

## Everything you wanted to know about Quant...

Primer

Bank of America  
Merrill Lynch

12 May 2017

### ...But were too afraid to ask

With a market that has recently seemed less driven by fundamentals and more driven by risk attributes (or “factors”) and themes, our primer may be particularly relevant today. In this eighth edition of the US Quantitative Primer, we outline the proprietary framework that is critical to our portfolio strategy work, as well as trends in the industry. We ultimately provide a guide as to how to better incorporate quantitative tools into security selection. We believe there is something for everyone in this book – asset allocators, generalist PMs, sector specialists and systematic investors alike.

### Everyone's becoming a quant

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 is underway. Jobs advertised for data scientists and quantitative analysts outnumber those for fundamental analysts by a factor of eight, and the number of fundamental analysts covering \$1B of market cap has shrunk from fourteen in 1986 to less than one person today. Quants are increasingly focused on real-time data feeds, AI, big data and machine learning. According to our survey, quants use 3x the number of signals today than they did twenty years ago. The advent of new tools has created a more interesting, but more competitive, landscape, and the risk of an August 2007-like meltdown may be increasing. Being different is of paramount importance.

### What's new? ESG: “good” companies make good stocks

It's not just for tree-huggers - incorporating environmental, social and corporate governance (ESG) considerations into one's framework is critical from a risk perspective. We include new findings on these metrics, which have been strong indicators of future volatility, earnings risk, price declines and even bankruptcies. Trends in the US investment landscape suggests that trillions of dollars could be allocated to ESG-oriented equity investments, and to stocks that are attractive on these attributes, over the next few decades- inflows equivalent to the size of the S&P 500 today. From an equity investors' perspective, ESG may be costly to ignore.

### The problem with backtests

Backtests are helpful in making investment decisions, but should be taken with many grains of salt – especially today. The last 30 years were characterized by falling interest rates and accommodative fiscal and monetary policy, culminating in an unprecedented wave of liquidity in the 2000s and 2010s. Levered companies, credit-sensitive sectors, low quality stocks and small caps—all of which thrive on access to cheap capital — outperformed for most of the last three decades. The next regime could look very different. We offer guidelines for investors to avoid conflating alpha with credit sensitivity (Exhibit 6).

### Different strokes for different sectors

The best methods for evaluating companies vary by sector. Using low Price to Book Value to screen bank stocks is actually inferior to low Price to Earnings (P/E). But low P/E screens for Media stocks may be ill advised, as low P/E Media stocks have routinely underperformed their high P/E counterparts. Media stocks' cash flow yield has been a better predictor. See Section III: Stock Strategies within Industries.

**BofA Merrill Lynch 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 245 to 246.

Timestamp: 12 May 2017 06:10AM EDT

Quantitative Strategy  
United States

Savita Subramanian  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 3878  
[savita.subramanian@bamll.com](mailto:savita.subramanian@bamll.com)

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 and sector rotation models, as well as an analysis of factor performance vis a vis macro environments. We also include industry attributes over time.

Dear Reader,

Each year since 2010, we have published our annual Quantitative Primer which highlights various aspects of our quantitative work, and is backed up by almost 100 proprietary stock screens that we regularly update and publish. We have found these to be helpful to clients as performance attribution benchmarks, as risk models and as analytical tools for devising style and sector rotation models. Ultimately these tools provide empirical evidence to support or refute the idea that particular stock attributes drive future returns.

**The 2017 Quantitative Primer contains all of these models under one cover. We also include risk/reward characteristics for each factor, as well as changes in sector composition over time.**

#### How to use this book

- **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 these have performed since inception. We measure risk by both volatility of returns and by probability of loss. For top vs. bottom ranked screens, we also assess consistency of top decile versus bottom decile spreads.
- **Sector composition:** We highlight the changes in sector composition of style screens. Since we calculate each screen without sector constraints, we have found that there is useful information in assessing changes in sector exposures both to determine a) whether particular sectors are driving returns, and b) how sectors have changed their characteristics over time.
- **Long-short performance:** Long-only and long-short investors may benefit from knowing not just how the top-ranked stocks have behaved, but also how the bottom-ranked stocks have behaved over time. This is useful in determining which screens to use as overweight or “buy” signals, and which screens to use as underweight or “sell” signals.
- **Sector specific models:** 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.
- **Trends in the quantitative finance industry:** We provide insight from our survey of institutional investors as to what factors folks are using/not using, how smart beta strategies have changed the framework for institutional investors, and **more**. We also include historical charts on industry attributes, on the market, and on other asset classes. We discuss how we weave these signals together to determine our outlook for (and within) the US equity market.

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



**Savita Subramanian**  
Head of US Equity and Quantitative Strategy

# Contents

US Equity & Quant Strategy Team	5
Section I: Core Concepts and Methodology	6
What drives market performance?	8
Earnings Expectation Life Cycle	21
Factor timing	24
Measuring risk	31
Roadmap to picking stocks	36
What are quants doing?	43
Section II: Stock Strategies within the S&P 500	55
GARP Strategies	56
Alpha Surprise Strategy	57
P/E-to-Growth	58
Valuation Strategies	59
Cash Deployment Strategies	69
Dividend Growth	71
Momentum Strategies	73
Growth Strategies	85
Quality Strategies	92
Risk Strategies	99
Miscellaneous Strategies	104
Section III: Stock Strategies within Industries	116
Sector Specific Overview	117
Consumer Discretionary: Media	118
Consumer Discretionary: Retailing	122
Other Disc. (Autos, Durables, Services)	126
Consumer Staples	130
Energy	134
Financials: Banks	138
Financials: Insurance	142
Other Financials (REITs, Diversified)	146
Health Care: Health Care Equipment & Svcs	150
Health Care: Pharmaceuticals Biotechnology & Life Sciences	154
Industrials: Capital Goods	158
Other Industrials (Services, Transports)	162
Information Technology	166
Materials	170

Telecommunication Services	174
Utilities	178
Section IV: Stock Strategies for Growth and Value Managers	183
Growth	184
Value	187
Section V: BofAML Quality Strategies	191
The reasons to stick with Quality	192
Quality Risk/Reward Profile	199
Performance Charts	203
Section VI: Relative Valuation for Industries	208
Relative valuation: industries	209
Section VII: Relative Valuation between Growth and Value Benchmarks	226
Fundamental Valuation	227
Growth Characteristics	228
Section VIII: ADR Strategies	229
Appendix	231
BofA Merrill Lynch Proprietary Models	232
BofA Merrill Lynch Factor Descriptions	237
Russell 1000 factor performance	240
Russell 1000 factor correlations vs. macro factors	241
S&P 500 factor efficacy	242
Research Analysts	247

# US Equity & Quant Strategy Team

**Savita Subramanian**

Equity & Quant Strategist

MLPF&S

savita.subramanian@baml.com

+1 646 855 3878

**Dan Suzuki, CFA**

Equity Strategist

MLPF&S

dan.suzuki@baml.com

+1 646 855 2827

**Alex Makedon**

Quantitative Strategist

MLPF&S

alex.makedon@baml.com

+1 646 855 5982

**Jill Carey Hall, CFA**

Equity Strategist

MLPF&S

jill.carey@baml.com

+1 646 855 3327

**Marc Pouey**

Equity & Quant Strategist

MLPF&S

marc.pouey@baml.com

+1 646 855 1142

**Jimmy Bonilla**

Equity & Quant Strategist

MLPF&S

jimmy.bonilla@baml.com

+1 646 556 4179

**James Yeo**

Equity & Quant Strategist

MLPF&S

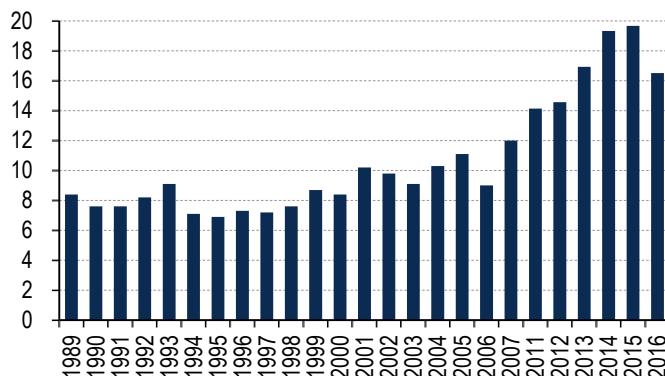
james.h.yeo@baml.com

+1 646 743 0187

## Is quant getting crowded?

Our quantitatively oriented clients have 3x the number of factors today than they did twenty years ago (Chart 1). Quant/factor investing popularity has increased sharply, at the expense of interest in fundamental investing (Chart 2). One of today's greatest market inefficiencies may stem from the scarcity of capital devoted toward long-term, fundamental investing. 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 is underway. Jobs advertised for data scientists and quantitative analysts outnumber those for fundamental analysts by a factor of eight, and the number of fundamental analysts covering \$1B of market cap has shrunk from fourteen in 1986 to less than one person today. Quants are increasingly focused on real-time data feeds, AI, big data and machine learning. According to our survey, quants use 3x the number of signals today than they did twenty years ago. The advent of new tools has created a more interesting, but more competitive, landscape, and the risk of an August 2007-like meltdown may be increasing. Being different from one's peers is of paramount importance.

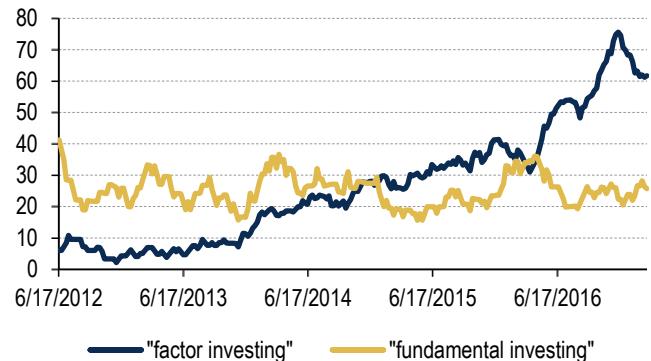
**Chart 1: BofAML Institutional Factor Survey: average number of factors used by investors over time**



Note: 2008-2010 excluded (insufficient responses)

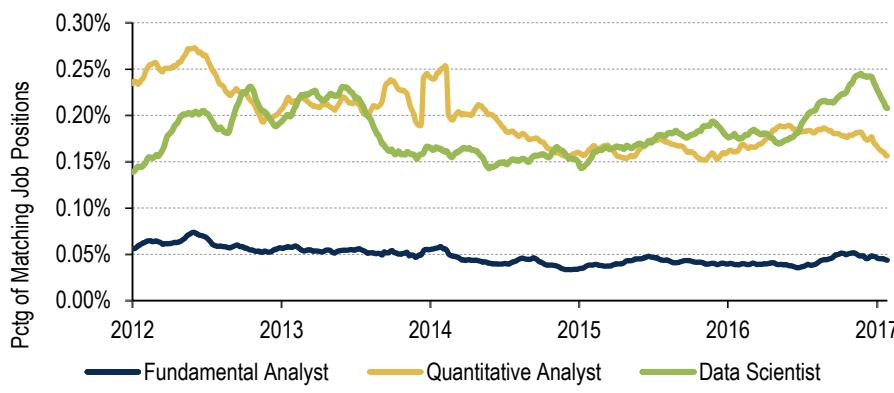
Source: BofA Merrill Lynch US equity & US Quant Strategy

**Chart 2: Google trends: "factor investing" vs "fundamental investing" (15 week average)**



Source: Google

**Chart 3: Number of "data scientist" vs. "quantitative analyst" job postings on indeed.com**



Source: www.indeed.com

# Section I: Core Concepts and Methodology

What drives market performance?	8
Earnings Expectation Life Cycle	21
Factor timing	24
Measuring risk	31
Roadmap to picking stocks	36
What are quants doing?	43
ESG: Good companies can make good stocks	49

# 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 them correctly, which can be very heavily influenced by investor sentiment.

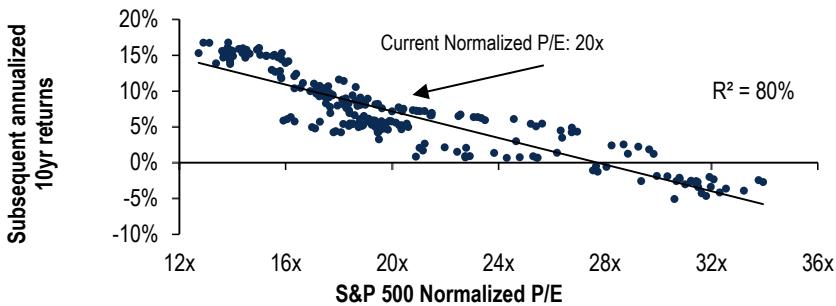
## 1. Valuation

Our work suggests that valuation is generally a poor market timing indicator over shorter time horizons. However, over longer time horizons it 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 – 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 Model

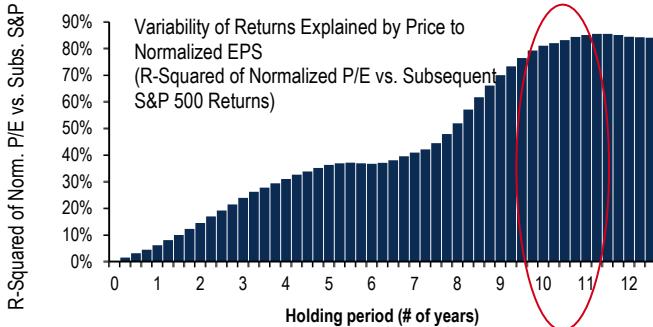
One way to adjust for the single-period bias is to estimate the underlying earnings power based on the historical trend, adjusting for cyclicalities. We estimate normalized earnings based on a linear log normal regression and our analysis shows that this measure of market valuation explains over 80% of the variability of equity market returns over the next 10 years (Chart 5). In the late-1990s, equity valuations were near peak levels, and we subsequently saw negative returns over the following decade. In contrast, valuations in the wake of the financial crisis reached extreme levels far below those seen during the 1980s and 1990s, and were similarly followed by strong equity market returns (Chart 6). Over the last two years, valuations have returned to levels in line with the history, and the S&P 500's current normalized PE ratio of 20x suggests annualized 10-year price returns of +7%, which would represent more than a doubling of the market's current levels.

Chart 4: S&P 500 Normalized P/E vs. subsequent annualized 10yr returns



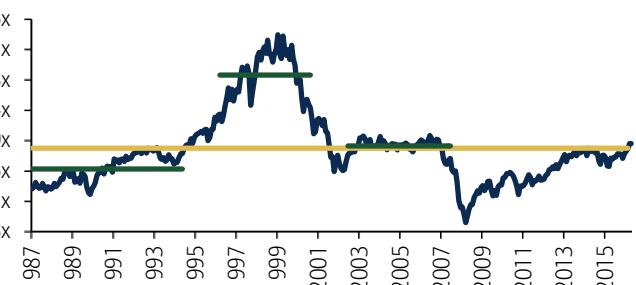
Source: BofA Merrill Lynch US Equity and US Quant Strategy

Chart 5: Normalized P/E's predictive power on S&P 500 returns



Source: BofA Merrill Lynch US Equity & US Quant Strategy

Chart 6: Normalized PE levels over time



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

## Equity Risk Premium Models

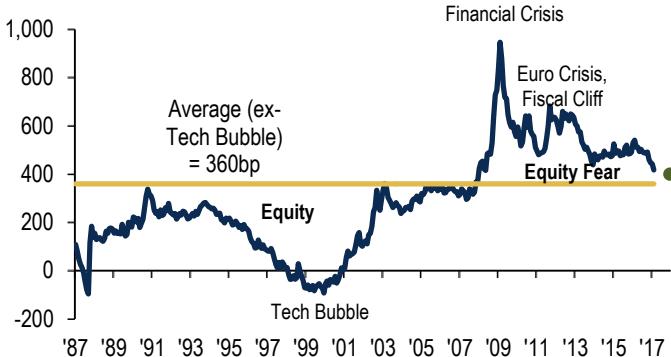
While normalized PE ratios adjust for the single-period bias, two criticisms of this valuation metric are that (1) it is backward looking and (2) does not account for changes in interest rates. The equity risk premium is the amount of additional return beyond the risk free rate that investors require as compensation for accepting the investment risks and costs associated with owning stocks. When investor fear is high, and the market perceives equities to be very risky, the equity risk premium is high to compensate for higher perceived risk, and vice versa.

Similar to volatility, when the risk premium is rising, this typically coincides with higher quality investments outperforming, and when the risk premium is falling, this typically coincides with lower quality investments outperforming. Another interpretation of this relationship is the idea that as the cost of equity capital is increasing, shorter duration (higher dividend yielding) equities generally outperform, and when the cost of capital is decreasing, longer duration, higher beta companies generally outperform.

### Normalized Equity Risk Premium Model

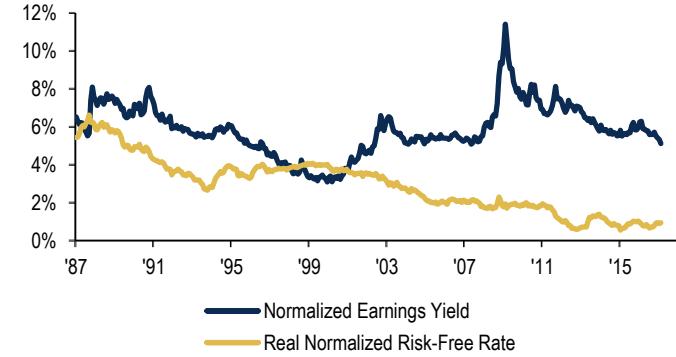
We estimate the historical ERP as the normalized EPS yield (normalized EPS ÷ current price) less the normalized real risk-free rate. In addition to the normalized EPS discussed in the previous section, we also normalize the risk-free rate. We assume that the market's interest rate and inflation expectations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

**Chart 7: Normalized equity risk premium**



Source: BofAML US Equity & Quant Strategy, Federal Reserve Board, Standard & Poor's, BLS

**Chart 8: Normalized EPS yield & risk-free rate**

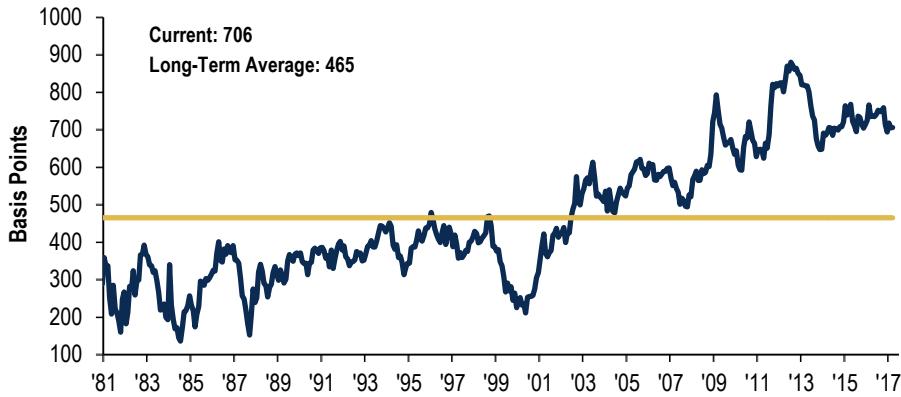


Source: BofAML US Equity & Quant Strategy, Federal Reserve Board, Standard & Poor's, BLS

### Dividend Discount Based Equity Risk Premium Model

Our Market-Based Equity Risk Premium model 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, this model essentially computes 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.

**Chart 9: S&P 500 Risk Premium (DDM Expected Return less AAA Corporate Bond Rate)**

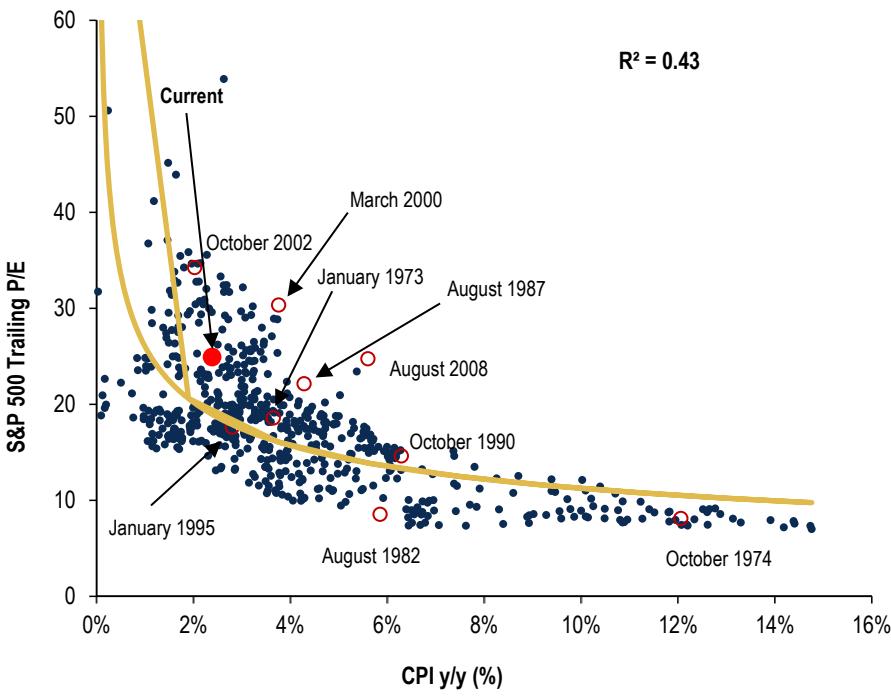


Source: BofA Merrill Lynch US Equity & Quantitative Strategy, I/B/E/S

### Inflation vs. P/E Model

The inflation vs. P/E model is based on the “Rule of 21” valuation model. The Rule of 21 model 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 generally true, but not at valuation and inflation extremes. Therefore, a non-linear curve better fits the model. The chart 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.

**Chart 10: Inflation vs. S&P 500 P/E Ratio (1965 to present)**



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

## 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 a direct inverse correlation between investors' willingness to invest in stocks and future equity returns.

### Sell Side Indicator

The Sell Side Indicator — our proprietary model that measures Wall Street's bullishness on stocks — is based on the average recommended equity allocation of Wall Street strategists as of the last business day of each month. These equity weightings are from strategists who submit their asset allocation recommendations to us or to Bloomberg — currently there are eight. 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.

**Table 1: Predictive Power of Selected Indicators Forecasting 12-Month S&P 500 Returns**

Indicator	R <sup>2</sup>
Sell Side Indicator	0.26
S&P 500 Dividend Yield	0.13
Proforma PE	0.12
Adj. Fed Model (EPS Yld - Real 10-Yr Tsy Yld)	0.04
10-Yr Treasury Yield	0.02
M2 Growth	0.02
3-Mo T-Bill Rate	0.01
Fed Model (EPS Yield - 10-Yr Treasury)	0.01
Yield Curve (10-Yr - 3-Mo)	0.00
BBB to Treasury Spread	0.00
GAAP PE	0.00
M1 Growth	0.00

Source: BofA Merrill Lynch US Equity & Quantitative Strategy

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.

**Exhibit 1: Sell Side Consensus Indicator (as of 31 March 2017)**



Source: BofAML Global Research US Equity & Quant Strategy

Note: Buy and Sell signals are based on rolling 15-year +/- 1 standard deviations 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.

The Sell Side Indicator does not catch every rally or decline in the stock market, but has historically had some predictive capability with respect to subsequent 12-month S&P 500 total returns. Although the r-squared of 26% 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.

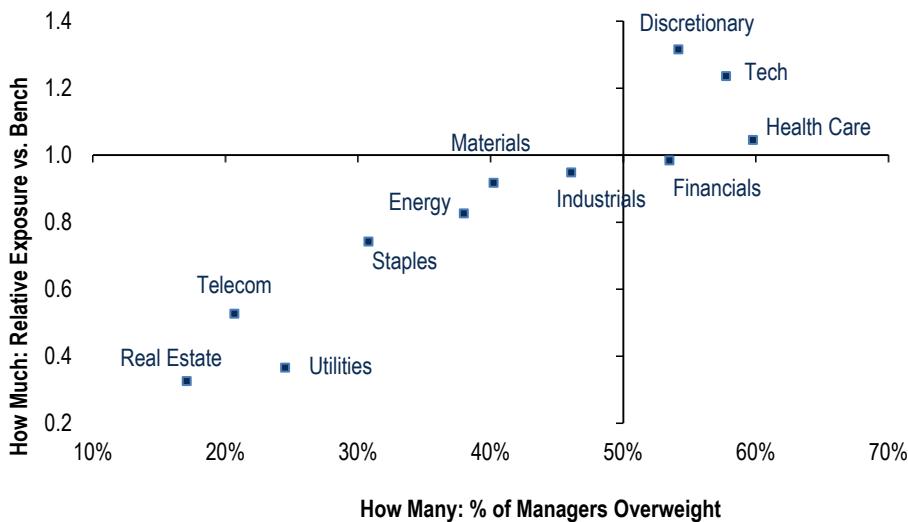
### 3. Positioning

#### Active managers holdings

At the sector and stock level, as well as for factors, we analyze large cap active managers’ positioning on a monthly basis (quarterly from 2008 to June 2016).

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.

**Chart 11: Active managers sector exposure (1Q17)**

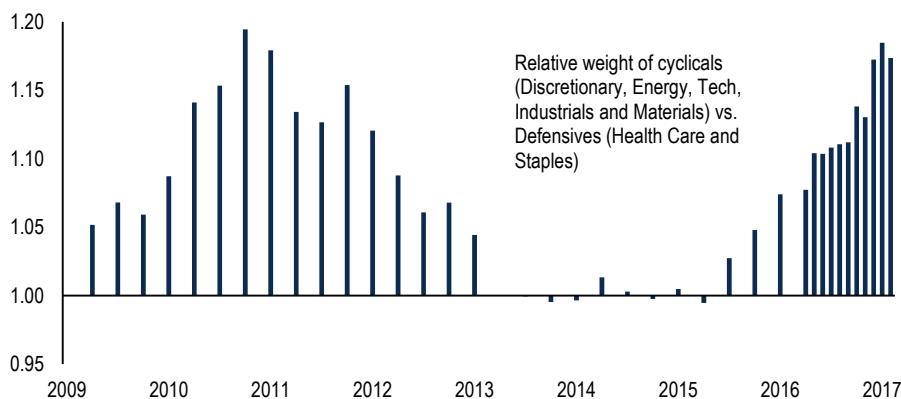


Source: BofAML US Quantitative Strategy, Lionshares

Pro-cyclical has been the main theme of active managers’ sector positioning over the past few months, as the cyclical vs. defensive positioning is near the highest levels in our data history.

**Chart 12: Cyclicals vs. Defensives relative exposure**

Large cap mutual fund exposure to cyclical vs. defensive sectors, 2Q09-1Q17

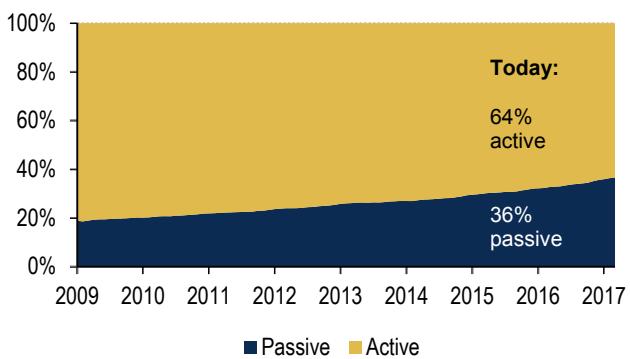


Source: Lipper Analytical Services; BofA Merrill Lynch US Equity & US Quant Strategy, Lionshares

## Extracting alpha from positioning

Positioning has added alpha at a stock level over the last several years. 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 8ppt to 18ppt of alpha per year (Chart 14). So far in 2017 most overweight stocks outperformed most underweight ones. This should reverse, as the main driver of the most crowded stocks' weakness – outflows from active fund into passive vehicles – is likely far from over (Chart 13).

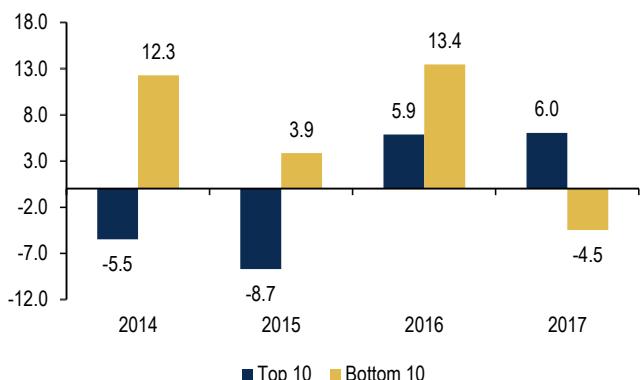
**Chart 13: AUM Landscape: Asset split between Active vs. Passive Equity Funds, 2009-present**



Note: Data through 3/31/2017

Source: Strategic Insight SimFund, BofAML Global Research

**Chart 14: 10 stock long/short alpha performance vs S&P 500**

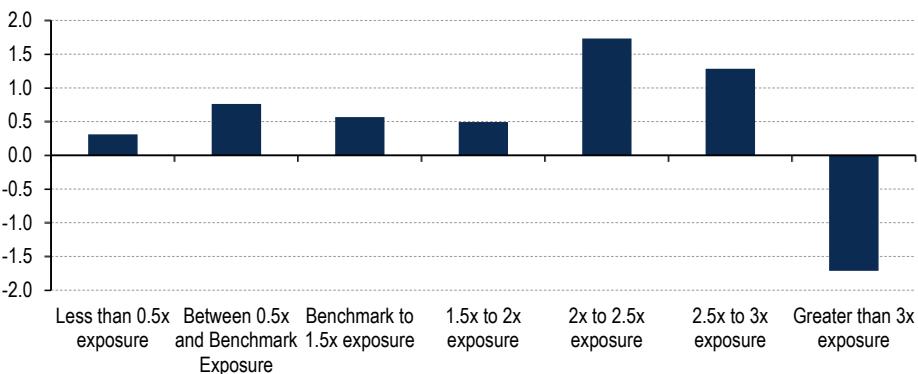


Note: 2016 performance through 3/31/2017

Source: BofA Merrill Lynch US Equity & US Quant Strategy.

Regardless of flows, crowded stocks have chronically underperformed. In our historical analysis, stocks with exposure of 3x or greater than the benchmark weight would have underperformed by 12ppt per year based on data back to 2008 (Chart 15).

**Chart 15: Relative 3-mth performance of stocks by buy-side exposure (1Q 2008 to 4Q 2016)**



Source: BofA Merrill Lynch US Equity & US Quant Strategy. 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.

## Global Fund Manager Survey cash balances

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

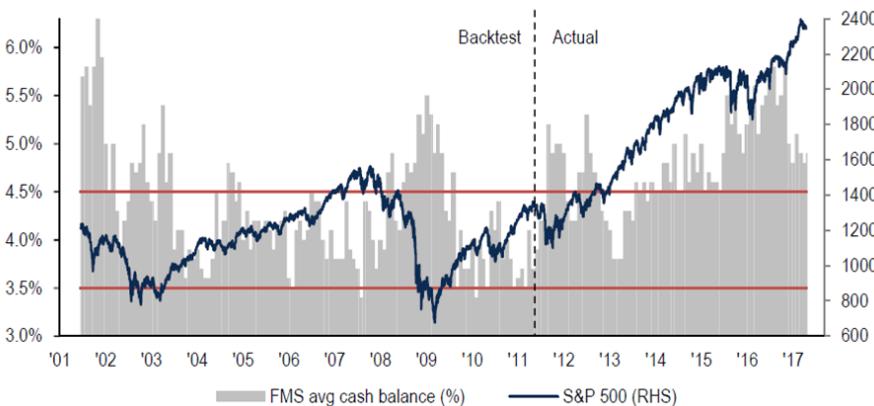
- When the cash balance falls below 3.5% a contrarian sell signal is generated.
- When the cash balance rises above 4.5% a contrarian buy signal is generated for equities.

### How it works

**Sell:** When the cash balance falls below 3.5% a contrarian sell signal is generated.

**Buy:** When the FMS average cash balance rises above 4.5% a contrarian buy signal is generated for equities.

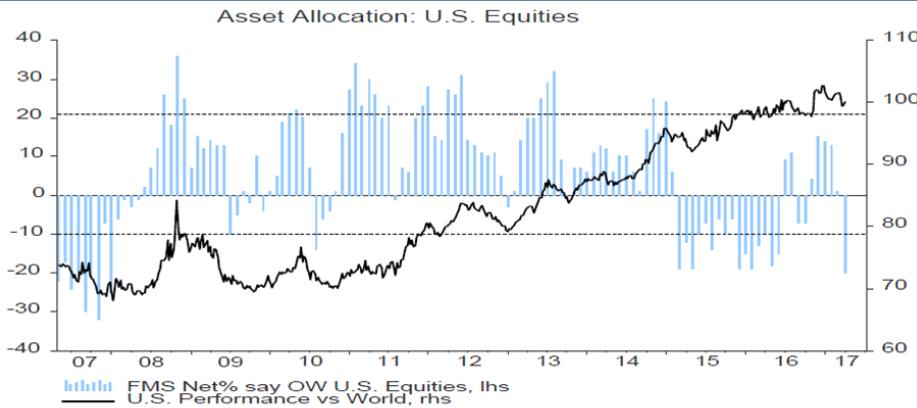
Chart 16: BofAML Global FMS Cash Indicator



Source: BofA Merrill Lynch Fund Manager Survey, DataStrea. Note: backtested results from Jan '02 to Mar '10. 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.

The BofAML Fund Manager Survey (FMS) also provides a context for global positioning of fund managers, and today highlights that global investors are underweight US stocks to the lowest level since January 2008.

## Exhibit 2: Investors are underweight the US

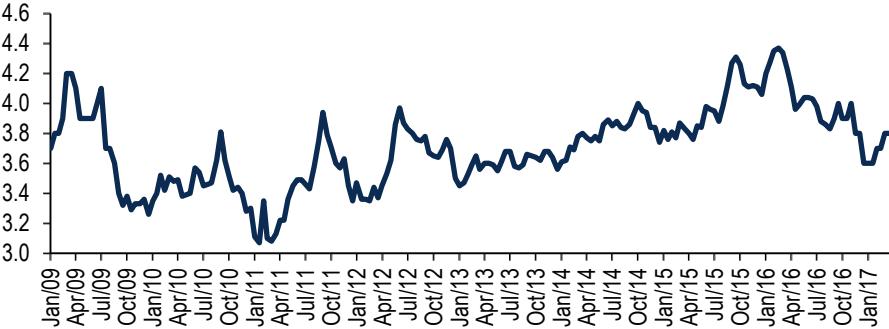


Source: Bank of America Merrill Lynch Global Manager Survey

## 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.

**Chart 17: Short Interest vs. Float Ratio for Total US Market**

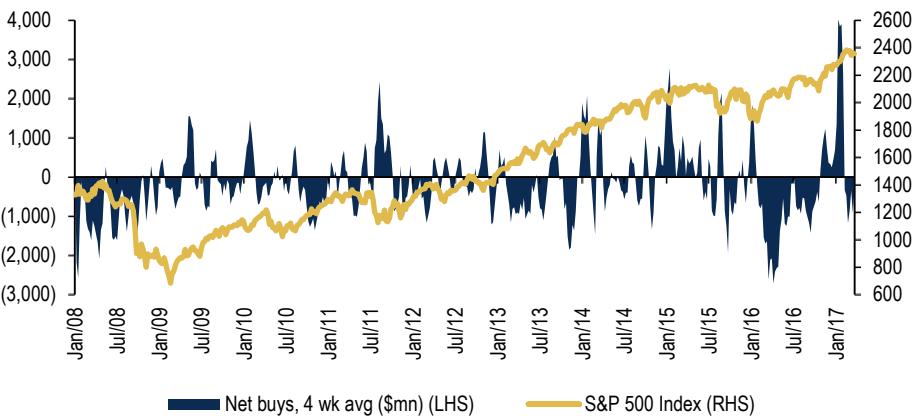


Source: BofA Merrill Lynch US Equity & US Quant Strategy, Bloomberg

### 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 BofAML client trading flows into US single stocks and ETFs which are executed by the cash equities business of the firm, and provide a weekly update on flows by sector, client type, and size segment.

**Chart 18: BofAML client net buys of US equities (\$mn) and S&P 500 since 2008**



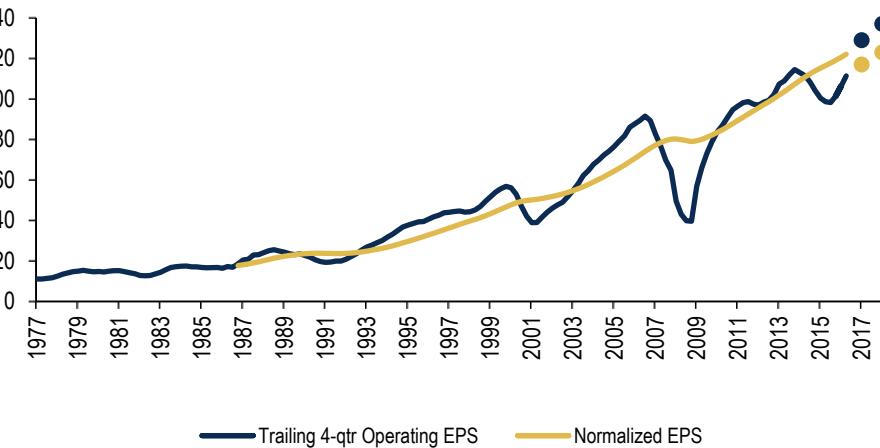
Source: Bank of America Merrill Lynch

## 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.

**Chart 19: S&P 500 Operating and Normalized earnings (1978 to 2015 using BofAML Estimate)**



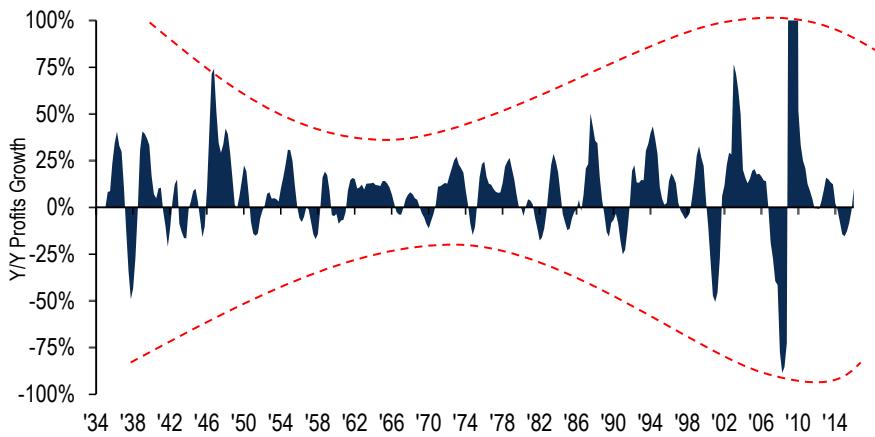
Source: BofA Merrill Lynch US Equity and US Quant Strategy

### Profits cycle

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

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

**Chart 20: Profits cycle: YoY EPS Growth for S&P 500, 1935 to present**



Source: BofA ML US Equity & Quant Strategy

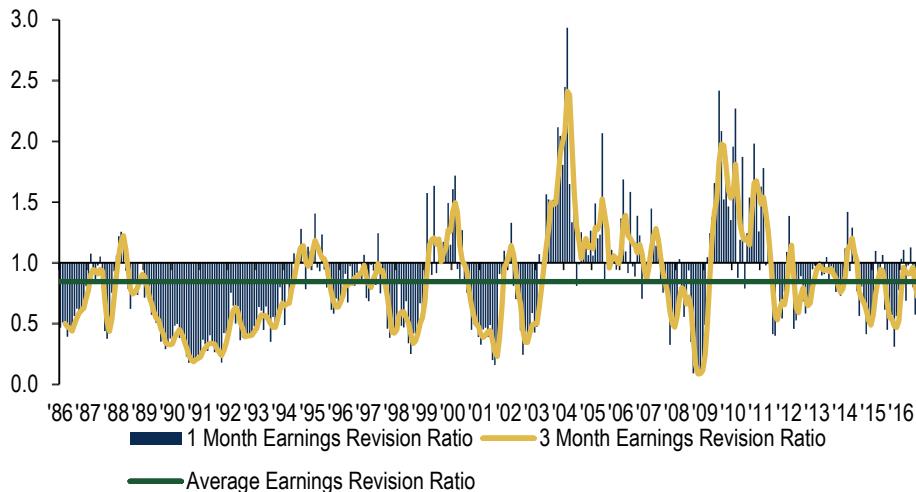
Whereas real earnings growth is possibly a better gauge of economic cycles, nominal earnings growth is a more important factor when examining the equity market. The equity market is a nominal concept because pricing and inflation, and not simply unit growth, influence profitability.

### S&P 500 earnings estimate revision ratio

The following chart shows the earnings estimate revision ratio, calculated as the ratio between the number of companies in the S&P 500 for which consensus earnings estimates have been raised versus those that have been lowered over a three month period. As a breadth ratio, the earnings revision ratio is generally an earlier indicator of changes in the profits cycle, as it is more sensitive to changes in earnings expectations than is a market capitalization weighted estimate revision model. 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.

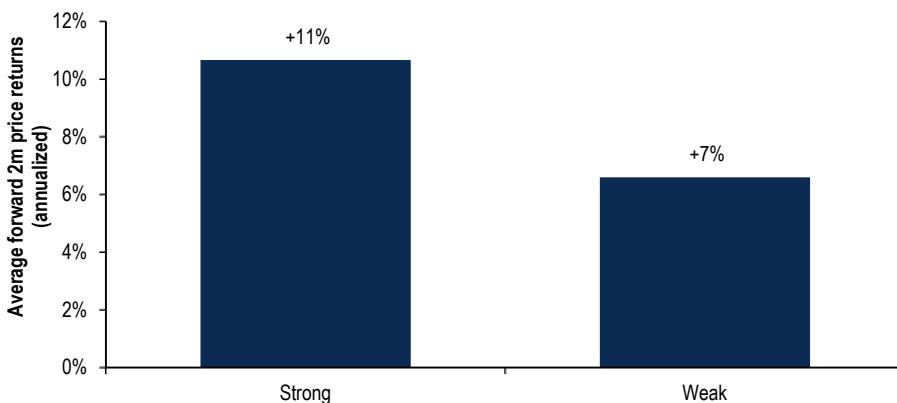
**Chart 21: S&P 500 Earnings Estimate Revision Ratio – 03/2017**



Source: BofA Merrill Lynch US Quantitative Strategy, I/B/E/S

The estimate revision ratio can be used as a short-term gauge of sentiment. The S&P 500 has displayed predictable patterns based on phases of the revision cycle, with the best predictive power over a forward 2-month period. The market has historically had the strongest returns when the ratio is Strong or above average (+11% annualized), and the weakest returns when the ratio is Weak or below average (+7% annualized).

**Chart 22: ERR vs. annualized forward 2-month returns (1986-present)**

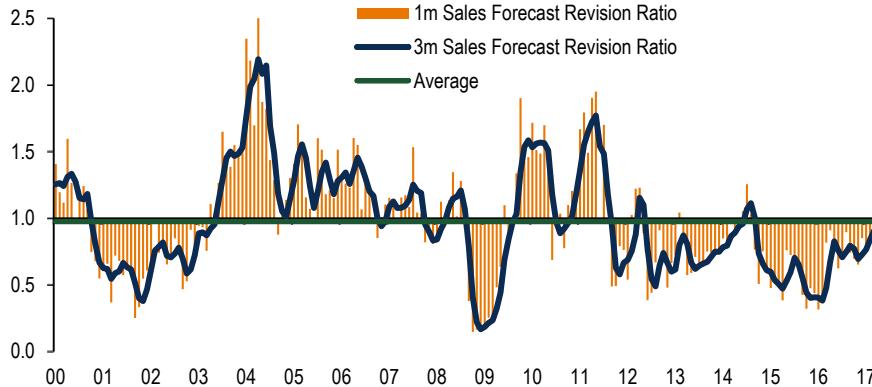


Source: BofA Merrill Lynch US Equity & US Quant Strategy

### 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.

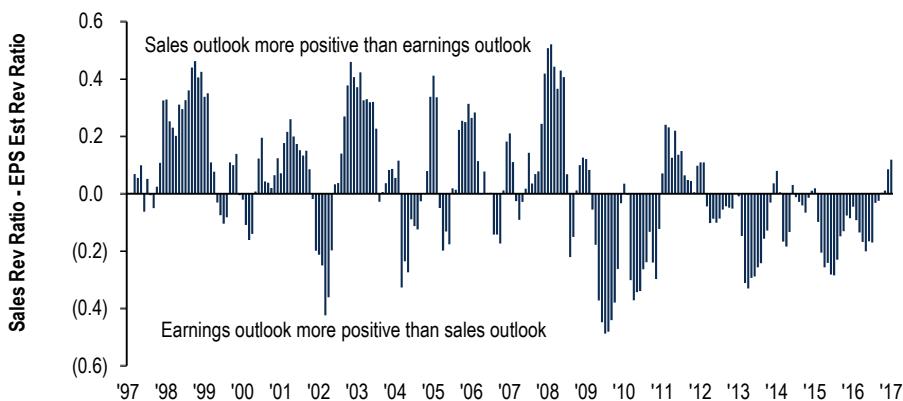
**Chart 23: S&P 500 Sales Forecast Revision Ratio – 03/2017**



Source: Bank of America Merrill Lynch US Equity & US Quant Strategy, I/B/E/S

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.

**Chart 24: Spread: 3-month sales forecast revision ratio vs. 3-month earnings estimate revision ratio**

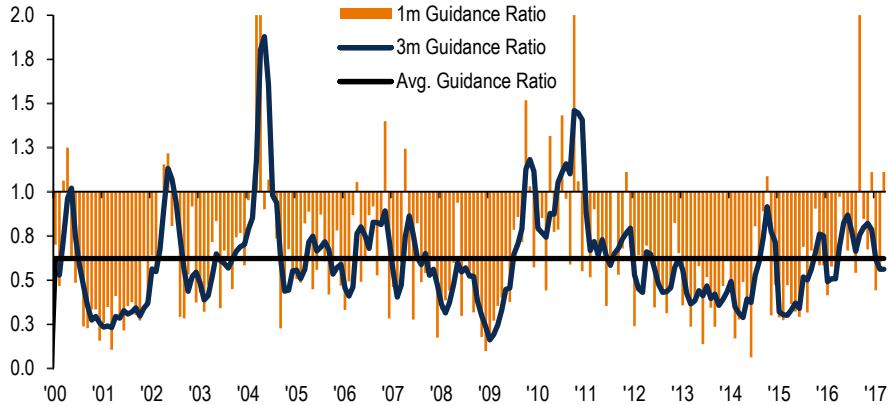


Source: BofAML US Equity & US Quant Strategy

### Management guidance ratio

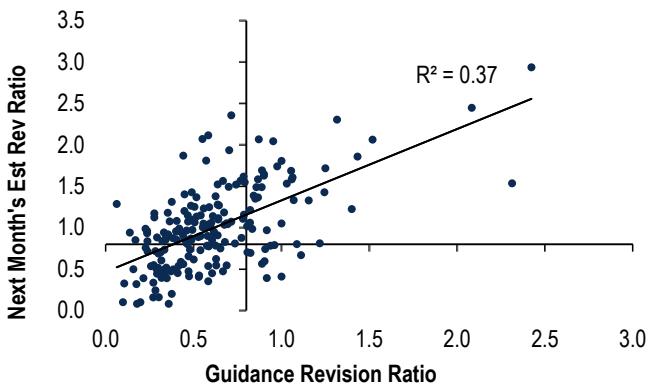
We track the ratio of total instances of above-consensus vs. below-consensus management guidance for S&P 500 companies over a one-month and three-month period, as we have found that guidance is generally a leading indicator of estimate revisions by about one month. Sustained divergences between the estimate 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. However, the two ratios have dramatically diverged in recent years, as management has maintained a consistently cautious stance while earnings have continued to surprise to the upside.

**Chart 25: S&P 500 Management Guidance Ratio (# Above vs. Below Consensus) – 03/17**



Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 26: Guidance Ratio vs. Subsequent Estimate Revision Ratio (2000 to present)**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 27: ...but the two have diverged in recent years**

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



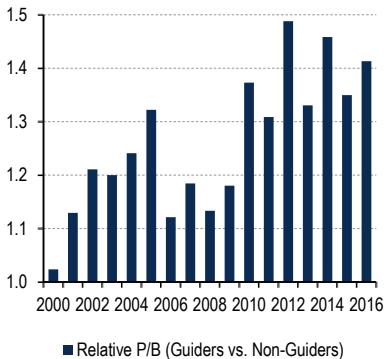
BofA Merrill Lynch US Equity & US Quant Strategy

### Evidence of a guidance premium

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

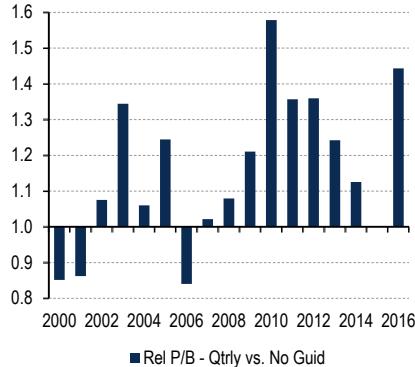
**Companies who regularly issue guidance may be rewarded for their apparent transparency.**

**Chart 28: Premium (discount) to S&P 500 based on median P/B for companies that issue annual or qtrly guidance vs those that do not**



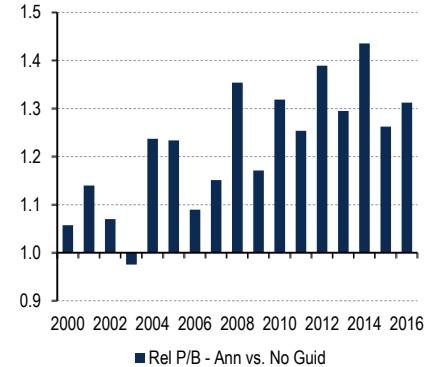
Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 29: Premium (discount) to S&P 500 based on median P/B for companies that issue qtrly guidance vs those that do not**



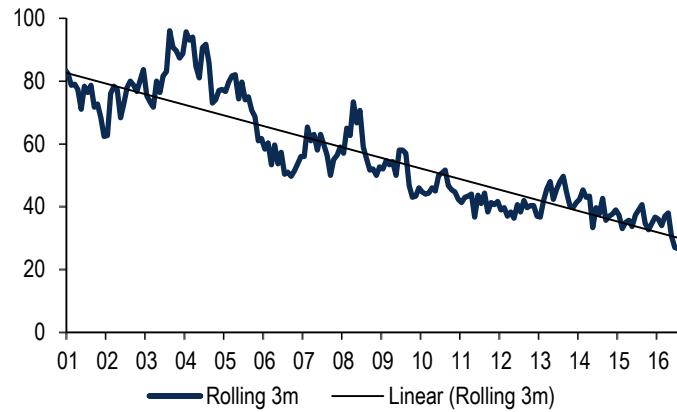
Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 30: Premium (discount) to S&P 500 based on median P/B for companies that issue annual guidance vs those that do not**



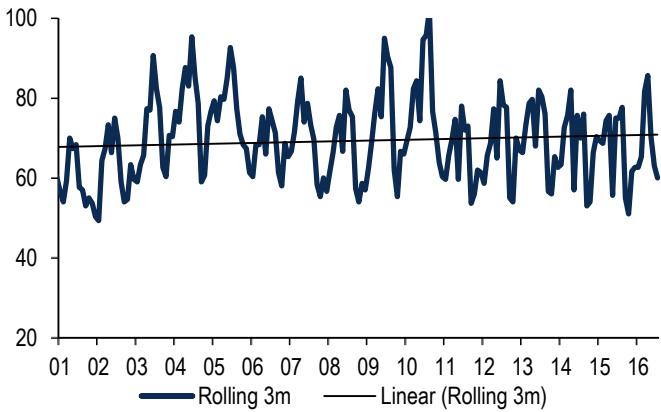
Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 31: S&P 500 quarterly earnings guidance instances**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 32: S&P 500 annual earnings guidance instances**



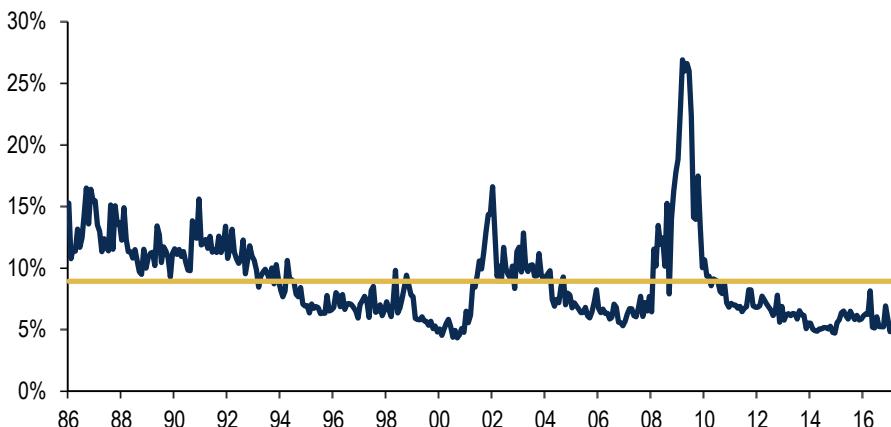
Source: BofA Merrill Lynch US Equity & US Quant Strategy

Corporates have shown to be less short-term focused as the number of companies issuing quarterly earnings guidance have steadily been declining over the last several years whereas the number of annual earnings guidance have remained steady.

### 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.

**Chart 33: Average dispersion of FY2 S&P500 Estimates (Feb 1986 to March 2017)**



BofA Merrill Lynch US Quantitative Strategy

## Earnings Expectation Life Cycle

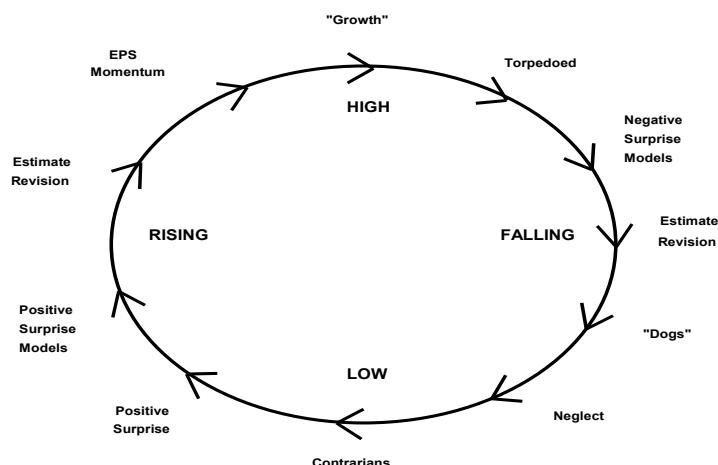
We believe that most stocks follow the pattern described by the cycle, although not every stock will stop at each point, nor will stocks reside in each phase for any regulated amount of time.

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 3: Earnings Expectation Life Cycle**



Source: BofA Merrill Lynch US Quantitative Strategy

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 Models**

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

We have found that these models have gained a lot of popularity with investors, thus the models 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 Models**

The same models 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 takeover, 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.

# 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 was essentially flat in 2015, but the highest 12-mth momentum stocks returned 8% that year, while stocks with the highest EPS Estimate Revisions fell 29%. And even as the market gained 10% in 2016, if one had invested in the stocks with the highest 12-mth momentum, he/she would have only made 0.2% versus 39% for the stocks with the lowest price. 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 4: Factor Timing

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: BofA Merrill Lynch US Quantitative Strategy

## The Earnings Expectation Life Cycle and Growth and Value

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 strategists 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.

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 astutely 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 sell a stock, whereas the hardest thing for a value manager to do is to buy 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.

### Growth and Value

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

### Growth and Value and the Earnings Expectations Life Cycle

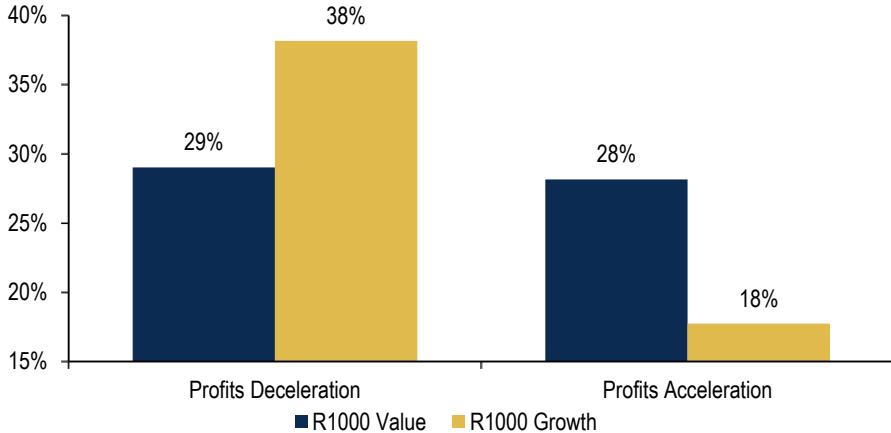
Within the context of the Earnings Expectations Life Cycle, **Value** managers are defined as investing in “low-expectations” equity since they search for out-of-favor stocks whose equity is priced at a discount. **Growth** managers are defined as investing in “high-expectations” equity since they search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

### Growth and Value and the Profits Cycle

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

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

**Chart 34: Growth vs. Value performance during the profits cycle (1982-present)**



Source: Russell Investment Group, BofA Merrill Lynch US Equity Strategy

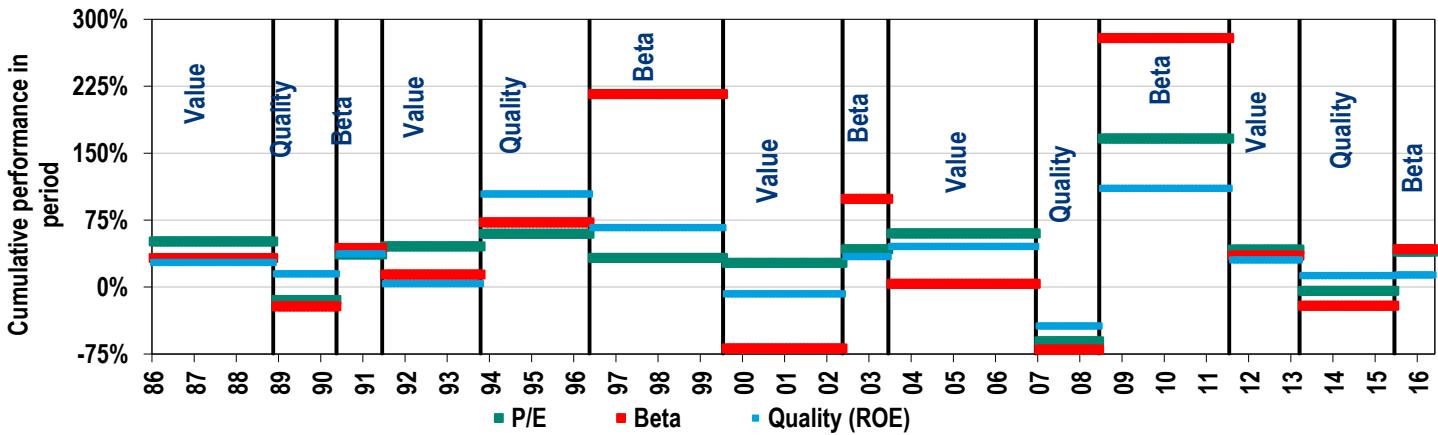
Because one of the factors influencing nominal earnings growth is inflation, we can assume that during inflationary environments, earnings growth tends to be more abundant and thus value outperforms growth. Therefore, during inflationary periods, the yield curve is steep, and future prospects are expected 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 Chart 34.

#### Fundamentals back in focus

- In addition to the profits cycle, the style cycle also currently favors value.
- History suggests that after periods of extreme outperformance of risk (beta), valuation-led markets follow as investors become more selective and look for market dislocations caused by beta runs.
- We think we are currently in a Value - and Quality-led environment, which should benefit stock pickers.

**Chart 35: After Beta it's Value: Cumulative performance by style (1986-2/2017)**

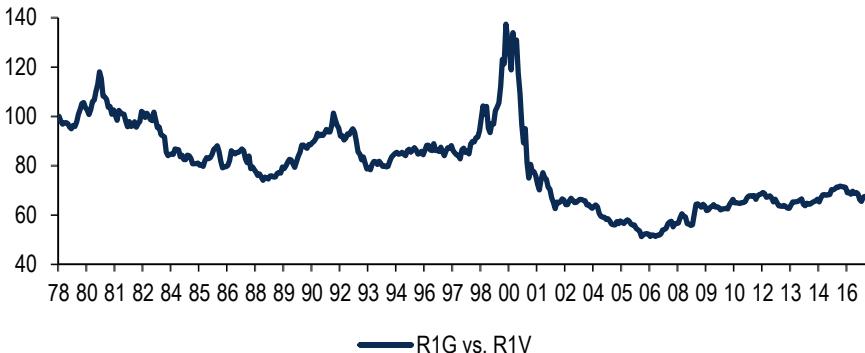


Source: BofA Merrill Lynch US Equity & US Quant Strategy

## Growth vs. Value benchmark performance

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

**Chart 36: Large caps: Relative performance (total return) of Growth vs. Value (1978-present)**



Source: Russell Investment Group, BofA Merrill Lynch US Equity Strategy

## Style differentiation has come back

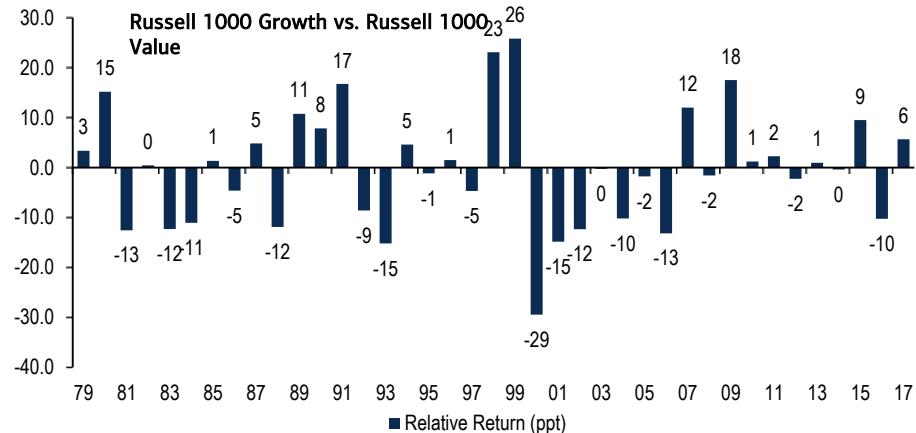
After several years of neck and neck Growth and Value performance, Growth led by 9ppt in 2015, followed by Value taking back the reins with 10ppt 2016 outperformance. So far this year Growth has led by 6ppt, but we prefer Value as we expect +9% EPS growth in 2017 following three years of flat EPS. Style performance spreads have historically been wider for small caps, suggesting that having a style benchmark view may be more important in this size segment (see Table 2).

**Table 2: Avg. rel. return of Growth vs. Value in years where Growth O/P'd, and avg. rel. return of Value vs. Growth in years where Value O/P'd**

	Russell 1000	Russell 2000
Avg. Growth Outperformance (ppt)	8.8	11.1
Avg. Value Outperformance (ppt)	8.9	13.0

Russell, BofA Merrill Lynch US Equity & Quant Strategy

**Chart 37: Relative Total Return: Growth vs. Value benchmarks(1979-3/31/2017)**



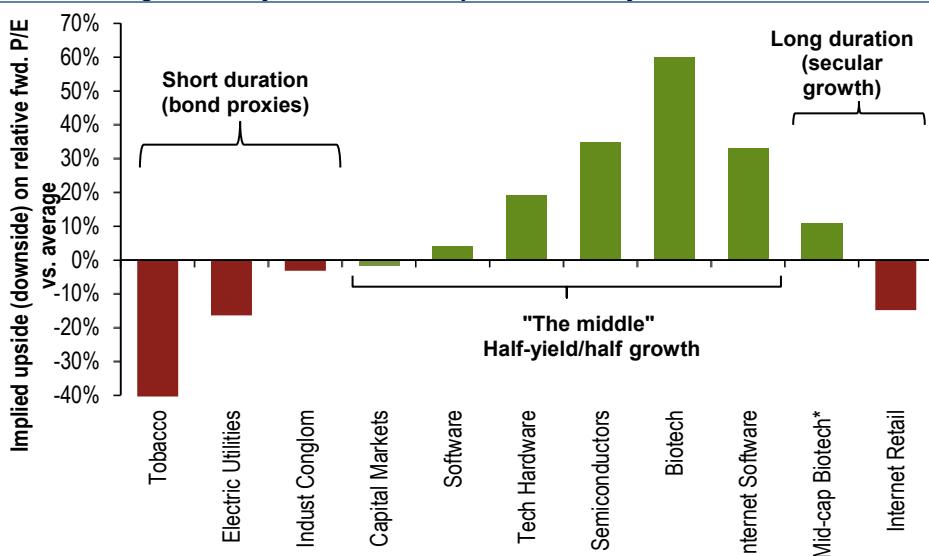
Source: Russell, BofA Merrill Lynch US Equity & US Quant Strategy

## Equity Duration

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

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

**Chart 38: The “tails” (bond proxies and secular growth) are expensive vs. history on relative forward P/E, while half-growth/half-yield sectors are inexpensive vs. History**



Note: Based on relative valuation data from 1986-3/31/17

Source: Factset/First Call, BofA Merrill Lynch US Equity & US Quant Strategy

## Size

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

### Nifty Fifty vs. Not-So-Nifty 450

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

### Small vs. Large Stock Performance

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

## Size Portfolio

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

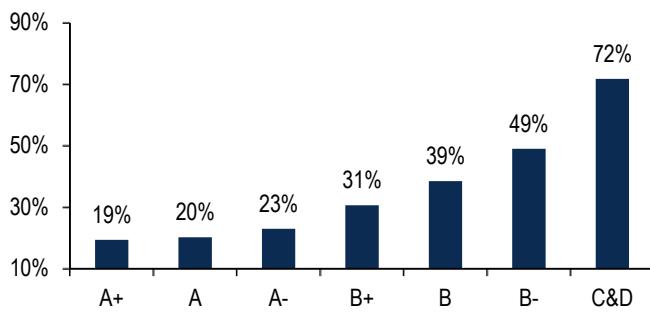
## The Profits Cycle and High Quality vs. Low Quality

Expansions and contractions in the profits cycle are almost entirely attributable to the 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.

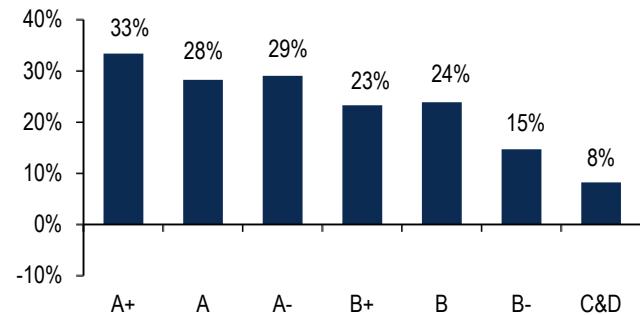
When the profits cycle decelerates and earnings growth becomes scarce, relative earnings will begin to favor higher quality companies and high quality should outperform. Likewise, when the profits cycle accelerates and earnings growth becomes more abundant, lower quality companies have better relative earnings than might higher quality issues, and thus tend to outperform.

**Chart 39: Average Performance by Quality When the Profits Cycle Accelerated (Last Five Cycles, 1986-2016)**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, Standard & Poor's

**Chart 40: Average Performance by Quality When the Profits Cycle Decelerated (Last Four Cycles, 1986-2016)**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, Standard & Poor's

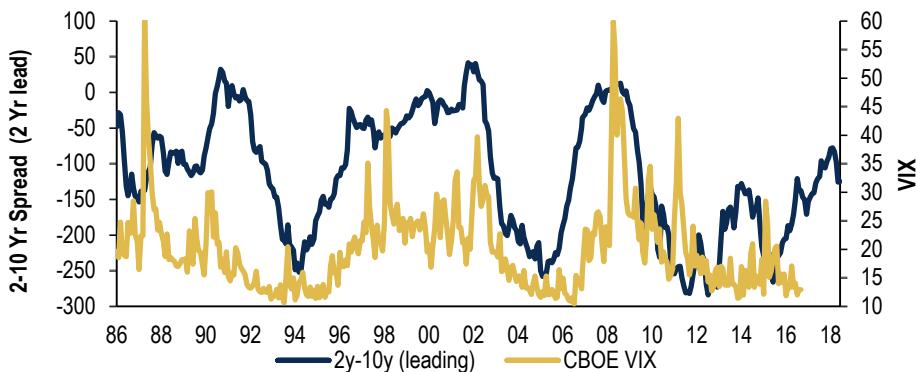
## The Profits Cycle and Size

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

## Volatility

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

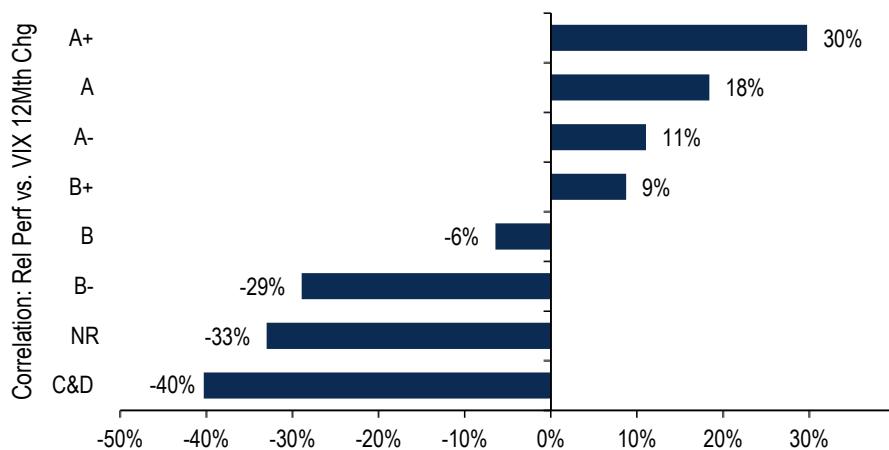
**Chart 41: CBOE VIX and Inverted Slope of Yield Curve (Jan 1986 to present)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

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

**Chart 42: BofAML Quality Indices 12-Mth Performance Correlation to 12-Mth Chg in CBOE VIX (1986-present)**

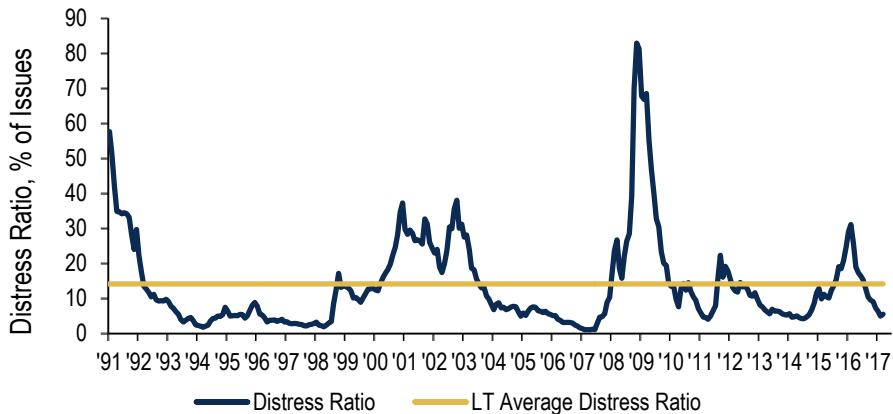


Source: BofAML US Equity & Quantitative Strategy

### Distress Ratio

The Distress Ratio measures the percentage of bonds in the BofA Merrill Lynch 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.

Chart 43: BofA Merrill Lynch High Yield Distress Ratio



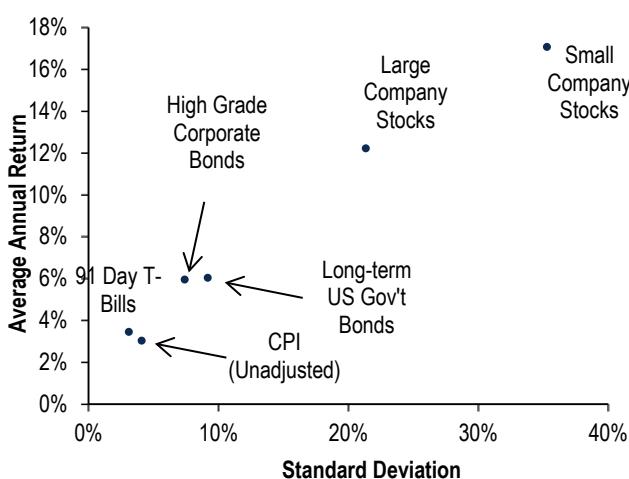
Source: BofA Merrill Lynch High Yield Research

## 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.

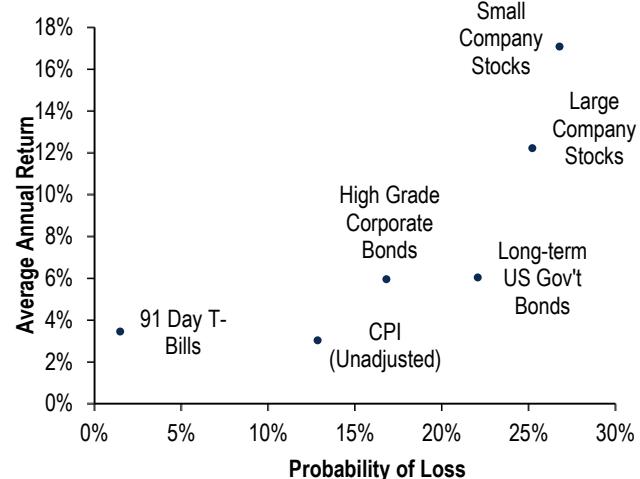
The other definition of risk is the probability of losing money. Our work suggests that, in practice, investors tend to be more concerned with the probability of losing money than they are with the predictability of return. Therefore, we prefer to define performance risk in much of our work as the probability of a negative return.

Chart 44: Risk Reward Characteristics (1925 to Present)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

Chart 45: Downside Risk Reward Characteristics (1925 to Present)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

### Long-short risk reward characteristics

For long-short models, 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 model outperforming the short model, which we gauge as the percentage of periods during which the long-short spread was positive.

## Risk-adjusted factor returns

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

For Russell 1000 factor sensitivity, please see the Appendix.

**Exhibit 5: Factor performance 1986 to present (Analyst Coverage since 1994; Institutional Ownership since 1999, Short Interest since 1993).**

Factor	Average Annualized Return	Avg. 12m		Probability of underperforming S&P 500	Volatility (Ann'zed)	Maximum Drawdown	Downside Volatility, Ann'zed		
		Excess Return vs. S&P 500	Sharpe Ratio vs. 10y Tsy						
Free Cash Flow/ EV	18.2%	6.4%	0.74	0.79	14.4%	25.1%	19.8%	-56.1%	15.0%
EV/ EBITDA	17.0%	5.6%	0.66	0.58	17.1%	32.0%	20.9%	-59.3%	15.1%
Most Active	16.3%	5.8%	0.61	0.39	21.3%	36.7%	22.1%	-63.7%	16.4%
Price/ Free Cash Flow	16.4%	5.4%	0.63	0.55	18.2%	29.8%	21.3%	-66.6%	16.8%
Earnings Yield	15.4%	4.0%	0.58	0.44	19.1%	37.3%	21.0%	-68.7%	15.4%
Share Repurchase	15.3%	3.1%	0.65	0.51	17.1%	35.9%	17.3%	-50.5%	14.0%
Short Interest	14.7%	3.0%	0.71	0.56	12.7%	31.3%	16.1%	-47.5%	12.0%
P/E-to-Growth	14.7%	3.6%	0.52	0.34	23.2%	36.7%	23.1%	-69.6%	16.9%
Price Return - 12-mth and 1-mth Reversal	14.4%	2.8%	0.57	0.21	15.7%	31.5%	19.1%	-56.5%	15.8%
ROC	14.4%	2.2%	0.63	0.26	17.1%	35.9%	16.7%	-50.2%	13.0%
Forward Earnings Yield	14.2%	4.2%	0.49	0.23	24.0%	41.2%	24.0%	-74.1%	17.5%
1yr ROE	13.8%	1.5%	0.59	0.18	16.9%	37.0%	16.5%	-46.0%	12.4%
5yr ROE Adj	13.9%	1.9%	0.57	0.19	16.6%	43.1%	17.7%	-43.7%	13.2%
Price Return - 9-mth Perf.	13.8%	2.6%	0.53	0.08	19.3%	39.5%	19.5%	-54.2%	14.6%
1yr ROE Adj	13.9%	1.6%	0.58	0.18	20.7%	44.8%	17.2%	-50.2%	12.5%
Price Return - 11-mth Perf.	13.8%	3.0%	0.52	0.09	22.4%	39.5%	20.2%	-56.2%	15.5%
Price/ Cash Flow	14.1%	3.1%	0.51	0.24	22.7%	37.6%	22.1%	-61.6%	16.3%
Price/ Sales	13.8%	3.9%	0.47	0.21	25.4%	41.7%	24.4%	-70.2%	18.2%
Price Return - 12-mth Perf.	13.6%	2.6%	0.52	0.07	20.4%	40.6%	19.6%	-53.7%	14.6%
5y ROE	13.3%	1.1%	0.56	0.12	18.2%	41.2%	16.6%	-44.0%	12.4%
ROA	13.2%	1.0%	0.53	0.09	21.8%	47.5%	17.8%	-50.2%	12.8%
Relative Strength - 10wk/40wk MA	13.2%	1.9%	0.51	0.04	20.4%	45.0%	19.0%	-56.1%	13.8%
Relative Strength - 30wk/75wk MA	12.9%	2.3%	0.47	0.04	21.5%	45.9%	21.0%	-59.6%	16.5%
Relative Strength - 5wk/30wk MA	12.7%	1.0%	0.50	0.00	18.2%	49.2%	18.0%	-48.8%	12.8%
Dividend Yield	12.3%	1.7%	0.45	0.00	22.7%	50.3%	20.2%	-78.4%	16.2%
Price/ Book Value	12.4%	2.9%	0.41	0.10	24.3%	41.7%	25.7%	-82.6%	19.2%
Size	12.6%	2.4%	0.42	0.14	28.5%	51.0%	25.1%	-68.7%	17.6%
Eq. Wtd. S&P 500	12.1%	na	0.49	na	18.8%	na	17.0%	-55.7%	13.3%
Dividend Growth	11.7%	-0.3%	0.45	-0.07	24.0%	49.2%	17.7%	-56.3%	13.6%
Low Price	12.0%	2.8%	0.38	0.08	28.5%	51.9%	28.9%	-68.8%	19.8%
Price Return - 12-mth and 1-mth Performance	11.9%	0.1%	0.46	-0.07	20.7%	48.1%	17.4%	-52.5%	13.0%
Price to Moving Average (200 day)	12.1%	0.5%	0.47	-0.05	20.2%	52.5%	18.0%	-51.4%	13.1%
EPS Estimate Revisions	11.9%	0.7%	0.43	0.00	23.8%	41.2%	20.1%	-60.8%	15.5%
Price Return - 3-mth Perf.	11.7%	0.0%	0.44	-0.07	20.4%	51.4%	18.2%	-55.7%	13.1%
Neglect - Analyst Coverage	11.3%	0.2%	0.48	-0.06	23.9%	48.5%	17.5%	-60.2%	13.2%
Earnings Torpedo	11.4%	0.6%	0.39	-0.02	21.0%	50.0%	22.2%	-65.7%	15.6%
Earning Momentum	11.2%	-0.2%	0.41	-0.10	25.4%	54.1%	19.1%	-59.3%	15.1%
Beta	9.8%	1.5%	0.31	-0.02	31.5%	53.3%	31.0%	-81.0%	22.1%
Proj. 5yr EPS Growth	9.3%	-0.2%	0.29	-0.12	25.1%	55.8%	26.0%	-82.0%	19.7%
Variability of Earnings	9.4%	-1.3%	0.30	-0.25	26.5%	54.7%	21.6%	-65.1%	16.1%
Estimate Dispersion	8.7%	-0.5%	0.27	-0.13	28.2%	54.1%	27.2%	-75.9%	19.4%
Neglect - Institutional Ownership	7.4%	-2.1%	0.31	-0.35	27.9%	62.3%	16.2%	-56.5%	12.0%

Factor performance 1986 to present (Analyst Coverage since 1994; Institutional Ownership since 1999).

## Macro matters

**Exhibit 6: S&P 500 factors: Correlation vs. macro factors**

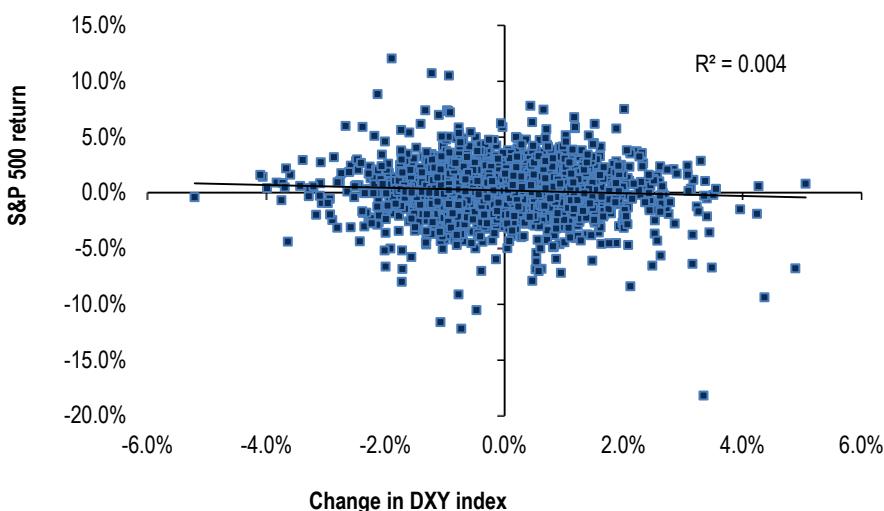
Factor	Interest Rates			Currency	Inflation	Commodity Prices	Economy	Market Volatility	Corporate Profits	Credit Quality
	10yr Nominal Yld	Tsy Real Yield	2s10s Tsy curve							
Earnings Yield	0.12	0.21	0.10	0.03	-0.01	-0.11	0.26	-0.37	-0.13	-0.52
Forward Earnings Yield	0.33	0.24	0.13	-0.11	-0.06	-0.05	0.22	-0.41	-0.14	-0.69
Dividend Yield	-0.15	0.16	0.14	-0.05	-0.10	-0.02	0.22	-0.27	-0.08	-0.49
Price/ Book Value	0.35	0.18	0.11	-0.11	-0.12	0.04	0.27	-0.51	-0.11	-0.74
Price/ Cash Flow	0.24	0.30	0.05	-0.27	0.16	0.09	0.33	-0.22	0.05	-0.29
Price/ Free Cash Flow	-0.08	0.41	0.20	-0.10	0.01	-0.11	0.29	-0.19	-0.02	-0.32
Price/ Sales	0.24	0.29	0.17	-0.10	-0.30	-0.06	0.18	-0.33	-0.28	-0.72
EV/ EBITDA	0.19	0.25	0.06	-0.27	0.21	0.07	0.33	-0.21	-0.05	-0.32
Free Cash Flow/ EV	-0.15	0.44	0.25	-0.03	0.06	-0.02	0.31	-0.05	-0.13	-0.12
Rel. Strength - 30wk/75wk MA	0.30	-0.39	-0.36	0.02	0.22	0.28	0.63	-0.01	0.17	0.26
Relative Strength - 5wk/30wk MA	0.26	-0.22	-0.19	0.09	0.13	0.36	0.52	0.12	0.18	0.33
Rel. Strgth - 10wk/40wk MA	0.28	-0.26	-0.27	0.06	0.12	0.34	0.62	0.09	0.25	0.28
Price to 200 day MA	0.23	-0.26	-0.23	0.15	0.14	0.28	0.55	0.18	0.16	0.42
Price Return - 12-mth Perf.	0.24	-0.35	-0.31	0.14	0.15	0.22	0.60	0.06	0.16	0.35
Price Return - 9-mth Perf.	0.28	-0.33	-0.31	0.08	0.14	0.27	0.60	0.08	0.23	0.34
Price Return - 3-mth Perf.	0.29	-0.23	-0.19	0.04	0.09	0.27	0.46	0.04	0.10	0.20
Price Return - 11-mth Perf.	0.27	-0.34	-0.30	0.09	0.16	0.26	0.64	0.03	0.16	0.28
Price Ret. - 12m and 1m Perf.	0.15	-0.32	-0.21	0.20	0.14	0.16	0.48	0.14	0.10	0.46
Price Ret. - 12m and 1m Reversal	0.10	-0.23	-0.27	0.07	0.15	0.08	0.63	0.06	0.30	0.32
Most Active	0.47	-0.22	-0.10	-0.17	0.07	0.29	0.44	-0.23	-0.08	-0.25
Low Price	0.32	0.32	0.23	-0.16	-0.24	0.02	0.18	-0.40	-0.19	-0.64
Earning Momentum	0.54	-0.36	-0.30	-0.16	0.18	0.32	0.48	-0.20	0.17	-0.05
Proj. 5yr EPS Growth	0.47	-0.29	-0.24	-0.16	0.09	0.36	0.48	-0.14	0.17	-0.06
Earnings Torpedo	0.18	0.08	-0.01	-0.18	-0.18	0.07	0.17	-0.31	-0.14	-0.64
EPS Estimate Revisions	0.41	-0.54	-0.46	-0.05	0.26	0.28	0.58	-0.08	0.28	0.08
Dividend Growth	-0.16	-0.09	-0.12	-0.16	0.20	0.06	0.33	0.01	0.16	-0.16
P/E-to-Growth	0.31	0.22	0.06	-0.04	0.12	0.09	0.35	-0.35	0.09	-0.55
1yr ROE	-0.38	0.09	0.12	0.04	0.21	-0.03	0.34	0.37	-0.10	0.60
5y ROE	-0.32	0.05	0.10	0.14	-0.01	-0.02	0.32	0.35	-0.03	0.48
1yr ROE Adj	0.01	-0.16	0.00	-0.11	0.29	0.18	0.37	0.23	-0.02	0.37
5y ROE Adj	0.05	-0.11	0.06	-0.02	0.07	0.15	0.35	0.15	-0.08	0.31
ROA	0.11	-0.18	-0.03	-0.05	0.20	0.27	0.39	0.16	-0.06	0.32
ROC	-0.17	-0.19	-0.05	0.11	0.15	0.03	0.43	0.31	0.02	0.49
Beta	0.52	-0.02	-0.04	-0.20	-0.07	0.28	0.33	-0.36	-0.09	-0.50
Variability of Earnings	0.44	-0.07	-0.02	-0.31	-0.08	0.14	0.30	-0.36	-0.04	-0.55
Estimate Dispersion	0.47	0.00	-0.06	-0.28	-0.07	0.29	0.38	-0.49	0.01	-0.61
Neglect - Analyst Coverage	-0.02	0.24	0.22	-0.04	-0.19	-0.22	0.34	-0.03	-0.10	-0.18
Neglect - Institutional Ownership	-0.47	0.25	0.25	-0.07	-0.24	-0.23	0.39	0.24	-0.07	-0.04
Size	0.25	0.34	0.22	-0.21	-0.25	0.05	0.13	-0.35	-0.24	-0.70
Share Repurchase	-0.17	0.49	0.33	0.03	0.08	-0.06	0.31	0.15	-0.09	0.13
Short Interest	-0.16	0.58	0.55	-0.09	0.07	0.02	0.42	0.13	-0.28	0.21

Source: BofA Merrill Lynch US Equity & Quantitative Strategy

## Macro focus: the US Dollar impact

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

Chart 46: Change in DXY index vs. S&P 500 (weekly) since 1979



Source: Bloomberg, S&P, BofA Merrill Lynch US Equity Strategy

### Dollar cycles can be persistent

Exhibit 7: Performance based on size segment has been inconsistent in secular uptrends for the USD

	10/78-3/85	6/95-2/02
Small Caps	296.1	114.2
Large Caps	159.8	125.1
Rel Performance (Small vs Large)	52.5	-4.8

Source of historical returns: CRSP®, Center for Research in Security Prices, Graduate School of Business, The University of Chicago.

Used with permission. All rights reserved. [www.crsp.uchicago.edu](http://www.crsp.uchicago.edu)

The performance has been calculated by BofA Merrill Lynch Small Cap Research All rights reserved.

Source: CRSP; Federal Reserve Bank; BofA Merrill Lynch Small Cap Research

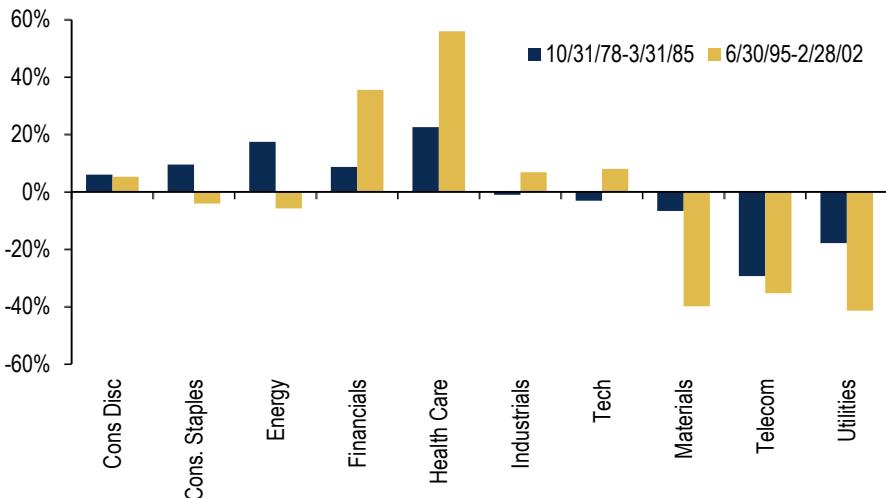
One notable observation with the USD is the persistence of its secular tendency – a trend, once started, can last for many years. In fact, the USD has completed only two major cycles in the last 40+ years. Both the 1978-1985 and the 1995-2002 cycles lasted 16 years. So what works in these secular dollar 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 '95-02 dollar uptrend (Exhibit 7).

At the sector level, in the two prior periods of secular dollar strength, 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.

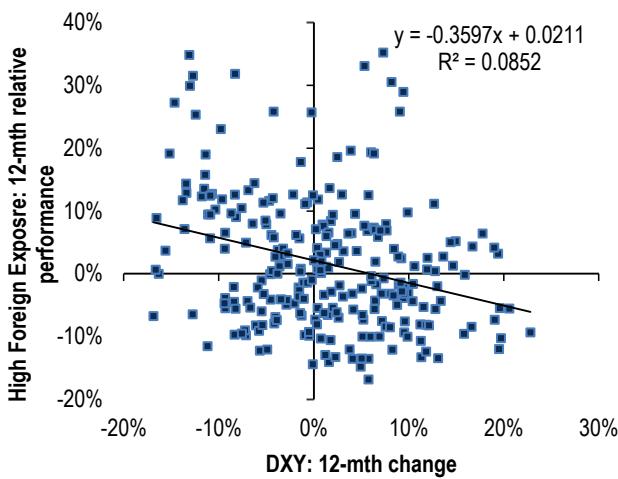
**Chart 47: Within the S&P 500, Discretionary, Financials and Health Care outperformed in both rising dollar time periods, while Materials, Telecom and Utilities underperformed**



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

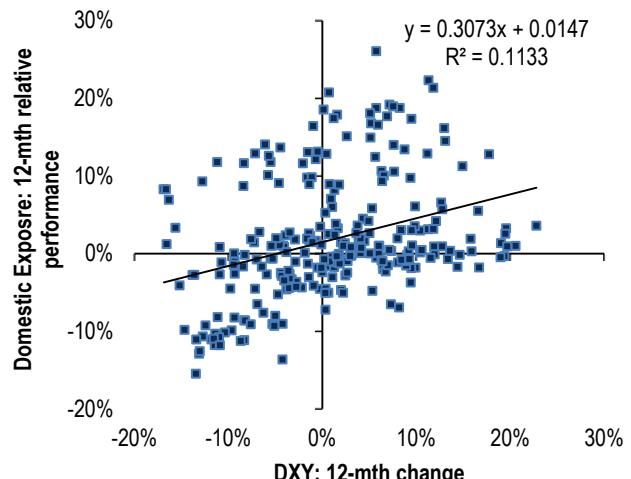
There has been a weak historical negative relationship between foreign exposed stocks and strong dollar backdrops and a slightly stronger relationship between more domestically oriented stocks and strong dollar backdrops. But the relationship has not been strong enough to justify a uniform penalty or 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 their foreign sales, or may have a large chunk of revenue associated with multinational companies that supply overseas and thus carry indirect currency risk based on end user demand weakening.

**Chart 48: High Foreign exposure performance vs. USD**



Source: BofA Merrill Lynch US Equity and Quant Strategy

**Chart 49: Domestic exposure performance vs. USD**



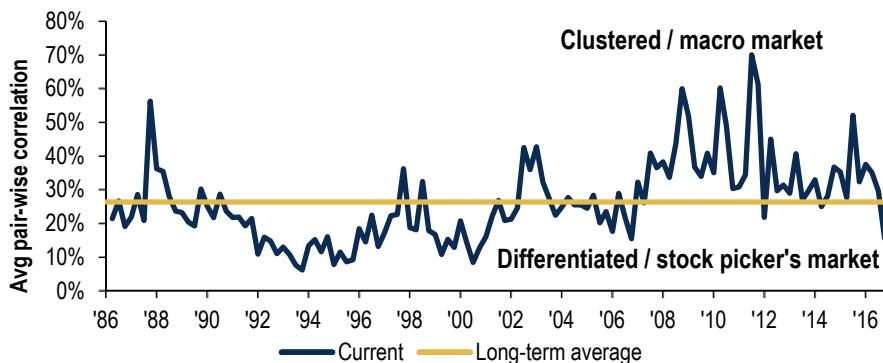
Source: BofA Merrill Lynch US Equity and Quant Strategy

# 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.

Chart 50: Pair-wise correlations of all S&P 500 stock combinations (daily returns per qtr. 2Q86-1Q17)



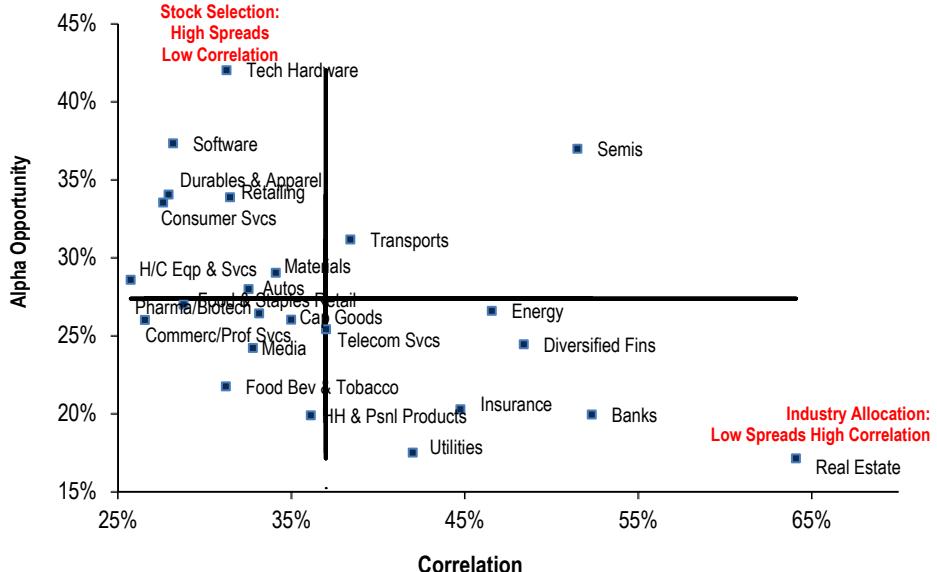
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

## 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.

**Chart 51: Historical Intra-stock correlation vs. performance spread (3Q86 to 1Q17)**

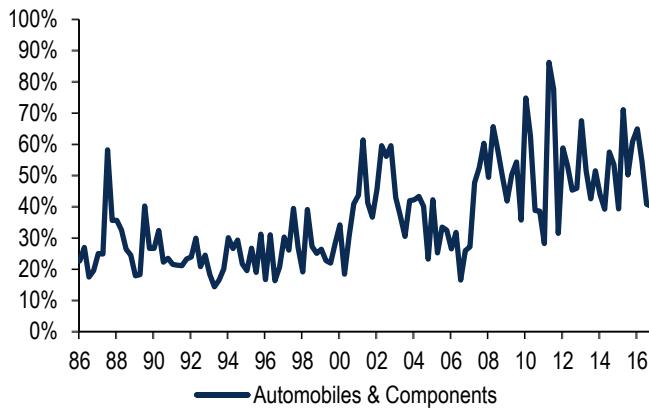


Source: BofA ML US Equity & US Quant Strategy

Note: Real Estate since 2012

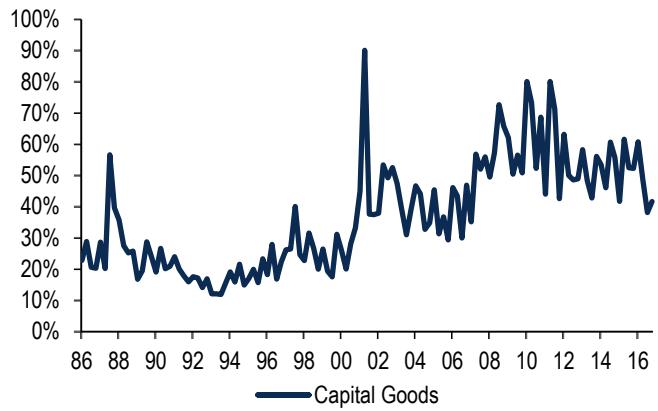
Below we provide historical charts of correlations within industry groups, which illustrate where stocks are most clustered or differentiated and how these relationships have changed over time. For example, Banks have exhibited an increase in correlations over the last two decades, while correlations 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.

**Chart 52: Automobiles & Components**

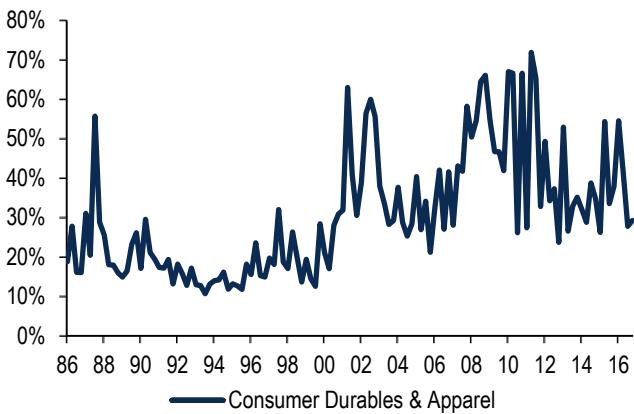


Source: BofA ML US Equity & US Quant Strategy

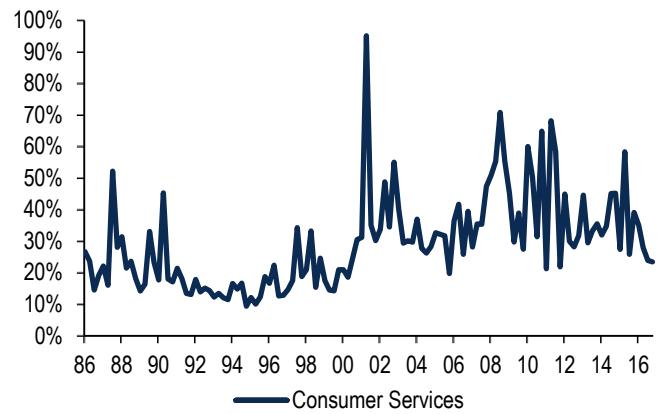
**Chart 53: Capital Goods**



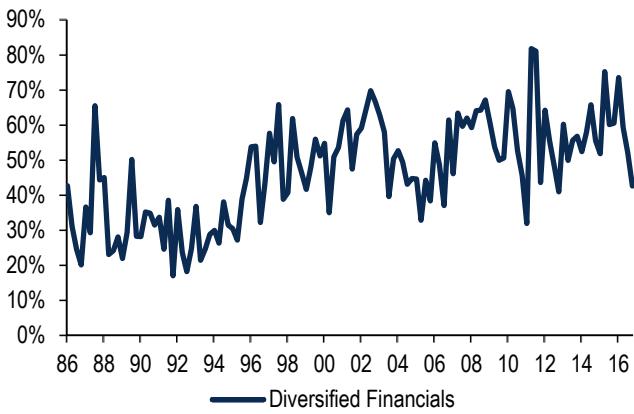
Source: BofA ML US Equity & US Quant Strategy

**Chart 54: Consumer Durables & Apparel**

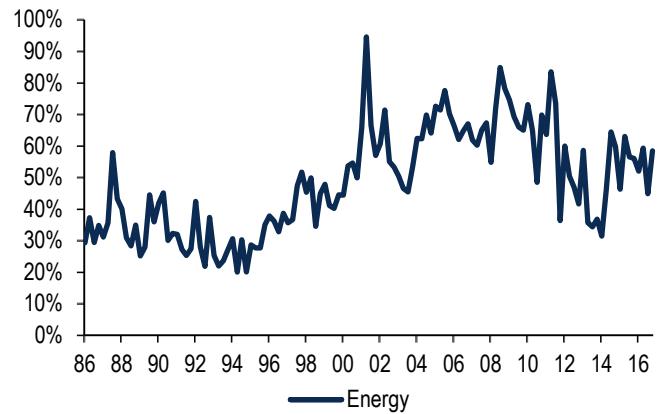
Source: BofA ML US Equity & US Quant Strategy

**Chart 55: Consumer Services**

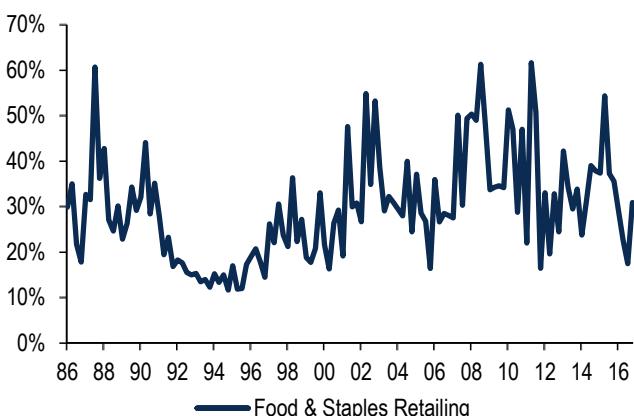
Source: BofA ML US Equity & US Quant Strategy

**Chart 56: Diversified Financials**

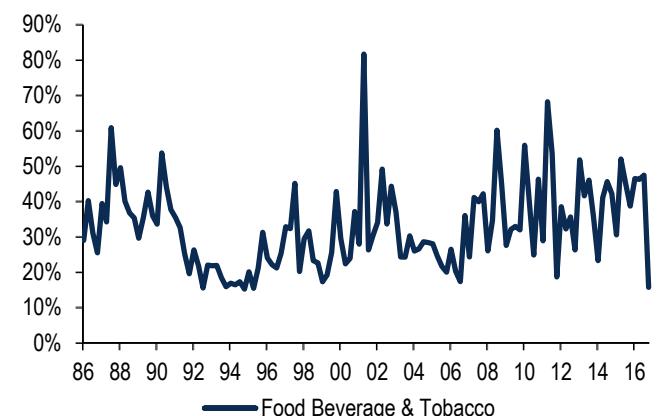
Source: BofA ML US Equity & US Quant Strategy

**Chart 57: Energy**

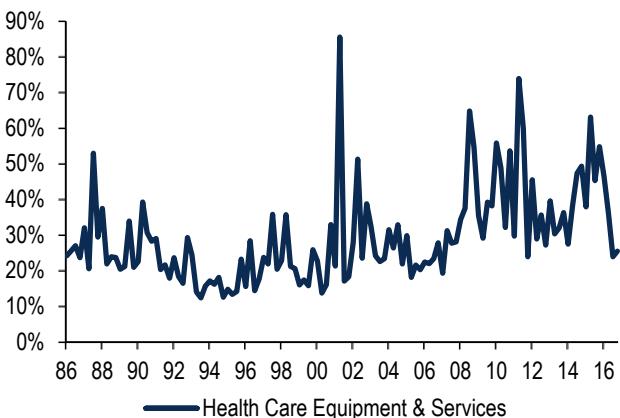
Source: BofA ML US Equity & US Quant Strategy

**Chart 58: Food & Staples Retailing**

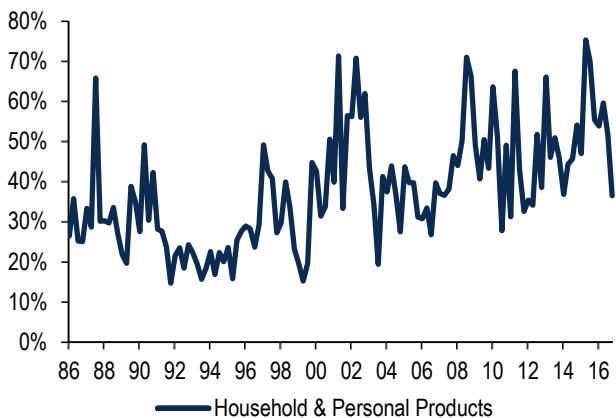
Source: BofA ML US Equity & US Quant Strategy

**Chart 59: Food Beverage & Tobacco**

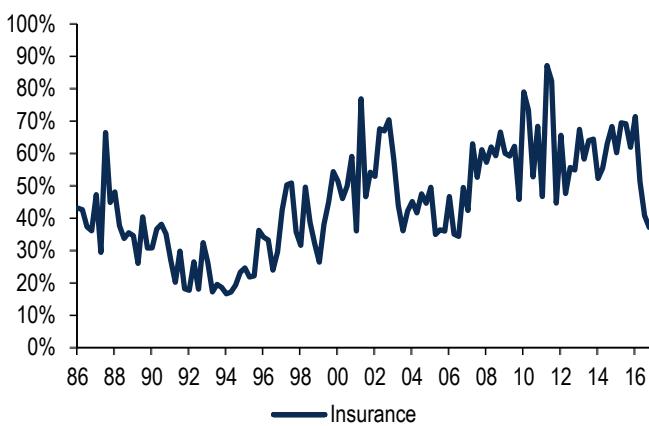
Source: BofA ML US Equity & US Quant Strategy

**Chart 60: Health Care Equipment & Services**

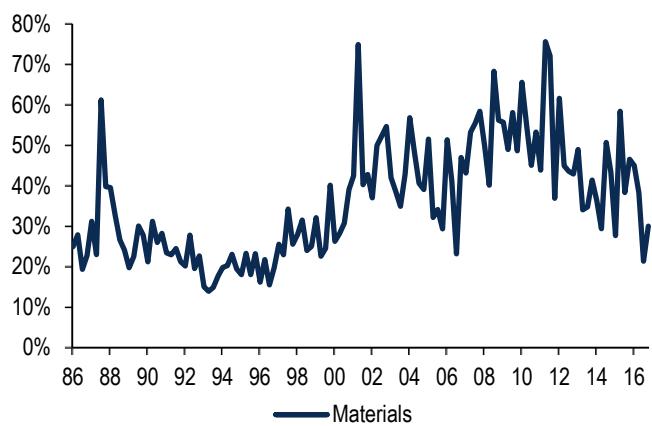
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 61: Household & Personal Products**

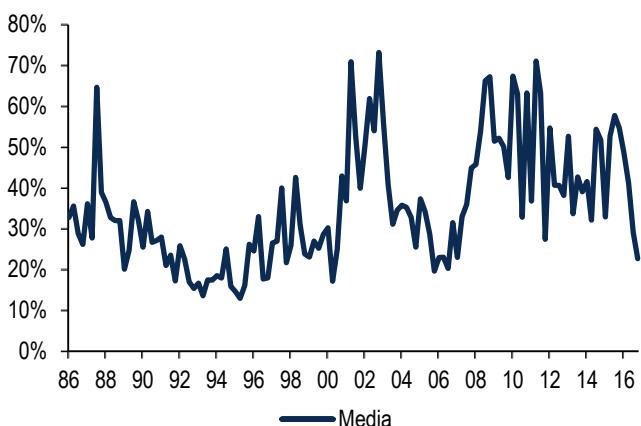
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 62: Insurance**

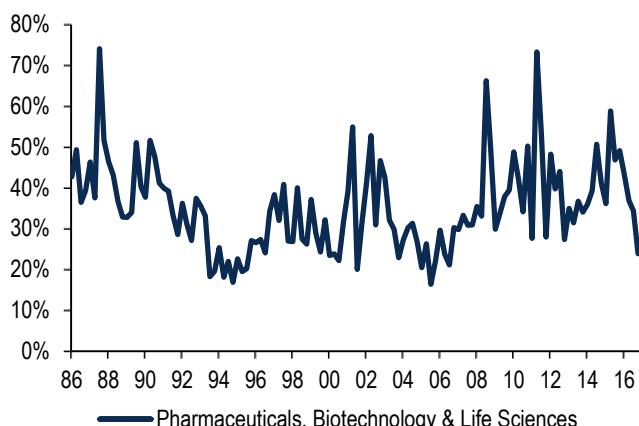
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 63: Materials**

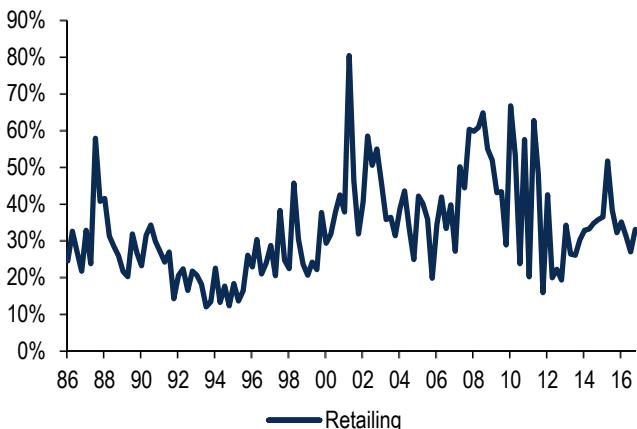
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 64: Media**

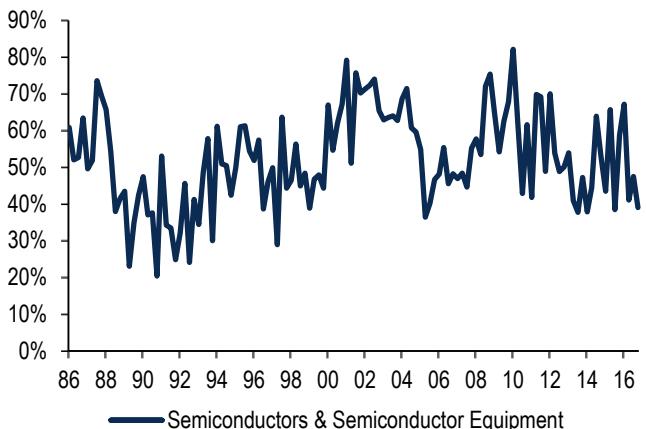
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 65: Pharmaceuticals, Biotechnology & Life Sciences**

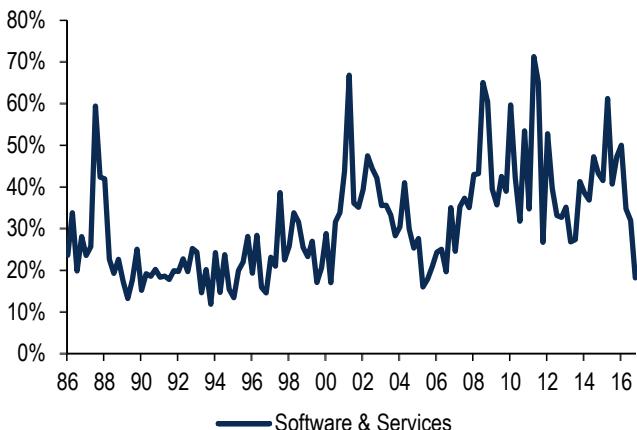
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 66: Retailing**

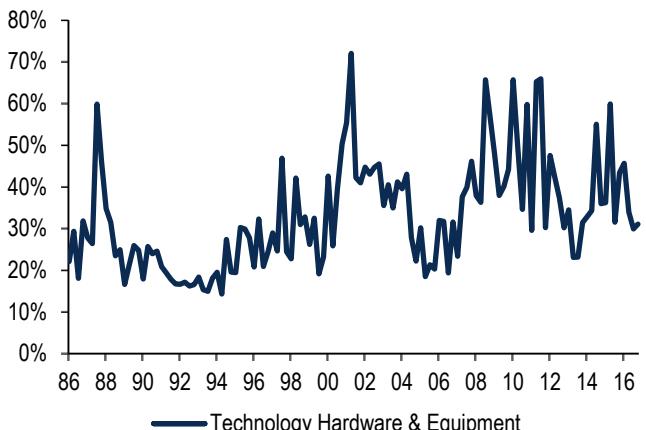
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 67: Semiconductors & Semiconductor Equipment**

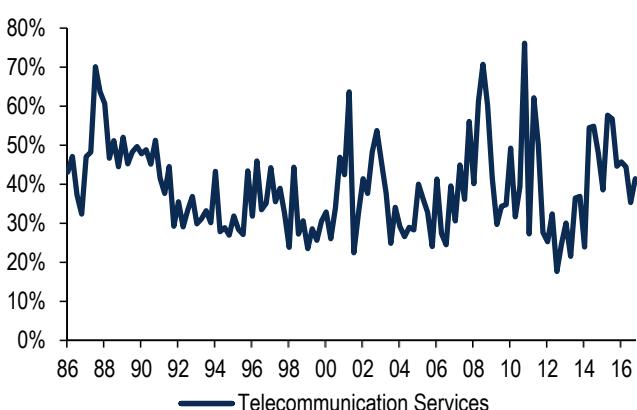
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 68: Software & Services**

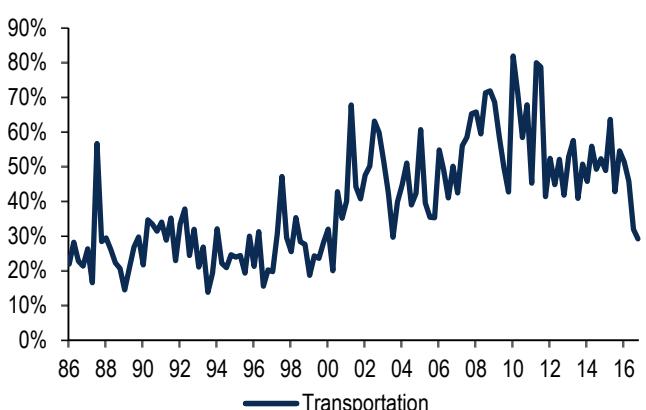
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 69: Technology Hardware & Equipment**

Source: BofA Merrill Lynch US Equity & Quantitative Strategy

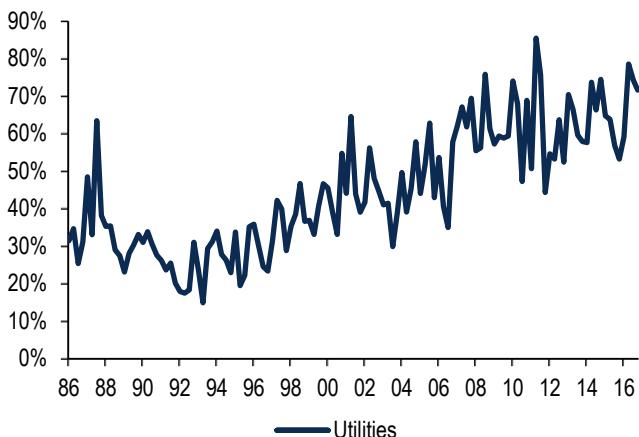
**Chart 70: Telecommunication Services**

Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 71: Transportation**

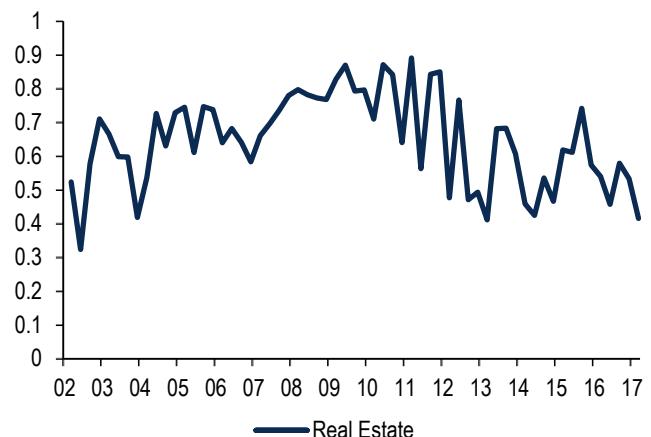
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 72: Utilities**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 73: Real Estate**

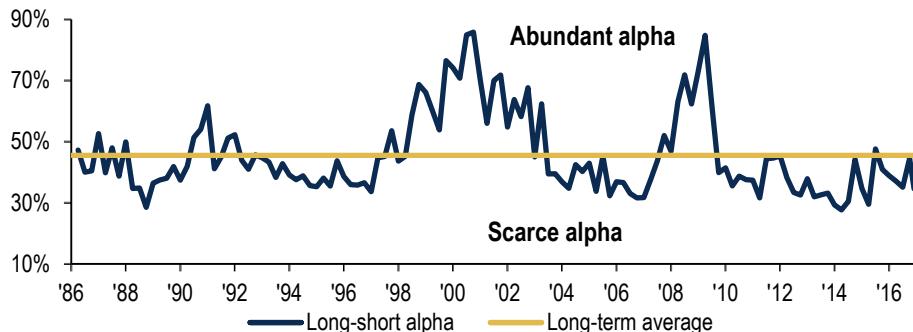


Source: BofA Merrill Lynch US Equity & Quantitative Strategy

## Scarce alpha remains a headwind

The scarcity of alpha opportunities (spreads) has been one headwind to active managers, with the spread between the fifty best and fifth worst performing stocks remaining near all-time lows. In 2007, managers used leverage to offset this scarcity. Today, risk aversion has capped leverage ratios at lower levels.

