

Portfolio Strategy November 2017

The Bond Surrogates: Stress Cracks, The VIX: Nothing to See Here, Keep Moving

The Bond Surrogates' Slow Bleed

- The bond surrogates are the 10% of the large-cap equity market with relative returns that are most correlated with the ups and downs of the Treasury bond market. At the moment those issues are primarily drawn from the utility, REIT and consumer staples sectors. Health care sources about a tenth of them. In the post-Crisis era they've behaved much more as a pack than before, although in the past 18 months that began to change and recently the correlation among their returns fell to its 2006 level. There are two reasons for that, one macro and one micro.
- On the macro front, the slack in the labor market has finally been cleared, leading to better wage growth at the low end and generally more vigor in the economy. That's produced stronger top-line gains, rendering low-growth companies that offer stable dividend yields less attractive. There are also problems coming from the micro side of the equation as the reliability of the fundamentals of some of the Surrogates has been called into question. We can see that in the declining correlations among the returns of both REITs and staples. Energy MLPs and telecom service stocks had suffered that same fate earlier in the decade and only the utilities have been able to maintain a united front.
- Ultimately the hurdle faced by the Surrogates is valuation. They're priced at a P/E premium to our *growth* stock universe yet their top-line is moving up at a much more glacial pace. In the past three years the comparison has been +4% versus +9%. In addition, the Surrogates' dividend growth has been (2.25) percentage points slower than that for the S&P 500 during that span. Stocks aren't bonds, growth is a big part of the equation and stability can prove fleeting. It looks like the bond proxies are slowly losing blood as both the macro and micro issues have inflicted paper cuts. A pick up in inflation or evidence of peaking in the commercial real estate cycle would create more life-threatening wounds. We think investors are better off elsewhere and Appendix 1 on page 11 ranks the bond proxies in our failure framework.

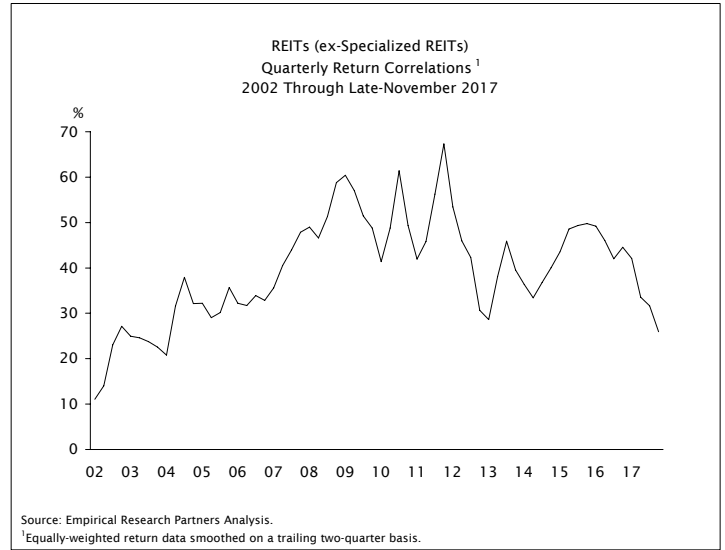
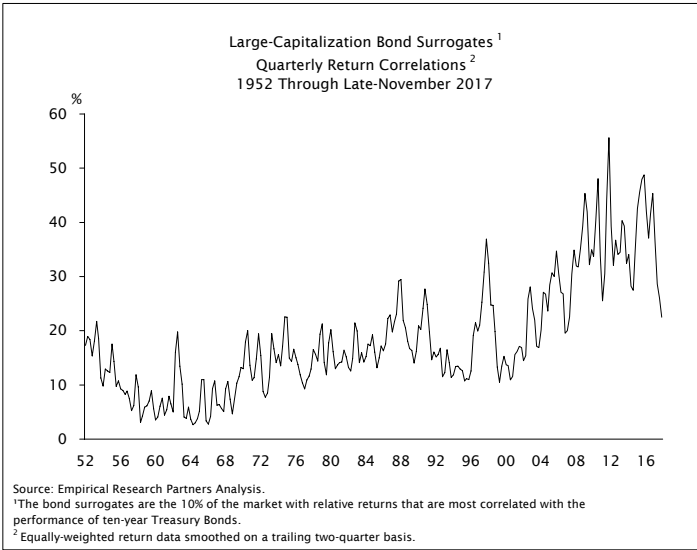
The Vix: Nothing to See Here, Keep Moving

- The VIX, that estimates the forward 30-day volatility of the equity market using a portfolio of put and call index options, has been exceptionally low. So too is the actual volatility of the market that in the latest quarter has been in the bottom 2.5% of outcomes seen over the past 90+ years. The volatility futures curve has been steep for a long time meaning that investors have been expecting a regression to the mean, that's yet to occur. The message from the VIX typically resembles that from our valuation spreads but at the moment that's not the case. Our spreads are much closer to normal levels, in part a function of the controversy in the energy sector. Empirical gauges of macro uncertainty tell the same story as our spreads.
- We developed a model to forecast market volatility a year from now using what's transpired over trailing windows that vary from a month to three years as inputs. If volatility has been depressed we should guess it will remain that way, as big spikes occur too infrequently to make them good bets. The level of volatility, either that realized or forecast, doesn't predict the returns of the equity market, nor tell us much about what to do within it. Elevated volatility is helpful though for value strategies. At the moment, as we describe above, it's expensive to play defense, and the threats to the market don't appear ominous enough to cause us to pay up. The provocative level of the VIX doesn't change our read of the situation.

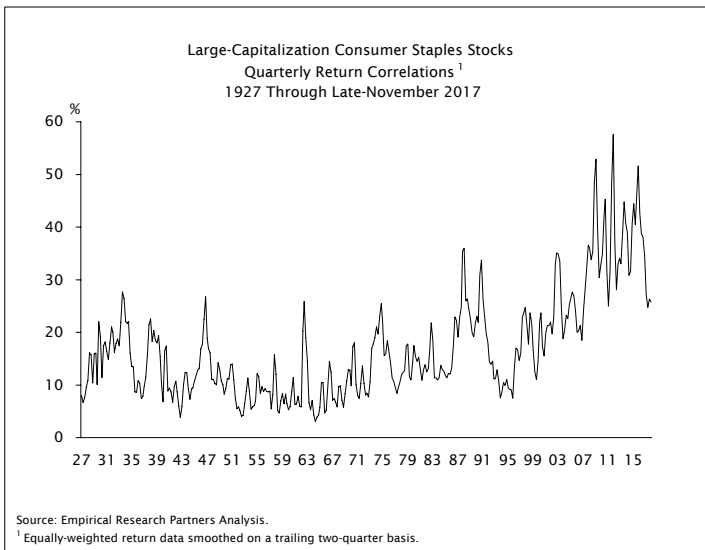
Nicole Price (212) 803-7935 Yi Liu (212) 803-7942 Yu Bai (212) 803-7919 Yuntao Ji (212) 803-7920 Janai Haynes (212) 803-8005

Conclusions in Brief

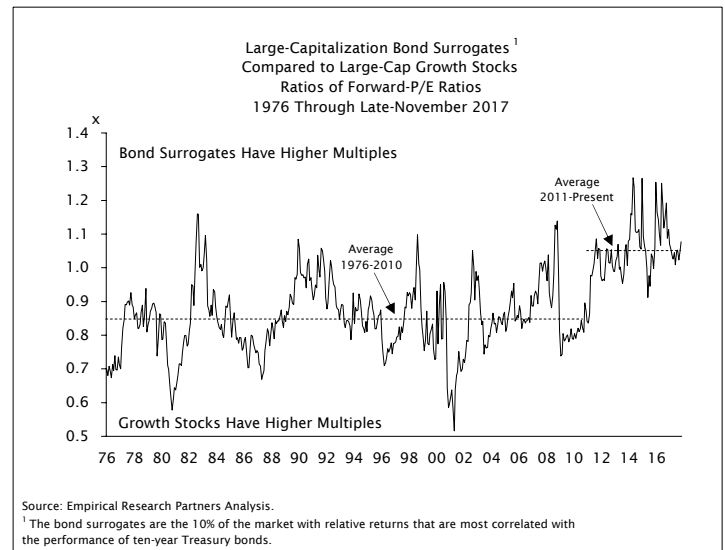
- The correlation among the returns of the bond surrogates is breaking down...
- ...Led by the REITs...



