TWO SIGMA

Street View

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BY JEFFREY N. SARET AND LAUREN M. SHOLDER

EXECUTIVE SUMMARY Two Sigma surveyed its macro Alpha Capture contributors about the event risks in today's financial markets. Respondents cite the loss of Central Bank credibility as their top concern. Emerging Market equities appear the most vulnerable to these macro event risks.

Inside:
Two Sigma Macro Event Risk Study: Loss of Central Bank Credibility Continues to Worry the Market

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TWO SIGMA MACRO EVENT RISK STUDY:
LOSS OF CENTRAL BANK CREDIBILITY CONTINUES TO WORRY THE MARKET[1]

BY THEIR NATURE, UNCERTAIN MACRO EVENTS POSE RISKS TO INVESTORS. It may seem vexing to quantify their likelihood, but that does not mean it's not worth the effort. To minimize the complexity of this problem, Two Sigma recognizes the value—and sometimes the wisdom—of a well-informed crowd. The sell-side professionals who contribute to Two Sigma's Macro Alpha Capture platform constitute one such crowd. These individuals enjoy a unique perspective by sitting at the intersection of their organizations' research teams, and the feedback from their institutional clients. Two Sigma surveyed many of these macro specialists about the market-related event risks that concern them. More than 125, a subset of the full panel, responded between September 26 and October 5. Chief among their concerns is a loss in central bank credibility.

RANKING THE RISKS: WHICH RISK EVENTS PRESENT THE GREATEST CONCERN?

Among respondents, 65 percent worry about the loss of G3 central bank (i.e. the Fed, BOJ, and ECB) credibility, defined as the ability of those banks to influence economic growth and market prices. This concern has increased more than ten percentage points since a year ago, perhaps in response to another year of observations about developed market monetary policy. The G3 banks continue to wage a protracted battle to encourage growth amidst low inflation and sluggish economies. For example, the Bank of Japan announced in early September plans to overshoot its previous two percent inflation target, with a focus on long-term government bond yields. For its part, the ECB has pushed interest rates below zero to boost the tepid one percent inflation rate. Many wonder what the Federal Reserve will do in the face of conflicting signals about the health of the U.S. economy and inflation.

Respondents cited the upcoming money market reform as the least concerning risk. Fewer than six percent of respondents selected this event as a concern, but they worry it is both the most likely to occur (47 percent probability) and the most imminent (9 month timeframe).[2] Survey respondents might believe that the market has already adjusted to the U.S. money market regulatory reform. Since the beginning of 2016, prime money market fund assets have fallen by half as money flowed to government and retail money market funds.

Several other changes in macro event risk warrant notice. A China hard landing and an emerging market sovereign debt crisis, while very concerning to respondents in January's survey, no longer appear high on respondents' list of concerns. Conversely, the risk of a European currency union break up has increased more than two-fold since the last survey in January. Brexit likely fuels some of that concern.