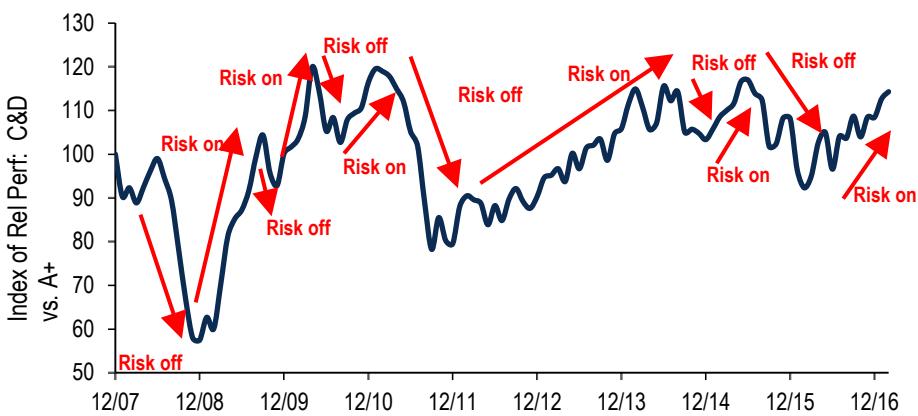
**Chart 74: S&P 500 Long-Short Spreads (Alpha)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

## Return of the macro market?

**Chart 75: Relative performance of C&D vs. A+ ranked stocks by S&P Quality rank, 2007-present**

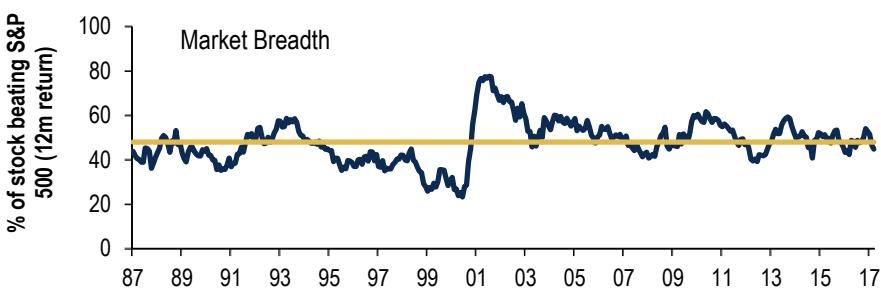


Source: S&P, BofA Merrill Lynch US Equity & US Quant Strategy

The performance of high quality vs. low quality stocks suggests we could be seeing a return of the risk-on/risk-off macro market.

## Market breadth

**Chart 76: Market Breadth: % of S&P 500 stocks beating the benchmark (12-month return), 1987-present**



Source: BofA Merrill Lynch US Equity & US Quant Strategy, FactSet

The market breadth has converged to the long-term average.

# What are quants doing?

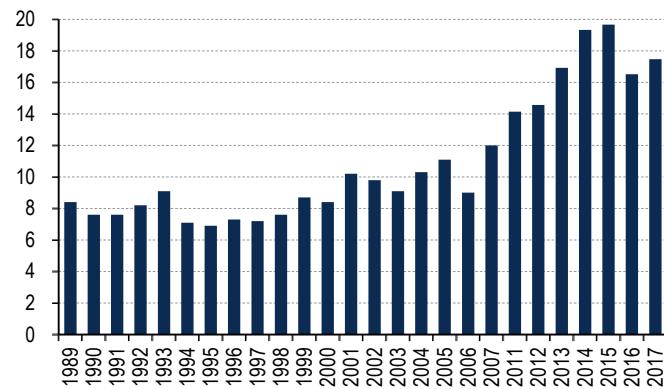
Each year, we survey institutional investors to monitor which factors, characteristics, attributes and models they use in their stock selection processes. These include valuation factors, quality and growth factors, risk factors, technical and price factors, risk factors and other factors.

## 2017: More complex models, quant tools still early in uptake

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 reached a record high of 20 in 2015, before dipping down a bit to 16 last year. This year that number ticked up, with respondents using an average of 17 factors—well above the historic average. Multi-factor models are more complex/diverse today than in the 1990s, when investors used an average of just 7-8 factors.

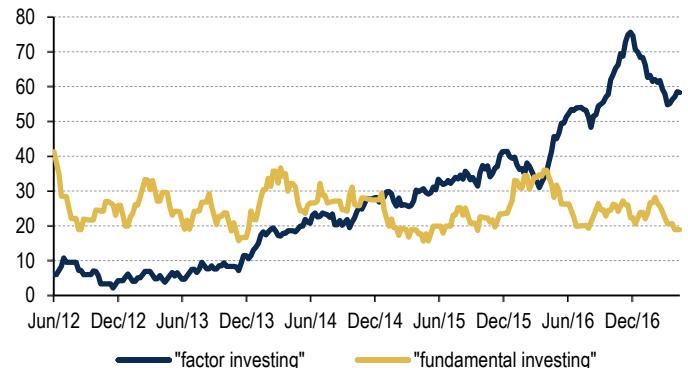
We've highlighted that [the popularity of quant/factor investing has increased sharply at the expense of fundamental investing](#) (Chart 77), and quants are increasingly focused on new factors, real-time data feeds, artificial intelligence, big data, machine learning, etc, as new alpha signals tend to be exploited quickly and arbitraged away. These techniques appear to still be early in their uptake, as they were among the least-cited factors used by 2017 survey respondents (Chart 79 below), particularly Artificial Intelligence, which was used by just 7% of respondents. Web-scraping and machine learning was the most popular quantitative tools, used by 19% and 13% of this year's respondents, respectively (Chart 78). But we suspect these tools will continue to increase in popularity.

**Chart 77: Average number of factors used by respondents, 1989-2017**



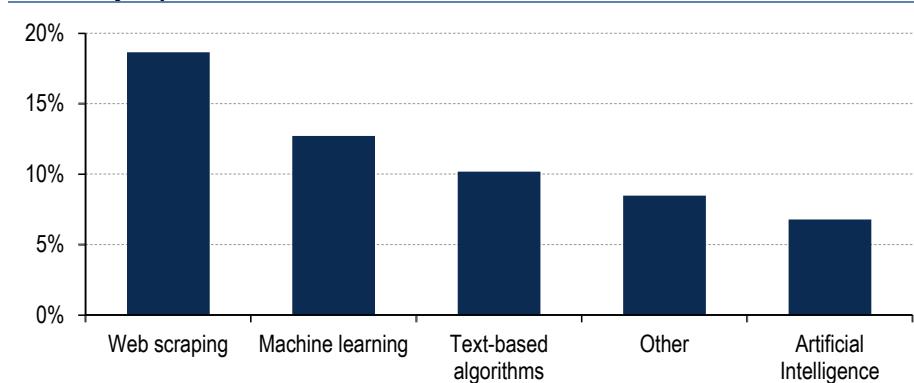
Note: Does not include data for 2008-10 due to lack of sufficient responses  
Source: BofA Merrill Lynch US Equity & US Strategy

**Chart 78: Google trends: “factor investing” vs “fundamental investing” (15 week average), 2012-present**



Source: Google, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 79: Which of the following quantitative tools do you use in your investment process? (% of 2017 survey respondents)**

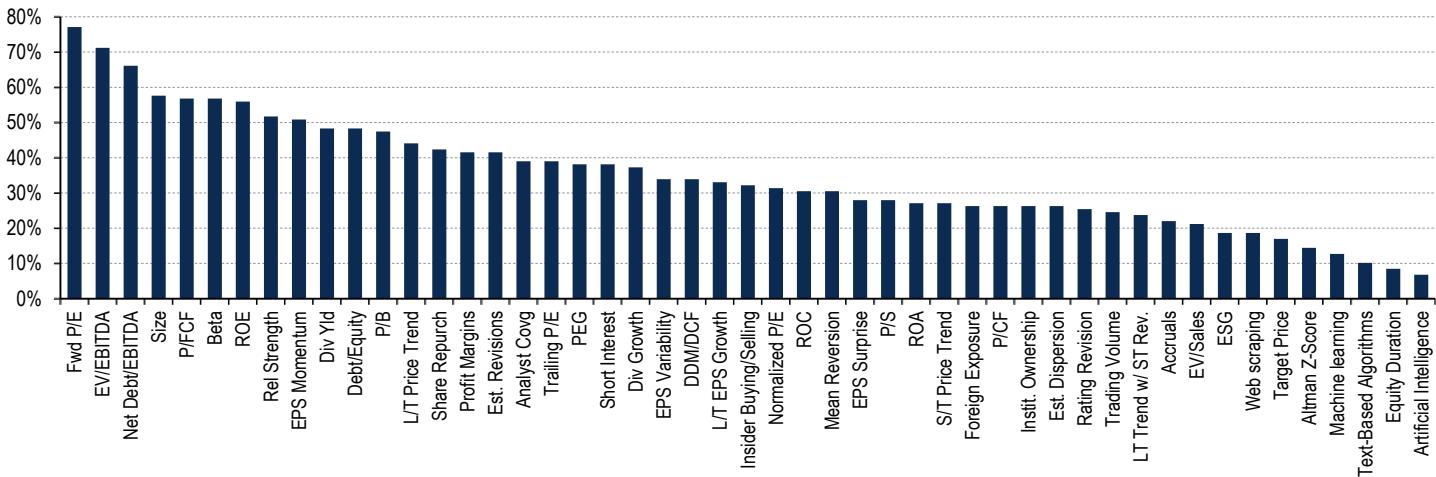


Source: BofA Merrill Lynch US Equity & US Strategy

## Price to Forward Earnings is still the most-used factor

Nearly 80% of survey respondents use Forward P/E as factor in their investment processes (Chart 80), remaining the most popular factor for the 11<sup>th</sup> year running. While cash-flow based valuation measures were more popular pre-crisis, Forward P/E has topped the list every year since the crisis. EV/EBITDA also remained popular (second-most cited factor), while Net Debt/EBITDA continued to climb on the list (more on this below).

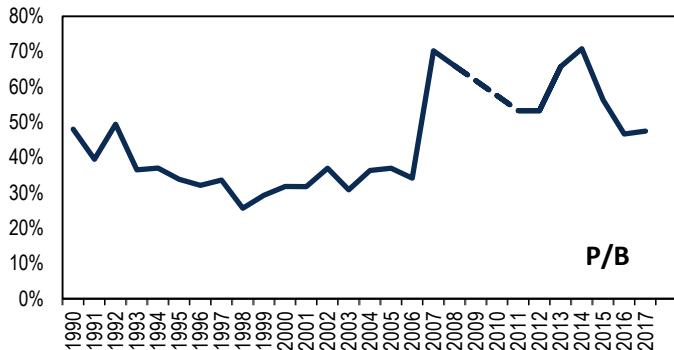
**Chart 80: Percentage of 2017 survey respondents using various factors**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

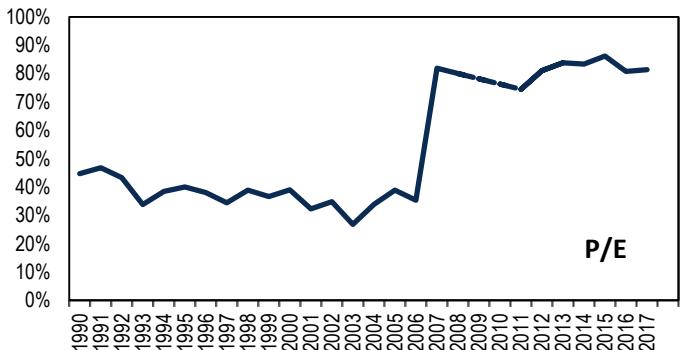
## Select valuation factors

**Chart 81: Percentage of Respondents using P/B**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 82: Percentage of Respondents using P/E**

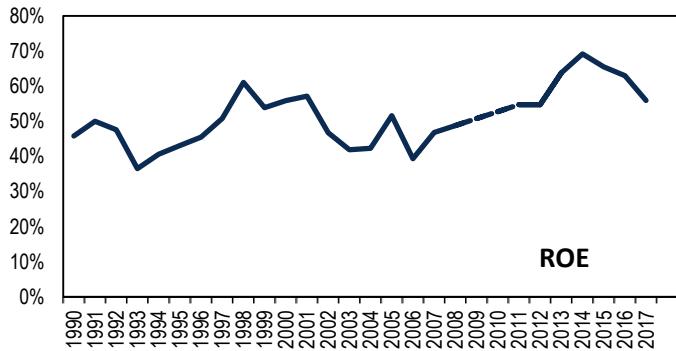


Source: BofA Merrill Lynch US Equity & US Quant Strategy

## Select growth and quality factors

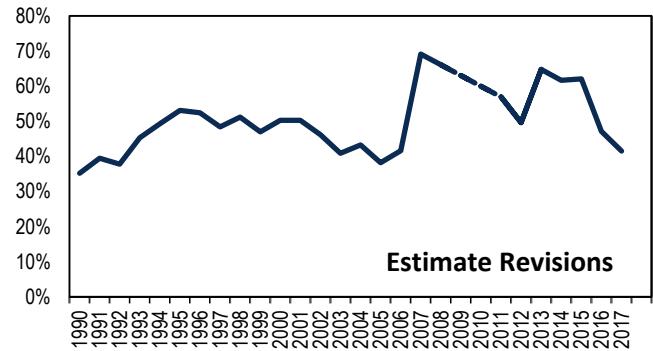
Note: due to lack of sufficient survey responses in 2008-10, results for these years have been interpolated based on 2007 and 2011 results.

**Chart 83: Percentage of Respondents using ROE**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

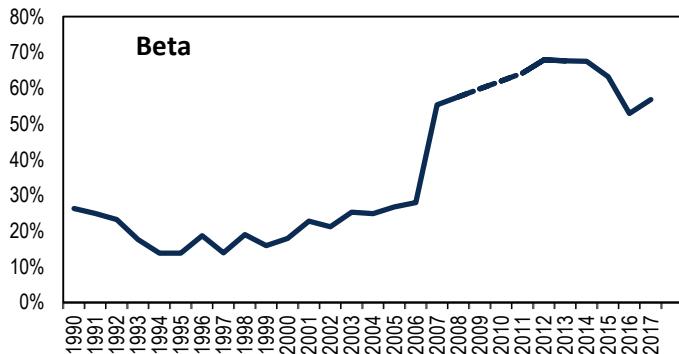
**Chart 84: Percentage of Respondents using Estimate Revisions**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

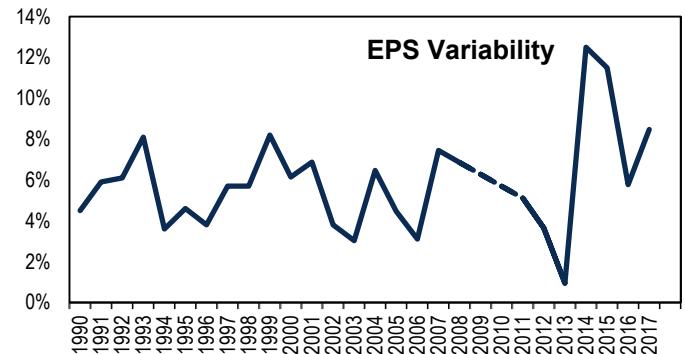
## Select risk factors

**Chart 85: Percentage of Respondents using Beta**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

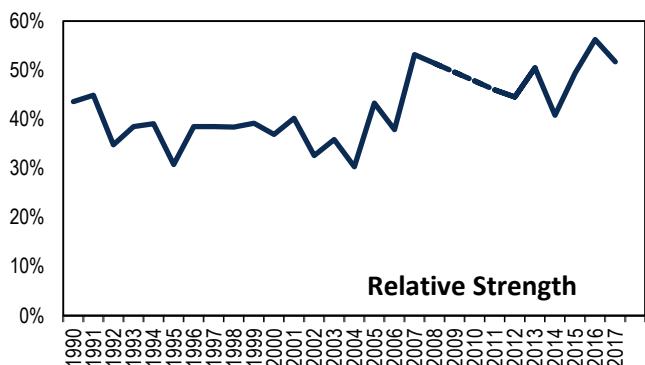
**Chart 86: Percentage of Respondents using EPS Variability**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

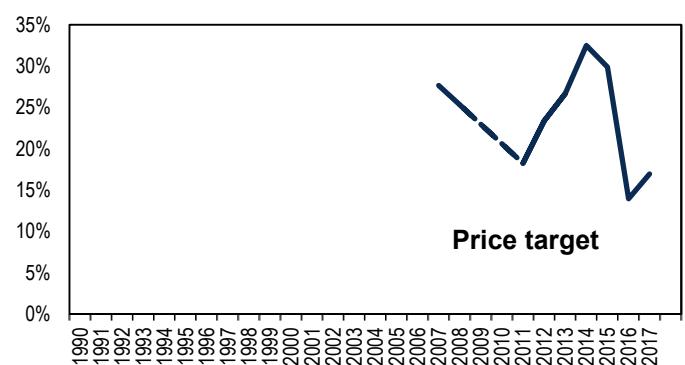
## Select price trend and technical factors

**Chart 87: Percentage of Respondents using Relative Strength**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

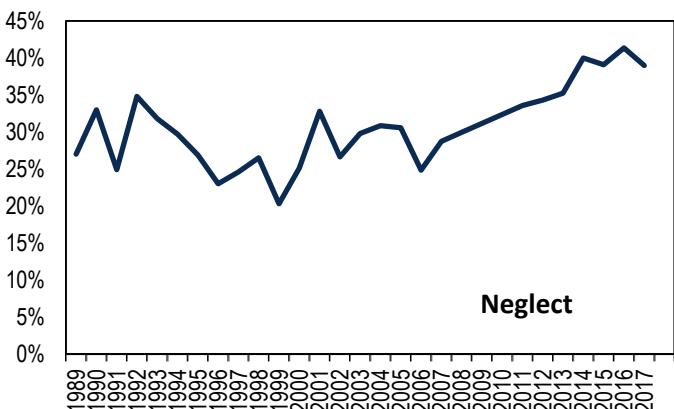
**Chart 88: Percentage of respondents using Sell Side Price Targets**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

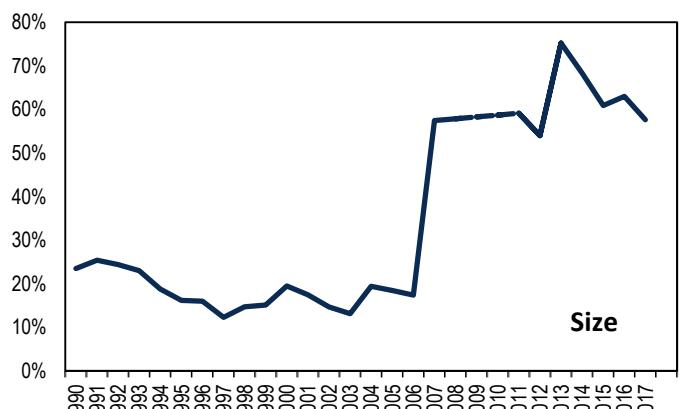
## Select other (miscellaneous) factors

**Chart 89: Percentage of respondents using Analyst Neglect**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 90: Percentage of respondents using Size (Market Cap)**



Source: BofA Merrill Lynch US Quantitative Strategy

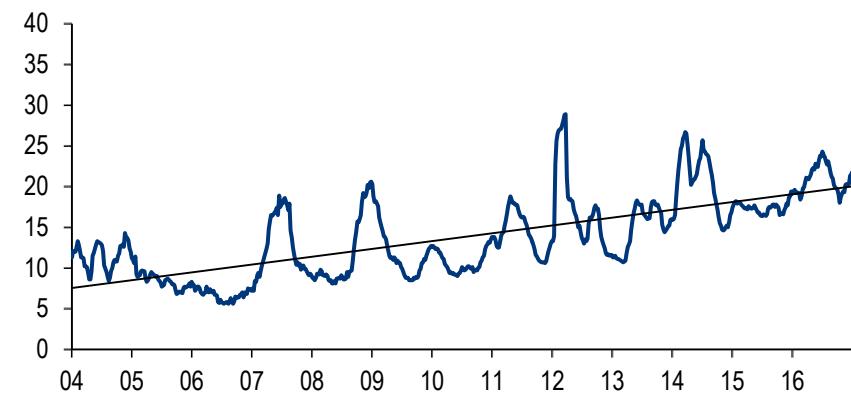
## The lowdown on Smart Beta

### 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 sources of risk. Alternative weighing schemes emerged, such as fundamental weighting (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.

**Chart 91: Google searches for “Smart Beta” saw a consistent rise right after the financial crisis**



Source: Google Trends; BofA Merrill Lynch US Quantitative Strategy

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

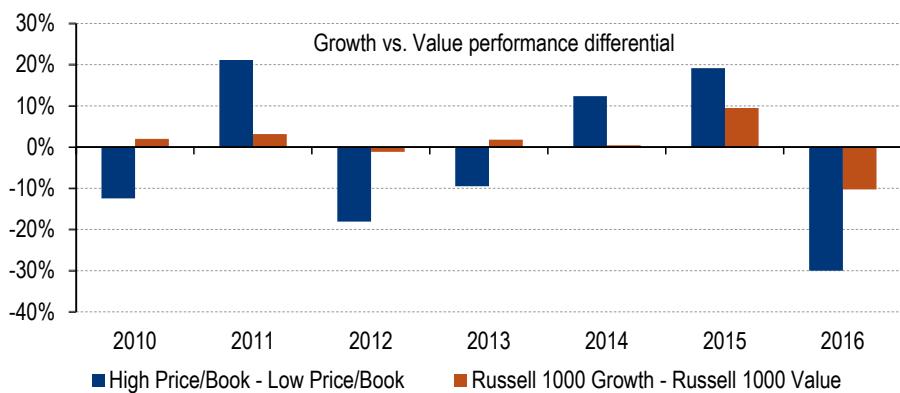
and passive investment styles -- more active than passive cap weighted index tracking but less active than active portfolio management with day-to-day investment decision making. The costs thus reflect the passive/active positioning: the management fees exceed those of the traditional index tracking 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 saw little performance divergence in recent years, Growth / Value performance differential as measures by High Price / Book and Low Price / Book factors was quite pronounced (Chart 92).

**Chart 92: Quant factors deliver more style differentiation than fundamentally weighted indices**



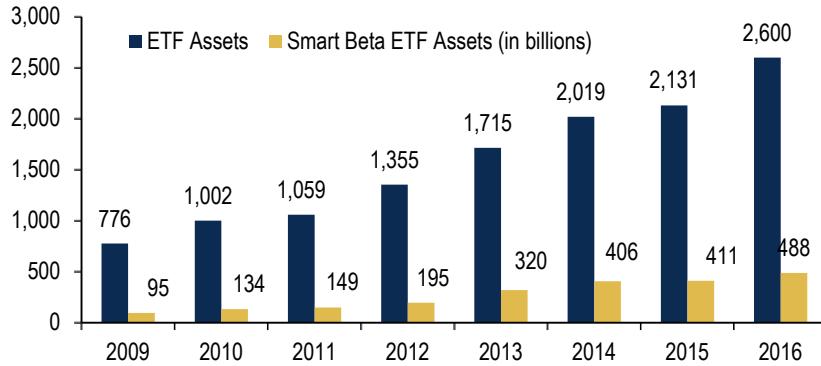
Source: BofA Merrill Lynch US Quantitative Strategy

### **How much money is currently tracking smart beta strategies**

Smart beta strategies have experienced a rapid growth in assets under management in recent years. According to the data compiled by Bloomberg (Chart 93), smart beta funds grew from under \$100bn in 2009 to almost \$500bn today, which represents a 26.2% annualized rate, well above the 18.9% growth rates for the ETF assets overall.

The bulk of these assets are in the US equities -- among top 100 smart beta ETFs by AUM, which account for 90% of assets, 87% of holdings are in the US equities.

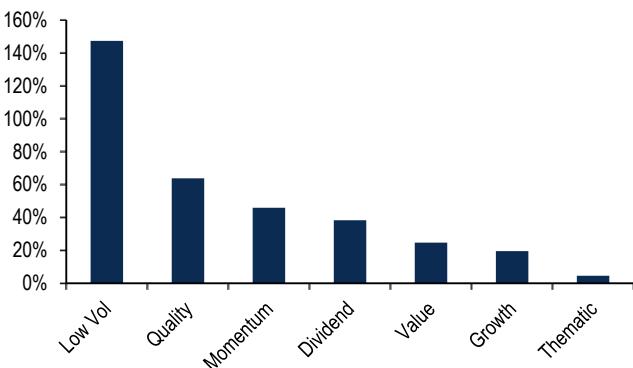
**Chart 93: Growth in Smart Beta vs. all ETFs (26% 5yr CAGR for Smart Beta vs 19% 5yr CAGR for all ETFs)**



Source: Bloomberg, BofA Merrill Lynch US Quantitative Strategy

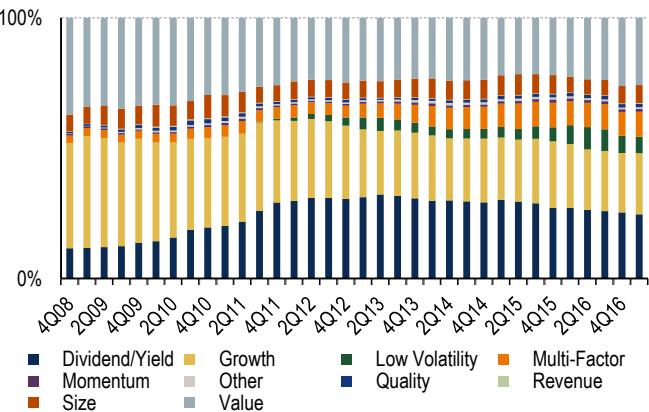
A massive influx of factor- or risk premium-based ETFs has yielded atypical swings in the market driven by risk attributes rather than stocks. Low volatility equity products have seen astronomical growth, followed by quality, momentum and dividend strategies.

**Chart 94: AUM growth in Smart Beta ETFs (average annual growth since 2009)**



Source: Bloomberg, BofA Merrill Lynch US Quantitative Strategy

**Chart 95: Smart beta ETFs: % of AUM by category, 2009-1Q17**



Source: Bloomberg Intelligence, BofA Merrill Lynch US Equity & US Quant Strategy

### Why should we care about factors? Look at low volatility ETFs.

The rise in low volatility ETFs has grown from an estimated \$5bn six years ago to about \$35bn today. In tandem, we have seen low beta stocks rerate to the highest relative multiple we have seen in thirty years (Chart 96).

**Chart 96: Relative forward P/E of S&P 500 low beta vs. high beta quintiles (1986-1Q17)**

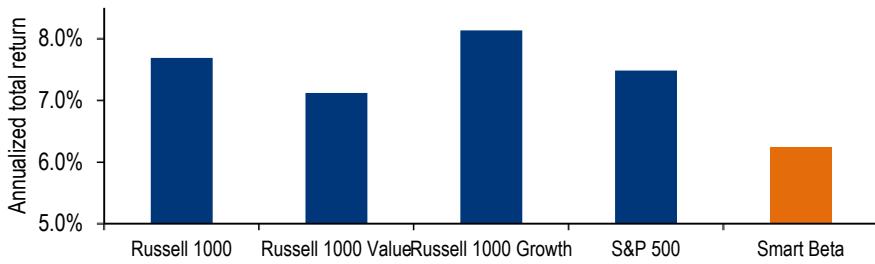


Source: BofA Merrill Lynch US Equity & US Quant Strategy

### Is smart beta all that smart?

With all the attention surrounding the Smart Beta concept, the performance of Smart Beta ETFs has been remarkably unexciting in recent years – since 2005 this group of products lagged major large cap indices by 0.9ppt to 1.9ppt per annum.

**Chart 97: Smart beta has lagged the benchmarks (12/2004 – 12/2016)**

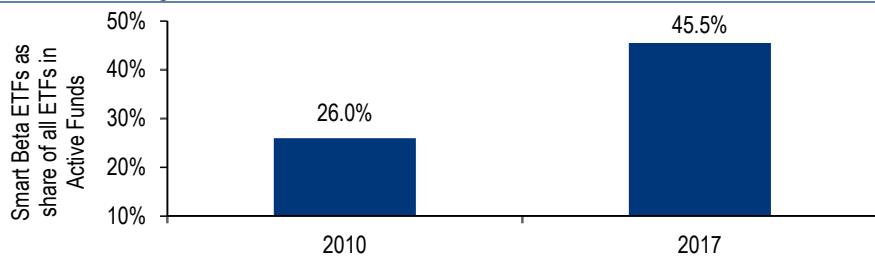


Source: BofA Merrill Lynch US Quantitative Strategy

#### Active funds increasingly using smart beta

Notably, active managers also turned their attention to smart beta products. While active managers have been using ETFs to easily gain exposure to various sleeves of the market, such as sectors and market cap bands (mid cap, small cap), in recent years active funds exposure to “pure” Smart Beta (style and volatility) increased materially from 26% of all ETFs used in active space in 2010 to 45% in 2017 (Chart 98).

**Chart 98: Active managers use of Smart Beta ETF's increased since 2010**



Source: BofA Merrill Lynch US Quantitative Strategy

## ESG: Good companies can make good stocks

For full details, see our latest [report](#).

### What is ESG?

It's not just for tree-huggers - incorporating environmental, social and corporate governance (ESG) considerations into one's framework is critical. First, these metrics have been strong indicators of future volatility, earnings risk, price declines and bankruptcies. Second, trends in the US investment landscape suggests that trillions of dollars could be allocated to ESG-oriented equity investments, to stocks that are attractive on these attributes, over the next few decades— inflows equivalent to the size of the S&P 500 today! In this first in a series of notes, we present our findings based on the Thomson Reuters ESG dataset, and conclude that ESG may be too costly to ignore. Values-based investing resonates at a human level — allocating capital to responsible companies with good governance feels like the right thing to do. But whether it enhances performance is less clear. Negative perceptions around the efficacy of ESG approaches may date back to the mid-70s where early attempts, branded as Socially Responsible Investing or SRI, primarily used negative screening—excluding “sin” stocks/industries from portfolios. The unintended consequence was a loss of diversification and fund concentration, which inhibited outperformance.

## ESG as a driver of returns

While academic research is split on the subject of whether ESG factors are superior predictors of returns, practitioners would claim they are. In a recent survey of fund managers who incorporate ESG factors, 80% cited better returns as one of the top reasons for incorporating ESG factors into their process (US SIF 2016 Survey).

**What we did:** Using the Thomson Reuters ESG dataset, we analyzed performance of companies' forward looking characteristics (returns, price volatility, earnings volatility etc.) based on the ranks assigned to companies, in some cases assessing the merits of each score individually or by calculating the average score. Please see the Appendix for a full methodology, and a more thorough discussion of the Thomson Reuters dataset.

**ESG translates into performance:** stocks that ranked within the top third by ESG scores relative to their peers would have outperformed stocks in the bottom third by about 18ppt from 2005 to today.

### ESG enhances returns even when adjusting for company size

Overall, we found that ESG factors enhanced rather than detracted from returns. But this performance was not consistent, and was very similar to the performance of large versus small companies. Given that ESG ranks are extremely correlated with size – larger companies tend to have higher ranks, and smaller companies tend to have lower ranks – we assessed performance controlling for size. Here we found that for the most part, performance spreads would have been positive based on a long-short strategy using Environmental and Social and combined ESG ranks, but performance based on Governance scores was not as consistent.

**Table 3: Size-adjusted forward performance spread (Q1 – Q5\*) by ESG ratings, 2005 to 2015, BofAML US coverage universe with ESG ratings**

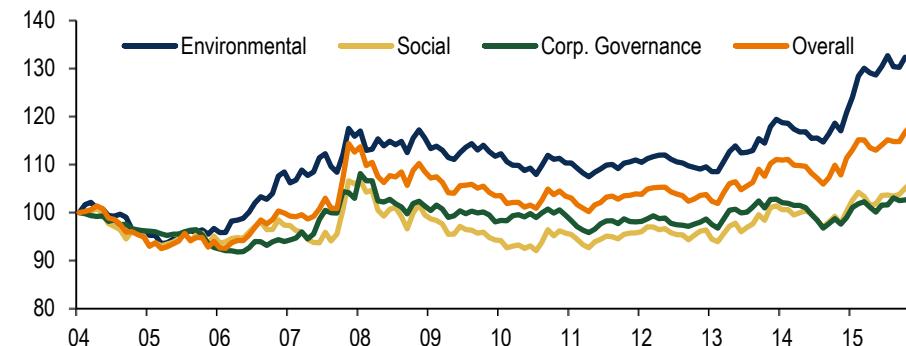
	Q1 (Largest)	Q2	Q3	Q4 (Smallest)
Environmental Score	3.3	4.1	2.0	1.8
Social Score	0.3	7.1	2.0	3.8
Corporate Governance Score	-1.3	3.1	2.0	-1.3
Overall	1.1	4.7	4.0	2.9

Source: Thomson Reuters, BofAML Global Research

\* Quintile 1 includes companies with strong ranks, within the highest quintile by ESG score, Quintile 5 includes companies with weak ranks, within the lowest quintile by overall ESG score

### Chart 99: Relative Performance: Highest third of universe vs. lowest third of universe by ESG scores

2005 to 2015, based on BofAML coverage universe with ESG ranks available



Source: Thomson Reuters, BofAML Global Research

Within sectors, we found that alpha was far less stable, suggesting that an investment strategy based on ESG data would likely be enhanced by creating sector specific models or using alternate approaches for sectors with negative results. Sectors with perverse results (opposite results to what we would have expected) included Health Care, Technology, and Consumer Staples. One common feature among these sectors is their more global exposure, and their higher levels of idiosyncratic (or stock specific) risk than that of other sectors. A topic for future research would be to determine a more effective way to assess ESG risks within these sectors.

**Table 4: Sector-specific annualized forward performance spread (Q1-Q5\*), 2005 to 2015, BofAML US coverage universe with ESG ratings**

	Discretionary	Staples	Energy	Financials	Health Care	Industrials	Info. Tech.	Materials	Real Estate	Utilities
Environmental Score	3.6	-1.1	9.0	-7.1	-2.1	-0.3	-2.2	0.3	8.1	2.0
Social Score	2.5	-7.2	11.2	1.9	-0.2	-2.6	-2.4	6.3	2.3	0.1
Corporate Governance Score	-2.2	-4.7	1.4	3.4	-5.2	0.6	-2.8	-5.3	-2.8	4.7
Overall	-1.2	-6.8	10.6	-1.2	-3.8	0.0	-0.7	-4.2	0.0	1.3

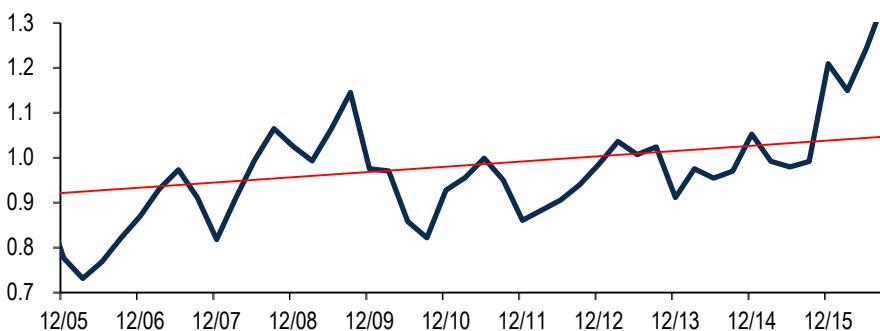
Source: Thomson Reuters, BofAML Global Research

\* Quintile 1 includes companies with strong ranks, within the highest quintile by ESG score; Quintile 5 includes companies with weak ranks, within the lowest quintile by overall ESG score

## A multiple re-rating may be in the works

Possibly driven by asset flows into these types of vehicles, on at least one valuation metric, EV/EBITDA, a re-rating of companies based on their ESG scores has been taking place over time, and more dramatically in recent years. Chart 100 below depicts the relative Enterprise Value/EBITDA ratio for companies within the highest versus lowest decile by overall ESG score (the average of the three pillars' scores.) High ranked companies appear to have re-rated relative to low ranked companies, especially in recent years.

**Chart 100: Median EV/EBITDA: of high vs. low ESG deciles based on overall ESG scores 4Q05-3Q16**



Note: based on deciles of BofAML US coverage universe for which Thomson Reuters ESG data are available

Source: Thomson Reuters, FactSet, BofA Merrill Lynch US Equity & US Quant Strategy

## ESG as a signal of future risk

In general, we found that if investors defaulted to owning companies within the top quintile by ESG ranks, they would have generally enjoyed lower price volatility and less extreme price declines within their portfolios, all else equal. If investors had limited their holdings to companies with above average ranks on Environmental and Social scores, they would have avoided most of the companies that filed for bankruptcy over the subsequent five years.

### Price volatility

As a signal of future price volatility, ESG scores appeared to be quite effective within larger stocks, moderately effective within mid-size stocks, but tapered off in efficacy within the smallest quintile. That said, within sectors, ESG factors appeared to provide good signaling of future volatility, with the exception of Financials, possibly due to the fact that the period we examined included the Global Financial Crisis.

**Table 5: Size adjusted price volatility spread over the next five years by ESG Quintile (difference Q5 – Q1\*), 2005 to 2015, rolling 5-year periods (positive numbers indicate that poor ranks result in higher volatility)**

Factor	Q1 Largest Mkt Cap		Q2	Q3	Q4 Smallest Mkt Cap
	Environmental Score	Social Score			
Environmental Score	11.4	7.9	3.5	0.1	-2.0
Social Score	9.7	9.4	0.6	0.5	1.6
Corporate Governance Score	9.7	9.4	4.1	1.0	-3.7
Overall	9.7	9.4	3.9	1.4	-2.6

Source: Thomson Reuters, BofAML US Equity & Quant Strategy

\* Quintile 5 includes companies with weak ranks, within the lowest quintile by overall ESG score; Quintile 1 includes companies with strong ranks, within the highest quintile by ESG score

**Table 6: Size adjusted price volatility spread over the next five years by ESG Quintile (difference Q5 – Q1), 2005 to 2015, rolling 5-year periods**

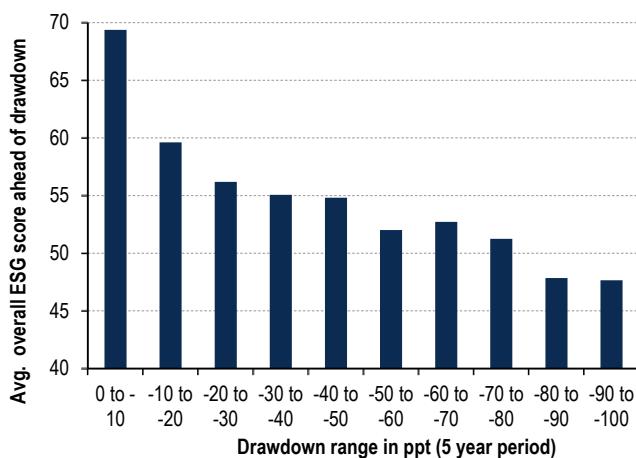
	Consumer Discretionary	Consumer Staples	Energy	Financials	Health Care	Industrials	Info. Tech	Materials	Real Estate	Utilities
Environmental Score	5.3	13.3	8.2	-0.2	6.3	6.1	-0.3	2.2	0.6	5.8
Social Score	11.1	15.7	11.8	-11.3	9.1	1.8	4.8	12.3	4.6	5.9
Corporate Governance Score	9.0	9.3	5.5	-5.5	6.1	6.8	-0.3	-3.2	16.8	4.3
Overall	8.6	15.5	9.5	-10.0	8.6	5.6	2.3	9.5	0.7	6.0

Source: Thomson Reuters, BofAML US Equity & Quant Strategy

### Peak to trough price declines

As a signal of significant future price declines, ESG scores again appear to be quite effective, with the exception of Corporate Governance ranks where results suggested scant information content (Chart 102). Overall, we found that stocks with minimal peak to trough declines or drawdowns over the subsequent five years had an average score of close to the 70<sup>th</sup> percentile ahead of the period analyzed, whereas those with extreme declines (over 90ppt) had an average score in the 47<sup>th</sup> percentile ahead of the decline. Encouragingly, results were monotonic: the weaker the stock's score, the greater the subsequent price decline.

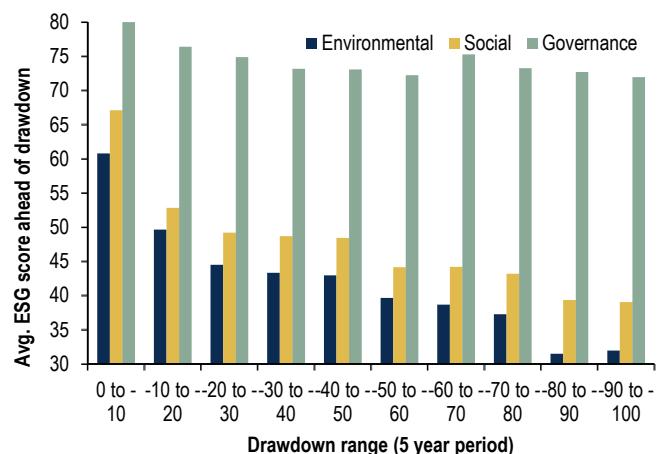
**Chart 101: Avg. overall ESG score\* of ahead of price declines, grouped by maximum peak to trough price decline over a 5-yr period (from 2005-2015)**



\*Based on average of Environmental, Social and Governance scores applied to the universe of ESG-ranked stocks in the BofAML US coverage universe

Source: Thomson Reuters , BofA Merrill Lynch Global Research

**Chart 102: Avg. Environmental, Social and Governance ESG scores of ESG-ranked stocks in BofAML US coverage universe ahead of price declines, grouped by maximum peak to trough price decline over a 5-yr period (from 2005-2015)**



Source: Thomson Reuters , BofA Merrill Lynch Global Research

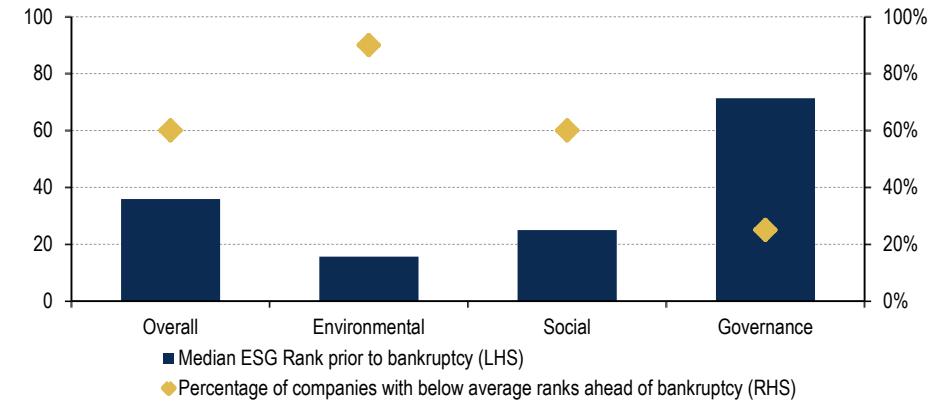
### Bankruptcy risk

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

Moreover, the average ESG scores one year prior to the date that the company filed for bankruptcy were quite low (sub-40) driven by effective forecasting from the Environmental and Social scores; again, similar to price decline risk, Corporate Governance was not a particularly effective forecasting tool for bankruptcy likelihood (Chart 103). A topic for future research would be to explore the generally weaker results in this dataset for the governance score, and identify a superior method for assessing corporate governance as a tool for forecasting volatility, price decline risk and bankruptcy risk.

### Chart 103: 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 BofAML US universe with ESG ranks that filed for bankruptcy between 2008-2015

Source: Thomson Reuters , BofA Merrill Lynch Global Research

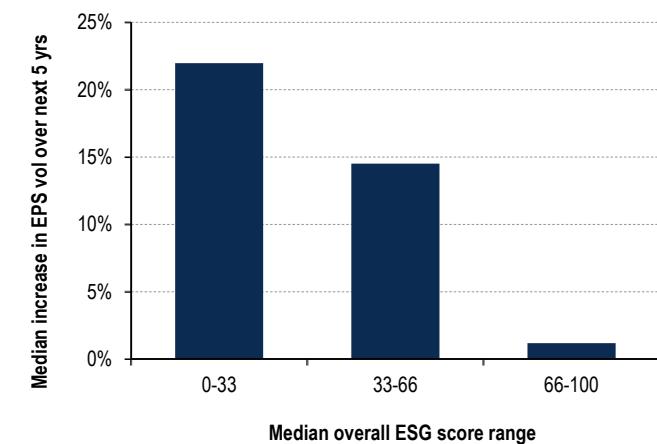
## ESG as signal of earnings attributes

### Earnings volatility

ESG scores appear to be effective at a broad level in signaling deteriorating earnings volatility, where we assessed this using two measures –the change in actual EPS volatility over the subsequent 5 years (Chart 104), and the change in Standard & Poor Common Stock rankings, which measures historical earnings and dividend volatility, over the subsequent five years (Chart 105).

### Chart 104: Stocks with lower ESG scores have tended to see EPS volatility pick up more than stocks with higher ESG scores

Median increase in EPS volatility over the subsequent five years based on median ESG score\* at start of period (2005-2015)

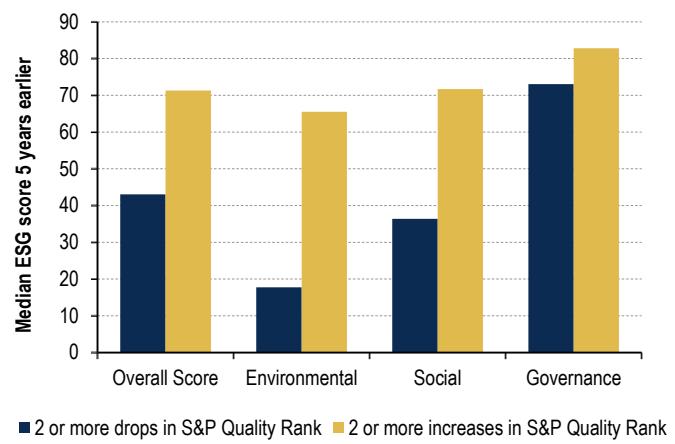


\*Based on average of Environmental, Social and Governance scores applied to the universe of ESG-ranked stocks in the BofAML US coverage universe

Source: Thomson Reuters , BofA Merrill Lynch Global Research

### Chart 105: Stocks which saw two or more drops in their S&P Quality Rank were preceded by weaker ESG scores 5 years prior than stocks which saw two more increases in their S&P Quality Rank

Median ESG scores of stocks based on subsequent S&P Quality rank chgs, 2005-2015



Note: Based on universe of ESG-ranked stocks in the BofAML US coverage universe, with overall score the average of the Environmental, Social and Governance scores

Note: Source: Thomson Reuters , BofA Merrill Lynch Global Research

## Return on Total Equity

As a predictor of return on total equity (ROTE), ESG scores appeared to be quite effective. Within each market capitalization quartile, better ranked stocks systematically had higher future ROEs than their lower ranked counterparts – an average spread of almost 5ppt (Chart 105).

**Table 7: Size adjusted Return on Total Equity spread by ESG quintiles (difference Q1 – Q5\*) rolling 5-year periods**

	<b>Q1</b>	<b>Q2</b>	<b>Q3</b>	<b>Q4</b>
ROE				
Environmental Score	7.8	5.2	3.9	3.9
Social Score	6.4	6.3	4.6	6.2
Corporate Governance Score	6.4	2.1	2.5	0.2
Overall	7.3	5.9	4.7	4.8

Source: BofA Merrill Lynch Global Research

Quintile 1 includes companies with strong ranks, within the highest quintile by ESG score, Quintile 5 includes companies with weak ranks, within the lowest quintile by overall ESG score

## Section II: Stock Strategies within the S&P 500

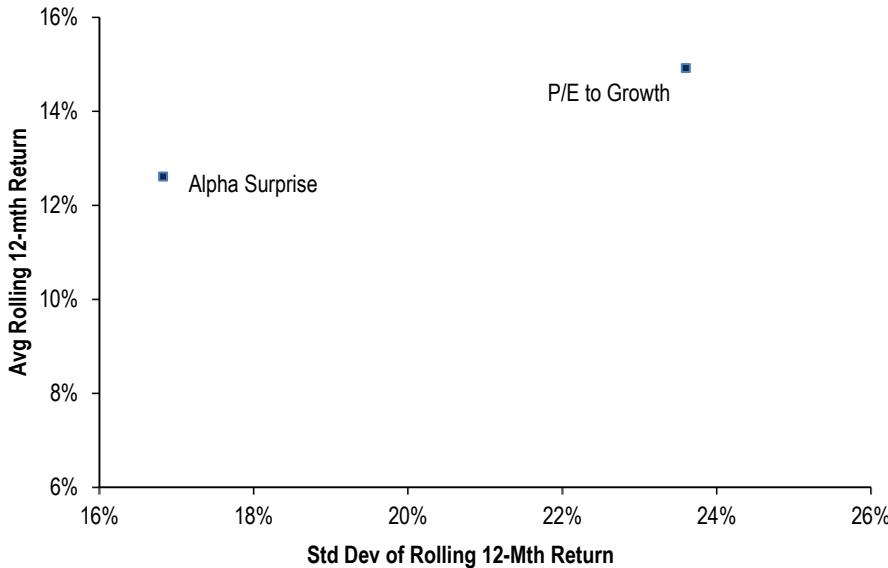
---

GARP Strategies	56
Valuation Strategies	59
Cash Deployment Strategies	69
Momentum Strategies	73
Growth Strategies	85
Quality Strategies	92
Risk Strategies	99
Miscellaneous Strategies	104

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

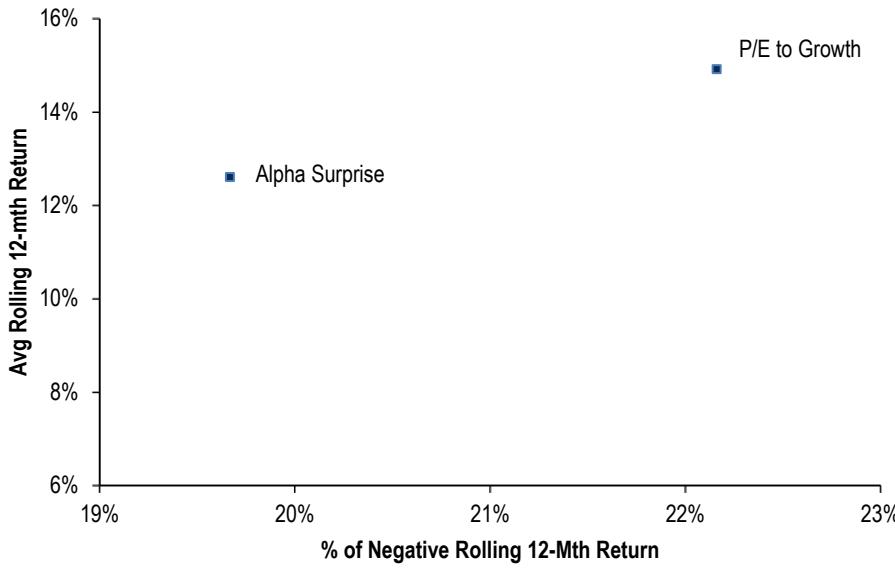
# GARP Strategies

Chart 106: GARP Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

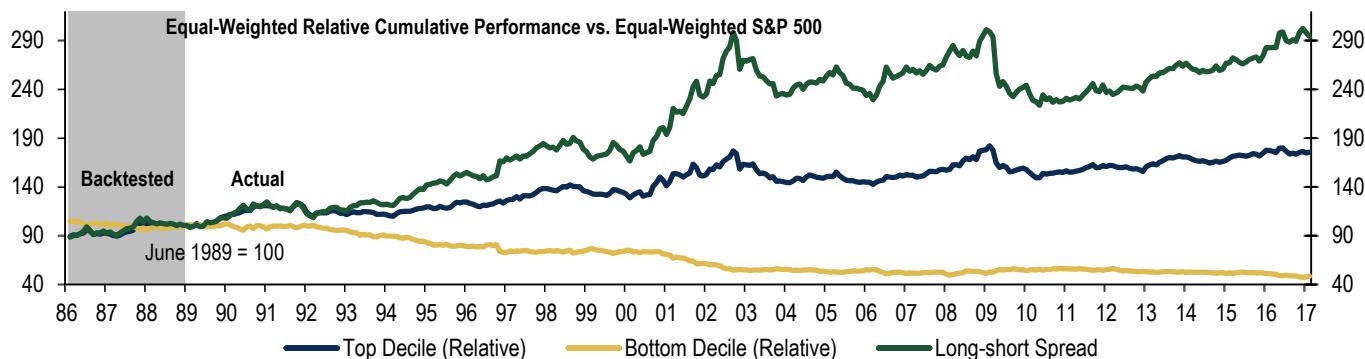
Chart 107: GARP Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

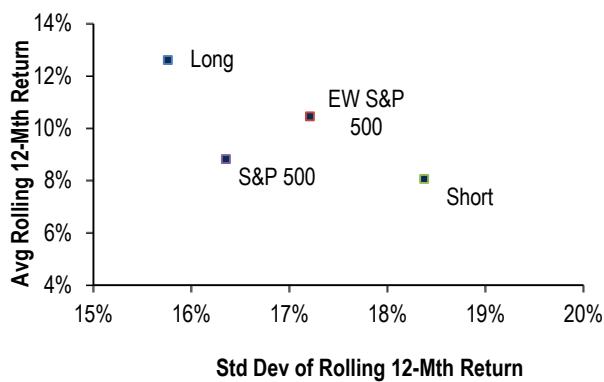
## Alpha Surprise Strategy

Chart 108: Performance of Top Decile, Bottom Decile and Long-Short Spread



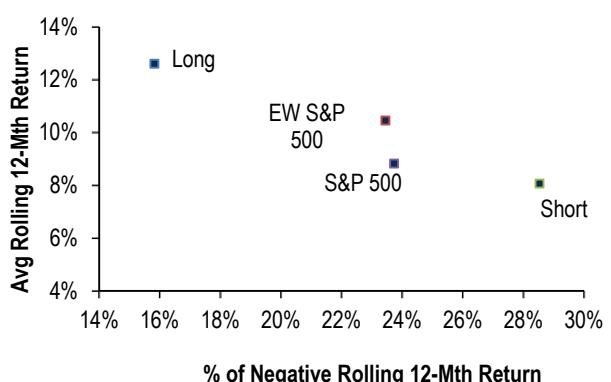
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and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

Chart 109: Alpha Surprise Model Risk Reward Characteristics



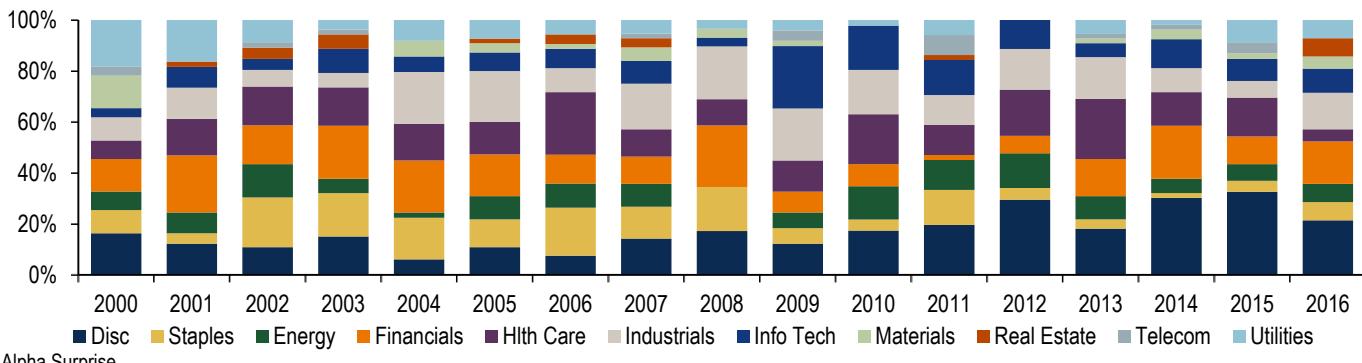
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 110: Alpha Surprise Model Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

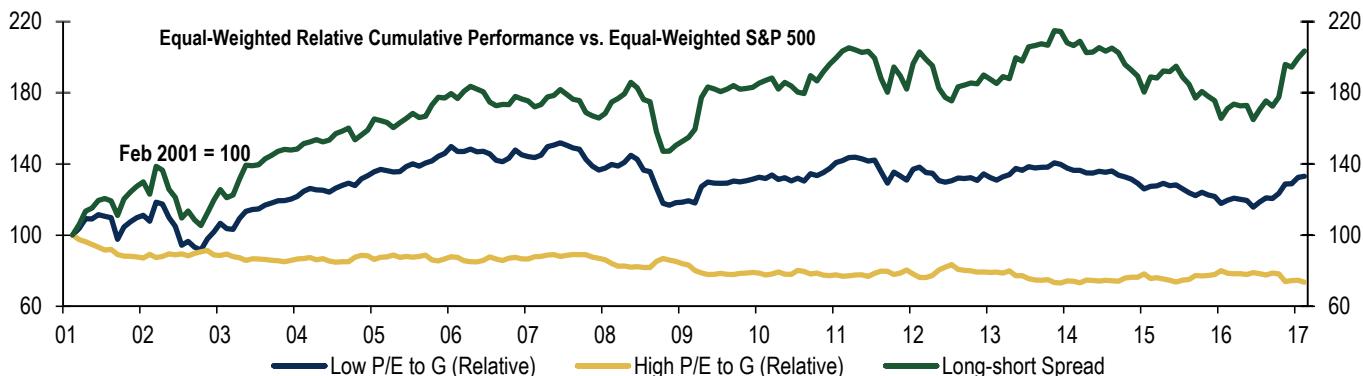
Chart 111: Alpha Surprise Model Sector Concentration (Top Decile)



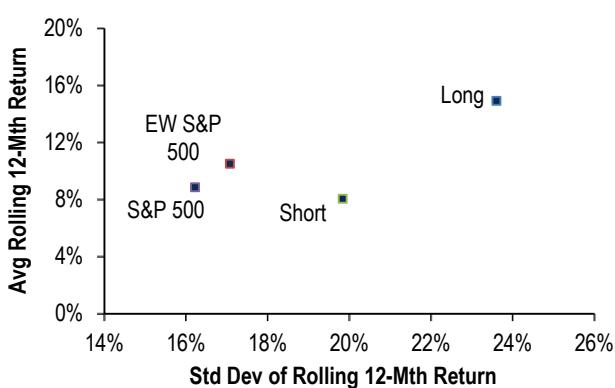
Source: BofA Merrill Lynch US Quantitative Strategy

## P/E-to-Growth

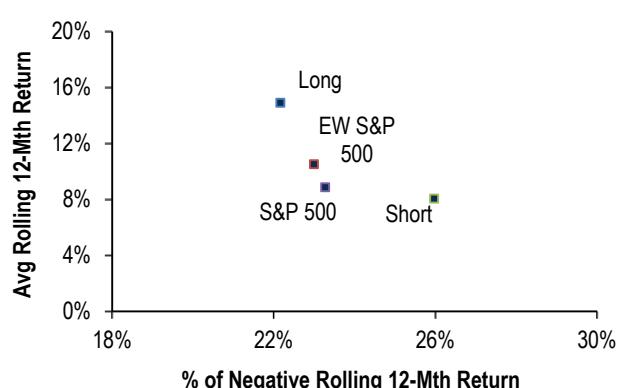
**Chart 112: Performance of Low P/E to Growth, High P/E to Growth and Long-Short Spread**



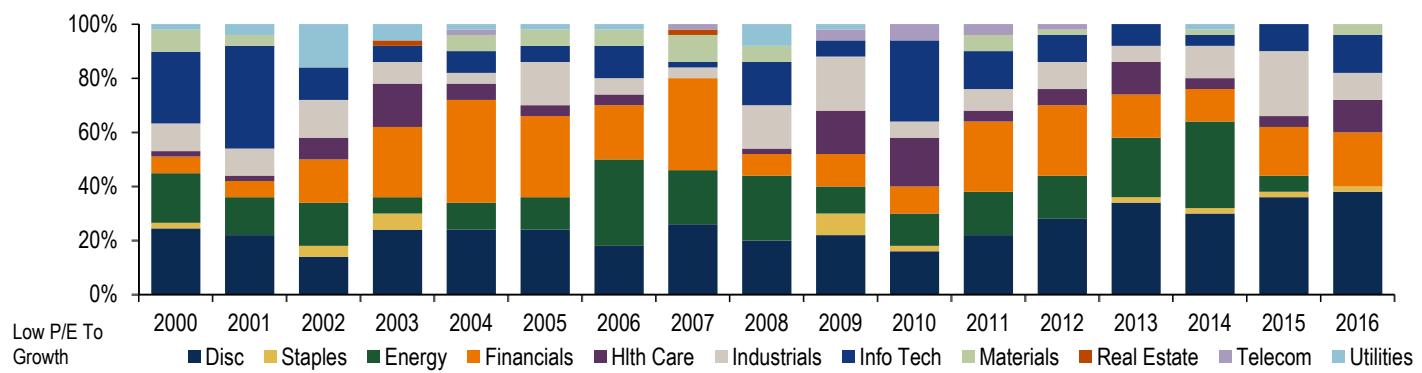
**Chart 113: Low P/E to Growth Risk Reward**



**Chart 114: Low P/E to Growth Downside Risk Reward**

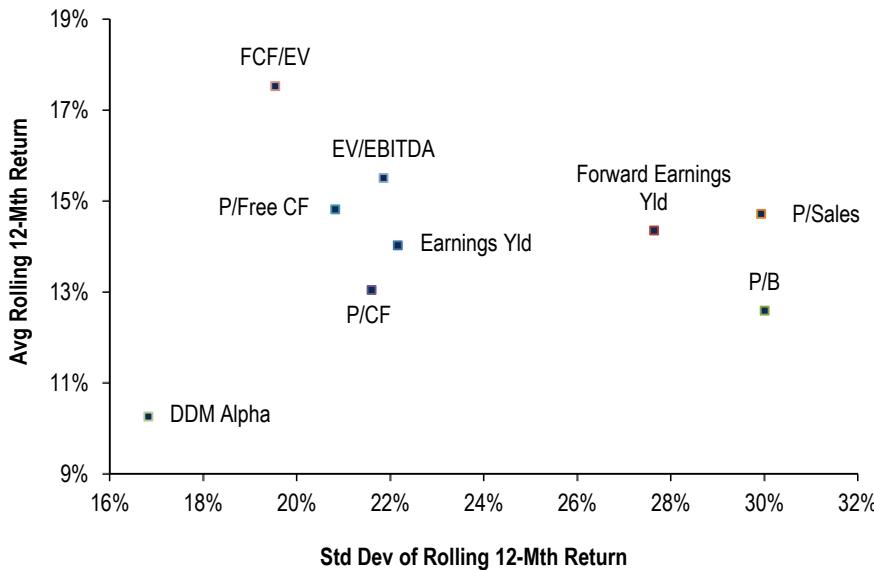


**Chart 115: P/E to Growth Sector Concentration (Low Decile)**



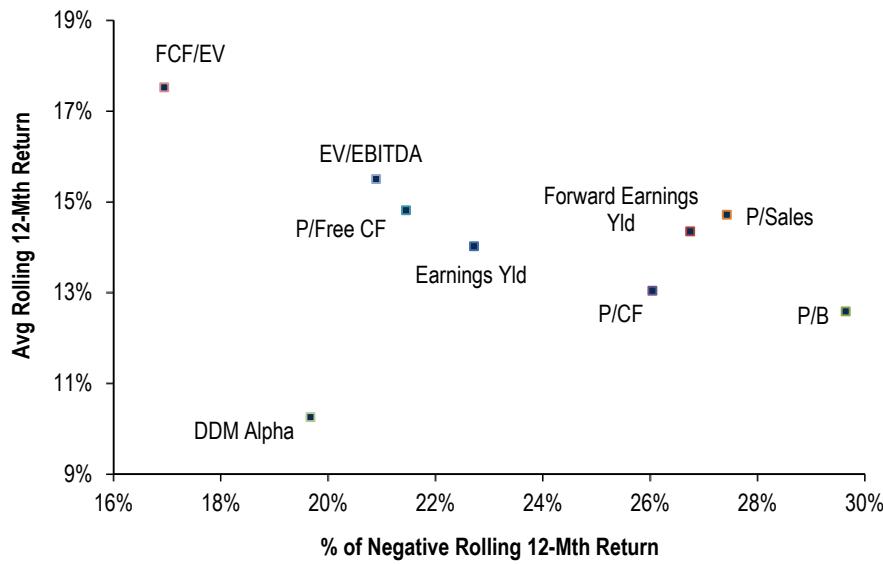
# Valuation Strategies

Chart 116: Valuation Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

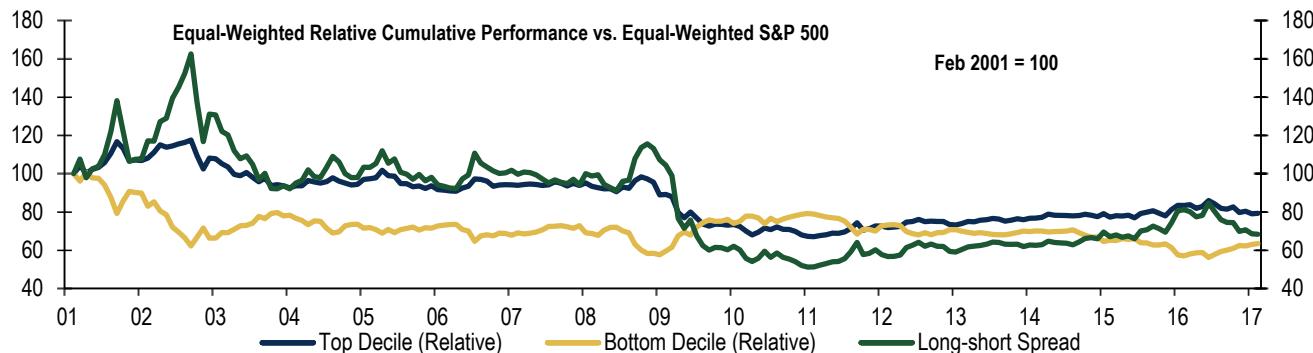
Chart 117: Valuation Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

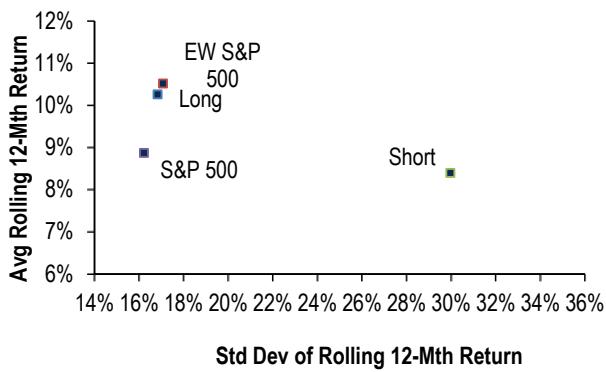
## DDM Alpha

**Chart 118: Performance of Top Decile, Bottom Decile and Long-Short Spread**



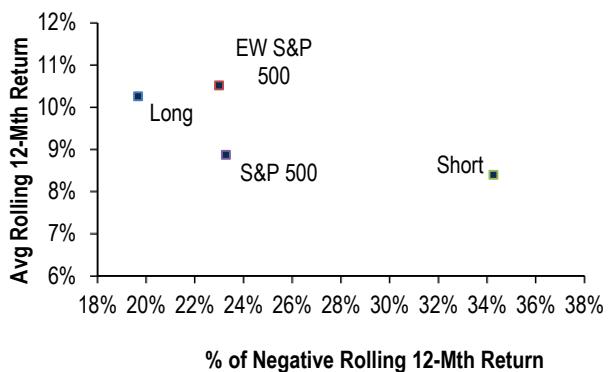
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 119: DDM Risk Reward Characteristics**



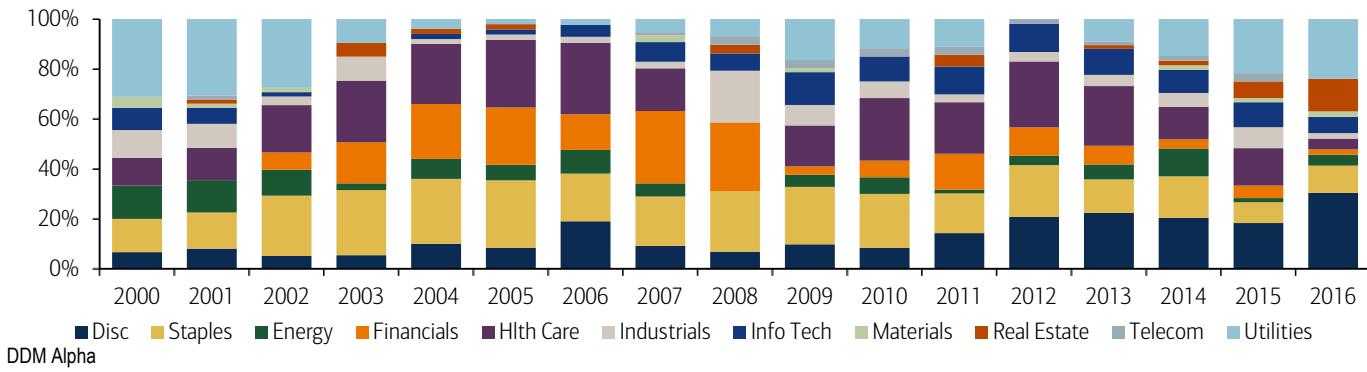
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 120: DDM Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 121: DDM Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

## Earnings Yield

Chart 122: Performance of Top Decile, Bottom Decile and Long-Short Spread

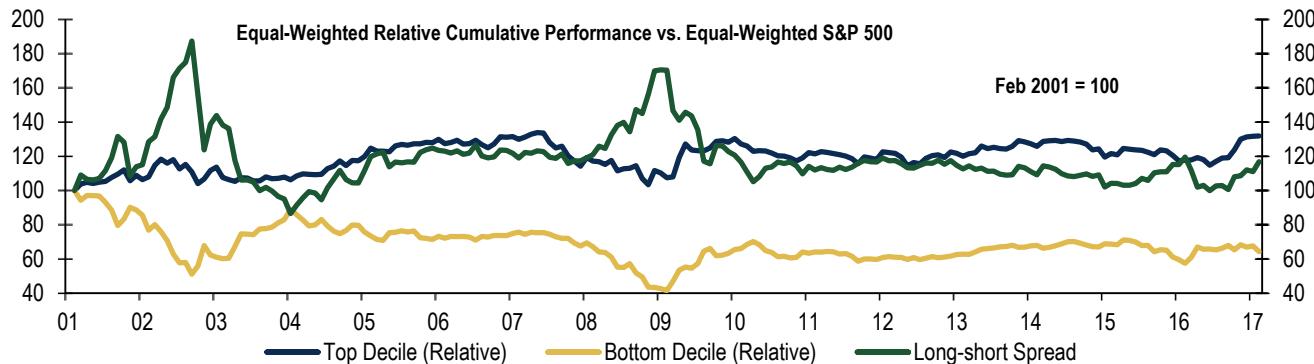


Chart 123: High Earnings Yield Risk Reward Characteristics

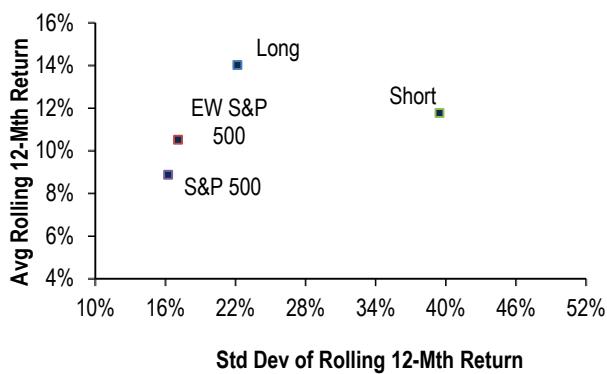


Chart 124: High Earnings Yield Downside Risk Reward

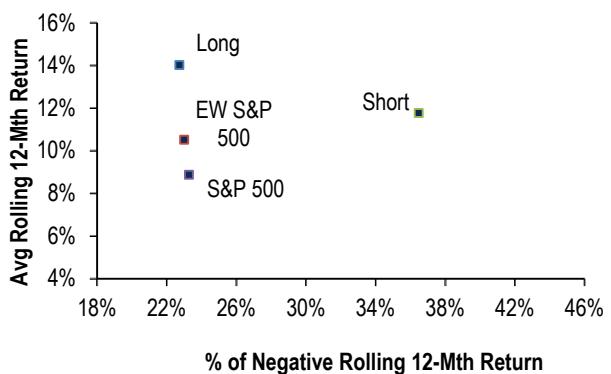
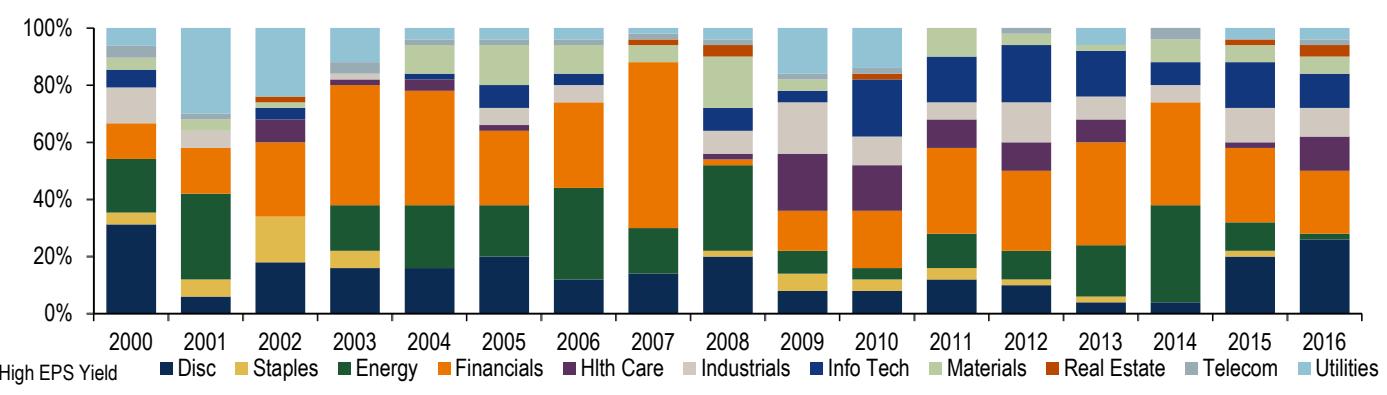
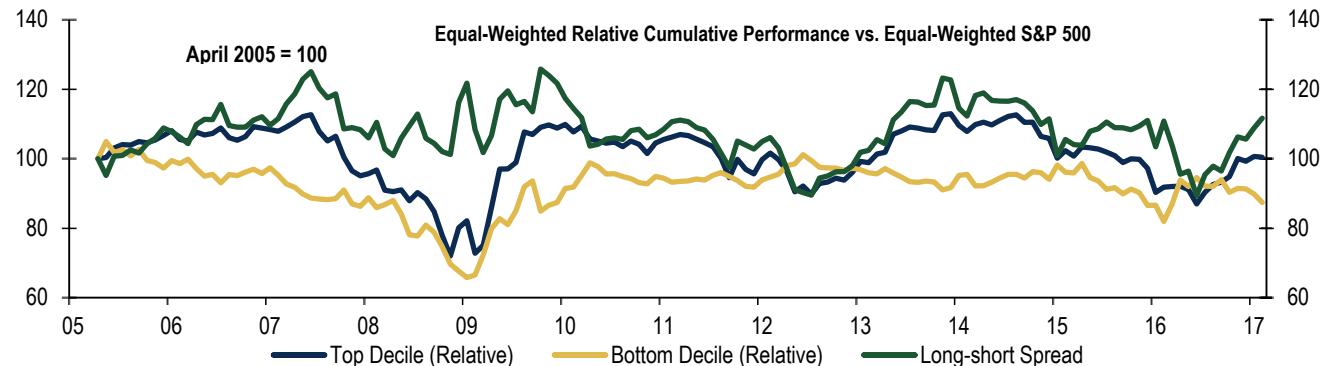


Chart 125: High Earnings Yield Sector Concentration (Top Decile)



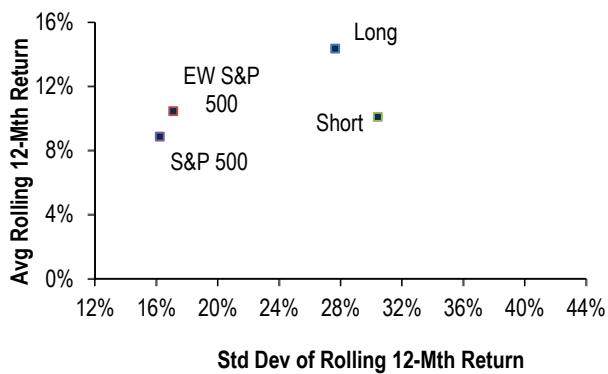
## Forward Earnings Yield

**Chart 126: Performance of Top Decile, Bottom Decile and Long-Short Spread**



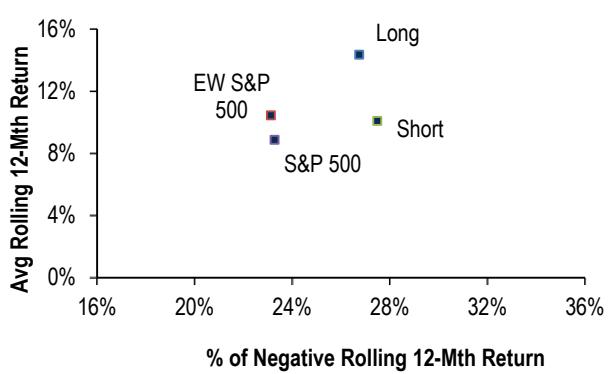
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 127: High Forward Earnings Yield Risk Reward Characteristics**



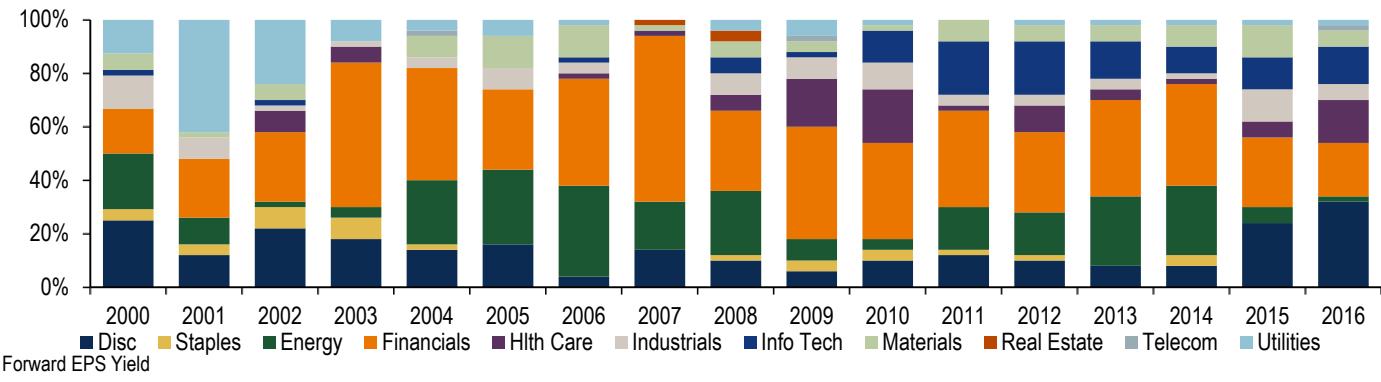
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 128: High Forward Earnings Yield Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

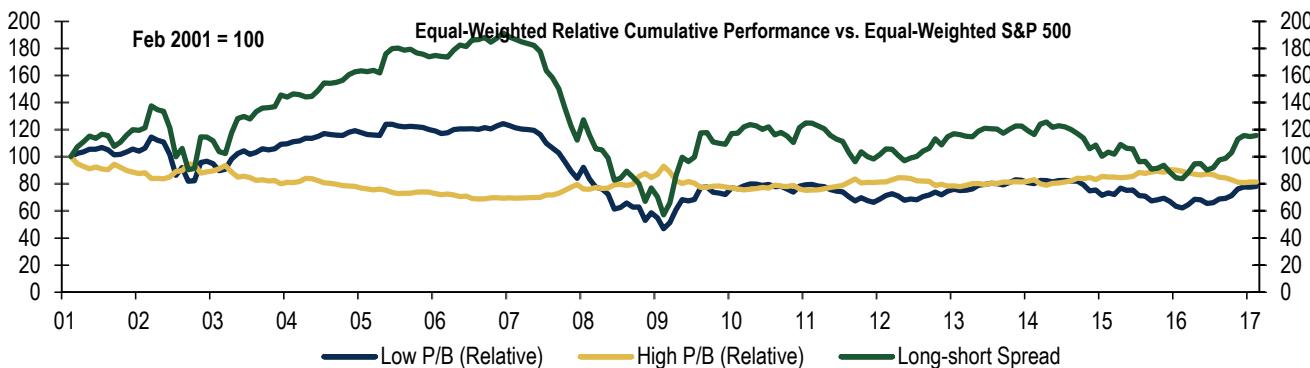
**Chart 129: High Forward Earnings Yield Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

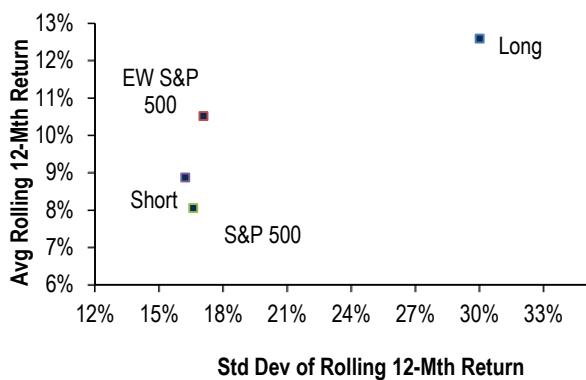
## Price/Book Value

**Chart 130: Performance of Low P/B, High P/B and Long-Short Spread**



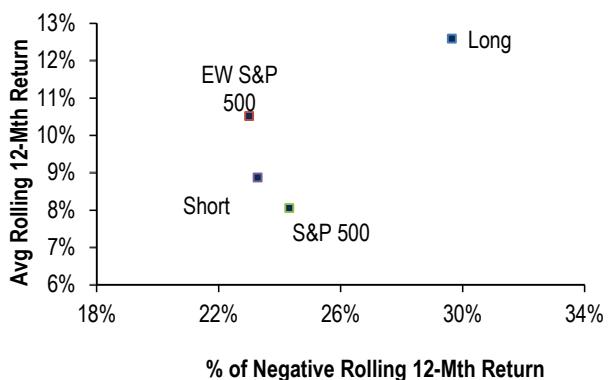
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 131: Low Price/Book Value Risk Reward Characteristics**



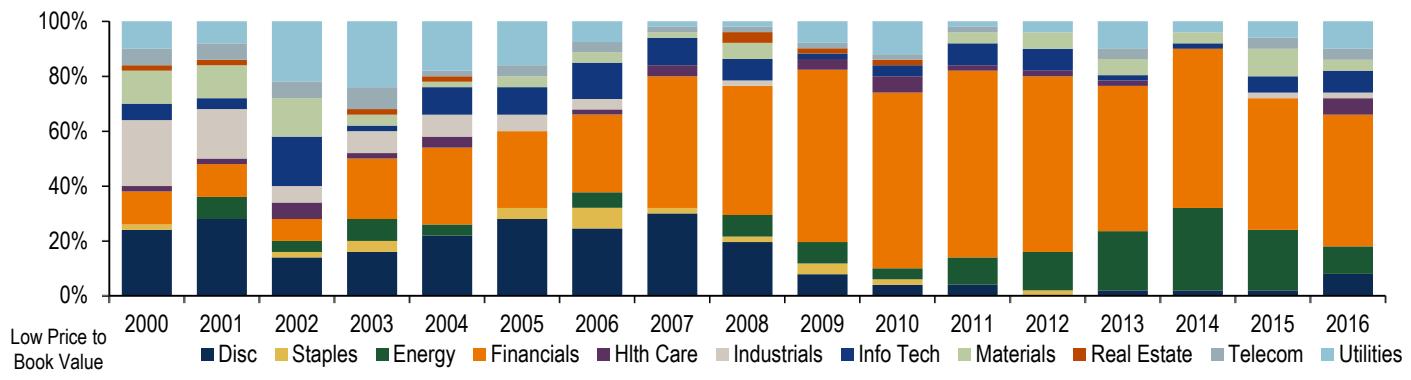
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 132: Low Price/Book Value Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

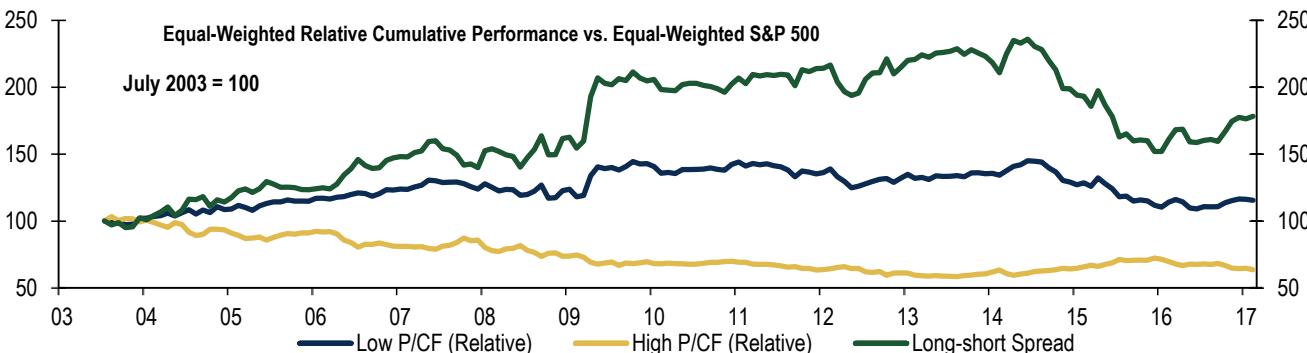
**Chart 133: Low Price/Book Value Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

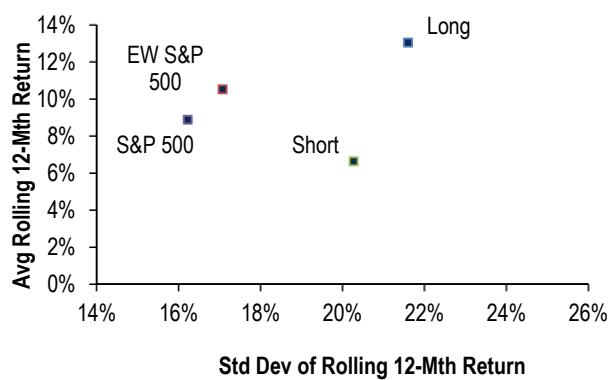
## Price/Cash Flow

**Chart 134: Performance of Low P/CF, High P/CF and Long-Short Spread**



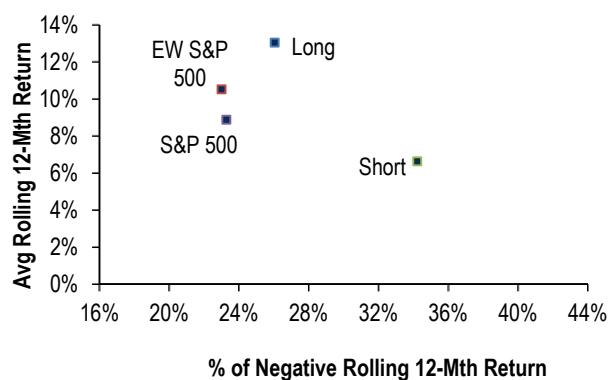
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 135: Low Price/Cash Flow Risk Reward Characteristics**



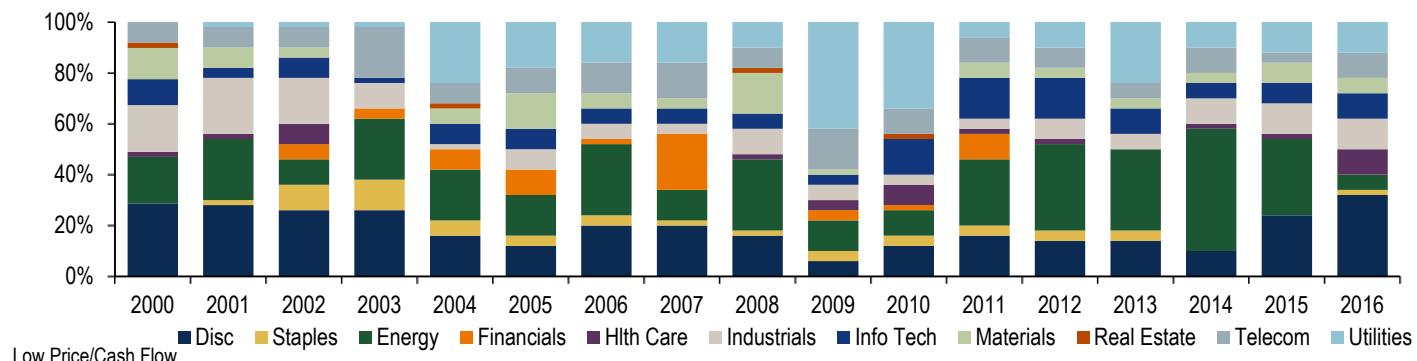
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 136: Low Price/Cash Flow Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

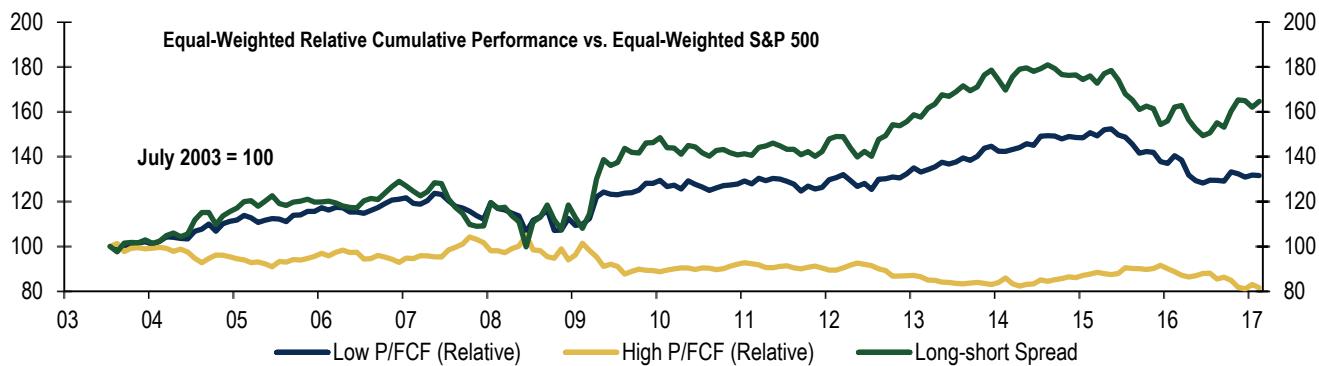
**Chart 137: Low Price/Cash Flow Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

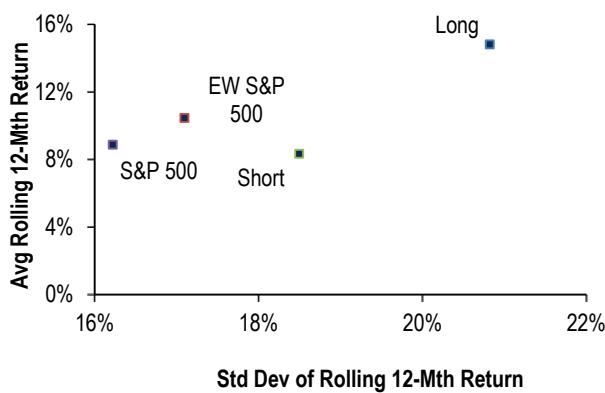
## Price/Free Cash Flow

**Chart 138: Performance of Low P/FCF, High P/FCF and Long-Short Spread**



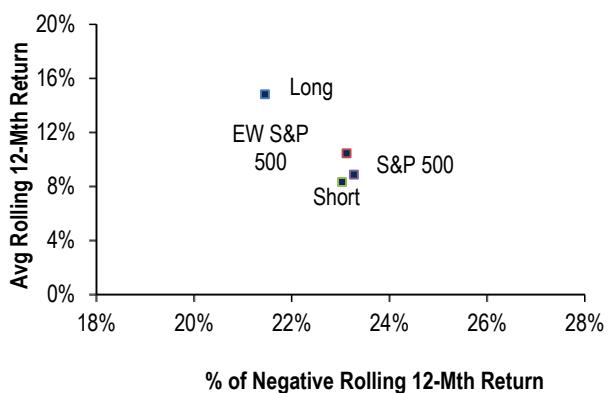
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 139: Low Price/Free Cash Flow Risk Reward Characteristics**



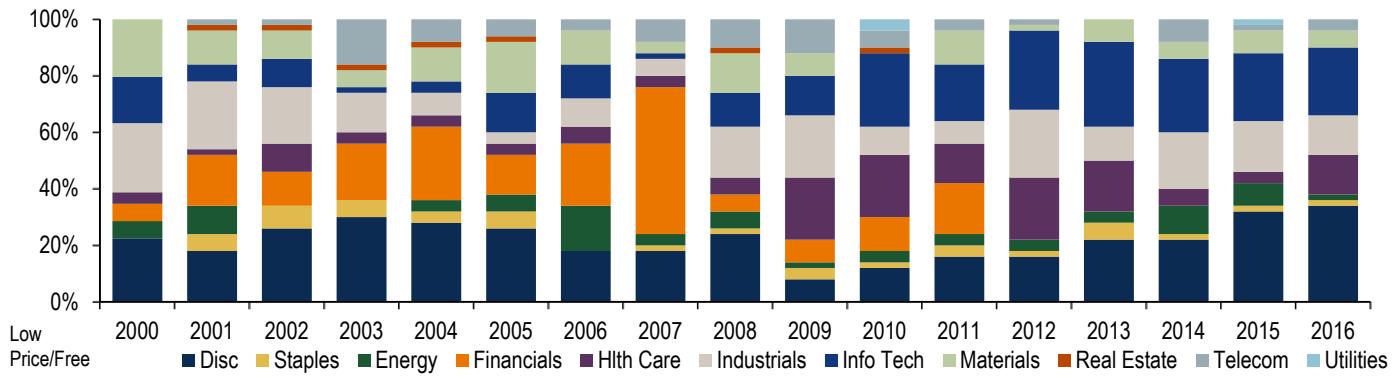
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 140: Low Price/Free Cash Flow Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

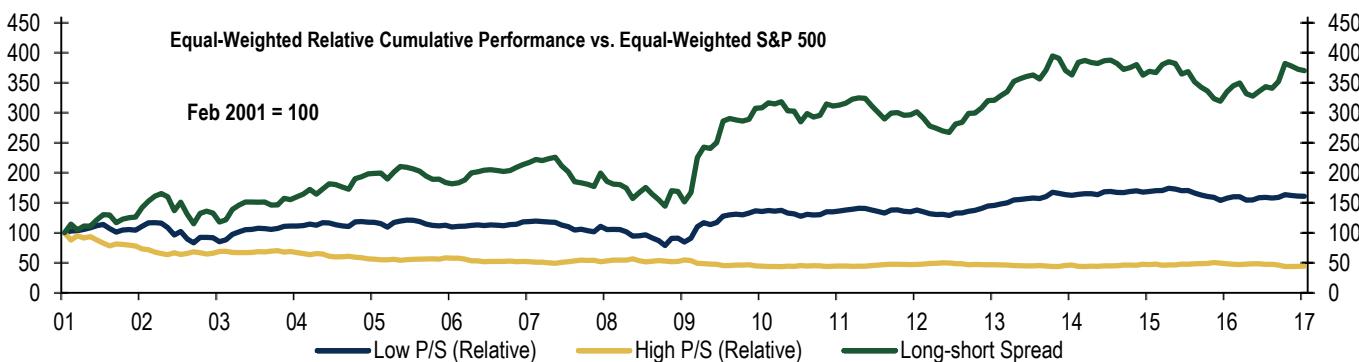
**Chart 141: Low Price/Free Cash Flow Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

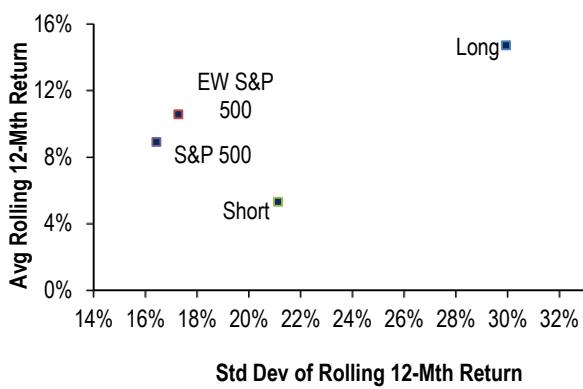
## Price/Sales

**Chart 142: Performance of Low P/S, High P/S and Long-Short Spread**



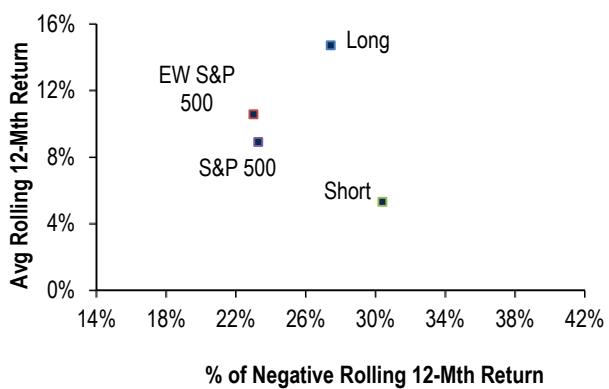
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 143: Low Price/Sales Risk Reward Characteristics**



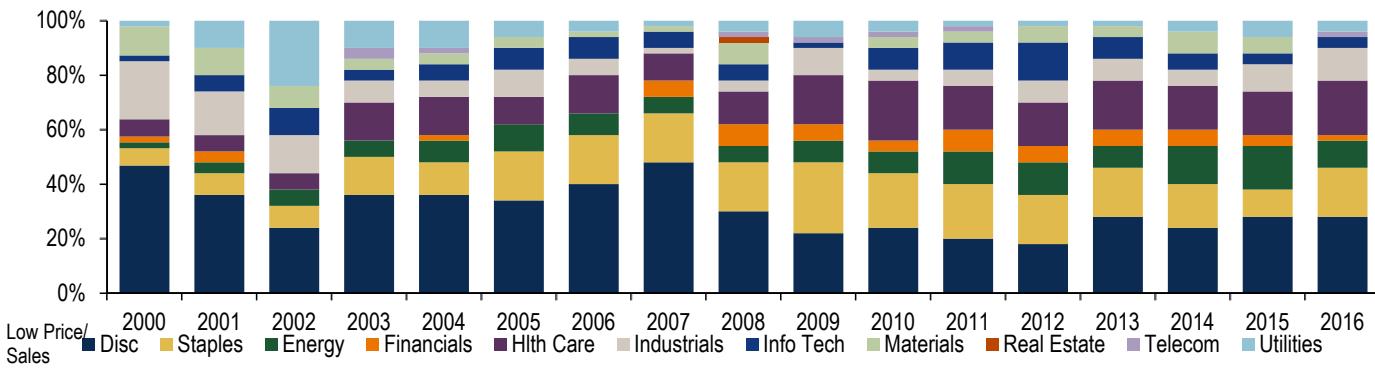
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 144: Low Price/Sales Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

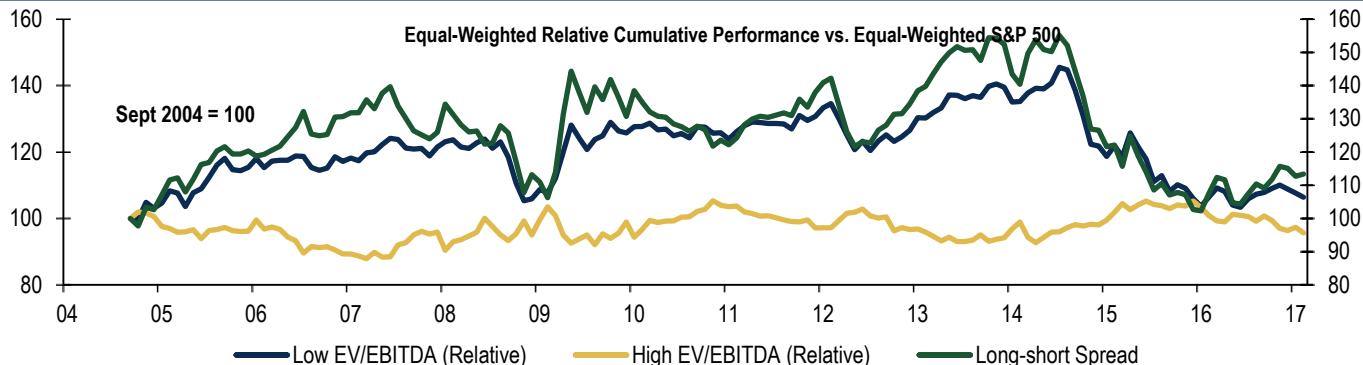
**Chart 145: Low Price/Sales Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

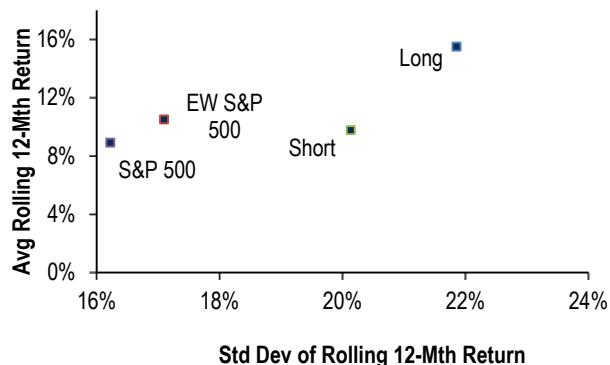
## EV/EBITDA

**Chart 146: Performance of Low EV/EBITDA, High EV/EBITDA and Long-Short Spread**



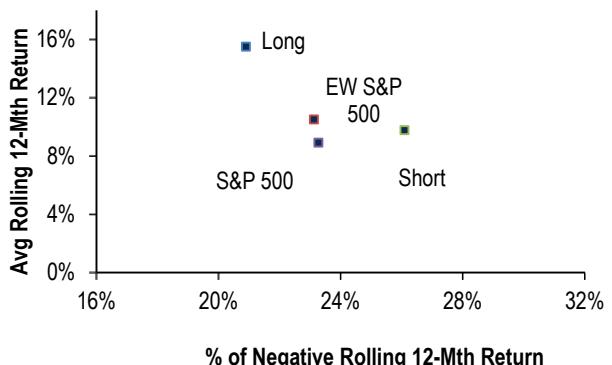
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 147: Low EV/EBITDA Risk Reward Characteristics**



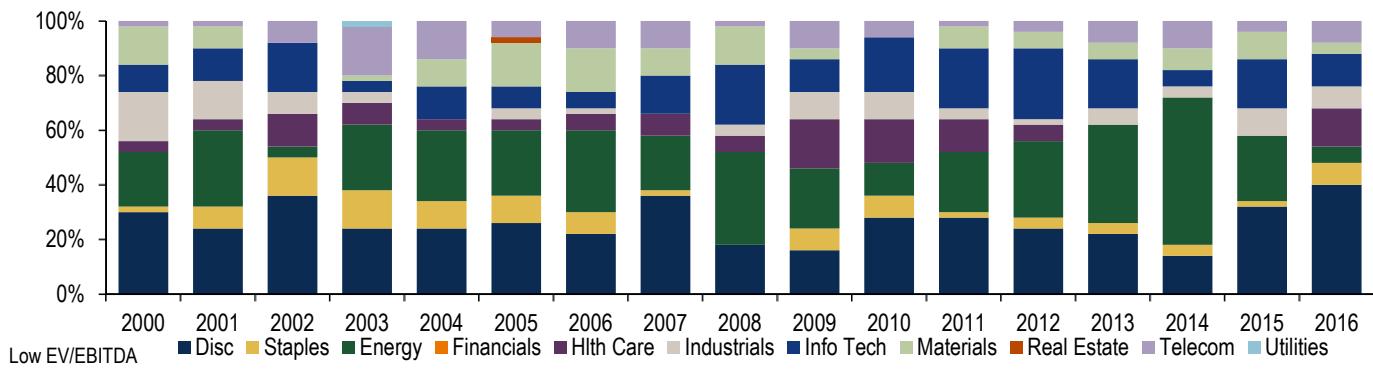
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 148: Low EV/EBITDA Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

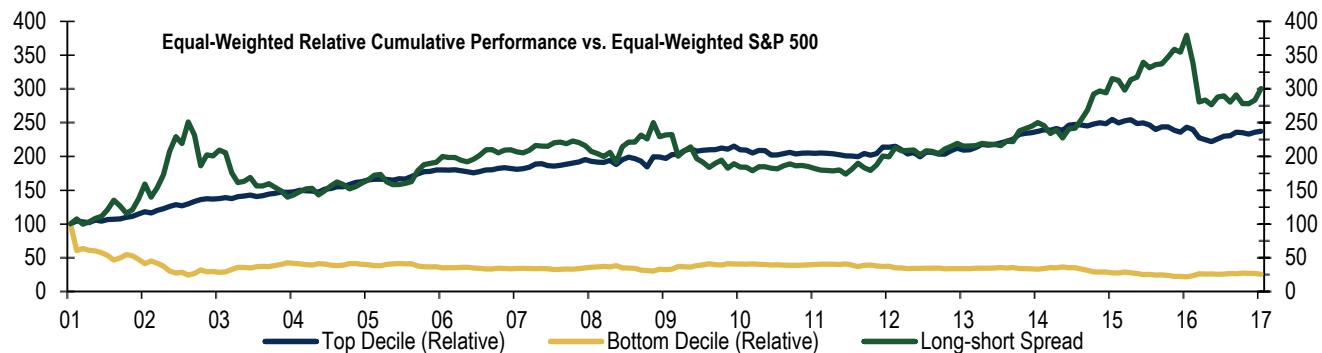
**Chart 149: Low EV/EBITDA Sector Concentration (Low EV/EBITDA)**



Source: BofA Merrill Lynch US Quantitative Strategy

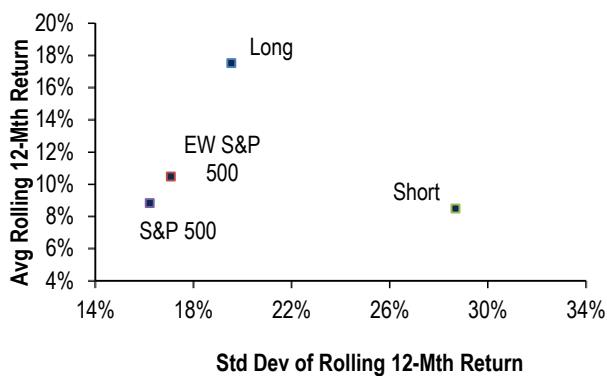
## Free Cash Flow/Enterprise Value

Chart 150: Performance of Low FCF/EV, High FCF/EV and Long-Short Spread



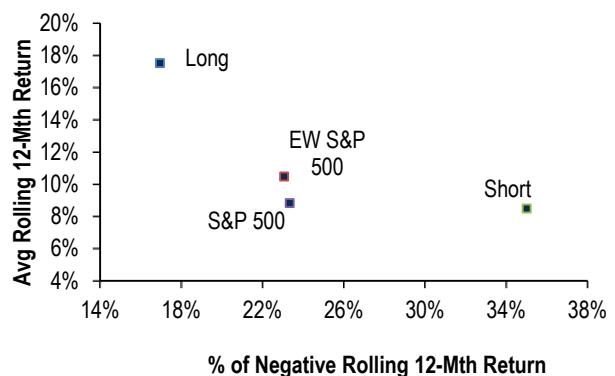
Source: BofA Merrill Lynch US Quantitative Strategy.