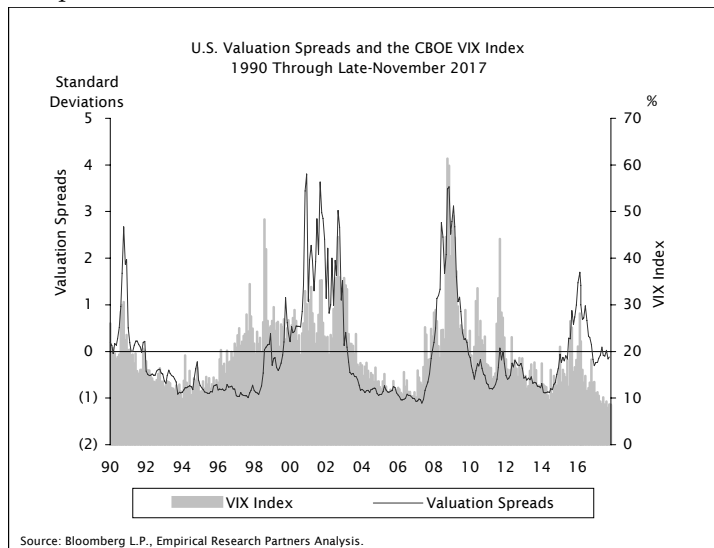
- ...And staples:



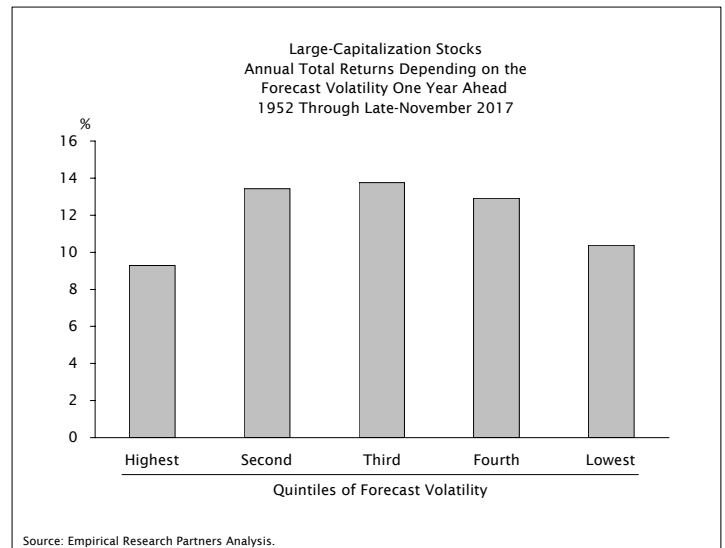
- One problem is valuation:



- The VIX tends to move in tandem with our valuation spreads...



- ...And volatility, either forecast or realized, doesn't tell us what to do:

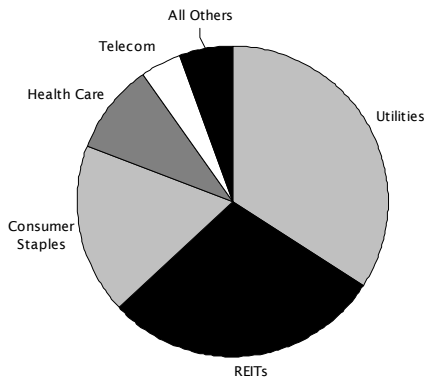


The Bond Surrogates: Stress Cracks

Still Surrogates...

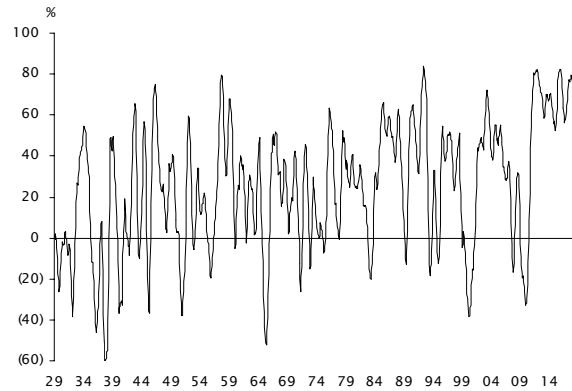
We've been keeping an eye on the bond surrogates looking for signs that the fad of buying equities in lieu of bonds was beginning to break down. That could occur as a result of rising interest rates and/or it could also be caused by declining confidence in the ability of those companies to deliver reliable and growing dividends. At the moment the Surrogates group, defined to be the 10% of the large-cap market with relative returns that are most correlated with the performance of the Treasury market, is largely comprised of utilities, REITs and consumer staples (see Exhibit 1). The health care sector also sources about a tenth of them.

Exhibit 1: Large-Capitalization Bond Surrogates Mix By Sector As of Late-November 2017



Source: Empirical Research Partners Analysis.

Exhibit 2: Large-Capitalization Bond Surrogates' Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 1929 Through Late-November 2017



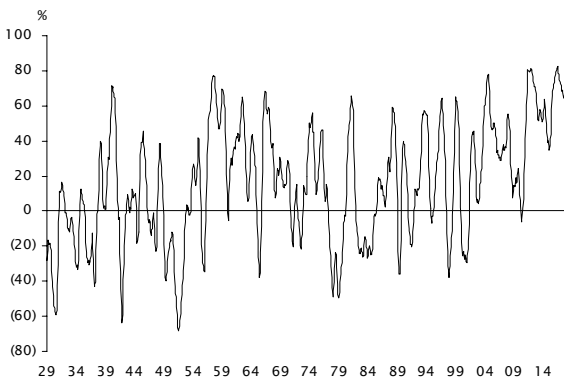
Source: Ibbotson Associates, Bloomberg L.P., Empirical Research Partners Analysis.

¹The bond surrogates are the 10% of the market with relative returns that are most correlated with the performance of ten-year Treasury bonds. Performance of longer bonds used prior to 1977.

²Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis.

The correlation of their relative returns with the ups and downs of the Treasury market has remained at record levels throughout this decade (see Exhibit 2). That's also been true for two of its leading sectors, utilities and staples (see Exhibits 3 and 4). The data for REITs though looks shakier, while telecom service stocks and energy MLPs, that at one point carried the surrogate credential, have lost it (see Exhibits 5 through 7).

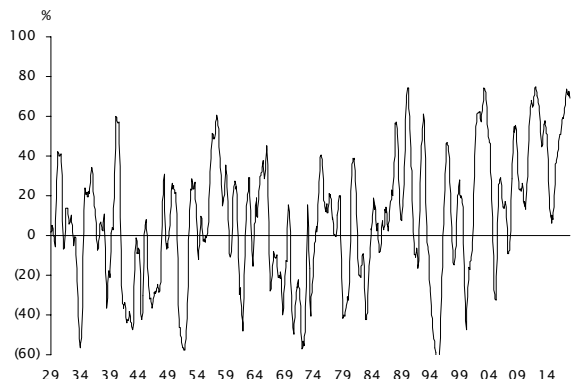
Exhibit 3: Large-Capitalization Utility Stocks Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 1929 Through Late-November 2017



Source: Ibbotson Associates, Bloomberg L.P., Empirical Research Partners Analysis.

¹Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis. Performance of longer bonds used prior to 1977.

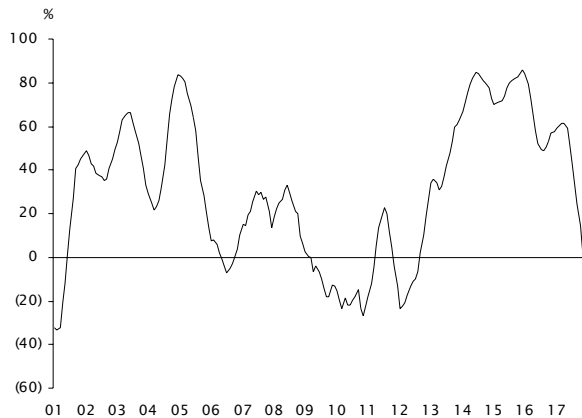
Exhibit 4: Large-Capitalization Consumer Staples Stocks Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 1929 Through Late-November 2017



Source: Ibbotson Associates, Bloomberg L.P., Empirical Research Partners Analysis.