1 Please see appendix for more information on methodology.
2 See charts in the appendix for details.

CHART 1: MOST FREQUENTLY SELECTED MACRO RISKS

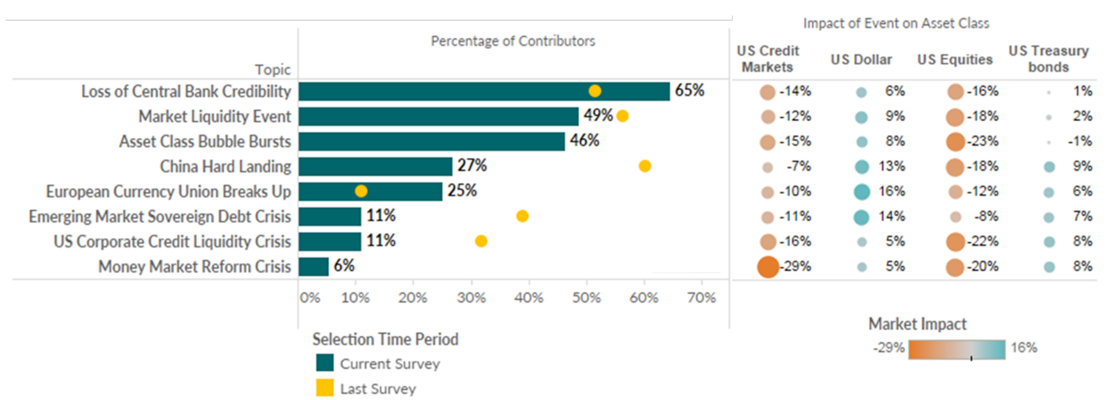
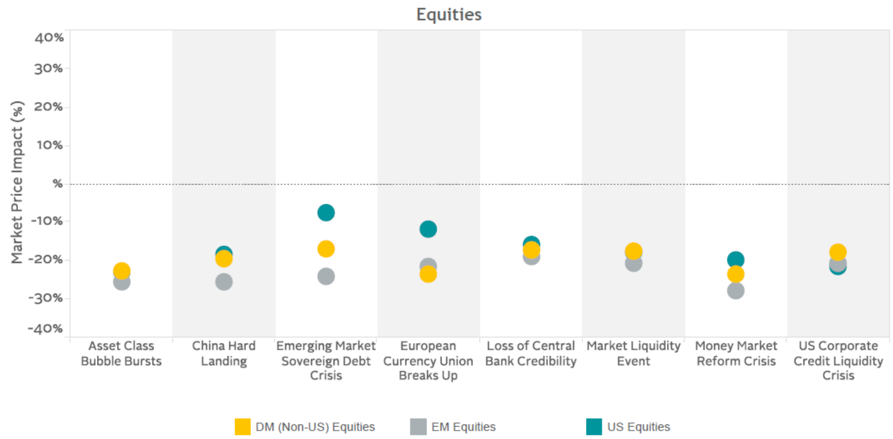
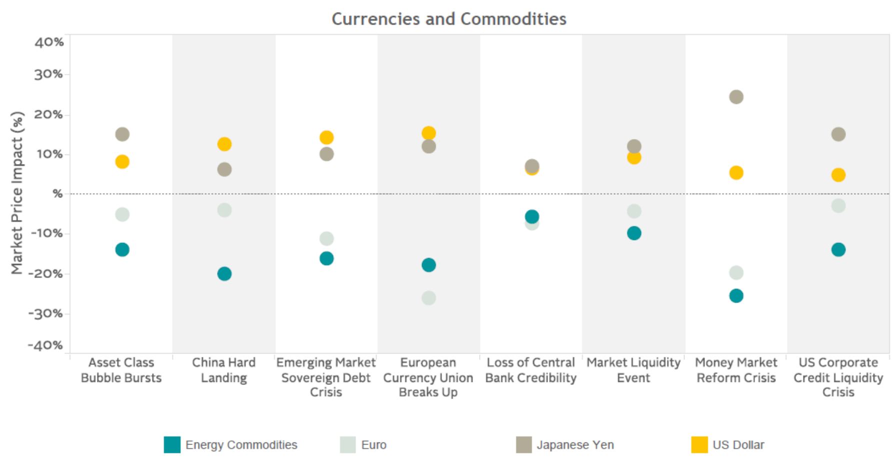
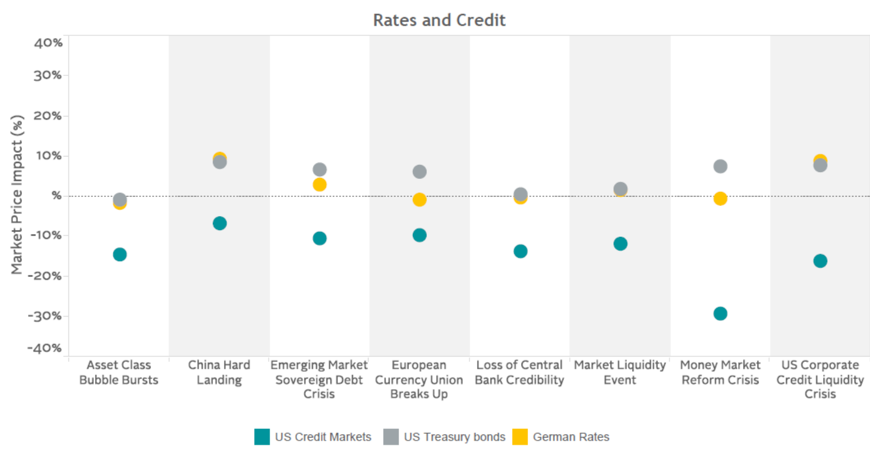


CHART 2: EXPECTED EFFECTS OF MACRO EVENTS RISKS ON MARKETS







Note: Based on 127 respondents, a subset of the full Two Sigma Macro Alpha Capture panel.

SIZING THE EFFECTS: HOW WILL THE RISK EVENTS AFFECT MARKETS?

While survey respondents seem to fear a China hard landing and EM debt crisis less, they harbor concerns that EM equities may prove especially volatile after strengthening 20 percent in 2016 (after sliding the same amount in 2015). Respondents predict 20-30 percent declines in EM equity returns should any of these macro events transpire. Other non-U.S. developed market equities seem just as vulnerable. Respondents expect only slightly smaller declines in those equity markets. Energy markets also appear vulnerable.