Chart 151: High FCF/EV Risk Reward Characteristics



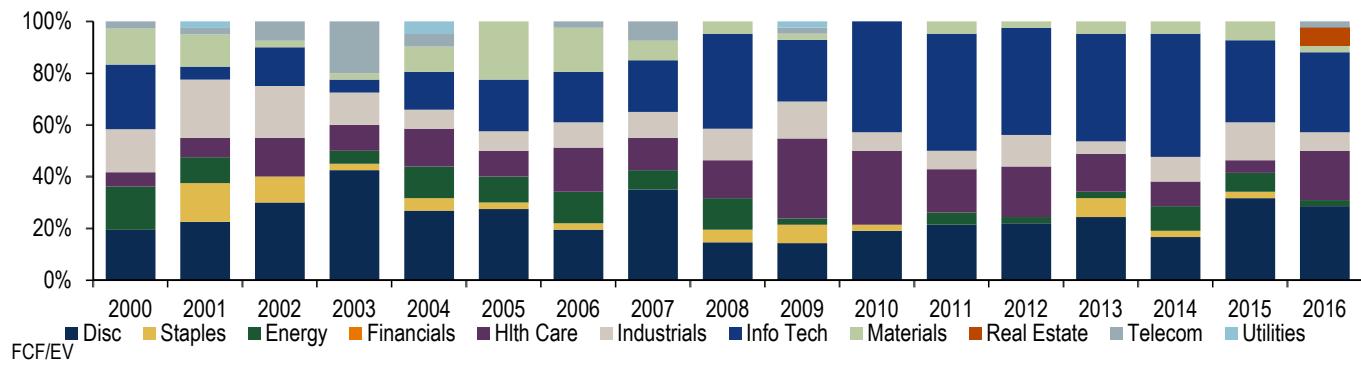
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 152: High FCF/EV Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

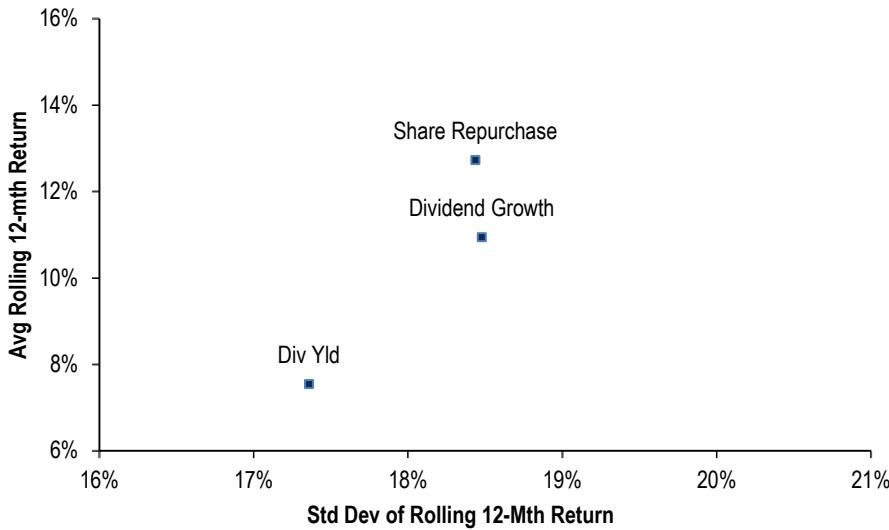
Chart 153: Low FCF/EV Sector Concentration (Low FCF/EV)



Source: BofA Merrill Lynch US Quantitative Strategy

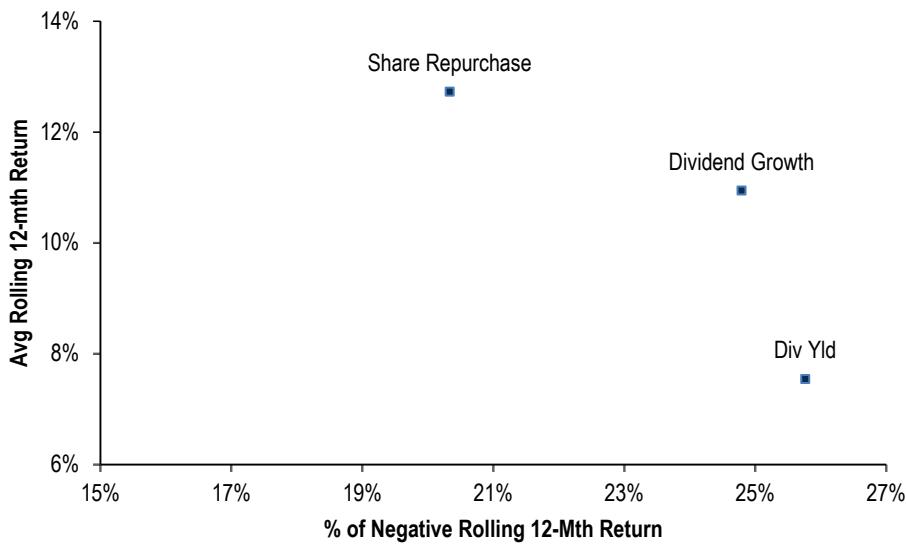
# Cash Deployment Strategies

Chart 154: Cash Deployment Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

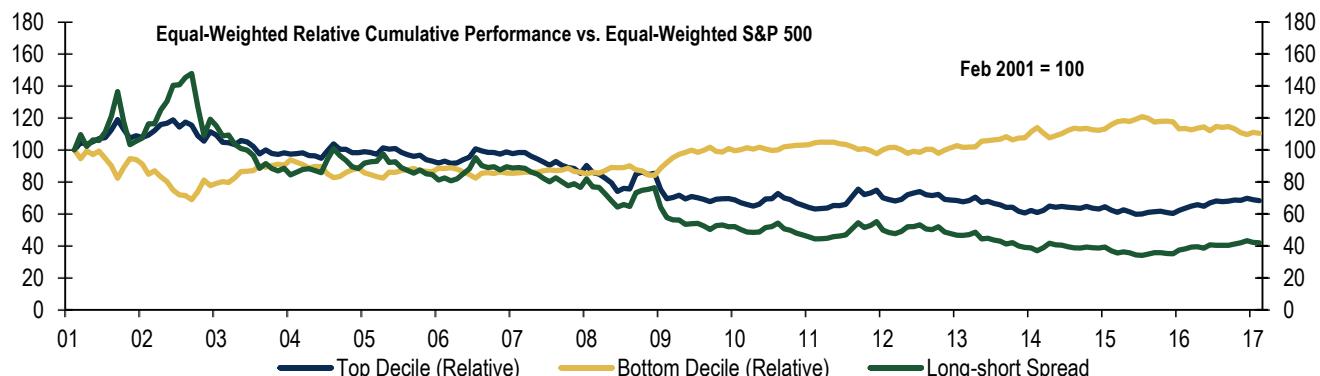
Chart 155: Cash Deployment Strategies



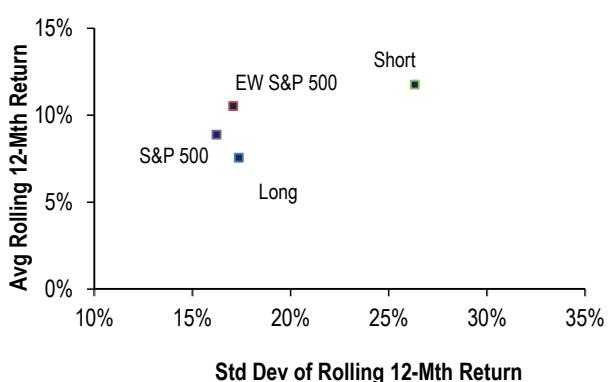
Source: BofA Merrill Lynch US Quantitative Strategy

## Dividend Yield

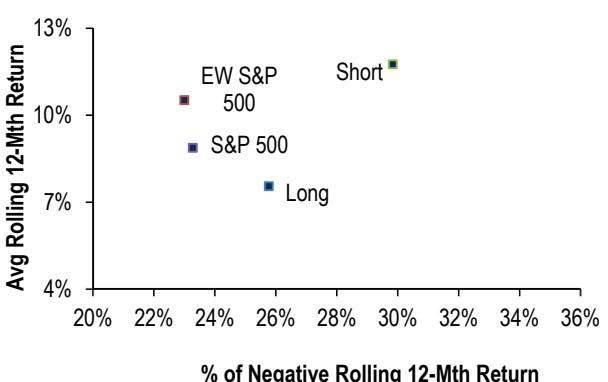
**Chart 156: Performance of Top Decile, Bottom Decile and Long-Short Spread**



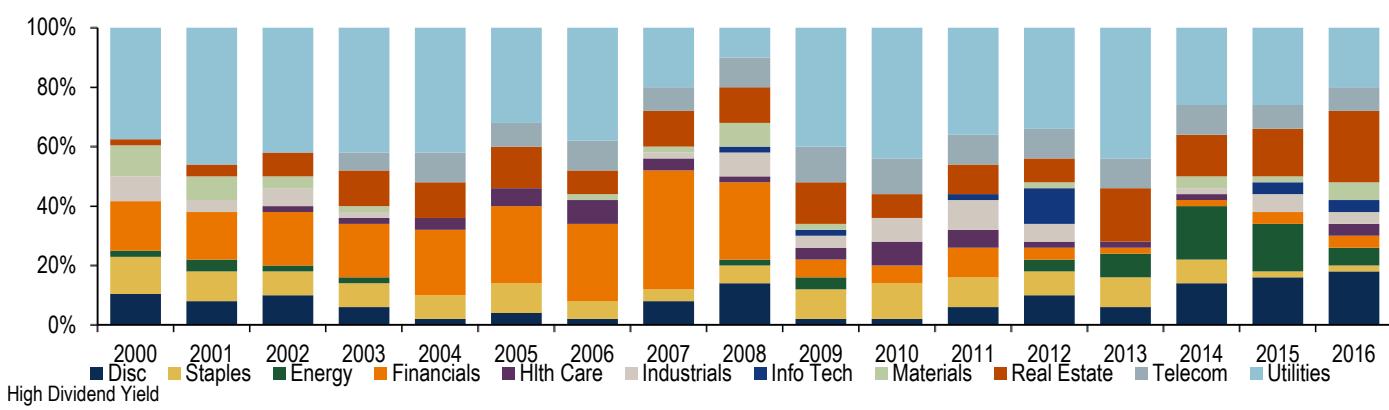
**Chart 157: High Dividend Yield Risk Reward Characteristics**



**Chart 158: High Dividend Yield Downside Risk Reward**

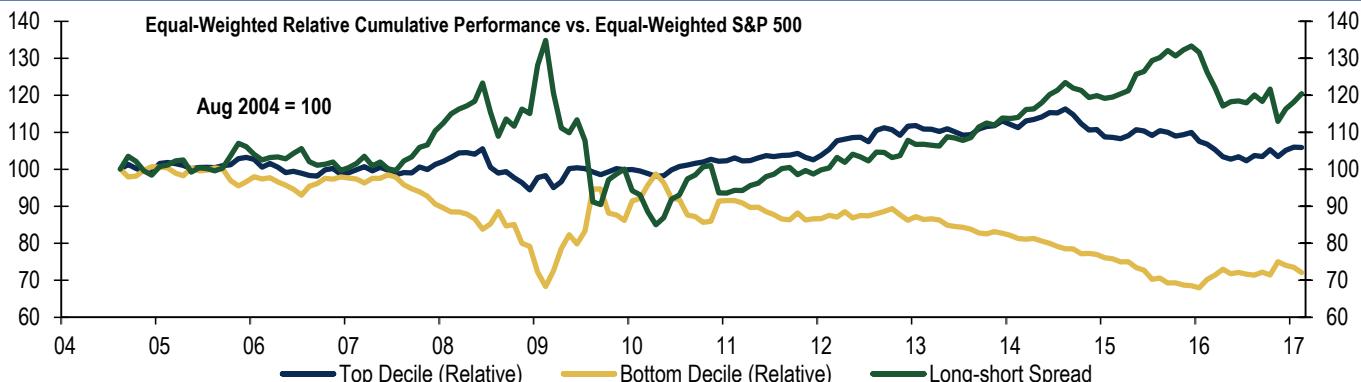


**Chart 159: High Dividend Yield Sector Concentration (Top Decile)**



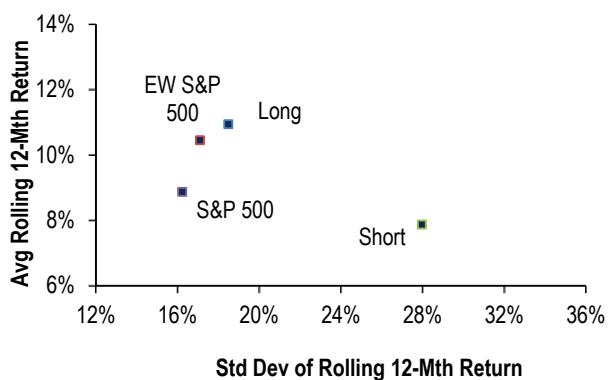
## Dividend Growth

**Chart 160: Performance of Top Decile, Bottom Decile and Long-Short Spread**



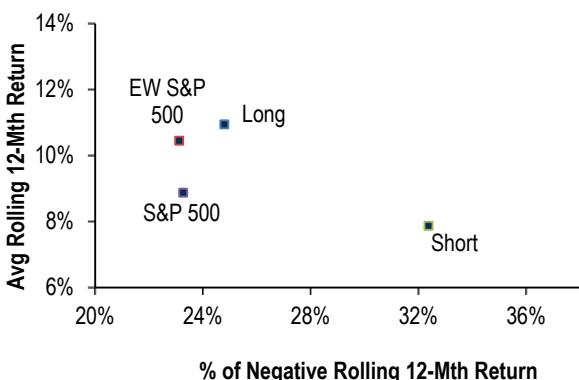
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 161: High Dividend Growth Risk Reward**



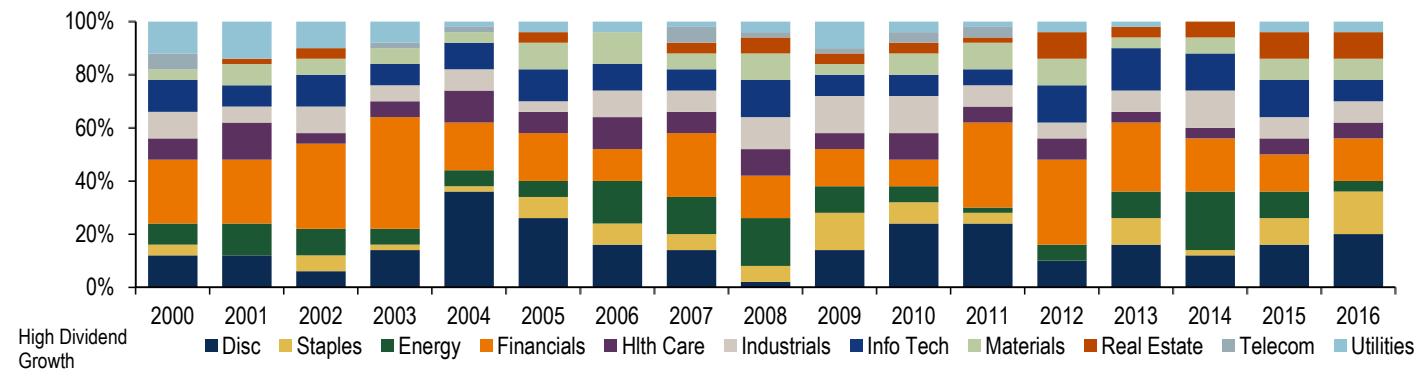
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 162: High Dividend Growth Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

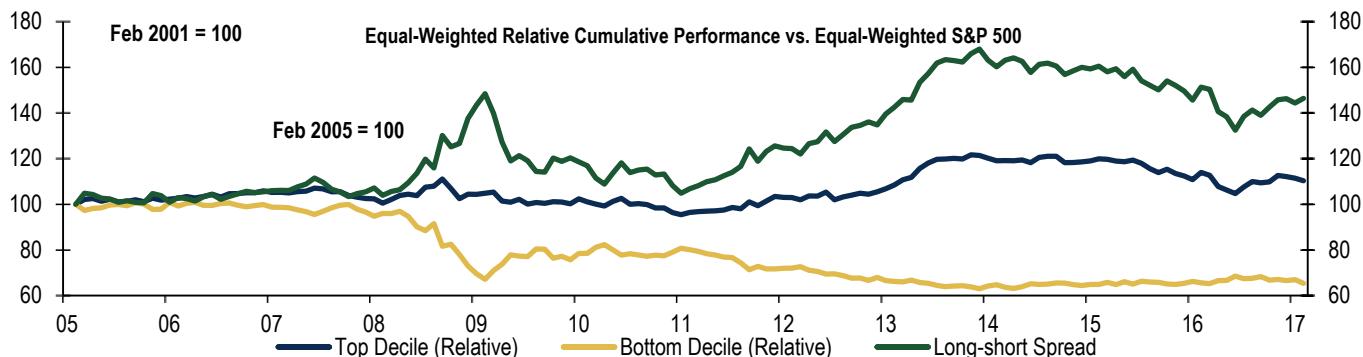
**Chart 163: High Dividend Growth Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

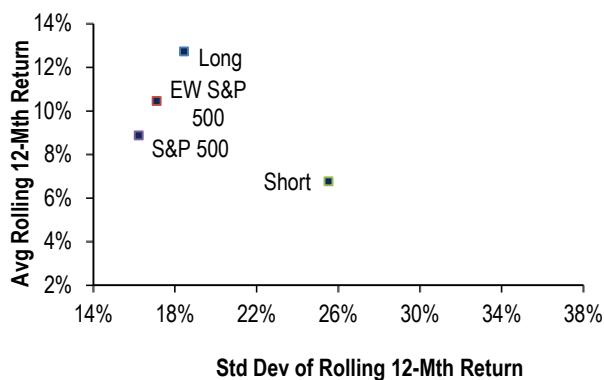
## Share Repurchase

**Chart 164: Performance of Top Decile, Bottom Decile and Long-Short Spread**



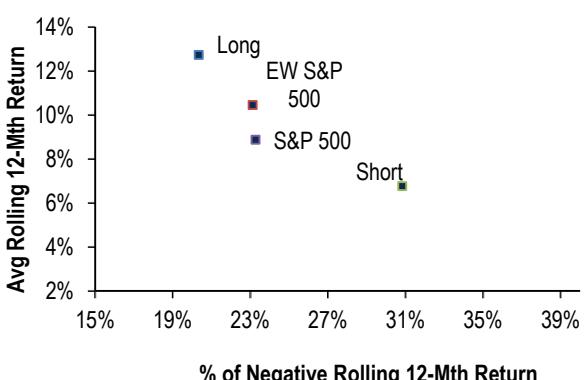
Source: BofA Merrill Lynch US Quantitative Strategy..

**Chart 165: High Share Repurchase Risk Reward Characteristics**



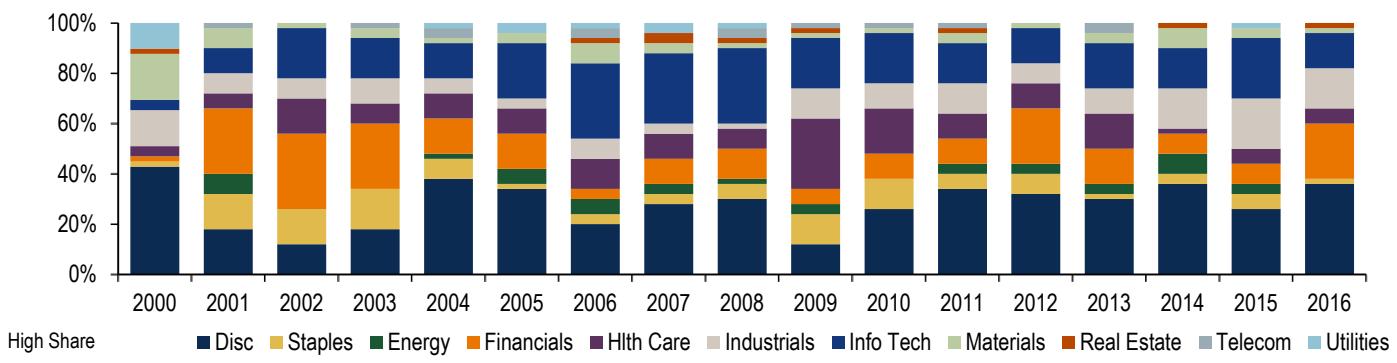
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 166: High Share Repurchase Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

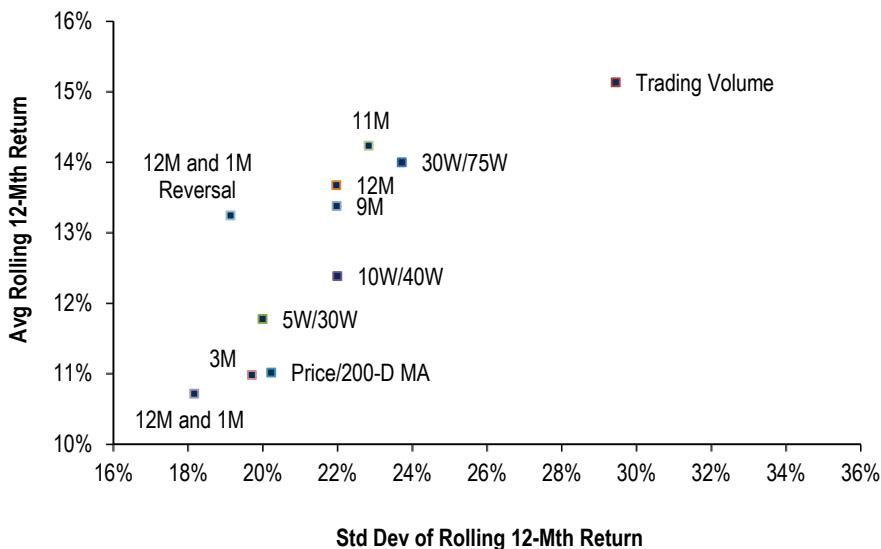
**Chart 167: High Share Repurchase Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

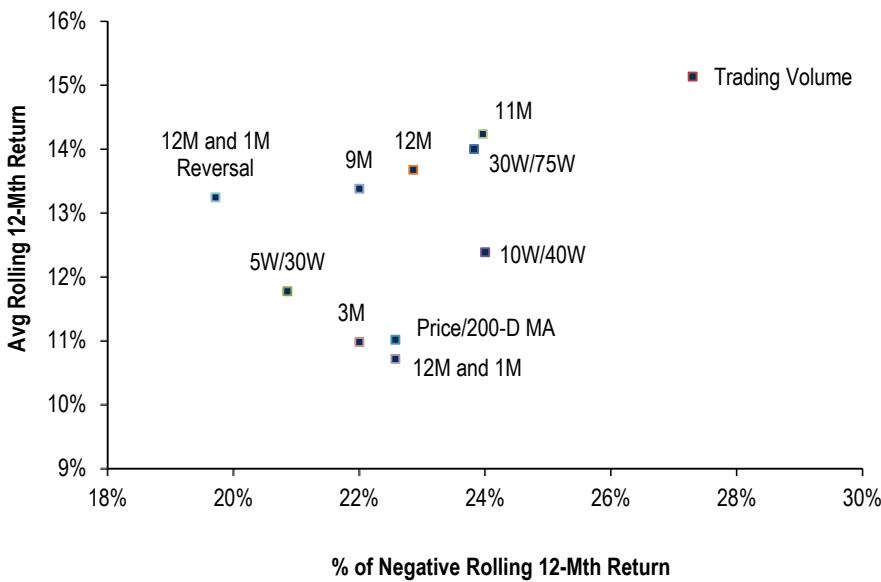
# Momentum Strategies

Chart 168: Momentum Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

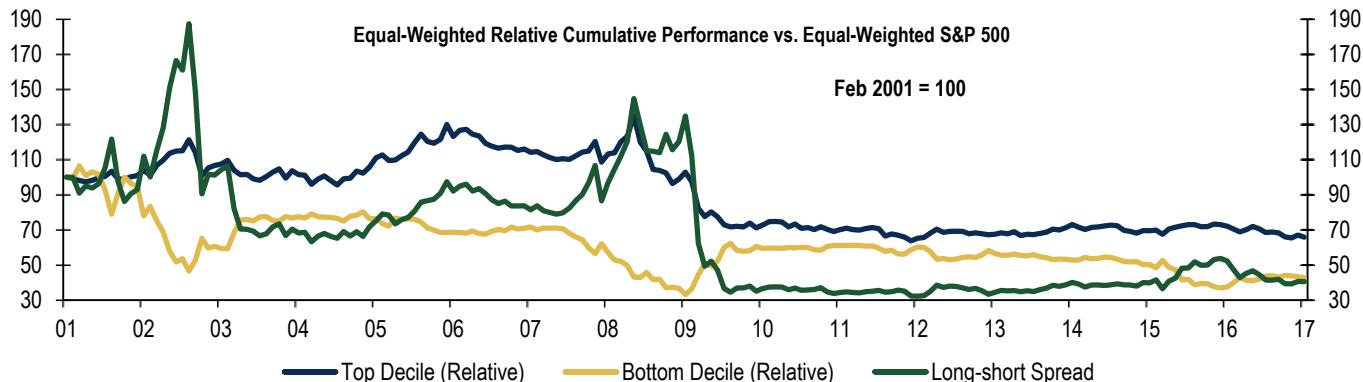
Chart 169: Momentum Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

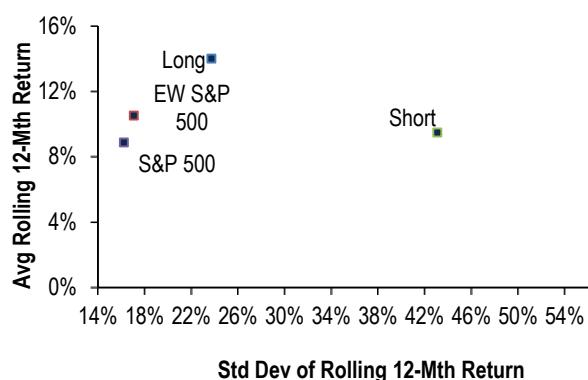
## Relative Strength – 30wk/75wk

Chart 170: Performance of Top Decile, Bottom Decile and Long-Short Spread



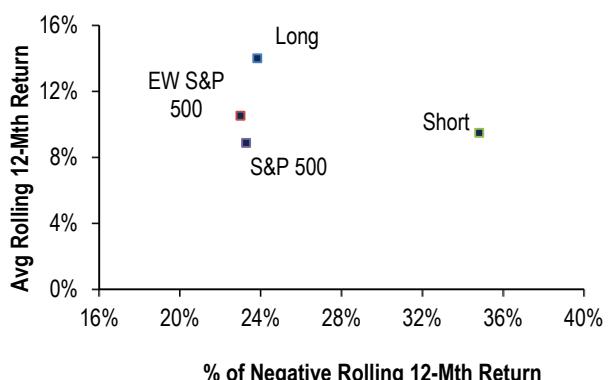
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 171: High Relative Strength – 30wk/75wk Risk Reward



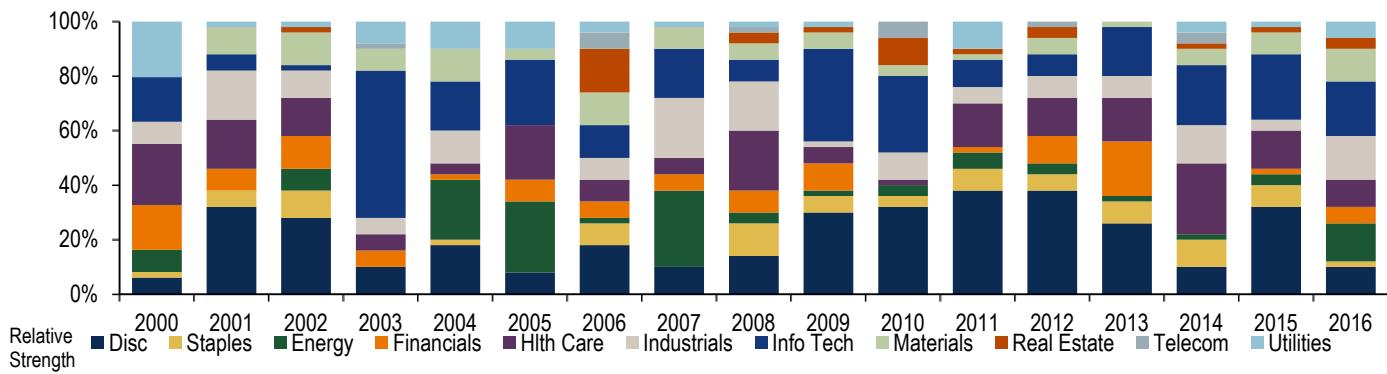
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 172: High Relative Strength – 30wk/75wk Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

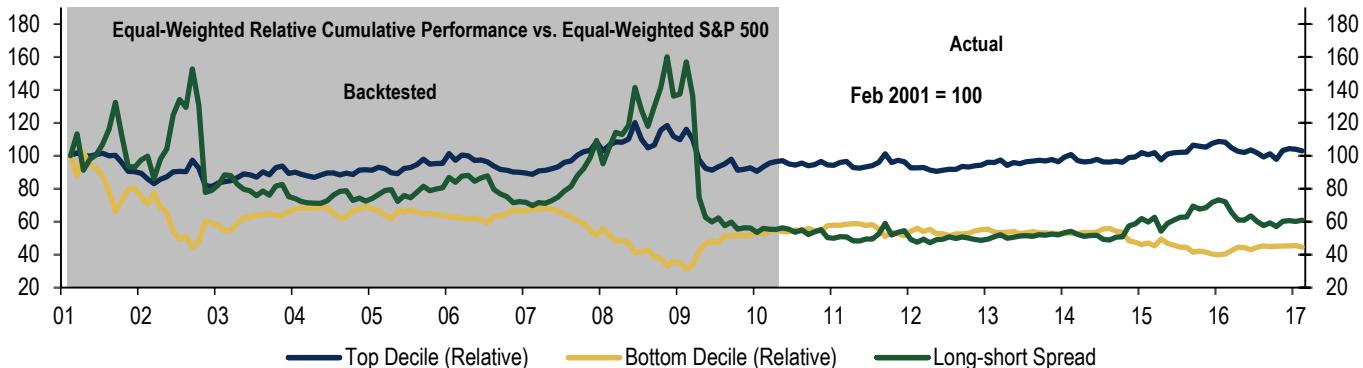
Chart 173: High Relative Strength (30wk/75wk) Sector Concentration (Top Decile)



Source: BofA Merrill Lynch US Quantitative Strategy

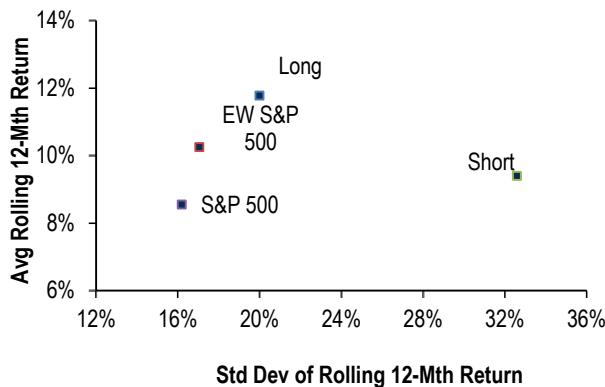
## Relative Strength – 5wk/30wk

Chart 174: Performance of Top Decile, Bottom Decile and Long-Short Spread



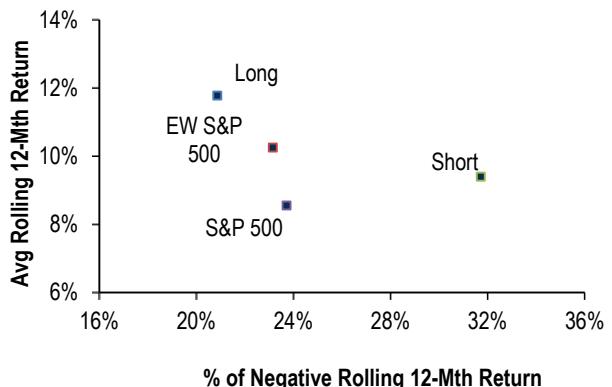
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

Chart 175: High Relative Strength – 5wk/30wk Risk Reward



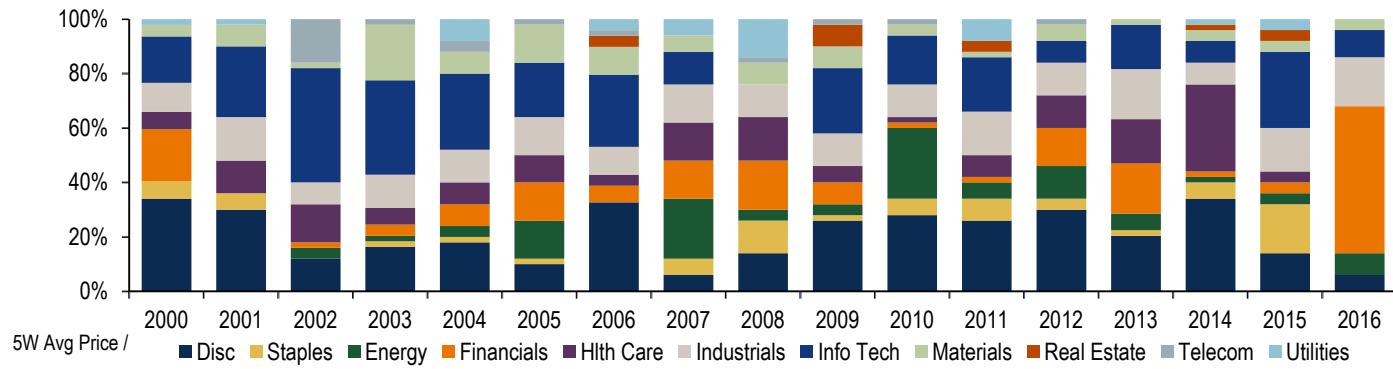
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 176: High Relative Strength – 5wk/30wk Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

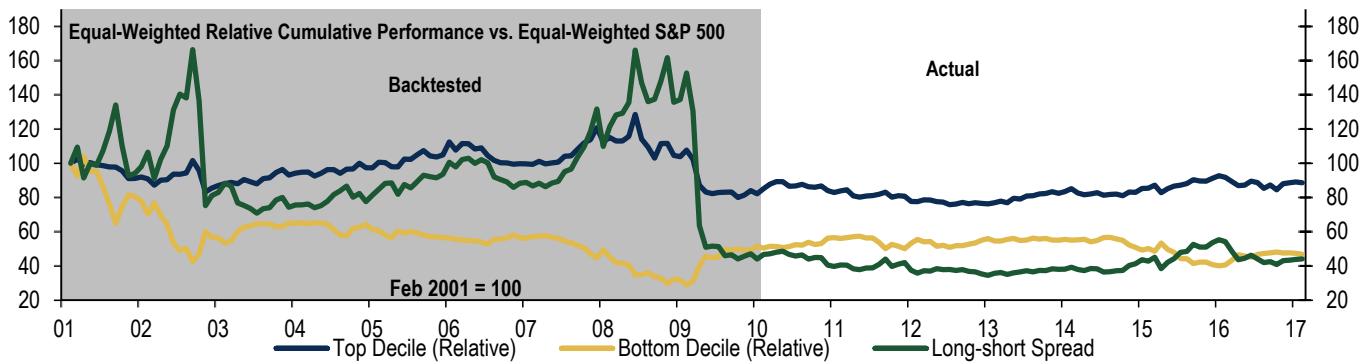
Chart 177: High Relative Strength (5wk/30wk) Sector Concentration (Top Decile)



Source: BofA Merrill Lynch US Quantitative Strategy

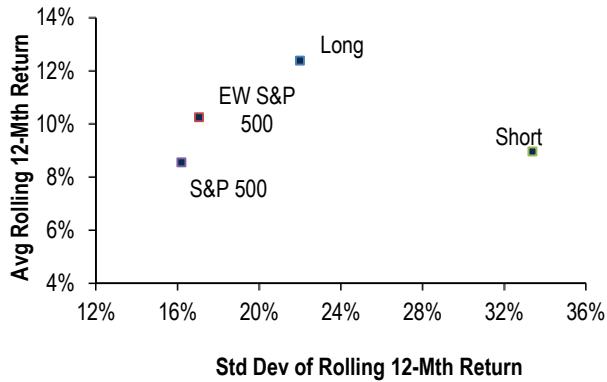
## Relative Strength – 10wk/40wk

**Chart 178: Performance of Top Decile, Bottom Decile and Long-Short Spread**



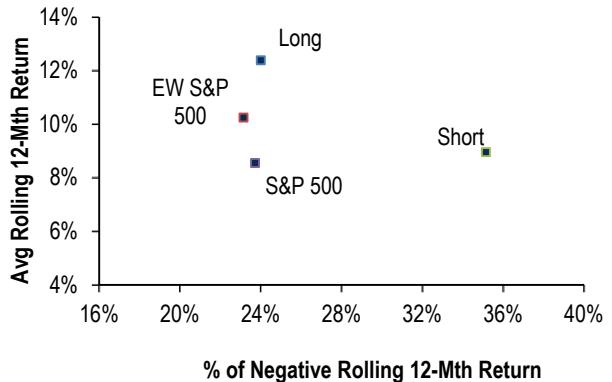
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 179: High Relative Strength – 10wk/40wk Risk Reward**



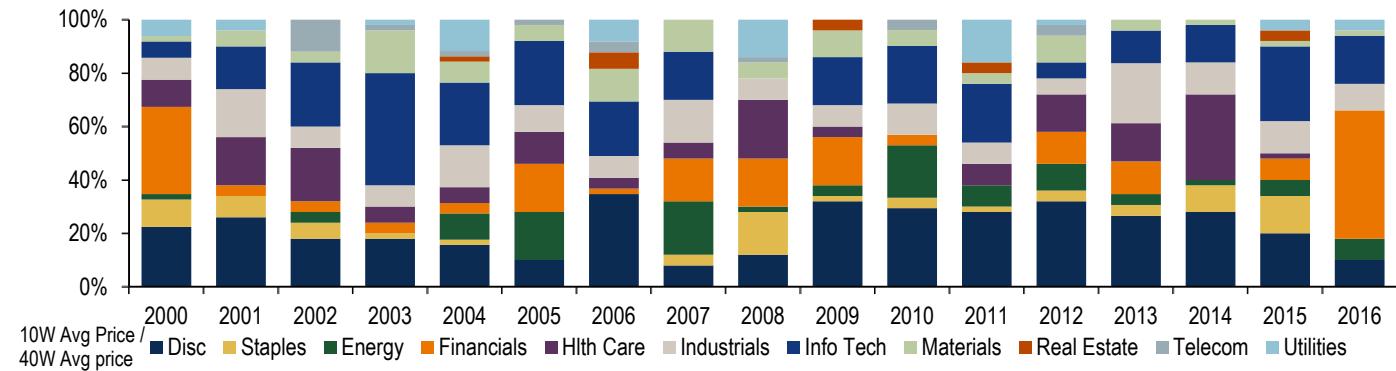
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 180: High Relative Strength – 10wk/40wk Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

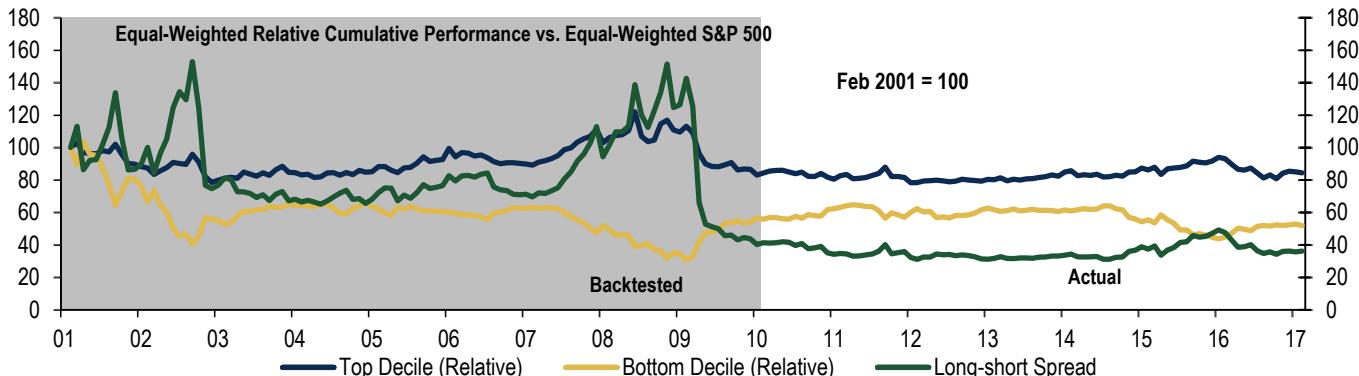
**Chart 181: High Relative Strength (10wk/40wk) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

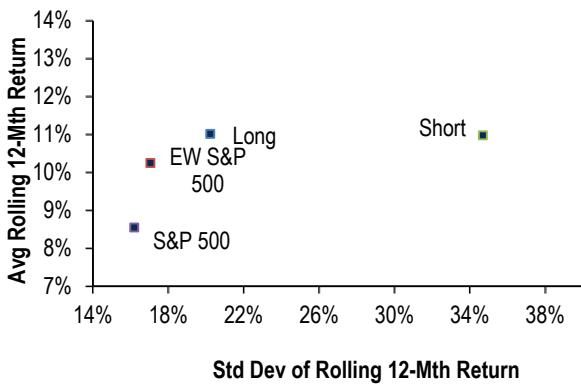
## Price to Moving Average (200-Day)

Chart 182: Performance of Top Decile, Bottom Decile and Long-Short Spread



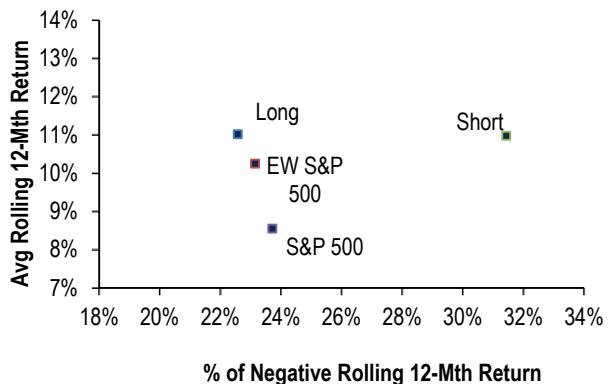
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

Chart 183: High Price/200D MA Risk Reward



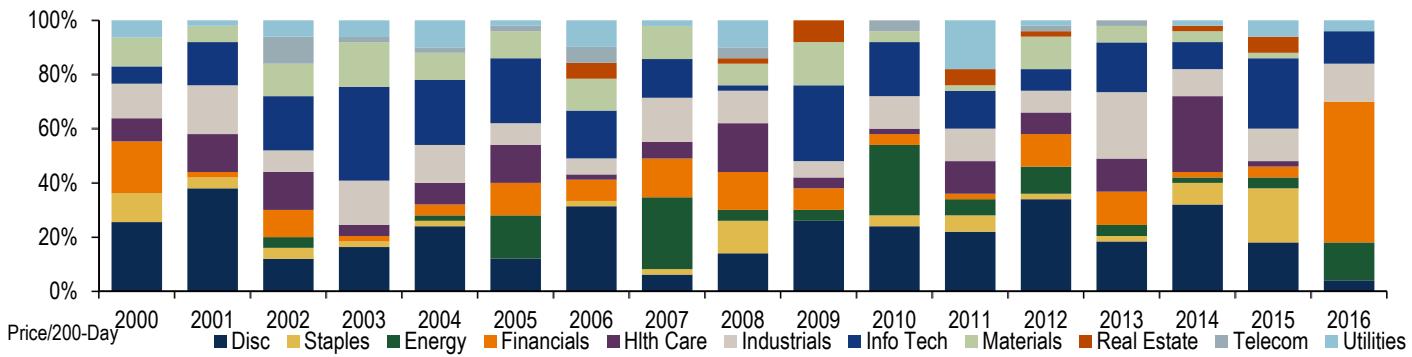
Source: BofA Merrill Lynch US Quantitative Strategy.

Chart 184: High Price/200D MA Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy.

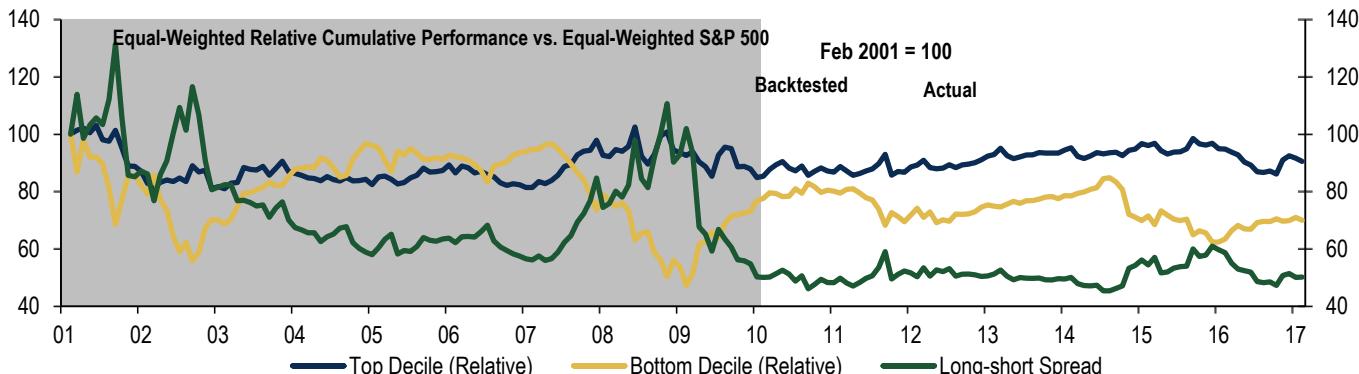
Chart 185: High Price/200D MA Sector Concentration (Top Decile)



Source: BofA Merrill Lynch US Quantitative Strategy

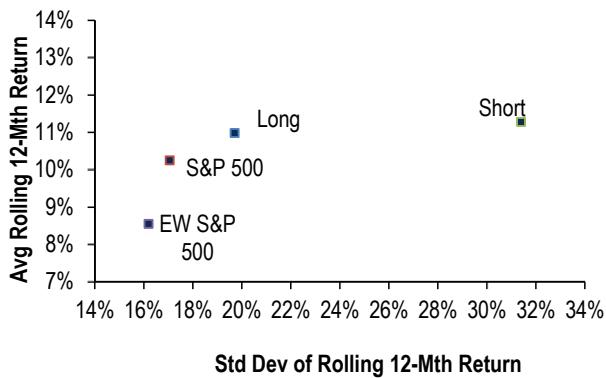
## Price Return – 3-Month Performance

**Chart 186: Performance of Top Decile, Bottom Decile and Long-Short Spread**



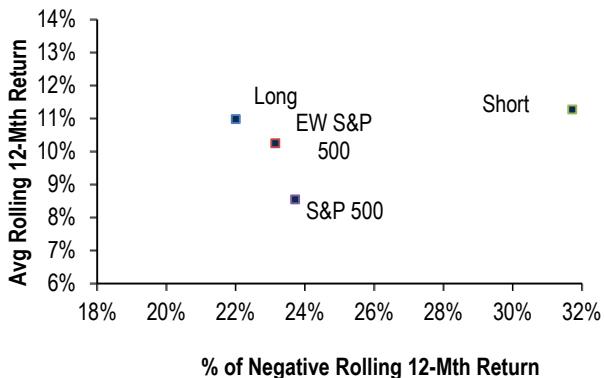
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 187: High Price Return – 3M Risk Reward**



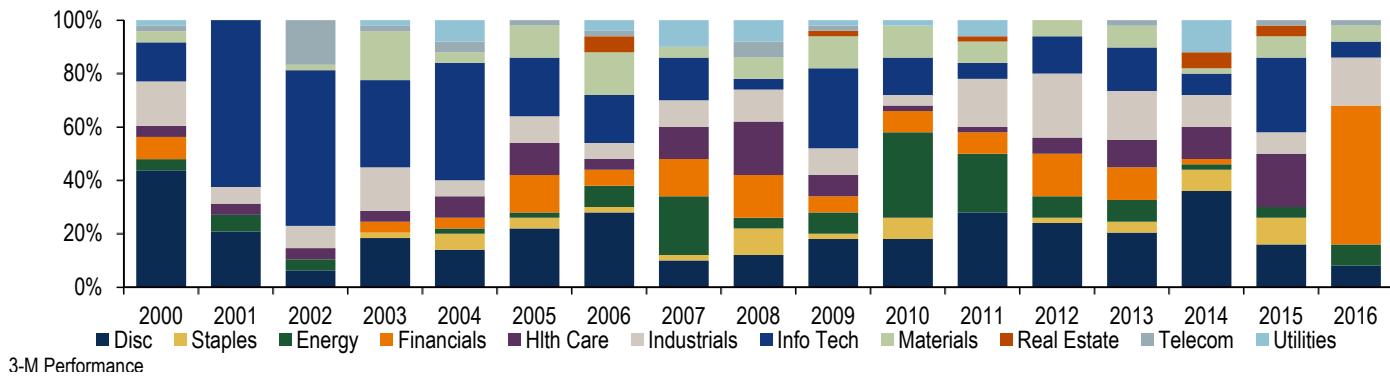
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 188: High Price Return – 3M Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

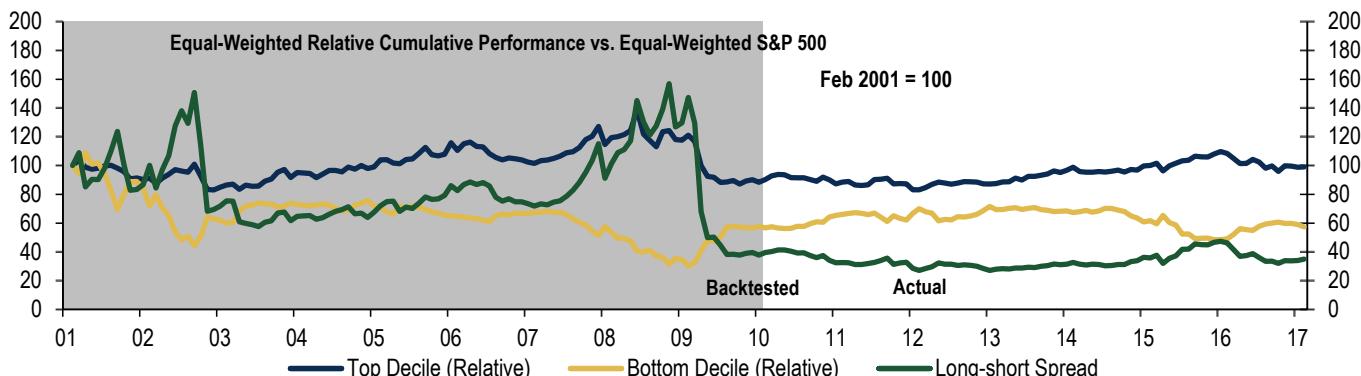
**Chart 189: High Price Return (3M) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

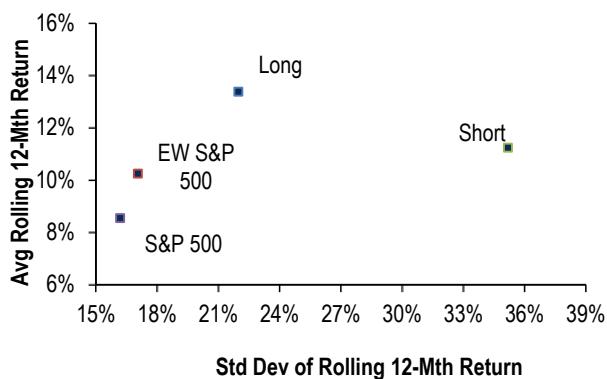
## Price Return – 9-Month Performance

**Chart 190: Performance of Top Decile, Bottom Decile and Long-Short Spread**



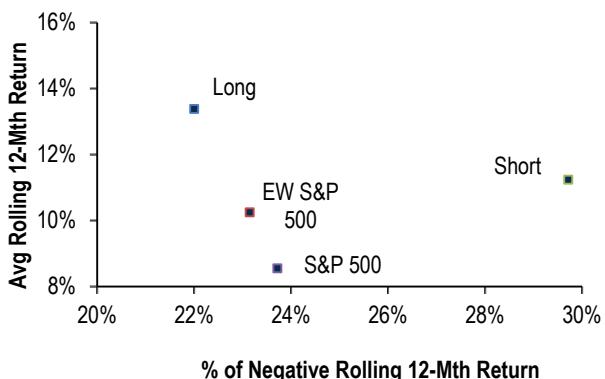
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 191: High Price Return – 9M Risk Reward**



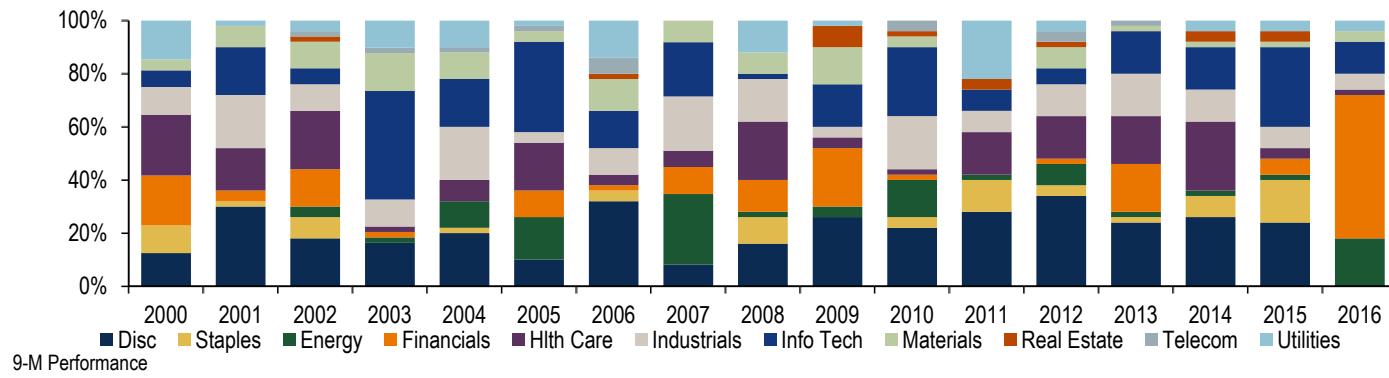
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 192: High Price Return – 9M Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

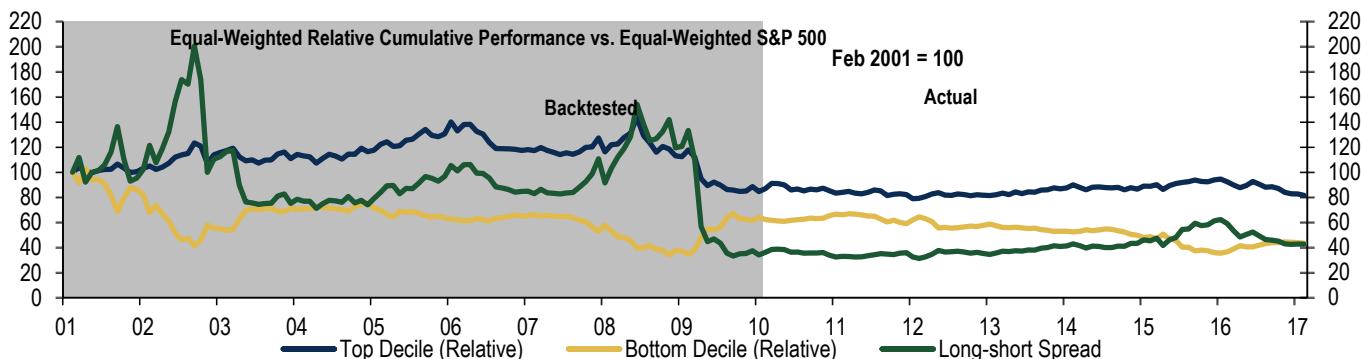
**Chart 193: High Price Return (9M) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy.

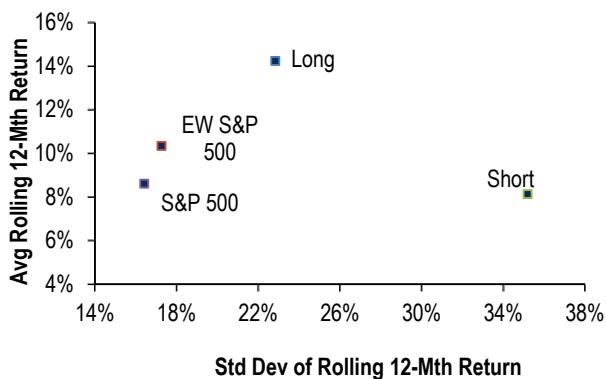
## Price Return – 11-Month Performance

**Chart 194: Performance of Top Decile, Bottom Decile and Long-Short Spread**



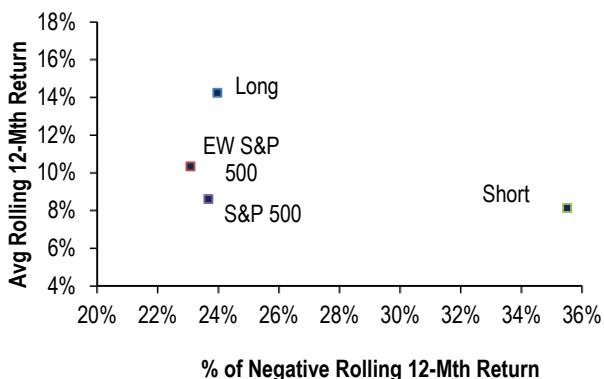
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 195: High Price Return – 11M Risk Reward**



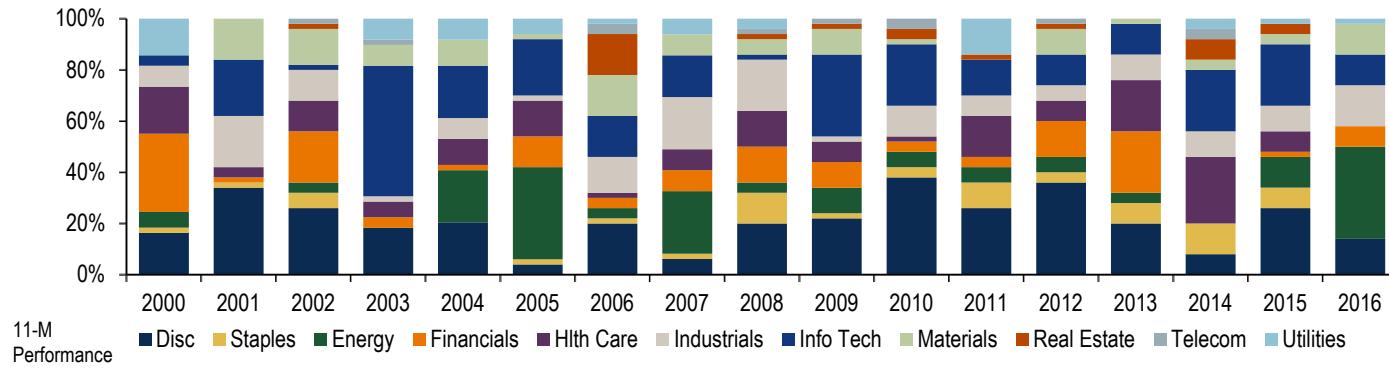
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 196: High Price Return – 11M Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

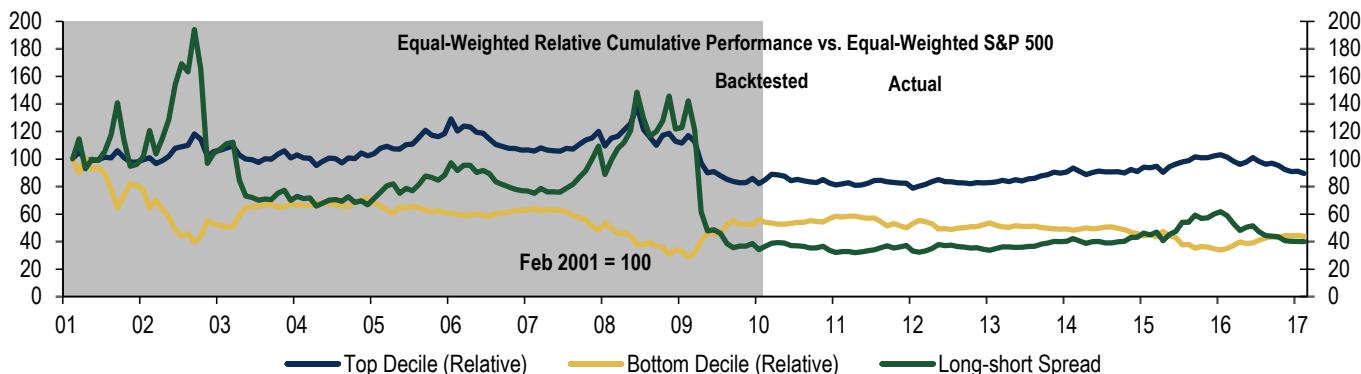
**Chart 197: High Price Return (11M) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

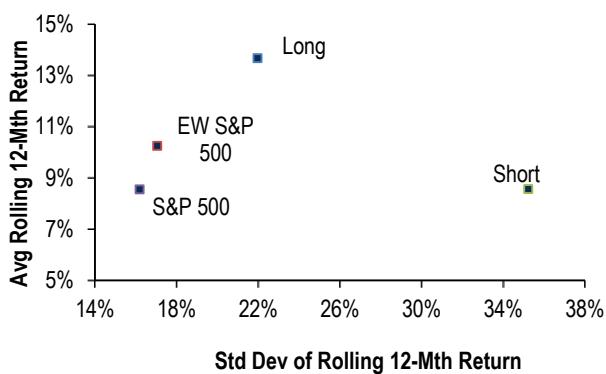
## Price Return – 12-Month Performance

**Chart 198: Performance of Top Decile, Bottom Decile and Long-Short Spread**



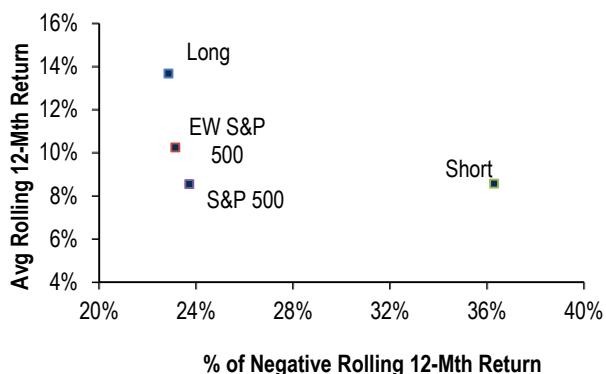
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 199: High Price Return – 12M Risk Reward**



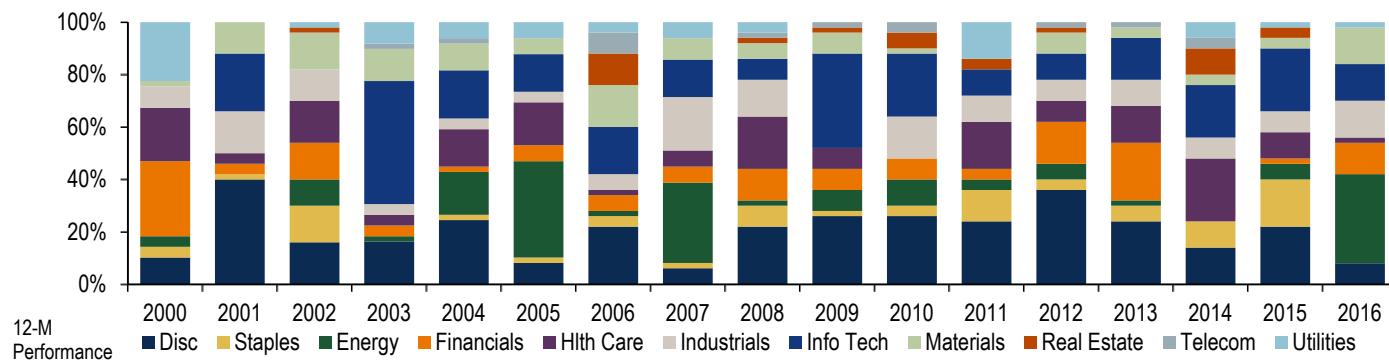
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 200: High Price Return – 12M Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

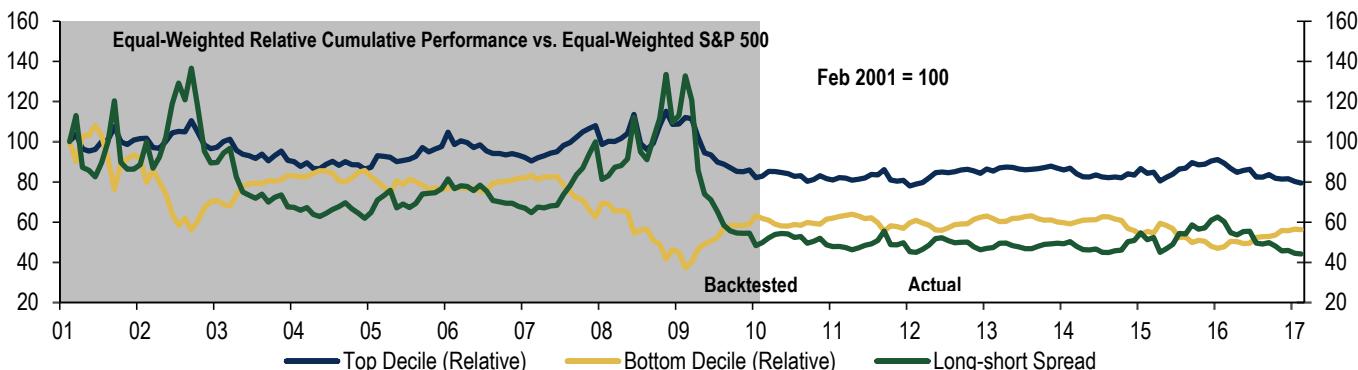
**Chart 201: High Price Return (12M) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

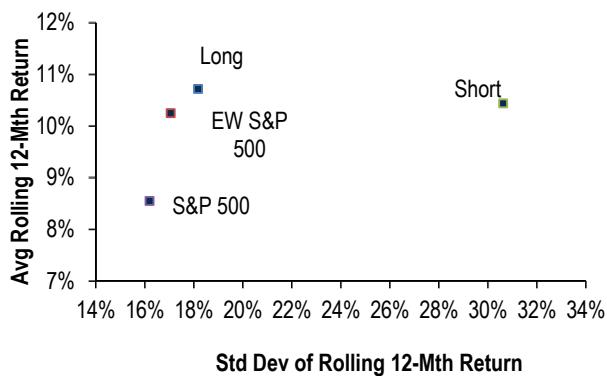
## Price Return – 12-Month and 1-Month Performance

Chart 202: Performance of Top Decile, Bottom Decile and Long-Short Spread



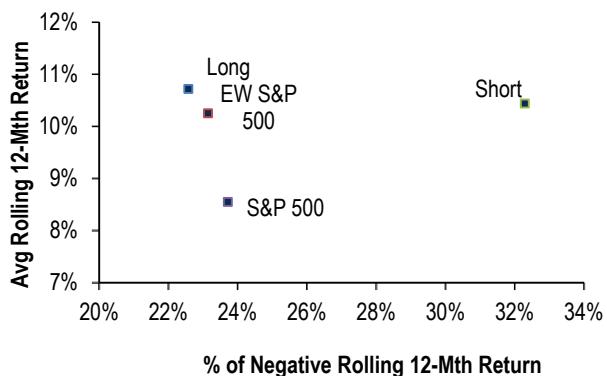
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

Chart 203: High Price Return – 12M and 1M Risk Reward



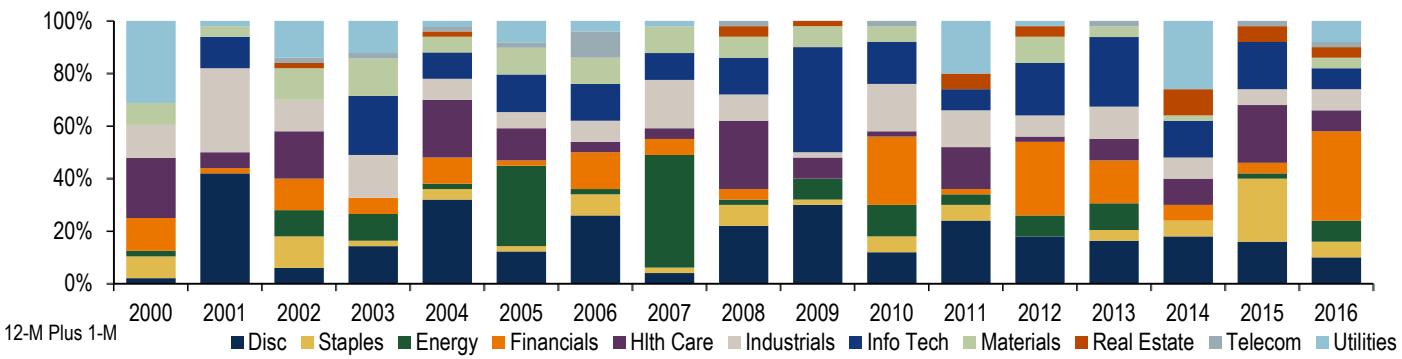
Source: BofA Merrill Lynch US Quantitative Strategy.

Chart 204: High Price Return – 12M and 1M Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy.

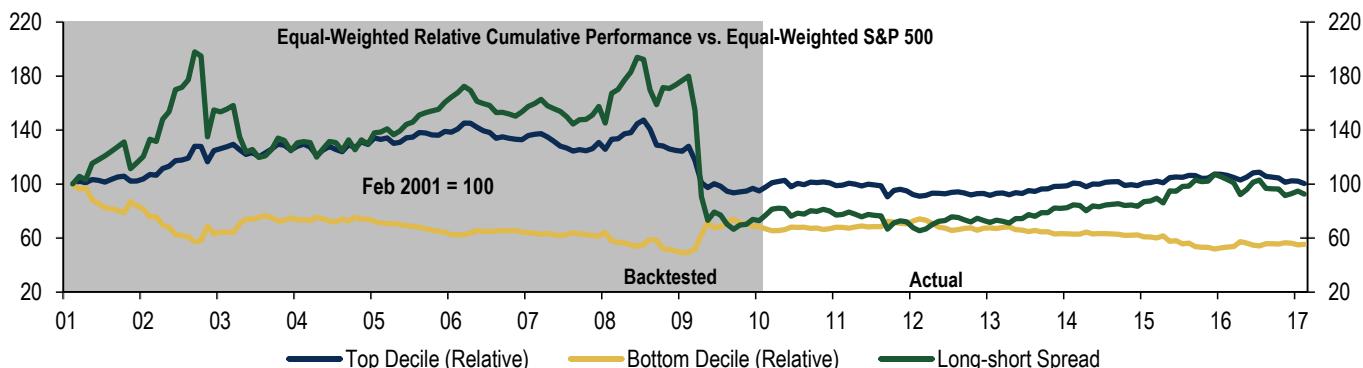
Chart 205: High Price Return (12M and 1M) Sector Concentration (Top Decile)



Source: BofA Merrill Lynch US Quantitative Strategy

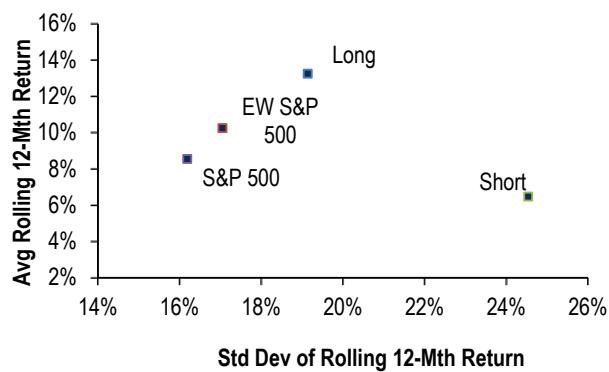
## Price Return – 12-Month and 1-Month Reversal

**Chart 206: Performance of Top Decile, Bottom Decile and Long-Short Spread**



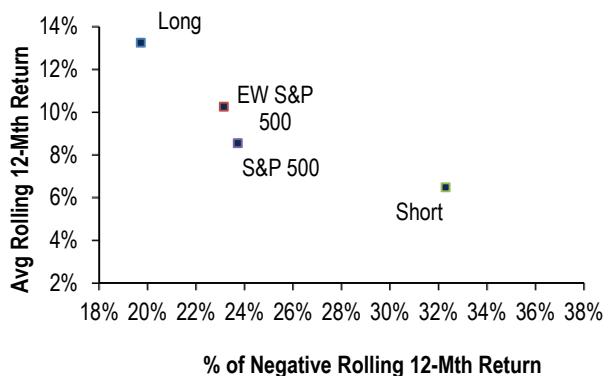
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end January 2010. The unshaded portion represents actual performance since February 2010. Backtesting is hypothetical in nature and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

**Chart 207: High Price Return – 12M and 1M Reversal Risk Reward**



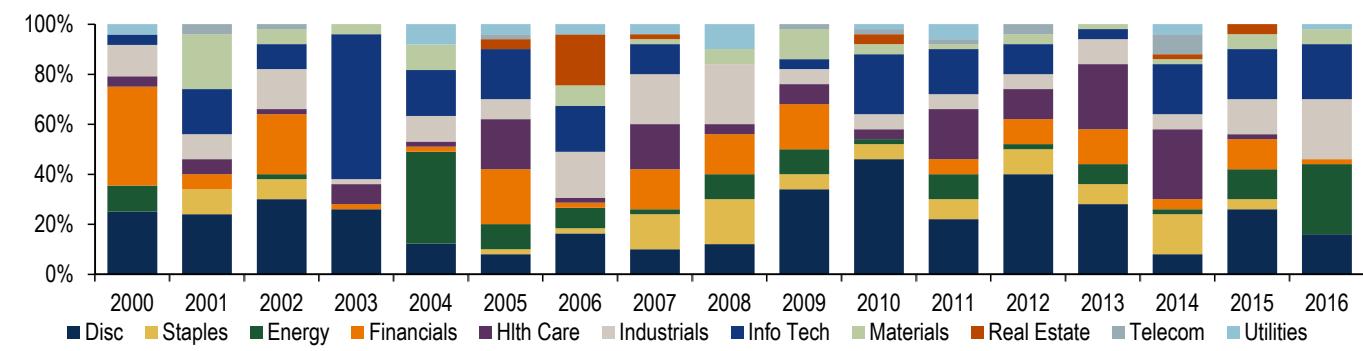
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 208: High Price Return – 12M and 1M Reversal Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

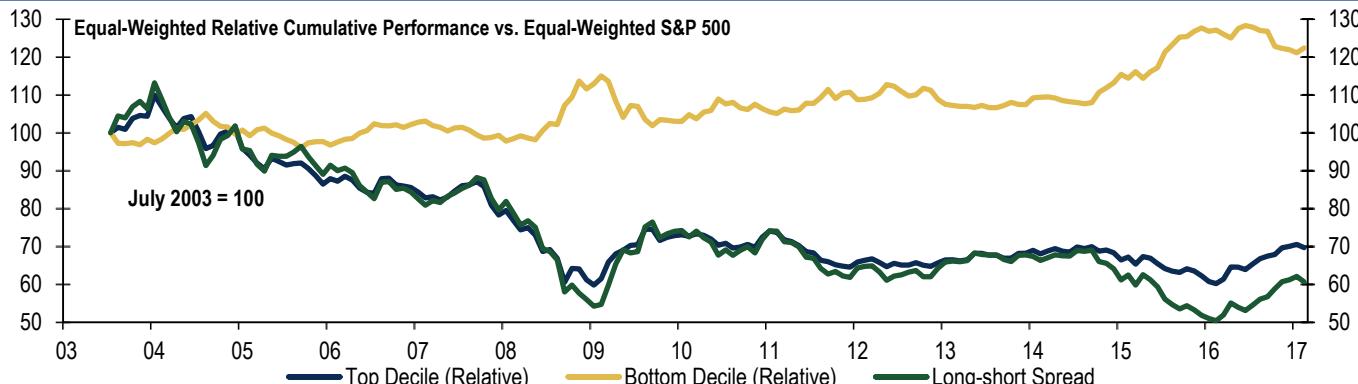
**Chart 209: High Price Return (12M and 1M Reversal) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

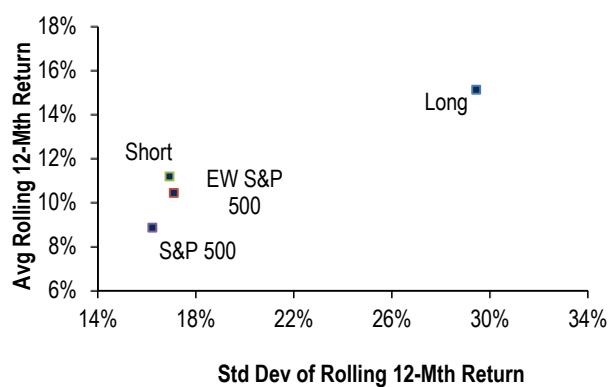
## Trading Volume

**Chart 210: Performance of Top Decile, Bottom Decile and Long-Short Spread**



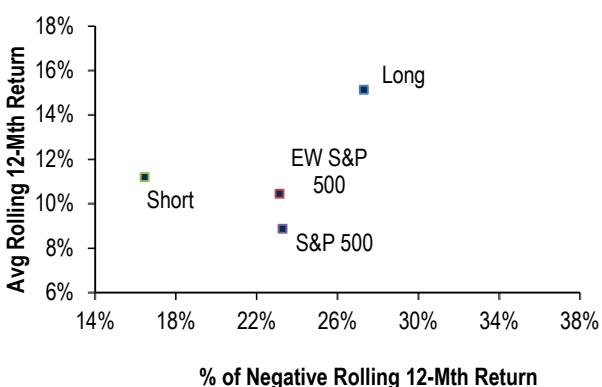
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 211: High Trading Volume Risk Reward**



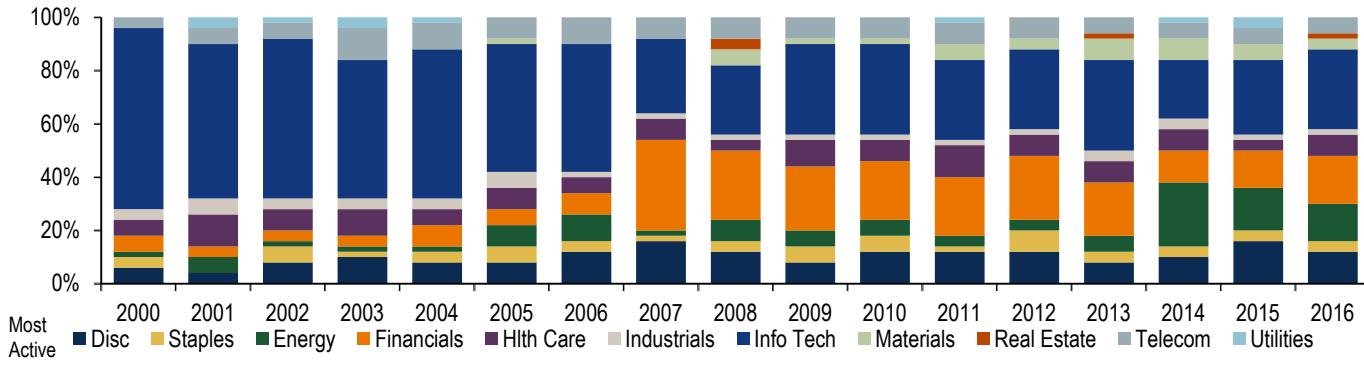
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 212: High Trading Volume Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

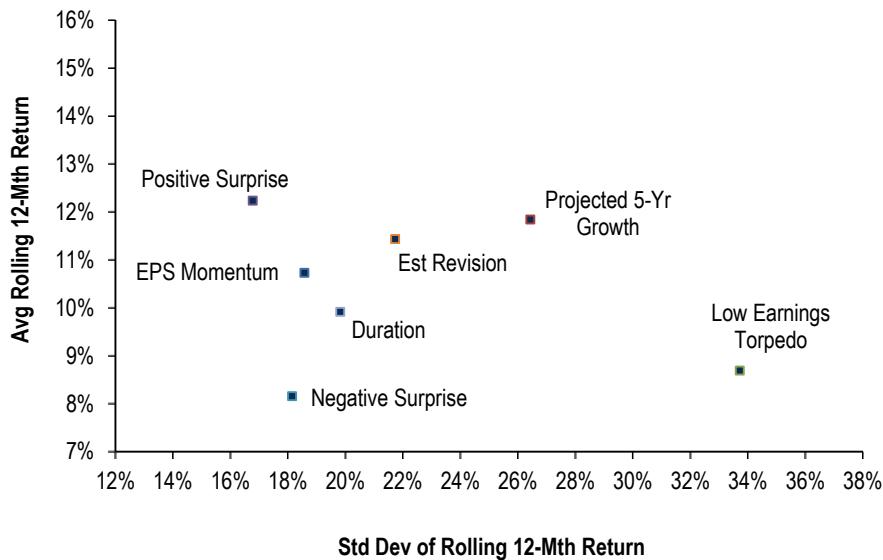
**Chart 213: High Trading Volume Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

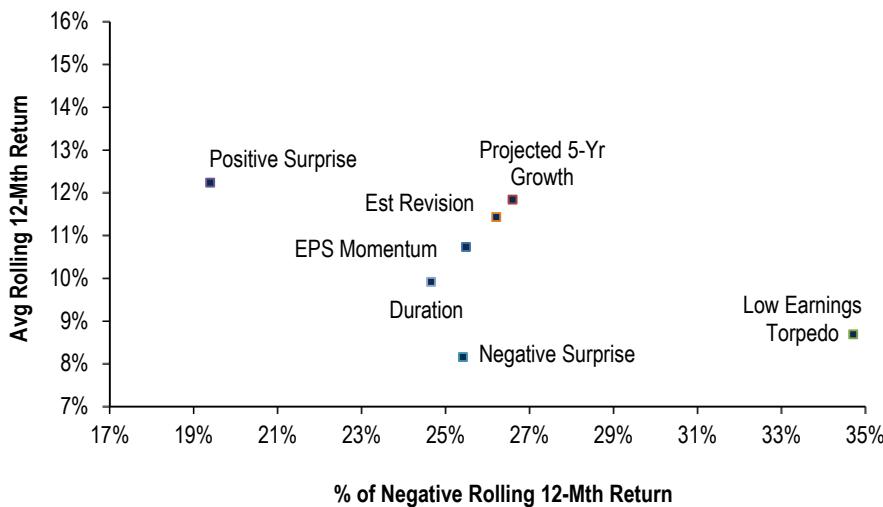
# Growth Strategies

Chart 214: Growth Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

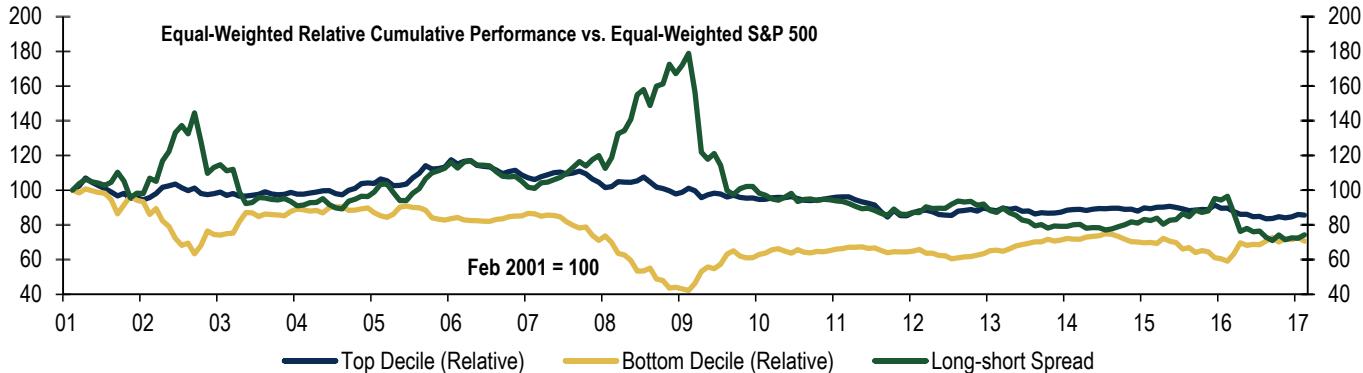
Chart 215: Growth Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

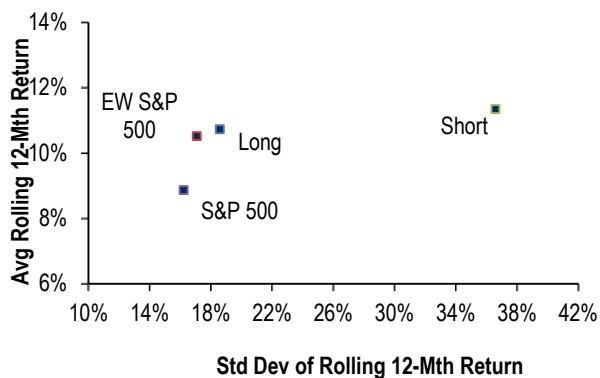
## Earnings Momentum

**Chart 216: Performance of Top Decile, Bottom Decile and Long-Short Spread**



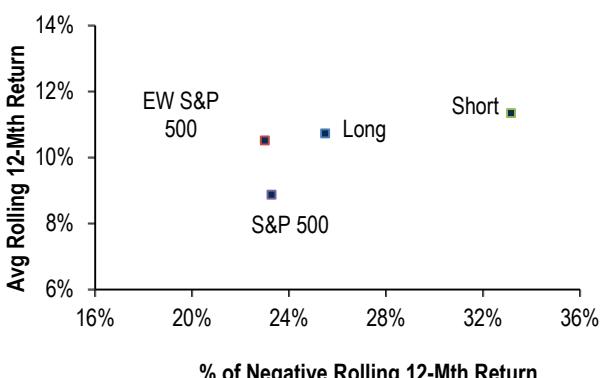
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 217: High Earnings Momentum Risk Reward**



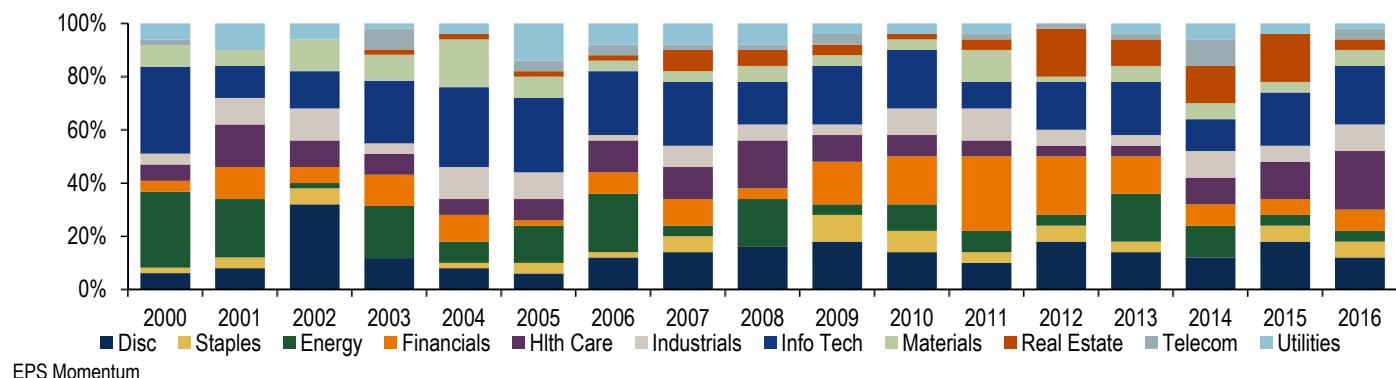
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 218: High Earnings Momentum Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

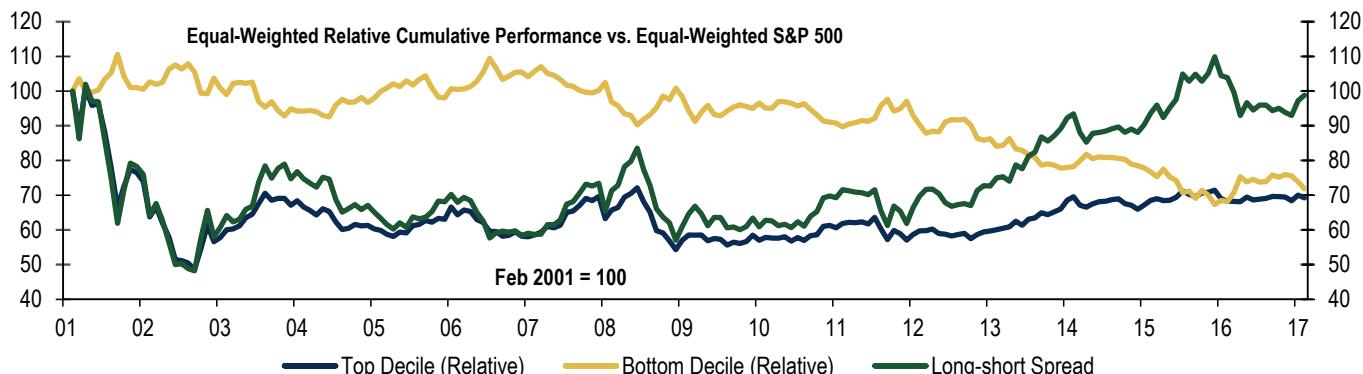
**Chart 219: High Earnings Momentum Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

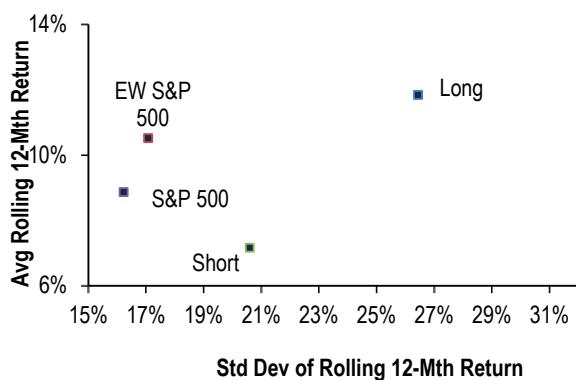
## Projected Five-Year EPS Growth

**Chart 220: Performance of Top Decile, Bottom Decile and Long-Short Spread**



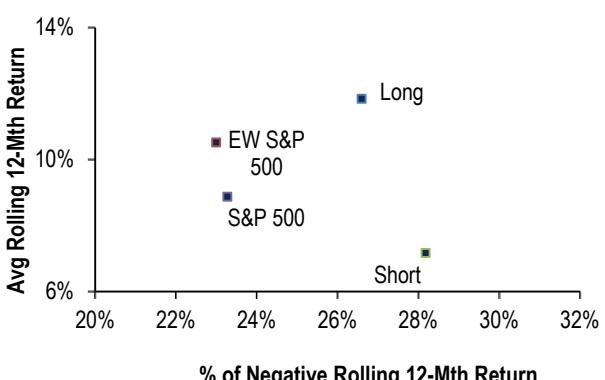
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 221: High Projected 5-Yr EPS Growth Risk Reward**



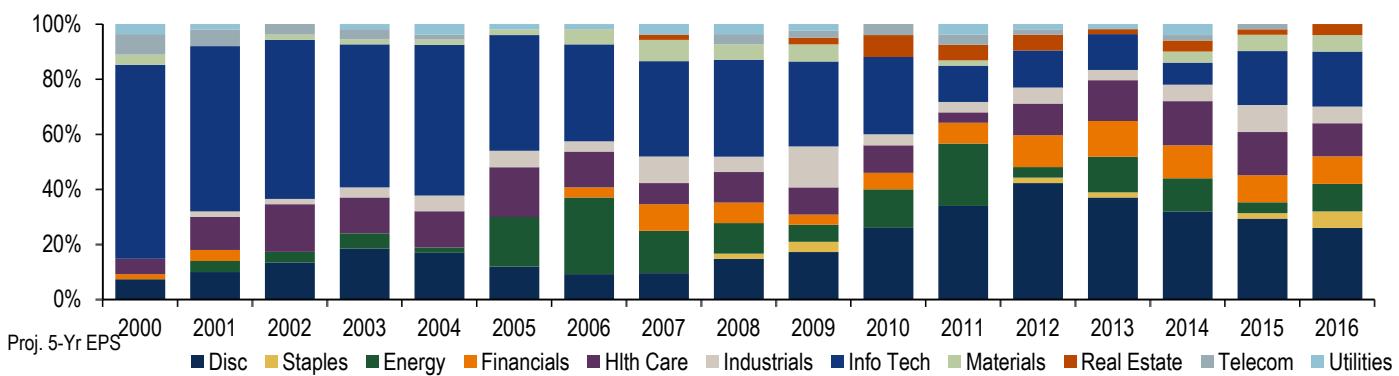
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 222: High Projected 5-Yr EPS Growth Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

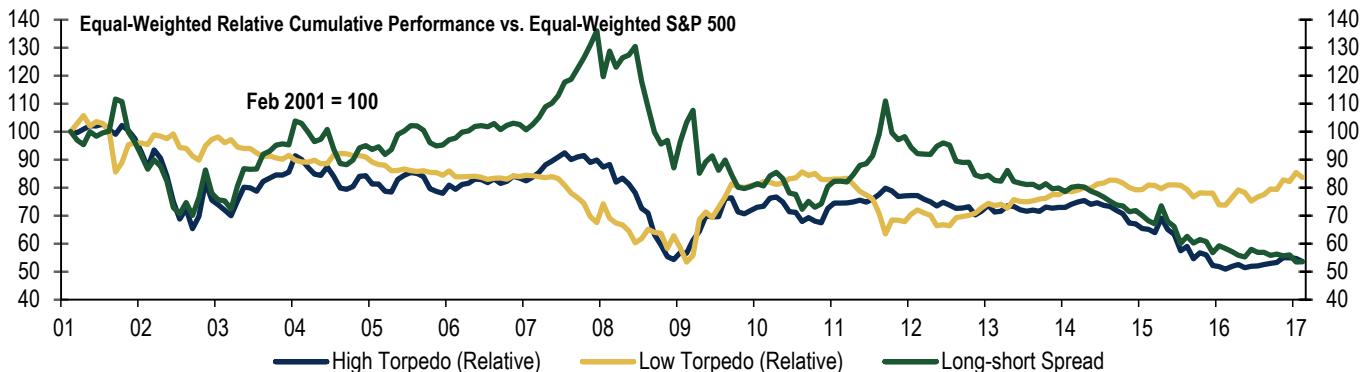
**Chart 223: High Projected 5-Yr EPS Growth Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

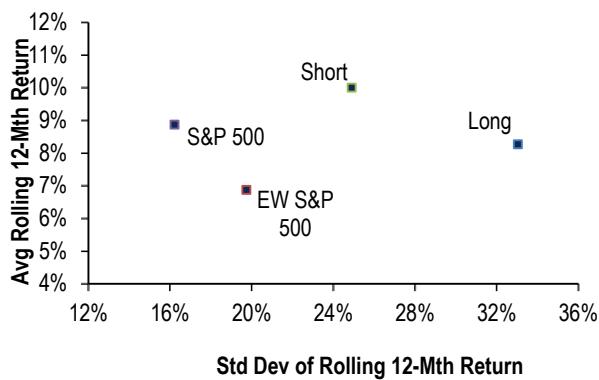
## Earnings Torpedo

**Chart 224: Performance of High Earnings Torpedo, Low Earnings Torpedo and Long-Short Spread**



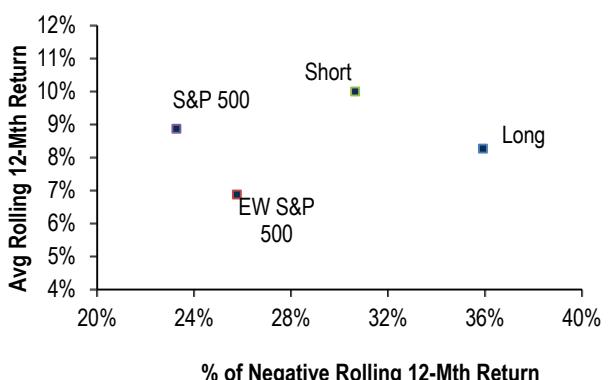
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 225: Low Earnings Torpedo Risk Reward**



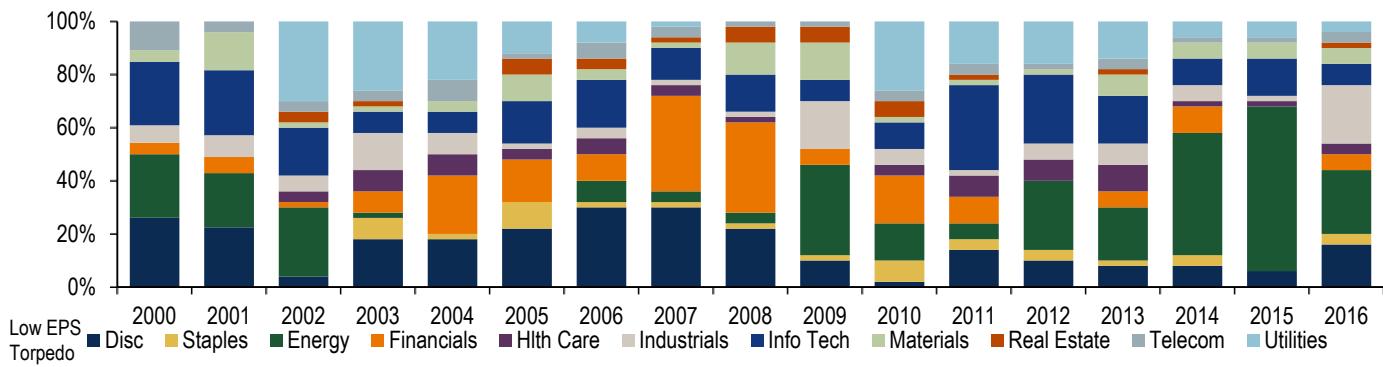
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 226: Low Earnings Torpedo Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

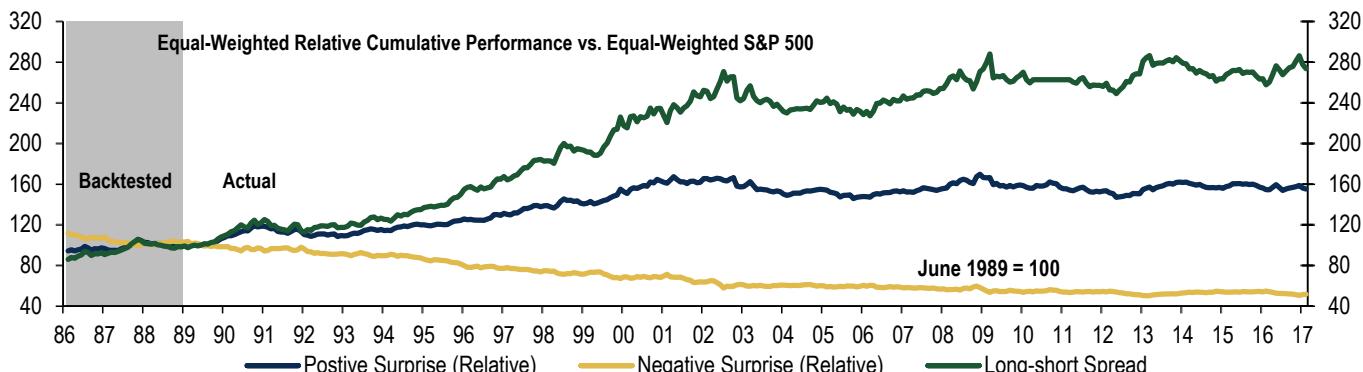
**Chart 227: Low Earnings Torpedo Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

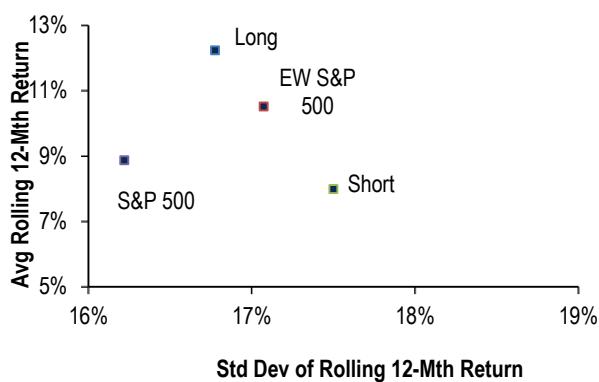
## Earnings Surprise

Chart 228: Performance of Positive Surprise, Negative Surprise and Long-Short Spread



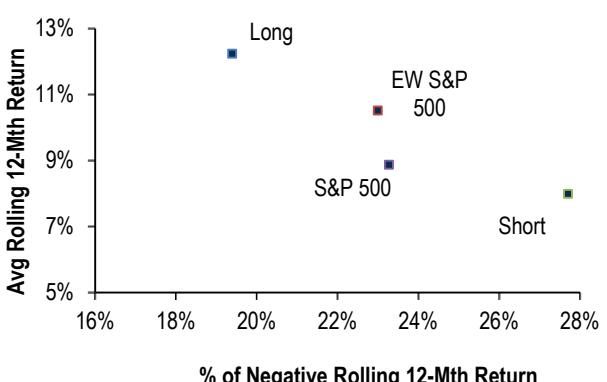
Source: BofA Merrill Lynch US Quantitative Strategy. The shaded area in performance chart shows back tested results during the period from month end March 1986 to month end December 1988. The unshaded portion represents actual performance since January 1989. Backtesting is hypothetical in nature and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

Chart 229: Earnings Surprise Risk Reward



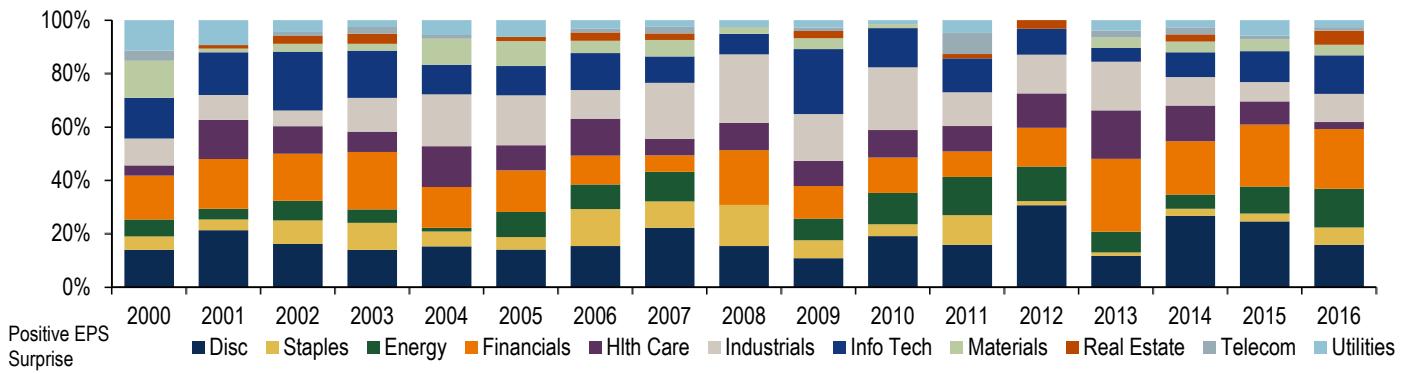
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 230: Earnings Surprise Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

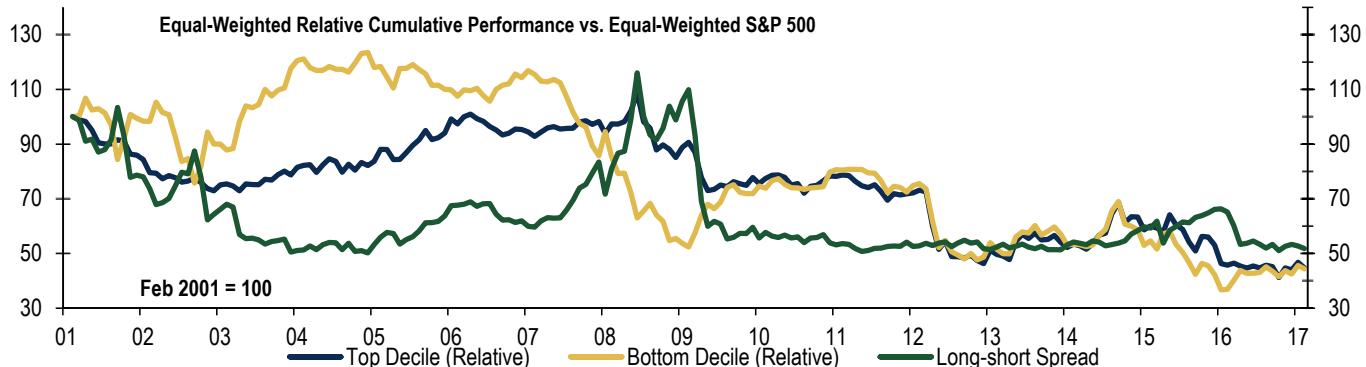
Chart 231: Positive Earnings Surprise Sector Concentration (Top Decile)



Source: BofA Merrill Lynch US Quantitative Strategy

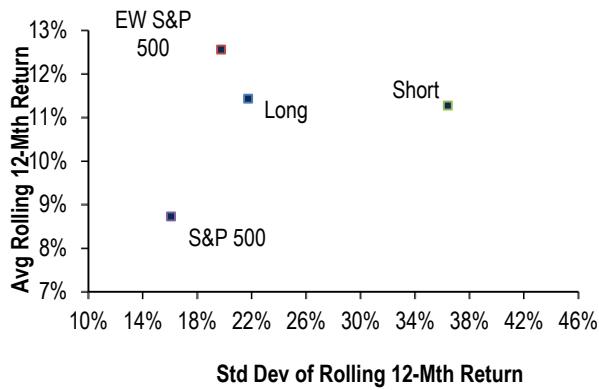
## Earnings Estimate Revision

**Chart 232: Performance of Top Decile, Bottom Decile and Long-Short Spread**



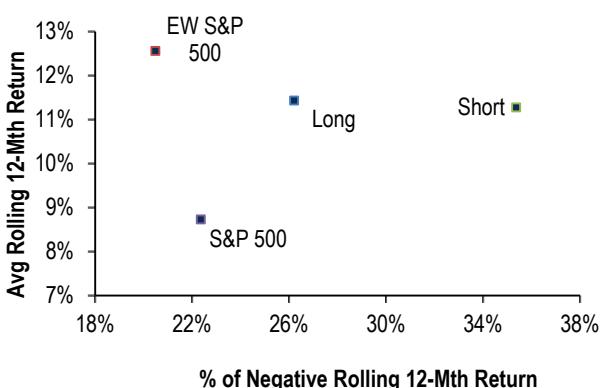
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 233: High Earnings Estimation Revision Risk Reward**



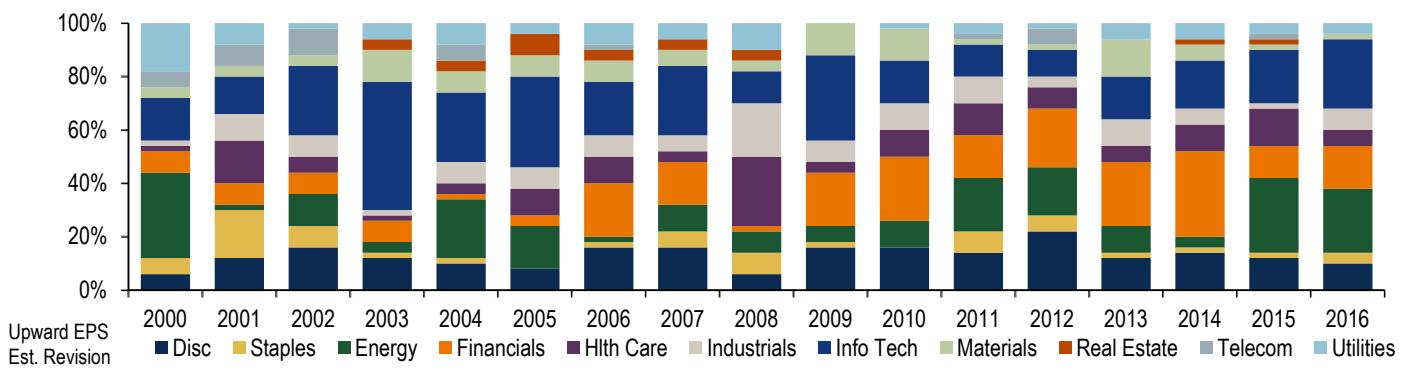
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 234: High Earnings Estimation Revision Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