¹Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis. Performance of longer bonds used prior to 1977.

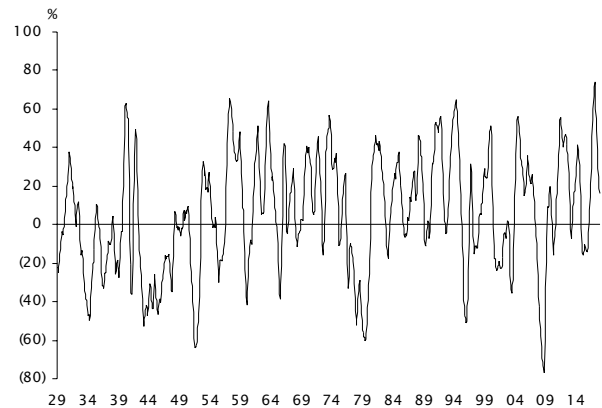
Exhibit 5: REITs (ex-Specialized REITs)
Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 2001 Through Late-November 2017



Source: Bloomberg L.P., Empirical Research Partners Analysis.

¹Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis.

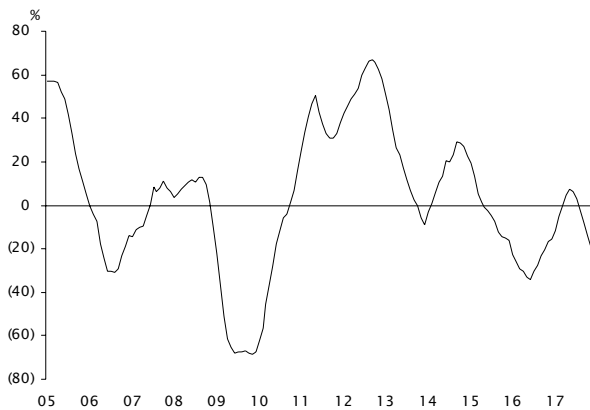
Exhibit 6: Large-Capitalization Telecom Service Stocks
Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 1929 Through Mid-November 2017



Source: Ibbotson Associates, Bloomberg L.P., Empirical Research Partners Analysis.

¹Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis. Performance of longer bonds used prior to 1977.

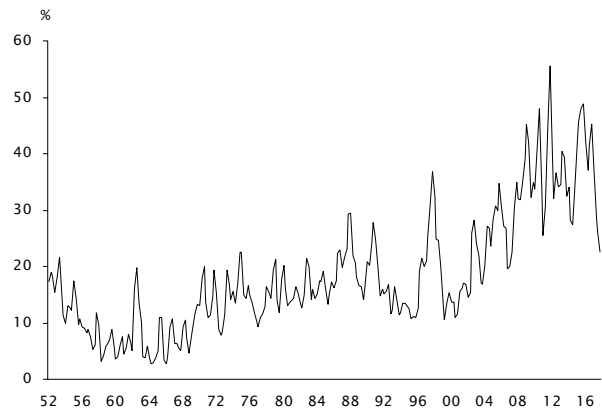
Exhibit 7: Energy MLPs
Correlation of Relative Returns with the Total Return of Ten-Year Treasury Bonds¹ 2005 Through Mid-November 2017



Source: Bloomberg L.P., Empirical Research Partners Analysis.

¹Constructed using trailing one-year equally-weighted return data; smoothed on a trailing six-month basis.

Exhibit 8: Large-Capitalization Bond Surrogates¹
Quarterly Return Correlations² 1952 Through Late-November 2017



Source: Empirical Research Partners Analysis.

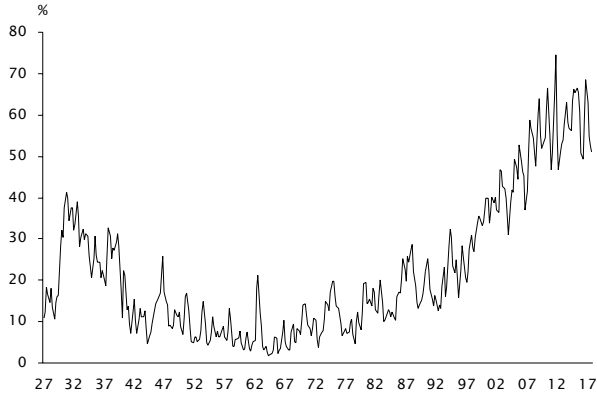
¹The bond surrogates are the 10% of the market with relative returns that are most correlated with the performance of ten-year Treasury Bonds.
²Equally-weighted return data smoothed on a trailing two-quarter basis.

...Although Their Ranks are Being Pared

We noticed that the correlation among the returns of the 75 stocks that make up the Surrogate composite began to break down in the second-quarter of last year, and the latest reading, 22%, is the lowest seen since before the financial crisis (see Exhibit 8). When we repeated the analysis for each of the leading sectors we found some notable differences among them.

For example, Exhibit 9 presents the correlations among the returns of utility stocks, and Exhibit 10 does the same for REITs. Both use equally-weighted data. The peak in correlations for utilities of 75% occurred back in April of 2011 while the latest data point is around 50%. While down, the current level matches the peak reading seen from 1926 through 2006. REITs have a much shorter history and the population of them has not only grown over time but also changed character, as the tower companies and other operating entities converted to the structure. We excluded those entities from the analysis although including them wouldn't alter our findings. The peak in correlations, 66%, occurred 6½ years ago, and since then it's come down by two-thirds. We saw something similar unfold among the energy MLPs earlier in the decade (see Exhibit 11). The data for telecom providers and staples look more like that for REITs than that for utilities (see Exhibits 12 and 13).

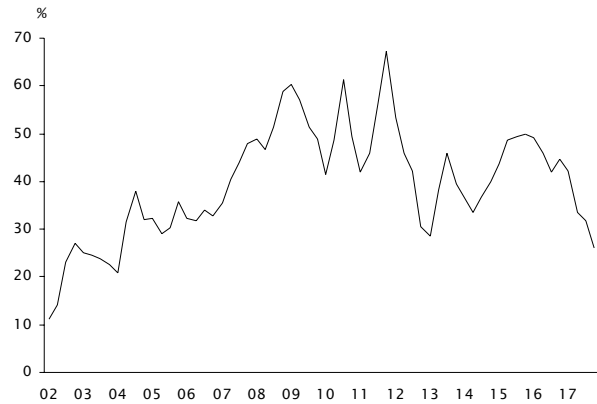
**Exhibit 9: Large-Capitalization Utility Stocks
Quarterly Return Correlations¹
1927 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹Equally-weighted return data smoothed on a trailing two-quarter basis.

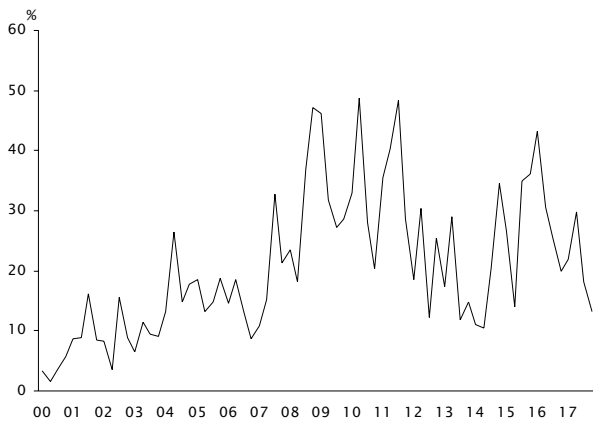
**Exhibit 10: REITs (ex-Specialized REITs)
Quarterly Return Correlations¹
2002 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹Equally-weighted return data smoothed on a trailing two-quarter basis.

