Empirical Research Partners

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Portfolio Strategy January 2019

Correlations Gone Wild: Looking for Opportunities

Earnings Expectations: Plausible?

When Stocks Become Asset Classes

- Correlations across the equity market spiked in the final quarter of last year, consistent with their behavior in other stressful periods. We count 21 episodes of high stress since 1950 and equities produced above-trend returns in the next year following 19 of them, with those in 1973 and 2007 the exceptions. The latest spike was the fourth big one in a decade, and all of them had to do with concerns about the sustainability of the world economic order. Correlations are a fear gauge worth watching.
- We examined the spikes within in a variety of cohorts we follow including top-line and Big Growers, value stocks, controversial issues, highly-indebted companies and the favorites of hedge funds and ETF investors. Our aim was to identify where the fear was palpable. The increase in correlations in the fourth quarter has thus far foretold the size of the bounce in January. We found that the greatest increase was among the top-line growers, with growth measured on a trailing four-quarter basis, and among companies with the largest increases in capital spending. In particular, within those two groupings the most-controversial stocks (i.e., those with high arbitrage risk in them) behaved as homogenous asset classes. E&P, semiconductor, biotech and internet service stocks are prominent among the controversial top-line growers, and in the first two cases, the market believes the fundamentals of the last year are unlikely to be repeated any time soon. Appendix 1 on page 11 lists stocks present in the highest quintiles of both revenue growth and arbitrage risk.

Earnings Expectations: Plausible?

- Analysts are forecasting a +4% rise in S&P 500 pre-tax earnings this year on a +4% increase in core revenues (i.e., excluding the commodity sectors). Single-digit earnings gains were a rarity before the current expansion, occurring only seven times in 50 years. The operating leverage of the system was such that earnings either grew by double-digits amounts or were down. In 2012, 2014 and 2016 though single-digit gains did materialize, and we looked into whether that's a sensible expectation for 2019.
- This year's comparisons are difficult because last year the tax bill fostered a short-lived capital spending boom that boosted the top line. The revenues of tech hardware, the sector that's driven the market's operating leverage in the last few years, are expected to decline. Earnings revisions and preannouncements look like what went on in 2016 and 2017, and so far the response to cuts doesn't resemble what's been seen in the run up to recessions. It's looked like business as usual.
- One positive we see is that capital spending growth is set to roll over. Last year the market punished companies that ramped up expenditures, with the exception of the FAANGs. Demand has simply not been strong enough to convince investors that in general the spending will pay off. A reduction in outlays should matter most in the semiconductor and E&P spaces.
- Analysts have a poor track record in predicting recessions, failing to call any of the last three. The current expectations are consistent with a slowly-growing global economy. The outcome of the trade war is the most important unknown, and we, like the market, have put the odds at about 60:40 in favor of a resolution of it.

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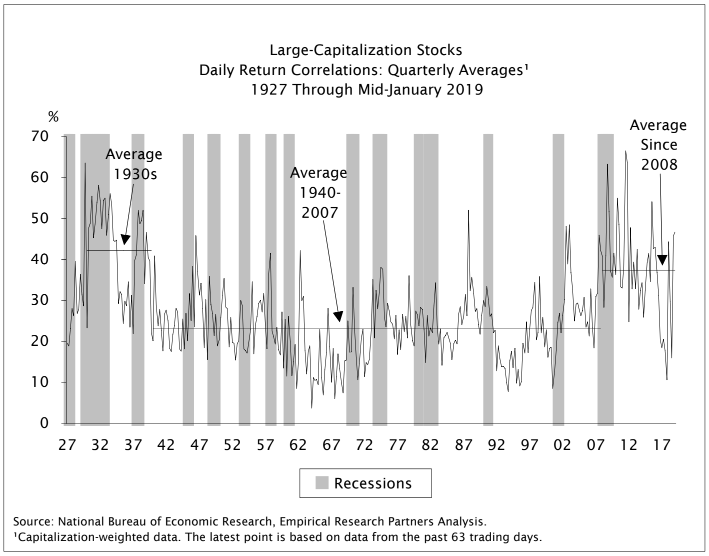
Conclusions in Brief

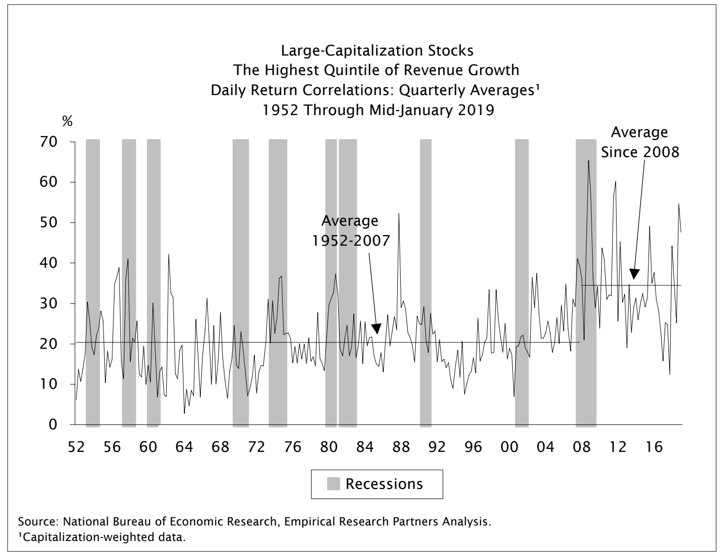
- In the fourth quarter correlations spiked across the market…



Large-Capitalization Stocks
Daily Return Correlations: Quarterly Averages[1]
1927 Through Mid-January 2019

Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1]Capitalization-weighted data. The latest point is based on data from the past 63 trading days.

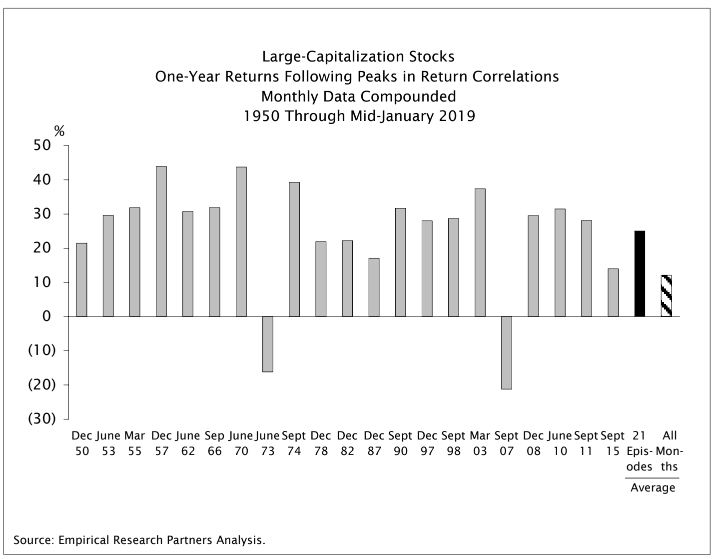
- …By most among the Big Top-Line Growers:



Large-Capitalization Stocks
The Highest Quintile of Revenue Growth
Daily Return Correlations: Quarterly Averages[1]
1952 Through Mid-January 2019

Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1]Capitalization-weighted data.

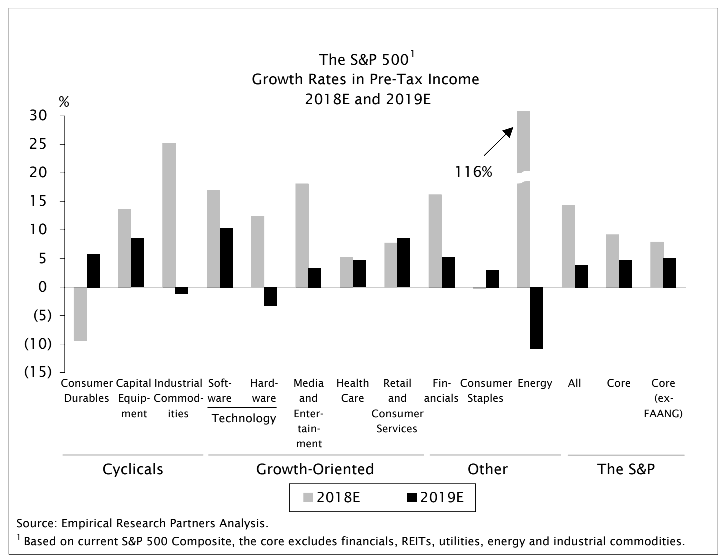
- Such spikes have usually been a bullish sign:



Large-Capitalization Stocks
One-Year Returns Following Peaks in Return Correlations
Monthly Data Compounded
1950 Through Mid-January 2019

Source: Empirical Research Partners Analysis.

