Empirical Research Partners

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January 10, 2019

Portfolio Strategy January 2019

The Sum of All Fears: The Pricing of Controversy Around the World

Multiple Problems

- P/E multiples have sunk around the world as the consequences of the trade wars and tighter monetary policy have showed up in the economic data. Investors are fearful that policymakers, including the Trump Administration, the Fed and the ECB, have underestimated the fragility and interest rate sensitivity of the global economy, as well as the consequences of their own behaviors. Tariffs, housing and the unwinding of Central Bank balance sheets top the list of worries. It may be though that the instinct for self-preservation will carry the day, and that in keeping with the precedents, the equity market will rebound, helped by the lower multiples. We'd put the odds at 60:40 in favor of that scenario. If that's in fact the way it plays out perhaps we should tilt toward stocks engulfed in controversy, that've suffered and could benefit disproportionately in a rebound. We looked around the globe to see if the table is set for that strategy and if there are obvious pockets of opportunity. Most of the time we should avoid getting involved in fights, but occasionally we get paid enough to dive in.
- Controversial stocks typically lag in down markets and this time proved no different. Last year's underperformance was in no way extraordinary, with a deficit of (7) percentage points in the U.S. and an average of just shy of (9) points in the other developed markets. The largest deficit, (11) points, was in Japan, an export-driven economy with little organic growth. The fact that controversial stocks have lagged in no way guarantees they're going to rebound, and the odds of that happening have been around 50:50. Two things make us think that they could be a little better than that now. First, high-arbitrage-risk issues have traded as a group, with a correlation in returns of around 50%, a near-record level, and second, uncharacteristically, they offer earnings and free cash flow yields that resemble those of the market. We conclude that we're getting paid to dabble, but unlike the situation in 2008, not enough to go all in. Globally controversy is concentrated in the commodity businesses, energy and metals, along with technology and some consumer cyclicals. In the U.S. biotech, internet services, homebuilders, entertainment and casinos are also part of the fray.
- The U.S. Big Growers, the 75 companies with the best growth profiles, suffered in the sell-off too, having become controversial in the middle of last year after a great run in the first half. The correlation in their returns reached 63% late in the year, a record. Repositioning by hedge funds is no doubt part of the story and their favorites have underperformed significantly, just as they did in 2008 and 2016. While the growth leadership would suffer in a recession, as its considerable operating leverage would cut the wrong way, in a soft landing scenario its enormous free cash flow production should carry the day. The odds of those stocks rebounding are at least as good as those for controversial value stocks.

Conclusion: Getting Paid to Take Some Risk

- In the U.S., big multiples declines of the sort we've just experienced were followed by market rebounds in 15 of the 20 episodes of the past 90+ years. The records elsewhere in the world are less convincing. This time there's enough room for policy adjustments to cause us to take the bullish historic data more or less literally. It makes sense to have some exposure to controversy but we're not being rewarded enough to have a whole portfolio of it. Appendix 1 on page 13 lists U.S. stocks with high arbitrage risk that rank in the top-two quintiles of our core model, and Appendices 2 and 3 on the subsequent pages do the same for the other developed and emerging markets.

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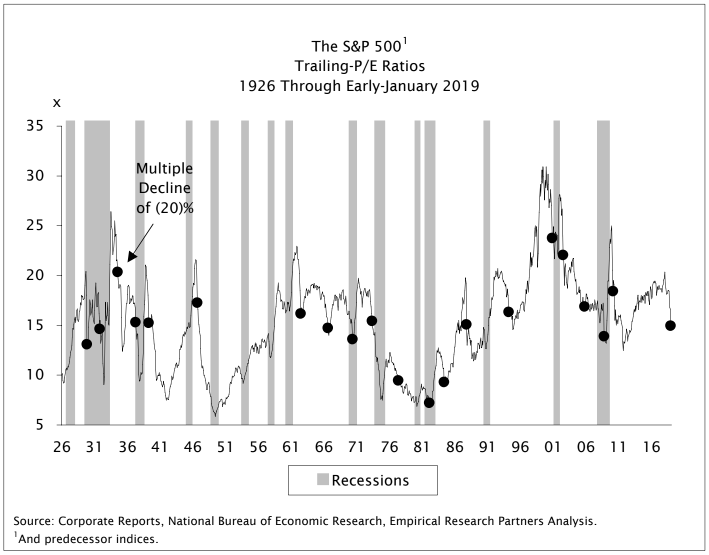
Conclusions in Brief

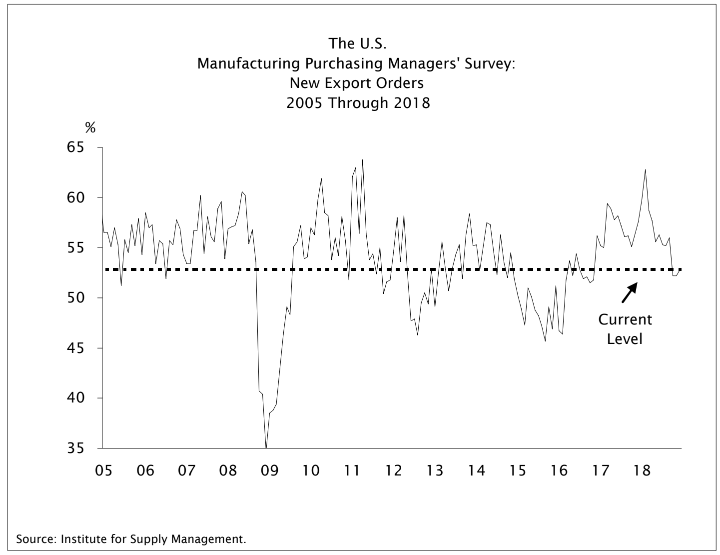
- P/E multiples have come down…



The S&P 500[1]
Trailing-P/E Ratios
1926 Through Early-January 2019

Source: Corporate Reports, National Bureau of Economic Research, Empirical Research Partners Analysis.
[1]And predecessor indices.

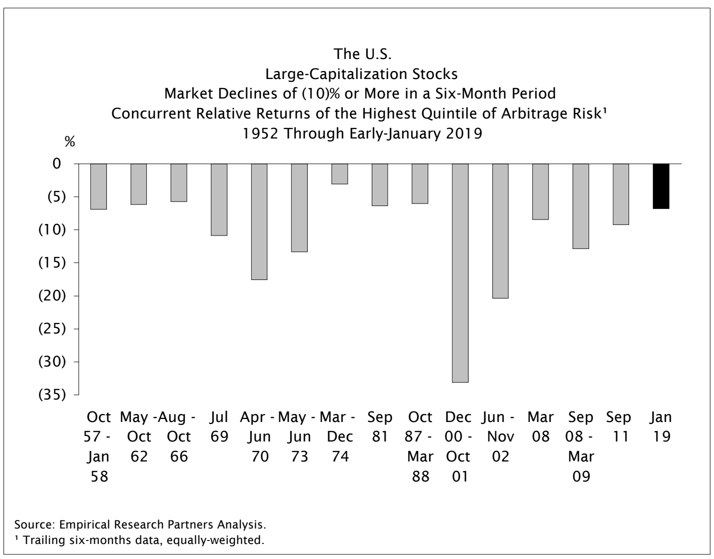
- …As the consequences of the trade war became real:



The U.S.
Manufacturing Purchasing Managers' Survey:
New Export Orders
2005 Through 2018

Source: Institute for Supply Management.

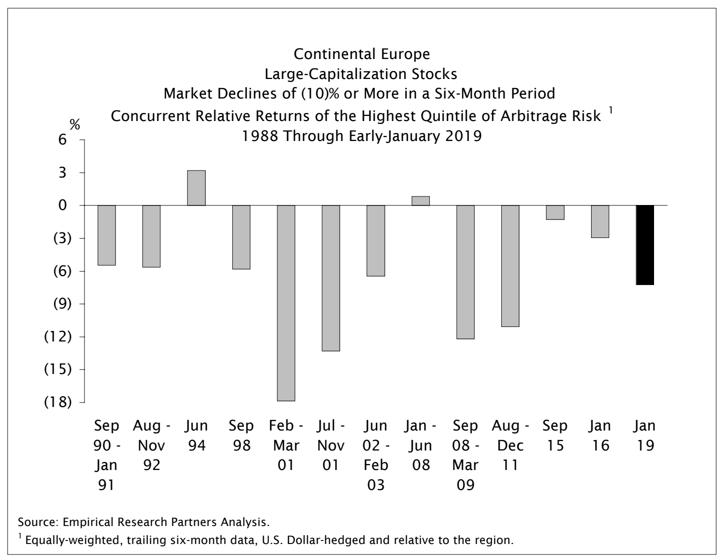
- Controversial stocks have lagged by a typical amount…



The U.S.
Large-Capitalization Stocks
Market Declines of (10)% or More in a Six-Month Period
Concurrent Relative Returns of the Highest Quintile of Arbitrage Risk[1]
1952 Through Early-January 2019

Source: Empirical Research Partners Analysis.
[1] Trailing six-months data, equally-weighted.

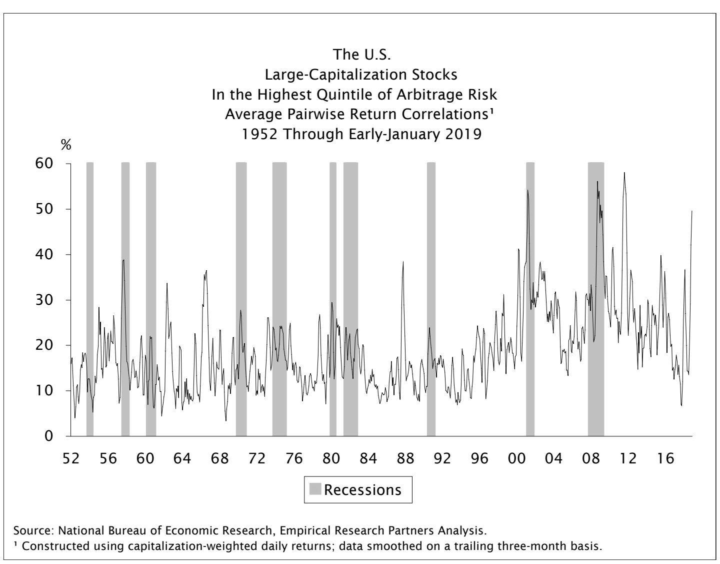
- …Everywhere:



Continental Europe
Large-Capitalization Stocks
Market Declines of (10)% or More in a Six-Month Period
Concurrent Relative Returns of the Highest Quintile of Arbitrage Risk [1]
1988 Through Early-January 2019

Source: Empirical Research Partners Analysis.
[1] Equally-weighted, trailing six-month data, U.S. Dollar-hedged and relative to the region.