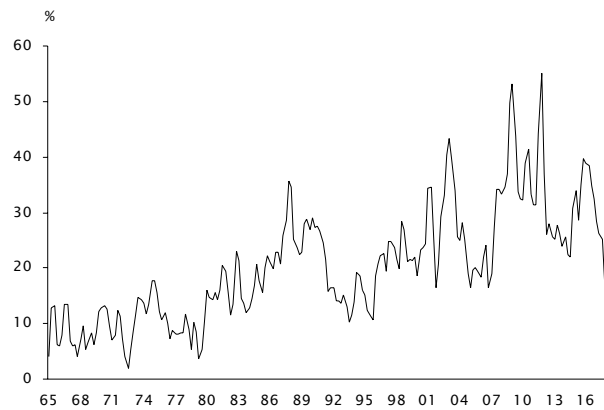
**Exhibit 11: Energy MLPs
Quarterly Return Correlations¹
2000 Through Mid-November 2017**



Source: Empirical Research Partners Analysis.

¹Equally-weighted return data smoothed on a trailing two-quarter basis.

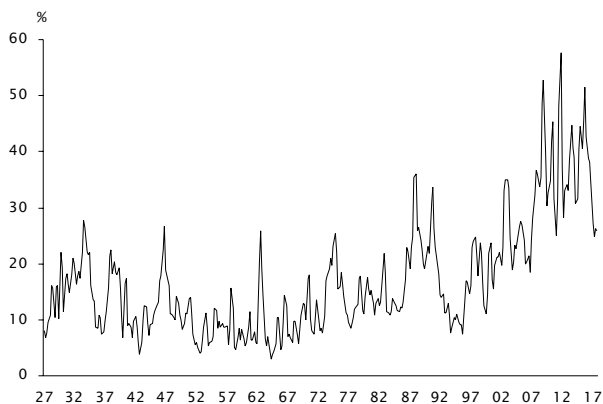
**Exhibit 12: Large-Capitalization Telecom Service Stocks
Quarterly Return Correlations¹
1965 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹Equally-weighted return data smoothed on a trailing two-quarter basis.

**Exhibit 13: Large-Capitalization Consumer Staples Stocks
Quarterly Return Correlations¹
1927 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹Equally-weighted return data smoothed on a trailing two-quarter basis.

**Exhibit 14: Individuals Working Part Time for Economic
Reasons as a Share of the Labor Force
2003 Through October 2017**



Source: Bureau of Labor Statistics, Empirical Research Partners Analysis.

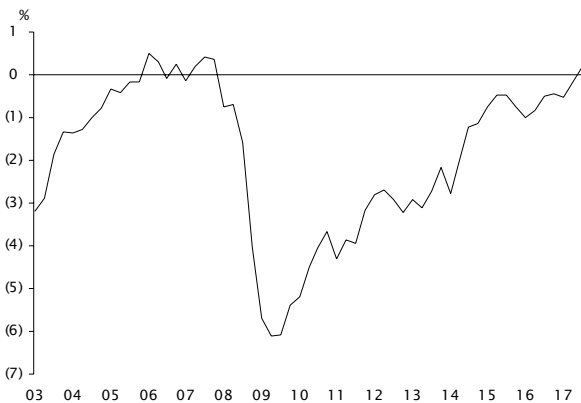
A Breakdown: The Macro and the Micro

There are two ways the bond surrogate phenomenon can end: the nominals in the economy can rise, making a point of stable dividend yield less valuable, and/or the fundamentals of the chosen companies can come to be seen as insufficiently reliable to qualify as bond equivalents. We see some evidence that both threats are unfolding.

The macro one has become real because the labor market has tightened as the inventory of people displaced by the financial crisis was cleared. We can see that in Exhibit 14 that depicts the share of the labor force working part time for economic reasons, that after six years of decline has finally returned to its pre-Crisis level. We observe the same trend in the CBO's estimate of economic slack (see Exhibit 15).

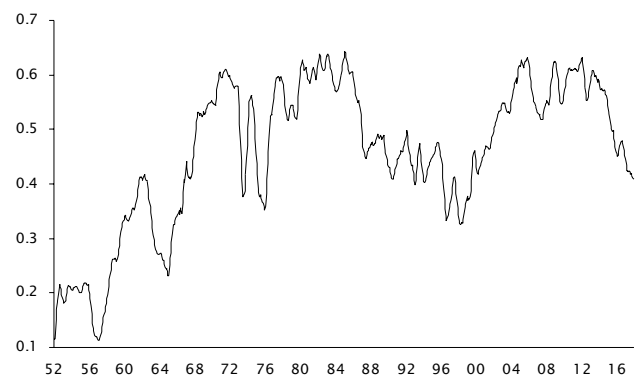
There's also signs of rising idiosyncratic risks, indicative that something new is going on. For example, Exhibit 16 presents the history of fundamental stability scores for the mega-cap consumer staples stocks. They take into account the level of each company's ROE, its stability, the volatility of earnings growth, financial leverage and beta. The average score peaked about six years ago and has been in steady decline since. It's a relative measure so some of the degradation is attributable to the business cycle, such that the rest of the market, led by the tech sector, has, at least for the moment, become more stable. We think a less advantageous trade-off between volume and price in the domestic operations of some of the staples' businesses is being captured in this chart as well. The utilities look to be the most reliable of the current crop of proxies (see Exhibit 17).

**Exhibit 15: Economic Slack as a Share of Potential GDP
2003 Through September 2017**



Source: Congressional Budget Office, Empirical Research Partners Analysis.

**Exhibit 16: Mega-Cap Consumer Staples¹
Average Fundamental Stability Score²
1952 Through Mid-November 2017**



Source: Empirical Research Partners Analysis.

¹Top 13 stocks by market cap.

²Data smoothed on a trailing six-month basis.

Conclusion: Death By a Thousand Cuts

The retail investors who turned to the stock market in search of income have done much better than those who stuck with bonds, although in the past five years they've underperformed the equity market (see Exhibit 18). One reason for the recent lackluster performance is that bond-like characteristics were bid up, and even now the Surrogates sell at a substantial +17% P/E premium to the market (see Exhibit 19). That puts them at a higher valuation than our growth stock universe, that offers much faster growth and higher ROEs to boot (see Exhibit 20). It's not surprising then that the Surrogates have underperformed the growth issues by more than three percentage points per annum in the last five years with much of that deficit occurring in 2017. Their 3.5% divided yields simply haven't been enough to carry them in a setting of +6% S&P 500 earnings growth.

While it's possible that inflation will climb toward 2% and undermine the assumptions built into the bond market, causing the Surrogates' valuation to come under serious pressure, we think it's more likely that they'll continue to suffer death by a thousand cuts as the confidence in their stability erodes. That process has been underway for several years now. In an expanding economy 21 times estimated earnings is simply too much to pay for +4% earnings growth and a one point dividend yield advantage. There's also the matter of growth, and in the past three years their dividends have grown at a rate of around (2.25) percentage points less than that of the S&P 500 (see Exhibit 21). Retail investors have lost some of their enthusiasm and this year flows into REIT ETFs have ebbed as their performance lagged behind the market (see Exhibit 22). Appendix 1 puts today's Surrogates through our Failure Model. On average they rank in the 6th decile, hurt by their valuation and popularity among ETF investors.

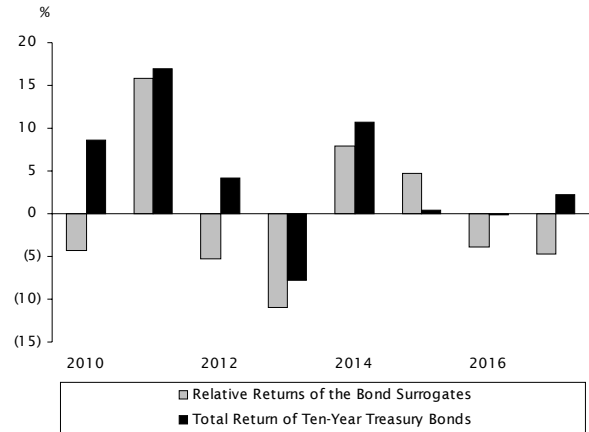
**Exhibit 17: Large-Capitalization Utility Stocks
Average Fundamental Stability Score¹
1952 Through Mid-November 2017**



Source: Empirical Research Partners Analysis.