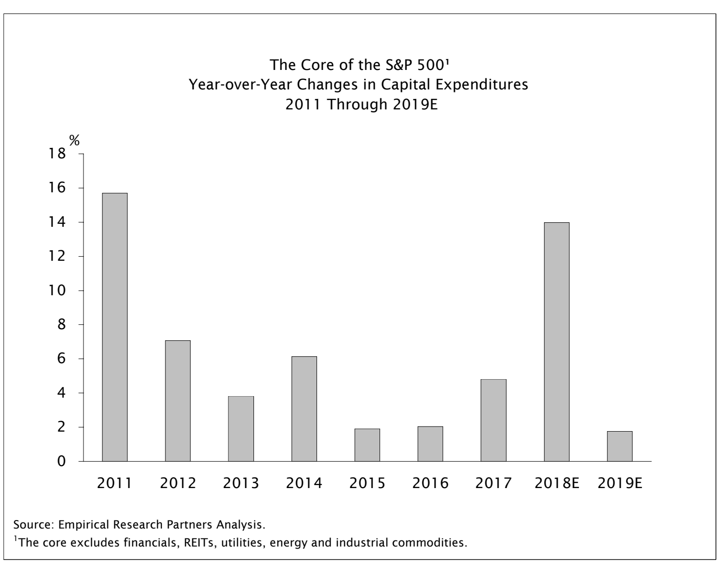
- The earnings expectations for 2019 are plausible…



The S&P 500[1]
Growth Rates in Pre-Tax Income
2018E and 2019E

Source: Empirical Research Partners Analysis.
[1] Based on current S&P 500 Composite, the core excludes financials, REITs, utilities, energy and industrial commodities.

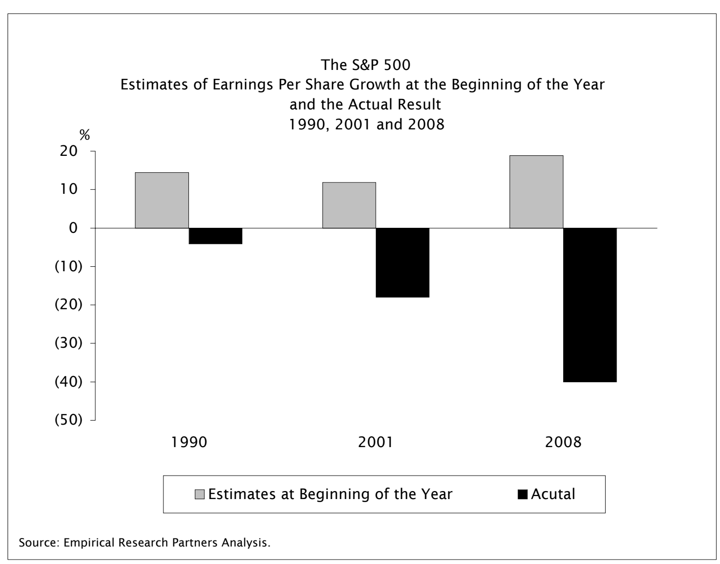
- …With capital spending growth forecast to roll over:



The Core of the S&P 500[1]
Year-over-Year Changes in Capital Expenditures
2011 Through 2019E

Source: Empirical Research Partners Analysis.
[1]The core excludes financials, REITs, utilities, energy and industrial commodities.

- Analysts haven't called recessions:



The S&P 500
Estimates of Earnings Per Share Growth at the Beginning of the Year
and the Actual Result
1990, 2001 and 2008

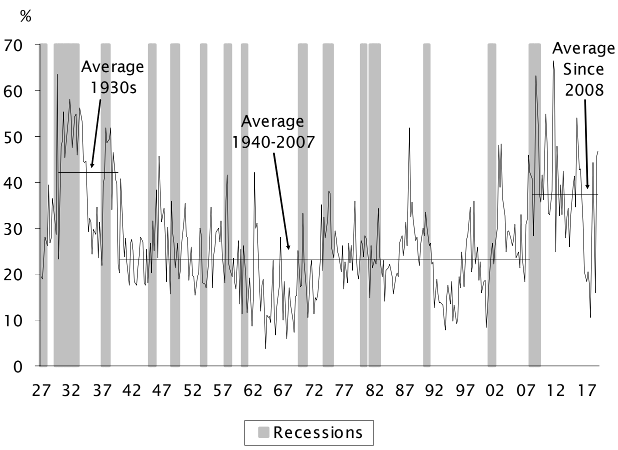
Source: Empirical Research Partners Analysis.

Correlations Gone Wild: Sizing the Opportunities

When Stocks Become Asset Classes

The correlation among the daily returns of U.S. large-cap equities has averaged 37% in the ten years since the financial crisis, a reading that's 1.6 times the average from 1940 through 2007 (see Exhibit 1). In the 1930s, a decade that included the Great Depression and a smaller one seven years later, the average correlation was 42%. It's not an apples-to-apples comparison though because back then the large-cap market consisted of around 340 issues, less than half the current population and given that we'd expect to see higher correlations. The greater co-movement in the last decade seems to represent a new normal, such that global macro forces bind companies together, for better or worse. The players in the market and the instruments at their disposal have something to do with the results too.

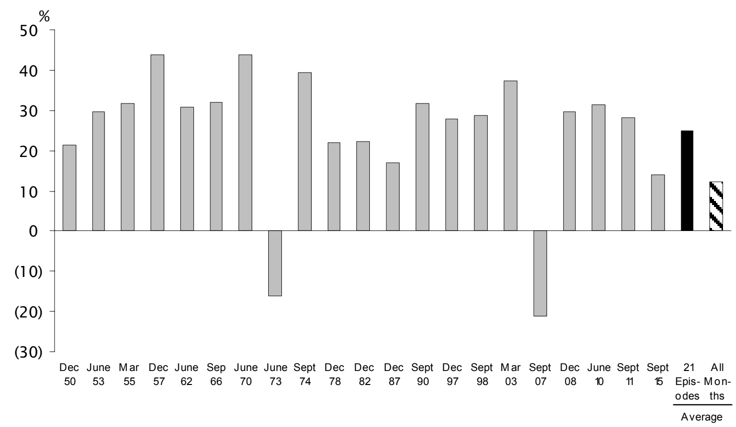
Exhibit 1: Large-Capitalization Stocks
Daily Return Correlations:
Quarterly Averages[1]
1927 Through Mid-January 2019



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

[1]Capitalization-weighted data. The latest point is based on data from the past 63 trading days.

Exhibit 2: Large-Capitalization Stocks
One-Year Nominal Returns Following Peaks in Correlations
Monthly Data Compounded
1950 Through Mid-January 2019



Source: Empirical Research Partners Analysis.

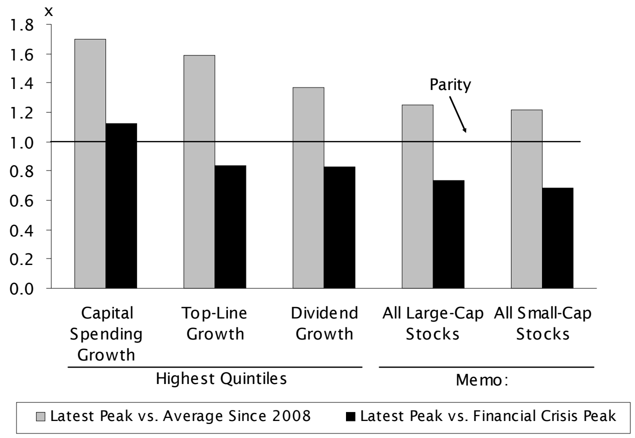
Correlations have spiked episodically, usually when something was going seriously wrong. For example they did so when President Kennedy went to war with the management of U.S. Steel back in 1962, and again in the final quarter of last year, when President Trump did the same with China.[1] The level of correlations tells us something about the intensity of the anxiety investors feel. The largest spikes came during depressions of the 1930s, the financial crisis of 2008 and the European debt crisis that followed. In general the worries that draw stocks together abate quickly and the performance of the market in the following year has been above normal most of the time (see Exhibit 2). The exceptions were during the first oil shock of the 1970s and the financial crisis of 2008.

