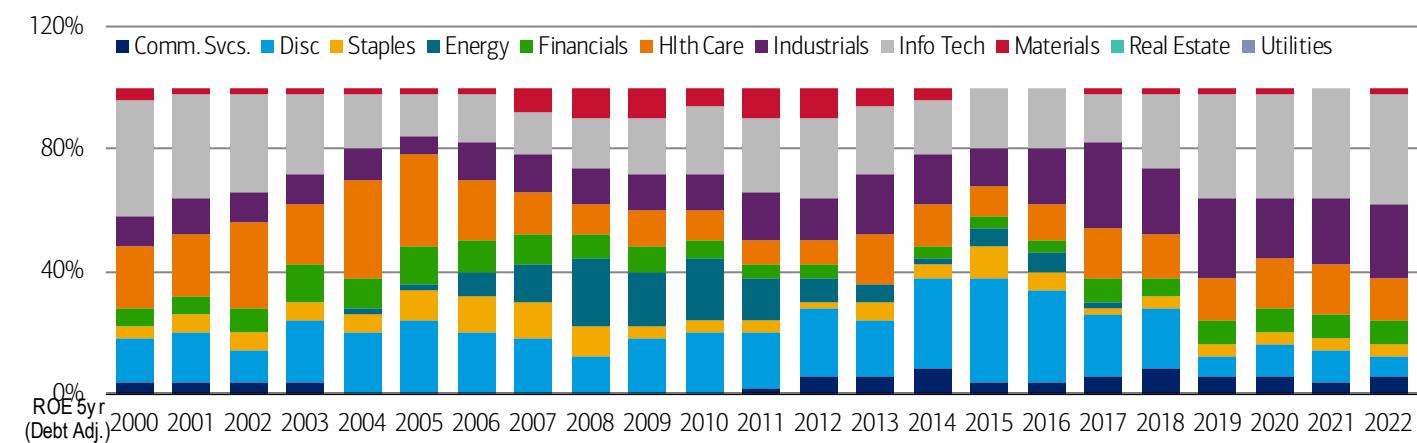


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 348: 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 349: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD

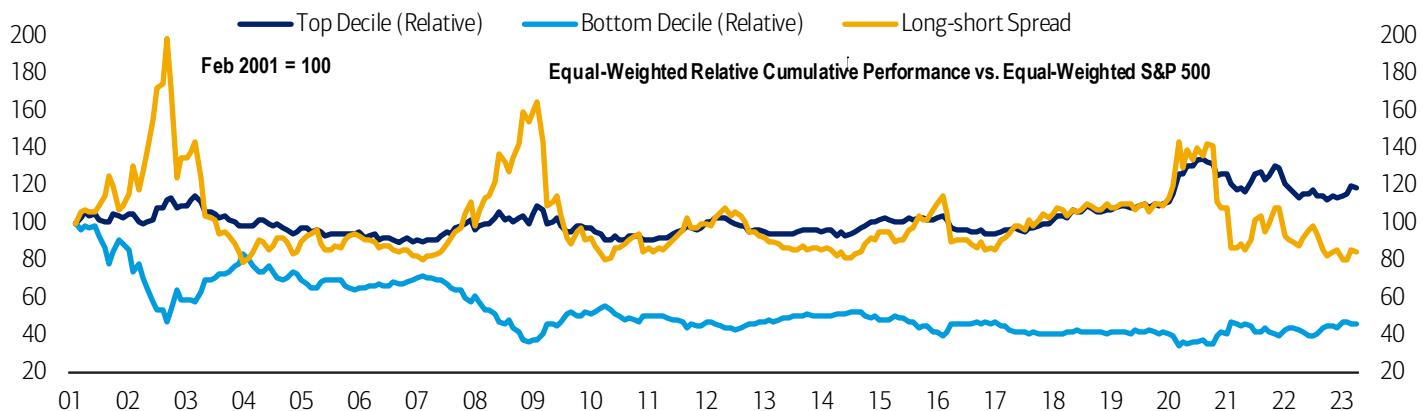


Exhibit 350: High Return on Assets Risk Reward

The factor has historically outperformed the index

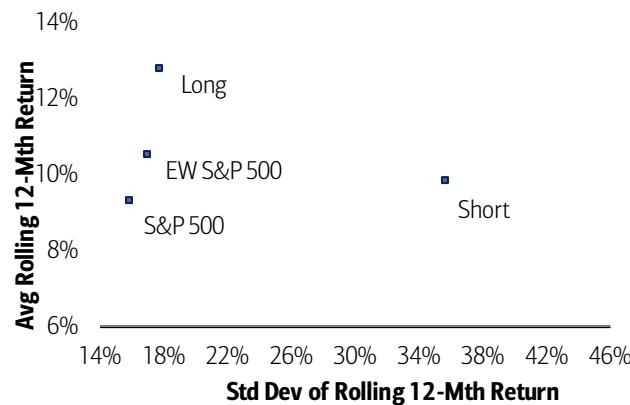


Exhibit 351: High Return on Assets Downside Risk Reward

The factor has historically outperformed the index

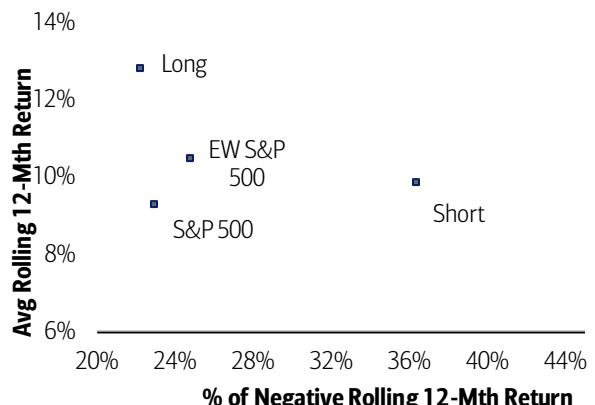
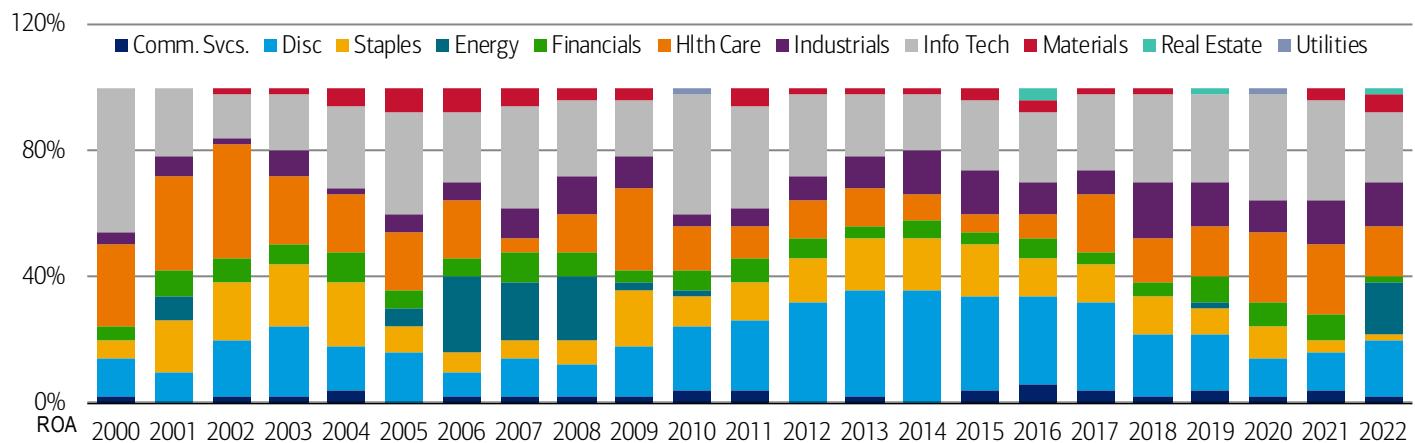


Exhibit 352: High Return on Assets Sector Concentration (Top Decile)

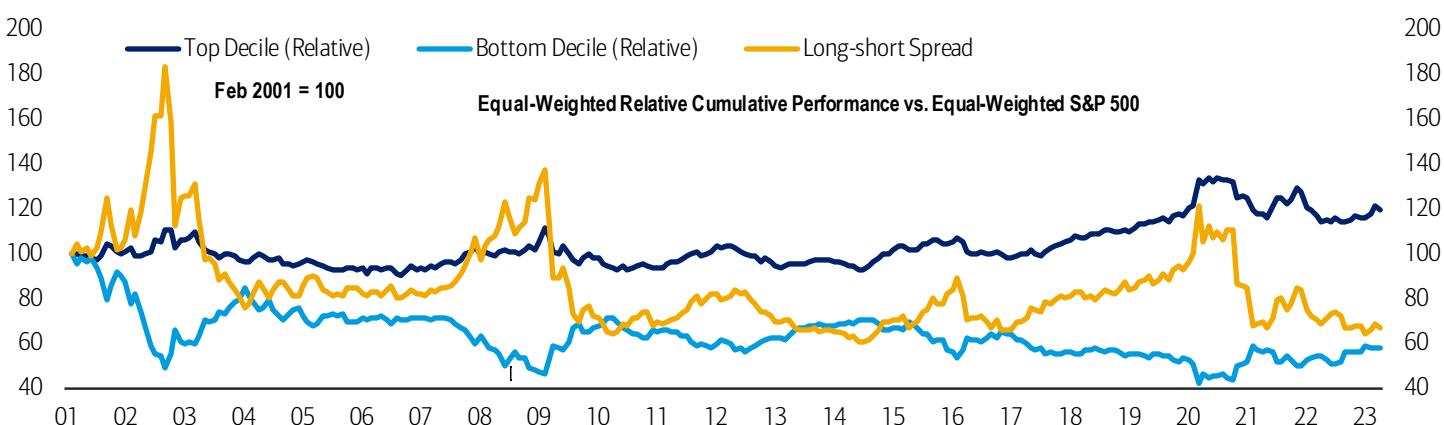
The factor has most weight in Info Tech



Return on Capital

Exhibit 353: Performance of Top Decile, Bottom Decile and Long-Short Spread

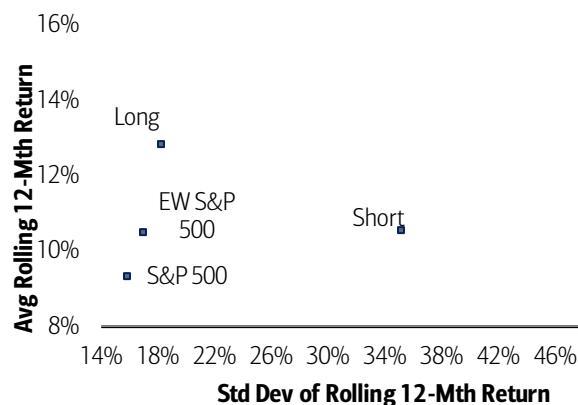
The factor has outperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 354: High Return on Capital Risk Reward

The factor has historically outperformed the index

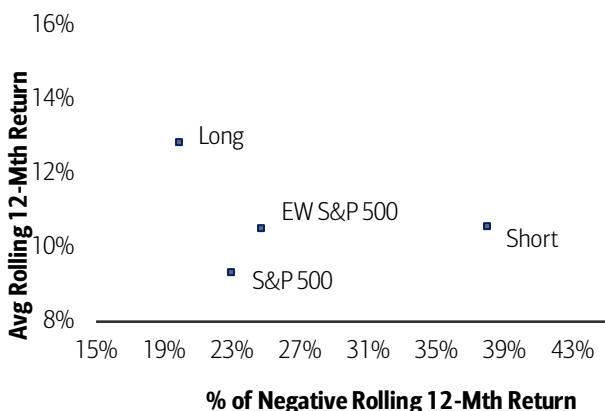


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 355: High Return on Capital Downside Risk Reward

The factor has historically outperformed the index

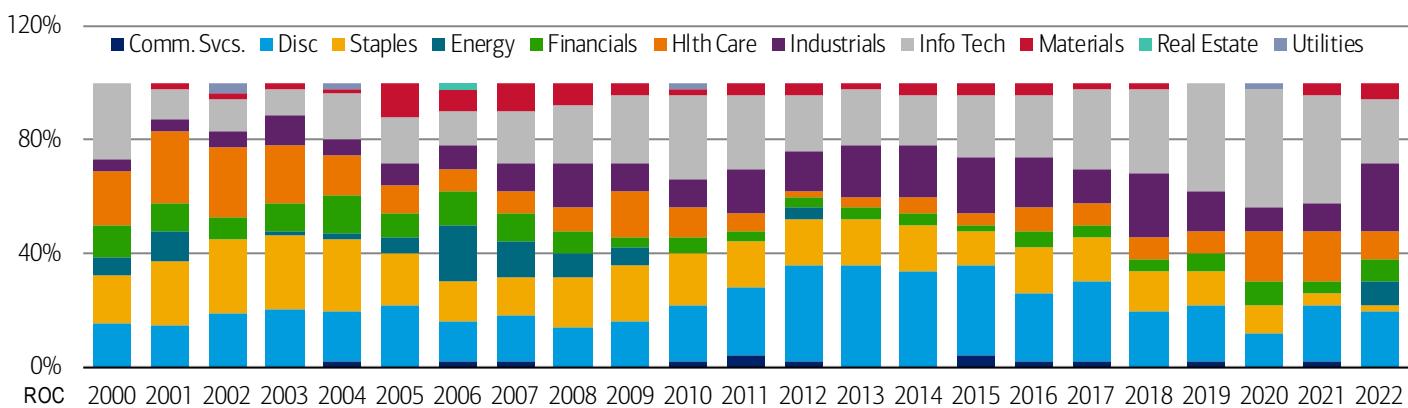


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 356: High Return on Capital Sector Concentration (Top Decile)

The factor has most weight in Industrials



Source: BofA US Equity and Quant Strategy

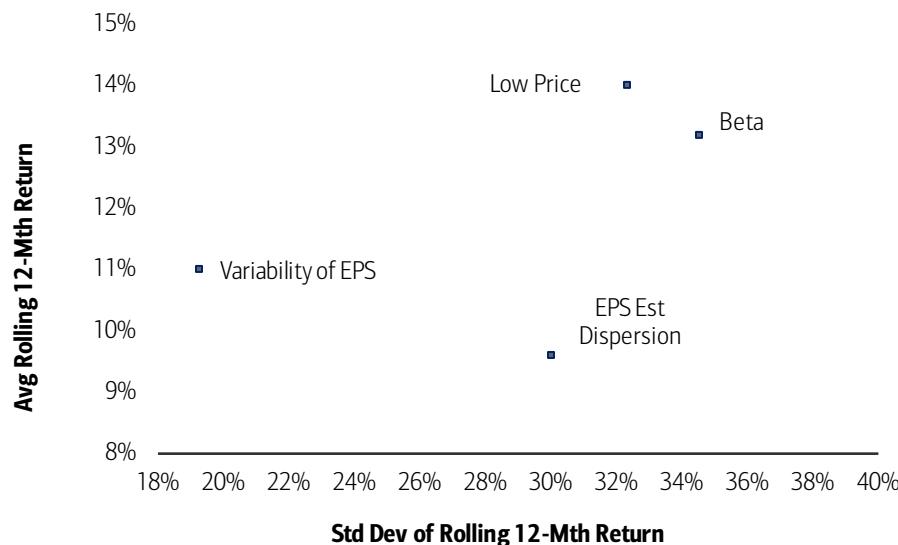
BofA GLOBAL RESEARCH



Risk Strategies

Exhibit 357: Risk Strategies

Low Price fared best

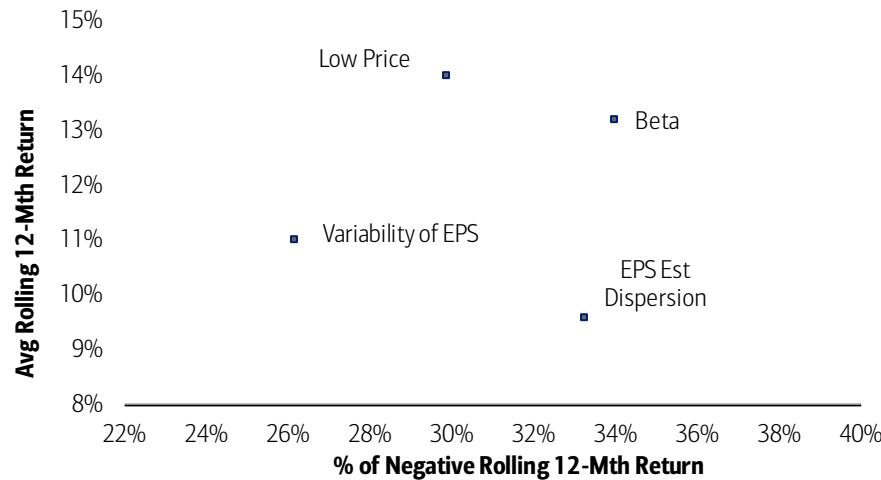


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 358: Risk Strategies

Low Price fared best



Source: BofA US Equity and Quant Strategy

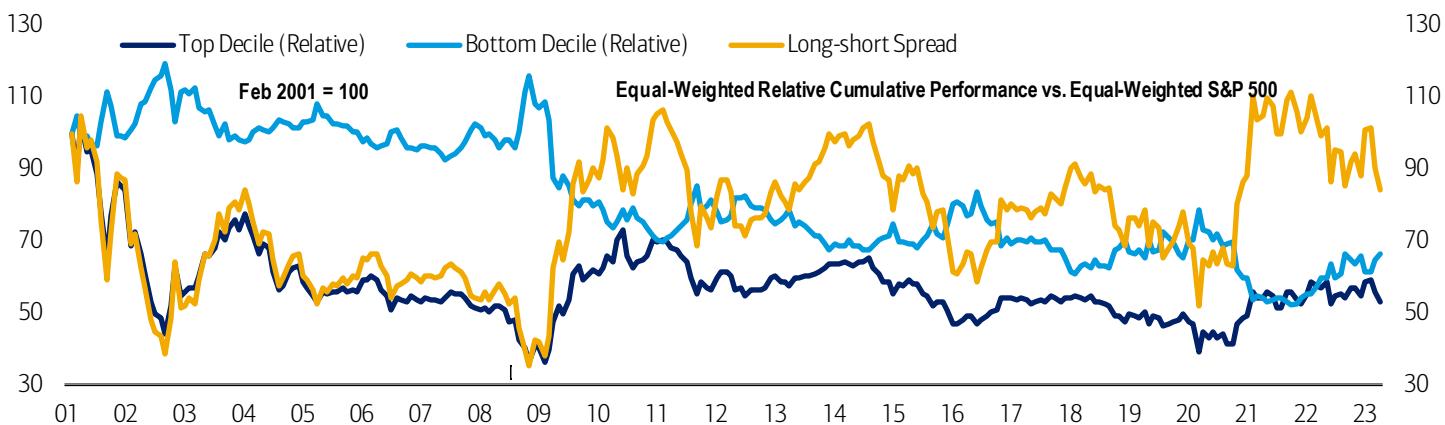
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Beta

Exhibit 359: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD



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Exhibit 360: High Beta Risk Reward

The factor has historically outperformed the index

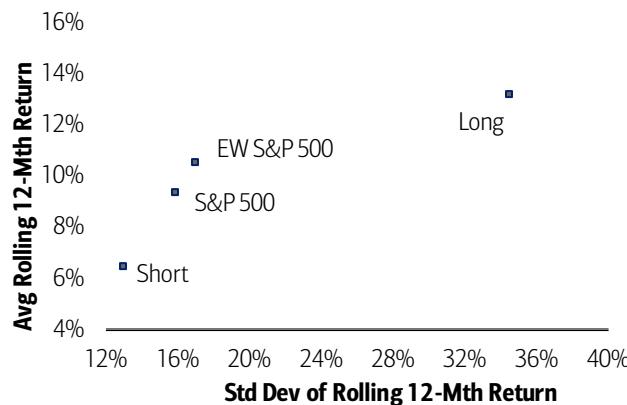
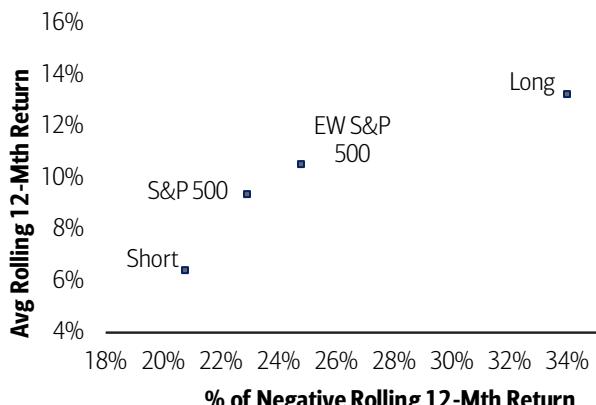


Exhibit 361: High Beta Downside Risk Reward

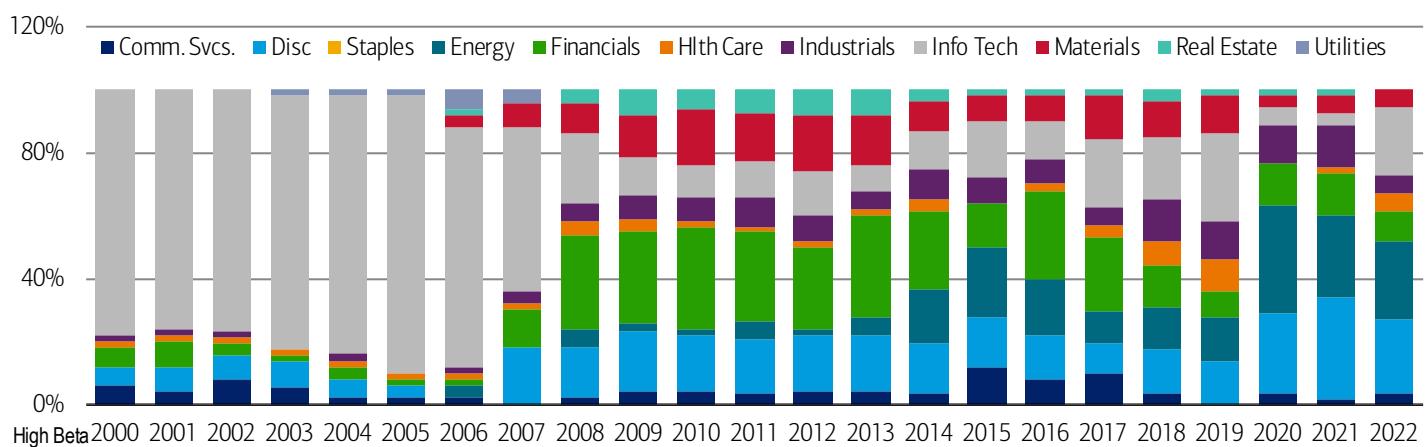
The factor has historically outperformed the index



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Exhibit 362: High Beta Sector Concentration of (Top Decile)

The factor has most weight in Energy



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Variability of Earnings

Exhibit 363: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has underperformed the index YTD

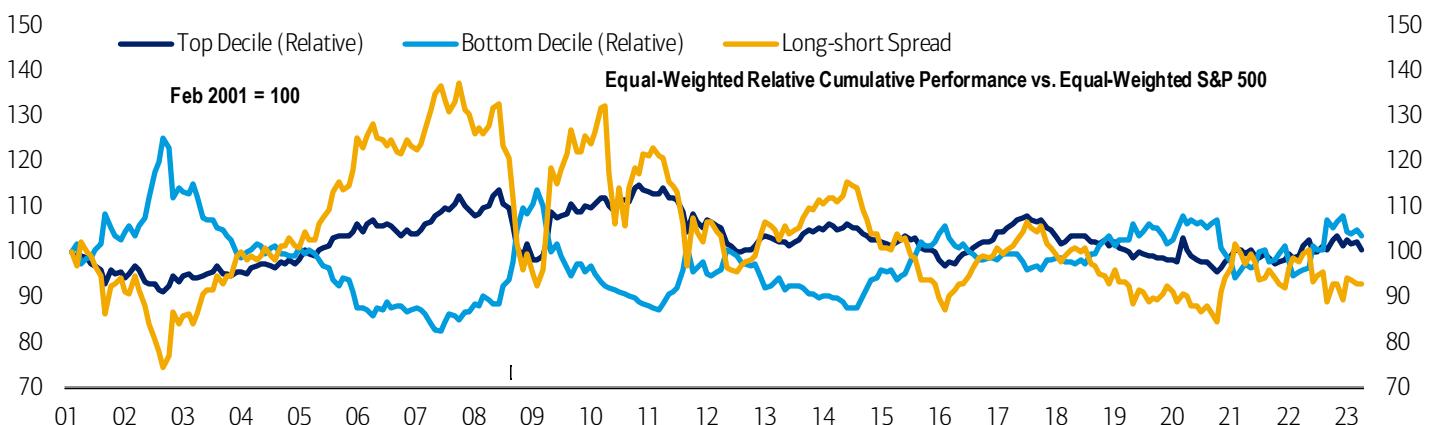


Exhibit 364: High EPS Variability Risk Reward

The factor has historically outperformed the index

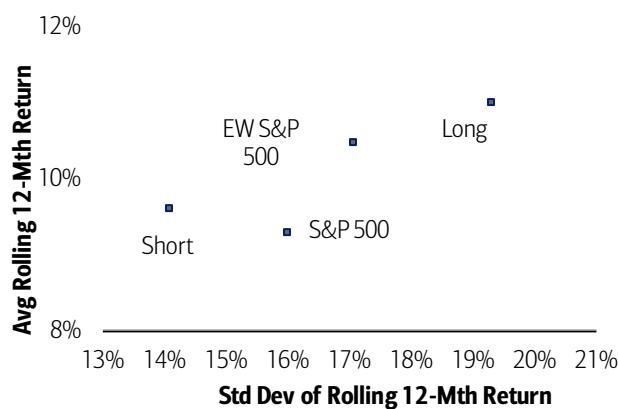


Exhibit 365: High EPS Variability Downside Risk Reward

The factor has historically outperformed the index

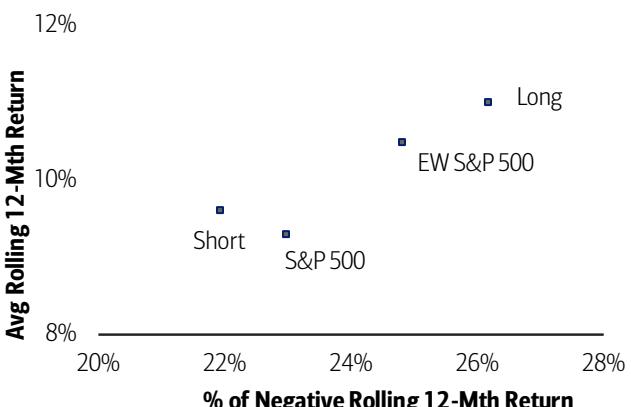
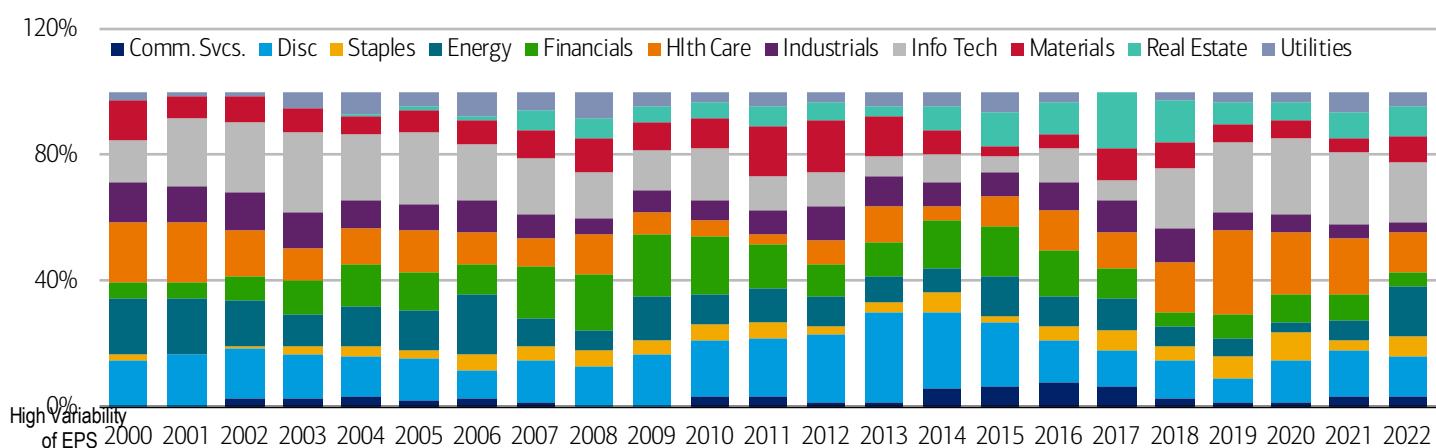


Exhibit 366: High EPS Variability Sector Concentration (Top Decile)

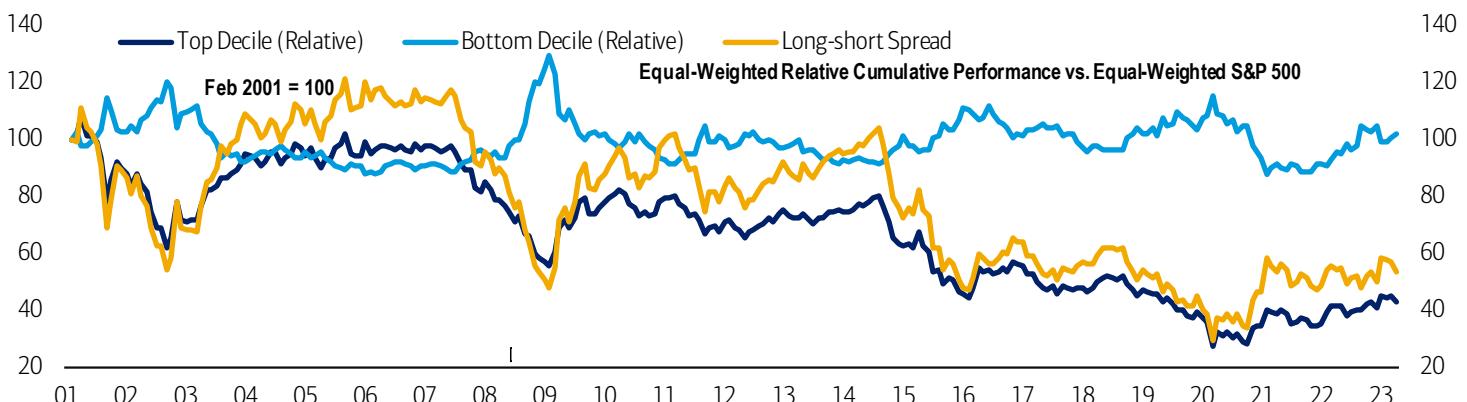
The factor has most weight in Info Tech



Estimate Dispersion

Exhibit 367: Performance of Top Decile, Bottom Decile and Long-Short Spread

The factor has outperformed the index YTD



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Exhibit 368: High EPS Dispersion Risk Reward

The factor has historically underperformed the index

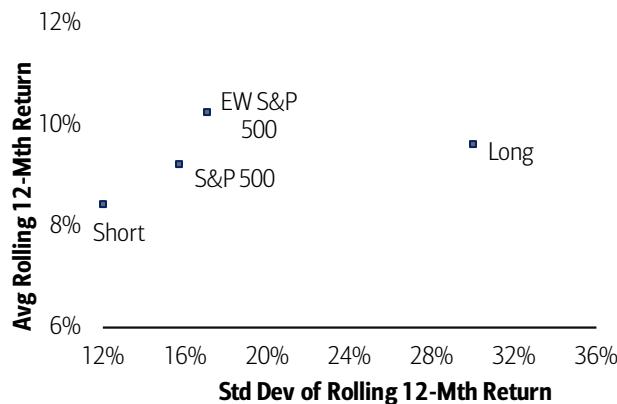
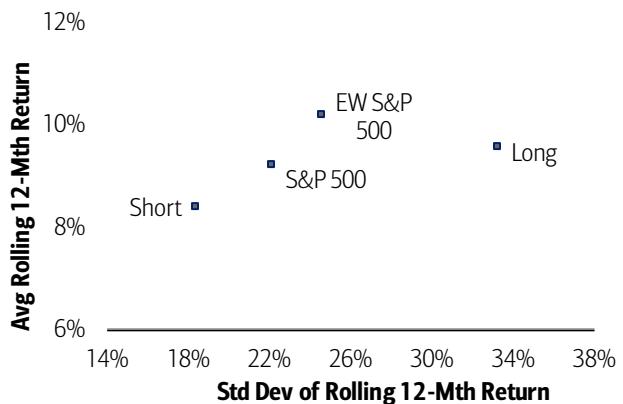


Exhibit 369: High EPS Dispersion Downside Risk Reward

The factor has historically underperformed the index

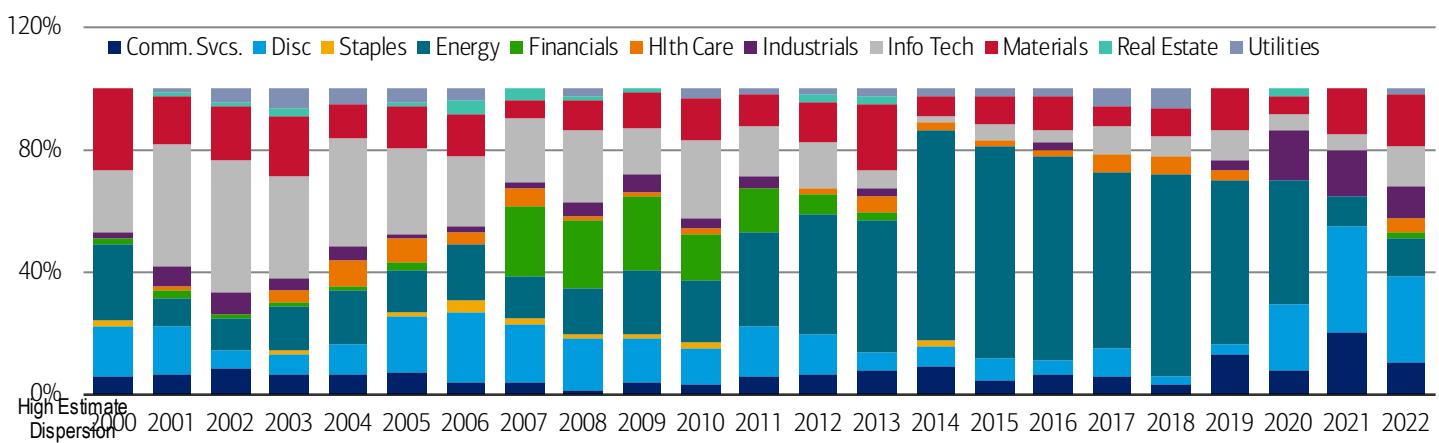


BofA GLOBAL RESEARCH

Source: BofA US Equity and Quant Strategy

Exhibit 370: High EPS Dispersion Sector Concentration (Top Decile)

The factor has most weight in Discretionary



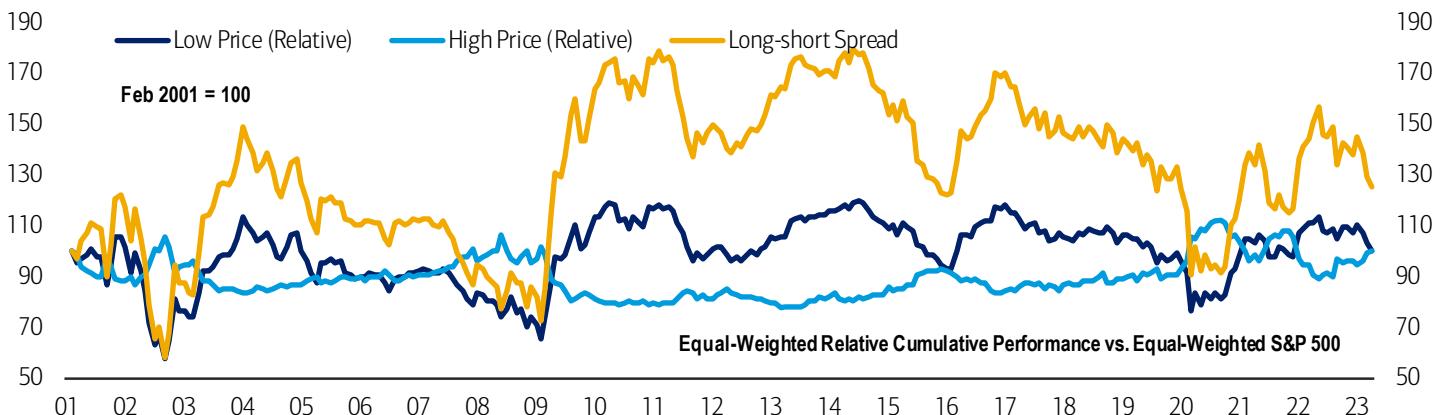
BofA GLOBAL RESEARCH

Price



Exhibit 371: Performance Low Price, High Price and Long-Short Spread

The factor has underperformed the index YTD

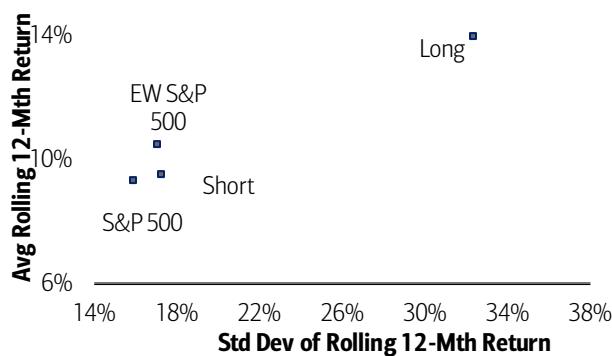


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 372: Low Price Risk Reward

The factor has historically outperformed the index

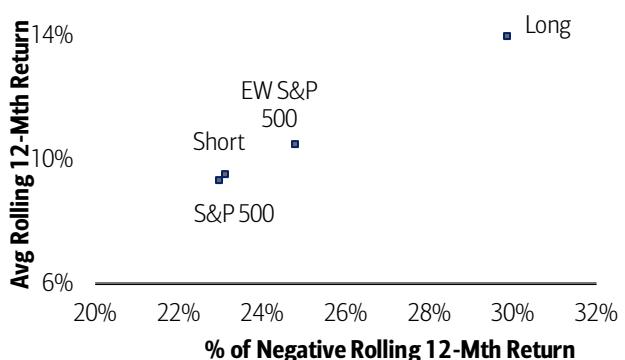


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 373: Low Price Downside Risk Reward

The factor has historically outperformed the index

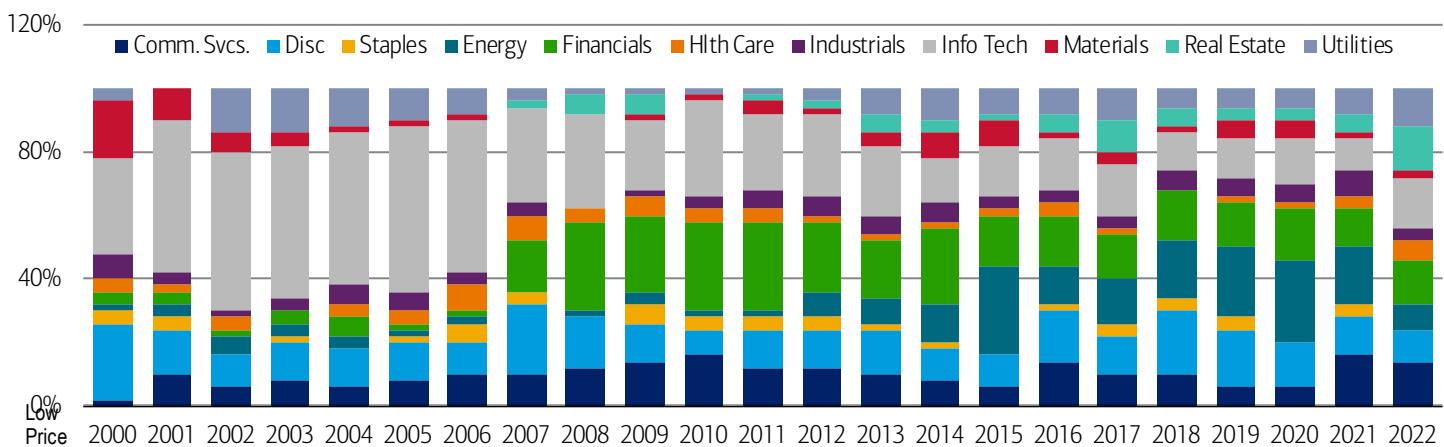


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 374: Price Sector Concentration (Low Decile)

The factor has most weight in Info Tech



Source: BofA US Equity and Quant Strategy

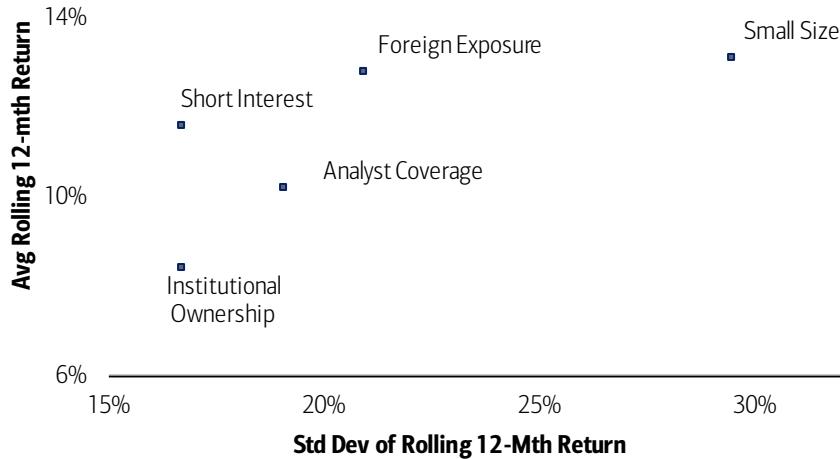
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Miscellaneous Strategies

Exhibit 375: Miscellaneous Strategies

Small Size fared best



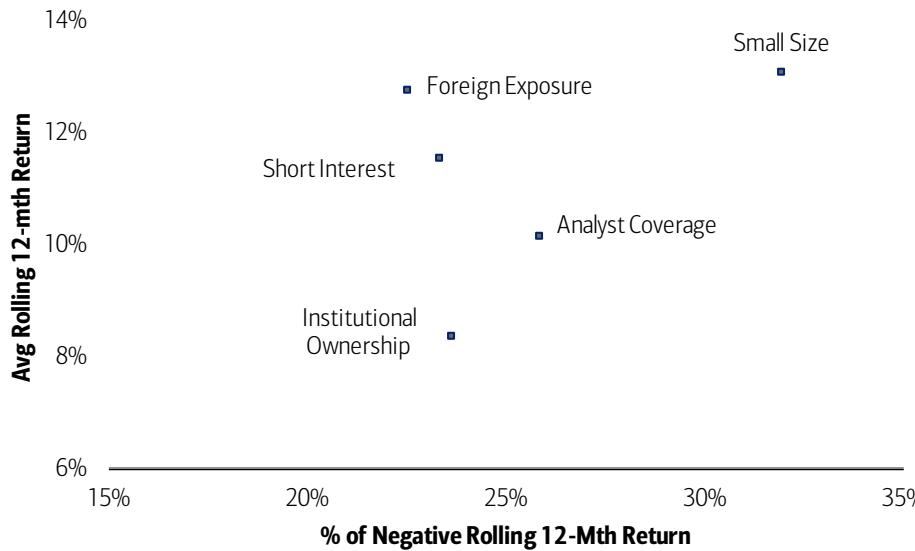
Source: BofA US Equity and Quant Strategy ,FactSet

Note: the performance timeframe for each factor corresponds to the time series chart shown on each of the subsequent pages

BofA GLOBAL RESEARCH

Exhibit 376: 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 377: Performance of Low Institutional Ownership, High Institutional Ownership and Long-Short Spread

The factor has outperformed the index YTD

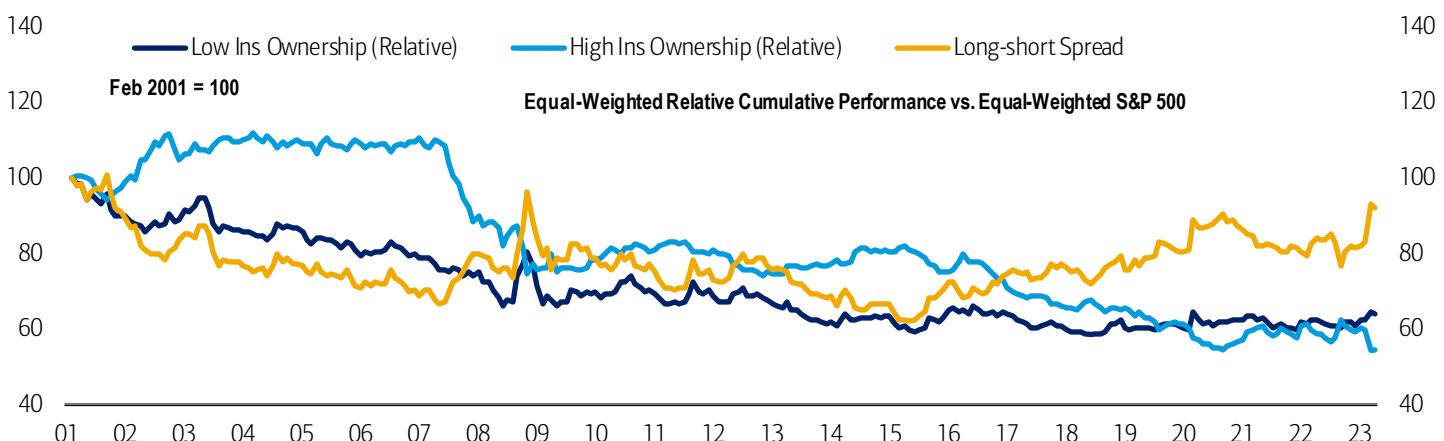


Exhibit 378: Low Institutional Ownership Risk Reward

The factor has historically underperformed the index

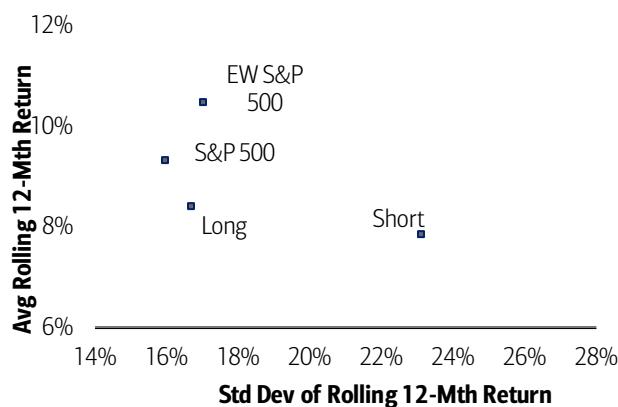


Exhibit 379: Low Institutional Ownership Downside Risk Reward

The factor has historically underperformed the index

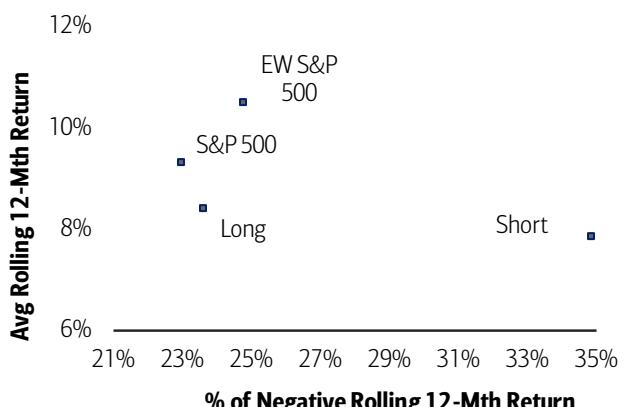
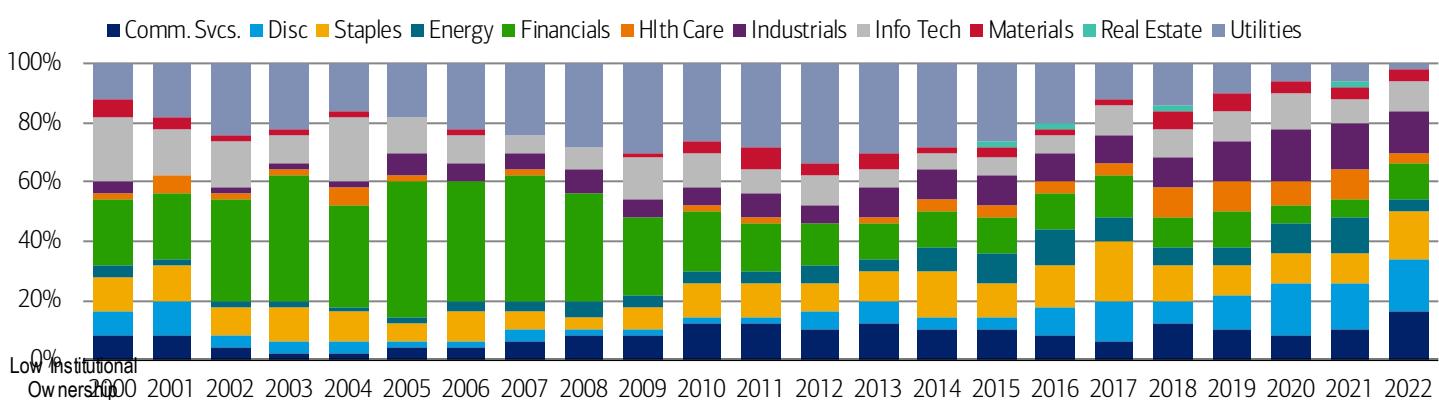


Exhibit 380: Low Institutional Ownership Sector Concentration (Low Decile)

The factor has most weight in Consumer Discretionary

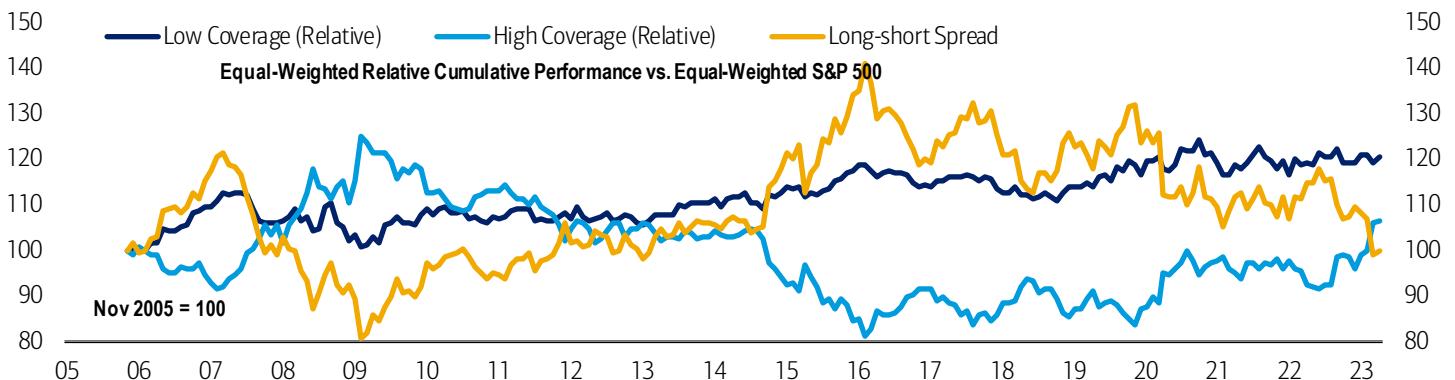


Analyst Coverage



Exhibit 381: Performance of Low Coverage, High Coverage and Long-Short Spread

The factor has outperformed the index YTD

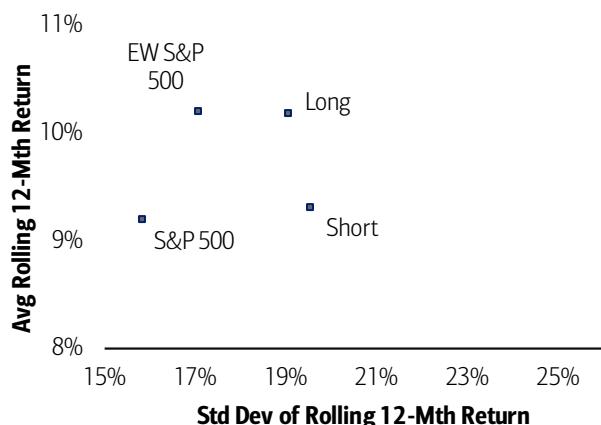


Source: BofA US Equity and Quant Strategy

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Exhibit 382: Low Analyst Coverage Risk Reward

The factor has historically performed in-line with the index

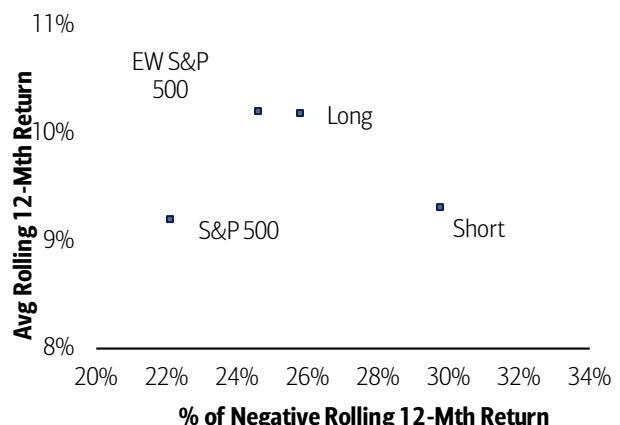


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 383: Low Analyst Coverage Downside Risk Reward

The factor has historically performed in-line with the index

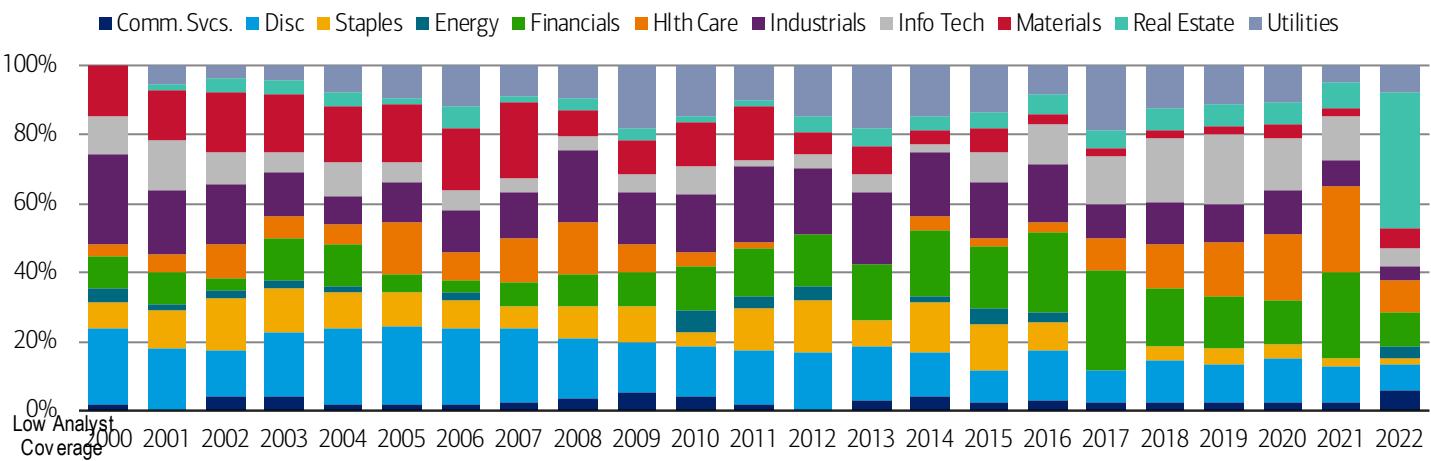


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 384: Low Analyst Coverage Sector Concentration (Low Decile)

The factor has most weight in Real Estate



Source: BofA US Equity and Quant Strategy

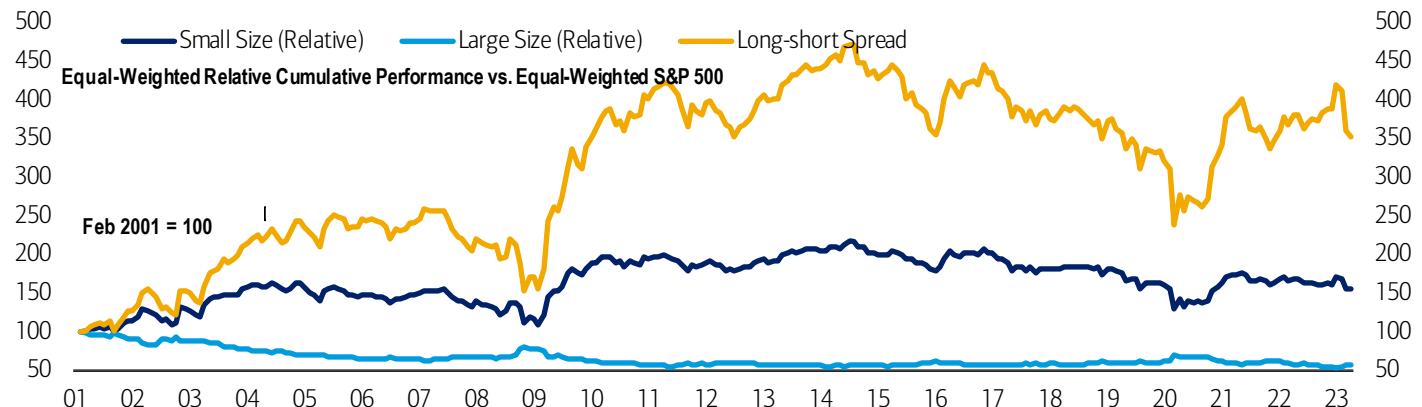
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Size



Exhibit 385: Performance of Small Size, Large Size and Long-Short Spread

The factor has underperformed the index YTD

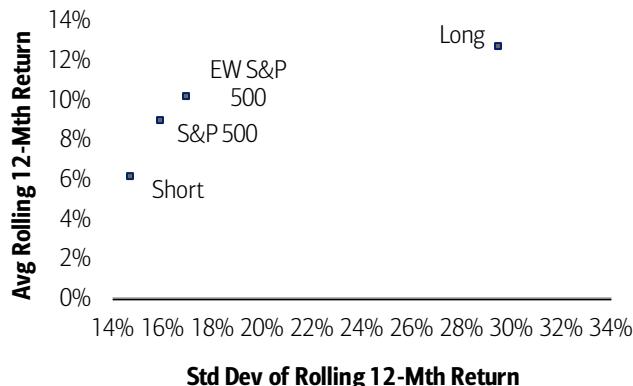


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 386: Small Size Risk Reward

The factor has historically outperformed the index

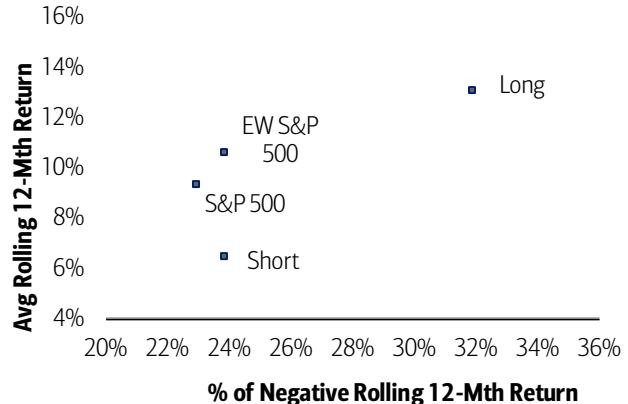


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 387: Small Size Downside Risk Reward

The factor has historically outperformed the index

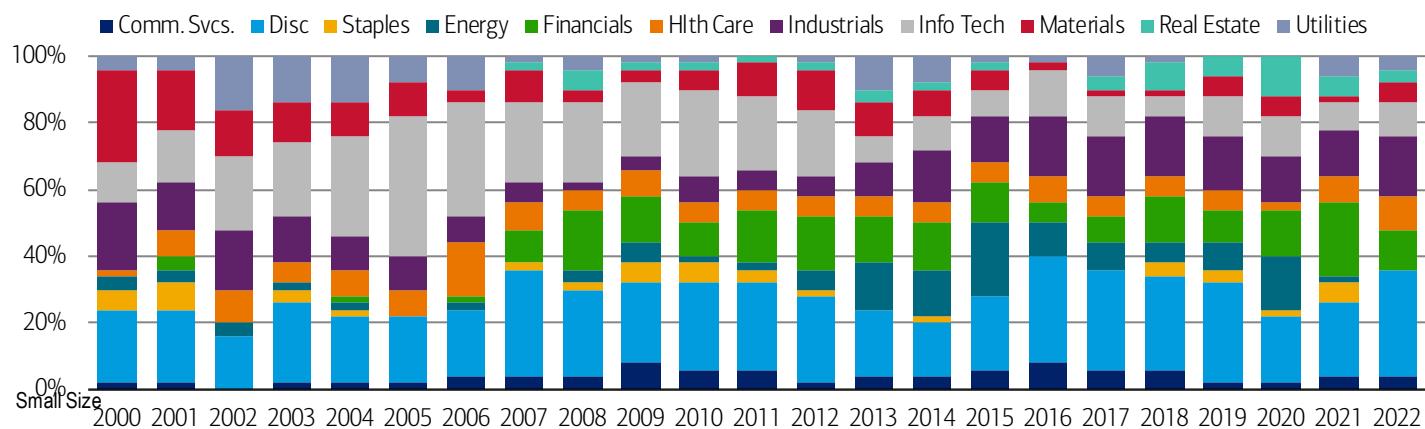


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 388: Small Size Sector Concentration (Low Decile)

The factor has most weight in Discretionary



Source: BofA US Equity and Quant Strategy

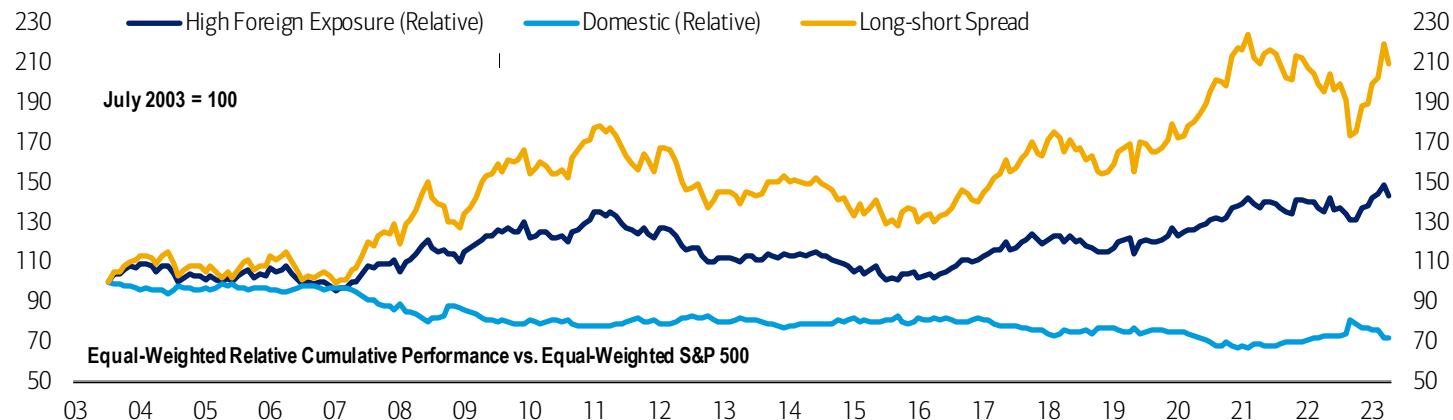
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Foreign Exposure



Exhibit 389: Performance of High Foreign Exposure, Domestic Companies and Long-short Spread

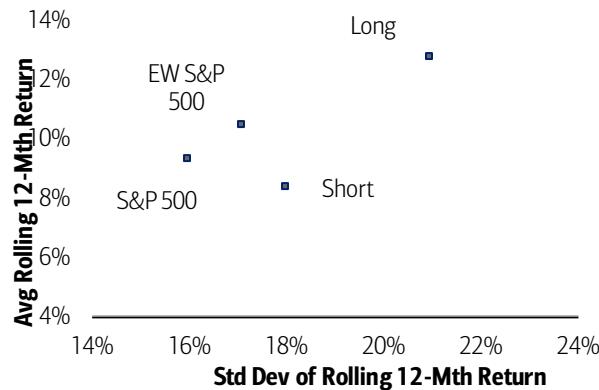
The factor has outperformed the index YTD



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Exhibit 390: High Foreign Exposure Risk Reward

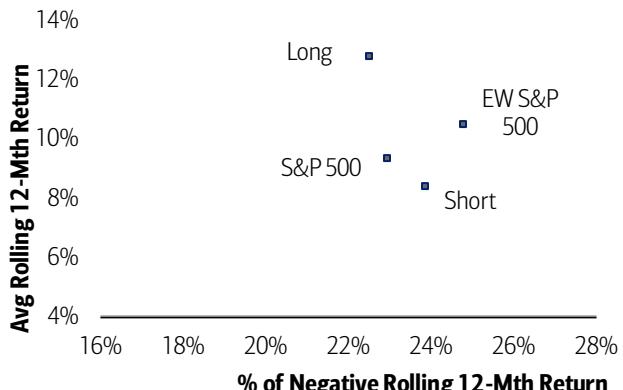
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 391: High Foreign Exposure Downside Risk Reward

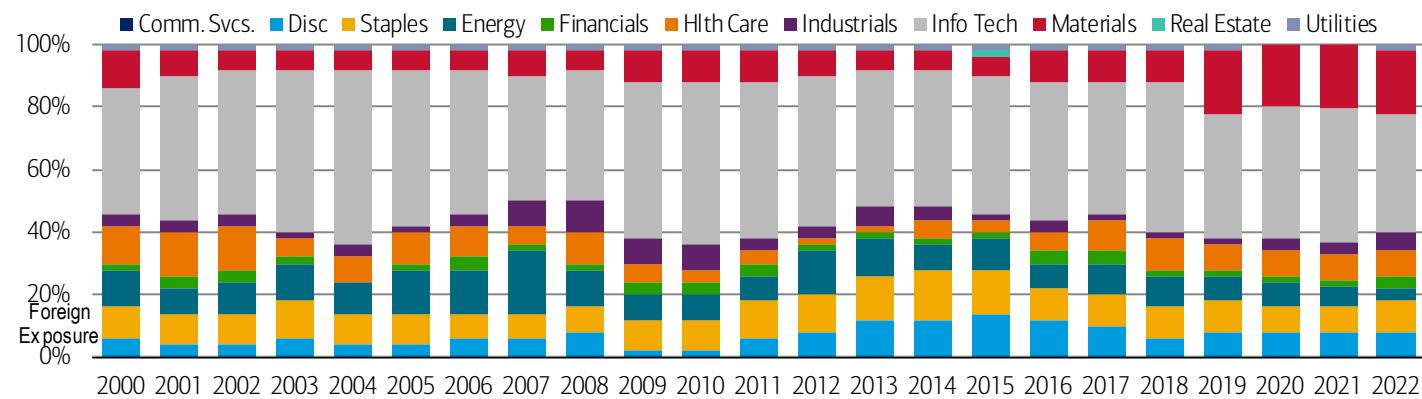
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 392: High Foreign Exposure Sector Concentration (Top Decile)

The factor has most weight in Info Tech



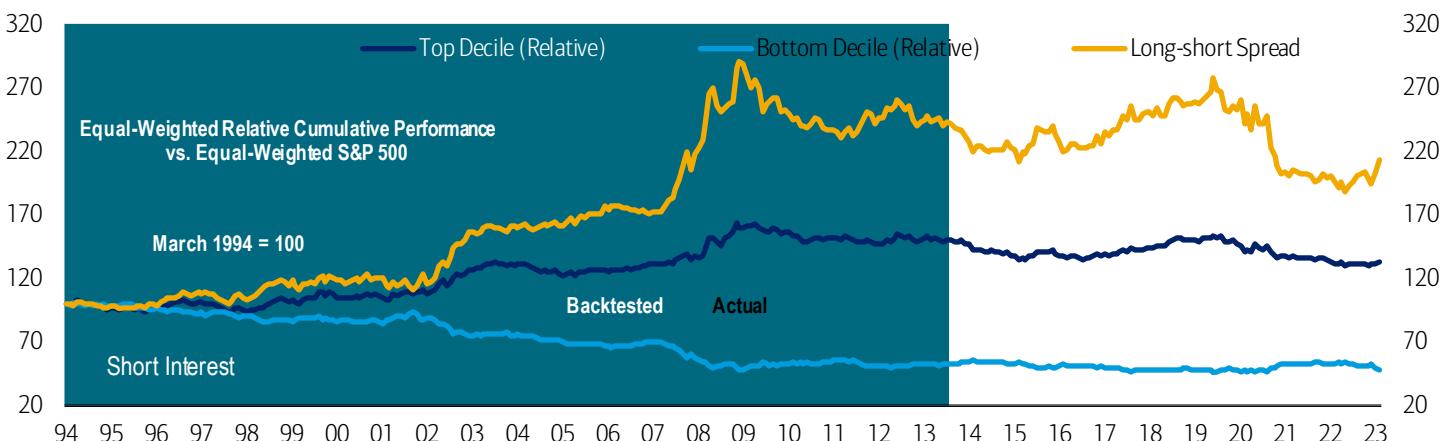
BofA GLOBAL RESEARCH



Short Interest

Exhibit 393: Performance of Top Decile, Bottom Decile and Long-Short Spread

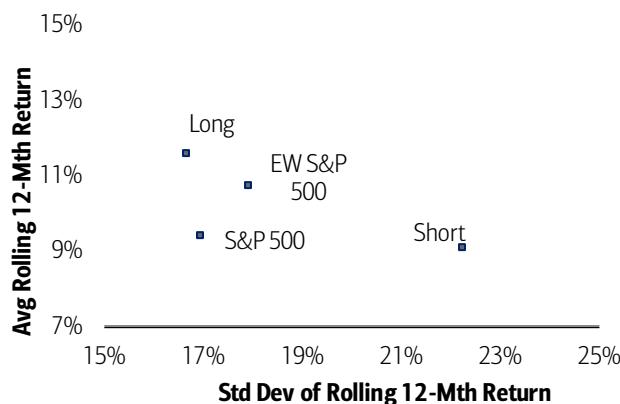
The factor has outperformed the index YTD



BofA GLOBAL RESEARCH

Exhibit 394: High Price Return – 12M and 1M Risk Reward

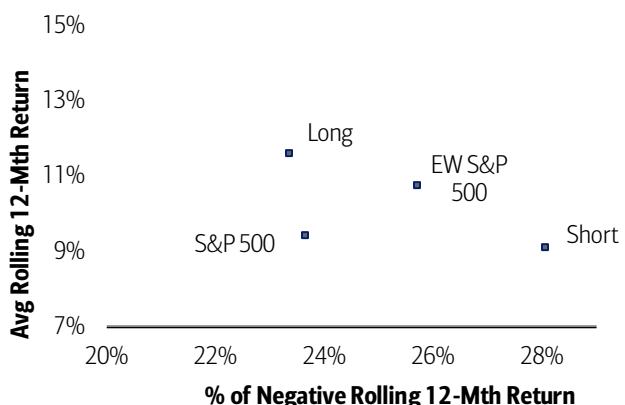
The factor has historically outperformed the index