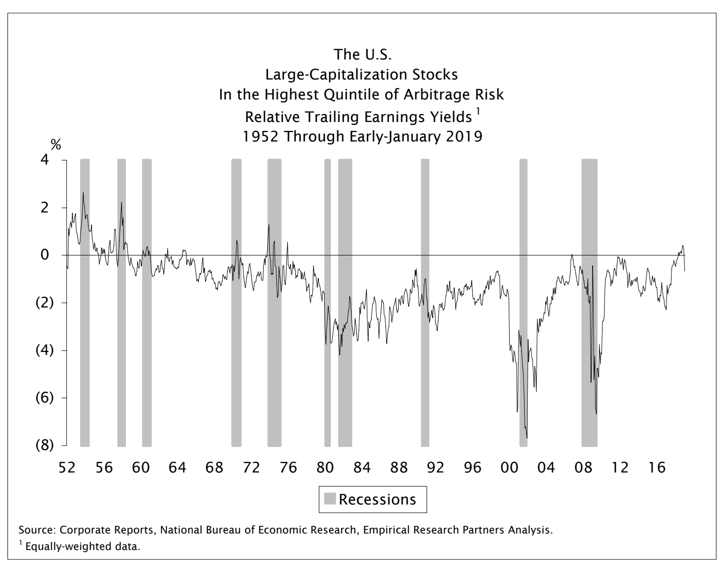
- The return correlations among them suggest that some opportunities have developed…



The U.S.
Large-Capitalization Stocks
In the Highest Quintile of Arbitrage Risk
Average Pairwise Return Correlations[1]
1952 Through Early-January 2019

Source: National Bureau of Economic Research, Empirical Research Partners Analysis.
[1] Constructed using capitalization-weighted daily returns; data smoothed on a trailing three-month basis.

- …And valuation support is better than usual:



The U.S.
Large-Capitalization Stocks
In the Highest Quintile of Arbitrage Risk
Relative Trailing Earnings Yields [1]
1952 Through Early-January 2019

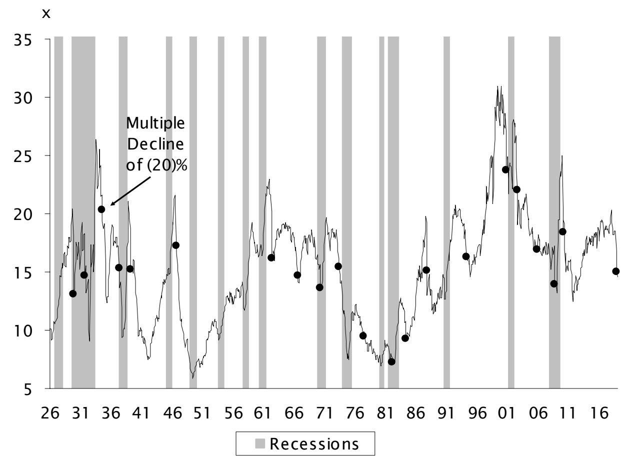
Source: Corporate Reports, National Bureau of Economic Research, Empirical Research Partners Analysis.
[1] Equally-weighted data.

The Sum of All Fears: The Pricing of Controversy Around the World

Multiples Plummet as the Evidence of Disruption Accumulates

Equity markets around the world have suffered large reductions in multiples and in the U.S. they peaked in Spring of last year (see Exhibits 1 and 2). Contractions of that sort have sometimes occurred right before a recession hit, and they've also been a response to tighter monetary policy. In 1962 and 1974 politics played a starring role in the collapses. This time around we'd chalk the declines up to worries about: 1) trade wars, 2) tighter U.S. monetary policy, and 3) central bank behavior and the fragility of the global economy.

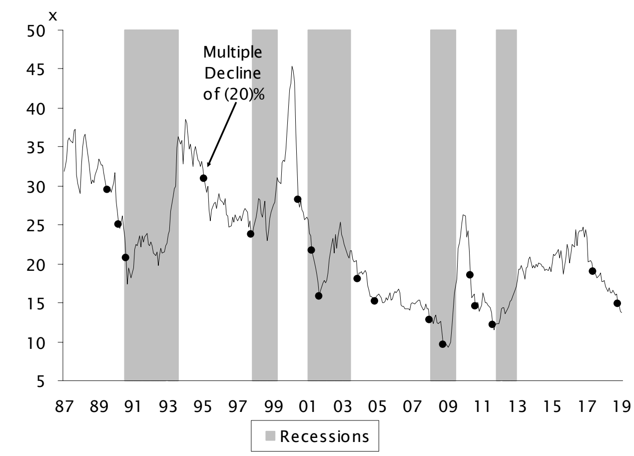
Exhibit 1: The S&P 500[1]
Trailing-P/E Ratios
1926 Through Early-January 2019



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

[1]And predecessor indices.

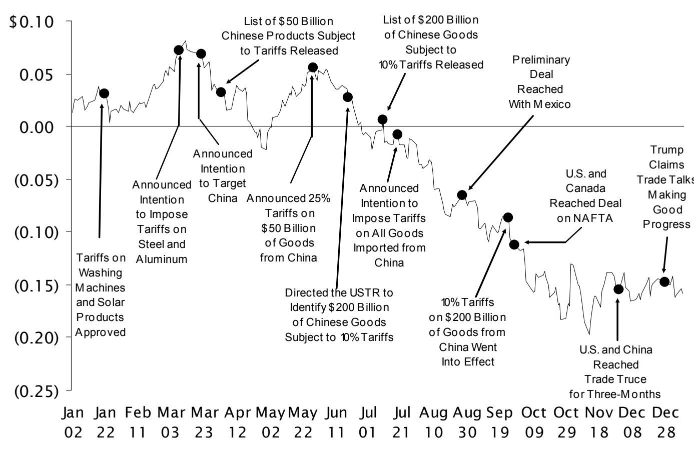
Exhibit 2: The Developed Markets (ex-U.S.)
Trailing-P/E Ratios[1]
1987 Through Early-January 2019



Source: OECD, Empirical Research Partners Analysis.

[1]Capitalization-weighted data.

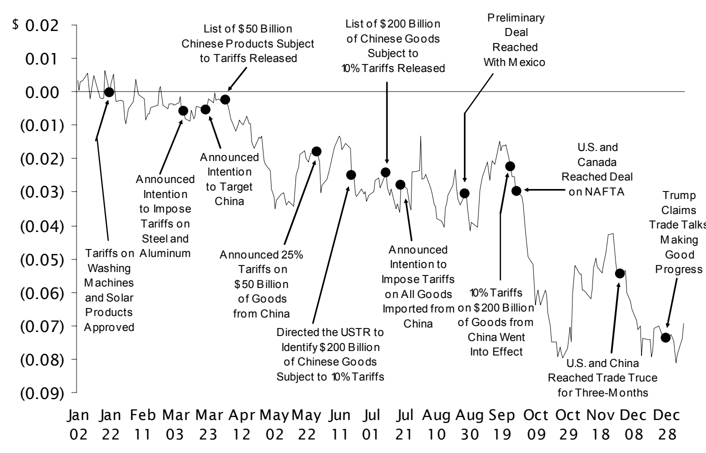
Exhibit 3: Large-Capitalization U.S. Stocks
With Share of Revenue from China Greater Than 20%
Relative Growth of a Dollar[1]
2018 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Capitalization-weighted data for the market and equally-weighted data for exporters to China.

Exhibit 4: Large-Capitalization U.S. Stocks
With Significant Supply Chain Imports from China
Relative Growth of a Dollar[1]
2018 Through Early-January 2019

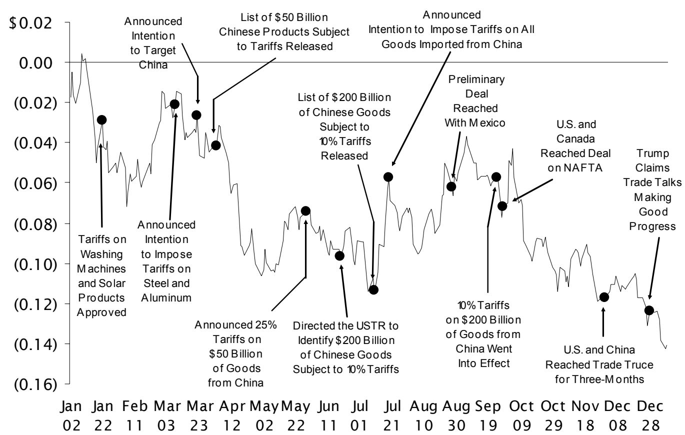


Source: Empirical Research Partners Analysis.

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

We think that the trade wars have been the most important of the factors pushing multiples down, and we can see how the process has played out by examining the relative returns of the stocks most exposed to them. Exhibit 3 presents the growth of a dollar, expressed in relative terms, of large-cap U.S. companies that garner more than a fifth of their revenue from Chinese customers. Those issues peaked in March of last year right before the Administration announced its intention to levy tariffs on Chinese imports. They underperformed in the next eight months, bottoming in November. We see the same story in the charts for issues with significant supply chain exposure to China and in that of Chinese exporters (see Exhibits 4 and 5). All three composites now sell at forward-P/E multiples of around ten times, a clear indication that investors believe that sell-side analysts are vastly underestimating the likelihood and consequences of a trade war (see Exhibit 6).

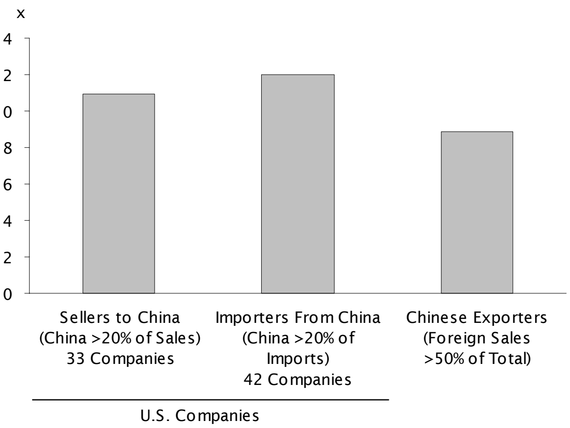
Exhibit 5: Chinese Equities
With Foreign Sales Greater Than 50% of the Total
Relative Growth of a Dollar[1]
2018 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Capitalization-weighted data for the market and equally-weighted data for Chinese exporters; USD-based relative returns.

Exhibit 6: U.S. and Chinese Equities
Forward-P/E Ratios of the Most-Exposed
Companies: Sellers and Importers[1]
As of Early-January 2019

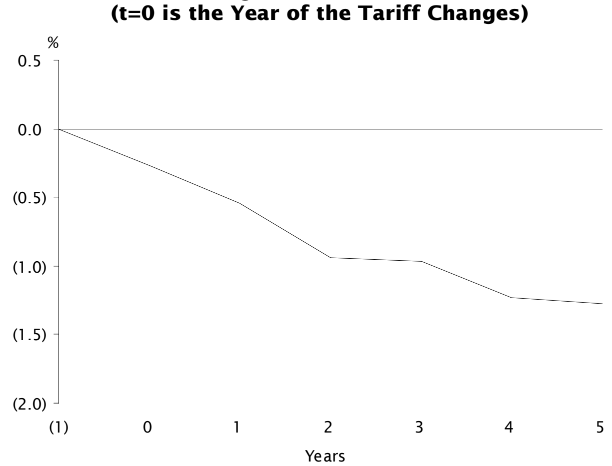


Source: Empirical Research Partners Analysis.

[1]Averaged on forward earnings yields.