We thought it could be useful to examine the recent peaks in correlations within some of the frameworks we employ. We evaluated them relative to the average readings of the past decade and vis-à-vis the peaks witnessed in the panic of 2008. The idea was that correlations represent a fear gauge. It can help us understand where we can get the biggest bang for our buck when betting against the prevailing concerns.

This time around the extremes in correlations were concentrated in stocks with big trailing growth rates, in either the top line or capital spending (see Exhibit 3). Most were highly valued, and some, including the E&P and semiconductor issues had big up cycles that at the moment appear to be over. The latest peaks were more than 50% above the post-Crisis averages. Exhibit 4 presents the time series of the correlations since 1952 for the stocks in the top quintile of revenue growth. The latest move up was greater than that seen during 2015 and 2016, when worries about the validity of the Chinese system came to a boil, although it's shy of what went on during the European debt crisis of 2011 and 2012.

[1]*Portfolio Strategy* December 2018. "Where We Stand: Fragility."

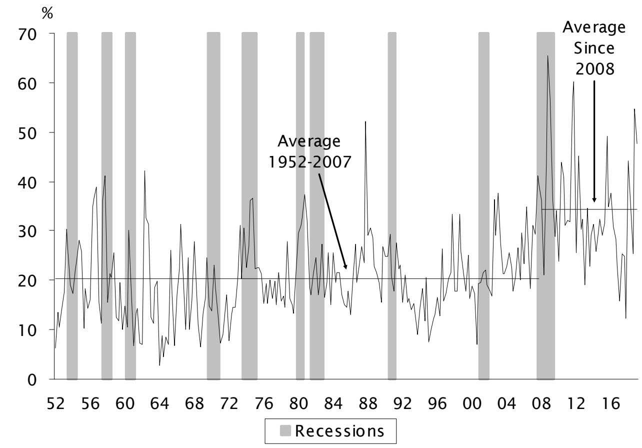
Exhibit 3: Large-Capitalization Stocks
Daily Return Correlations of High Growth Issues: Quarterly Averages¹
Latest Peak Versus the Average Since 2008 and the Financial Crisis Peak
2008 Through Mid-January 2019



Source: Empirical Research Partners Analysis.

¹Capitalization-weighted data. The latest point is based on data from the past 63 trading days.

Exhibit 4: Large-Capitalization Stocks
The Highest Quintile of Revenue Growth Daily Return Correlations: Quarterly Averages¹
1952 Through Mid-January 2019



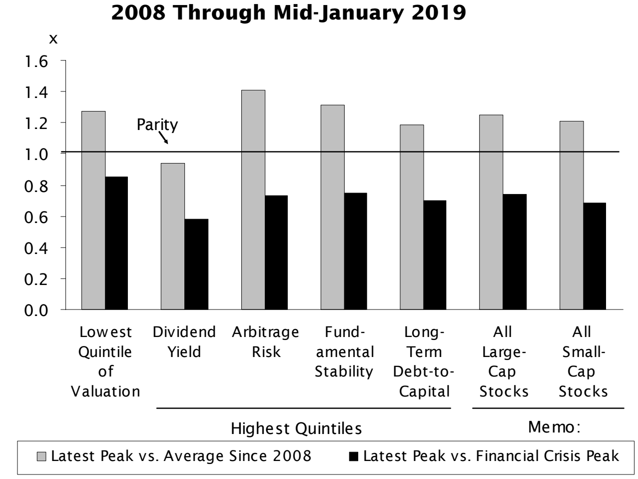
Source: National Bureau of Economic Research, Empirical Research Partners Analysis.

¹Capitalization-weighted data.

We also examined correlations within our frameworks that measure controversy and valuation. Those results were somewhat less provocative, and the greatest extreme was in stocks with high arbitrage risk, where stock price volatility in the last three months has been far greater than what would have been expected based on their betas (see Exhibit 5). We studied that dynamic in some recent research.[2]

Finally, we looked into whether the composition of stock ownership helps us understand what's been going on. We found it didn't, and the changes in the return correlations among the longs and shorts of fundamental and quant hedge funds look like those for the market as a whole (see Exhibit 6). Drawing upon our framework that measures flows into sector ETFs didn't tell us much this time either. What happened last year had to do with concerns about fundamentals, particularly in oil, and the vulnerability of stocks with high multiples.

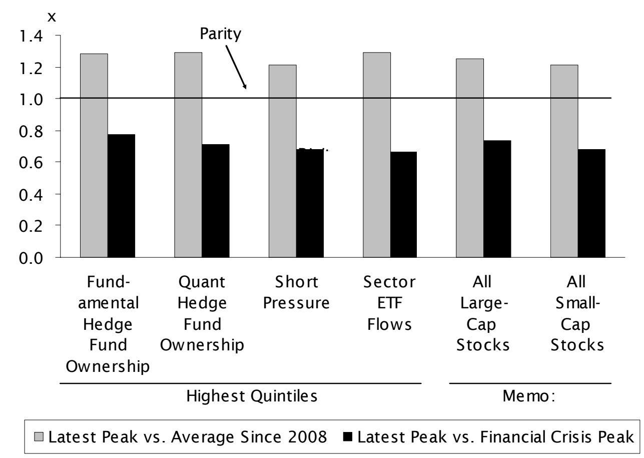
Exhibit 5: Large-Capitalization Stocks
Daily Return Correlations of Controversial and Stable Issues: Quarterly Averages¹
Latest Peak Versus the Average Since 2008 and the Financial Crisis Peak
2008 Through Mid-January 2019



Source: Empirical Research Partners Analysis.

¹Capitalization-weighted data. The latest point is based on data from the past 63 trading days.

Exhibit 6: Large-Capitalization Stocks
Daily Return Correlations of Hedge Fund Favorites, Long and Short: Quarterly Averages¹
Latest Peak Versus the Average Since 2008 and the Financial Crisis Peak
2008 Through Mid-January 2019



Source: Empirical Research Partners Analysis.

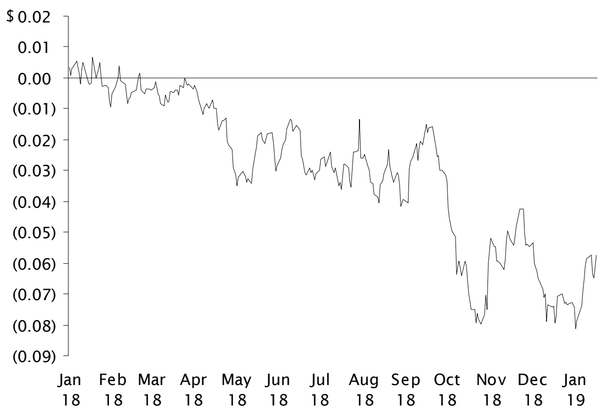
¹Capitalization-weighted data. The latest point is based on data from the past 63 trading days.

²*Portfolio Strategy* January 2019. "The Sum of All Fears – The Pricing of Controversy Around the World."

Conclusion: Controversial Growth Stocks Constitute the Tail

We've thought that the countervailing forces to the very-negative sentiment would involve a friendlier Fed, signs of progress on trade and better housing data. We've had a good amount of the first and some of the second (see Exhibit 7). As for housing, mortgage rates have retraced half of their rise and there are some signs that activity could be bottoming (see Exhibit 8). We expect that given the psychology of home buyers the decline in borrowing costs should spur activity, as they buy on the dip.