BofA GLOBAL RESEARCH

Exhibit 395: High Price Return – 12M and 1M Downside Risk Reward

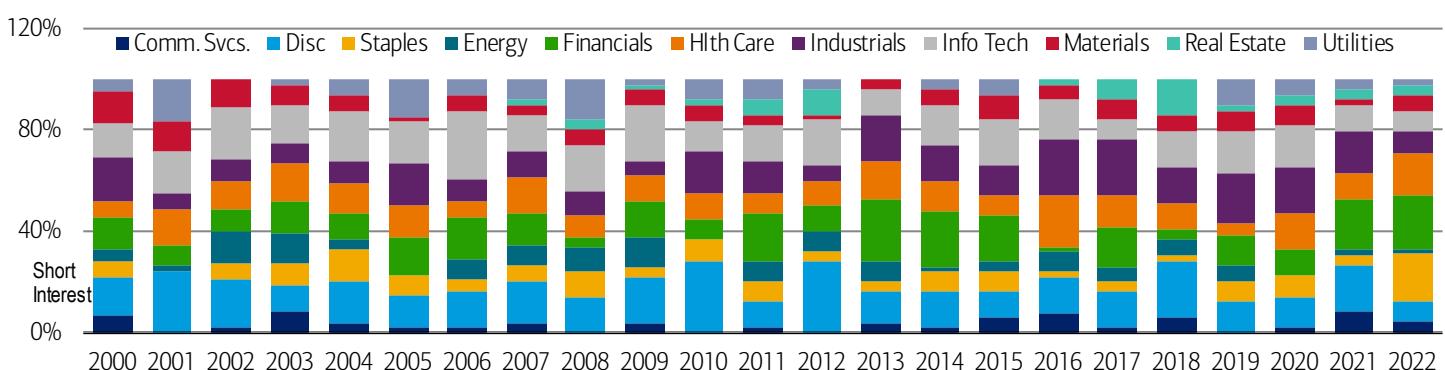
The factor has historically outperformed the index



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Exhibit 396: Short Interest Sector Concentration (Top Decile)

The factor has most weight in Financials



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Exhibit 397: 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

1988 - 2022

Factor	'22	'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	Rwd to
Dividend Yield (Total Return)	4	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	-3	25	8	30	-11	na	na	0.70	
Estimate Dispersion	4	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	-1	20	23	51	-35	3	30	0.33	
EPS Estimate Revisions	3	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	0.56
Dividend Growth (Total Return)	-2	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	0.72
Price Return - 12M	-3	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	0.64
Proj. 5yr EPS Growth	-4	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	0.49
Forward Earnings Yield	-5	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	0.50
Low Price	-5	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	0.44
Price Return - 9M	-6	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	0.65
Relative Strength - 5wk/30wk	-6	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	0.62
Price Return - 11M	-6	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	0.64
EV/EBITDA	-7	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	0.62
Price Ret - 12M and 1M Reversal	-7	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	0.73
Relative Strength - 10wk/40wk	-7	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	0.61
P/E-to-Growth	-7	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	0.63
Relative Strength - 30wk/75wk	-8	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	0.61
Price to MA (200 day)	-8	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	0.59
Size	-8	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	0.46
Price/Sales	-8	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	0.51
Beta	-9	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	0.39
DDM Alpha	-9	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	0.57
Variability of Earnings	-10	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	0.59
High Debt/Equity	-10	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	0.56
Price/ Book Value	-11	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	0.42
Earning Momentum	-11	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	0.59
Price/ Free Cash Flow	-11	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	0.68
Alpha Surprise Model	-11	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	0.82
Price/ Cash Flow	-11	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	0.54
Positive EPS Surprise	-11	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	0.76
Neglect - Institutional Ownership	-11	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	0.52
Share Repurchase	-12	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	0.67
5y ROE	-12	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	0.69
Free Cash Flow/ EV	-12	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	0.86
Earnings Torpedo	-12	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	0.39	
S&P 500	-13	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	0.64
Neglect - Analyst Coverage	-13	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	3	15	8	26	-5	27	12	0.58	
Price Return - 3M	-13	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	0.59
Price Return - 12M and 1M	-14	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	0.61
Most Active	-14	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	0.54
1yr ROE	-14	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	0.78
Short Interest	-15	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</td	

Performance and Calculation Methodology

Exhibit 398: Quantitative Strategies Performance (Top Decile)

As of 4/30/2023

Strategies (based on the S&P 500)		1 M	3 M	6 M	12 M	YTD	2 Yr Perf.		3 Yr Perf.		5 Yr Perf.		Inception Date
							Gross	Anlzd	Gross	Anlzd	Gross	Anlzd	
Price Returns (12-Month)	Technical	1.9	-1.9	-2.9	1.2	-0.2	5.1	2.5	52.6	15.1	44.0	7.6	1/31/2010
Price Returns (11-Month since 1 year ago)	Technical	1.6	-2.4	-3.1	3.8	-0.1	0.3	0.1	42.8	12.6	40.9	7.1	1/31/2010
S&P 500 Index (Price Return)	Benchmark	1.5	2.3	7.7	0.9	8.6	-0.3	-0.1	43.2	12.7	57.5	9.5	
Price Returns (12-Month plus 1-Month Reversal)	Technical	1.4	-1.3	5.3	9.4	4.3	5.2	2.5	42.7	12.6	48.7	8.3	1/31/2010
Share Repurchase	Corp Cash Deployment	1.3	-4.9	6.6	1.2	5.6	5.6	2.8	66.4	18.5	42.3	7.3	12/31/2004
Short Interest	Miscellaneous	1.3	-2.8	5.3	-0.7	3.2	-4.7	-2.4	42.3	12.5	33.3	5.9	10/31/2013
Analyst Coverage Neglect	Miscellaneous	1.3	-4.8	5.2	-0.1	4.1	-0.5	-0.3	55.0	15.7	56.5	9.4	6/30/1989
Relative Strength (30wk/75wk)	Technical	1.2	-2.4	-4.5	1.4	-1.1	-0.7	-0.3	41.1	12.2	36.1	6.4	8/31/1995
High Dividend Growth (Total Return)	Corp Cash Deployment	1.0	-5.8	2.8	5.2	1.0	16.7	8.0	76.1	20.8	66.0	10.7	12/31/2004
High Dividend Growth (Price Return)	Corp Cash Deployment	0.9	-6.6	1.2	2.0	0.1	10.9	5.3	63.6	17.8	46.6	8.0	12/31/2004
Price Returns (12-Month plus 1-Month)	Technical	0.9	0.6	0.3	-5.4	1.5	-3.4	-1.7	51.0	14.7	39.8	6.9	1/31/2010
Forecast Negative Earnings Surprise	Growth (Negative)	0.8	-7.5	1.3	-1.0	-1.6	-0.4	-0.2	52.0	15.0	38.7	6.8	12/31/1988
Dividend Yield (Total Return)	Corp Cash Deployment	0.6	-9.1	1.6	-4.0	-0.7	13.4	6.5	91.7	24.2	69.0	11.1	12/31/1988
Dividend Yield (Price Return)	Corp Cash Deployment	0.3	-10.4	-1.2	-9.1	-2.4	2.7	1.3	63.1	17.7	31.3	5.6	12/31/1988
Low PE to GROWTH	GARP	0.3	-10.0	-5.7	-3.2	-1.7	1.9	0.9	59.1	16.7	23.0	4.2	12/30/1988
S&P 500 Equal Weighted (Total Return)	Benchmark	0.2	-3.9	5.2	0.7	3.4	1.8	0.9	60.4	17.1	61.2	10.0	
Low Price to Free Cash Flow	Value	0.2	-8.5	-0.3	-9.1	-0.4	-5.8	-2.9	40.8	12.1	10.7	2.1	7/30/2003
DDM Valuation	Value	0.2	-5.8	-0.3	-0.4	3.3	0.8	0.4	32.4	9.8	5.5	1.1	12/31/1988
S&P 500 Equal Weighted (Price Return)	Benchmark	0.1	-4.4	4.1	-1.4	2.8	-2.0	-1.0	51.4	14.8	45.6	7.8	
ROE (1-Yr Average)	Quality	-0.2	-0.9	7.7	4.0	6.0	7.5	3.7	57.3	16.3	70.4	11.2	4/30/1997
ROE (5-Yr Average)	Quality	-0.3	-1.0	6.8	5.8	6.0	4.9	2.4	51.1	14.8	58.6	9.7	4/30/1997
High Free Cash Flow to EV	Value	-0.3	-8.5	-4.1	-9.4	-2.1	-10.6	-5.4	38.2	11.4	12.5	2.4	7/31/2010
Institutional Neglect	Miscellaneous	-0.3	-1.7	8.0	1.6	8.8	0.8	0.4	56.1	16.0	58.0	9.6	12/31/1988
Low EV/EBITDA	Value	-0.4	-7.3	1.5	-5.4	1.4	-0.7	-0.3	66.4	18.5	7.4	1.4	9/30/2001
ROE (5-Yr Avg. Adj. by Debt)	Quality	-0.4	5.2	18.7	8.8	16.3	1.8	0.9	57.4	16.3	78.1	12.2	4/30/1997
High Duration	Growth	-0.4	1.6	11.6	1.2	7.8	-5.5	-2.8	40.6	12.0	55.1	9.2	12/31/1988
High Projected 5-Yr Growth	Growth	-0.5	-5.2	1.3	5.1	2.9	8.0	3.9	63.7	17.9	56.3	9.3	12/31/1988
Forecast Positive Earnings Surprise	Growth	-0.6	-6.0	1.1	-3.5	0.1	-2.9	-1.5	50.6	14.6	45.8	7.8	12/31/1988
ROA	Quality	-0.6	-1.0	10.1	3.2	7.5	-1.7	-0.9	43.1	12.7	68.0	10.9	4/30/1997
Relative Strength (Price/200-Day Moving Avg)	Technical	-0.6	-0.8	0.8	1.1	3.3	2.4	1.2	71.8	19.8	62.3	10.2	1/31/2010
EPS Momentum	Growth	-0.7	-7.9	-5.4	-6.2	-1.2	-0.9	-0.4	45.3	13.3	26.2	4.8	12/31/1988
Relative Strength (10wk/40wk)	Technical	-0.8	-3.5	-2.1	1.9	0.2	-6.5	-3.3	51.2	14.8	49.8	8.4	1/31/2010
Price Returns (9-Month)	Technical	-0.8	-4.0	-6.8	-0.1	-2.2	-1.9	-1.0	53.5	15.4	56.1	9.3	1/31/2010
Low Price to Sales	Value	-1.0	-10.4	-3.4	-9.0	-1.3	-6.1	-3.1	69.2	19.2	49.7	8.4	12/31/1988
Low Price to Cash Flow	Value	-1.0	-9.0	-0.1	-8.2	1.6	-4.0	-2.0	50.4	14.6	-5.3	-1.1	12/31/1988
Small Size	Miscellaneous	-1.1	-13.6	-0.3	-10.0	-2.0	-13.4	-7.0	63.1	17.7	23.0	4.2	12/31/1988
ROE (1-Yr Avg. Adj. by Debt)	Quality	-1.2	-0.9	7.2	3.3	8.5	-4.9	-2.5	40.0	11.9	52.2	8.8	4/30/1997
ROC	Quality	-1.3	-0.9	8.3	3.8	6.7	-0.5	-0.2	38.3	11.4	63.7	10.4	4/30/1997
High Variability of EPS	Risk	-1.3	-6.3	1.8	-2.1	2.1	-0.8	-0.4	51.3	14.8	41.6	7.2	12/31/1988
Relative Strength (5wk/30wk)	Technical	-1.5	-4.1	-0.1	-1.3	1.3	1.4	0.7	71.8	19.8	61.0	10.0	1/31/2010
Low Price to Book Value	Value	-1.9	-16.4	-7.4	-12.9	-5.7	-9.9	-5.1	63.6	17.8	14.9	2.8	12/31/1988
Upward Estimate Revisions	Growth	-2.0	-3.6	2.6	7.7	2.1	21.8	10.4	111.0	28.3	76.4	12.0	12/31/1988
Low EPS Torpedo	Growth (Negative)	-2.1	-11.3	3.7	-4.0	1.5	-5.7	-2.9	82.2	22.1	62.1	10.1	12/31/1988
Earnings Yield	Value	-2.2	-16.3	-9.8	-17.1	-7.6	-17.7	-9.3	40.2	11.9	-1.2	-0.2	12/31/1988
Most Active	Technical	-2.3	-5.3	2.9	-3.3	6.8	-0.4	-0.2	68.7	19.0	62.4	10.2	8/31/2003
Low Price	Risk	-2.6	-13.0	-4.5	-10.9	-3.4	-4.5	-2.3	81.5	22.0	36.3	6.4	12/31/1988
Price Returns (3-Month)	Technical	-2.9	-6.6	0.0	-8.1	0.2	-7.6	-3.9	63.4	17.8	45.2	7.8	1/31/2010
Forward Earnings Yield	Value	-3.0	-17.2	-12.1	-11.7	-8.5	-5.1	-2.6	64.1	17.9	13.3	2.5	12/31/1988
High Foreign Exposure	Miscellaneous	-3.3	-3.5	14.0	4.6	7.2	2.3	1.2	72.4	19.9	74.0	11.7	12/31/1988
High EPS Estimate Dispersion	Risk	-4.6	-9.5	5.2	1.7	6.9	8.8	4.3	98.7	25.7	24.5	4.5	12/31/1988
High Beta	Risk	-4.6	-13.7	-2.5	-8.2	-0.6	-3.5	-1.8	80.6	21.8	44.8	7.7	12/31/1988

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.

¹For 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.

BofA GLOBAL RESEARCH



Exhibit 399: Quantitative Strategies Performance (Bottom Decile)

As of 4/30/2023

Strategies (Universe based on the S&P 500)		1 M	3 M	6 M	12 M	YTD	2 Yr Perf.		3 Yr Perf.		5 Yr Perf.		Inception Date
							Gross	Anlzd	Gross	Anlzd	Gross	Anlzd	
Rising Short Interest	Miscellaneous	-3.6	-10.0	-1.1	-10.2	-2.1	-11.0	-5.7	54.1	15.5	44.9	7.7	4/30/1994
Relative Strength (30wk/75wk)	Technical	-2.7	-10.4	7.1	1.7	6.5	4.3	2.1	99.8	25.9	39.1	6.8	3/1/2001
Price Returns (12-Month)	Technical	-2.5	-10.8	6.7	-6.4	6.8	-8.4	-4.3	81.9	22.1	43.5	7.5	2/27/1987
Low Estimate Revisions	Growth	-2.4	-11.8	6.5	0.6	2.7	-8.4	-4.3	64.9	18.1	31.2	5.6	3/1/2001
Earnings Torpedo	Growth	-2.1	-11.3	3.7	-4.0	1.5	-5.7	-2.9	82.2	22.1	62.1	10.1	
Low Share Repurchase	Cash Deployment	-1.9	-11.5	-5.9	-12.6	-2.6	-9.0	-4.6	32.8	9.9	31.4	5.6	3/31/2005
Dividend Discount Model Alpha	Value	-1.8	-3.0	9.3	2.1	5.9	-1.7	-0.9	76.1	20.8	47.5	8.1	3/30/2001
No Dividend Yield	Cash Deployment	-1.7	-3.1	9.2	3.9	9.4	-9.8	-5.0	53.9	15.5	74.4	11.8	3/1/2001
Price Returns (3-Month)	Technical	-1.6	-8.5	5.1	-2.7	4.9	0.8	0.4	60.6	17.1	50.2	8.5	2/27/1987
Relative Strength (10wk/40wk)	Technical	-1.6	-13.0	1.6	-6.2	1.4	-13.0	-6.7	36.9	11.0	14.4	2.7	2/27/1987
Price Returns (12-Month plus 1-Month)	Technical	-1.6	-11.8	4.6	-9.4	4.4	-9.4	-4.8	71.3	19.6	63.2	10.3	2/27/1987
Low Projected 5-Yr Growth	Growth	-1.2	-12.6	-0.4	-4.9	-3.3	-5.6	-2.8	58.9	16.7	38.2	6.7	3/1/2001
High Price/ Cash Flow	Value	-1.1	2.8	11.6	10.0	12.5	-5.1	-2.6	44.0	12.9	83.6	12.9	8/1/2003
Low Variability of Earnings	Risk	-1.1	-4.9	2.4	6.2	-1.5	4.3	2.1	47.6	13.9	54.6	9.1	3/1/2001
Relative Strength (5wk/30wk)	Technical	-1.0	-9.8	4.2	-5.0	4.0	-7.8	-4.0	38.3	11.4	25.3	4.6	2/27/1987
Price Returns (9-Month)	Technical	-1.0	-13.6	2.4	-11.1	3.1	-11.2	-5.7	54.0	15.5	5.8	1.1	2/27/1987
Relative Strength (Price/200-Day Moving Avg)	Technical	-1.0	-11.9	2.5	-10.2	3.1	-14.3	-7.4	34.5	10.4	7.7	1.5	2/27/1987
Price Returns (11-Month since 1 year ago)	Technical	-0.8	-9.5	7.1	-5.2	7.2	-8.7	-4.4	76.7	20.9	34.3	6.1	2/27/1987
Low Duration	Growth	-0.6	-8.7	-2.9	8.5	0.1	14.1	6.8	96.2	25.2	43.7	7.5	3/1/2001
High EV/ EBITDA	Value	-0.6	3.1	12.5	8.1	12.1	-3.0	-1.5	50.1	14.5	98.1	14.7	10/30/2004
Low Forward Earnings Yield	Value	-0.4	-2.9	8.8	-2.9	8.4	-12.5	-6.4	37.1	11.1	40.5	7.0	5/31/2005
Low Free Cash Flow/ EV	Value	-0.4	-3.5	4.6	-3.8	3.3	-5.0	-2.5	80.4	21.7	57.8	9.6	3/1/2001
Price Returns (12-Month plus 1-Month Reversal)	Technical	-0.3	-0.5	8.8	-0.1	10.2	-2.9	-1.5	63.5	17.8	12.7	2.4	2/27/1987
Most Active	Technical	-0.1	-0.8	10.5	8.1	6.7	-1.5	-0.8	49.8	14.4	62.5	10.2	8/31/2003
Low Dividend Growth	Cash Deployment	-0.1	-8.4	-0.6	-0.4	-1.4	-2.4	-1.2	88.7	23.6	45.8	7.8	9/30/2004
S&P 500 Equal Weighted (Price Return)	Benchmark	0.1	-4.4	4.1	-1.4	2.8	-2.0	-1.0	51.4	14.8	45.6	7.8	
S&P 500 Equal Weighted (Total Return)	Benchmark	0.2	-3.9	5.2	0.7	3.4	1.8	0.9	60.4	17.1	61.2	10.0	
High Price/ Sales	Value	0.3	0.9	8.2	-0.3	8.8	-6.1	-3.1	28.6	8.8	57.0	9.4	3/31/2001
Low ROE (1-Yr Avg. Adj. by Debt)	Quality	0.3	-1.1	7.7	10.6	6.1	8.4	4.1	57.8	16.4	64.6	10.5	3/1/2001
High Price/ Book Value	Value	0.3	1.3	7.3	11.1	7.8	6.5	3.2	53.7	15.4	87.1	13.4	3/30/2001
Low Earnings Yield	Value	0.5	-3.8	7.4	7.4	9.0	-3.1	-1.5	85.1	22.8	59.8	9.8	3/30/2001
High Price	Risk	0.5	0.6	8.8	8.4	6.4	-0.6	-0.3	43.9	12.9	67.2	10.8	7/30/1986
Low ROA	Quality	0.6	-5.7	6.2	6.1	7.9	-0.1	-0.1	89.3	23.7	60.5	9.9	3/1/2001
High Analyst Coverage	Miscellaneous	0.6	2.9	12.0	13.6	13.9	9.6	4.7	69.5	19.2	68.0	10.9	3/1/2001
High Price/ Free Cash Flow	Value	0.6	-0.7	6.0	4.9	6.3	-5.7	-2.9	44.0	12.9	61.9	10.1	8/1/2003
High Institutional Ownership	Miscellaneous	0.7	-13.5	-6.8	-7.9	-4.8	-11.0	-5.6	45.2	13.2	20.8	3.9	3/1/2001
Low ROE (1-Yr Average)	Quality	0.8	-5.2	5.6	9.3	6.6	0.9	0.4	86.0	23.0	59.2	9.7	3/31/1986
Low ROC	Quality	0.8	-5.6	7.1	5.7	7.2	1.4	0.7	89.2	23.7	49.5	8.4	3/1/2001
Forecast Negative Earnings Surprise	Growth	0.8	-7.5	1.3	-1.0	-1.6	-0.4	-0.2	52.0	15.0	38.7	6.8	3/31/1986
Low EPS Momentum	Growth	0.9	-5.3	2.6	6.5	3.9	-3.6	-1.8	78.9	21.4	50.9	8.6	3/1/2001
Low ROE (5-Yr Average)	Quality	0.9	-7.0	0.5	7.5	3.1	19.5	9.3	104.9	27.0	68.9	11.0	3/1/2001
Low Foreign Exposure	Miscellaneous	1.0	-8.9	-4.7	-2.0	-3.7	2.9	1.4	50.6	14.6	39.5	6.9	1/31/1995
Low ROE (5-Yr Avg. Adj. by Debt)	Quality	1.1	-0.9	6.4	10.1	5.1	5.1	2.5	51.7	14.9	58.1	9.6	3/1/2001
High P/E-to-Growth	GARP	1.1	-0.7	7.3	3.0	5.3	2.7	1.3	43.1	12.7	33.9	6.0	3/30/2001
S&P 500 Index (Price Return)	Benchmark	1.5	2.3	7.7	0.9	8.6	-0.3	-0.1	43.2	12.7	57.5	9.5	
Low EPS Estimate Dispersion	Risk	1.6	-1.6	3.2	5.8	0.4	10.0	4.9	41.7	12.3	52.1	8.8	2/28/1989
Large Size	Miscellaneous	1.6	2.9	8.5	4.7	7.9	2.2	1.1	37.6	11.2	56.5	9.4	3/1/2001
Low Beta	Risk	2.5	2.9	6.5	9.6	3.7	20.1	9.6	37.1	11.1	51.3	8.6	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.

*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 400: Factor valuations and crowdedness as of 4/30/2023

Long-short factors listed from most to least expensive & crowded using a multi-indicator ranking

Factor	Long Factors (S&P 500 top decile)				Short Factors (S&P 500 bottom decile)			
	Price to Book Relative Multiple vs. history	Forward P/E (Relative) >1 = expensive vs. history	Crowdedne ss Long Only Funds' Relative Wt.	Long Rank Rank for Long Factor (1=most expensive / most crowded)	Price to Book (Relative) Multiple vs. history	Forward P/E (Relative) >1 = expensive vs. history	Crowdedness Long Only Funds' Relative Wt.	Short Rank Rank for Short Factor (1=least expensive / least crowded)
High (Low) Price Returns (9-Month)	1.31	0.96	1.32	5	0.70	0.64	0.78	2
High (Low) Price/200-Day MA	1.30	1.20	1.30	1	0.60	0.51	1.00	5
Forecast Positive (Neg've) EPS Surprise	1.28	1.03	1.18	8	0.71	0.94	0.83	4
High (Low) Relative Strength (5wk/30wk)	1.71	1.23	1.09	2	0.71	0.49	1.08	12
High (Low) Duration	1.73	1.13	1.02	7	0.85	0.46	0.95	7
High (Low) Price Returns (3-Month)	1.45	1.23	1.08	3	0.62	0.49	1.17	14
High (Low) Rel. Strength (10wk/40wk)	1.32	1.02	1.31	3	0.99	0.68	0.94	16
High (Low) Price Returns (12-m + 1-m)	1.00	1.07	1.20	9	0.53	0.53	1.09	10
High (Low) Price Returns (12-Month)	1.28	1.01	1.12	11	0.83	0.77	0.92	10
High (Low) Dividend Growth	0.86	0.72	1.15	24	0.70	0.67	0.69	1
High (No) Foreign Exposure	1.06	0.90	1.15	16	0.81	0.92	0.93	12
High (Low) ROE (1-Yr Average)	1.33	1.13	0.86	14	na	1.15	0.86	20
Low EPS Torpedo	na	na	0.78	28	0.73	0.57	0.78	3
High (Low) ROC	1.89	1.02	0.84	15	0.90	1.10	0.80	16
High (Low) Projected 5-Yr Growth	0.76	0.77	1.26	22	0.88	0.67	0.87	5
High (Low) ROE (5-Yr Average)	1.92	1.08	0.86	11	0.72	0.92	1.22	24
High (Low) ROA	0.99	1.01	1.05	18	0.88	1.04	0.89	16
High (Low) Price Ret. (11m since 1y ago)	1.14	1.03	1.11	11	1.05	1.00	0.96	25
Falling (Rising) Short Interest	0.85	0.96	1.16	17	0.78	0.98	0.98	21
High (Low) ROE (5-Yr Avg. Adj. by Debt)	0.97	1.10	1.21	9	1.89	1.14	0.85	29
High (Low) EPS Estimate Dispersion	1.11	0.54	0.99	29	0.70	1.06	0.91	9
High (Low) Price Ret. (12-m + 1-m Rev.)	1.24	1.12	1.18	5	1.36	1.33	0.97	37
High (Low) Upward Estimate Revisions	1.04	0.76	1.06	20	1.02	0.72	1.01	22
High (Low) Beta	1.10	0.69	0.93	29	1.07	1.06	0.75	15
High (Low) Free Cash Flow to EV	0.78	0.80	0.81	33	0.92	0.96	0.76	7
High (Low) Share Repurchase	0.78	0.76	1.23	21	0.80	1.33	0.93	22
Low (High) PE to GROWTH	0.91	0.76	1.01	25	0.95	1.03	0.98	25
High (Low) EPS Momentum	0.85	0.67	0.92	35	0.75	0.97	0.95	16
High (Low) ROE (1-Yr Avg. Adj. by Debt)	0.80	0.96	1.06	23	1.77	1.11	0.87	29
Low (High) Institutional Ownership	1.20	1.04	0.77	19	1.73	1.24	0.95	36
High (Low) Rel. Strength (30wk/75wk)	0.77	0.81	1.11	27	1.08	1.08	1.04	32
High (Low) Variability of EPS	0.75	0.82	0.87	31	0.85	1.08	1.14	28
Low (High) Analyst Coverage	0.88	1.14	0.40	26	1.62	1.13	1.04	37
High (Low) Earnings Yield	0.78	0.70	0.82	41	1.05	1.20	0.94	27
Small (Large) Size	0.99	0.74	0.53	35	1.09	1.28	0.97	33
Most (Least) Active	0.57	0.67	0.94	42	1.24	1.30	0.91	29
Low (High) DDM Valuation	0.67	0.71	0.95	39	1.69	1.25	0.95	35
Low (High) Price to Book Value	0.82	0.61	0.83	40	1.40	1.50	0.94	34
Low (High) Price to Free Cash Flow	0.84	0.81	0.75	34	1.34	1.61	1.20	42
Low (High) Price to Cash Flow	0.97	0.72	0.76	35	1.17	2.01	1.20	41
Low (High) EV/EBITDA	0.81	0.79	0.76	38	1.52	2.01	1.13	43
Low (High) Price to Sales	0.89	0.75	0.77	32	1.62	1.86	1.21	45
High (Low) Dividend Yield	0.77	0.70	0.48	44	1.22	1.25	1.09	39
High (Low) Forward Earnings Yield	0.70	0.75	0.73	43	1.36	2.71	1.07	40
Low (High) Price	0.64	0.50	0.68	45	1.53	1.35	1.48	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



Exhibit 401: Advances and Declines (Top Decile)

As of 4/30/2023

Quantitative Strategies	1M		3M		6M		12M		YTD		2Yr		3Yr		5Y	
	Adv.	Dec.														
Price Returns (12-Month)	33	17	69	81	148	152	305	294	100	100	610	588	978	820	1615	1381
Price Returns (11-Month since 1 year ago)	33	17	71	79	147	153	307	292	103	97	591	607	958	840	1594	1403
Price Returns (12-Month plus 1-Month Reversal)	29	21	71	79	162	138	315	284	108	92	596	602	968	830	1637	1360
Share Repurchase	31	19	54	96	150	150	295	305	98	102	612	588	1016	782	1642	1355
Short Interest	31	18	70	75	162	129	288	295	107	86	564	606	947	811	1612	1312
Analyst Coverage Neglect	32	24	69	92	156	147	261	278	118	96	539	550	966	749	1607	1250
Relative Strength (30wk/75wk)	32	18	71	79	142	158	300	300	98	102	592	608	955	846	1600	1405
High Dividend Growth (Price Return)	29	21	56	94	149	151	298	302	102	98	624	576	1005	795	1626	1373
Price Returns (12-Month plus 1-Month)	27	23	74	76	144	156	275	325	98	102	586	614	989	810	1639	1358
Forecast Negative Earnings Surprise	48	30	104	147	258	235	487	490	169	169	913	924	1470	1269	2457	2069
Dividend Yield (Price Return)	26	22	49	99	144	154	285	312	92	106	615	581	1005	789	1637	1356
Low PE to GROWTH	28	22	50	100	135	165	285	315	91	109	595	605	1002	797	1577	1421
Low Price to Free Cash Flow	25	25	48	102	137	163	276	324	87	113	570	630	938	861	1541	1458
DDM Valuation	21	18	40	68	102	114	208	238	67	73	511	527	913	828	1692	1518
ROE (1-Yr Average)	26	24	75	75	160	140	299	300	111	89	605	594	992	807	1686	1313
ROE (5-Yr Average)	26	24	70	80	155	145	297	302	107	93	597	602	973	825	1654	1344
High Free Cash Flow to EV	18	20	40	76	99	135	217	263	67	88	454	518	764	693	1254	1176
Institutional Neglect	25	25	65	85	157	142	289	309	103	97	597	600	972	826	1645	1354
Low EV/EBITDA	23	27	53	97	146	154	294	306	96	104	592	608	974	825	1558	1441
ROE (5-Yr Avg. Adj. by Debt)	20	30	82	68	182	118	302	298	130	70	604	596	1002	798	1673	1327
High Duration	27	23	79	71	171	129	286	314	115	85	576	624	958	842	1645	1354
High Projected 5-Yr Growth	25	25	58	92	143	157	285	315	97	103	586	614	962	841	1596	1405
Forecast Positive Earnings Surprise	32	40	76	141	204	241	404	483	128	162	820	888	1381	1184	2354	1927
ROA	25	25	76	74	173	127	305	295	121	79	605	595	1000	800	1704	1296
Relative Strength (Price/200-Day Moving Avg.)	23	27	67	83	140	160	288	312	98	102	598	602	1001	799	1657	1339
EPS Momentum	28	21	59	90	144	155	288	311	100	99	599	600	973	825	1583	1414
Relative Strength (10wk/40wk)	22	28	60	90	137	163	297	303	93	107	579	621	976	824	1632	1362
Price Returns (9-Month)	24	26	64	86	131	169	292	308	94	106	591	609	976	824	1631	1365
Low Price to Sales	25	25	46	104	137	163	284	316	88	112	588	612	969	831	1590	1409
Low Price to Cash Flow	20	30	47	103	141	159	280	320	90	110	571	629	928	871	1517	1481
Small Size	22	28	43	107	140	160	273	327	90	110	567	633	976	822	1570	1425
ROE (1-Yr Avg. Adj. by Debt)	23	27	74	76	168	132	296	304	120	80	605	595	995	805	1650	1350
ROC	24	26	72	78	164	136	305	295	115	85	596	604	984	816	1696	1303
High Variability of EPS	29	35	71	121	183	199	364	399	122	133	740	763	1247	1083	2175	1867
Relative Strength (5wk/30wk)	21	29	57	93	138	162	282	318	92	108	593	607	1004	796	1647	1347
Low Price to Book Value	22	27	43	106	141	158	287	312	89	110	609	597	1025	789	1633	1397
Upward Estimate Revisions	17	33	58	92	150	150	312	287	97	103	627	572	1056	742	1685	1311
Low EPS Torpedo	24	26	54	96	157	143	301	299	100	100	598	602	975	824	1600	1397
Earnings Yield	23	26	44	105	135	164	276	323	87	112	591	608	994	804	1594	1404
Most Active	23	26	64	85	156	141	288	309	109	90	589	608	936	860	1583	1412
Low Price	22	26	43	105	139	159	279	318	90	108	573	623	967	825	1576	1414
Price Returns (3-Month)	18	32	57	93	145	155	272	328	95	105	571	629	986	814	1622	1374
Forward Earnings Yield	21	28	43	106	135	164	293	306	88	111	596	603	983	814	1590	1407
High Foreign Exposure	14	36	57	93	159	140	298	301	102	98	587	611	995	801	1649	1345
High EPS Estimate Dispersion	17	24	47	81	132	136	246	257	89	86	409	416	667	611	1040	983
High Beta	19	34	50	104	149	160	293	328	100	106	612	623	1012	841	1638	1465

Source: BofA US Equity and Quant Strategy, FactSet

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Exhibit 402: Advances and Declines (Bottom Decile)

As of 4/30/2023

Quantitative Strategies	1M		3M		6M		12M		YTD		2Yr		3Yr		5Yr	
	Adv.	Dec.														
Short Interest	18	31	51	98	146	153	279	320	94	105	575	622	962	834	1610	1371
Relative Strength - 30wk/75wk MA	22	28	58	92	156	145	288	313	107	93	584	616	973	825	1583	1416
Price Returns (12-Month)	22	27	54	95	153	146	284	315	104	95	569	630	950	847	1572	1423
Low EPS Estimate Revisions	24	26	55	95	155	144	283	316	102	98	567	631	947	850	1562	1433
Low Share Repurchase	28	21	56	93	142	157	271	327	99	100	584	614	935	860	1622	1371
Dividend Discount Model Alpha	26	40	79	111	192	184	341	418	131	122	690	797	1130	958	1877	1674
Low Dividend Yield	46	60	140	175	330	298	603	659	233	186	1250	1375	2177	1894	3367	2782
Price Returns (3-Month)	21	28	55	94	151	148	285	314	102	97	603	596	966	832	1601	1395
Relative Strength (10wk/40wk)	26	24	52	98	149	151	281	319	100	100	570	630	921	878	1544	1453
Price Returns (12-Month plus 1-Month)	24	24	56	92	149	149	276	322	104	94	568	630	950	848	1614	1384
Low Proj. 5yr EPS Growth	21	28	48	101	147	152	285	317	92	107	579	624	950	853	1574	1425
High Price/ Cash Flow	22	28	76	74	158	141	288	311	117	83	567	632	952	847	1653	1344
Low Variability of Earnings	30	22	72	87	163	157	316	315	106	107	662	652	1086	885	1760	1375
Relative Strength (5wk/30wk)	26	23	58	91	156	143	291	308	106	93	593	606	939	858	1572	1423
Price Returns (9-Month)	26	24	50	100	148	152	272	328	99	101	566	634	928	870	1530	1466
Relative Strength (Price/200-Day Moving Avg)	25	24	55	94	153	146	280	319	103	96	570	629	916	881	1537	1458
Price Returns (11-Month since 1 year ago)	24	25	57	92	151	148	280	319	106	93	568	631	948	849	1555	1441
Low Equity Duration	26	24	48	102	136	164	285	315	91	109	601	599	1007	793	1609	1390
High EV/ EBITDA	21	29	74	76	152	147	278	321	115	85	573	626	959	840	1672	1326
Low Forward Earnings Yield	24	25	63	86	147	151	256	341	106	93	551	646	894	902	1570	1422
FCF / EV	23	14	48	65	117	111	236	230	73	78	476	470	761	660	1299	1073
Price Returns (12-Month plus 1-Month Reversal)	23	27	62	88	152	148	284	316	106	94	590	610	992	805	1574	1423
Least Active	24	26	68	82	161	139	285	315	110	90	587	613	981	819	1666	1334
Low Dividend Growth	24	26	49	101	146	154	279	319	92	108	566	632	958	839	1581	1414
High Price/ Sales	26	24	78	72	162	138	270	329	121	79	575	624	942	857	1655	1343
Low 1yr ROE Adj	26	24	72	78	161	139	298	301	111	89	590	609	972	826	1646	1352
High Price/ Book Value	28	22	82	68	163	137	300	299	118	82	596	603	970	829	1675	1325
Low Earnings Yield	26	24	60	90	143	156	269	329	102	98	554	643	932	863	1559	1430
High Price	27	23	77	73	161	139	289	311	113	87	590	610	979	821	1677	1321
Low ROA	28	22	55	95	147	152	283	315	101	99	575	622	953	843	1578	1413
High Analyst Coverage	37	24	92	77	188	140	343	332	139	81	656	676	1078	919	1795	1499
High Price/ Free Cash Flow	29	21	76	74	160	140	287	313	113	87	573	627	965	835	1655	1344
High Institutional Ownership	29	23	51	101	144	158	280	321	97	105	574	626	983	817	1641	1412
Low 1yr ROE	28	22	58	92	150	149	290	309	100	100	575	623	950	847	1588	1406
Low ROC	29	21	59	91	151	148	285	312	102	98	582	614	952	842	1563	1426
Negative EPS Surprise	48	30	104	147	258	235	487	490	169	169	913	924	1470	1269	2457	2069
Low Earning Momentum	29	21	58	92	142	158	283	315	96	104	559	639	931	866	1571	1424
Low 5y ROE	29	21	51	99	142	158	284	316	93	107	599	600	971	828	1592	1402
Low Foreign Exposure	72	48	143	225	354	387	691	771	232	260	1438	1470	2366	1988	4004	3256
Low 5yr ROE Adj	29	21	73	77	160	140	298	301	109	91	587	612	968	830	1642	1356
High P/E-to-Growth	31	19	73	77	162	137	289	308	108	91	588	609	961	834	1624	1369
Low Estimate Dispersion	60	28	133	135	268	261	503	527	181	175	1037	1019	1634	1381	2797	2173
Large Size	33	17	84	66	172	127	290	309	119	81	598	601	965	834	1671	1328
Low Beta	34	18	90	64	176	131	335	285	114	90	656	579	1000	858	1736	1343

Source: BofA US Equity and Quant Strategy, FactSet

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Russell 1000 factor efficacy

Exhibit 403: Russell 1000 factors: Sharpe Ratio

As of 4/30/2023

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	0.54	0.55	0.49	0.44	0.21
Forward Earnings Yield	0.31	0.42	0.44	0.41	0.70
Dividend Yield	0.49	0.60	0.52	0.47	0.45
Price/ Book Value	0.47	0.49	0.40	0.41	0.42
Price/ Cash Flow	0.53	0.51	0.47	0.41	0.28
Price/ Free Cash Flow	0.66	0.71	0.46	0.29	0.16
Price/ Sales	0.51	0.53	0.50	0.39	0.25
EV/ EBITDA	0.62	0.56	0.46	0.40	0.20
Free Cash Flow/ EV	0.68	0.67	0.52	0.36	0.27
Relative Strength - 30wk/75wk MA	0.54	0.55	0.51	0.43	0.22
Relative Strength - 5wk/30wk MA	0.57	0.42	0.55	0.48	0.24
Relative Strength - 10wk/40wk MA	0.55	0.45	0.55	0.48	0.22
Price to Moving Average (200 day)	0.51	0.46	0.54	0.47	0.26
Price Return - 12-mth Perf.	0.57	0.54	0.50	0.42	0.25
Price Return - 9-mth Perf.	0.52	0.54	0.51	0.44	0.25
Price Return - 3-mth Perf.	0.49	0.49	0.49	0.47	0.31
Price Return - 11-mth Perf.	0.58	0.55	0.50	0.42	0.23
Price Return - 12-mth and 1-mth Performance	0.47	0.46	0.48	0.49	0.33
Price Return - 12-mth and 1-mth Reversal	0.56	0.55	0.47	0.41	0.23
Most Active	0.58	0.43	0.46	0.41	0.33
Low Price	0.37	0.45	0.45	0.48	0.49
Earning Momentum	0.42	0.53	0.52	0.53	0.30
Proj. 5yr EPS Growth	0.27	0.48	0.51	0.52	0.50
Earnings Torpedo	0.38	0.56	0.56	0.48	0.32
EPS Estimate Revisions	0.46	0.55	0.55	0.42	0.29
Dividend Growth	0.49	0.50	0.60	0.53	0.49
P/E-to-Growth	0.48	0.54	0.57	0.54	0.40
1yr ROE	0.57	0.54	0.51	0.45	0.27
5y ROE	0.51	0.52	0.50	0.49	0.28
1yr ROE Adj	0.56	0.56	0.47	0.49	0.26
5y ROE Adj	0.54	0.51	0.49	0.48	0.27
ROA	0.53	0.52	0.51	0.50	0.27
ROC	0.56	0.55	0.48	0.48	0.26
Beta	0.33	0.42	0.50	0.56	0.48
Variability of Earnings	0.37	0.38	0.44	0.48	0.62
Estimate Dispersion	0.29	0.44	0.45	0.51	0.62
Neglect - Analyst Coverage	0.42	0.48	0.45	0.47	0.44
Neglect - Institutional Ownership	0.36	0.53	0.55	0.41	0.37
Size	0.41	0.45	0.45	0.48	0.46
Share Repurchase	0.63	0.56	0.48	0.40	0.21
Short Interest	0.70	0.61	0.42	0.35	0.25

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.



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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 404: Most predictive long-short factors within industry groups.

Analysis spans 1985 to Apr 2023, Historical Russell 1000 Constituents

	Valuation Measure	Momentum Measure	Growth Measure	Quality Measure
Communication Services				
Media & Entertainment	Price to Cash Flow, FCF/EV	12-Mth Return and 1-Mth Reversal, Trading Volume	PEG Ratio	ROC, 5-yr Debt Adj. ROE
Telecommunication Services	Dividend Yield	12-Mth Return and 1-Mth Reversal	Dividend Growth, PEG Ratio	ROC
Consumer Discretionary				
Retailing	P/FCF, EV/EBITDA	Trading Volume, Relative Strength - 5W/30W	Estimate Revision	ROC
Other Discretionary (Autos, Durables, Services)	FCF/EV, Forward P/E	12-Mth Return and 1-Mth Reversal, 30Wk / 75Wk Relative Strength	Estimate Revision	ROC
Consumer Staples	Trailing and Forward 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	12-Mth Return and 1-Mth Reversal	PEG Ratio, EPS Revisions	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), ROC
Industrials				
Capital Goods	Price to FCF, EV/EBITDA	12-Mth Return and 1-Mth Reversal	Earnings Torpedo, PEG Ratio	ROE (5-Yr), ROE (5-Yr, Debt Adj), ROC
Other Industrials (Services, Transports)	EV/EBITDA	Trading Volume, 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, Price / FCF	12-Mth Return and 1-Mth Reversal	PEG Ratio, Long-Term Growth	ROE 1 yr, ROE (1-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, 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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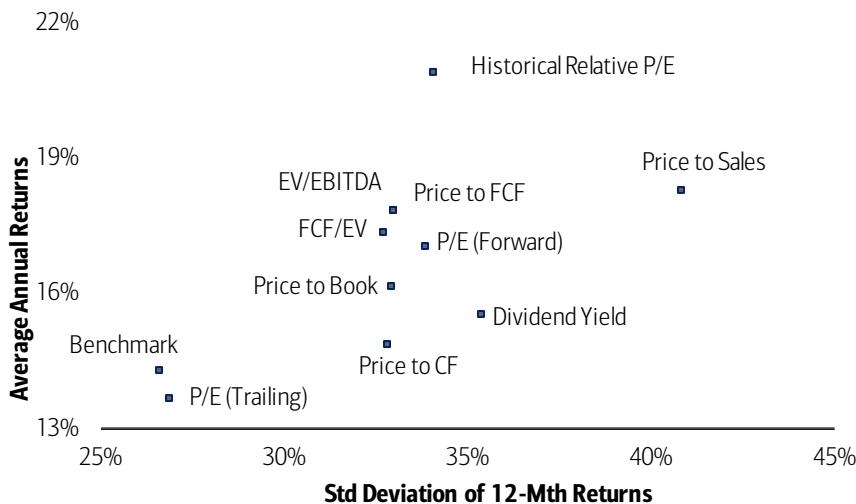


Communication Services: Media & Entertainment

Long only: Top Quintile Performance

Exhibit 405: Valuation Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2023)

Historical Relative P/E outperformed the index most



Source: BofA US Equity & Quant Strategy

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Exhibit 406: Momentum Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2023)

Trading Volume outperformed the index most

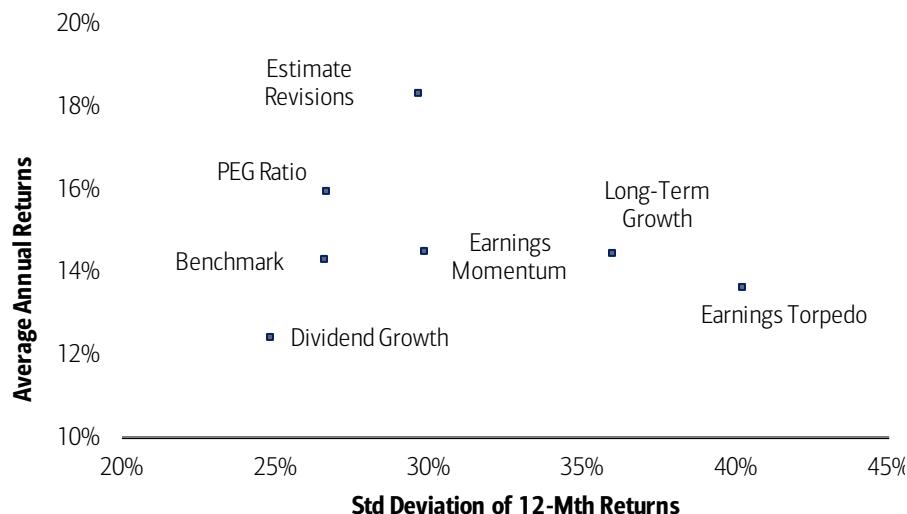


Source: BofA US Equity & Quant Strategy

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Exhibit 407: Growth Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2023)

Estimate Revisions outperformed the index most

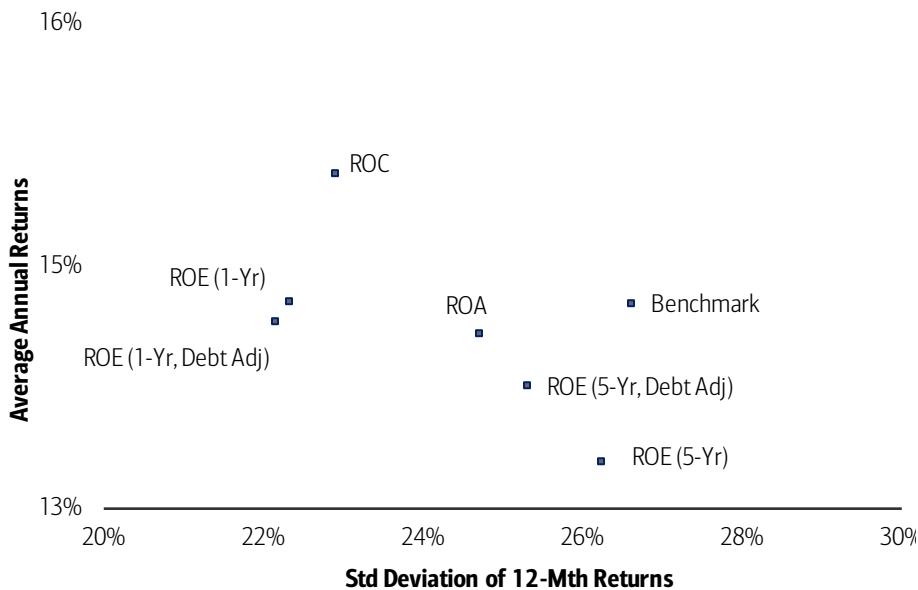


Source: BofA US Equity & Quant Strategy

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Exhibit 408: Quality Strategies for Media & Entertainment: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

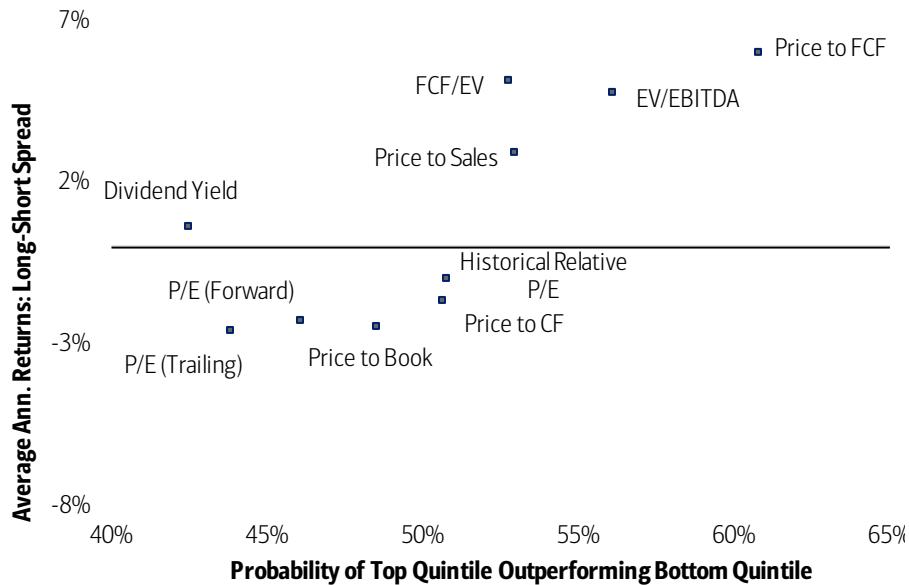
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Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 409: Valuation Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to FCF performed best

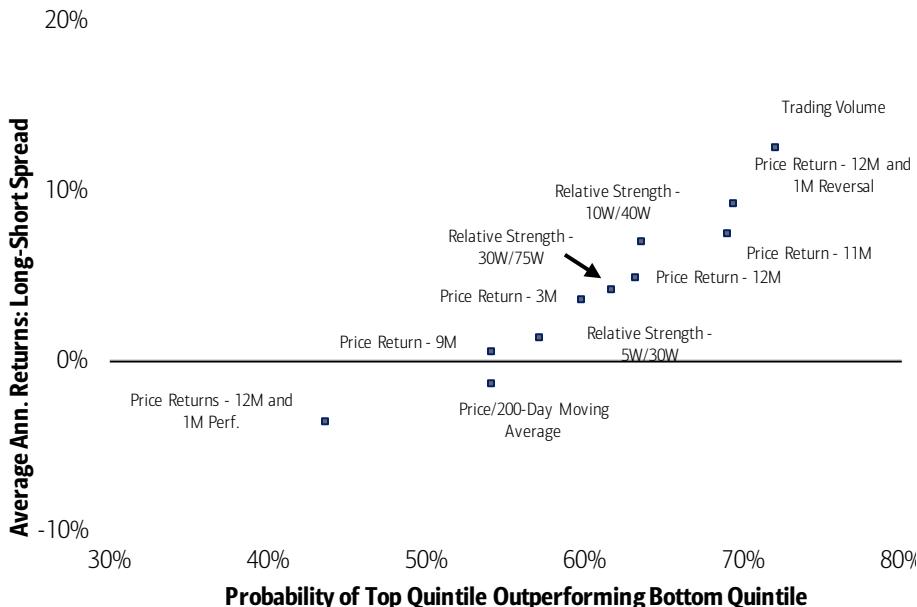


Source: BofA US Equity & Quant Strategy

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Exhibit 410: Momentum Strategies for Media & Entertainment: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Trading Volume performed best

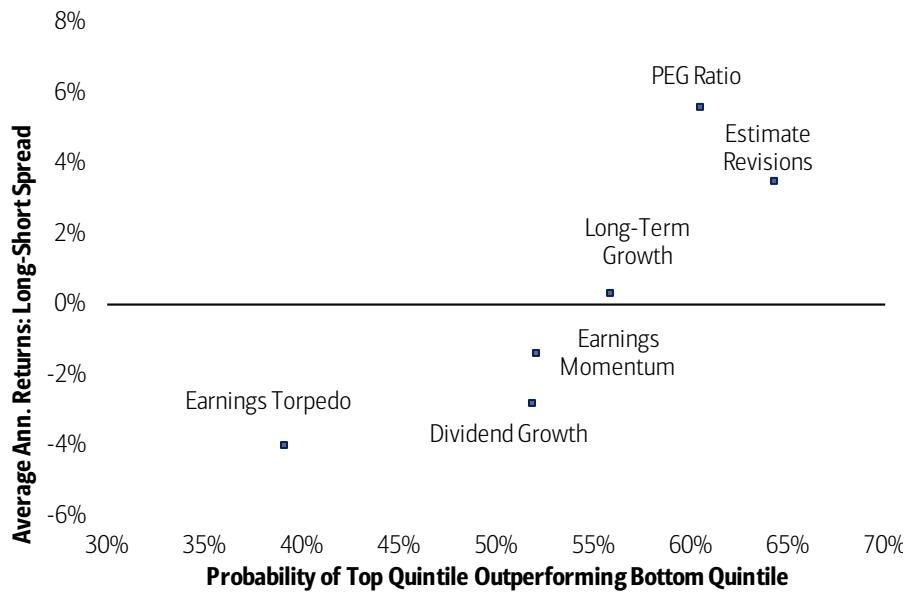


Source: BofA US Equity & Quant Strategy

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Exhibit 411: Growth Strategies for Media & Entertainment: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

PEG Ratio performed best

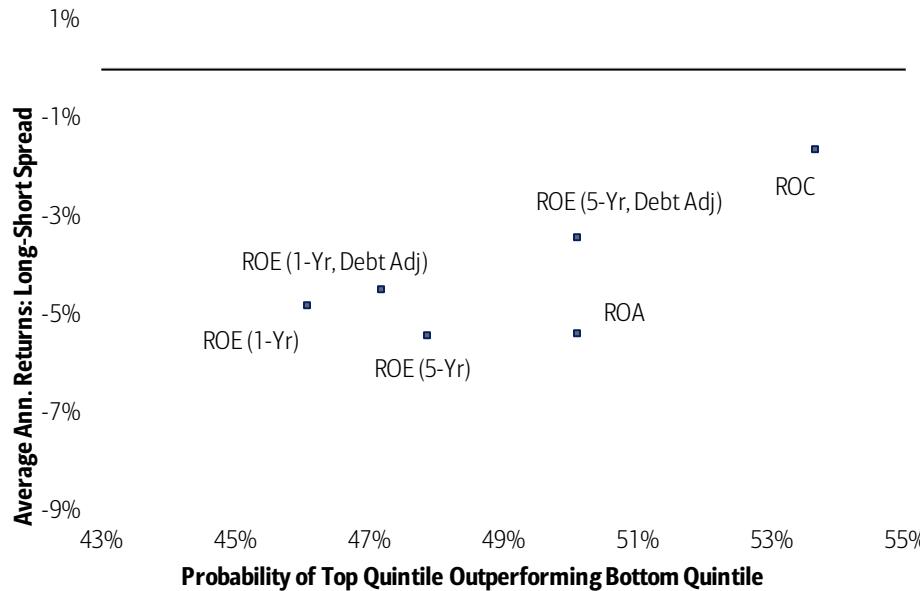


Source: BofA US Equity & Quant Strategy

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Exhibit 412: Quality Strategies for Media & Entertainment: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

ROC performed best



Source: BofA US Equity & Quant Strategy

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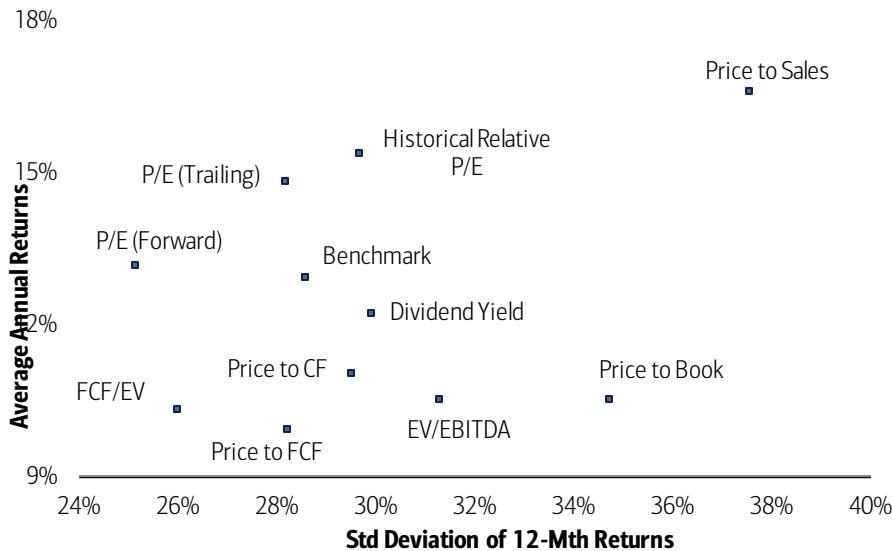


Communication Services: Telecommunication Services

Long only: Top Quintile Performance

**Exhibit 413: Valuation Strategies for Telecommunication Services: Top Quintile Returns
(1985 to 2023)**

Price / Sales outperformed the index most

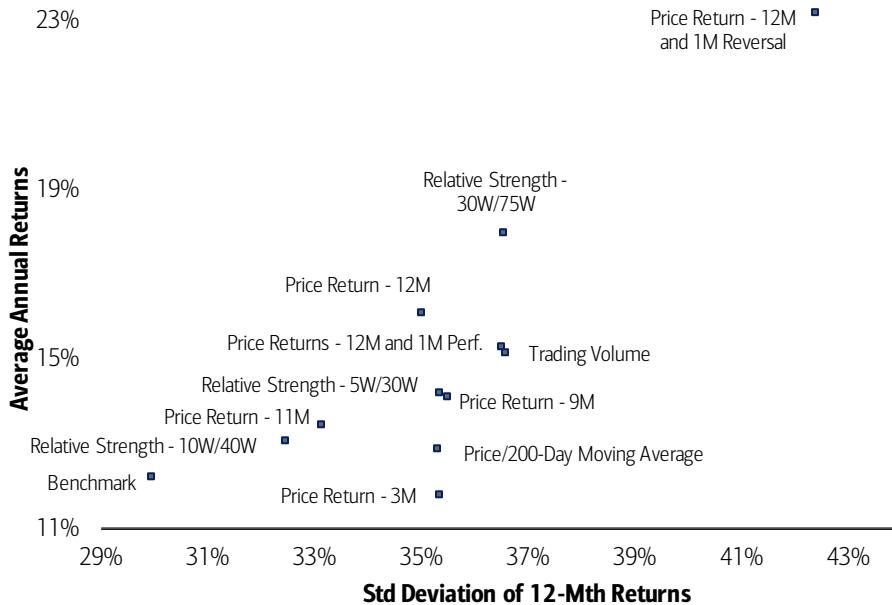


Source: BofA US Equity & Quant Strategy

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**Exhibit 414: Momentum Strategies for Telecommunication Services: Top Quintile Returns
(1985 to 2023)**

12-mth and 1-mth Reversal outperformed the index most



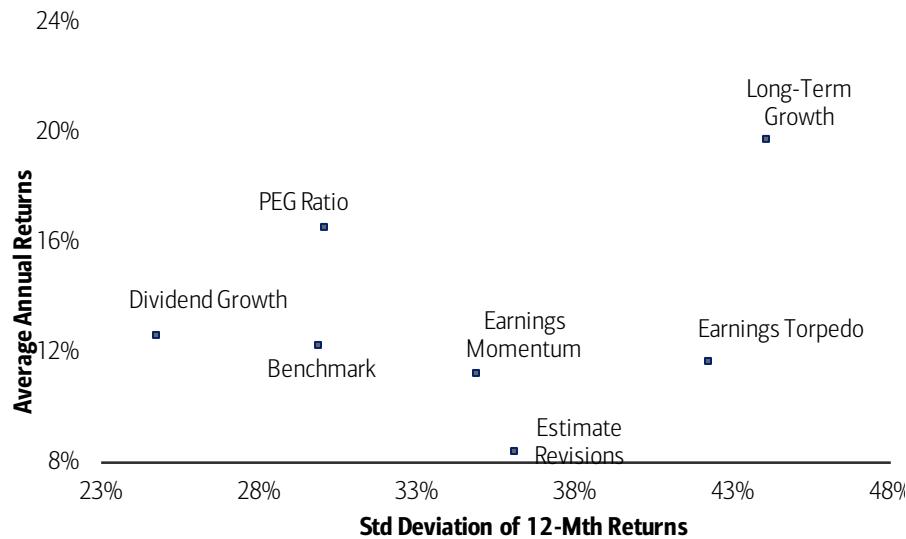
Source: BofA US Equity & Quant Strategy

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Exhibit 415: Growth Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2023)

Long-Term Growth fared best

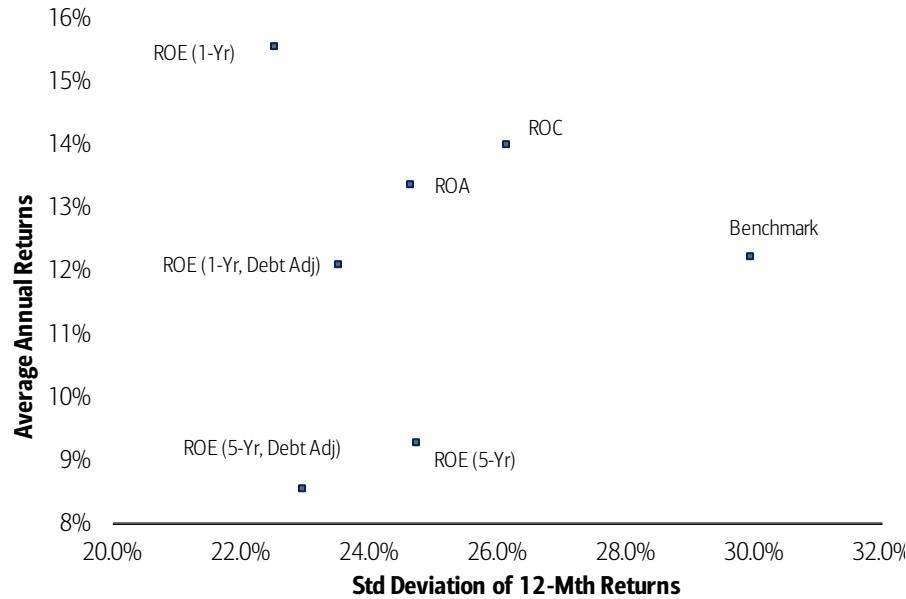


Source: BofA US Equity & Quant Strategy

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Exhibit 416: Quality Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2023)

1-yr ROE outperformed the index most



Source: BofA US Equity & Quant Strategy

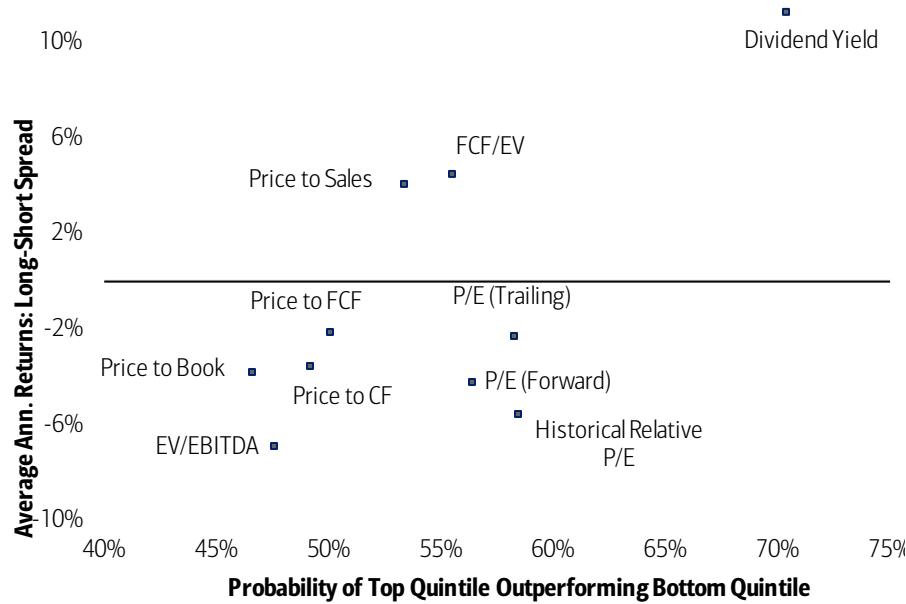
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Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 417: Valuation Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2022)

Dividend Yield fared best

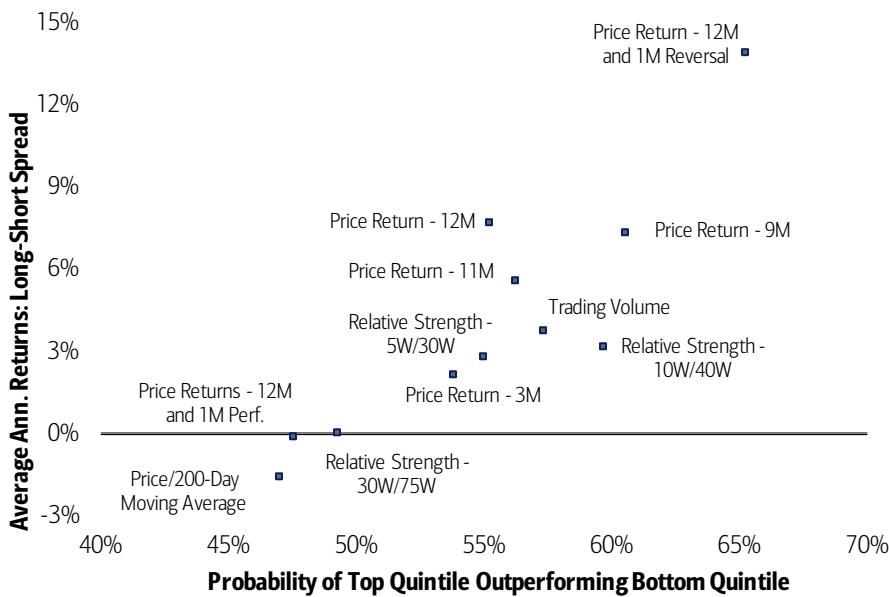


Source: BofA US Equity & Quant Strategy

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Exhibit 418: Momentum Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversal fared best



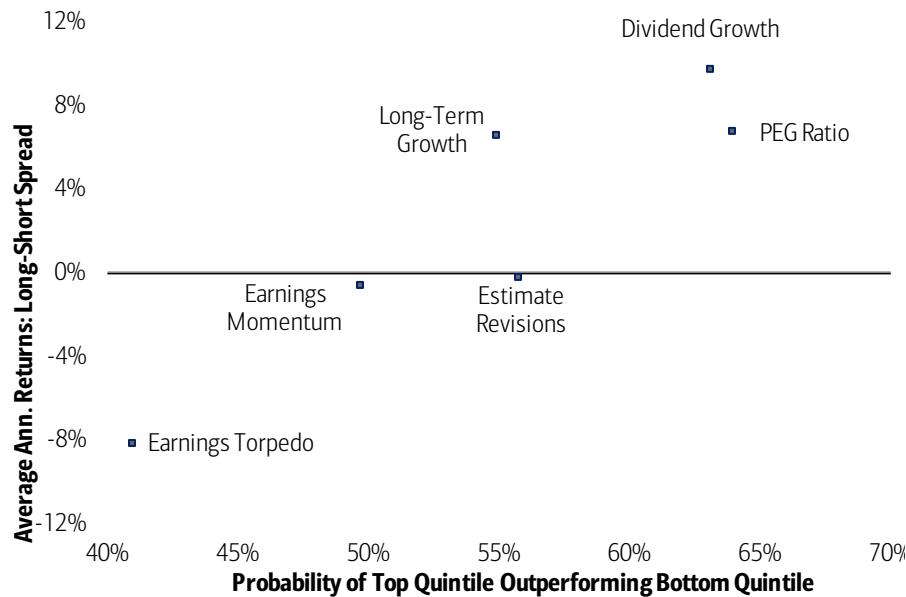
Source: BofA US Equity & Quant Strategy

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Exhibit 419: Growth Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Dividend fared best

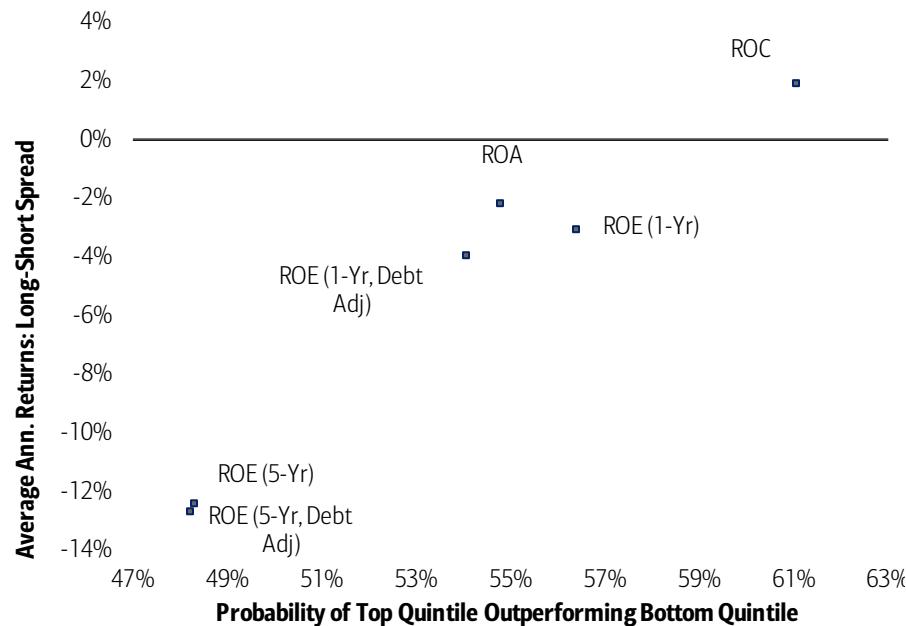


Source: BofA US Equity & Quant Strategy

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Exhibit 420: Quality Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

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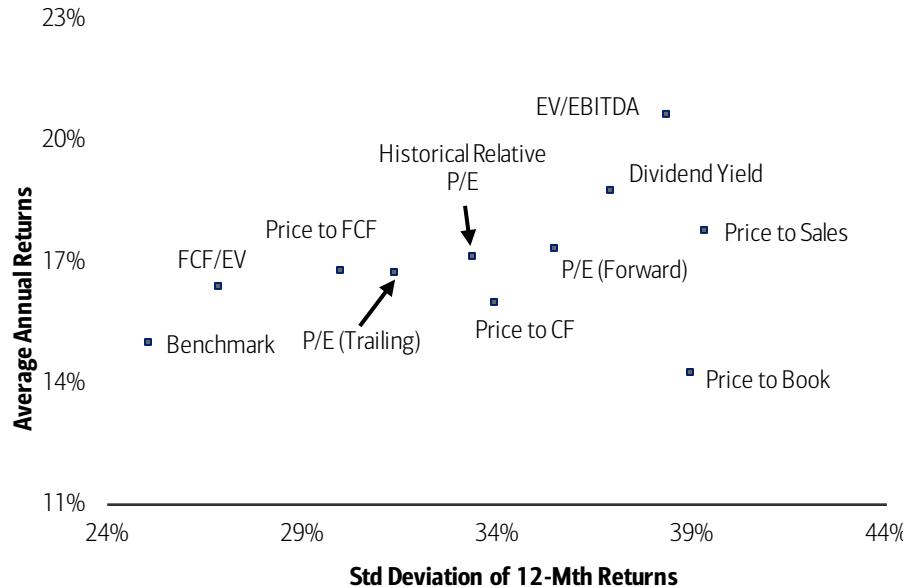


Consumer Discretionary: Retailing

Long only: Top Quintile Performance

Exhibit 421: Valuation Strategies for Retailing: Top Quintile Returns (1985 to 2023)