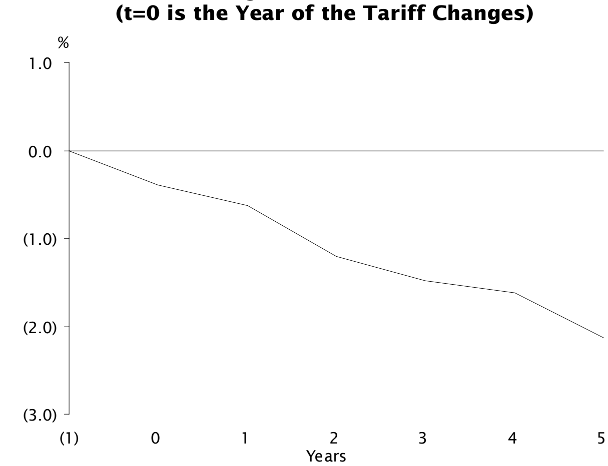
Empirical evidence gathered from five decades of data suggests that tariffs are a negative for equity markets because they eventually lead to reductions in both output and productivity (see Exhibits 7 and 8). That's also true if the sample is restricted to just the developed economies (see Exhibit 9). Recent work done at the New York Fed estimates that in short order around 20% of the tariffs show up in producer prices, even for companies that aren't directly affected by them (see Exhibit 10). Throwing sand in the machinery of global capitalism is both contractionary and inflationary, and that explains the market's aversion to tariffs.

Exhibit 7: Panel of 151 Economies
The Effect of Tariff Increases on Output
1963 Through 2014
(t=0 is the Year of the Tariff Changes)



Source: Furceri, D., Hannan, S. A., Ostry, J. D. and Andrew K. Rose, 2018. "Macroeconomic Consequences of Tariffs," NBER Working Paper No. 25402.

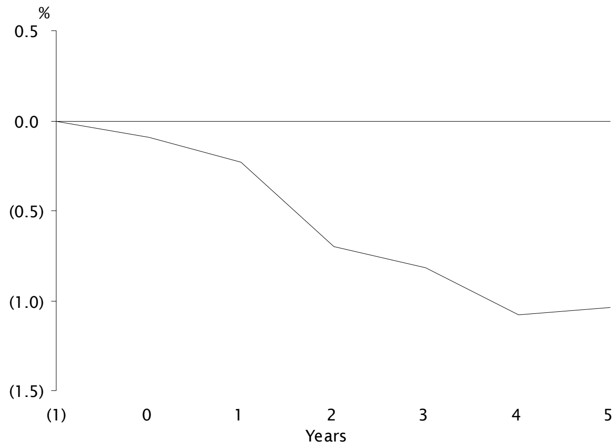
Exhibit 8: Panel of 151 Economies
The Effect of Tariff Increases on Productivity
1963 Through 2014
(t=0 is the Year of the Tariff Changes)



Source: Furceri, D., Hannan, S. A., Ostry, J. D. and Andrew K. Rose, 2018. "Macroeconomic Consequences of Tariffs," NBER Working Paper No. 25402.

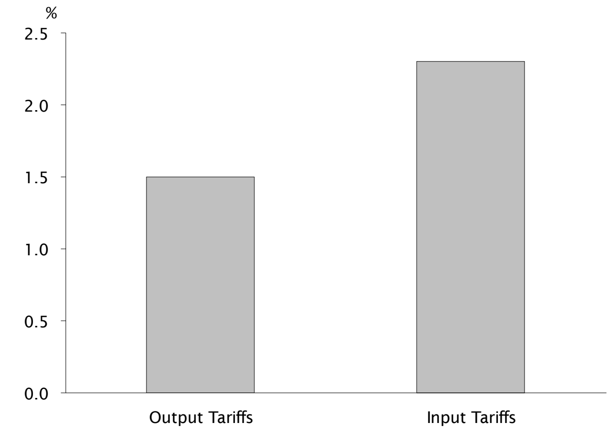
Last year's reactions to the Administration's trade policy weren't based on some sort of theoretical model but rather stemmed from the economic data itself. Sowing uncertainty in the world's second-largest economy has predictably created blowback (see Exhibit 11). Exhibit 12 presents a gauge of new export orders taken from the domestic purchasing manager survey and last year's decline was swift. As we've expected, investors haven't responded well to threats to the Bretton Woods II world order. That's because the benefits of globalization have been even greater for the equity market than for the real economy.

Exhibit 9: Advanced Economies
The Effect of Tariff Increases on Output
1963 Through 2014
(t=0 is the Year of the Tariff Changes)



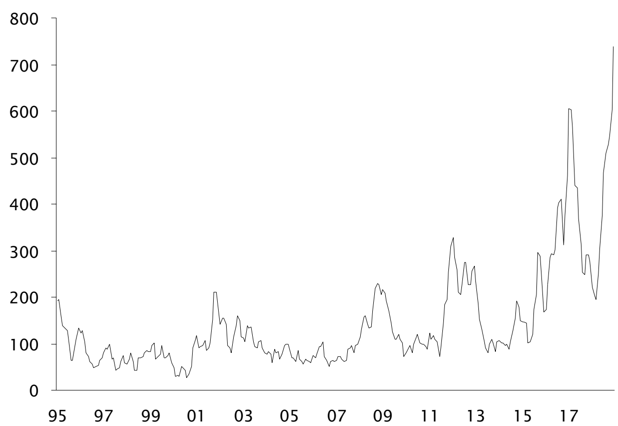
Source: Furceri, D., Hannan, S. A., Ostry, J. D. and Andrew K. Rose, 2018. "Macroeconomic Consequences of Tariffs," NBER Working Paper No. 25402.

Exhibit 10: U.S. Industries
Short-Term Impact of a 10% Tariff on the PPI
2017 Through October 2018



Source: Amiti, M., Heise, S. and Noah Kwicklis, 2019. "The Impact of Import Tariffs on U.S. Domestic Prices," Liberty Street Economics 01/04.

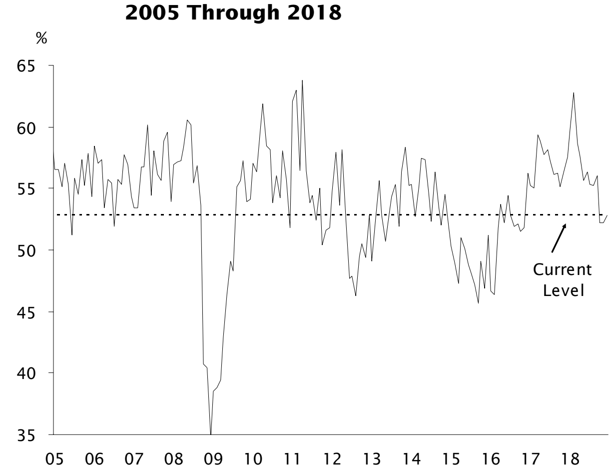
Exhibit 11: China
Monthly News-Based Economic Policy Uncertainty Index[1]
1995 Through 2018



Source: Baker, S., Bloom, N. and Steven J. Davis, 2013. "Measuring Economic Policy Uncertainty," https:/www.policyuncertainty.com.

[1]Smoothed on a trailing three-month basis.

Exhibit 12: The U.S.
Manufacturing Purchasing Managers' Survey: New Export Orders
2005 Through 2018



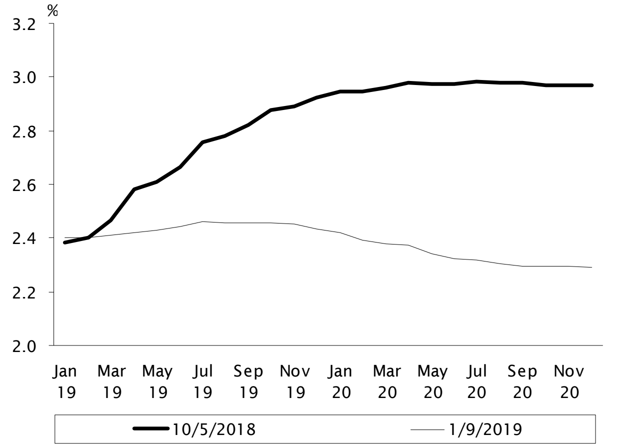
Source: Institute for Supply Management.

Housing is Another Vulnerability

The market also became concerned about a cycle-ending monetary policy error, and the Fed Funds futures market has radically revised its expectations for tightening (see Exhibit 13). Concurrently, breakeven inflation rates have round-tripped much of the rise that had occurred in the earlier years of the Trump Administration, as some of its policy choices have produced unintended consequences (see Exhibit 14). On the rate front investors have concluded that you simply can't get to higher levels from here, with housing the barrier to doing so. California comprises the cutting edge of the affordability problem, and the data from there has been worrisome (see Exhibit 15). It represents more than a fifth of the value of the U.S. housing stock. By comparison, together New York, New Jersey and Connecticut account for about half that share.

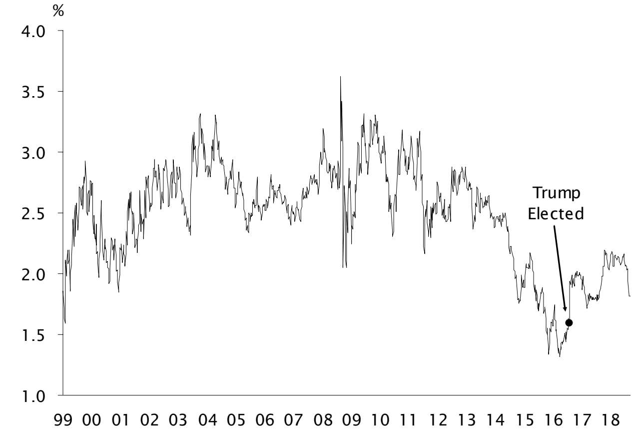
The relationship between the trailing-P/E ratios of utilities and banks conveys the current mindset. The former is priced to more than 70% premium to the latter despite the fact that its dividend yield advantage is only +64 basis points (see Exhibits 16 and 17). The Cleveland Fed has a model that estimates insolvency risk for the banking system, based on the implied volatilities of put and call options on a financial ETF. It suggests fears like those of early-2016, a far cry from what went on in 2008 (see Exhibit 18). This time the concerns revolve around interest rates more so than credit, a more benign backdrop.

Exhibit 13: Fed Fund Futures Curves
As of October 5th 2018 and January 9th 2019



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

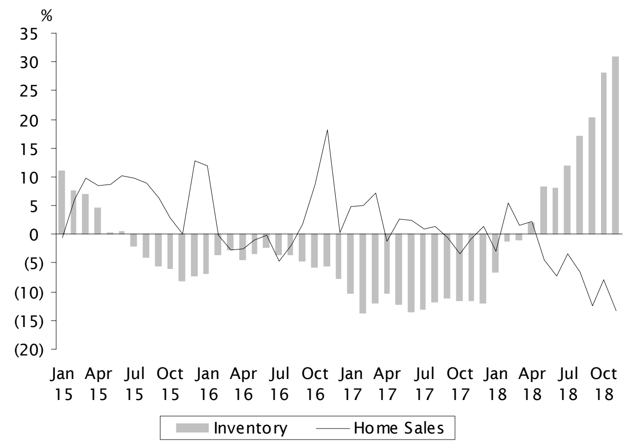
Exhibit 14: Five-Year Forward Breakeven Inflation Rate[1]
1999 Through 2018



Source: Federal Reserve Board

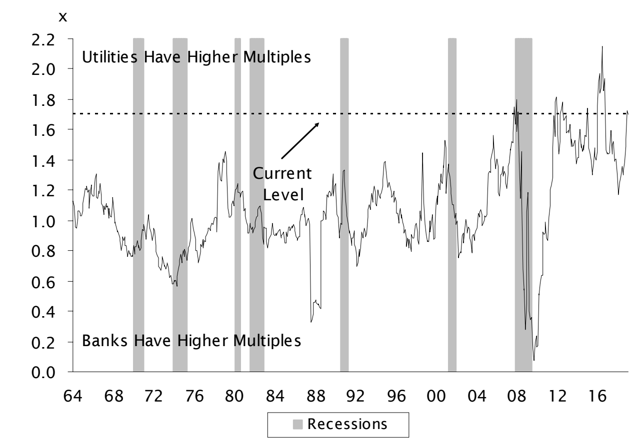
[1]Market's expectation of the average level of inflation over five years that begins five years from now.