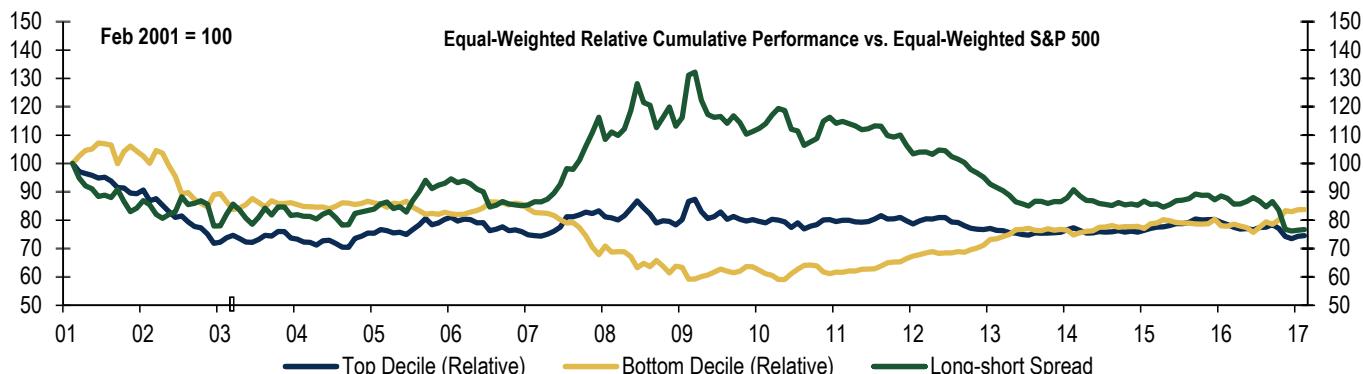
**Chart 235: High Earnings Estimation Revision Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

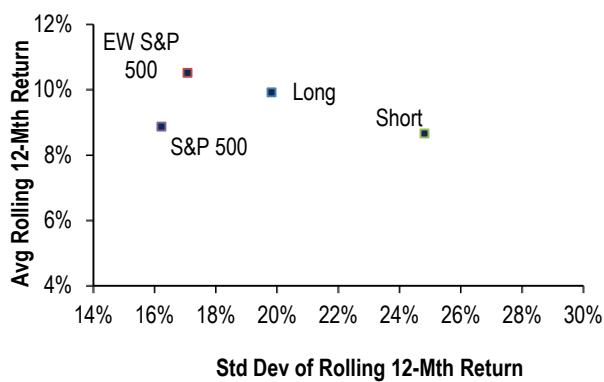
## Equity Duration

**Chart 236: Performance of Top Decile, Bottom Decile and Long-Short Spread**



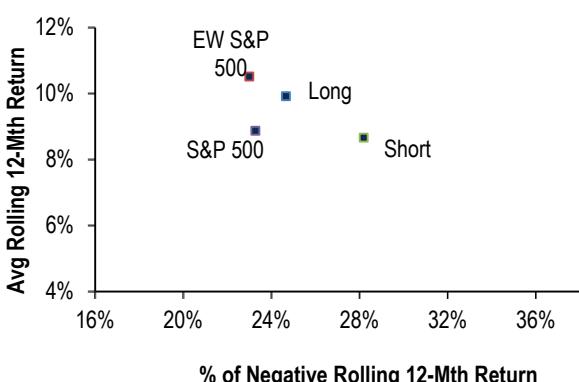
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 237: High Duration Risk Reward**



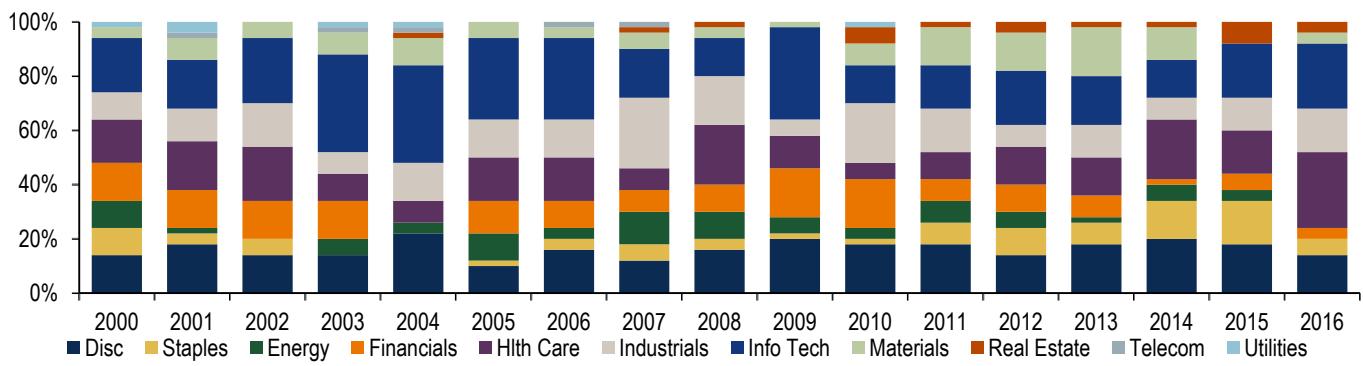
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 238: High Duration Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

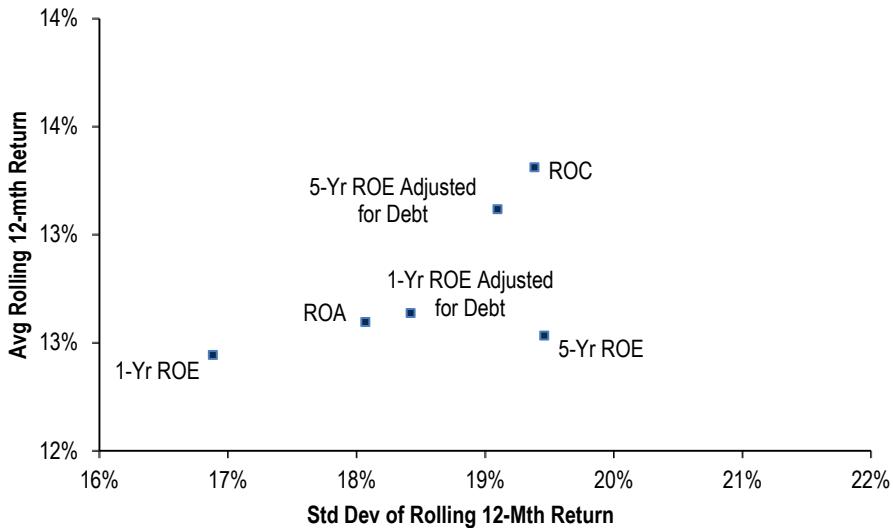
**Chart 239: High Duration Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

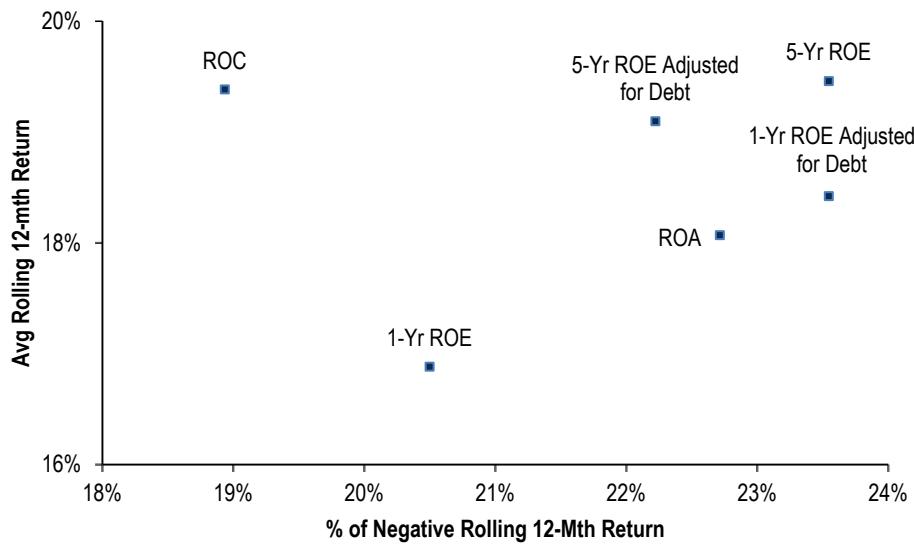
# Quality Strategies

Chart 240: Quality Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

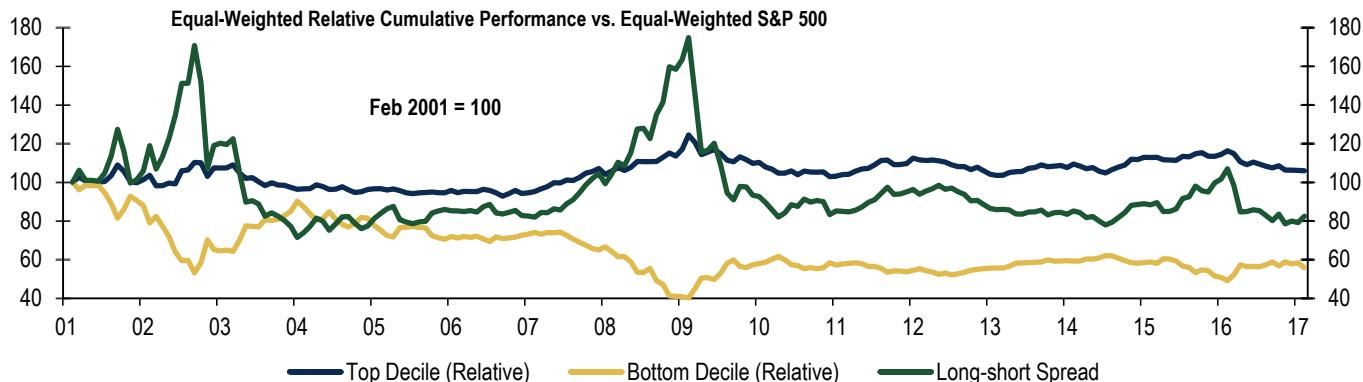
Chart 241: Quality Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

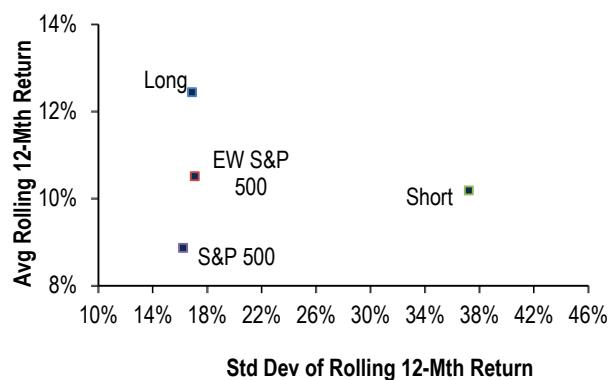
## One-Year Return on Equity

**Chart 242: Performance of Top Decile, Bottom Decile and Long-Short Spread**



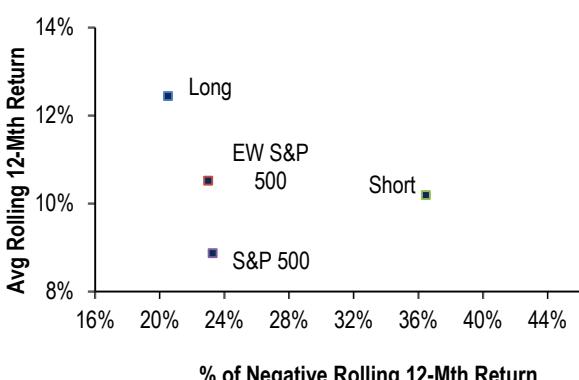
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 243: High 1-Yr Return on Equity Risk Reward**



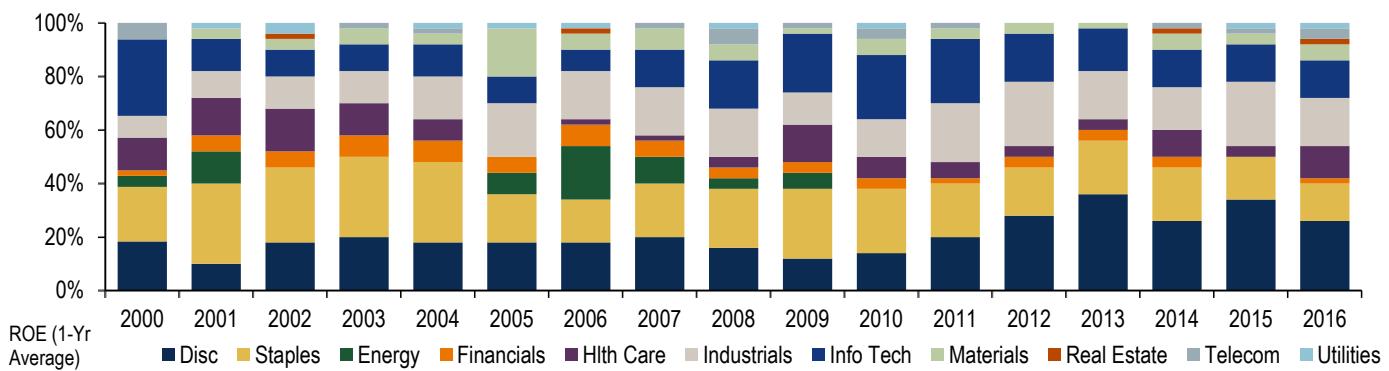
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 244: High 1-Yr Return on Equity Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

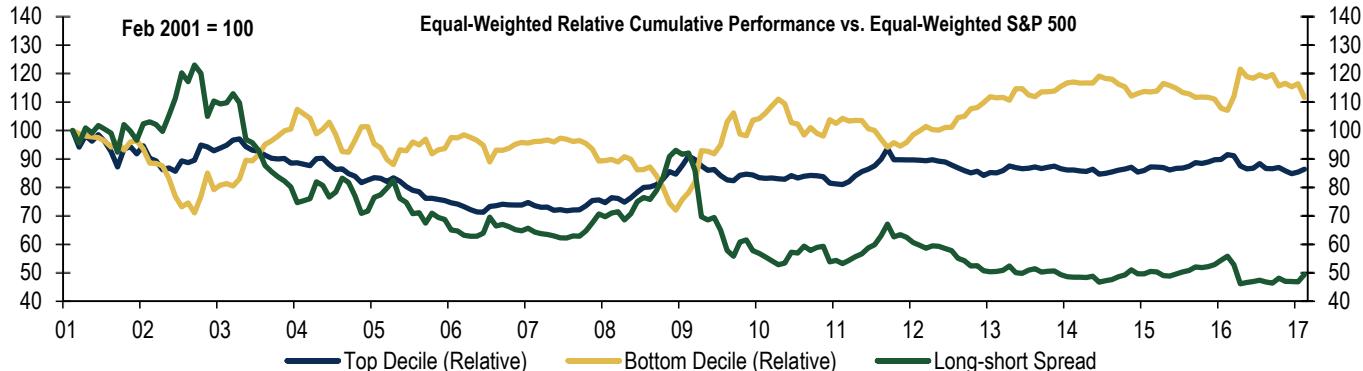
**Chart 245: High 1-Yr Return on Equity Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

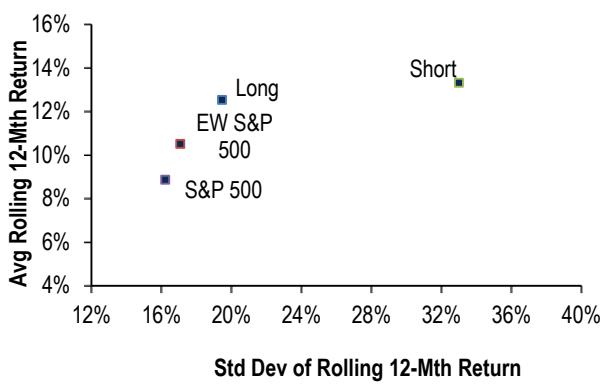
## Five-Year Return on Equity

**Chart 246: Performance of Top Decile, Bottom Decile and Long-Short Spread**



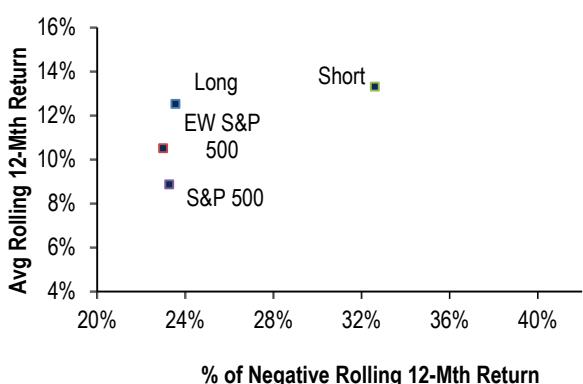
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 247: High 5-Yr Return on Equity Risk Reward**



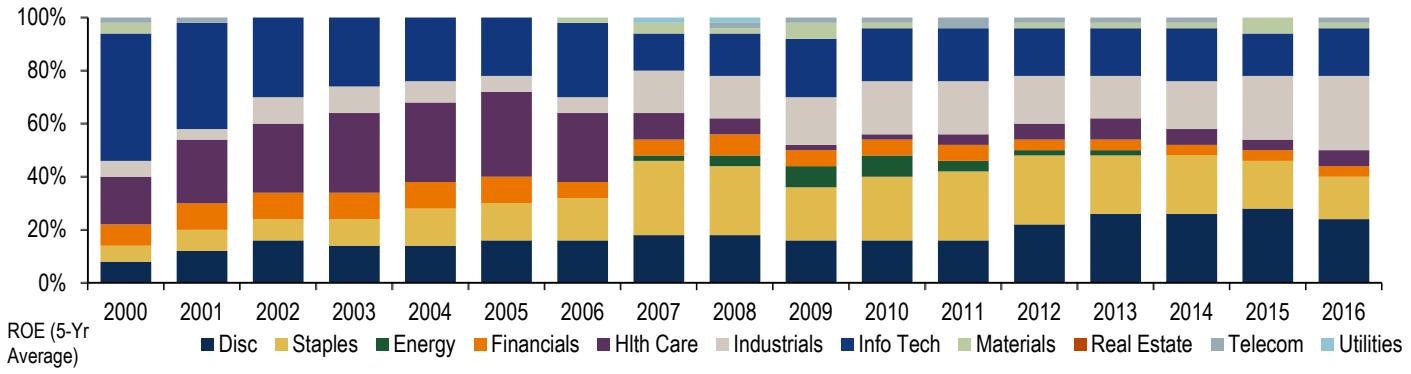
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 248: High 5-Yr Return on Equity Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

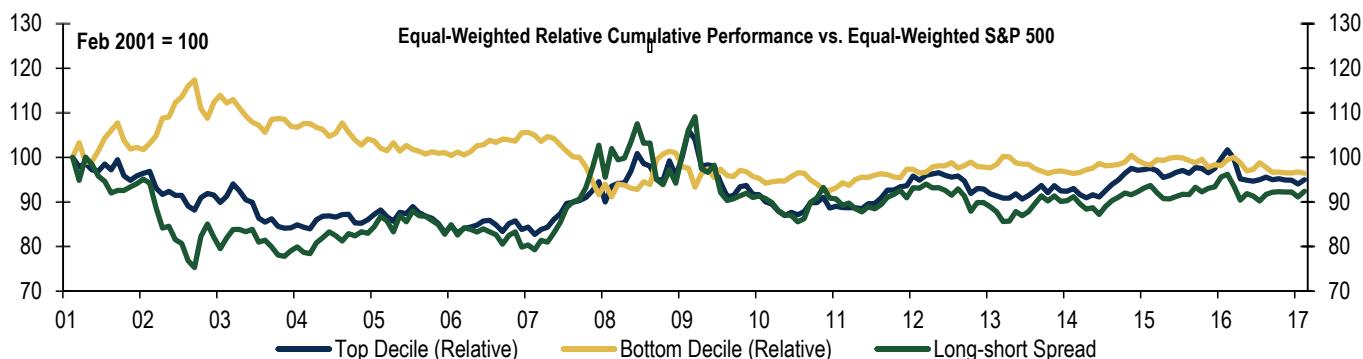
**Chart 249: High 5-Yr Return on Equity Sector Concentration of (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

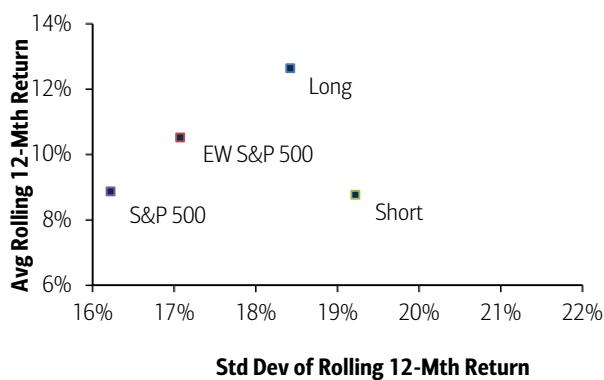
## One-Year Return on Equity (Adjusted for Debt)

Chart 250: Performance of Top Decile, Bottom Decile and Long-Short Spread



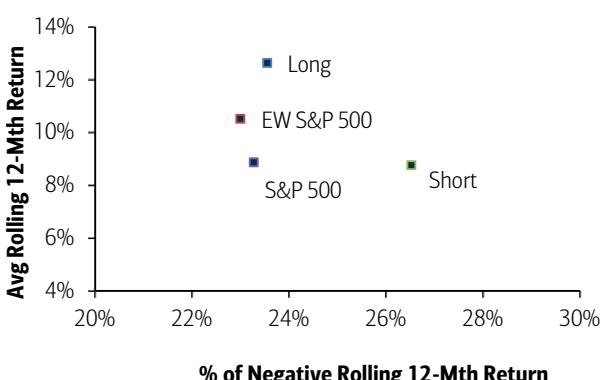
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 251: High 1-Yr ROE Adjusted for Debt Risk Reward



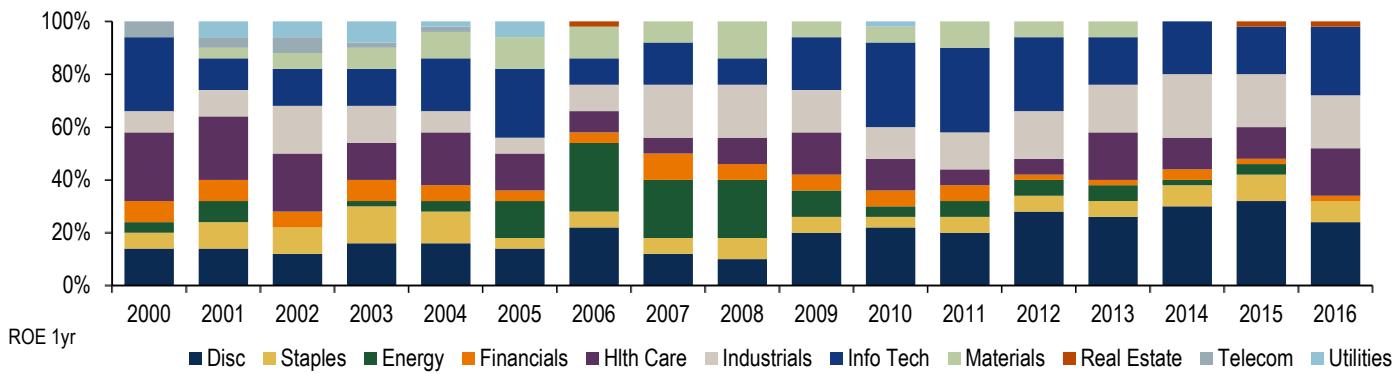
Source: BofA Merrill Lynch US Quantitative Strategy

Chart 252: High 1-Yr ROE Adjusted for Debt Downside Risk Reward



Source: BofA Merrill Lynch US Quantitative Strategy

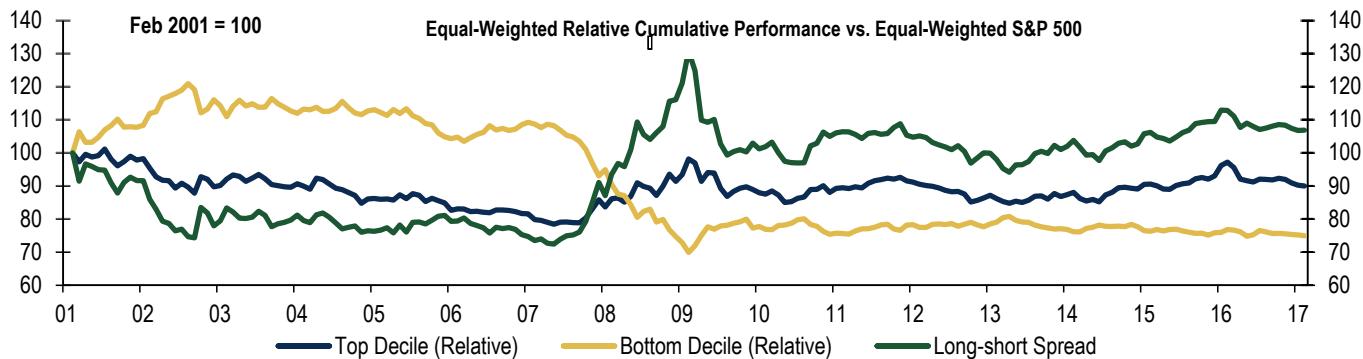
Chart 253: High 1-Yr ROE Adjusted for Debt Sector Concentration (Top Decile)



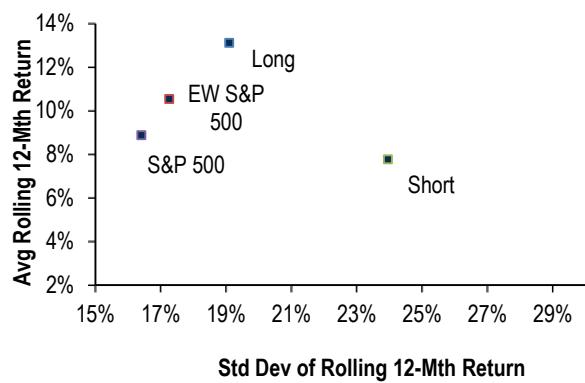
Source: BofA Merrill Lynch US Quantitative Strategy

## Five-Year Return on Equity (Adjusted for Debt)

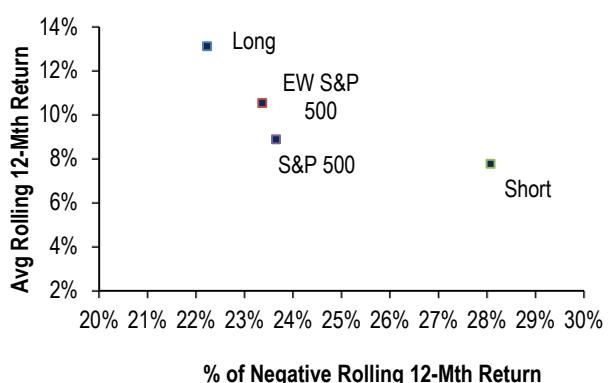
**Chart 254: Performance of Top Decile, Bottom Decile and Long-Short Spread**



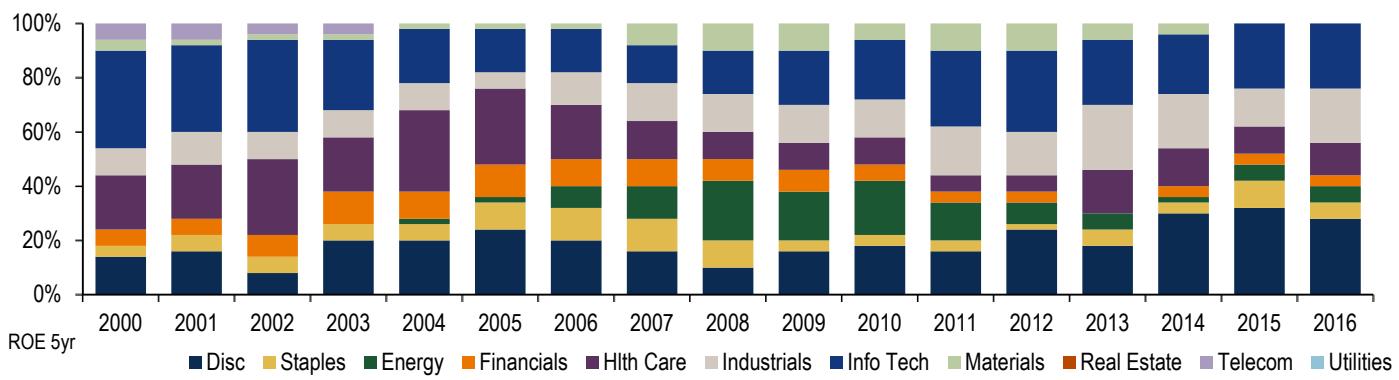
**Chart 255: High 5-Yr ROE Adjusted for Debt Risk Reward**



**Chart 256: High 5-Yr ROE Adjusted for Debt Downside Risk Reward**

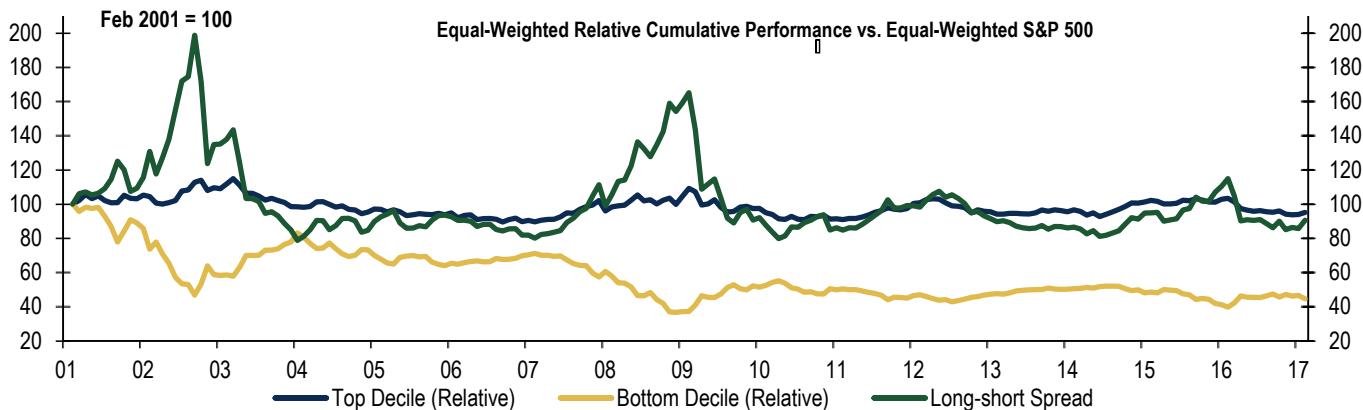


**Chart 257: High 5-Yr ROE Adjusted for Debt Sector Concentration (Top Decile)**



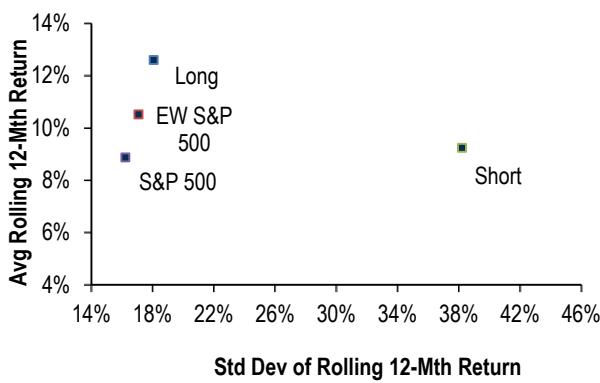
## Return on Assets

**Chart 258: Performance of Top Decile, Bottom Decile and Long-Short Spread**



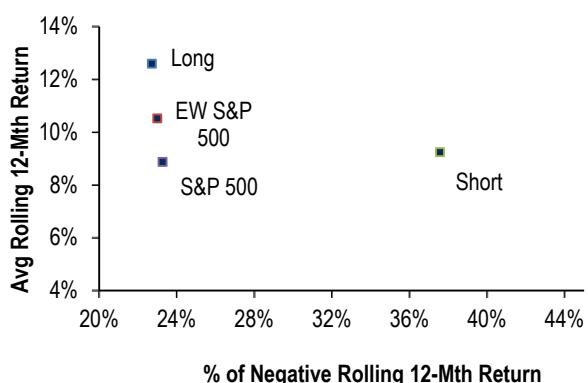
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 259: High Return on Assets Risk Reward**



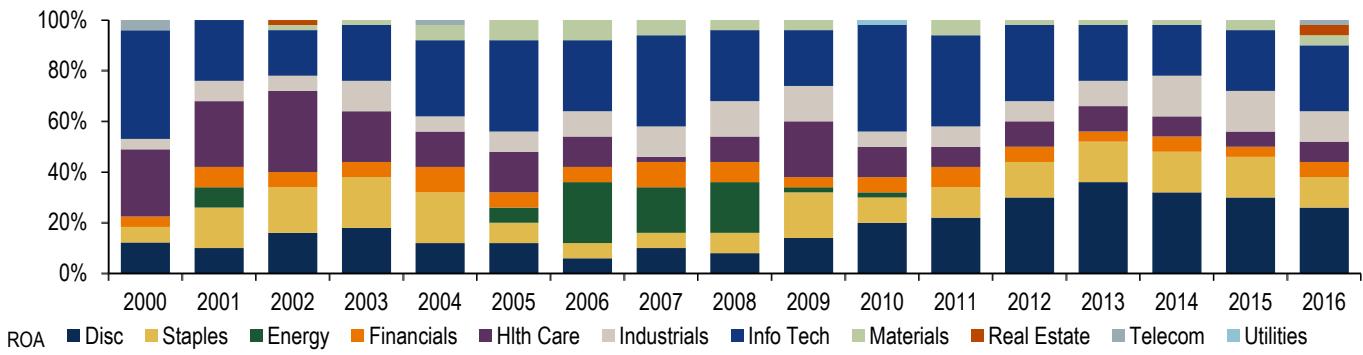
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 260: High Return on Assets Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

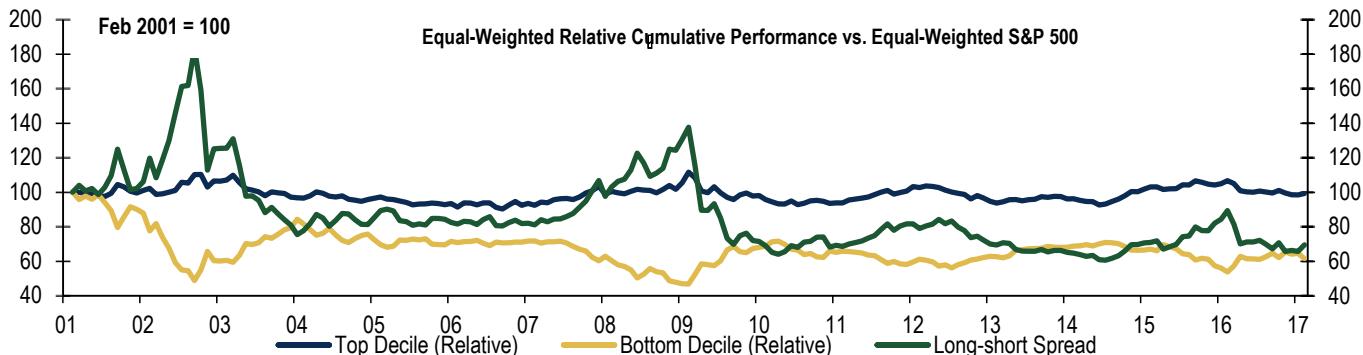
**Chart 261: High Return on Assets Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

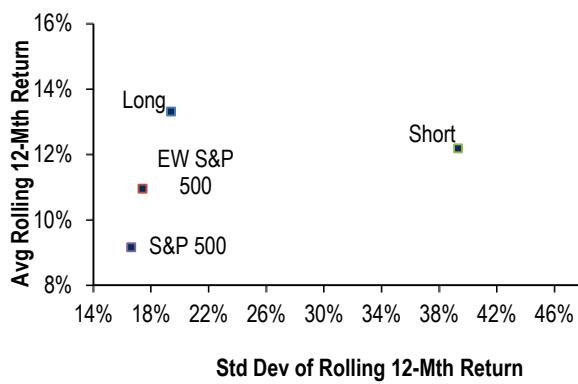
## Return on Capital

**Chart 262: Performance of Top Decile, Bottom Decile and Long-Short Spread**



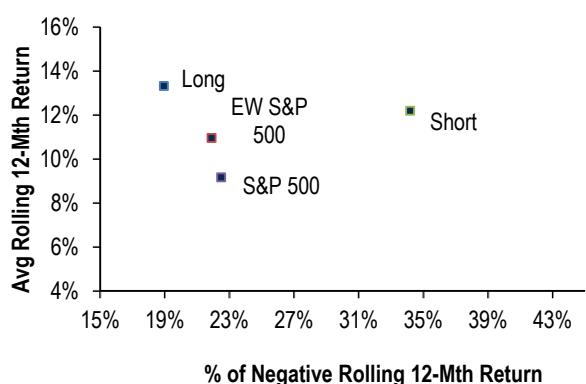
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 263: High Return on Capital Risk Reward**



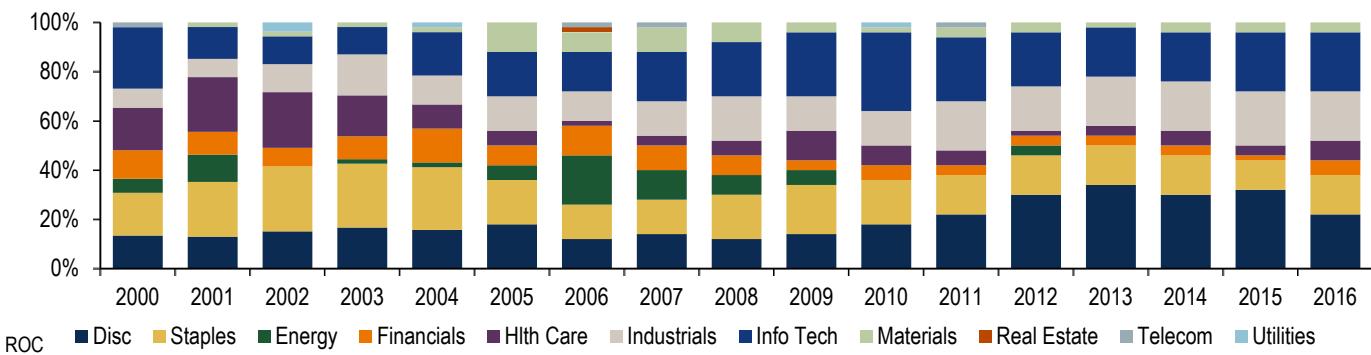
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 264: High Return on Capital Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

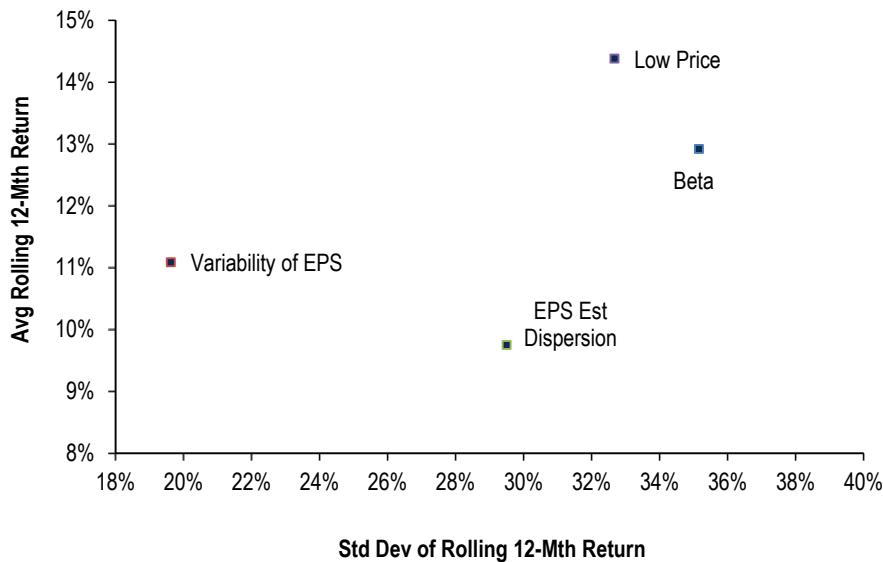
**Chart 265: High Return on Capital Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

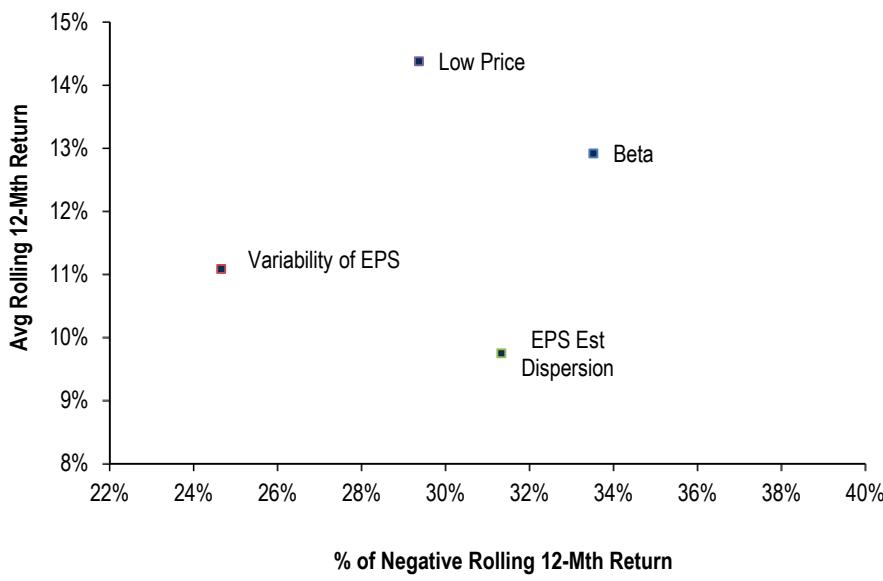
# Risk Strategies

Chart 266: Risk Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

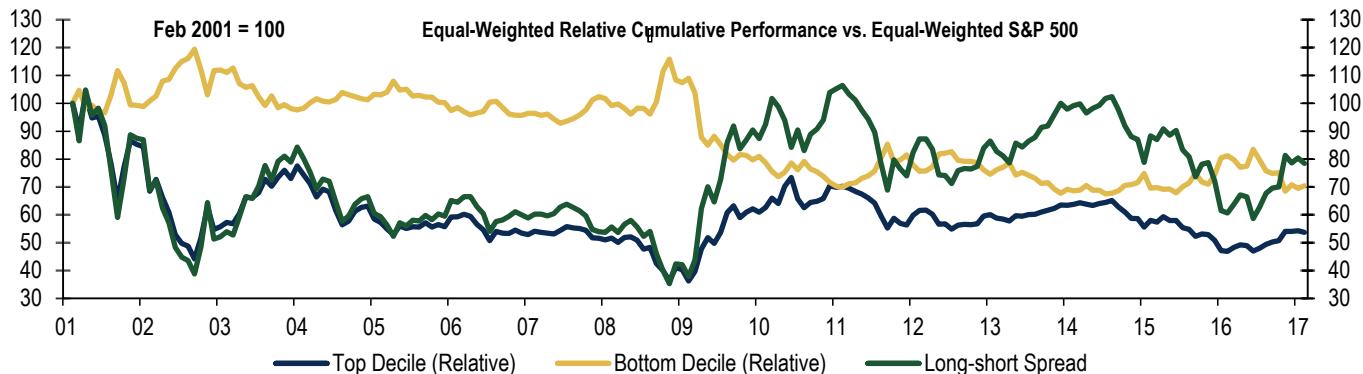
Chart 267: Risk Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

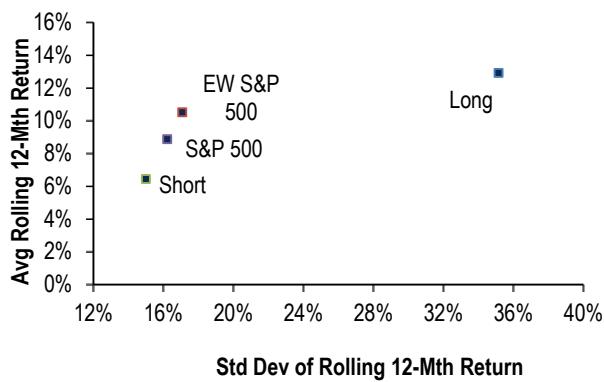
## Beta

**Chart 268: Performance of Top Decile, Bottom Decile and Long-Short Spread**



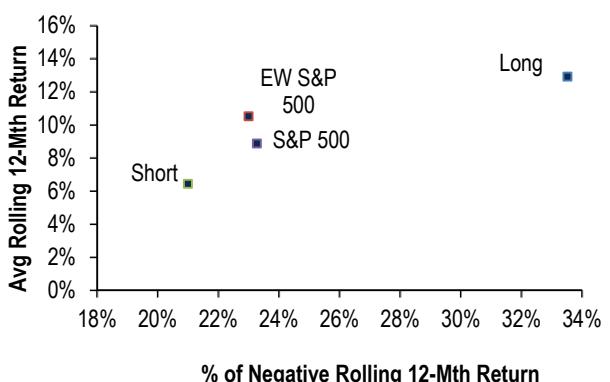
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 269: High Beta Risk Reward**



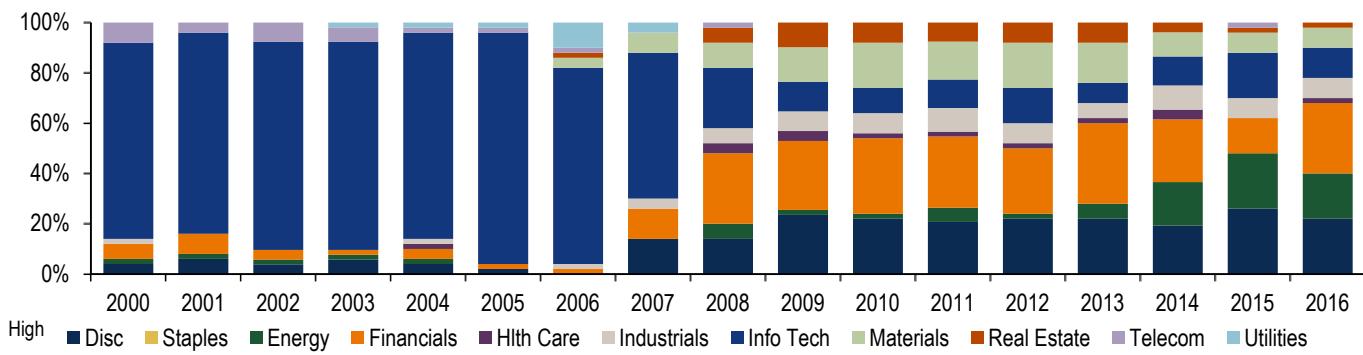
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 270: High Beta Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

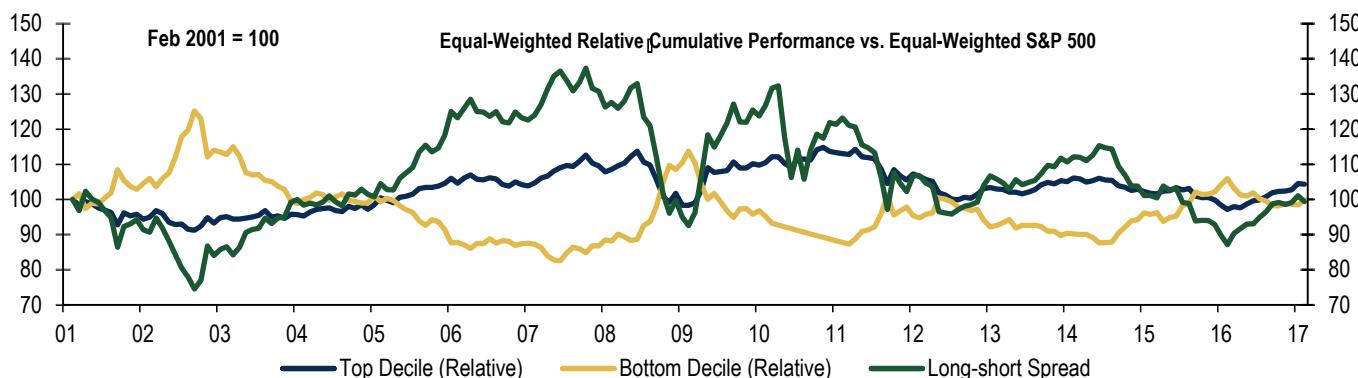
**Chart 271: High Beta Sector Concentration of (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

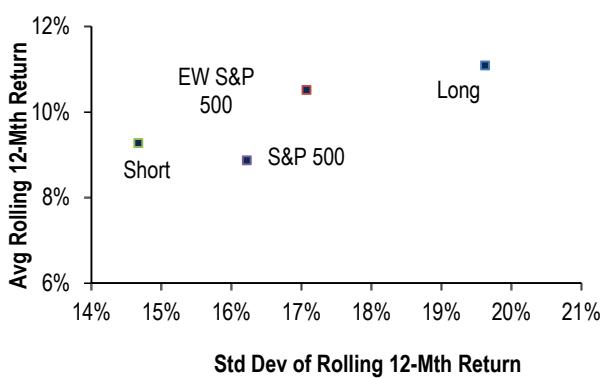
## Variability of Earnings

**Chart 272: Performance of Top Decile, Bottom Decile and Long-Short Spread**



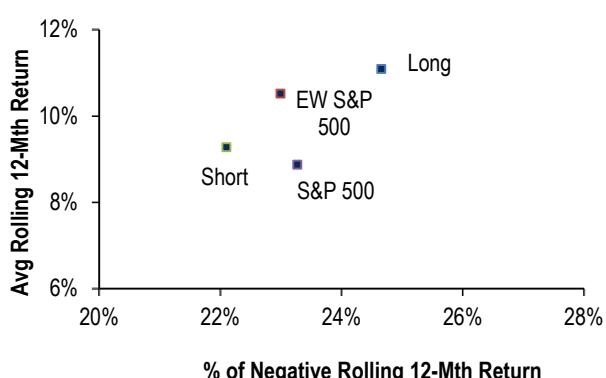
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 273: High EPS Variability Risk Reward**



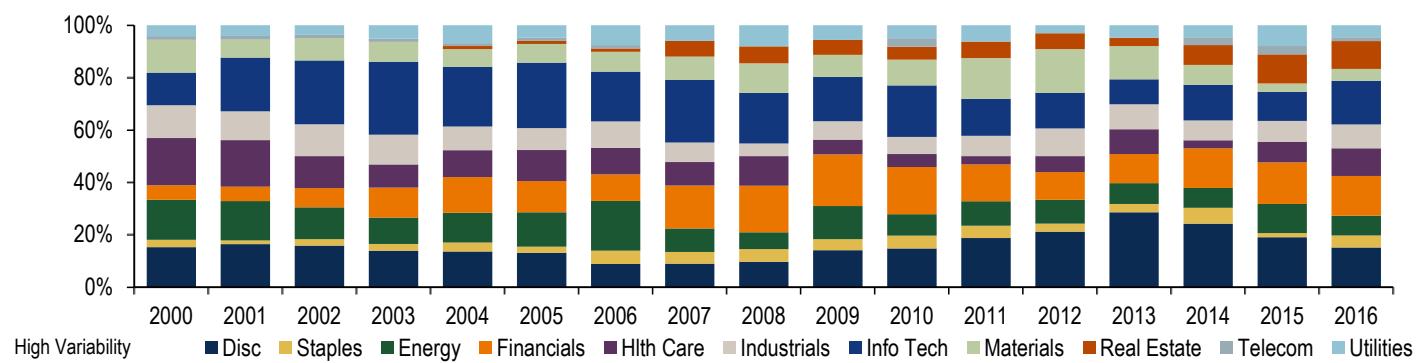
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 274: High EPS Variability Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

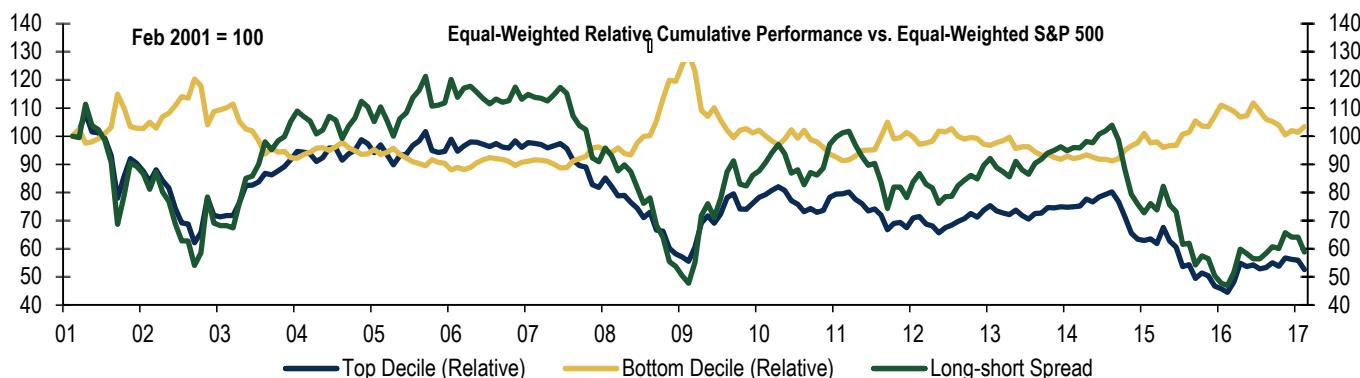
**Chart 275: High EPS Variability Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

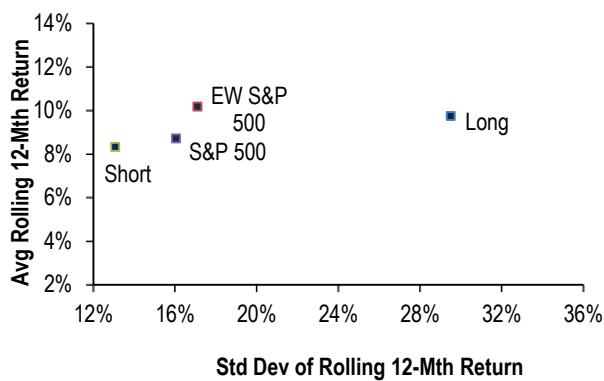
## Estimate Dispersion

**Chart 276: Performance of Top Decile, Bottom Decile and Long-Short Spread**



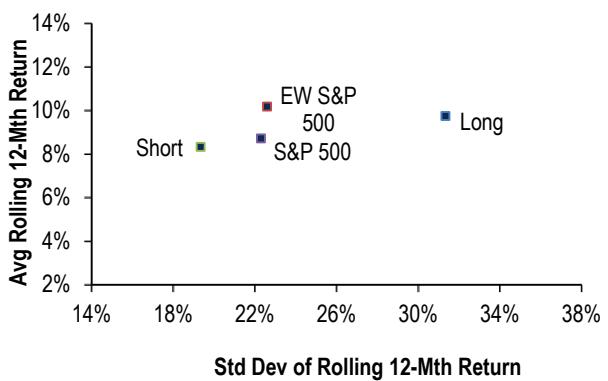
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 277: High EPS Dispersion Risk Reward**



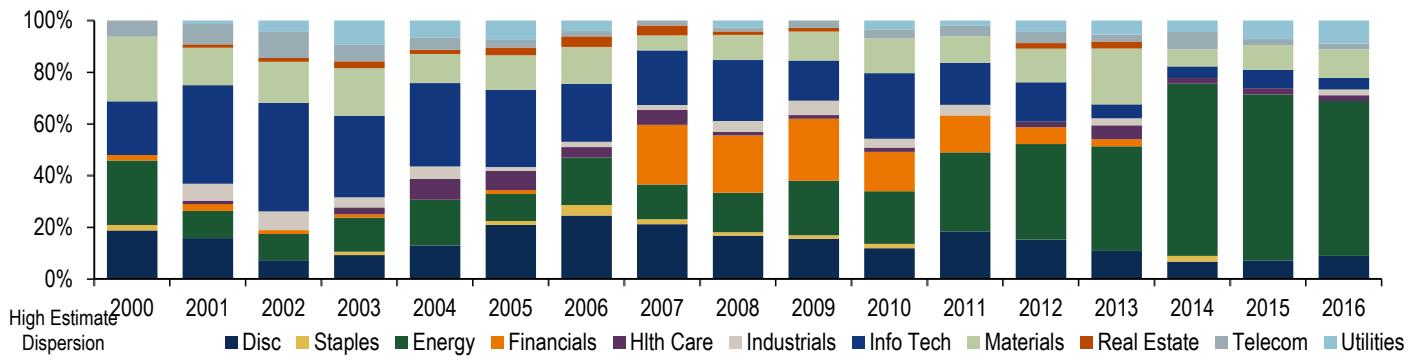
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 278: High EPS Dispersion Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

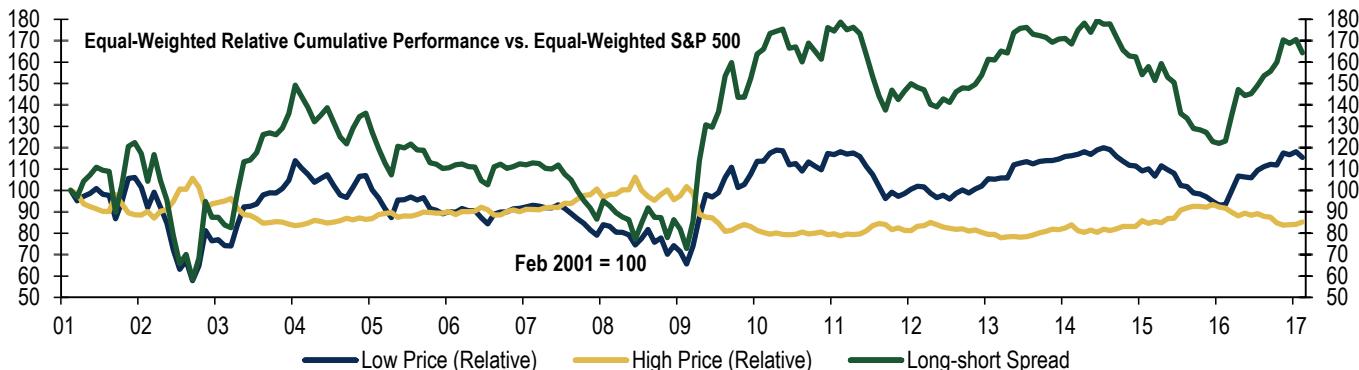
**Chart 279: High EPS Dispersion Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

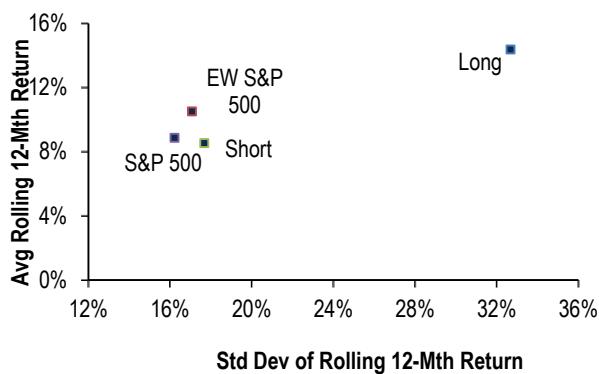
## Price

**Chart 280: Performance Low Price, High Price and Long-Short Spread**



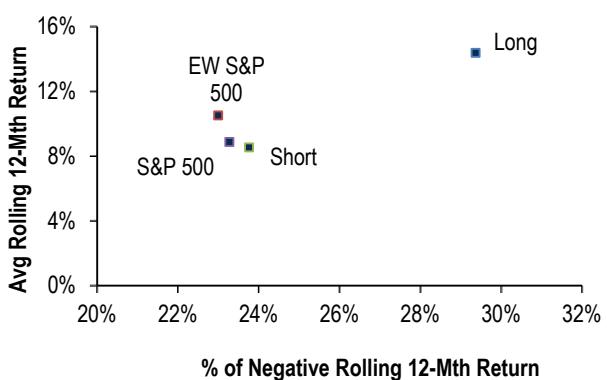
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 281: Low Price Risk Reward**



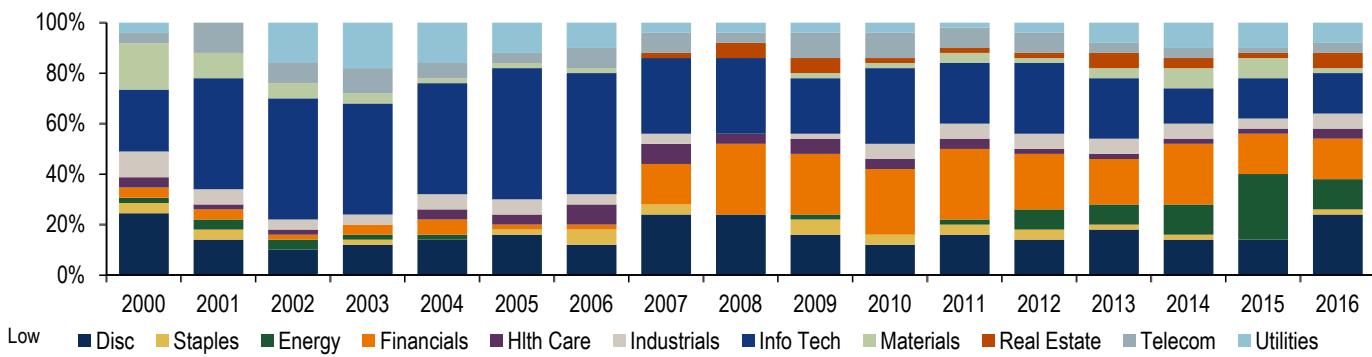
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 282: Low Price Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

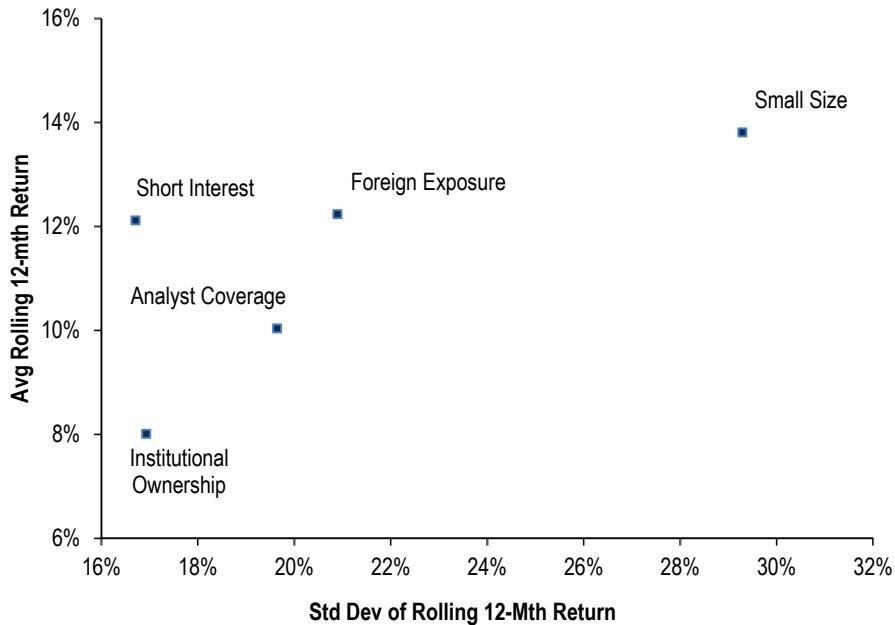
**Chart 283: Price Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

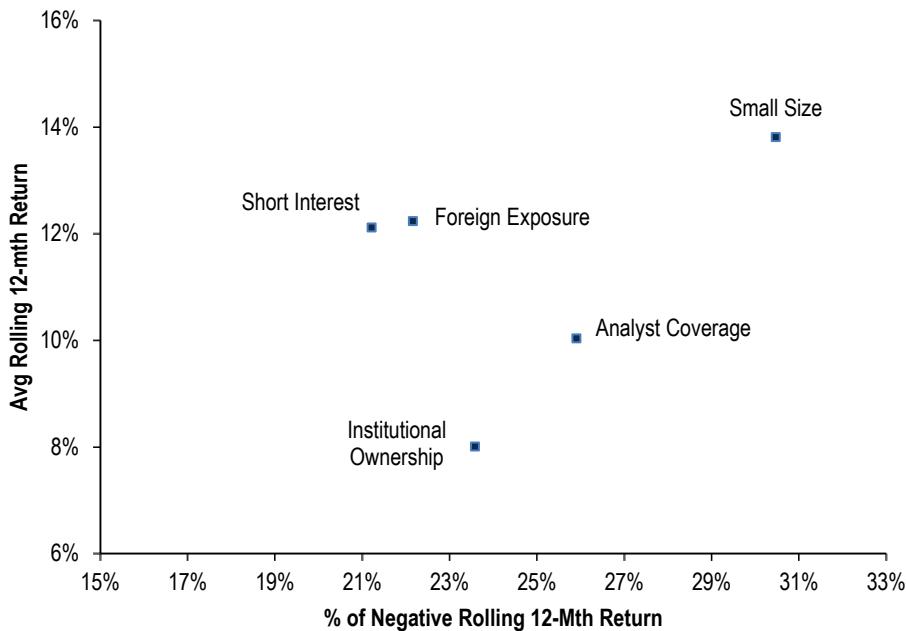
# Miscellaneous Strategies

Chart 284: Miscellaneous Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

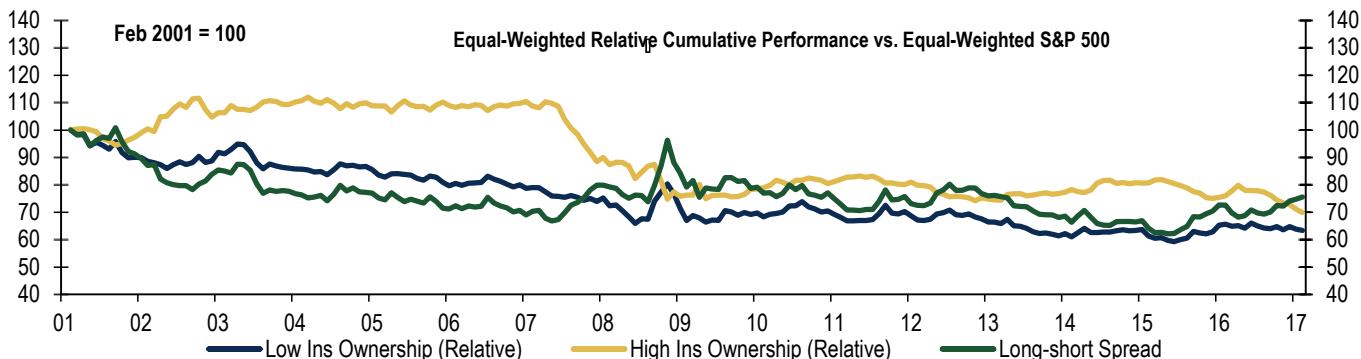
Chart 285: Miscellaneous Strategies



Source: BofA Merrill Lynch US Quantitative Strategy

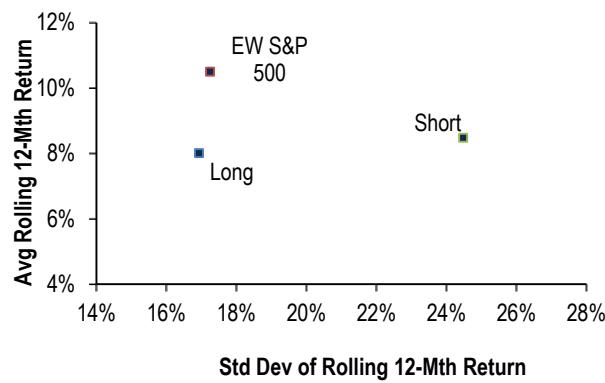
## Institutional Ownership

**Chart 286: Performance of Low Institutional Ownership, High Institutional Ownership and Long-Short Spread**



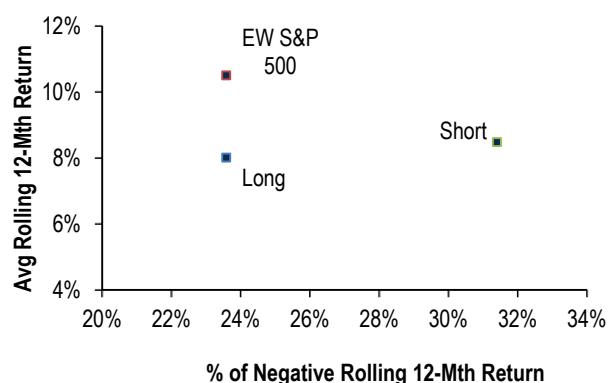
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 287: Low Institutional Ownership Risk Reward**



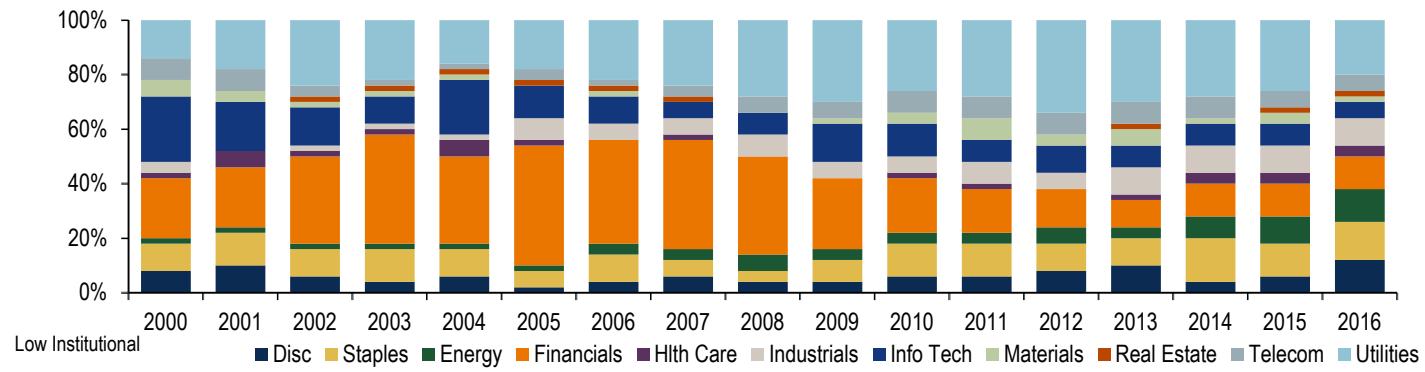
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 288: Low Institutional Ownership Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

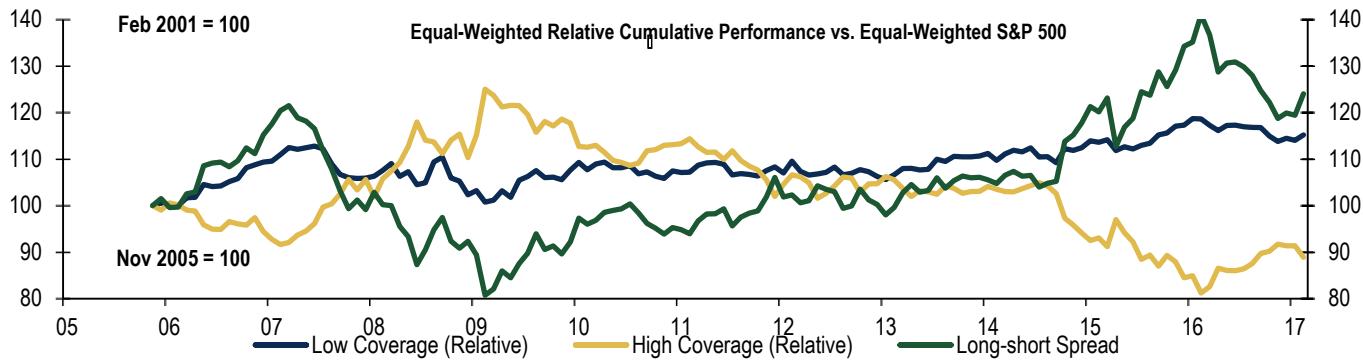
**Chart 289: Low Institutional Ownership Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

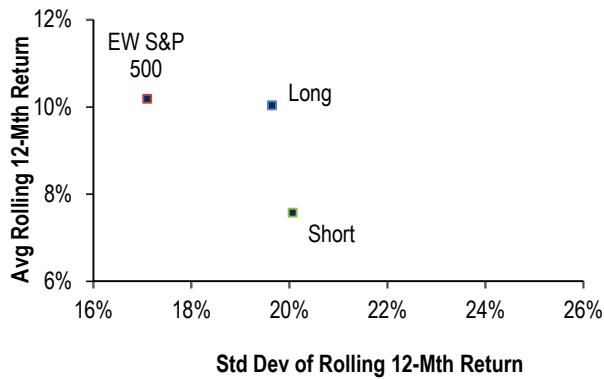
## Analyst Coverage

**Chart 290: Performance of Low Coverage, High Coverage and Long-Short Spread**



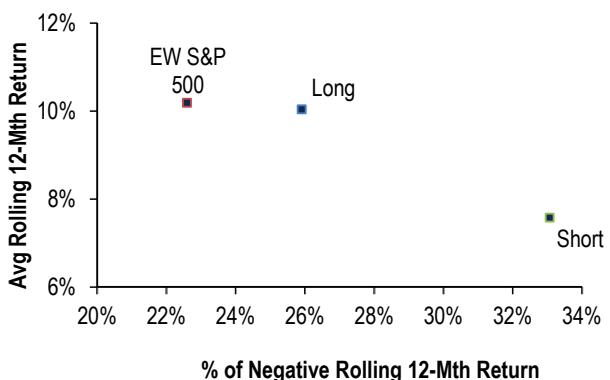
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 291: Low Analyst Coverage Risk Reward**



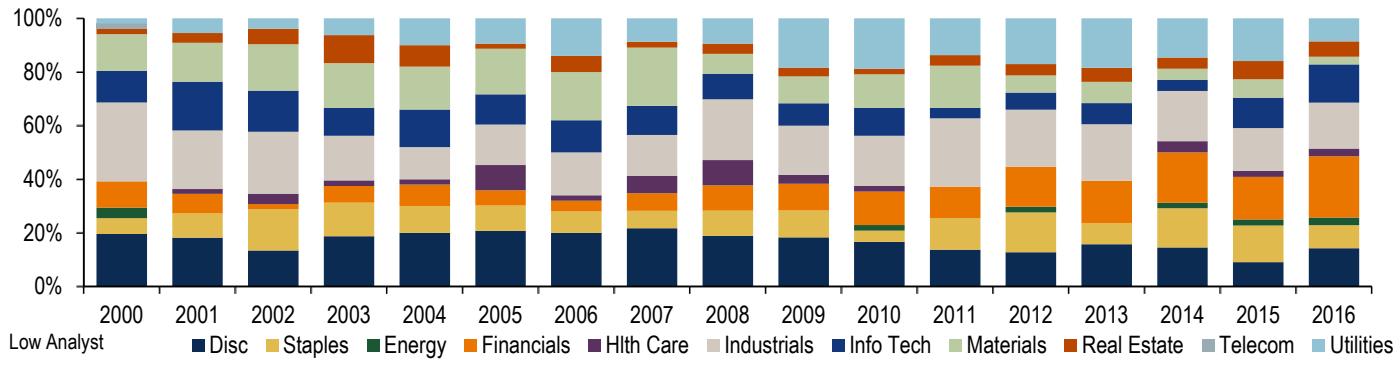
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 292: Low Analyst Coverage Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

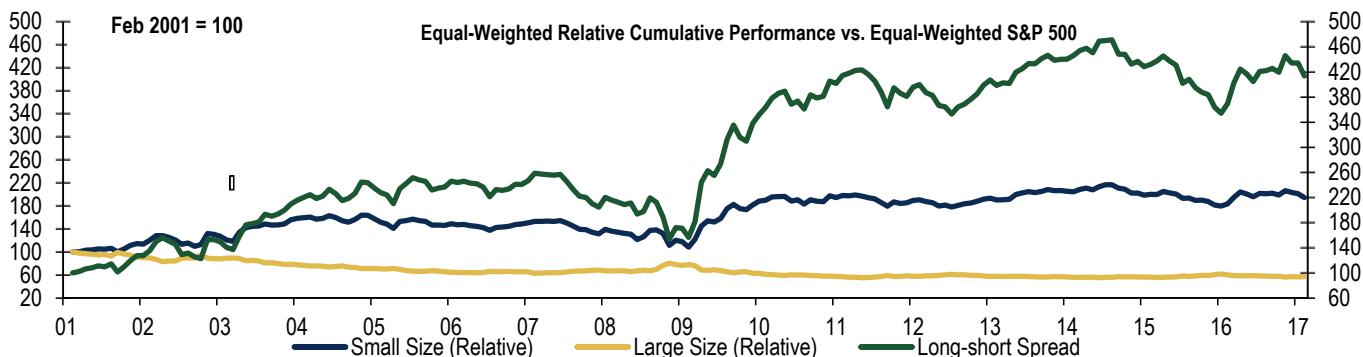
**Chart 293: Low Analyst Coverage Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

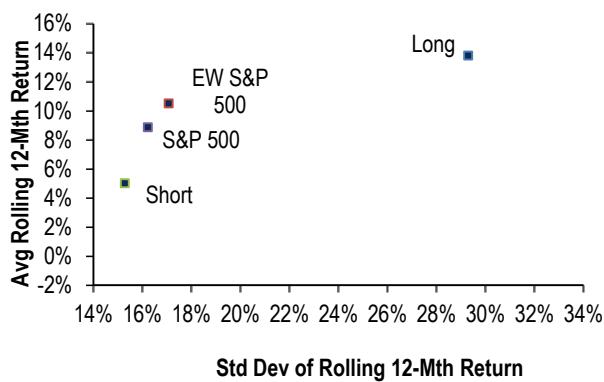
## Size

**Chart 294: Performance of Small Size, Large Size and Long-Short Spread**



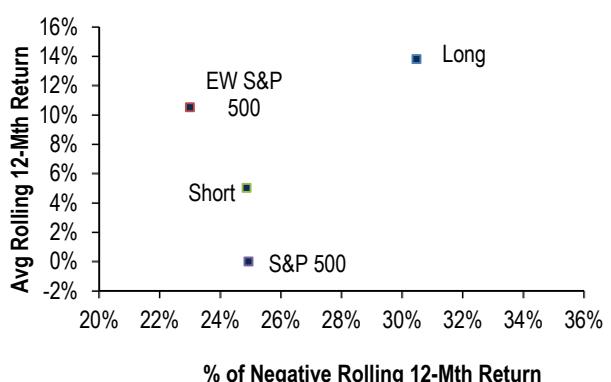
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 295: Small Size Risk Reward**



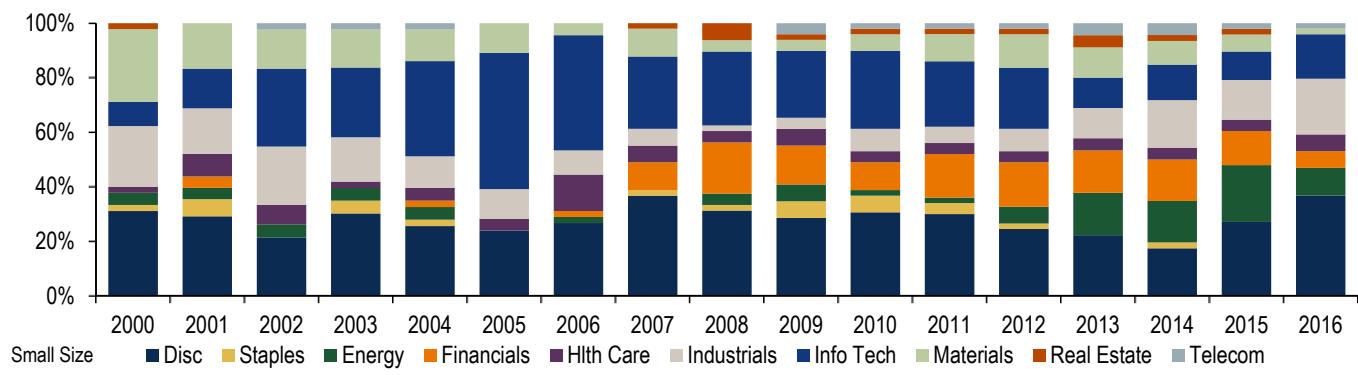
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 296: Small Size Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

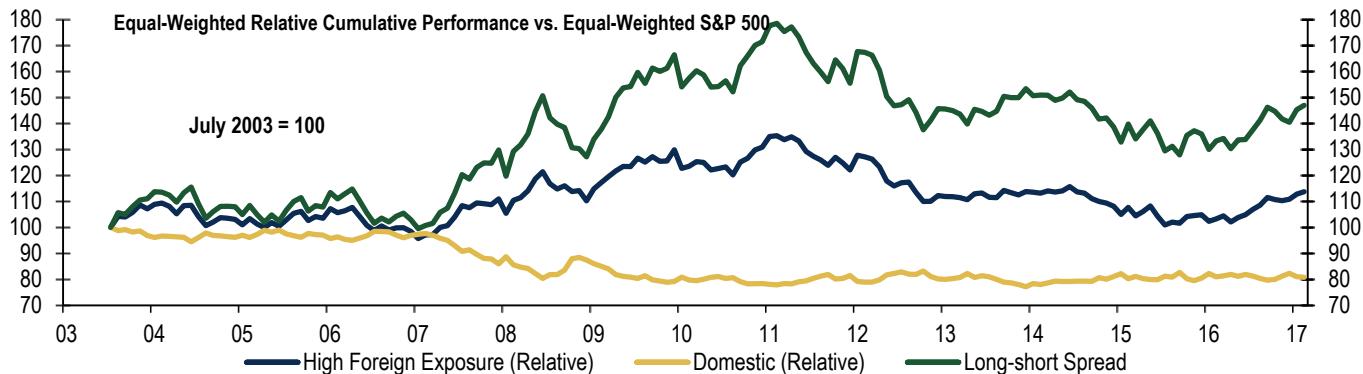
**Chart 297: Small Size Sector Concentration (Low Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

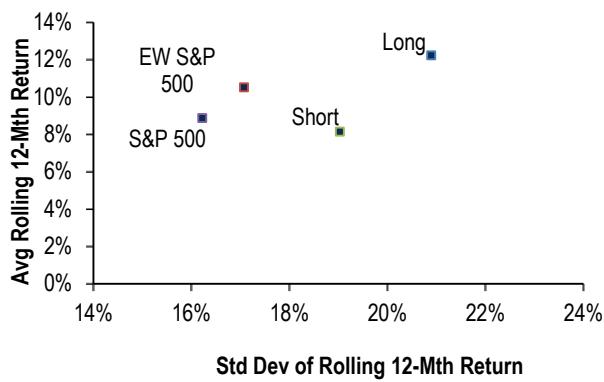
## Foreign Exposure

**Chart 298: Performance of High Foreign Exposure, Domestic Companies and Long-short Spread**



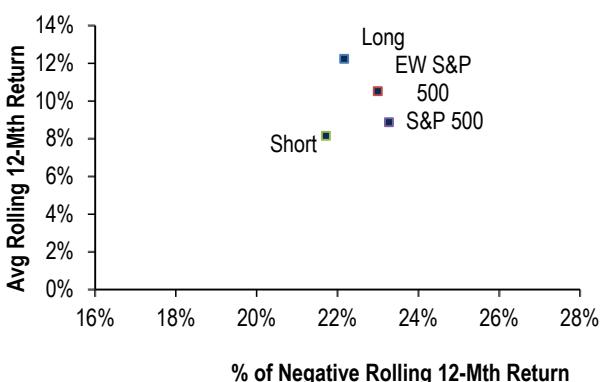
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 299: High Foreign Exposure Risk Reward**



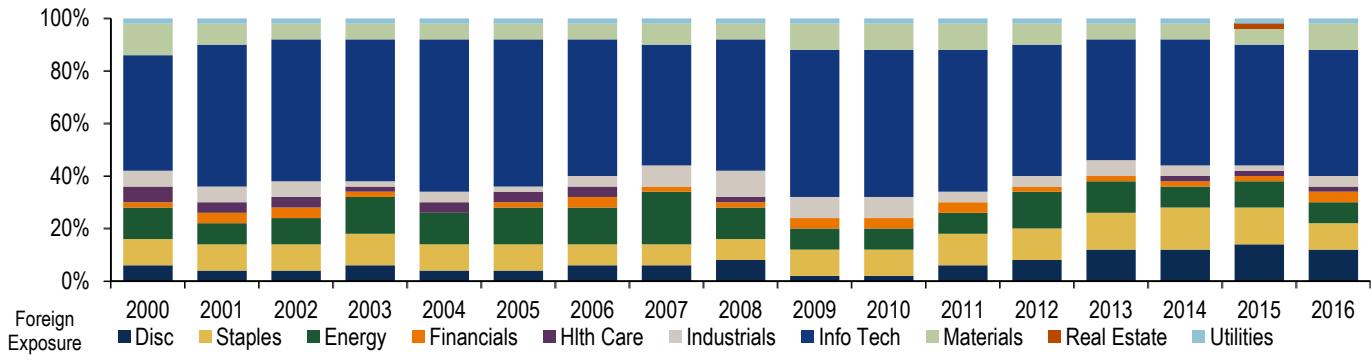
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 300: High Foreign Exposure Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy

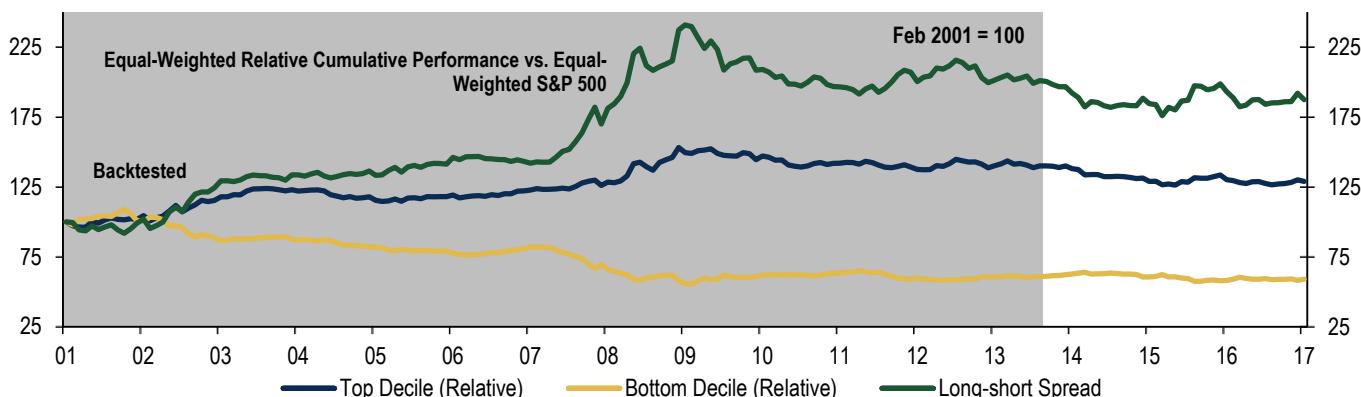
**Chart 301: High Foreign Exposure Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

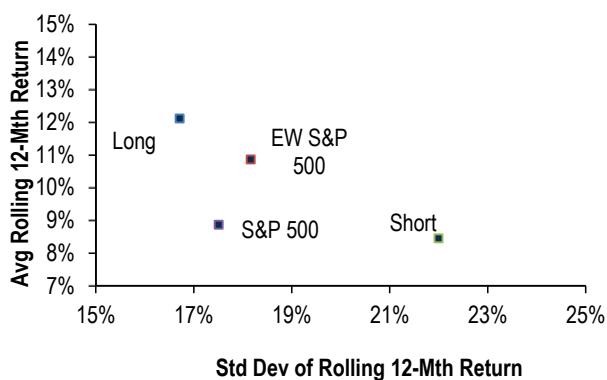
## Short Interest

**Chart 302: Performance of Top Decile, Bottom Decile and Long-Short Spread**



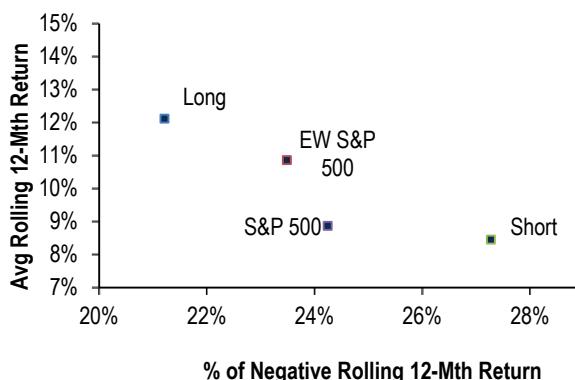
Source: BofA Merrill Lynch US Quantitative Strategy. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

**Chart 303: High Price Return – 12M and 1M Risk Reward**



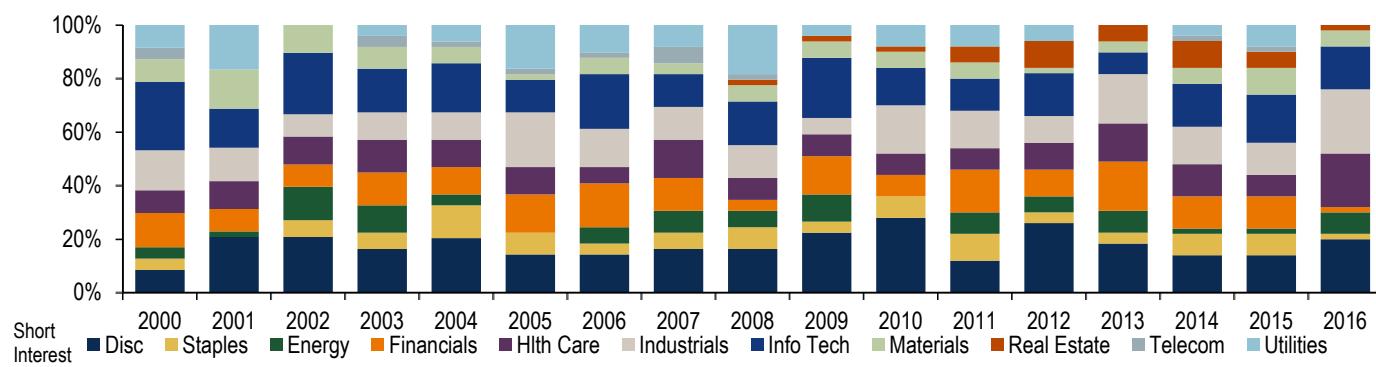
Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 304: High Price Return – 12M and 1M Downside Risk Reward**



Source: BofA Merrill Lynch US Quantitative Strategy.

**Chart 305: High Price Return (12M and 1M) Sector Concentration (Top Decile)**



Source: BofA Merrill Lynch US Quantitative Strategy

**Table 8: Annual Performance of BofAML 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.**

Factor	'16	'15	'14	'13	'12	'11	'10	'09	'08	'07	'06	'05	'04	'03	'02	'01	'00	'99	'98	'97	'96	'95	'94	'93	'92	'91	'90	'89	'88	'87	Rwd to Risk
Low Price	39	-19	9	50	19	-17	31	110	-45	-15	18	-11	18	91	-41	38	1	15	13	28	19	11	2	18	24	57	-33	8	26	3	0.44
Dividend Yield (Total Return)	37	<b>-4</b>	22	24	11	<b>18</b>	19	25	<b>-38</b>	-10	27	5	21	29	<b>-13</b>	<b>18</b>	19	-2	9	33	17	<b>34</b>	-2	19	18	<b>42</b>	-18	24	22	<b>4</b>	0.75
Estimate Dispersion	36	-29	-5	<b>36</b>	<b>26</b>	-15	<b>23</b>	<b>89</b>	-59	-16	16	3	<b>23</b>	<b>78</b>	-35	-3	3	<b>53</b>	5	10	12	19	-1	22	23	31	-37	na	na	na	0.34
Price/ Book Value	31	-15	2	<b>48</b>	<b>29</b>	-17	<b>30</b>	<b>78</b>	-59	-33	<b>19</b>	7	<b>26</b>	<b>57</b>	-26	<b>22</b>	<b>11</b>	4	9	21	<b>20</b>	<b>30</b>	-1	20	23	<b>51</b>	-35	3	<b>30</b>	5	0.42
Most Active	27	-13	<b>12</b>	<b>39</b>	<b>17</b>	-12	19	72	-54	-9	13	-9	12	61	-44	-26	-18	<b>74</b>	<b>59</b>	<b>39</b>	<b>31</b>	<b>41</b>	6	14	19	47	3	37	15	<b>9</b>	0.51
Size	26	-14	10	<b>44</b>	<b>19</b>	-8	<b>30</b>	<b>118</b>	-47	-13	<b>17</b>	-5	21	<b>66</b>	-7	<b>25</b>	-5	6	-2	<b>31</b>	<b>17</b>	<b>22</b>	-2	20	15	50	-32	3	<b>27</b>	1	0.47
Earnings Yield	23	-7	9	<b>40</b>	<b>19</b>	-2	11	<b>66</b>	-43	-14	<b>17</b>	16	26	34	<b>-17</b>	<b>25</b>	<b>21</b>	8	-2	<b>33</b>	<b>15</b>	<b>39</b>	-1	22	19	52	-21	18	<b>33</b>	-2	0.63
Beta	20	-17	4	<b>43</b>	<b>22</b>	-21	<b>29</b>	<b>119</b>	-54	-5	10	-6	0	<b>86</b>	-48	-22	-6	<b>60</b>	<b>33</b>	<b>30</b>	13	<b>38</b>	0	16	16	<b>49</b>	-26	9	<b>17</b>	0	0.36
P/E-to-Growth	19	-10	4	<b>39</b>	<b>18</b>	-6	<b>25</b>	61	-50	-7	14	16	<b>28</b>	<b>64</b>	-25	<b>33</b>	<b>13</b>	6	1	22	<b>23</b>	<b>41</b>	10	14	20	36	-7	15	<b>21</b>	<b>17</b>	0.63
Foreign Exposure	19	-7	7	<b>36</b>	6	-8	21	<b>70</b>	-42	12	9	7	11	<b>66</b>	-25	-1	0	<b>40</b>	10	12	<b>23</b>	<b>35</b>	7	17	6	<b>38</b>	-13	16	7	<b>10</b>	0.59
Earnings Torpedo	19	-26	3	<b>36</b>	7	2	<b>23</b>	<b>86</b>	-46	-20	14	-1	15	31	<b>-18</b>	<b>4</b>	2	<b>14</b>	-2	<b>34</b>	16	22	-4	17	<b>23</b>	<b>36</b>	-24	7	10	-3	0.36
Price/ Cash Flow	17	-17	7	<b>37</b>	12	-7	19	<b>68</b>	-42	-1	<b>23</b>	12	<b>23</b>	37	<b>-3</b>	<b>28</b>	-7	<b>22</b>	-7	<b>33</b>	16	21	-1	11	<b>21</b>	<b>42</b>	-23	13	<b>34</b>	8	0.60
Neglect - Institutional Ownership	16	-5	<b>16</b>	22	11	-2	<b>22</b>	30	<b>-39</b>	-9	13	-1	<b>17</b>	35	-20	-7	2	<b>12</b>	<b>17</b>	23	10	<b>30</b>	1	17	6	24	-24	<b>27</b>	11	1	0.49
Variability of Earnings	16	-7	10	<b>37</b>	12	-9	<b>24</b>	<b>56</b>	-46	4	14	14	17	<b>43</b>	-21	-5	<b>21</b>	<b>13</b>	7	19	14	<b>31</b>	-1	22	12	17	-15	17	16	<b>4</b>	0.57
EV/ EBITDA	16	-17	-2	<b>48</b>	11	2	<b>20</b>	<b>71</b>	-49	3	16	<b>19</b>	27	<b>42</b>	-6	<b>44</b>	4	15	9	<b>34</b>	17	19	6	<b>21</b>	<b>20</b>	29	<b>-9</b>	14	<b>30</b>	<b>9</b>	0.69
Forward Earnings Yield	15	-12	5	<b>57</b>	<b>16</b>	-10	15	<b>96</b>	-51	-14	17	17	31	<b>51</b>	-23	<b>27</b>	-2	2	0	<b>33</b>	<b>31</b>	<b>32</b>	-1	23	<b>20</b>	<b>57</b>	-25	10	<b>37</b>	-2	0.52
Price/ Sales	15	-10	<b>15</b>	<b>58</b>	<b>19</b>	-1	22	<b>112</b>	-48	-12	17	0	24	<b>67</b>	-29	22	-6	-1	<b>13</b>	<b>38</b>	<b>19</b>	16	0	<b>26</b>	<b>21</b>	<b>51</b>	-36	4	<b>28</b>	4	0.49
Alpha Surprise Model	14	1	9	<b>46</b>	11	3	17	30	<b>-35</b>	3	19	4	<b>19</b>	24	<b>-12</b>	3	<b>18</b>	8	9	<b>41</b>	16	<b>36</b>	3	11	5	31	<b>-6</b>	<b>33</b>	14	<b>12</b>	0.81
Positive EPS Surprise	14	-4	9	<b>44</b>	14	-1	19	35	<b>-36</b>	1	<b>18</b>	1	<b>18</b>	35	-21	-1	<b>14</b>	<b>21</b>	<b>14</b>	<b>34</b>	21	<b>34</b>	2	<b>18</b>	8	26	<b>-5</b>	<b>27</b>	12	<b>10</b>	0.74
S&P 500	13	0	12	34	15	-2	20	44	-42	-1	15	6	16	39	-19	0	8	10	11	26	17	29	-2	12	12	32	-15	22	16	2	0.50
Low Debt/Equity	13	-4	13	28	13	2	<b>24</b>	<b>52</b>	-41	2	11	5	13	<b>60</b>	-29	-19	-10	<b>48</b>	<b>26</b>	<b>26</b>	<b>18</b>	24	2	0	12	<b>39</b>	-2	18	9	<b>5</b>	0.54
Share Repurchase	13	-9	10	<b>54</b>	<b>17</b>	6	15	39	-41	-4	19	<b>9</b>	12	36	<b>-9</b>	<b>16</b>	<b>18</b>	11	8	<b>36</b>	15	<b>37</b>	4	6	9	<b>35</b>	-13	19	<b>19</b>	4	0.69
High Debt/Equity	12	-4	16	34	16	1	<b>20</b>	<b>53</b>	-40	0	15	-2	16	34	<b>-13</b>	<b>14</b>	5	-5	-2	<b>29</b>	13	18	<b>-2</b>	<b>19</b>	<b>19</b>	18	-21	14	10	<b>11</b>	0.54
DDM Alpha	12	0	15	<b>38</b>	<b>16</b>	5	12	11	-41	-2	15	6	<b>17</b>	21	<b>-18</b>	<b>22</b>	<b>12</b>	4	10	<b>30</b>	<b>20</b>	<b>36</b>	5	6	1	30	-15	21	15	<b>2</b>	0.61
EPS Estimate Revisions	11	-4	15	<b>40</b>	<b>16</b>	-10	<b>21</b>	32	-49	2	16	<b>22</b>	<b>21</b>	<b>50</b>	-31	-15	<b>14</b>	<b>33</b>	<b>15</b>	25	24	24	-3	<b>25</b>	8	30	<b>-11</b>	na	na	na	0.53
5yr ROE Adj	10	0	15	<b>34</b>	9	2	19	40	<b>-38</b>	4	10	5	11	39	-25	-6	-1	<b>37</b>	27	<b>35</b>	17	<b>35</b>	19	-4	5	<b>56</b>	13	24	13	-2	0.69
Free Cash Flow/ EV	10	-8	20	<b>50</b>	17	-2	16	<b>53</b>	-39	4	18	17	27	<b>49</b>	0	<b>29</b>	<b>26</b>	4	10	<b>36</b>	24	27	6	<b>21</b>	<b>21</b>	<b>36</b>	-2	<b>26</b>	<b>28</b>	3	0.90
Neglect - Analyst Coverage	10	0	14	<b>39</b>	13	-1	20	<b>52</b>	-44	-4	25	0	<b>19</b>	<b>42</b>	<b>-18</b>	<b>16</b>	4	-1	-2	<b>29</b>	20	23	2	<b>14</b>	10	<b>39</b>	-29	na	na	na	0.54
1yr ROE Adj	10	-4	18	33	14	4	16	38	<b>-41</b>	12	15	3	<b>18</b>	28	-22	-4	-5	<b>29</b>	<b>23</b>	<b>38</b>	<b>18</b>	<b>42</b>	19	-7	1	<b>47</b>	13	<b>28</b>	10	-1	0.69
Relative Strength - 10wk/40wk	10	5	13	<b>44</b>	9	-5	<b>20</b>	16	-49	20	9	14	21	<b>51</b>	-24	-15	<b>22</b>	<b>58</b>	27	<b>36</b>	17	29	1	17	-6	<b>32</b>	-20	27	5	na	0.56
Relative Strength - 5wk/30wk	9	4	16	<b>37</b>	13	0	22	20	<b>-40</b>	19	8	11	<b>19</b>	<b>53</b>	-27	-18	<b>15</b>	<b>62</b>	<b>16</b>	25	18	24	1	<b>18</b>	3	<b>36</b>	-11	24	1	na	0.59
Short Interest	9	-3	6	32	<b>15</b>	-2	14	<b>47</b>	-34	5	<b>18</b>	7	11	<b>48</b>	-9	<b>3</b>	<b>9</b>	11	20	21	<b>25</b>	<b>23</b>	na	na	na	na	na	na	na	0.73	
Proj. 5yr EPS Growth	8	4	12	<b>49</b>	20	-8	<b>26</b>	<b>56</b>	-55	18	6	9	6	<b>65</b>	-40	-33	-18	<b>61</b>	<b>24</b>	23	14	<b>29</b>	-1	10	3	32	-7	30	6	<b>15</b>	0.45
Dividend Growth (Total Return)	8	-5	10	<b>36</b>	<b>26</b>	1	<b>27</b>	<b>57</b>	-44	4	11	13	21	34	<b>-13</b>	<b>-9</b>	<b>17</b>	7	<b>15</b>	<b>29</b>	<b>25</b>	<b>42</b>	1	8	<b>12</b>	<b>44</b>	-11	27	22	-2	0.71
Price Return - 3M	8	-2	14	<b>37</b>	21	-2	19	34	-44	18	8	10	12	<b>49</b>	-26	-20	1	<b>49</b>	11	24	16	<b>30</b>	1	19	16	<b>41</b>	-15	17	<b>16</b>	na	0.56
Price Return - 12M and 1M Reversal	7	4	13	42	13	-7	<b>25</b>	12	-44	-3	10	14	20	<b>39</b>	-1	<b>3</b>	2	24	29	37	24	<b>36</b>	-1	22	10	37	-20	<b>32</b>	12	na	0.69
Price/ Free Cash Flow	7	-11	15	<b>46</b>	21	-3	20	<b>64</b>	-42	-8	20	11	26	<b>45</b>	0	<b>33</b>	5	6	12	35	21	24	3	15	<b>18</b>	<b>38</b>	-19	13	<b>26</b>	12	0.71
ROC	7	-1	15	<b>35</b>	10	6	15	39	-43	11	14	3	14	27	-13	-3	6	15	27	35	21	<b>38</b>	17	2	19	<b>79</b>	-11	18	20	-18	0.68
5y ROE	7	1	11	<b>38</b>	8	8	16	44	<b>-35</b>	1	12	-3	8	33	<b>-18</b>	-15	1	45	29	32	19	<b>41</b>	17	-5	5	<b>59</b>	2	<b>24</b>	10	-4	0.64
1yr ROE	6	-3	15	<b>37</b>	11	5	12	39	<b>-38</b>	12	14	4	14	26	<b>-13</b>	-2	<b>9</b>	10	26	31	<b>24</b>	<b>42</b>	16	-5	1	<b>51</b>	9	23	11	-3	0.74
Price to Moving Average (200 day)	5	3	16	<b>39</b>	12	-2	13	13	-42	22	12	<b>16</b>	<b>16</b>	<b>50</b>	-29	-17	<b>15</b>	<b>56</b>	21	<b>28</b>	16	<b>29</b>	2	17	2	<b>34</b>	-11	20	-1	na	0.54
ROA</																															

## Performance and Calculation Methodology

Table 9: Quantitative Strategies Performance as of 4/28/2017

Strategies (Universe based on the S&P 500)		2 Yr Perf.					3 Yr Perf.		5 Yr Perf.		Inception Date	
		1 M	3 M	6 M	12 M	YTD	Gross	Anlzd	Gross	Anlzd		
High Foreign Exposure	Miscellaneous	0.6	6.1	16.8	29.7	10.1	22.1	10.5	26.6	8.2	66.1	10.7
High Duration	Growth	1.9	6.5	11.0	14.1	10.0	10.4	5.1	26.1	8.0	68.5	11.0
High Variability of EPS	Risk	1.3	4.8	15.9	24.4	8.8	15.8	7.6	25.5	7.9	78.4	12.3
EPS Momentum	Growth	1.3	4.6	14.7	15.7	8.5	7.9	3.9	22.4	7.0	75.7	11.9
ROE (5-Yr Average)	Quality	1.1	5.5	11.9	13.9	8.4	12.2	5.9	26.5	8.1	72.0	11.5
High Free Cash Flow to EV	Value	1.0	4.3	12.8	19.7	7.7	5.4	2.6	23.9	7.4	100.5	14.9
ROA	Quality	0.2	5.3	11.4	12.5	7.7	7.0	3.4	27.1	8.3	64.2	10.4
High Projected 5-Yr Growth	Growth	-0.2	2.9	12.0	17.2	7.5	14.0	6.8	30.2	9.2	104.7	15.4
Forecast Negative Earnings Surprise	Growth (Negative)	1.2	3.8	11.0	10.3	7.4	6.9	3.4	19.9	6.2	67.6	10.9
ROE (1-Yr Avg. Adj. by Debt)	Quality	1.3	6.0	13.2	16.0	7.2	13.0	6.3	31.7	9.6	77.1	12.1
Analyst Coverage Neglect	Miscellaneous	1.2	5.1	12.8	14.4	6.9	16.1	7.7	28.8	8.8	92.6	14.0
S&P 500 Index (Price Return)	Benchmark	0.9	4.6	12.1	15.4	6.5	14.3	6.9	26.6	8.2	70.6	11.3
ROC	Quality	0.5	4.4	10.0	12.9	6.4	9.5	4.7	30.5	9.3	70.2	11.2
Low Price to Free Cash Flow	Value	0.7	3.5	10.8	14.7	6.4	-2.8	-1.4	13.8	4.4	80.4	12.5
Low PE to GROWTH	GARP	-0.5	1.3	17.5	23.7	6.3	12.4	6.0	19.5	6.1	70.4	11.3
Relative Strength (30wk/75wk)	Technical	-0.5	1.5	7.6	9.4	6.2	9.2	4.5	16.5	5.2	71.0	11.3
Short Interest	Miscellaneous	-0.3	2.5	13.5	15.3	6.1	14.1	6.8	20.0	6.3		10/31/2013
S&P 500 Equal Weighted (Total Return)	Benchmark	0.6	3.7	12.6	16.6	5.9	16.8	8.1	32.2	9.7	96.3	14.4
ROE (5-Yr Avg. Adj. by Debt)	Quality	1.0	4.3	10.3	13.3	5.7	14.4	7.0	32.4	9.8	79.3	12.4
High Dividend Growth (Total Return)	Corp Cash Deployment	0.7	2.5	11.5	16.3	5.4	7.8	3.8	15.0	4.8	71.9	11.4
ROE (1-Yr Average)	Quality	1.2	3.4	9.4	9.9	5.4	6.4	3.2	23.3	7.2	68.5	11.0
S&P 500 Equal Weighted (Price Return)	Benchmark	0.6	3.2	11.6	14.3	5.3	11.7	5.7	24.0	7.4	76.6	12.1
Price Returns (3-Month)	Technical	1.9	4.1	19.7	13.8	5.2	9.5	4.6	25.2	7.8	84.8	13.1
High Dividend Growth (Price Return)	Corp Cash Deployment	0.5	1.9	10.3	13.8	4.8	3.1	1.5	7.5	2.5	53.3	8.9
DDM Valuation	Value	1.1	4.1	7.7	11.4	4.5	14.5	7.0	25.4	7.9	94.5	14.2
Alpha Surprise Model	GARP	0.4	3.3	12.5	14.1	4.5	13.7	6.6	30.0	9.1	92.5	14.0
High Beta	Risk	-0.6	2.0	17.9	24.5	4.4	0.9	0.5	4.2	1.4	57.4	9.5
Relative Strength (Price/200-Day Moving Avg)	Technical	1.1	2.6	16.8	11.5	4.2	13.1	6.3	25.9	8.0	87.7	13.4
Forward Earnings Yield	Value	-1.3	0.6	15.4	21.8	4.1	6.1	3.0	10.1	3.3	79.7	12.4
Price Returns (9-Month)	Technical	-0.2	2.4	14.0	10.6	3.6	13.9	6.7	27.5	8.4	99.2	14.8
Earnings Yield	Value	-0.8	1.1	16.3	23.7	3.4	15.7	7.6	24.0	7.4	90.7	13.8
Most Active	Technical	-1.1	0.5	12.9	21.5	3.3	13.9	6.7	22.7	7.1	84.4	13.0
Price Returns (12-Month plus 1-Month Reversal)	Technical	-1.2	1.4	7.1	11.3	3.2	11.0	5.3	27.0	8.3	89.9	13.7
Price Returns (12-Month plus 1-Month)	Technical	1.6	2.6	8.8	7.5	2.9	10.7	5.2	19.8	6.2	71.8	11.4
Price Returns (11-Month since 1 year ago)	Technical	-0.5	0.9	3.7	5.4	2.8	4.8	2.4	16.7	5.3	72.7	11.6
Price Returns (12-Month)	Technical	0.1	0.4	3.8	5.4	2.7	9.7	4.7	24.0	7.4	87.4	13.4
Low Price to Cash Flow	Value	-0.1	0.5	11.3	13.2	2.5	-4.4	-2.2	-0.3	-0.1	54.4	9.1
Forecast Positive Earnings Surprise	Growth	0.5	1.8	9.7	12.1	2.3	7.3	3.6	19.5	6.1	80.7	12.6
Low Price to Sales	Value	0.6	0.8	10.4	12.4	2.1	3.1	1.5	18.2	5.7	110.9	16.1
Share Repurchase	Corp Cash Deployment	-0.6	0.7	10.5	15.4	2.1	2.2	1.1	13.3	4.3	85.4	13.1
Relative Strength (10wk/40wk)	Technical	-0.3	-0.4	13.5	13.0	2.1	15.9	7.7	30.6	9.3	93.4	14.1
Relative Strength (5wk/30wk)	Technical	0.0	0.3	15.3	12.4	2.0	15.7	7.6	30.2	9.2	95.4	14.3
Low Price	Risk	-1.3	-1.4	12.5	20.8	1.8	13.1	6.3	18.6	5.8	101.9	15.1
Upward Estimate Revisions	Growth	-1.8	-1.5	13.7	15.8	1.4	6.8	3.4	19.1	6.0	83.0	12.9
Low EV/EBITDA	Value	1.2	0.0	6.7	10.2	0.9	-7.4	-3.8	-7.1	-2.4	47.2	8.0
Dividend Yield (Total Return)	Corp Cash Deployment	-0.9	-0.3	9.3	19.4	0.5	29.1	13.6	44.4	13.0	113.3	16.4
Low EPS Torpedo	Growth (Negative)	0.6	-1.1	9.7	14.0	0.5	-15.3	-8.0	-13.8	-4.8	23.5	4.3
Institutional Neglect	Miscellaneous	-0.7	-0.2	6.3	8.3	0.4	13.5	6.6	19.5	6.1	61.8	10.1
Low Price to Book Value	Value	-1.3	-2.3	15.0	22.5	-0.5	6.7	3.3	10.5	3.4	83.0	12.9
Dividend Yield (Price Return)	Corp Cash Deployment	-1.2	-1.5	6.8	14.1	-0.9	17.3	8.3	25.5	7.9	67.9	10.9
Small Size	Miscellaneous	-1.4	-2.8	6.3	6.0	-1.9	3.2	1.6	11.3	3.6	80.3	12.5
High EPS Estimate Dispersion	Risk	-3.8	-7.3	4.2	4.6	-6.0	-17.0	-8.9	-19.8	-7.1	30.2	5.4

Source: BofA Merrill Lynch US Equity and US Quant Strategy

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.