EV/EBITDA fared best

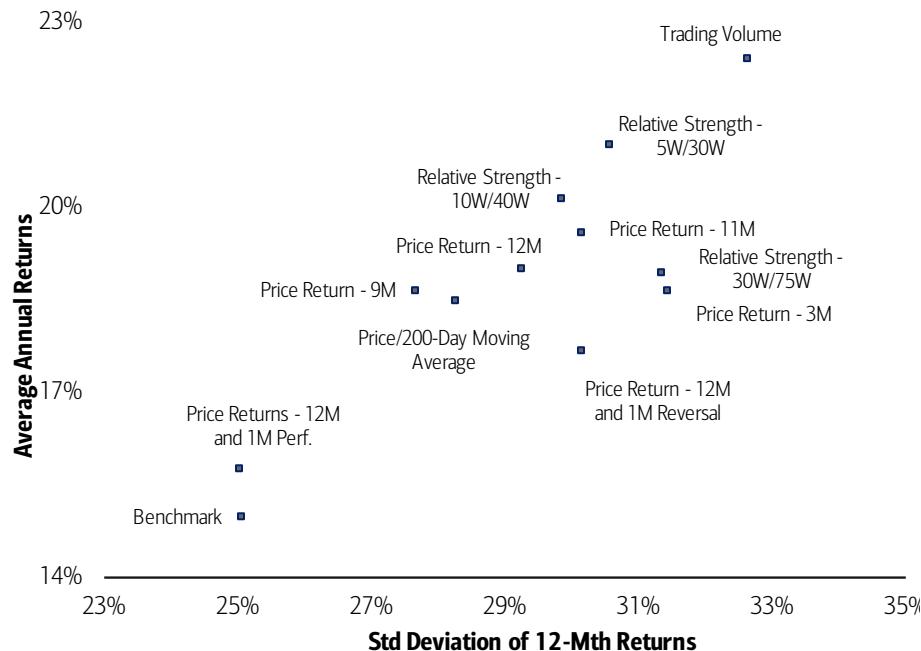


Source: BofA US Equity & Quant Strategy

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Exhibit 422: Momentum Strategies for Retailing: Top Quintile Returns (1985 to 2023)

Trading Volume fared best



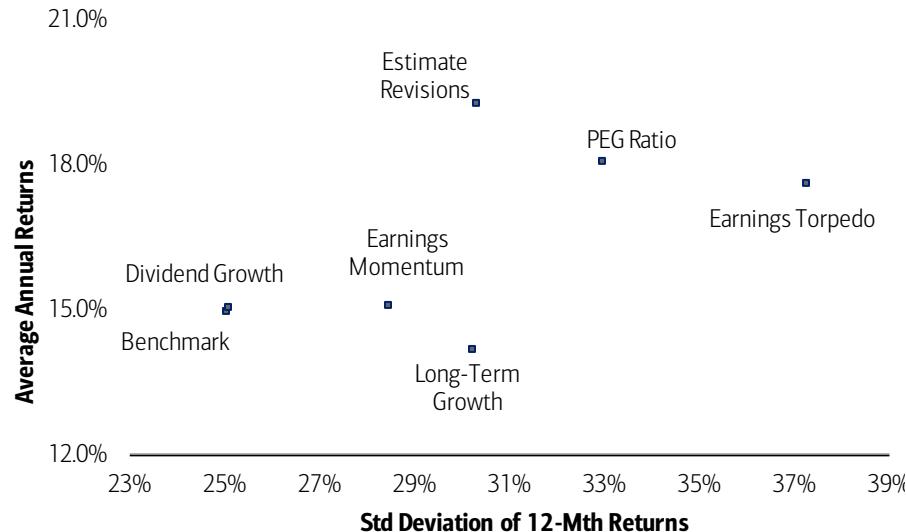
Source: BofA US Equity & Quant Strategy

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Exhibit 423: Growth Strategies for Retailing: Top Quintile Returns (1985 to 2023)

EPS Estimate Revisions fared best

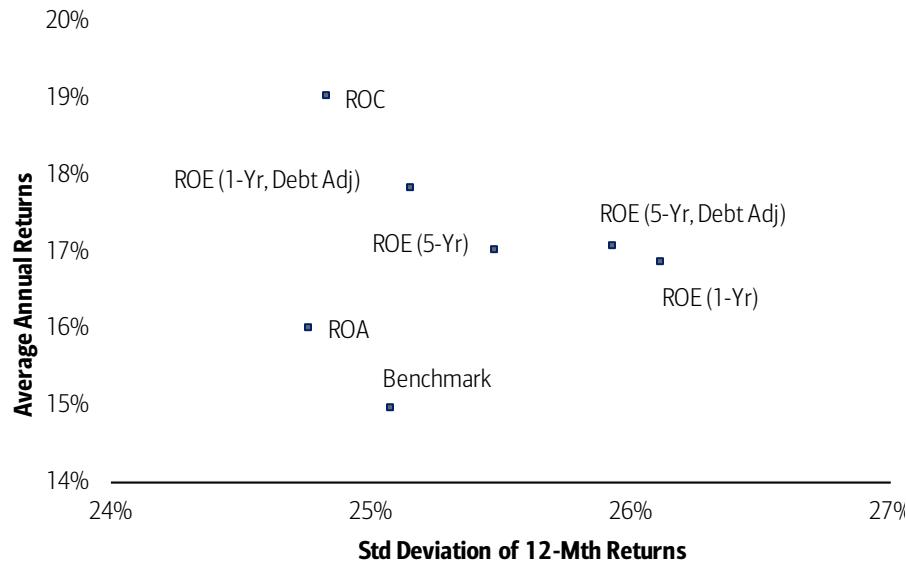


Source: BofA US Equity & Quant Strategy

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Exhibit 424: Quality Strategies for Retailing: Top Quintile Returns (1985 to 2023)

Return on Capital fared best



Source: BofA US Equity & Quant Strategy

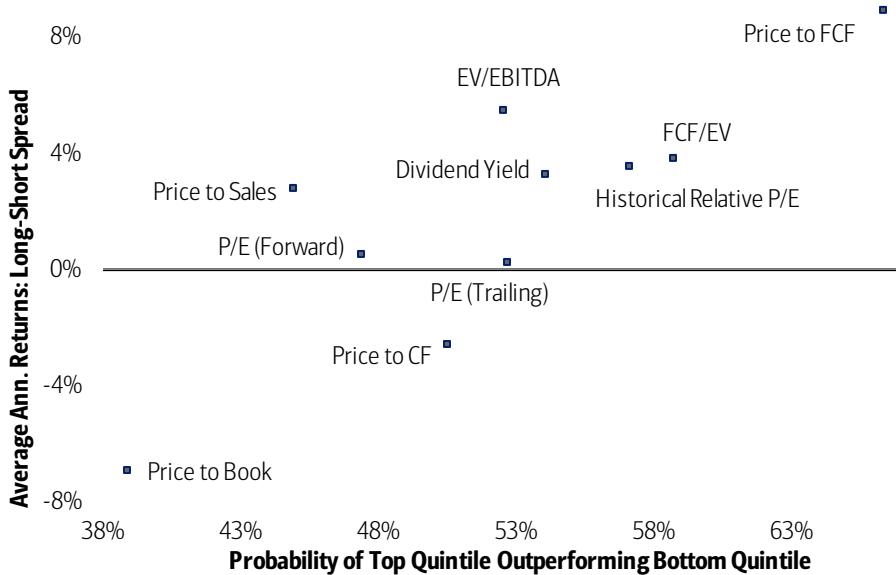
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Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 425: Valuation Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to FCF fared best

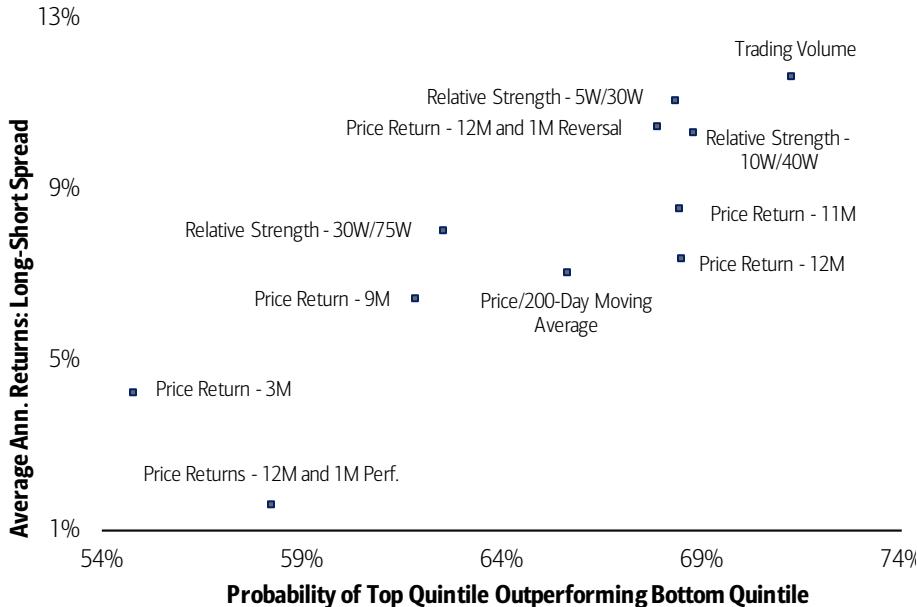


Source: BofA US Equity & Quant Strategy

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Exhibit 426: Momentum Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Trading Volume fared best



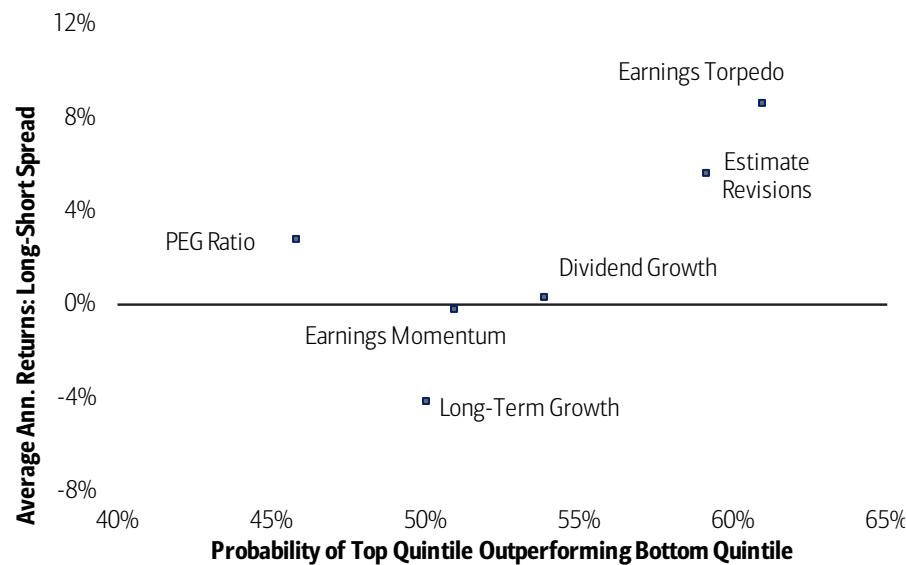
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 427: Growth Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

EPS Estimate Revisions fared best

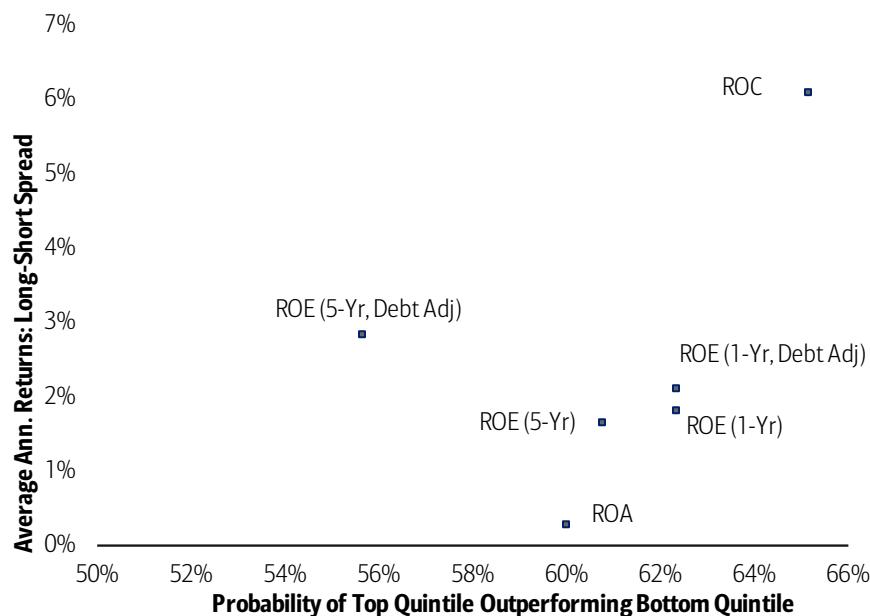


Source: BofA US Equity & Quant Strategy

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Exhibit 428: Quality Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

High Return on Capital fared best



Source: BofA US Equity & Quant Strategy

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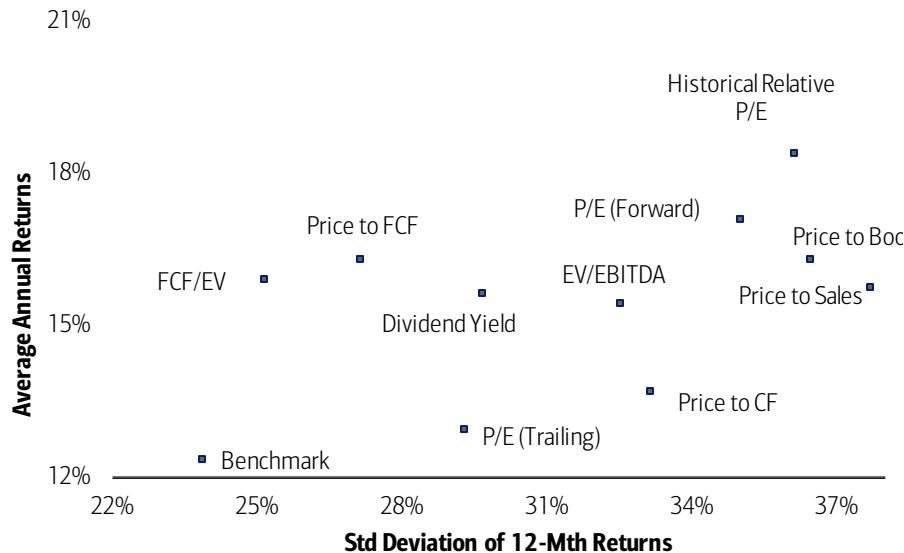


Other Disc. (Autos, Durables, Services)

Long only: Hypothetical Top Quintile Performance

Exhibit 429: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2023)

Historical Relative P/E fared best

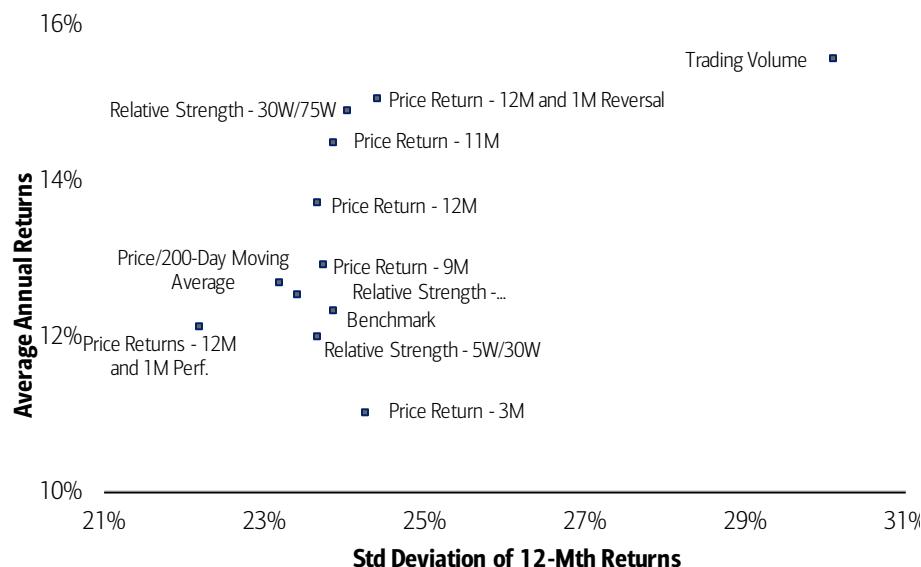


Source: BofA US Equity & Quant Strategy

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Exhibit 430: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2023)

Trading Volume fared best

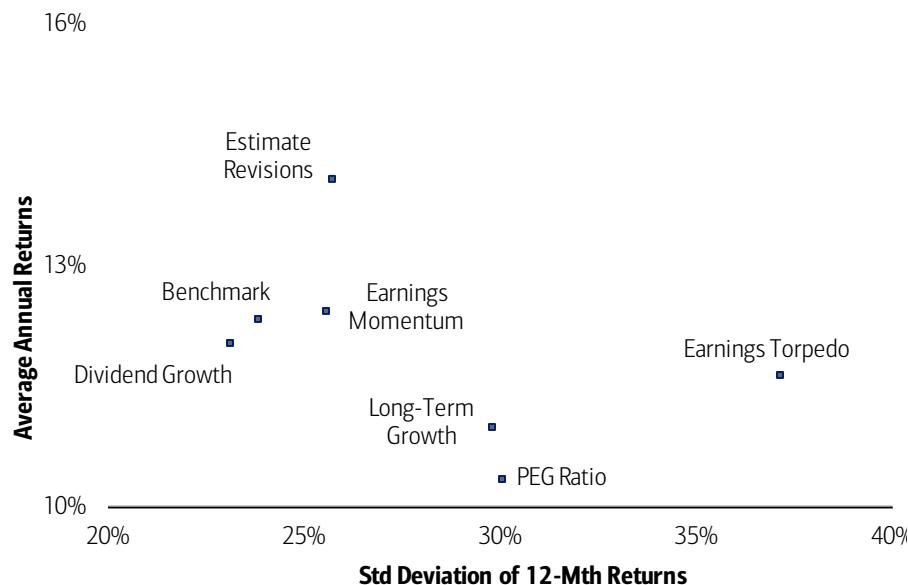


Source: BofA US Equity & Quant Strategy

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Exhibit 431: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2023)

EPS Estimate Revisions fared best

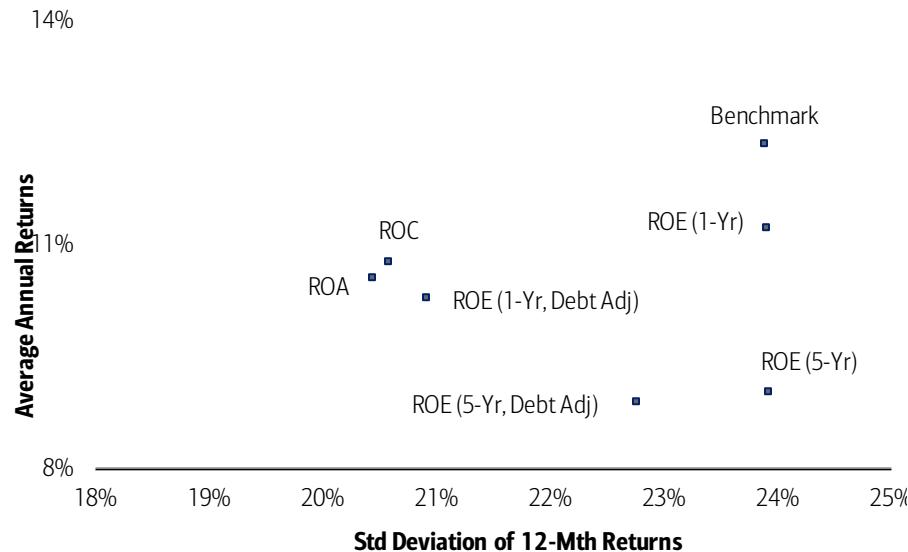


Source: BofA US Equity & Quant Strategy

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Exhibit 432: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2023)

1-yr ROE underperformed least



Source: BofA US Equity & Quant Strategy

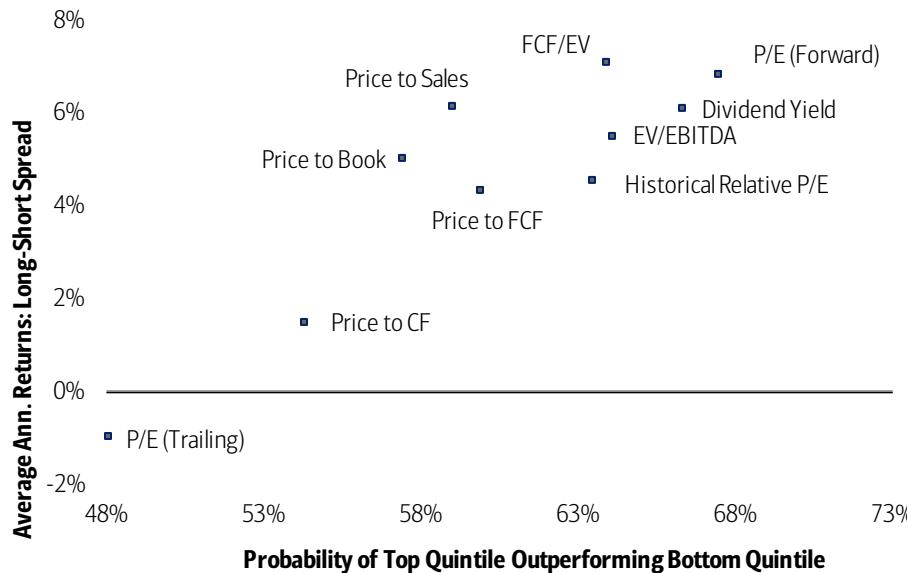
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Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 433: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

FCF/EV fared best

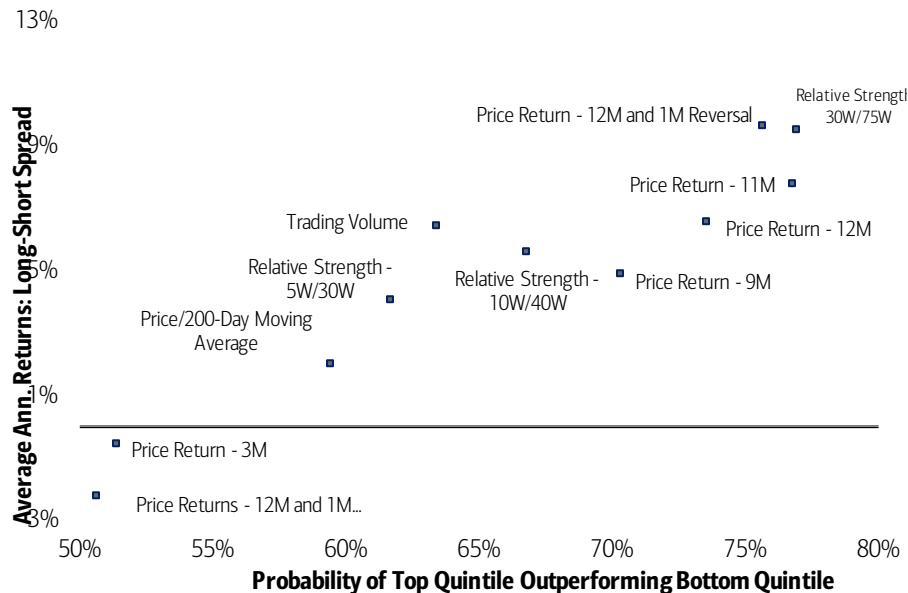


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 434: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversal fared best

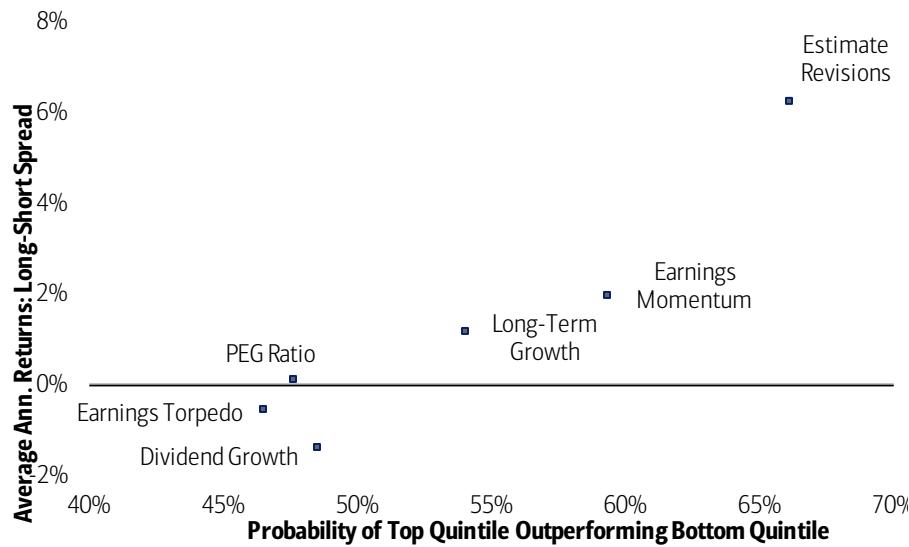


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 435: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-**Short Spreads vs. Consistency of Spreads (1985 to 2023)**

EPS Estimate Revisions fared best

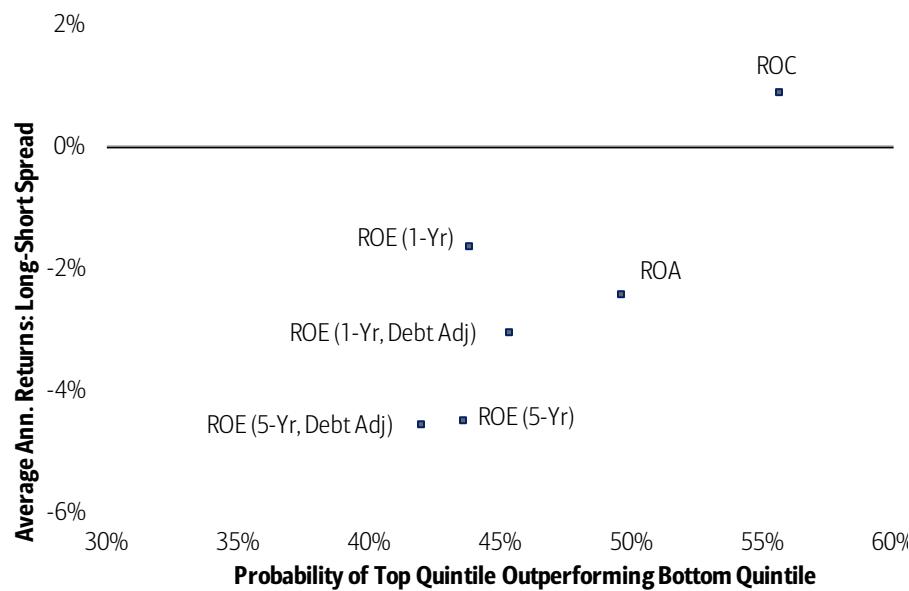


Source: BofA US Equity & Quant Strategy

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Exhibit 436: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

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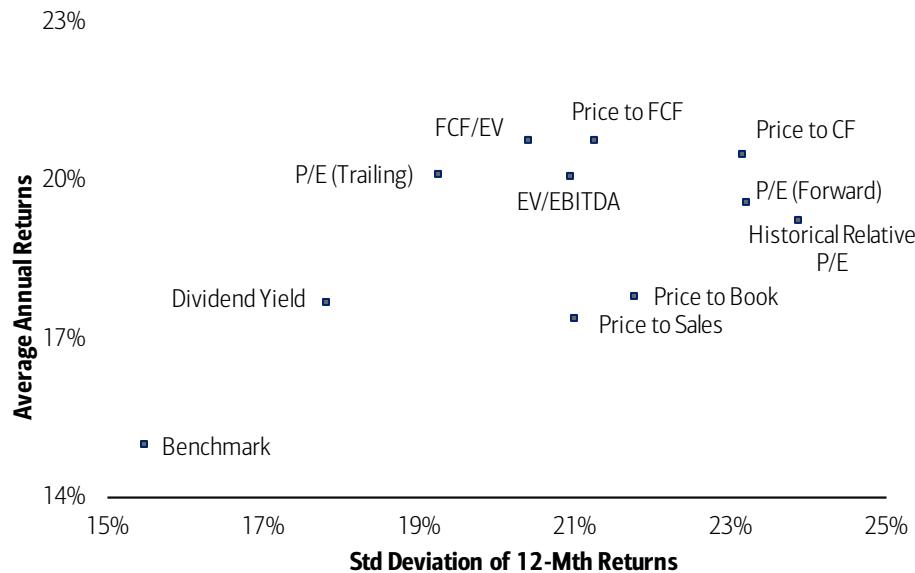


Consumer Staples

Long only: Top Quintile Performance

Exhibit 437: Valuation Strategies for Consumer Staples: Top Quintile Returns (1985 to 2023)

FCF/EV and Price to FCF fared best

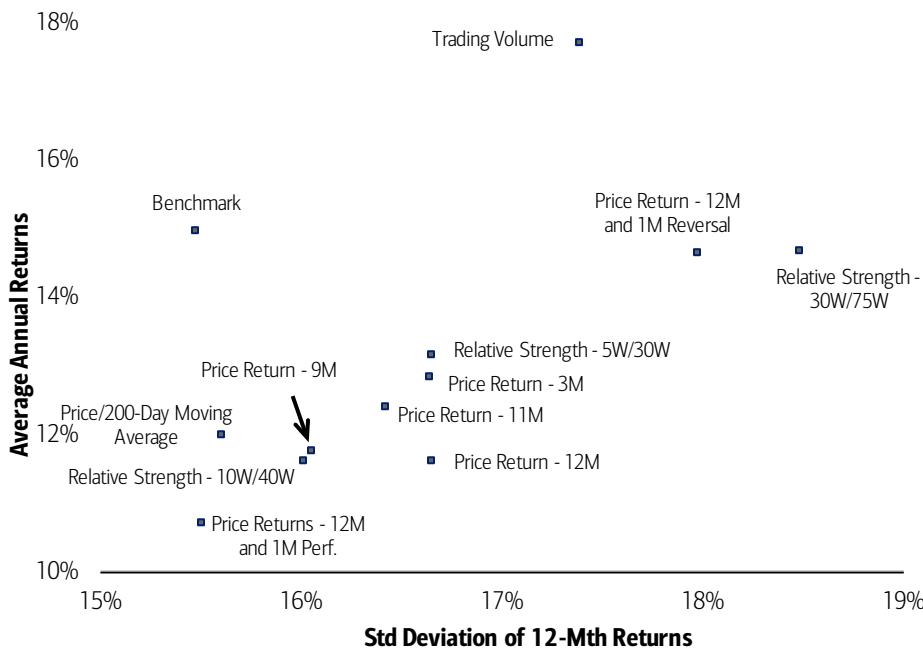


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 438: Momentum Strategies for Consumer Staples: Top Quintile Returns (1985 to 2023)

Trading Volume outperformed the index most

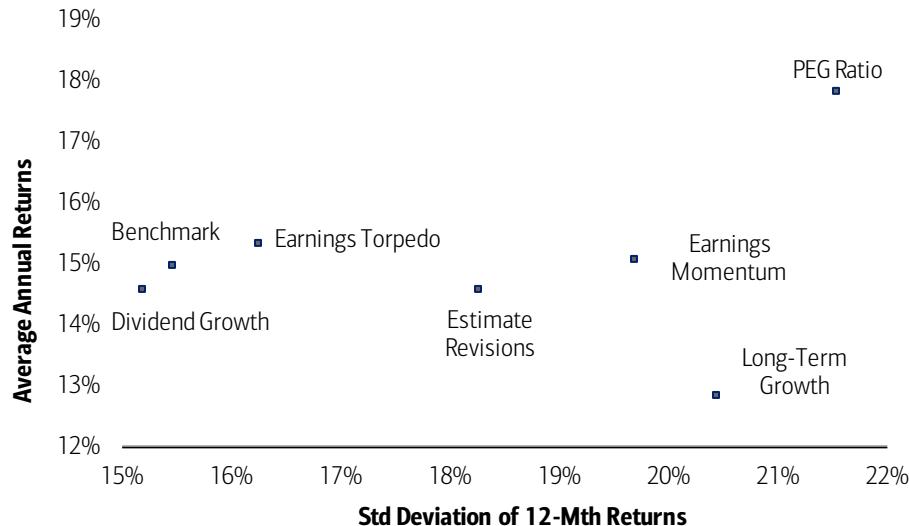


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 439: Growth Strategies for Consumer Staples: Top Quintile Returns (1985 to 2023)

PEG Ratio outperformed the index most

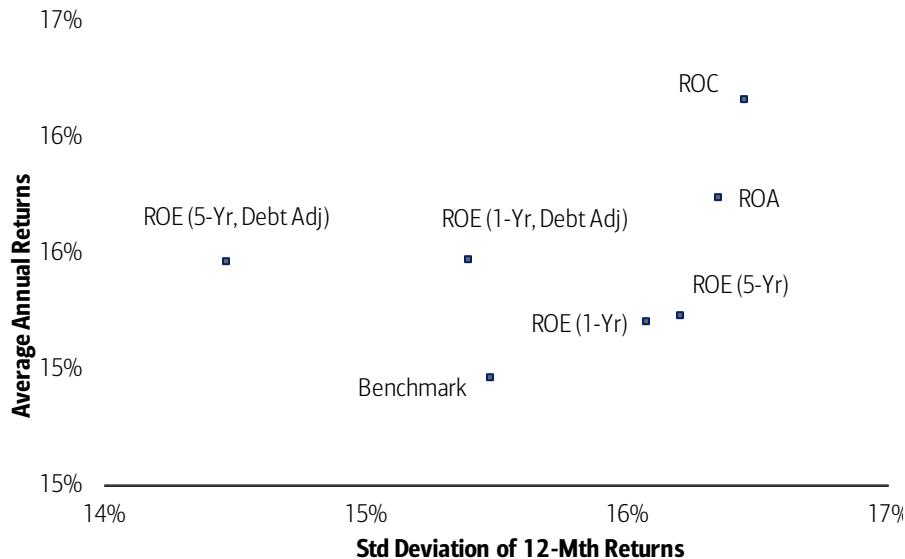


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 440: Quality Strategies for Consumer Staples: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

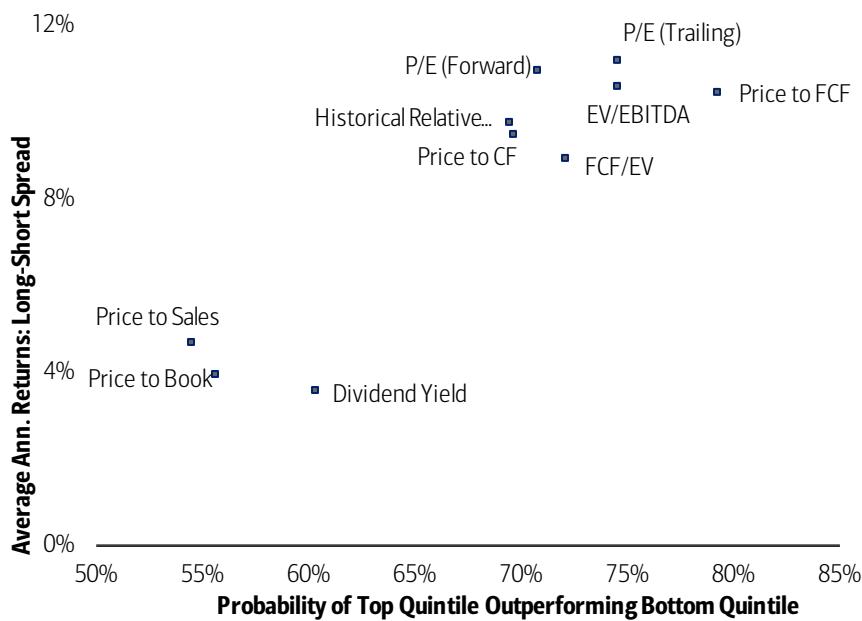
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Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 441: Valuation Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

P/E fared best

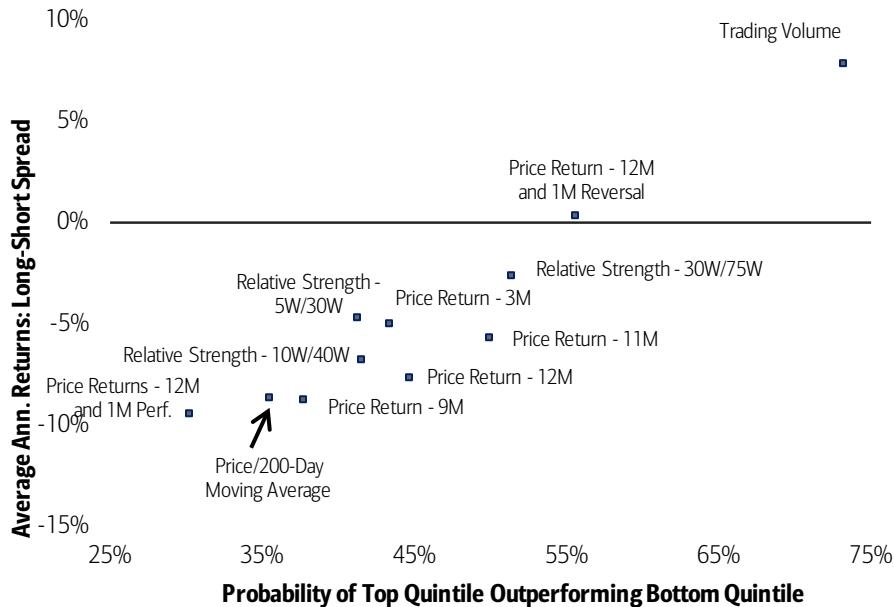


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 442: Momentum Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Trading Volume fared best

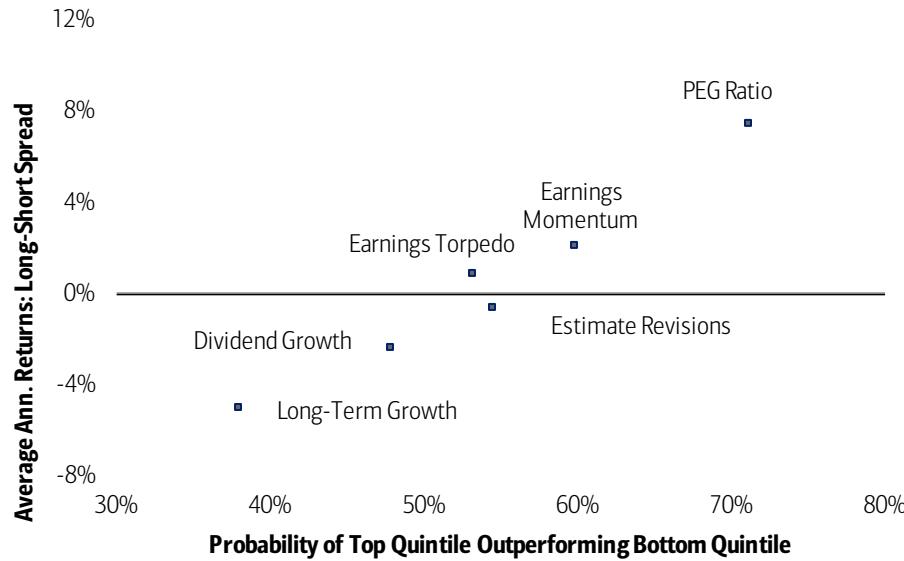


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 443: Growth Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

PEG Ratio fared best

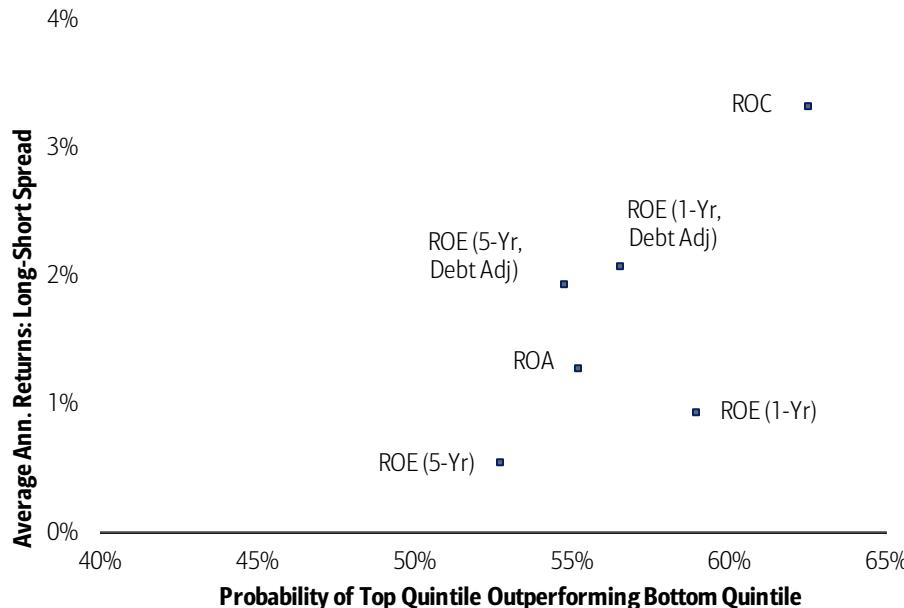


Source: BofA US Equity & Quant Strategy

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Exhibit 444: Quality Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Return on Capital fared best



Source: BofA US Equity & Quant Strategy

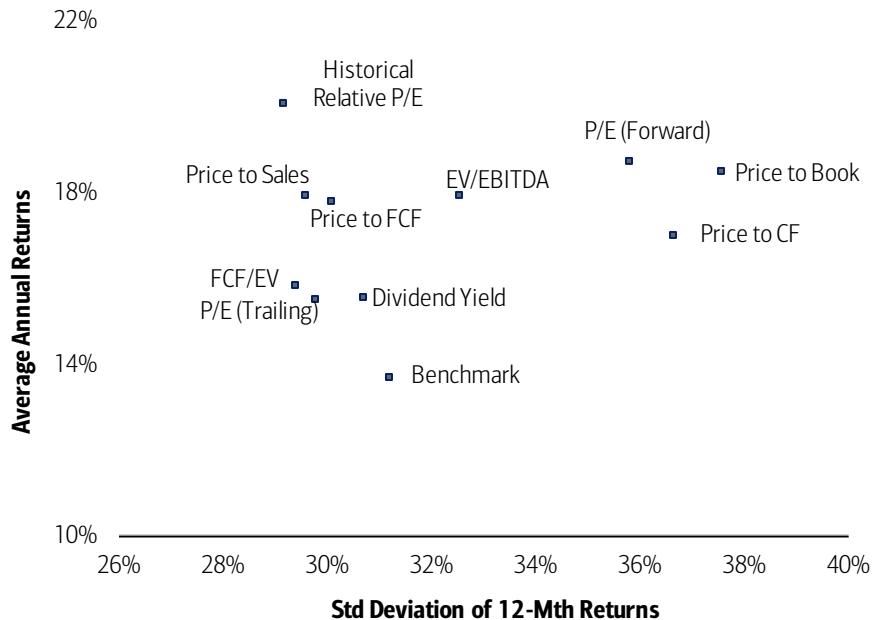
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Energy

Long only: Top Quintile Performance

Exhibit 445: Valuation Strategies for Energy: Top Quintile Returns (1985 to 2023)

Historical Relative P/E fared best

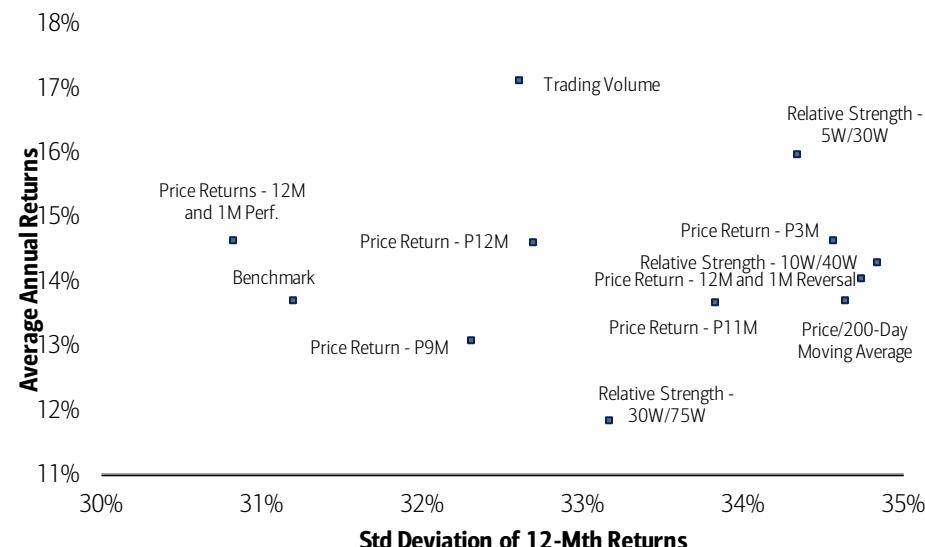


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 446: Momentum Strategies for Energy: Top Quintile Returns (1985 to 2023)

Trading Volume fared best



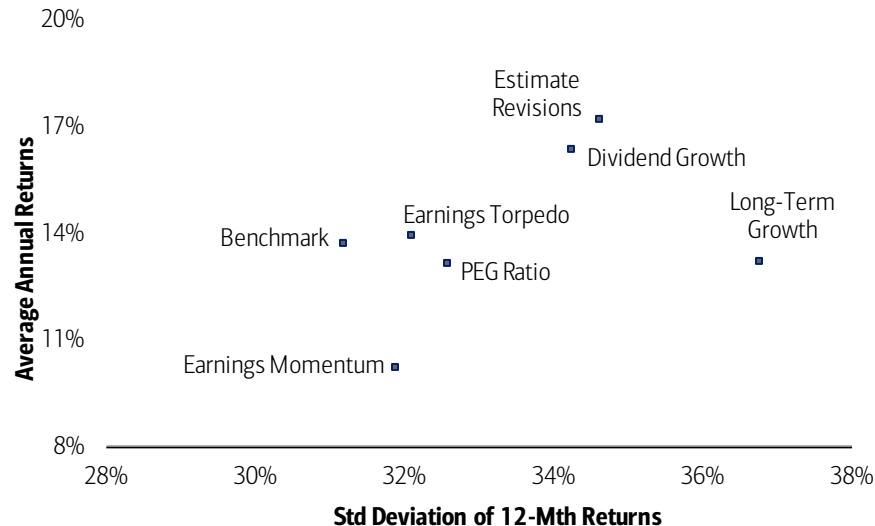
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 447: Growth Strategies for Energy: Top Quintile Returns (1985 to 2023)

High EPS Estimate Revisions fared best

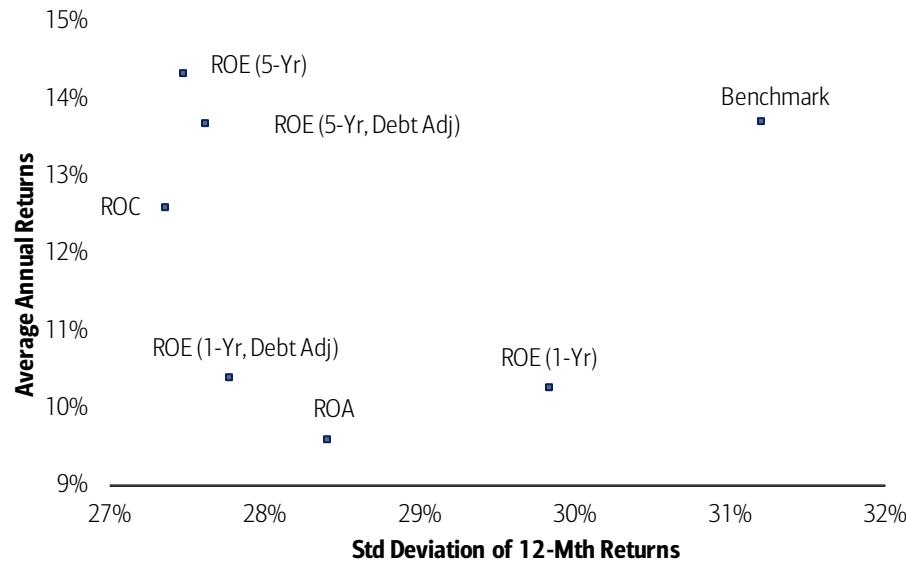


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 448: Quality Strategies for Energy: Top Quintile Returns (1985 to 2023)

5-yr ROE fared best



Source: BofA US Equity & Quant Strategy

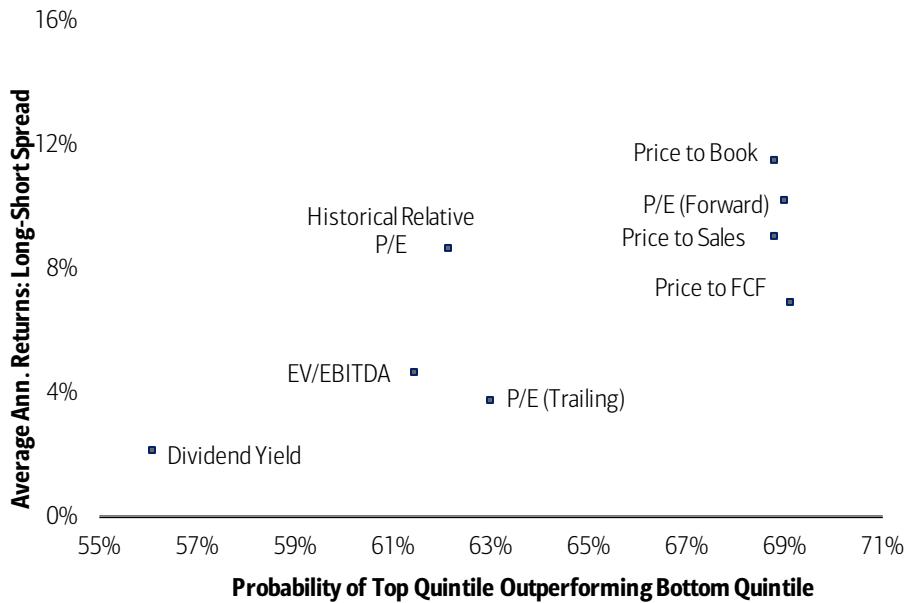
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 449: Valuation Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price / Book fared best

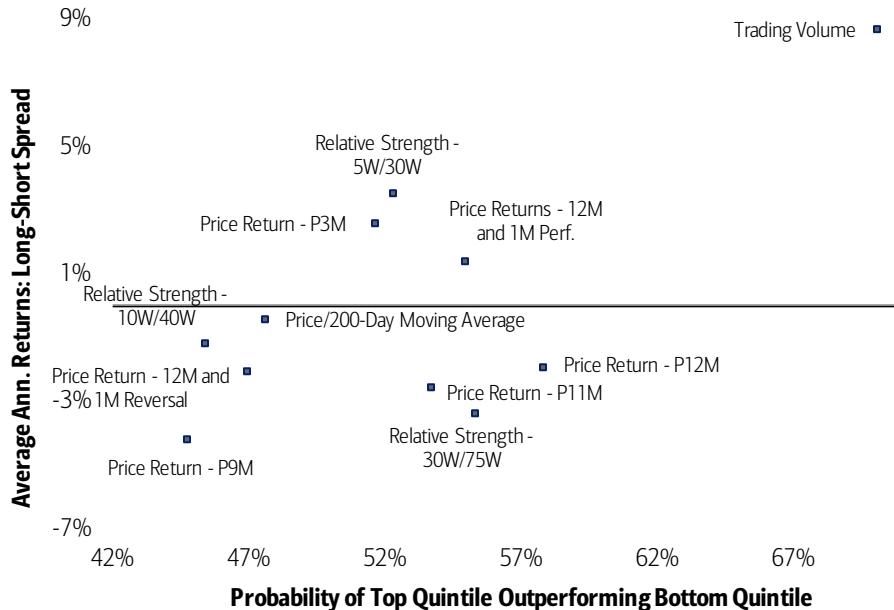


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 450: Momentum Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2021)

Trading Volume fared best

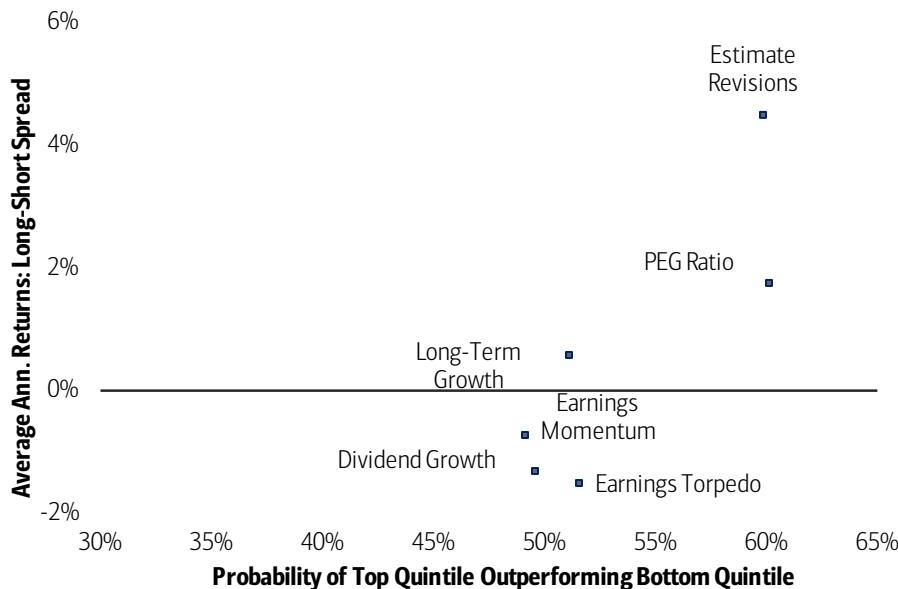


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 451: Growth Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Estimate Revisions fared best

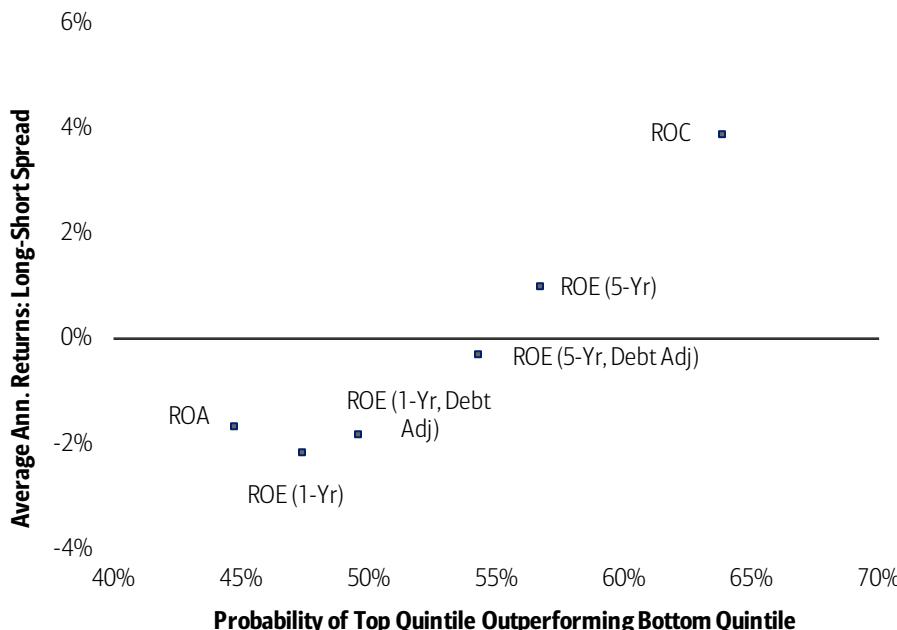


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 452: Quality Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2021)

Return on Capital fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

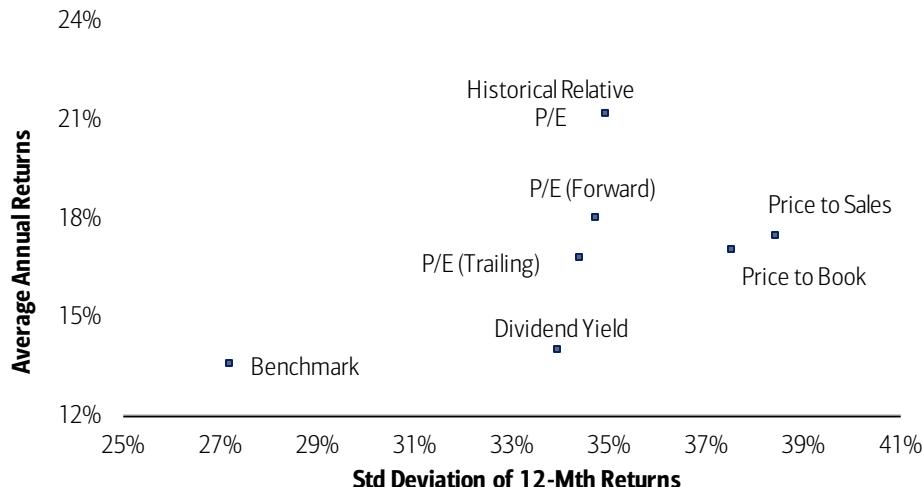


Financials: Banks

Long only: Top Quintile Performance

Exhibit 453: Valuation Strategies for Banks: Top Quintile Returns (1985 to 2023)

Historical Relative P/E fared best

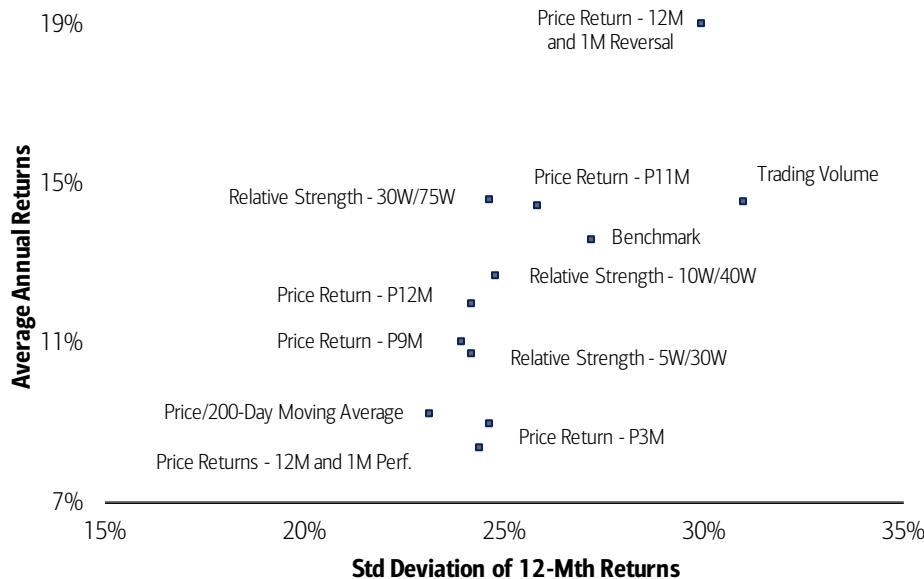


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 454: Momentum Strategies for Banks: Top Quintile Returns (1985 to 2023)

12-mth and 1-mth Reversal outperformed the index most

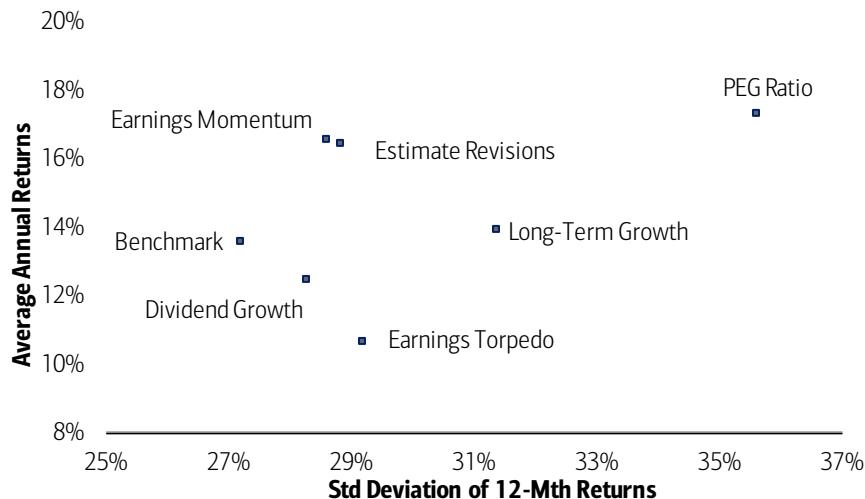


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 455: Growth Strategies for Banks: Top Quintile Returns (1985 to 2023)

PEG Ratio and EPS Momentum outperformed the index most

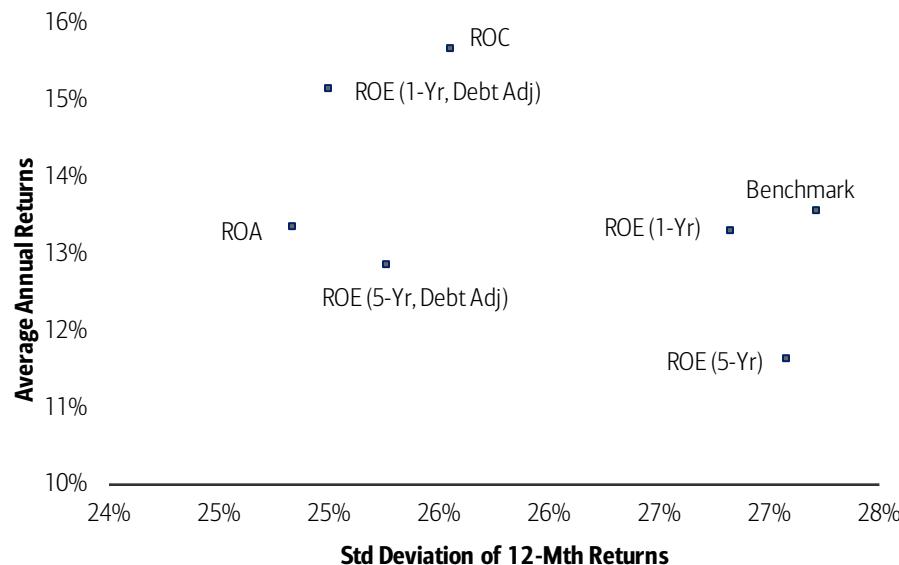


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 456: Quality Strategies for Banks: Top Quintile Returns (1985 to 2023)

Return on Capital outperformed the index most



Source: BofA US Equity & Quant Strategy

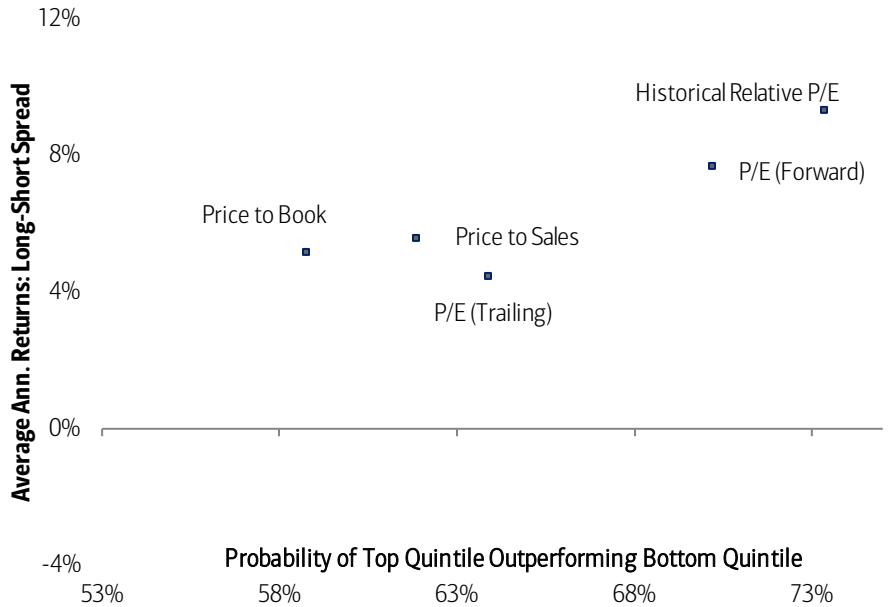
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 457: Valuation Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Historical Relative P/E fared best

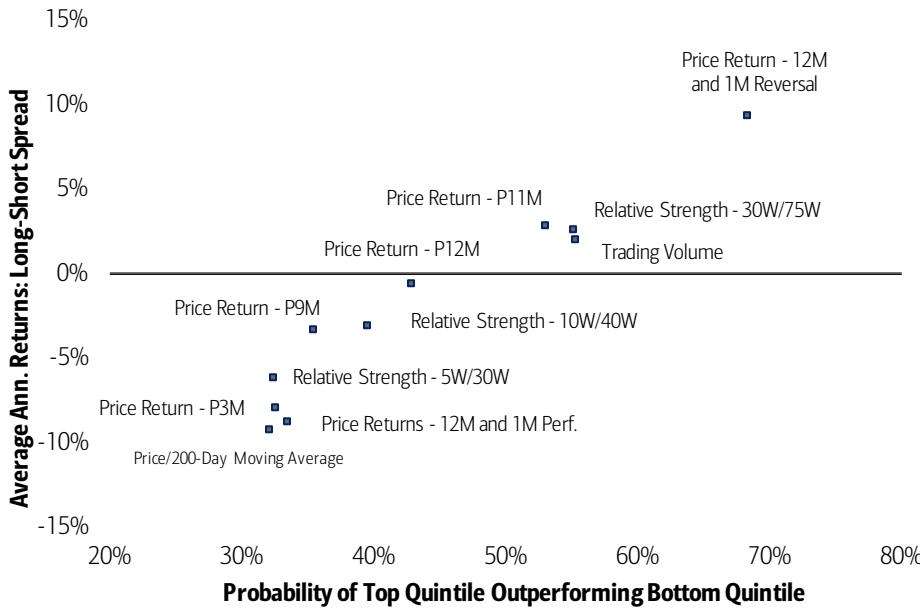


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 458: Momentum Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversals fared best



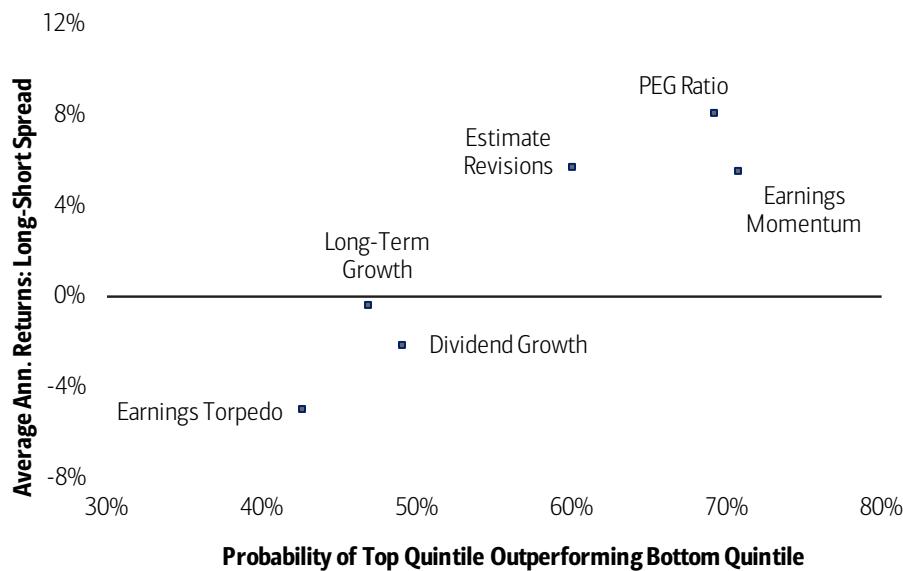
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



**Exhibit 459: Growth Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads
(1985 to 2023)**

Low PEG ratio fared best

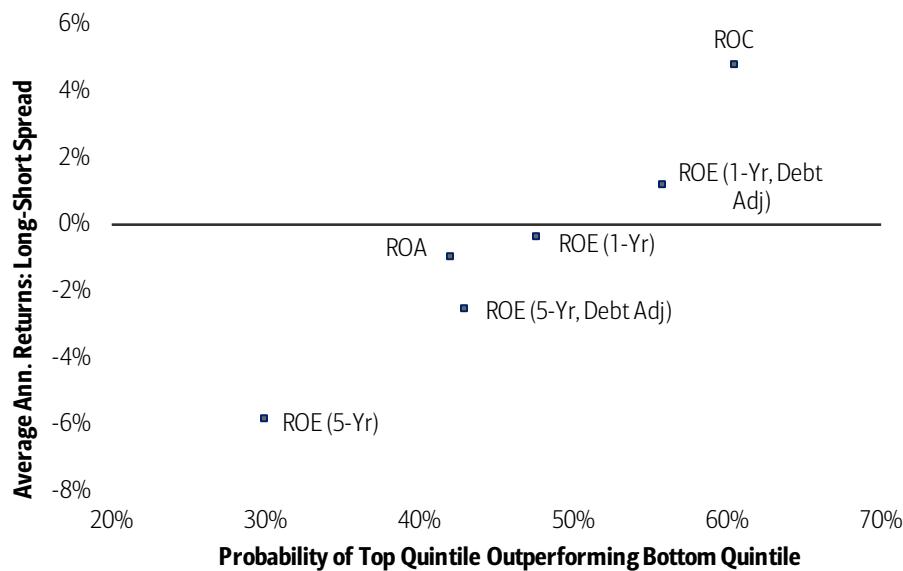


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

**Exhibit 460: Quality Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads
(1985 to 2023)**

Return on Capital fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

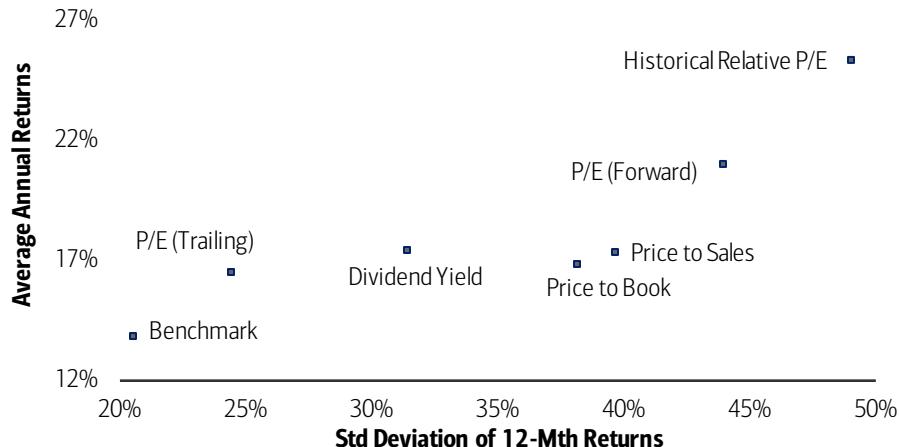


Financials: Insurance

Long only: Top Quintile Performance

Exhibit 461: Valuation Strategies for Insurance: Top Quintile Returns (1985 to 2023)

Historical Relative P/E outperformed the index most

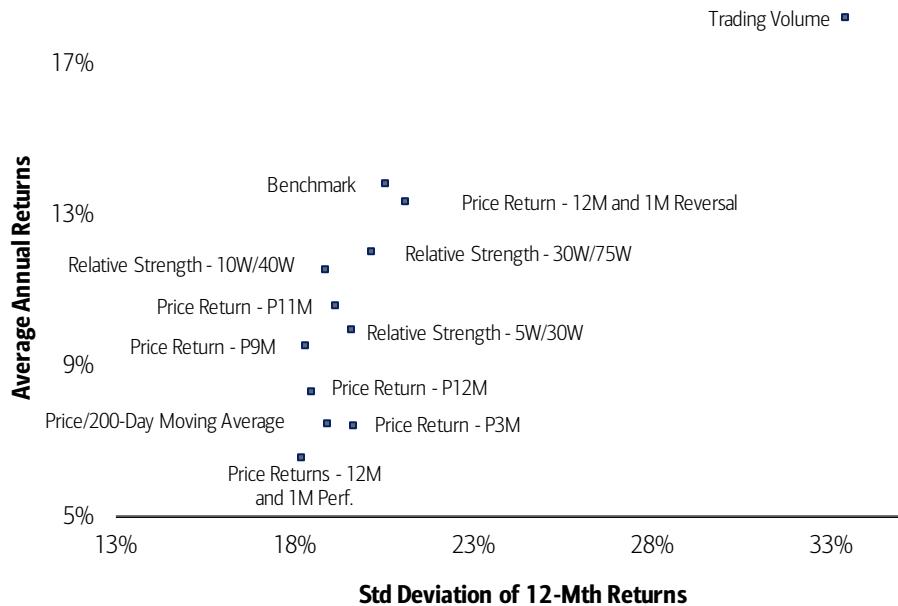


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 462: Momentum Strategies for Insurance: Top Quintile Returns (1985 to 2023)