Exhibit 15: California
Year-over-Year Changes in Existing Home Inventories and Sales
2015 Through November 2018



Source: California Association of Realtors.

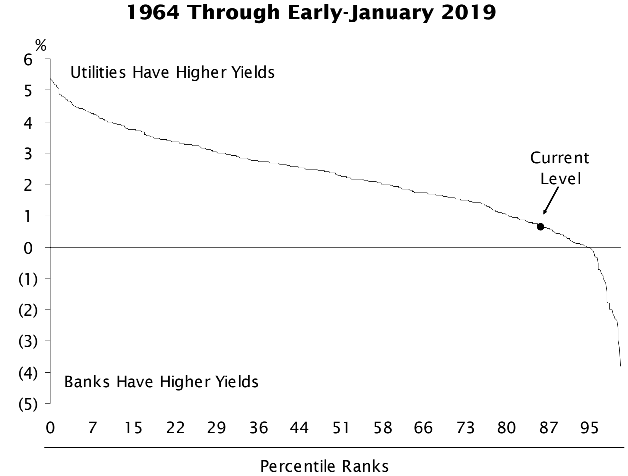
Exhibit 16: Large-Capitalization Utilities Relative to Banks
Ratios of Trailing-P/E Ratios[1]
1964 Through Early-January 2019



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

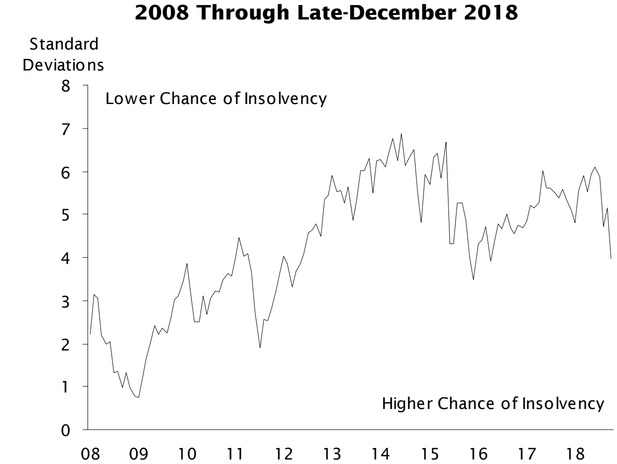
[1]Capitalization-weighted data.

Exhibit 17: Large-Capitalization Utilities Compared to Banks
Differentials in Dividend Yields
1964 Through Early-January 2019



Source: Corporate Reports, Empirical Research Partners Analysis.

Exhibit 18: U.S. Commercial Banking System
Insolvency Risk: Distance-to-Default Estimates[1]
2008 Through Late-December 2018



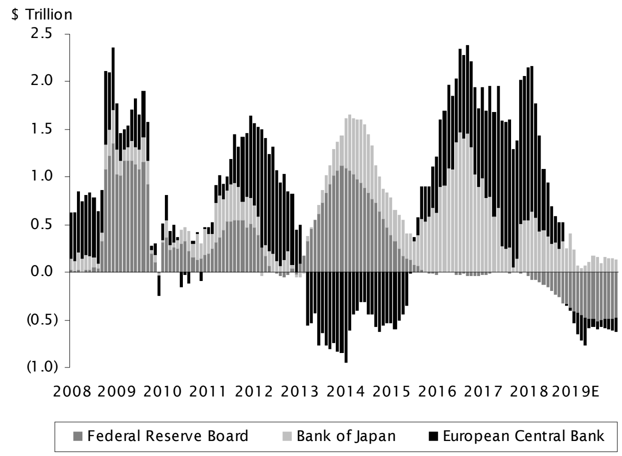
Source: Federal Reserve Bank of Cleveland, Bloomberg L.P.

[1]Uses implied volatilities of put and call options on the KBE ETF.

A third concern is that quantitative tightening raises the risk of an economic accident, and central bank balance sheets are expected to contract this year and beyond (see Exhibit 19). Policymakers are diving into a pool that may prove to be shallow. The large body of research on this subject concludes that unconventional monetary policy has the greatest effects early in a financial crisis, when the promise to do whatever is necessary can turn the tide of sentiment. The rest of the time its effectiveness is debatable.

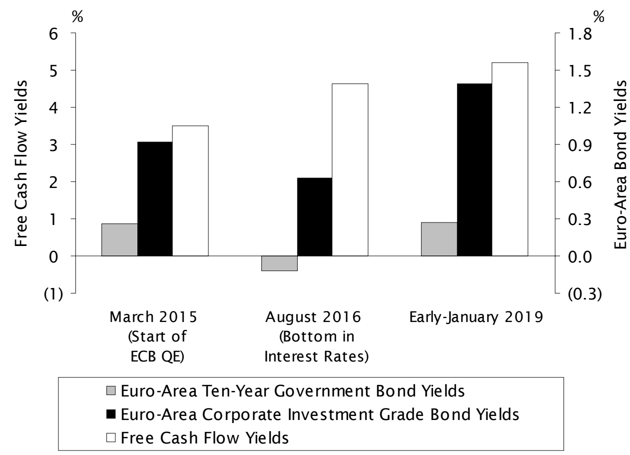
Our work suggests that the stimulative policies of the ECB have had some effect on global interest rates.[1] It's not at all clear though that they've boosted European equities by much if at all as their free cash flow yields have never budged (see Exhibit 20). Moreover, the benefit to corporate borrowing rates has already been reversed. Quantitative tightening does seem to us to be a risk, but it sits well below the top two.

Exhibit 19: The Federal Reserve Board, European Central Bank and the Bank of Japan Balance Sheets Year-over-Year Changes in Assets 2008 Through 2019E



Source: Federal Reserve, European Central Bank, Bank of Japan, Empirical Research Partners Analysis and Estimates.

Exhibit 20: Continental Europe Euro-Area Ten-Year Government Bond Yields, Euro-Area Corporate Investment Grade Bond Yields and Free Cash Flow Yields[1] 2015 Through Early-January 2019



Source: Centre for Economic Policy Research, Bloomberg L.P., European Central Bank, Empirical Research Partners Analysis.

[1]Free cash flow yields are capitalization-weighted. Ten-year Euro-Area government bond yields are of issuers rated AAA. The corporate investment grade bond yield is based on the Bloomberg Barclays Euro-Aggregate Bond Index and includes bonds with maturities over one year.

We now turn to the question of how much we're being paid to bet that the worries that developed in the final nine months of last year were overblown. To identify the extremes we'll draw upon our arbitrage risk framework.

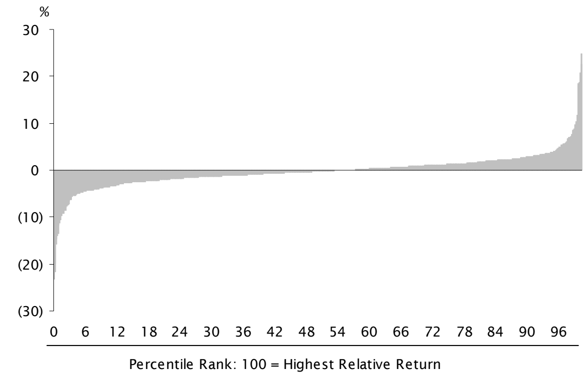
Is Controversy the Place to Be?

Arbitrage risk measures whether a stock is acting like itself or if it's undergone a personality transformation. To gauge it we compare the stock's return volatility in the prior sixty trading days to what we would have expected based on its beta. High-arb-risk stocks are those where the observed volatility is far above our expectations and we interpret the excess volatility to mean that a fight has broken out. On average, stocks involved in fights have underperformed, and in our failure modeling we look for expensive ones (see Exhibit 21). Sometimes though, as shown at the far-right side of the chart, they've been great performers, often following inflection points in market sentiment. When investing in those risky situations low valuations have generally been better than high ones (see Exhibit 22). In the last five years though it's been wise to sidestep controversy entirely, no matter what the valuation, because the trajectory of the expansion had already been sussed out, leaving little room for upside surprises.

We examined how controversial stocks have fared in down markets, that we define to be declines of (10)% or more in a six-month period. As shown in Exhibit 23, the latest run of underperformance in the U.S., about (7) percentage points, is a run-of-the-mill result that's not provocative enough to suggest that investors have become inordinately fearful. The data for Continental Europe looks much the same, while that for Japan, an export-driven economy, is more provocative (see Exhibits 24 and 25). Even in the beleaguered emerging markets the deficit doesn't look anomalous (see Exhibit 26).

[1]*Global Portfolio Strategy*, June 2018. "The Big Picture: Less Synchronous?"

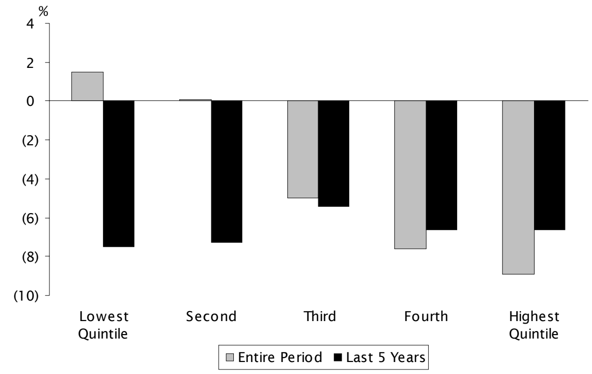
Exhibit 21: The U.S.
Large-Capitalization Stocks
Relative Returns to the Highest Quintile of Arbitrage Risk[1]
Measured Over One-Month Holding Periods
Ranked from Worst-to-Best
1952 Through Early-January 2019



Source: Empirical Research Partners Analysis.

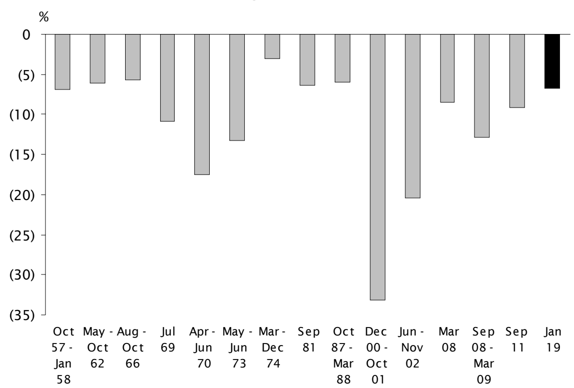
[1]Equally-weighted data.

Exhibit 22: The U.S.
Large-Capitalization Stocks
The Highest Quintile of Arbitrage Risk
Relative Returns by Valuation Quintile
Monthly Data Compounded and Annualized
1952 Through Early-January 2019



Source: Empirical Research Partners Analysis.