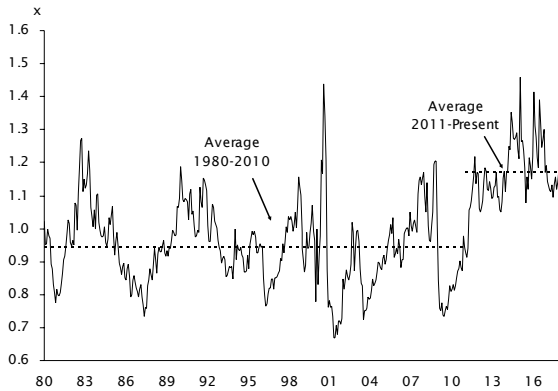
¹Equally-weighted data smoothed on a trailing six-month basis.

**Exhibit 18: Large-Capitalization Bond Surrogates
Capitalization-Weighted Relative Returns
and Total Returns of Ten-Year Treasury Bonds
Monthly Data Compounded
2010 Through Late-November 2017**



Source: Bloomberg L.P., Empirical Research Partners Analysis.

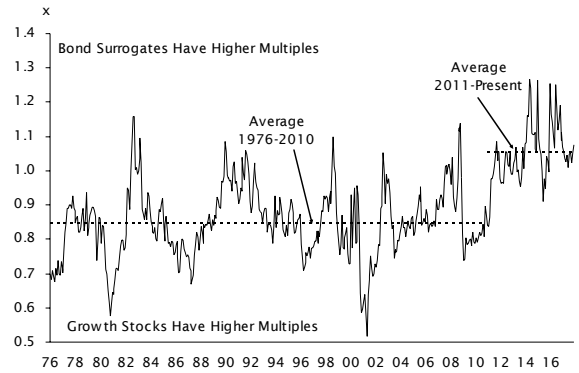
**Exhibit 19: Large-Capitalization Bond Surrogates¹
Relative Forward-P/E Ratios
1980 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹The bond surrogates are the 10% of the market with relative returns that are most correlated with the performance of ten-year Treasury bonds.

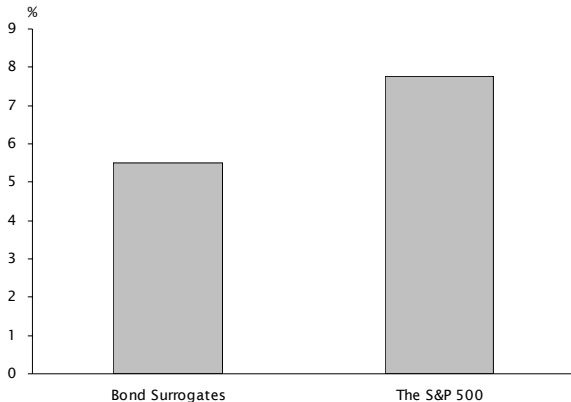
**Exhibit 20: Large-Capitalization Bond Surrogates¹
Compared to Large-Cap Growth Stocks
Ratios of Forward-P/E Ratios
1976 Through Late-November 2017**



Source: Empirical Research Partners Analysis.

¹The bond surrogates are the 10% of the market with relative returns that are most correlated with the performance of ten-year Treasury bonds.

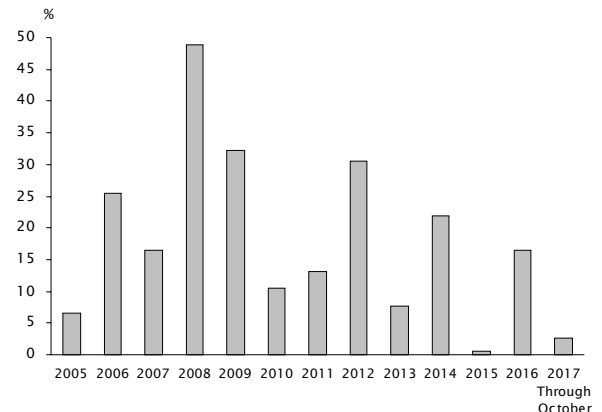
**Exhibit 21: Large-Cap Bond Surrogates and the S&P 500 Stocks¹
Annualized Growth Rates of Dividend Per Share
Three Years Ending Q3 2017**



Source: Standard and Poor's, Empirical Research Partners Analysis.

¹The bond surrogates are the 10% of the market with relative returns that are most correlated with the performance of ten-year Treasury bonds.

**Exhibit 22: REIT ETFs
Annual Growth From Net Inflows
2005 Through October 2017**



Source: Strategic Insight Simfund, Empirical Research Partners Analysis.

The VIX, Spreads and Dread

Low Vol, Disbelieved

We're often asked about the VIX. That index estimates the expected volatility of the S&P 500 for the next thirty days using a portfolio of call and put index options. Given its current level it seems to have nowhere to go but up, and it may convey that a dangerous complacency has developed among investors. We've never used the VIX in our work because the horizon it uses is so short. Moreover, it can remain at a low level for a long time until something upsets the apple cart. It's our job to figure out what that something is and if it's about to happen. The VIX futures, that are less volatile, contain more useful information than the widely-followed spot index.¹

We decided to examine the VIX after reading a couple of interesting pieces by economists at the Federal Reserve Bank of New York on that topic.² The authors concluded that the index was indeed mean reverting, although most of the time low readings have predicted more of the same. It takes a big shock to create a move from a depressed to high level in short order.

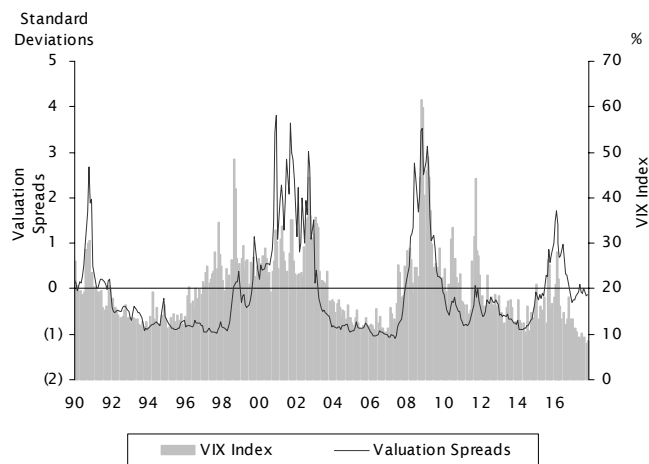
There's a term structure in the futures market for volatility that helps us quantify expectations. In the post-Crisis years the curve has been steeper than before, and since 2010 the spread between the one- and twelve-month implied volatility has been roughly double that seen from 2003 though 2007. Even though volatility has been depressed for some time investors have never really bought into the idea that it would stay that way. Rather, they've embraced a regression-to-the-mean scenario, that's yet to be fulfilled.

Spreads and Dread Revisited

All of this seems familiar because the VIX has tended to move in tandem with our valuation spreads and in fact both frameworks, that quantify stress though analyzing the equity market, were launched at about the same time (see Exhibit 23). Mostly they tell the same story and usually that is that there are few overarching controversies priced into the market. The last time both gauges spiked was around the beginning of 2016 when investors became concerned that both China and the energy sector were vulnerable to runs on the bank.

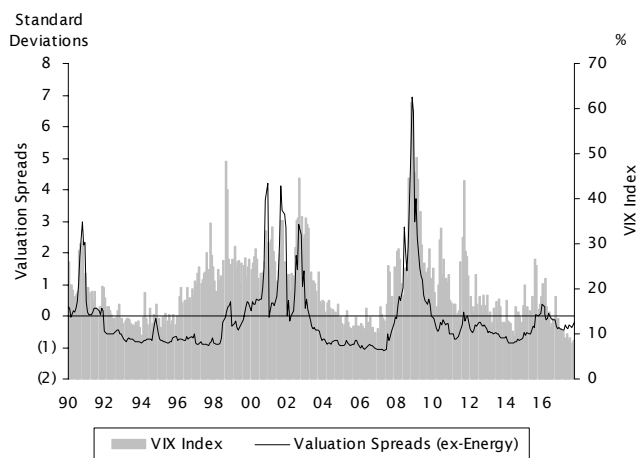
Recently though the readings from the VIX and our spreads have diverged, to a degree last seen during the late-1990s. Some of that disagreement is explained by the ongoing stresses in the energy sector, where the shale boom has pushed the valuation spread up to a high level for more than three years running. It's unusual to see problems go unresolved for that long. Even if we take that sector out of the equation there's still more disagreement expressed in our spreads than in the VIX (see Exhibit 24). The current level resembles where they were during the middle parts of the last couple of expansions, while the VIX has fallen to new lows.