High Trading Volume outperformed the index most

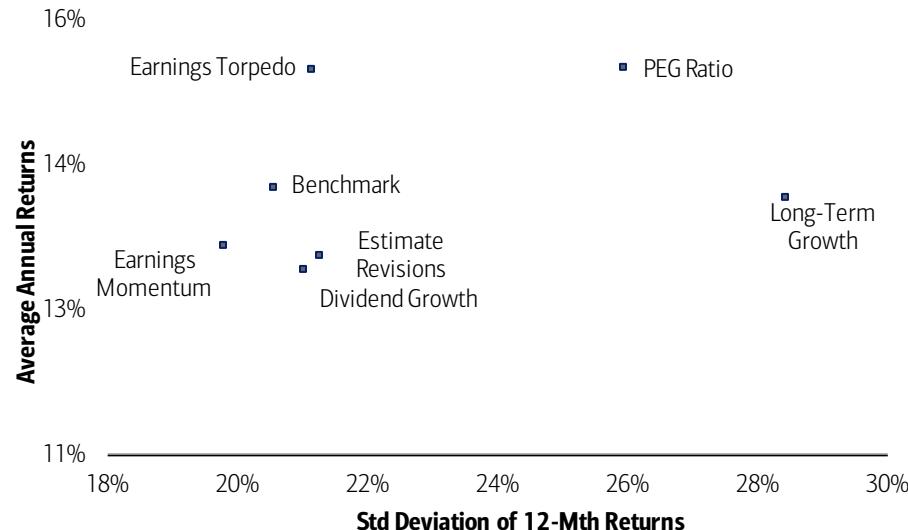


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 463: Growth Strategies for Insurance: Top Quintile Returns (1985 to 2023)

PEG Ratio outperformed the index most

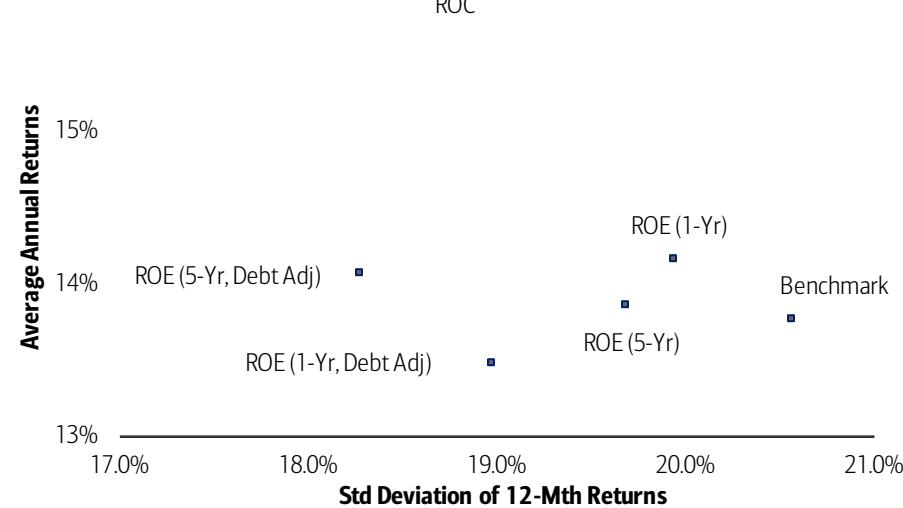


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 464: Quality Strategies for Insurance: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

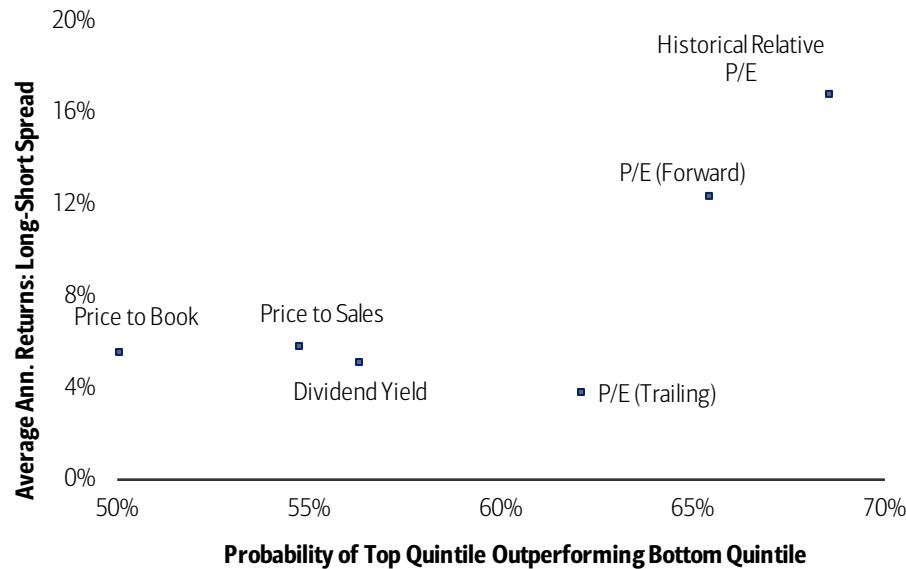
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 465: Valuation Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Historical Relative P/E fared best

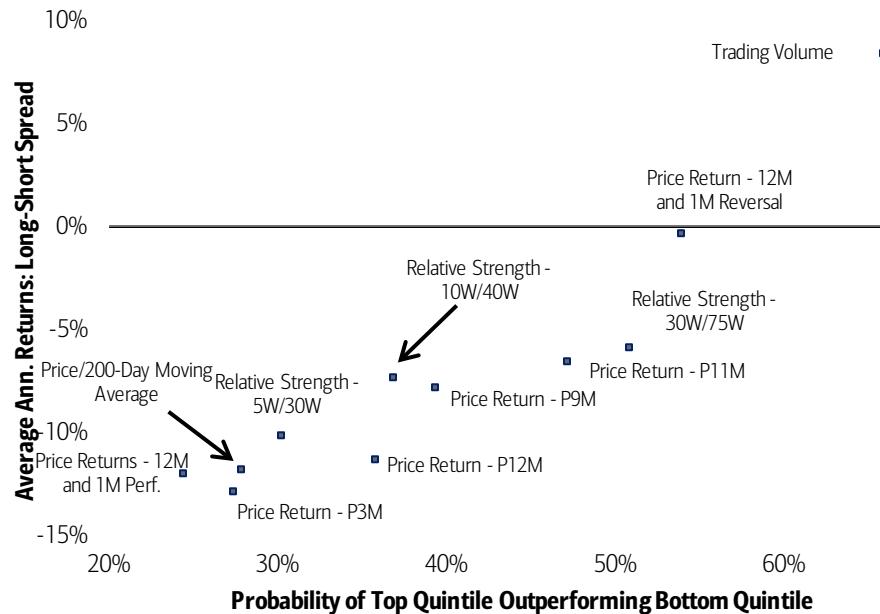


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 466: Momentum Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

High Trading Volume fared best

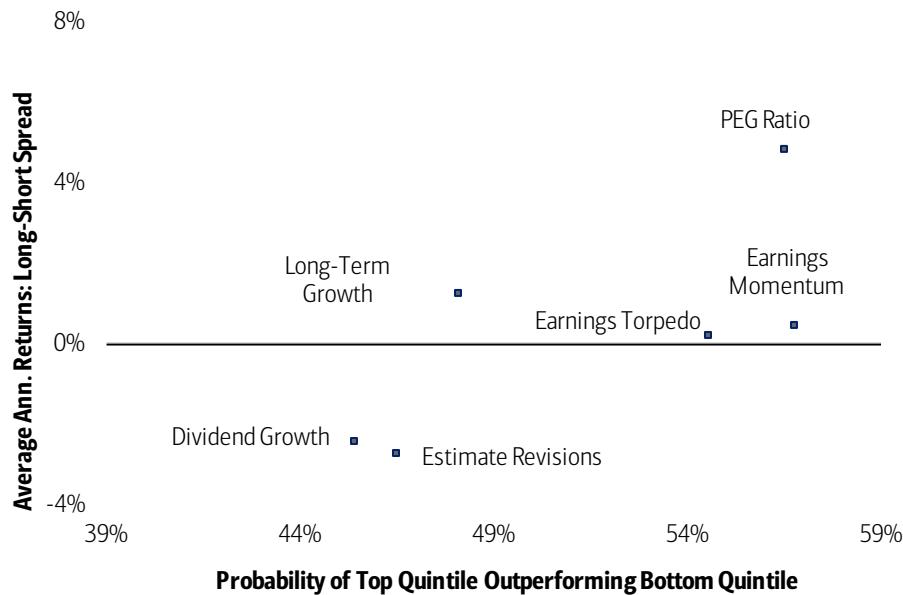


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 467: Growth Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

PEG Ratio fared best

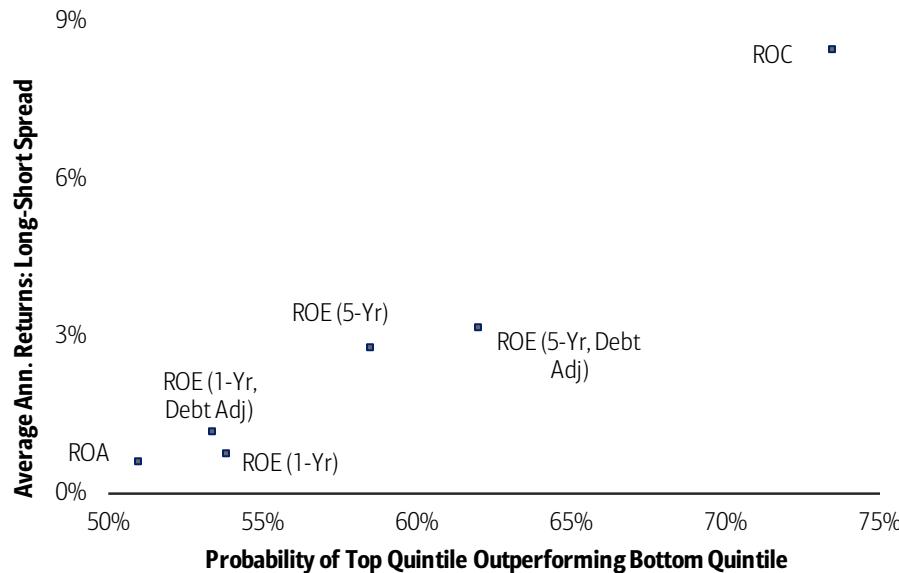


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 468: Quality Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

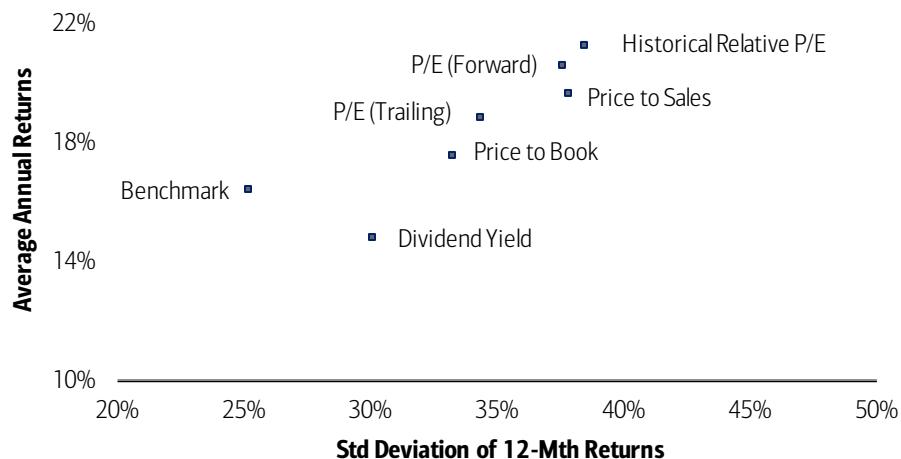


Financials: Diversified

Long only: Top Quintile Performance

Exhibit 469: Valuation Strategies for Diversified Financials: Top Quintile Returns (1985 to 2023)

Historical Relative P/E outperformed the index most

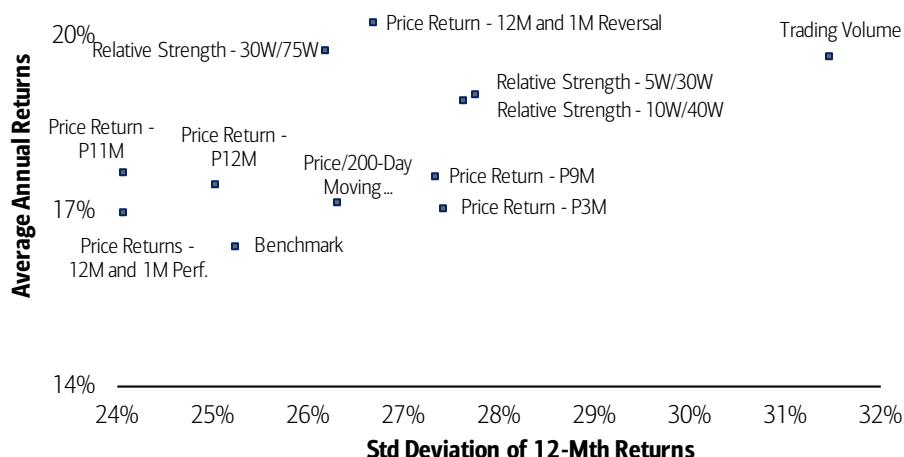


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 470: Momentum Strategies for Diversified Financials: Top Quintile Returns (1985 to 2023)

12M and 1M Reversal outperformed the index most

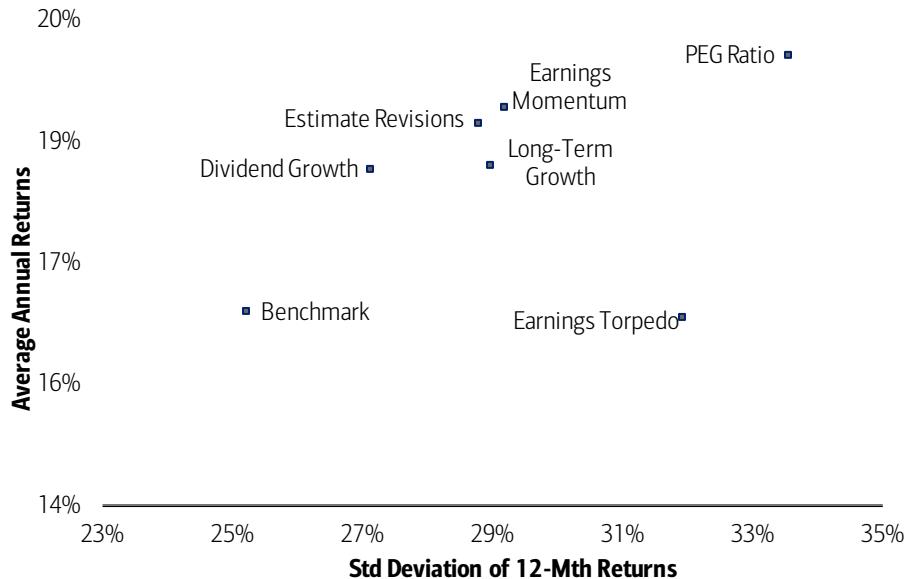


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 471: Growth Strategies for Diversified Financials: Top Quintile Returns (1985 to 2023)

PEG Ratio outperformed the index most

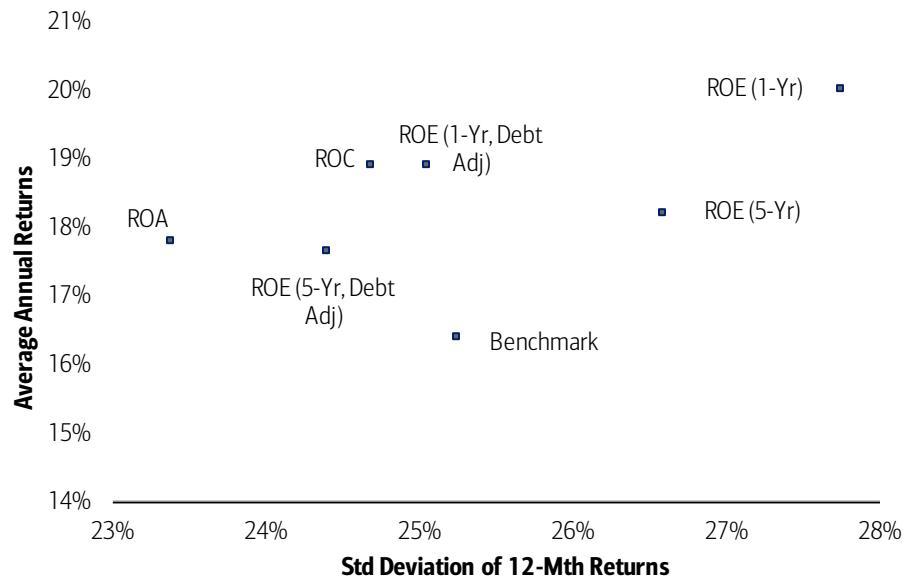


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 472: Quality Strategies for Diversified Financials: Top Quintile Returns (1985 to 2023)

1-yr ROE outperformed the index most



Source: BofA US Equity & Quant Strategy

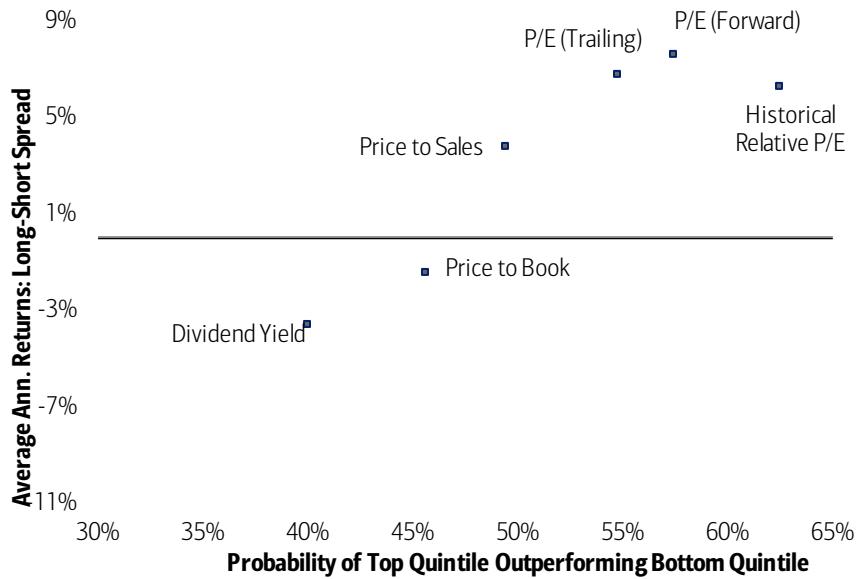
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 473: Valuation Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Forward and Trailing P/E fared best

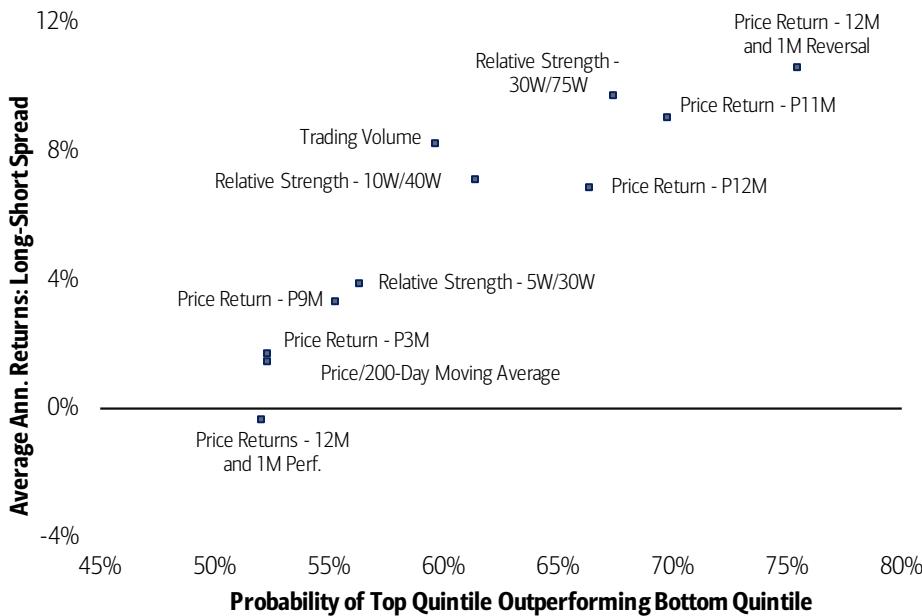


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 474: Momentum Strategies for Diversified Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12M and 1M Reversal fared best



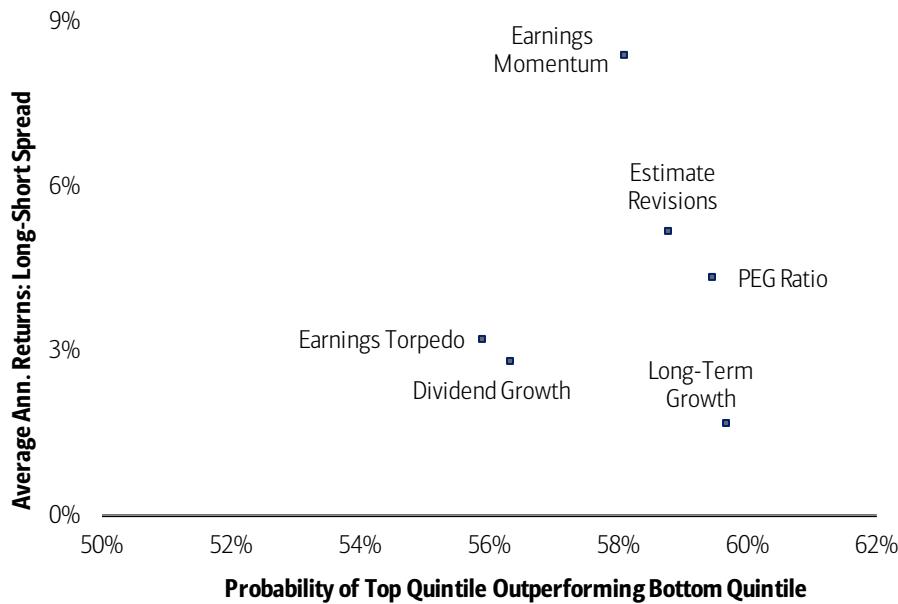
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 475: Growth Strategies for Diversified Financials: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

EPS Momentum fared best

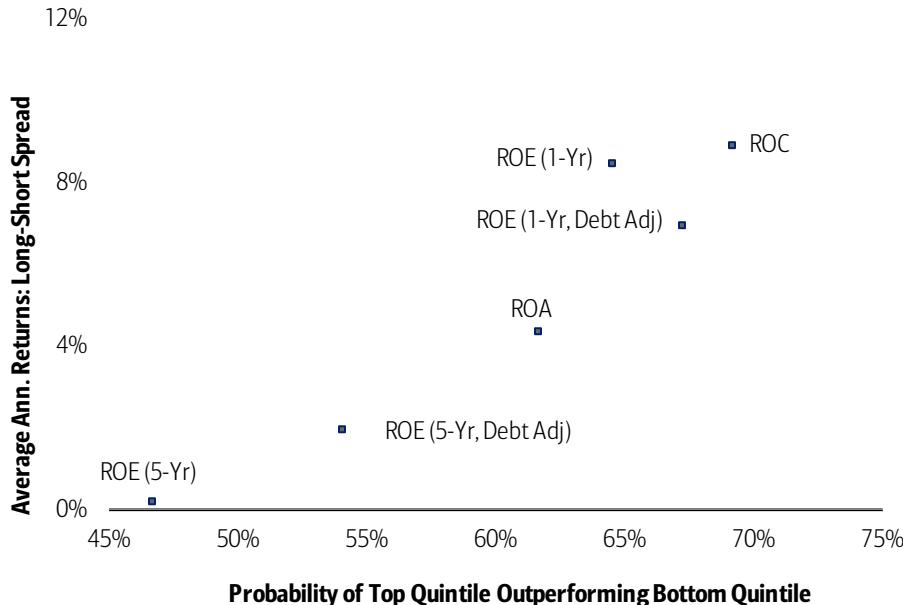


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 476: Quality Strategies for Diversified Financials: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

ROC fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

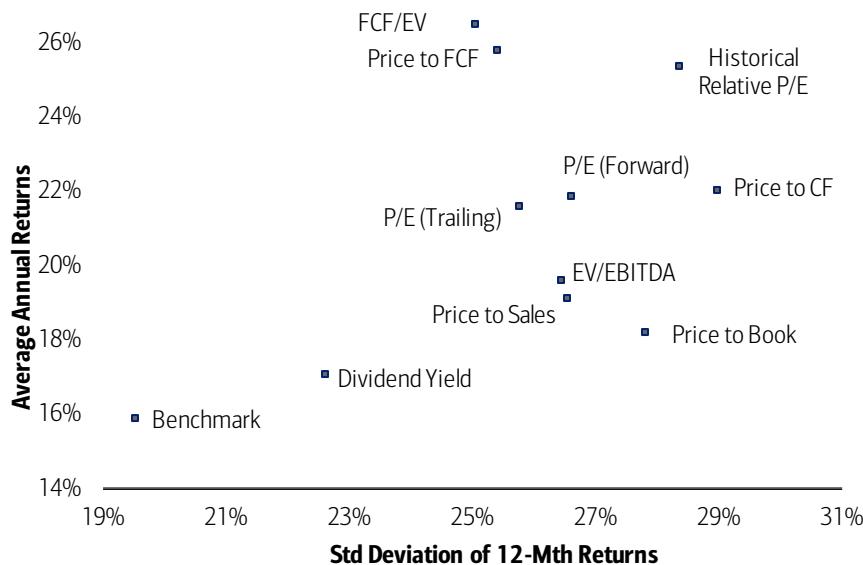


Health Care: Health Care Equipment & Svcs

Long only: Top Quintile Performance

Exhibit 477: Valuation Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2023)

FCF/EV outperformed the index most

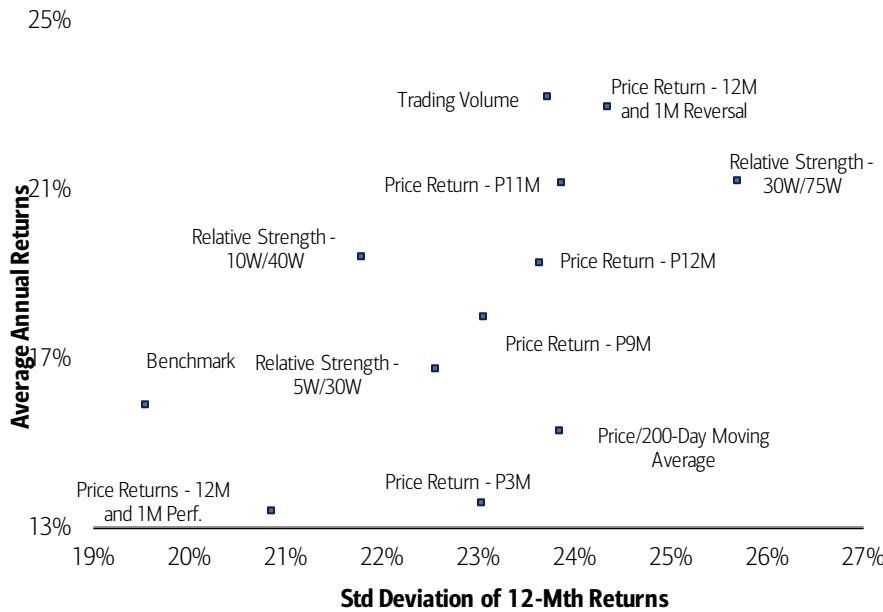


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 478: Momentum Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2023)

Trading Volume and 12-mth and 1-mth Reversal outperformed the index most



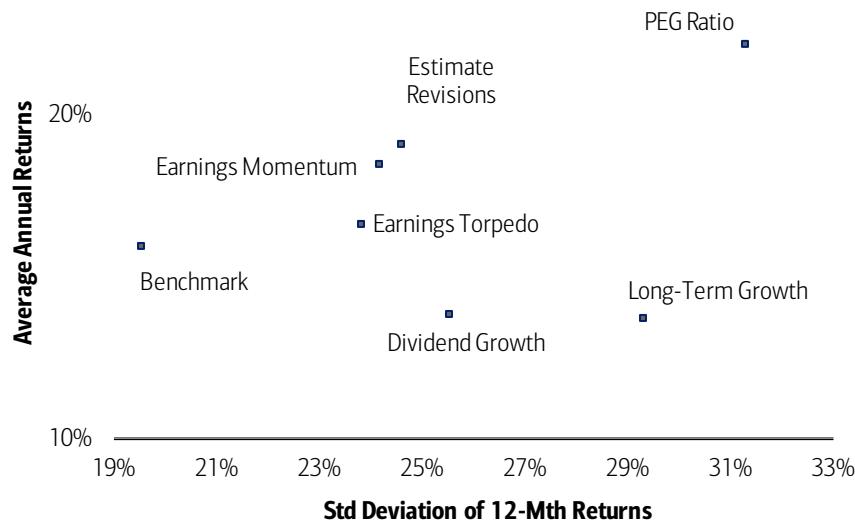
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 479: Growth Strategies for Health Care Equipment & Services: Top Quintile Returns**(1985 to 2023)**

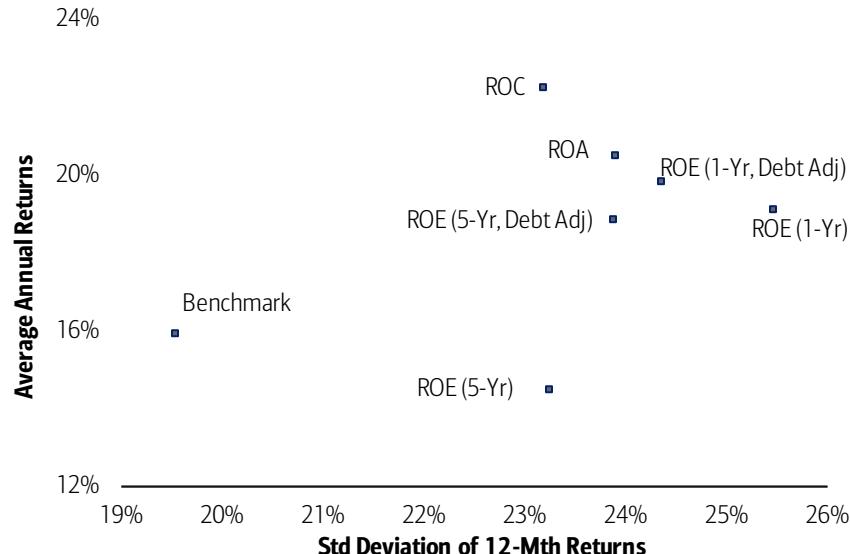
PEG Ratio outperformed the index most

**Source:** BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 480: Quality Strategies for Health Care Equipment & Services: Top Quintile Returns**(1985 to 2023)**

ROC outperformed the index most

**Source:** BofA US Equity & Quant Strategy

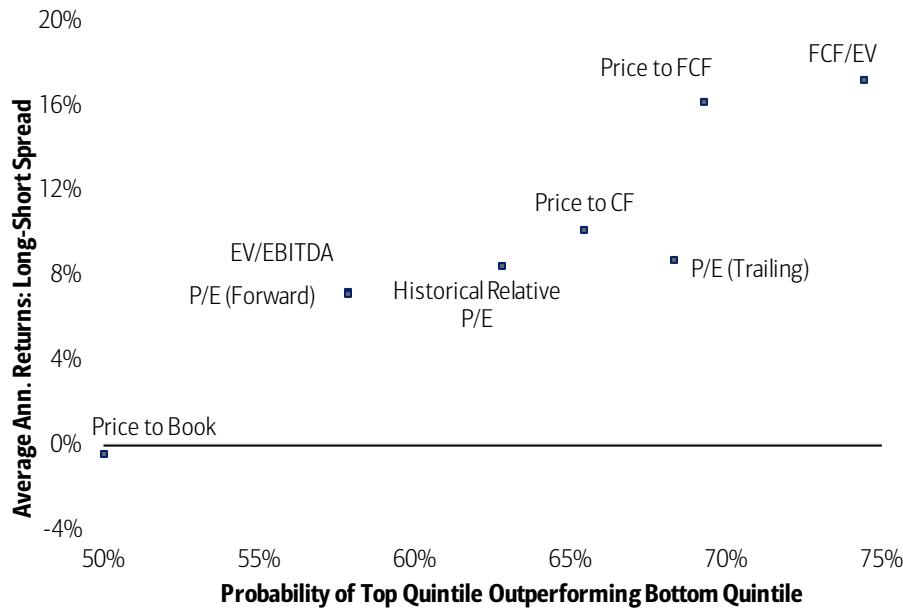
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 481: Valuation Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

FCF/EV fared best

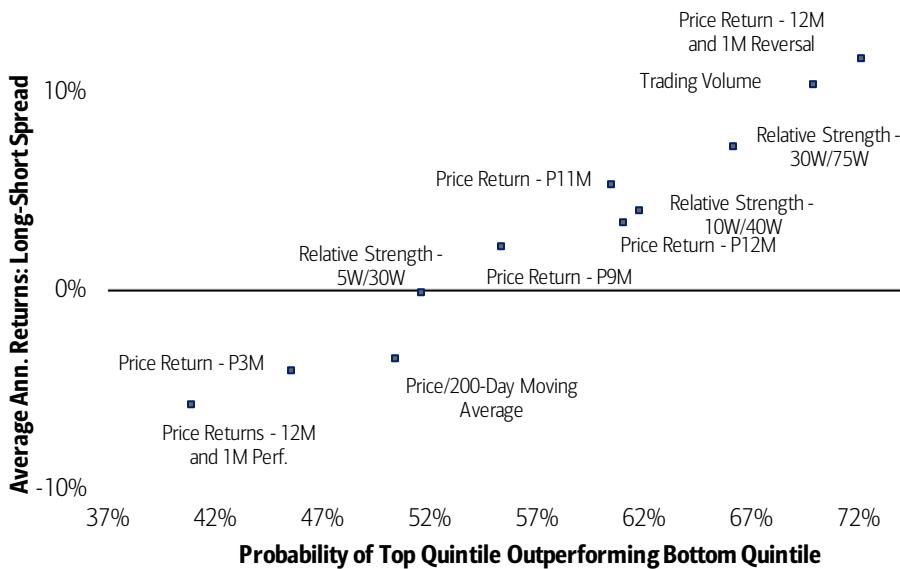


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 482: Momentum Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversal fared best



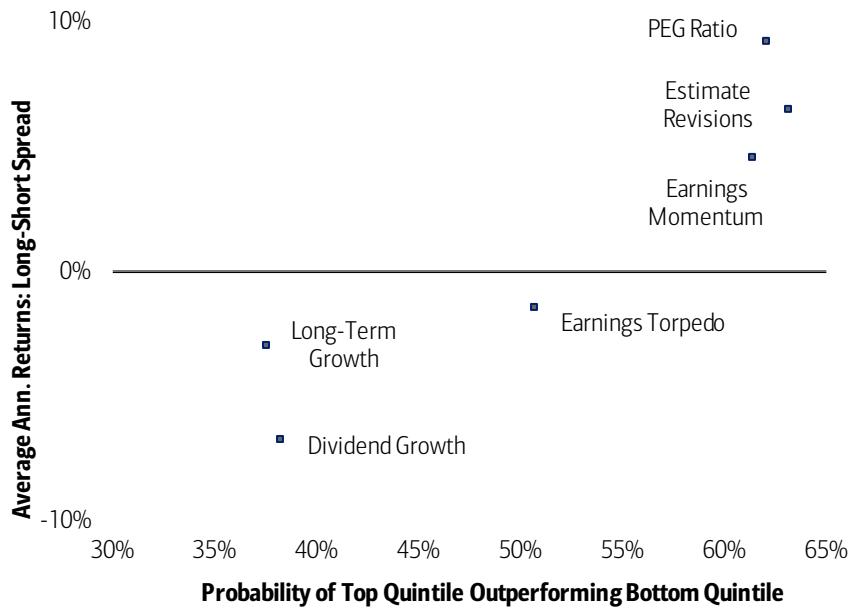
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 483: Growth Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

PEG Ratio fared best

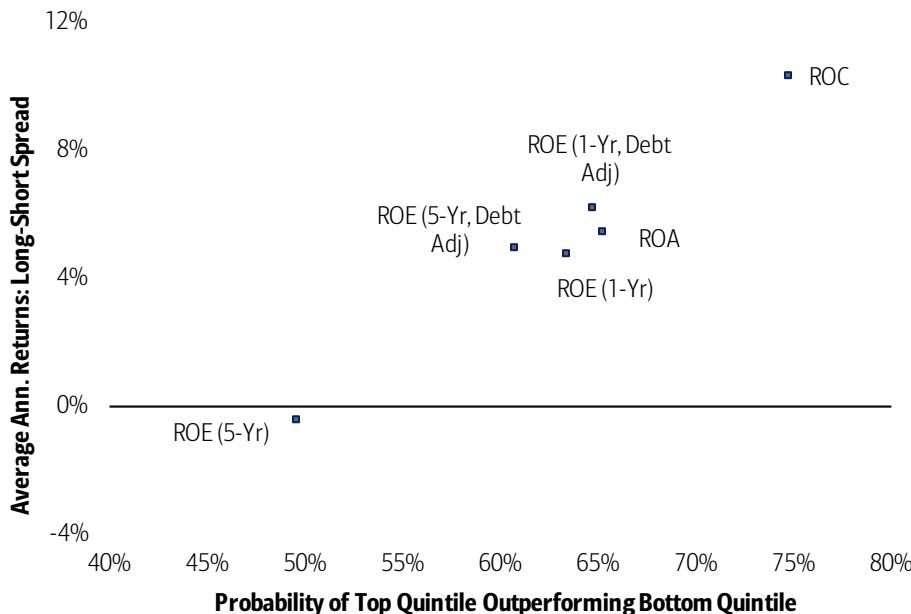


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 484: Quality Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

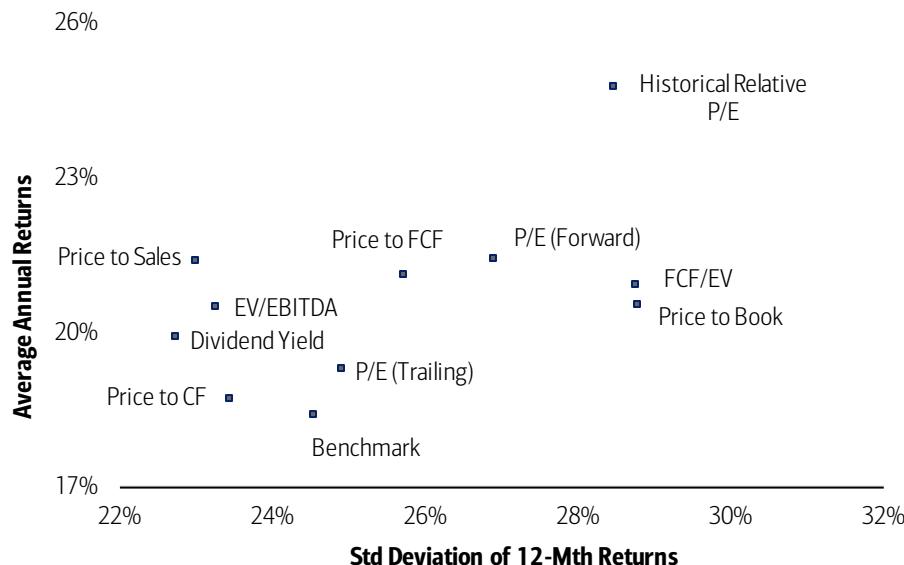


Health Care: Pharmaceuticals Biotechnology & Life Sciences

Long only: Top Quintile Performance

Exhibit 485: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2023)

Historical Relative P/E outperformed the index most

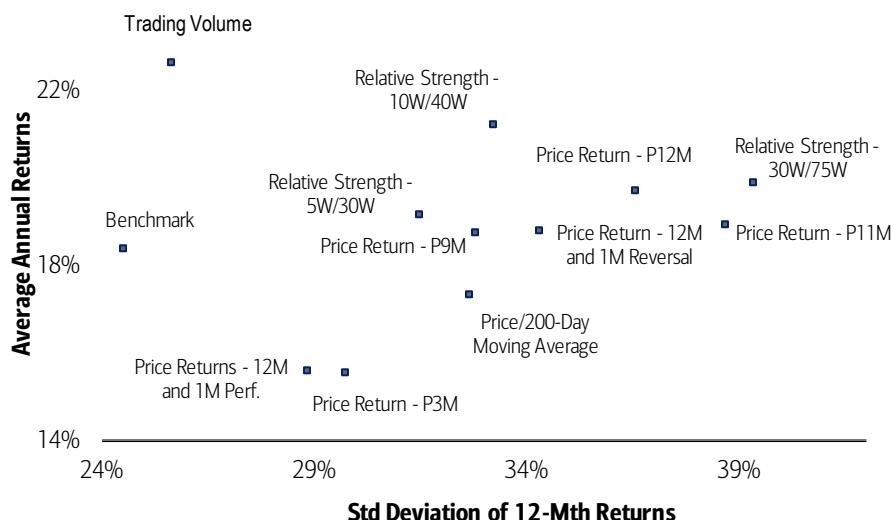


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 486: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2023)

Trading Volume and 30W/75W Relative Strength outperformed the index most

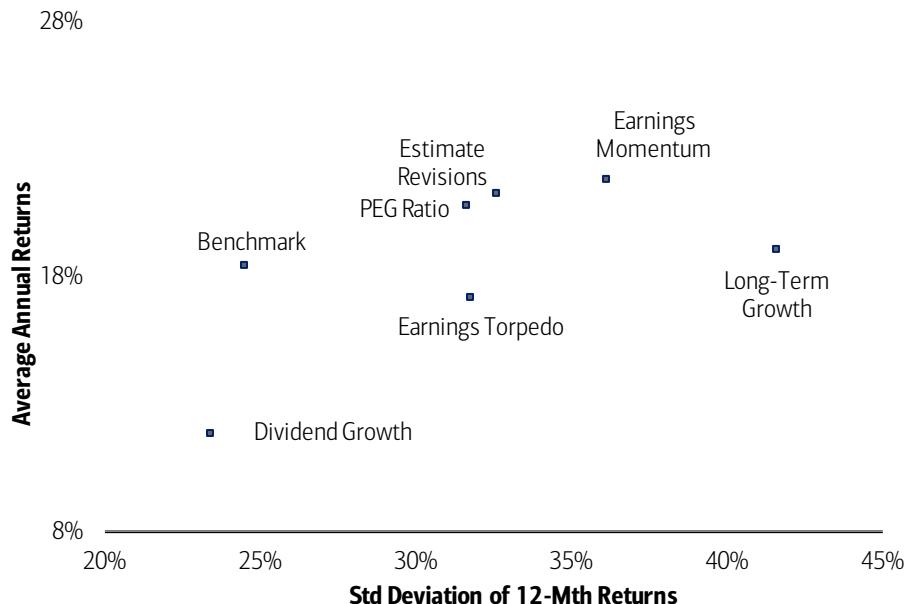


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 487: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2023)

EPS Momentum outperformed the index most

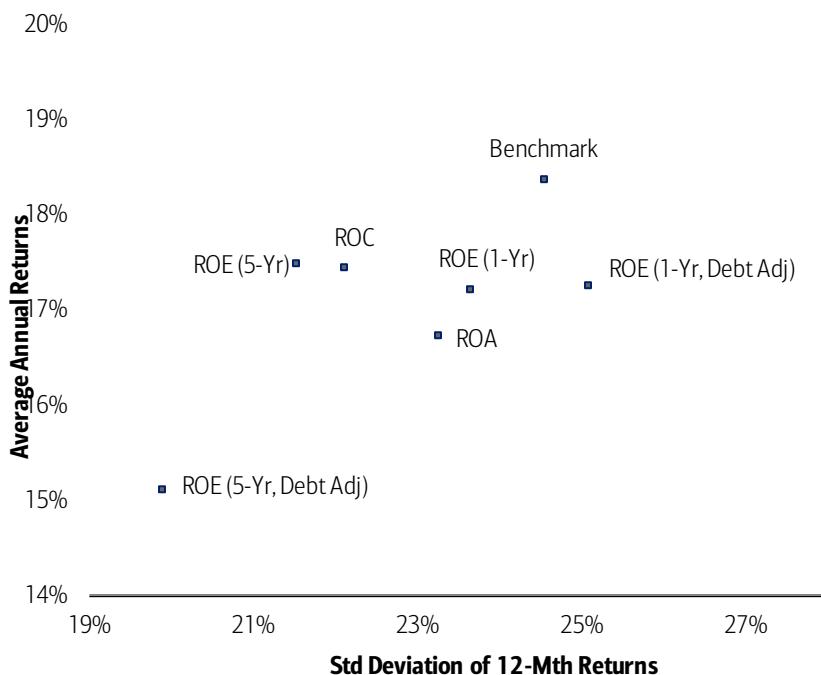


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 488: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2023)

5-y ROE underperformed the index least



Source: BofA US Equity & Quant Strategy

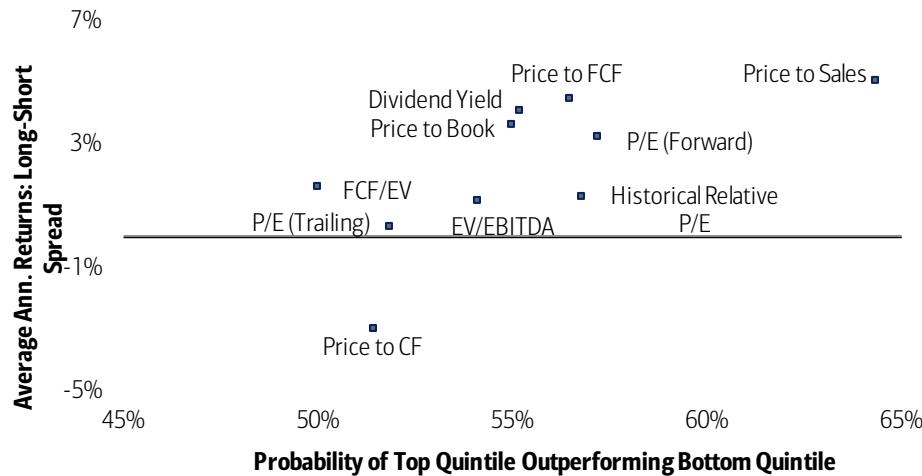
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 489: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to Sales fared best

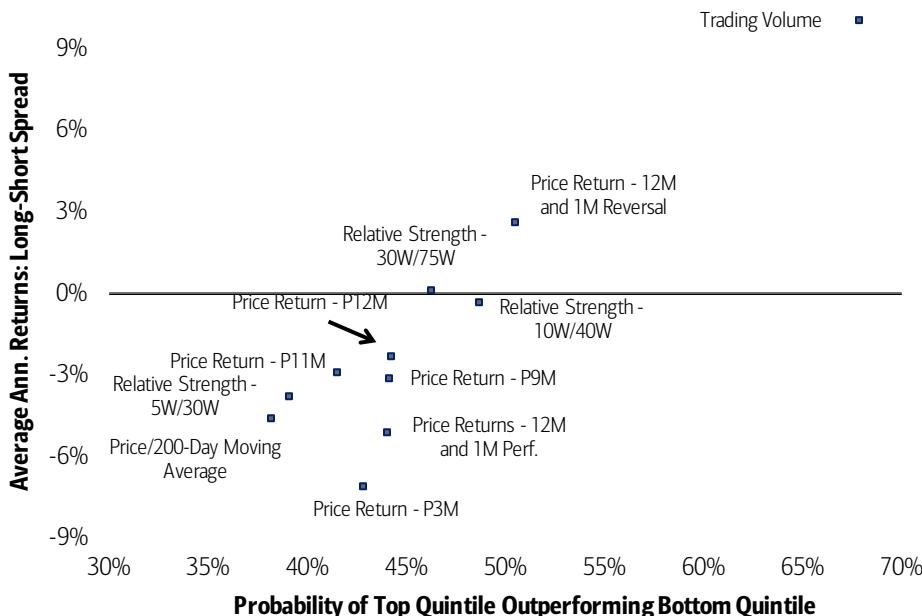


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 490: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Trading Volume and 12-m + 1-m Reversal fared best



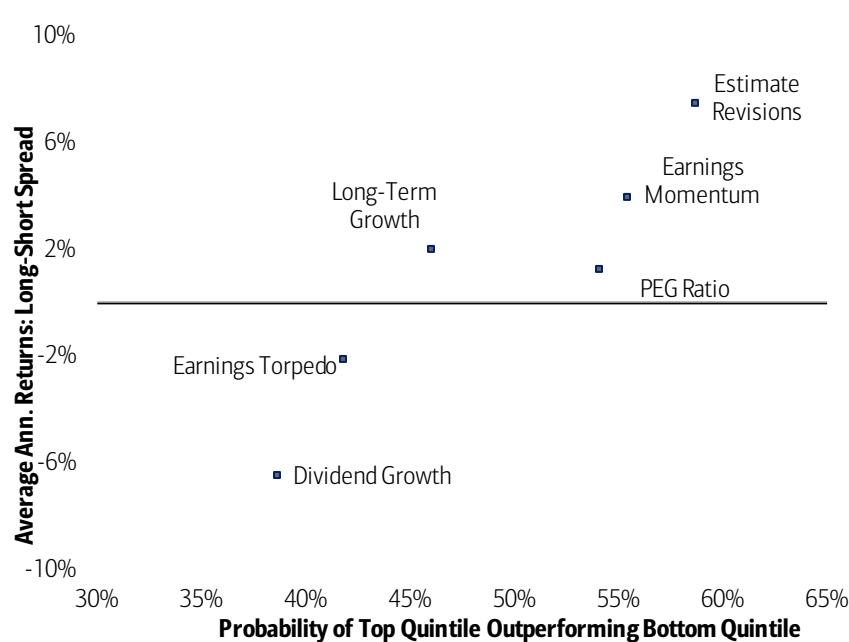
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 491: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

EPS Revisions fared best

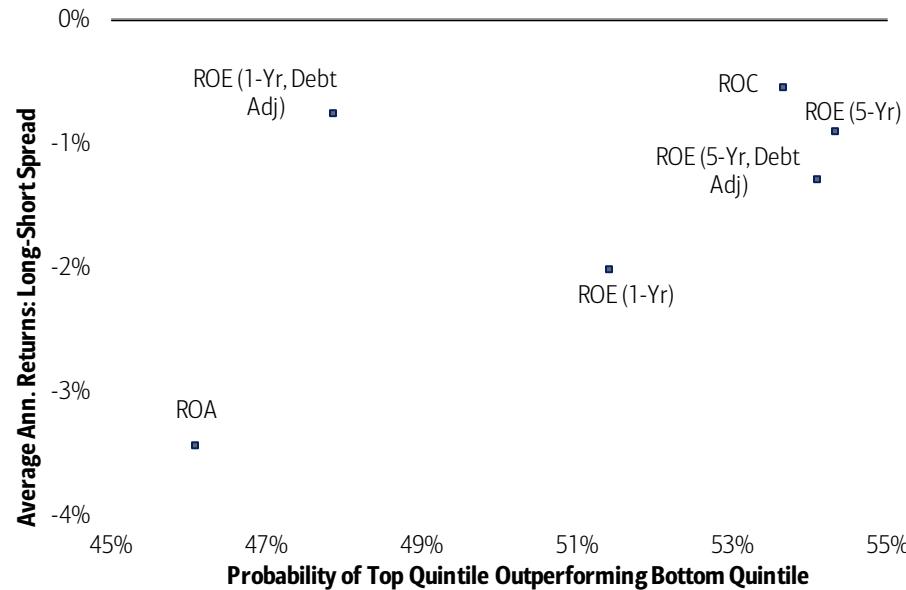


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 492: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

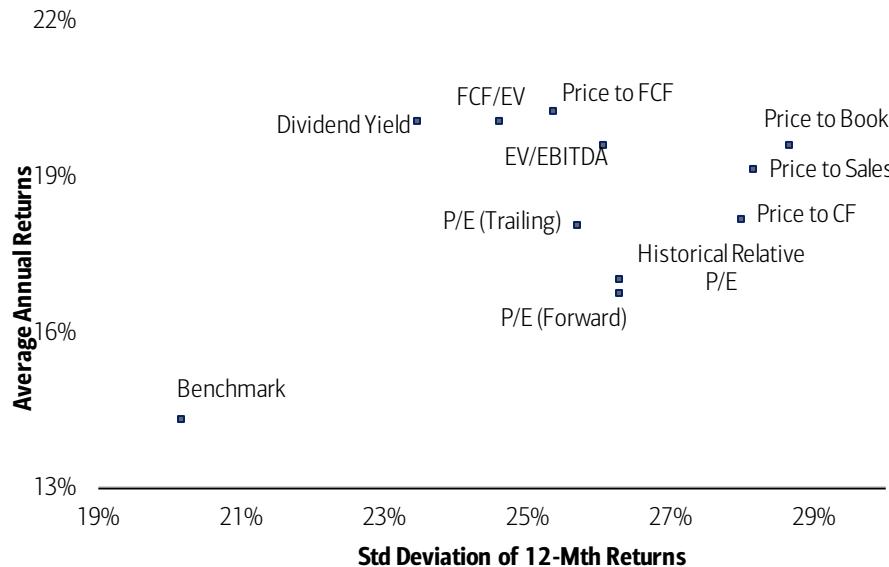


Industrials: Capital Goods

Long only: Top Quintile Performance

Exhibit 493: Valuation Strategies for Capital Goods: Top Quintile Returns (1985 to 2023)

Price to FCF outperformed the index most

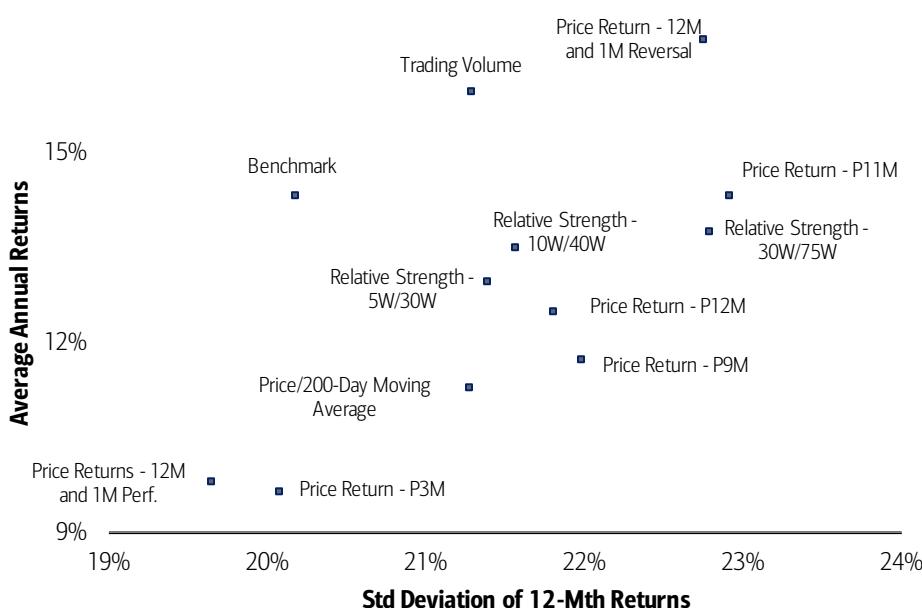


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 494: Momentum Strategies for Capital Goods: Top Quintile Returns (1985 to 2023)

12-mth and 1-mth Reversals outperformed the index most

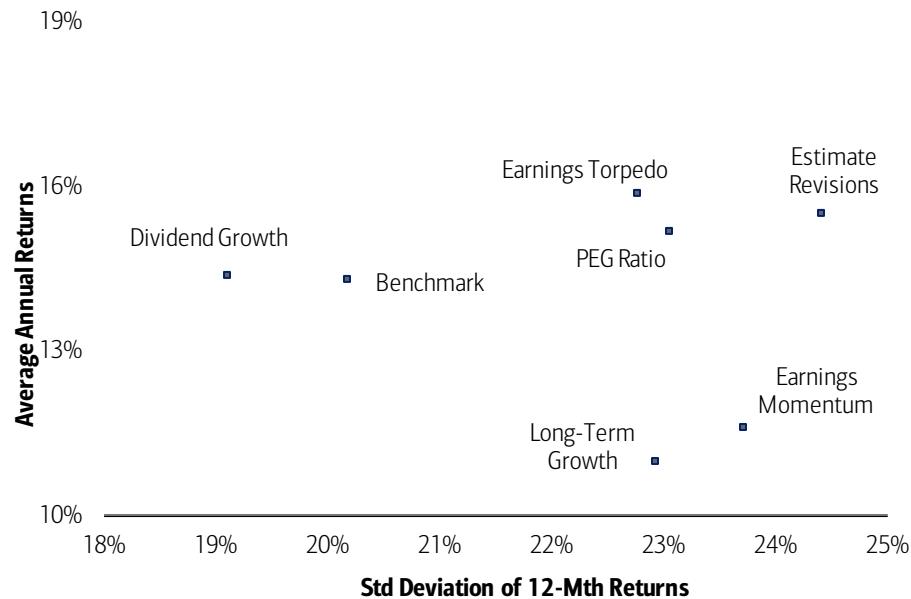


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 495: Growth Strategies for Capital Goods: Top Quintile Returns (1985 to 2023)

EPS Torpedo outperformed the index most

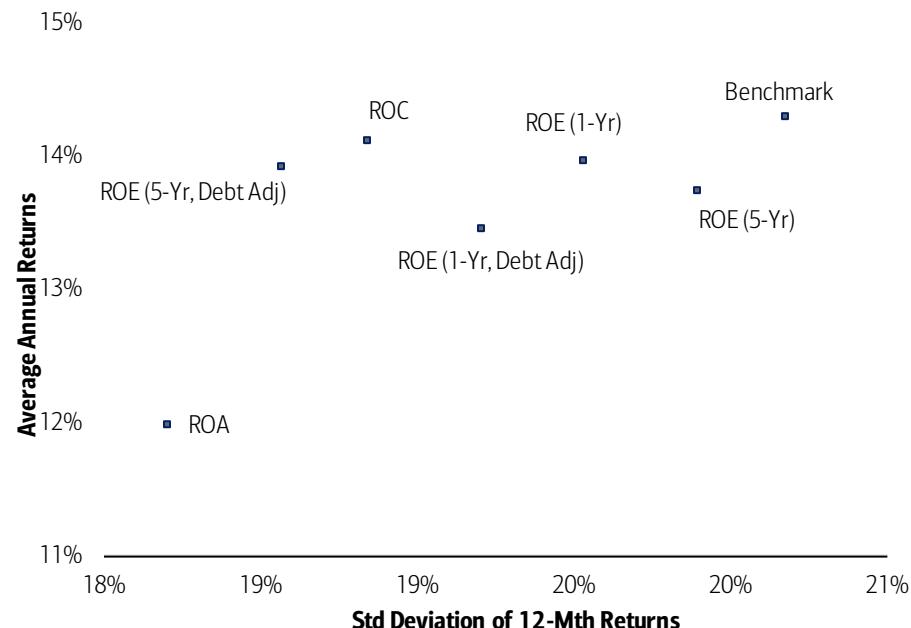


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 496: Quality Strategies for Capital Goods: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

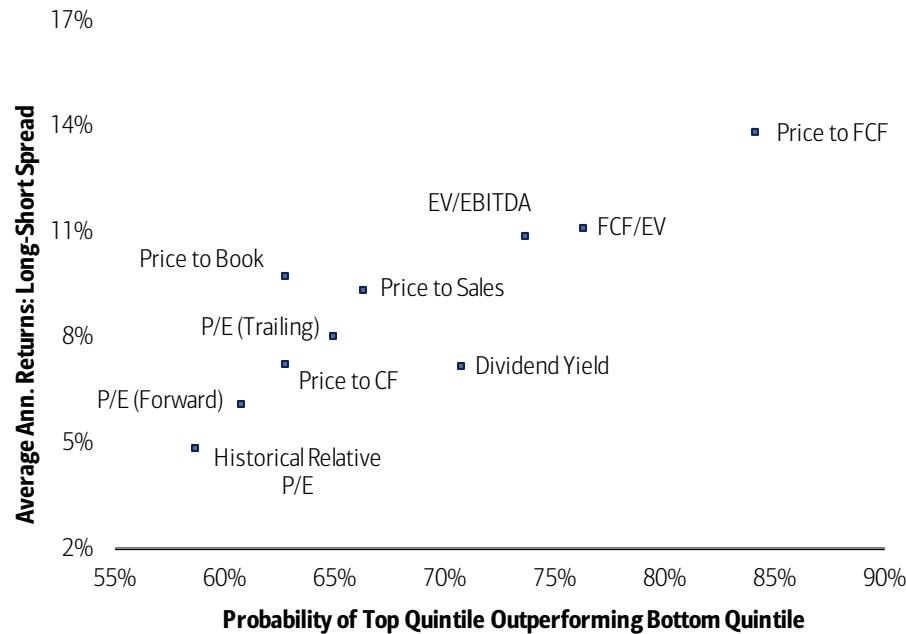
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 497: Valuation Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to FCF fared best

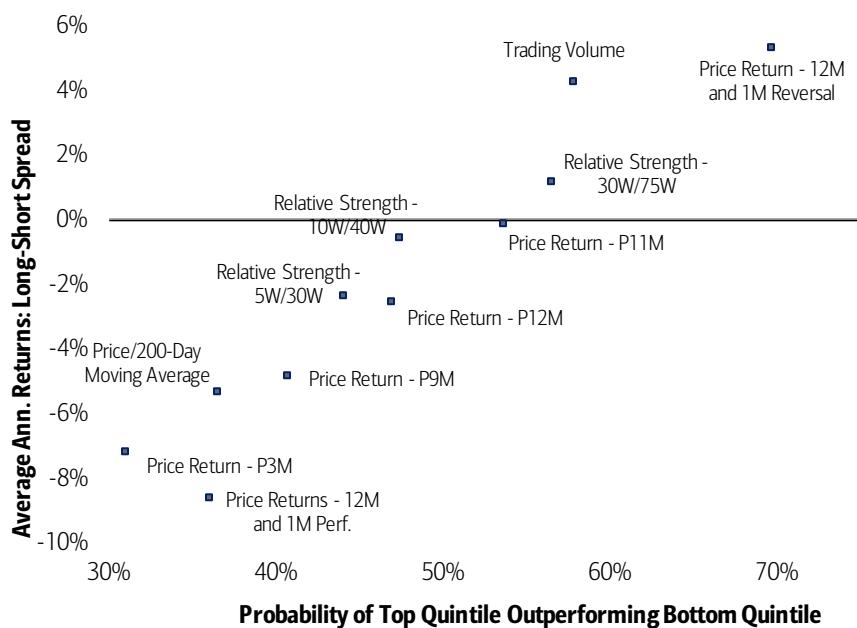


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 498: Momentum Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversals fared best



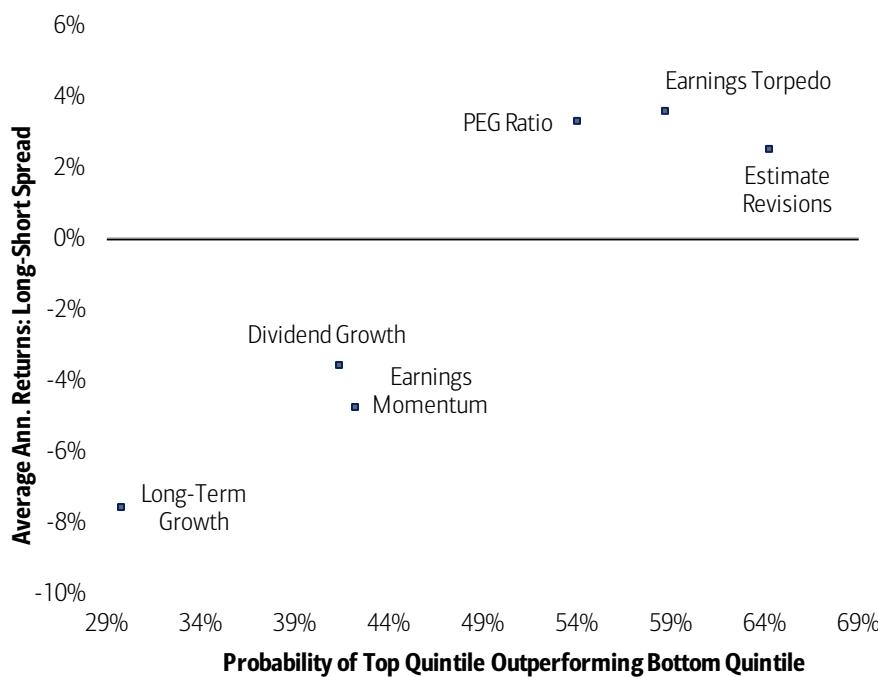
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 499: Growth Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

EPS Torpedo fared best



Source: BofA US Equity & Quant Strategy

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Exhibit 500: Quality Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

5-yr ROE fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

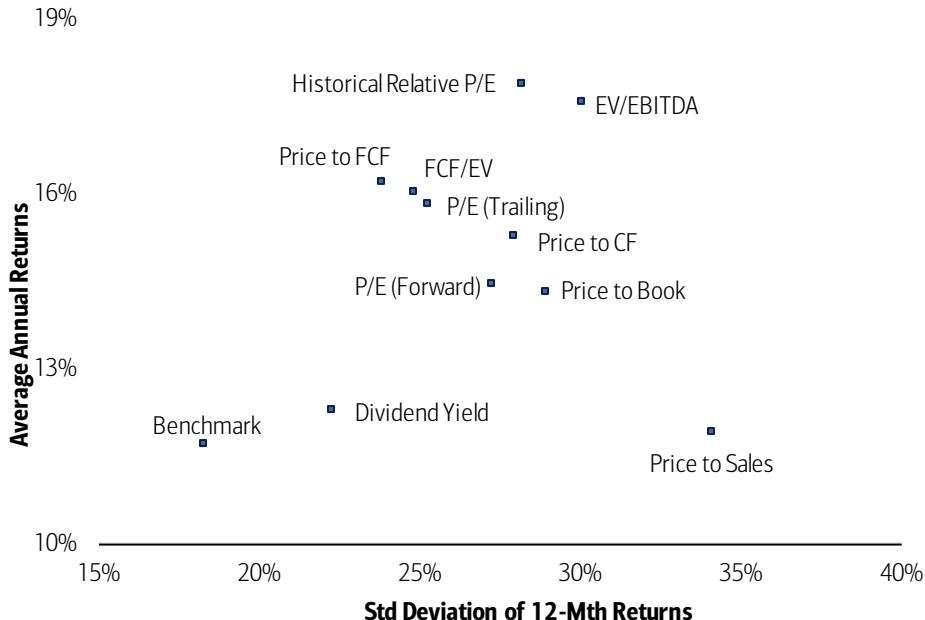


Other Industrials (Services, Transports)

Long only: Top Quintile Performance

Exhibit 501: Valuation Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2023)

Historical Relative P/E outperformed the index most

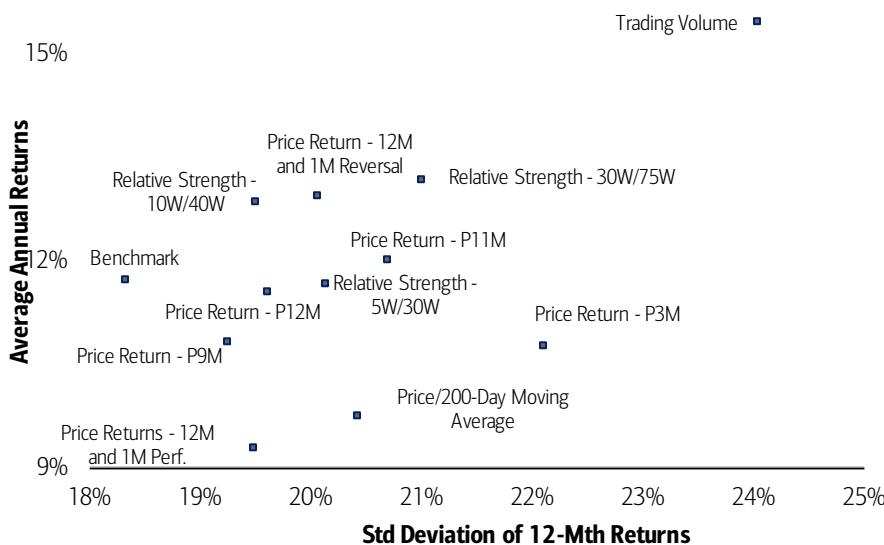


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 502: Momentum Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2023)

Trading Volume outperformed the index most



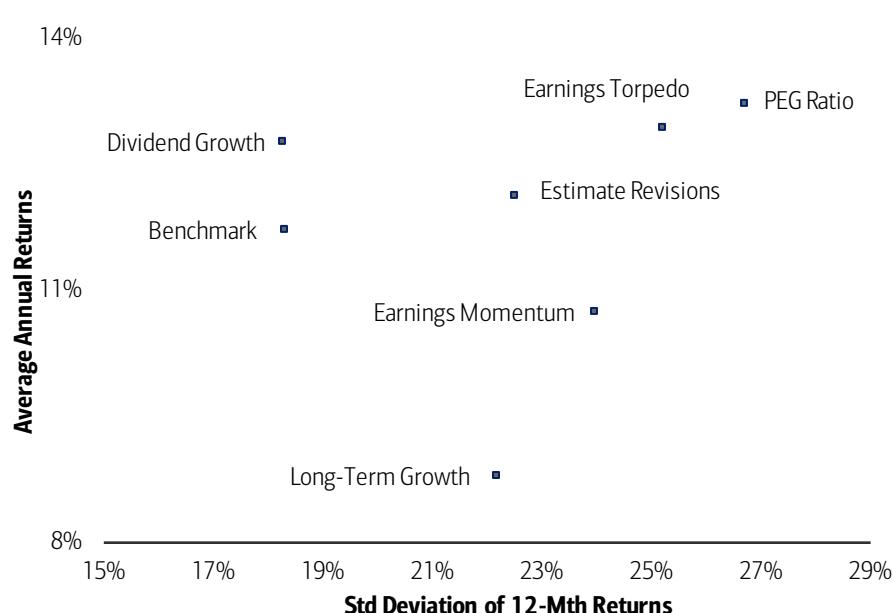
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 503: Growth Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2023)

PEG Ratio and Dividend Growth outperformed the index most

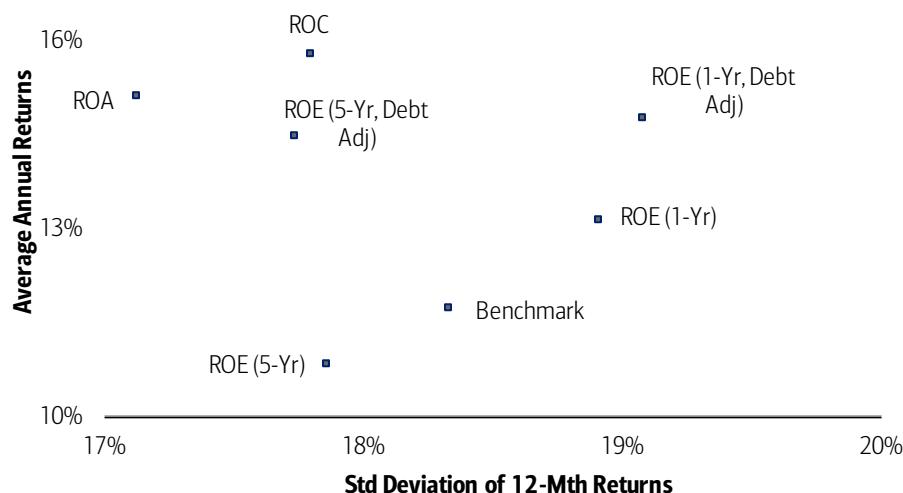


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 504: Quality Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