**Table 10: Factor valuations as of 4/28/2017**

The five factors with the greatest implied upside on each metric are shown with borders. The five factors with the greatest implied downside on each metric are shown in red. Sorted by Price to Book Z-Score from low (cheap vs. history) to high (expensive vs. history).

		Price to Book (Relative)			Forward P/E (Relative)				
		Current	Avg.	Implied upside	Z-Score	Current	Avg.	Implied upside	Z-Score
Share Repurchase	Corp Cash Deployment	0.64	1.02	60%	-2.73	0.74	0.90	22%	-1.83
Relative Strength (30wk/75wk)	Technical	0.71	1.36	90%	-2.15	0.79	1.14	44%	-2.33
High Foreign Exposure	Miscellaneous	1.03	1.28	24%	-1.54	0.92	1.10	21%	-1.25
Earnings Yield	Value	0.51	0.61	19%	-1.44	0.60	0.64	5%	-0.64
High Variability of EPS	Risk	0.79	0.91	15%	-1.23	1.04	1.02	-2%	0.23
High Dividend Growth	Corp Cash Deployment	0.82	0.95	15%	-0.95	1.02	0.96	-6%	0.73
Price Returns (12-Month plus 1-Month Reversal)	Technical	0.96	1.17	22%	-0.94	0.80	1.07	33%	-1.90
Most Active	Technical	0.72	0.97	35%	-0.91	0.73	1.03	41%	-0.98
Forecast Negative Earnings Surprise	Growth (Negative)	0.90	1.03	14%	-0.84	0.92	0.98	6%	-0.96
High Beta	Risk	0.71	0.89	25%	-0.80	0.75	1.09	46%	-0.81
Analyst Coverage Neglect	Miscellaneous	0.80	0.88	9%	-0.78	0.92	0.99	8%	-1.60
Low Price	Risk	0.51	0.58	15%	-0.66	0.75	0.85	13%	-0.50
Dividend Yield	Corp Cash Deployment	0.62	0.67	8%	-0.64	0.93	0.88	-5%	0.40
Price Returns (11-Month since 1 year ago)	Technical	1.16	1.33	15%	-0.60	0.82	1.15	40%	-1.98
High Free Cash Flow to EV	Value	0.79	0.83	5%	-0.55	0.72	0.78	8%	-0.93
Relative Strength (10wk/40wk)	Technical	1.12	1.26	12%	-0.47	0.81	1.17	43%	-2.13
Low Price to Book Value	Value	0.35	0.37	7%	-0.42	0.72	0.71	-2%	0.18
Price Returns (12-Month)	Technical	1.24	1.36	10%	-0.39	0.84	1.17	40%	-1.88
ROE (5-Yr Avg. Adj. by Debt)	Quality	1.66	1.71	3%	-0.31	1.09	1.15	5%	-0.66
ROE (1-Yr Avg. Adj. by Debt)	Quality	1.78	1.83	3%	-0.27	1.09	1.09	0%	0.04
Low EPS Torpedo	Growth (Negative)	0.64	0.66	3%	-0.20	0.85	0.92	7%	-0.55
Low PE to GROWTH	GARP	0.71	0.73	3%	-0.20	0.79	0.74	-7%	0.83
Price Returns (9-Month)	Technical	1.23	1.28	4%	-0.18	0.82	1.17	44%	-2.12
DDM Valuation	Value	1.02	1.04	2%	-0.12	1.09	0.94	-14%	1.65
ROA	Quality	2.23	2.26	1%	-0.07	1.18	1.18	0%	-0.02
Alpha Surprise Model	GARP	1.07	1.07	0%	-0.03	0.99	0.99	1%	-0.09
Forecast Positive Earnings Surprise	Growth	1.03	1.02	0%	0.01	1.04	1.01	-2%	0.38
Low Price to Free Cash Flow	Value	0.74	0.74	0%	0.01	0.71	0.74	4%	-0.55
Institutional Neglect	Miscellaneous	0.78	0.77	-2%	0.16	0.99	0.94	-5%	0.74
High Projected 5-Yr Growth	Growth	1.44	1.40	-3%	0.21	1.21	1.38	14%	-0.58
Small Size	Miscellaneous	0.68	0.66	-3%	0.21	0.91	0.91	0%	0.02
Relative Strength (5wk/30wk)	Technical	1.30	1.23	-5%	0.23	1.02	1.17	15%	-0.93
Price Returns (12-Month plus 1-Month)	Technical	1.36	1.28	-6%	0.30	1.23	1.16	-5%	0.39
Forward Earnings Yield	Value	0.59	0.57	-4%	0.30	0.54	0.57	6%	-0.76
Low Price to Sales	Value	0.68	0.63	-8%	0.51	0.73	0.77	5%	-0.36
Upward Estimate Revisions	Growth	1.05	0.94	-10%	0.65	1.12	1.04	-7%	0.55
High EPS Estimate Dispersion	Risk	0.71	0.64	-10%	0.71	1.71	1.13	-34%	2.28
Relative Strength (Price/200-Day Moving Avg)	Technical	1.46	1.26	-14%	0.73	1.07	1.18	10%	-0.68
Low EV/EBITDA	Value	0.74	0.69	-7%	0.74	0.71	0.73	2%	-0.22
ROC	Quality	2.87	2.58	-10%	0.88	1.16	1.09	-6%	0.88
Short Interest	Miscellaneous	1.23	1.09	-11%	0.91	1.01	1.04	3%	-0.53
EPS Momentum	Growth	1.06	0.93	-12%	1.03	1.15	1.02	-11%	1.22
High Duration	Growth	1.52	1.26	-17%	1.20	1.27	1.30	2%	-0.15
ROE (1-Yr Average)	Quality	3.49	3.01	-14%	1.30	1.09	1.04	-5%	0.97
ROE (5-Yr Average)	Quality	2.97	2.43	-18%	1.63	1.08	1.15	7%	-0.44
Price Returns (3-Month)	Technical	1.71	1.16	-32%	2.15	1.22	1.15	-6%	0.43
Low Price to Cash Flow	Value	0.71	0.60	-16%	2.45	0.69	0.75	10%	-0.94

Source: BofA Merrill Lynch US Quantitative Strategy. Based on data since February 2001.

**Table 11: Advances and Declines as of 4/28/2017**

Quantitative Strategies	1M		3M		6M		12M		YTD		2Yr		3Yr		5Yr	
	Adv.	Dec.														
High Foreign Exposure	30	20	99	51	196	103	373	226	135	64	641	557	958	837	1679	1313
High Duration	34	16	102	47	185	114	338	259	138	61	624	571	968	827	1684	1309
High Variability of EPS	34	25	111	69	240	140	451	309	156	90	830	687	1264	1009	2222	1572
EPS Momentum	31	19	95	55	198	102	348	252	132	68	644	555	990	807	1714	1281
ROE (5-Yr Average)	31	19	102	48	195	105	336	264	136	64	633	567	966	832	1690	1305
High Free Cash Flow to EV	24	18	71	49	149	93	285	205	99	63	496	487	798	686	1431	1034
ROA	25	25	94	56	182	118	330	270	126	74	612	587	964	835	1661	1338
High Projected 5-Yr Growth	28	26	96	60	193	114	355	254	134	72	647	564	1003	813	1743	1288
Forecast Negative Earnings Surprise	48	29	131	88	267	161	471	382	181	104	860	831	1295	1160	2287	1780
ROE (1-Yr Avg. Adj. by Debt)	28	22	97	53	191	109	343	257	129	71	628	572	977	823	1712	1288
Analyst Coverage Neglect	23	16	67	49	135	97	268	216	88	63	559	498	893	751	1567	1137
ROC	26	24	94	56	182	118	338	262	125	75	623	576	986	813	1698	1299
Low Price to Free Cash Flow	25	25	85	65	186	114	338	260	120	80	595	603	942	853	1715	1277
Low PE to GROWTH	24	26	80	70	196	104	368	232	123	77	642	558	980	818	1711	1284
Relative Strength (30wk/75wk)	24	26	82	68	170	131	320	278	121	79	617	580	952	841	1667	1326
Short Interest	27	23	91	59	200	99	360	237	131	68	657	537	972	819	1643	1283
ROE (5-Yr Avg. Adj. by Debt)	27	23	94	56	179	121	334	266	124	76	627	573	979	820	1704	1295
High Dividend Growth (Total Return)	29	21	85	64	184	115	351	247	120	79	636	562	975	822	1746	1248
ROE (1-Yr Average)	34	16	96	54	191	109	329	271	129	71	617	582	971	826	1700	1295
Price Returns (3-Month)	31	19	90	59	195	103	334	262	117	81	629	564	964	829	1671	1314
High Dividend Growth (Price Return)	28	22	84	65	181	118	341	257	118	81	618	579	948	848	1711	1284
DDM Valuation	31	25	105	65	188	122	368	284	132	84	681	601	1070	876	1954	1418
Alpha Surprise Model	26	24	88	62	173	100	286	198	114	78	569	466	963	726	1682	1175
High Beta	24	27	85	71	190	119	360	256	116	89	620	618	947	909	1702	1365
Relative Strength (Price/200-Day Moving Avg)	32	18	90	60	195	104	326	271	116	83	632	563	970	823	1699	1286
Forward Earnings Yield	19	31	79	71	184	116	354	246	115	85	640	560	972	826	1748	1246
Price Returns (9-Month)	23	27	83	67	178	122	320	277	110	90	635	559	977	815	1713	1271
Earnings Yield	22	28	81	69	190	110	365	235	113	87	646	554	994	804	1775	1219
Most Active	19	31	76	74	178	122	350	248	111	89	629	567	968	826	1709	1279
Price Returns (12-Month plus 1-Month Reversal)	22	28	82	68	175	124	324	271	112	87	621	571	983	807	1711	1277
Price Returns (12-Month plus 1-Month)	34	16	93	57	182	118	328	272	120	80	650	548	973	824	1694	1297
Price Returns (11-Month since 1 year ago)	23	27	75	75	154	146	303	294	103	97	601	594	947	844	1671	1318
Price Returns (12-Month)	27	23	80	70	165	135	321	277	111	89	637	559	979	814	1701	1288
Low Price to Cash Flow	24	26	74	76	177	123	323	275	106	94	577	621	898	898	1626	1361
Forecast Positive Earnings Surprise	41	34	125	99	264	177	476	372	167	133	897	797	1443	1178	2541	1833
Low Price to Sales	25	25	77	73	170	130	318	279	103	97	593	604	943	853	1698	1293
Share Repurchase	23	27	78	72	183	117	335	264	110	90	584	614	940	858	1712	1286
Relative Strength (10wk/40wk)	24	26	75	75	176	123	325	271	105	94	639	554	979	811	1696	1289
Relative Strength (5wk/30wk)	24	26	76	74	179	120	316	281	103	96	633	560	969	821	1695	1287
Low Price	18	32	69	81	165	135	327	272	101	99	589	608	903	887	1634	1349
Upward Estimate Revisions	20	30	72	77	171	128	327	272	102	97	625	572	962	835	1722	1271
Low EV/EBITDA	28	22	73	77	162	138	306	292	101	99	558	640	874	921	1615	1377
Dividend Yield (Total Return)	20	30	71	79	168	132	329	270	99	101	635	563	977	819	1760	1234
Low EPS Torpedo	24	26	69	81	168	132	321	278	99	101	555	644	872	925	1581	1411
Institutional Neglect	23	27	78	72	176	124	322	276	107	93	621	575	935	859	1690	1299
Low Price to Book Value	19	31	69	83	178	124	362	241	101	101	645	560	991	815	1785	1230
Dividend Yield (Price Return)	20	30	67	83	161	139	311	288	94	106	604	593	929	866	1669	1323
Small Size	19	31	70	80	157	143	301	298	97	103	576	621	898	895	1621	1367
High EPS Estimate Dispersion	9	33	44	85	125	141	257	278	63	111	462	587	704	820	1336	1241

Source: BofA Merrill Lynch US Quantitative Strategy

## Russell 1000 factor efficacy

**Table 12: Russell 1000 factors: 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	Quintile 1	Quintile 2	Quintile 3	Quintile 4	Quintile 5
Earnings Yield	<b>0.66</b>	0.53	0.53	0.34	0.27
Forward Earnings Yield	0.59	<b>0.59</b>	0.50	0.43	0.20
Dividend Yield	0.54	<b>0.62</b>	0.53	0.44	0.45
Price/ Book Value	<b>0.54</b>	0.53	0.41	0.39	0.39
Price/ Cash Flow	<b>0.62</b>	0.54	0.48	0.39	0.26
Price/ Free Cash Flow	<b>0.67</b>	0.59	0.43	0.36	0.26
Price/ Sales	0.55	<b>0.57</b>	0.53	0.40	0.23
EV/ EBITDA	<b>0.72</b>	0.59	0.48	0.38	0.20
Free Cash Flow/ EV	<b>0.74</b>	0.57	0.43	0.34	0.25
Relative Strength - 30wk/75wk MA	0.53	<b>0.56</b>	0.52	0.45	0.23
Relative Strength - 5wk/30wk MA	0.55	0.40	<b>0.57</b>	0.49	0.27
Relative Strength - 10wk/40wk MA	0.52	0.44	<b>0.58</b>	0.50	0.25
Price to Moving Average (200 day)	0.49	0.45	<b>0.55</b>	0.49	0.29
Price Return - 12-mth Perf.	<b>0.56</b>	0.55	0.50	0.44	0.25
Price Return - 9-mth Perf.	0.50	<b>0.54</b>	0.50	0.46	0.27
Price Return - 3-mth Perf.	0.47	0.47	0.50	<b>0.51</b>	0.32
Price Return - 11-mth Perf.	<b>0.58</b>	0.56	0.50	0.43	0.23
Price Return - 12-mth and 1-mth Performance	0.46	0.46	0.49	<b>0.51</b>	0.34
Price Return - 12-mth and 1-mth Reversal	<b>0.57</b>	0.55	0.48	0.43	0.24
Most Active	<b>0.60</b>	0.43	0.48	0.41	0.34
Low Price	0.40	0.47	0.46	0.46	<b>0.48</b>
Earning Momentum	0.44	0.55	<b>0.59</b>	0.52	0.28
Proj. 5yr EPS Growth	0.26	0.46	0.53	0.53	<b>0.56</b>
Earnings Torpedo	0.37	0.56	<b>0.59</b>	0.51	0.33
EPS Estimate Revisions	0.45	0.53	<b>0.57</b>	0.43	0.33
Dividend Growth	0.48	0.51	<b>0.61</b>	0.55	0.52
P/E-to-Growth	0.52	0.57	<b>0.61</b>	0.47	0.39
1yr ROE	0.56	<b>0.56</b>	0.54	0.47	0.26
5y ROE	0.49	0.51	<b>0.53</b>	0.52	0.31
1yr ROE Adj	0.55	<b>0.60</b>	0.49	0.51	0.25
5yr ROE Adj	<b>0.53</b>	0.50	0.51	0.51	0.30
ROA	0.51	0.53	0.54	<b>0.54</b>	0.26
ROC	<b>0.66</b>	0.59	0.56	0.43	0.18
Beta	0.33	0.40	0.52	<b>0.60</b>	0.50
Variability of Earnings	0.38	0.40	0.46	0.48	<b>0.65</b>
Estimate Dispersion	0.34	0.42	0.45	0.52	<b>0.62</b>
Neglect - Analyst Coverage	<b>0.51</b>	0.51	0.49	0.51	0.41
Neglect - Institutional Ownership	0.32	<b>0.54</b>	0.50	0.45	0.50
Size	0.44	<b>0.52</b>	0.43	0.47	0.43
Share Repurchase	<b>0.68</b>	0.56	0.49	0.42	0.22
Short Interest	<b>0.76</b>	0.65	0.42	0.35	0.23

Source: BofA Merrill Lynch US Equity & Quantitative 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.

## 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.**

## Section III: Stock Strategies within Industries

---

Sector Specific Overview	117
Consumer Discretionary: Media	118
Consumer Discretionary: Retailing	122
Other Disc. (Autos, Durables, Services)	126
Consumer Staples	130
Energy	134
Financials: Banks	138
Financials: Insurance	142
Other Financials (REITs, Diversified)	146
Health Care: Health Care Equipment & Svcs	150
Health Care: Pharmaceuticals Biotechnology & Life Sciences	154
Industrials: Capital Goods	158
Other Industrials (Services, Transports)	162
Information Technology	166
Materials	170
Telecommunication Services	174
Utilities	178
Backtesting methodology	182

**Note:** All charts in Section III are based on backtested results. Backtesting is hypothetical in nature and reflects application of the screen at the time when it did not exist. It is not intended to be indicative of how the screen would perform if used going forward.

## Sector Specific Overview

**Exhibit 8: Most predictive long only factors within industry groups. (Analysis spans 1985 to 2017, Historical Russell 1000 Constituents)**

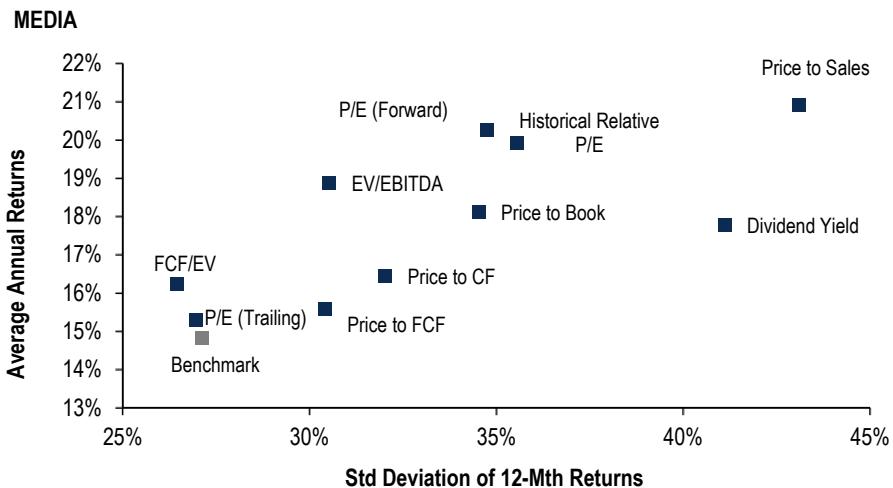
	Valuation Measure	Momentum Measure	Growth Measure	Quality Measure
<b>Consumer Discretionary</b>				
Media	Forward P/E, EV/EBITDA	30W/75W Relative Strength	PEG Ratio, Estimate Revision	ROE (1-Yr), ROC
Retailing	Free Cash Flow / EV, Price / FCF	12-Mth Return and 1-Mth Perf.	Estimate Revision	ROE (1-Yr Debt Adj'd), ROA
Other Discretionary (Autos, Durables, Services)	Fwd P/E, FCF/EV	12-Mth Return and 1-Mth Reversal	Estimate Revision	ROC
<b>Consumer Staples</b>	FCF/EV	Trading Volume, 30W/75W Relative Strength	PEG Ratio	ROC
<b>Energy Financials</b>	Historical P/E	Trading Volume	PEG Ratio, Estimate Revision	ROE (5-Yr)
Banks	Historical Relative P/E, Fwd P/E	12-Mth Return and 1-Mth Reversal	EPS Momentum, EPS Estimate Revisions	ROE (1-Yr), ROC
Insurance	Historical Relative P/E, P/E (Fwd)	Trading Volume	PEG Ratio	ROC
Other Financials (REITs, Diversified) (*Real Estate was broken out as a separate sector since 9/16)	Fwd P/E, Trail P/E	12-Mth Return and 1-Mth Reversal	PEG Ratio, EPS Momentum	ROE (1-Yr), ROC
<b>Health Care</b>				
Health Care Equipment & Services	Price to Free Cash Flow, FCF/EV	12-Mth Return and 1-Mth Reversal	PEG Ratio, Estimate Revision	ROE (1-Yr Debt Adj'd), ROC
Pharma, Biotech + Life sci	Price to Sales	Trading Volume	Earnings Momentum, Estimate Revisions	ROC
<b>Industrials</b>				
Capital Goods	FCF/EV, Dividend Yield	Trading Volume	Estimate Revisions	ROE (5-Yr, Debt Adj'd), ROE (1- yr)
Other Industrials (Services, Transports)	Trail P/E, Historical Relative P/E	12-Mth Return and 1-Mth Reversal	PEG Ratio, Dividend Growth	ROC
<b>Technology</b>	FCF/EV, Price to Free Cash Flow	Trading Volume	Estimate Revision	ROC
<b>Materials</b>	EV/EBITDA	12-Mth Return and 1-Mth Reversal	PEG Ratio	ROC
<b>Telecommunication Services</b>	Price / Sales, P/E (Fwd)	12-Mth Return and 1-Mth Reversal	Long-Term Growth	ROE (1-yr), ROC
<b>Utilities</b>	Price to Sales, EV/EBITDA	10WK/40WK Moving Average, 11-Mth Price Return	PEG Ratio, EPS Momentum	ROC

Note: Historical Relative P/E is calculated as the relative forward P/E of a stock compared to its long-term average relative P/E.

## Consumer Discretionary: Media

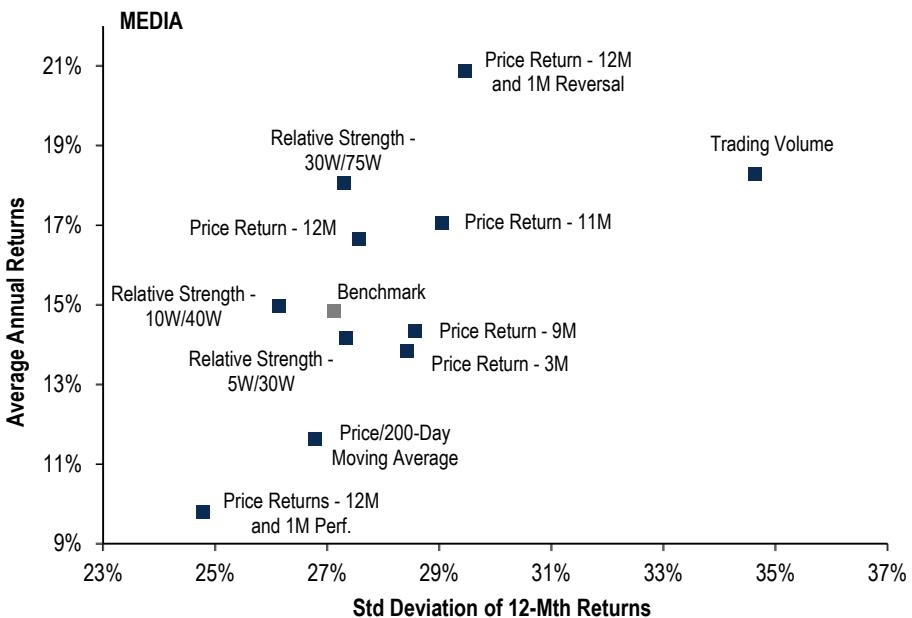
### Long only: Top Quintile Performance

Chart 306: Valuation Strategies for Media: Top Quintile Returns (1985 to 2017)



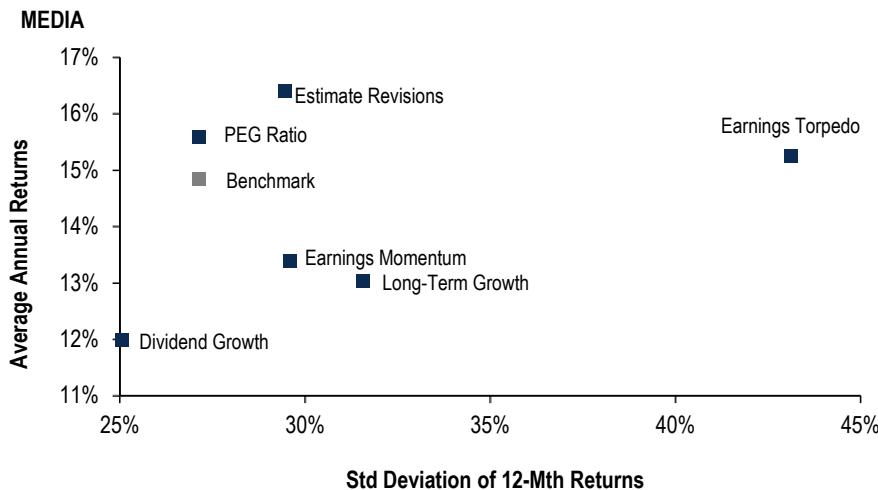
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

Chart 307: Momentum Strategies for Media: Top Quintile Returns (1985 to 2017)



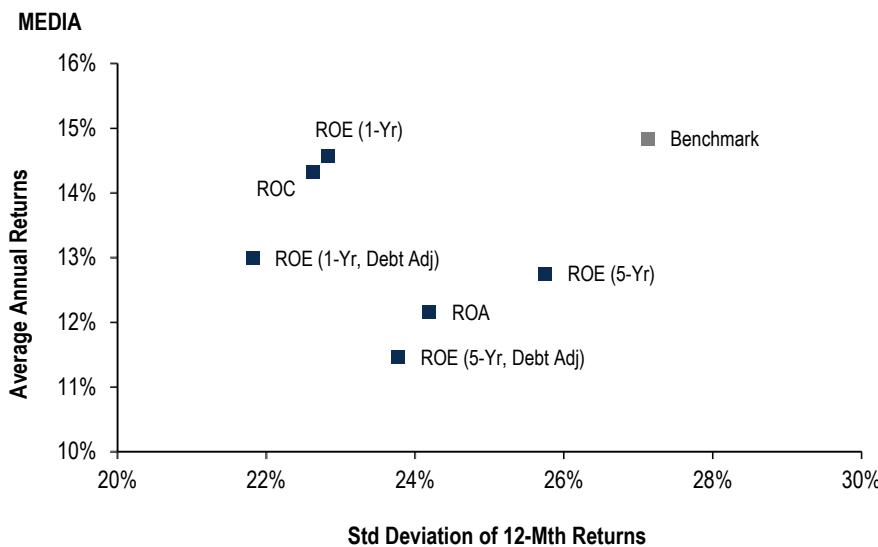
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 308: Growth Strategies for Media: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

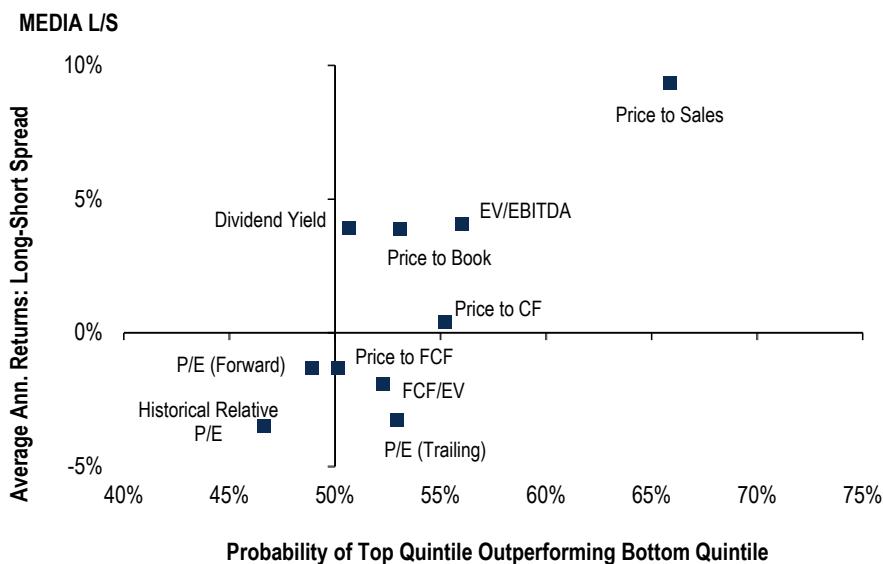
**Chart 309: Quality Strategies for Media: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

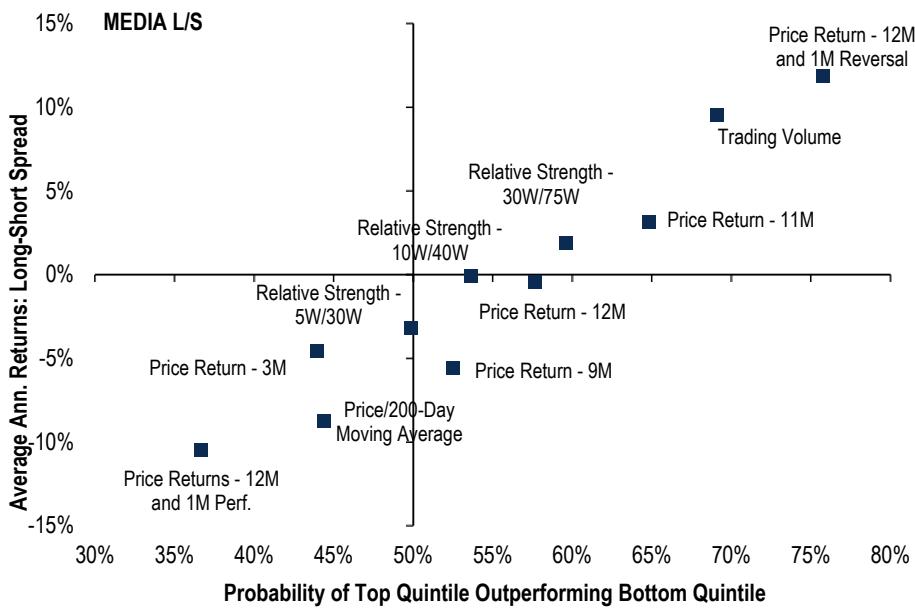
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 310: Valuation Strategies for Media: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



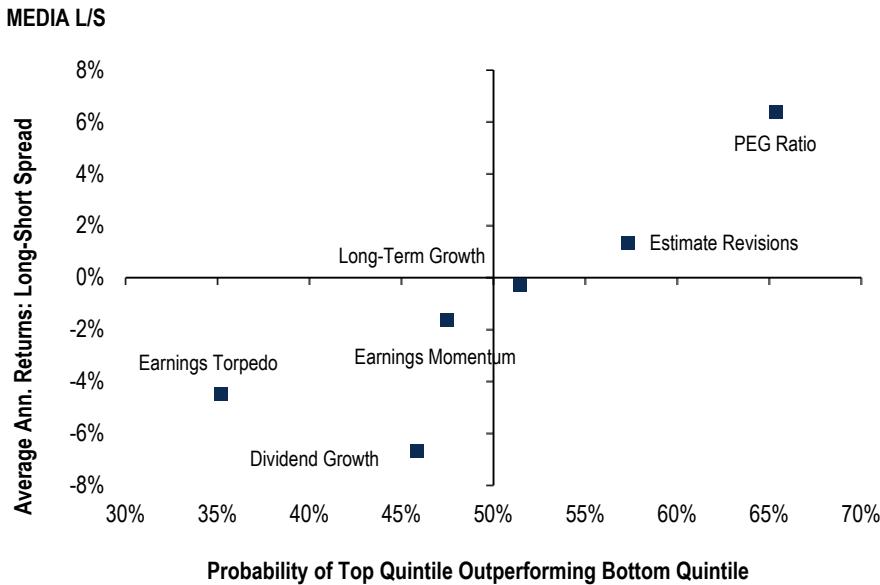
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 311: Momentum Strategies for Media: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



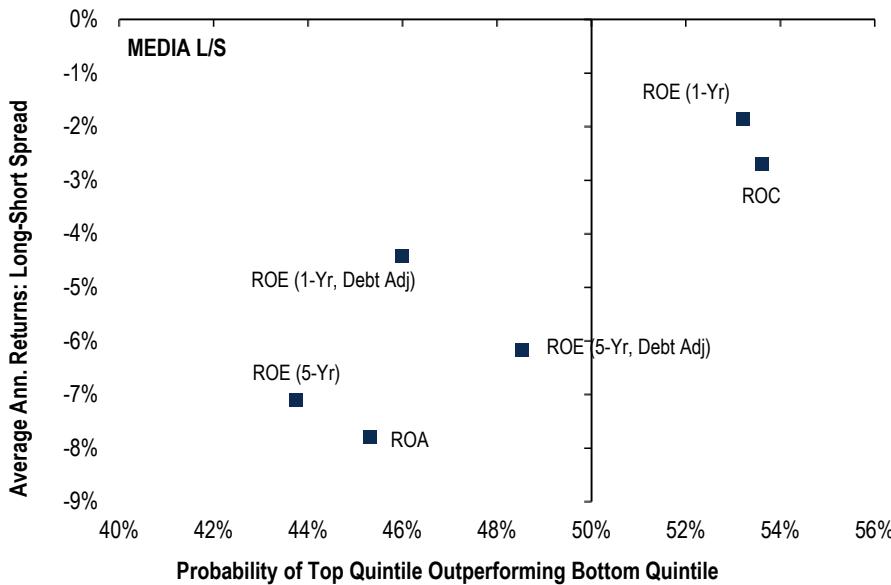
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 312: Growth Strategies for Media: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2016)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 313: Quality Strategies for Media: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

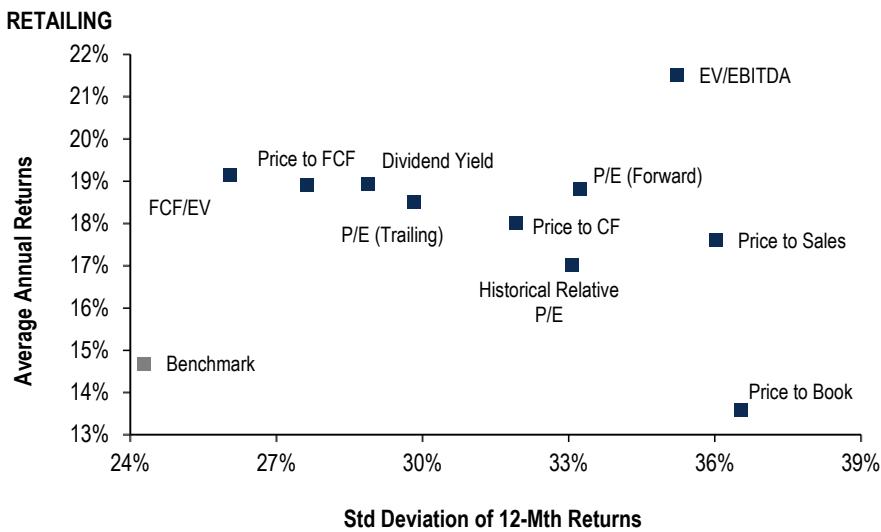


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Consumer Discretionary: Retailing

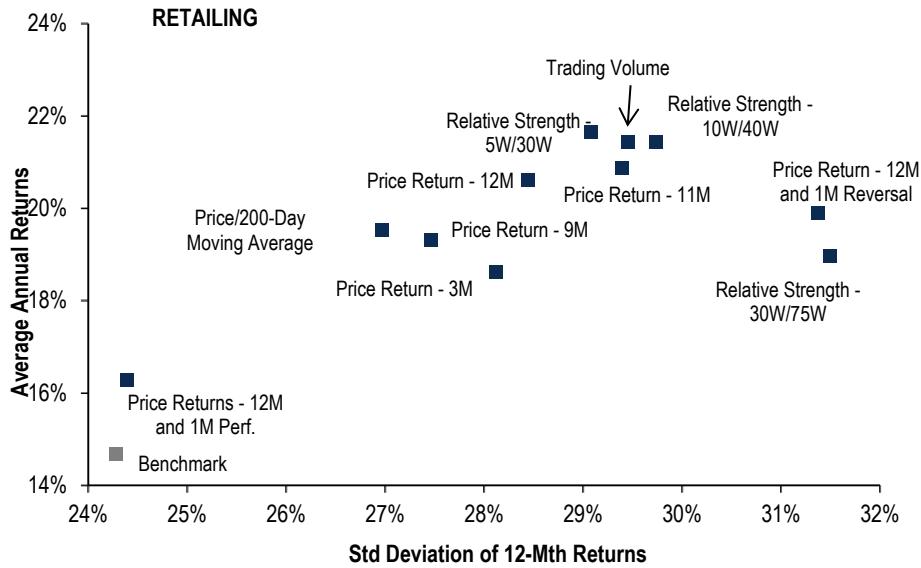
### Long only: Top Quintile Performance

**Chart 314: Valuation Strategies for Retailing: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

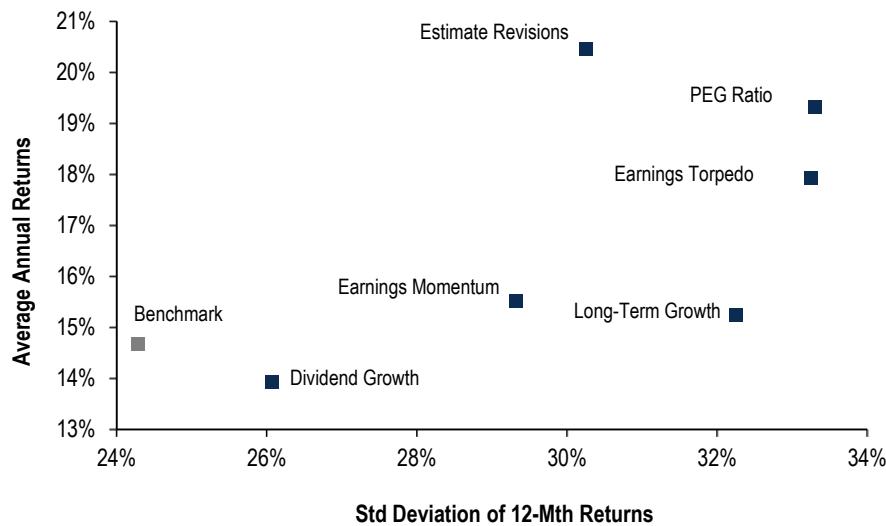
**Chart 315: Momentum Strategies for Retailing: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 316: Growth Strategies for Retailing: Top Quintile Returns (1985 to 2017)**

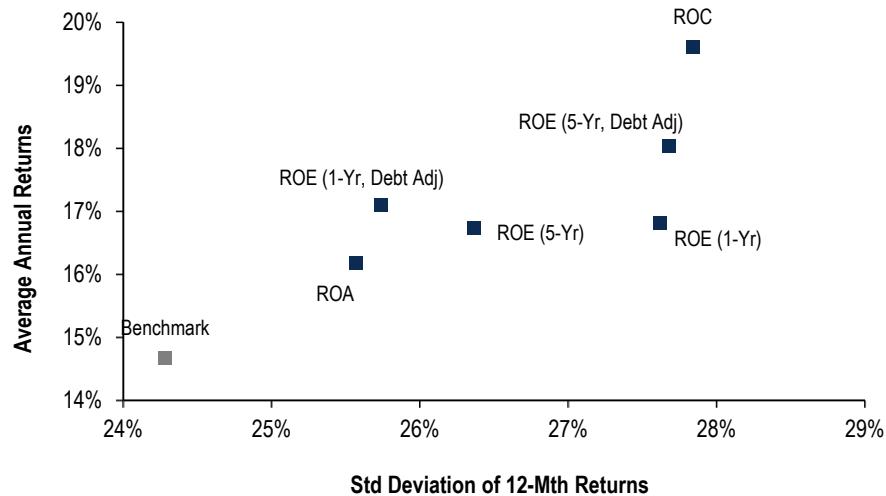
**RETAILING**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 317: Quality Strategies for Retailing: Top Quintile Returns (1985 to 2017)**

**RETAILING**

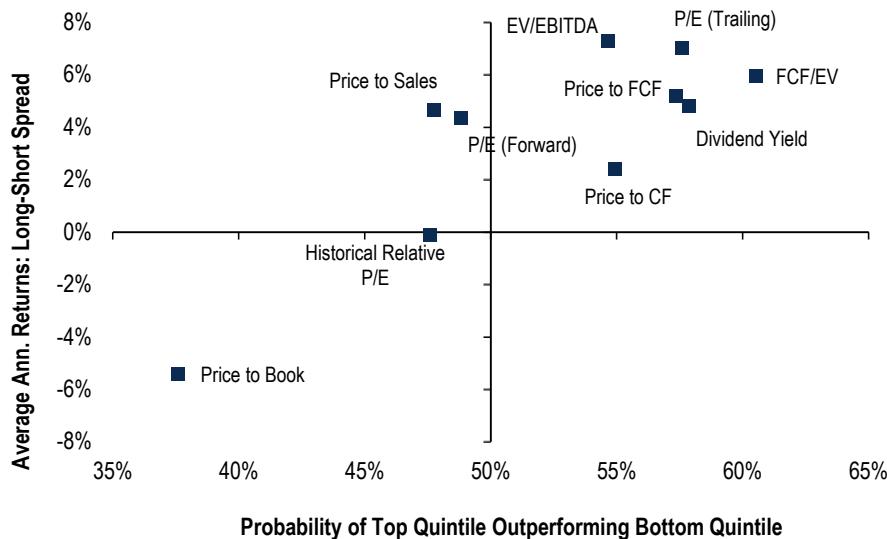


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

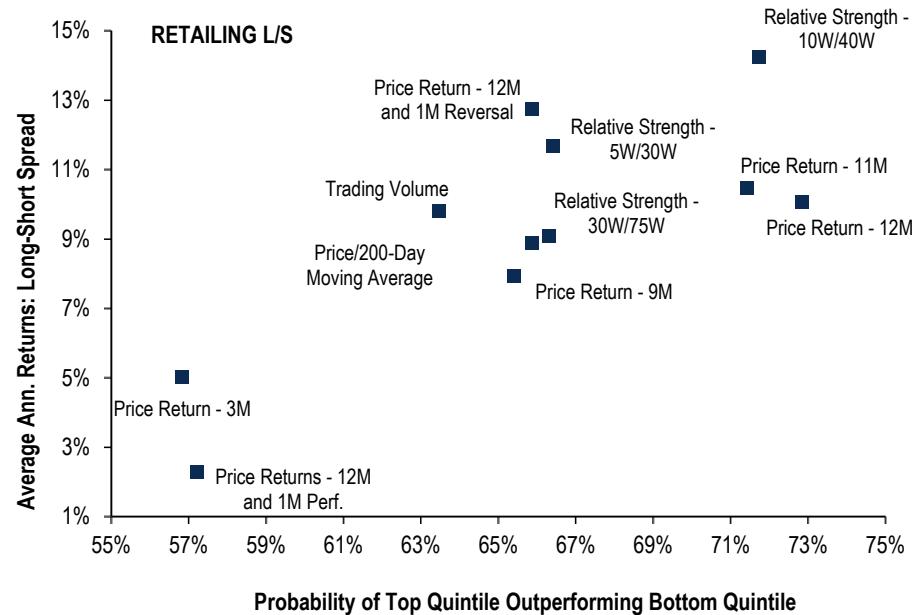
**Chart 318: Valuation Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

### RETAILING L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

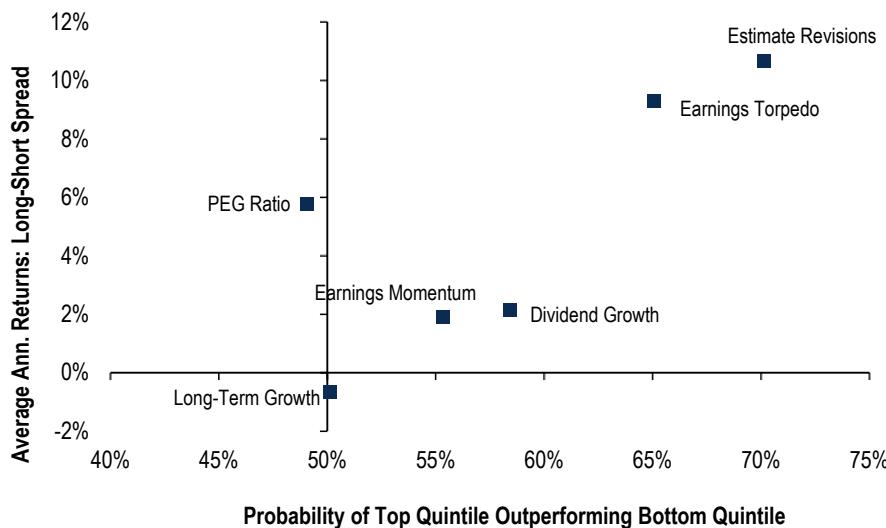
**Chart 319: Momentum Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 320: Growth Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

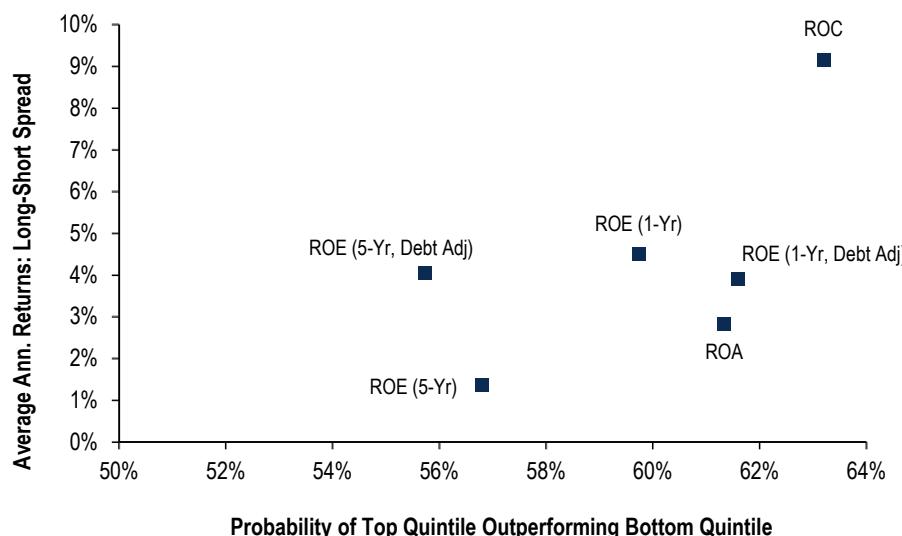
**RETAILING L/S**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 321: Quality Strategies for Retailing: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

**RETAILING L/S**



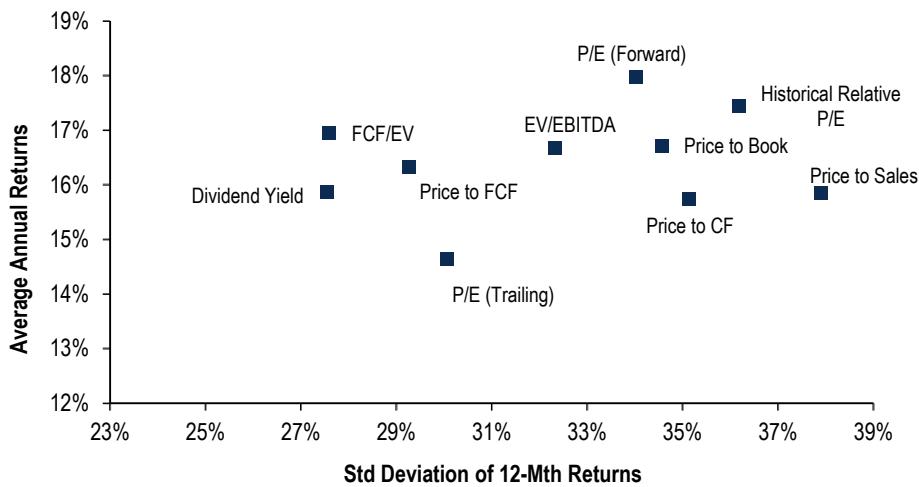
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Other Disc. (Autos, Durables, Services)

## Long only: Hypothetical Top Quintile Performance

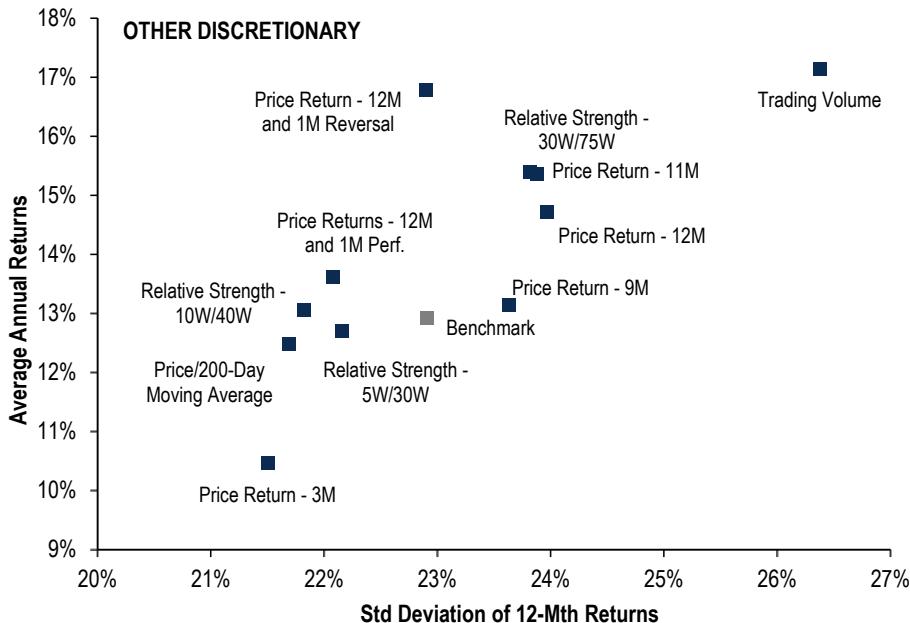
**Chart 322: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2017)**

### OTHER DISCRETIONARY



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

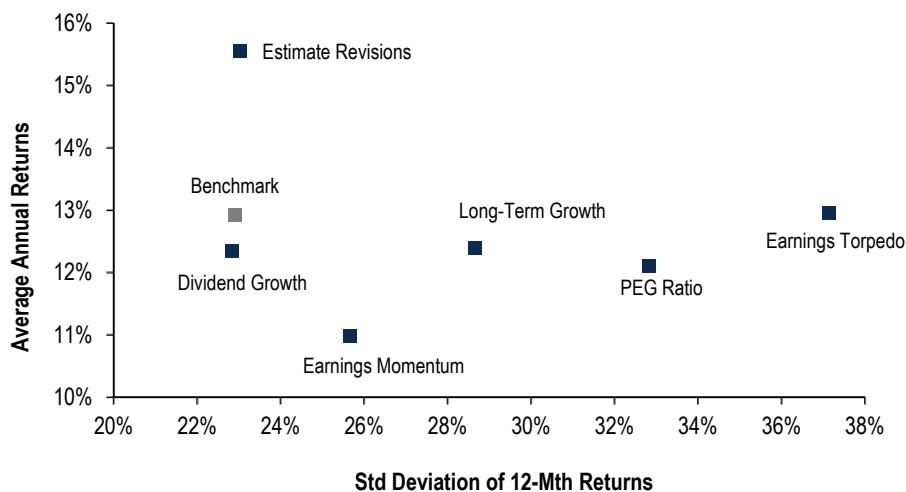
**Chart 323: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 324: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2017)**

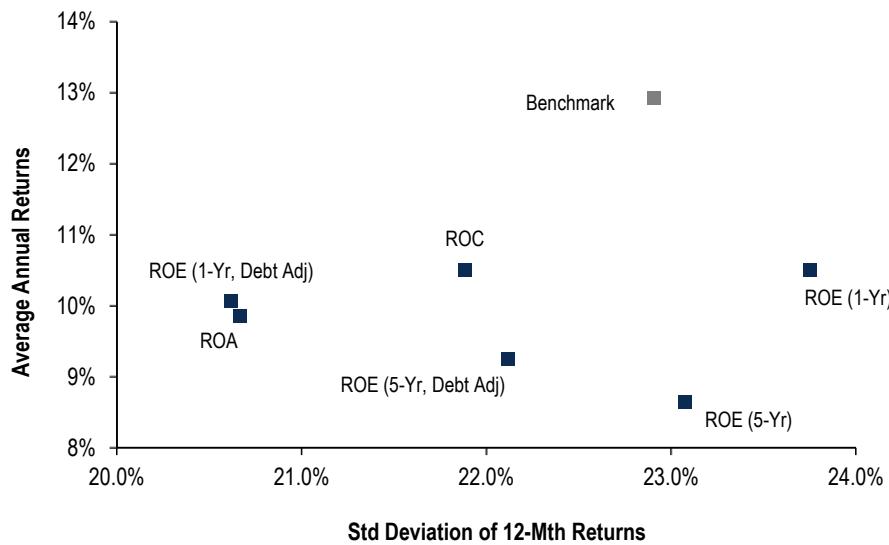
**OTHER DISCRETIONARY**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 325: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Top Quintile Returns (1985 to 2017)**

**OTHER DISCRETIONARY**

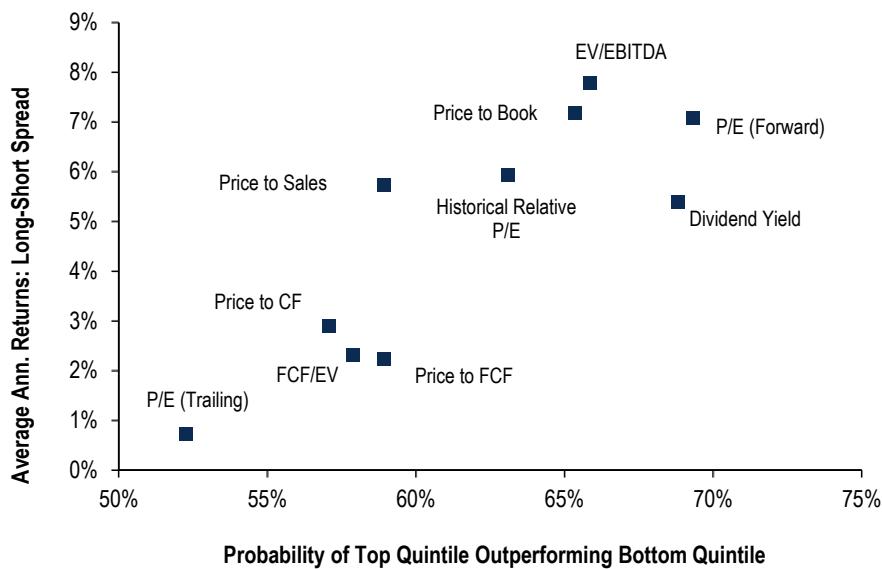


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 326: Valuation Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

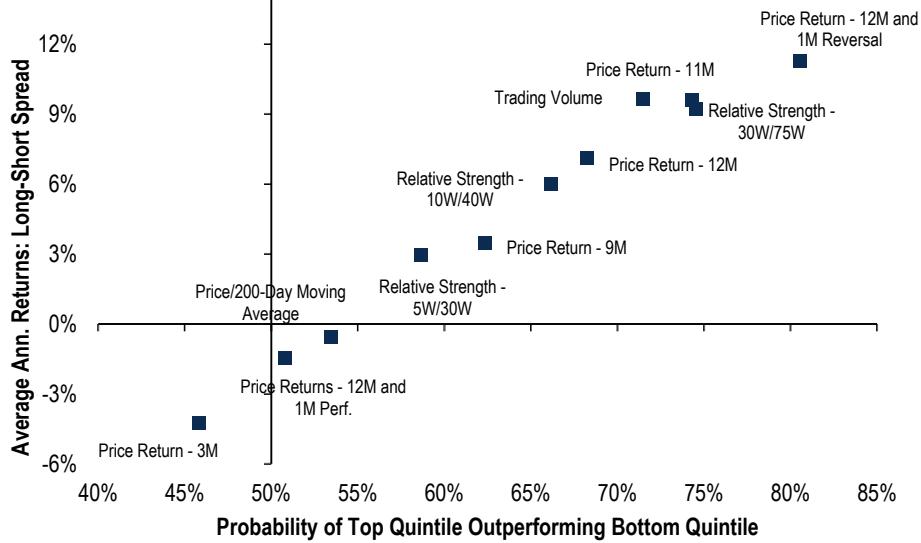
### OTHER DISCRETIONARY L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 327: Momentum Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

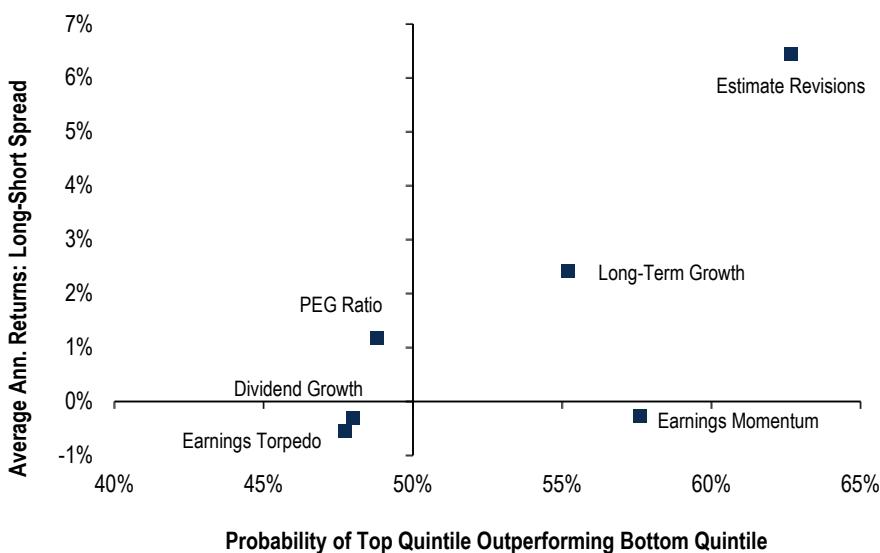
### OTHER DISCRETIONARY L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 328: Growth Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

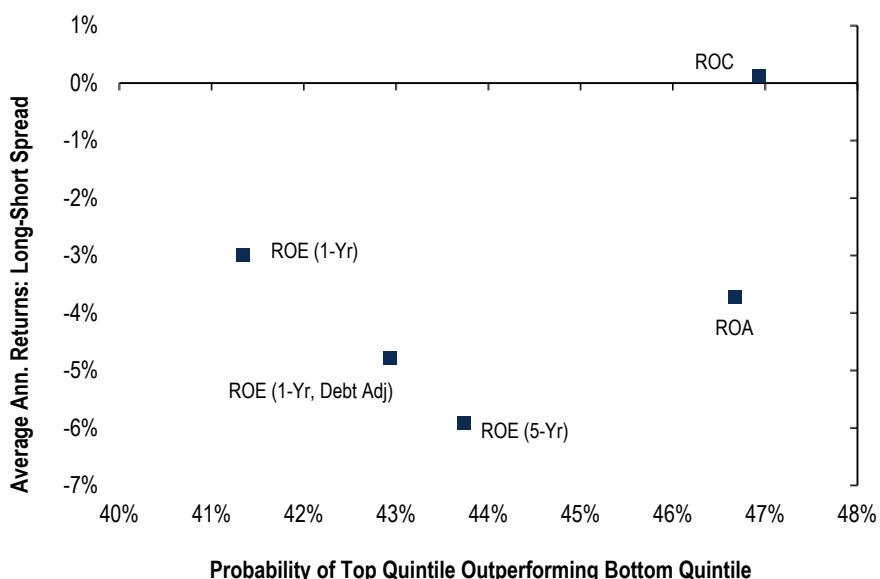
**OTHER DISCRETIONARY L/S**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 329: Quality Strategies for Autos, Cons Durables & Apparel, Cons Svcs: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

**OTHER DISCRETIONARY L/S**

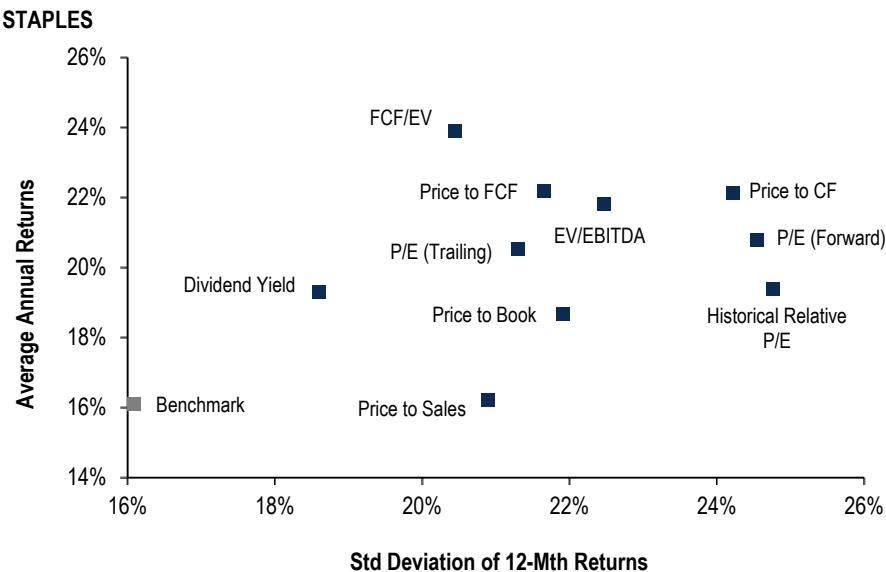


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Consumer Staples

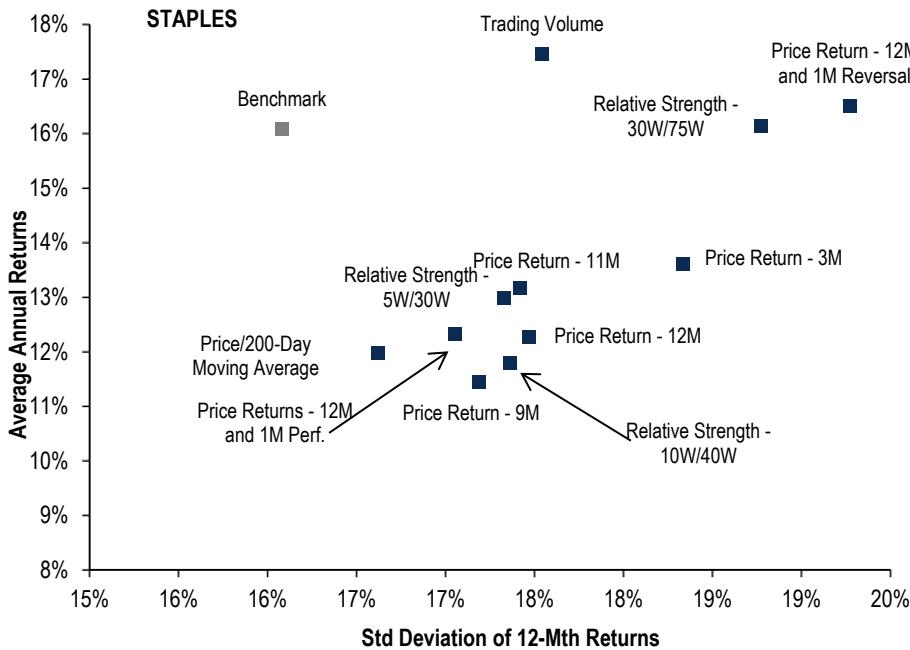
## Long only: Top Quintile Performance

Chart 330: Valuation Strategies for Consumer Staples: Top Quintile Returns (1985 to 2017)



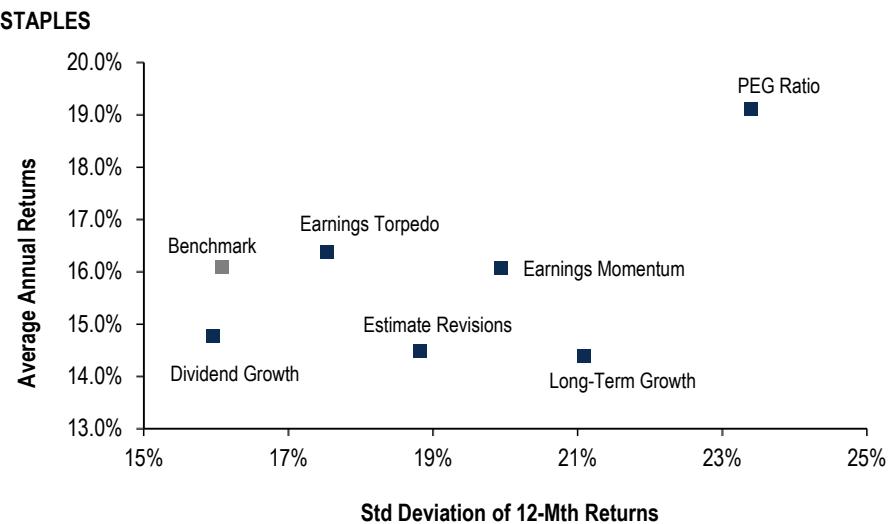
Source: BofA Merrill Lynch US Equity & Quantitative Strategy See Backtesting Methodology at the end of this section.

Chart 331: Momentum Strategies for Consumer Staples: Top Quintile Returns (1985 to 2017)



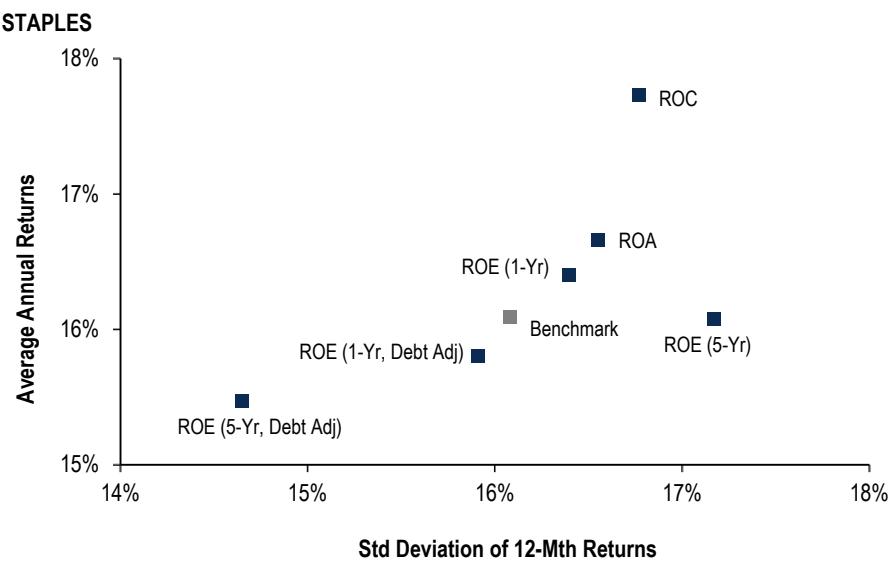
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 332: Growth Strategies for Consumer Staples: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

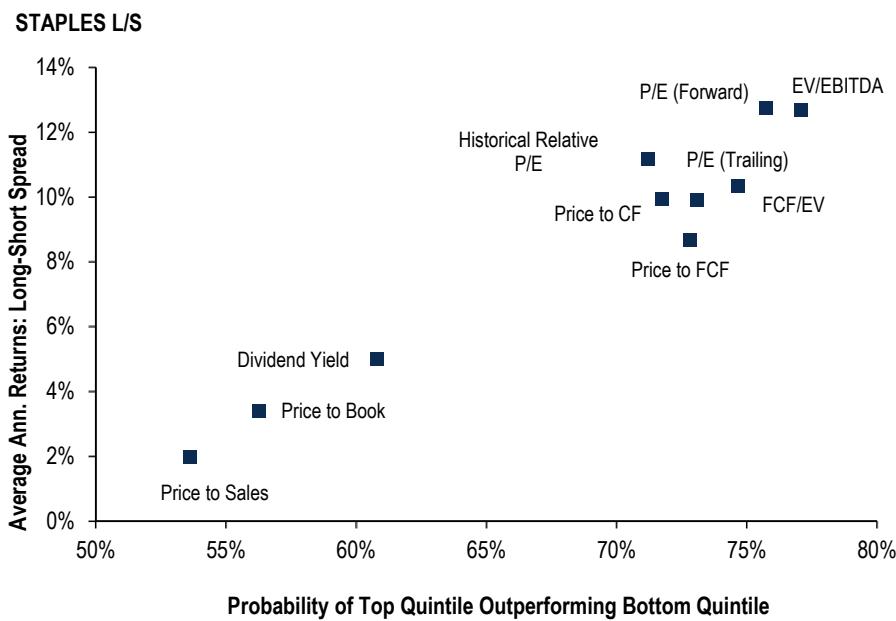
**Chart 333: Quality Strategies for Consumer Staples: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

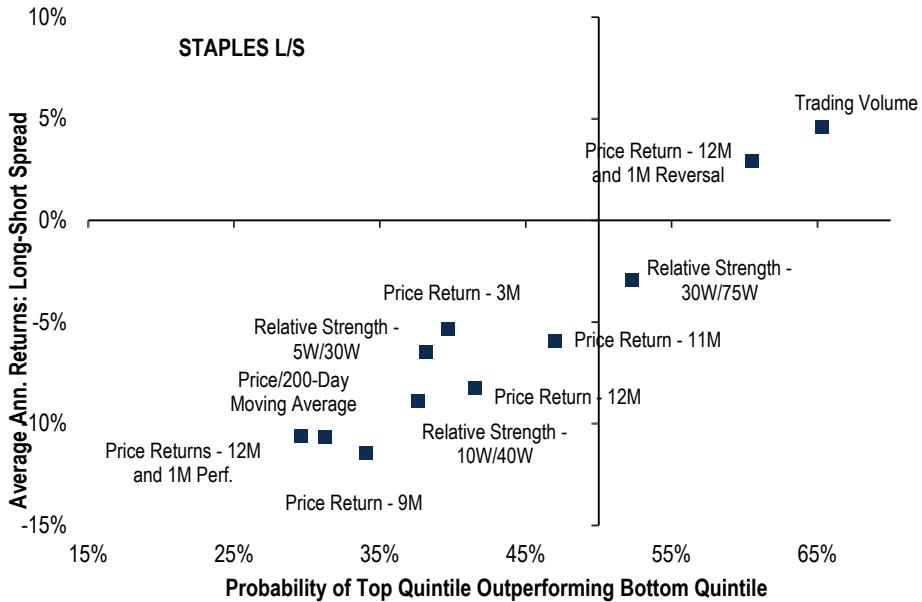
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 334: Valuation Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

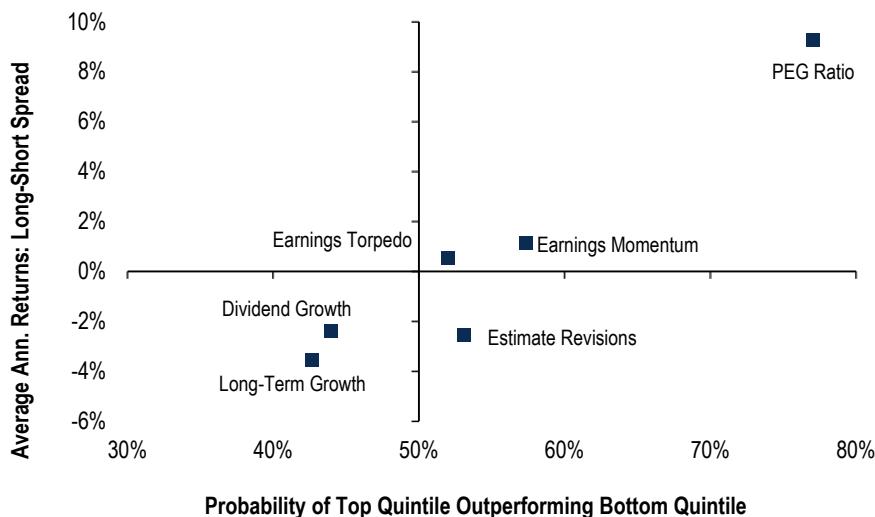
**Chart 335: Momentum Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 336: Growth Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

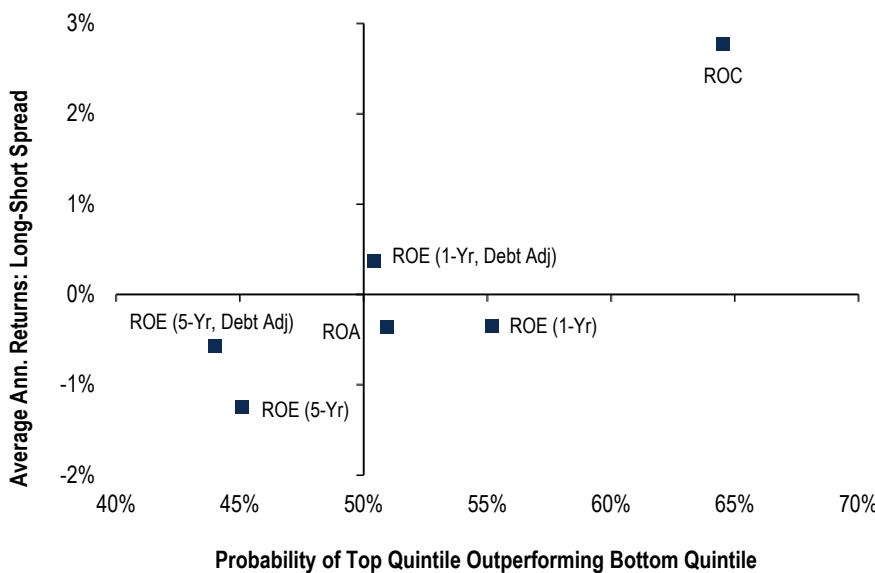
**STAPLES L/S**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 337: Quality Strategies for Consumer Staples: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

**STAPLES L/S**

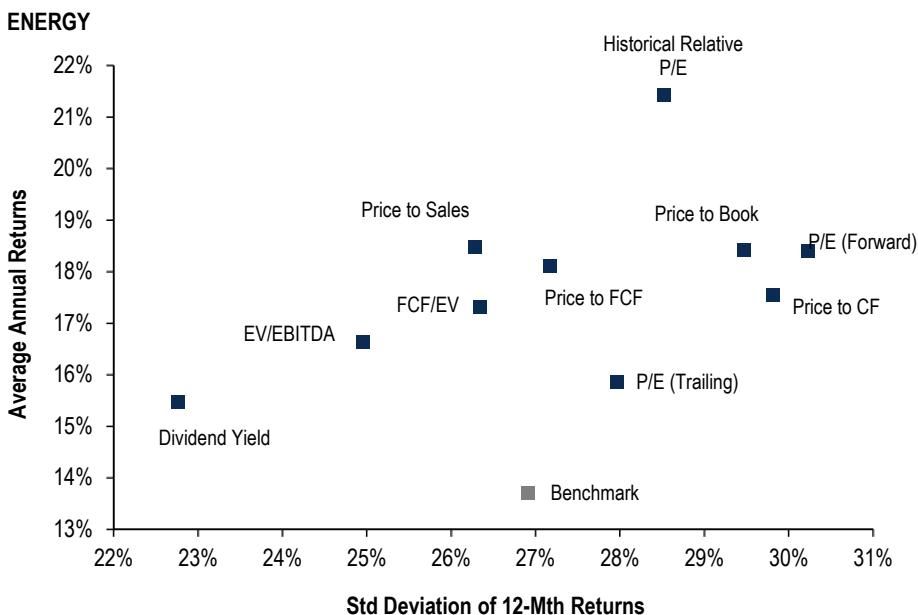


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Energy

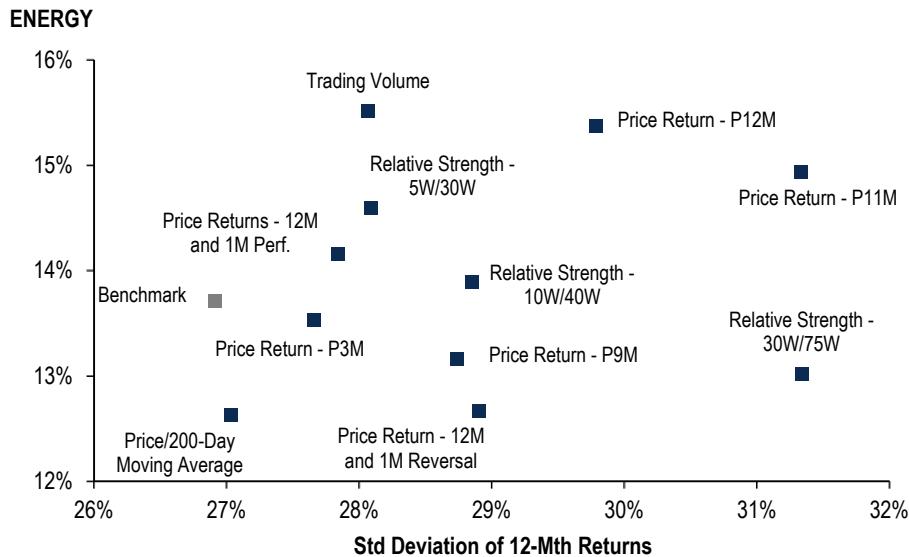
## Long only: Top Quintile Performance

**Chart 338: Valuation Strategies for Energy: Top Quintile Returns (1985 to 2017)**



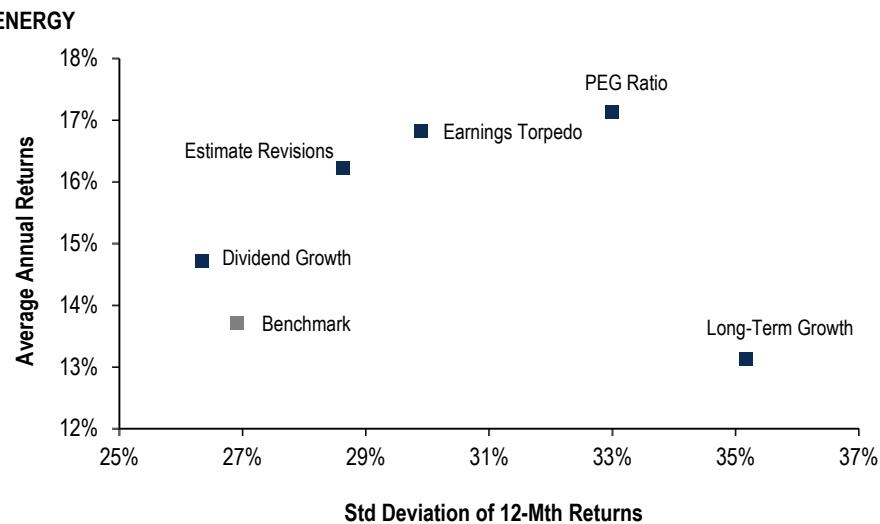
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 339: Momentum Strategies for Energy: Top Quintile Returns (1985 to 2017)**



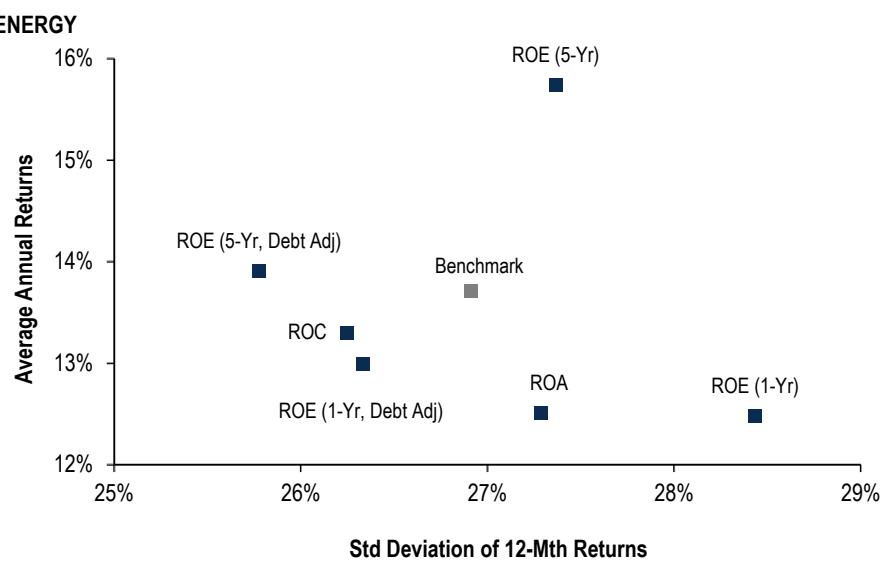
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 340: Growth Strategies for Energy: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

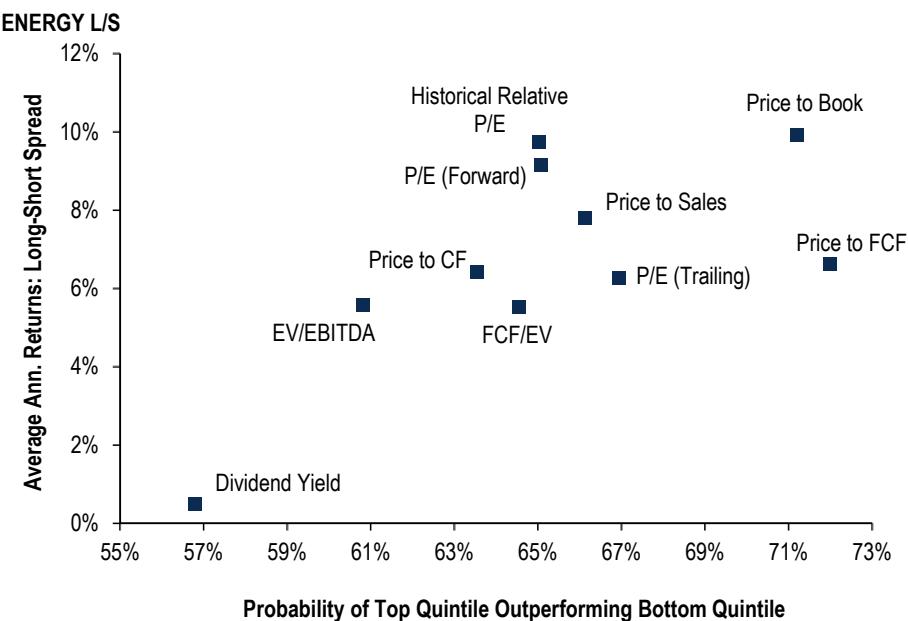
**Chart 341: Quality Strategies for Energy: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

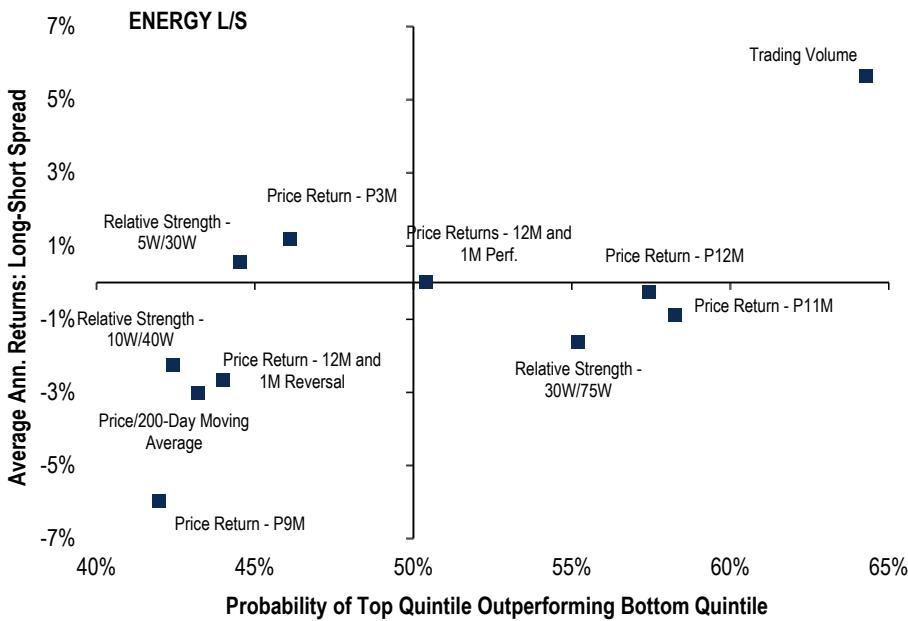
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 342: Valuation Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



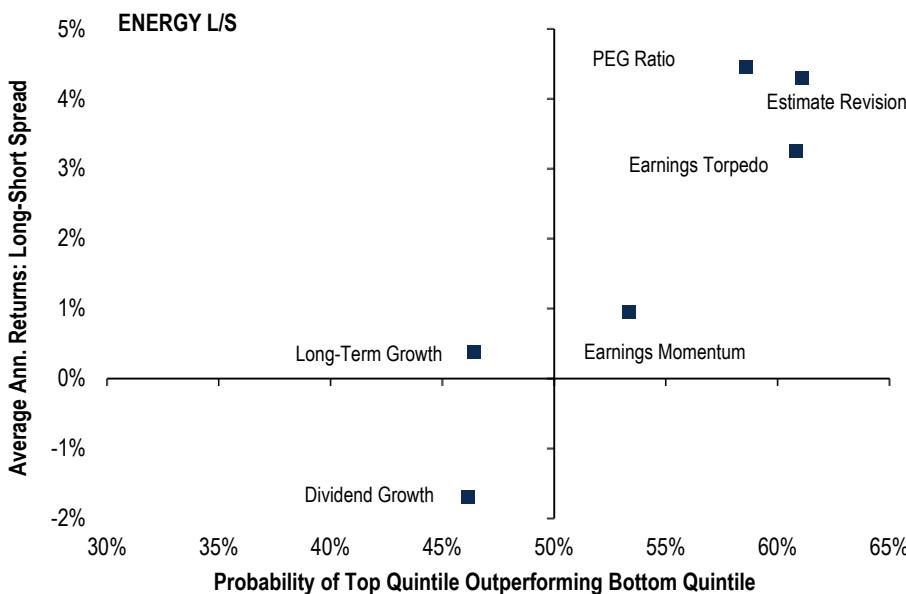
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 343: Momentum Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



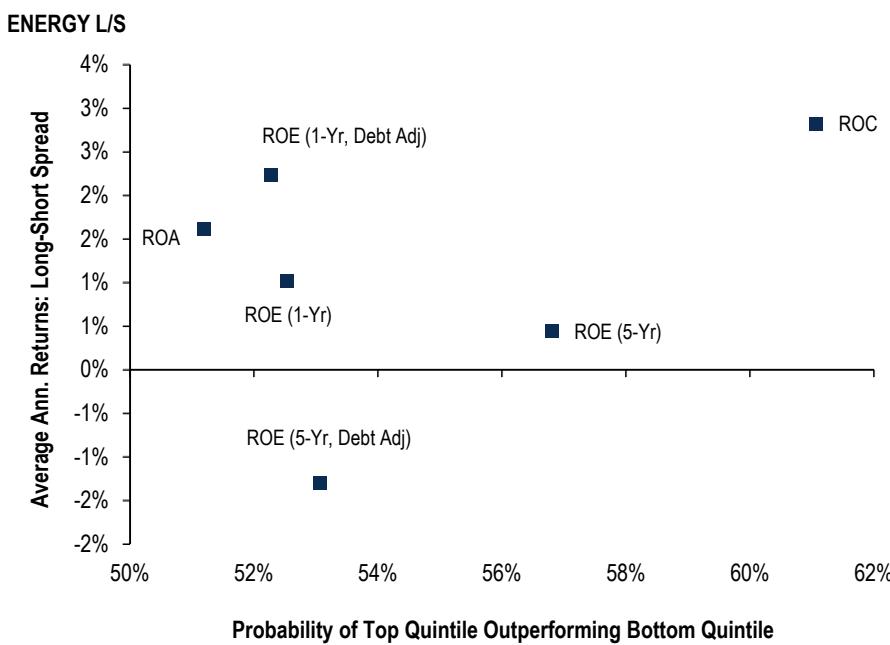
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 344: Growth Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 345: Quality Strategies for Energy: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

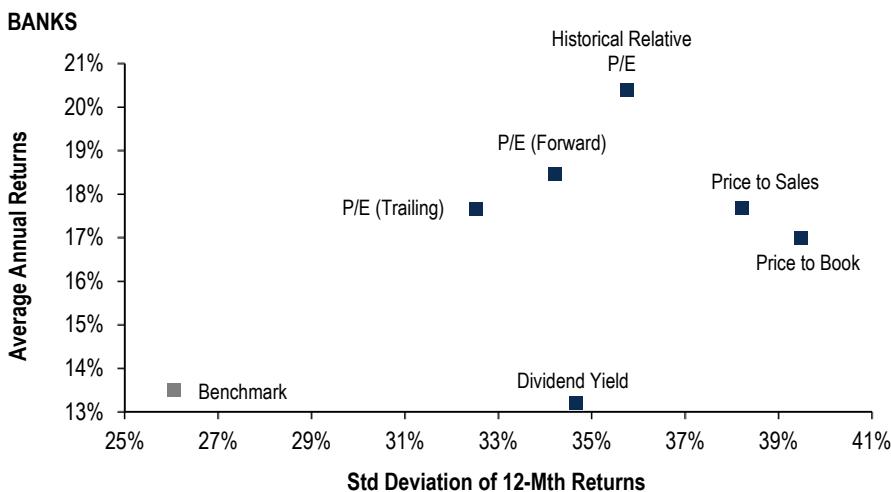


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Financials: Banks

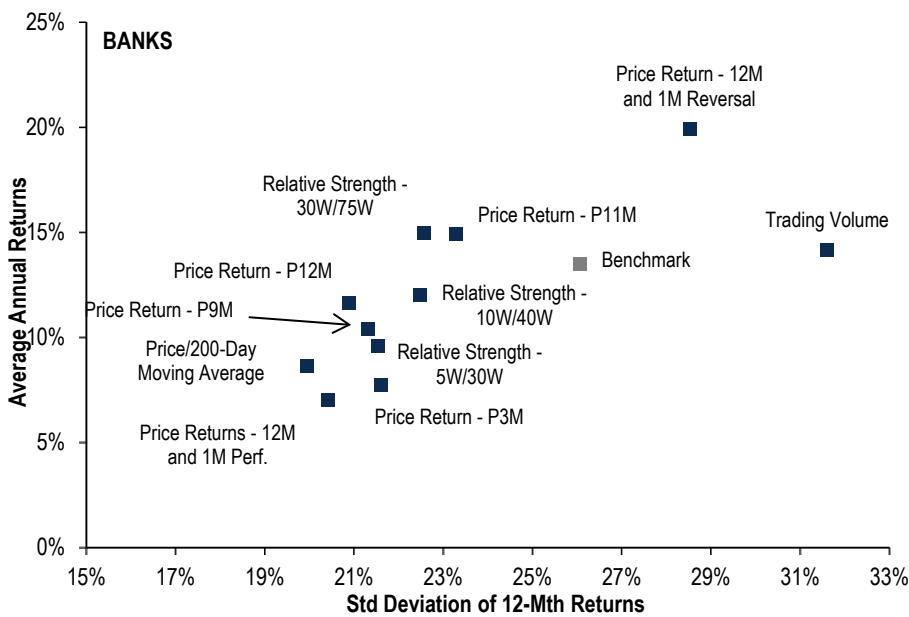
## Long only: Top Quintile Performance

**Chart 346: Valuation Strategies for Banks: Top Quintile Returns (1985 to 2017)**



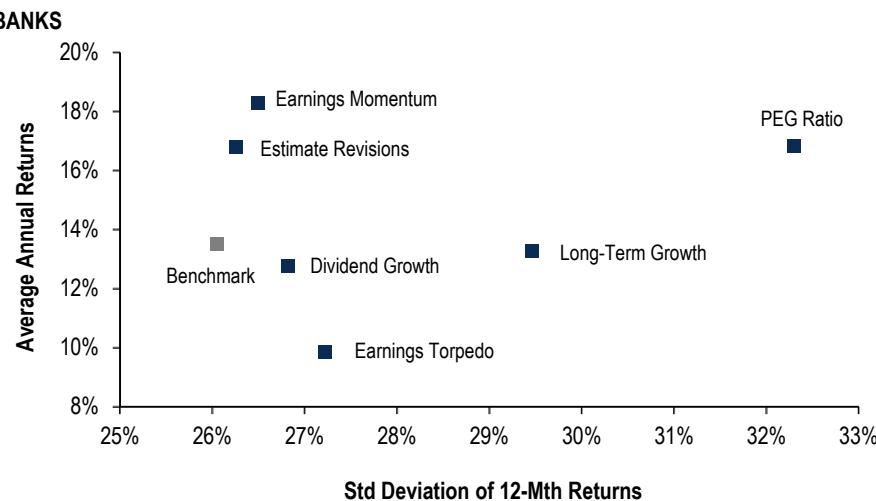
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 347: Momentum Strategies for Banks: Top Quintile Returns (1985 to 2017)**



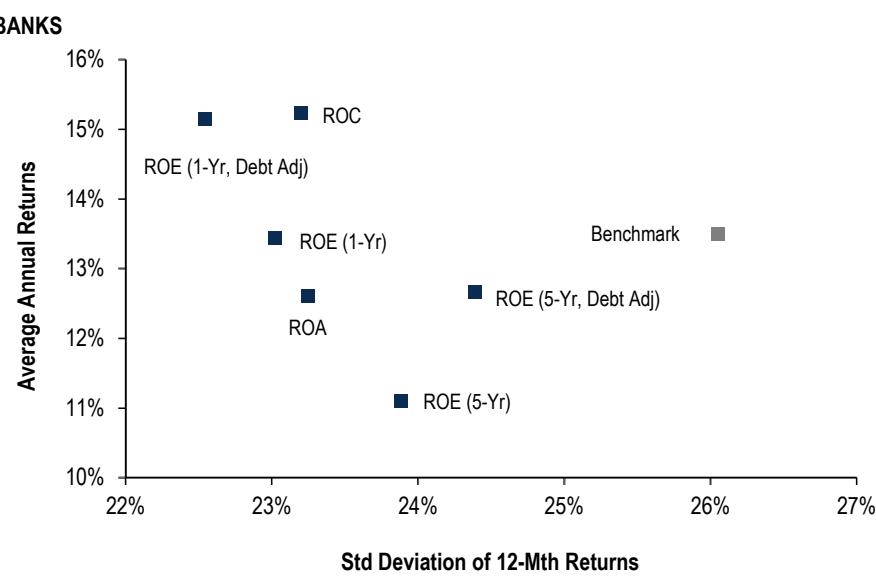
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 348: Growth Strategies for Banks: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

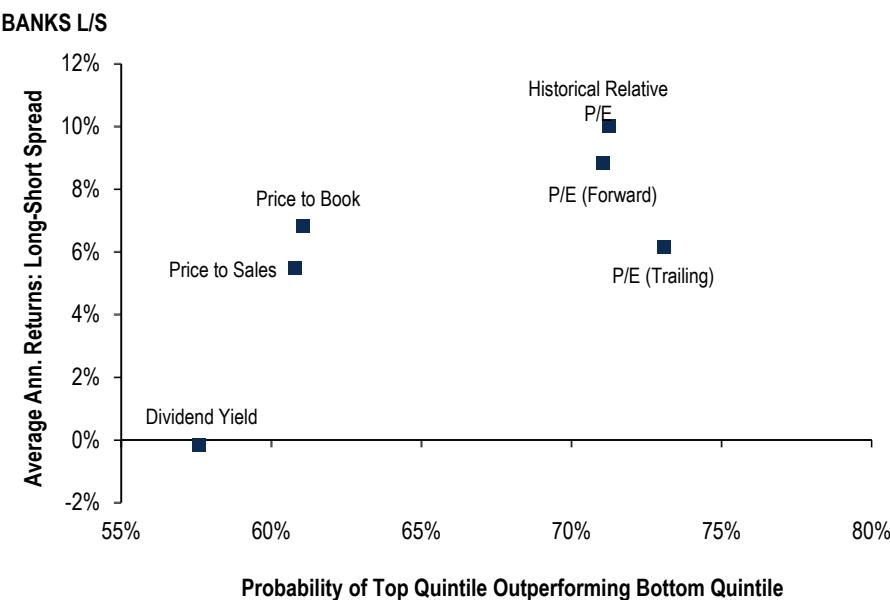
**Chart 349: Quality Strategies for Banks: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

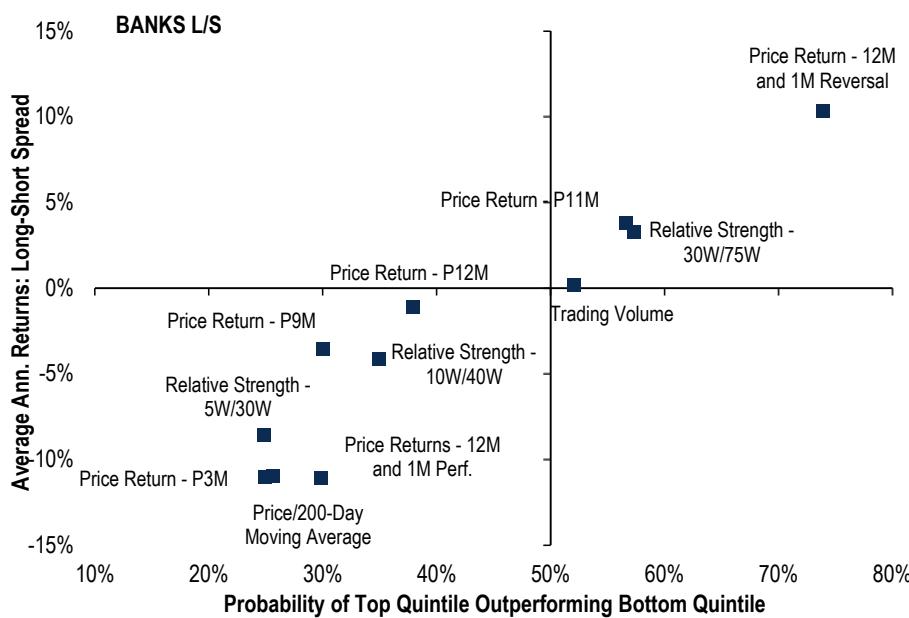
## Long-Short: Quintile 1 / Quintile 5 Spread

Chart 350: Valuation Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)



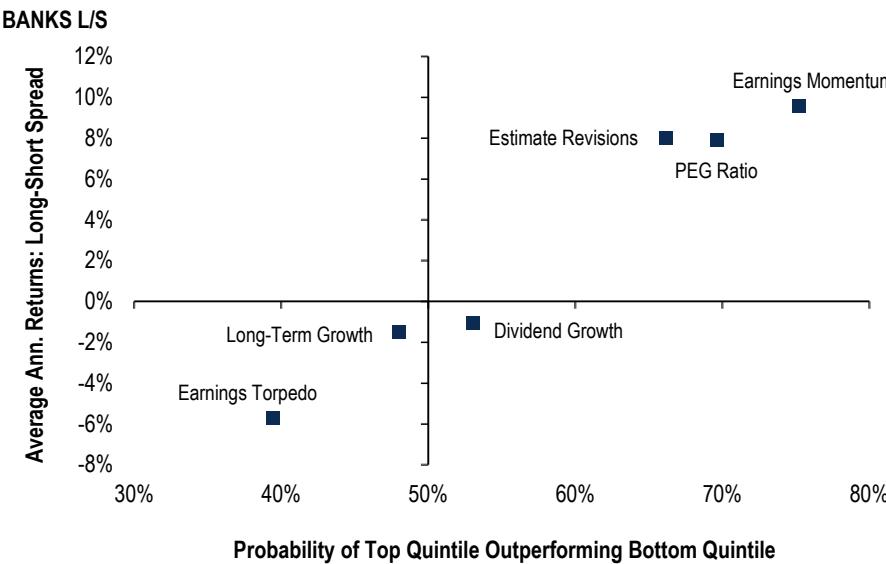
Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

Chart 351: Momentum Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)



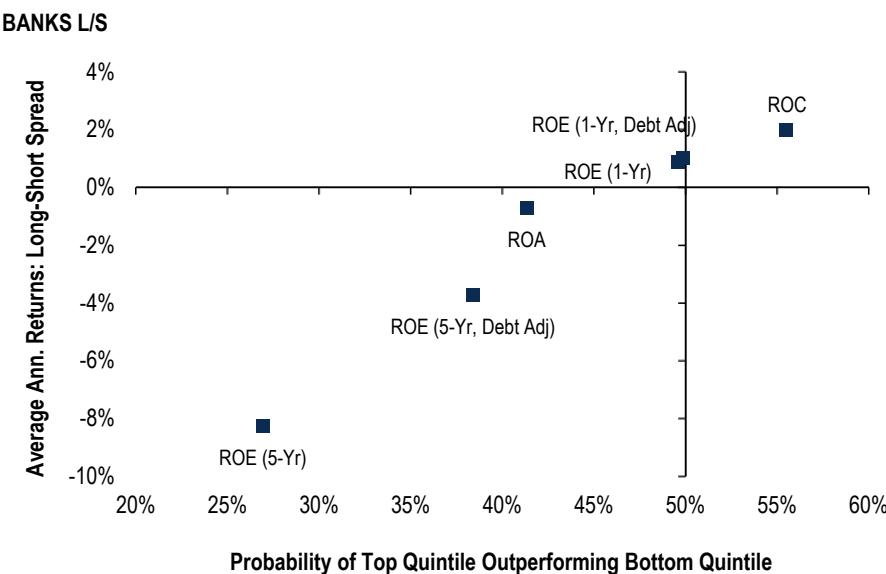
Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

**Chart 352: Growth Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 353: Quality Strategies for Banks: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

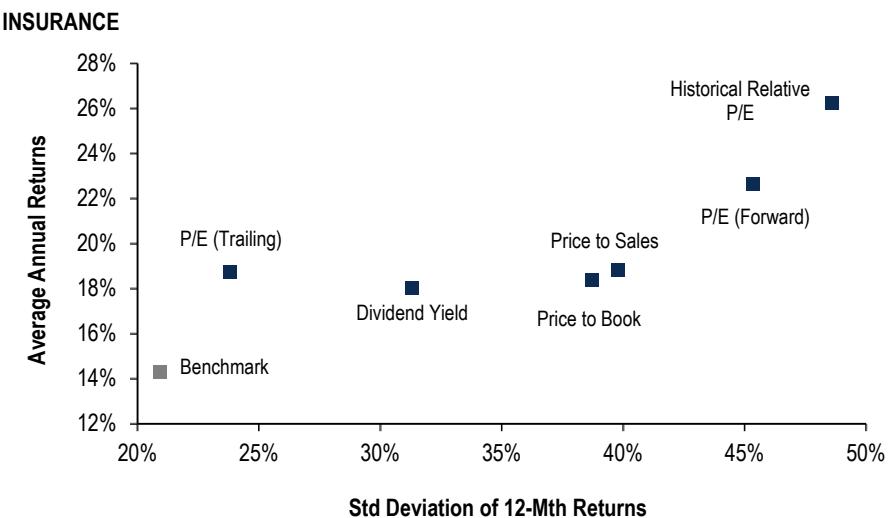


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Financials: Insurance

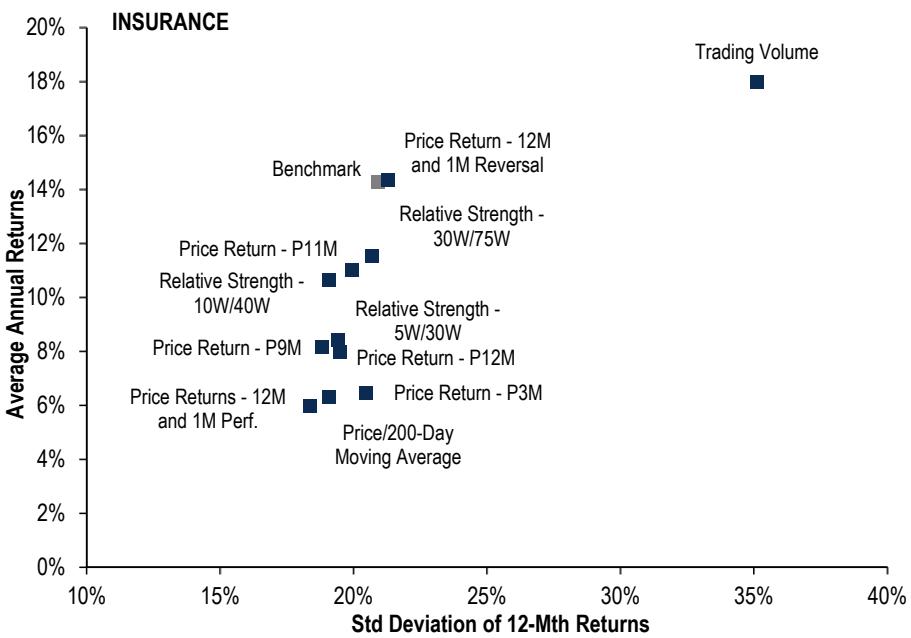
## Long only: Top Quintile Performance

Chart 354: Valuation Strategies for Insurance: Top Quintile Returns (1985 to 2017)



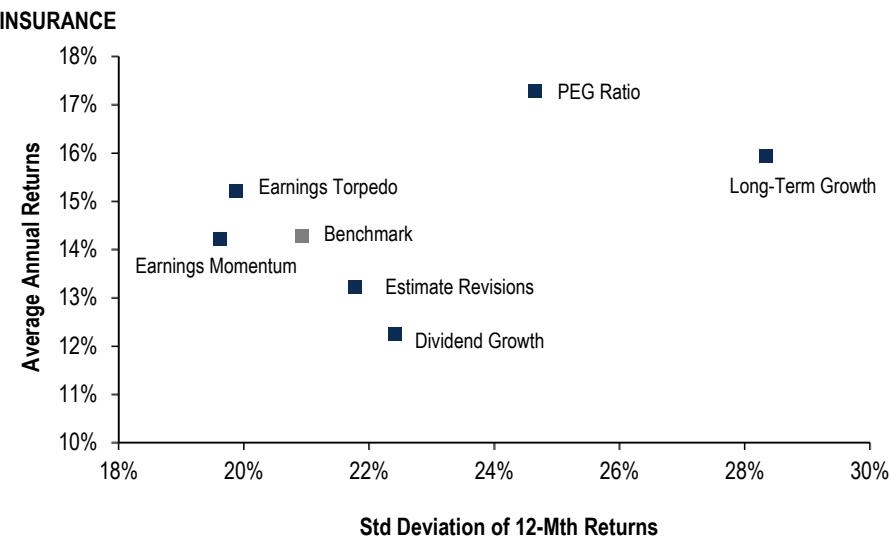
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

Chart 355: Momentum Strategies for Insurance: Top Quintile Returns (1985 to 2017)



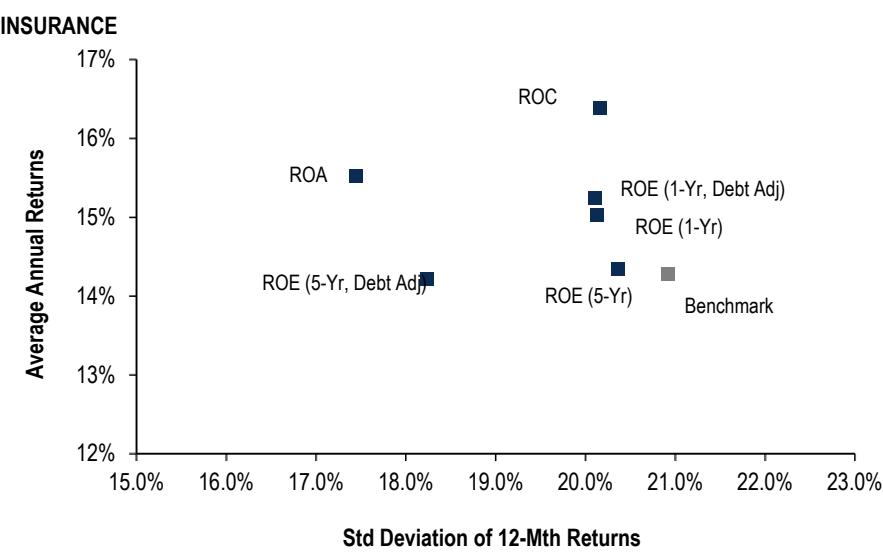
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 356: Growth Strategies for Insurance: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

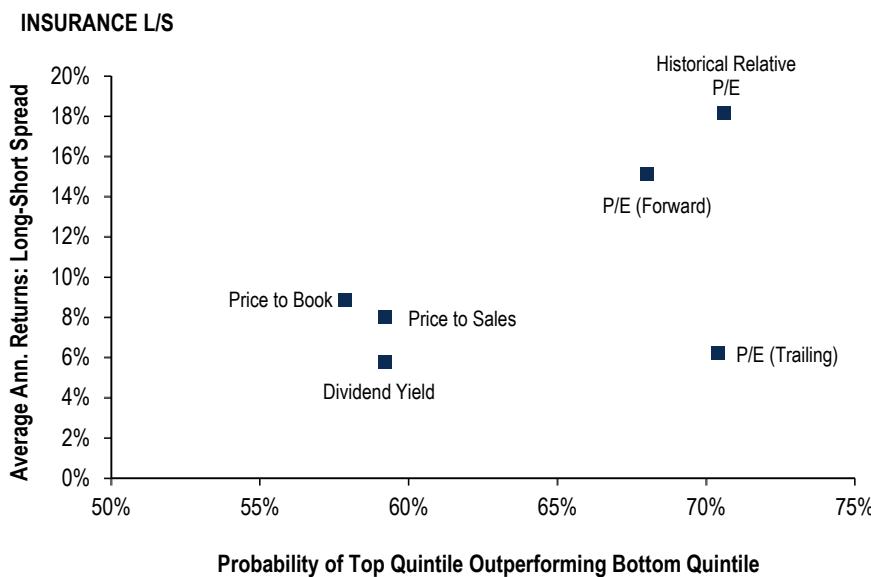
**Chart 357: Quality Strategies for Insurance: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

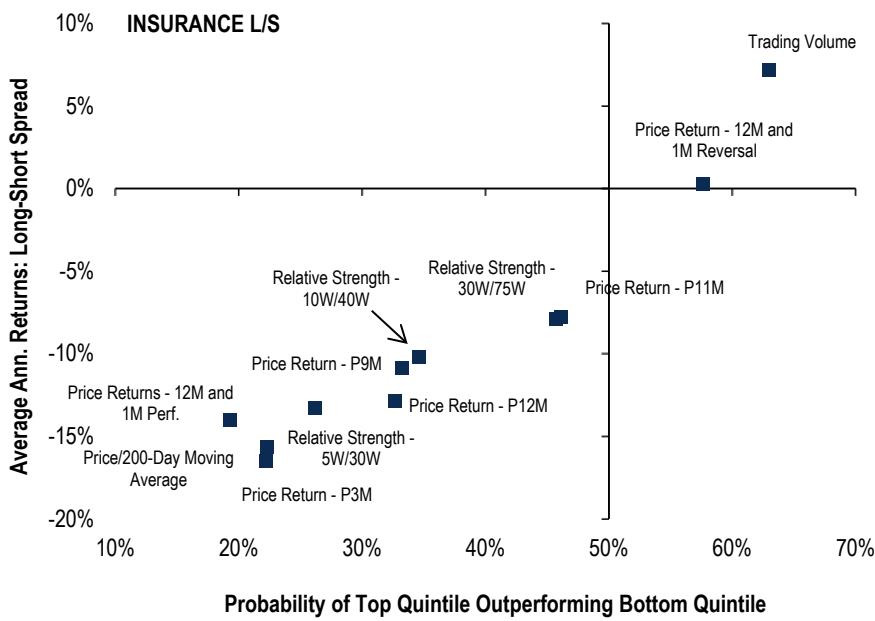
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 358: Valuation Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