Exhibit 23: U.S. Valuation Spreads and the CBOE VIX Index 1990 Through Late-November 2017



Source: Bloomberg L.P., Empirical Research Partners Analysis.

Exhibit 24: U.S. Valuation Spreads (ex-Energy) and the CBOE VIX Index 1990 Through Late-November 2017



Source: Bloomberg L.P., Empirical Research Partners Analysis.

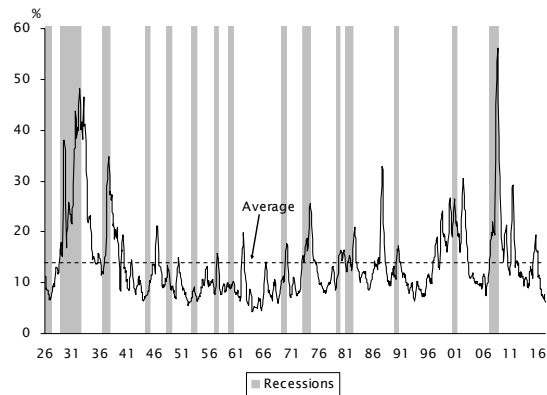
¹Chen, Y-L and Wei-Che Tsai, 2017. "Determinants of Price Discovery in the VIX Futures Market," *Journal of Empirical Finance*, Forthcoming.

²Lucca, D., Roberts, D. and Peter Van Tassel, 2017. "The Low Volatility Puzzle: Are Investors Complacent?" Liberty Street Economics, November 13, and Lucca, D., Roberts, D. and Peter Van Tassel, 2017. "The Low Volatility Puzzle: Is This Time Different?" Liberty Street Economics, November 15.

Predicting Volatility

We did some work trying to predict equity market volatility starting with what’s actually been realized. The raw material that went into our analysis is depicted in Exhibit 25, that presents the annualized monthly numbers for the large-cap market for the last 90+ years. The reading for the last six months, 6.2%, ranks in the bottom 2.5% of the distribution, and the even lower points mostly occurred in the mid-1960s, another period of low interest rates. We then built a model to predict where volatility will be a year from now, weighing data drawn from the 21-, 126- and 756-day (three year) windows. Given the backward-looking nature of the methodology it’s not surprising to find that the current forecast is low, in the same ballpark as what was witnessed near the peak of the 2000s housing cycle and in the 1960s (see Exhibit 26). Like economists at the New York Fed we found that if volatility as been low the best (statistical) guess is that it will remain that way.

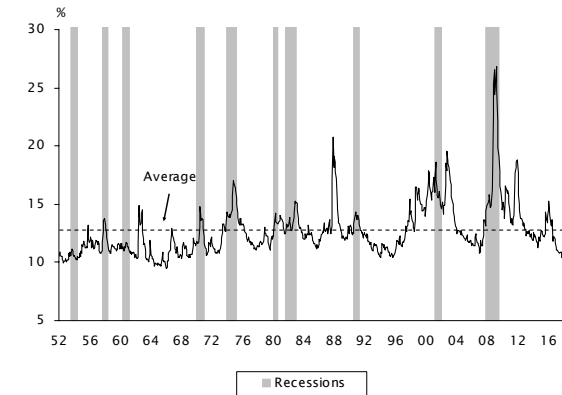
**Exhibit 25: Large-Capitalization Stocks
Realized Annualized Return Volatility¹
July 1926 Through Late-November 2017**



Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

¹Computed monthly using daily data and smoothed on a six-month basis.

**Exhibit 26: Large-Capitalization Stocks
Forecast Annualized Return Volatility
One Year Ahead¹
1952 Through Late-November 2017**

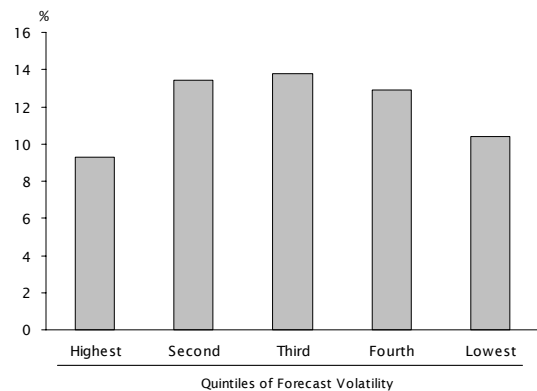


Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

¹Volatility measured over one-month horizons using daily data. Prediction based on a GARCH-type discrete historical model, weighing one-month past volatility.

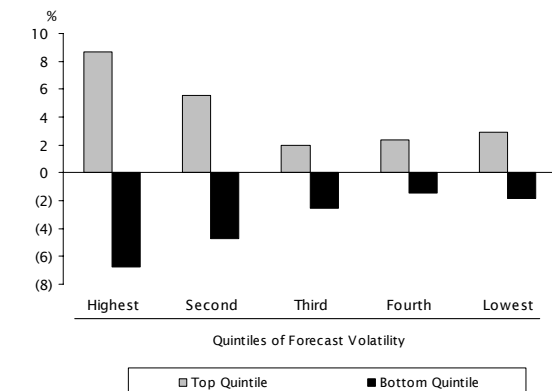
The fact that we have a forecast for volatility doesn’t tell us much about what we should do in the stock market. Exhibit 27 presents the market’s forward one-year return depending on the forecasted level of volatility. Bottom quintile forecasts, like the current one, have been associated with lower returns, but the differences aren’t huge. High expected volatility, like wide valuation spreads, turns out to have been helpful for value strategies and for companies with favorable capital deployment profiles (see Exhibits 28 and 29). Trend-following approaches on the other hand do a bit better when the seas are calm (see Exhibit 30). The underlying logic is similar to that embodied in our regime indicator.

**Exhibit 27: Large-Capitalization Stocks
Annual Total Returns Depending on the
Forecast Volatility One Year Ahead
1952 Through Late-November 2017**



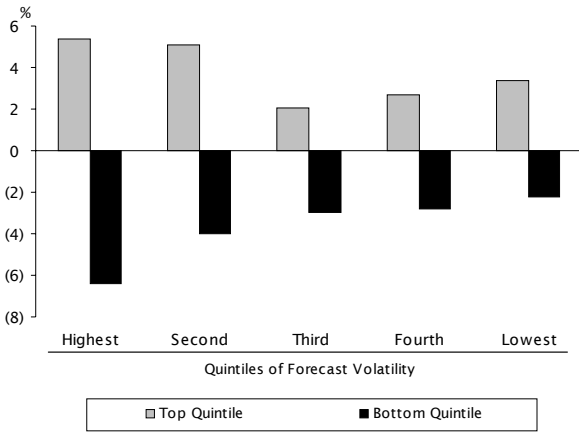
Source: Empirical Research Partners Analysis.

**Exhibit 28: Large-Capitalization Stocks
Annual Relative Returns of the Top and
Bottom Quintiles of Valuation
Depending on the Forecast Volatility
One Year Ahead
1952 Through Late-November 2017**



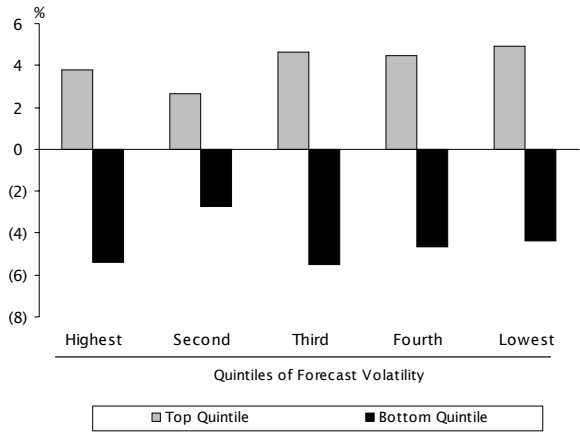
Source: Empirical Research Partners Analysis.

Exhibit 29: Large-Capitalization Stocks
Annual Relative Returns of the Top and Bottom Quintiles of Capital Deployment Depending on the Forecast Volatility One Year Ahead 1952 Through Late-November 2017



Source: Empirical Research Partners Analysis.