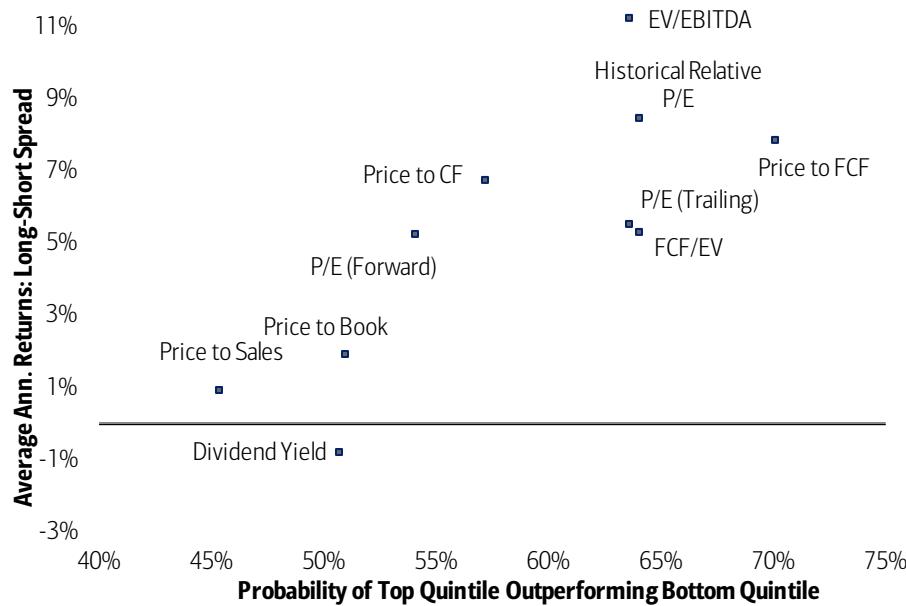
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 505: Valuation Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

EV/EBITDA fared best

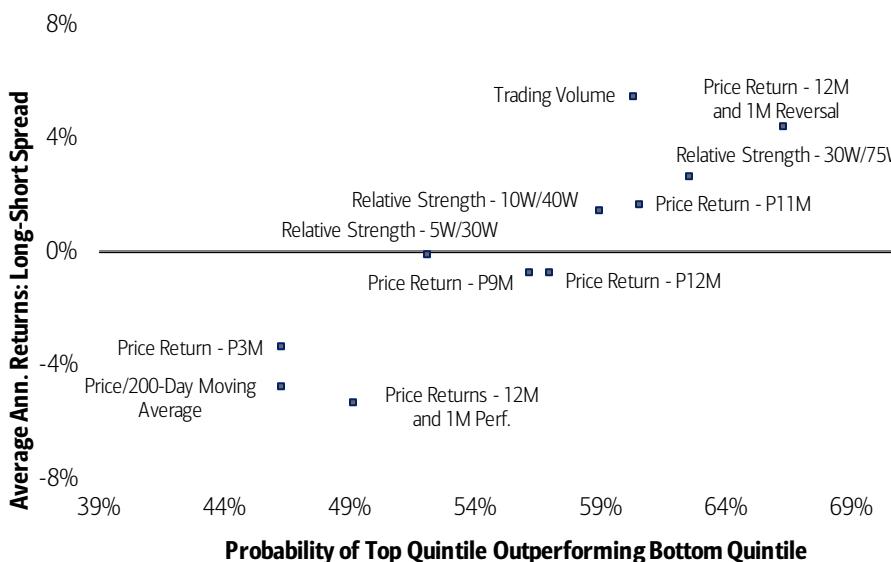


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 506: Momentum Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Trading Volume and 12-mth and 1-mth Reversal fared best



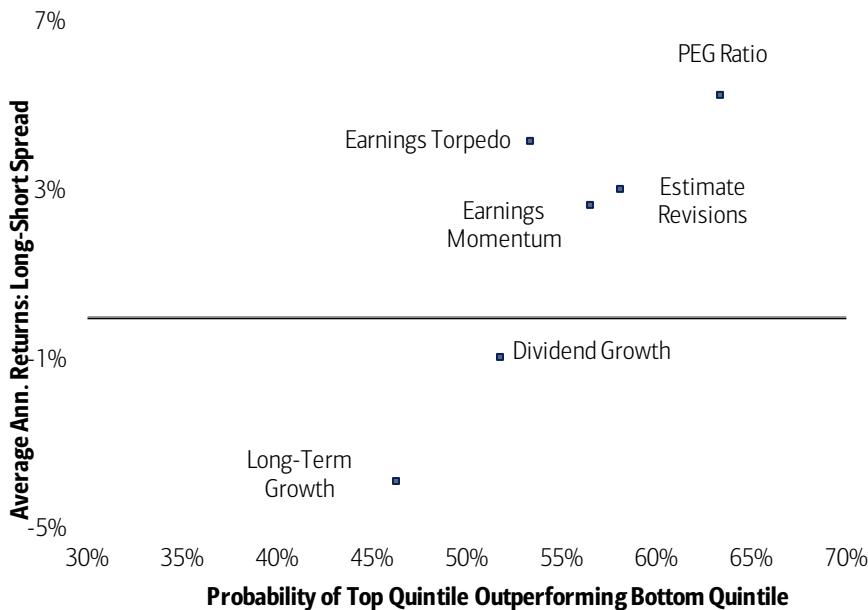
Source: BofA US Equity & Quant Strategy

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Exhibit 507: Growth Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

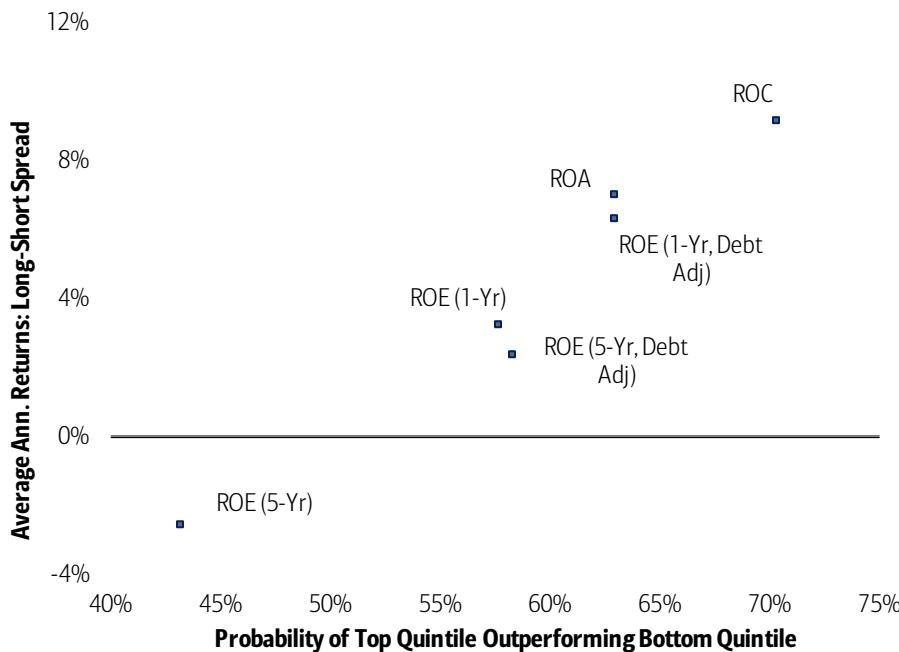
PEG Ratio fared best



Source: BofA US Equity & Quant Strategy

Exhibit 508: Quality Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



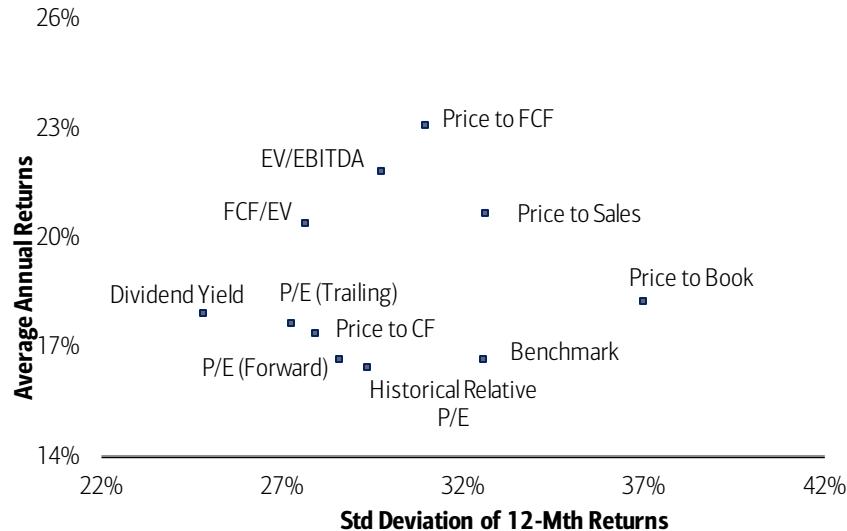
Source: BofA US Equity & Quant Strategy

Information Technology

Long only: Top Quintile Performance

Exhibit 509: Valuation Strategies for Information Technology: Top Quintile Returns (1985 to 2023)

Price to FCF outperformed the index most

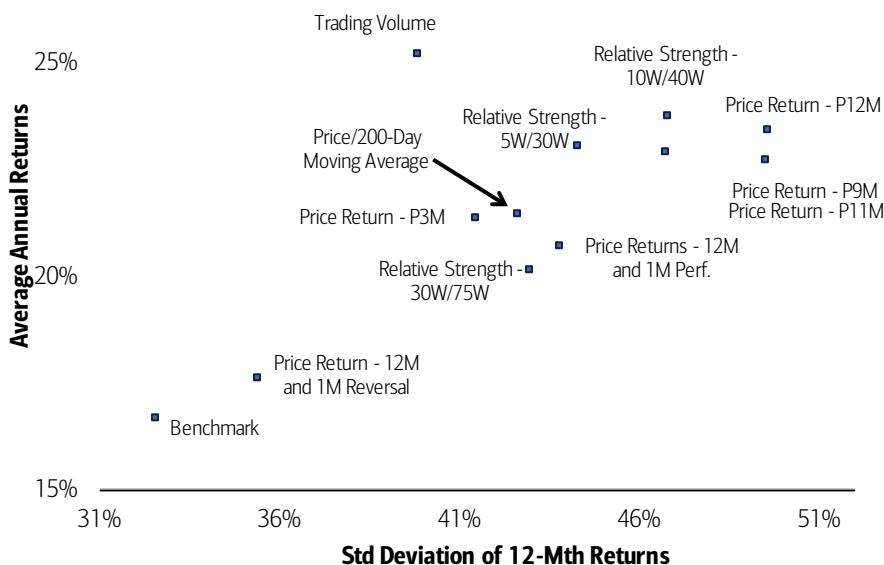


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 510: Momentum Strategies for Information Technology: Top Quintile Returns (1985 to 2023)

Trading Volume outperformed the index most

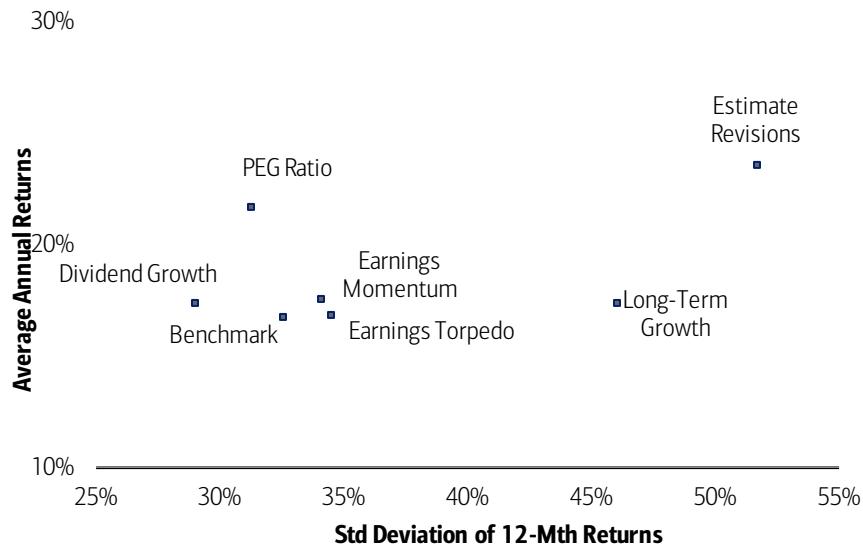


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 511: Growth Strategies for Information Technology: Top Quintile Returns (1985 to 2023)

EPS Revisions outperformed the index most

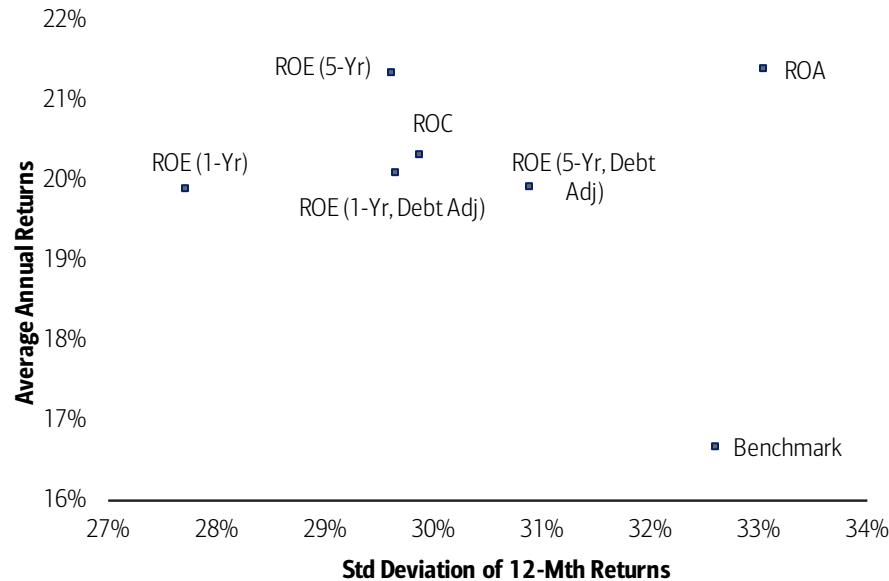


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 512: Quality Strategies for Information Technology: Top Quintile Returns (1985 to 2023)

ROA outperformed the index most



Source: BofA US Equity & Quant Strategy

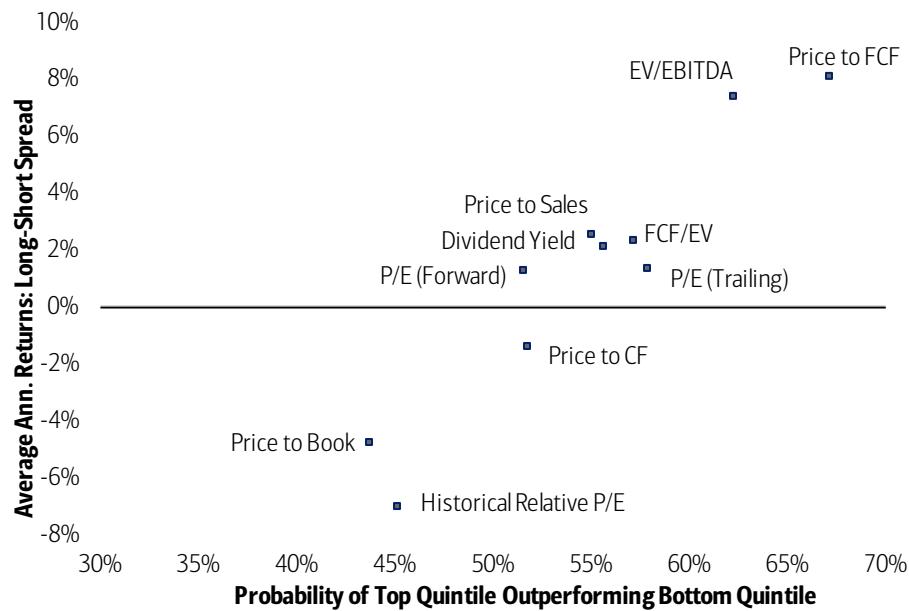
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 513: Valuation Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to FCF fared best

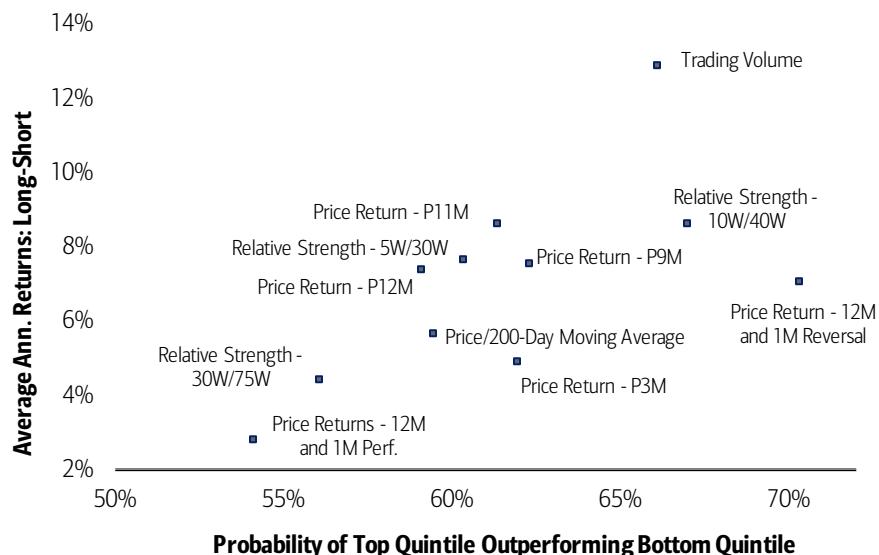


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 514: Momentum Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

High Trading Volume fared best

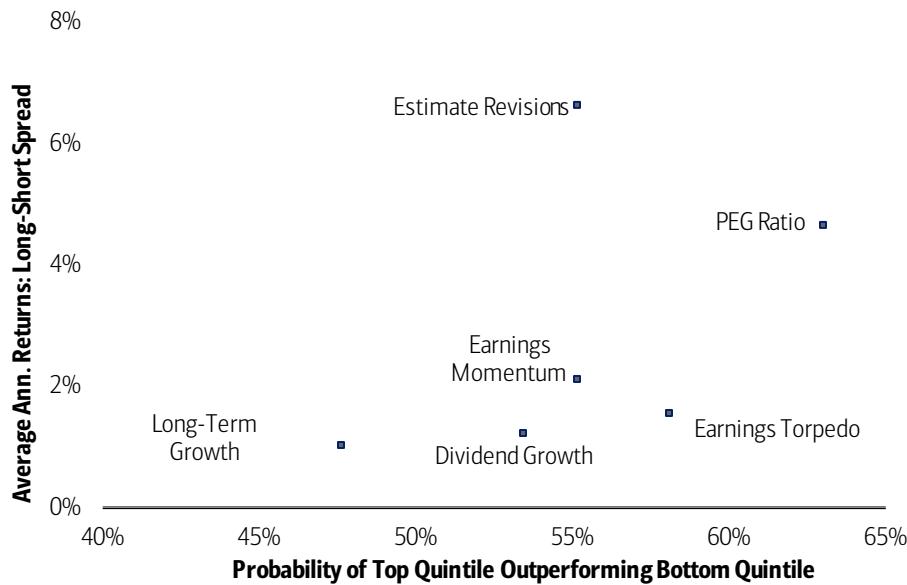


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 515: Growth Strategies for Information Technology: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

EPS Estimate Revisions fared best

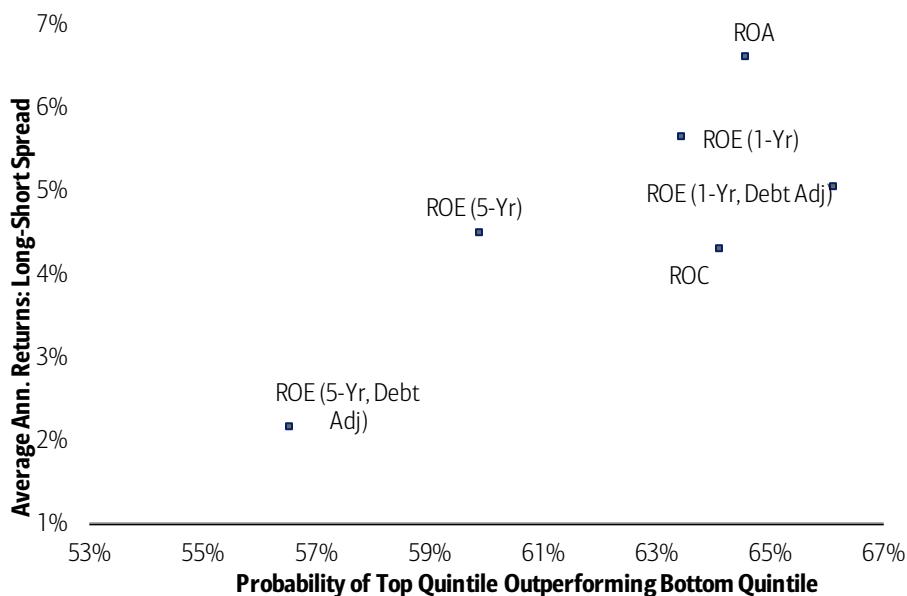


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 516: Quality Strategies for Information Technology: Avg Long-Short Spreads vs.**Consistency of Spreads (1985 to 2023)**

ROA fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

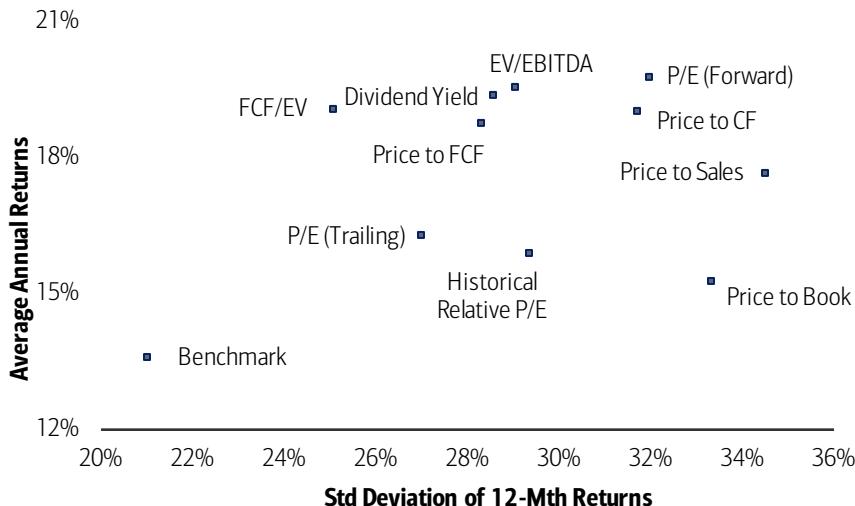


Materials

Long only: Top Quintile Performance

Exhibit 517: Valuation Strategies for Materials: Top Quintile Returns (1985 to 2023)

Forward P/E outperformed the index most

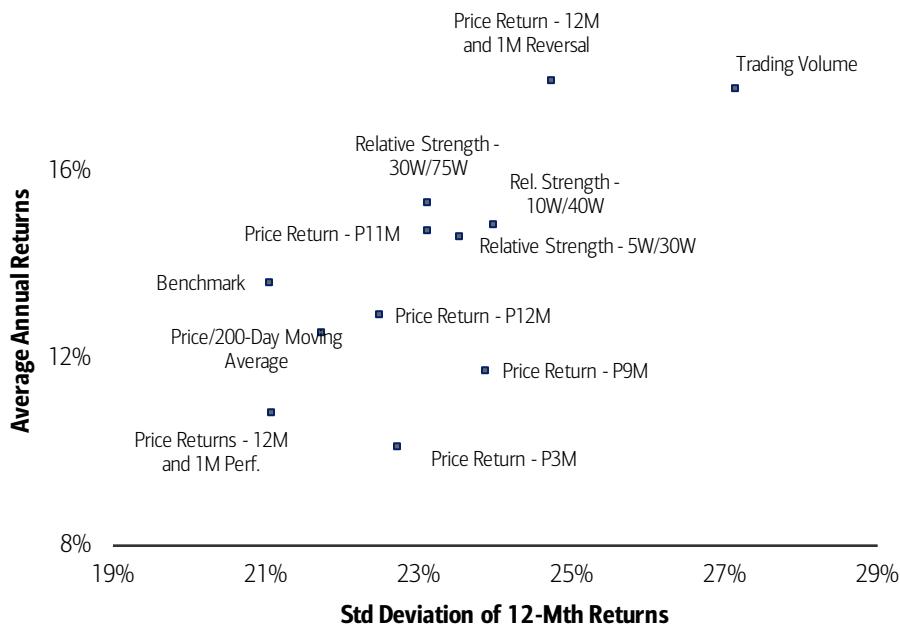


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 518: Momentum Strategies for Materials: Top Quintile Returns (1985 to 2023)

12-mth and 1-mth Reversal outperformed the index most



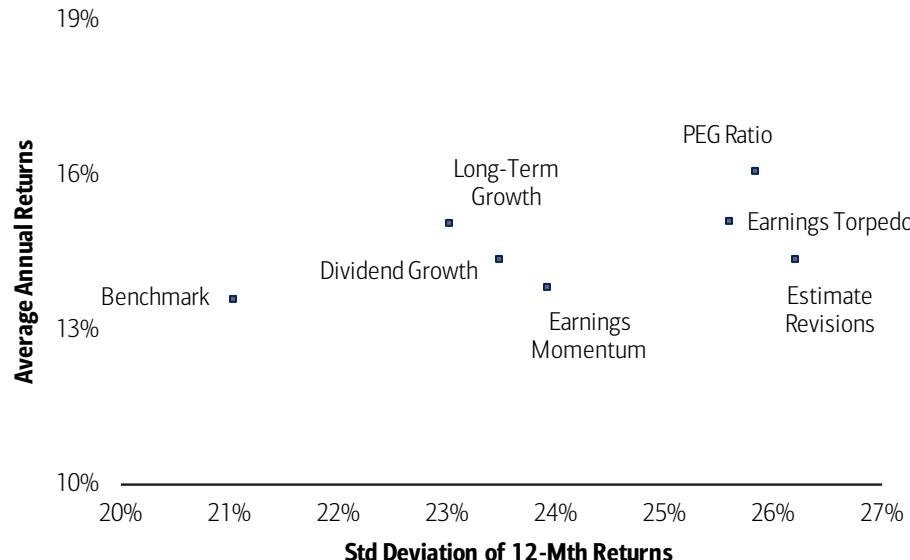
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 519: Growth Strategies for Materials: Top Quintile Returns (1985 to 2023)

PEG Ratio outperformed the index most

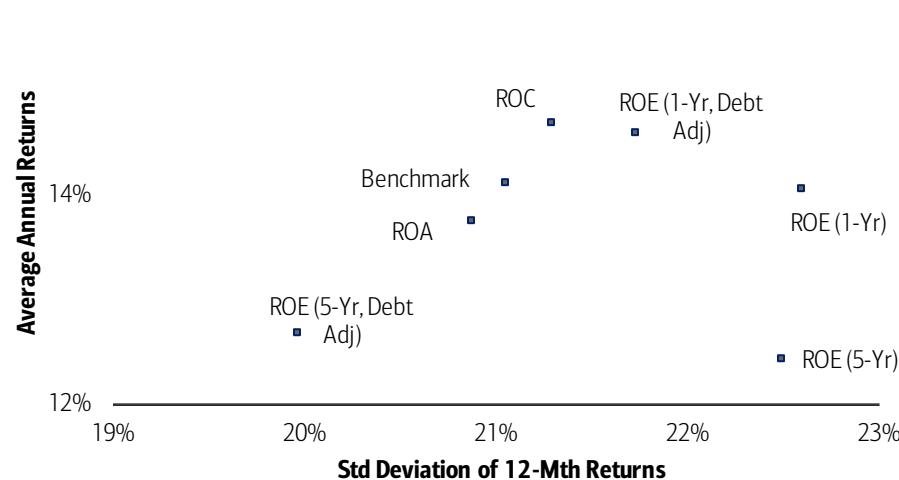


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 520: Quality Strategies for Materials: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

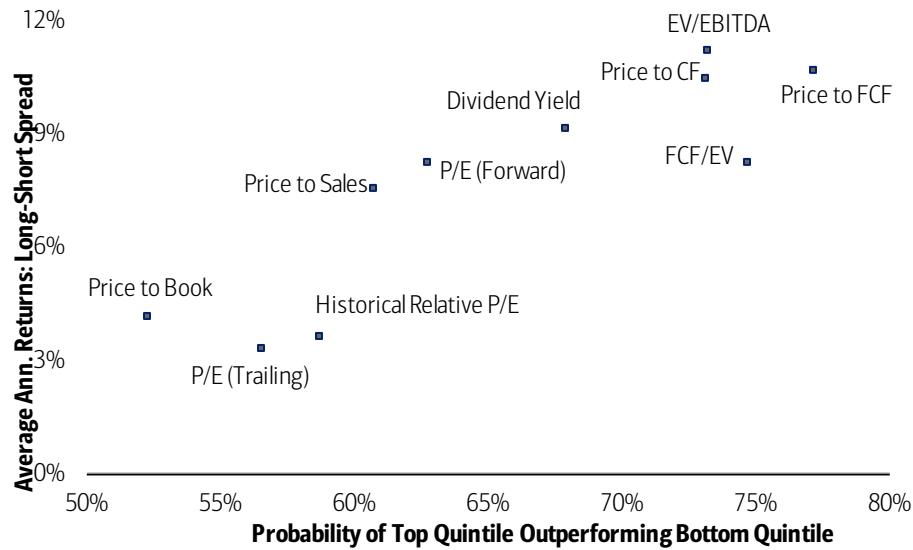
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 521: Valuation Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

EV/EBITDA outperformed the index most

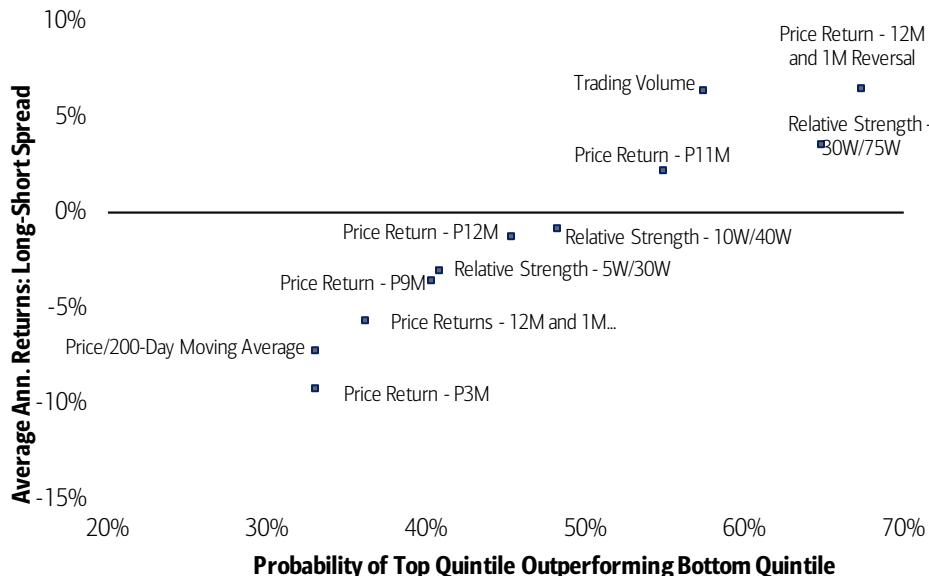


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 522: Momentum Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversal outperformed the index most



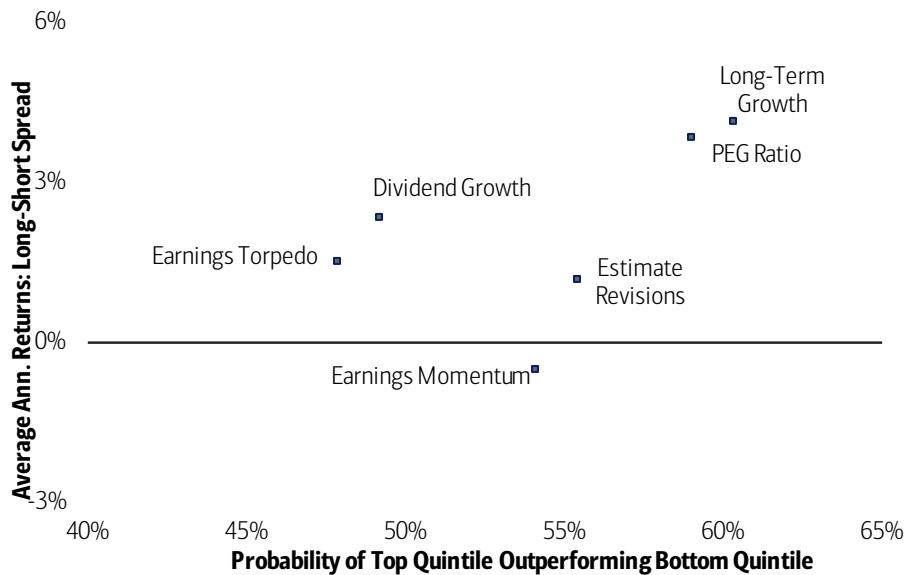
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 523: Growth Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

PEG Ratio and Long-Term Growth outperformed the index most

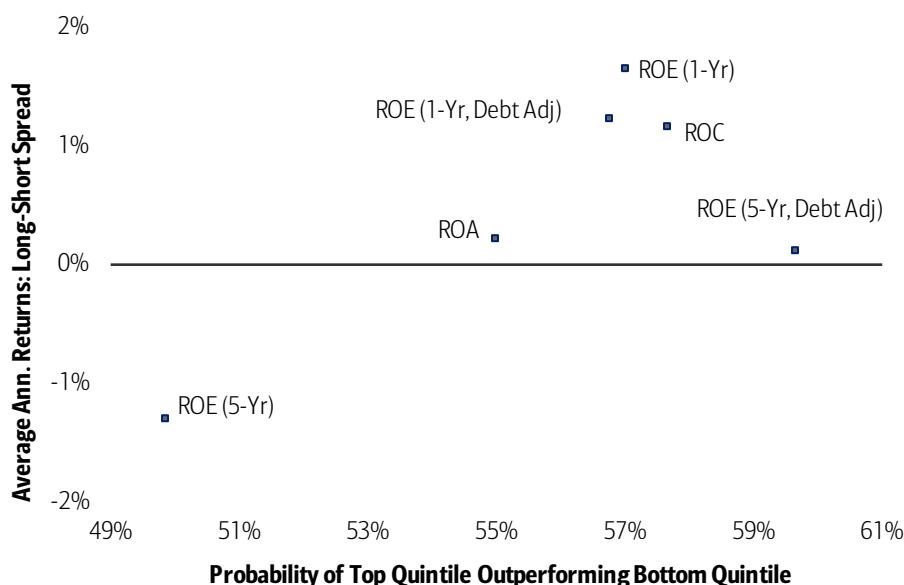


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 524: Quality Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

1-yr. ROE outperformed the index most



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

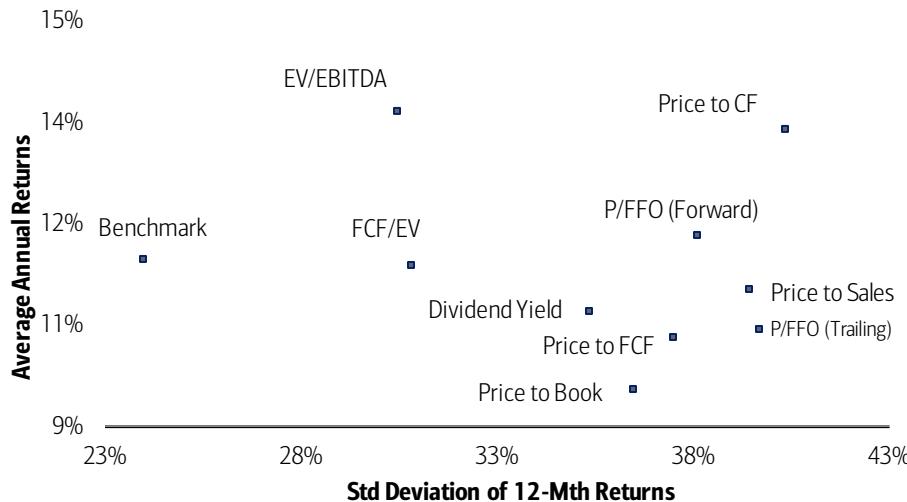


Real Estate

Long only: Top Quintile Performance

Exhibit 525: Valuation Strategies for Real Estate Top Quintile Returns (1985 to 2023)

EV/EBITDA outperformed the index most

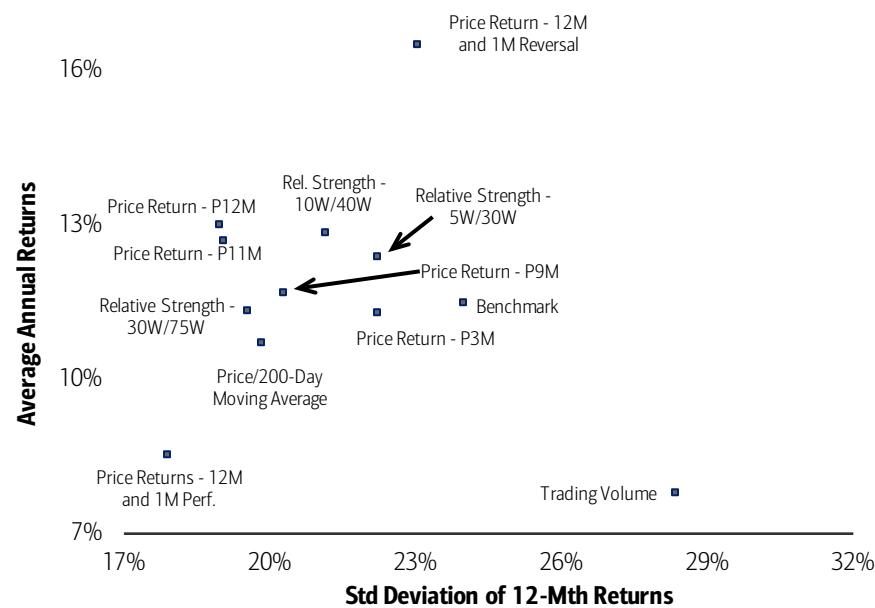


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 526: Momentum Strategies for Real Estate Top Quintile Returns (1985 to 2023)

12-mth and 1-mth Reversal outperformed the index most



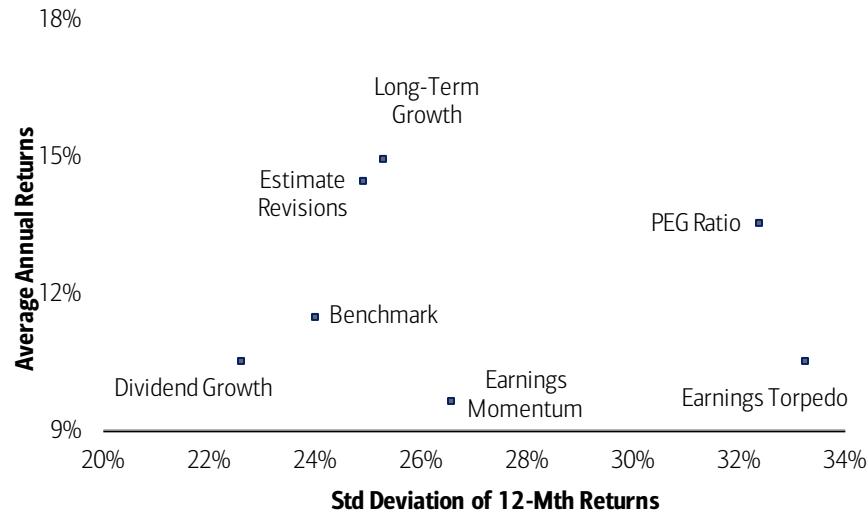
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 527: Growth Strategies for Real Estate: Top Quintile Returns (1985 to 2023)

Long-Term Growth outperformed the index most

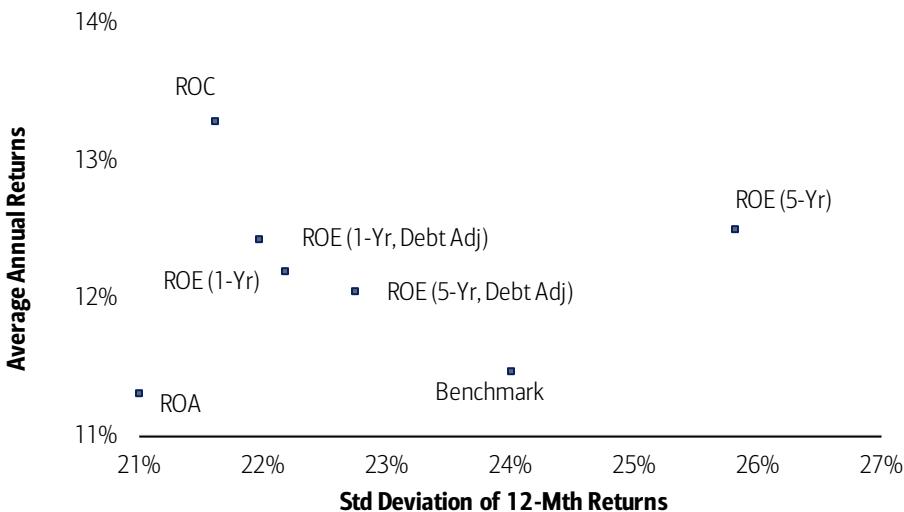


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 528: Quality Strategies for Real Estate: Top Quintile Returns (1985 to 2023)

ROC outperformed the index most



Source: BofA US Equity & Quant Strategy

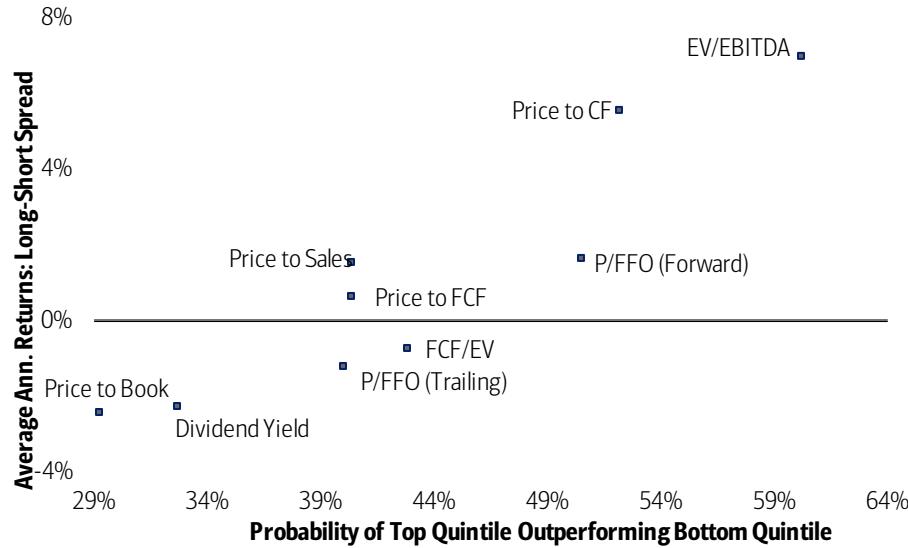
BofA GLOBAL RESEARCH



Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 529: Valuation Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price to Cash Flow and EV/EBITDA fared best

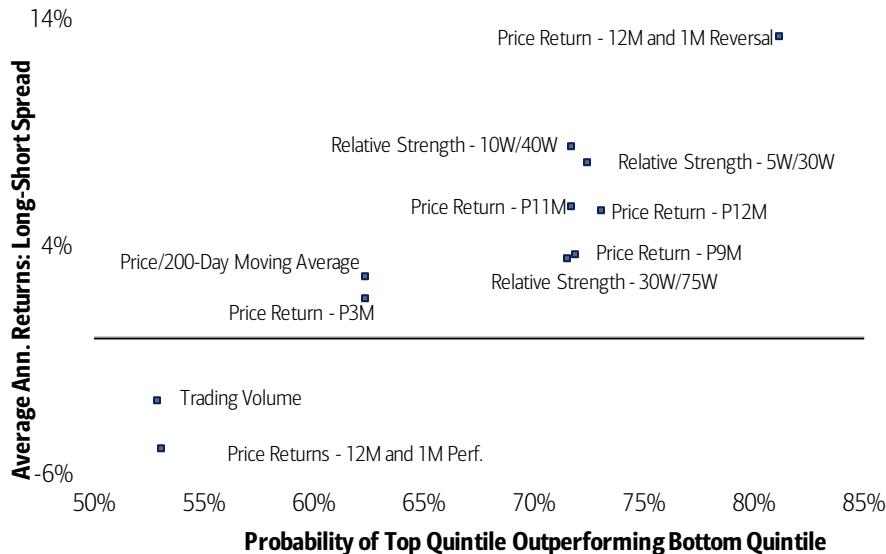


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 530: Momentum Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

12-mth and 1-mth Reversal fared best



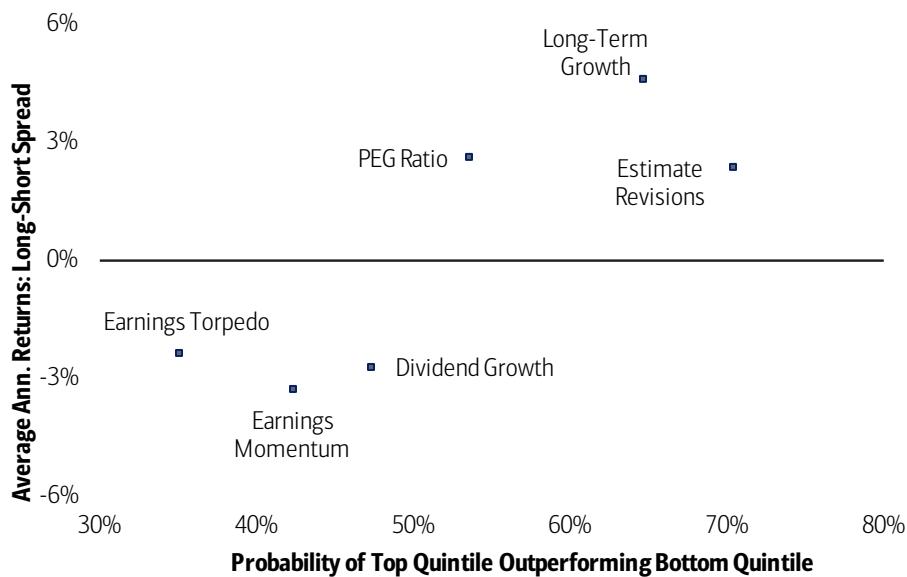
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 531: Growth Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Long Term Growth fared best

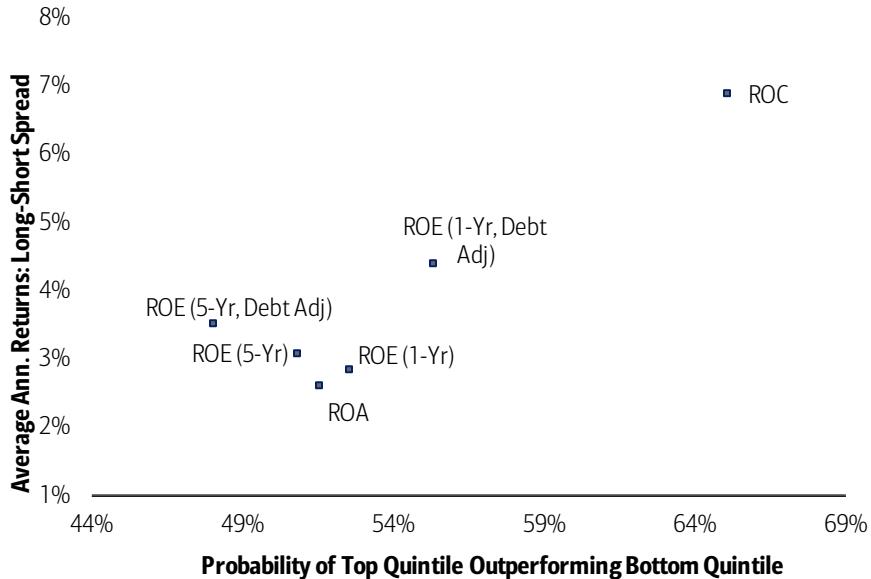


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 532: Quality Strategies for Real Estate: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

ROC fared best



Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

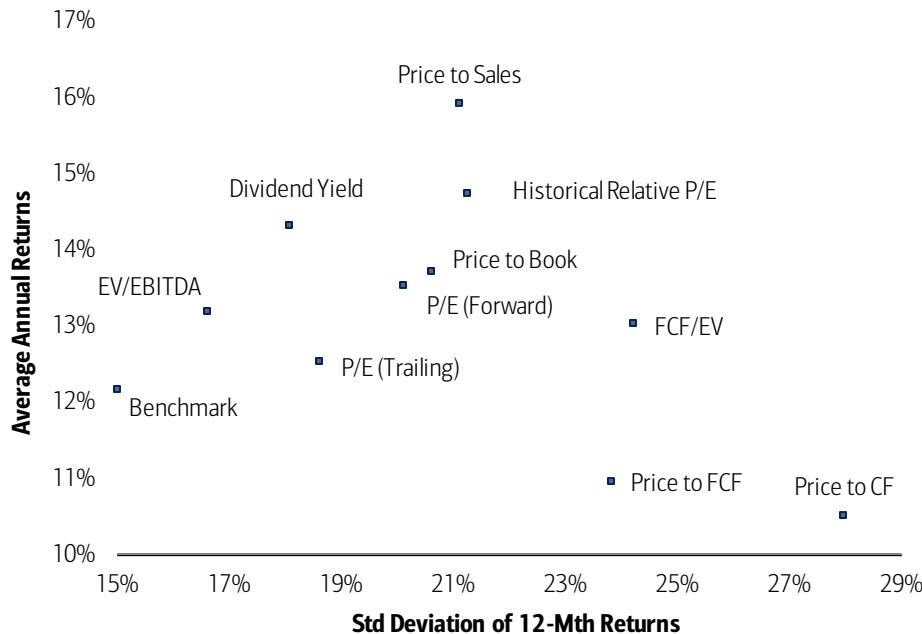


Utilities

Long only: Top Quintile Performance

Exhibit 533: Valuation Strategies for Utilities: Top Quintile Returns (1985 to 2023)

Price to Sales outperformed the index most

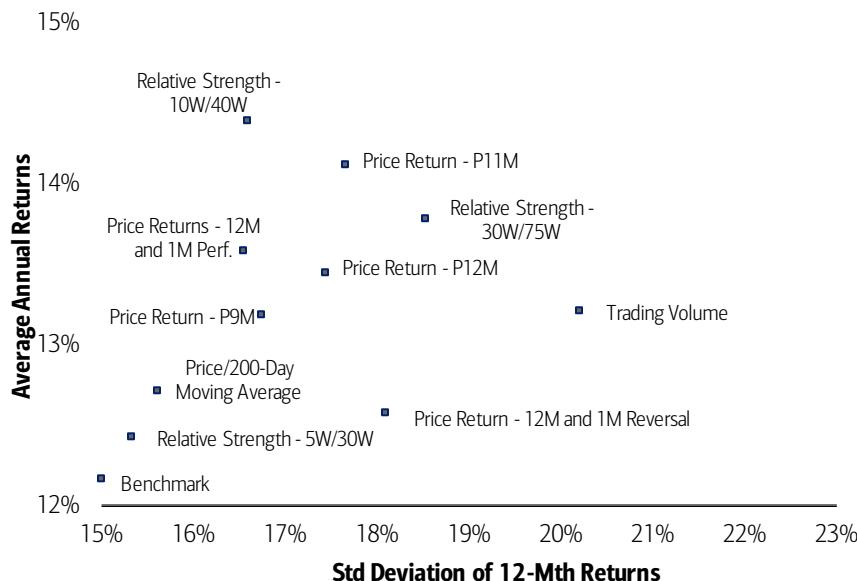


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 534: Momentum Strategies for Utilities: Top Quintile Returns (1985 to 2023)

10W/40W Relative Strength outperformed the index most

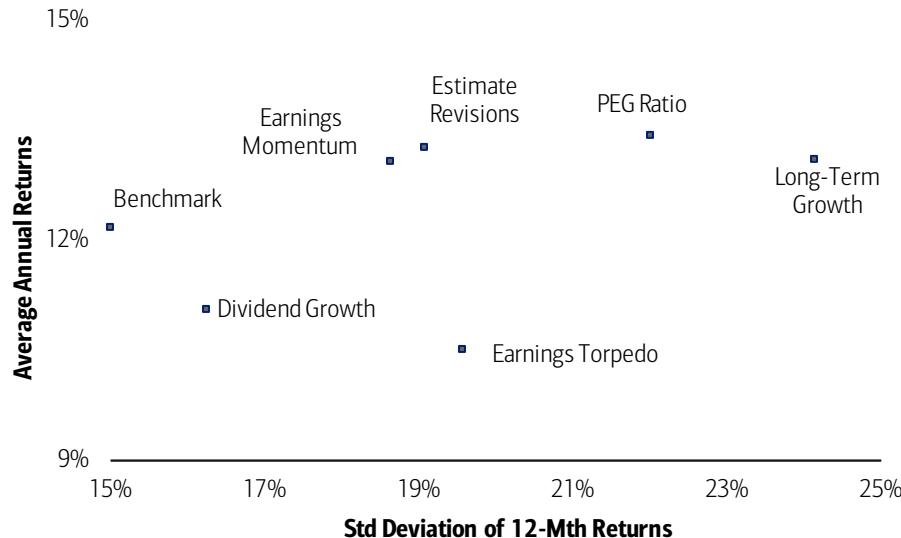


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 535: Growth Strategies for Utilities: Top Quintile Returns (1985 to 2023)

PEG Ratio outperformed the index most

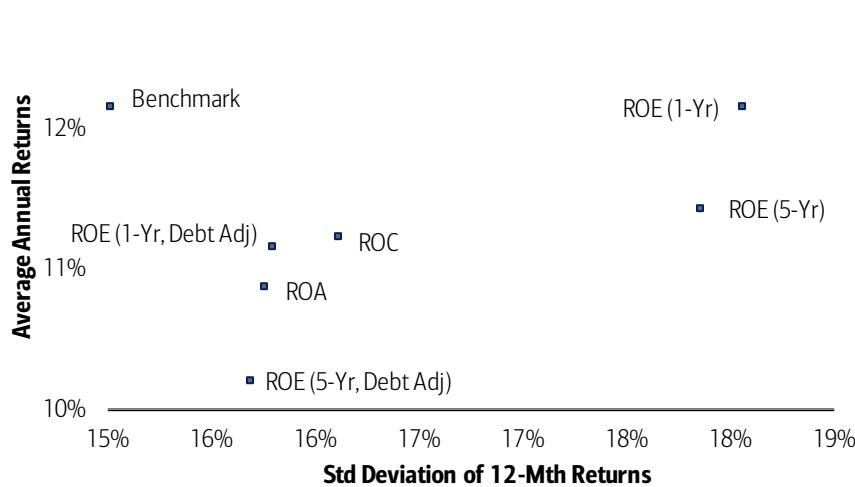


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 536: Quality Strategies for Utilities: Top Quintile Returns (1985 to 2023)

1-yr ROE outperformed the index most



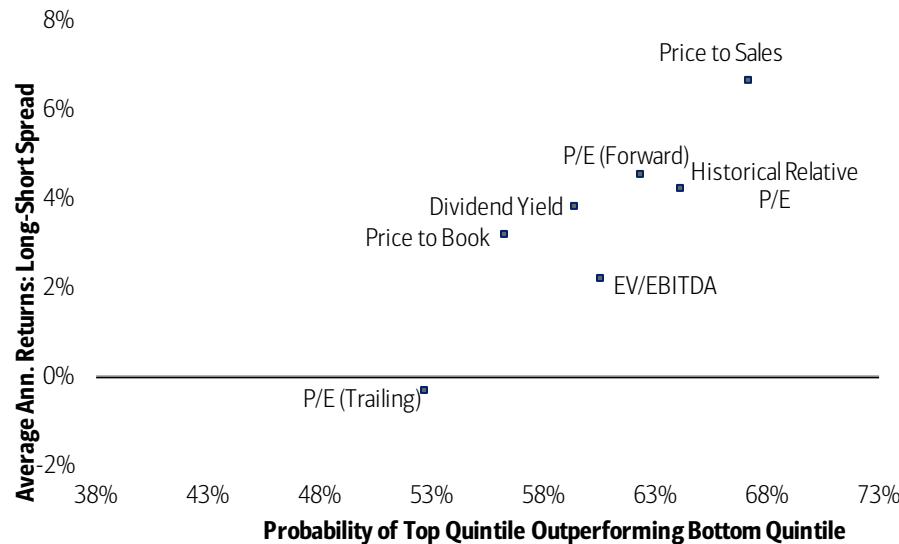
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Long-Short: Quintile 1 / Quintile 5 Spread

Exhibit 537: Valuation Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Price / Sales fared best

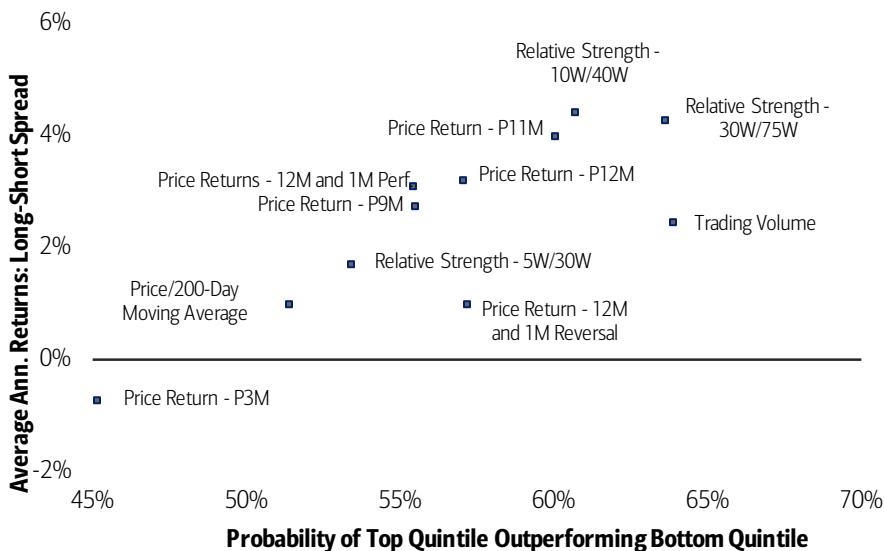


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 538: Momentum Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2023)

Relative Strength 10W/40W and 30W/75W fared best



Source: BofA US Equity & Quant Strategy

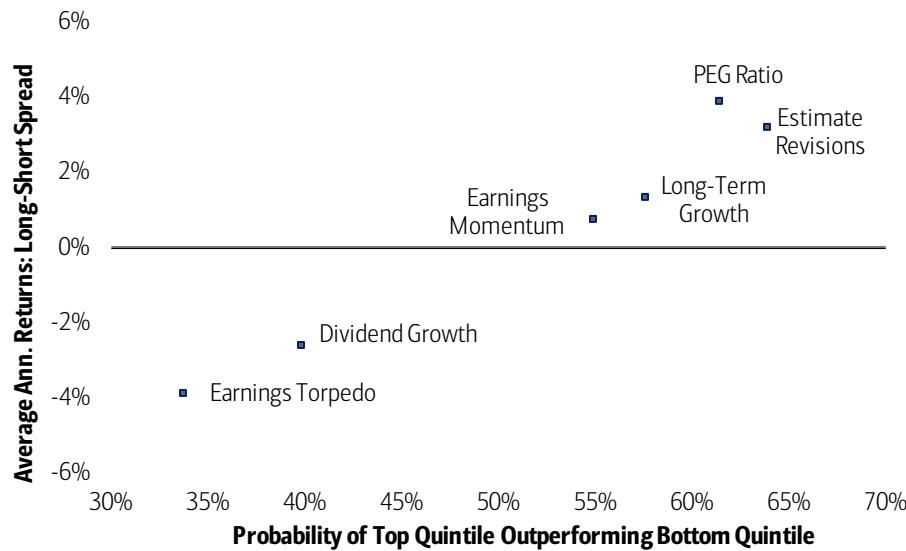
BofA GLOBAL RESEARCH



Exhibit 539: Growth Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads

(1985 to 2023)

PEG Ratio fared best



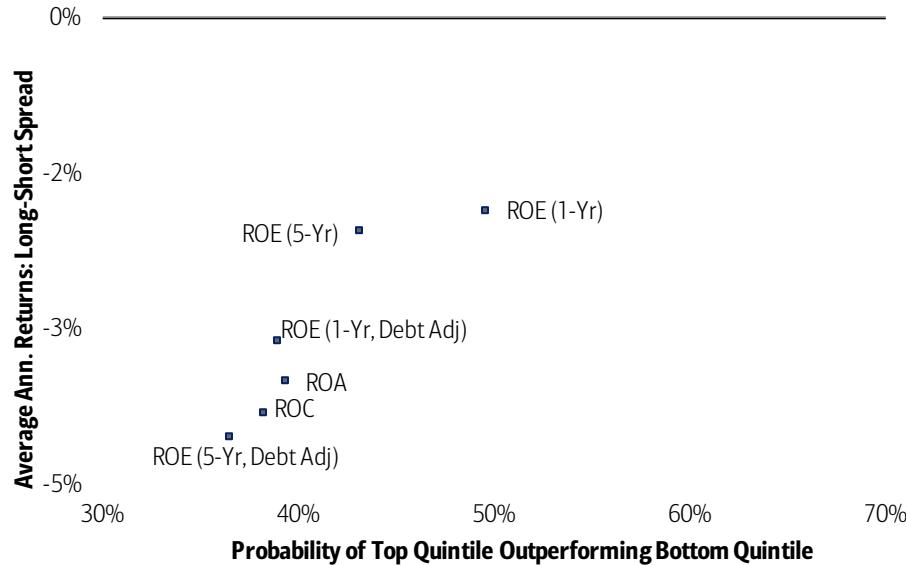
Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 540: Quality Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads

(1985 to 2023)

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

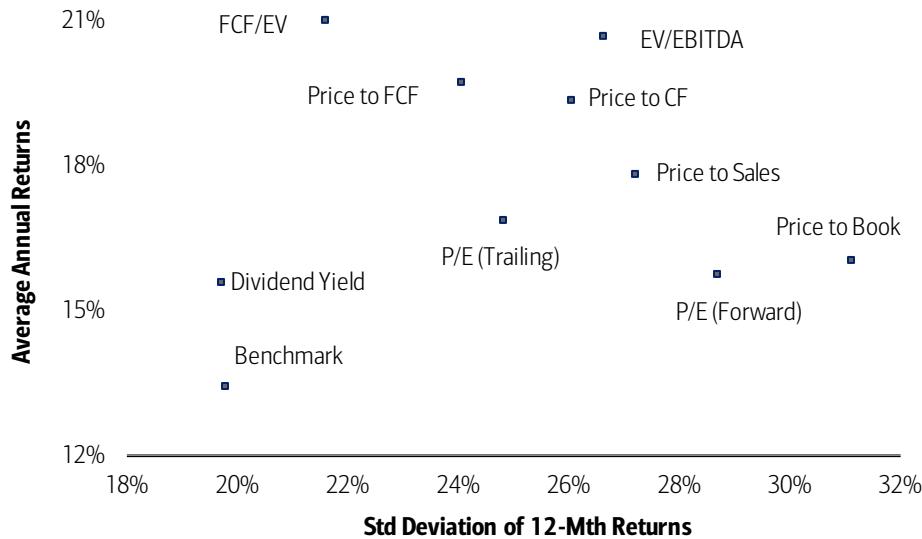
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Note: All charts in this section are based on backtested results during the period from month end Jan 1986 to month end March Mar 2018. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not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



Growth

Exhibit 541: Value Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023
FCF/EV fared best

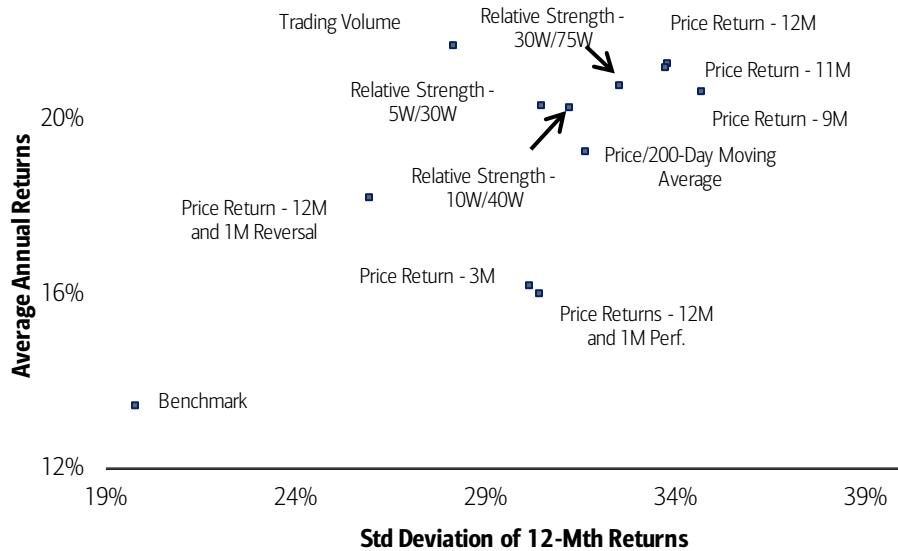


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 542: Momentum Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023

High Trading Volume fared best



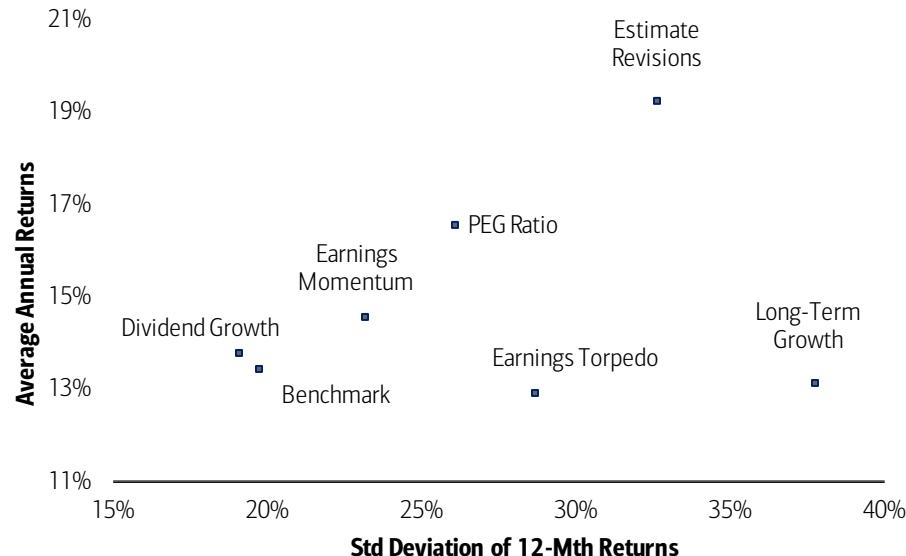
Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH



Exhibit 543: Growth Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023

Estimate Revisions fared best

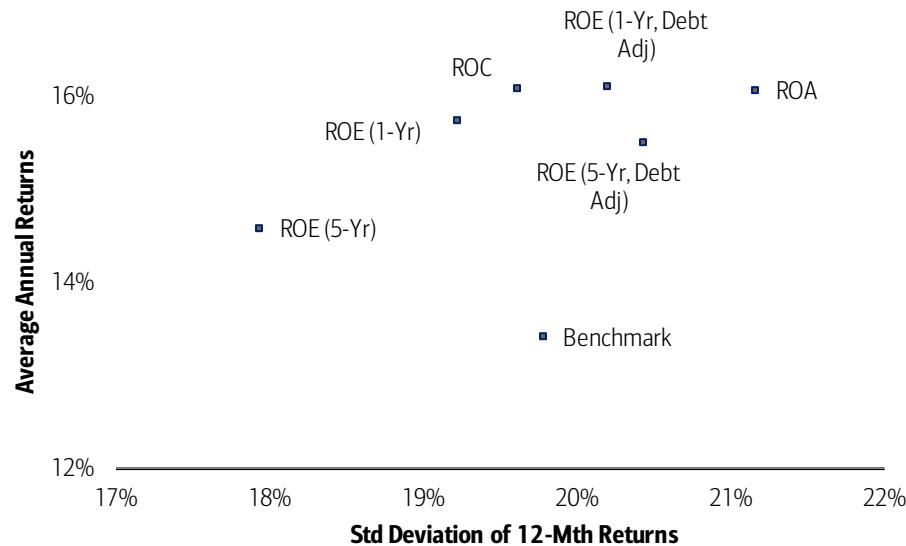


Source: BofA US Equity and Quant Strategy

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Exhibit 544: Quality Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023

Debt Adjusted 1-yr Debt Adj'd ROE and ROC fared best



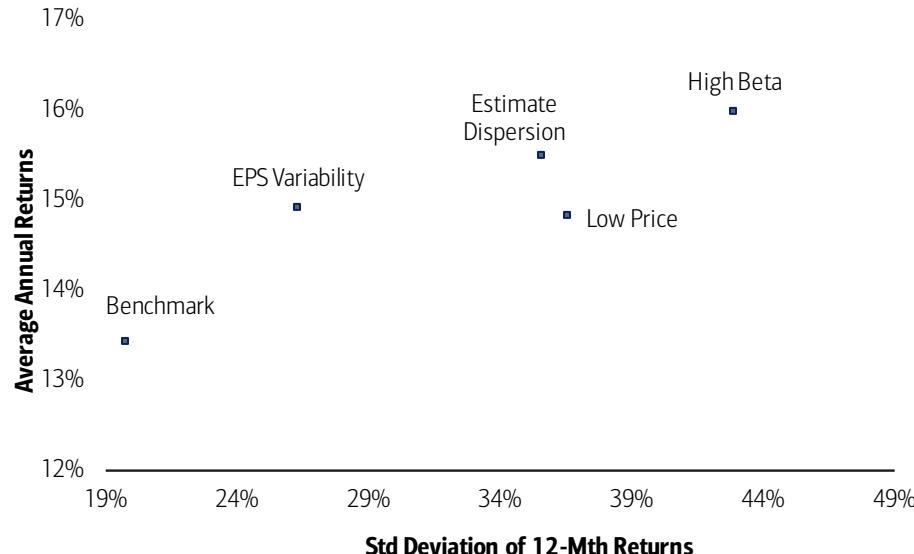
Source: BofA US Equity and Quant Strategy

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Exhibit 545: Risk Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023

High Beta and Estimate Dispersion fared best

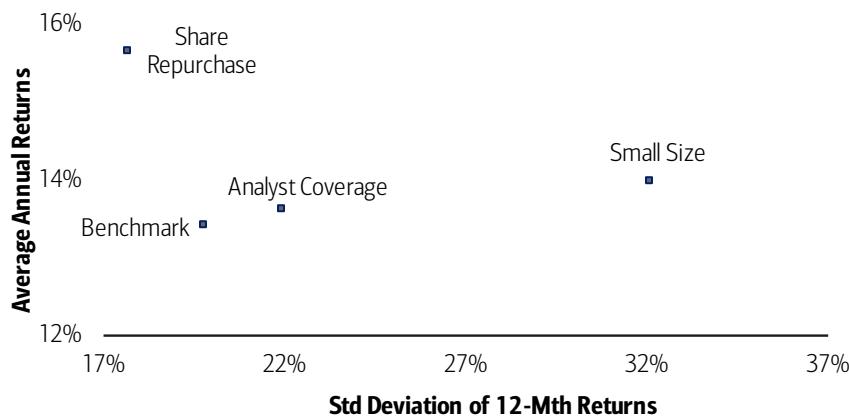


Source: BofA US Equity and Quant Strategy

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Exhibit 546: Miscellaneous Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2023

Share Repurchase fared best



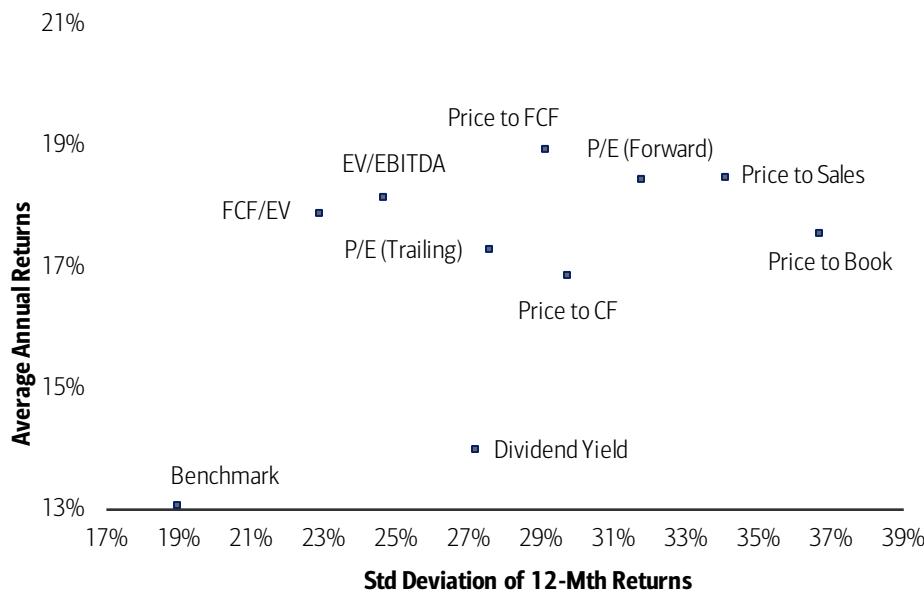
Source: BofA US Equity & Quant Strategy

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Value

Exhibit 547: Value Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

Price / FCF fared best

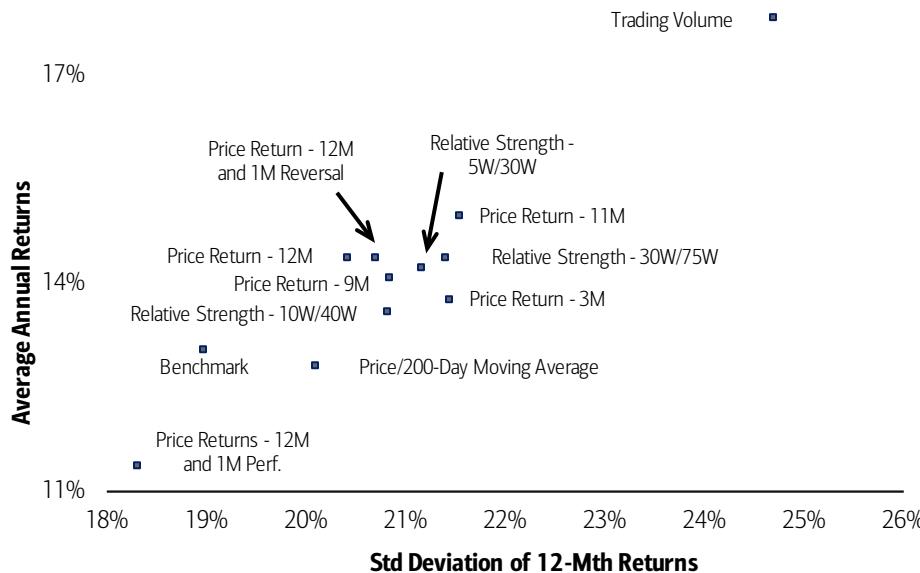


Source: BofA US Equity and Quant Strategy

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Exhibit 548: Momentum Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

High Trading Volume fared best



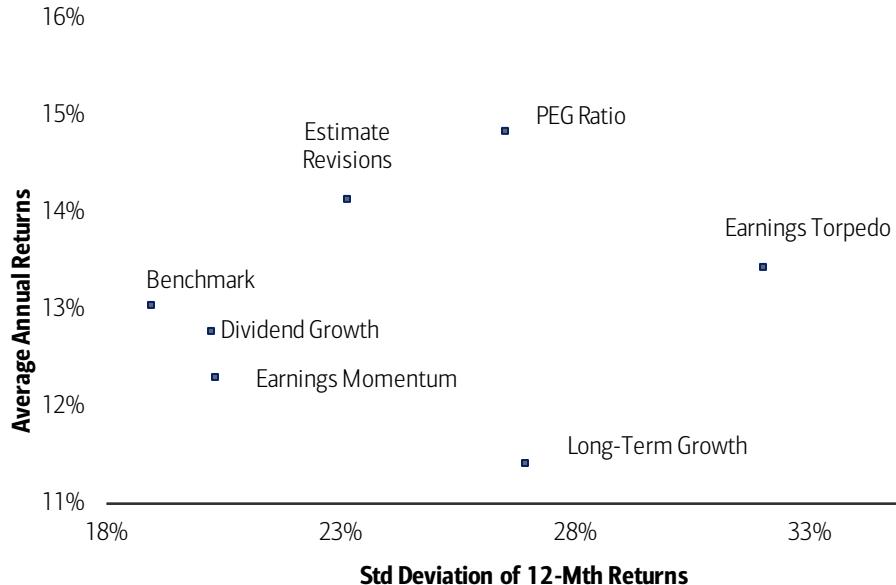
Source: BofA US Equity and Quant Strategy

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Exhibit 549: Growth Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

PEG Ratio fared best

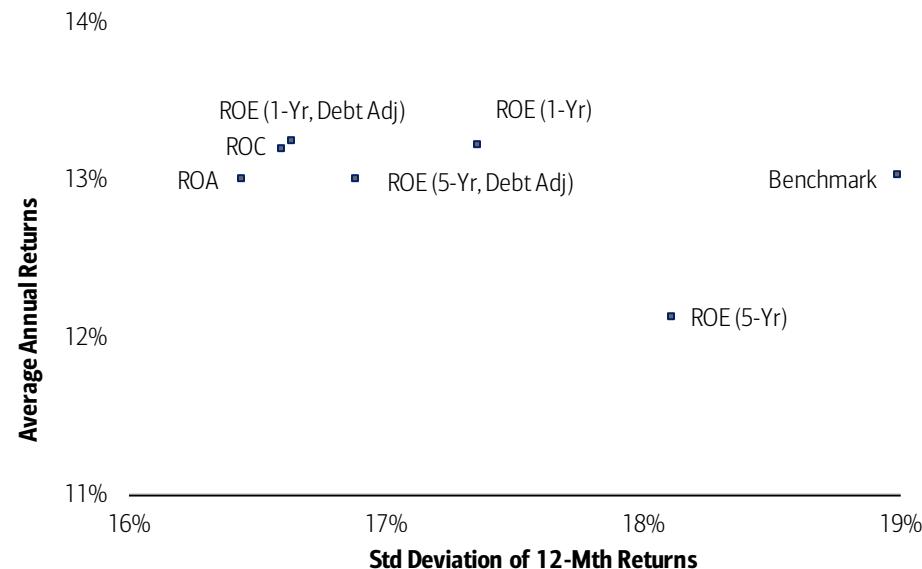


Source: BofA US Equity & Quant Strategy

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Exhibit 550: Quality Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

1-yr Debt Adj'd ROE fared best

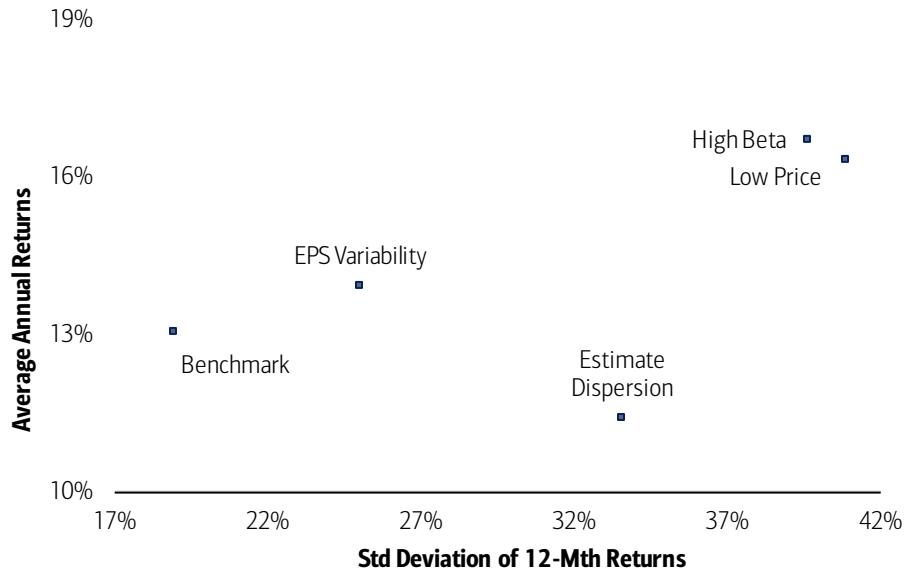


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 551: Risk Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

High Beta and Low Price fared best

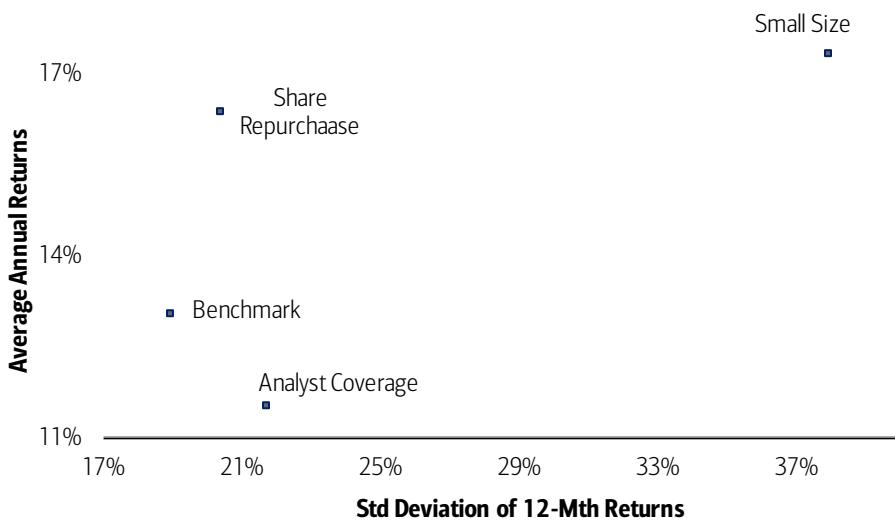


Source: BofA US Equity and Quant Strategy

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Exhibit 552: Miscellaneous Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2023

Small Size fared best



Source: BofA US Equity and Quant Strategy

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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 V: BofA Quality Strategies

Quality: cyclical & secular tailwinds	243
Performance Charts	259

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.