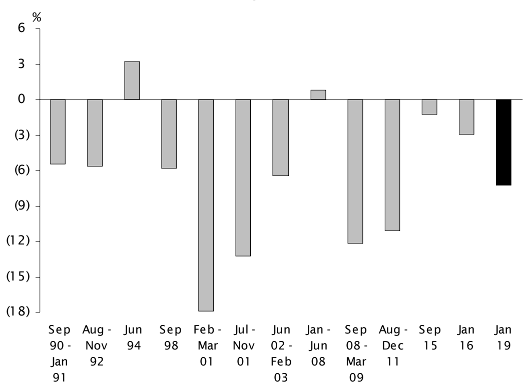
Exhibit 23: The U.S.
Large-Capitalization Stocks
Market Declines of (10)%+ in a Six-Month Period
Concurrent Relative Returns of the
Highest Quintile of Arbitrage Risk[1]
1952 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Equally-weighted, trailing six-month data.

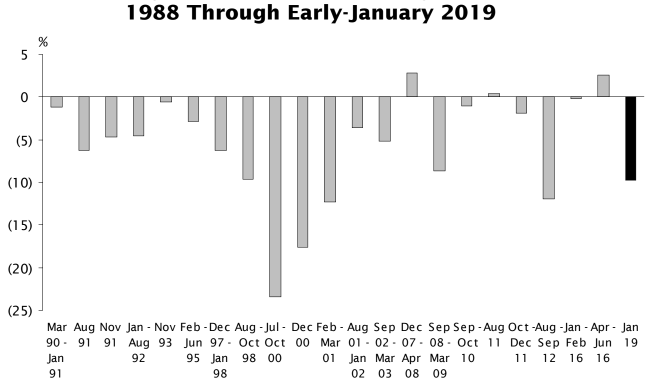
Exhibit 24: Continental Europe
Large-Capitalization Stocks
Market Declines of (10)%+ in a Six-Month Period
Concurrent Relative Returns of the
Highest Quintile of Arbitrage Risk[1]
1988 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Equally-weighted, trailing six-month data; U.S. Dollar-hedged and relative to the region.

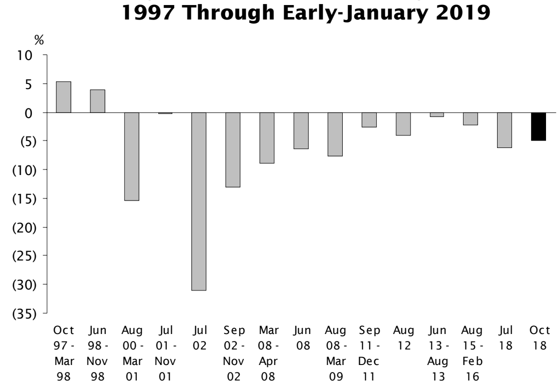
Exhibit 25: Japan
Large-Capitalization Stocks
Market Declines of (10)%+ in a Six-Month Period
Concurrent Relative Returns of the
Highest Quintile of Arbitrage Risk[1]
1988 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Equally-weighted, trailing six-month data; U.S. Dollar-hedged and relative to the region.

Exhibit 26: The Emerging Markets
Large-Capitalization Stocks
Market Declines of (10)%+ in a Six-Month Period
Concurrent Relative Returns of the
Highest Quintile of Arbitrage Risk[1]
1997 Through Early-January 2019

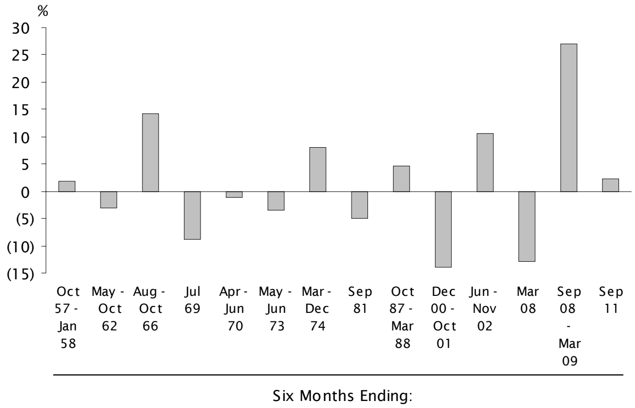


Source: Empirical Research Partners Analysis.

[1]Equally-weighted, trailing six-month data; U.S. Dollar-based and relative to the region.

The mere fact that controversial stocks have lagged doesn't ensure that they're about to rebound. Exhibit 27 presents their relative performance following the 14 U.S. drawdowns described in Exhibit 23. In half of them there was alpha, but only in 2008 was it of career-altering proportions. The best win rate has come in Japan, where sentiment has waxed and waned frequently (see Exhibit 28).

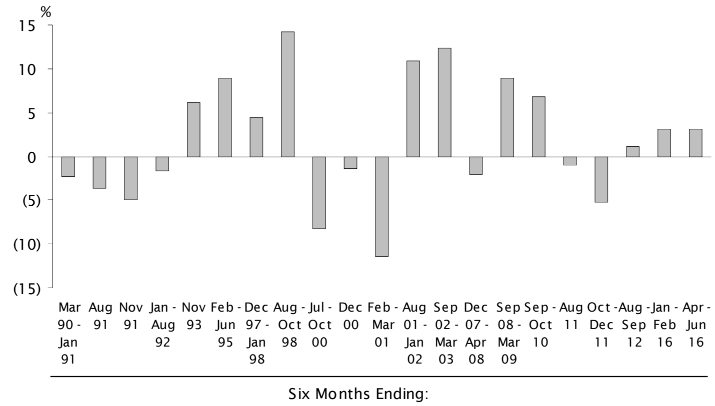
Exhibit 27: The U.S.
Large-Capitalization Stocks
Relative Returns to the Highest Quintile of Arbitrage Risk[1]
Six Months Following a (10)%+ Market Drawdown
Monthly Data Compounded
1952 Through Early-January 2019



Source: Empirical Research Partners Analysis.

[1]Equally-weighted data.

Exhibit 28: Japan
Large-Capitalization Stocks
Relative Returns to the Highest Quintile of Arbitrage Risk[1]
Six Months Following a (10)%+ Market Drawdown
Monthly Data Compounded
1988 Through Early-January 2019

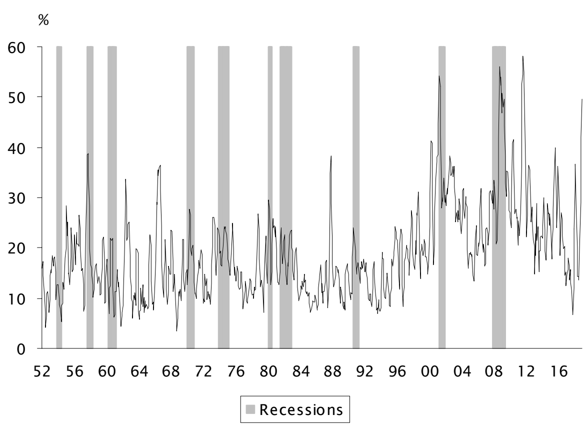


Source: Empirical Research Partners Analysis.

[1]Equally-weighted data; U.S. Dollar-hedged and relative to the region.

What leads us to think that there may be an opportunity for stock pickers among high-controversy stocks is the correlation of their returns along with their valuations. As shown in Exhibit 29, the co-movement among the controversial U.S. issues has been among the highest ever, topped only by what went on during the European debt crisis, the Financial Crisis and at the peak of the New Economy era. In Continental Europe and Japan the correlations are also stretched (see Exhibit 30). What also stands out is that the controversial U.S. issues are selling at a market-like trailing earnings yield, not often the case (see Exhibit 31). The data for the other regions tell a similar story (see Exhibit 32). If in fact the trade war concerns do ebb, the presence of actual earnings (and free cash flow) should be a virtue.

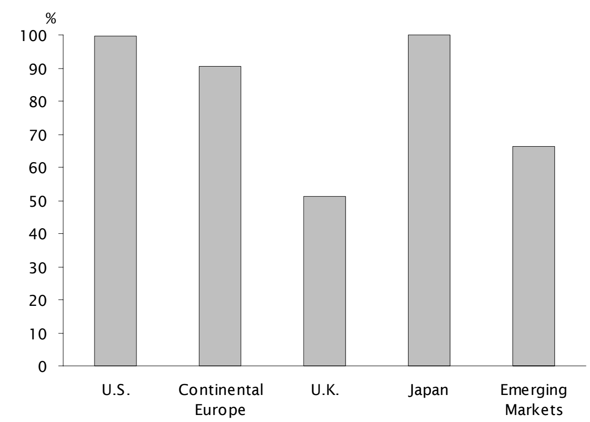
Exhibit 29: The U.S.
Large-Capitalization Stocks
The Highest Quintile of Arbitrage Risk
Pairwise Return Correlations[1]
1952 Through Early-January 2019



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

[1]Constructed using capitalization-weighted daily returns; data smoothed on a trailing three-month basis.

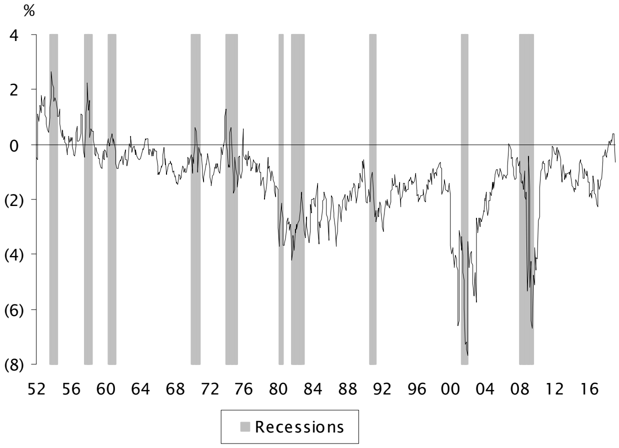
Exhibit 30: Large-Capitalization Stocks Worldwide
In the Highest Quintile of Arbitrage Risk
Pairwise Return Correlations[1]
Current Readings Compared to History
Percentiles (1=Lowest; Highest = 100)
1952 Through Early-January 2019[2]



Source: Empirical Research Partners Analysis.

[1]Constructed using capitalization-weighted U.S. Dollar daily returns. Stocks are ranked within each region.
[2]Developed markets (ex-U.S.) data since 1987; emerging markets data since 1997.

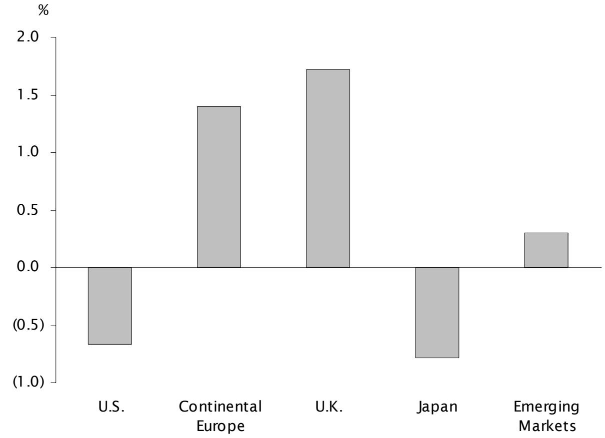
Exhibit 31: The U.S.
Large-Capitalization Stocks
In the Highest Quintile of Arbitrage Risk
Relative Trailing Earnings Yields[1]
1952 Through Early-January 2019



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

[1]Equally-weighted data.