Exhibit 30: Large-Capitalization Stocks
Annual Relative Returns of the Top and Bottom Quintiles of Market Reaction Depending on the Forecast Volatility One Year Ahead 1952 Through Late-November 2017



Source: Empirical Research Partners Analysis.

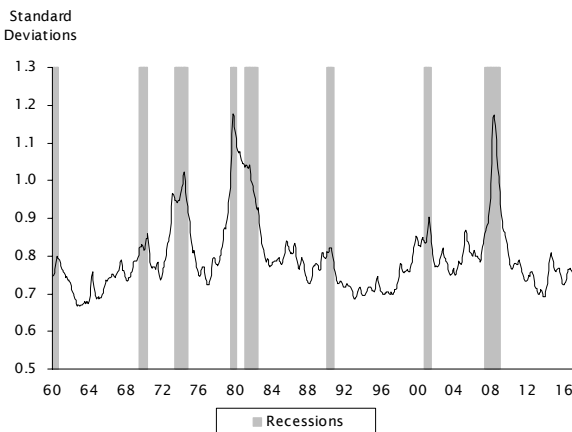
Conclusion: Nothing to See Here: Keep Walking

While we can theorize why volatility is so low, we can't be all that confident in our answers. Little inflation, low nominal economic growth, a compliant Fed, a bounty of free cash flow and more capital-lite business models all may have something to do with the unusually stable conditions. Or, it could simply be a run of good luck. Empirical gauges of macro uncertainty, that make predictions over a quarter or a year, look much like our valuation spreads and as they did in the middle of the last expansion (see Exhibits 31 and 32). Like much else that's transpired in the Bretton Woods II era, investors simply don't believe the current conditions are sustainable and have perpetually anticipated regression to the mean. That's why the futures curve has been steep.

The exceptionally-low realized and forecast volatility is not echoed elsewhere in our work. Valuation spreads are only a little narrower than normal and the regime is somewhere between growth-tilted and neutral. Multiples are high but so too are real free cash flow yields.

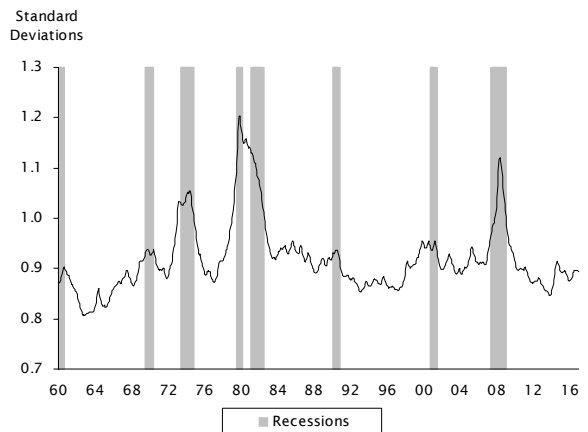
As we described in the first section of this research playing traditional defense is still costly and carries its own risks. We don't see the threats to the business cycle as ominous enough move to a defensive formation and instead we continue to try to exploit the system's enormous free cash flow production. The provocative level of the VIX isn't enough to convince us to do otherwise.

Exhibit 31: Macro Uncertainty Index Looking Three-Months Ahead 1960 Through June 2017



Source: Jurado, K., Ludvigson, S. and Serena Ng, 2015. "Measuring Uncertainty," *American Economic Review*, 105 (3), pp. 1177-1216, National Bureau of Economic Research.

Exhibit 32: Macro Uncertainty Index Looking One-Year Ahead 1960 Through June 2017



Source: Jurado, K., Ludvigson, S. and Serena Ng, 2015. "Measuring Uncertainty," *American Economic Review*, 105 (3), pp. 1177-1216, National Bureau of Economic Research.

**Appendix 1: Large-Capitalization Bond Surrogates Stocks
Failure Model Ranks
Sorted By Rank and Market Capitalization Within Sector
As of Late-November 2017**

Symbol	Company	Valuation				Capital Deployment and Earnings Quality				Market Reaction				Market Structure				Market Capitalization (\$ Billion)		
		Price	Gross Cash Flow Enterprise Value	Free Cash Flow Yield	P/E Ratio	Capital Spending	Inventory Growth	Change in Common Shares Outstanding	Free Cash Flow Margin	Earnings Quality	Arbitrage Risk (1=Lowest, 10=Highest)	Downside Risk	Nine-Month Price Trend	Share Turnover	Technical Indicator	Nine-Month Change in Short Interest	Sector ETF Flows and Equivalent Volume		Core Model	Failure Model Rank
Commercial Services and Supplies																				
WCN	WASTE CONNECTIONS INC	\$69.23	6	6	5	10	na	7	3	6	3	4	3	2	1	5	2	7	4	\$18.2
Industrial Commodities																				
ARNC	ARCONIC INC	\$23.89	8	10	4	10	6	10	10	2	9	10	10	8	3	na	7	7	10	\$11.5
WPM	WHEATON PRECIOUS METALS CORP	20.47	6	2	10	7	na	6	1	1	8	8	7	7	5	3	10	4	10	9.1
Health Care																				
BAX	BAXTER INTERNATIONAL INC	\$63.88	7	5	8	5	3	6	3	7	2	1	2	4	3	6	4	3	2	\$34.8
JNJ	JOHNSON & JOHNSON	137.93	4	6	6	3	7	4	3	10	3	1	4	1	1	3	6	6	3	370.6
MDT	MEDTRONIC PLC	78.90	7	3	2	6	3	5	2	7	5	2	7	3	5	7	5	8	5	106.9
COO	COOPER COMPANIES INC	239.94	8	6	7	2	5	7	3	8	5	3	8	8	9	2	2	7	6	11.7
ISRG	INTUITIVE SURGICAL INC	395.03	10	8	8	10	9	2	1	1	3	4	10	4	10	1	9	8	8	44.0
EW	EDWARDS LIFESCIENCES CORP	107.16	9	7	5	6	4	10	4	9	7	3	4	7	10	6	3	9	8	22.7
SYK	STRYKER CORP	154.75	10	9	8	8	8	5	6	7	6	3	3	2	5	5	5	10	9	57.9
Consumer Staples																				
UN	UNILEVER NV	\$56.53	8	6	na	na	2	10	5	8	5	1	3	1	2	6	na	6	3	\$97.3
PEP	PEPSICO INC	114.91	6	5	6	8	4	4	4	5	1	1	6	2	9	6	7	4	4	163.5
EL	LAUDER (ESTEE) COS INC -CL A	125.18	8	7	7	6	5	8	4	9	7	2	1	8	9	3	5	3	5	46.1
INGR	INGREDION INC	134.37	5	5	6	5	8	6	6	6	3	7	5	6	10	3	2	6	5	9.7
PF	PINNACLE FOODS INC	55.88	6	4	5	6	6	8	5	3	2	7	9	9	10	3	2	7	5	6.7
PM	PHILIP MORRIS INTERNATIONAL	102.54	8	6	6	9	7	4	2	7	3	3	7	9	10	4	8	7	5	159.3
CL	COLGATE-PALMOLIVE CO	72.07	8	6	7	na	4	6	4	5	2	1	8	3	6	3	7	9	6	63.3
STZ	CONSTELLATION BRANDS	217.58	9	9	7	4	4	2	5	8	2	1	1	8	6	5	5	6	6	92.6
GIS	GENERAL MILLS INC	54.24	4	3	4	8	3	4	4	5	7	3	9	7	7	10	5	6	6	30.8
CLX	CLOROX CO/DE	134.59	7	5	6	1	6	6	4	5	5	3	7	6	9	8	5	7	7	17.4
PG	PROCTER & GAMBLE CO	88.27	9	8	7	7	3	1	8	2	1	8	2	8	4	4	7	9	8	224.9
K	KELLOGG CO	65.56	5	4	5	8	3	4	5	6	8	1	9	7	10	10	4	5	10	22.6
MKC	MCCORMICK & CO INC	100.08	8	7	7	5	7	9	5	10	7	5	7	8	10	9	5	10	10	13.1
Financials																				
NLY	ANNALY CAPITAL MANAGEMENT	\$11.73	na	na	na	na	na	na	na	na	3	6	5	8	10	8	3	2	3	\$13.6
AGNC	AGNC INVESTMENT CORP	20.07	na	na	na	na	na	na	na	na	4	5	5	6	6	9	3	4	4	7.9
Real Estate																				
AMT	AMERICAN TOWER CORP	\$146.22	8	na	na	9	na	8	na	6	6	8	2	4	5	3	7	2	3	\$62.8
VER	VEREIT INC	8.01	3	na	na	10	na	10	na	1	3	4	8	8	5	9	7	2	3	7.8
GLPI	GAMING & LEISURE PPTYS	35.89	5	na	na	2	na	9	na	3	2	3	4	2	2	6	8	4	3	7.6
HCN	WELLTOWER INC	67.93	6	na	na	8	na	9	na	na	2	3	7	4	5	2	8	3	4	25.2
WPC	W P CAREY INC	71.49	5	na	na	8	na	8	na	3	1	1	4	2	9	5	8	4	4	7.6
VTR	VENTAS INC	64.25	4	na	na	8	na	8	na	7	2	1	6	4	6	5	8	5	5	22.9
SBAC	SBA COMMUNICATIONS CORP	165.68	9	na	na	na	na	2	na	3	8	4	1	5	7	9	3	4	6	19.6
ELS	EQUITY LIFESTYLE PROPERTIES	89.27	8	na	na	9	na	9	na	5	4	5	4	4	5	7	9	5	6	7.8
IRM	IRON MOUNTAIN INC	40.92	7	na	na	4	na	8	na	7	4	1	4	4	9	6	8	5	7	10.9
NIN	NATIONAL RETAIL PROPERTIES	42.40	6	na	na	7	na	9	na	9	6	8	7	9	9	6	6	5	7	6.4
CCI	CROWN CASTLE INTL CORP	110.48	9	na	na	7	na	10	na	8	6	3	6	6	6	9	6	5	8	44.9
DRE	DUKE REALTY CORP	28.91	10	na	na	8	na	7	na	2	1	6	4	4	8	3	9	8	8	10.3
SUI	SUN COMMUNITIES INC	93.06	9	na	na	6	na	10	na	10	2	4	4	4	8	10	8	8	8	7.4
SPC	SIMON PROPERTY GROUP INC	159.01	5	na	na	9	na	4	na	4	7	6	9	6	6	10	4	9	9	56.9
DLR	DIGITAL REALTY TRUST INC	117.41	9	na	na	7	na	10	na	10	8	2	4	7	3	1	8	6	9	24.1
O	REALTY INCOME CORP	56.12	7	na	na	8	na	10	na	9	2	5	8	6	8	3	8	8	9	15.8
ACC	AMERICAN CAMPUS COMMUNITIES	41.91	7	na	na	9	na	9	na	7	5	6	9	5	4	2	8	9	9	5.7
REG	REGENCY CENTERS CORP	67.19	9	na	na	5	na	10	na	8	6	4	8	10	10	1	8	9	10	11.4
FRT	FEDERAL REALTY INVESTMENT TR	131.24	8	na	na	7	na	na	na	9	6	3	8	7	10	9	8	10	10	9.5
Energy																				
TRP	TRANSCANADA CORP	\$49.62	3	9	10	6	9	2	10	5	3	1	6	1	9	5	6	8	6	\$43.4
Telecommunications																				
RCI	ROGERS COMMUNICATIONS -CL B	\$54.19	3	5	3	3	2	5	4	4	1	3	3	1	9	1	2	3	1	\$27.9
BCE	BCE INC	48.25	2	4	5	4	6	6	3	9	1	2	5	1	9	3	3	7	2	43.5
TU	TELUS CORP	38.06	2	9	9	4	7	6	9	8	1	3	4	1	8	4	3	7	2	22.6