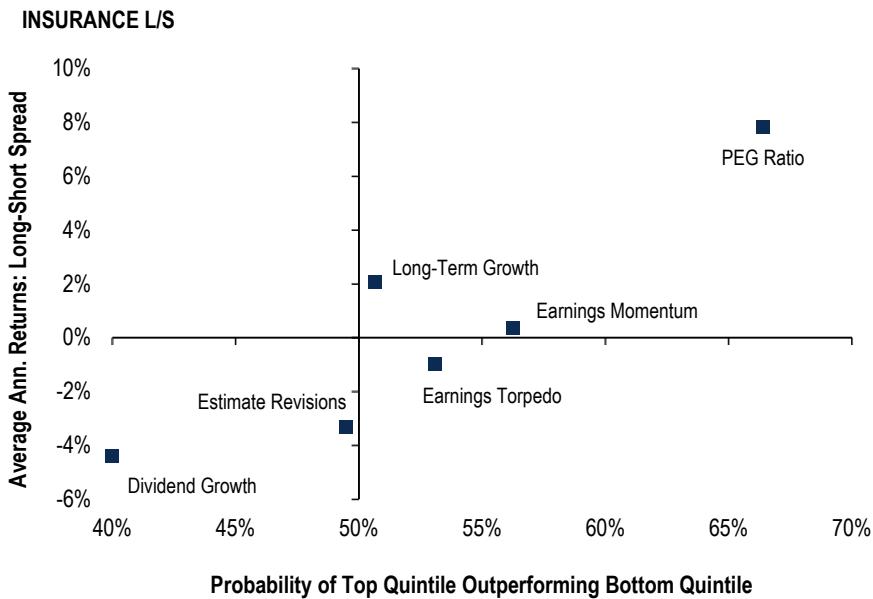
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 359: Momentum Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



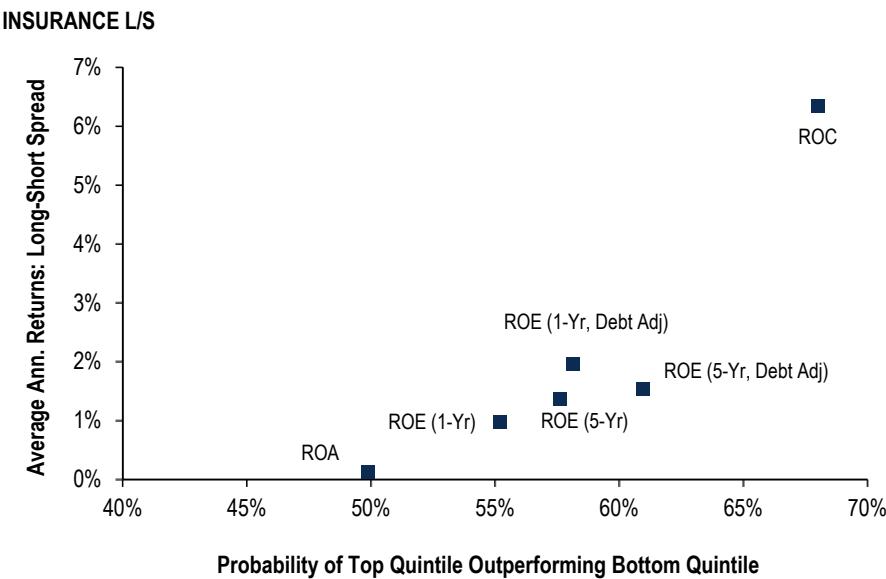
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 360: Growth Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 361: Quality Strategies for Insurance: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

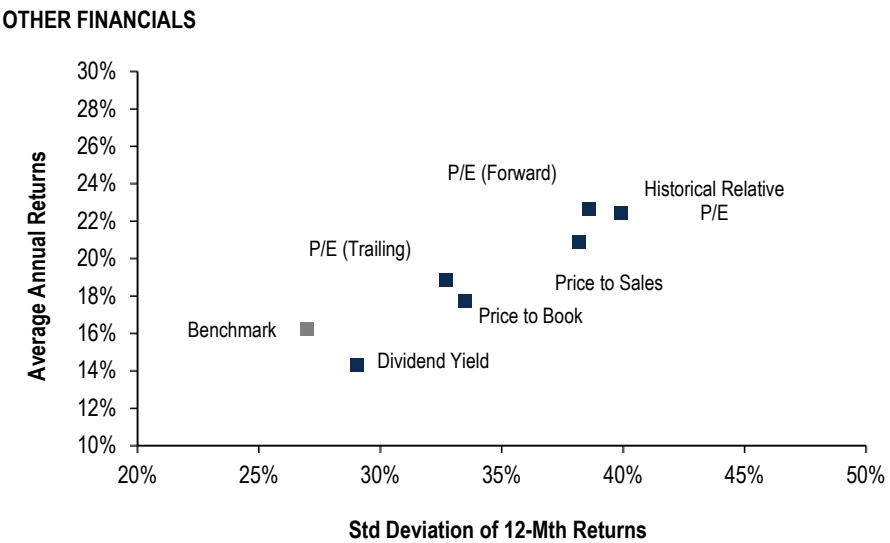


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Other Financials (REITs, Diversified)

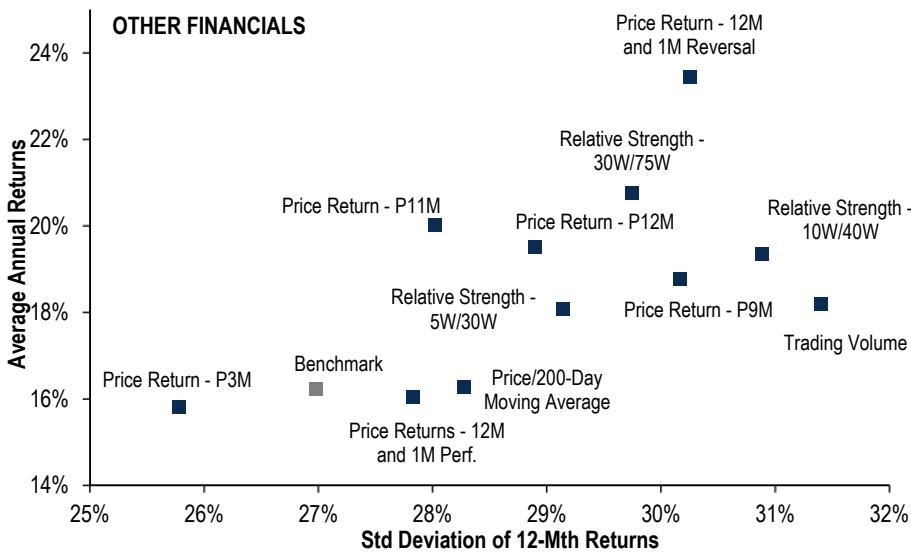
## Long only: Top Quintile Performance

Chart 362: Valuation Strategies for other Financials: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

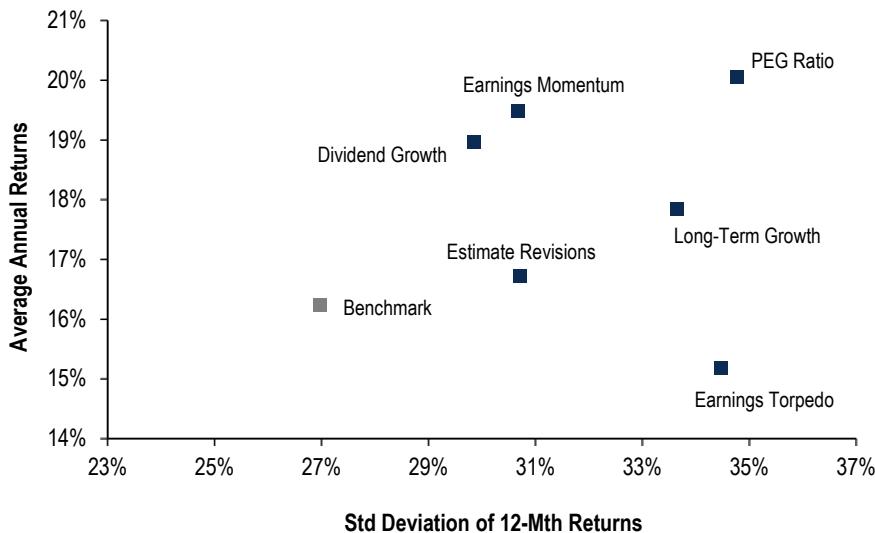
Chart 363: Momentum Strategies for Other Financials: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 364: Growth Strategies for Other Financials: Top Quintile Returns (1985 to 2017)**

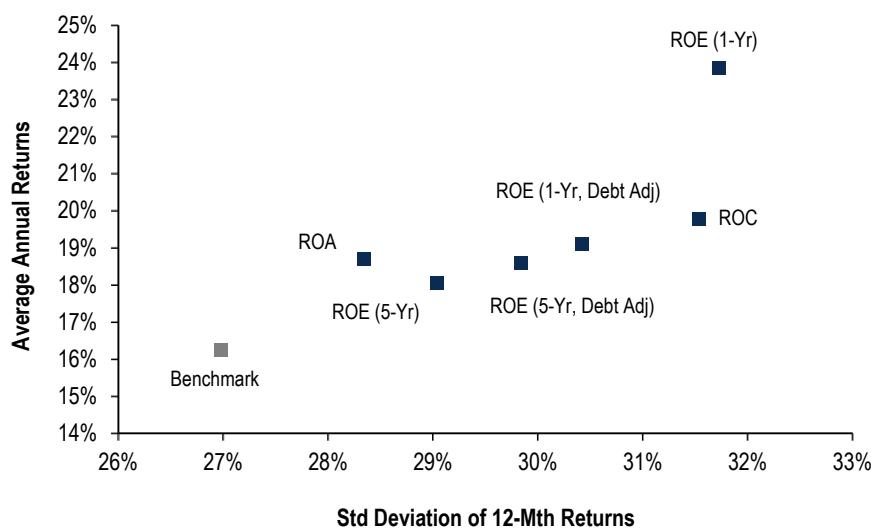
**OTHER FINANCIALS**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 365: Quality Strategies for Other Financials: Top Quintile Returns (1985 to 2017)**

**OTHER FINANCIALS**

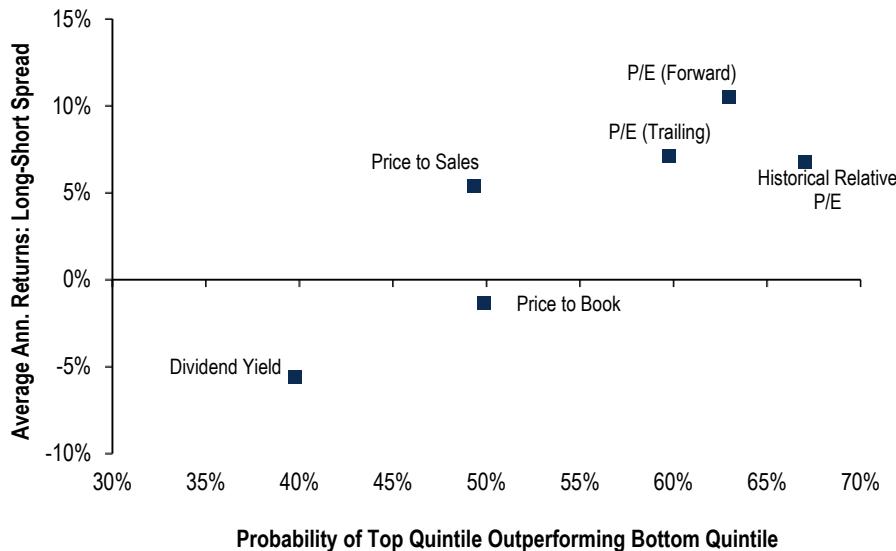


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 366: Valuation Strategies for Other Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

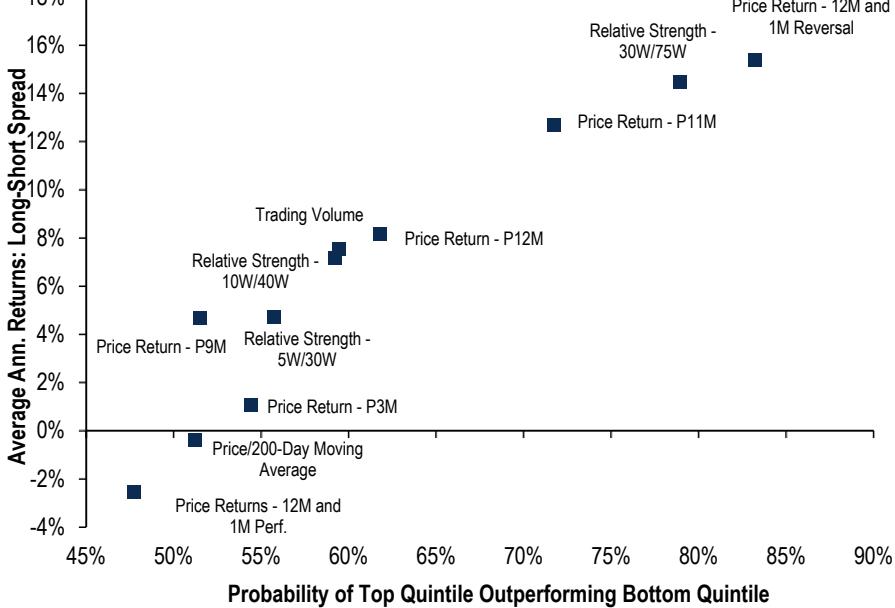
### OTHER FINANCIALS L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 367: Momentum Strategies for Other Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

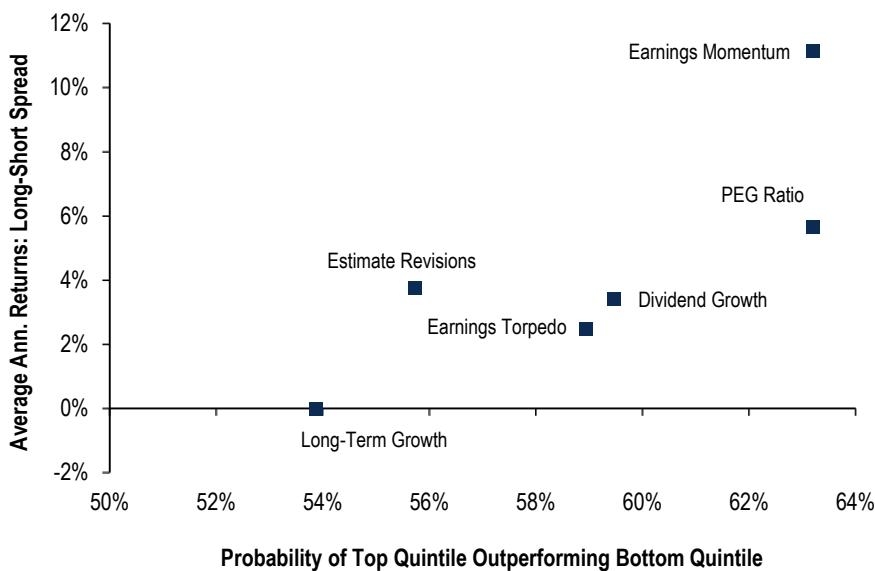
### OTHER FINANCIALS L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 368: Growth Strategies for Other Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

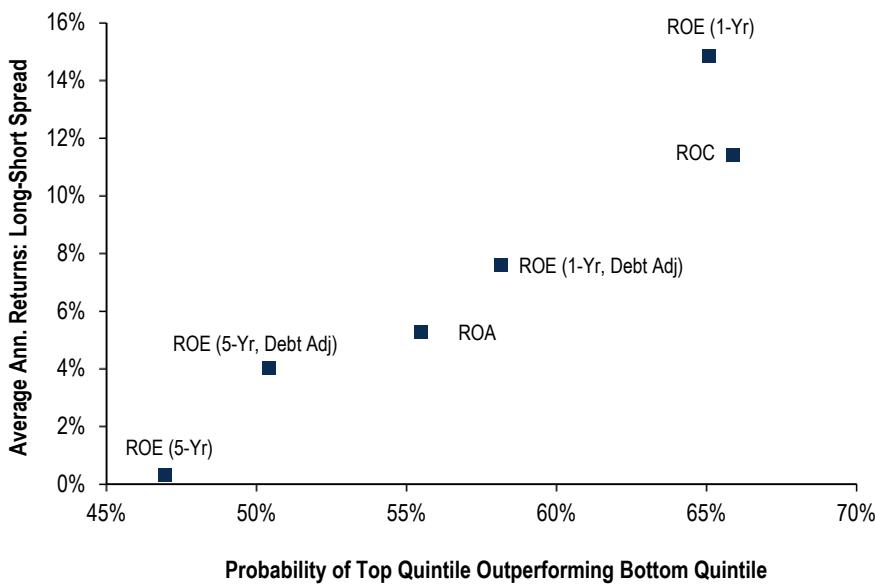
**OTHER FINANCIALS L/S**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 369: Quality Strategies for Other Financials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

**OTHER FINANCIALS L/S**

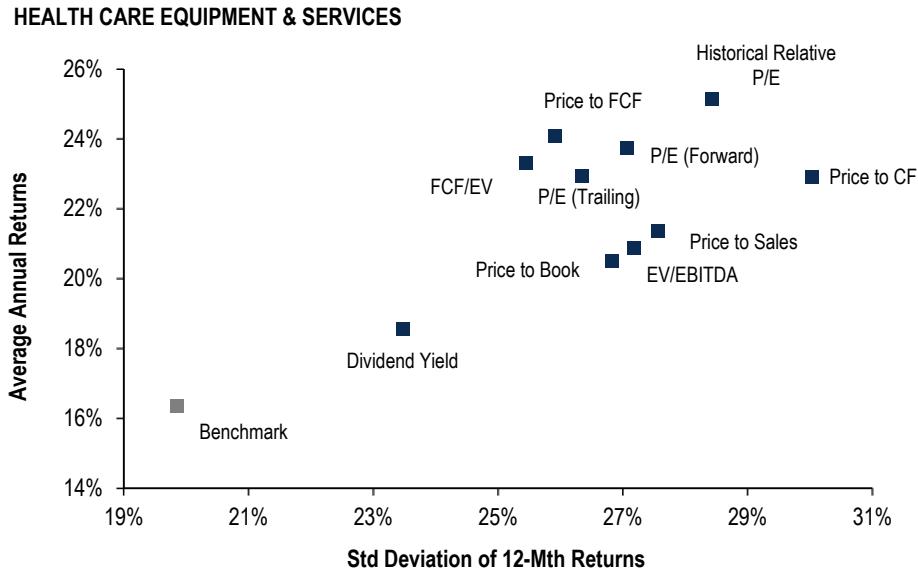


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Health Care: Health Care Equipment & Svcs

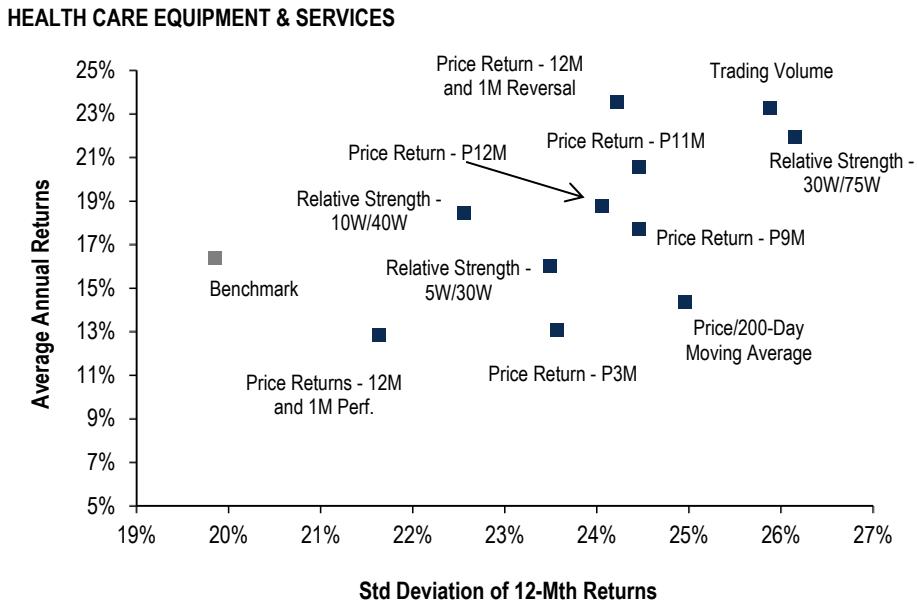
## Long only: Top Quintile Performance

Chart 370: Valuation Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

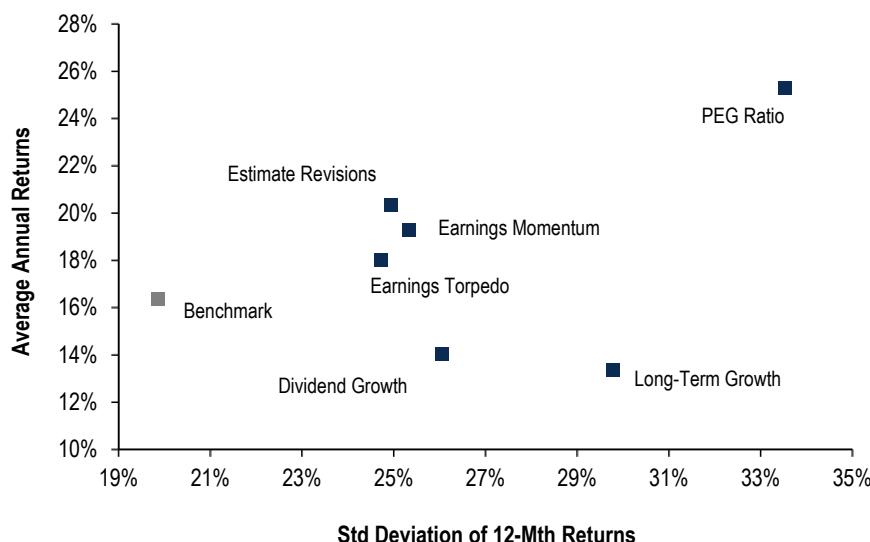
Chart 371: Momentum Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 372: Growth Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2017)**

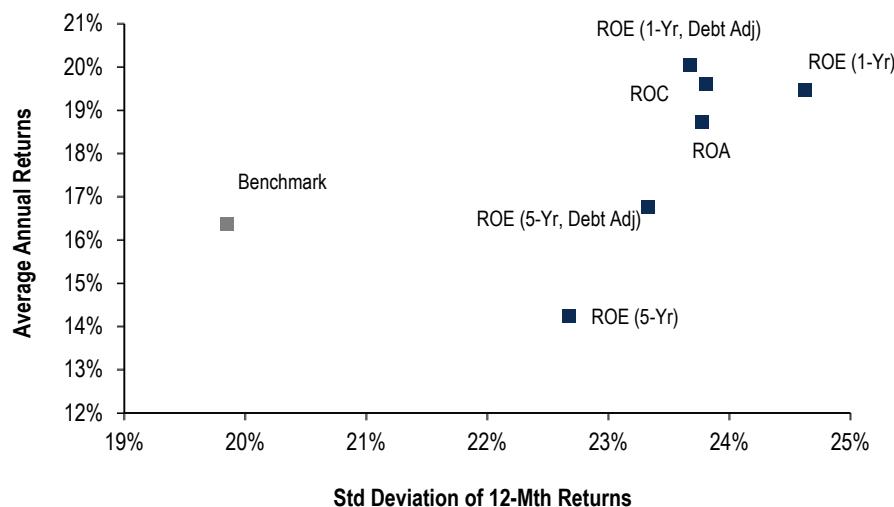
#### HEALTH CARE EQUIPMENT & SERVICES



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 373: Quality Strategies for Health Care Equipment & Services: Top Quintile Returns (1985 to 2017)**

#### HEALTH CARE EQUIPMENT & SERVICES

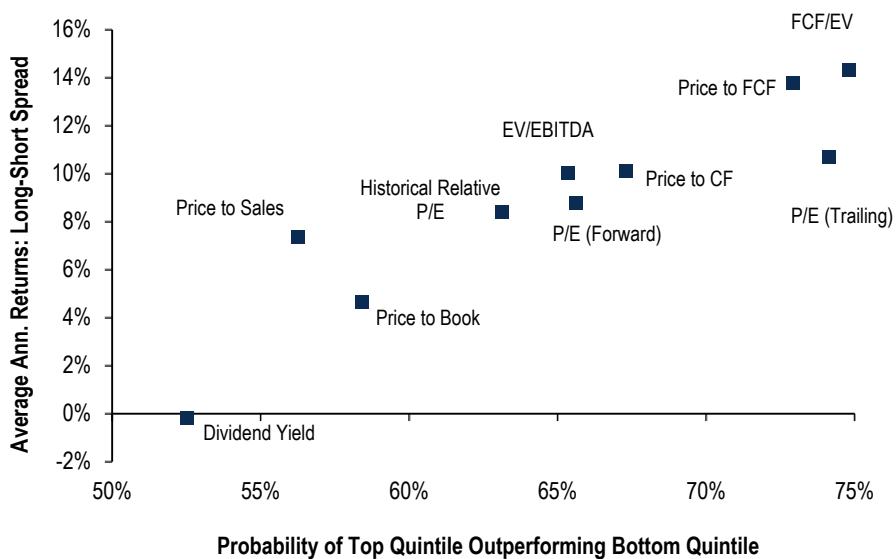


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 374: Valuation Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

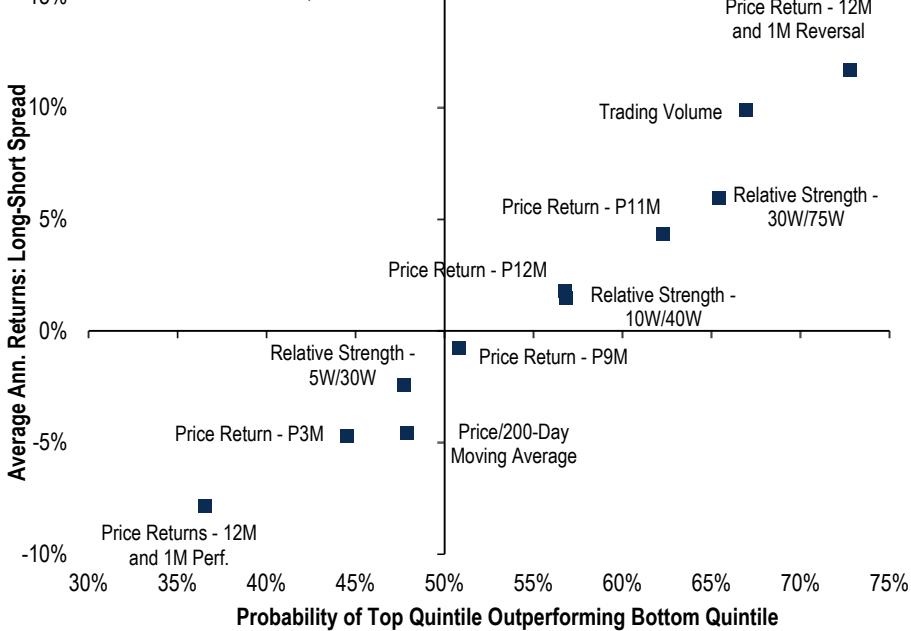
### HEALTH CARE EQUIPMENT & SERVICES L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 375: Momentum Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

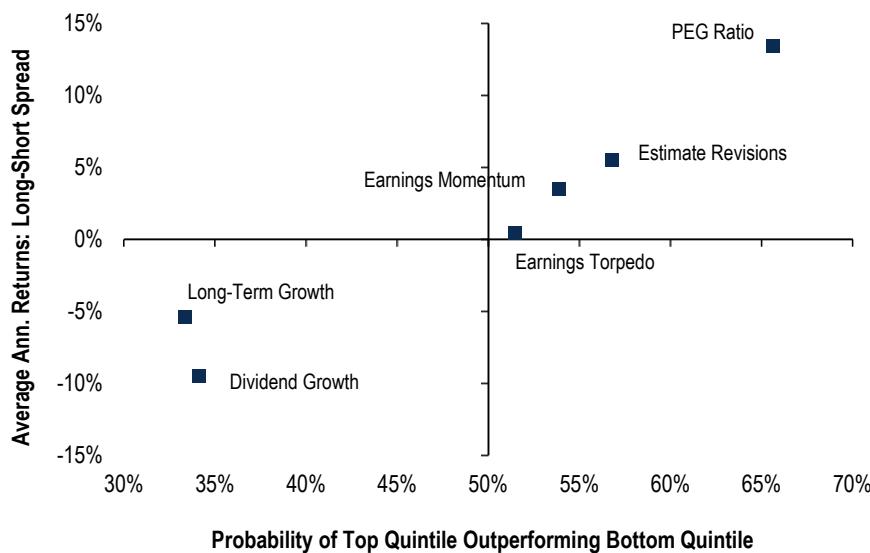
### HEALTH CARE EQUIPMENT & SERVICES L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 376: Growth Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

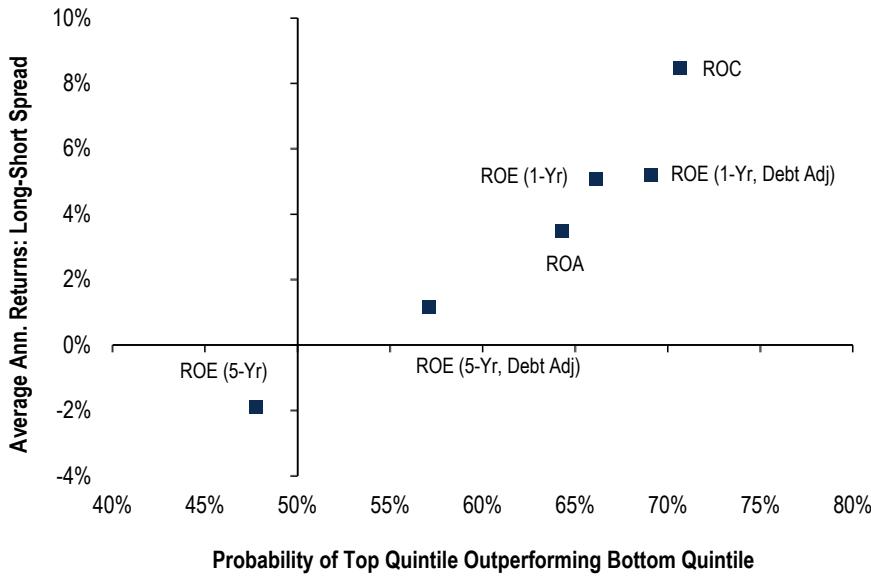
#### HEALTH CARE EQUIPMENT & SERVICES L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 377: Quality Strategies for Health Care Equipment & Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

#### HEALTH CARE EQUIPMENT & SERVICES L/S

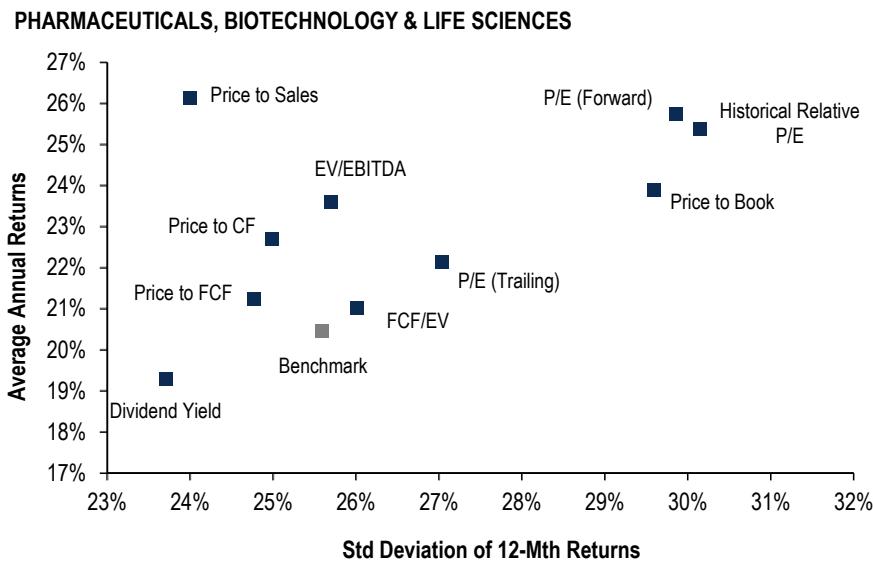


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Health Care: Pharmaceuticals Biotechnology & Life Sciences

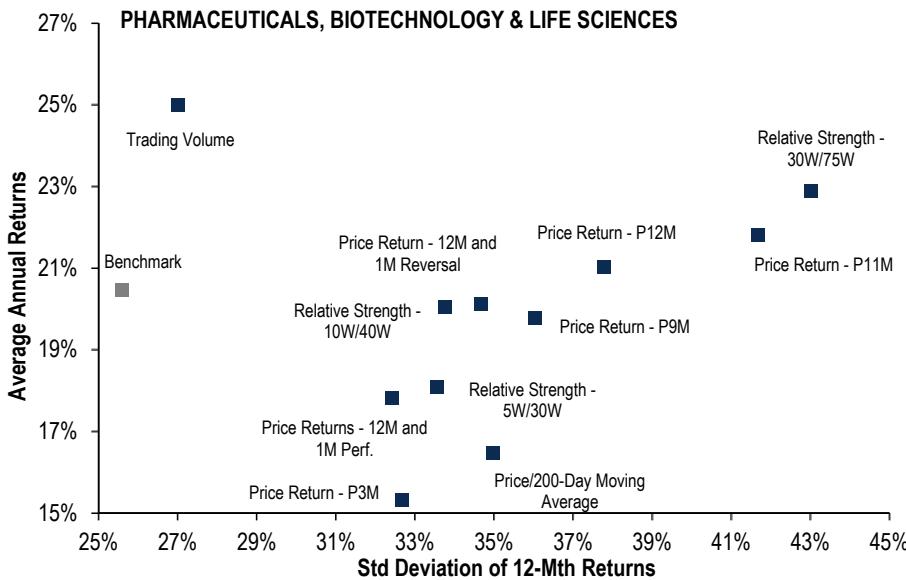
## Long only: Top Quintile Performance

**Chart 378: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

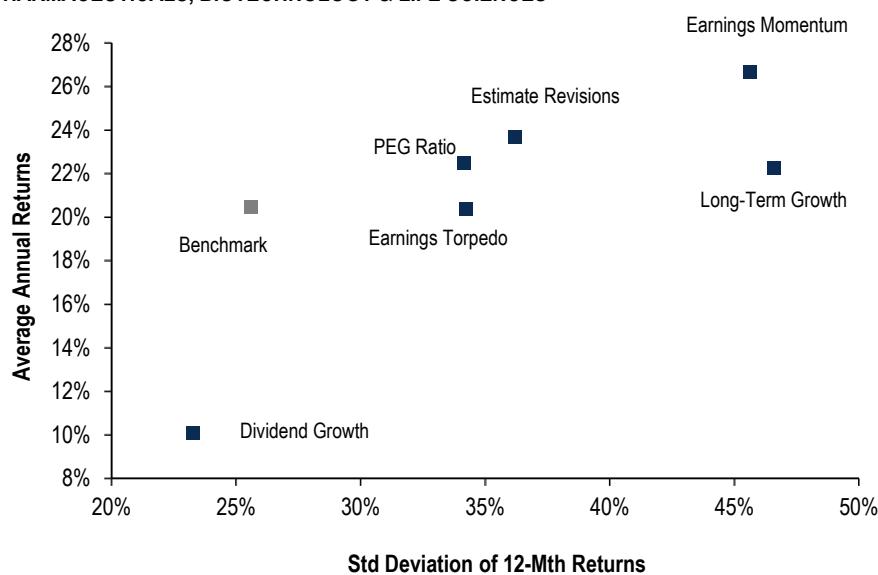
**Chart 379: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 380: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2017)**

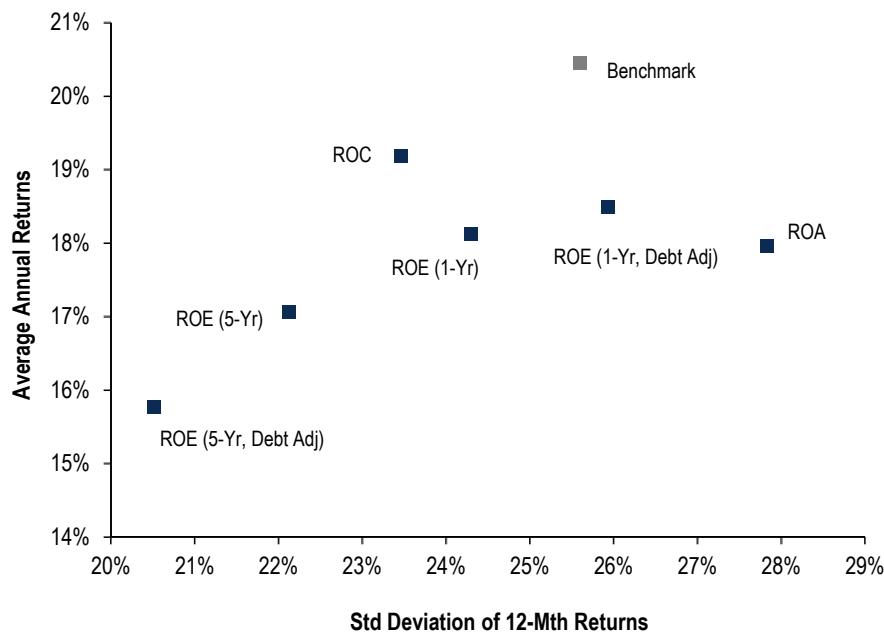
**PHARMACEUTICALS, BIOTECHNOLOGY & LIFE SCIENCES**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 381: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Top Quintile Returns (1985 to 2017)**

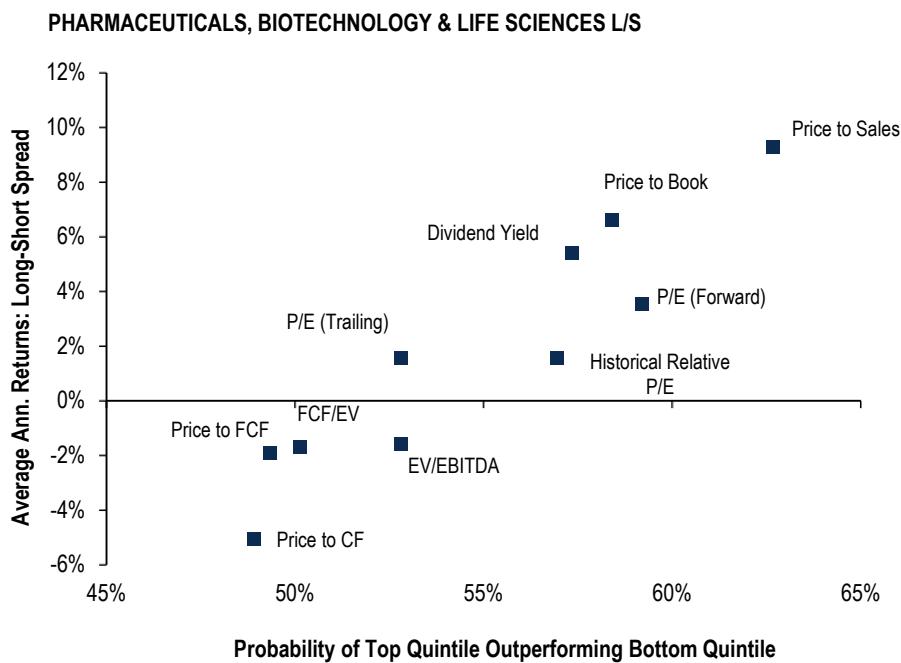
**PHARMACEUTICALS, BIOTECHNOLOGY & LIFE SCIENCES**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

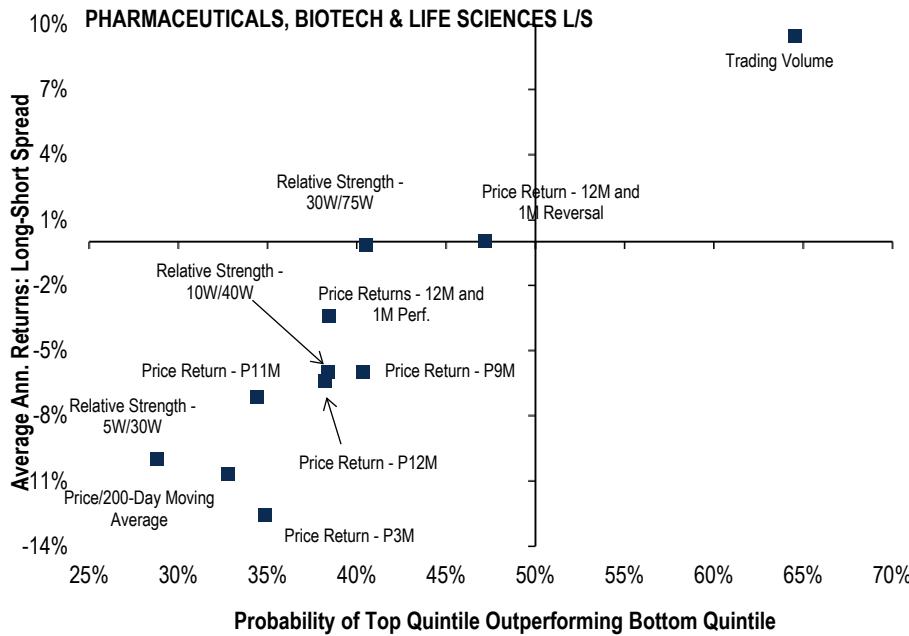
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 382: Valuation Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



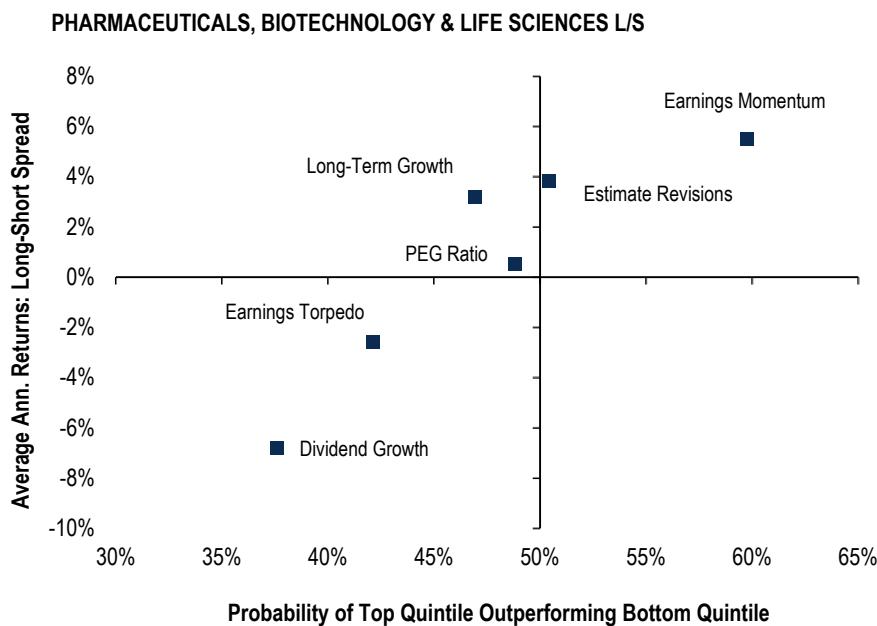
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 383: Momentum Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



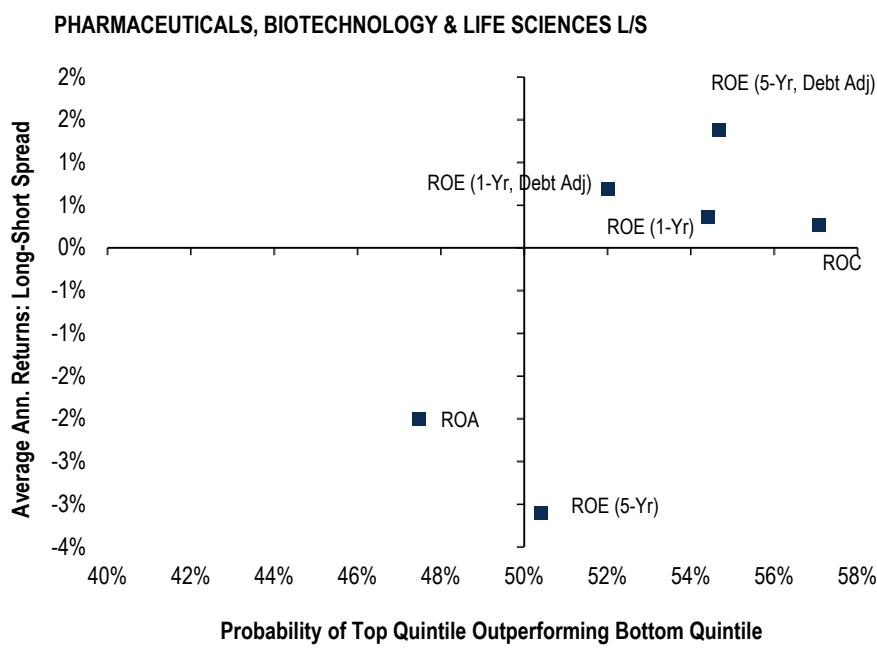
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 384: Growth Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 385: Quality Strategies for Pharmaceuticals, Biotechnology & Life Sciences: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



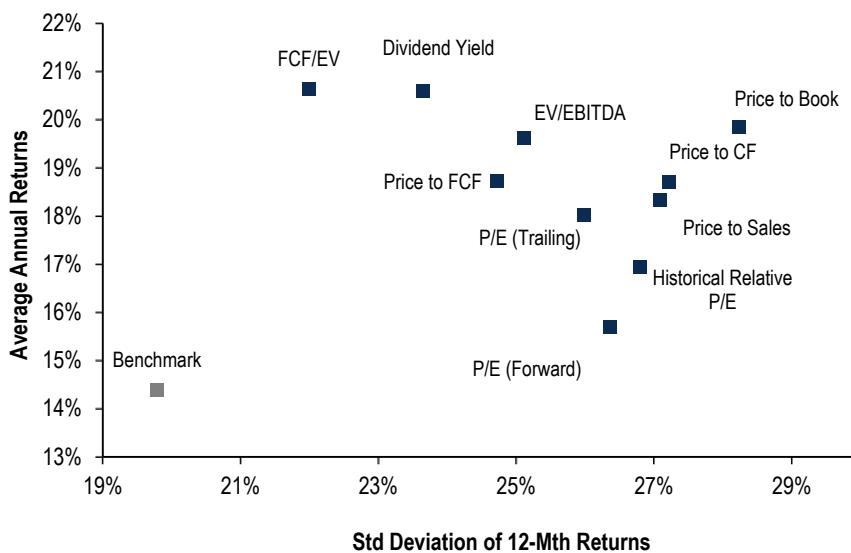
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Industrials: Capital Goods

## Long only: Top Quintile Performance

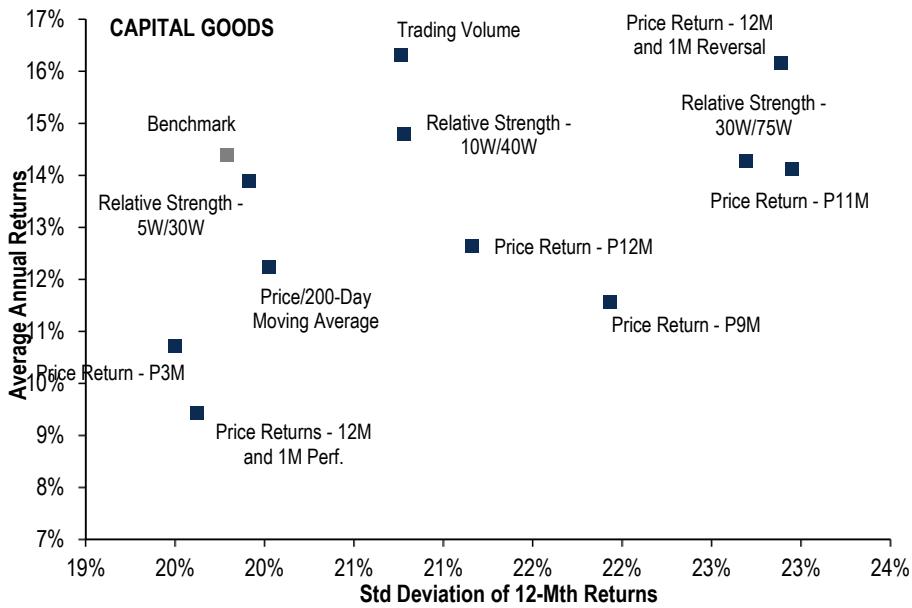
**Chart 386: Valuation Strategies for Capital Goods: Top Quintile Returns (1985 to 2017)**

### CAPITAL GOODS



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

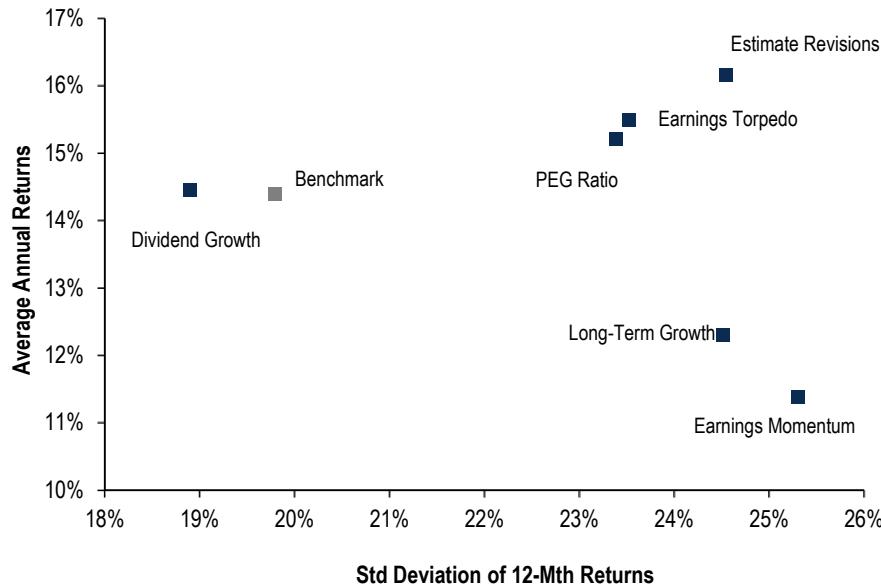
**Chart 387: Momentum Strategies for Capital Goods: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 388: Growth Strategies for Capital Goods: Top Quintile Returns (1985 to 2017)**

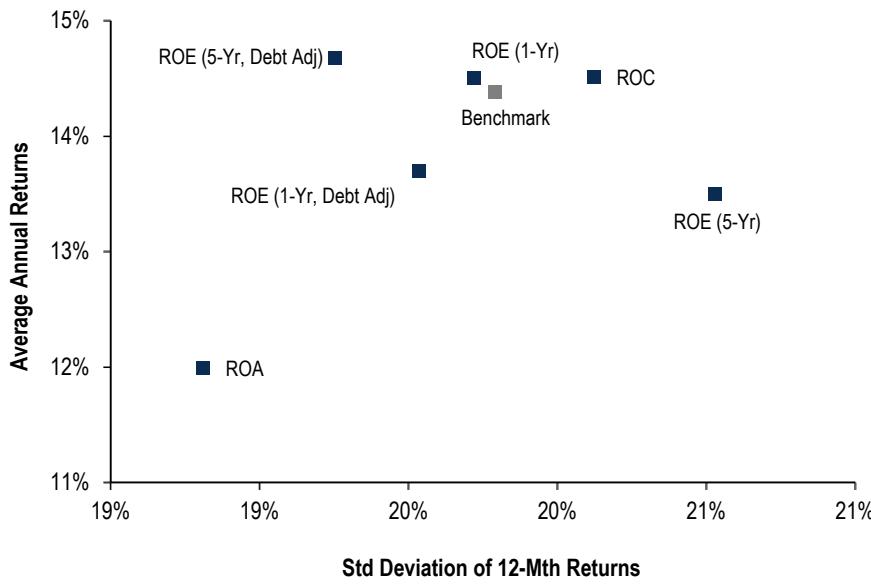
#### CAPITAL GOODS



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 389: Quality Strategies for Capital Goods: Top Quintile Returns (1985 to 2017)**

#### CAPITAL GOODS

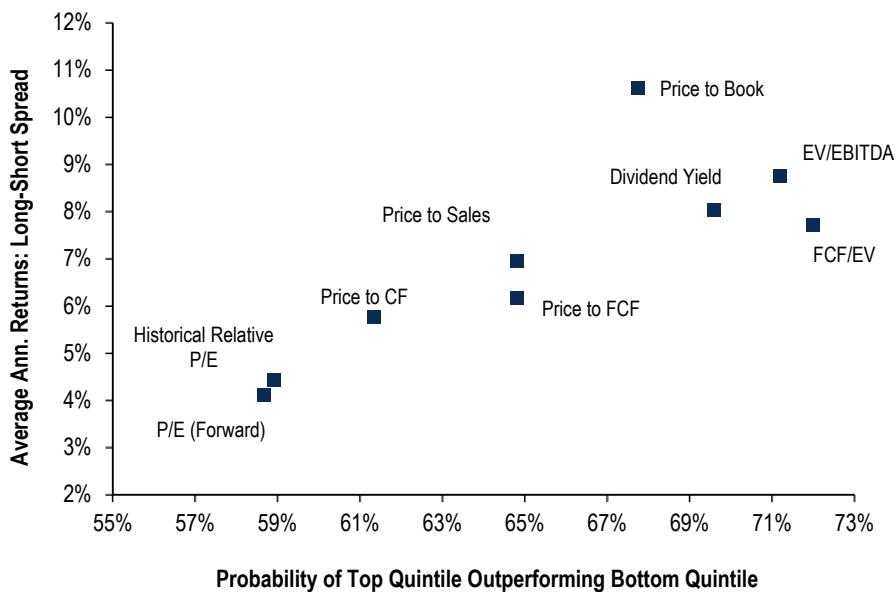


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 390: Valuation Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

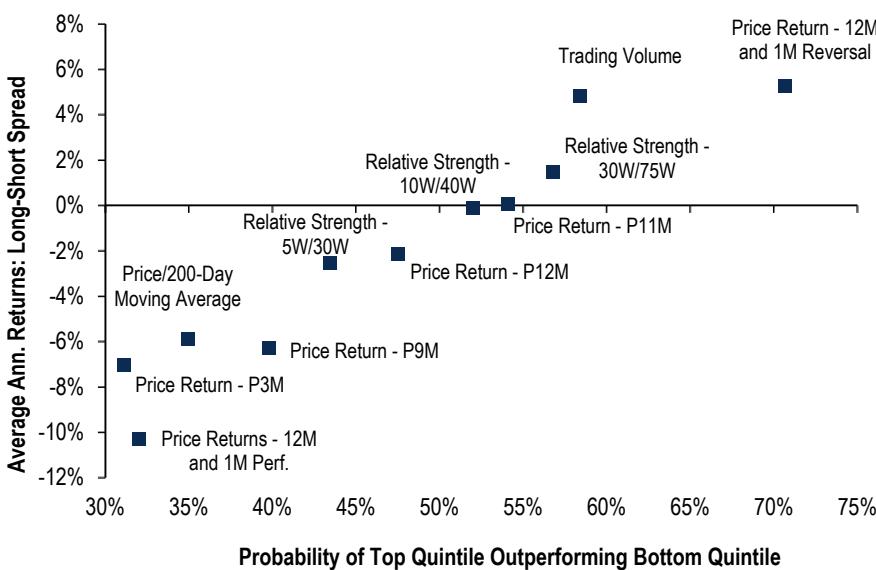
### CAPITAL GOODS L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

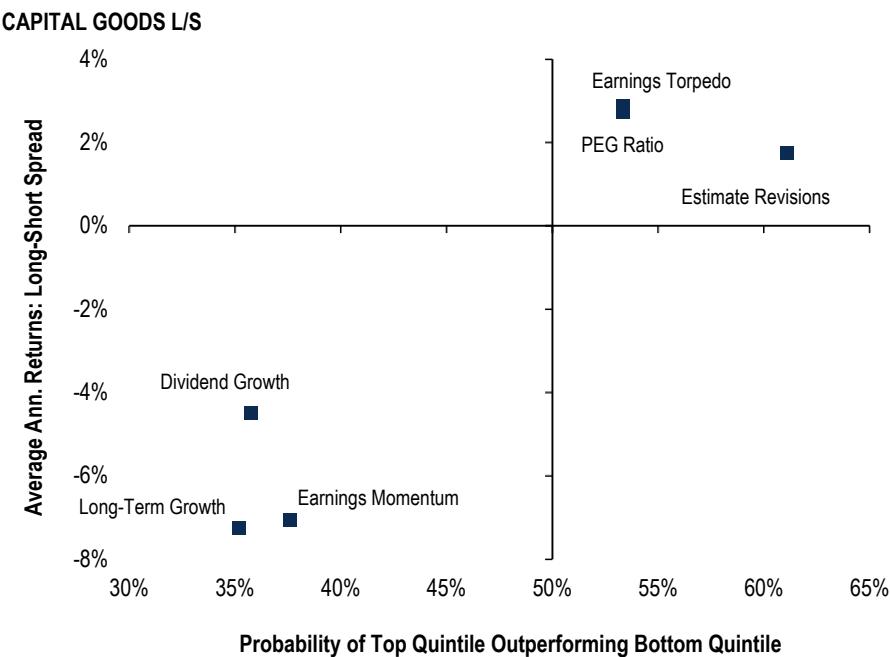
**Chart 391: Momentum Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

### CAPITAL GOODS L/S



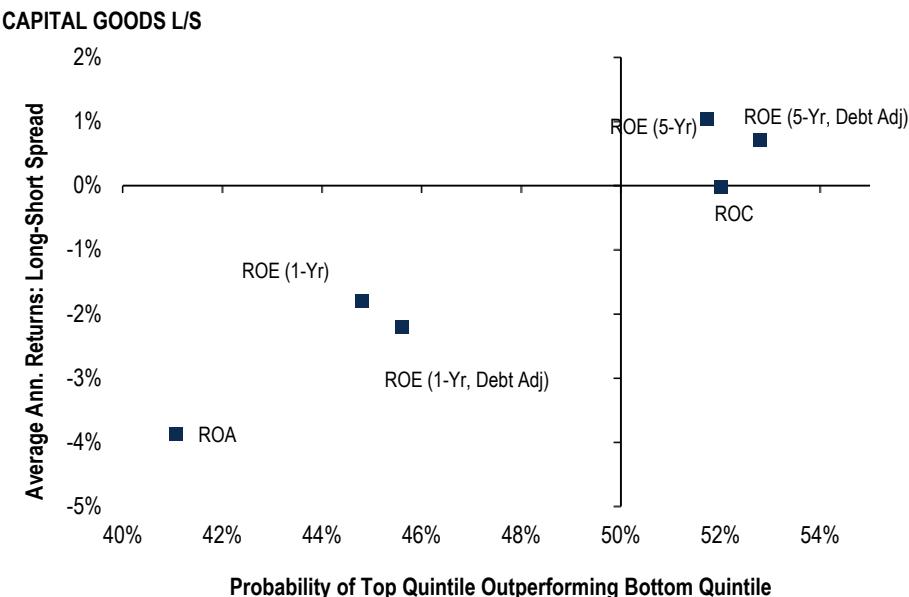
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 392: Growth Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 393: Quality Strategies for Capital Goods: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

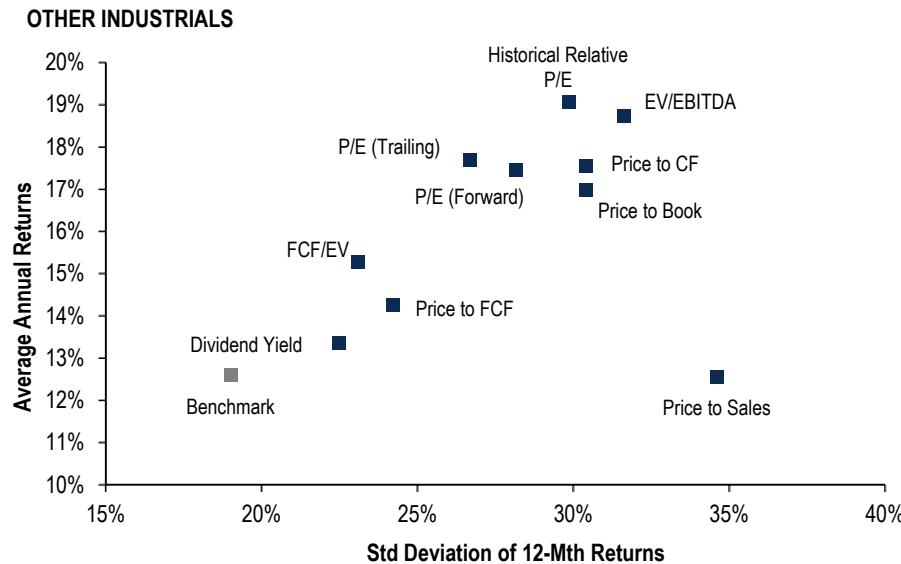


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Other Industrials (Services, Transports)

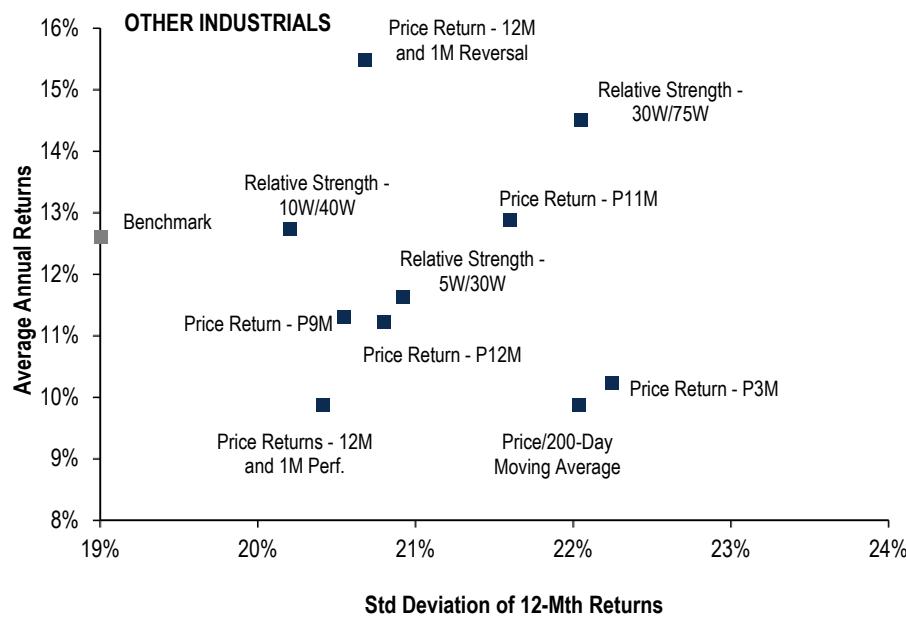
## Long only: Top Quintile Performance

Chart 394: Valuation Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

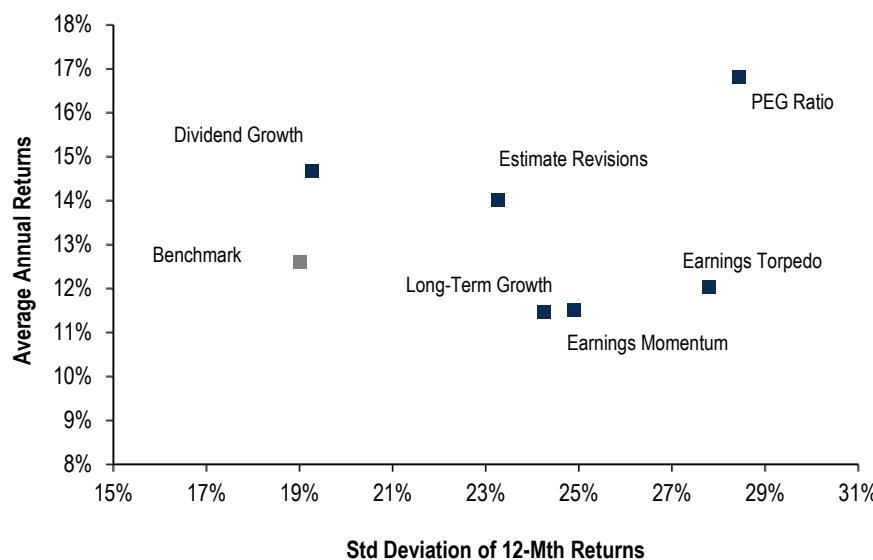
Chart 395: Momentum Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2017)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 396: Growth Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2017)**

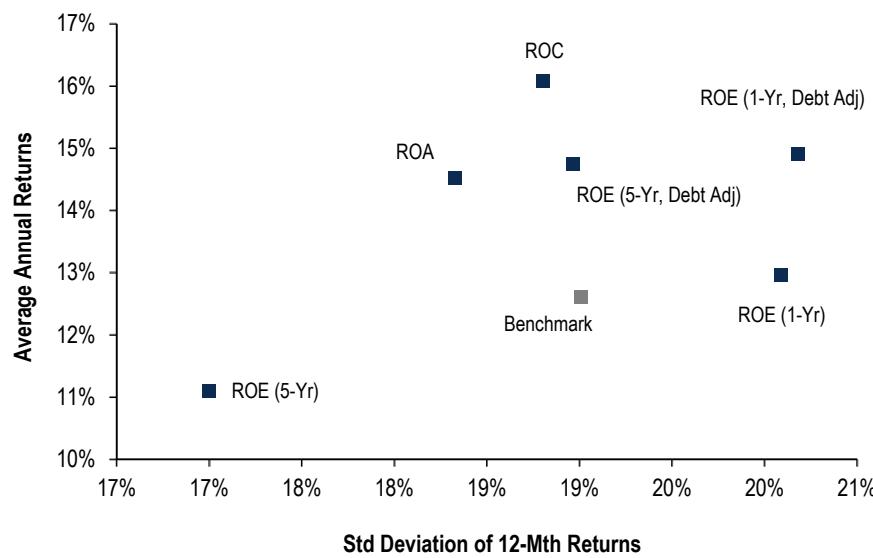
**OTHER INDUSTRIALS**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 397: Quality Strategies for Commercial Services, Transports: Top Quintile Returns (1985 to 2017)**

**OTHER INDUSTRIALS**

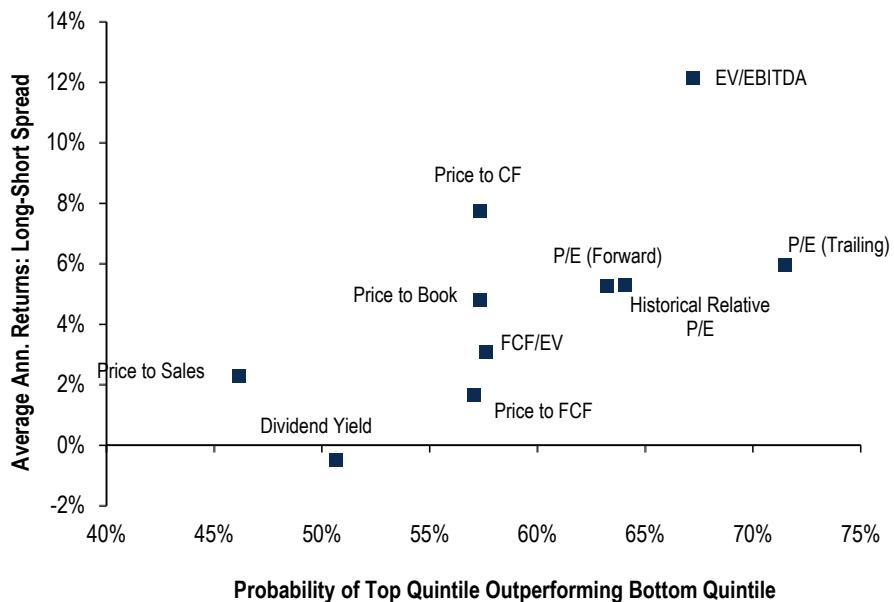


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 398: Valuation Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

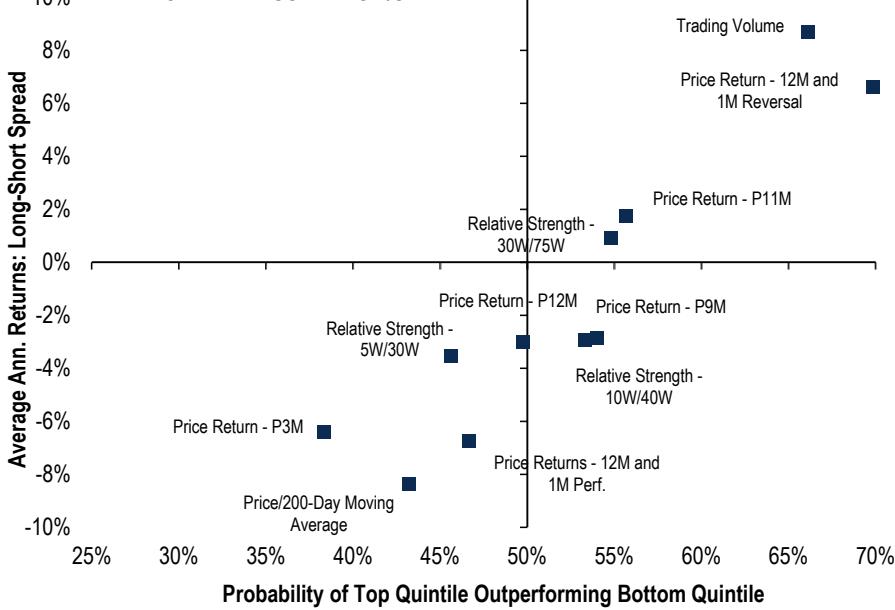
### OTHER INDUSTRIALS L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 399: Momentum Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

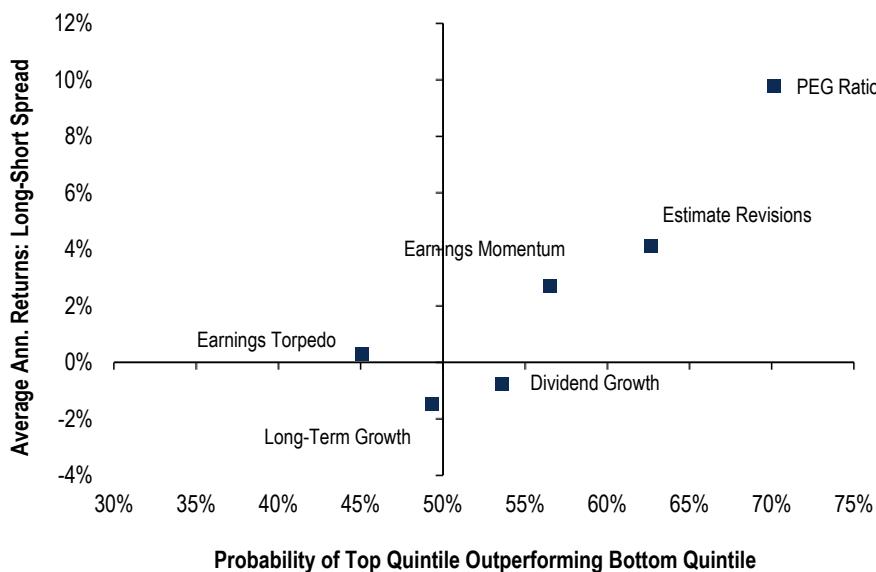
### OTHER INDUSTRIALS L/S



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 400: Growth Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

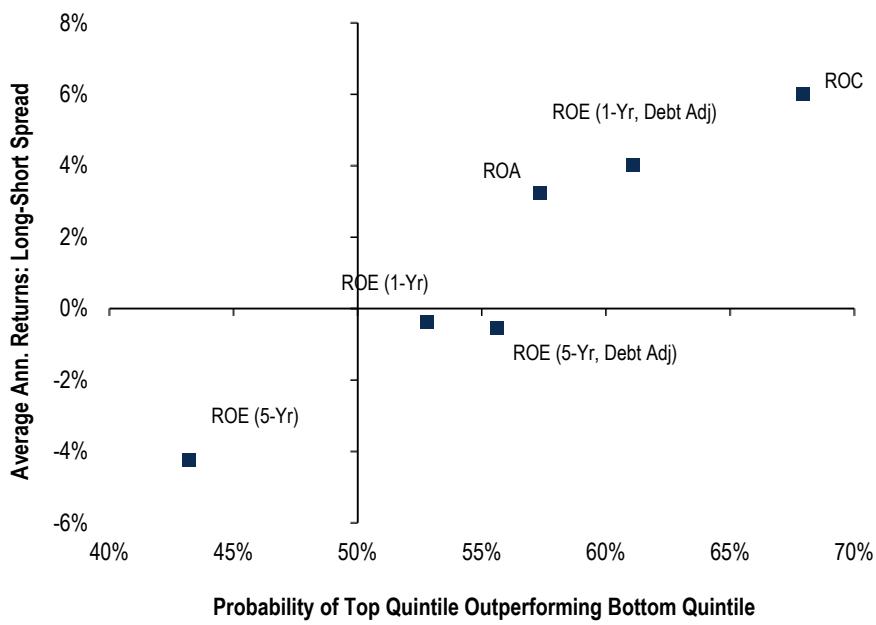
**OTHER INDUSTRIALS L/S**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 401: Quality Strategies for Commercial Services, Transports: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

**OTHER INDUSTRIALS L/S**

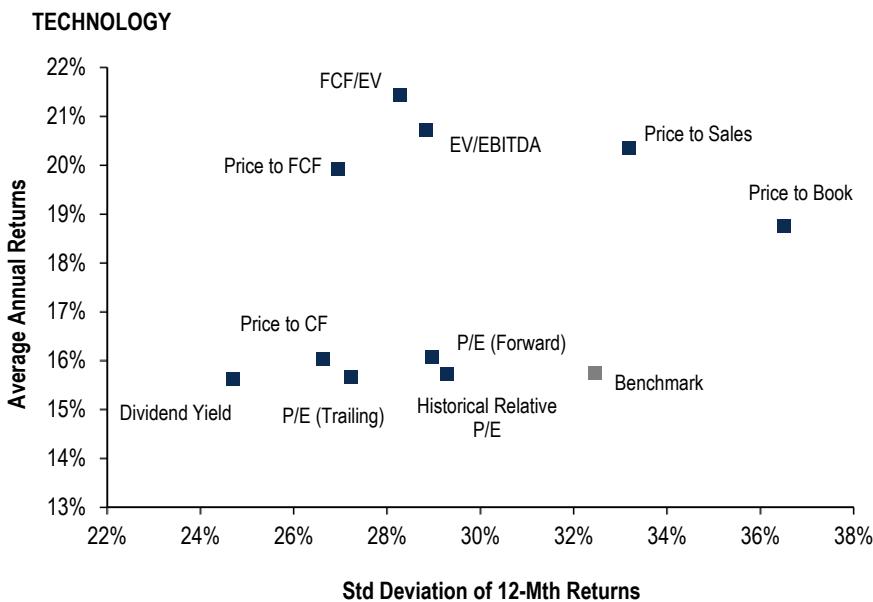


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Information Technology

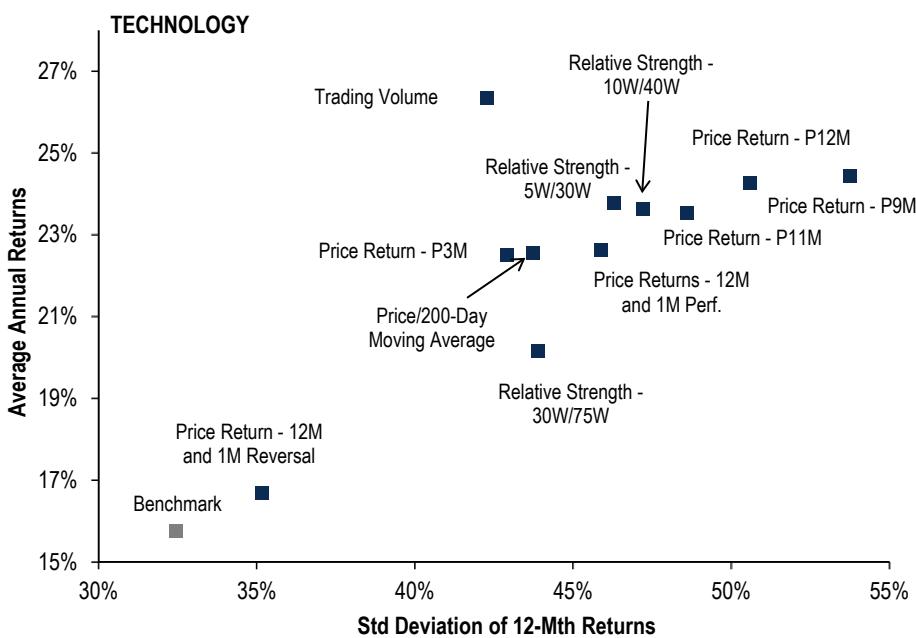
## Long only: Top Quintile Performance

**Chart 402: Valuation Strategies for Information Technology: Top Quintile Returns (1985 to 2017)**



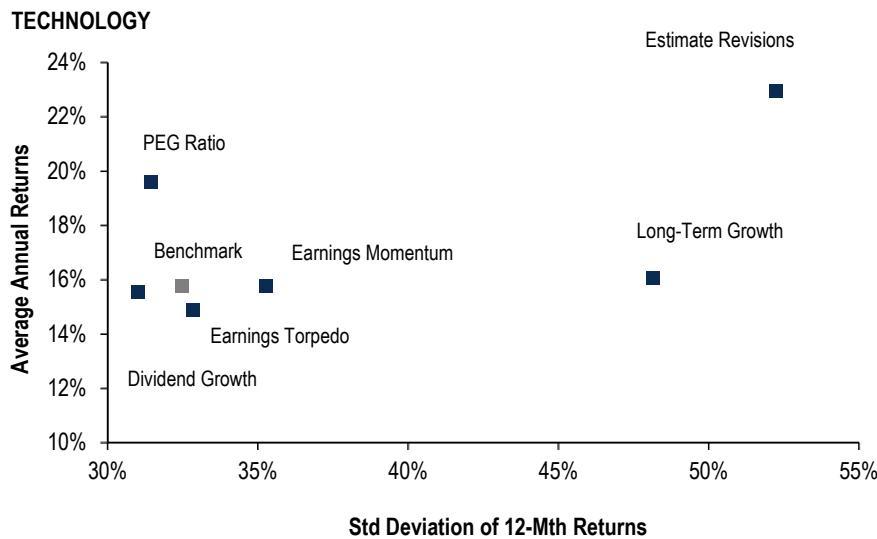
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 403: Momentum Strategies for Information Technology: Top Quintile Returns (1985 to 2017)**



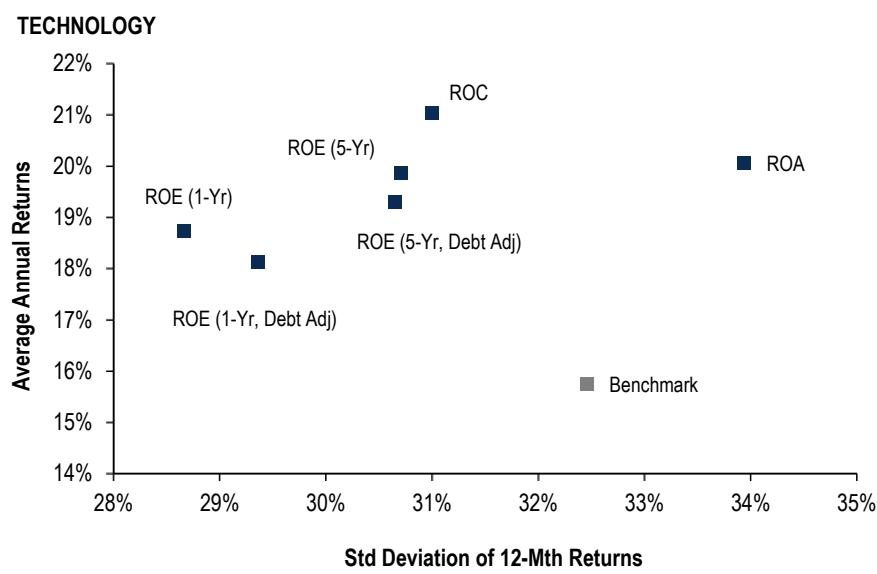
Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

**Chart 404: Growth Strategies for Information Technology: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

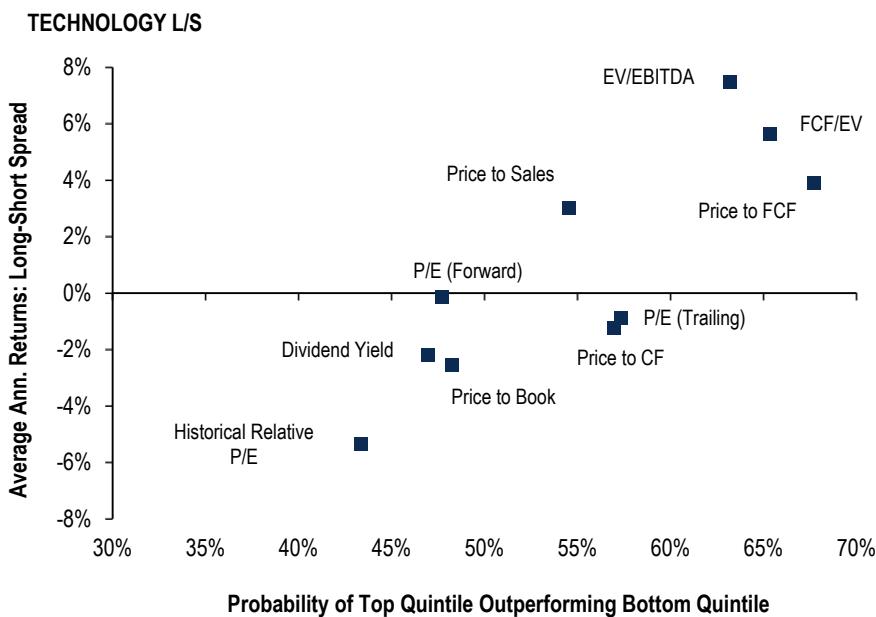
**Chart 405: Quality Strategies for Information Technology: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

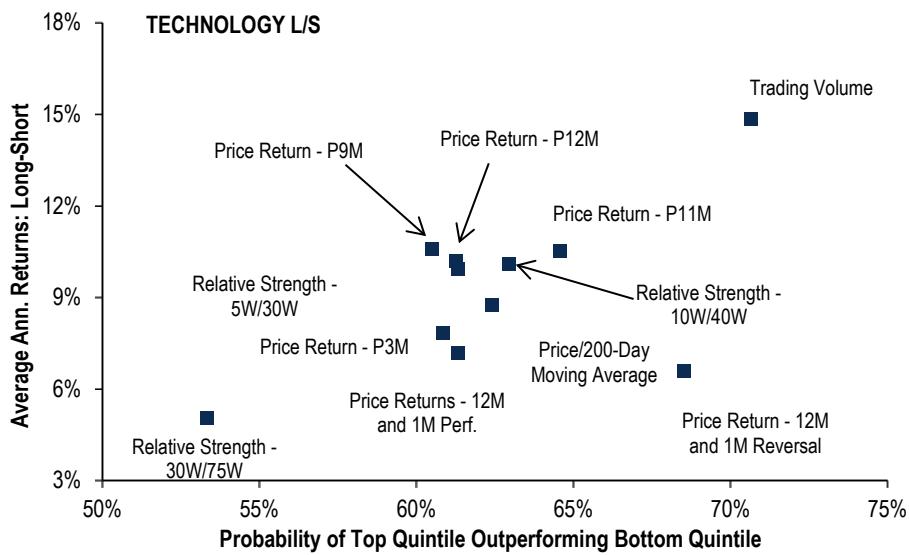
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 406: Valuation Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



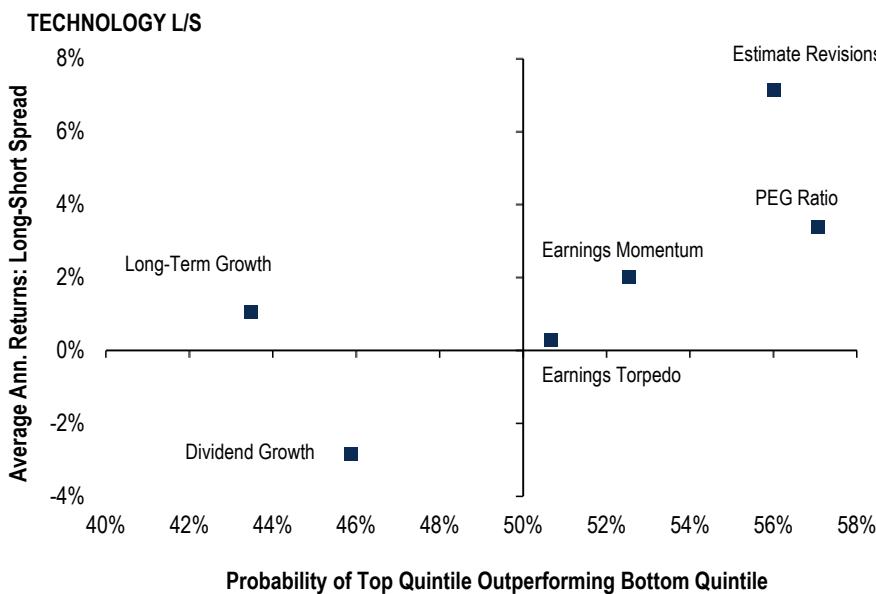
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 407: Momentum Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



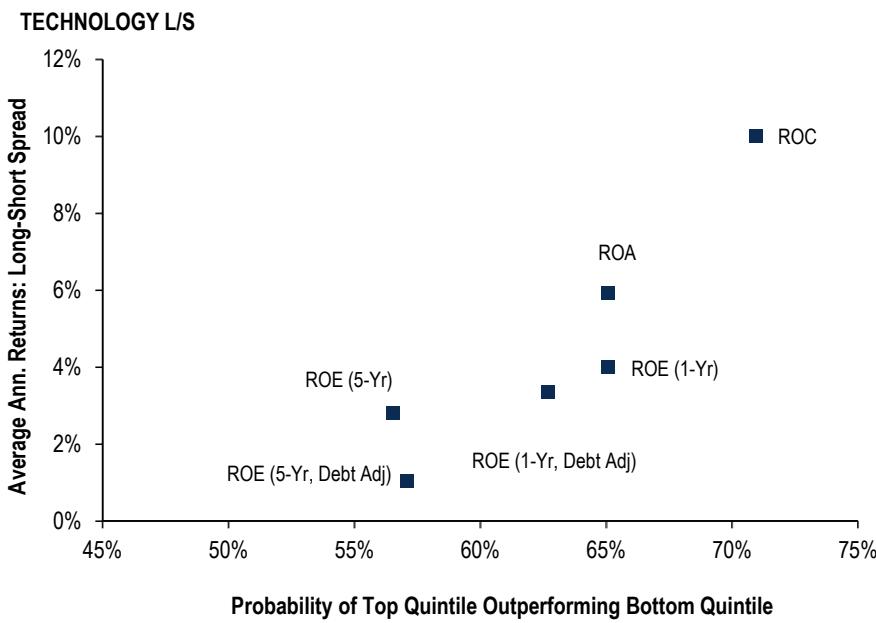
Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

**Chart 408: Growth Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 409: Quality Strategies for Information Technology: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

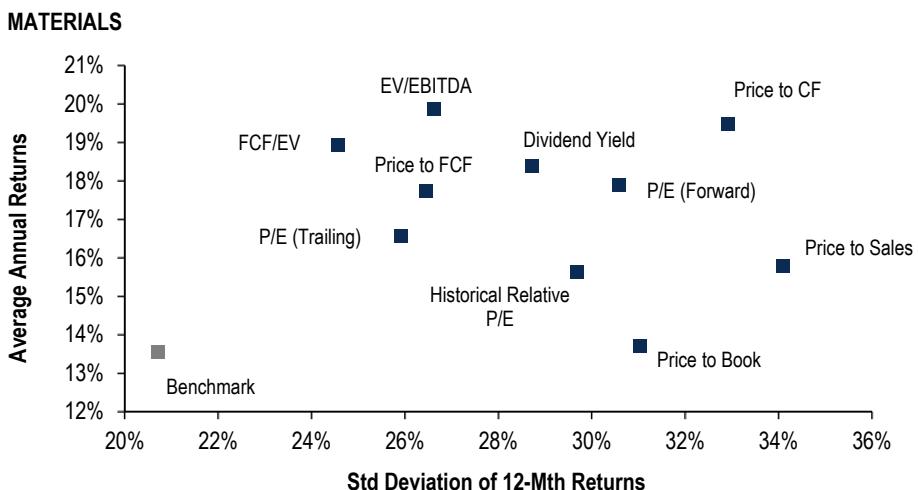


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Materials

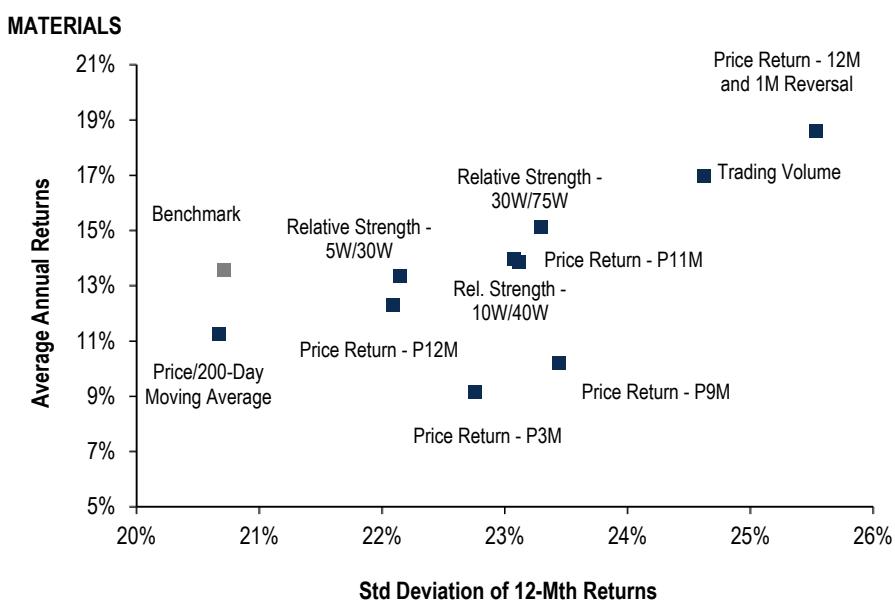
## Long only: Top Quintile Performance

Chart 410: Valuation Strategies for Materials: Top Quintile Returns (1985 to 2017)



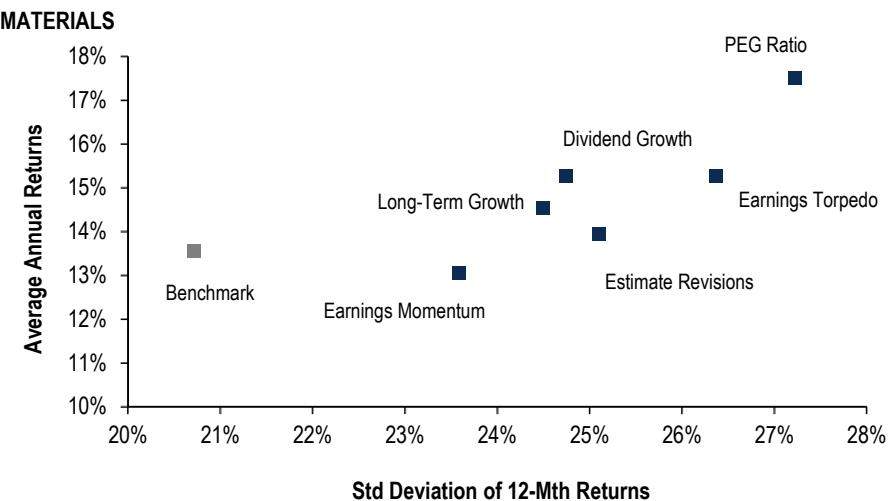
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

Chart 411: Momentum Strategies for Materials: Top Quintile Returns (1985 to 2017)



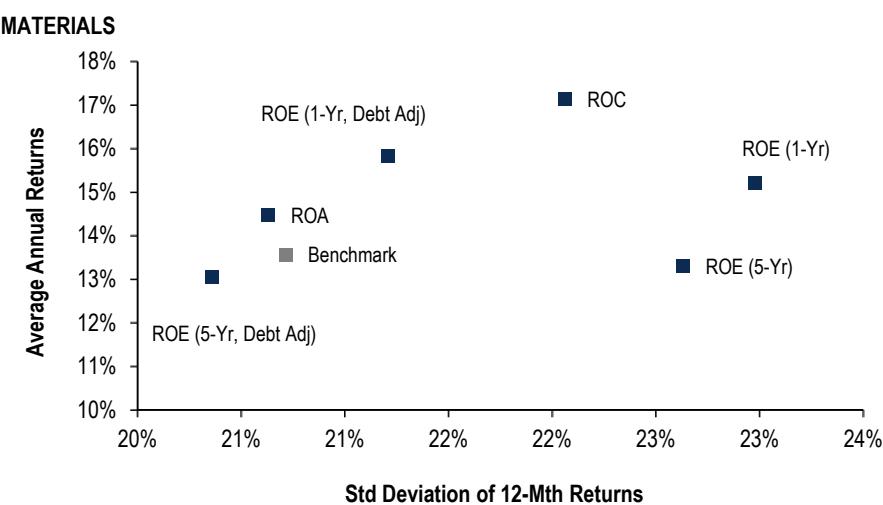
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 412: Growth Strategies for Materials: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

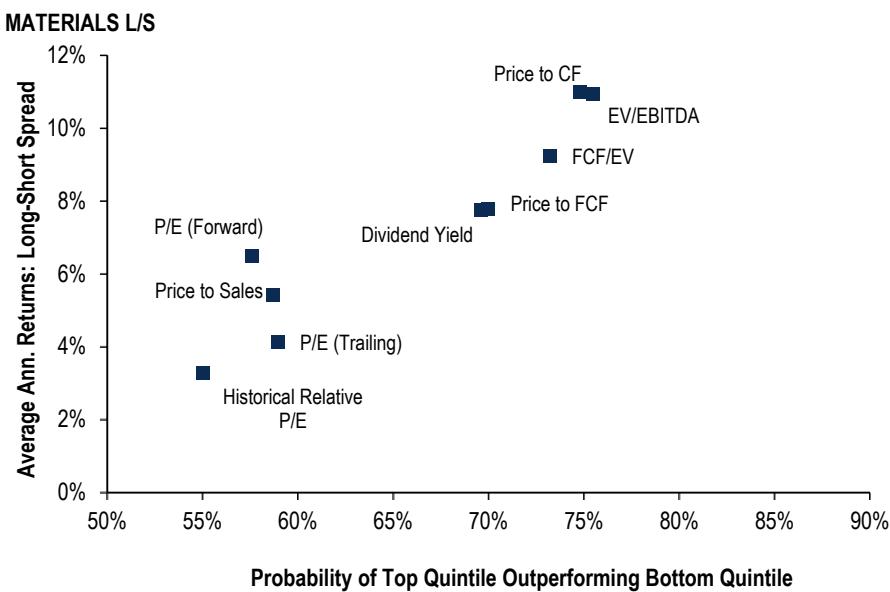
**Chart 413: Quality Strategies for Materials: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

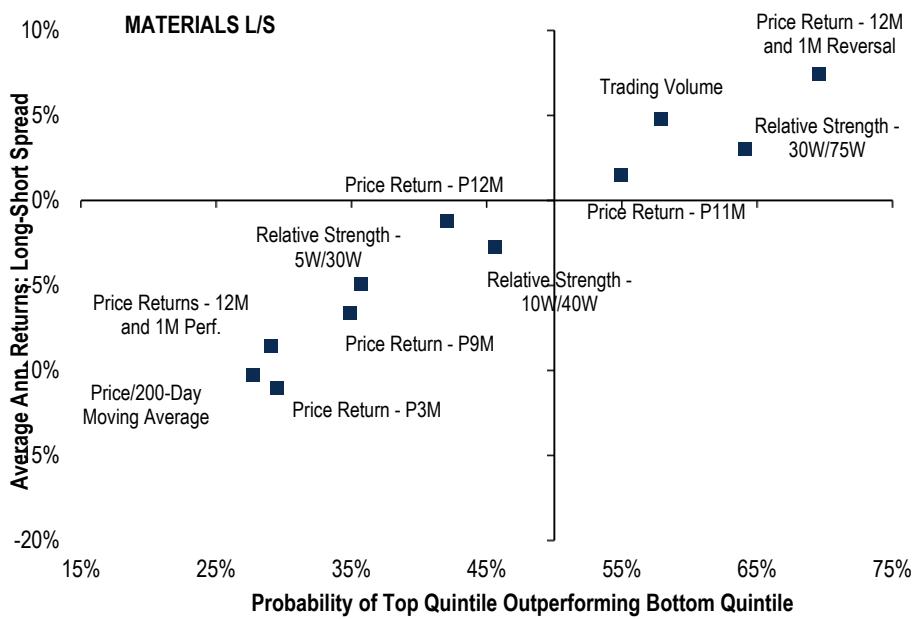
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 414: Valuation Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



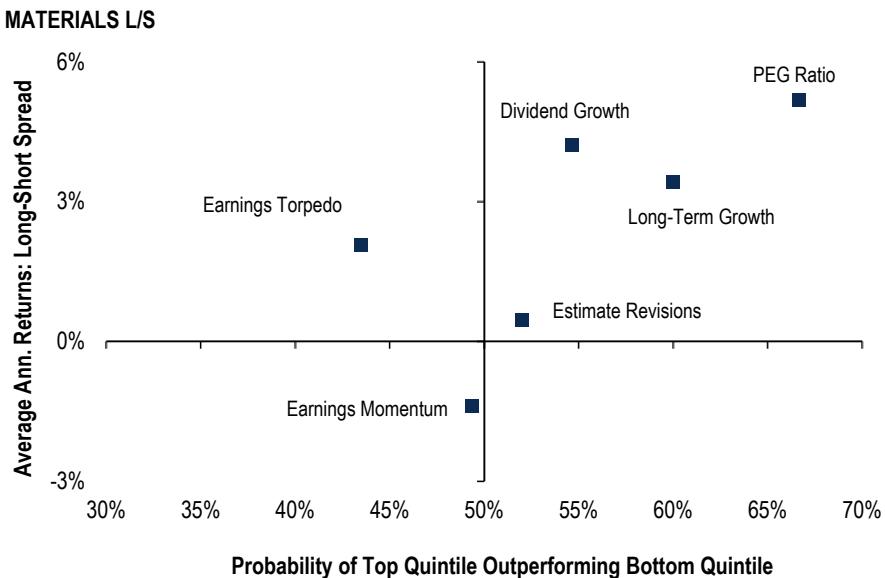
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 415: Momentum Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



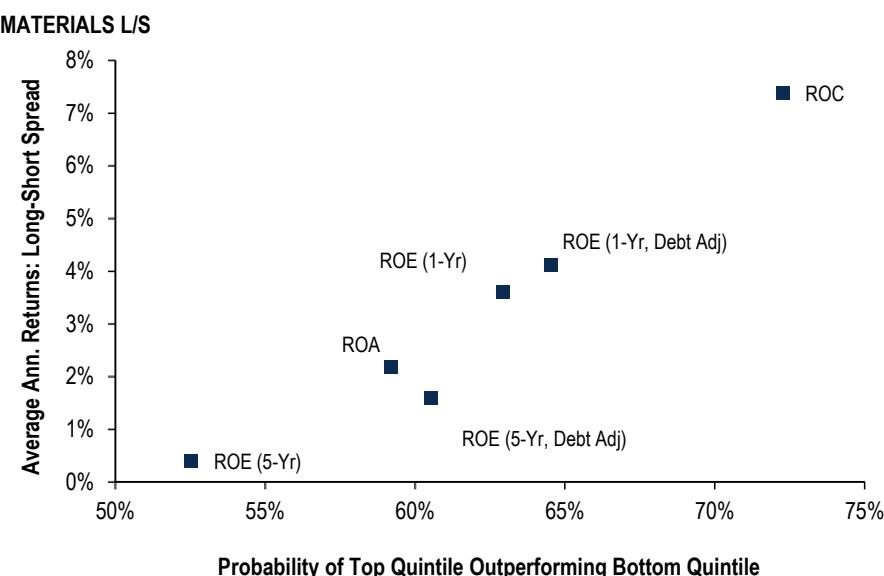
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 416: Growth Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 417: Quality Strategies for Materials: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

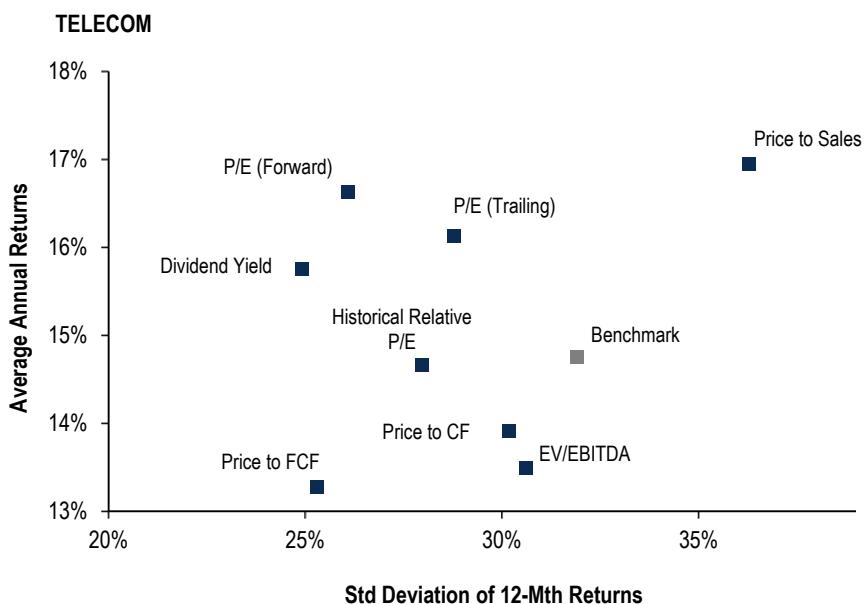


Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

# Telecommunication Services

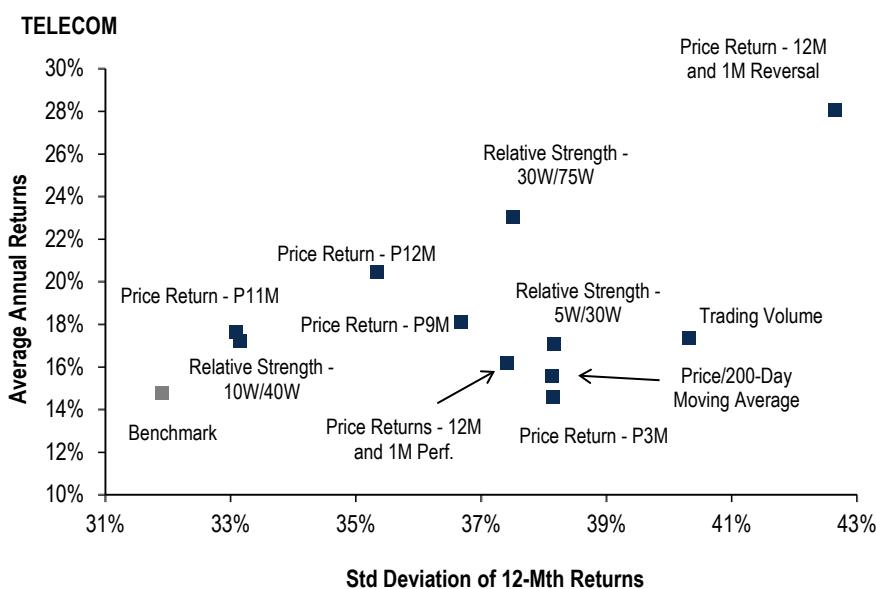
## Long only: Top Quintile Performance

Chart 418: Valuation Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2017)



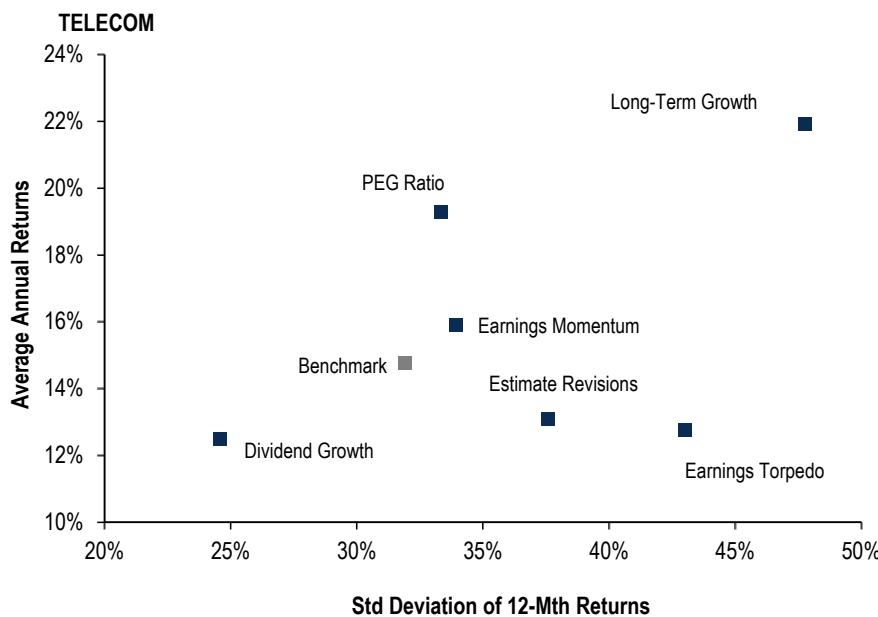
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

Chart 419: Momentum Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2017)



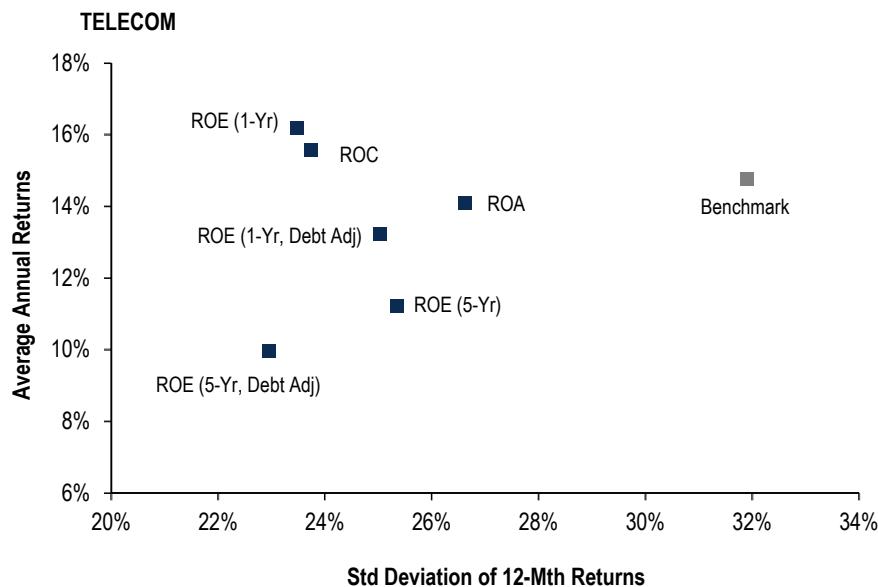
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 420: Growth Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

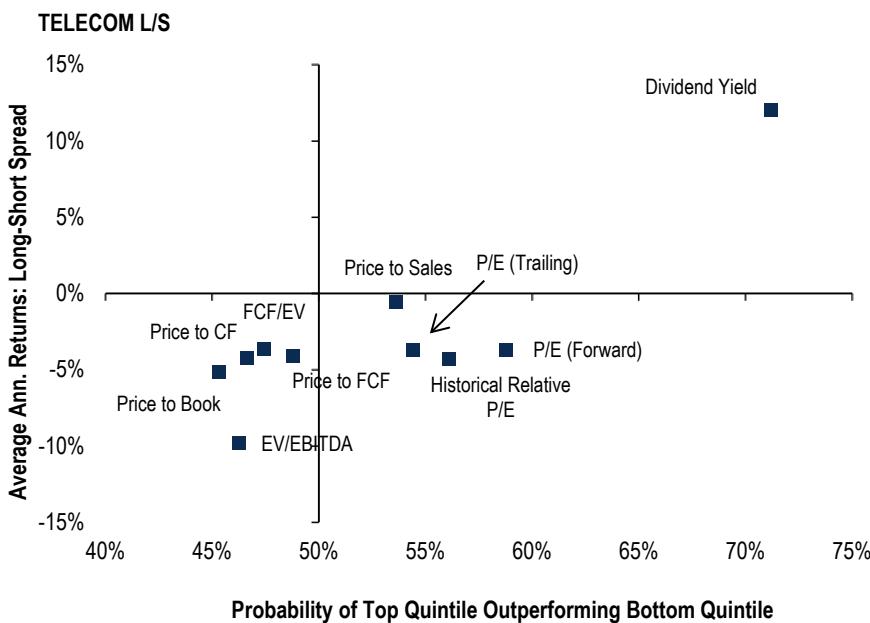
**Chart 421: Quality Strategies for Telecommunication Services: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

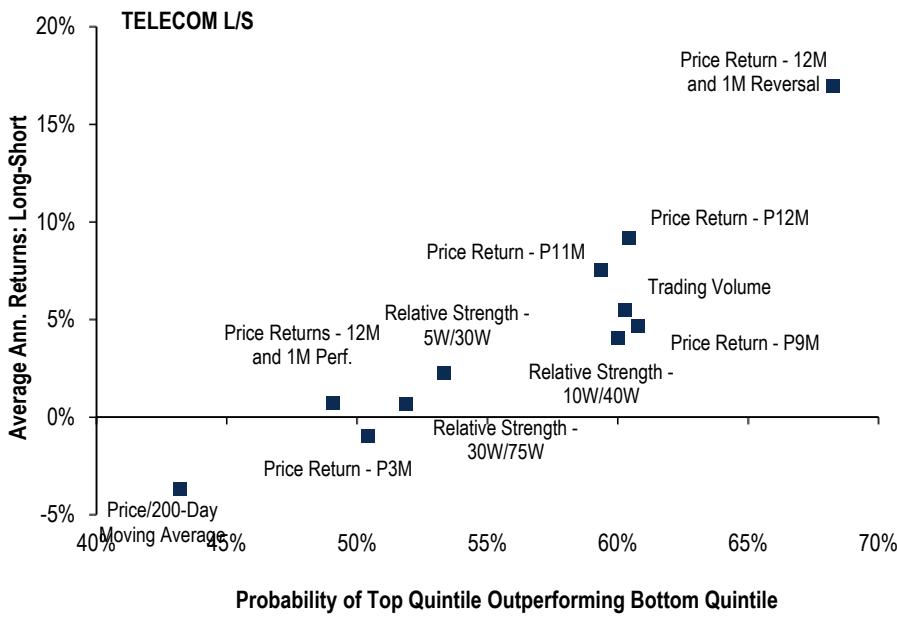
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 422: Valuation Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