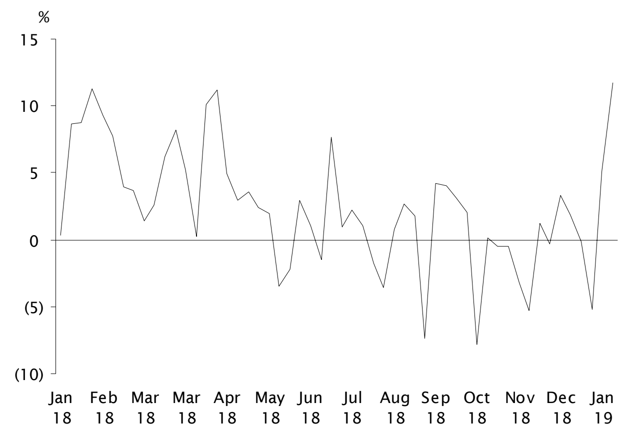
Exhibit 7: Large-Capitalization Stocks
With Significant Supply Chain Imports from China
Relative Growth of a Dollar[1]
2018 Through Mid-January 2019



Source: Empirical Research Partners Analysis.

[1]Capitalization-weighted data for the market and equally-weighted data for Importers from China.

Exhibit 8: Purchase Mortgage Application Index[1]
Year-over-Year Changes
2018 Through Mid-January 2019



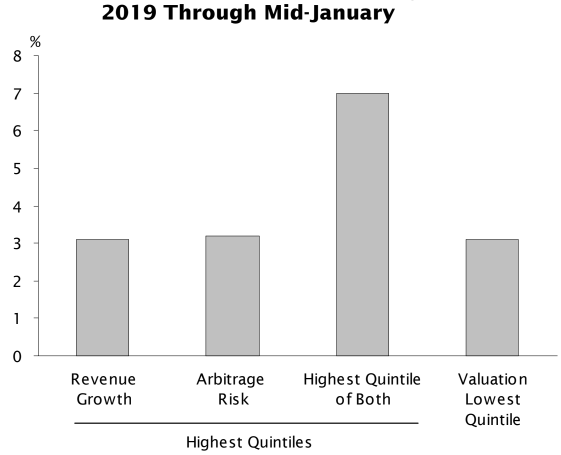
Source: Mortgage Bankers Association.

[1]Purchase index measures mortgage loan application volume based on purchasing.

The stocks that saw their correlations rise by most in the final quarter of last year have outperformed in this year's rally (see Exhibit 9). Consistent with our earlier analyses controversial top-line growers have fared best, leading by +7 percentage points.

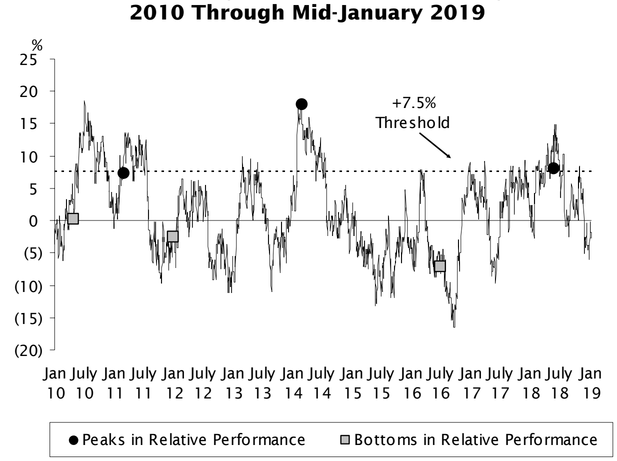
We track the share of the big top-line growers that are surrounded by controversy (i.e., rank in the highest quintile of arbitrage risk). A spike in that share signals that something is going on and when that happens it's generally not good, with a spike above +7.5 percentage points the critical threshold. When growth is high there's a lot that can go wrong. We moved decisively above that level in the second quarter of last year (see Exhibit 10). A decline in representation in the controversial issues of around (5) points has coincided with bottoms, and we reached that point in December. Appendix 1 on page 11 presents today's controversial top-line growth group that includes a good number of energy issues, that for the most part have stopped growing.

Exhibit 9: Large-Capitalization Stocks
Relative Returns of High-Growth and
Controversial Issues
Measured on an Equally-Weighted Basis
2019 Through Mid-January



Source: Empirical Research Partners Analysis.

Exhibit 10: Large-Capitalization Stocks
The Best Quintile of Top-Line Growth
Six-Month Change in the Share Represented
in the Highest Quintile of Arbitrage Risk
2010 Through Mid-January 2019



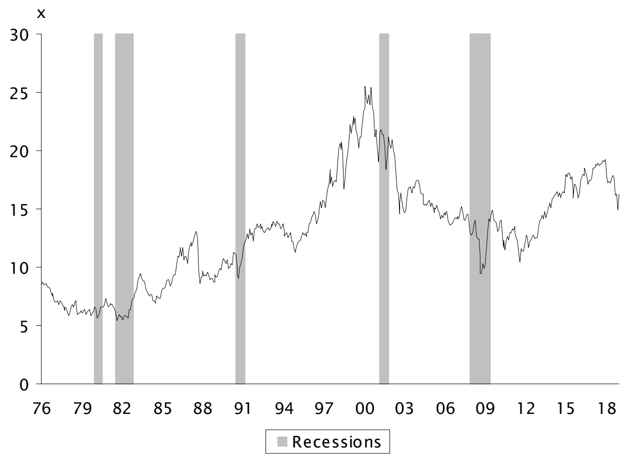
Source: Empirical Research Partners Analysis.

Earnings Expectations: Sensible?

Tough Comparisons, on Multiple Fronts

There are concerns that earnings expectations for 2019 are much too high and that a deceleration in top-line growth will have dire consequences. After all, operating leverage can cut both ways. The sharp decline in the forward multiple of the market that occurred last year was in part rooted in the apprehension about the legitimacy of the estimates (see Exhibit 11). In this research we'll examine whether they're plausible.

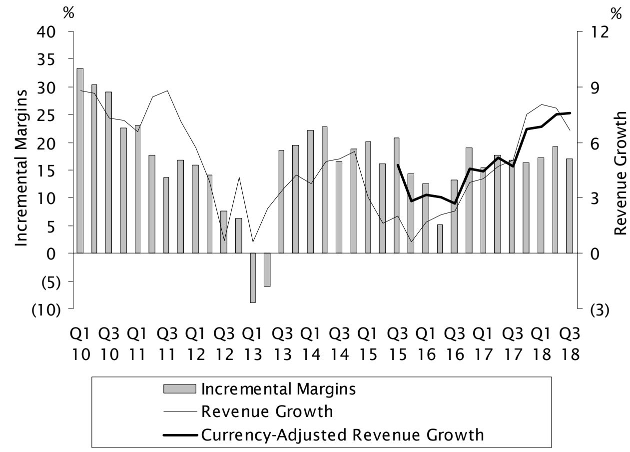
Exhibit 11: Large-Capitalization Stocks Forward-P/E Ratios[1] 1976 Through Mid-January 2019



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

[1]Capitalization-weighted data.

Exhibit 12: The Core of the S&P 500[1] Incremental Pre-Tax Margins and Revenue Growth Rates 2010 Through Q3 2018

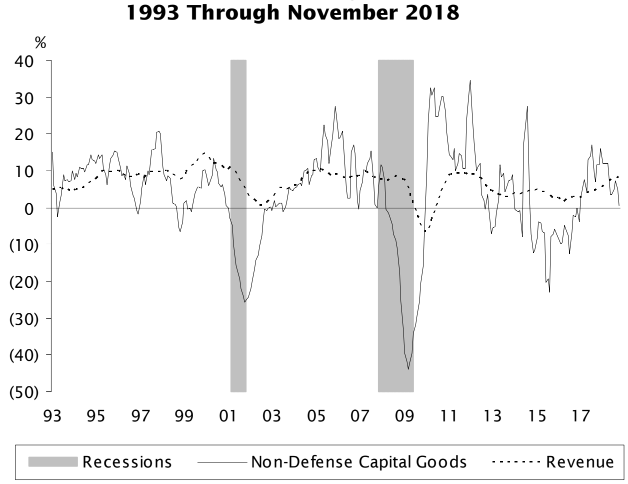


Source: Corporate Reports, Empirical Research Partners Analysis.

[1]The core excludes financials, REITs, utilities, energy and industrial commodities.