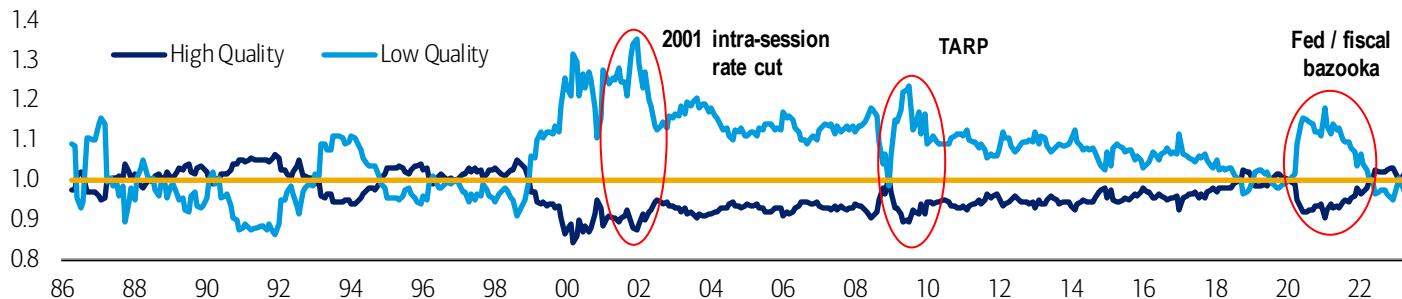
Quality: cyclical & secular tailwinds

We provide an updated investor's guide to Quality in this section.

Finance 101 tells us that investors should pay a premium for safety and take a discount for risk. But fiscal and monetary stimulus buoyed risk assets for over two decades, leading risky stocks to trade at a premium to quality stocks. Now, today, after over a year of Fed tightening, the valuation gap has finally closed, and high quality stocks have begun to trade at a slight premium. We continue to expect quality to re-rate, buoyed by both cyclical and secular factors.

Exhibit 553: After 20+ years of trading at a premium, risky stocks now trade at a discount to quality stocks

B+ or Better vs. B or Worse Fwd. P/E relative to BofA Universe (1986-4/30/23)



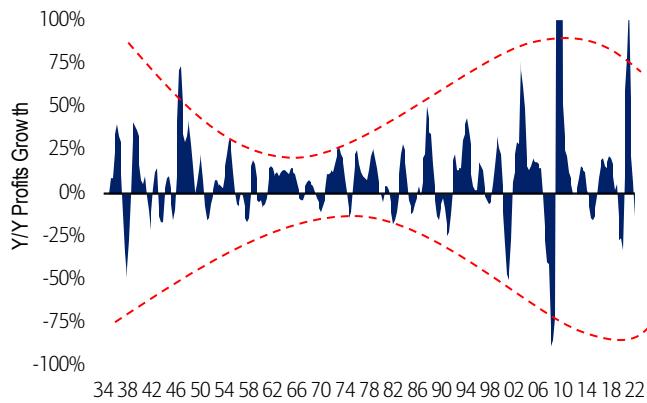
Source: FactSet, BofA US Equity & Quant Strategy

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The S&P 500 has more quality – based on our definition (see “What is Quality?” 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 554: Earnings volatility has decreased, and 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 4Q22

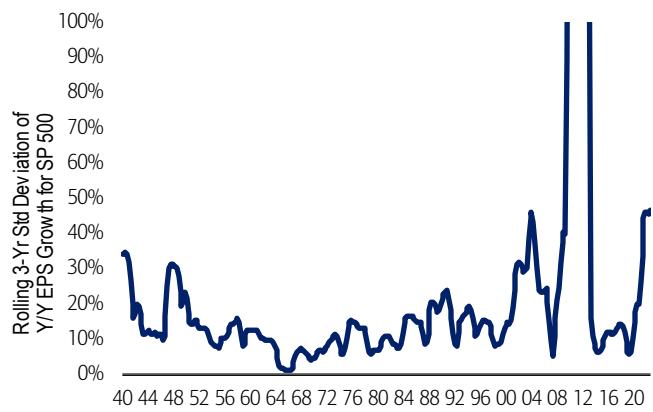


Source: BofA US Equity & Quant Strategy, S&P

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Exhibit 555: Earnings volatility is currently elevated following COVID

Rolling 3yr standard deviation of S&P 500 12m EPS growth (2Q40-4Q22)



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

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Exhibit 556: 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, 1990-4/23



Source: FactSet, BofA US Equity & US Quant Strategy

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The S&P 500 has grown higher quality since 2016. The proportion of stable earners has increased from 52% to 60% and the proportion of volatile earners has decreased from 47% to 40%.

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 four-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 557: Strategies of investing in Quality by various measures have generally behaved similarly over time

Correlation between High-Low Quality Performance Spreads (1989 to 4/30/2023)

	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	64.8%	100.0%			
Certain vs. Uncertain Earnings	58.3%	63.7%	100.0%		
Nifty 50 vs. Small Size	67.4%	54.0%	51.8%	100.0%	
"A+" vs. "C&D"	58.0%	64.0%	62.6%	42.5%	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.

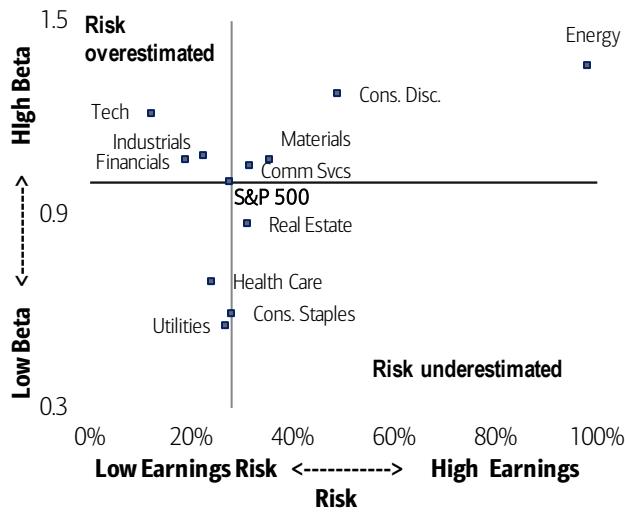
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Baskets of high and Low Quality stocks corresponding to each of these measures generally behave similarly over time based on correlations of monthly returns. Although some strategies are more similar than others, most display reasonably high correlations in returns.

Mispricing of risk: high quality ≠ low beta

Exhibit 558: Mispricing of risk: High Quality doesn't = 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 4/30/23



Source: BofA US Equity & Quant Strategy, FactSet

Note: Financials excludes BRK.B which is 15% of the sector.

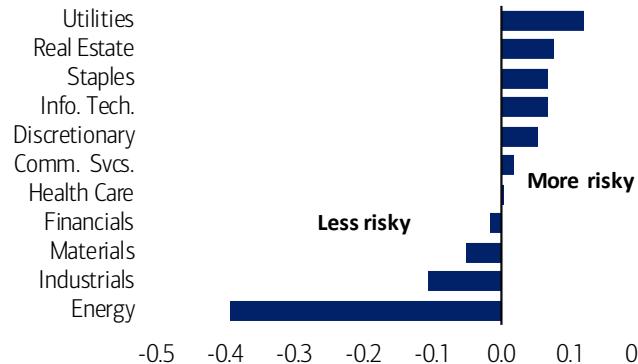
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Low beta is often used as a measure of safety but we prefer assessing earnings volatility ("fundamental beta") instead of price volatility. When classifying a stock as "safe", we think investors should care more about the underlying earnings risk, 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 stable earnings (e.g., Financials – which we are overweight, [see Sector Focus Point, 30 May 2023](#)), while some of the lowest beta sectors exhibit above-market earnings volatility (e.g., Real Estate – which we are marketweight).

Exhibit 559: Some “safe” sectors have grown riskier (e.g. Utilities), while some “risky” sectors have grown safer (e.g. Energy) based on 1yr vs. 5yr betas

1yr vs. 5yr beta for S&P 500 sectors, spread as of 4/30/2023



Source: Factset, BofA US Equity & US Quant Strategy

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Utilities, Real Estate and Staples have recently seen their betas rise while Energy and Industrials’ betas have declined the most.

Exhibit 560: Low beta stocks have generally underperformed

Equal-Weighted Relative Cumulative Performance of Low Beta S&P 500 stocks vs. Equal-Weighted S&P 500, June 1989=100, as of 4/30/2023



Source: BofA US Equity & Quant Strategy

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Low beta strategies have underperformed for decades.

Exhibit 561: 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 4/30/23

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).

Metric	B+ or Beta (Lowest Decile Median)	Better (Median)	Diff (spread)
EPS Volatility	55.7%	39.3%	16.4%
EPS Stability (lower = more stable)	15.6	16.5	-0.9
DPS Vol	2.3%	5.8%	-3.6%
Max 5-yr EPS Decline	26.1%	15.2%	-10.9%
Max 5-yr Price Decline	18.4%	30.4%	12.0%
Net Debt/EBITDA	2.6	2.1	0.5
ROIC	8.6%	11.7%	-3.1%
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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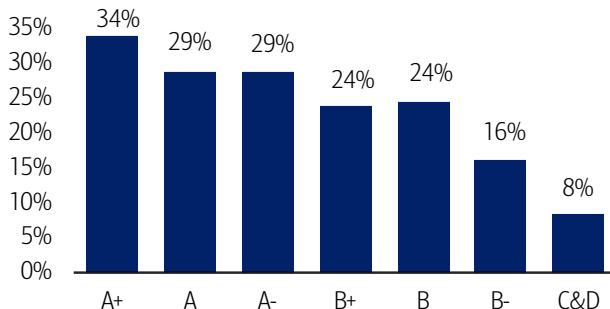


What drives quality?

The profits cycle

Exhibit 562: 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

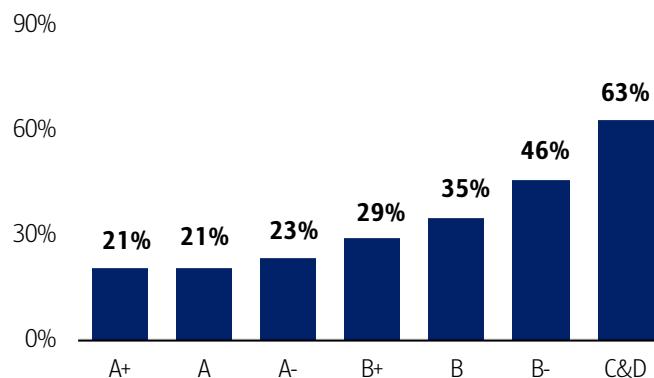
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Quality works when profits decelerate

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 563: ...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

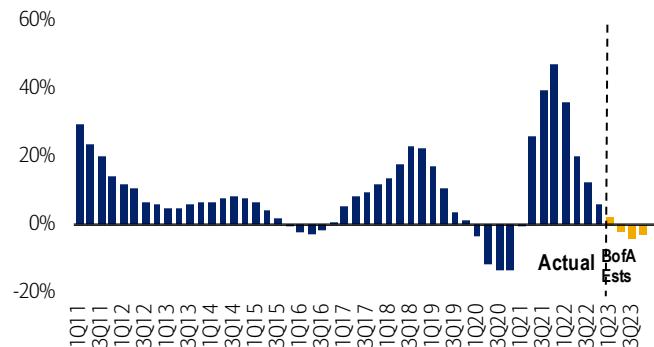
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But accelerating profits favor Low Quality

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 564: We expect earnings to decelerate through 3Q23

S&P 500 trailing 12-mo YoY profit growth, 1Q11-4Q22 and BofA forecasts for 1Q23



We expect profits growth to further decelerate from here, which would favor High Quality stocks, all else equal.

Source: BofA US Equity & Quant Strategy, Haver Analytics, FactSet

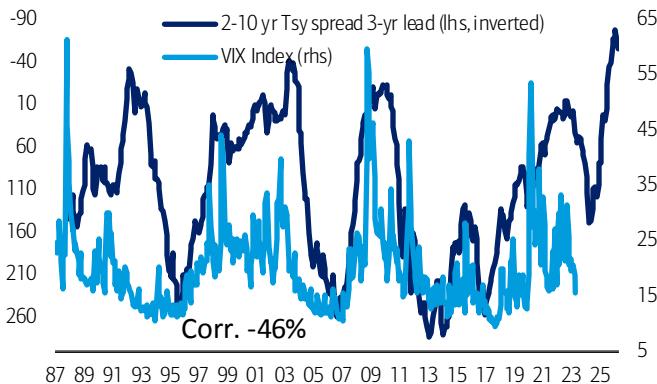
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Volatility (which is likely to increase)

Exhibit 565: The yield curve suggests volatility is likely to increase from current levels

CBOE VIX and Inverted Slope of Yield Curve (1986-present)



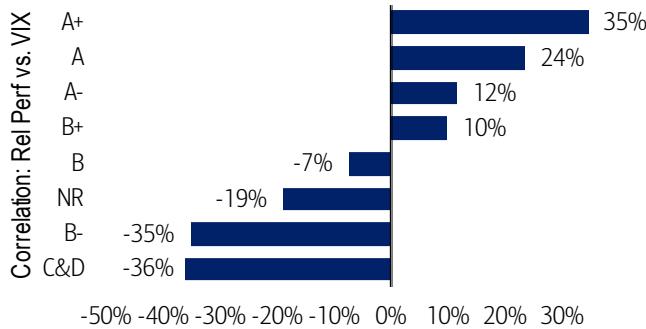
Source: CBOE, BEA, BofA US Equity & Quant Strategy

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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 several years.

Exhibit 566: 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 567: 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, 1990-4/30/23



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

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Exhibit 568: 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 4/30/23

Correlation

Since 1990	22.8%
Last 10 years	53.6%
Last 5 years	41.7%

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

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Quality and Regimes

Exhibit 569: US Regime Indicator now in “Downturn” phase

(January 1990-April 2023)



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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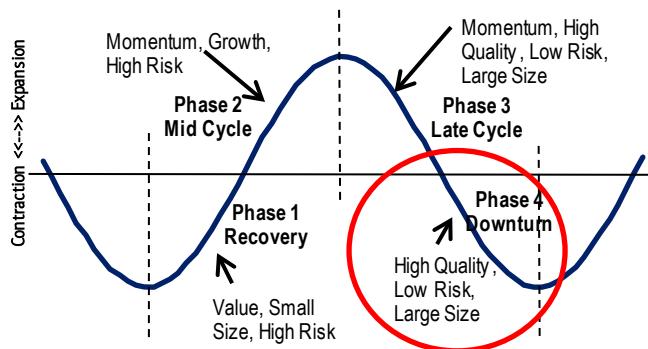
Our US Regime Indicator aggregates top-down variables that capture earnings and economic growth expectations, inflation, credit conditions and other variables, to yield four phases (Exhibit 569).

Presently, our Regime Indicator is in “Downturn”, where High Quality historically generated 5.2ppt of alpha (on average) since 1990.

Exhibit 570: Downturns favor Quality

US Regimes – a heuristic

High Quality has been one of the best-performing Strategy in Downturn regimes (in addition to in Late Cycle regimes).



Source: BofA US Equity & US Quant Strategy

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Exhibit 571: Quality outperforms in bear markets

High vs. Low Quality price performance during prior bear markets/major market corrections.

High Quality stocks have also consistently outperformed in each of the last seven S&P 500 bear markets/big market corrections.

Period	Rel Perf of B+ or Better vs B		
	B + or Better (annualized)	B or Worse (annualized)	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%
Dec '21 - Sep '22	-25.7%	-37.1%	11.4%
Average	-45.6%	-56.9%	11.3%
Median	-42.2%	-60.7%	8.6%

Note: Sept.- Dec. 18 was not an official bear market

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

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Positioning in quality has neutralized

Exhibit 572: High Quality stocks are slightly overweight in mutual fund holdings

Relative long-only fund positioning of stocks ranked B+ or better vs. B or Worse (2008-4/30/23)



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

Positioning within the Quality spectrum has shifted from Low Quality to mostly neutral on Quality.



Quality valuations

Exhibit 574: High Quality looks expensive on price/book
 Relative Price/Book of High (B+ or Better) vs Low Quality (B or Worse),
 1986-1Q23

While Exhibit 552 earlier indicates that High Quality trades at a slight premium to Low Quality on forward earnings, High Quality trades at a 20% premium to Low Quality relative its historical average on book value.



Source: FactSet, BofA US Equity & Quant Strategy

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Exhibit 575: High Quality is also getting expensive on price/sales
 Relative Price/Sales of High (B+ or Better) vs Low Quality (B or Worse),
 1986-1Q23

On price to sales, High Quality stocks are 17% more expensive than Low Quality stock relative to history.



Source: FactSet, BofA US Equity & US Quant Strategy

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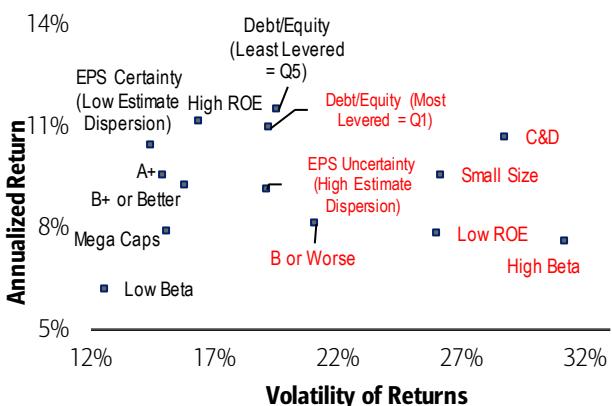
Risk / reward of High vs. Low Quality

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&Ds". Low Beta stocks have offered the lowest returns at the lowest volatility, but their downside risk, measured by probability of loss, rivals other Low Quality factors.



Exhibit 576: High Quality Strategies tend to exhibit lower volatility of returns...

Average annual return vs. annualized volatility (standard deviation) of returns (3/31/86-4/30/23)

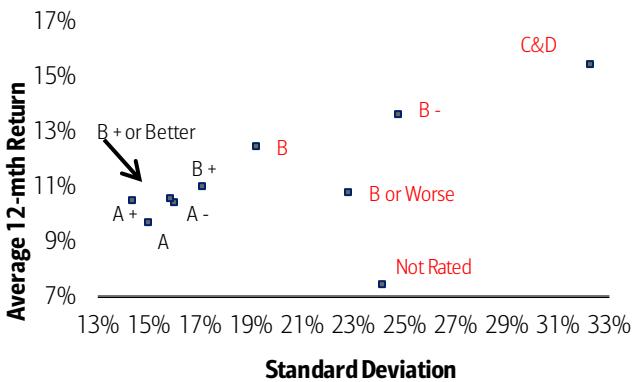


Source: BofA US Equity and Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 578: High Quality Strategies tend to exhibit lower volatility of returns...

Risk Reward Characteristics for S&P 500 Quality rankings (1986-4/30/23)



Source: BofA US Equity and Quantitative Strategy

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Quality has outperformed over the near- and long-term

Exhibit 580: High Quality has outperformed over the long-run

Relative price performance of B+ or Better vs. B or Worse stocks, as of 4/30/23

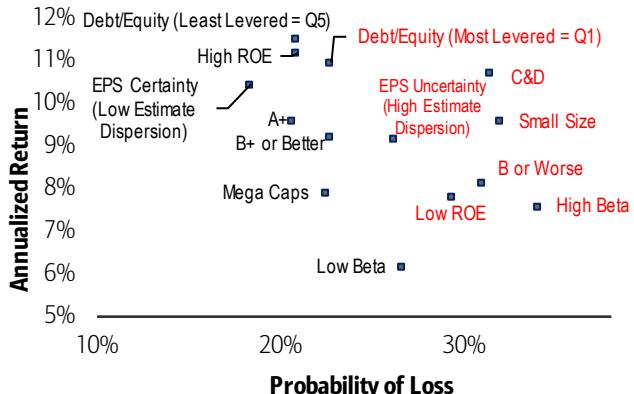
Period	Performance Spread (ppt)
1 month	1.8
3 months	5.1
6 months	5.0
12 months	7.2
Year to date	-2.0
2 years	25.0
3 years	24.4
5 years	36.6
10 years	82.9
15 years	112.4

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

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Exhibit 577: ...and lower probability of loss

Average annual return vs. probability of loss (3/31/86-4/30/23)

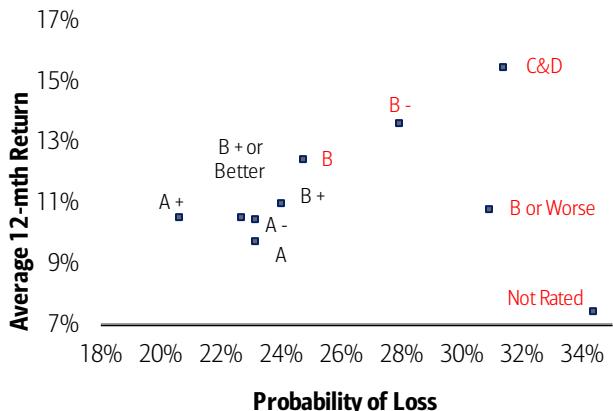


Source: BofA US Equity and Quant Strategy

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Exhibit 579: ...and lower probability of loss

Downside Risk Reward Characteristics for S&P 500 Quality rankings (1986-4/30/23)



Source: BofA US Equity and Quantitative Strategy

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High Quality (B+ or Better) stocks have outperformed Low Quality (B or Worse) stocks over the past 10 (+82.9ppt) and 15 years (+112.4ppt) in addition to recent outperformance.

Exhibit 581: Long-term winner

High quality stocks (B+ or Better S&P Quality rank) 10-yr rolling price returns, 1996-4/30/23

High quality stocks have never had a negative 10-yr return in our data history (back to 1986), even excluding dividends



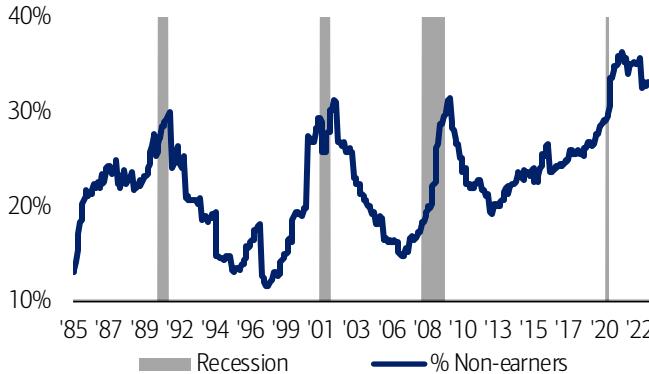
Source: BofA US Equity & Quant Strategy, S&P

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Smaller companies tend to be lower quality**Exhibit 582: One-third of the Russell 2000 is non-earners**

% of Russell 2000 index that is non-earners, 1985-4/30/23

The percentage of non-earners within the Russell 2000 has been rising and was exacerbated by the COVID-19 pandemic to record levels.



Source: FactSet, BofA US Equity & US Quant Strategy

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Deep dive on Quality fundamentals**Exhibit 583: Quality has grown higher quality (but some puts & takes)**

B+ or Higher median fundamental attributes vs. historical average (7/90 – 4/23)

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 have increased, while EPS Quality (spread between proforma and GAAP EPS) has fallen slightly.

	B+ or Better	Historical Avg	Spread
EPS Volatility	39%	27%	12.3%
EPS Stability (lower = more stable)	16.5	16.4	0.1
DPS Vol	5.8%	6.2%	-0.3%
Max 5-yr EPS Decline	15%	9%	6.6%
Max 5-yr Price Decline	30%	23%	7.1%
Net Debt/EBITDA	2.1	1.2	0.8
ROIC	12%	11%	0.7%
ROE	19%	17%	1.6%
Beta	1.0	1.0	0.0
5-yr Proforma vs. GAAP EPS	8.8%	6.3%	2.5%
5-yr Proforma vs. FCF/Sh	12.0%	26.8%	-14.8%
Quality Score (lower = higher quality)	3.0	3.2	-0.2

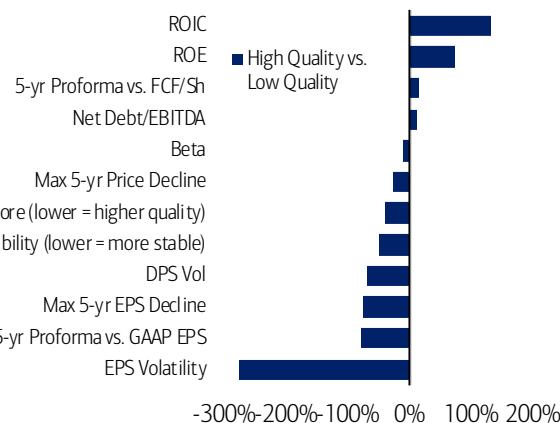
Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 584: High Quality vs. Low Quality: more EPS & div stability

Current B+ or Higher vs. B or Lower fundamental attributes (median % difference), as of 4/30/2023

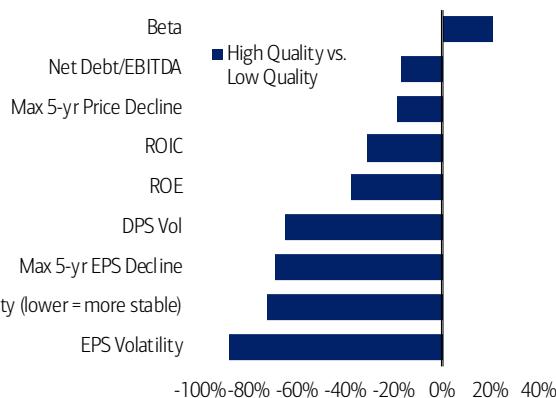


Source: BofA US Equity and Quant Strategy, FactSet, Compustat, IBES, S&P

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Exhibit 585: 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 – 4/30/2023

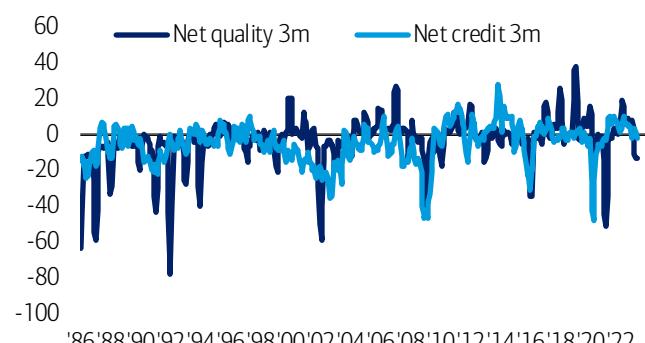


Source: BofA US Equity and Quant Strategy, FactSet, Compustat, IBES, S&P

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Exhibit 586: Net quality downgrades outpacing net credit downgrades

Net Quality and credit rating upgrades/downgrades on a rolling 3-month basis within the S&P 500 (1986 – 4/30/23)



Source: BofA US Equity & Quant Strategy, 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 slightly higher leverage.

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.

In examining the relationship between credit ratings 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 587: High vs Low Quality P/B is cheap vs history in Staples, Financials and Utilities

Relative P/B of High & Low Quality stocks vs. sector, and relative P/B of High vs. Low Quality stocks, 1Q86-1Q23

	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.	vs avg.
Comm Svcs	1.12	1.05	0.75	1.09	1.49	1.14	6%	-31%	30%	
Discretionary	1.79	1.19	0.74	0.89	2.42	1.41	50%	-17%	71%	
Staples	1.17	1.06	1.02	1.39	1.15	1.44	11%	-27%	-20%	
Energy	2.29	0.84	0.98	1.23	2.33	1.02	172%	-20%	128%	
Financials	1.21	1.11	0.65	0.71	1.86	2.14	9%	-8%	-13%	
Health Care	1.03	1.00	0.95	1.50	1.08	1.05	3%	-36%	4%	
Industrials	1.11	1.07	0.72	0.81	1.53	1.41	4%	-10%	9%	
Technology	1.29	1.09	0.46	0.84	2.80	1.36	18%	-45%	106%	
Materials	1.31	1.19	0.77	0.85	1.69	1.47	10%	-9%	15%	
Real Estate	1.23	1.14	0.73	0.36	1.68	1.22	8%	105%	38%	
Utilities	1.06	1.04	0.92	0.86	1.15	1.24	2%	7%	-7%	

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 588: High vs Low Quality P/Sales is cheap vs history in five of eleven sectors

Relative P/S of High or Low Quality stocks vs. sector, and relative P/S of High vs. Low Quality stocks, 1Q86-1Q23

	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.	vs avg.
Comm Svcs	1.14	1.02	0.70	0.91	1.64	1.33	12%	-24%	23%	
Discretionary	1.02	1.26	0.95	0.73	1.08	1.93	-19%	31%	-44%	
Staples	0.97	1.05	1.66	0.86	0.58	2.14	-8%	94%	-73%	
Energy	1.76	0.77	0.98	1.37	1.79	0.89	129%	-28%	100%	
Financials	1.17	1.14	0.54	0.70	2.16	2.50	3%	-22%	-14%	
Health Care	1.11	1.00	0.73	1.77	1.52	0.99	11%	-59%	55%	
Industrials	1.18	1.18	0.57	0.65	2.06	1.85	0%	-13%	12%	
Technology	1.24	1.14	0.54	0.80	2.28	1.51	8%	-32%	51%	
Materials	1.13	1.23	0.96	0.87	1.18	1.49	-8%	11%	-21%	
Real Estate	1.12	0.98	0.99	2.46	1.12	1.27	14%	-60%	-11%	
Utilities	1.27	1.10	0.72	0.78	1.76	1.45	15%	-8%	22%	

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 589: High vs Low Quality Fwd P/E is cheap vs history in Discretionary and Real Estate

Relative P/E of High or Low Quality stocks vs. sector, and relative P/E of High vs. Low Quality stocks, 1Q86-1Q23

	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.	vs avg.
Comm Svcs	1.00	0.81	0.89	1.44	1.12	0.72	22%	-38%	55%	
Discretionary	0.72	1.01	1.22	1.04	0.59	1.07	-28%	17%	-44%	
Staples	1.07	0.99	0.82	1.35	1.31	1.02	8%	-39%	29%	
Energy	1.54	0.87	0.98	1.41	1.57	0.74	77%	-30%	110%	
Financials	1.02	1.01	0.89	0.91	1.15	1.12	1%	-3%	2%	
Health Care	0.95	0.96	1.06	1.38	0.90	0.80	-1%	-23%	12%	
Industrials	1.02	1.01	0.82	0.99	1.24	1.06	1%	-17%	18%	
Technology	0.99	0.98	0.96	1.01	1.03	1.00	1%	-5%	3%	
Materials	1.11	1.03	0.86	1.07	1.30	0.99	8%	-20%	31%	
Real Estate	0.88	0.97	1.31	1.77	0.67	0.96	-9%	-26%	-30%	
Utilities	1.10	1.00	0.82	0.90	1.34	1.13	10%	-8%	18%	

Source: BofA US Equity and Quant Strategy; Note Real Estate LT avg since 2003

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Exhibit 590: 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	-11.3%	-27.7%	-12.4%	-12.2%	-7.3%	-12.5%	-17.9%	-6.6%	-16.8%	-36.6%
2023	-2.0%	-9.2%	0.0%	-2.6%	1.3%	-3.4%	-9.8%	-7.9%	-3.4%	-10.5%

*Note: 2023 reflects 12-month return as of 4/30/22.

Source: BofA US Equity and Quant Strategy

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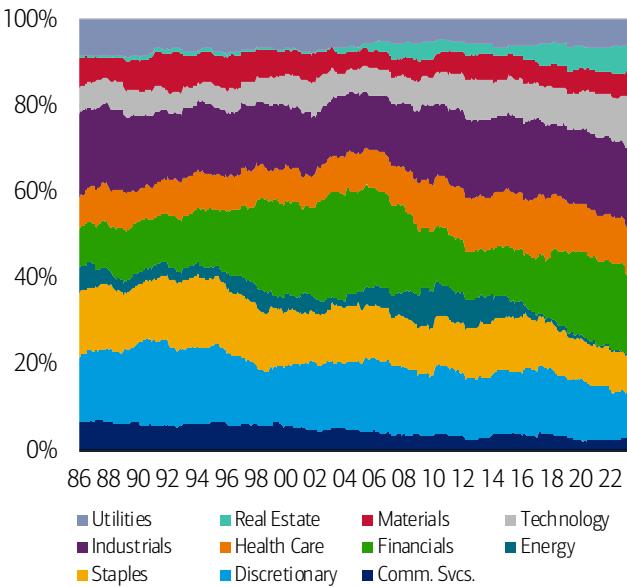
Quality composition within sectors

Since the Global 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 second biggest (after Industrials, 19%) share of High Quality stocks of all the sectors. Other shifts? Consumer Discretionary and Consumer Staples have been declining in Quality since 2017 and the proportion of High Quality stocks is near record lows. Today, only 0.3% of High Quality stocks are in Energy vs 8% in 2008. Overall, Financials, Industrials, Health Care and Tech are the sectors with the most High Quality stocks.



Exhibit 591: Trends in Quality composition by sector

B+ or Better sector exposure over time based on number of co.'s (as of 4/30/23)

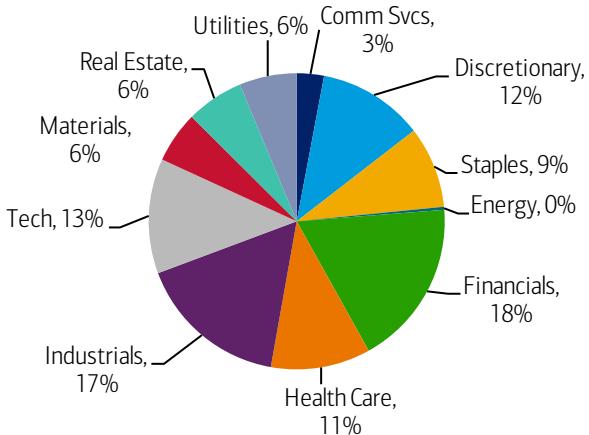


Source: BofA US Equity and Quant Strategy, FactSet, S&P

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Exhibit 593: Financials and Industrials represent the largest share of High Quality stocks today

S&P 500 Sector distribution for “B+ or Better” stocks, as of 4/30/23

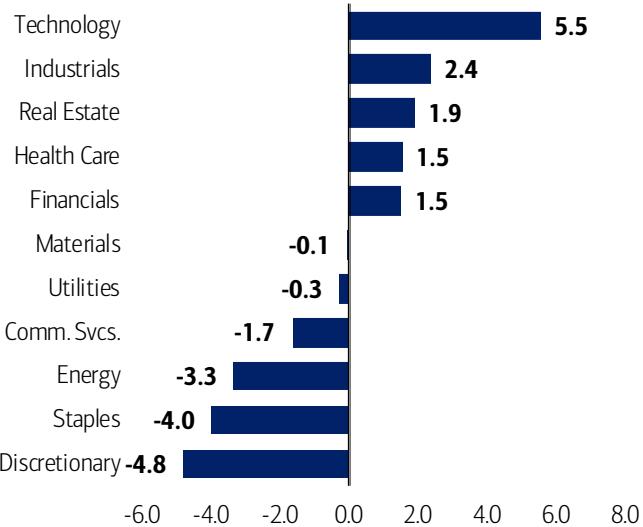


Source: S&P, BofA US Equity and Quant Strategy

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Exhibit 592: 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 4/30/23



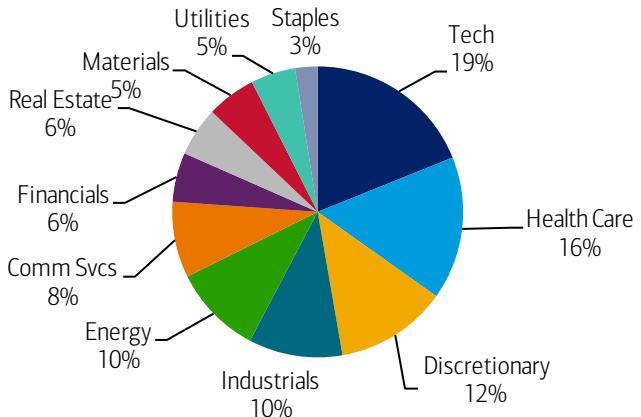
Note: based on equal weight (number of companies)

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

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Exhibit 594: Tech and Health Care have the highest composition in Low Quality

S&P 500 Sector distribution for “B or Worse” stocks, as of 4/30/23



Source: S&P BofA US Equity and Quant Strategy

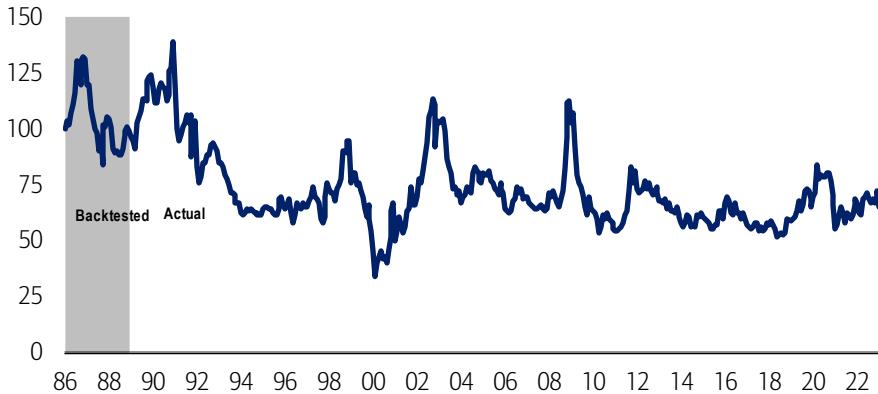
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Performance Charts

Exhibit 595: Highest quality stocks (A+) have outperformed the lowest quality stocks (C&D) since 2021

A+ vs C&D relative performance, 1986-4/30/23



Source: BofA US Equity and Quantitative Strategy

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Exhibit 596: B+ or Better have led B or Worse since 2021

B+ or Better vs B or Worse relative performance, 1986-4/30/23

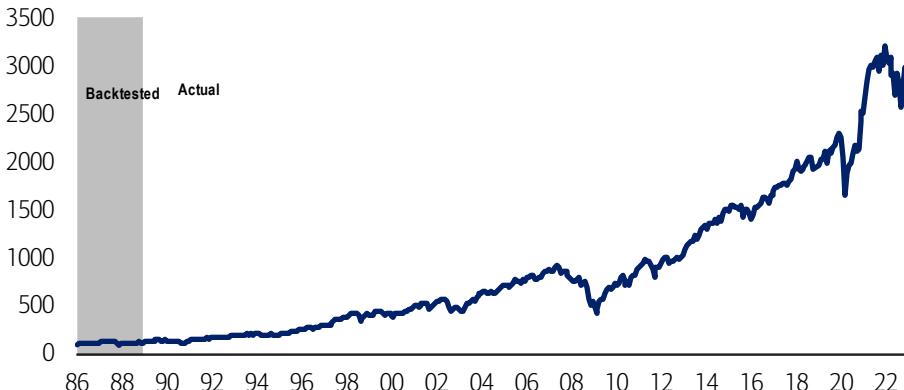


Source: BofA US Equity and Quantitative Strategy

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Exhibit 597: B+ or Better rated stocks declined -0.2% YTD

B+ or Better cumulative index performance (100=1986), as of 4/30/23

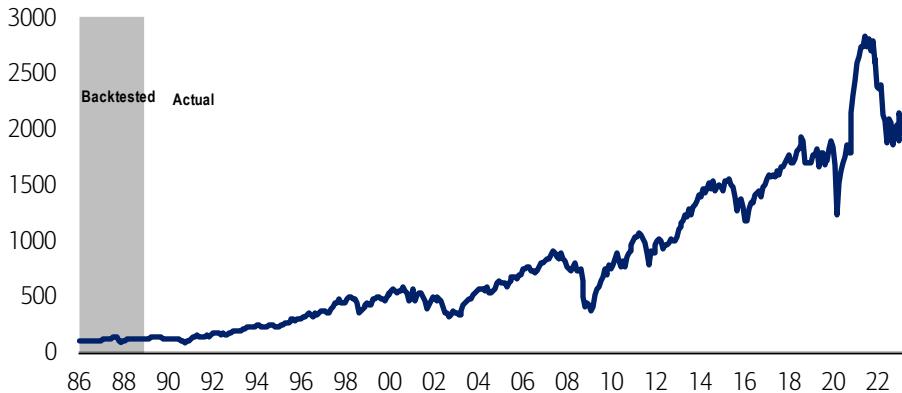


Source: BofA US Equity and Quantitative Strategy

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Exhibit 598: B or Worse rated stocks gained +1.8% YTD

B or Worse cumulative index performance (100=1986), as of 4/30/23

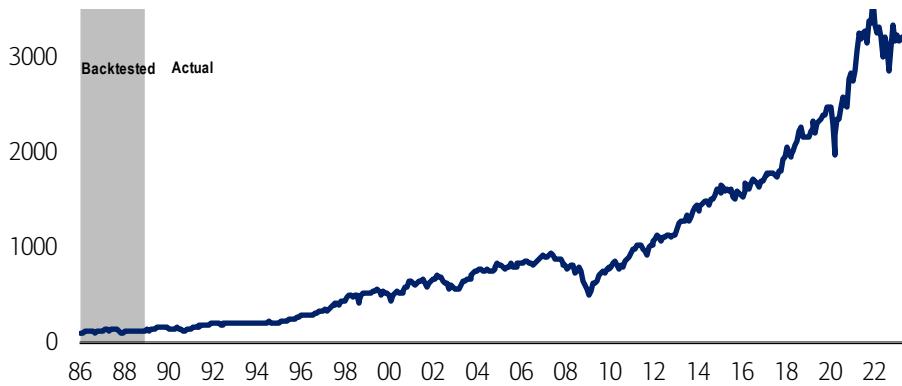


Source: BofA US Equity and Quantitative Strategy

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Exhibit 599: A+ rated stocks gained +1.8% YTD

A+ index performance (100=1986), as of 4/30/23

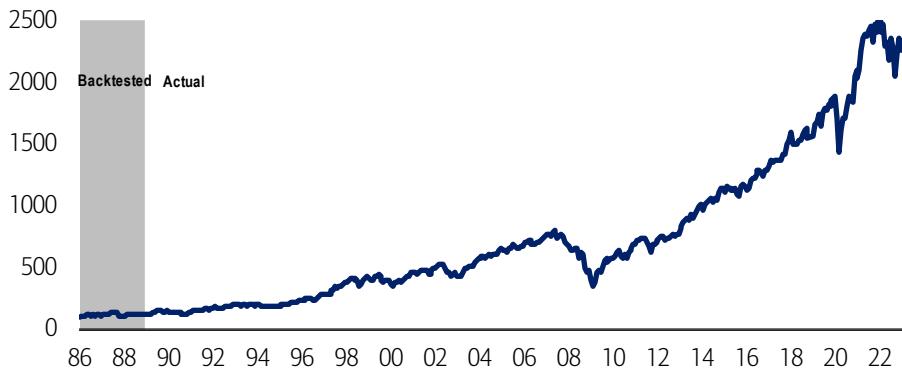


Source: BofA US Equity and Quantitative Strategy

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Exhibit 600: A rated stocks declined -1.1% YTD

A index performance (100=1986), as of 4/30/23

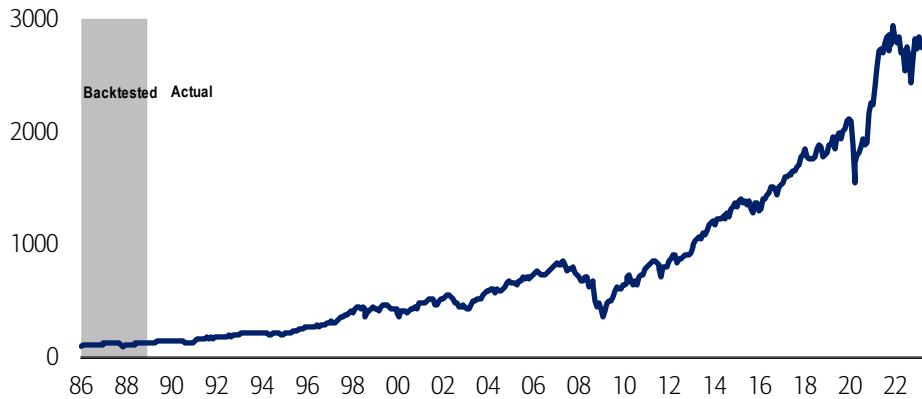


Source: BofA US Equity and Quantitative Strategy

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Exhibit 601: A- rated stocks gained +0.4% YTD

A- index performance (100=1986), as of 4/30/23

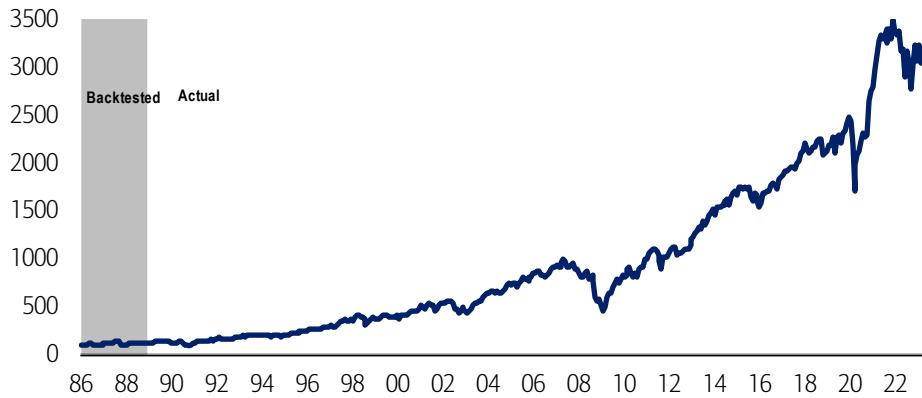


Source: BofA US Equity and Quantitative Strategy

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Exhibit 602: B+ rated stocks declined -0.3% YTD

B+ index performance (100=1986), as of 4/30/23

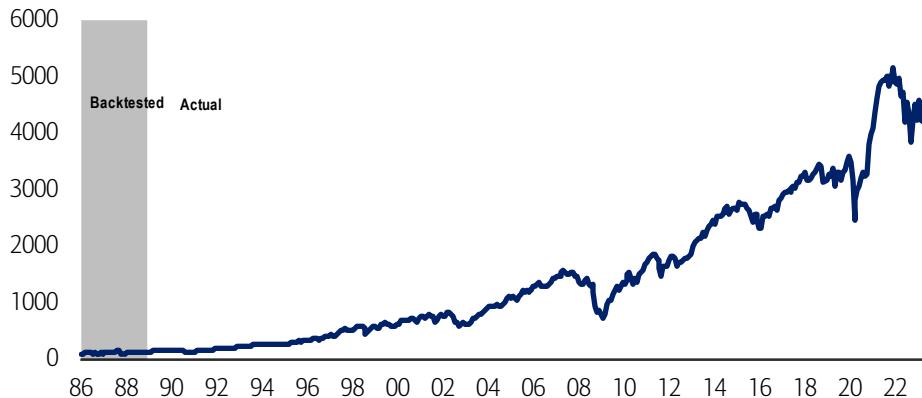


Source: BofA US Equity and Quantitative Strategy

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Exhibit 603: B rated stocks declined -1.1% YTD

B index performance (100=1986), as of 4/30/23

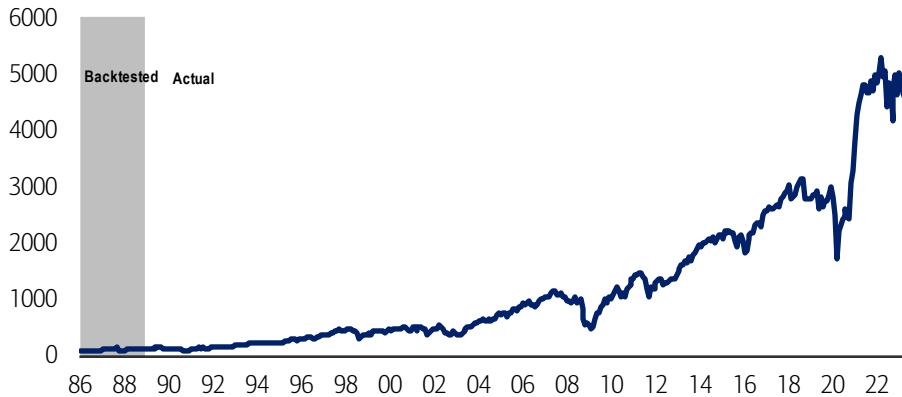


Source: BofA US Equity and Quantitative Strategy

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Exhibit 604: B- rated stocks declined -1.6% YTD

B- index performance (100=1986), as of 4/30/23

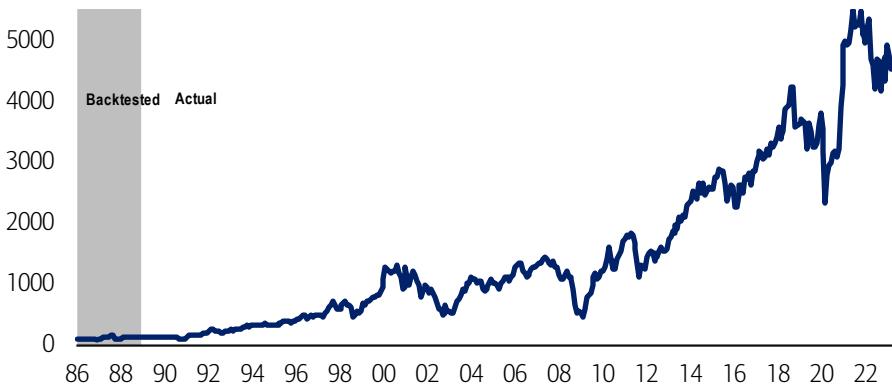


Source: BofA US Equity and Quantitative Strategy

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Exhibit 605: C&D rated stocks gained 4.3% YTD

C&D index performance (100=1986), as of 4/30/23



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

Relative Valuation for Industries

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Relative Valuation for Industries

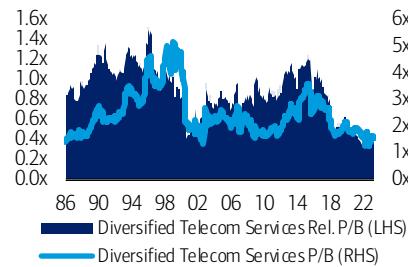
The below charts illustrate the absolute and relative Price/Book, Price/Operating Cash Flow, and Forward (NTM) P/E of the S&P 500 industries from 1986-April 2023. Industries with less than 10 years of valuation history are excluded.

Communication Services

Exhibit 606: Diversified

Telecommunication Services: P/B

On a Price/Book basis valuations have declined in recent years



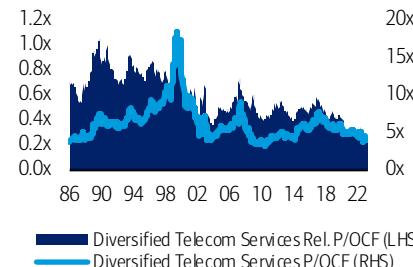
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 607: Diversified

Telecommunication Services: P/OCF

On a Price/OCF basis valuations have declined in recent years



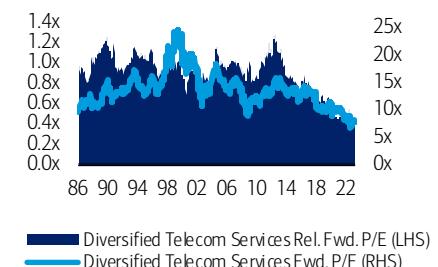
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 608: Diversified

Telecommunication Services: Fwd. P/E

On a Forward P/E basis valuations have declined in recent years

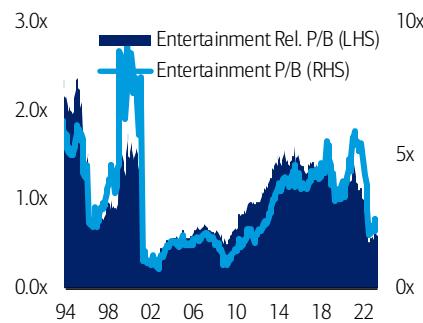


Source: I/B/E/S, BofA US Equity & Quant Strategy

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

Exhibit 609: Entertainment: P/B

On a Price/Book basis valuations have edged higher

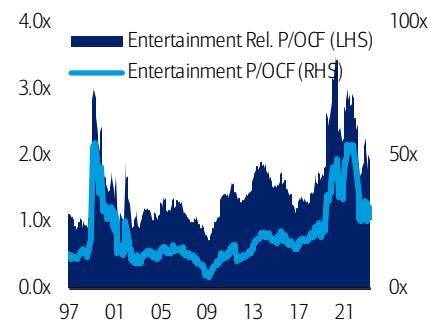


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 610: Entertainment: P/OCF

On a Price/OCF basis valuations have edged higher

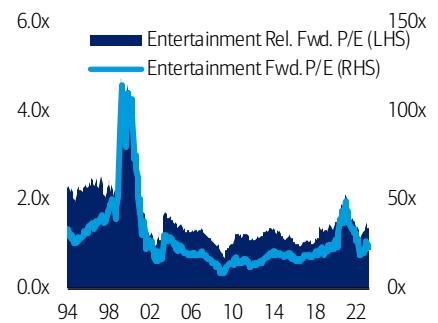


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 611: Entertainment: Fwd. P/E

On a Forward P/E basis valuations have edged higher

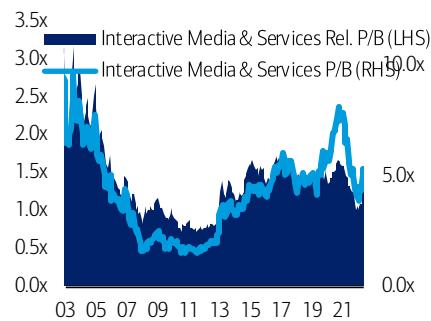


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 612: Interactive Media & Services: P/B

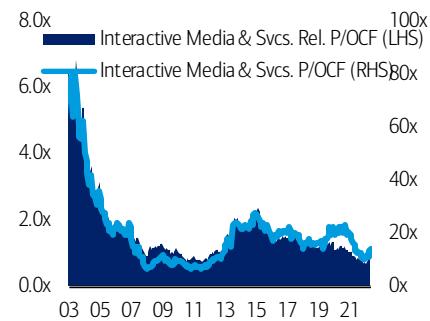
On a Price/Book basis valuations have edged higher



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 613: Interactive Media & Services: P/OCF

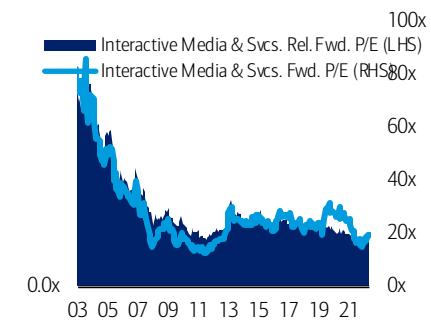
On a Price/OCF basis valuations have edged higher



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 614: Interactive Media & Services: Fwd. P/E

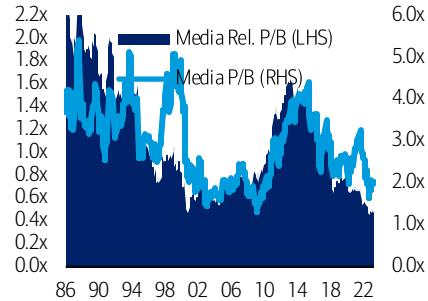
On a Forward P/E basis valuations have edged higher



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 615: Media: P/B

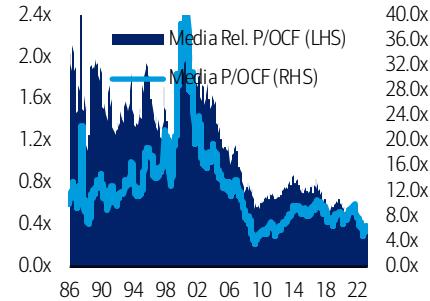
On a Price/Book basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 616: Media: P/OCF

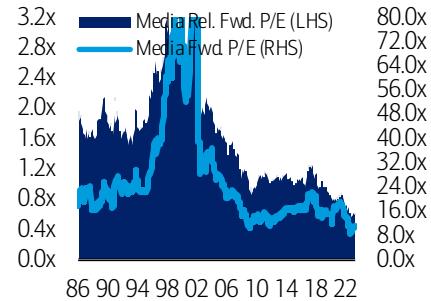
On a Price/OCF basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 617: Media: Fwd. P/E

On a Forward P/E basis valuations have declined recently

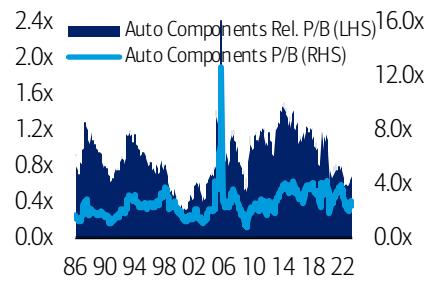


Source: I/B/E/S, BofA US Equity & Quant Strategy
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Consumer Discretionary

Exhibit 618: Auto Components: P/B

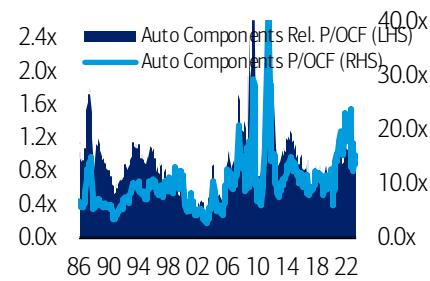
On a Price/Book basis valuations have edged higher recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 619: Auto Components: P/OCF

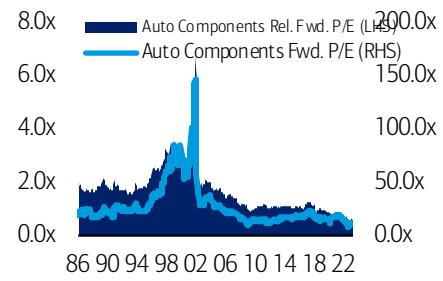
On a Price/OCF basis valuations have declined recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 620: Auto Components: Fwd. P/E

On a Forward P/E basis valuations have declined recently

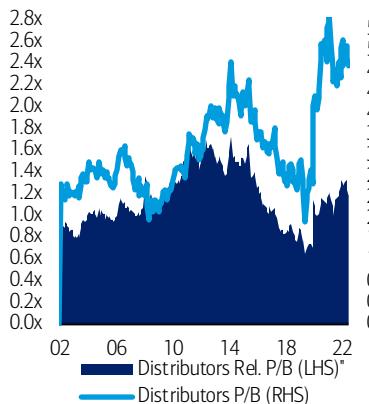


Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 621: Distributors: P/B

On a Price/Book basis valuations have edged higher recently

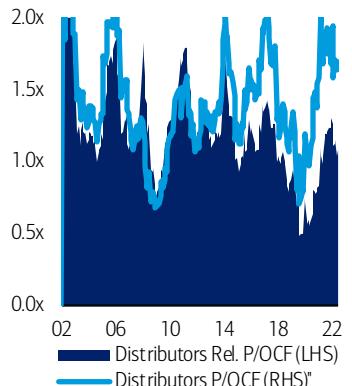


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 622: Distributors: P/OCF

On a Price/OCF basis valuations have declined recently

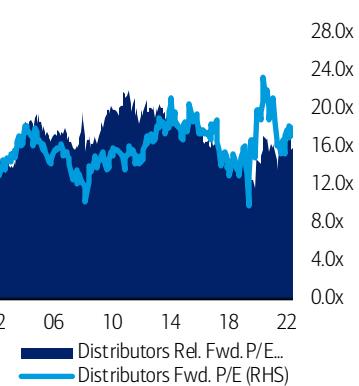


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 623: Distributors: Fwd. P/E

On a Forward P/E basis valuations have risen recently

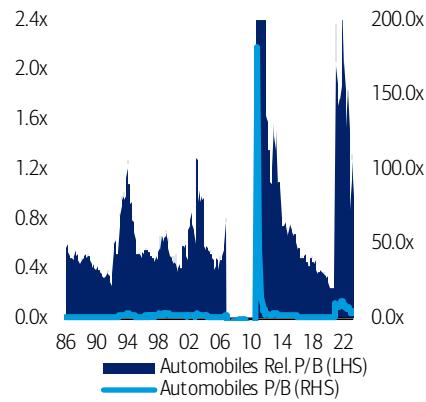


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 624: Automobile: P/B

On a Price/Book basis valuations have edged lower recently

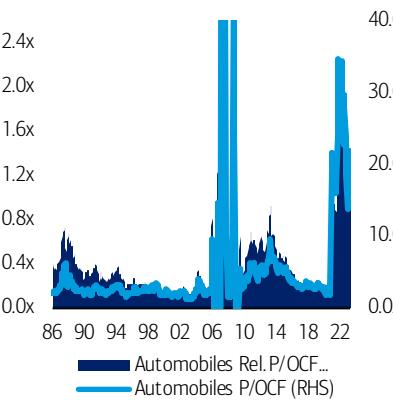


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 625: Automobile: P/OCF

On a Price/OCF basis valuations have declined recently

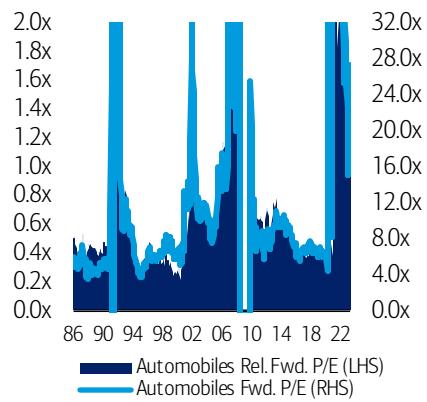


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 626: Automobile: Fwd. P/E

On a Forward P/E basis valuations have declined recently

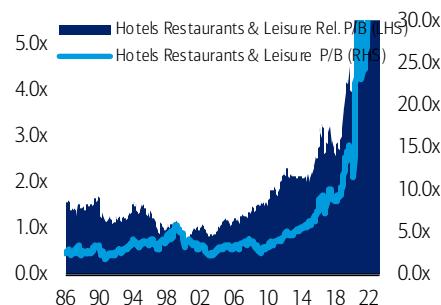


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 627: Hotels Restaurants & Leisure: P/B