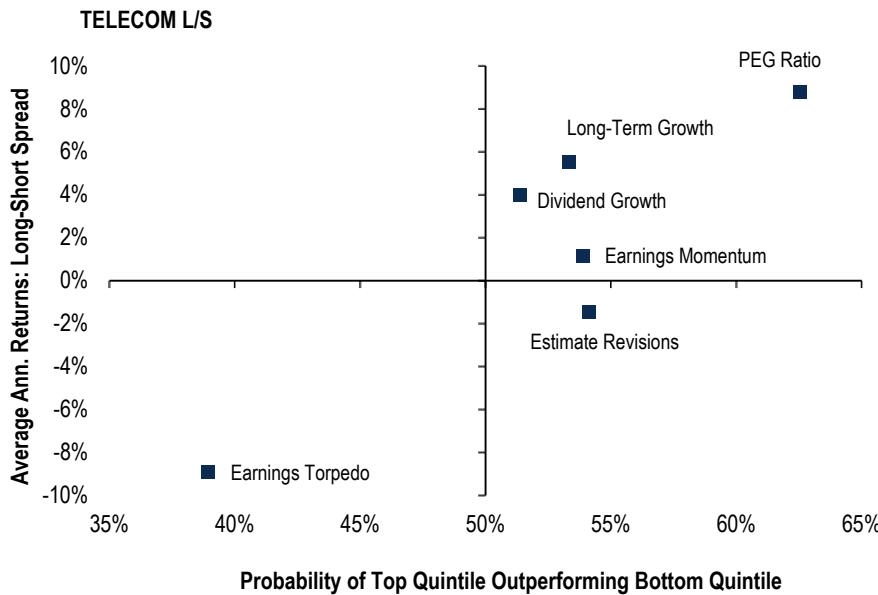
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 423: Momentum Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



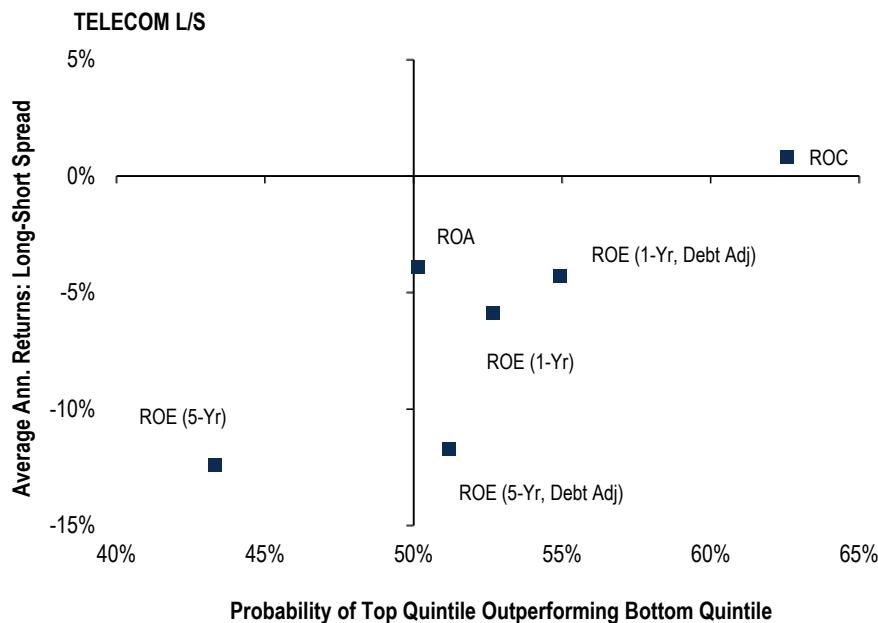
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 424: Growth Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy

**Chart 425: Quality Strategies for Telecommunication Services: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**

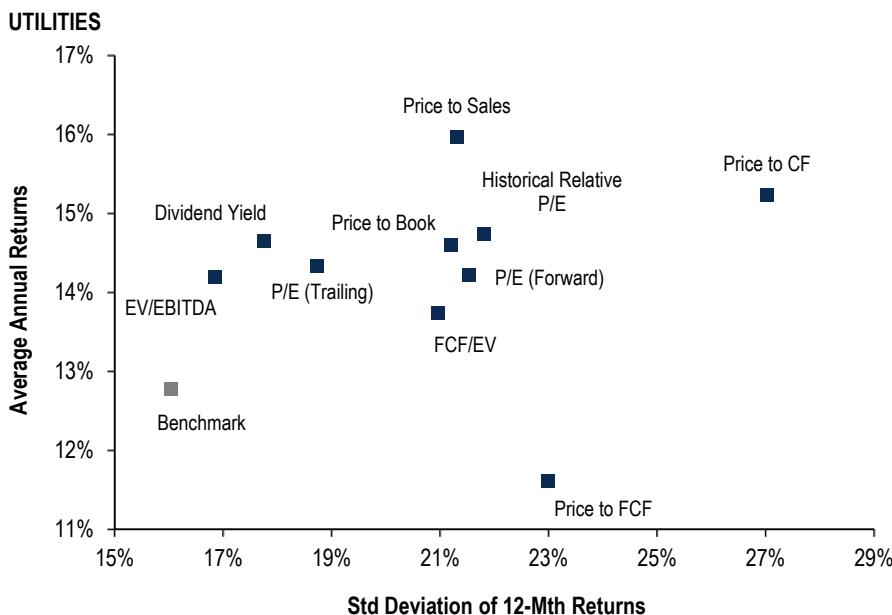


Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Utilities

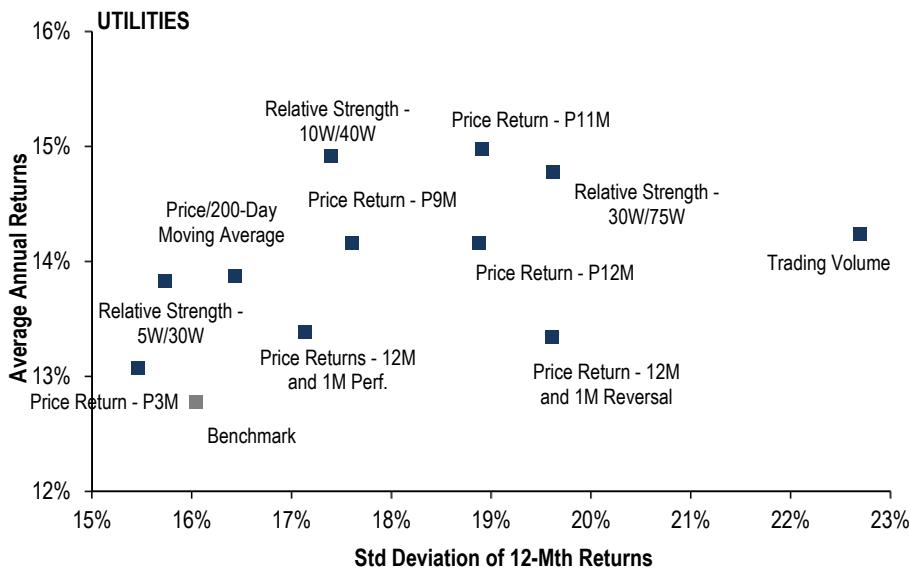
## Long only: Top Quintile Performance

**Chart 426: Valuation Strategies for Utilities: Top Quintile Returns (1985 to 2017)**



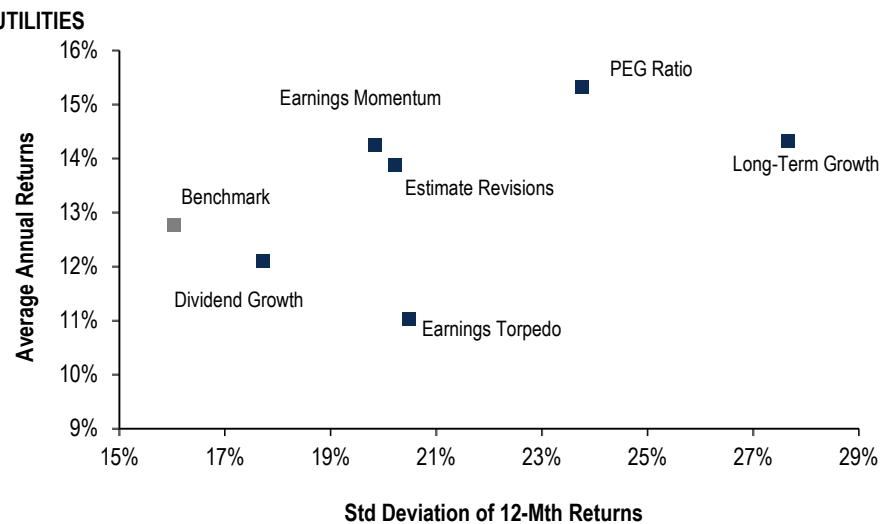
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 427: Momentum Strategies for Utilities: Top Quintile Returns (1985 to 2017)**



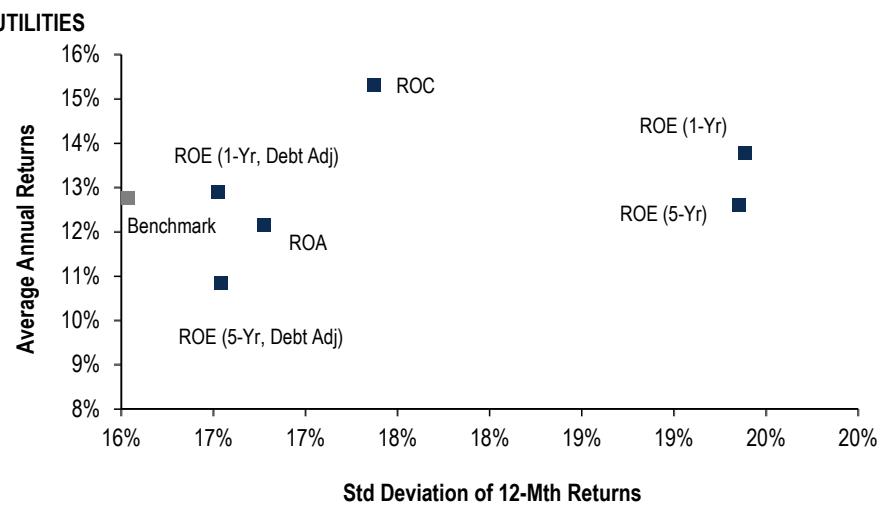
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 428: Growth Strategies for Utilities: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

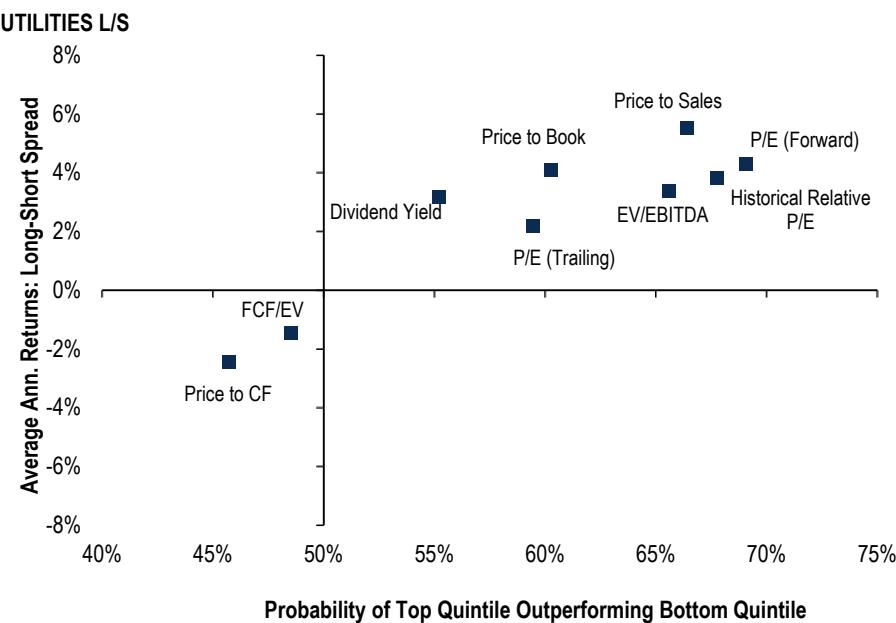
**Chart 429: Quality Strategies for Utilities: Top Quintile Returns (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

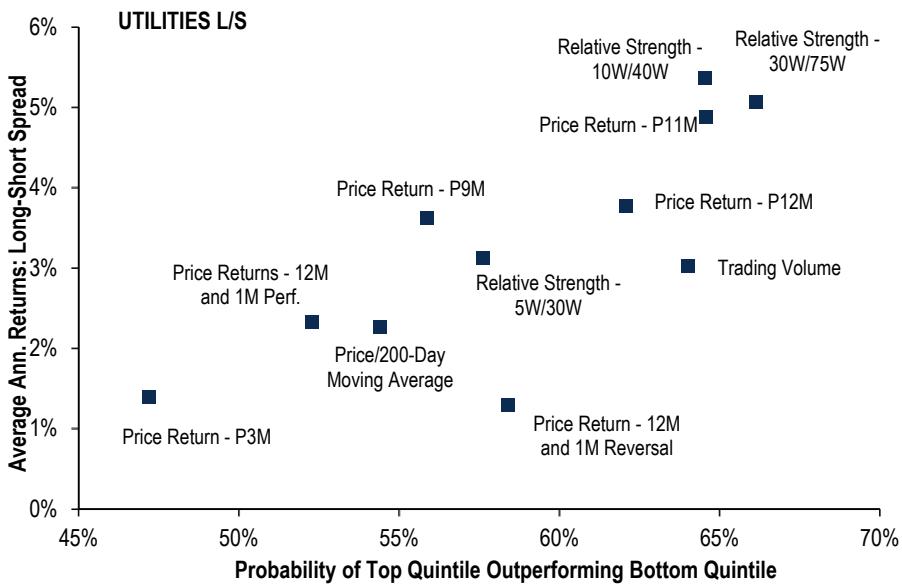
## Long-Short: Quintile 1 / Quintile 5 Spread

**Chart 430: Valuation Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



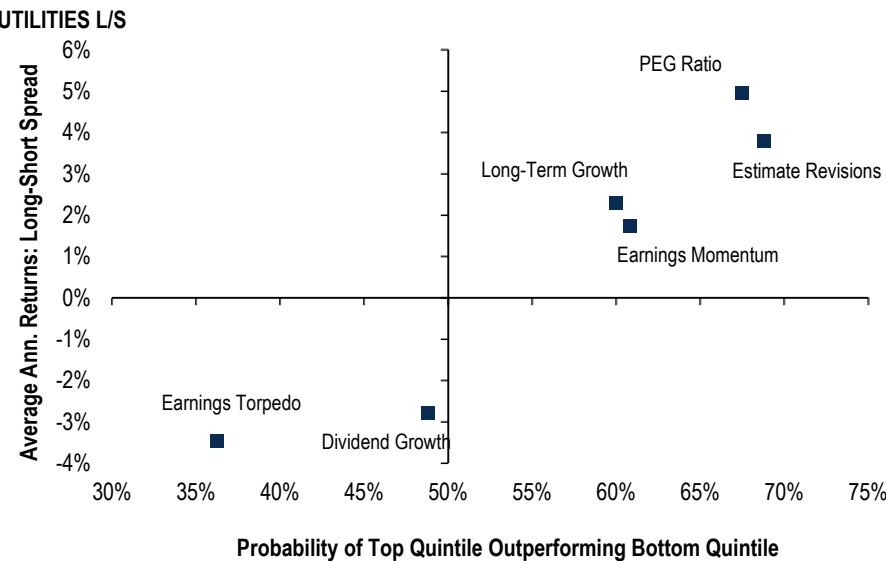
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 431: Momentum Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



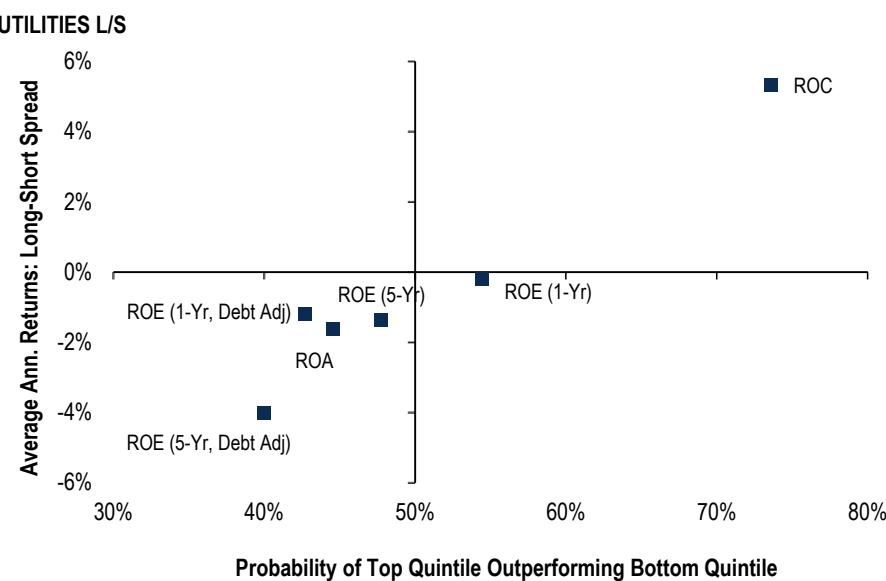
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 432: Growth Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 433: Quality Strategies for Utilities: Avg Long-Short Spreads vs. Consistency of Spreads (1985 to 2017)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

# Backtesting methodology

We created top and bottom quintile stock screens for various factors that we follow for companies in the Russell 1000 Index GICS industry groups. 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 quintiles. We tracked the output of these screens for the subsequent month.

We use Global Industry Classification Standard (GICS) level 2 industry groups, which was developed by MSCI and Standard & Poor's (S&P). The GICS structure consists of 10 sectors (Consumer Discretionary, Consumer Staples, Energy, Financials, Health Care, Industrials, Information Technology, Materials, Real Estate, Telecommunication Services, and Utilities) and 24 Industry Groups.

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 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.

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.

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

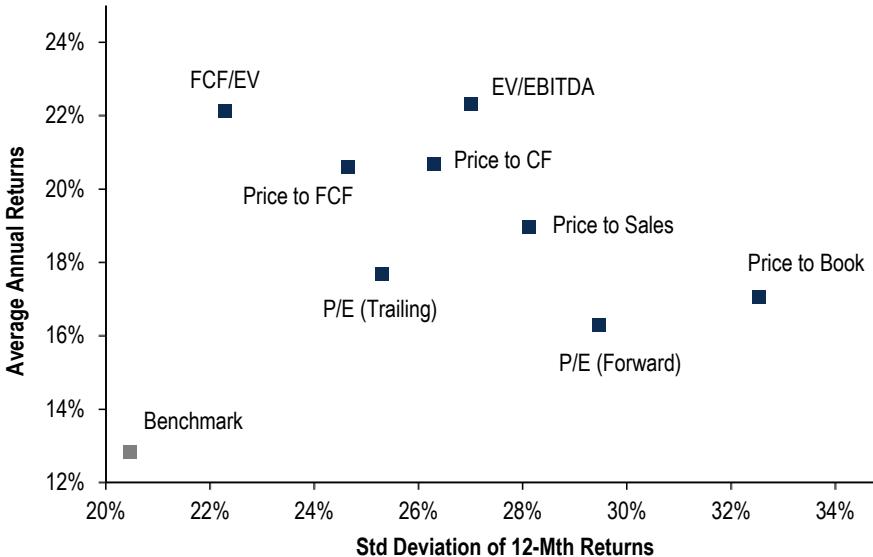
---

<b>Growth</b>	<b>184</b>
Value Strategies	181
Momentum Strategies	181
Growth Strategies	182
Quality Strategies	182
Risk Strategies	183
Miscellaneous Strategies	183
<b>Value</b>	<b>187</b>
Value Strategies	184
Momentum Strategies	184
Growth Strategies	185
Quality Strategies	185
Risk Strategies	186
Miscellaneous Strategies	186
Backtesting Methodology	190

**Note:** All charts in this section are based on backtested results during the period from month end Jan 1986 to month end March 2017. 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.

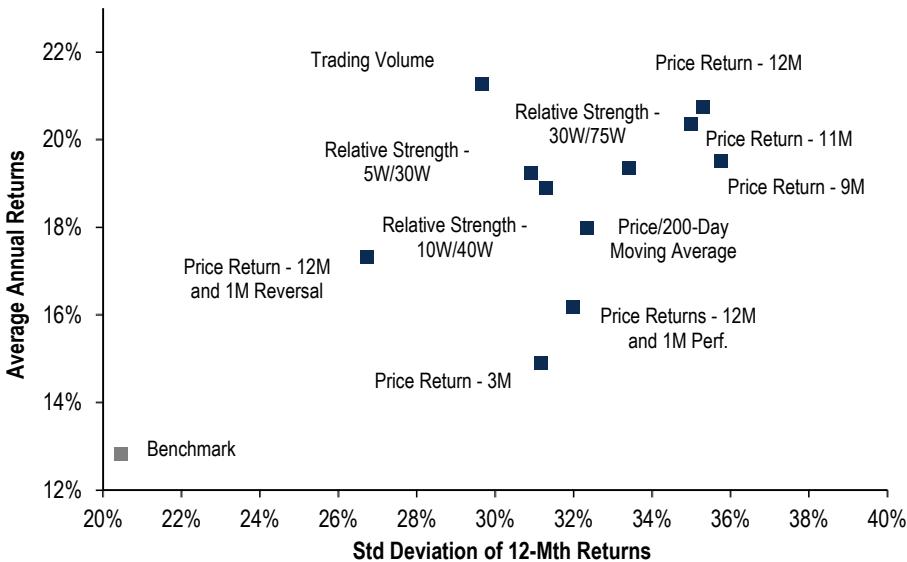
## Growth

**Chart 434: Value Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



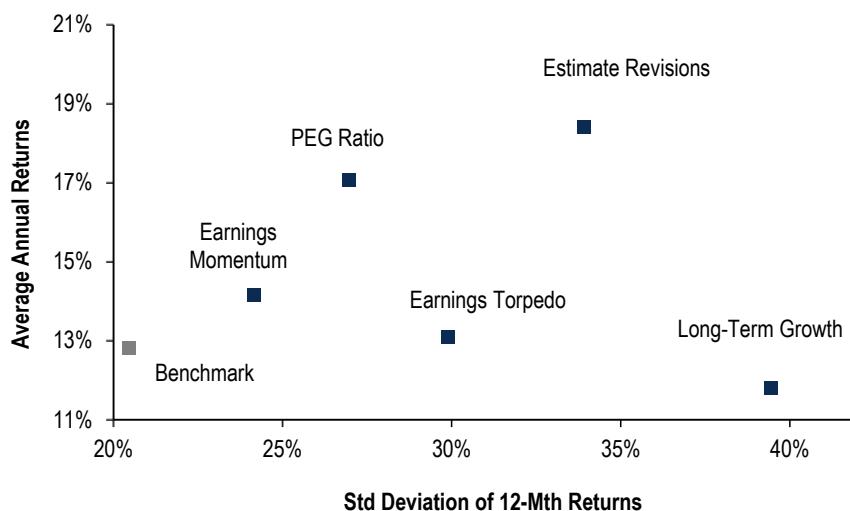
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 435: Momentum Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



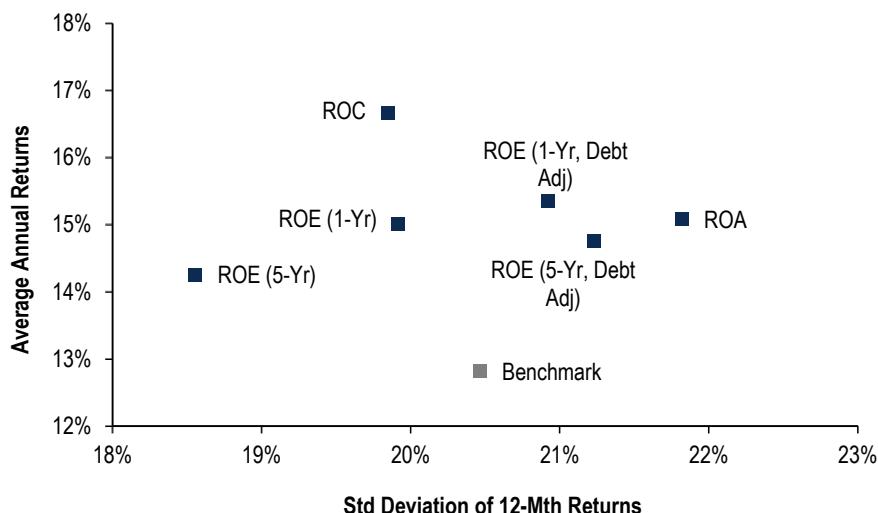
Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

**Chart 436: Growth Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



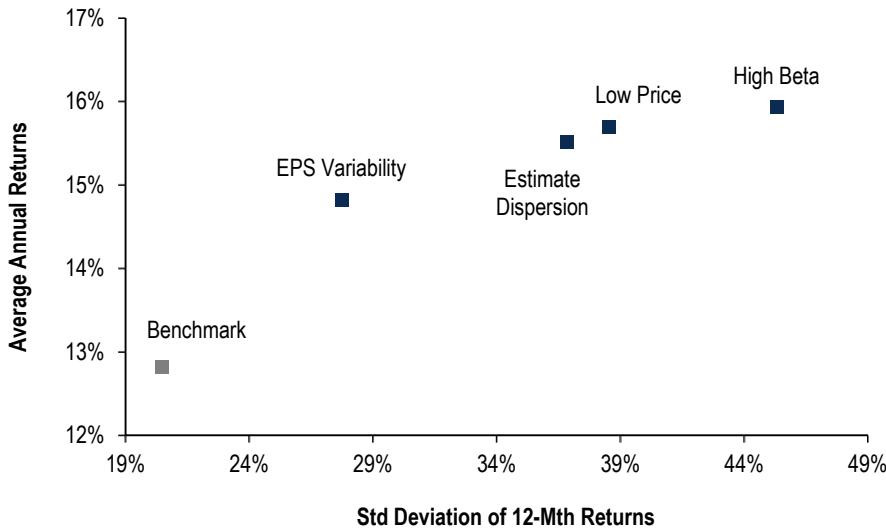
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 437: Quality Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



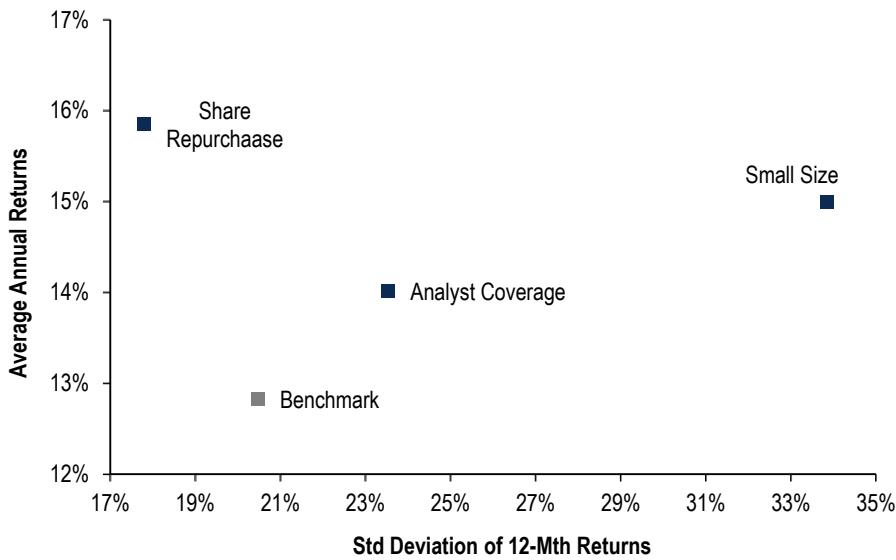
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 438: Risk Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

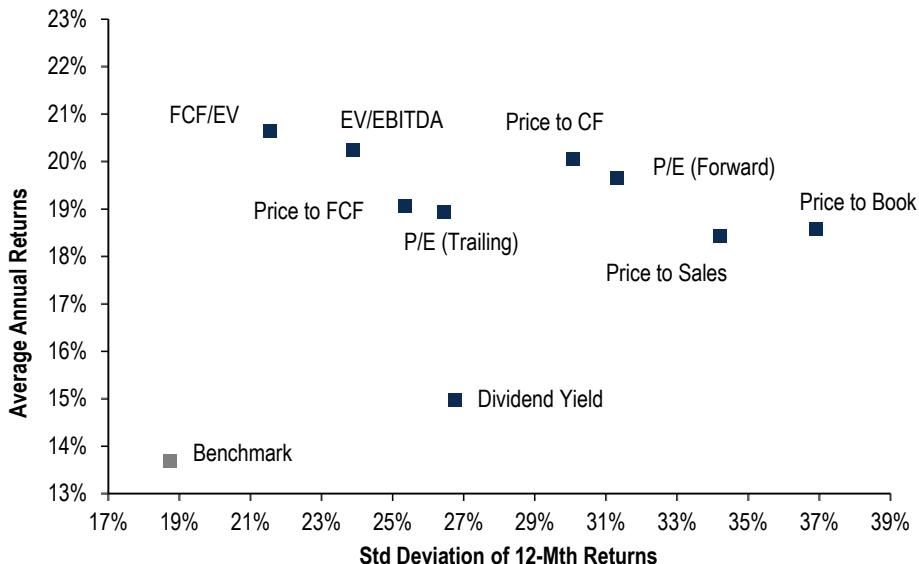
**Chart 439: Miscellaneous Strategies for Russell 1000 Growth: Top Decile Returns from 1986 to 2017**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

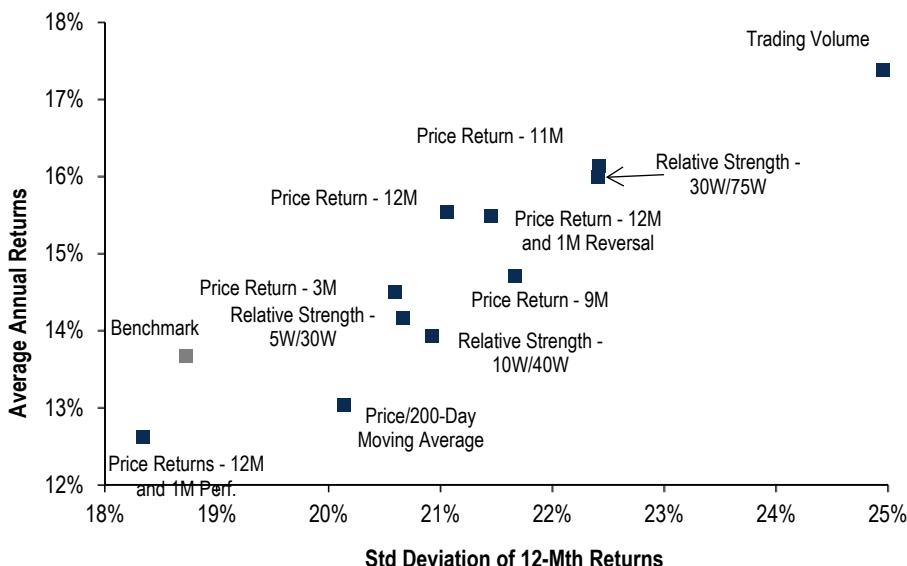
## Value

**Chart 440: Value Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



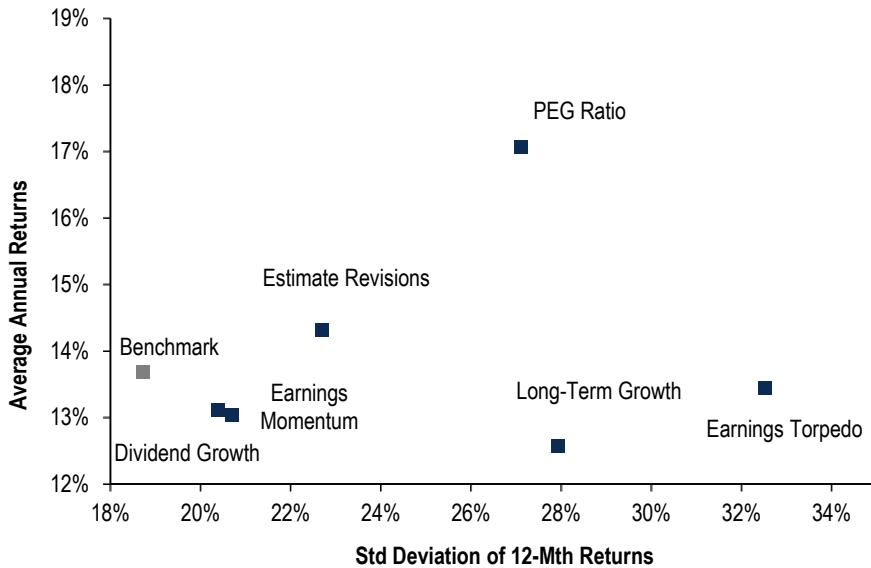
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 441: Momentum Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



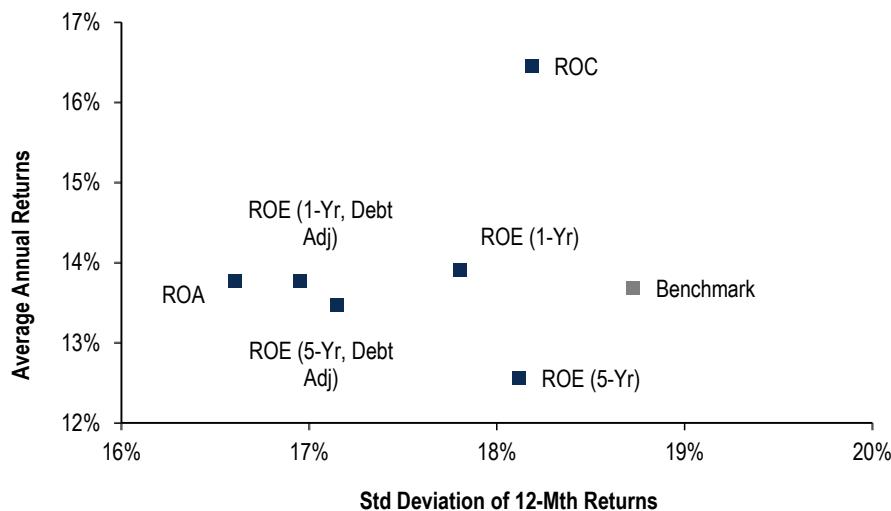
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 442: Growth Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



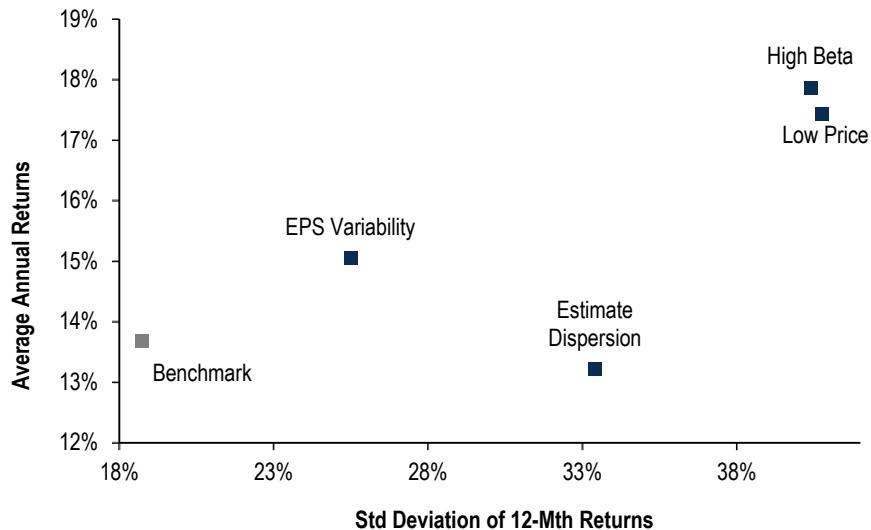
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 443: Quality Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



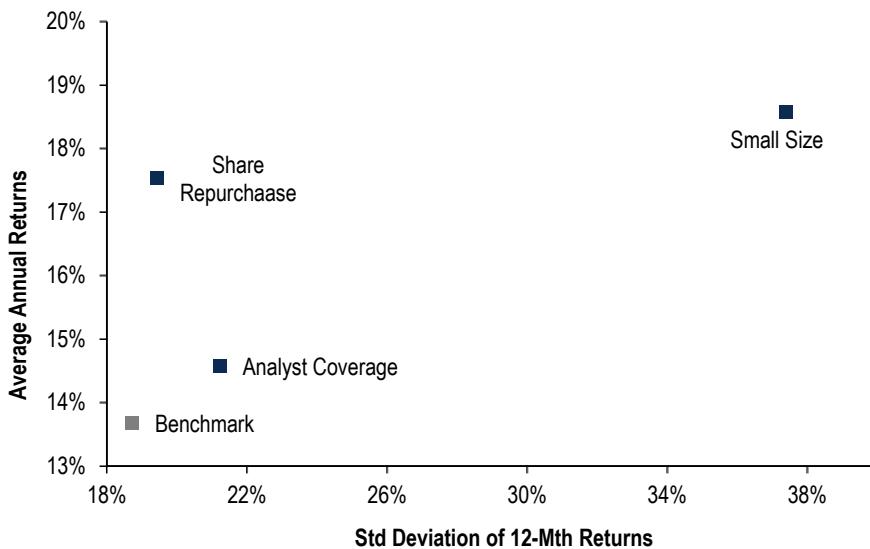
Source: BofA Merrill Lynch US Equity & Quantitative Strategy. See Backtesting Methodology at the end of this section.

**Chart 444: Risk Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

**Chart 445: Miscellaneous Strategies for Russell 1000 Value: Top Decile Returns from 1986 to 2017**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy . See Backtesting Methodology at the end of this section.

# 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: BofAML Quality Strategies

The reasons to stick with Quality	192
Quality Risk/Reward Profile	199
Performance Charts	203

**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.

## The reasons to stick with Quality

Over the years, we have written extensively on the topic of [quality](#), and it continues to be one of our key themes for long-term investors. (For the near-term, however, low quality stocks could continue to be buoyed by expectations for stimulus). Below, we lay out key facts that investors should know about Quality:

**Table 13: Relative price performance of B+ or Better vs. B or Worse stocks**

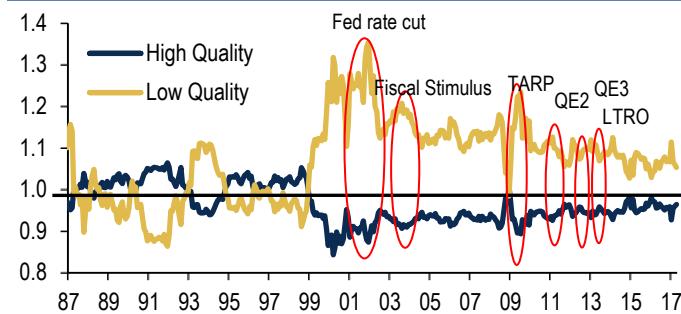
Period	Performance Spread (ppt)
1 month	-0.1
3 months	-0.7
6 months	-0.7
12 months	-10.1
Year to date	-0.7
2 years	9.3
3 years	18.7
5 years	17.1
10 years	11.8
15 years	-12.4

Source: BofA Merrill Lynch US Quantitative Strategy, Standard & Poor's  
As of March 31, 2017

### QUALITY HAS BEEN A LONG TERM OUTPERFORMER

High quality (B+ or higher) stocks have outperformed low quality (B or lower) stocks over the past two, five and 10 years.

**Chart 446: Relative Fwd. P/E high quality (B+ or better) and low quality (B or worse) stocks**



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

### ...BUT IT'S STILL CHEAP

As a result of the outperformance, the valuation gap has been closing, but High Quality still remains cheap relative to Low Quality.

**Table 14: Price performance during prior bear markets (including latest correction)**

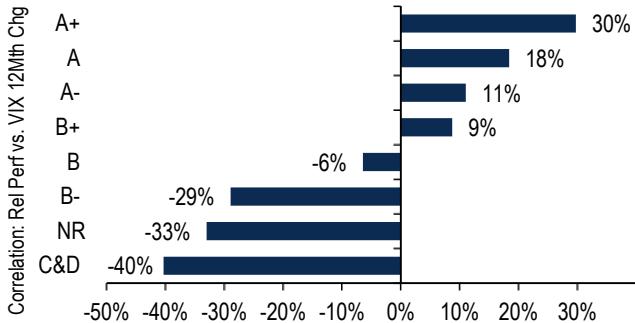
Period	B + or Better (annualized)	B or Worse (annualized)	Relative Performance: B+ or Better vs B or Worse (annualized)
Aug '87 - Nov '87	-74.9%	-79.2%	4.3%
Jun '90 - Oct '90	-53.1%	-61.7%	8.6%
Mar '00 - Sep '02	2.8%	-20.8%	23.6%
Oct '07 - Feb '09	-42.2%	-48.2%	6.0%
May '15 – Feb '16	-8.5%	-31.0%	22.5%
<b>Average</b>	<b>-35.2%</b>	<b>-48.2%</b>	<b>13.0%</b>
<b>Median</b>	<b>-42.2%</b>	<b>-48.2%</b>	<b>8.6%</b>

Source: BofA Merrill Lynch US Quantitative Strategy, Standard & Poor's

### ....AND IS A GOOD BEAR MARKET HEDGE

High quality stocks have consistently outperformed in each of the last four bear markets and during the most recent market correction.

**Chart 447: BofAML Quality Indices 12m Performance Correlation to 12m Changes in CBOE VIX (1986 to present)**

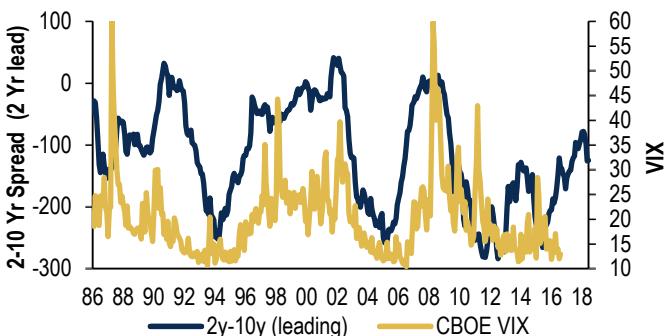


Source: BofA Merrill Lynch US Equity and Quantitative Strategy, Standard & Poor's

## ...AND THE BEST HEDGE AGAINST VOLATILITY

High Quality is the best hedge against rising volatility.

**Chart 448: CBOE VIX and Inverted Slope of Yield Curve (1986 to present)**



Source: CBOE, BEA, BofA Merrill Lynch US Equity & US Quantitative Strategy

## VOLATILITY MIGHT BE ON THE HORIZON

The VIX remains stubbornly low, but the yield curve suggests upside risk to volatility.

**Chart 449: B+ or Higher vs. B or Lower and 3m Avg VIX**



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

## ...AND THIS FAVORS HIGHER QUALITY

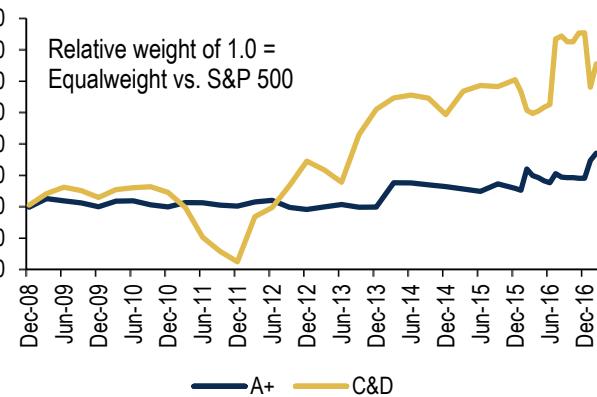
Quality has behaved in line with historical trends over the last few years, with nearly every spike in volatility coinciding with the outperformance of higher quality stocks. This relationship has held true over the last 5 and 10 years.

**Table 15: High Quality vs. Low Quality and 3-month average VIX**

Correlation
Since 1990
Last 10 years
Last 5 years

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

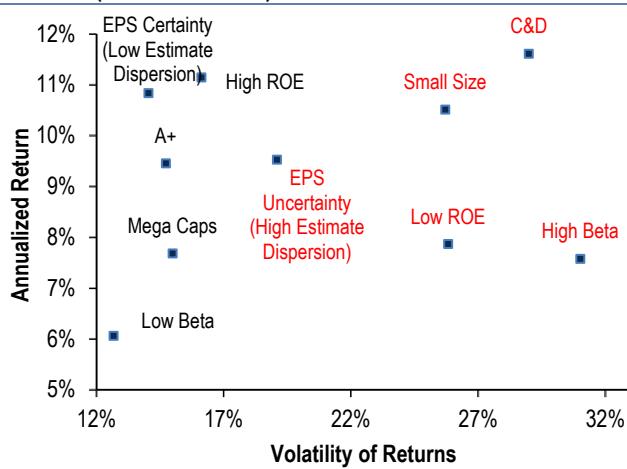
**Chart 450: Relative fund positioning of stocks with A+ and C&D ratings**



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

Low beta has historically had a much weaker risk-return profile than other high quality/low risk factors.

**Chart 451: High and Low Quality Strategies Reward vs. Risk**  
Average annualized return vs. annualized volatility (standard deviation) of returns (3/31/86-2/28/17)

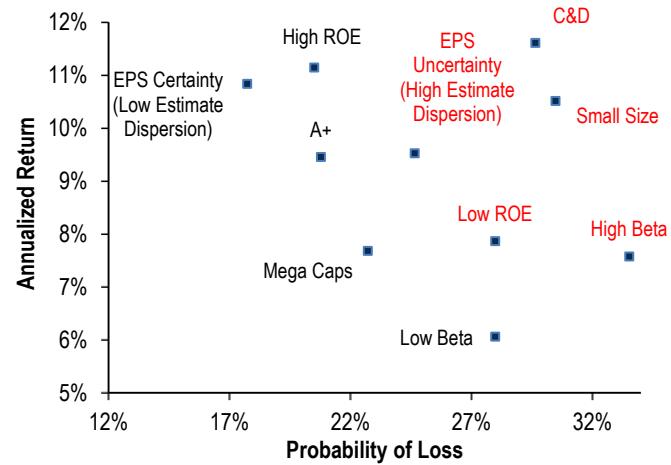


Source: BofA Merrill Lynch US Equity and Quantitative Strategy

## YET INVESTORS ARE OVERWEIGHT LOW QUALITY

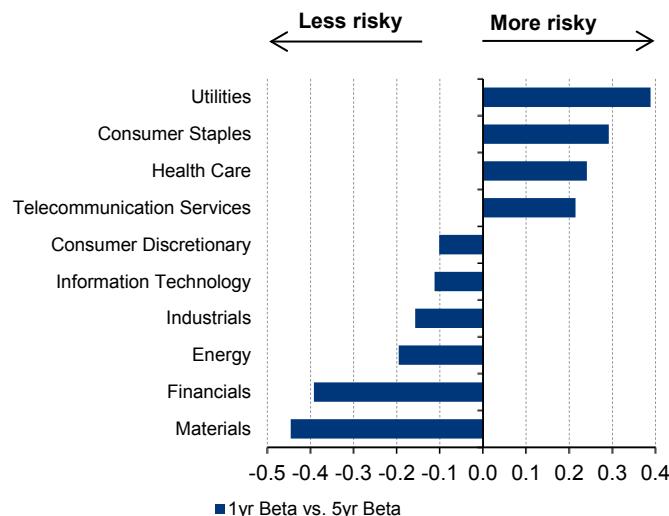
Large cap fund managers have become increasingly overweight Low Quality.

**Chart 452: High and Low Quality Strategies Reward vs. Downside Risk**  
Average annualized return vs. probability of loss (3/31/86-2/28/17)



Source: BofA Merrill Lynch US Equity and Quantitative Strategy

**Chart 453: 1yr vs. 5yr beta for S&P 500 sectors**

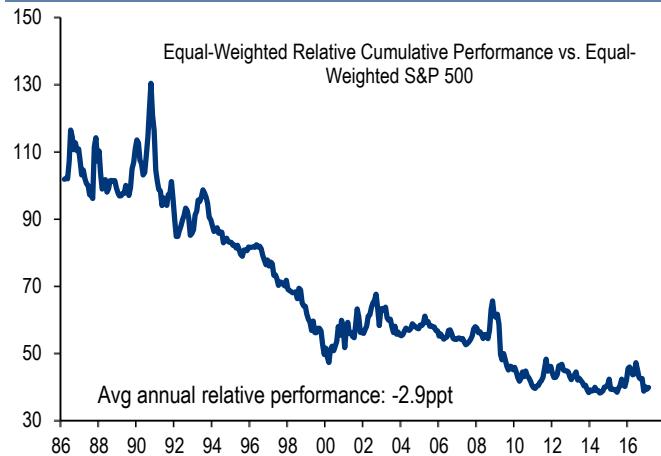


Source: Factset, BofA Merrill Lynch US Equity & US Quant Strategy

## BETA IS A LESS CONSISTENT FACTOR

Beta tends to be inconsistent and volatile over the course of a cycle, making it a less reliable defensive factor.

**Chart 454: Relative performance of S&P 500 bottom beta decile stocks**



Source: BofA Merrill Lynch US Equity & US Quant Strategy

## ....AND LOW BETA TENDS TO UNDERPERFORM

Low beta strategies tend to underperform most of the time.

**Table 16: Quality (fundamental stability) vs. Low Beta (price stability)**

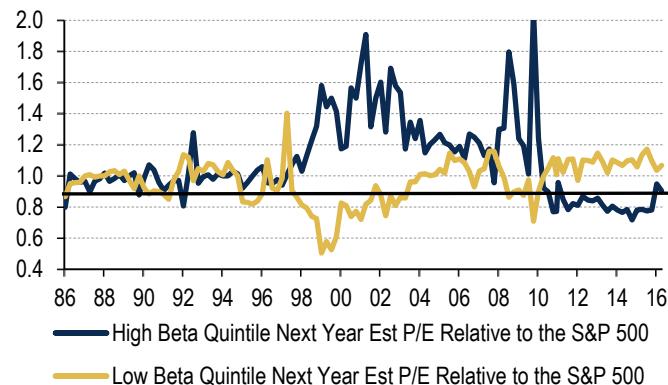
Metric	Beta (Lowest Decile Median)	B+ or Better (Median)	Diff (%)
EPS Volatility	27%	20%	37.7%
EPS Stability (lower = more stable)	23.2	13.1	77.6%
DPS Vol	2%	7%	-67.2%
Max 5-yr EPS Decline	24%	11%	121.3%
Max 5-yr Price Decline	14%	13%	4.2%
Net Debt/EBITDA	3.49	1.39	150.4%
ROCE	5%	12%	-61.0%
ROE	10%	21%	-51.8%
Beta	0.50	0.95	-47.0%
Quality Score (lower = higher quality)	4.00	3.00	33.3%

Source: BofA Merrill Lynch US Equity & US Quant Strategy, S&P, Compustat

## LOW BETA ≠ QUALITY

Stocks with the lowest beta tend to have higher earnings volatility, more leverage and lower returns on investment than those based on fundamental beta.

**Chart 455: Relative Fwd. P/E of S&P 500 Low Beta and High Beta Quintiles**

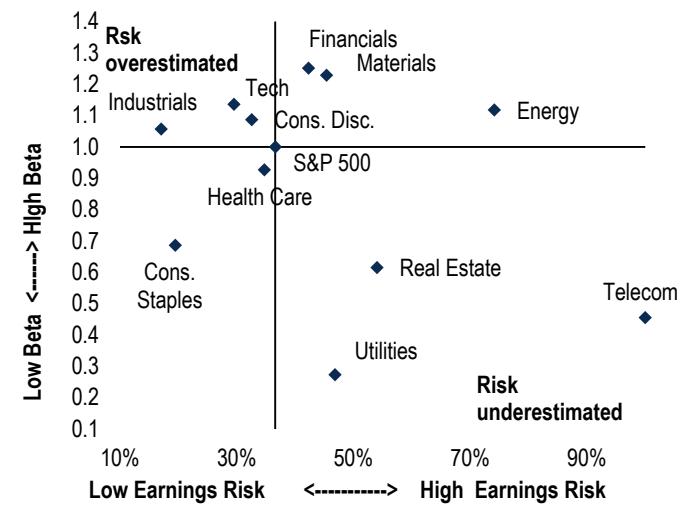


Source: BofA Merrill Lynch US Equity & US Quant Strategy

## LOW VS HIGH BETA

In contrast to High Quality, Low Beta is more expensive than High Beta.

**Chart 456: Price risk (5yr beta) vs. earnings risk (market-weighted % of low quality stocks) for S&P 500 sectors (as of 2/29/17)**



Note: Earnings risk based on S&P Quality Ranks (stocks ranked B or worse classified as low quality)  
based on last 10 years

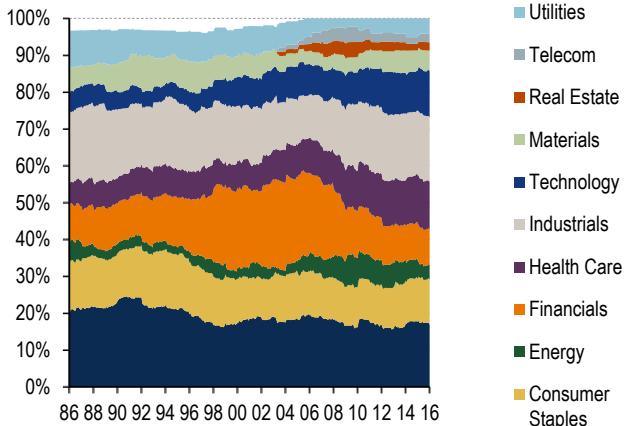
Source: S&P BofA Merrill Lynch US Equity & US Quant Strategy

## ...AND MISPRICES THE RISK

A fundamental mispricing of risk: Quality ≠ Defensive

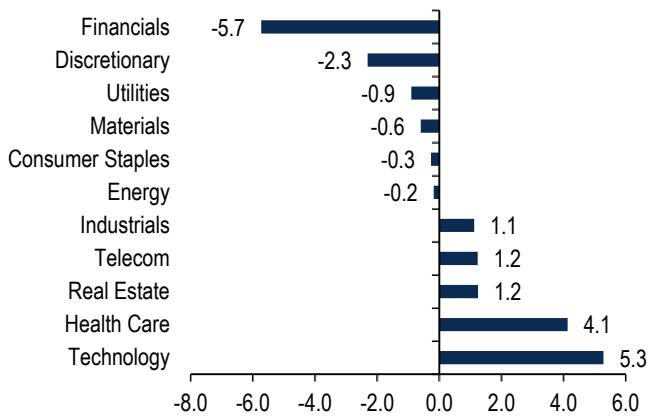
In the wake of the Financial Crisis, we have seen a substantial shift in the sector composition of stocks rated B+ or higher. In particular, the percentage of Technology stocks is the highest in our data history (13%), while Health Care is just off the all-time highs, also at 13%. Additionally, Industrials is now tied with Consumer Discretionary for the sector with the most high quality stocks, a title that the Financials held until 2009.

**Chart 457: B+ or Better sector exposure over time based on number of cos**



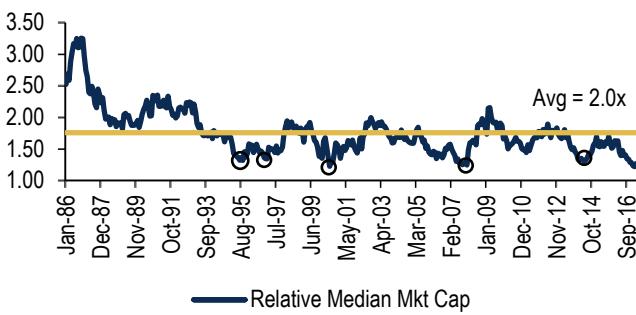
Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, S&P

**Chart 458: B+ or Better current sector weight vs. historical avg (ppt)**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, S&P

**Chart 459: S&P 500 relative median mkt cap: B+ or Higher vs. B or Lower**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, S&P

**Table 17: Median B+ or Higher attributes vs. historical average since July 1990**

	B+ or Better	Historical Avg	Diff
EPS Volatility	20%	26%	-7%
EPS Stability (lower = more stable)	13.1	18.2	-5.1
DPS Vol	7%	6%	1%
Max 5-yr EPS Decline	11%	10%	1%
Max 5-yr Price Decline	13%	25%	-11%
Net Debt/EBITDA	1.39	1.13	0.27
ROCE	12%	12%	0%
ROE	21%	18%	4%
Beta	0.95	0.91	0.04
5-yr Proforma vs. GAAP EPS	7.5%	5.6%	1.9%
5-yr Proforma vs. FCFE/Sh	8.7%	39.5%	-30.8%
Quality Score (low = high quality)	3.00	2.93	0.07

Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, Compustat, IBES, S&P

Relative to Low Quality stocks, High Quality stocks have higher returns on investment and EPS stability, lower leverage, lower beta and lower EPS volatility (Chart 460).

Compared to history, the relative ROE and quality of earnings of High Quality vs. Low Quality stocks is higher today (Chart 461).

## HIGHER QUALITY IS USUALLY BIGGER

Since 1992, the median High Quality stock has generally had a market cap between 1.2x and 2.1x the size of the median Low Quality stock.

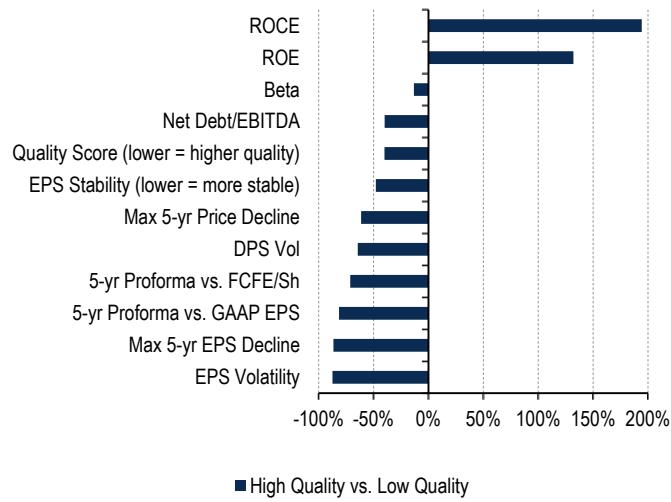
At current 1.3x level, the relative median market cap is near all-time lows. Historically, after declining to such low levels, high quality outperformed low quality by 12ppt (on avg.) in the next 12-mth.

## ...AND CONSISTENT OVER TIME

Relative to its historical average (since 1990), the median ROE has increased despite a drop in earnings volatility and leverage.

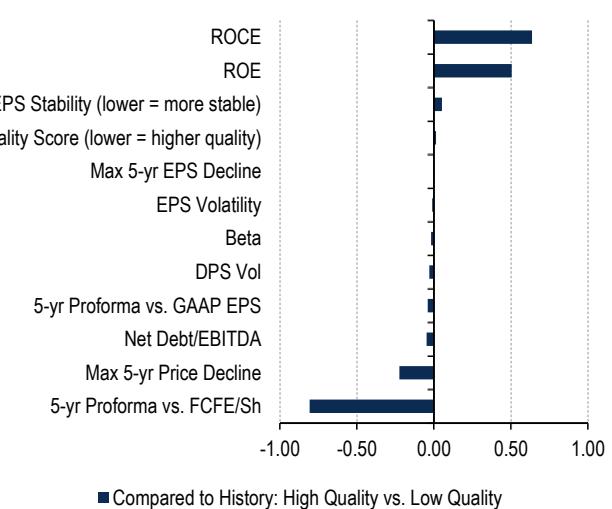
Meanwhile, the beta and dividend volatility have increased a bit, while the average quality rating has dipped.

**Chart 460: Current B+ or Higher vs. B or Lower attributes (relative)**



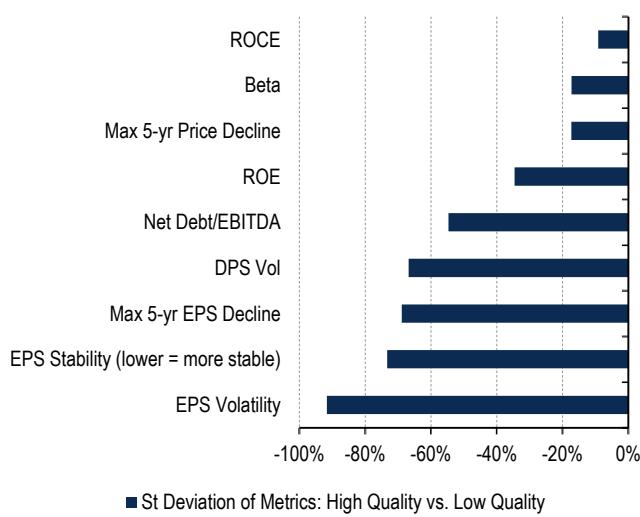
Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, Compustat, IBES, S&P

**Chart 461: B+ or Higher vs. B or Lower attributes (relative) vs. history**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, Compustat, IBES, S&P

**Chart 462: B+ or Higher vs. B or Lower standard deviation of attributes since July 1990**



Source: BofA Merrill Lynch US Equity and Quantitative Strategy, FactSet, Compustat, IBES, S&P

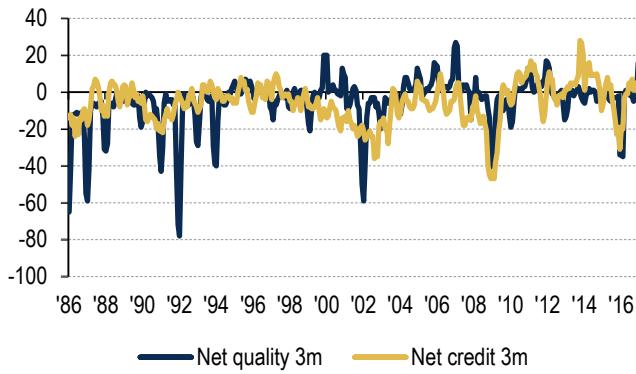
### ....IN CONTRAST TO LOWER QUALITY

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, leverage and earnings quality fluctuate significantly over the course of the cycle.

### Quality ratings vs. credit ratings

In examining the relationship between credit and quality ratings, we found that there is a relationship in that both are impacted by the underlying fundamentals of the companies. If the profits decline meaningfully, it can reduce the earnings and dividend stability of the company as well as the company's ability to meet their financial obligations. In aggregate, we did see a coincident relationship between overall credit and quality rating changes.

### **Chart 463: Net quality and credit rating upgrades/downgrades**

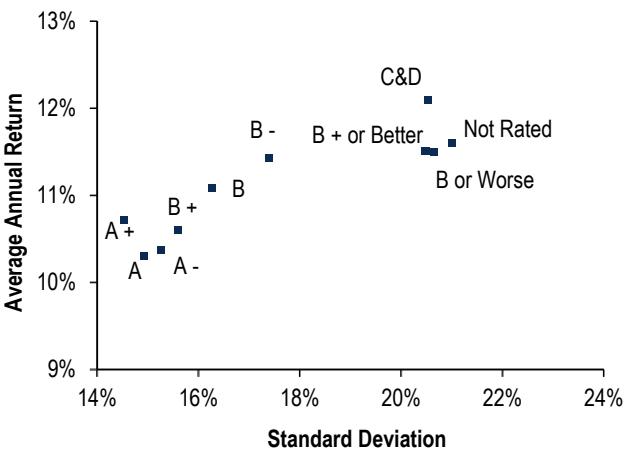


Source: BofAML US Equity & Quant Strategy, S&P

## Quality Risk/Reward Profile

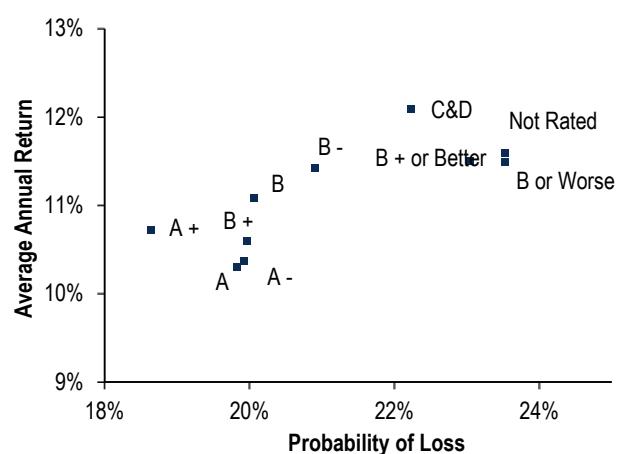
Below we show the risk to reward, using two measures of risk, of high and low quality stocks based on various measures of quality. This includes the S&P Common Stock Ranks (our preferred measure of quality) as well as Earnings Estimate Dispersion, ROE, Size, and Beta.

### **Chart 464: Risk Reward Characteristics (1986 to 2017)**



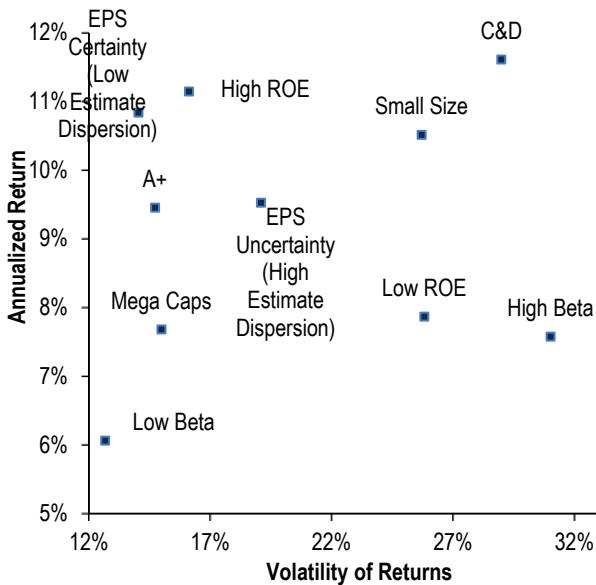
Source: BofA Merrill Lynch US Quantitative Strategy

### **Chart 465: Downside Risk Reward Characteristics (1986 to 2017)**



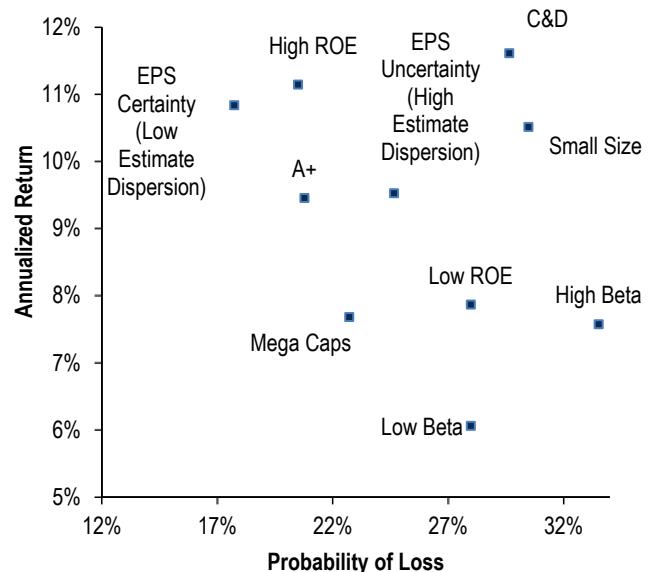
Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 466: High and Low Quality Strategies Reward vs. Risk**  
**Average annual return vs. annualized volatility (standard deviation) of returns**  
(3/31/86-2/28/17)



Source: BofA Merrill Lynch US Equity and Quantitative Strategy. 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.

**Chart 467: High and Low Quality Strategies Reward vs. Downside Risk**  
**Average annual return vs. probability of loss (3/31/86-2/28/17)**

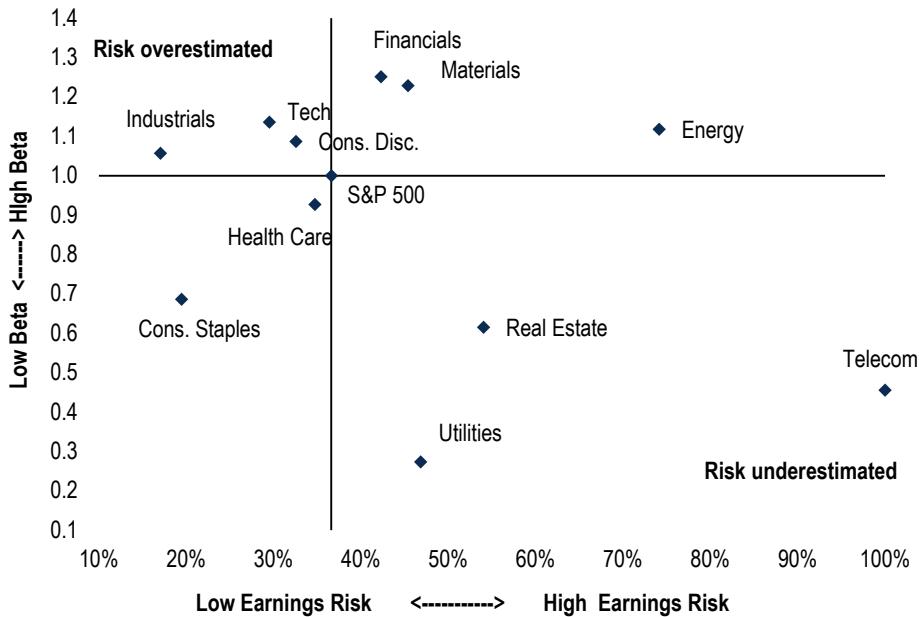


Source: BofA Merrill Lynch US Equity and Quantitative Strategy Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

### Comparing “fundamental beta” to price beta

While many investors use low beta as another measure of quality, we recommend 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 a host of other factors that play into the safety of an investment. Investors that equate low beta with earnings stability may be surprised to find that sectors that are penalized for being too cyclical, and thus trade at higher betas, have actually exhibited far more earnings stability over the last cycle than some of their lower beta counterparts, key examples being Industrials and Tech vs. Utilities and Telecom, respectively.

**Chart 468: 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**



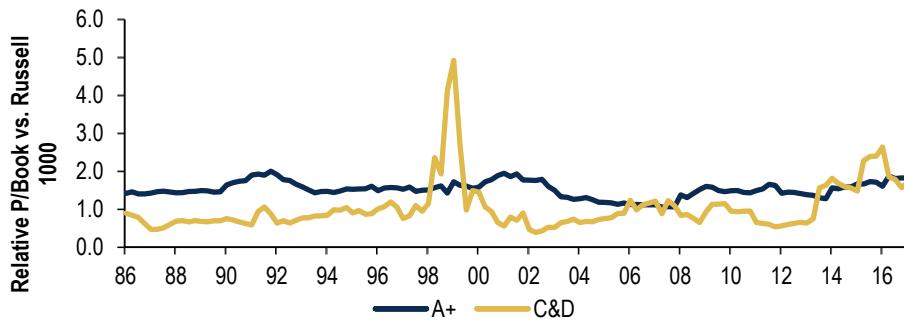
Source: BofA Merrill Lynch US Equity & Quant Strategy, Standard & Poor's

## Valuations

High quality stocks are historically inexpensive based on a wide variety of valuation metrics.

High quality seems historically inexpensive on book value: high quality stocks trade in line with low quality stocks on book value, where they have normally traded at a steep premium.

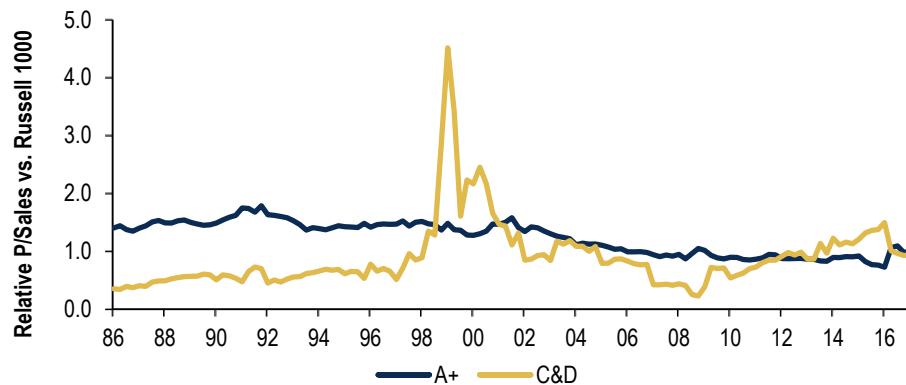
**Chart 469: A+ vs. C&D Price to Book relative to Benchmark (1986 to present)**



BofA Merrill Lynch US Equity & US Quantitative Strategy

Low quality is historically expensive on sales: on price to sales, low quality stocks are roughly in line with high quality stocks, again where they have normally traded at a discount.

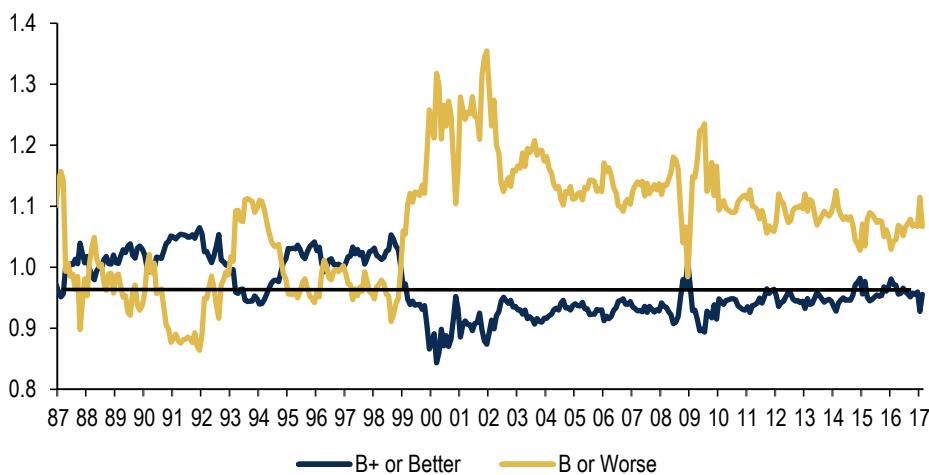
**Chart 470: A+ vs. C&D Price to Sales relative to Benchmark (1986 to present)**



BofA Merrill Lynch US Equity & US Quantitative Strategy

On earnings, low quality is still expensive and high quality is still cheap. But mean reversion has begun, and we think, will continue.

**Chart 471: "B+ or Better" vs. "B or Worse" Forward P/E relative to Benchmark (1986 to present)**

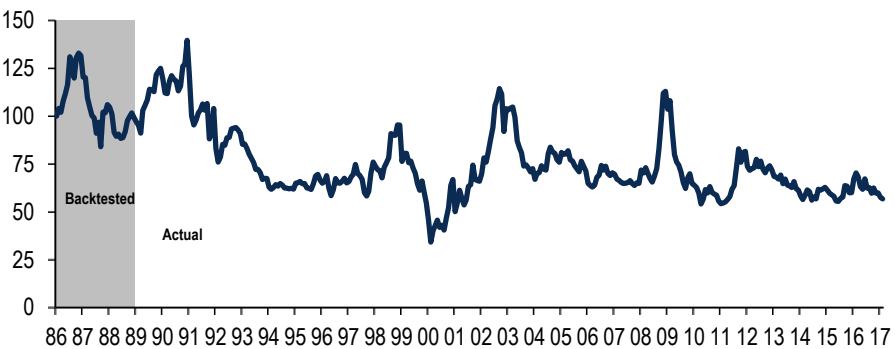


Source: BofA Merrill Lynch US Equity & US Quantitative Strategy

NB: we use B+ or Better vs. B or Worse as our definitions of high and low quality in Chart 14 because C&D rated companies had many months of negative aggregated earnings forecasts.

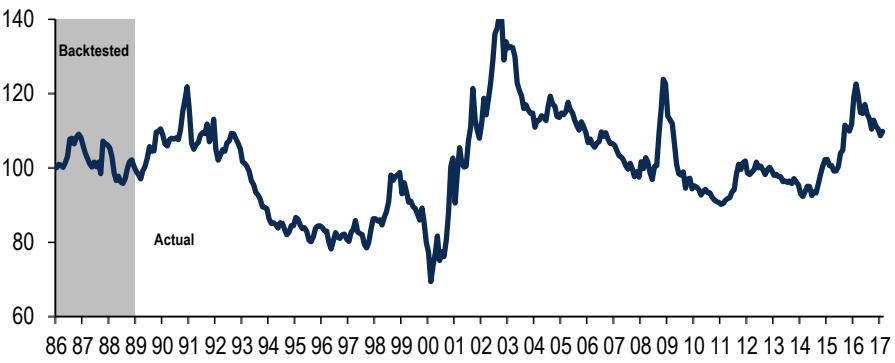
## Performance Charts

Chart 472: A+ vs C&D



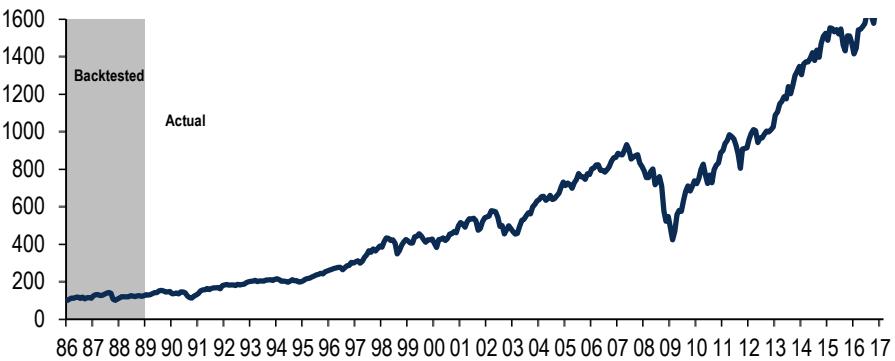
Source: BofA Merrill Lynch US Quantitative Strategy. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

Chart 473: B+ or Better vs. B or Worse



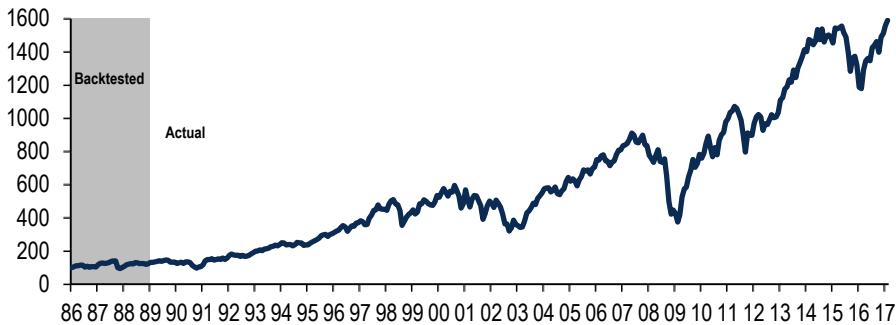
Source: BofA Merrill Lynch US Quantitative Strategy. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

Chart 474: B+ or Better



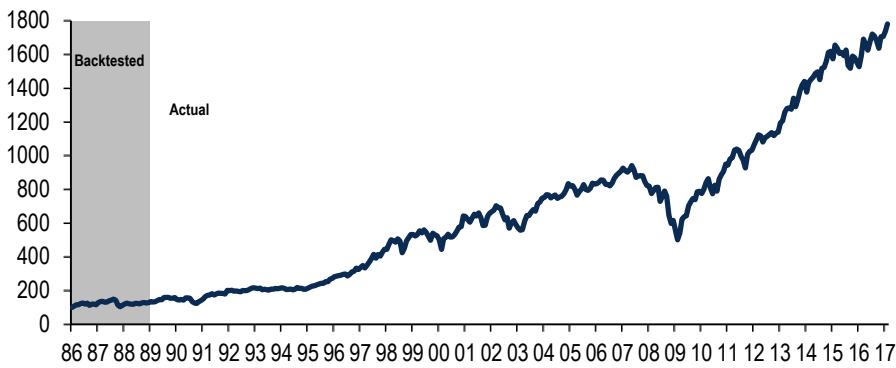
Source: BofA Merrill Lynch US Quantitative Strategy. Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance.

### Chart 475: B or Worse



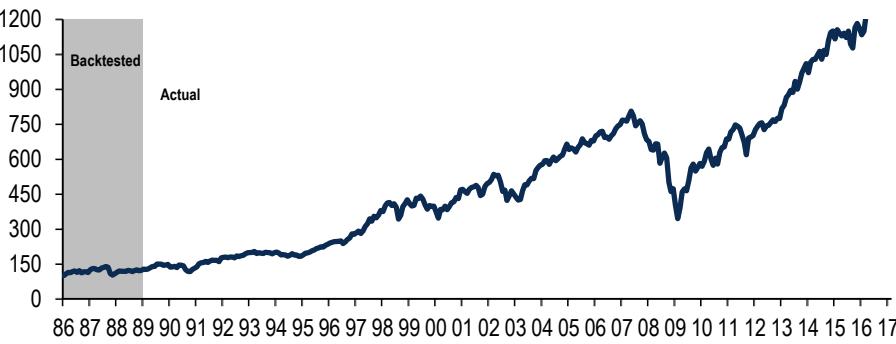
Source: BofA Merrill Lynch US Quantitative Strategy Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance

### Chart 476: A+

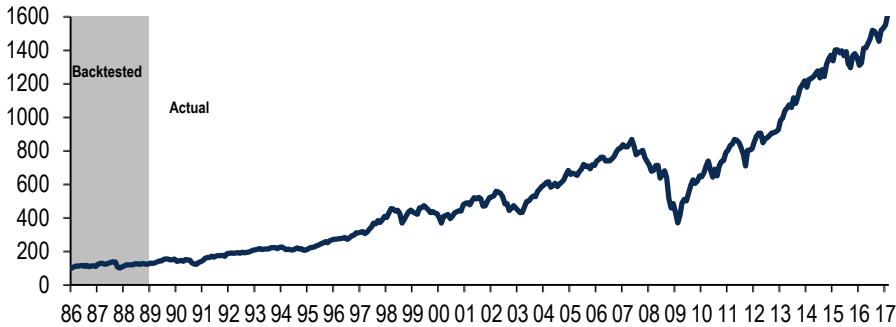


Source: BofA Merrill Lynch US Quantitative Strategy Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance

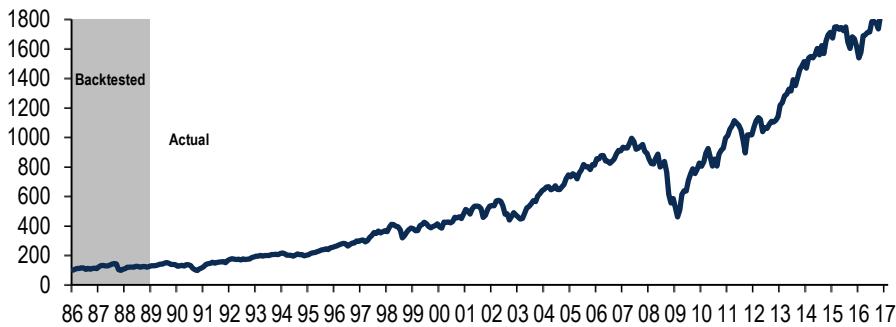
### Chart 477: A



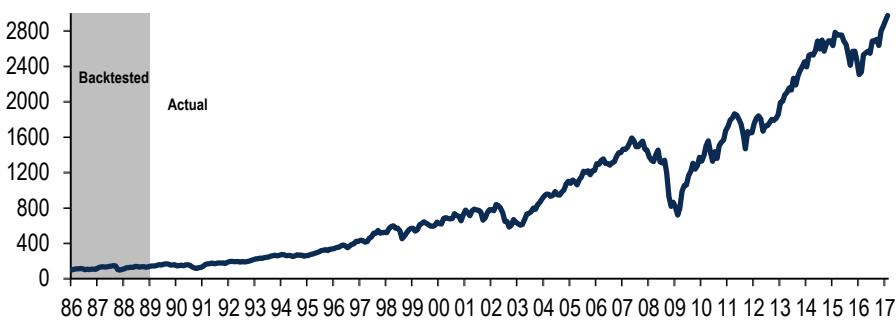
Source: BofA Merrill Lynch US Quantitative Strategy Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance

**Chart 478: A-**

Source: BofA Merrill Lynch US Quantitative Strategy 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

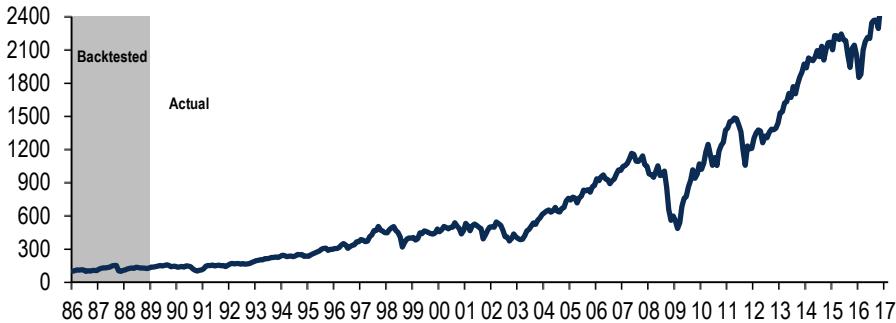
**Chart 479: B+**

Source: BofA Merrill Lynch US Quantitative Strategy 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

**Chart 480: B**

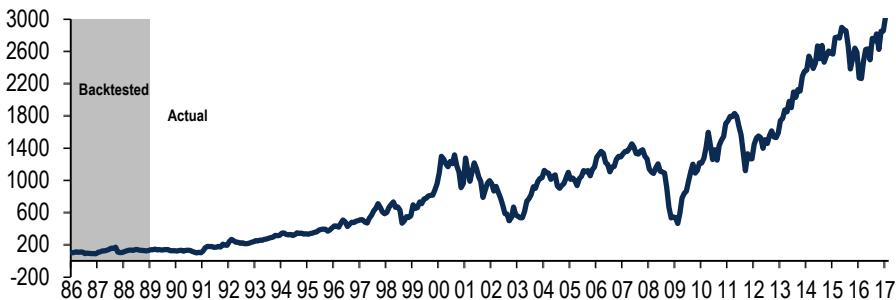
Source: BofA Merrill Lynch US Quantitative Strategy Backtesting is hypothetical in nature and reflects application of the screen prior to its introduction. It is not intended to be indicative of future performance

Chart 481: B-



Source: BofA Merrill Lynch US Quantitative Strategy 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

Chart 482: C&D



Source: BofA Merrill Lynch US Quantitative Strategy 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

## Definitions of quality metrics

- “A+” vs. “C&D”: Highest vs. lowest quality stocks within the BofAML US coverage universe based on the S&P Common Stock Rankings. These rankings are based on a quantitative assessment of long-term growth and the stability of a company’s earnings and dividends over a 10-year period.
- Note: we also sometimes define high quality vs. low quality in our work as “B+ or Better” vs. “B or Worse” ranked stocks when a broader sample of stocks is needed.
- **ROE:** Top and bottom deciles of the S&P 500 on Trailing 4-quarter return on equity where return is measured as trailing twelve month earnings, equity is measured by book value.
- **Beta:** Top and bottom deciles of the S&P 500 based on five-year (60-month) adjusted beta vs. S&P 500.
- **Earnings Certainty:** Bottom decile of the S&P 500 based on dispersion of next year’s consensus estimates, where low dispersion or clustered estimates suggest a higher level of certainty. **Earnings Uncertainty:** Top decile of the S&P 500 based on

dispersion of next year's consensus estimates, where most dispersed estimates suggest a lower level of certainty.

- **Nifty 50 / Small Size:** Top and bottom deciles of the S&P 500 based on current market capitalization.

Strategies of investing in quality by various measures have generally behaved similarly over time.

As the table below illustrates, baskets of high and low quality stocks corresponding to each of these measures generally behave similarly over time based on correlations of monthly returns. Whereas some strategies are more similar than others, most display reasonably high correlations in returns.

**Exhibit 9: Correlation between High-Low Quality Performance Spreads (1989 to 2/2017)**

	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 s. High Beta	63.5%	100.0%			
Certain vs Uncertain Earnings	60.5%	64.2%	100.0%		
Nifty 50 vs. Small Size	65.2%	48.6%	53.6%	100.0%	
"A+" vs. "C&D"	60.3%	64.4%	64.5%	39.8%	100.0%

Source: BofA Merrill Lynch US Equity and US Quantitative Strategy

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, so comparisons would be unfair.

## Methodology

For the BofAML Quality indices, we created stock screens by using Standard and Poor's quality ranking for companies in the BofA Merrill Lynch 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.

**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. A complete performance record is available upon request.**

## **Section VI: Relative Valuation for Industries**

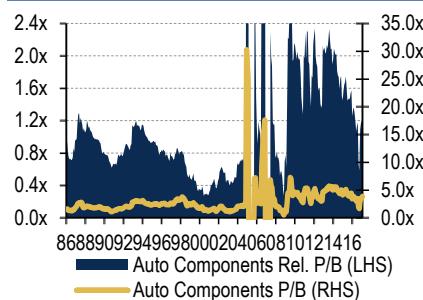
Consumer Discretionary	209
Consumer Staples	212
Energy	213
Financials	214
Health Care	216
Industrials	217
Information Technology	220
Materials	222
Real Estate	224
Telecommunication Services	224
Utilities	224

# Relative Valuation: Industries

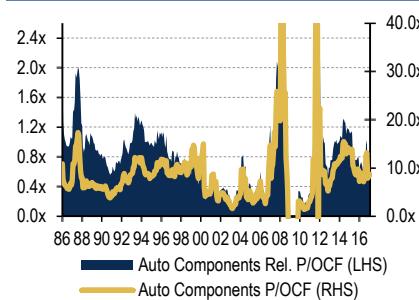
The below charts illustrate the absolute and relative Price/Book, Price/Operating Cash Flow, and Forward (NTM) P/E of the S&P 500 industries from 1986–February 2017. Industries with less than 10 years of valuation history are excluded.

## Consumer Discretionary

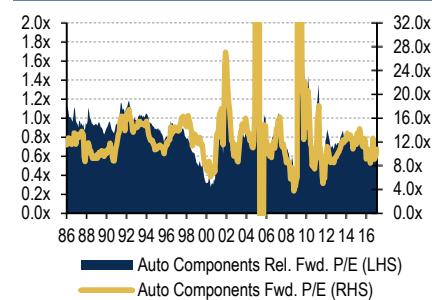
**Chart 483: Auto Components: P/B**



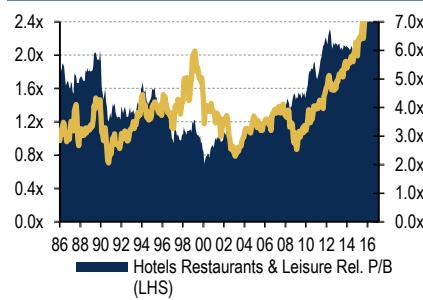
**Chart 484: Auto Components: P/OCF**



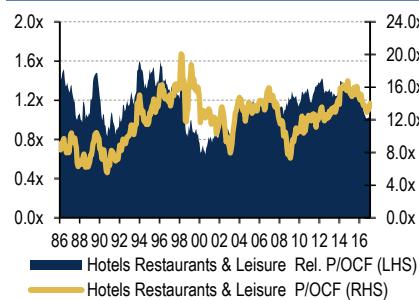
**Chart 485: Auto Components: Fwd. P/E**



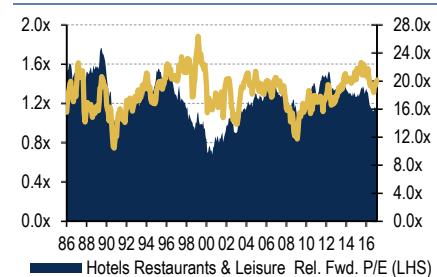
**Chart 486: Hotels Restaurants & Leisure: P/B**



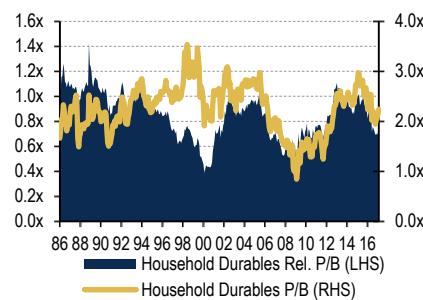
**Chart 487: Hotels Restaurants & Leisure: P/OCF**



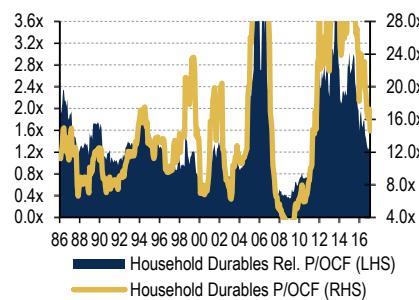
**Chart 488: Hotels Restaurants & Leisure: Fwd. P/E**



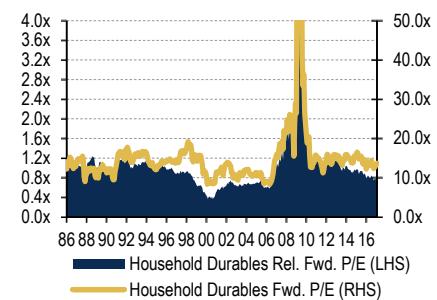
**Chart 489: Household Durables: P/B**

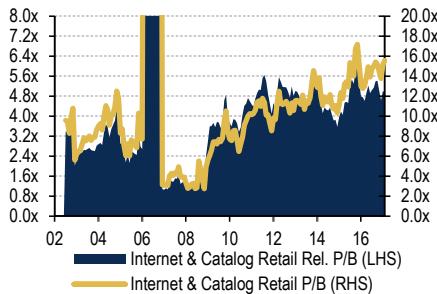
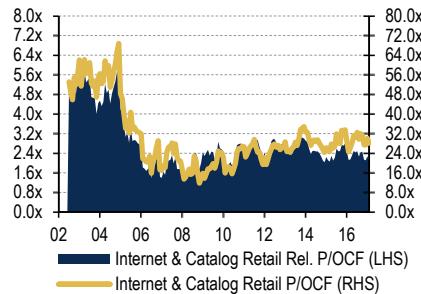
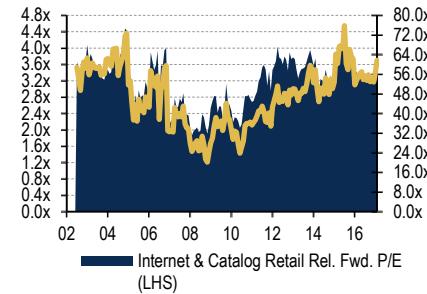
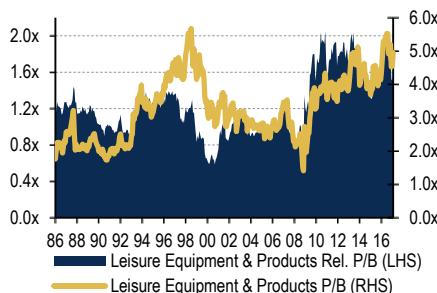
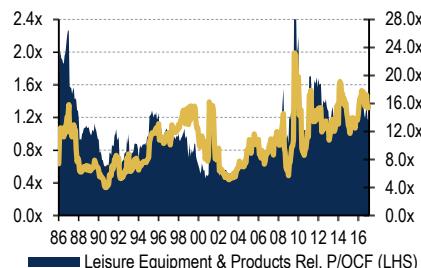
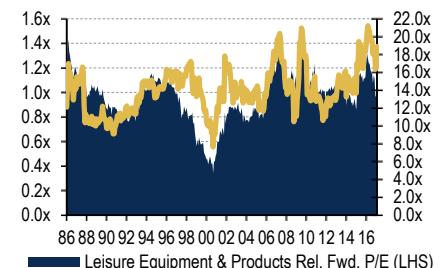
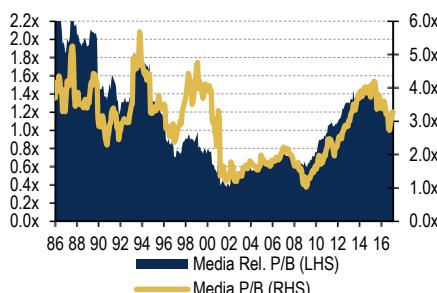
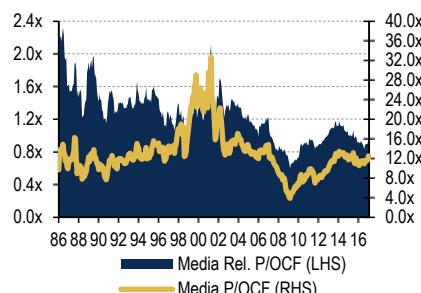
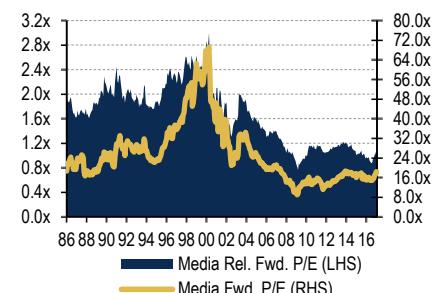


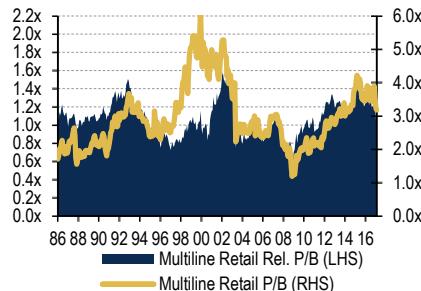
**Chart 490: Household Durables: P/OCF**



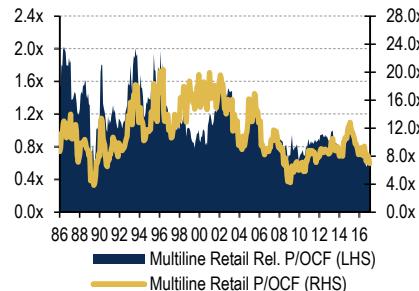
**Chart 491: Household Durables: Fwd. P/E**



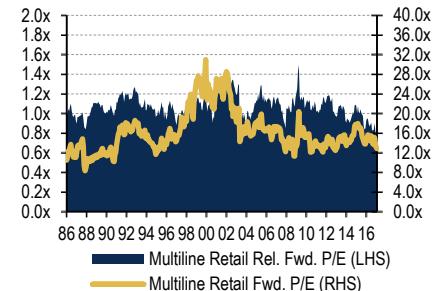
**Chart 492: Internet & Catalog Retail: P/B****Chart 493: Internet & Catalog Retail: P/OCF****Chart 494: Internet & Catalog Retail: Fwd. P/E****Chart 495: Leisure Equipment & Products: P/B****Chart 496: Leisure Equipment & Products: P/OCF****Chart 497: Leisure Equipment & Products: Fwd. P/E****Chart 498: Media: P/B****Chart 499: Media: P/OCF****Chart 500: Media: Fwd. P/E**

**Chart 501: Multiline Retail: P/B**

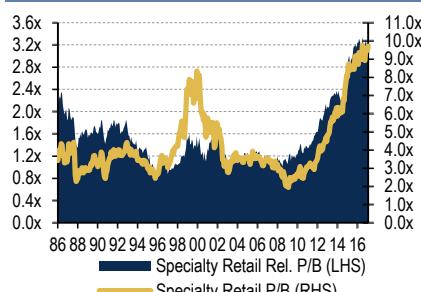
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 502: Multiline Retail: P/OCF**

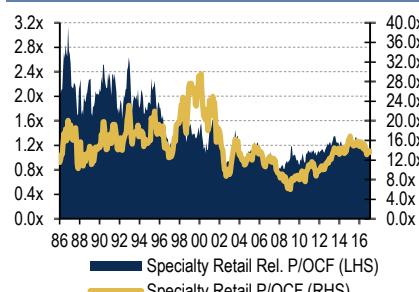
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 503: Multiline Retail: Fwd. P/E**

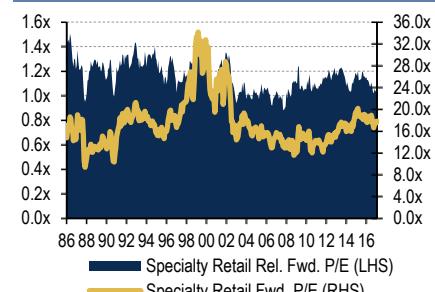
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 504: Specialty Retail: P/B**

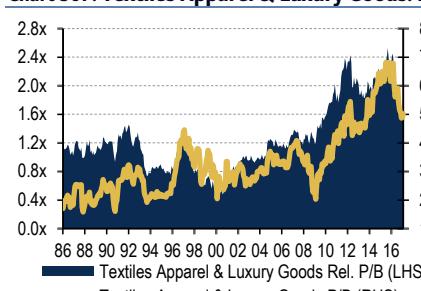
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 505: Specialty Retail: P/OCF**

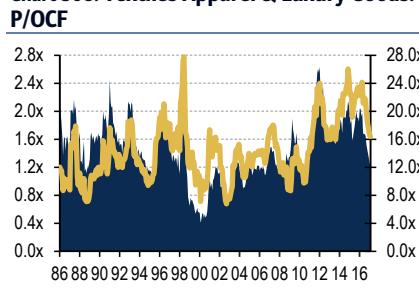
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 506: Specialty Retail: Fwd. P/E**

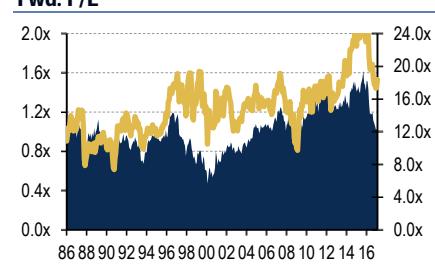
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 507: Textiles Apparel & Luxury Goods: P/B**

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

**Chart 508: Textiles Apparel & Luxury Goods: P/OCF**

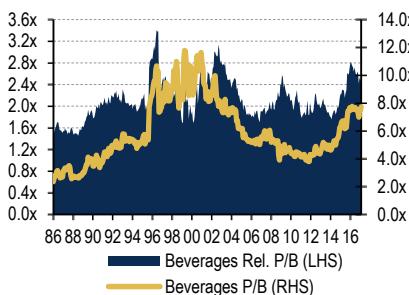
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 509: Textiles Apparel & Luxury Goods: Fwd. P/E**

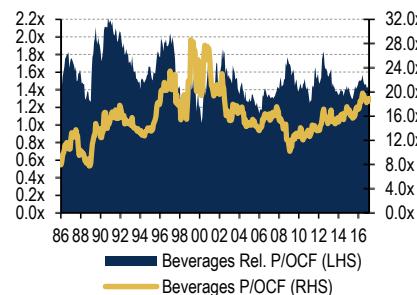
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

## Consumer Staples

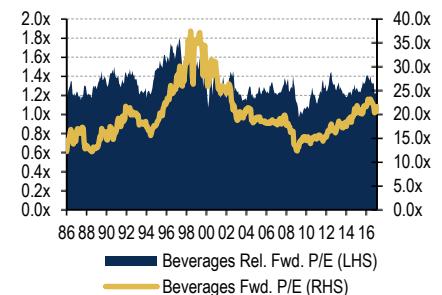
**Chart 510: Beverages: P/B**



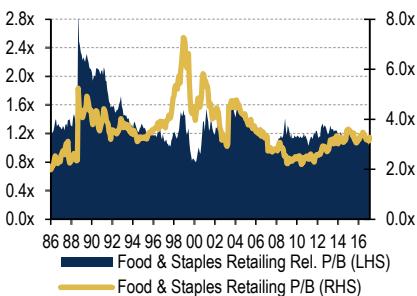
**Chart 511: Beverages: P/OCF**



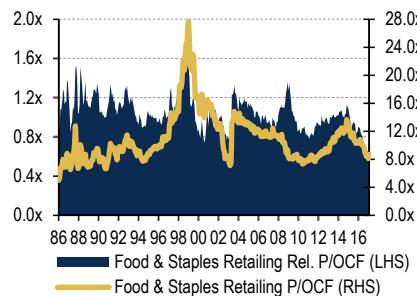
**Chart 512: Beverages Fwd. P/E**



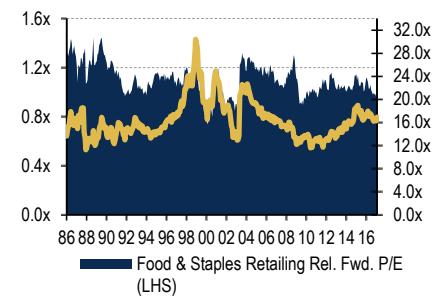
**Chart 513: Food & Staples Retailing: P/B**



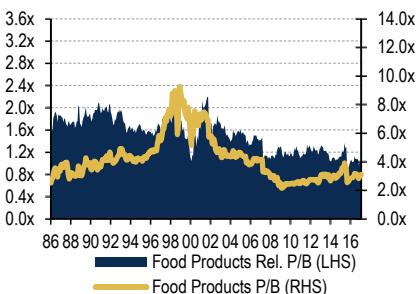
**Chart 514: Food & Staples Retailing: P/OCF**



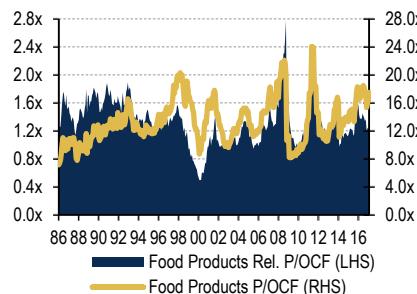
**Chart 515: Food & Staples Retailing: Fwd. P/E**



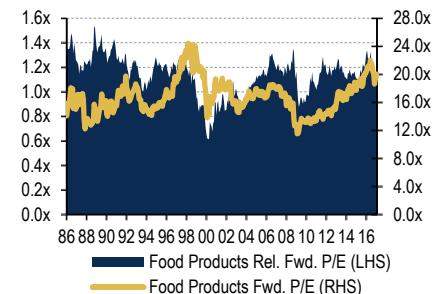
**Chart 516: Food Products: P/B**

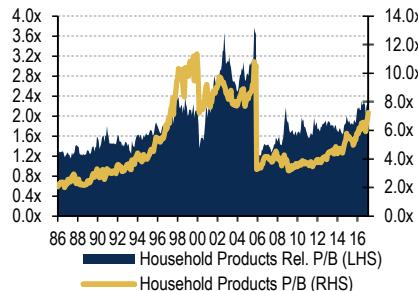
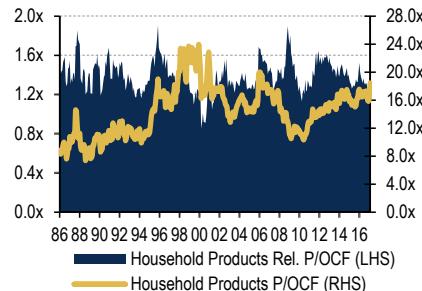
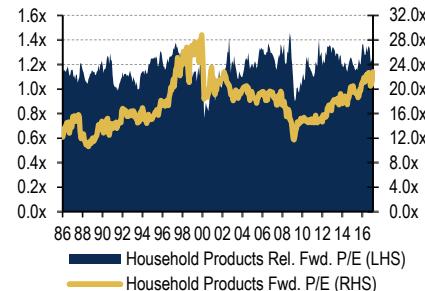
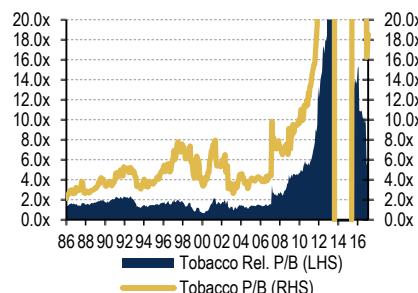
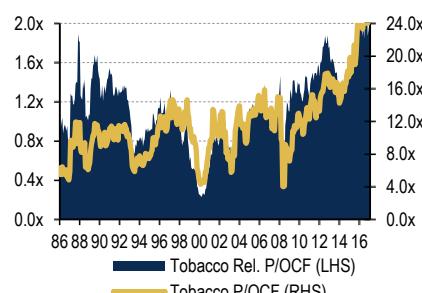
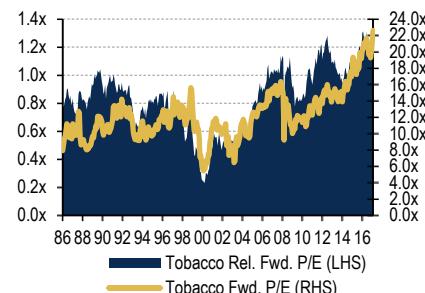


**Chart 517: Food Products: P/OCF**

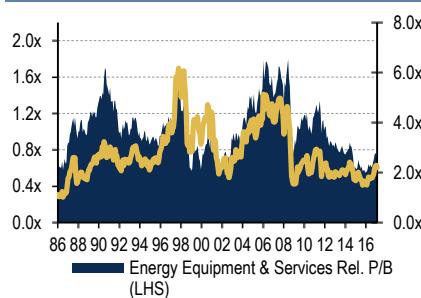
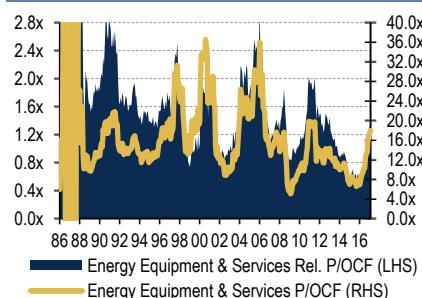
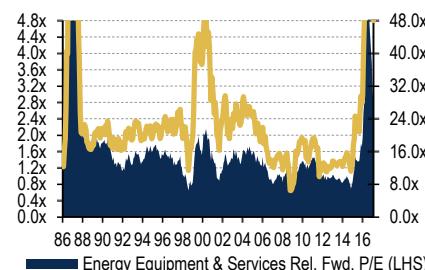


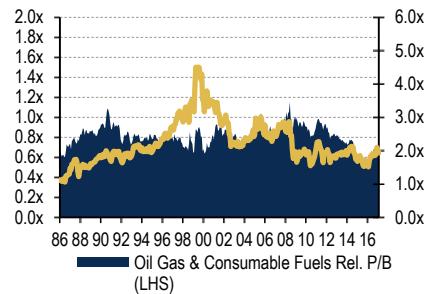
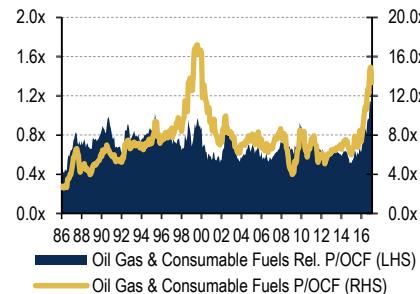
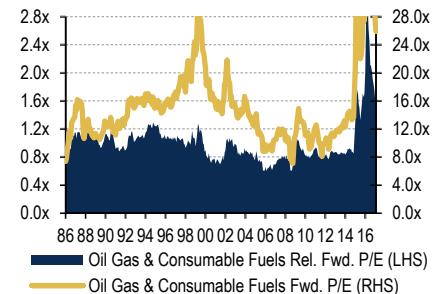
**Chart 518: Food Products: Fwd. P/E**