Exhibit 32: The World
Large-Capitalization Stocks
In the Highest Quintile of Arbitrage Risk
Relative Trailing Earnings Yields[1]
As of Early-January 2019

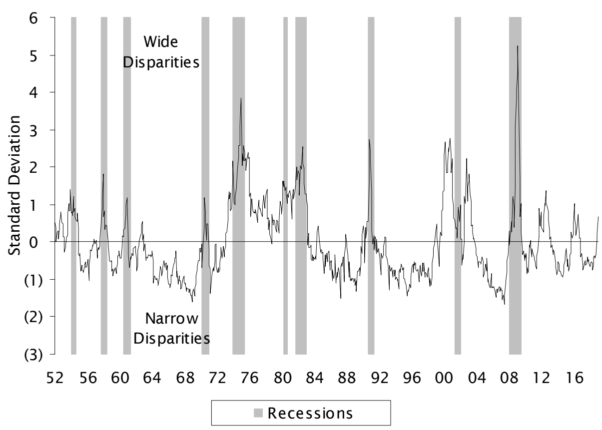


Source: Empirical Research Partners Analysis.

[1]Equally-weighted data. Stocks are ranked within, and valuations are relative to, each region.

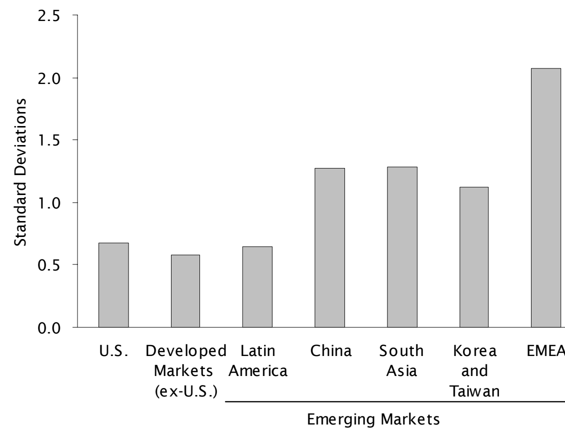
The conclusions that spring from this work mimic those that come out of our study of valuation spreads. In the U.S. valuation differentials have increased from a low level last Spring but have yet to reach the point seen in the mini-Crisis of early-2016 (see Exhibit 33). Spreads throughout the developed world are roughly comparable, and the expected return from a value strategy looks to be best in the emerging markets (see Exhibit 34).

Exhibit 33: The U.S.
Large-Capitalization Stocks
Valuation Spreads
The Top Quintile Compared to the Average
1952 Through 2018



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

Exhibit 34: The World
Valuation Spreads by Region
The Top Quintile Compared to
the Regional Average[1]
As of the End-of-2018



Source: Empirical Research Partners Analysis.

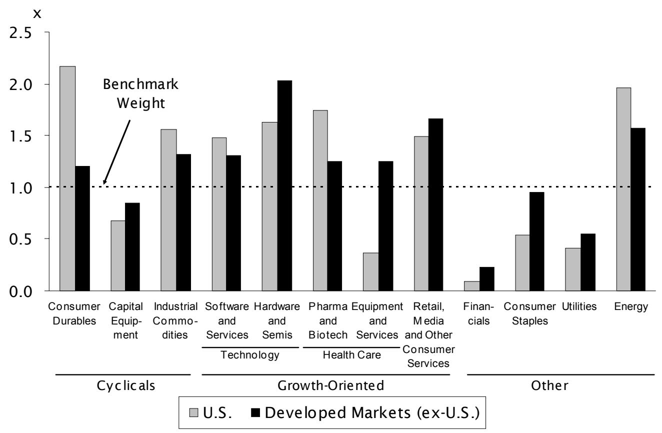
[1]Standard deviations computed using data that begin in 1952 for the U.S., 1987 for the rest of the developed world and 1997 for the emerging markets.

The sectors embodying controversy are much the same throughout the developed world, with cyclicals, particularly commodity businesses, at the heart of the conflict (see Exhibit 35). The outsized exposures in the U.S. are in the rate-sensitive consumer durables group and in energy, owing to the many E&P stocks. Those are also the areas where valuation spreads are the widest (see Exhibit 36).

The Big Growers, Another Good Option

Complicating matters further, the growth leadership of the U.S. market, the companies with the best revenue trajectories, suffered a classic correction in the latter-half of last year, and the correlation in returns among them hit a record level (see Exhibit 37). Stocks of that ilk tend to get into trouble when they become controversial, and we keep track of what proportion of them reside in the highest quintile of arbitrage risk. We've found that when that share spikes by +7.5 percentage points or more, underperformance often ensues (see Exhibit 38). We passed through that threshold in May of last year. More recently, controversy has begun to fade and we're now near a rate-of-change that in the past has signified a bottom. Some of the woes of the growth leadership are no doubt related to de-risking by hedge funds. Their favorite stocks have fared poorly, much as they did in 2008 and 2016 (see Exhibit 39). The breadth of underperformance among the favorites speaks to the dynamic at work (see Exhibit 40). The fact that re-positioning is part of the story adds to our interest in the Big Growers.

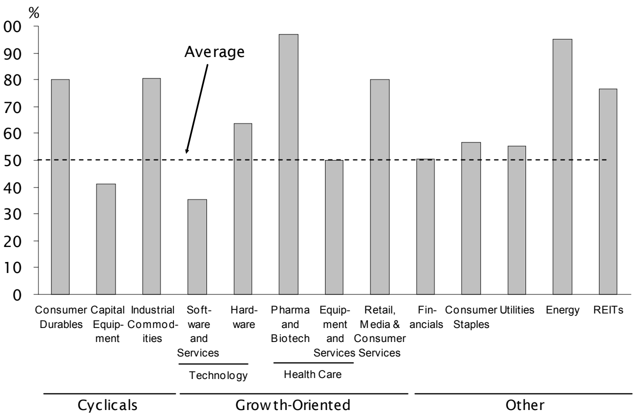
Exhibit 35: The Developed World Large-Capitalization Stocks In the Highest Quintile of Arbitrage Risk Weight Relative to the Benchmark by Sector[1] As of the End-of-2018



Source: Empirical Research Partners Analysis.

[1]Equally-weighted data.

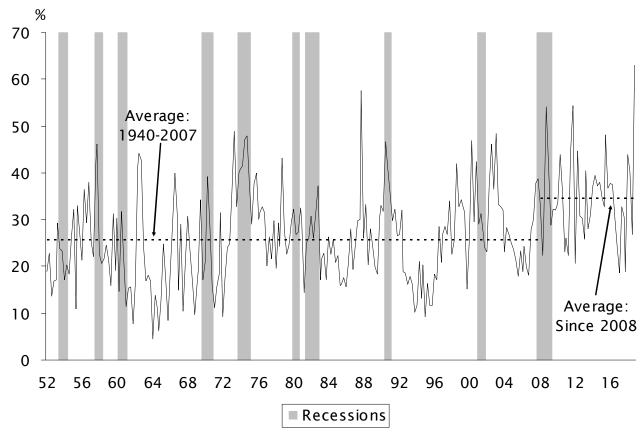
Exhibit 36: The U.S. Intra-Sectoral Valuation Spreads[1] Current Readings Compared to the History Percentiles (1=Narrowest; 100=Widest) 1952 Through 2018



Source: Empirical Research Partners Analysis.

[1]Based on an analysis of a 1,500 stock universe. Framework varies across sectors depending on what's efficacious.

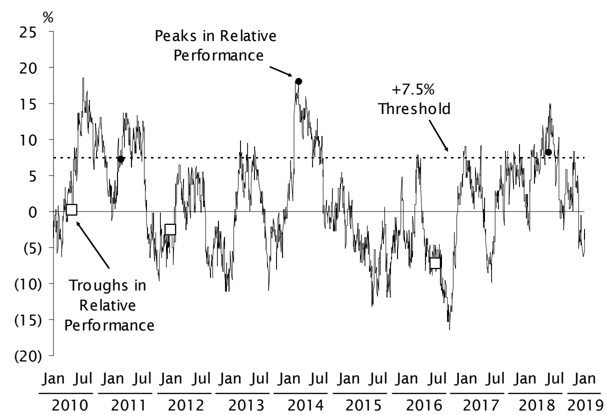
Exhibit 37: The U.S. Large-Capitalization Big Growers Return Correlations[1] 1952 Through 2018



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

[1]Correlation measured daily and reported quarterly.

Exhibit 38: The U.S. Large-Capitalization Stocks In the Top Quintile of Revenue Growth Six-Month Change in the Share in the Highest Quintile of Arbitrage Risk 2010 Through Early-January 2019

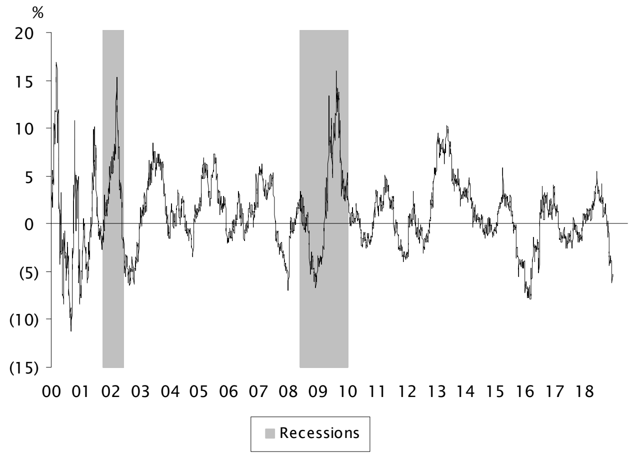


Source: Empirical Research Partners Analysis.

Conclusion: Getting Paid to Take Some Risk

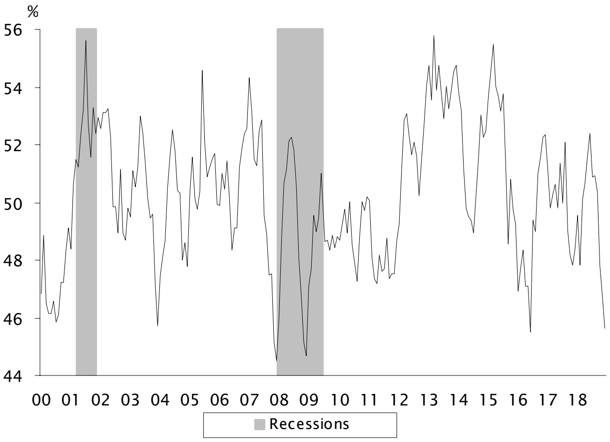
We've thought that there was around a 60% chance that the market's negative reaction to the various macro developments was an overreaction and a 40% shot that it would prove to be more or less on the mark. Investors have believed that President Trump wouldn't stomach the painful consequences of an extended trade war with China and in recent days there's been some evidence that presumption could be correct. It seems important that there's a wide range of deals that could be positioned as wins. The policy decisions of both the Administration and Fed look to be bending to the will of the market.