On a Price/Book basis valuations have risen to all-time highs

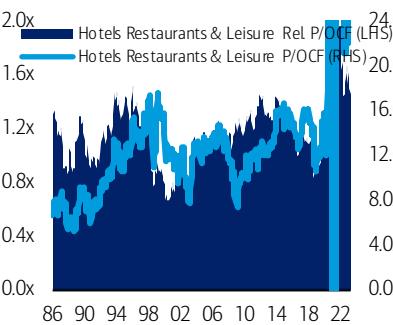


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 628: Hotels Restaurants & Leisure: P/OCF

On a Price/OCF basis valuations have declined sharply recently

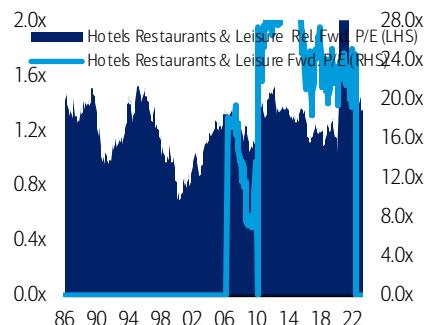


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 629: Hotels Restaurants & Leisure: Fwd. P/E

On a Forward P/E basis valuations have declined from all-time highs



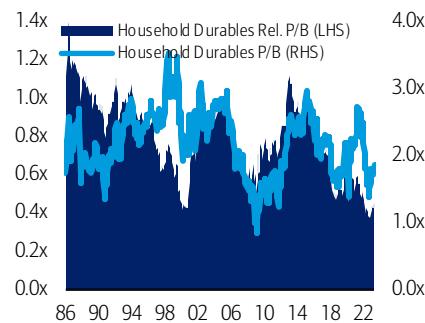
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 630: Household Durables: P/B

On a Price/Book basis valuations have risen recently

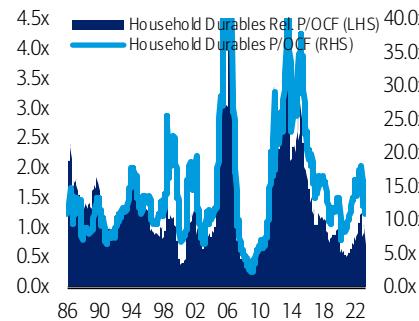


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 631: Household Durables: P/OCF

On a Price/OCF basis valuations have declined

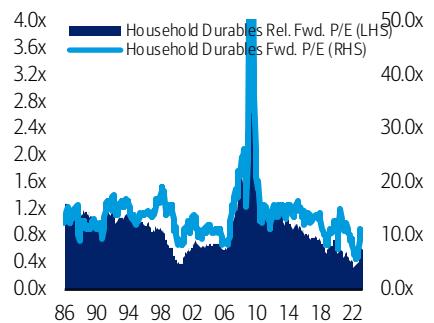


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 632: Household Durables: Fwd. P/E

On a Forward P/E basis valuations have risen recently

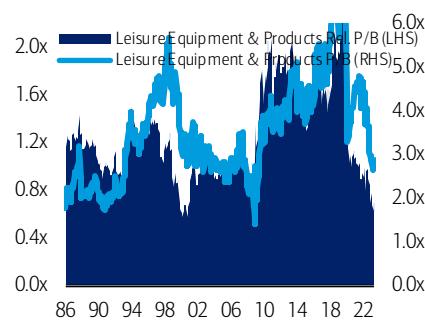


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 633: Leisure Products: P/B

On a Price/Book basis valuations have declined recently

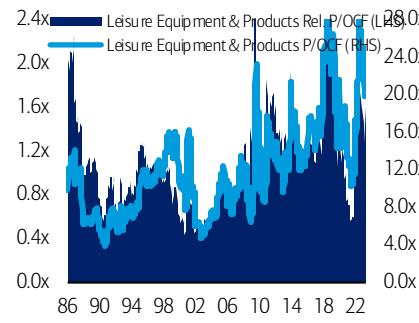


Source: I/B/E/S, BofA US Equity & US Quant Strategy

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Exhibit 634: Leisure Products: P/OCF

On a Price/OCF basis valuations have declined recently

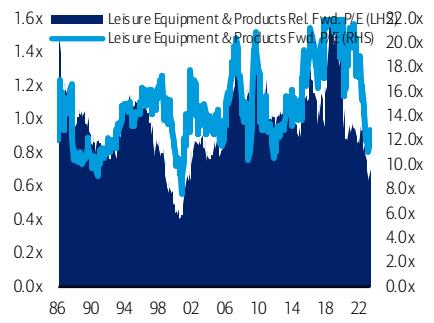


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 635: Leisure Products: Fwd. P/E

On a Forward P/E basis valuations have declined recently

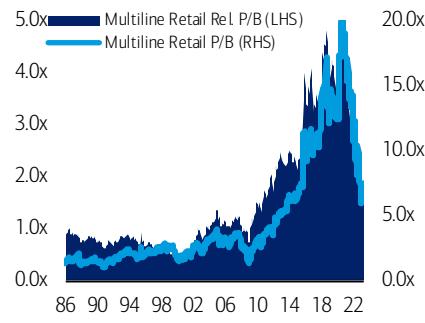


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 636: Broadline Retail: P/B

On a Price/Book basis valuations have declined in recent years

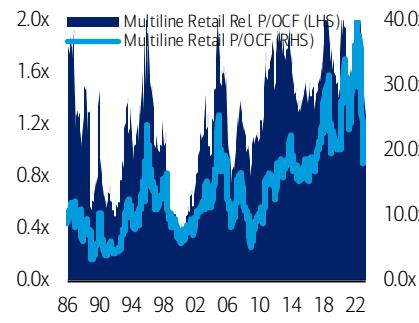


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 637: Broadline Retail: P/OCF

On a Price/OCF basis valuations have declined recently

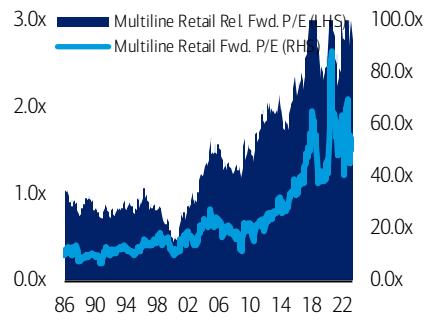


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 638: Broadline Retail: Fwd. P/E

On a Forward P/E basis valuations have declined recently



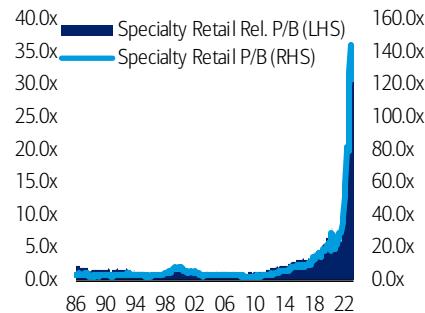
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 639: Specialty Retail: P/B

On a Price/Book basis valuations have risen sharply in recent years

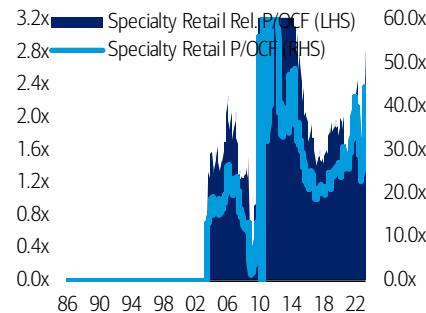


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 640: Specialty Retail: P/OCF

On a Price/OCF basis valuations have edged lower recently

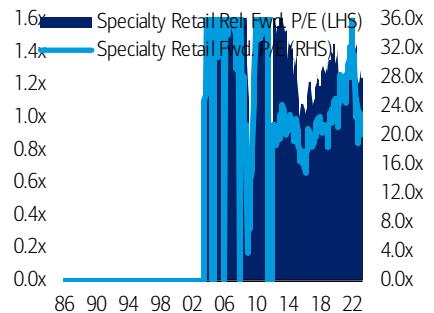


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 641: Specialty Retail: Fwd. P/E

On a Forward P/E basis valuations have declined recently

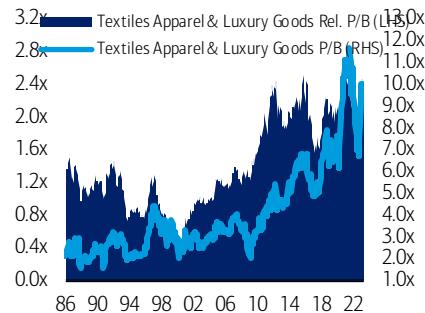


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 642: Textiles Apparel & Luxury Goods: P/B

On a Price/Book basis valuations have risen recently

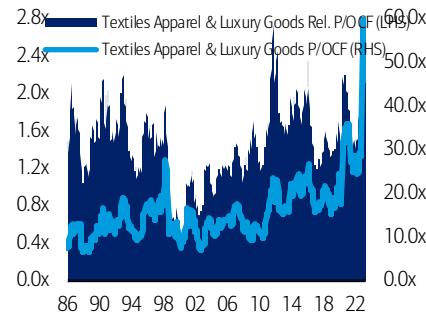


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 643: Textiles Apparel & Luxury Goods: P/OCF

On a Price/OCF basis valuations have risen recently

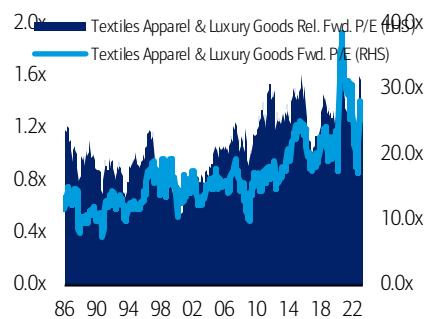


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 644: Textiles Apparel & Luxury Goods: Fwd. P/E

On a Forward P/E basis valuations have risen



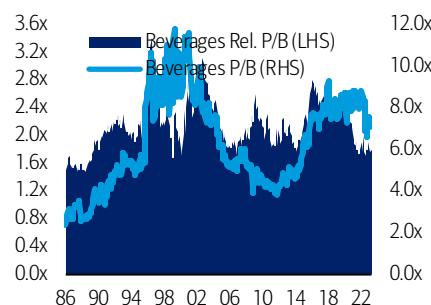
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Consumer Staples

Exhibit 645: Beverages: P/B

On a Price/Book basis valuations have edged higher recently

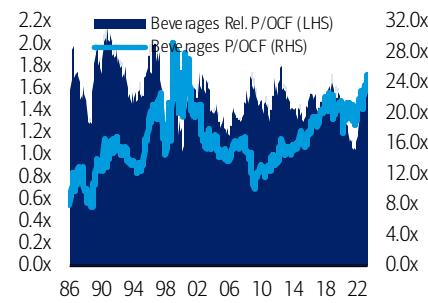


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 646: Beverages: P/OCF

On a Price/OCF basis valuations have risen

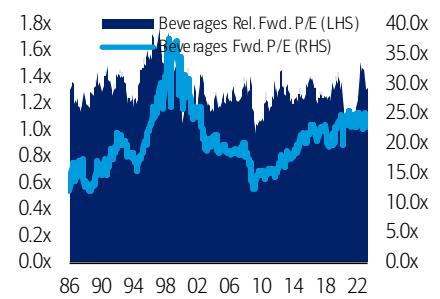


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 647: Beverages Fwd. P/E

On a Forward P/E basis valuations have edged higher recently

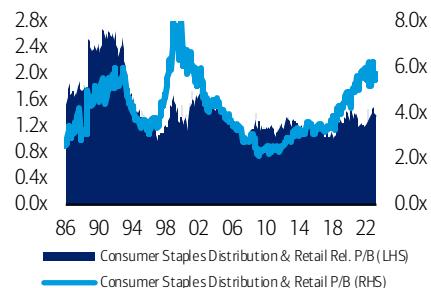


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 648: Distribution & Retail: P/B

On a Price/Book basis valuations have risen in recent years

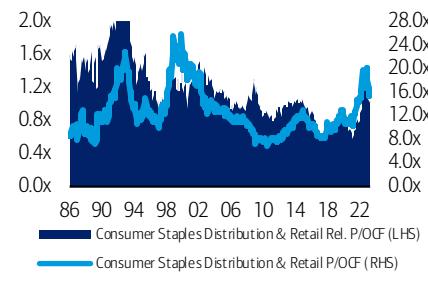


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 649: Distribution & Retail: P/OCF

On a Price/OCF basis valuations have edged lower recently

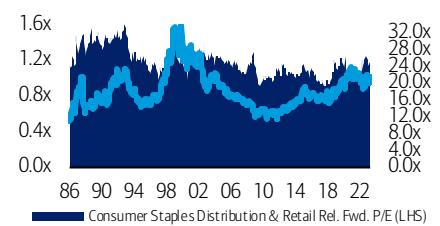


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 650: Distribution & Retail: Fwd. P/E

On a Forward P/E basis valuations have risen

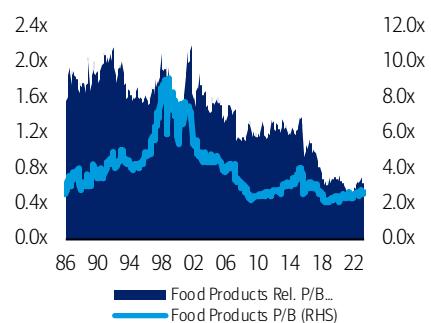


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 651: Food Products: P/B

On a Price/Book basis valuations have edged higher recently

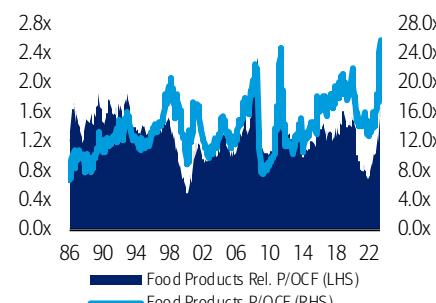


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 652: Food Products: P/OCF

On a Price/OCF basis valuations have edged higher recently

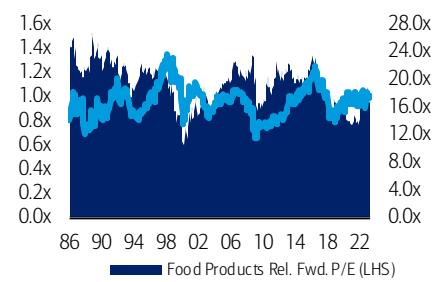


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 653: Food Products: Fwd. P/E

On a Forward P/E basis valuations have edged higher recently



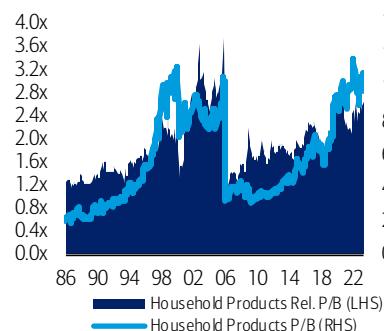
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 654: Household Products: P/B

On a Price/Book basis valuations have risen in recent years

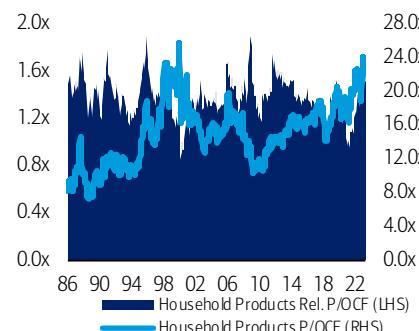


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 655: Household Products: P/OCF

On a Price/OCF basis valuations have edged higher recently

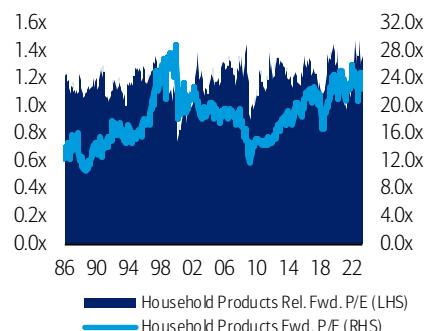


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 656: Household Products: Fwd. P/E

On a Forward P/E basis valuations have edged higher recently

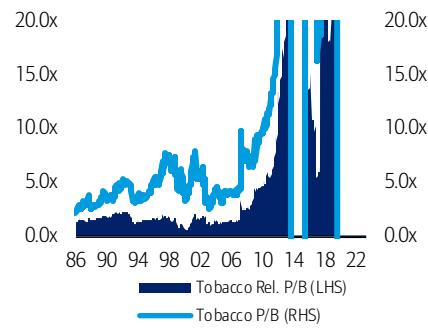


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 657: Tobacco: P/B

Book value has been negative in recent years

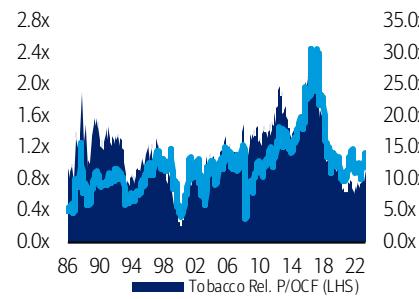


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 658: Tobacco: P/OCF

On a Price/OCF basis valuations have edged higher recently

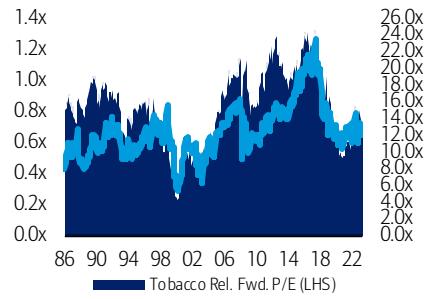


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 659: Tobacco: Fwd. P/E

On a Forward P/E basis valuations have edged higher recently



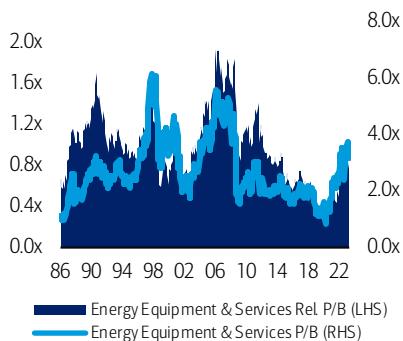
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Energy

Exhibit 660: Energy Equipment & Services: P/B

On a Price/Book basis valuations have risen recently

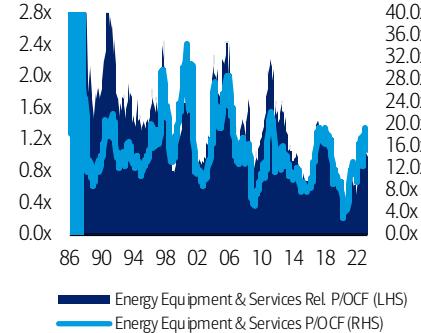


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 661: Energy Equipment & Services: P/OCF

On a Price/OCF basis valuations have risen recently

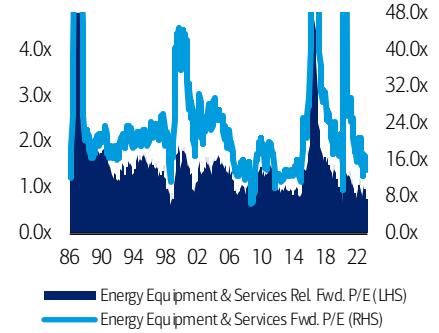


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 662: Energy Equipment & Services: Fwd. P/E

On a Forward P/E basis valuations have declined from all-time highs

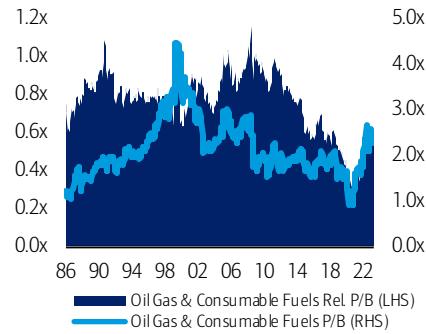


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 663: Oil Gas & Consumable Fuels: P/B

On a Price/Book basis valuations have edged higher recently

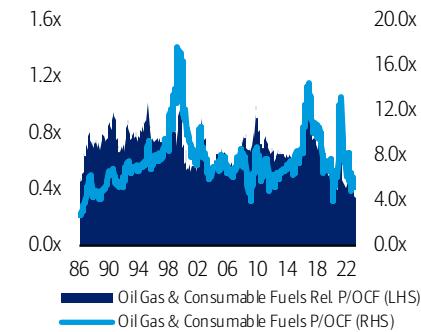


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 664: Oil Gas & Consumable Fuels: P/OCF

On a Price/OCF basis valuations have declined recently

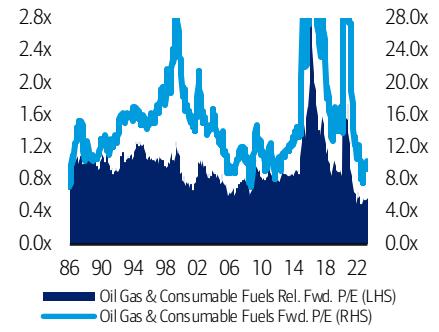


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 665: Oil Gas & Consumable Fuels: Fwd. P/E

On a Forward P/E basis valuations have risen recently



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

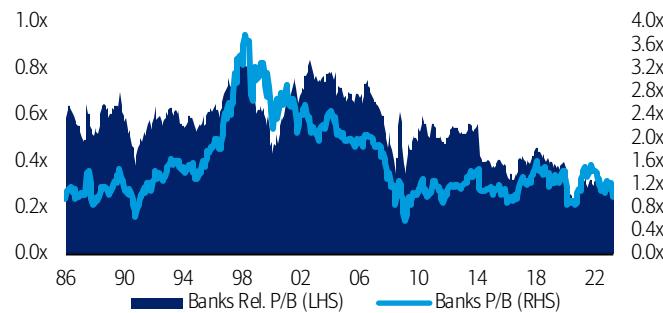
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Financials

Exhibit 666: Banks: P/B

On a Price/Book basis valuations have edged lower recently

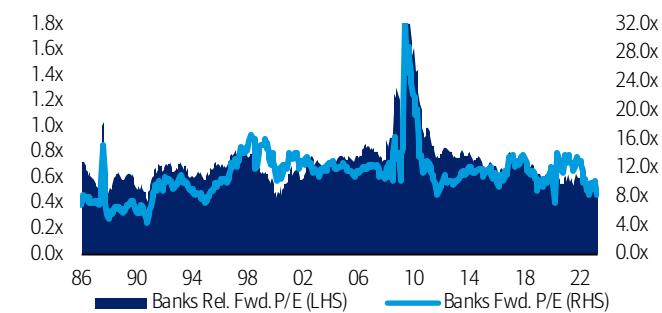


Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 667: Banks: Fwd. P/E

On a Forward P/E basis valuations have edged lower recently

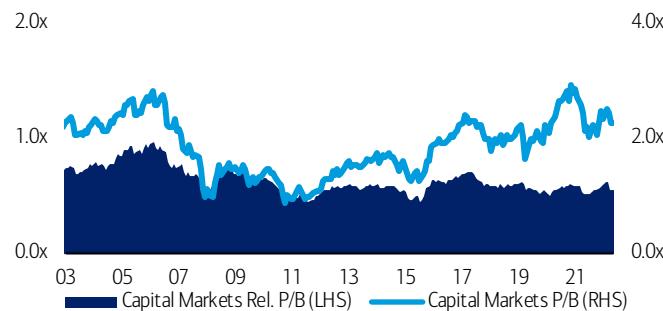


Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 668: Capital Markets: P/B

On a Price/Book basis valuations have declined recently

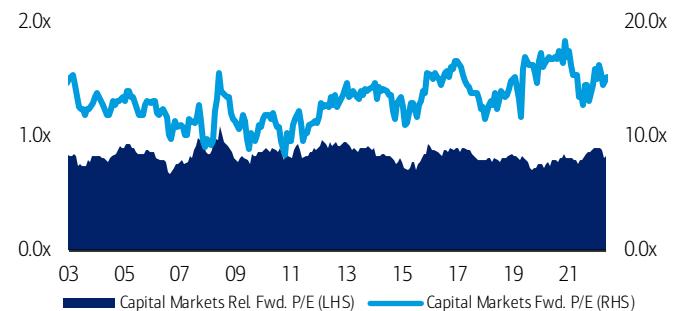


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 669: 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 670: Consumer Finance: P/B

On a Price/Book basis valuations have edged lower recently

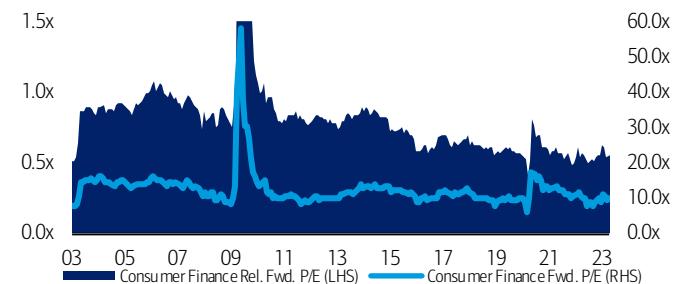


Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 671: Consumer Finance: Fwd. P/E

On a Forward P/E basis valuations have edged lower recently



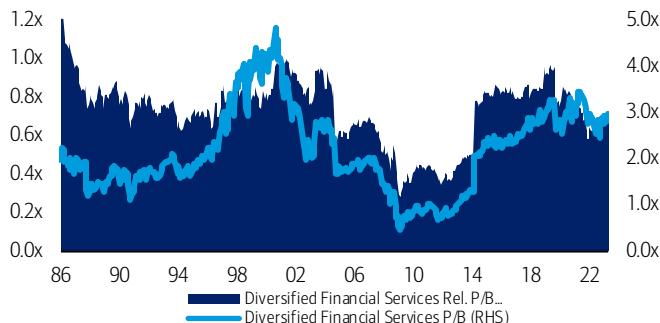
Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 672: Financial Services: P/B

On a Price/Book basis valuations have edged higher recently



Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 673: Financial Services: Fwd. P/E

On a Forward P/E basis valuations have risen recently

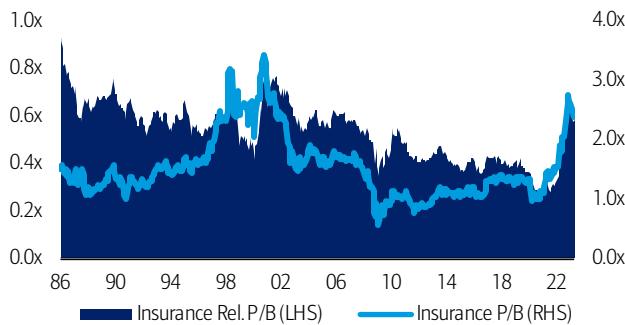


Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 674: Insurance: P/B

On a Price/Book basis valuations have edged lower recently

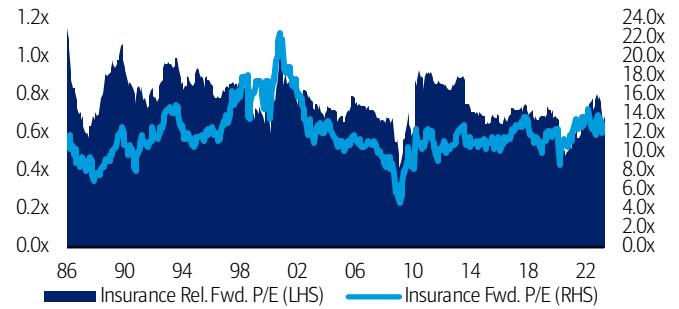


Source: Compustat, BofA US Equity & Quant Strategy

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Exhibit 675: Insurance: Fwd. P/E

On a Forward P/E basis valuations have declined recently



Source: Compustat, BofA US Equity & Quant Strategy

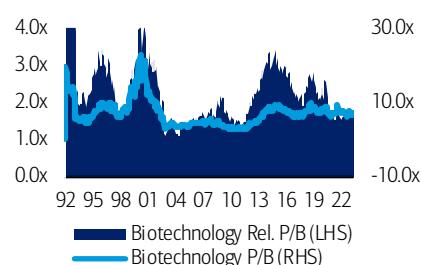
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Health Care

Exhibit 676: Biotechnology: P/B

On a Price/Book basis valuations have edged higher recently

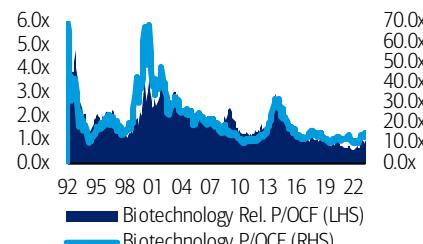


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 677: Biotechnology: P/OCF

On a Price/OCF basis valuations have risen in

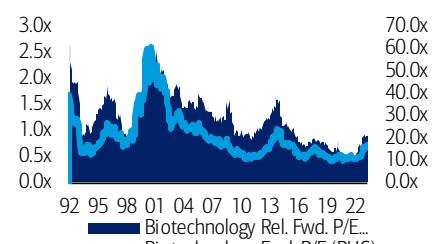


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 678: Biotechnology: Fwd. P/E

On a Forward P/E basis valuations have risen recently

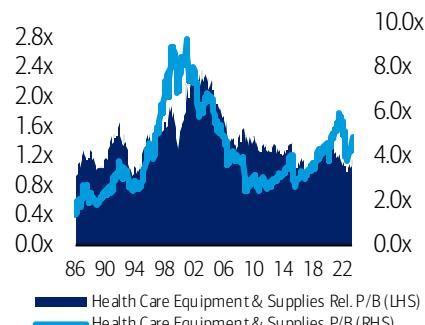


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 679: Health Care Equipment & Supplies: P/B

On a Price/Book basis valuations have risen

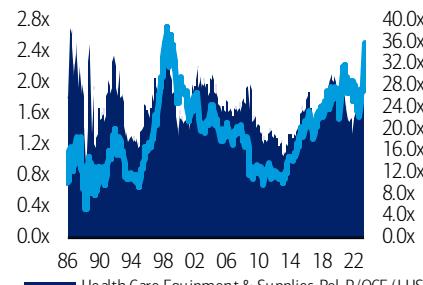


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 680: Health Care Equipment & Supplies: P/OCF

On a Price/OCF basis valuations have risen

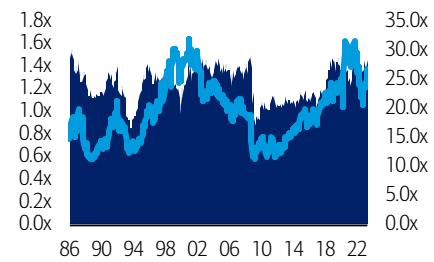


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 681: Health Care Equipment & Supplies: Fwd. P/E

On a Forward P/E basis valuations have risen

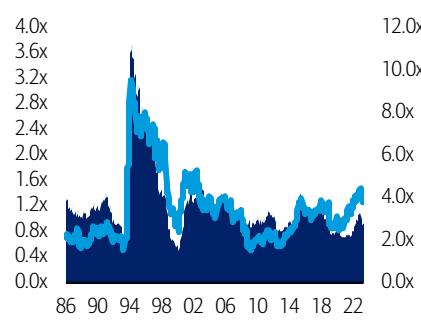


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 682: Health Care providers & Services: P/B

On a Price/Book basis valuations have edged lower recently

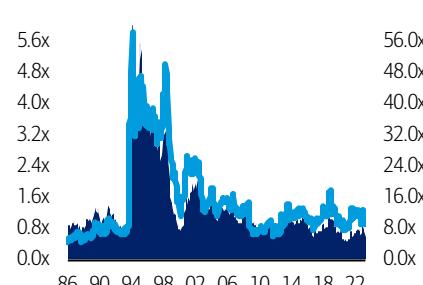


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 683: Health Care providers & Services: P/OCF

On a Price/OCF basis valuations have declined recently

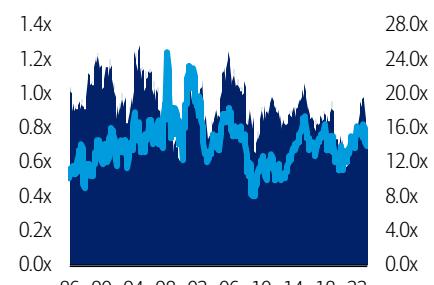


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 684: Health Care providers & Services: Fwd. P/E

On a Forward P/E basis valuations have edged lower recently



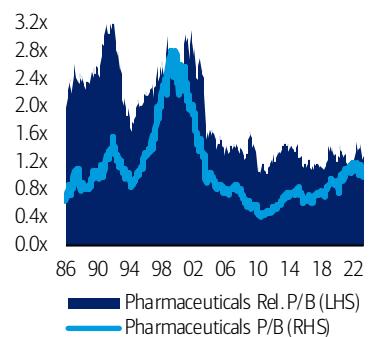
Source: I/B/E/S, BofA US Equity & Quant Strategy

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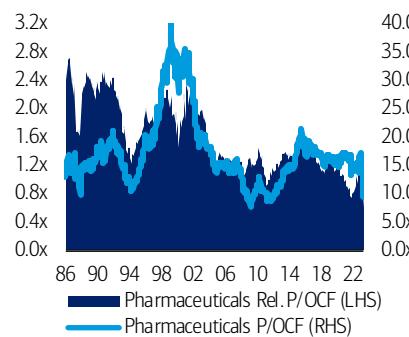


Exhibit 685: Pharmaceuticals: P/B

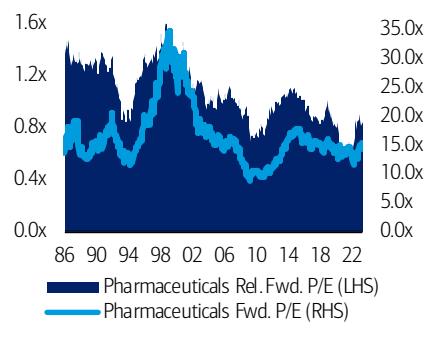
On a Price/Book basis valuations have edged lower recently

**Exhibit 686: Pharmaceuticals: P/OCF**

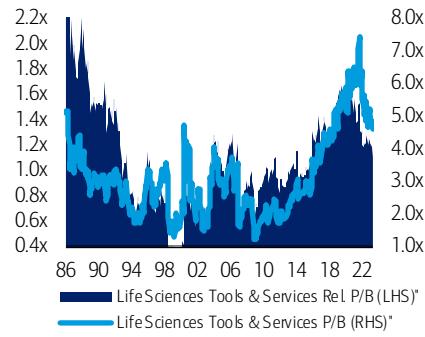
On a Price/OCF basis valuations have declined recently

**Exhibit 687: Pharmaceuticals: Fwd. P/E**

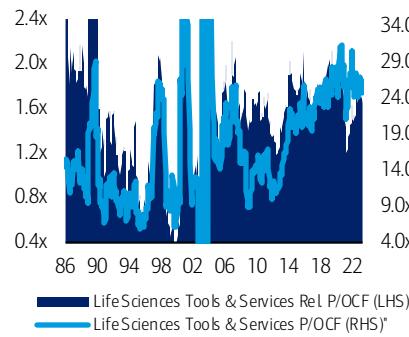
On a Forward P/E basis valuations have risen recently

**Exhibit 688: Life Sciences Tools & Services: P/B**

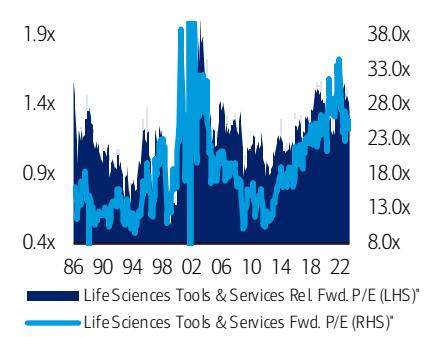
On a Price/Book basis valuations have declined

**Exhibit 689: Life Sciences Tools & Services: P/OCF**

On a Price/OCF basis valuations have risen recently

**Exhibit 690: Life Sciences Tools & Services: Fwd. P/E**

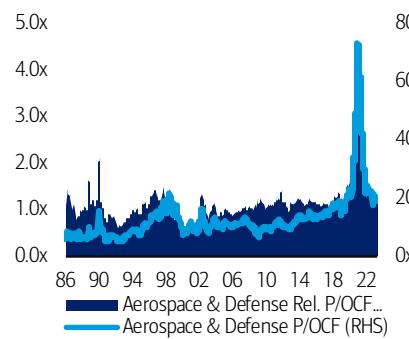
On a Forward P/E basis valuations have declined recently

**Industrials****Exhibit 691: Aerospace & Defense: P/B**

On a Price/Book basis valuations have edged higher recently

**Exhibit 692: Aerospace & Defense: P/OCF**

On a Price/OCF basis valuations have declined from all-time highs

**Exhibit 693: Aerospace & Defense: Fwd. P/E**

On a Forward P/E basis valuations have risen recently

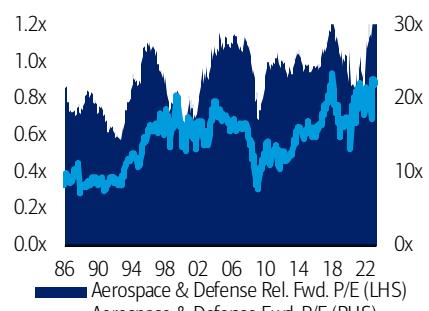
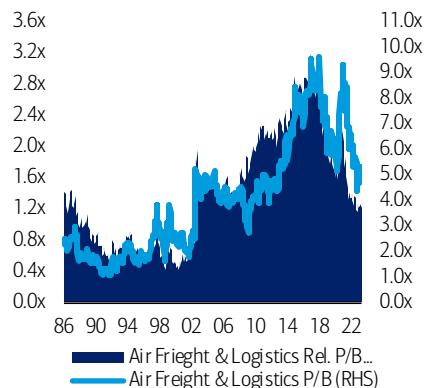
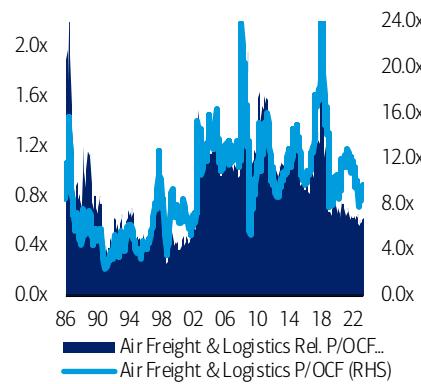


Exhibit 694: Air Freight & Logistics: P/B

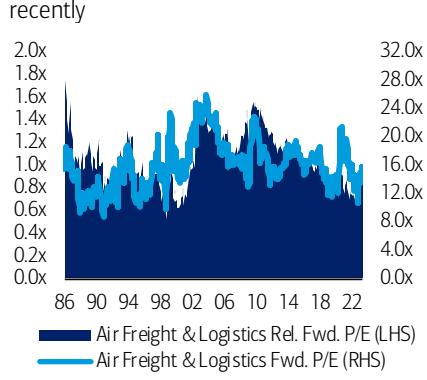
On a Price/Book basis valuations have declined

**Exhibit 695: Air Freight & Logistics: P/OCF**

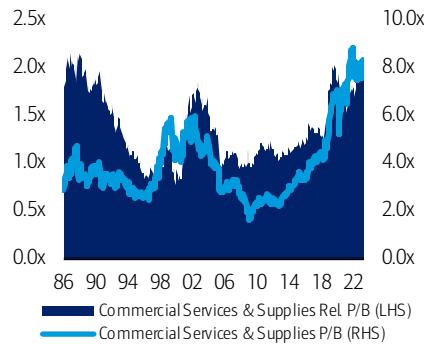
On a Price/OCF basis valuations have edged higher recently

**Exhibit 696: Air Freight & Logistics: Fwd. P/E**

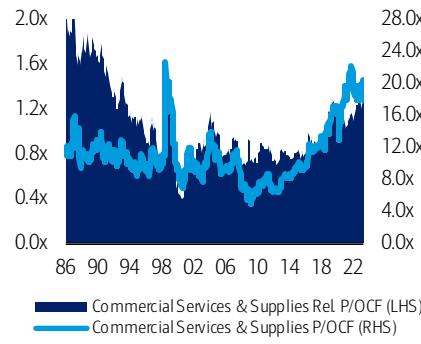
On a Forward P/E basis valuations have risen recently

**Exhibit 697: Commercial Services & Supplies : P/B**

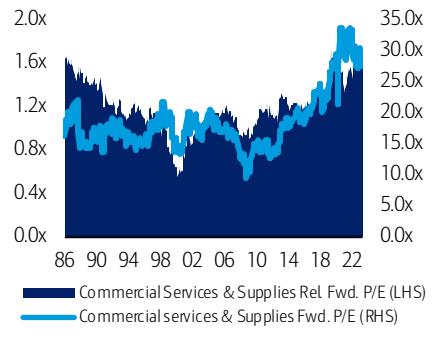
On a Price/Book basis valuations are near all-time highs

**Exhibit 698: Commercial Services & Supplies : P/OCF**

On a Price/OCF basis valuations have risen in recent years

**Exhibit 699: Commercial Services & Supplies : Fwd. P/E**

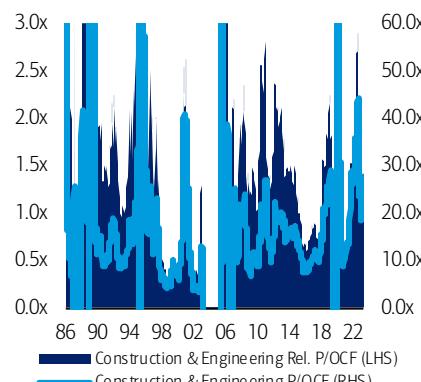
On a Forward P/E basis valuations have declined

**Exhibit 700: Construction & Engineering: P/B**

On a Price/Book basis valuations have risen recently

**Exhibit 701: Construction & Engineering: P/OCF**

On a Price/OCF basis valuations have declined recently

**Exhibit 702: Construction & Engineering: Fwd. P/E**

On a Forward P/E basis valuations have edged higher recently

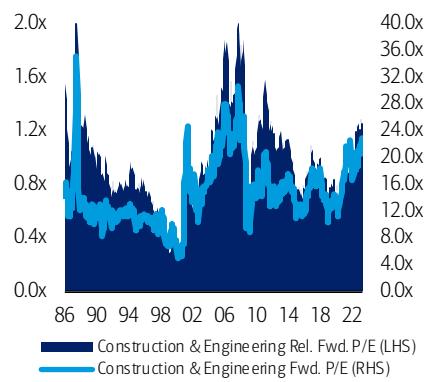
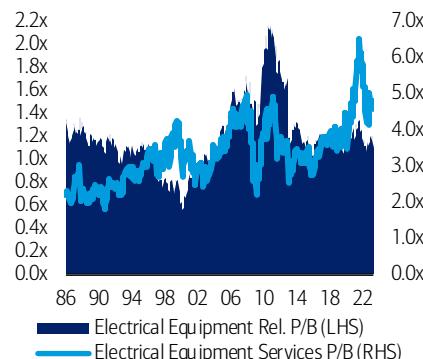


Exhibit 703: Electrical Equipment: P/B

On a Price/Book basis valuations have declined recently from all-time highs

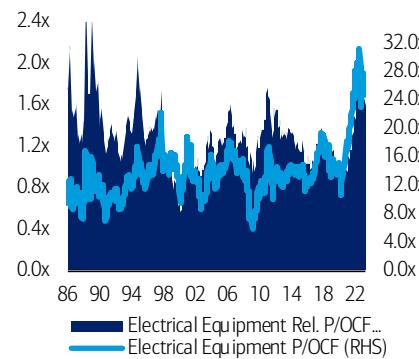


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 704: Electrical Equipment: P/OCF

On a Price/OCF basis valuations have risen recently

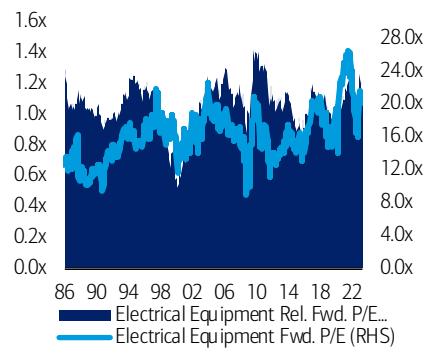


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 705: Electrical Equipment: Fwd. P/E

On a Forward P/E basis valuations have risen recently

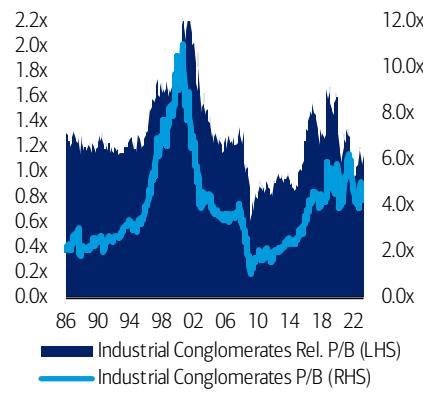


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 706: Industrial Conglomerates: P/B

On a Price/Book basis valuations have risen recently

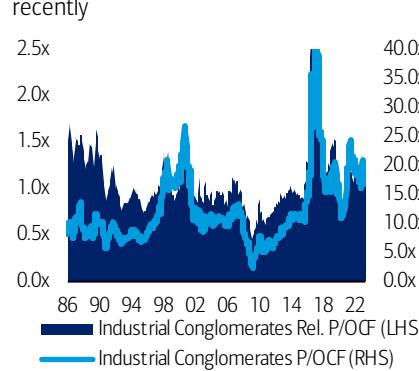


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 707: Industrial Conglomerates: P/OCF

On a Price/OCF basis valuations have declined recently

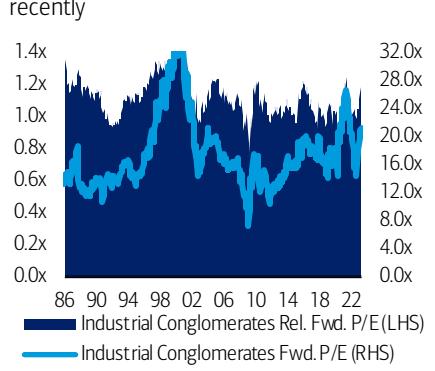


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 708: Industrial Conglomerates: Fwd. P/E

On a Forward P/E basis valuations have risen recently

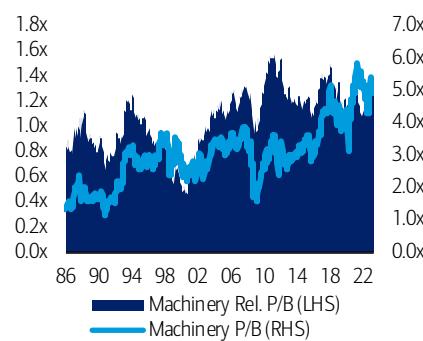


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 709: Machinery: P/B

On a Price/Book basis valuations have risen recently

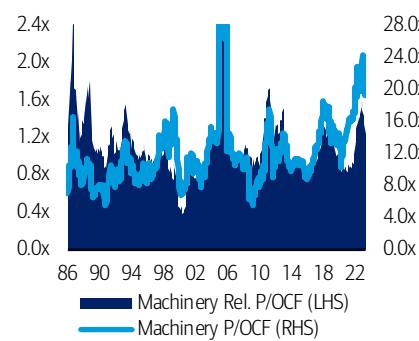


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 710: Machinery: P/OCF

On a Price/OCF basis valuations have declined recently

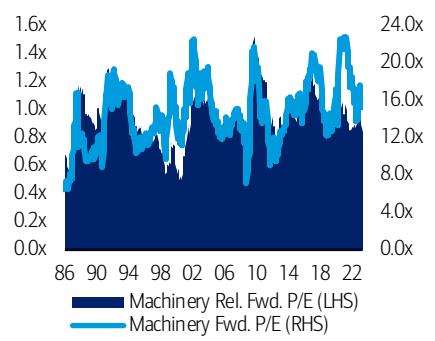


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 711: Machinery: 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 712: Trading Companies & Distributors: P/B

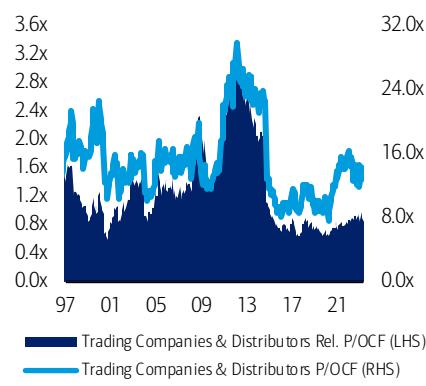
On a Price/Book basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 713: Trading Companies & Distributors: P/OCF

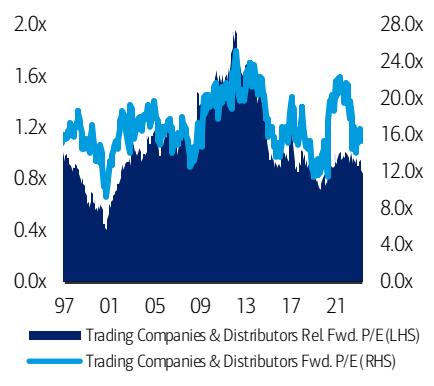
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 714: Trading Companies & Distributors: Fwd. P/E

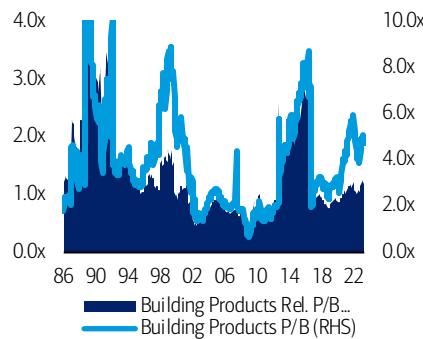
On a Forward P/E basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 715: Building products: P/B

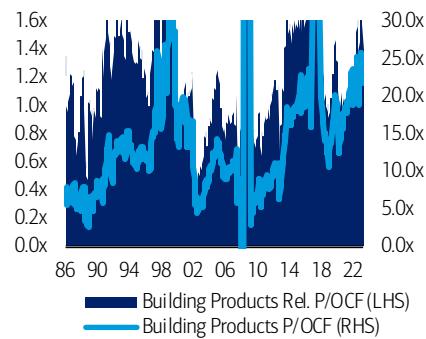
On a Price/Book basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 716: Building products: P/OCF

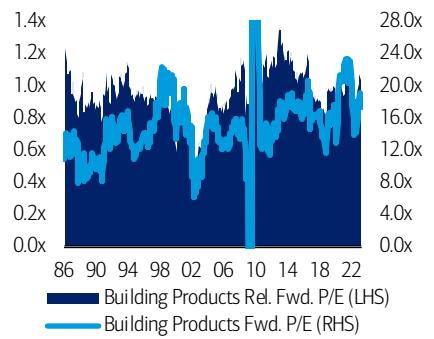
On a Price/OCF basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 717: Building products: Fwd. P/E

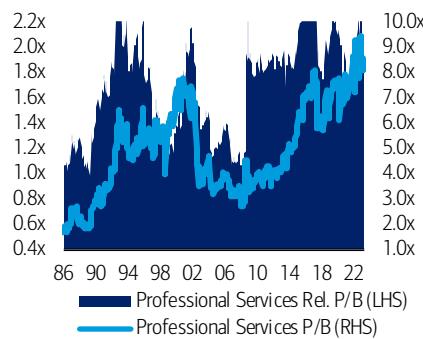
On a Forward P/E basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 718: Professional Services: P/B

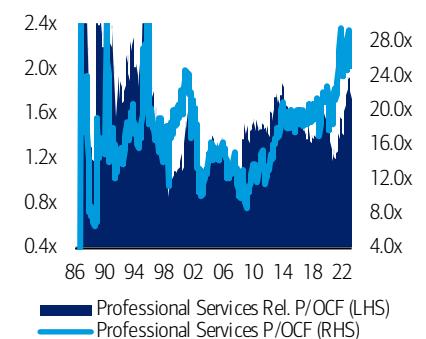
On a Price/Book basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 719: Professional Services: P/B

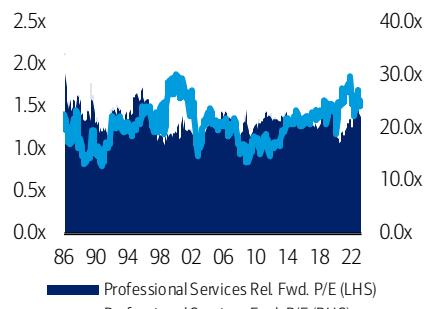
On a Price/OCF basis valuations have risen recently



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

Exhibit 720: Professional Services: Fwd. P/E

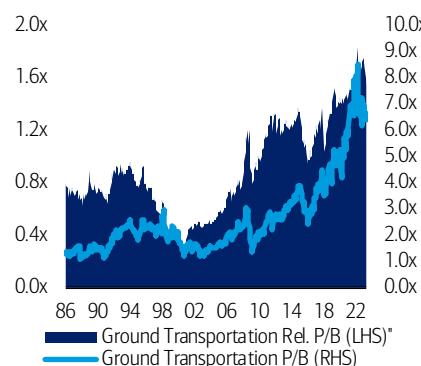
On a Forward P/E basis valuations have risen recently



Source: I/B/E/S, BofA US Equity & Quant Strategy
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Exhibit 721: Ground Transportation: P/B

On a Price/Book basis valuations have declined recently

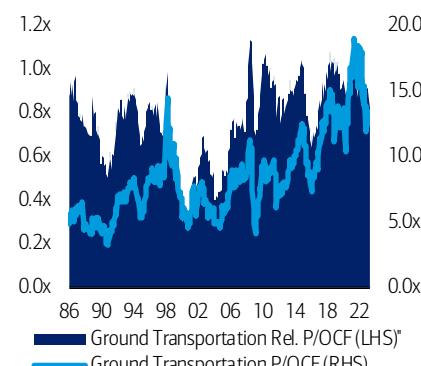


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 722: Ground Transportation: P/OCF

On a Price/OCF basis valuations have declined recently

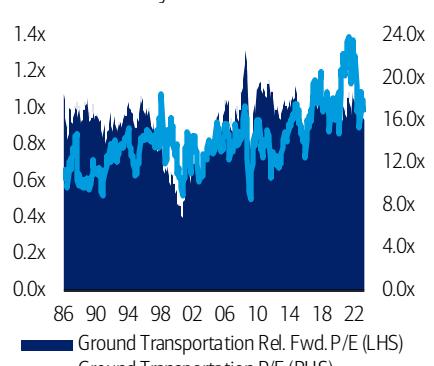


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 723: Ground Transportation: Fwd. P/E

On a Forward P/E basis valuations have declined recently

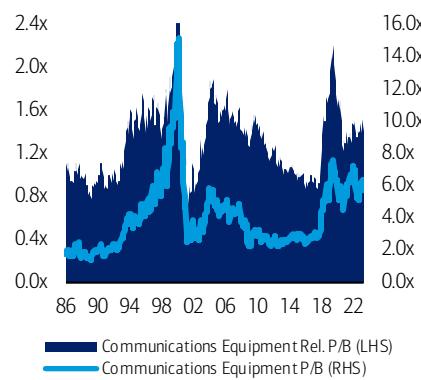


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Information Technology**Exhibit 724: Communication Equipment: P/B**

On a Price/Book basis valuations have risen recently

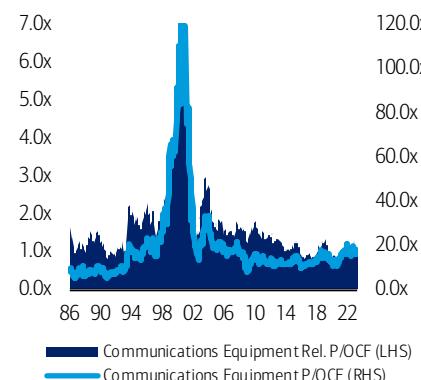


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 725: Communication Equipment: P/OCF

On a Price/OCF basis valuations have edged higher recently

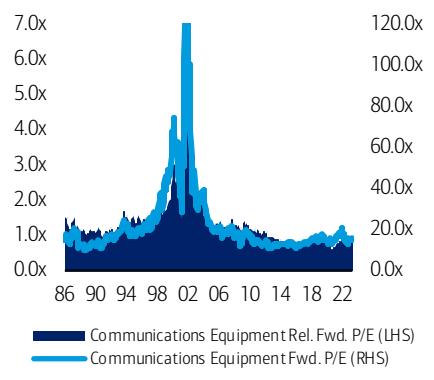


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 726: 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

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Exhibit 727: Electronic Equipment Instruments & Components: P/B

On a Price/Book basis valuations have declined recently

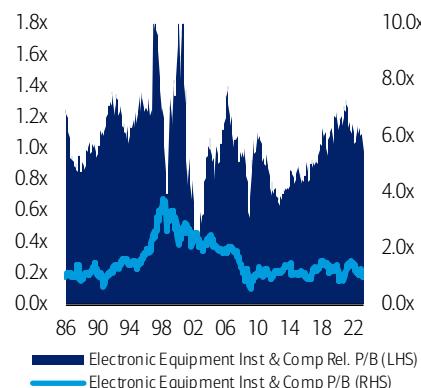


Exhibit 728: Electronic Equipment Instruments & Components: P/OCF

On a Price/OCF basis valuations have risen in recent years

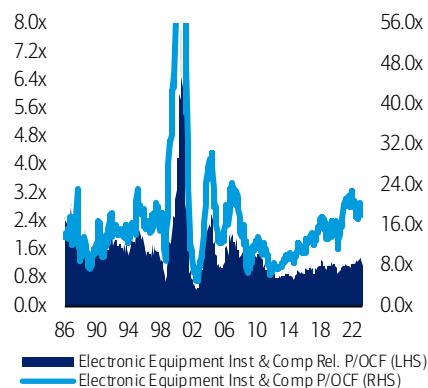


Exhibit 729: Electronic Equipment Instruments & Components: Fwd. P/E

On a Forward P/E basis valuations have risen recently

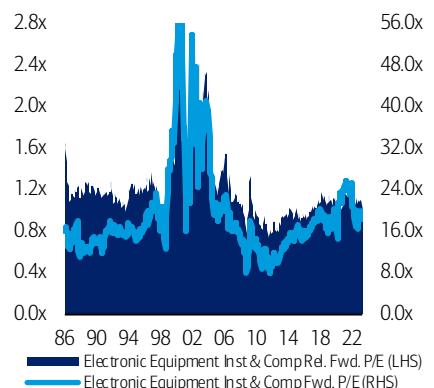


Exhibit 730: IT Services: P/B

On a Price/Book basis valuations have edged lower recently

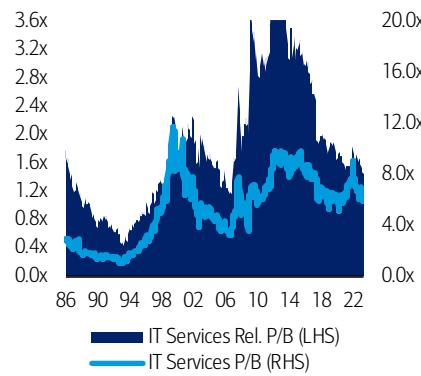


Exhibit 731: IT Services: P/OCF

On a Price/OCF basis valuations have declined

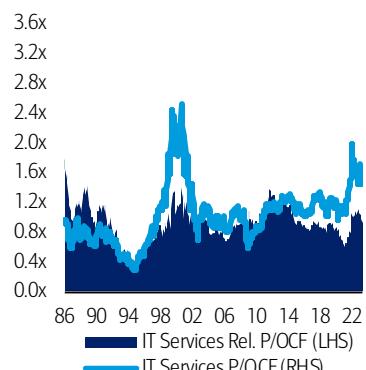


Exhibit 732: IT Services: Fwd. P/E

On a Forward P/E basis valuations have declined recently

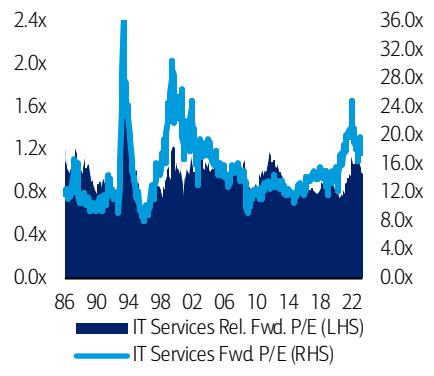


Exhibit 733: Semiconductors & Semiconductor Equipment: P/B

On a Price/Book basis valuations have risen



Exhibit 734: Semiconductors & Semiconductor Equipment: P/OCF

On a Price/OCF basis valuations have risen

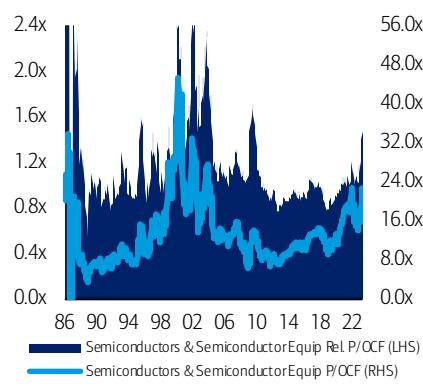


Exhibit 735: Semiconductors & Semiconductor Equipment: Fwd. P/E

On a Forward P/E basis valuations have declined

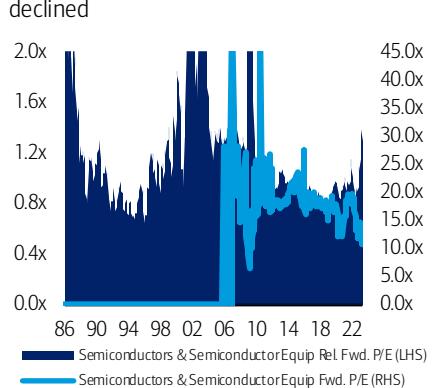
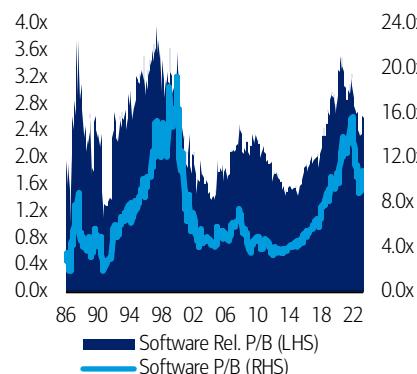


Exhibit 736: Software: P/B

On a Price/Book basis valuations have risen recently

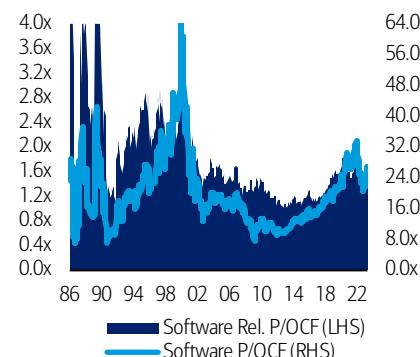


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 737: Software: P/OCF

On a Price/OCF basis valuations have risen recently

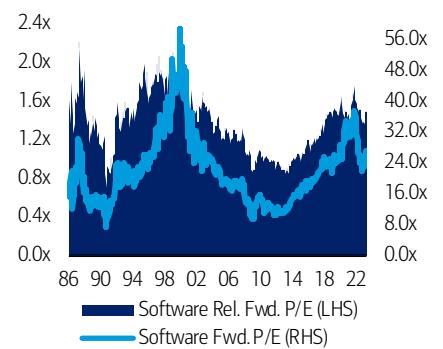


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 738: Software: Fwd. P/E

On a Forward P/E basis valuations have risen recently

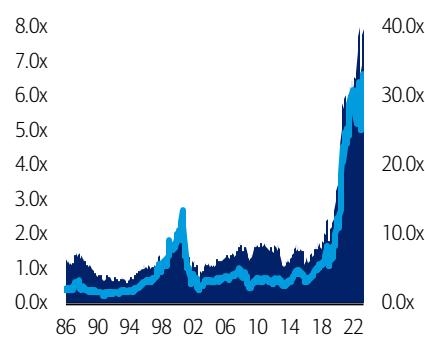


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 739: Technology Hardware Storage & Peripherals: P/B

On a Price/Book basis valuations are near all-time highs

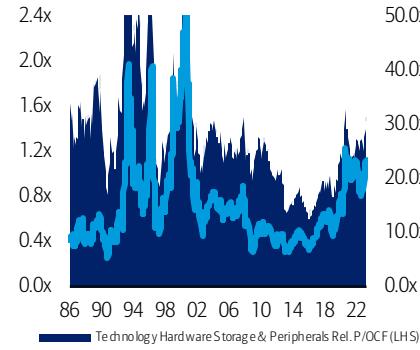


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 740: Technology Hardware Storage & Peripherals: P/OCF

On a Price/OCF basis valuations have risen

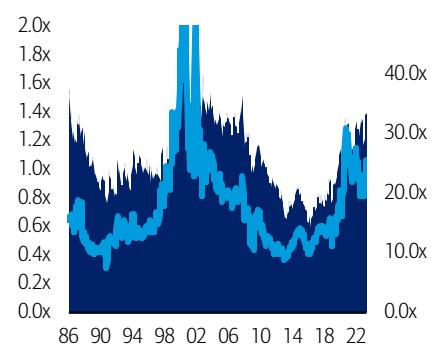


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 741: Technology Hardware Storage & Peripherals: Fwd. P/E

On a Forward P/E basis valuations have risen recently



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

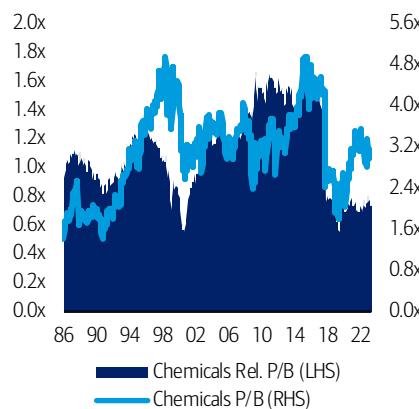
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Materials

Exhibit 742: Chemicals: P/B

On a Price/Book basis valuations have risen recently

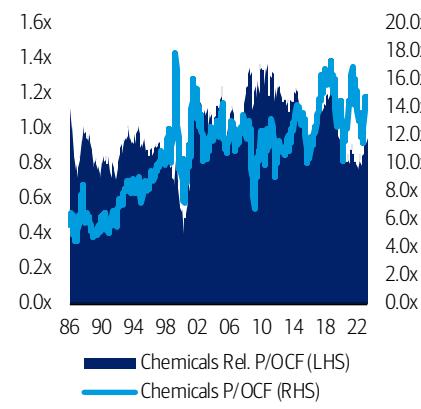


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 743: Chemicals: P/OCF

On a Price/OCF basis valuations have risen recently

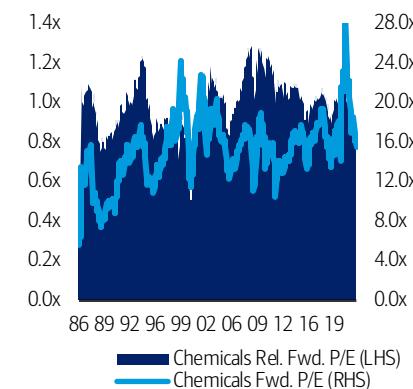


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 744: Chemicals: Fwd. P/E

On a Forward P/E basis valuations have declined from all-time highs

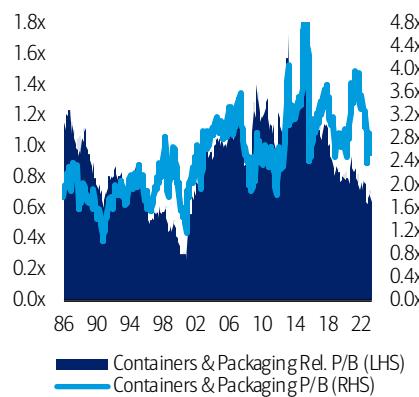


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 745: Containers & Packaging: P/B

On a Price/Book basis valuations have declined recently

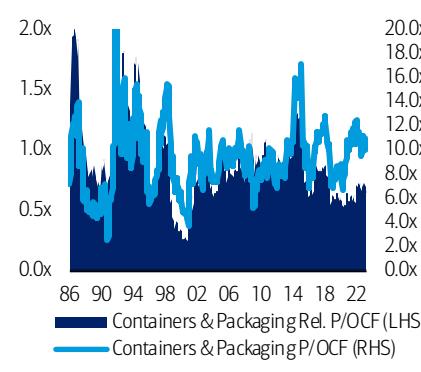


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 746: Containers & Packaging: P/OCF

On a Price/OCF basis valuations have risen recently

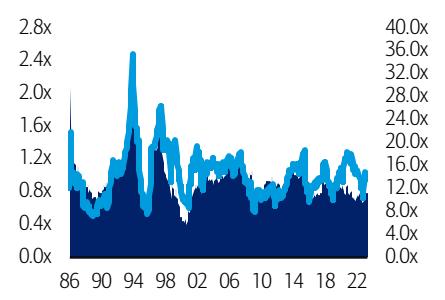


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 747: Containers & Packaging: 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 748: Metals & Mining: P/B

On a Price/Book basis valuations have risen recently

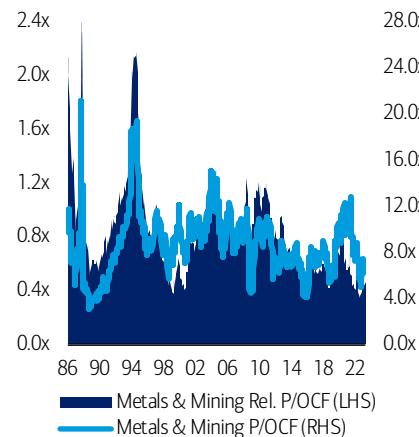


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 749: Metals & Mining: P/OCF

On a Price/OCF basis valuations have edged lower recently

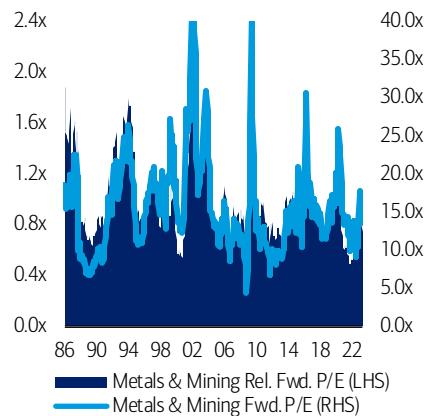


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 750: Metals & Mining: Fwd. P/E

On a Forward P/E basis valuations have declined recently

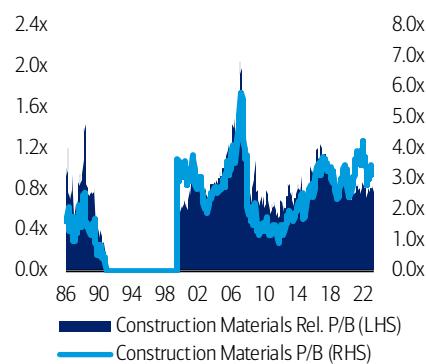


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 751: Construction Materials: P/B

On a Price/Book basis valuations have risen recently

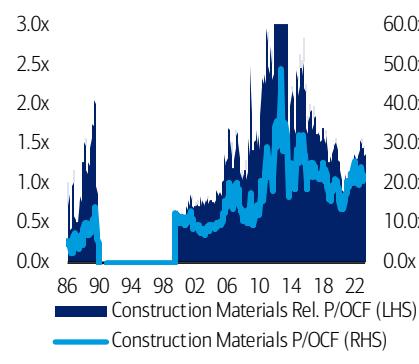


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 752: Construction Materials: P/OCF