There are good reasons to be skeptical about the earnings forecasts and the comparisons are exceptionally difficult. Last year revenue growth for the core of the market (i.e., excluding the commodity sectors) was about +200 basis points better than in 2017, on both a reported and currency-adjusted basis (see Exhibit 12). The stimulus created by the tax bill ultimately showed up in demand for both consumer and capital goods. That increase in the top line created positive leverage and incremental pre-tax margins improved by nearly +2 percentage points. It took a big deficit-funded package to foster margin improvement in what appears to be a mature profit cycle.

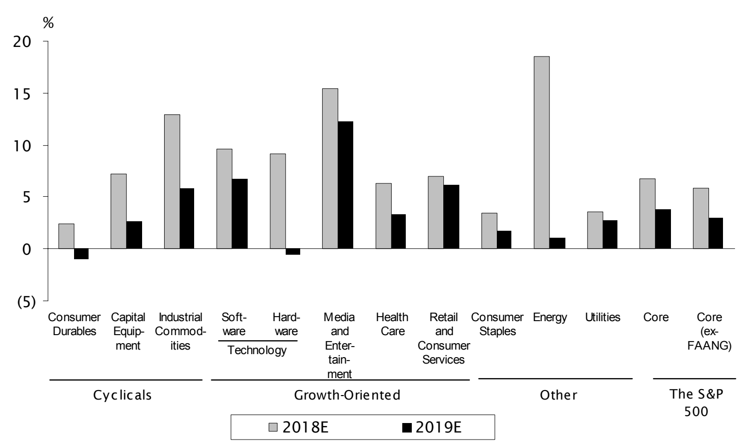
Exhibit 13: New Orders for Non-Defense Capital Goods and Revenue of Large-Cap "Core" Stocks Year-over-Year Changes[1] 1993 Through November 2018



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

[1]Data smoothed on a trailing three-month basis.

Exhibit 14: The S&P 500[1] Growth Rates in Revenues 2018E and 2019E

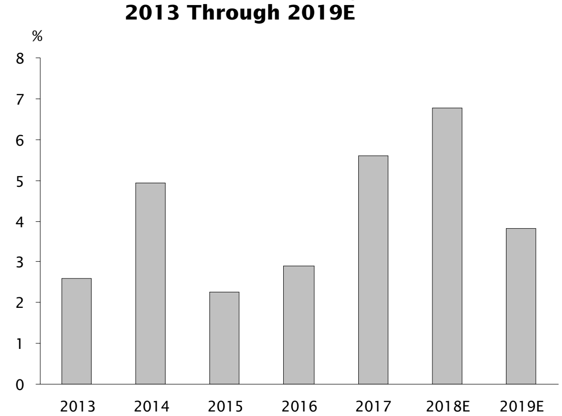


Source: Empirical Research Partners Analysis.

[1]Based on current S&P 500 composite excluding financials and REITs.

It seems likely that the fundamentals will be less cooperative this year. Much of the variation in top-line growth is tied to the trajectory of capital spending, that's far more volatile than the economy itself. Exhibit 13 (overleaf) compares the rate of change in domestic non-defense capital goods orders to that for the revenue line of the core of the market. The 2017 tax bill created a one-time pop in those expenditures, that, consistent with precedents, looks like it's run its course. The fall off in orders has not been lost on the analyst community and they're forecasting a (10) percentage point deceleration in revenue growth in the tech hardware sector, and a (5.5) point reduction for industrial capital goods manufacturers (see Exhibit 14 overleaf). The revenue growth rate for the entire core of the market is expected to halve this year. The forecast resembles what was going on earlier in the expansion: sluggish economic growth and low inflation (see Exhibit 15). Given the worries already priced into the market, that outcome would be a bullish one.

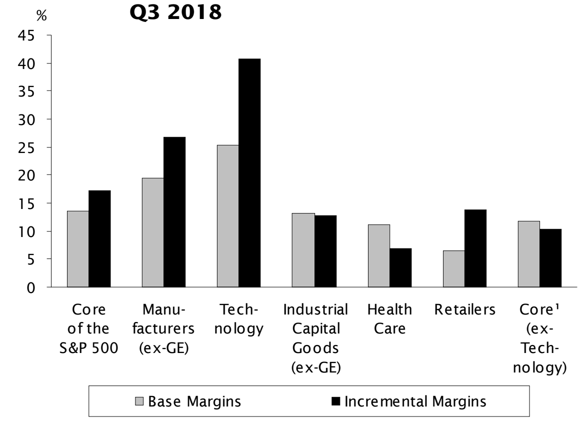
Exhibit 15: The Core of the S&P 500
Year-over-Year Changes in Revenues[1]
2013 Through 2019E



Source: Empirical Research Partners Analysis.

[1]The core excludes financials, REITs, utilities, energy and industrial commodities.

Exhibit 16: The S&P 500
The Core, Manufacturers and Select Sectors[1]
Base and Incremental Pre-Tax Margins
Q3 2018

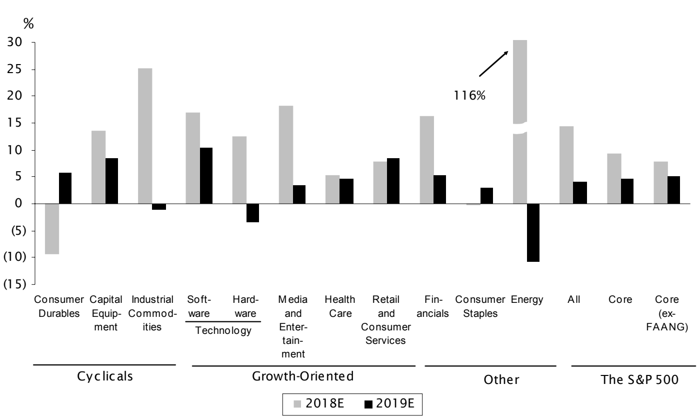


Source: Empirical Research Partners Analysis.

[1]The core excludes financials, REITs, utilities, energy and industrial commodities.

An obvious concern is that not only is the decline in revenue growth being underestimated by analysts, so too is the operating leverage of the system itself. As we've pointed out many times the technology sector has been the driver of that leverage and as goes tech demand goes the market. That has remained the case and Exhibit 16 presents the third-quarter statistics. Not only have semiconductor, hardware and software businesses demonstrated strong operating leverage, their earnings now constitute almost a quarter of those of the S&P 500. Substantial deceleration in the growth rate of pre-tax earnings is already penciled in for tech hardware, as we're on the wrong side of what were big cycles for semis and storage, and as the demand for high-end smart phones softened, Apple stumbled **(see Exhibit 17**). The FAANG stocks are a contributor to the slowdown.

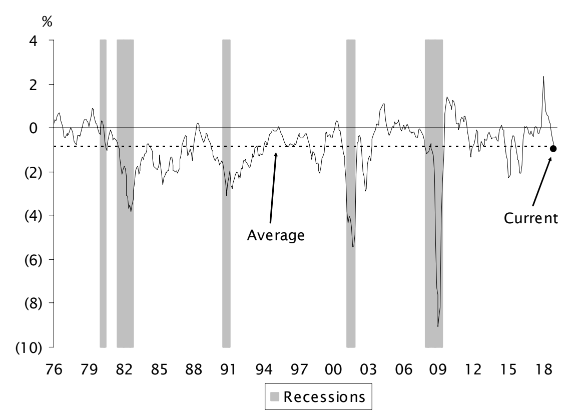
Exhibit 17: The S&P 500[1]
Growth Rates in Pre-Tax Income
2018E and 2019E



Source: Empirical Research Partners Analysis.

[1]Based on current S&P 500 Composite, the core excludes financials, REITs, utilities, energy and industrial commodities.

Exhibit 18: Large Capitalization Stocks
Average Monthly Earnings Revision[1]
1976 Through Mid-January 2019



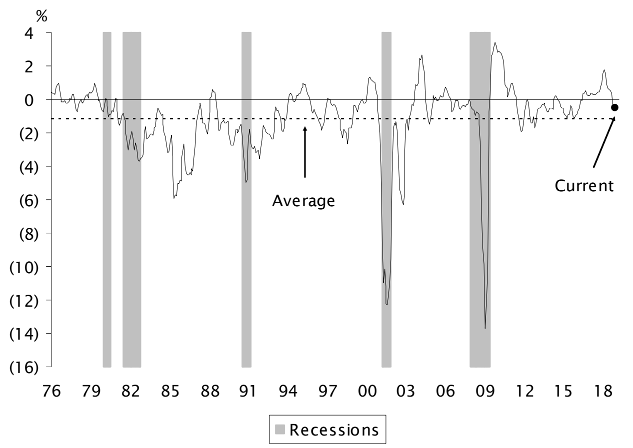
Source: I/B/E/S, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Equally-weighted data smoothed on a trailing three-month basis.