Exhibit 39: The U.S.
Large-Capitalization Stocks
The Top Quintile of Hedge Fund Ownership
Trailing Six-Month Relative Returns
2000 Through 2018



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

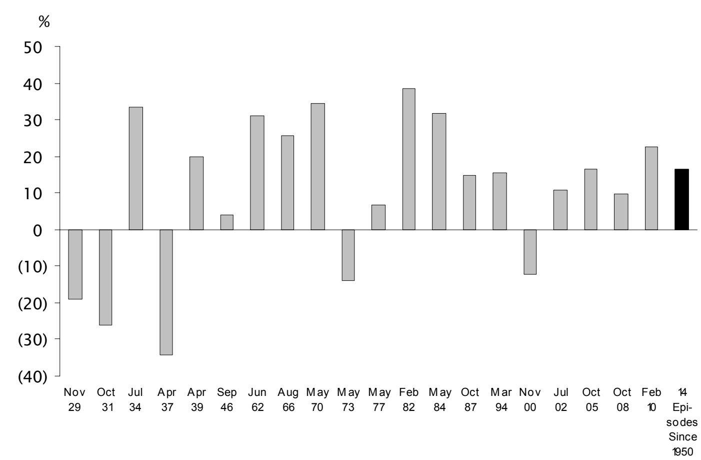
Exhibit 40: The U.S.
Large-Capitalization Stocks
The Top Quintile of Hedge Fund Ownership
Share Outperforming the Market
Measured Monthly Over Six-Month Windows
2000 Through 2018



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

The history is that in the year following big contractions in multiples the S&P 500 has rebounded, in part because the starting point became more advantageous (see Exhibit 41). In the post-WWII era the returns were above trend. When that didn't happen was when valuations had become very extended, during the Nifty Fifty and New Economy eras, and during the Great Depression and in the lesser one that followed in 1937. The track record in the rest of the developed world is less convincing (see Exhibit 42).

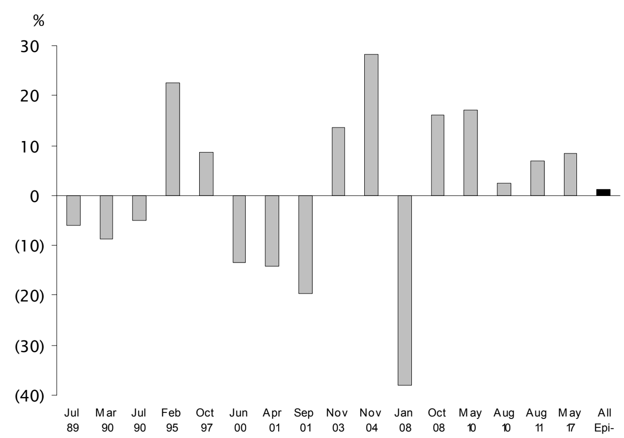
Exhibit 41: The S&P 500
Total Returns in the Year Following
a (20)% Decline in Trailing-P/E Ratios
1926 Through 2018



Source: Empirical Research Partners Analysis.

[1]Equally-weighted data.

Exhibit 42: The Developed Markets (ex-U.S.)
Total Returns in the Year Following
a (20)% Decline in Trailing-P/E Ratios[1]
1987 Through 2018



Source: Empirical Research Partners Analysis.

[1]Capitalization-weighted U.S. Dollar-hedged returns.

We still see odds of around 60/40 favoring a recovery in the market, as the self-preservation instinct of policymakers appears to be taking hold. Moreover, there aren't obvious excesses in the economy that need to be corrected. We think that the Big Growers would likely again lead in a market recovery as their record free cash flow production would carry the day in a setting of slower economic growth. That said, given the current set up, there's also some role for controversial stocks in portfolio construction.

Appendix 1 on page 13 highlights U.S. stocks drawn from the highest quintile of arbitrage risk that rank in the top-two quintiles of our core model. The list is surprisingly diverse. Appendices 2 and 3 on pages 14 and 15 repeat the exercise for the other developed and emerging markets.

Appendix 1: The U.S.: Large-Capitalization Stocks
The Highest Quintile of Arbitrage Risk and the Top-Two Quintiles of the Core Model
Sorted by Capitalization Within Core Model Rank
As of Early-January 2019

			Quintiles (1=Best; 5=Worst)							
				Super Factors						
Symbol	Company	Price	Arbitrage Risk (1=Lowest; 5=Highest)	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model	Forward-P/E Ratio	Market Capitalization ($ Billion)
CELG	CELGENE CORP	$87.52	5	2	2	4	3	1	8.6 x	$61.3
CNQ	CANADIAN NATURAL RESOURCES	25.92	5	1	1	2	5	1	14.7	31.4
FCAU	FIAT CHRYSLER AUTOMOBILES NV	15.18	5	1	1	3	5	1	3.9	29.7
NXPI	NXP SEMICONDUCTORS NV	76.01	5	1	1	1	5	1	8.9	22.5
TEVA	TEVA PHARMACEUTICAL INDUSTRIES ADR	17.67	5	1	1	1	3	1	6.3	19.1
CTL	CENTURYLINK INC	16.30	5	1	5	2	3	1	14.2	17.6
DXC	DXC TECHNOLOGY COMPANY	57.36	5	1	1	3	5	1	6.6	16.1
MYL	MYLAN NV	29.75	5	1	5	2	5	1	5.8	15.3
AAL	AMERICAN AIRLINES GROUP INC	32.95	5	1	1	1	5	1	6.0	15.2
IAC	IAC/INTERACTIVECORP	181.03	5	4	2	1	1	1	23.3	15.1
WPP	WPP PLC	55.62	5	1	1	2	5	1	8.7	14.0
MRO	MARATHON OIL CORP	15.62	5	1	2	5	2	1	35.8	13.1
ATUS	ALTICE USA INC	17.91	5	1	3	1	2	1	36.1	13.0
FTNT	FORTINET INC	70.09	5	3	1	1	1	1	35.1	11.9
MOS	MOSAIC CO	30.62	5	2	5	1	1	1	12.9	11.8
AAP	ADVANCE AUTO PARTS INC	161.14	5	3	1	2	1	1	20.0	11.7
KSS	KOHL'S CORP	68.01	5	1	1	2	2	1	11.8	11.2
WDC	WESTERN DIGITAL CORP	38.48	5	1	1	2	5	1	5.3	11.1
NBL	NOBLE ENERGY INC	21.39	5	1	3	2	5	1	31.3	10.4
CF	CF INDUSTRIES HOLDINGS INC	44.11	5	3	1	4	1	1	16.7	10.2
AKAM	AKAMAI TECHNOLOGIES INC	61.24	5	2	1	1	4	1	15.3	10.0
CVE	CENOVUS ENERGY INC	7.79	5	1	1	2	5	1	20.2	9.6
M	MACY'S INC	29.91	5	1	2	4	2	1	8.0	9.2
HFC	HOLLYFRONTIER CORP	52.34	5	1	1	2	2	1	7.5	9.1
NWL	NEWELL BRANDS INC	19.50	5	1	2	1	4	1	9.2	9.1
DVA	DAVITA INC	54.37	5	1	3	1	5	1	11.3	9.0
JWN	NORDSTROM INC	48.16	5	1	1	2	4	1	12.8	8.1
PHM	PULTEGROUP INC	28.21	5	1	3	1	1	1	7.6	8.0
BHC	BAUSCH HEALTH COMPANIES INC	22.36	5	1	1	3	1	1	6.0	7.8
JAZZ	JAZZ PHARMACEUTICALS PLC	128.76	5	1	5	1	3	1	9.2	7.8
TRIP	TRIPADVISOR INC	55.24	5	4	2	1	1	1	29.7	7.6
ON	ON SEMICONDUCTOR CORP	17.00	5	1	3	4	5	1	8.8	7.2
FL	FOOT LOCKER INC	56.40	5	1	1	5	1	1	11.6	6.4
ETSY	ETSY INC	51.57	5	5	2	1	1	1	78.1	6.2
PRGO	PERRIGO CO PLC	44.03	5	1	1	1	5	1	9.3	6.0
ECA	ENCANA CORP	6.28	5	1	3	4	5	1	7.2	6.0
UMC	UNITED MICROELECTRONICS CORP	1.77	5	1	1	1	5	1	14.2	4.4
F	FORD MOTOR CO	8.29	5	1	1	3	5	2	6.1	33.0
RHT	RED HAT INC	174.50	5	4	3	2	1	2	45.5	30.8
EIX	EDISON INTERNATIONAL	57.34	5	2	3	5	3	2	12.7	18.7
LULU	LULULEMON ATHLETICA INC	134.10	5	5	5	1	1	2	31.6	17.8
FDC	FIRST DATA CORP	17.22	5	2	4	3	2	2	11.0	16.1
ULTA	ULTA BEAUTY INC	271.00	5	4	3	2	1	2	21.8	16.1
FCX	FREEPORT-MCMORAN INC	11.00	5	1	1	4	5	2	13.9	15.9
INCY	INCYTE CORP	74.21	5	5	4	3	1	2	64.7	15.8
NTAP	NETAPP INC	59.13	5	3	1	4	2	2	12.5	15.0
HES	HESS CORP	47.88	5	4	1	1	4	2	NM	14.2
DISH	DISH NETWORK CORP	28.60	5	1	1	4	5	2	11.4	13.4
DISCA	DISCOVERY INC	26.53	5	1	5	5	2	2	7.7	13.3
SYMC	SYMANTEC CORP	19.33	5	2	2	2	4	2	11.7	12.3
CDNS	CADENCE DESIGN SYSTEMS INC	43.42	5	3	4	2	1	2	22.3	12.3
TECK	TECK RESOURCES LTD	21.14	5	1	2	5	4	2	7.6	12.2
DVN	DEVON ENERGY CORP	25.35	5	1	1	4	5	2	18.1	12.0
RL	RALPH LAUREN CORP	106.70	5	2	1	4	2	2	15.0	8.6
LB	L BRANDS INC	28.87	5	1	2	3	5	2	10.5	7.9
UBNT	UBIQUITI NETWORKS INC	103.25	5	5	2	1	1	2	22.3	7.5
QRVO	QORVO INC	59.78	5	2	1	3	4	2	9.7	7.5
USFD	US FOODS HOLDING CORP	33.16	5	2	3	3	2	2	15.1	7.2
EXEL	EXELIXIS INC	21.90	5	5	5	3	1	2	16.7	6.5
XEC	CIMAREX ENERGY CO	66.36	5	2	3	1	5	2	10.4	6.3
WWE	WORLD WRESTLING ENTMT INC	79.73	5	5	4	1	1	2	62.7	6.2
NFX	NEWFIELD EXPLORATION CO	16.12	5	1	5	3	5	2	4.9	3.2

Source: Empirical Research Partners Analysis.