Source: Empirical Research Partners Analysis.

**Appendix 1 (cont.): Large-Capitalization Bond Surrogates Stocks
Failure Model Ranks
Sorted By Rank and Market Capitalization Within Sector
As of Late-November 2017**

Symbol	Company	Valuation				Capital Deployment and Financing				Earnings Quality				Market Reaction				Market Structure			
		Price	Yield	Free Cash Flow-to-Enterprise Value	P/E Ratio	Capital Spending Growth	Inventory Growth	Change in Common Shares Outstanding	Free Cash Flow Margin	Change in Net Current Assets	Arbitrage Risk (1=Lowest, 10=Highest)	Downside Risk	Nine-Month Price Trend	Share Turnover	Technical Indicator	Nine-Month Change in Short Interest	Sector ETF Flows and Equivalent Volume	Core Model	Failure Model Rank	Market Capitalization (\$ Billion)	
																					Gross Cash Flow Yield
AES	AES CORP	\$10.60	1	4	na	6	3	na	na	6	3	8	8	7	6	8	1	1	\$7.0		
ETR	ENERGY CORP	85.65	1	10	na	4	4	na	na	4	2	3	6	4	2	8	3	2	15.4		
WEC	WEC ENERGY GROUP INC	67.98	3	8	na	4	7	na	7	na	2	3	5	1	3	5	7	3	21.5		
EIX	EDISON INTERNATIONAL	80.43	2	9	na	3	4	na	9	na	2	6	6	6	3	9	6	4	26.2		
AEE	AMEREN CORP	63.16	2	9	na	7	5	na	9	na	2	3	6	6	5	9	6	4	15.3		
UGI	UGI CORP	47.70	2	6	na	na	8	na	7	na	1	4	3	4	3	7	7	4	8.3		
NEE	NEXTERA ENERGY INC	155.92	4	9	na	5	7	na	6	na	3	3	3	8	2	9	6	5	73.3		
PCG	PG&E CORP	52.65	1	8	na	3	4	na	9	na	2	1	6	1	7	8	4	5	27.1		
PEG	PUBLIC SERVICE ENTERPRISE GROUP INC	51.57	2	10	na	4	6	na	5	na	2	3	5	9	7	9	7	5	26.1		
XEL	XCEL ENERGY INC	50.59	2	9	na	6	3	na	9	na	1	5	3	6	7	9	7	5	25.7		
FTS	FORTIS INC	37.09	2	9	na	3	9	na	10	na	1	4	1	6	na	5	8	5	15.6		
DUK	DUKE ENERGY CORP	88.66	3	10	na	6	7	na	9	na	1	3	4	3	5	9	9	6	62.1		
AEP	AMERICAN ELECTRIC POWER CO	76.44	3	10	na	5	7	na	10	na	2	5	4	7	7	9	6	6	37.6		
ED	CONSOLIDATED EDISON INC	86.00	2	10	na	5	6	na	9	na	2	4	4	3	5	9	8	6	26.7		
ES	EVERSOURCE ENERGY	63.84	3	9	na	6	7	na	5	na	2	4	4	4	6	10	9	6	20.2		
CMS	CMS ENERGY CORP	49.41	2	9	na	6	4	na	8	na	2	5	6	7	8	9	8	6	13.9		
ATO	ATMOS ENERGY CORP	89.11	4	10	na	6	6	na	9	na	1	5	4	2	4	5	10	6	9.5		
DTE	DTE ENERGY CO	112.23	4	10	na	6	8	na	9	na	2	3	4	7	8	9	9	7	20.1		
AWK	AMERICAN WATER WORKS CO INC	88.38	4	9	na	8	5	na	10	na	2	4	4	5	5	9	9	7	16.1		
PNW	PINNACLE WEST CAPITAL CORP	89.35	3	10	na	5	4	na	7	na	2	6	6	6	6	9	9	7	10.0		
NI	NISOURCE INC	27.09	4	10	na	8	4	na	9	na	2	4	3	7	3	9	9	7	9.1		
D	DOMINION ENERGY INC	81.15	4	10	na	6	3	na	10	na	2	3	5	6	2	9	10	8	52.3		
SO	SOUTHERN CO	51.18	2	10	na	5	7	na	9	na	2	4	4	2	6	9	8	8	51.4		
SRE	SEMPRA ENERGY	118.80	3	10	na	6	5	na	7	na	2	4	4	5	8	9	10	8	29.8		
LNT	ALLIANT ENERGY CORP	44.26	3	10	na	6	8	na	9	na	2	4	4	6	7	9	10	8	10.2		

Source: Empirical Research Partners Analysis.