Analysts Assume a Soft Landing

The tenor of the guidance embodied in analyst estimates looks like a return to trend economic growth rather than anticipation of a real turning point. Expectations came under pressure beginning in October. Exhibit 18 (overleaf) depicts the average monthly earnings revision across the large-cap market, on an equally-weighted basis, while Exhibit 19 does the same for the tech sector. The trend has continued to weaken this month, and the preannouncement data conveys much the same story, a return to the pre-stimulus status quo (see Exhibits 20 and 21). The fact that managements are guiding analysts to a soft(ish) landing scenario doesn't mean it's correct. Rather, as usual, they're forecasting a continuation of the fundamentals of the moment.

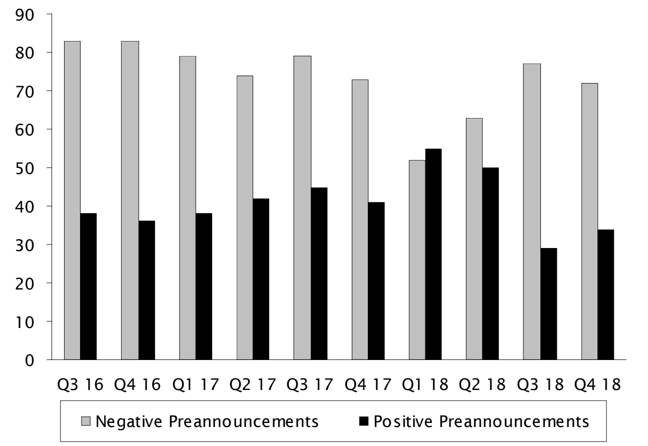
Exhibit 19: Large Capitalization Technology Stocks
Average Monthly Earnings Revision[1]
1976 Through Mid-January 2019



Source: I/B/E/S, National Bureau of Economic Research, Empirical Research Partners Analysis.

[1]Equally-weighted data smoothed on a trailing three-month basis.

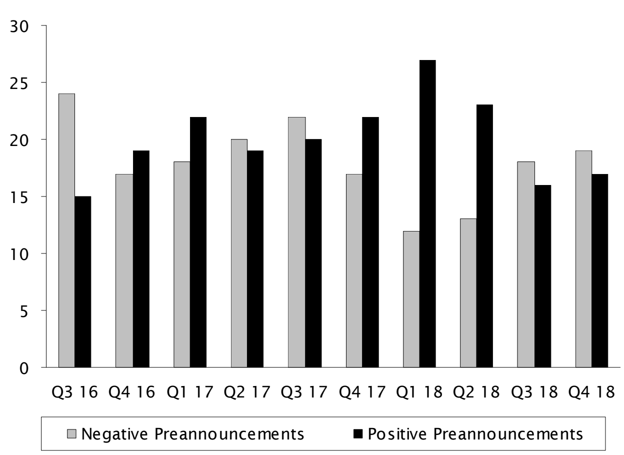
Exhibit 20: The S&P 500
Number of Negative and Positive Earnings Preannouncements
Q3 2016 Through Q4 2018E



Source: FactSet Research Systems, Empirical Research Partners Analysis.

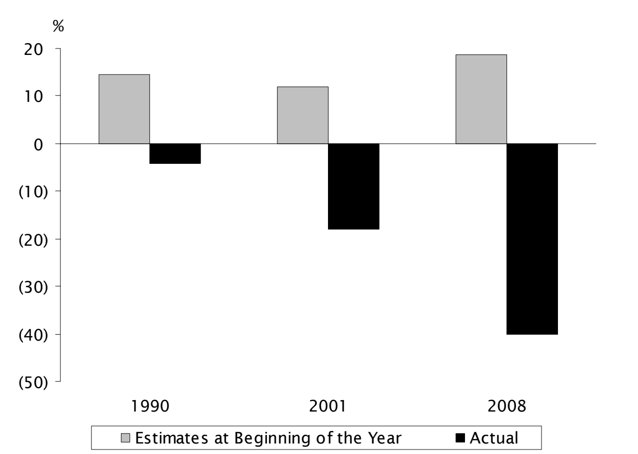
We examined what analysts were thinking at the outset of the years right before the last three recessions. As apparent in Exhibit 22 they never saw it coming. Many other indicators proved more useful. It's noteworthy that in recent months investors haven't reacted strongly to their behavior as they typically do when the economic data convinces them that real trouble is around the corner (see Exhibits 23 and 24). Rather they've sold companies with rising estimates, a composite that's been dominated by cyclicals. The market's violent sell-off in the fourth quarter was the anticipation of a turning point, that's not yet arrived.

Exhibit 21: The S&P 500 Technology Constituents
Number of Negative and Positive Earnings Preannouncements
Q3 2016 Through Q4 2018E



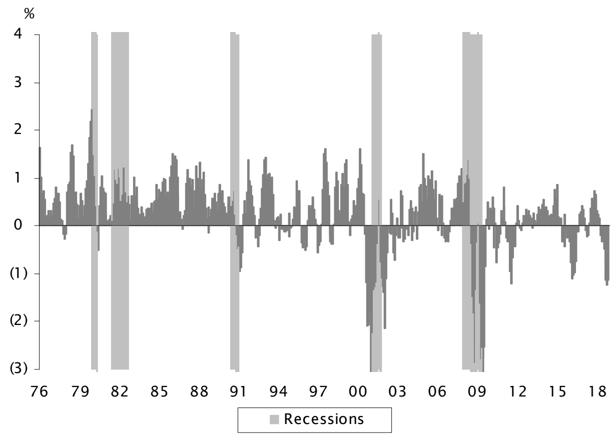
Source: FactSet Research Systems, Empirical Research Partners Analysis.

Exhibit 22: The S&P 500
Estimates of Earnings Per Share Growth at the Beginning of the Year and the Actual Result
1990, 2001 and 2008



Source: Empirical Research Partners Analysis.

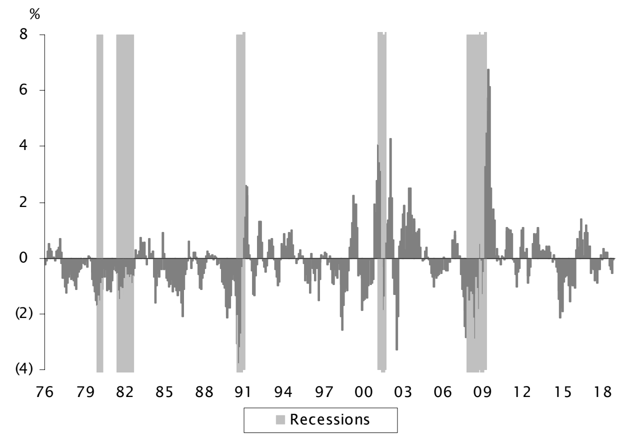
Exhibit 23: Large-Capitalization Stocks
Relative Returns to the Best Quintile of Earnings Revisions
Measured Over One-Month Holding Periods[1]
1976 Through Mid-January 2019



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

[1]Data smoothed on a trailing three-month basis.

Exhibit 24: Large-Capitalization Stocks
Relative Returns to the Worst Quintile of Earnings Revisions
Measured Over One-Month Holding Periods[1]
1976 Through Mid-January 2019



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

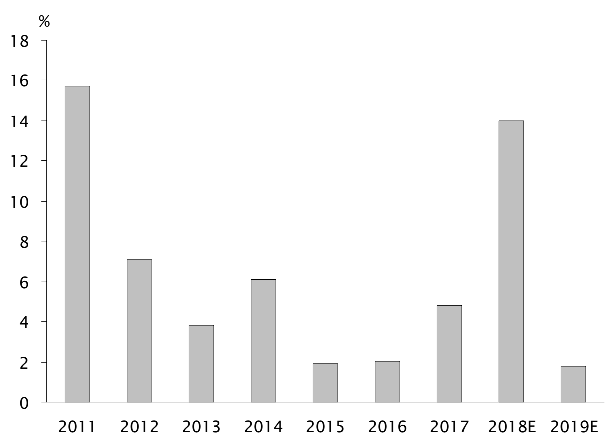
[1]Data smoothed on a trailing three-month basis.