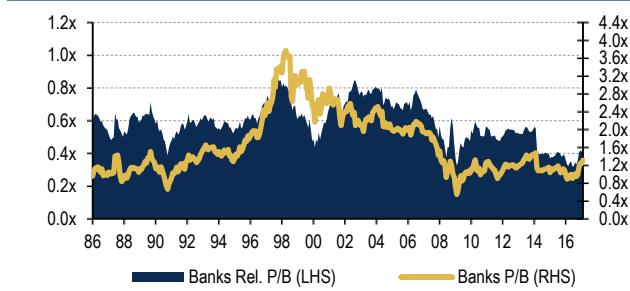
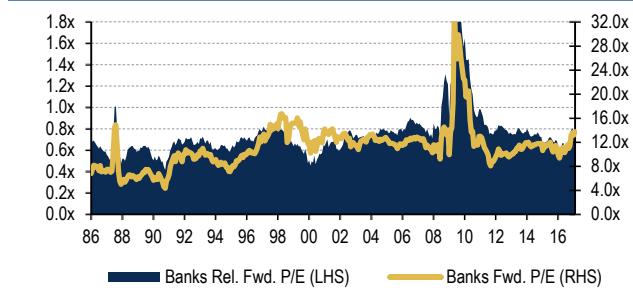
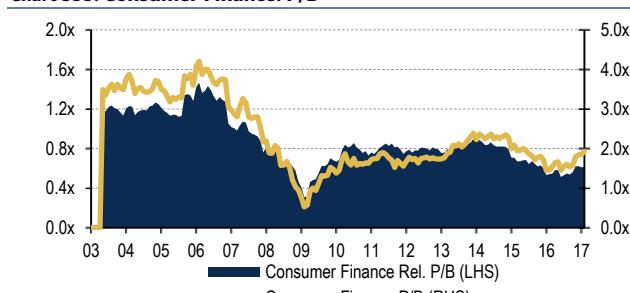
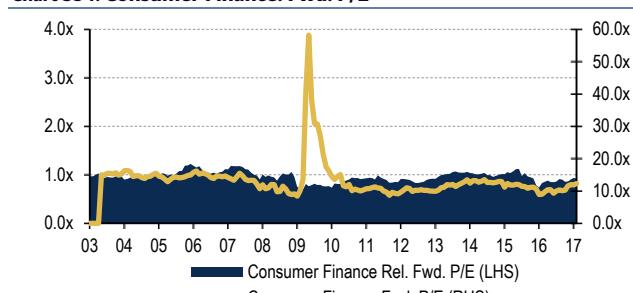
**Chart 519: Household Products: P/B****Chart 520: Household Products: P/OCF****Chart 521: Household Products: Fwd. P/E****Chart 522: Tobacco: P/B****Chart 523: Tobacco: P/OCF****Chart 524: Tobacco: Fwd. P/E**

## Energy

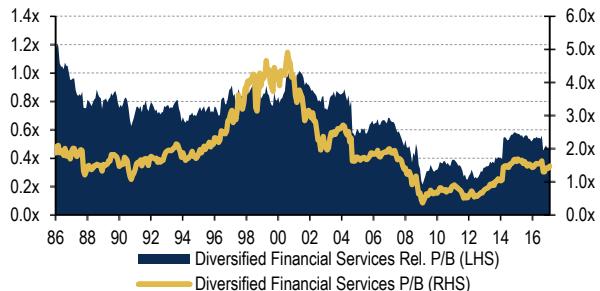
**Chart 525: Energy Equipment & Services: P/B****Chart 526: Energy Equipment & Services: P/OCF****Chart 527: Energy Equipment & Services: Fwd. P/E**

**Chart 528: Oil Gas & Consumable Fuels: P/B****Chart 529: Oil Gas & Consumable Fuels: P/OCF****Chart 530: Oil Gas & Consumable Fuels: Fwd. P/E**

## Financials

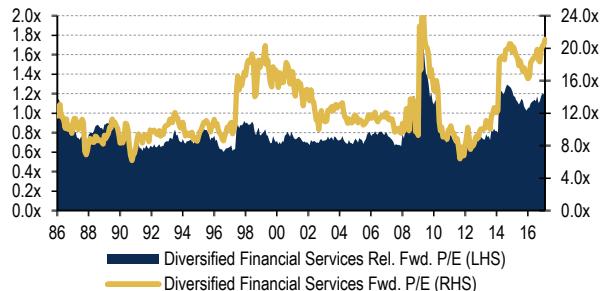
**Chart 531: Banks: P/B****Chart 532: Banks: Fwd. P/E****Chart 533: Consumer Finance: P/B****Chart 534: Consumer Finance: Fwd. P/E**

**Chart 535: Diversified Financial Services Consumer Finance: P/B**



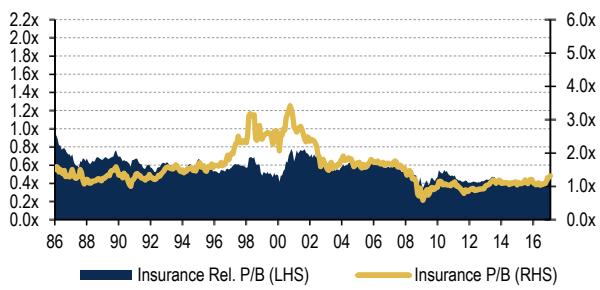
Source: Compustat, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 536: Diversified Financial Services: Fwd. P/E**



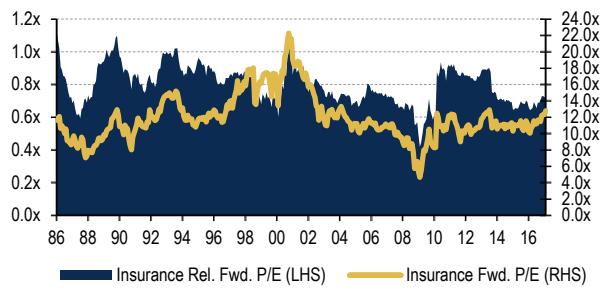
Source: Compustat, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 537: Insurance: P/B**



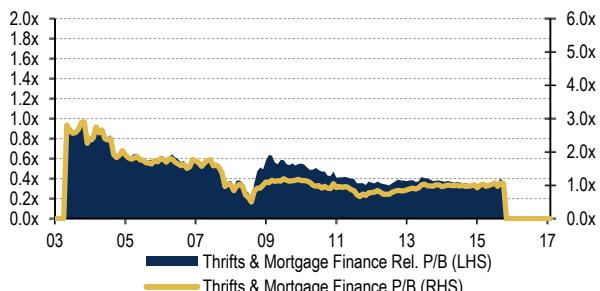
Source: Compustat, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 538: Insurance: Fwd. P/E**



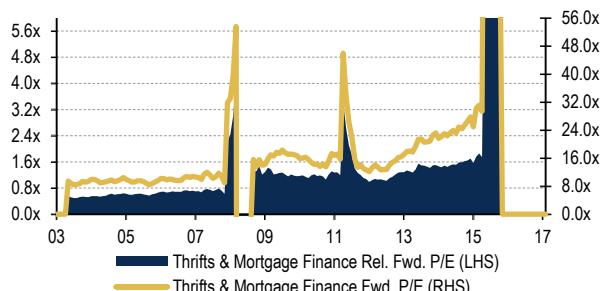
Source: Compustat, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 539: Thrifts & Mortgage Finance: P/B**



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

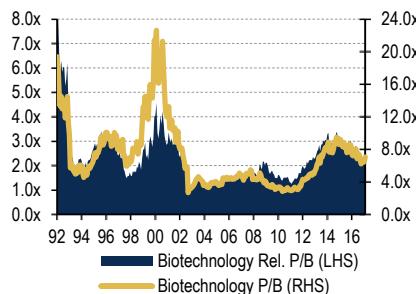
**Chart 540: Thrifts & Mortgage Finance: Fwd. P/E**



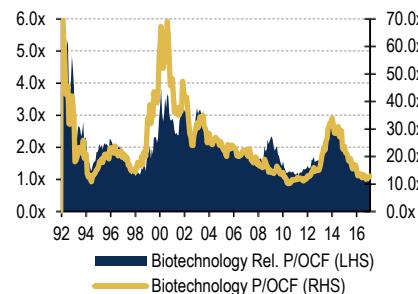
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

## Health Care

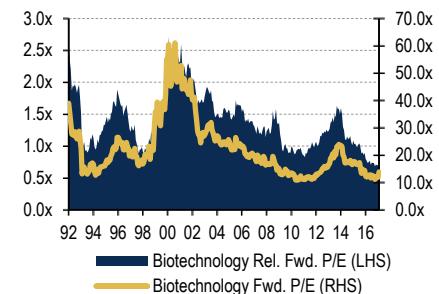
**Chart 541: Biotechnology: P/B**



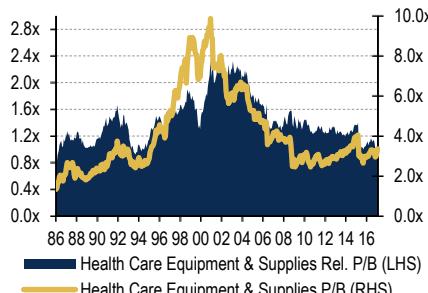
**Chart 542: Biotechnology: P/OCF**



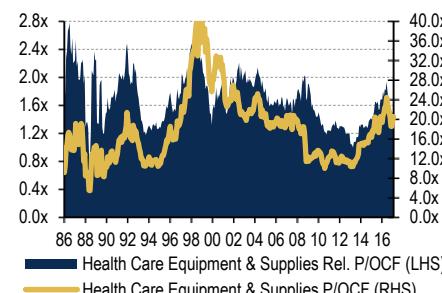
**Chart 543: Biotechnology: Fwd. P/E**



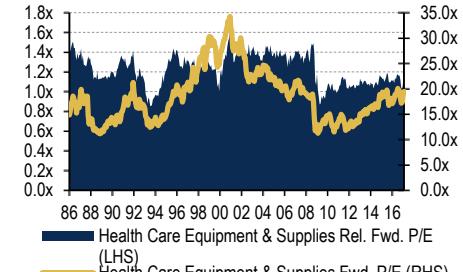
**Chart 544: Health Care Equipment & Supplies: P/B**



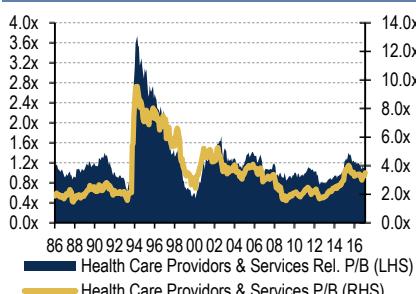
**Chart 545: Health Care Equipment & Supplies: P/OCF**



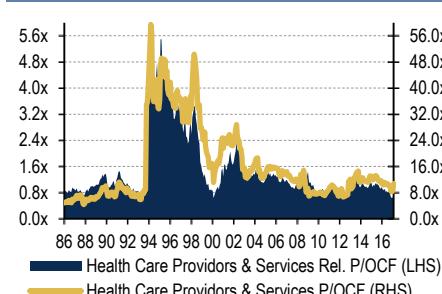
**Chart 546: Health Care Equipment & Supplies: Fwd. P/E**



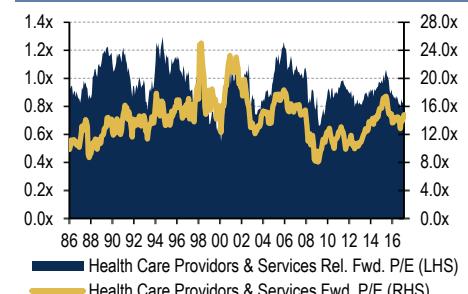
**Chart 547: Health Care Providers & Services: P/B**

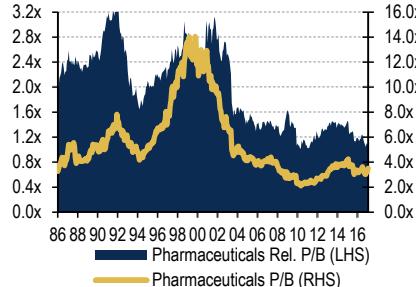
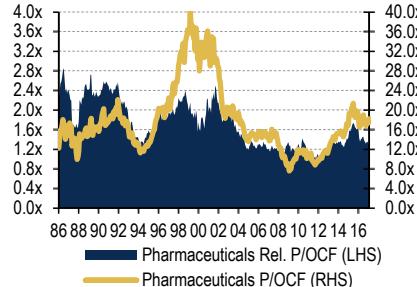
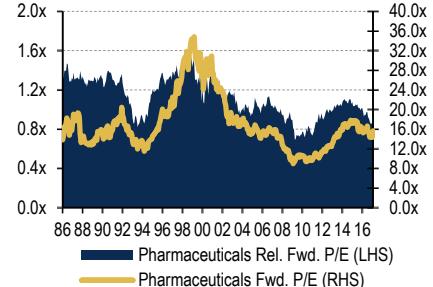


**Chart 548: Health Care Providers & Services: P/OCF**

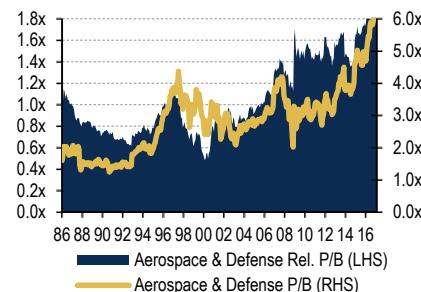
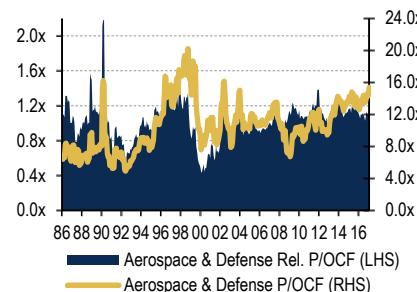
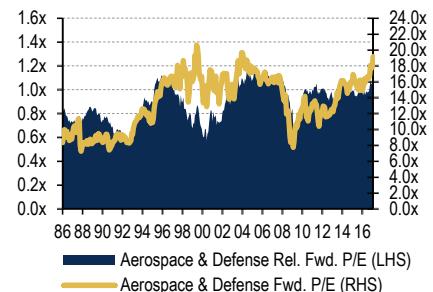
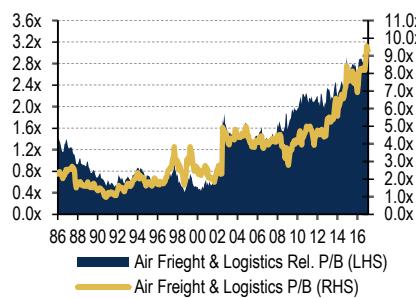
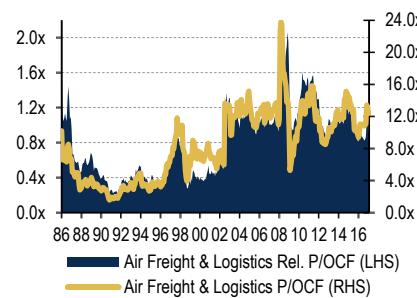
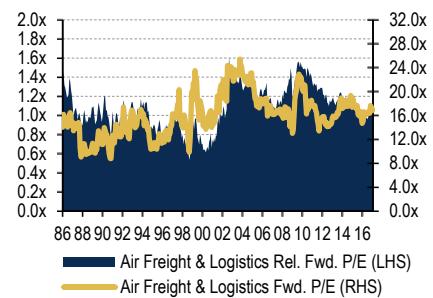


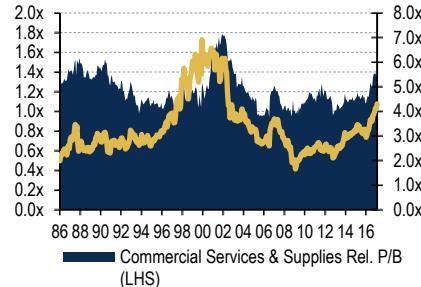
**Chart 549: Health Care Providers & Services: Fwd. P/E**



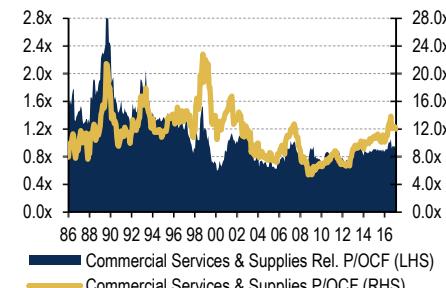
**Chart 550: Pharmaceuticals: P/B****Chart 551: Pharmaceuticals: P/OCF****Chart 552: Pharmaceuticals: Fwd. P/E**

## Industrials

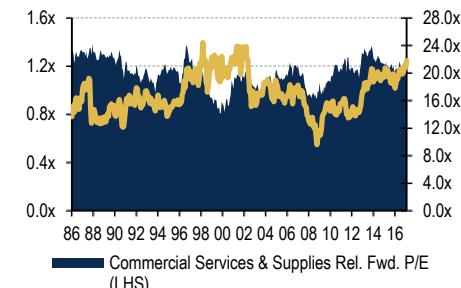
**Chart 553: Aerospace & Defense: P/B****Chart 554: Aerospace & Defense: P/OCF****Chart 555: Aerospace & Defense: Fwd. P/E****Chart 556: Air Freight & Logistics: P/B****Chart 557: Air Freight & Logistics: P/OCF****Chart 558: Air Freight & Logistics: Fwd. P/E**

**Chart 559: Commercial Services & Supplies : P/B**

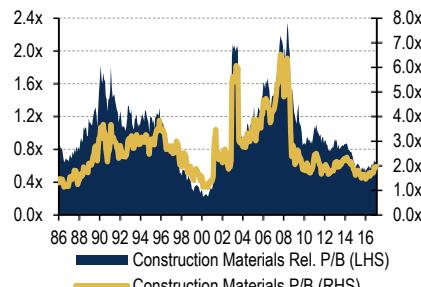
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 560: Commercial Services & Supplies : P/OCF**

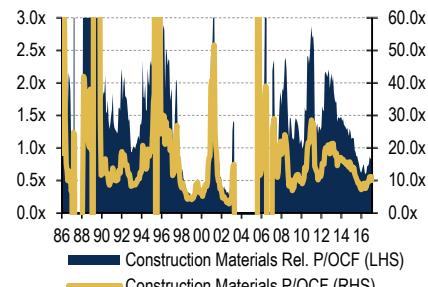
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 561: Commercial Services & Supplies : Fwd. P/E**

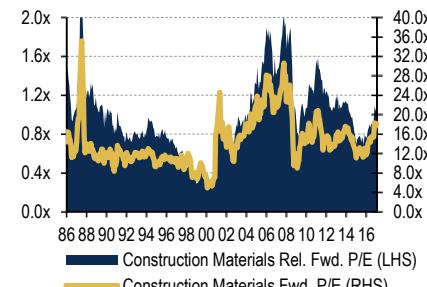
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 562: Construction & Engineering: P/B**

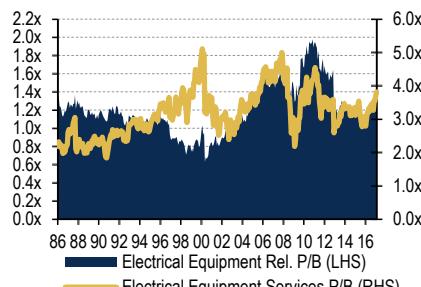
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 563: Construction & Engineering: P/OCF**

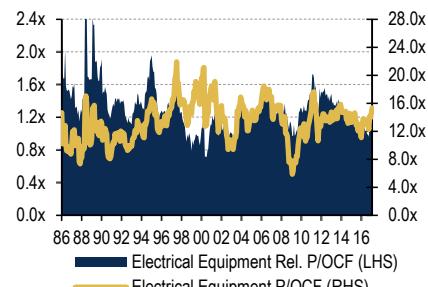
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 564: Construction & Engineering: Fwd. P/E**

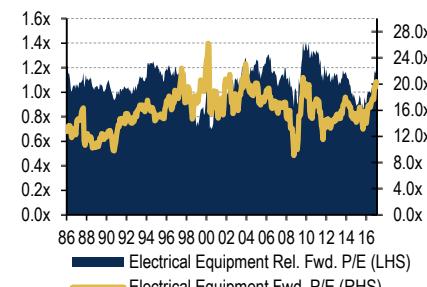
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 565: Electrical Equipment: P/B**

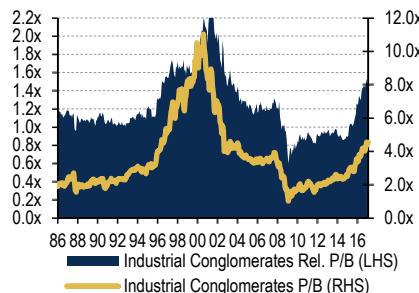
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 566: Electrical Equipment: P/OCF**

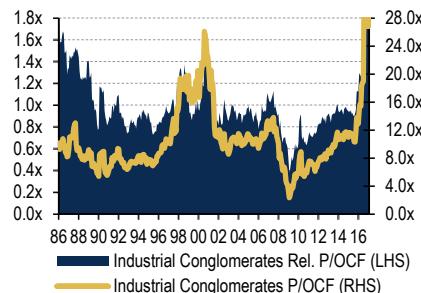
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 567: Electrical Equipment: Fwd. P/E**

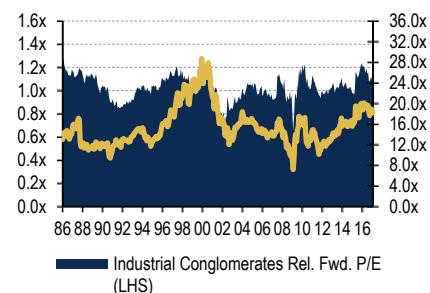
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 568: Industrial Conglomerates: P/B**

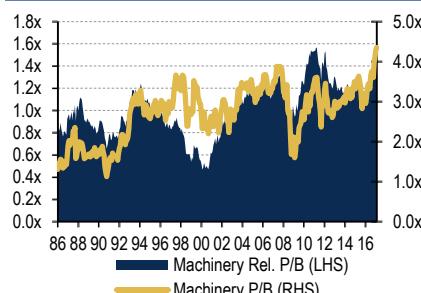
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 569: Industrial Conglomerates: P/OCF**

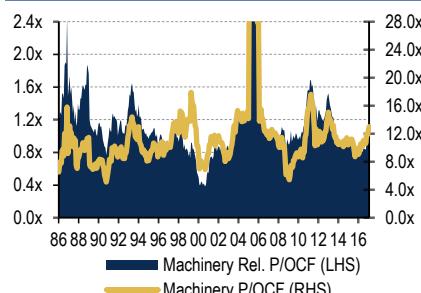
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 570: Industrial Conglomerates: Fwd. P/E**

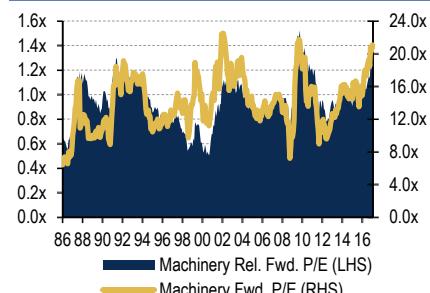
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 571: Machinery: P/B**

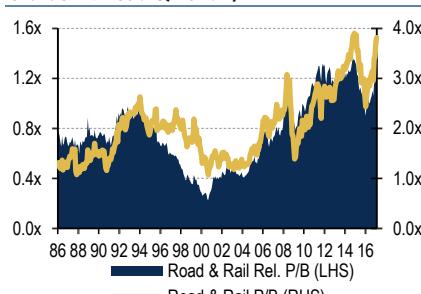
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 572: Machinery: P/OCF**

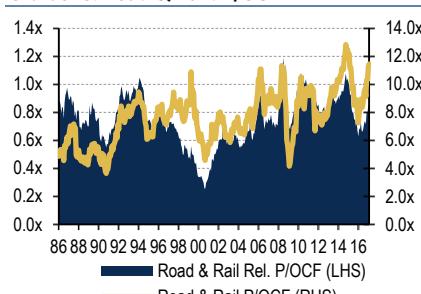
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 573: Machinery: Fwd. P/E**

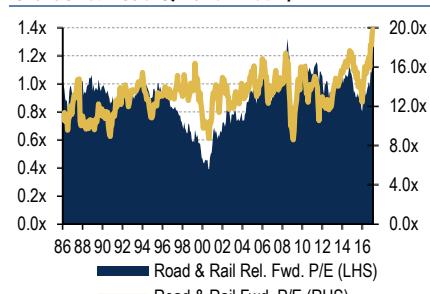
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 574: Road & Rail: P/B**

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

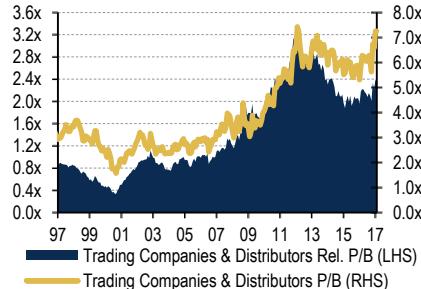
**Chart 575: Road & Rail: P/OCF**

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

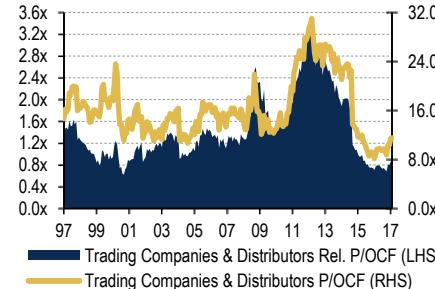
**Chart 576: Road & Rail: Fwd. P/E**

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

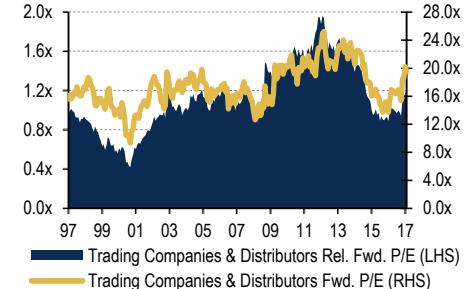
**Chart 577: Trading Companies & Distributors: P/B**



**Chart 578: Trading Companies & Distributors: P/OCF**

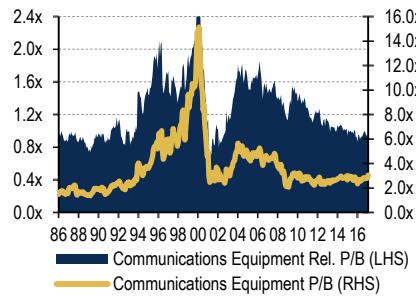


**Chart 579: Trading Companies & Distributors: Fwd. P/E**

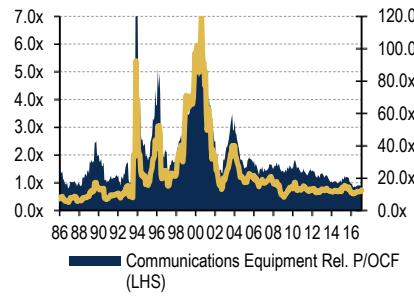


## Information Technology

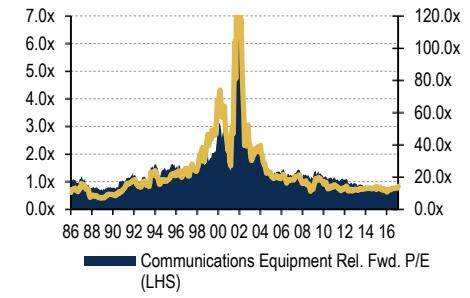
**Chart 580: Communication Equipment: P/B**



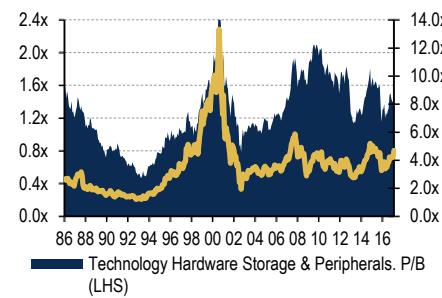
**Chart 581: Communication Equipment: P/OCF**



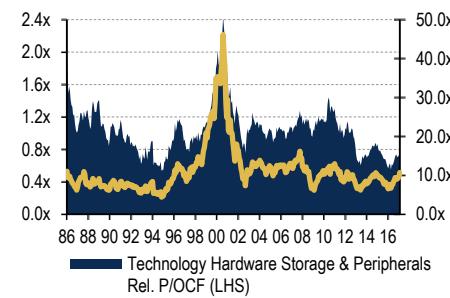
**Chart 582: Communication Equipment: Fwd. P/E**



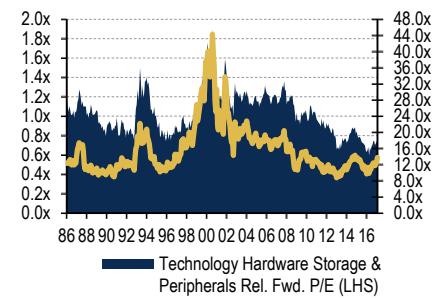
**Chart 583: Technology Hardware Storage & Peripherals: P/B**



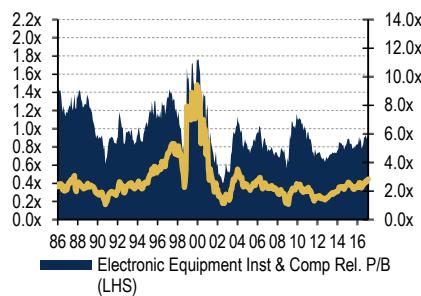
**Chart 584: Technology Hardware Storage & Peripherals: P/OCF**



**Chart 585: Technology Hardware Storage & Peripherals: Fwd. P/E**

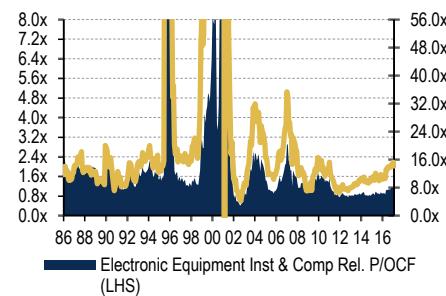


**Chart 586: Electronic Equipment Instruments & Components: P/B**



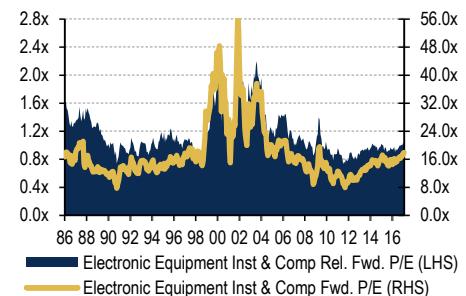
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 587: Electronic Equipment Instruments & Components: P/OCF**



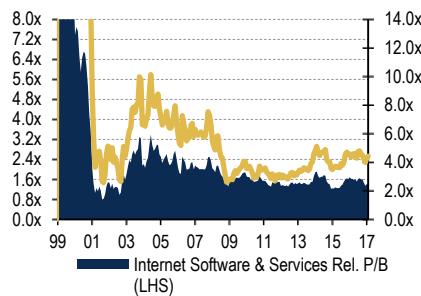
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 588: Electronic Equipment Instruments & Components: Fwd. P/E**



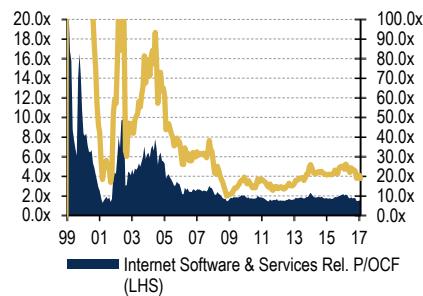
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 589: Internet Software & Services: P/B**



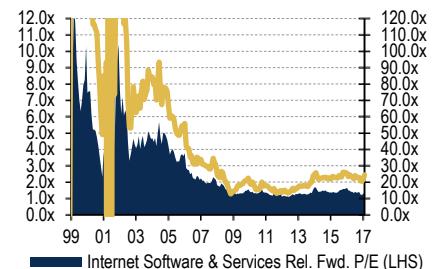
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 590: Internet Software & Services: P/OCF**



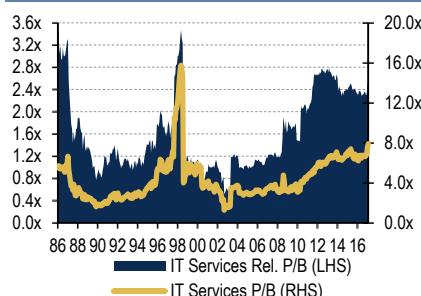
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 591: Internet Software & Services: Fwd. P/E**



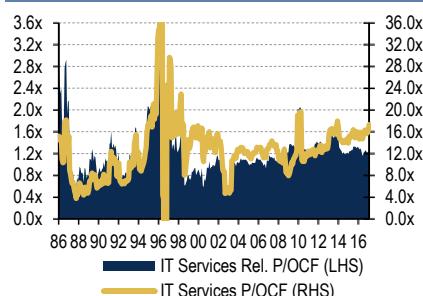
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 592: IT Services: P/B**



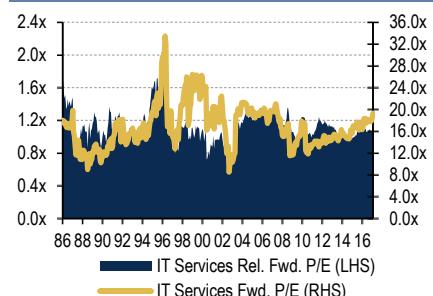
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 593: IT Services: P/OCF**



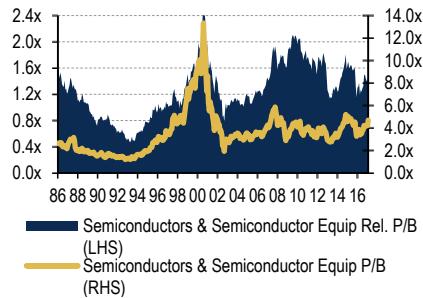
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 594: IT Services: Fwd. P/E**

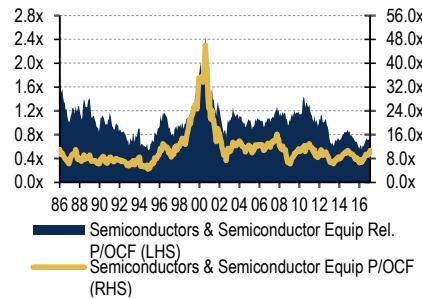


Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

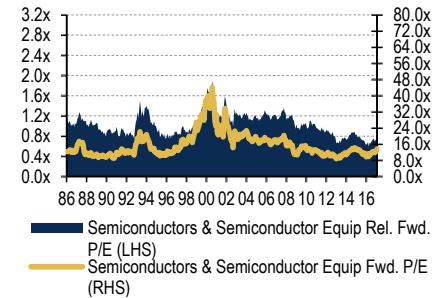
**Chart 595: Semiconductors & Semiconductor Equipment: P/B**



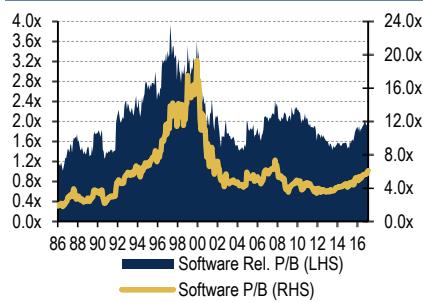
**Chart 596: Semiconductors & Semiconductor Equipment: P/OCF**



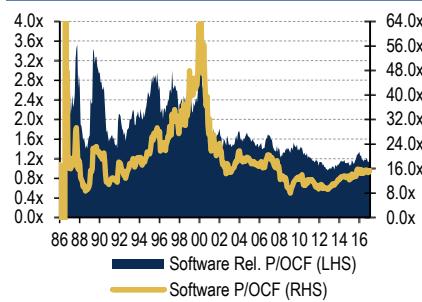
**Chart 597: Semiconductors & Semiconductor Equipment: Fwd. P/E**



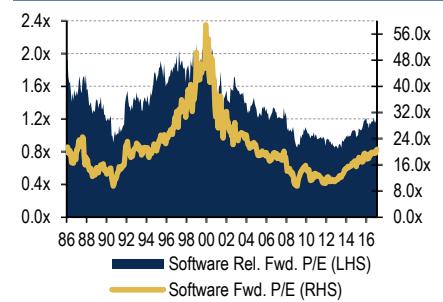
**Chart 598: Software: P/B**



**Chart 599: Software: P/OCF**

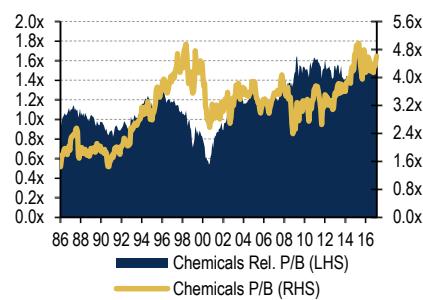


**Chart 600: Software: Fwd. P/E**

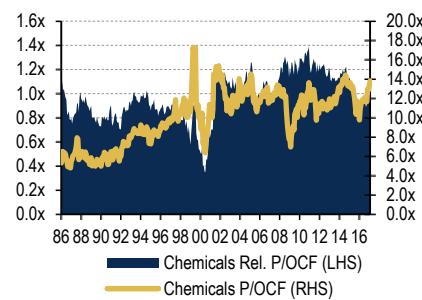


## Materials

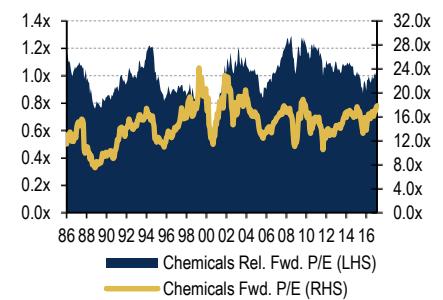
**Chart 601: Chemicals: P/B**

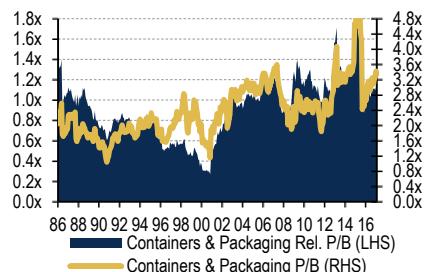


**Chart 602: Chemicals: P/OCF**

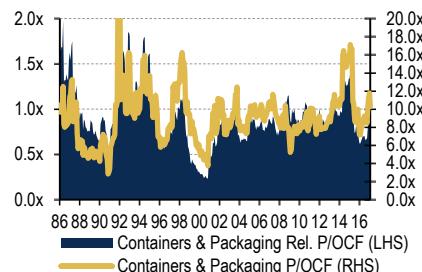


**Chart 603: Chemicals: Fwd. P/E**

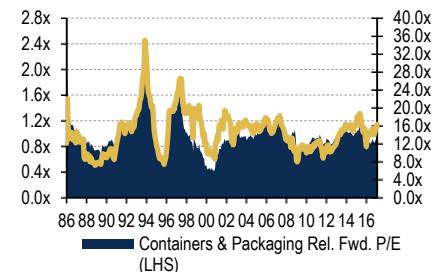


**Chart 604: Containers & Packaging: P/B**

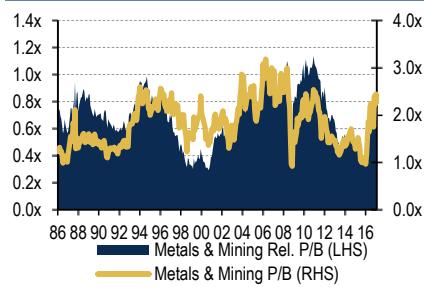
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 605: Containers & Packaging: P/OCF**

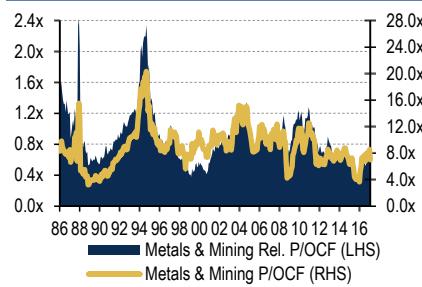
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 606: Containers & Packaging: Fwd. P/E**

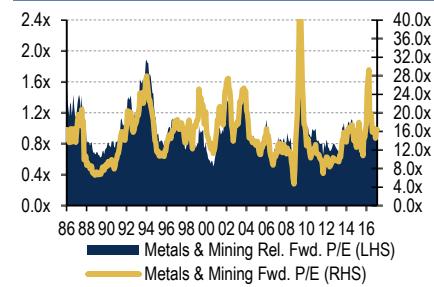
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

**Chart 607: Metals & Mining: P/B**

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

**Chart 608: Metals & Mining: P/OCF**

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

**Chart 609: Metals & Mining: Fwd. P/E**

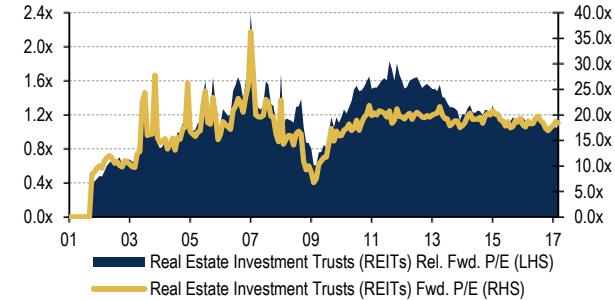
Source: I/B/E/S, BofA Merrill Lynch US Equity & US Quant Strategy

## Real Estate

**Chart 610: Real Estate Investment Trusts (REITs): P/B**

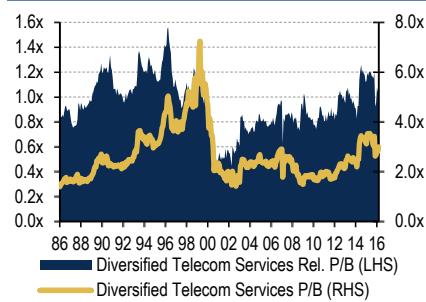


**Chart 611: Real Estate Investment Trusts (REITs): Fwd. P/E**

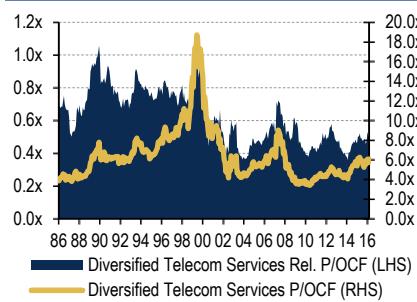


## Telecom Services

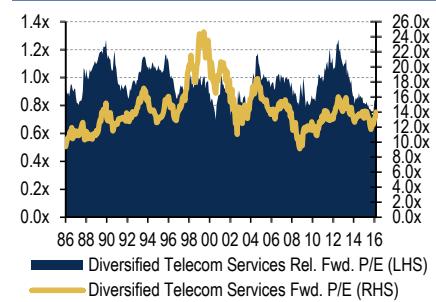
**Chart 612: Diversified Telecommunication Services: P/B**



**Chart 613: Diversified Telecommunication Services: P/OCF**

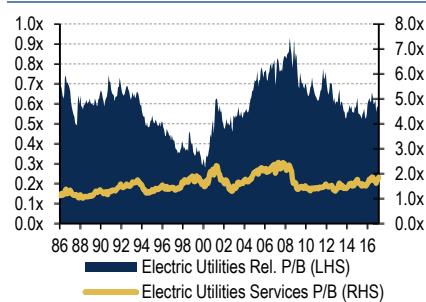


**Chart 614: Diversified Telecommunication Services: Fwd. P/E**

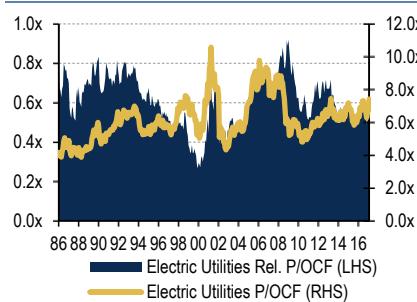


## Utilities

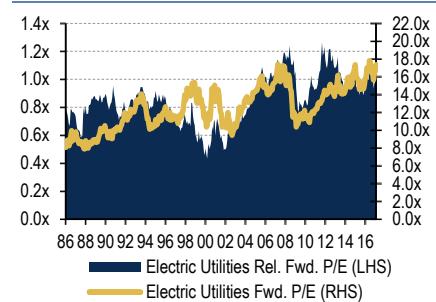
**Chart 615: Electric Utilities: P/B**

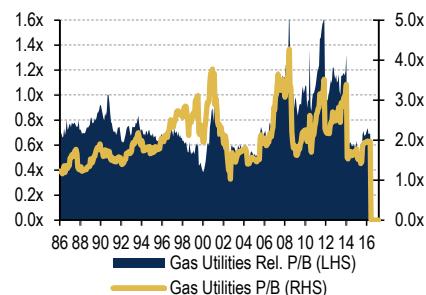
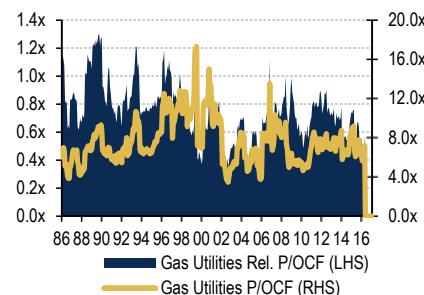
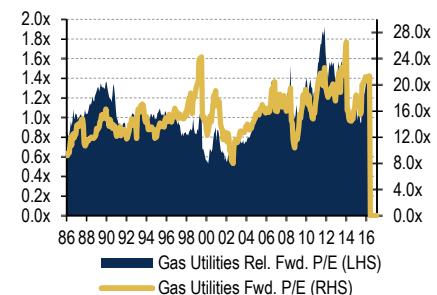
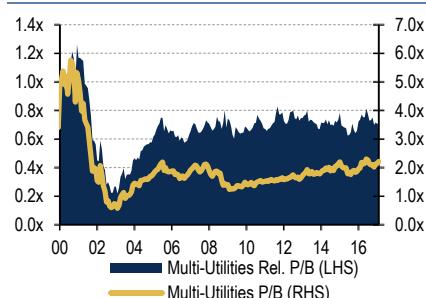
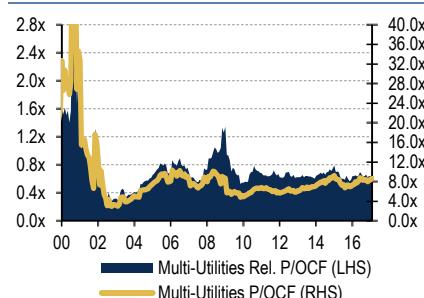
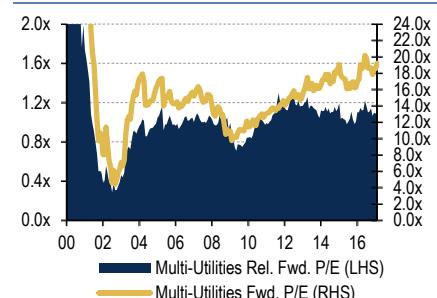


**Chart 616: Electric Utilities: P/OCF**



**Chart 617: Electric Utilities: Fwd. P/E**



**Chart 618: Gas Utilities: P/B****Chart 619: Gas Utilities: P/OCF****Chart 620: Gas Utilities: Fwd. P/E****Chart 621: Multi-Utilities: P/B****Chart 622: Multi-Utilities: P/B****Chart 623: Multi-Utilities: Fwd. P/E**

## **Section VII: Relative Valuation between Growth and Value Benchmarks**

---

Fundamental Valuation	227
Growth Characteristics	228

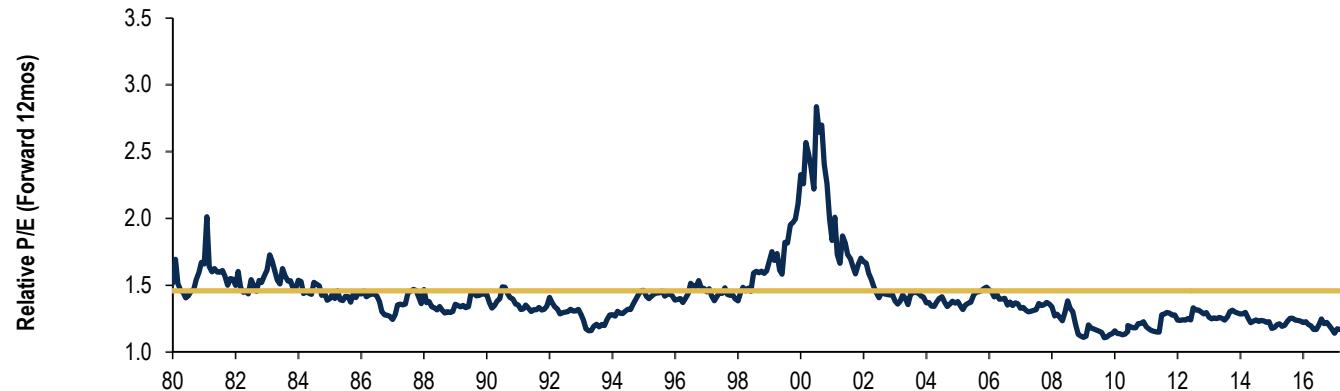
## Fundamental Valuation

Chart 624: Russell 1000 Growth vs. Value Trailing P/E (1978 – present)



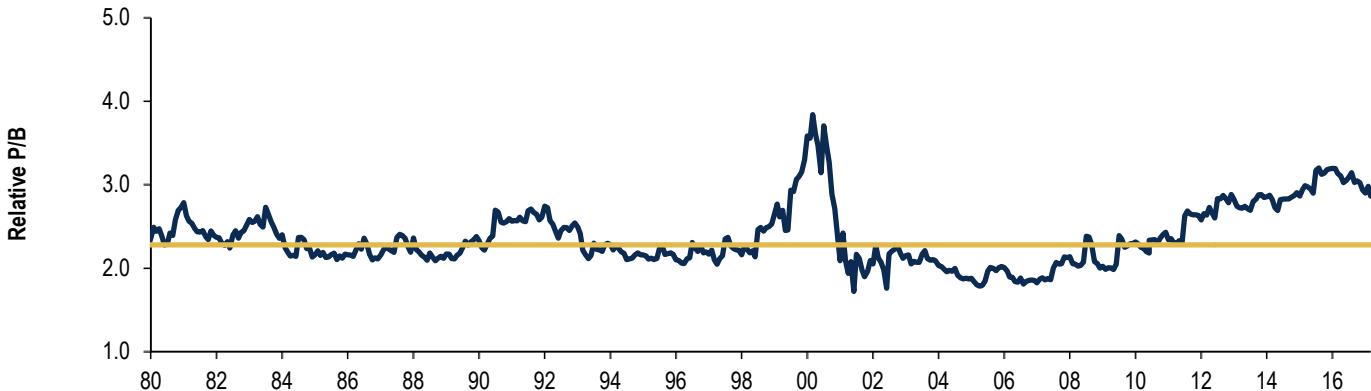
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

Chart 625: Russell 1000 Growth vs. Value Forward P/E (1978 – present)



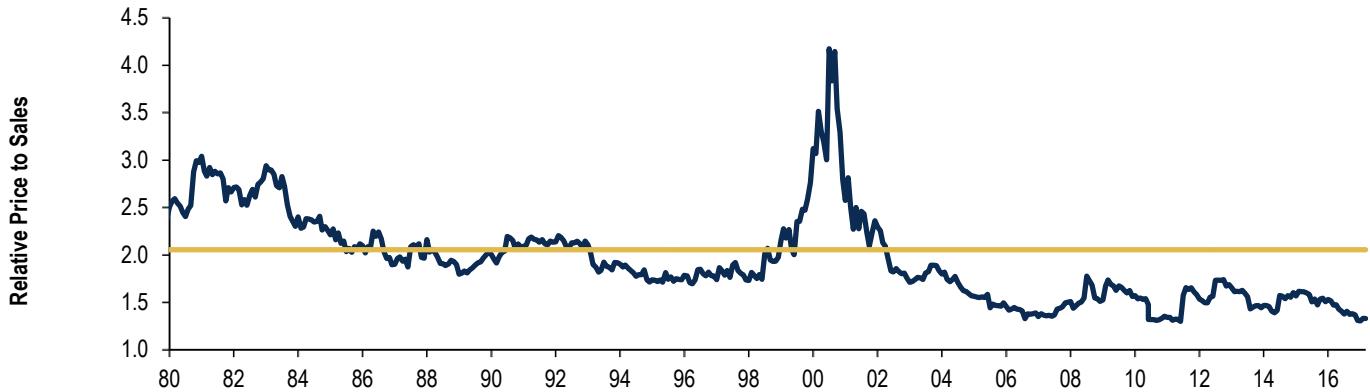
Source: BofA Merrill Lynch US Equity & Quantitative Strategy

Chart 626: Russell 1000 Growth vs. Value Price/Book Value (1978 – present)



Source: BofA Merrill Lynch US Equity & Quantitative Strategy, Russell Investment Group

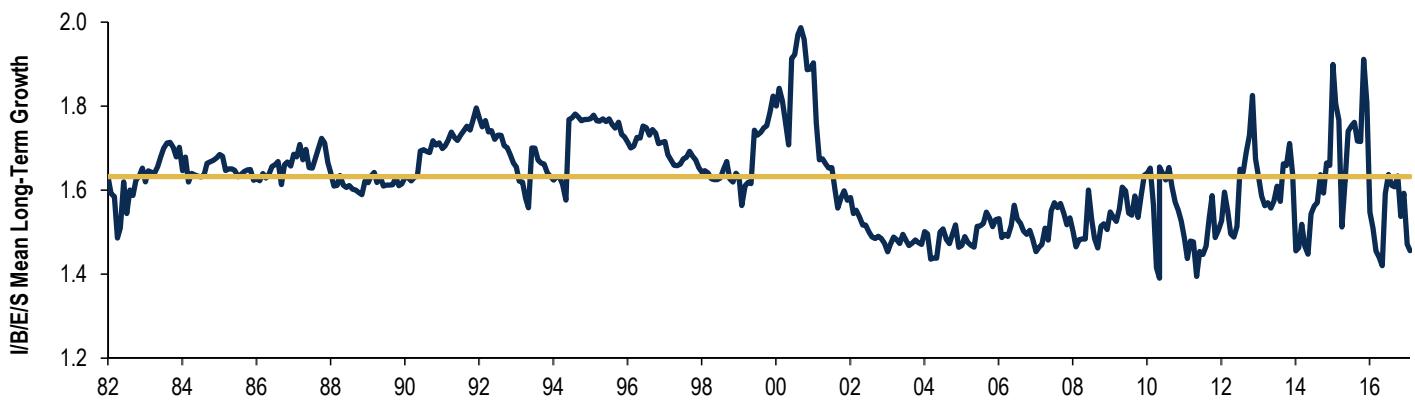
**Chart 627: Russell 1000 Growth vs. Value Price/Sales (1978 – present)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy, Russell Investment Group

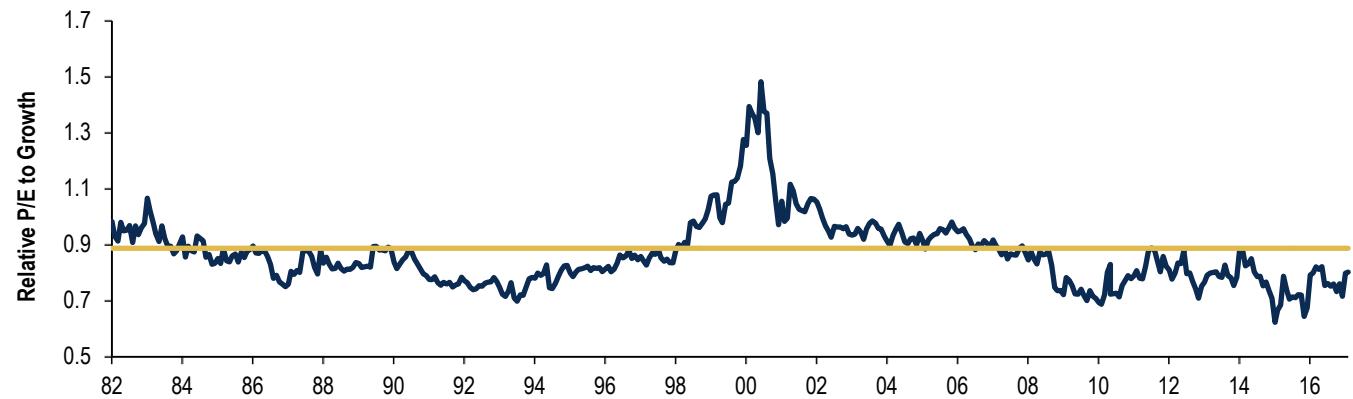
## Growth Characteristics

**Chart 628: Russell 1000 Growth vs. Value Long-term Growth (1982 – present)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy, Russell Investment Group

**Chart 629: Russell 1000 Growth vs. Value P/E to Growth (1978 – present)**



Source: BofA Merrill Lynch US Equity & Quantitative Strategy, Russell Investment Group

## **Section VIII: ADR Strategies**

---

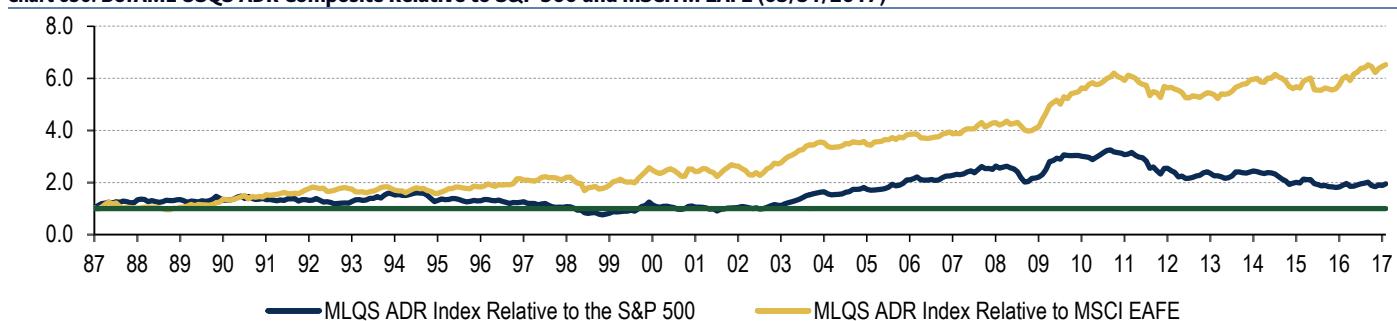
Regional Indices	230
Country Indices	230

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

**Exhibit 10: BofAML Quant Strategy ADR Index Performance As of 3/31/2017**

	Price Index 3/31/2017	1 M	3 M	6 M	12 M	YTD	3yr	5yr	10yr	ADR vs. MSCI™ 1M Rel Ret	Weights
ADR COMPOSITE	1,903	3.5	11.8	7.5	18.0	11.8	0.62	5.91	3.45		100.0%
ADR COMPOSITE (ex Latin America)	923	3.4	10.7	5.3	11.4	10.7	-0.67	7.12	2.90		81.2%
ADR Latin America	479	3.9	16.7	17.0	46.6	16.7	4.55	-0.41	3.82		18.8%
ADR Asia (ex Japan)	385	2.9	10.8	0.4	8.2	10.8	0.68	11.10	4.48		29.4%
ADR Europe	380	2.0	8.6	6.1	9.9	8.6	-0.01	5.79	3.17		16.7%
ADR EMU	226	6.8	12.7	12.7	12.7	12.7	-6.36	3.42	-0.35		19.5%
ADR Emerging Europe	743	-1.2	7.5	5.5	19.9	7.5	-4.77	-3.28	1.49		5.0%
MSCI EAFE ® (re-indexed to 12/86)	292	2.3	6.5	5.4	8.5	6.5	-2.18	2.91	-1.79		
S&P 500	2,363	0.0	5.5	9.0	14.7	5.5	8.06	10.90	5.22		
<b>EUROPE</b>											
ADR France	938	5.2	9.2	6.5	4.9	9.2	-0.74	7.29	-0.84	-0.9	5.3%
ADR Germany	329	3.4	7.6	-2.3	-0.8	7.6	-5.93	0.18	0.74	-0.8	2.5%
ADR Ireland	1,578	5.5	5.8	-13.6	-3.3	5.8	-1.67	5.69	3.10	2.5	2.1%
ADR Italy	234	10.5	7.0	19.0	3.3	7.0	-5.98	4.61	-2.49	1.2	1.6%
ADR Netherlands	751	5.1	8.4	14.9	12.0	8.4	0.52	6.47	1.37	-0.5	3.4%
ADR Norway	1,461	-4.3	-3.5	-2.7	16.9	-3.5	-0.67	9.16	5.57	-2.0	0.7%
ADR Spain	399	11.5	15.3	27.3	19.0	15.3	-19.04	-1.75	-5.82	0.4	1.4%
ADR Sweden	1,483	-2.3	-2.3	-9.0	-21.2	-2.3	-11.77	-3.41	-1.85	-4.8	1.1%
ADR Switzerland	388	1.8	13.3	18.4	31.0	13.3	0.37	6.04	3.77	0.1	2.8%
ADR United Kingdom	1,576	3.6	7.8	4.1	7.1	7.8	-0.10	5.65	3.20	2.3	11.0%
<b>LATIN AMERICA</b>											
ADR Argentina	409	10.6	30.3	32.9	61.3	30.3	41.92	28.60	11.47	-2.2	3.2%
ADR Brazil	476	-3.5	16.0	19.3	76.3	16.0	-4.26	-9.57	-0.54	1.1	7.8%
ADR Chile	394	8.6	15.9	15.1	20.1	15.9	0.85	-5.43	5.12	1.3	3.0%
ADR Mexico	326	11.8	16.7	6.5	-3.6	16.7	-1.43	1.92	2.19	2.2	3.2%
<b>ASIA</b>											
ADR China	549	1.9	7.7	-4.7	2.6	7.7	-1.27	12.62	4.94	-0.3	20.0%
ADR Hong Kong	47	8.8	11.6	4.0	12.3	11.6	-3.42	-0.72	3.38	6.1	2.1%
ADR Indonesia	168	9.4	6.9	-5.7	15.4	6.9	7.83	9.56	-0.01	5.5	0.2%
ADR India	736	4.8	14.8	6.7	10.2	14.8	0.91	2.31	3.54	-1.0	2.3%
ADR Japan	622	1.3	7.3	4.8	15.8	7.3	6.45	8.66	1.79	2.4	6.0%
ADR Korea	191	1.0	29.7	40.0	65.7	29.7	10.95	7.55	1.16	-4.2	2.1%
ADR Philippines	129	14.7	16.7	-9.8	-25.7	16.7	-19.22	-12.36	-4.05	13.7	0.2%
ADR Taiwan	506	8.0	19.4	5.8	10.9	19.4	12.09	14.43	6.81	6.2	2.1%
<b>OTHER</b>											
ADR Australia	370	6.3	22.2	11.8	8.0	22.2	-11.50	-0.66	2.62	4.3	2.3%
ADR Israel	268	-2.9	11.3	-10.1	-2.6	11.3	-15.11	-3.25	1.53	-3.3	3.4%
ADR Russia	192	2.7	-1.4	41.4	91.2	-1.4	10.60	-5.35	-0.32	0.5	1.1%
ADR South Africa	230	1.5	11.0	-13.0	1.3	11.0	-3.36	-13.28	-7.25	2.5	1.8%

Source: BofA Merrill Lynch US Quantitative Strategy

**Chart 630: BofAML USQS ADR Composite Relative to S&P 500 and MSCI EAFE (03/31/2017)**


Source: BofA Merrill Lynch US Quantitative Strategy

# Appendix

BofA Merrill Lynch Proprietary Models	232
BofA Merrill Lynch Factor Descriptions	237
Russell 1000 Factor Performance	240
Russell 1000 Factor Correlations with Macro Factors	241
S&P 500 Factor Efficacy	242

## BofA Merrill Lynch Proprietary Models

### BofAML versus Consensus (Positive and Negative Earnings Surprise Models)

The BofAML 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 Merrill Lynch 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:

$$\text{Surprise} = \frac{\text{(BofAML Estimate} - \text{I/B/E/S Mean Estimate)}}{\text{Standard Deviation of I/B/E/S Estimates}}$$

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 BofAML analysts are most optimistic about earnings while 10 represents companies where BofAML analysts are most pessimistic about earnings.

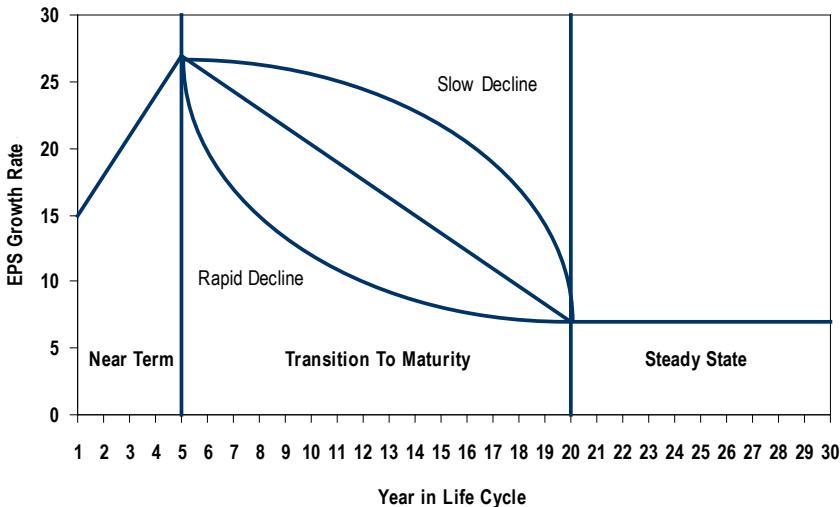
### Dividend Discount Model

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.

**Chart 631: Transition to Maturity Within Valuation Model**



Source: BofA Merrill Lynch US Equity and Quant Strategy

**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 BofAML 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 BofAML 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 Merrill Lynch's 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 BofAML 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. BofAML 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 Merrill Lynch 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 Growth10 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.**

### Stock Selection Criteria

"Growth 10"	"Value 10"
<b>Buy Criteria:</b>	<b>Buy Criteria:</b>
(1) BofAML vs. Cons. EPS Surprise Rating of "1"	(1) BofAML vs. Cons. EPS Surprise Rating of "1"
(2) BofAML "BUY" Opinion	(2) BofAML "BUY" Opinion
(3) Must be rated "1 or 2" by BofAML vs. Cons. EPS Surprise Model for < 10 mos.	(3) Must be rated "1 or 2" by BofAML vs. Cons. EPS Surprise Model for < 10 mos.
(4) Select 10 Stocks with highest 5-Yr. Proj. EPS growth rate	(4) Select 10 Stocks with lowest trailing 12-Month P/E
<b>Sell Criteria:</b>	<b>Sell Criteria:</b>
(1) BofAML vs. Cons. EPS Surprise Rating falls below 5	(1) BofAML vs. Cons. EPS Surprise Rating falls below 5
(2) BofAML QRQ falls below "BUY" Opinion	(2) BofAML QRQ falls below "BUY" Opinion
(3) Stocks removed from the S&P 500	(3) Stocks removed from the S&P 500
(4) Stock no longer covered by BofAML research	(4) Stock no longer covered by BofAML research

Source: BofA Merrill Lynch US Quantitative Strategy

## Industry relative valuation model

In this model, we calculate the price momentum, earnings momentum, and valuation ranks for S&P500 GICS Level 3 industries relative to the S&P 500. The charts are in Section III.

### Price Momentum

Price momentum of each industry is the change in its relative price over the last three months. Relative price is the ratio of the month-end price of a given industry divided by the index level of the S&P500. Industries are ranked from 1 to 10, with 10 exhibiting the strongest price momentum.

### Earnings Momentum

Earnings momentum of an industry is the change in its relative EPS over the last three months. Relative EPS is the ratio of the total 12-month rolling forward IBES consensus earnings forecasts of the industry divided by that of the S&P500. Industries are ranked from 1 to 10, with 10 indicating strongest momentum.

### Valuation

Earnings Yield (EY) of an industry is the ratio of current relative forecast EPS divided by current relative Price. We use EY, the inverse of P/E, to accommodate cases in which industries have negative earnings. We compare the relative EY to the industry's own historical average by calculating the percentage spread between the two. Industries are then assigned a Valuation Rank from 1 to 10, with 10 being the most undervalued.

## How to read the charts

### Prospective EPS Relative (Earnings Line)

The Prospective EPS line indicates the direction and magnitude of earnings estimate revisions relative to those of the S&P 500. Revisions to earnings over the last 3 months are ranked from 1 to 10 (1 = biggest downgrade, 10 = biggest upgrade).

### Price Relative (Price Line)

The Price Relative line indicates how the sector/industry has performed relative to the S&P500 and is based to 100 at the latest point on the chart.

### Valuation

The relationship between the Price Relative and the Prospective EPS Relative indicates the P/E relative. If the Price Relative line is above the EPS Relative line, the sector/industry has an above-market P/E. If the Price Relative line is below the EPS Relative line, the sector/industry has a below-market P/E. More specifically, divide the current value of the Relative Price by that of the EPS Relative to get the relative P/E. For example, if the price line is at 100 and the earnings line is at 80, the P/E relative is 1.25 (100/80). The graph thus shows the historical prospective P/E of the sector/industry relative to the S&P 500 over time.

### The Good Chart

- Prospective EPS Relative is rising
- Price Relative is rising
- Price Relative is below the EPS Relative

### The Bad Chart

- Prospective EPS Relative is falling
- Price Relative is falling
- Price Relative is above the EPS Relative

### BofAML 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 BofAML 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 BofAML ADR strategy and its MSCI counterpart. Each of the BofAML ADR baskets is updated on a monthly basis.

## BofA Merrill Lynch 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 BofAML 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 BofAML Fundamental Equity Research. If a BofAML 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 BofAML 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, BofAML relative to the consensus, 10 being among the most pessimistic, BofAML. 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 BofAML Fundamental Equity Research. If a BofAML 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 11: Russell 1000 factors

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 vs. Russell 1000	Sharpe Ratio vs. Russell	Probability of loss	Probability of underperforming Russell 1000	Volatility (Ann'zed)	Max Drawdown	Downside Volatility, Ann'zed
		vs. Russell 1000	Tsy							
EV/ EBITDA	17.6%	6.7%	0.72	0.80	16.5%	25.6%	20.4%	-62.5%	14.6%	
Free Cash Flow/ EV	17.2%	5.6%	0.74	1.00	14.6%	22.9%	18.9%	-57.7%	14.5%	
Price/ Free Cash Flow	16.2%	5.0%	0.67	0.71	16.5%	23.4%	19.7%	-63.7%	16.0%	
Short Interest	15.8%	4.4%	0.76	1.03	12.4%	13.8%	16.6%	-51.1%	12.6%	
Earnings Yield	15.8%	4.6%	0.66	0.58	18.5%	36.4%	18.9%	-65.9%	14.3%	
Price/ Cash Flow	15.6%	4.7%	0.62	0.50	19.8%	31.7%	20.7%	-61.2%	15.8%	
Most Active	15.4%	4.7%	0.60	0.55	22.6%	31.1%	21.1%	-57.7%	15.1%	
Forward Earnings Yield	15.2%	4.6%	0.59	0.42	21.8%	36.9%	21.2%	-70.2%	16.2%	
ROC	15.0%	3.0%	0.66	0.52	15.7%	27.0%	17.4%	-51.2%	13.4%	
Price/ Sales	14.9%	4.7%	0.55	0.39	22.0%	33.9%	22.8%	-66.9%	16.7%	
Share Repurchase	14.9%	2.9%	0.68	0.45	14.3%	30.9%	16.2%	-55.0%	13.1%	
Price/ Book Value	14.5%	4.2%	0.54	0.34	20.1%	35.5%	22.1%	-71.7%	15.8%	
Price Return - 11-mth Perf.	14.5%	3.7%	0.58	0.20	20.9%	32.8%	19.6%	-55.3%	15.4%	
P/E-to-Growth	14.1%	3.2%	0.52	0.38	21.2%	40.2%	22.2%	-67.8%	16.3%	
Price Return - 12-mth and 1-mth Reversal	14.0%	2.7%	0.57	0.24	18.5%	31.1%	19.2%	-58.1%	16.3%	
Price Return - 12-mth Perf.	13.9%	3.0%	0.56	0.14	20.4%	37.5%	19.0%	-50.9%	14.4%	
Relative Strength - 30wk/75wk MA	13.7%	2.8%	0.53	0.16	21.5%	40.5%	20.1%	-56.2%	15.8%	
1yr ROE	13.4%	1.4%	0.56	0.29	18.2%	38.0%	17.6%	-53.4%	13.5%	
Relative Strength - 5wk/30wk MA	13.3%	1.8%	0.55	0.09	19.0%	42.4%	17.6%	-46.6%	12.9%	
1yr ROE Adj	13.2%	1.2%	0.55	0.21	18.2%	42.7%	17.7%	-50.5%	13.4%	
Relative Strength - 10wk/40wk MA	13.0%	1.6%	0.52	0.06	22.0%	44.9%	18.3%	-51.1%	13.9%	
Dividend Yield	12.9%	1.5%	0.54	0.04	18.5%	52.1%	17.2%	-68.2%	13.6%	
5yr ROE Adj	12.8%	0.9%	0.53	0.19	20.7%	45.5%	17.8%	-47.9%	13.4%	
ROA	12.8%	0.8%	0.51	0.14	17.9%	49.3%	18.2%	-50.9%	13.4%	
Size	12.7%	2.1%	0.44	0.18	24.8%	54.0%	24.2%	-65.0%	16.8%	
Price Return - 9-mth Perf.	12.5%	1.4%	0.50	0.03	22.6%	44.4%	18.6%	-52.2%	14.4%	
Low Price	12.2%	2.6%	0.40	0.13	24.0%	47.1%	26.5%	-69.1%	18.3%	
5y ROE	12.1%	0.3%	0.49	0.05	20.7%	43.0%	17.6%	-51.5%	13.5%	
Price to Moving Average (200 day)	12.0%	0.6%	0.49	-0.04	22.9%	53.2%	17.5%	-47.7%	13.0%	
EPS Estimate Revisions	12.0%	1.2%	0.45	0.06	24.0%	39.9%	20.3%	-63.4%	16.7%	
Earning Momentum	11.9%	0.5%	0.44	0.06	24.8%	47.1%	19.9%	-60.7%	15.6%	
Eq. Wtd. Russell 1000	11.8%	na	0.47	na	21.8%	na	17.7%	-56.3%	13.8%	
Price Return - 3-mth Perf.	11.8%	0.2%	0.47	-0.05	22.0%	55.6%	17.5%	-48.4%	12.6%	
Dividend Growth	11.7%	-0.3%	0.48	-0.06	23.7%	50.7%	16.8%	-56.2%	13.3%	
High Leverage	11.7%	0.7%	0.44	0.00	23.4%	47.1%	19.4%	-70.3%	15.2%	
Neglect - Analyst Coverage	11.6%	0.9%	0.51	0.17	20.4%	41.1%	18.2%	-57.5%	13.2%	
Price Return - 12-mth and 1-mth Performance	11.4%	-0.2%	0.46	-0.10	20.4%	49.3%	17.0%	-50.0%	13.0%	
Variability of Earnings	11.0%	0.6%	0.38	0.00	25.9%	49.9%	22.5%	-65.8%	17.5%	
Earnings Torpedo	10.5%	-0.8%	0.37	-0.14	24.0%	59.2%	20.3%	-62.7%	14.6%	
Beta	10.3%	1.9%	0.33	0.02	28.4%	51.0%	29.8%	-81.8%	21.7%	
Estimate Dispersion	10.2%	0.6%	0.34	-0.04	27.3%	54.0%	25.3%	-68.8%	18.4%	
Proj. 5yr EPS Growth	8.1%	-0.9%	0.26	-0.17	25.9%	58.1%	26.6%	-83.9%	21.1%	
Neglect - Institutional Ownership	7.8%	-1.3%	0.32	-0.30	30.9%	59.8%	19.0%	-56.6%	13.1%	

Source: BofA Merrill Lynch US Equity & Quantitative Strategy

## Russell 1000 factor correlations vs. macro factors

Table 18: Russell 1000 factors: Correlation vs. macroeconomic factors

	Interest Rates		Currency	Inflation	Commodity Prices		Economy	Market Volatility	Corporate Profits	Credit Quality
Factor	10yr Tsy Nominal Yld	Real Yield	2s10s Tsy curve	Trade Wtd. USD	CPI	WTI	GDP Growth	VIX	Profit Cycle	Credit Spread
Earnings Yield	-0.17	0.31	0.25	0.11	-0.04	-0.17	0.27	-0.18	-0.08	-0.27
Forward Earnings Yield	-0.01	0.36	0.27	0.05	-0.06	-0.15	0.25	-0.25	-0.11	-0.45
Dividend Yield	-0.40	0.18	0.17	0.07	-0.16	-0.19	0.22	-0.08	-0.13	-0.24
Price/ Book Value	0.14	0.26	0.15	-0.05	-0.15	-0.09	0.25	-0.40	-0.19	-0.68
Price/ Cash Flow	-0.06	0.46	0.29	-0.13	0.08	0.09	0.22	-0.14	-0.09	-0.36
Price/ Free Cash Flow	-0.24	0.34	0.25	-0.09	-0.01	-0.12	0.28	-0.11	-0.08	-0.28
Price/ Sales	0.07	0.35	0.23	-0.02	-0.19	-0.07	0.16	-0.26	-0.24	-0.64
EV/ EBITDA	-0.02	0.47	0.34	-0.16	0.07	-0.02	0.24	-0.18	-0.11	-0.36
Free Cash Flow/ EV	-0.24	0.41	0.32	-0.09	0.01	-0.11	0.30	-0.03	-0.14	-0.13
Relative Strength - 30wk/75wk MA	0.22	-0.24	-0.20	0.05	0.21	0.27	0.53	0.02	0.19	0.32
Relative Strength - 5wk/30wk MA	0.20	-0.15	-0.10	0.11	0.18	0.37	0.46	0.20	0.16	0.41
Relative Strength - 10wk/40wk MA	0.21	-0.13	-0.14	0.10	0.17	0.32	0.52	0.18	0.25	0.38
Price to Moving Average (200 day)	0.21	-0.18	-0.10	0.10	0.17	0.34	0.45	0.20	0.17	0.45
Price Return - 12-mth Perf.	0.21	-0.21	-0.16	0.10	0.16	0.25	0.51	0.09	0.20	0.40
Price Return - 9-mth Perf.	0.25	-0.23	-0.17	0.09	0.14	0.27	0.51	0.11	0.26	0.39
Price Return - 3-mth Perf.	0.18	-0.12	-0.02	0.05	0.17	0.34	0.36	0.16	0.08	0.34
Price Return - 11-mth Perf.	0.22	-0.22	-0.19	0.10	0.16	0.25	0.55	0.05	0.24	0.33
Price Return - 12-m and 1-m Perf.	0.13	-0.26	-0.12	0.13	0.18	0.27	0.42	0.19	0.11	0.52
Price Return - 12-m and 1-m Reversal	0.06	-0.17	-0.23	0.05	0.12	0.03	0.57	0.04	0.32	0.31
Most Active	0.44	-0.18	-0.12	-0.10	0.13	0.27	0.43	-0.15	-0.03	-0.08
Low Price	0.38	0.18	0.14	-0.21	-0.14	0.11	0.18	-0.43	-0.24	-0.71
Earning Momentum	0.37	-0.22	-0.18	-0.22	0.31	0.32	0.44	-0.17	0.27	0.08
Proj. 5yr EPS Growth	0.49	-0.27	-0.17	-0.18	0.12	0.37	0.36	-0.16	0.11	-0.05
Earnings Torpedo	0.35	-0.14	-0.17	-0.18	-0.22	0.21	0.25	-0.29	-0.16	-0.56
EPS Estimate Revisions	0.34	-0.46	-0.40	-0.10	0.33	0.31	0.52	-0.03	0.25	0.17
Dividend Growth	-0.52	0.12	0.07	0.20	0.05	-0.28	0.31	0.20	0.00	0.13
P/E-to-Growth	0.07	0.34	0.22	0.03	0.02	-0.03	0.29	-0.26	0.00	-0.40
High Leverage	0.09	0.03	-0.13	0.08	-0.17	-0.10	0.31	-0.34	0.01	-0.74
1yr ROE	-0.28	0.04	0.15	0.05	0.21	0.10	0.35	0.29	-0.06	0.49
5y ROE	-0.50	-0.01	0.22	0.04	0.00	0.00	0.31	0.26	-0.04	0.42
1yr ROE Adj	-0.11	0.03	0.16	-0.02	0.22	0.14	0.36	0.28	-0.04	0.59
5yr ROE Adj	-0.12	0.01	0.18	-0.05	0.12	0.15	0.36	0.25	-0.06	0.52
ROA	-0.09	-0.05	0.12	-0.09	0.17	0.16	0.35	0.18	-0.06	0.51
ROC	-0.26	-0.11	0.05	0.09	0.20	0.03	0.39	0.23	0.03	0.57
Beta	0.54	-0.07	-0.05	-0.27	0.00	0.36	0.27	-0.35	-0.08	-0.48
Variability of Earnings	0.64	-0.12	-0.21	-0.27	0.08	0.34	0.35	-0.36	0.02	-0.55
Estimate Dispersion	0.61	-0.06	-0.09	-0.30	0.00	0.45	0.36	-0.40	-0.04	-0.54
Neglect - Analyst Coverage	-0.13	0.28	0.24	-0.16	-0.22	-0.10	0.41	-0.08	-0.19	-0.17
Neglect - Institutional Ownership	0.01	0.22	0.22	-0.35	-0.29	-0.01	0.40	0.07	-0.29	-0.20
Size	0.31	0.28	0.23	-0.26	-0.18	0.14	0.13	-0.40	-0.29	-0.74
Share Repurchase	-0.37	0.35	0.27	0.21	-0.03	-0.24	0.35	0.22	-0.02	0.19
Short Interest	-0.28	0.52	0.48	-0.06	0.15	0.11	0.46	0.13	-0.17	0.11

Source: BofA Merrill Lynch US Equity & Quantitative Strategy  
 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

**Table 19: S&P 500 factors: 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	<b>0.60</b>	0.52	0.57	0.52	0.56	0.50	0.39	0.39	0.36	0.27
Forward Earnings Yield	0.49	0.57	0.53	<b>0.63</b>	0.49	0.50	0.45	0.49	0.27	0.25
Dividend Yield	0.46	0.55	0.56	<b>0.60</b>	0.60	0.46	0.41	0.42	0.43	0.36
Price/ Book Value	<b>0.40</b>	0.56	<b>0.58</b>	0.51	0.42	0.46	0.42	0.40	0.43	0.43
Price/ Cash Flow	0.49	0.53	<b>0.55</b>	0.53	0.54	0.46	0.40	0.48	<b>0.32</b>	0.34
Price/ Free Cash Flow	0.62	<b>0.63</b>	0.58	0.62	0.52	0.34	0.46	0.33	<b>0.25</b>	0.33
Price/ Sales	0.46	0.49	0.50	0.54	0.52	<b>0.54</b>	0.51	0.35	0.42	<b>0.26</b>
EV/ EBITDA	<b>0.67</b>	0.67	0.46	0.61	0.51	0.51	0.36	0.43	0.36	0.18
Free Cash Flow/ EV	<b>0.74</b>	0.58	0.59	0.62	0.47	0.36	0.40	0.34	0.31	0.30
Relative Strength - 30wk/75wk MA	0.48	0.53	<b>0.55</b>	0.54	0.50	0.54	0.54	0.44	0.33	0.22
Relative Strength - 5wk/30wk MA	0.50	0.42	0.33	0.40	0.54	<b>0.62</b>	0.59	0.55	0.45	0.23
Relative Strength - 10wk/40wk MA	0.51	0.36	0.38	0.46	0.54	<b>0.62</b>	0.54	0.52	0.46	0.22
Price to Moving Average (200 day)	0.45	0.37	0.44	0.43	0.49	<b>0.58</b>	0.51	0.53	0.48	0.28
Price Return - 12-mth Perf.	0.53	<b>0.56</b>	0.47	0.56	0.49	0.50	0.45	0.51	0.35	0.22
Price Return - 9-mth Perf.	<b>0.54</b>	0.47	0.44	0.45	0.48	0.49	0.47	0.49	0.42	0.29
Price Return - 3-mth Perf.	0.44	0.41	0.43	0.47	0.52	0.47	<b>0.58</b>	0.52	0.45	0.32
Price Return - 11-mth Perf.	0.53	<b>0.57</b>	0.52	0.52	0.51	0.50	0.48	0.46	0.39	0.17
Price Return - 12-mth and 1-mth Performance	0.47	0.45	0.51	0.51	0.36	0.48	0.51	<b>0.52</b>	0.49	0.30
Price Return - 12-mth and 1-mth Reversal	0.58	0.52	<b>0.59</b>	0.50	0.38	0.49	0.48	0.50	0.41	0.20
Most Active	<b>0.60</b>	0.54	0.60	0.49	0.49	0.40	0.50	0.38	0.37	0.22
Low Price	<b>0.38</b>	0.45	0.48	0.46	0.52	<b>0.56</b>	0.40	0.54	0.38	0.49
Earning Momentum	0.41	0.49	0.51	0.56	0.55	<b>0.56</b>	0.51	0.49	0.35	<b>0.30</b>
Proj. 5yr EPS Growth	<b>0.30</b>	0.40	0.45	0.54	0.45	0.48	0.55	0.52	0.48	<b>0.57</b>
Earnings Torpedo	0.39	0.40	0.52	0.55	<b>0.64</b>	0.62	0.53	0.44	0.40	0.31
EPS Estimate Revisions	0.43	0.51	<b>0.55</b>	0.42	0.54	0.52	0.50	0.45	0.45	0.26
Dividend Growth	0.47	0.50	<b>0.40</b>	0.44	0.53	<b>0.57</b>	0.51	0.53	0.50	0.48
P/E-to-Growth	0.52	0.50	0.46	0.51	0.55	0.51	<b>0.60</b>	0.41	0.46	0.34
1yr ROE	<b>0.60</b>	0.57	0.48	0.48	0.56	0.50	0.37	0.50	0.41	0.29
5y ROE	<b>0.56</b>	0.47	0.47	0.50	0.50	0.45	0.46	0.44	0.49	0.34
1yr ROE Adj	<b>0.58</b>	0.49	0.53	0.51	0.51	0.48	0.44	0.50	0.44	0.28
5yr ROE Adj	<b>0.56</b>	0.44	0.46	0.52	0.54	0.45	0.40	0.52	0.47	0.34
ROA	0.53	0.45	0.52	0.47	0.48	0.52	<b>0.53</b>	0.48	0.46	0.25
ROC	<b>0.62</b>	0.60	0.58	0.48	0.50	0.52	0.54	0.41	0.36	0.20
Beta	0.31	0.39	0.45	0.44	0.54	0.48	0.54	<b>0.58</b>	0.54	0.41
Variability of Earnings	0.31	0.38	0.43	0.46	0.43	0.55	0.52	0.46	<b>0.62</b>	0.60
Estimate Dispersion	0.26	0.45	0.46	0.46	0.48	0.43	0.46	0.52	0.61	<b>0.65</b>
Neglect - Analyst Coverage	0.48	<b>0.63</b>	0.45	0.53	0.49	0.59	0.53	0.48	<b>0.37</b>	0.43
Neglect - Institutional Ownership	<b>0.30</b>	0.48	<b>0.56</b>	0.43	0.46	0.42	0.38	0.48	0.39	0.50
Size	0.40	<b>0.60</b>	0.41	0.45	0.55	0.43	0.50	0.42	<b>0.38</b>	0.45
Share Repurchase	0.66	<b>0.68</b>	0.56	0.49	0.47	0.43	0.49	0.44	0.36	0.19
Short Interest	0.71	0.66	<b>0.72</b>	0.55	0.56	0.45	0.44	0.33	0.36	0.24

Source: BofA Merrill Lynch US Equity & Quantitative 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.

## **Exhibit 12: S&P 500 Factor correlations**

	Low Analyst Coverage		Low Institutional Ownership		Low Price		Estimate Dispersion		Variability of Earnings		Foreign Exposure	
	Size	Alpha Surprise Model	Beta	ROC	ROA	5yr ROE Adj	1yr ROE Adj	5y ROE	1yr ROE	Equity Duration	EPS Estimate Revisions	Positive EPS Surprise
P/E-to-Growth	0.86											
DDM Alpha	0.91	0.87										
Earnings Yield	0.88	0.94	0.88									
Forward EPS Yield	0.84	0.93	0.86	0.97								
Price/ Book Value	0.79	0.89	0.81	0.91	0.93							
Price/ Cash Flow	0.84	0.92	0.86	0.93	0.92	0.91						
Price/ Free Cash Flow	0.88	0.93	0.88	0.94	0.92	0.89	0.95					
Price/ Sales	0.81	0.89	0.83	0.90	0.92	0.95	0.92	0.92				
EV/ EBITDA	0.85	0.93	0.85	0.92	0.91	0.89	0.96	0.94	0.91			
Free Cash Flow/ EV	0.89	0.91	0.87	0.92	0.90	0.87	0.91	0.96	0.88	0.92		
Dividend Yield	0.84	0.80	0.88	0.86	0.84	0.86	0.84	0.83	0.80	0.81		
Dividend Growth	0.93	0.90	0.88	0.92	0.89	0.84	0.88	0.91	0.86	0.89	0.92	0.82
Share Repurchase	0.93	0.89	0.91	0.91	0.89	0.85	0.89	0.93	0.87	0.90	0.94	0.84
30wk/75wk MA	0.50	0.51	0.47	0.46	0.48	0.41	0.47	0.49	0.47	0.51	0.49	0.35
5wk/30wk MA*	0.74	0.65	0.66	0.63	0.61	0.57	0.63	0.65	0.64	0.66	0.67	0.56
10wk/40wk MA	0.72	0.63	0.65	0.61	0.59	0.55	0.61	0.63	0.61	0.65	0.65	0.52
Price / 200d MA	0.71	0.62	0.64	0.61	0.59	0.55	0.61	0.63	0.62	0.64	0.65	0.53
Price Return (12-mth)	0.68	0.61	0.62	0.59	0.56	0.51	0.59	0.62	0.58	0.63	0.64	0.48
Price Return (9-mth)	0.68	0.61	0.63	0.59	0.57	0.52	0.58	0.62	0.59	0.62	0.64	0.50
Price Return (3-mth)	0.75	0.70	0.68	0.70	0.69	0.68	0.71	0.71	0.72	0.72	0.68	0.74
Price Return (11-mth)	0.70	0.63	0.64	0.61	0.58	0.53	0.61	0.64	0.60	0.65	0.66	0.50
Price Return (12m and 1m)	0.72	0.63	0.65	0.63	0.60	0.56	0.62	0.66	0.63	0.67	0.70	0.55
Price Ret. (12m and 1m Rev.)	0.83	0.76	0.78	0.75	0.72	0.67	0.74	0.78	0.71	0.77	0.79	0.65
Most Active	0.75	0.80	0.72	0.75	0.74	0.76	0.76	0.78	0.75	0.73	0.72	0.73
Earning Momentum	0.89	0.91	0.86	0.89	0.87	0.83	0.89	0.91	0.85	0.90	0.91	0.84
Proj. 5yr EPS Growth	0.74	0.81	0.70	0.72	0.71	0.70	0.75	0.76	0.73	0.78	0.76	0.78
Positive EPS Surprise	0.96	0.90	0.88	0.90	0.87	0.84	0.88	0.91	0.86	0.90	0.92	0.82
EPS Estimate Revisions	0.82	0.82	0.76	0.79	0.78	0.72	0.79	0.80	0.75	0.86	0.87	0.84
Equity Duration	0.82	0.81	0.79	0.77	0.77	0.76	0.81	0.83	0.80	0.87	0.84	0.85
1yr ROE	0.89	0.85	0.86	0.82	0.80	0.74	0.81	0.86	0.78	0.91	0.89	0.80
5y ROE	0.81	0.82	0.78	0.76	0.74	0.73	0.77	0.82	0.75	0.85	0.90	0.86
1yr ROE Adj	0.85	0.86	0.83	0.81	0.79	0.74	0.81	0.85	0.80	0.86	0.89	0.87
5yr ROE Adj	0.85	0.85	0.82	0.79	0.77	0.75	0.80	0.84	0.78	0.75	0.79	0.77
ROA	0.82	0.81	0.79	0.76	0.73	0.68	0.76	0.81	0.72	0.86	0.82	0.85
ROC	0.87	0.83	0.84	0.82	0.79	0.74	0.79	0.84	0.77	0.75	0.77	0.83
Beta	0.73	0.84	0.69	0.80	0.80	0.83	0.81	0.82	0.83	0.81	0.71	0.73
Variability of Earnings	0.90	0.92	0.87	0.91	0.89	0.88	0.92	0.92	0.89	0.94	0.92	0.87
Estimate Dispersion	0.77	0.87	0.73	0.84	0.84	0.89	0.89	0.86	0.87	0.90	0.83	0.89
Low Price	0.76	0.89	0.78	0.85	0.86	0.93	0.89	0.88	0.92	0.89	0.84	0.81
Low Institutional Ownership	0.86	0.82	0.84	0.82	0.80	0.84	0.83	0.85	0.86	0.85	0.82	0.83
Low Analyst Coverage	0.88	0.89	0.87	0.89	0.87	0.86	0.90	0.92	0.90	0.91	0.83	0.86
Size	0.82	0.89	0.81	0.89	0.90	0.94	0.92	0.91	0.95	0.86	0.84	0.86
Foreign Exposure	0.84	0.89	0.81	0.84	0.83	0.82	0.87	0.88	0.83	0.76	0.77	0.87
Short Interest	0.86	0.88	0.81	0.86	0.85	0.82	0.87	0.89	0.84	0.75	0.76	0.87

Source: BofA Merrill Lynch US Equity & Quantitative Strategy; Bold typeface indicates correlations above one standard deviation from the average. Shaded cells indicate correlations below one standard deviation from the average.

## Link to Definitions

### Macro

[Click here for definitions of commonly used terms.](#)

# Disclosures

## Important Disclosures

**FUNDAMENTAL EQUITY OPINION KEY:** Opinions include a Volatility Risk Rating, an Investment Rating and an Income Rating. **VOLATILITY RISK RATINGS**, indicators of potential price fluctuation, are: A - Low, B - Medium and C - High. **INVESTMENT RATINGS** reflect the analyst's assessment of a stock's: (i) absolute total return potential and (ii) attractiveness for investment relative to other stocks within its *Coverage Cluster* (defined below). There are three investment ratings: 1 - Buy stocks are expected to have a total return of at least 10% and are the most attractive stocks in the coverage cluster; 2 - Neutral stocks are expected to remain flat or increase in value and are less attractive than Buy rated stocks and 3 - Underperform stocks are the least attractive stocks in a coverage cluster. Analysts assign investment ratings considering, among other things, the 0-12 month total return expectation for a stock and the firm's guidelines for ratings dispersions (shown in the table below). The current price objective for a stock should be referenced to better understand the total return expectation at any given time. The price objective reflects the analyst's view of the potential price appreciation (depreciation).

Investment rating	Total return expectation (within 12-month period of date of initial rating)	Ratings dispersion guidelines for coverage cluster*
Buy	≥ 10%	≤ 70%
Neutral	≥ 0%	≤ 30%
Underperform	N/A	≥ 20%

\* Ratings dispersions may vary from time to time where BofA Merrill Lynch Research believes it better reflects the investment prospects of stocks in a Coverage Cluster.

**INCOME RATINGS, INDICATORS OF POTENTIAL CASH DIVIDENDS, ARE: 7 - SAME/HIGHER (DIVIDEND CONSIDERED TO BE SECURE), 8 - SAME/LOWER (DIVIDEND NOT CONSIDERED TO BE SECURE) AND 9 - PAYS NO CASH DIVIDEND.** Coverage Cluster is comprised of stocks covered by a single analyst or two or more analysts sharing a common industry, sector, region or other classification(s). A stock's coverage cluster is included in the most recent BofA Merrill Lynch report referencing the stock.

BofA Merrill Lynch Research Personnel (including the analyst(s) responsible for this report) receive compensation based upon, among other factors, the overall profitability of Bank of America Corporation, including profits derived from investment banking. The analyst(s) responsible for this report may also receive compensation based upon, among other factors, the overall profitability of the Bank's sales and trading businesses relating to the class of securities or financial instruments for which such analyst is responsible.

## Other Important Disclosures

Prices are indicative and for information purposes only. Except as otherwise stated in the report, for the purpose of any recommendation in relation to: (i) an equity security, the price referenced is the publicly traded price of the security as of close of business on the day prior to the date of the report or, if the report is published during intraday trading, the price referenced is indicative of the traded price as of the date and time of the report; or (ii) a debt security (including equity preferred and CDS), prices are indicative as of the date and time of the report and are from various sources including Bank of America Merrill Lynch trading desks.

The date and time of completion of the production of any recommendation in this report shall be the date and time of dissemination of this report as recorded in the report timestamp.

This report may refer to fixed income securities that may not be offered or sold in one or more states or jurisdictions. Readers of this report are advised that any discussion, recommendation or other mention of such securities is not a solicitation or offer to transact in such securities. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Financial Global Wealth Management financial advisor for information relating to fixed income securities.

Officers of MLPF&S or one or more of its affiliates (other than research analysts) may have a financial interest in securities of the issuer(s) or in related investments.

**BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://go.bofa.com/coi>.**

**"BofA Merrill Lynch" includes Merrill Lynch, Pierce, Fenner & Smith Incorporated ("MLPF&S") and its affiliates. Investors should contact their BofA Merrill Lynch representative or Merrill Lynch Global Wealth Management financial advisor if they have questions concerning this report. "BofA Merrill Lynch" and "Merrill Lynch" are each global brands for BofA Merrill Lynch Global Research.**

**Information relating to Non-US affiliates of BofA Merrill Lynch and Distribution of Affiliate Research Reports:**

MLPF&S distributes, or may in the future distribute, research reports of the following non-US affiliates in the US (short name: legal name, regulator): Merrill Lynch (South Africa): Merrill Lynch South Africa (Pty) Ltd., regulated by The Financial Service Board; MLI (UK): Merrill Lynch International, regulated by the Financial Conduct Authority (FCA) and the Prudential Regulation Authority (PRA); Merrill Lynch (Australia): Merrill Lynch Equities (Australia) Limited, regulated by the Australian Securities and Investments Commission; Merrill Lynch (Hong Kong): Merrill Lynch (Asia Pacific) Limited, regulated by the Hong Kong Securities and Futures Commission (HKSFC); Merrill Lynch (Singapore): Merrill Lynch (Singapore) Pte Ltd, regulated by the Monetary Authority of Singapore (MAS); Merrill Lynch (Canada): Merrill Lynch Canada Inc, regulated by the Investment Industry Regulatory Organization of Canada; Merrill Lynch (Mexico): Merrill Lynch Mexico, SA de CV, Casa de Bolsa, regulated by the Comisión Nacional Bancaria y de Valores; Merrill Lynch (Argentina): Merrill Lynch Argentina SA, regulated by Comisión Nacional de Valores; Merrill Lynch (Japan): Merrill Lynch Japan Securities Co., Ltd, regulated by the Financial Services Agency; Merrill Lynch (Seoul): Merrill Lynch International Incorporated (Seoul Branch) regulated by the Financial Supervisory Service; Merrill Lynch (Taiwan): Merrill Lynch Securities (Taiwan) Ltd., regulated by the Securities and Futures Bureau; DSP Merrill Lynch (India): DSP Merrill Lynch Limited, regulated by the Securities and Exchange Board of India; Merrill Lynch (Indonesia): PT Merrill Lynch Sekuritas Indonesia, regulated by Otoritas Jasa Keuangan (OJK); Merrill Lynch (Israel): Merrill Lynch Israel Limited, regulated by Israel Securities Authority; Merrill Lynch (Russia): OOO Merrill Lynch Securities, Moscow, regulated by the Central Bank of the Russian Federation; Merrill Lynch (DIFC): Merrill Lynch International (DIFC Branch), regulated by the Dubai Financial Services Authority (DFSA); Merrill Lynch (Spain): Merrill Lynch Capital Markets Espana, S.A.S.V., regulated by Comisión Nacional del Mercado De Valores; Merrill Lynch (Brazil): Bank of America Merrill Lynch Banco Multiplo S.A., regulated by Comissão de Valores Mobiliários; Merrill Lynch KSA Company, Merrill Lynch Kingdom of Saudi Arabia Company, regulated by the Capital Market Authority.

This research report: has been approved for publication and is distributed in the United Kingdom (UK) to professional clients and eligible counterparties (as each is defined in the rules of the FCA and the PRA) by MLI (UK) and Bank of America Merrill Lynch International Limited, which are authorized by the PRA and regulated by the FCA and the PRA, and is distributed in the UK to retail clients (as defined in the rules of the FCA and the PRA) by Merrill Lynch International Bank Limited, London Branch, which is authorized by the Central Bank of Ireland and subject to limited regulation by the FCA and PRA - details about the extent of our regulation by the FCA and PRA are available from us on request; has been considered and distributed in Japan by Merrill Lynch (Japan), a registered securities dealer under the Financial Instruments and Exchange Act in Japan; is issued and distributed in Hong Kong by Merrill Lynch (Hong Kong) which is regulated by HKSFC (research reports containing any information in relation to, or advice on, futures contracts are not intended for issuance or distribution in Hong Kong and are not directed to, or intended for issuance or distribution to, or use by, any person in Hong Kong); is issued and distributed in Taiwan by Merrill Lynch (Taiwan); is issued and distributed in India by DSP Merrill Lynch (India); and is issued and distributed in Singapore to institutional investors and/or accredited investors (each as defined under the Financial Advisers Regulations) by Merrill Lynch International Bank Limited (Merchant Bank) (MLIBLMB) and Merrill Lynch (Singapore) (Company Registration Nos F 06872E and 198602883D respectively). MLIBLMB and Merrill Lynch (Singapore) are regulated by MAS. Bank of America N.A. Australian Branch (ARBN 064 874 531), AFS License 412901 (BANA Australia) and Merrill Lynch Equities (Australia) Limited (ABN 65 006 276 795), AFS License 235132 (MLEA) distribute this report in Australia only to 'Wholesale' clients as defined by s.761G of the Corporations Act 2001. With the exception of BANA Australia, neither MLEA nor any of its affiliates involved in preparing this research report is an Authorised Deposit-Taking Institution under the Banking Act 1959 nor regulated by the Australian Prudential Regulation Authority. No approval is required for publication or distribution of this report in Brazil and its local distribution is by Merrill Lynch (Brazil) in accordance with applicable regulations. Merrill Lynch (DIFC) is authorized and regulated by the DFSA. Research reports prepared and issued by Merrill Lynch (DIFC) are done so in accordance with the requirements of the DFSA conduct of business rules. Bank of America Merrill Lynch International Limited, Frankfurt Branch (BAMLI Frankfurt) distributes this report in Germany and is regulated by BaFin.

This research report has been prepared and issued by MLPF&S and/or one or more of its non-US affiliates. MLPF&S is the distributor of this research report in the US and accepts full responsibility for research reports of its non-US affiliates distributed to MLPF&S clients in the US. Any US person receiving this research report and wishing to effect any transaction in any security discussed in the report should do so through MLPF&S and not such foreign affiliates. Hong Kong recipients of this research report should contact Merrill Lynch (Asia Pacific) Limited in

respect of any matters relating to dealing in securities (and not futures contracts) or provision of specific advice on securities (and not futures contracts). Singapore recipients of this research report should contact Merrill Lynch International Bank Limited (Merchant Bank) and/or Merrill Lynch (Singapore) Pte Ltd in respect of any matters arising from, or in connection with, this research report.

**General Investment Related Disclosures:**

**Taiwan Readers:** Neither the information nor any opinion expressed herein constitutes an offer or a solicitation of an offer to transact in any securities or other financial instrument. No part of this report may be used or reproduced or quoted in any manner whatsoever in Taiwan by the press or any other person without the express written consent of BofA Merrill Lynch. This research report provides general information only. Neither the information nor any opinion expressed constitutes an offer or an invitation to make an offer, to buy or sell any securities or other financial instrument or any derivative related to such securities or instruments (e.g., options, futures, warrants, and contracts for differences). This report is not intended to provide personal investment advice and it does not take into account the specific investment objectives, financial situation and the particular needs of any specific person. Investors should seek financial advice regarding the appropriateness of investing in financial instruments and implementing investment strategies discussed or recommended in this report and should understand that statements regarding future prospects may not be realized. Any decision to purchase or subscribe for securities in any offering must be based solely on existing public information on such security or the information in the prospectus or other offering document issued in connection with such offering, and not on this report.

Securities and other financial instruments discussed in this report, or recommended, offered or sold by Merrill Lynch, are not insured by the Federal Deposit Insurance Corporation and are not deposits or other obligations of any insured depository institution (including, Bank of America, N.A.). Investments in general and, derivatives, in particular, involve numerous risks, including, among others, market risk, counterparty default risk and liquidity risk. No security, financial instrument or derivative is suitable for all investors. In some cases, securities and other financial instruments may be difficult to value or sell and reliable information about the value or risks related to the security or financial instrument may be difficult to obtain. Investors should note that income from such securities and other financial instruments, if any, may fluctuate and that price or value of such securities and instruments may rise or fall and, in some cases, investors may lose their entire principal investment. Past performance is not necessarily a guide to future performance. Levels and basis for taxation may change.

This report may contain a short-term trading idea or recommendation, which highlights a specific near-term catalyst or event impacting the issuer or the market that is anticipated to have a short-term price impact on the equity securities of the issuer. Short-term trading ideas and recommendations are different from and do not affect a stock's fundamental equity rating, which reflects both a longer term total return expectation and attractiveness for investment relative to other stocks within its Coverage Cluster. Short-term trading ideas and recommendations may be more or less positive than a stock's fundamental equity rating.

BofA Merrill Lynch is aware that the implementation of the ideas expressed in this report may depend upon an investor's ability to "short" securities or other financial instruments and that such action may be limited by regulations prohibiting or restricting "shortselling" in many jurisdictions. Investors are urged to seek advice regarding the applicability of such regulations prior to executing any short idea contained in this report.

Foreign currency rates of exchange may adversely affect the value, price or income of any security or financial instrument mentioned in this report. Investors in such securities and instruments, including ADRs, effectively assume currency risk.

**UK Readers:** The protections provided by the U.K. regulatory regime, including the Financial Services Scheme, do not apply in general to business coordinated by BofA Merrill Lynch entities located outside of the United Kingdom. BofA Merrill Lynch Global Research policies relating to conflicts of interest are described at <http://go.bofa.com/coi>.

MLPF&S or one of its affiliates is a regular issuer of traded financial instruments linked to securities that may have been recommended in this report. MLPF&S or one of its affiliates may, at any time, hold a trading position (long or short) in the securities and financial instruments discussed in this report.

BofA Merrill Lynch, through business units other than BofA Merrill Lynch Global Research, may have issued and may in the future issue trading ideas or recommendations that are inconsistent with, and reach different conclusions from, the information presented in this report. Such ideas or recommendations reflect the different time frames, assumptions, views and analytical methods of the persons who prepared them, and BofA Merrill Lynch is under no obligation to ensure that such other trading ideas or recommendations are brought to the attention of any recipient of this report.

In the event that the recipient received this report pursuant to a contract between the recipient and MLPF&S for the provision of research services for a separate fee, and in connection therewith MLPF&S may be deemed to be acting as an investment adviser, such status relates, if at all, solely to the person with whom MLPF&S has contracted directly and does not extend beyond the delivery of this report (unless otherwise agreed specifically in writing by MLPF&S). MLPF&S is and continues to act solely as a broker-dealer in connection with the execution of any transactions, including transactions in any securities mentioned in this report.

**Copyright and General Information regarding Research Reports:**

Copyright 2017 Bank of America Corporation. All rights reserved. iQmethod, iQmethod 2.0, iQprofile, iQtoolkit, iQworks are service marks of Bank of America Corporation. iQanalytics®, iQcustom®, iQdatabase® are registered service marks of Bank of America Corporation. This research report is prepared for the use of BofA Merrill Lynch clients and may not be redistributed, retransmitted or disclosed, in whole or in part, or in any form or manner, without the express written consent of BofA Merrill Lynch. BofA Merrill Lynch Global Research reports are distributed simultaneously to internal and client websites and other portals by BofA Merrill Lynch and are not publicly-available materials. Any unauthorized use or disclosure is prohibited. Receipt and review of this research report constitutes your agreement not to redistribute, retransmit, or disclose to others the contents, opinions, conclusion, or information contained in this report (including any investment recommendations, estimates or price targets) without first obtaining expressed permission from an authorized officer of BofA Merrill Lynch.

Materials prepared by BofA Merrill Lynch Global Research personnel are based on public information. Facts and views presented in this material have not been reviewed by, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch, including investment banking personnel. BofA Merrill Lynch has established information barriers between BofA Merrill Lynch Global Research and certain business groups. As a result, BofA Merrill Lynch does not disclose certain client relationships with, or compensation received from, such issuers in research reports. To the extent this report discusses any legal proceeding or issues, it has not been prepared as nor is it intended to express any legal conclusion, opinion or advice. Investors should consult their own legal advisers as to issues of law relating to the subject matter of this report. BofA Merrill Lynch Global Research personnel's knowledge of legal proceedings in which any BofA Merrill Lynch entity and/or its directors, officers and employees may be plaintiffs, defendants, co-defendants or co-plaintiffs with or involving issuers mentioned in this report is based on public information. Facts and views presented in this material that relate to any such proceedings have not been reviewed by, discussed with, and may not reflect information known to, professionals in other business areas of BofA Merrill Lynch in connection with the legal proceedings or matters relevant to such proceedings.

This report has been prepared independently of any issuer of securities mentioned herein and not in connection with any proposed offering of securities or as agent of any issuer of any securities. None of MLPF&S, any of its affiliates or their research analysts has any authority whatsoever to make any representation or warranty on behalf of the issuer(s). BofA Merrill Lynch Global Research policy prohibits research personnel from disclosing a recommendation, investment rating, or investment thesis for review by an issuer prior to the publication of a research report containing such rating, recommendation or investment thesis.

Any information relating to the tax status of financial instruments discussed herein is not intended to provide tax advice or to be used by anyone to provide tax advice. Investors are urged to seek tax advice based on their particular circumstances from an independent tax professional.

The information herein (other than disclosure information relating to BofA Merrill Lynch and its affiliates) was obtained from various sources and we do not guarantee its accuracy. This report may contain links to third-party websites. BofA Merrill Lynch is not responsible for the content of any third-party website or any linked content contained in a third-party website. Content contained on such third-party websites is not part of this report and is not incorporated by reference into this report. The inclusion of a link in this report does not imply any endorsement by or any affiliation with BofA Merrill Lynch. Access to any third-party website is at your own risk, and you should always review the terms and privacy policies at third-party websites before submitting any personal information to them. BofA Merrill Lynch is not responsible for such terms and privacy policies and expressly disclaims any liability for them.

Certain outstanding reports may contain discussions and/or investment opinions relating to securities, financial instruments and/or issuers that are no longer current. Always refer to the most recent research report relating to an issuer prior to making an investment decision.

In some cases, an issuer may be classified as Restricted or may be Under Review or Extended Review. In each case, investors should consider any investment opinion relating to such issuer (or its security and/or financial instruments) to be suspended or withdrawn and should not rely on the analyses and investment opinion(s) pertaining to such issuer (or its securities and/or financial instruments) nor should the analyses or opinion(s) be considered a solicitation of any kind. Sales persons and financial advisors affiliated with MLPF&S or any of its affiliates may not solicit purchases of securities or financial instruments that are Restricted or Under Review and may only solicit securities under Extended Review in accordance with firm policies.

Neither BofA Merrill Lynch nor any officer or employee of BofA Merrill Lynch accepts any liability whatsoever for any direct, indirect or consequential damages or losses arising from any use of this report or its contents.

# Research Analysts

---

**Savita Subramanian**  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 3878  
[savita.subramanian@baml.com](mailto:savita.subramanian@baml.com)

**Dan Suzuki, CFA**  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 2827  
[dan.suzuki@baml.com](mailto:dan.suzuki@baml.com)

**Alex Makedon**  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 5982  
[alex.makedon@baml.com](mailto:alex.makedon@baml.com)

**Jill Carey Hall, CFA**  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 3327  
[jill.carey@baml.com](mailto:jill.carey@baml.com)

**Marc Pouey**  
Equity & Quant Strategist  
MLPF&S  
+1 646 855 1142  
[marc.pouey@baml.com](mailto:marc.pouey@baml.com)

**Jimmy Bonilla**  
Equity & Quant Strategist  
MLPF&S  
+1 646 556 4179  
[jimmy.bonilla@baml.com](mailto:jimmy.bonilla@baml.com)