On a Price/OCF basis valuations have edged higher recently

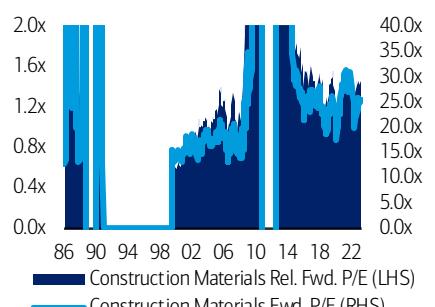


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 753: Construction Materials: Fwd. P/E

On a Forward P/E basis valuations have risen recently



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

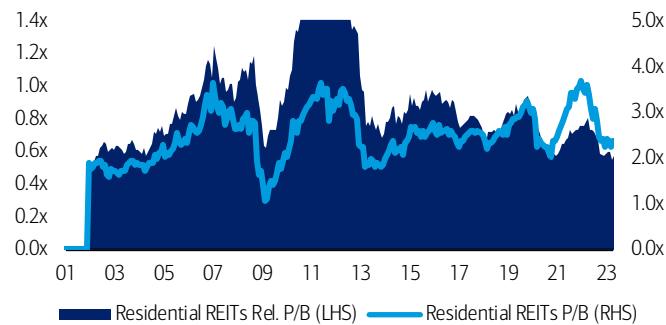
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Real Estate

Exhibit 754: Residential REITs: P/B

On a Price/Book basis valuations have declined recently

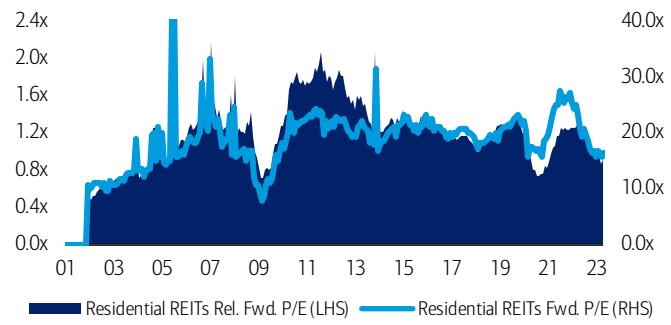


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 755: Residential 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 756: Real Estate Management & Development: P/B

On a Price/Book basis valuations have edged lower recently

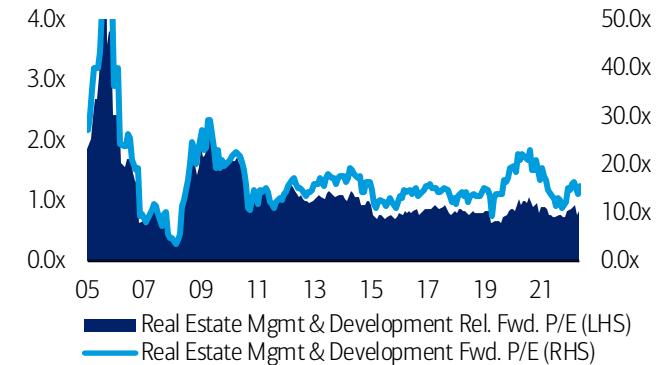


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 757: Real Estate Management & Development: Fwd. P/E

On a Forward P/E basis valuations have risen recently



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

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Exhibit 758: Retail REITs Rel Fwd. P/B (LHS)

On a Price/Book basis valuations have edged lower recently

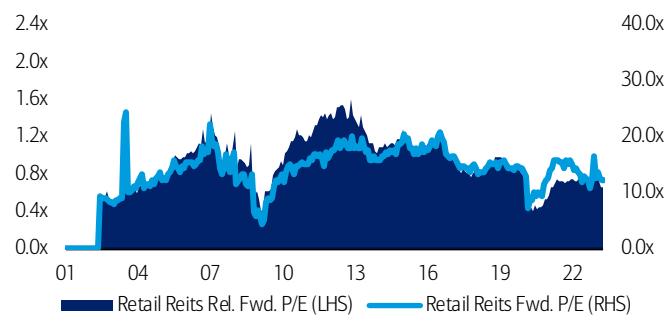


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 759: Retail REITs

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 760: Specialized REITs

On a Price/Book basis valuations have declined



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

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Exhibit 761: Specialized REITs

On a Forward P/E basis valuations have declined

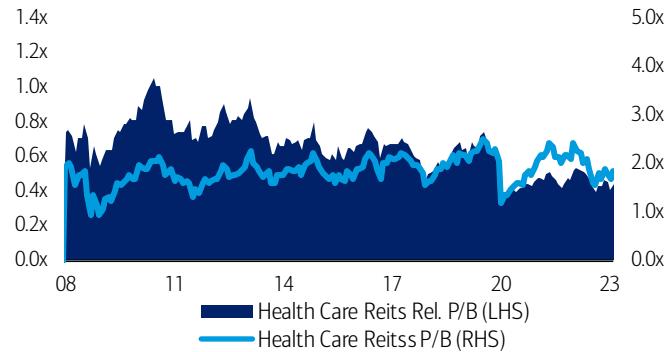


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 762: Health Care REITs

On a Price/Book basis valuations have risen

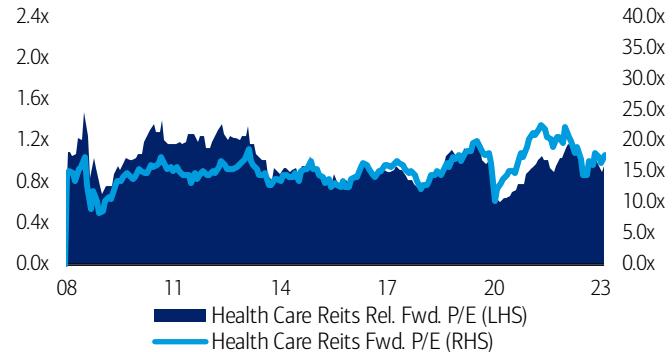


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 763: Health Care REITs

On a Forward P/E basis valuations have risen

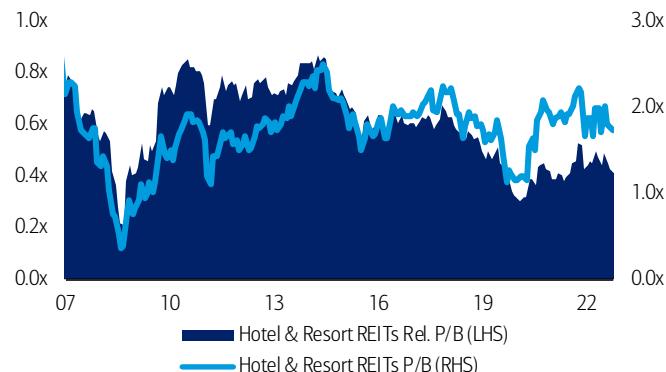


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 764: Hotel & Resort REITs

On a Price/Book basis valuations have declined

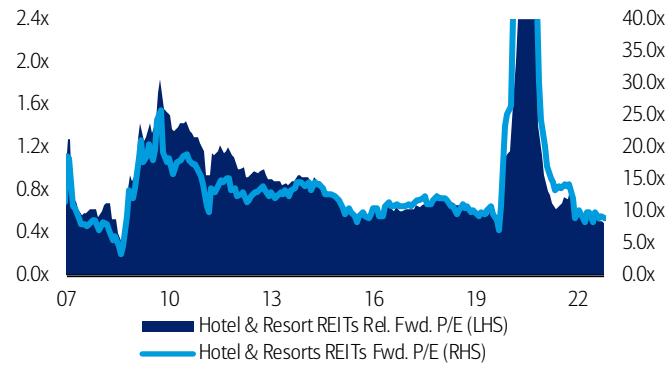


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 765: Hotel & Resort REITs

On a Forward P/E basis valuations have declined



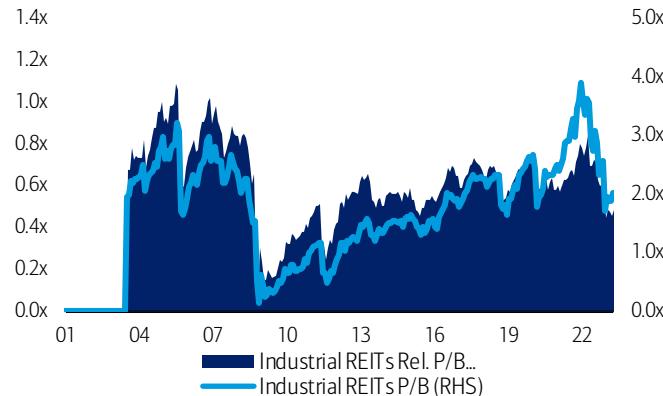
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 766: Industrial REITs

On a Price/Book basis valuations have declined

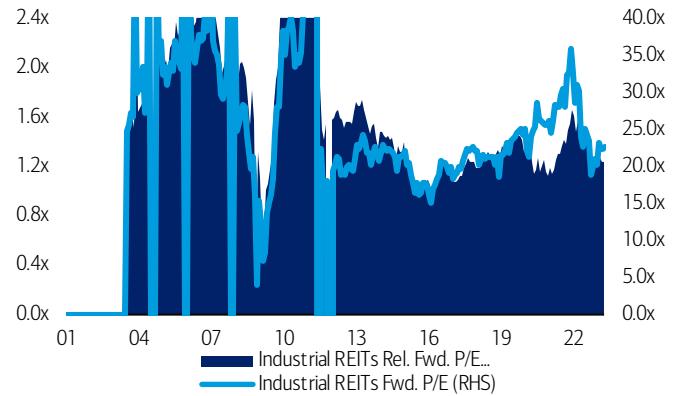


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 767: Industrial REITs

On a Forward P/E basis valuations have risen

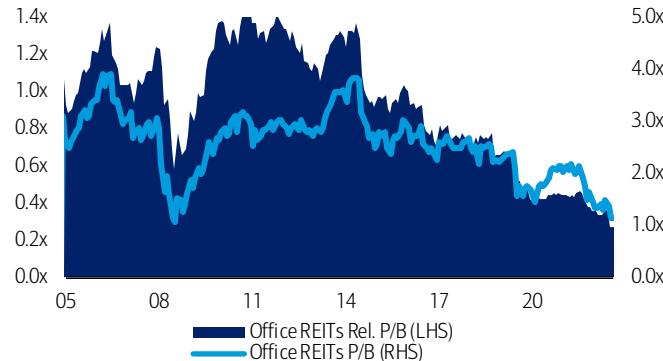


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 768: Office REITs

On a Price/Book basis valuations have declined

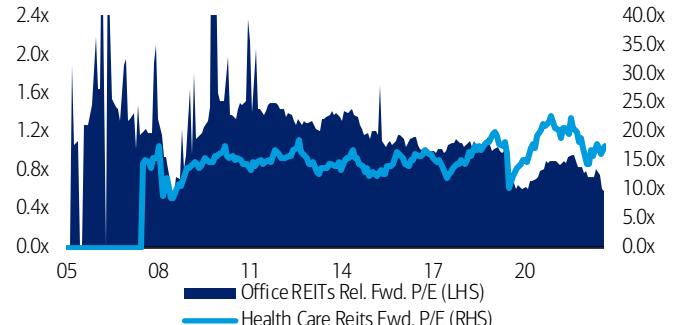


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 769: Office REITs

On a Forward P/E basis valuations have risen



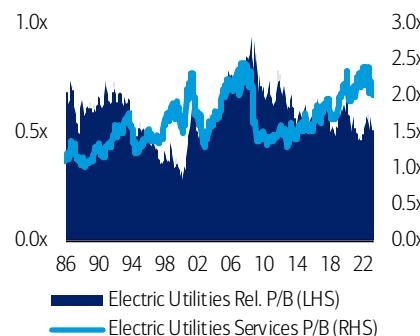
Source: I/B/E/S, BofA US Equity & Quant Strategy

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Utilities

Exhibit 770: Electric Utilities: P/B

On a Price/Book basis valuations have declined

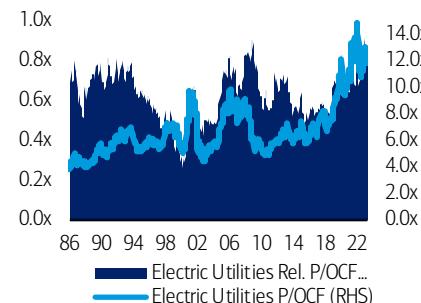


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 771: Electric Utilities: P/OCF

On a Price/OCF basis valuations have edged higher recently

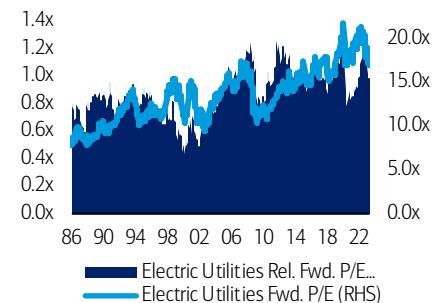


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 772: Electric Utilities: Fwd. P/E

On a Forward P/E basis valuations have edged lower recently

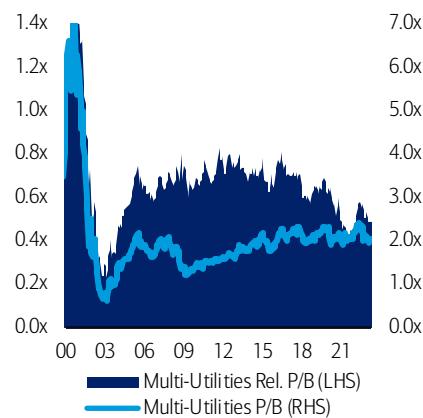


Source: I/B/E/S, BofA US Equity & Quant Strategy

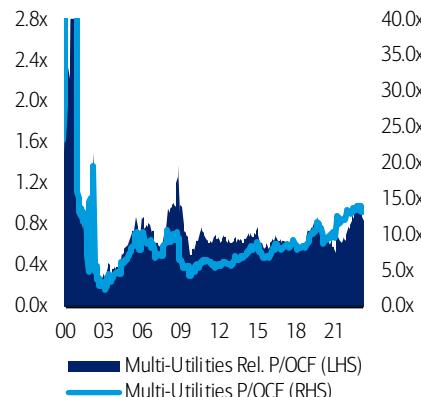
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Exhibit 773: Multi-Utilities: P/B

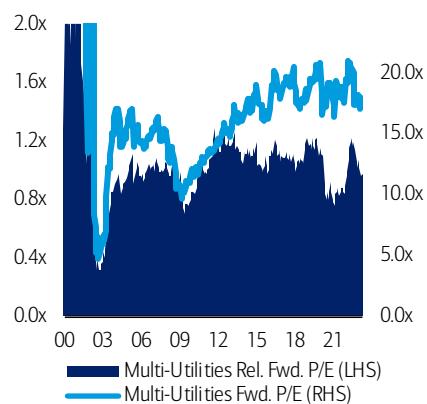
On a Price/Book basis valuations have edged lower recently

**Exhibit 774: Multi-Utilities: P/B**

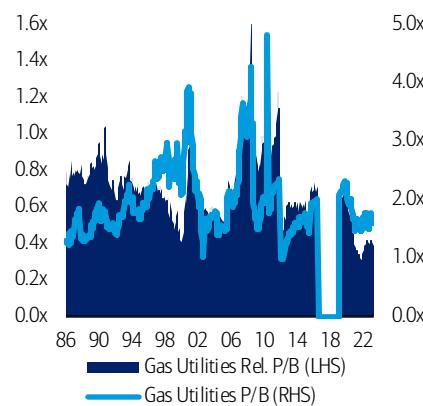
On a Price/OCF basis valuations have risen

**Exhibit 775: Multi-Utilities: Fwd. P/E**

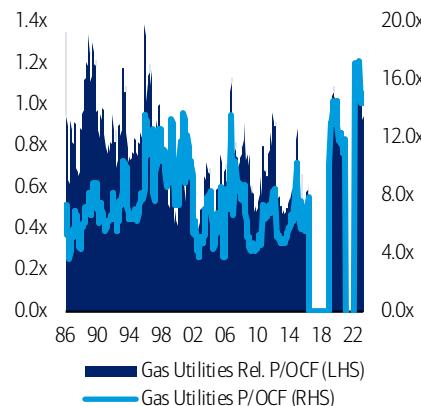
On a Forward P/E basis valuations have edged lower recently

**Exhibit 776: Gas Utilities: P/B**

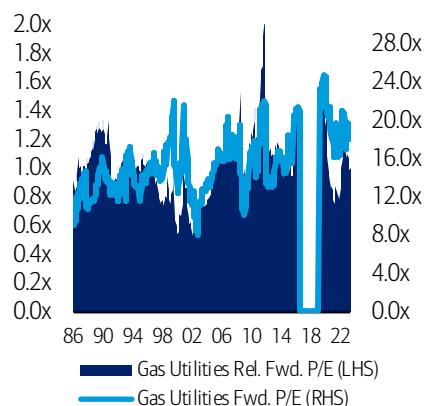
On a Price/Book basis valuations have edged lower recently

**Exhibit 777: Multi-Utilities: P/B**

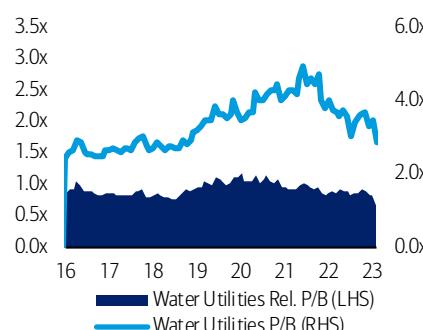
On a Price/OCF basis valuations have declined

**Exhibit 778: Gas Utilities: Fwd. P/E**

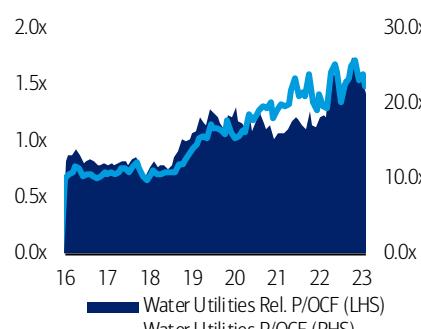
On a Forward P/E basis valuations have edged lower recently

**Exhibit 779: Water Utilities: P/B**

On a Price/Book basis valuations have edged lower recently

**Exhibit 780: Water Utilities: P/OCF**

On a Price/OCF basis valuations have declined

**Exhibit 781: Water Utilities: Fwd. P/E**

On a Forward P/E basis valuations have edged higher recently

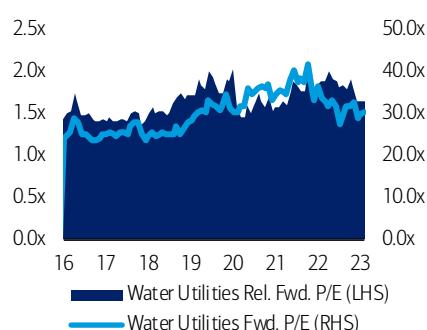
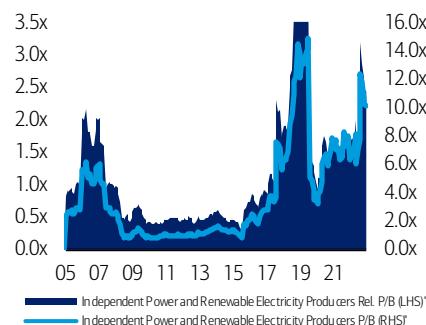


Exhibit 782: Independent Power and Renewable Electricity Producers: P/B

On a Price/Book basis valuations have edged lower

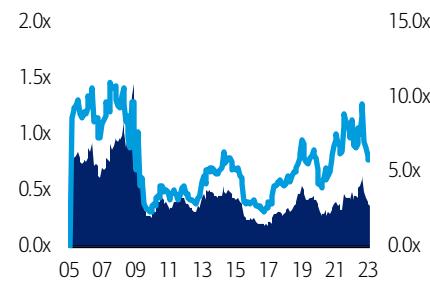


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 783: Independent Power and Renewable Electricity Producers: P/OCF

On a Price/OCF basis valuations have declined

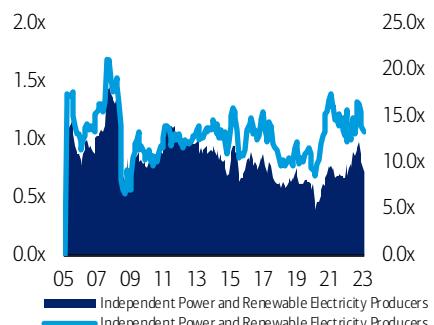


Source: I/B/E/S, BofA US Equity & Quant Strategy

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Exhibit 784: Independent Power and Renewable Electricity Producers: 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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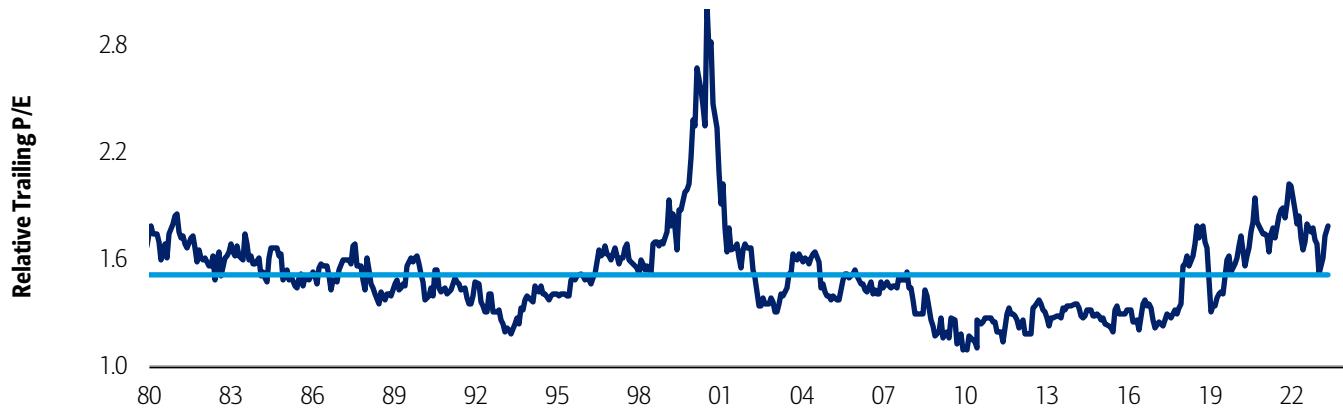
Section VII: Relative Valuation between Growth and Value Benchmarks

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Fundamental Valuation

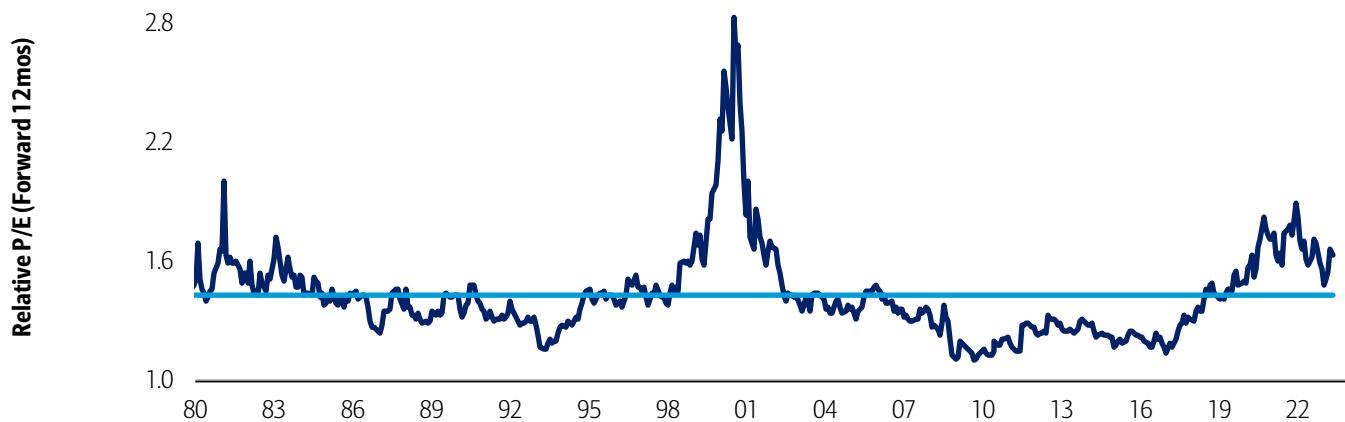
Exhibit 785: Russell 1000 Growth vs. Value Trailing P/E (1978 – 4/30/23)
On a Trailing P/E basis relative valuations are approaching the long-term average



Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 786: Russell 1000 Growth vs. Value Forward P/E (1978 – 4/30/23)
On a Forward P/E basis Growth valuations relative to Value remain above historic average

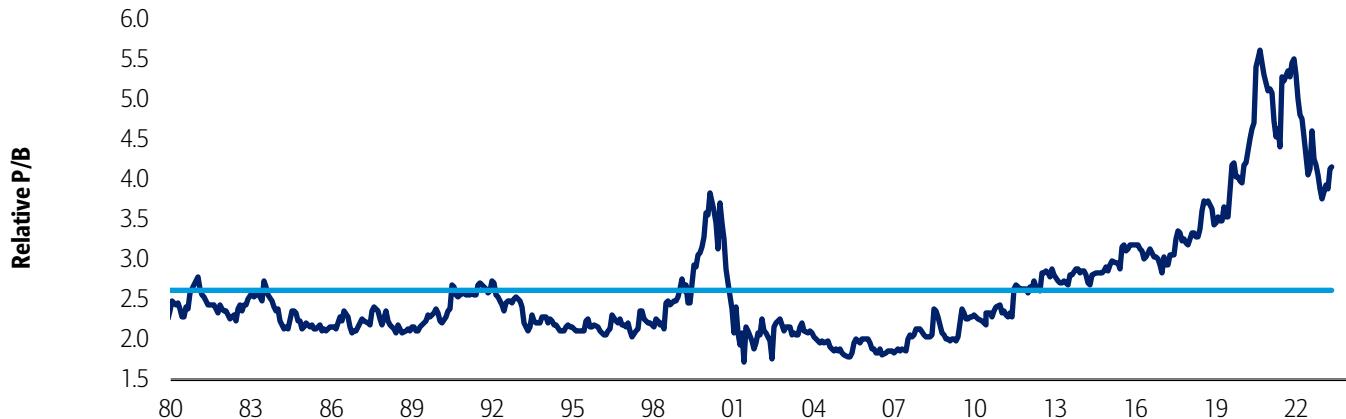


Source: BofA US Equity & Quant Strategy

BofA GLOBAL RESEARCH

Exhibit 787: Russell 1000 Growth vs. Value Price/Book Value (1978 – 4/30/23)

On a Price/Book Value basis Growth valuations relative to Value remain near historic highs

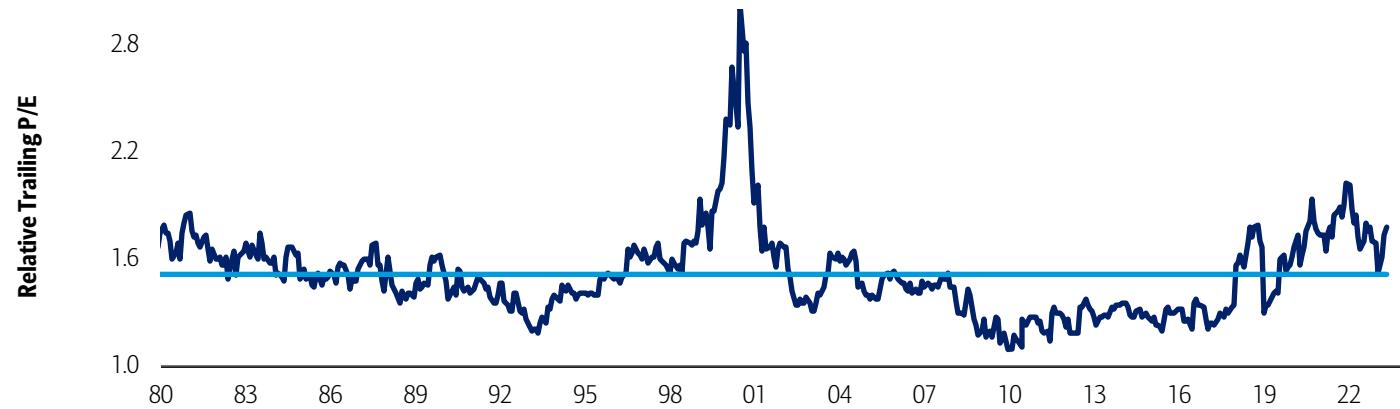


Source: BofA US Equity & Quant Strategy, Russell Investment Group, FactSet

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Exhibit 788: Russell 1000 Growth vs. Value Price/Sales (1978 – 4/30/23)

On a Price to Sales basis Growth valuations relative to Value remain elevated



Source: BofA US Equity & Quant Strategy, Russell Investment Group, FactSet

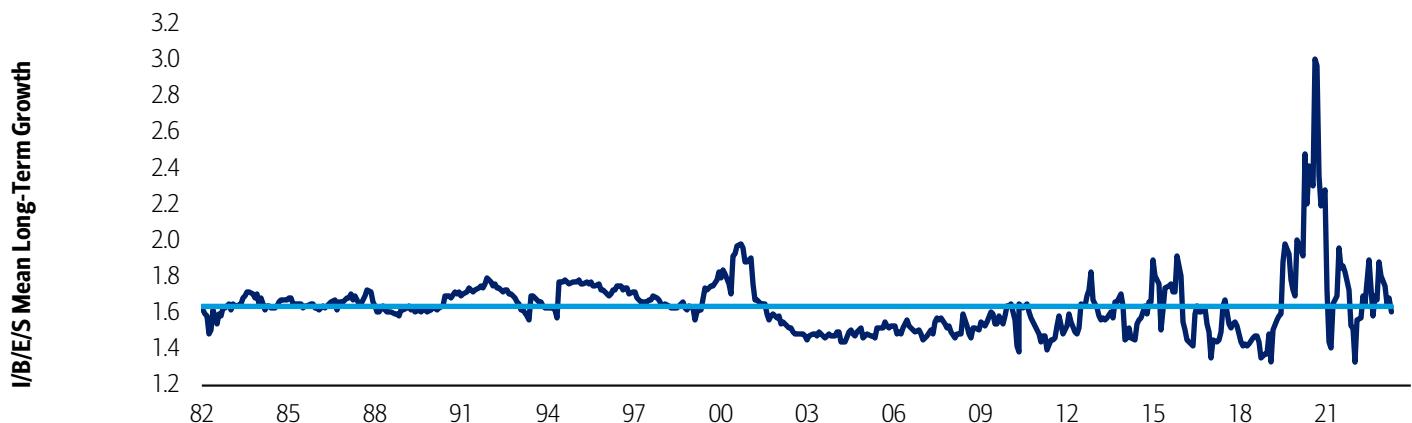
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Growth Characteristics

Exhibit 789: Russell 1000 Growth vs. Value Long-term Growth (1982 – 4/30/23)

Long-Term EPS Growth of Growth index declined to average levels vs Value index

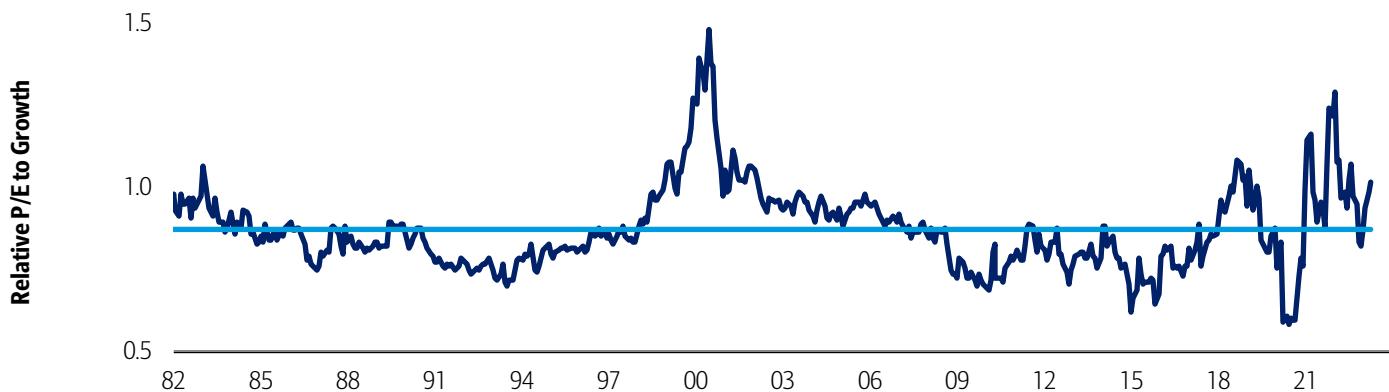


Source: BofA US Equity & Quant Strategy, FactSet

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Exhibit 790: Russell 1000 Growth vs. Value P/E to Growth (1978 – 4/30/23)

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

BofA US Equity & Quant Strategy ADR Indices

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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 791: Monthly price performance by different regions of the world

BofA Quant Strategy ADR Index Performance as of 04/30/2023

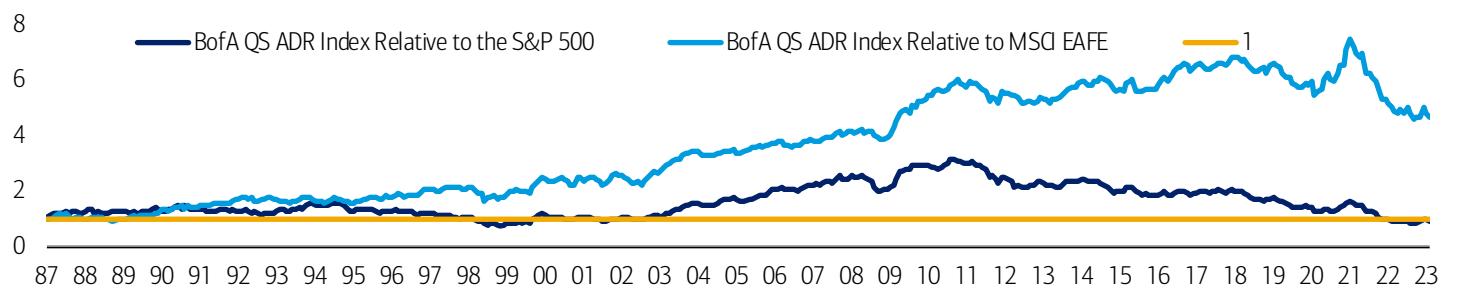
	Price Index 4/30/2023	1 M	3 M	6 M	12 M	YTD	3yr	5yr	10yr	ADR vs. MSCITM 1M Rel Ret	Weights
ADR COMPOSITE	1,588	-0.3	-7.2	21.3	-1.2	7.8	1.5	-6.4	0.8		100.0%
ADR COMPOSITE (ex Latin America)	759	-0.4	-7.9	22.8	-2.5	7.7	-1.1	-6.9	0.8		85.8%
ADR Latin America	444	0.4	-3.2	8.2	4.5	7.5	17.3	-5.2	-0.5		14.2%
ADR Asia (ex Japan)	234	-2.3	-11.5	38.8	-1.8	7.1	-9.1	-13.4	0.4		34.2%
ADR Europe (non - EMU)	343	1.6	-6.7	11.4	-5.1	4.3	0.3	-3.4	0.5		16.2%
ADR EMU	277	1.0	-2.7	24.4	5.1	15.2	9.3	-1.1	2.8		19.4%
ADR Emerging Europe	150	-5.9	-20.1	-25.9	-50.3	-8.3	-27.7	-27.3	-17.2		4.0%
MSCI EAFE ® (re-indexed to 12/86)	349	2.4	2.1	22.5	5.4	10.3	9.0	1.0	2.0		
S&P 500	4,169	1.5	2.3	7.7	0.9	8.6	12.7	9.5	10.1		
EUROPE											
ADR France	778	0.4	-2.0	22.4	8.8	13.7	7.4	-1.8	1.9	-3.8	6.0%
ADR Germany	228	1.6	-1.7	23.3	-4.1	18.2	3.1	-5.6	-1.1	-1.3	5.1%
ADR Ireland	2,735	1.7	0.7	36.8	26.0	30.9	7.8	6.8	6.6	-0.9	1.7%
ADR Italy	285	3.8	-2.5	29.5	4.4	8.2	36.3	3.1	5.8	0.6	1.1%
ADR Netherlands	1,106	1.3	0.7	34.4	16.2	13.3	10.8	2.1	6.2	3.2	2.3%
ADR Norway	1,298	2.6	15.1	26.9	2.1	12.3	17.8	-2.4	4.3	2.3	0.8%
ADR Spain	574	0.9	0.0	29.2	16.0	15.1	13.6	-4.2	-2.0	-0.9	1.3%
ADR Sweden	1,429	0.0	-2.1	16.9	-3.0	3.0	-3.0	1.5	-3.0	-3.2	1.9%
ADR Switzerland	417	1.4	-2.7	22.8	-3.2	13.5	6.4	-1.2	2.0	-4.0	2.1%
ADR United Kingdom	1,276	2.3	-9.7	7.3	-5.8	3.5	-0.6	-5.2	-0.6	-2.7	10.4%
LATIN AMERICA											
ADR Argentina	189	2.5	-9.6	28.0	40.6	6.2	28.7	-19.2	7.4	-1.3	2.5%
ADR Brazil	466	1.3	-5.9	-8.2	-12.1	2.1	12.5	-4.3	-4.2	-0.5	6.6%
ADR Chile	232	0.4	2.1	17.7	13.4	11.6	-1.2	-13.9	-7.2	2.9	1.7%
ADR Mexico	472	-1.6	8.2	28.3	27.1	26.4	36.4	8.3	1.7	-3.9	2.3%
ASIA											
ADR China	260	-2.6	-12.7	42.4	-1.2	7.6	-14.9	-18.4	-1.4	2.6	25.3%
ADR Hong Kong	21	4.4	-9.2	66.7	-2.2	7.1	-6.5	-10.4	-4.9	3.9	2.5%
ADR Indonesia	87	5.6	10.1	3.9	-8.3	20.1	21.7	5.1	1.8	-0.5	0.2%
ADR India	1,454	0.6	-3.0	0.0	-5.8	5.6	28.4	10.9	9.9	-3.5	1.3%
ADR Japan	654	1.4	-1.0	17.6	3.2	6.9	4.4	-0.8	2.8	1.0	6.8%
ADR Korea	210	-2.0	-9.4	13.2	-10.8	1.8	7.3	-3.1	4.4	-1.1	1.9%
ADR Philippines	84	-14.4	-15.6	-21.5	-39.2	-5.2	-4.4	-4.7	-11.8	-15.4	0.2%
ADR Taiwan	867	-8.2	-3.2	28.6	-9.5	13.2	21.1	10.0	11.5	-3.9	1.1%
OTHER											
ADR Australia	387	-0.3	-15.6	-8.7	-32.2	-5.1	12.9	-1.3	-3.8	-0.5	3.6%
ADR Israel	87	-5.1	-21.6	-31.3	-55.1	-12.0	-16.1	-22.3	-15.0	-3.2	3.6%
ADR South Africa	632	9.0	13.8	60.2	14.7	23.0	21.0	22.1	6.8	8.8	1.1%

Source: FactSet, BofA US Equity and Quant Strategy

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Exhibit 792: Monthly relative performance based on ADR index

BofA USQS ADR Composite Relative to S&P 500 and MSCI™ EAFE (04/30/2023)



Source: FactSet, BofA US Equity and Quant Strategy

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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

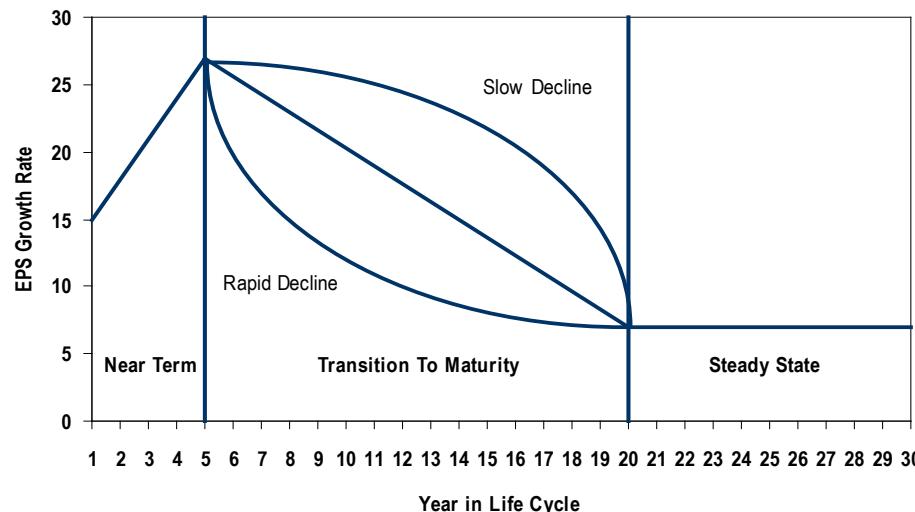
Our three-stage (Near Term, Transition to Maturity, and Maturity or Steady State) Dividend Discount Model (DDM) computes the discount rate that equates the current stock price to the projected stream of dividends. Data from our analysts' estimates provide the information to construct this stream. This 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 793: 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 $0.25 \times 1 + 0.75 \times 10$.



- **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 portfolio 10 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 794: Stock Selection Criteria

Growth 10 and Value 10

"Growth 10"

Buy Criteria:

- (1) BofA vs. Cons. EPS Surprise Rating of "1"
- (2) BofA "BUY" Opinion
- (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

"Value 10"

Buy Criteria:

- (1) BofA vs. Cons. EPS Surprise Rating of "1"
- (2) BofA "BUY" Opinion
- (3) Must be rated "1 or 2" by BofA vs. Cons. EPS Surprise Model for < 10 mos.
- (4) Select 10 Stocks with lowest trailing 12-Month P/E

Sell Criteria:

- (1) BofA vs. Cons. EPS Surprise Rating falls below 5
- (2) BofA QRQ falls below "BUY" Opinion
- (3) Stocks removed from the S&P 500
- (4) Stock no longer covered by BofA research

Sell Criteria:

- (1) BofA vs. Cons. EPS Surprise Rating falls below 5
- (2) BofA QRQ falls below "BUY" Opinion
- (3) Stocks removed from the S&P 500
- (4) Stock no longer covered by BofA research

Source: BofA US Equity and Quant Strategy

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Quintile 2

Methodology

Each month, we calculate the trailing 12-month dividend yield for each company in the Russell 1000. We then rank all dividend-paying Russell 1000 stocks by this dividend yield. The screen published here, Quintile 2, represents stocks within the second-highest quintile of companies that pay a dividend.

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 quintile is computed on the basis of equal-weighted total return. 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 stocks in the Quintile 2 screen do not constitute a recommended list and investors should consider the fundamentals of the companies before investing.



This screen was introduced on September 28, 2010. The criteria for selection have been consistent since 1/31/1984. We have back-tested the screen from 1/31/1984 to 9/28/2010.

Note that we exclude recent dividend cutters and suspenders from the screen.

Quintile 2 performance is based on back-tested results from 1/31/84 through 9/28/10. Actual performance is from 9/28/10-present. This performance is back-tested and does not represent the actual performance of any account or fund. Back-tested performance depicts the theoretical (not actual) performance of a particular strategy over the time period indicated. No representation is being made that any actual portfolio is likely to have achieved returns similar to those shown herein. Disclaimer: The screen identified as Quintile 2 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 relied upon by third parties for any other purpose, without the prior written consent of BofA Global Research. This screen was not created to act as a benchmark.

Exhibit 795: Quintile 2 outperformed the index by 0.5ppt since inception

Total Returns (4/30/2023)

	Quintile 2	Eq. Wtd. Russell 1000
1m	1.5%	-0.8%
3m	-4.7%	-5.6%
6m	3.7%	4.4%
YTD	1.8%	4.2%
12m	-0.8%	-1.6%
Since Inception*	298.8%	277.1%
<u>Annualized</u>		
3yr	17.8%	16.7%
5yr	8.9%	8.0%
Since Inception	11.6%	11.1%

Source: BofA US Equity & Quant Strategy

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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 Thomson Financial 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-weighted 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-weighted combination of the following factors: EPS Momentum, Projected 5-year Growth and EPS Estimate Revisions.

Momentum: 12-month Price Momentum.

High Quality: an equal-weighted 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 weighted 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 796: 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		Sharpe Ratio		Probability of underperforming Russell 1000	Volatility (Ann'zed)	Max Drawdown	Downside Volatility, Ann'zed
		vs. Russell 1000	vs. 10y Tsy	vs. 1000	vs. Russell 1000				
Price/ Free Cash Flow	16.4%	5.6%	0.64	0.75	18.8%	24.5%	20.5%	-61.0%	16.0%
EV/ EBITDA	16.0%	5.3%	0.59	0.58	20.1%	29.3%	21.5%	-62.5%	16.1%
Free Cash Flow/ EV	15.9%	4.9%	0.66	0.71	17.8%	24.9%	18.9%	-58.3%	15.0%
Most Active	15.0%	4.6%	0.58	0.59	22.7%	27.5%	21.4%	-57.7%	15.5%
Short Interest	14.5%	3.6%	0.69	0.96	15.8%	16.9%	17.1%	-51.2%	13.3%
Share Repurchase	14.4%	2.8%	0.59	0.39	17.2%	31.1%	17.5%	-55.1%	14.4%
Earnings Yield	14.2%	4.2%	0.50	0.36	23.8%	38.4%	22.3%	-70.4%	17.8%
Price Return - 11-mth Perf.	14.2%	3.3%	0.57	0.23	21.1%	32.7%	19.3%	-55.3%	15.1%
Price/ Sales	14.1%	4.2%	0.47	0.30	24.3%	37.3%	23.6%	-67.4%	17.4%
Price/ Cash Flow	14.0%	3.4%	0.50	0.32	23.1%	37.5%	22.0%	-60.8%	17.2%
Price Return - 12-mth Perf.	13.7%	2.7%	0.55	0.16	20.6%	35.2%	18.7%	-50.9%	14.3%
Price Return - 12-mth and 1-mth Reversal	13.7%	2.4%	0.55	0.29	18.8%	31.8%	19.2%	-58.2%	16.0%
Relative Strength - 30wk/75wk MA	13.6%	2.7%	0.53	0.20	22.0%	39.8%	19.8%	-56.3%	15.5%
Relative Strength - 5wk/30wk MA	13.4%	2.3%	0.53	0.09	19.9%	38.0%	17.7%	-46.6%	13.1%
1yr ROE	13.4%	1.5%	0.55	0.35	17.8%	35.7%	17.8%	-53.6%	13.5%
ROC	13.3%	1.4%	0.54	0.28	18.3%	39.8%	17.7%	-51.6%	13.2%
1yr ROE Adj	13.3%	1.5%	0.54	0.28	19.7%	40.0%	17.9%	-51.1%	13.4%
Relative Strength - 10wk/40wk MA	13.1%	2.1%	0.50	0.08	22.0%	40.0%	18.4%	-51.2%	14.1%
Price/ Book Value	13.0%	3.4%	0.44	0.19	23.6%	38.9%	23.2%	-72.2%	17.2%
5yr ROE Adj	13.0%	1.2%	0.51	0.25	21.7%	39.8%	18.0%	-48.0%	13.4%
P/E-to-Growth	12.9%	2.3%	0.46	0.28	24.3%	43.7%	22.4%	-67.8%	16.6%
ROA	12.8%	1.0%	0.51	0.20	19.5%	46.2%	18.4%	-51.1%	13.4%
Price Return - 9-mth Perf.	12.7%	1.8%	0.49	0.06	22.9%	40.5%	18.4%	-52.2%	14.3%
5y ROE	12.4%	0.6%	0.47	0.14	20.1%	38.4%	18.0%	-51.7%	13.7%
Dividend Yield	12.3%	1.5%	0.44	-0.03	20.4%	52.9%	18.8%	-68.6%	15.7%
Price to Moving Average (200 day)	12.3%	1.2%	0.47	-0.02	23.1%	47.8%	17.5%	-47.8%	13.0%
Size	11.9%	2.0%	0.40	0.15	26.8%	52.4%	25.0%	-65.0%	17.5%
Price Return - 3-mth Perf.	11.9%	0.8%	0.44	-0.05	22.7%	50.8%	17.7%	-48.4%	12.7%
EPS Estimate Revisions	11.9%	1.4%	0.41	0.04	25.2%	35.9%	20.3%	-63.6%	16.6%
Dividend Growth	11.8%	0.2%	0.45	-0.04	23.6%	47.1%	17.6%	-56.5%	14.0%
Eq. Wtd. Russell 1000	11.4%	na	0.43	na	22.7%	na	18.1%	-56.3%	14.2%
Price Return - 12-mth and 1-mth Performance	11.3%	-0.1%	0.43	-0.10	21.7%	49.2%	16.9%	-50.0%	13.0%
Earning Momentum	11.1%	-0.1%	0.40	0.01	26.5%	49.2%	20.0%	-60.0%	15.6%
Neglect - Analyst Coverage	10.9%	-0.4%	0.41	-0.05	24.3%	54.0%	19.0%	-59.2%	15.2%
Low Price	10.9%	1.9%	0.35	0.06	27.0%	53.1%	26.8%	-69.1%	18.8%
Earnings Torpedo	10.5%	-0.3%	0.35	-0.12	24.7%	57.4%	20.9%	-62.1%	14.9%
Variability of Earnings	10.5%	0.3%	0.34	-0.04	27.7%	51.3%	22.8%	-66.6%	17.6%
Beta	9.9%	1.9%	0.30	0.01	29.7%	51.5%	29.8%	-81.8%	21.7%
Forward Earnings Yield	9.5%	1.7%	0.23	-0.14	32.0%	52.6%	31.5%	-59.1%	20.9%
Estimate Dispersion	8.7%	-0.5%	0.28	-0.10	30.9%	57.2%	26.0%	-71.1%	18.7%
Neglect - Institutional Ownership	8.7%	-0.3%	0.36	0.09	25.9%	50.7%	19.3%	-55.9%	13.3%
Proj. 5yr EPS Growth	8.2%	-0.9%	0.25	-0.15	26.8%	57.9%	25.8%	-83.8%	20.4%

Source: BofA US Equity & Quant Strategy, FactSet

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Russell 1000 factor correlations vs. macro factors

Exhibit 797: Russell 1000 factor correlations vs. macroeconomic factors

Based on relative factor performance vs the index

Factor	Interest Rates			Currency	Inflation	Commodity Prices		Market Volatility	Corporate Profits	Credit Quality
	10yr Tsy Nominal Yld	10yr Tsy Real Yield	2s10s Tsy curve			Trade Wtd. USD	CPI	WTI	Economy GDP Growth	VIX
Earnings Yield	0.16	0.01	0.23	0.02	0.12	0.06	0.33	-0.33	-0.07	-0.44
Forward Earnings Yield	0.41	0.27	-0.13	-0.16	0.68	0.65	0.40	-0.05	0.20	0.06
Dividend Yield	-0.08	-0.13	0.10	0.07	0.13	0.06	0.33	-0.19	-0.03	-0.24
Price/ Book Value	0.26	0.00	0.13	-0.08	0.05	0.12	0.31	-0.44	-0.13	-0.65
Price/ Cash Flow	0.12	-0.04	0.21	-0.14	0.21	0.20	0.30	-0.22	-0.03	-0.33
Price/ Free Cash Flow	-0.01	-0.10	0.25	-0.01	0.05	-0.01	0.31	-0.20	-0.20	-0.34
Price/ Sales	0.16	-0.07	0.23	-0.07	-0.03	0.10	0.24	-0.30	-0.20	-0.63
EV/ EBITDA	0.15	0.01	0.27	-0.17	0.17	0.11	0.32	-0.25	-0.05	-0.32
Free Cash Flow/ EV	-0.07	-0.05	0.18	0.04	0.06	-0.10	0.33	-0.09	-0.09	-0.12
Rel. Strength - 30wk/75wk MA	0.08	0.09	-0.18	0.05	0.09	0.13	0.41	0.11	0.16	0.33
Rel. Strength - 5wk/30wk MA	0.19	0.17	-0.07	0.08	0.15	0.36	0.41	0.16	0.13	0.37
Rel. Strength - 10wk/40wk MA	0.19	0.19	-0.12	0.09	0.15	0.30	0.45	0.17	0.23	0.35
Price to 200 day MA	0.18	0.20	-0.09	0.08	0.14	0.29	0.39	0.20	0.15	0.42
Price Return - 12-mth Perf.	0.12	0.18	-0.17	0.10	0.08	0.13	0.41	0.15	0.18	0.42
Price Return - 9-mth Perf.	0.16	0.19	-0.16	0.08	0.07	0.19	0.43	0.15	0.22	0.38
Price Return - 3-mth Perf.	0.19	0.11	0.03	-0.01	0.16	0.37	0.35	0.13	0.05	0.27
Price Return - 11-mth Perf.	0.10	0.14	-0.19	0.10	0.06	0.11	0.43	0.12	0.21	0.35
Price Ret. - 12-m + 1-m Perf.	0.07	0.16	-0.12	0.12	0.10	0.15	0.34	0.24	0.08	0.51
Price Ret. - 12-m and 1-m Revers.	-0.04	0.09	-0.24	0.07	0.01	-0.11	0.48	0.10	0.29	0.33
Most Active	0.31	0.16	-0.03	-0.11	0.06	0.28	0.39	-0.15	-0.05	-0.07
Low Price	0.30	-0.03	0.19	-0.24	-0.07	0.22	0.25	-0.42	-0.24	-0.70
Earning Momentum	0.34	0.21	-0.13	-0.25	0.26	0.25	0.39	-0.09	0.22	0.08
Proj. 5yr EPS Growth	0.33	0.15	-0.13	-0.19	0.03	0.28	0.29	-0.08	0.07	-0.05
Earnings Torpedo	0.29	0.00	-0.07	-0.17	-0.16	0.25	0.28	-0.24	-0.18	-0.55
EPS Estimate Revisions	0.37	0.26	-0.34	-0.10	0.31	0.32	0.48	-0.06	0.25	0.14
Dividend Growth	-0.20	0.01	-0.07	0.24	0.25	-0.20	0.34	0.14	0.10	0.17
P/E-to-Growth	0.12	-0.02	0.17	0.03	0.04	0.00	0.31	-0.27	0.01	-0.38
1yr ROE	-0.25	-0.05	0.05	0.09	0.07	-0.09	0.33	0.33	-0.04	0.47
5y ROE	-0.29	-0.02	0.09	0.10	0.05	-0.09	0.32	0.30	-0.01	0.41
1yr ROE Adj	-0.18	-0.04	0.10	0.00	0.02	-0.05	0.30	0.34	-0.06	0.51
5yr ROE Adj	-0.16	-0.01	0.11	0.00	0.01	0.00	0.32	0.33	-0.09	0.48
ROA	-0.20	-0.10	0.08	-0.06	-0.02	-0.03	0.29	0.27	-0.06	0.44
ROC	-0.23	-0.04	0.04	0.07	0.01	-0.12	0.31	0.35	-0.05	0.51
Beta	0.43	0.07	0.02	-0.29	0.01	0.39	0.28	-0.34	-0.10	-0.50
Variability of Earnings	0.55	0.20	-0.15	-0.27	0.14	0.36	0.36	-0.32	0.03	-0.54
Estimate Dispersion	0.43	0.04	0.04	-0.33	-0.09	0.41	0.32	-0.34	-0.08	-0.54
Neglect - Analyst Coverage	0.00	-0.15	-0.09	-0.18	-0.06	0.05	0.35	-0.25	0.02	-0.25
Neglect - Institutional Ownership	-0.44	-0.47	0.35	-0.24	-0.49	-0.16	0.35	0.18	-0.26	-0.06
Size	0.24	-0.11	0.28	-0.25	-0.14	0.20	0.21	-0.41	-0.29	-0.72
Share Repurchase	-0.08	0.07	0.17	0.20	0.14	-0.08	0.39	0.05	0.04	0.15
Short Interest	-0.23	-0.18	0.31	-0.03	0.00	-0.02	0.45	0.05	-0.09	0.13

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 since 1986 (Analyst Coverage since 1994; Institutional Ownership since 1999; Short Interest since 1993).



S&P 500 factor efficacy

Exhibit 798: 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	0.50	0.46	0.54	0.49	0.58	0.53	0.41	0.47	0.39	0.32
Forward Earnings Yield	0.47	0.53	0.52	0.60	0.50	0.51	0.47	0.52	0.33	0.28
Dividend Yield	0.45	0.55	0.56	0.55	0.55	0.49	0.46	0.43	0.44	0.37
Price/ Book Value	0.38	0.51	0.54	0.48	0.44	0.47	0.43	0.41	0.49	0.51
Price/ Cash Flow	0.45	0.52	0.54	0.50	0.57	0.48	0.42	0.53	0.35	0.38
Price/ Free Cash Flow	0.61	0.66	0.73	0.65	0.56	0.45	0.39	0.28	0.24	0.19
Price/ Sales	0.49	0.47	0.49	0.50	0.52	0.52	0.53	0.38	0.45	0.30
EV/ EBITDA	0.57	0.61	0.49	0.56	0.55	0.49	0.40	0.45	0.38	0.26
Free Cash Flow/ EV	0.61	0.67	0.69	0.59	0.56	0.49	0.39	0.31	0.36	0.22
Relative Strength - 30wk/75wk MA	0.48	0.55	0.55	0.53	0.50	0.53	0.54	0.42	0.35	0.25
Relative Strength - 5wk/30wk MA	0.51	0.46	0.38	0.43	0.55	0.61	0.55	0.52	0.44	0.24
Relative Strength - 10wk/40wk MA	0.52	0.41	0.43	0.51	0.55	0.57	0.54	0.50	0.45	0.22
Price to Moving Average (200 day)	0.50	0.40	0.49	0.43	0.53	0.57	0.52	0.50	0.47	0.26
Price Return - 12-mth Perf.	0.53	0.56	0.48	0.59	0.50	0.51	0.46	0.49	0.34	0.25
Price Return - 9-mth Perf.	0.55	0.48	0.46	0.49	0.49	0.54	0.46	0.48	0.42	0.28
Price Return - 3-mth Perf.	0.46	0.45	0.45	0.51	0.50	0.48	0.56	0.47	0.45	0.33
Price Return - 11-mth Perf.	0.53	0.58	0.50	0.54	0.54	0.53	0.48	0.46	0.37	0.21
Price Return - 12-mth and 1-mth Performance	0.47	0.47	0.53	0.51	0.39	0.47	0.54	0.49	0.48	0.33
Price Return - 12-mth and 1-mth Reversal	0.59	0.52	0.58	0.51	0.42	0.52	0.49	0.48	0.39	0.20
Most Active	0.63	0.59	0.54	0.49	0.50	0.40	0.47	0.41	0.36	0.25
Low Price	0.39	0.43	0.49	0.45	0.52	0.55	0.45	0.53	0.42	0.50
Earning Momentum	0.42	0.45	0.52	0.53	0.54	0.51	0.54	0.48	0.40	0.35
Proj. 5yr EPS Growth	0.33	0.42	0.45	0.53	0.47	0.47	0.54	0.47	0.54	0.52
Earnings Torpedo	0.41	0.46	0.55	0.57	0.59	0.60	0.52	0.44	0.37	0.31
EPS Estimate Revisions	0.46	0.53	0.50	0.49	0.52	0.54	0.48	0.45	0.45	0.26
Dividend Growth	0.51	0.49	0.38	0.49	0.55	0.58	0.51	0.50	0.51	0.45
P/E-to-Growth	0.48	0.47	0.47	0.48	0.54	0.56	0.60	0.50	0.46	0.37
1yr ROE	0.62	0.57	0.48	0.49	0.56	0.47	0.36	0.48	0.41	0.34
5y ROE	0.58	0.48	0.55	0.49	0.48	0.48	0.45	0.42	0.47	0.35
1yr ROE Adj	0.60	0.51	0.55	0.52	0.46	0.45	0.40	0.50	0.45	0.31
5yr ROE Adj	0.59	0.45	0.51	0.52	0.53	0.44	0.43	0.46	0.46	0.34
ROA	0.55	0.49	0.54	0.49	0.44	0.48	0.51	0.48	0.42	0.30
ROC	0.59	0.55	0.55	0.50	0.51	0.41	0.45	0.49	0.42	0.31
Beta	0.33	0.39	0.46	0.44	0.54	0.46	0.56	0.60	0.52	0.45
Variability of Earnings	0.32	0.39	0.43	0.48	0.44	0.55	0.52	0.48	0.61	0.60
Estimate Dispersion	0.27	0.43	0.49	0.47	0.49	0.46	0.45	0.52	0.56	0.67
Neglect - Analyst Coverage	0.44	0.45	0.48	0.50	0.48	0.52	0.43	0.46	0.51	0.48
Neglect - Institutional Ownership	0.35	0.59	0.42	0.49	0.57	0.58	0.52	0.44	0.41	0.31
Size	0.40	0.51	0.46	0.43	0.60	0.43	0.51	0.44	0.43	0.49
Share Repurchase	0.59	0.63	0.56	0.51	0.48	0.48	0.50	0.44	0.39	0.19
Short Interest	0.67	0.65	0.70	0.52	0.54	0.46	0.47	0.37	0.37	0.28

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 799: S&P 500 factor correlations

Based on monthly returns from January 1990 to present

	Foreign Exposure		Size	
	Low Analyst Coverage		Low Institutional Ownership	
	Estimate Dispersion		Low Price	
	Variability of Earnings		Beta	
	ROA	ROC	ROA	ROC
P/E-to-Growth	0.87			
DDM Alpha	0.91 0.89			
Earnings Yield	0.89 0.94 0.90			
Forward EPS Yield	0.85 0.94 0.87 0.97			
Price/ Book Value	0.79 0.90 0.82 0.93 0.94			
Price/ Cash Flow	0.85 0.93 0.87 0.95 0.94 0.92			
Price/ Free Cash Flow	0.87 0.93 0.89 0.95 0.93 0.90 0.96			
Price/ Sales	0.81 0.90 0.83 0.92 0.93 0.95 0.92 0.92			
EV/ EBITDA	0.85 0.93 0.86 0.93 0.93 0.91 0.97 0.94 0.92			
Free Cash Flow/ EV	0.88 0.93 0.89 0.93 0.92 0.88 0.92 0.96 0.89 0.93			
Dividend Yield	0.83 0.82 0.88 0.88 0.86 0.88 0.87 0.85 0.85 0.84 0.83			
Dividend Growth	0.92 0.92 0.89 0.93 0.91 0.86 0.90 0.92 0.87 0.90 0.92 0.84			
Share Repurchase	0.92 0.91 0.91 0.93 0.91 0.87 0.91 0.94 0.88 0.91 0.94 0.85 0.94			
30wk/75wk MA	0.62 0.65 0.63 0.60 0.59 0.52 0.60 0.62 0.58 0.63 0.64 0.48 0.70 0.63			
5wk/30wk MA'	0.70 0.67 0.66 0.65 0.64 0.59 0.64 0.65 0.64 0.67 0.67 0.58 0.75 0.70 0.82			
10wk/40wk MA	0.68 0.65 0.65 0.62 0.61 0.56 0.61 0.63 0.61 0.65 0.65 0.53 0.72 0.67 0.87 0.97			
Price / 200d MA	0.67 0.64 0.65 0.63 0.61 0.56 0.61 0.63 0.62 0.64 0.65 0.55 0.72 0.67 0.84 0.97 0.96			
Price Return (12-mth)	0.65 0.63 0.63 0.60 0.59 0.53 0.60 0.62 0.59 0.63 0.63 0.50 0.71 0.64 0.93 0.90 0.93 0.93			
Price Return (9-mth)	0.65 0.63 0.64 0.60 0.59 0.53 0.58 0.61 0.59 0.62 0.63 0.51 0.70 0.65 0.89 0.94 0.97 0.96 0.96			
Price Return (3-mth)	0.73 0.72 0.68 0.71 0.70 0.68 0.71 0.71 0.72 0.72 0.72 0.64 0.78 0.73 0.76 0.93 0.88 0.92 0.83 0.86			
Price Return (11-mth)	0.67 0.65 0.66 0.62 0.61 0.55 0.62 0.64 0.60 0.65 0.66 0.52 0.73 0.66 0.94 0.89 0.93 0.90 0.99 0.95 0.81			
Price Return (12m and 1m)	0.70 0.66 0.66 0.65 0.63 0.58 0.63 0.66 0.63 0.65 0.68 0.56 0.75 0.69 0.85 0.90 0.89 0.94 0.92 0.92 0.89 0.89			
Price Ret. (12m and 1m Rev.)	0.81 0.78 0.78 0.76 0.74 0.68 0.74 0.77 0.72 0.76 0.78 0.65 0.83 0.80 0.85 0.79 0.83 0.77 0.85 0.82 0.73 0.90 0.75			
Most Active	0.72 0.81 0.72 0.77 0.76 0.78 0.78 0.79 0.77 0.80 0.80 0.67 0.81 0.78 0.73 0.76 0.73 0.73 0.73 0.80 0.74 0.74 0.76			
Earning Momentum	0.88 0.92 0.87 0.90 0.88 0.84 0.90 0.91 0.86 0.90 0.91 0.79 0.92 0.89 0.77 0.78 0.77 0.77 0.77 0.78 0.76 0.81 0.80 0.78 0.86 0.84			
Proj. 5yr EPS Growth	0.71 0.82 0.71 0.74 0.73 0.71 0.75 0.76 0.74 0.78 0.78 0.60 0.80 0.76 0.80 0.79 0.78 0.77 0.79 0.78 0.82 0.80 0.79 0.79 0.93 0.87			
Positive EPS Surprise	0.96 0.91 0.88 0.91 0.89 0.86 0.89 0.91 0.87 0.90 0.91 0.83 0.94 0.93 0.72 0.78 0.75 0.75 0.73 0.73 0.81 0.75 0.77 0.85 0.85 0.93 0.84			
EPS Estimate Revisions	0.83 0.84 0.79 0.81 0.81 0.75 0.81 0.82 0.78 0.83 0.83 0.70 0.87 0.83 0.84 0.86 0.87 0.86 0.86 0.86 0.84 0.87 0.84 0.89 0.88 0.89			
Equity Duration	0.81 0.81 0.77 0.78 0.76 0.74 0.78 0.78 0.79 0.81 0.86 0.66 0.85 0.81 0.81 0.83 0.82 0.82 0.83 0.82 0.84 0.83 0.84 0.86 0.88 0.89 0.88 0.88			
1yr ROE	0.84 0.92 0.88 0.88 0.90 0.89 0.88 0.87 0.88 0.89 0.87 0.77 0.89 0.87 0.87 0.75 0.77 0.76 0.75 0.75 0.74 0.75 0.82 0.75 0.75 0.79 0.90 0.90 0.88 0.88 0.89 0.84			
5y ROE	0.88 0.86 0.86 0.83 0.81 0.75 0.82 0.86 0.79 0.83 0.88 0.74 0.91 0.89 0.74 0.75 0.74 0.74 0.73 0.73 0.77 0.75 0.76 0.82 0.80 0.88 0.81 0.90 0.83 0.86 0.83			
1yr ROE Adj	0.78 0.83 0.78 0.78 0.75 0.74 0.78 0.82 0.76 0.79 0.83 0.68 0.84 0.82 0.75 0.75 0.73 0.73 0.73 0.73 0.79 0.75 0.75 0.78 0.89 0.91 0.84 0.90 0.87 0.80 0.89 0.84 0.90			
5yr ROE Adj	0.83 0.85 0.81 0.80 0.77 0.73 0.80 0.84 0.77 0.81 0.85 0.67 0.87 0.84 0.77 0.75 0.74 0.74 0.75 0.74 0.77 0.76 0.77 0.82 0.84 0.88 0.86 0.88 0.82 0.94 0.92 0.92 0.94 0.97			
ROA	0.82 0.83 0.79 0.78 0.76 0.73 0.78 0.78 0.72 0.77 0.80 0.64 0.85 0.83 0.75 0.76 0.74 0.74 0.74 0.74 0.78 0.76 0.77 0.79 0.78 0.81 0.85 0.86 0.88 0.85 0.81 0.88 0.79 0.94 0.94 0.96 0.95			
ROC	0.79 0.81 0.77 0.76 0.73 0.68 0.75 0.79 0.71 0.77 0.82 0.62 0.84 0.80 0.80 0.76 0.76 0.75 0.78 0.76 0.77 0.79 0.78 0.81 0.85 0.86 0.88 0.85 0.81 0.88 0.79 0.94 0.94 0.96 0.95			
Beta	0.86 0.83 0.83 0.81 0.81 0.78 0.73 0.79 0.83 0.76 0.79 0.84 0.71 0.88 0.85 0.76 0.75 0.75 0.76 0.75 0.77 0.78 0.78 0.83 0.80 0.87 0.81 0.88 0.82 0.89 0.81 0.95 0.90 0.93 0.91 0.94			
Variability of Earnings	0.72 0.85 0.71 0.82 0.82 0.85 0.83 0.83 0.84 0.84 0.84 0.83 0.70 0.83 0.80 0.69 0.72 0.70 0.70 0.69 0.68 0.80 0.70 0.71 0.73 0.94 0.85 0.92 0.85 0.84 0.85 0.91 0.77 0.87 0.80 0.83 0.80 0.77			
Estimate Dispersion	0.90 0.92 0.86 0.91 0.90 0.88 0.91 0.92 0.89 0.91 0.91 0.82 0.94 0.94 0.91 0.71 0.77 0.75 0.74 0.72 0.72 0.81 0.74 0.75 0.84 0.85 0.94 0.85 0.95 0.89 0.88 0.91 0.88 0.85 0.86 0.87 0.86 0.87			
Low Price	0.77 0.87 0.76 0.86 0.85 0.90 0.90 0.85 0.87 0.90 0.83 0.79 0.84 0.82 0.61 0.70 0.67 0.67 0.63 0.64 0.77 0.64 0.66 0.72 0.85 0.85 0.81 0.86 0.83 0.79 0.90 0.75 0.78 0.75 0.72 0.73 0.89 0.89			
Low Institutional Ownership	0.75 0.90 0.79 0.87 0.88 0.93 0.90 0.88 0.93 0.90 0.87 0.80 0.83 0.84 0.57 0.63 0.60 0.60 0.57 0.58 0.72 0.59 0.60 0.70 0.86 0.85 0.81 0.85 0.79 0.79 0.92 0.76 0.79 0.77 0.79 0.73 0.74 0.91 0.88 0.92			
Low Analyst Coverage	0.84 0.83 0.84 0.84 0.82 0.85 0.84 0.86 0.84 0.83 0.85 0.85 0.87 0.86 0.62 0.72 0.68 0.69 0.64 0.66 0.78 0.65 0.70 0.75 0.84 0.85 0.78 0.89 0.79 0.81 0.84 0.83 0.84 0.81 0.82 0.78 0.81 0.83 0.88 0.84 0.85			
Size	0.88 0.89 0.87 0.89 0.87 0.86 0.88 0.91 0.89 0.88 0.89 0.82 0.90 0.91 0.68 0.72 0.70 0.70 0.69 0.68 0.75 0.70 0.73 0.81 0.77 0.90 0.78 0.91 0.83 0.86 0.85 0.87 0.83 0.85 0.86 0.82 0.86 0.81 0.91 0.82 0.86 0.88			
Foreign Exposure	0.81 0.89 0.81 0.91 0.91 0.95 0.92 0.91 0.95 0.92 0.89 0.85 0.86 0.89 0.56 0.64 0.61 0.61 0.57 0.58 0.72 0.60 0.62 0.72 0.79 0.86 0.76 0.87 0.78 0.78 0.90 0.79 0.77 0.76 0.77 0.72 0.75 0.87 0.90 0.91 0.95 0.86 0.90			
Short Interest	0.83 0.89 0.80 0.85 0.84 0.82 0.87 0.87 0.83 0.88 0.88 0.74 0.88 0.86 0.73 0.78 0.75 0.76 0.74 0.73 0.83 0.75 0.77 0.81 0.88 0.91 0.89 0.88 0.89 0.88 0.86 0.88 0.86 0.90 0.93 0.87 0.87 0.85 0.87 0.86 0.86			

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