Less Capital Spending Growth is a Positive

One positive aspect of slower growth is that the capital spending of public companies is set to decelerate markedly. Analysts are forecasting a minimal increase in outlays after a mid-teens one in 2018 (see Exhibit 25). The argument that last year's increase represented a one-time tax-law-driven pop, rather than a rebirth of animal spirits, is buoyed by the forecasts of sharp declines nearly across the board (see Exhibit 26). Outlays are expected to contract in the tech hardware and industrial capital goods, the sectors most exposed to the trade war with China.

All of that matters because investors have remained capital spending-phobic, believing as we do that every dollar spent carries greater consequences than in the past (see Exhibit 27). Price inflation for capital goods has lagged far behind that for other items and as a result a dollar goes further than it used to, particularly when robots end up on the plant floor. Given that, a high level of expenditures can, with a lag, lead to overcapacity and lower profit margins. The end of the capital spending boom is positive for multiples, particularly in highly-cyclical businesses like semiconductors and E&P.

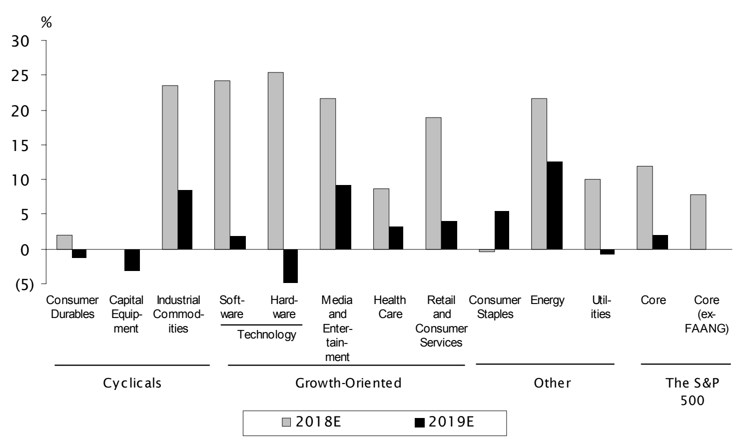
Exhibit 25: The Core of the S&P 500[1]
Growth in Capital Spending
Measured on a Year-over-Year Basis
2011 Through 2019E



Source: Empirical Research Partners Analysis.

[1]The core excludes financials, REITs, utilities, energy and industrial commodities.

Exhibit 26: The S&P 500[1]
Growth Rates in Capital Spending
2018E and 2019E



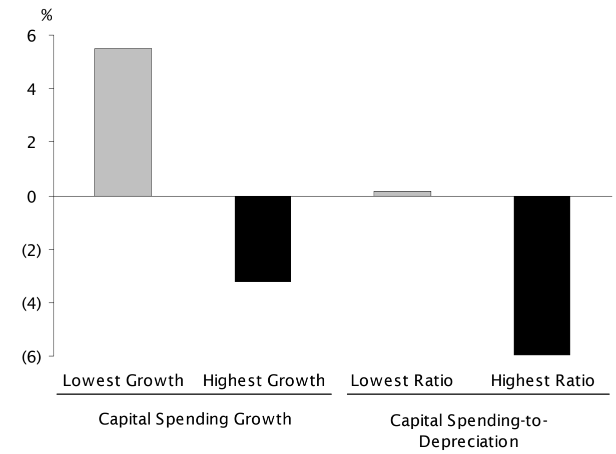
Source: Empirical Research Partners Analysis.

[1]Based on current S&P 500 composite excluding financials and REITs.

Conclusion: The Odds Favor the Extremes

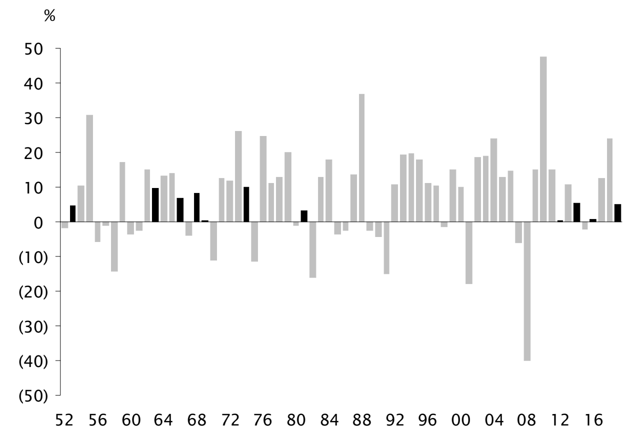
The consensus expectations for 2019 S&P 500 earnings growth are for a mid-single-digit increase, a forecast that at face value looks plausible. However history doesn't suggest that the odds favor that outcome. The leverage of the system is such that earnings are usually either up by double-digit amounts or down. Exhibit 28 presents S&P 500 earnings growth beginning in early-1950s. In the era of globalization that began around 25 years ago there've been only a couple of occasions (shown in black) when earnings grew at single-digit rates or were flat: in 2012, 2014 and 2016. The bottom line is that this year's numbers don't look ambitious but could easily turn out to be far off the mark.

Exhibit 27: Large-Capitalization Stocks
Relative Returns to the Best and Worst Quintiles
of Select Capital Spending-Related Metrics[1]
Monthly Data Compounded to Annual Periods
2018



Source: Empirical Research Partners Analysis.

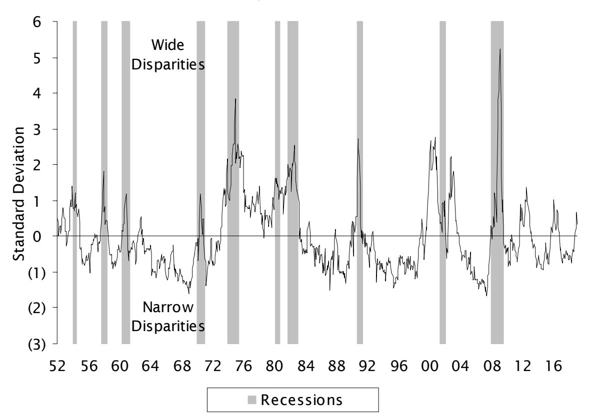
Exhibit 28: The S&P 500
Annual Earnings Per Share Growth Rates
1952 Through 2019E



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

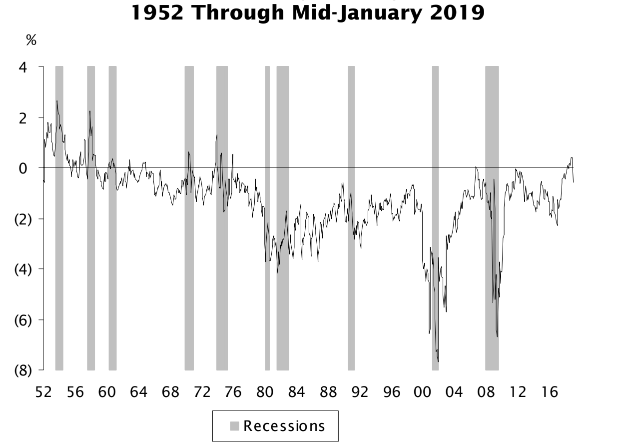
The earnings estimates embody an expected-value forecast and assign some weight to the scenario that the adverse trends that unfolded in 2018 – tariffs, Brexit, higher rates – will continue unabated this year. The valuation paradigm priced into the market also reflects the unpredictability of the circumstances. Exhibit 29 depicts our valuation spreads, one measure of the stress. After bottoming in April they widened by 1½ standard deviations last year, reaching 7/10th of a deviation above the mean. By comparison in January of 2016 they peaked at a standard deviation above the mean, and in 2012, when the European debt crisis was center stage, they reached 1.4 standard deviations. Now, after this month's value stock rally, the reading is a third of a deviation. The relative earnings yields of the most-controversial issues tell the same tale (see Exhibit 30). Investors smell smoke but have yet to find the fire.