Appendix 2: The Developed Markets (ex-U.S.): Large-Capitalization Stocks
The Highest Quintile of Arbitrage Risk and the Top-Two Quintiles of the Core Model
Sorted by Capitalization Within Core Model Rank
As of Early-January 2019

				Quintiles (1=Best; 5=Worst)							
					Super Factors						
Symbol	Company	Price (Local)	Local Currency	Arbitrage Risk (1=Lowest; 5=Highest)	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model	Forward-P/E Ratio	Market Capitalization ($ Billion)
9432 JP	Nippon Telegraph and Telephone Corporation	4,495.00	JPY	5	1	1	1	4	1	9.7 x	$80.8
CNQ CN	Canadian Natural Resources Limited	34.47	CAD	5	2	1	1	5	1	14.7	31.5
BT/A LN	BT Group plc	2.38	GBP	5	2	1	5	1	1	9.2	30.4
NXPI US	NXP Semiconductors NV	76.01	USD	5	2	1	1	4	1	8.9	22.9
TEVA IT	Teva Pharmaceutical Industries Limited	65.03	ILS	5	1	1	2	1	1	6.2	18.7
DANSKE DC	Danske Bank A/S	133.50	DKK	5	1	1	4	5	1	6.8	18.4
TECK/B CN	Teck Resources Limited Class B	28.11	CAD	5	1	3	1	4	1	7.6	11.7
CNA LN	Centrica plc	1.31	GBP	5	1	1	3	5	1	10.9	9.6
1COV GR	Covestro AG	45.06	EUR	5	1	1	1	5	1	7.6	9.5
LUN DC	H. Lundbeck A/S	287.30	DKK	5	2	1	1	5	1	14.8	8.7
TEMN SW	Temenos AG	115.00	CHF	5	5	1	1	2	1	34.3	8.3
PSN LN	Persimmon Plc	20.08	GBP	5	2	1	2	4	1	7.2	8.2
TW/ LN	Taylor Wimpey plc	1.40	GBP	5	2	1	4	5	1	6.7	5.8
TNET BB	Telenet Group Holding NV	42.68	EUR	5	2	4	1	3	1	16.4	5.8
5002 JP	Showa Shell Sekiyu K.K.	1,586.00	JPY	5	1	1	2	4	1	8.5	5.4
B4B GR	METRO AG	13.30	EUR	5	1	1	4	2	1	12.4	5.4
EO FP	Faurecia SA	33.40	EUR	5	1	1	1	5	1	5.9	5.0
ETL FP	Eutelsat Communications SA	17.88	EUR	5	2	2	2	2	1	13.2	4.9
4004 JP	Showa Denko K.K.	3,430.00	JPY	5	2	1	3	2	1	3.4	4.7
PNDORA DC	Pandora A/S	275.00	DKK	5	1	1	1	5	1	5.8	4.7
BSL AU	Bluescope Steel Limited	11.88	AUD	5	1	2	2	5	1	6.6	4.5
8036 JP	Hitachi High-Technologies Corp.	3,455.00	JPY	5	2	1	2	4	1	10.0	4.4
5938 JP	LIXIL Group Corp.	1,390.00	JPY	5	1	1	4	5	1	23.2	4.0
PSM GR	ProSiebenSat.1 Media SE	15.07	EUR	5	1	1	1	5	1	7.4	3.9
ATC NA	Altice Europe NV Class A	1.85	EUR	5	1	3	4	3	1	NM	3.7
YZJSGD SP	Yangzijiang Shipbuilding (Holdings) Ltd.	1.27	SGD	5	2	2	2	1	1	9.0	3.7
RMG LN	Royal Mail plc	2.88	GBP	5	1	1	4	5	1	10.7	3.7
3436 JP	SUMCO Corporation	1,226.00	JPY	5	1	2	2	5	1	6.3	3.3
BATS LN	British American Tobacco p.l.c.	24.75	GBP	5	1	5	1	5	2	7.8	71.7
1928 HK	Sands China Ltd.	33.70	HKD	5	3	2	1	4	2	15.6	33.4
4502 JP	Takeda Pharmaceutical Co. Ltd.	3,995.00	JPY	5	2	3	2	5	2	33.6	29.3
NESTE FH	Neste Corporation	73.90	EUR	5	4	1	2	1	2	16.5	22.4
8035 JP	Tokyo Electron Ltd.	12,640.00	JPY	5	1	4	1	5	2	9.6	19.3
9503 JP	Kansai Electric Power Company Incorporated	1,714.50	JPY	5	2	2	4	3	2	10.7	14.8
WPP LN	WPP Plc	8.66	GBP	5	1	4	4	5	2	8.6	14.0
CA FP	Carrefour SA	15.29	EUR	5	1	3	5	3	2	13.8	13.6
EN FP	Bouygues SA	30.90	EUR	5	1	2	4	4	2	11.0	12.8
LHA GR	Deutsche Lufthansa AG	19.82	EUR	5	1	2	5	5	2	4.8	10.9
AKERBP NO	Aker BP ASA	245.00	NOK	5	3	2	1	3	2	18.8	10.5
FMG AU	Fortescue Metals Group Ltd	4.44	AUD	5	2	4	3	2	2	10.2	9.7
UBI FP	Ubisoft Entertainment SA	70.70	EUR	5	3	2	1	2	2	22.5	9.0
ATO FP	Atos SE	69.74	EUR	5	1	2	5	5	2	7.2	8.6
STO AU	Santos Limited	5.79	AUD	5	3	1	4	4	2	12.2	8.3
WDH DC	William Demant Holding A/S	194.50	DKK	5	4	2	2	2	2	21.0	7.6
ELISA FH	Elisa Oyj Class A	37.95	EUR	5	5	2	1	1	2	18.7	7.4
7272 JP	Yamaha Motor Co. Ltd.	2,171.00	JPY	5	2	3	2	5	2	7.1	7.0
REA AU	REA Group Ltd	74.03	AUD	5	5	1	1	2	2	28.7	7.0
322 HK	Tingyi (Cayman Islands) Holding Corp.	9.59	HKD	5	2	1	2	5	2	18.0	6.7
FR FP	Valeo SA	25.37	EUR	5	1	3	2	5	2	7.7	6.7
BDEV LN	Barratt Developments PLC	4.77	GBP	5	2	1	2	4	2	7.0	6.2
BIRG ID	Bank of Ireland Group Plc	4.98	EUR	5	1	1	5	5	2	7.6	6.2
BKG LN	Berkeley Group Holdings plc	35.45	GBP	5	3	1	2	1	2	9.2	5.8
ATM NZ	a2 Milk Company Ltd.	11.14	NZD	5	5	2	1	3	2	29.7	5.5
6753 JP	Sharp Corporation	1,122.00	JPY	5	1	4	4	3	2	7.9	5.5
ORNBV FH	Orion Oyj Class B	32.37	EUR	5	4	2	1	1	2	20.7	5.4
LLC AU	Lendlease Group	11.44	AUD	5	1	1	2	5	2	12.0	4.4
GFS LN	G4S plc	2.00	GBP	5	2	2	5	5	2	10.7	4.0
4182 JP	Mitsubishi Gas Chemical Company Inc.	1,677.00	JPY	5	1	2	3	5	2	7.7	3.6
BAB LN	Babcock International Group PLC	5.02	GBP	5	1	4	5	4	2	6.0	3.2
FLT AU	Flight Centre Travel Group Limited	42.36	AUD	5	3	1	3	3	2	14.3	3.0

Source: Empirical Research Partners Analysis.

Appendix 3: The Emerging Markets: Large-Capitalization Stocks
The Highest Quintile of Arbitrage Risk and the Top-Two Quintiles of the Core Model
Sorted by Capitalization Within Core Model Rank
As of Early-January 2019

				Quintiles (1=Best, 5=Worst)							
					Super Factors						
Symbol	Company	Price (Local)	Listing Currency	Arbitrage Risk (1=Lowest; 5=Highest)	Valuation	Capital Deployment	Earnings Quality and Trend	Market Reaction	Core Model	Forward-P/E Ratio	Market Capitalization ($ Billion)
JBSS3 BZ	JBS S.A.	12.11	BRL	5	1	1	5	1	1	8.1 x	$9.2
011170 KS	Lotte Chemical Corp.	272,500.00	KRW	5	1	1	4	5	1	5.3	8.3
UNTR IJ	PT United Tractors Tbk	27,975.00	IDR	5	2	1	1	2	1	8.7	7.4
GARAN TI	Turkiye Garanti Bankasi Anonim Sirketi	8.16	TRY	5	1	2	3	3	1	5.1	6.2
HPCL IN	Hindustan Petroleum Corporation Limited	248.95	INR	5	1	3	2	5	1	8.2	5.5
2408 TT	Nanya Technology Corporation	51.80	TWD	5	1	2	1	5	1	5.9	5.2
TCELL TI	Turkcell Iletisim Hizmetleri A.S.	12.44	TRY	5	2	1	2	1	1	8.4	4.9
AKBNK TI	Akbank TAS	5.97	TRY	5	1	2	3	4	1	5.7	4.7
200625 CH	Chongqing Changan Automobile Company Limited Class B	3.85	HKD	5	1	1	5	5	1	5.8	4.6
INKP IJ	PT Indah Kiat Pulp & Paper Tbk	11,150.00	IDR	5	1	1	3	3	1	5.5	4.3
YY US	YY Inc. Sponsored ADR Class A	65.27	USD	5	1	1	4	4	1	8.5	4.3
PGAS IJ	PT Perusahaan Gas Negara (Persero) Tbk Class B	2,270.00	IDR	5	2	1	2	3	1	15.2	4.1
2327 TT	Yageo Corporation	296.50	TWD	5	1	3	3	1	1	3.7	4.0
THYAO TI	Turk Hava Yollari A.O.	15.06	TRY	5	1	1	3	1	1	4.5	3.8
6488 TT	GlobalWafers Co. Ltd.	273.00	TWD	5	2	2	1	1	1	7.6	3.8
ISCTR TI	Turkiye Is Bankasi Anonim Sirketi Class C	4.24	TRY	5	1	3	3	5	1	3.6	3.4
RECL IN	REC Limited	119.95	INR	5	1	3	4	1	1	3.9	3.3
ADRO IJ	PT Adaro Energy Tbk	1,390.00	IDR	5	1	1	2	5	1	8.0	3.2
JD US	JD.com Inc. Sponsored ADR Class A	22.76	USD	5	2	2	2	5	2	41.7	33.2
CTRP US	Ctrip.com International Ltd Sponsored ADR	29.18	USD	5	2	1	4	5	2	25.5	16.2
SUZB3 BZ	Suzano Papel e Celulose SA	35.85	BRL	5	3	2	1	1	2	5.0	10.8
CIEL3 BZ	Cielo	10.06	BRL	5	1	4	3	5	2	8.4	7.9
AVAL CB	Grupo Aval Acciones y Valores SA	1,020.00	COP	5	2	3	2	4	2	8.3	7.7
CCRO3 BZ	CCR S.A.	11.90	BRL	5	3	4	2	2	2	12.9	6.9
YES IN	Yes Bank Limited	186.95	INR	5	2	3	2	5	2	8.0	6.3
009150 KS	Samsung Electro-Mechanics Co. Ltd	95,500.00	KRW	5	2	4	2	1	2	3.0	6.2
INDIGO IN	InterGlobe Aviation Ltd	1,114.05	INR	5	3	4	1	4	2	60.9	6.1
QNBFB TI	QNB Finansbank A.S.	9.01	TRY	5	4	1	2	3	2	NM	5.9
MOMO US	Momo Inc Sponsored ADR Class A	26.22	USD	5	2	2	1	3	2	10.3	5.7
2474 TT	Catcher Technology Co. Ltd.	211.50	TWD	5	1	1	3	5	2	6.0	5.3
IHFL IN	Indiabulls Housing Finance Ltd.	793.50	INR	5	2	2	1	5	2	7.5	4.8
GLO PM	Globe Telecom Inc.	1,860.00	PHP	5	2	5	1	2	2	13.2	4.7
DLFU IN	DLF Limited	179.55	INR	5	4	3	1	1	2	25.0	4.5
KROT3 BZ	Kroton Educacional S.A.	9.13	BRL	5	2	1	5	4	2	NM	4.2
GENM MK	Genting Malaysia Bhd.	3.11	MYR	5	1	1	5	5	2	15.3	4.2

Source: Empirical Research Partners Analysis.