Exhibit 29: Large-Capitalization Stocks
Valuation Spreads
The Top Quintile Compared to the Average
1952 Through Mid-January 2019



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

Exhibit 30: Large-Capitalization Stocks
In the Highest Quintile of Arbitrage Risk
Relative Trailing Earnings Yields[1]
1952 Through Mid-January 2019



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

[1]Equally-weighted data.

Appendix 1: Large-Capitalization Stocks
Highest Quintiles of Revenue Growth and Arbitrage Risk
Growth Model Ranking Report
Sorted by Model Rank Within Sector
As of Mid-January 2019

			Quintile Ranks (1=Best; 5=Worst)								
			Super Factors						Memo:		
			Management Behavior								
Symbol	Company	Price	Capital Deployment	Earnings Quality and Trend	Market Reaction	Valuation	Growth Model Rank	Failure Model Rank	Free Cash Flow Yield	Forward P/E-Ratio	Market Capitalization ($ Billion)
Consumer Cyclicals:											
Consumer Durables											
LEN	LENNAR CORP	$44.10	5	4	4	1	3	5	1	7.5 x	$14.6
TSLA	TESLA INC	302.26	4	4	1	5	4	4	5	51.7	51.9
Retail and Other Consumer Cyclicals											
ETSY	ETSY INC	$55.83	2	1	1	5	1	3	4	84.6 x	$6.7
YUMC	YUM CHINA HOLDINGS INC	36.16	1	4	3	3	3	3	3	23.0	13.8
FIVE	FIVE BELOW INC	122.68	5	4	1	5	4	4	5	39.9	6.8
MELI	MERCADOLIBRE INC	350.66	5	5	3	5	5	5	5	NM	15.9
W	WAYFAIR INC	102.14	5	5	2	5	5	4	5	NM	9.2
GRUB	GRUBHUB INC	80.97	5	5	5	5	5	5	4	41.7	7.3
Media and Entertainment											
IAC	IAC/INTERACTIVECORP	$200.01	2	2	1	4	2	2	3	25.5 x	$16.7
DISCA	DISCOVERY INC	27.71	5	5	2	1	3	2	1	8.0	13.9
MTCH	MATCH GROUP INC	48.22	4	1	2	5	3	4	3	29.8	13.4
NFLX	NETFLIX INC	339.10	5	5	2	5	5	5	5	83.9	147.9
SPOT	SPOTIFY TECHNOLOGY SA	133.66	3	4	4	5	5	5	5	NM	24.2
ANGI	ANGI HOMESERVICES INC	16.50	5	4	2	5	5	4	5	88.7	8.3
SNAP	SNAP INC	6.18	4	3	5	5	5	5	5	NM	8.0
Z	ZILLOW GROUP INC	34.00	2	5	5	5	5	5	4	86.4	6.9
Technology:											
Technology Software and Services											
TEAM	ATLASSIAN CORP PLC	$90.67	5	1	1	5	2	5	4	106.9 x	$21.8
SPLK	SPLUNK INC	120.72	1	4	1	5	2	4	4	79.1	17.8
NOW	SERVICENOW INC	190.09	4	1	2	5	3	5	5	61.1	34.1
DXC	DXC TECHNOLOGY COMPANY	62.62	1	5	5	1	3	1	1	7.2	17.6
DATA	TABLEAU SOFTWARE INC	123.68	2	4	1	5	3	4	5	85.3	10.3
OKTA	OKTA INC	77.90	5	4	1	5	3	4	5	NM	8.6
DOCU	DOCUSIGN INC	47.00	2	3	2	5	3	5	5	NM	7.8
WDAY	WORKDAY INC	172.08	5	5	1	5	4	4	5	111.7	37.5
SQ	SQUARE INC	72.24	5	5	1	5	4	4	5	104.3	29.9
SHOP	SHOPIFY INC	158.43	5	5	1	5	4	4	5	NM	17.1
TWLO	TWILIO INC	105.32	4	5	1	5	4	4	5	NM	10.6
RNG	RINGCENTRAL INC	91.25	5	5	1	5	4	4	5	132.1	7.3
ZEN	ZENDESK INC	65.03	5	5	1	5	4	4	5	NM	7.0
DBX	DROPBOX INC	23.59	2	5	5	5	5	5	4	54.0	9.6
NTNX	NUTANIX INC	52.16	5	4	3	5	5	5	5	NM	9.6
PAGS	PAGSEGURO DIGITAL LTD	22.39	5	5	5	5	5	5	5	18.3	7.3
Semiconductors											
STM	STMICROELECTRONICS NV	$14.55	5	4	5	1	3	4	4	11.0 x	$13.3
AMD	ADVANCED MICRO DEVICES	20.77	5	2	1	5	4	4	5	33.5	20.8
NVDA	NVIDIA CORP	156.93	5	3	5	5	5	5	3	23.8	95.7
Health Care:											
Pharmaceuticals											
NKTR	NEKTAR THERAPEUTICS	$46.20	2	3	5	3	5	5	1	NM	$8.0
ACB	AURORA CANNABIS INC	6.44	5	5	2	5	5	4	5	NM	6.4
Biotechnology											
EXEL	EXELIXIS INC	$22.65	5	2	1	5	1	4	3	17.4 x	$6.8
NBIX	NEUROCRINE BIOSCIENCES INC	91.53	5	2	1	5	2	4	5	55.5	8.3
INCY	INCYTE CORP	78.42	4	2	2	5	3	4	5	64.4	16.7
LOXO	LOXO ONCOLOGY INC	233.50	5	3	1	5	3	4	4	NM	7.2
SGEN	SEATTLE GENETICS INC	73.61	5	5	2	5	4	4	5	NM	11.8
EXAS	EXACT SCIENCES CORP	78.80	5	5	2	5	4	4	5	NM	9.7
SRPT	SAREPTA THERAPEUTICS INC	122.80	5	5	3	5	4	4	5	NM	8.7
ALNY	ALNYLAM PHARMACEUTICALS INC	83.12	5	5	5	5	5	5	5	NM	8.8
Health Care Equipment and Services											
ABMD	ABIOMED INC	$333.74	5	3	1	5	4	4	5	68.6 x	$15.0
ALGN	ALIGN TECHNOLOGY INC	220.09	5	2	5	5	5	5	5	37.9	17.6
DXCM	DEXCOM INC	149.52	5	5	1	5	5	4	5	NM	13.3
Energy:											
Integrateds, Oil Service, Refiners and Other											
CVE	CENOVUS ENERGY INC	$8.14	1	4	5	1	2	2	1	29.3 x	$10.0
HFC	HOLLYFRONTIER CORP	55.97	1	4	3	1	2	1	1	8.4	9.8
TRGP	TARGA RESOURCES CORP	43.50	5	4	3	3	5	4	5	82.7	10.0
HP	HELMERICH & PAYNE	54.14	2	3	5	3	5	4	5	35.3	5.9
Exploration and Production											
CNQ	CANADIAN NATURAL RESOURCES	$27.50	1	1	4	1	1	1	1	19.4 x	$33.3
XEC	CIMAREX ENERGY CO	74.74	3	1	5	1	1	4	1	12.3	7.1
MRO	MARATHON OIL CORP	16.10	2	2	3	2	2	2	5	64.3	13.5
NFX	NEWFIELD EXPLORATION CO	18.57	5	2	5	1	2	4	5	6.6	3.7
APC	ANADARKO PETROLEUM CORP	48.67	1	2	5	2	3	4	5	28.6	24.5
CLR	CONTINENTAL RESOURCES INC	47.59	4	2	4	2	3	5	4	19.4	17.9
APA	APACHE CORP	32.09	3	3	5	1	3	4	3	50.7	12.2
FANG	DIAMONDBACK ENERGY INC	106.89	5	4	3	4	4	5	5	13.6	17.5
HES	HESS CORP	52.81	1	2	4	5	4	4	5	NM	15.6
CXO	CONCHO RESOURCES INC	124.87	5	5	4	4	5	5	5	24.9	25.0
Telecommunication Services											
CTL	CENTURYLINK INC	$15.83	5	4	4	1	2	1	1	13.8 x	$17.1

Source: Empirical Research Partners Analysis.