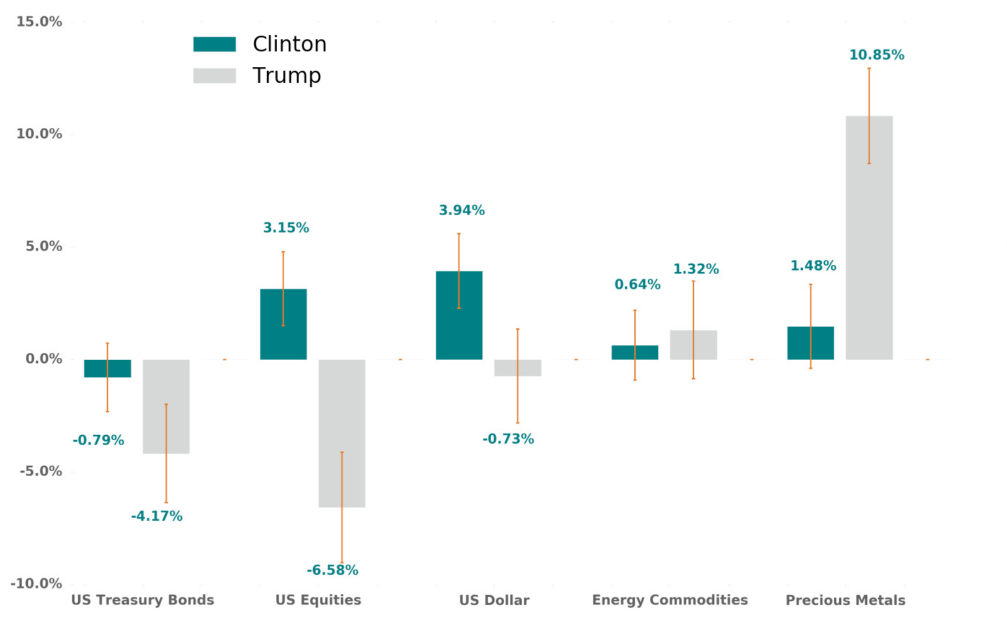
THE US PRESIDENTIAL ELECTION 2016

The survey also sought to explore the perceived importance of the upcoming U.S. election on the markets. Survey respondents believe that the difference in asset class returns between a Hillary Clinton and Donald Trump victory might amount to three to ten percent during 2017, depending on the asset class.[3]

The absolute return levels reflect participants' belief in a "flight to safety" if Donald Trump wins in November. According to survey respondents, a Trump victory could herald a ten percent gain in precious metals, but a five percent loss in U.S. equities and a four percent loss in U.S. Treasury bond prices. Conversely, if Clinton wins, respondents expect U.S. equities (+4 percent) and the US dollar (+5 percent) to strengthen. The expected change to other asset classes did not show statistical significance.

Since market returns during 2017 will likely stem from factors beyond just the U.S. presidential election, the relative difference in market expectations between a Clinton or Trump victory may prove more insightful. Relative to a potential Trump presidency, respondents believe that U.S. Equities (+10 percent), the U.S. dollar (+5 percent), and U.S. Treasury bonds (+3 percent) will all strengthen more, or fall less, during the first year of a

CHART 3: EXPECTED 2017 MARKET CHANGES UNDER A TRUMP AND CLINTON PRESIDENCY



	US Treasury Bonds	US Equities	US Dollar	Energy Commodities	Precious Metals
Trump–Clinton Outcome	-2.88%	-9.74%	-4.61%	+0.70%	+9.23%

Note: The Presidential Survey Questions are based on 120 respondents, a subset of the full Two Sigma Macro Alpha capture panel. Orange lines show 95 percent confidence intervals.

3 These views represent those of the survey respondents and not necessarily those of Two Sigma Investments, LP, any of its affiliates, or the authors of this paper.

Clinton administration. The positive correlation between equities and fixed income may seem counterintuitive to some, though political pontificators might point to the candidates' statements about both the Federal Reserve and the value of honoring U.S. sovereign debt as a potential explanation. Consistent with that argument, respondents posit that a Trump victory would strengthen precious metals (+9 percent) like gold more than a Clinton win.

IMPLICATIONS

Investors face many challenges when allocating assets for the long-term, particularly when trying to quantify the market effects of idiosyncratic events. Trying to compile a 360 degree perspective on the markets, using traditional and non-traditional sources of information like the wisdom of a well-informed crowd, might help. It is our hope that this Street View provides an additional, but certainly not a definitive, lens with these survey results.

APPENDIX

TWO SIGMA MACRO EVENT RISK STUDY METHODOLOGY AND OTHER SUMMARY STATISTICS

Two Sigma introduced its Macro event risk study in September 2015 to quantify the potential effects of economically significant, idiosyncratic or low probability events. The third survey took place between Sep 26 through Oct 5, 2016, and more than 125 sell-side professionals, a subset of the full Macro Alpha Capture panel, from the Americas, Europe, and Asia responded. These contributors participate in Two Sigma's Macro Alpha Capture Trade Ideas Platform[4] and work in sales, trading, and research roles at broker-dealer and research firms.

The web-based survey seeks to quantify exogenous market risk events by presenting users with a list of risks for selection and evaluation. Conditional upon the risks selected, respondents assessed the likelihood of each risk, the likely timing of the event within three timeframes, and quantified the event's effect on the return of ten macro instruments on a scale from -50 percent to +50 percent. Respondents also had the opportunity to write in other event risks not already listed.

As an addendum to the most recent survey respondents also forecast the US Presidential election on November 8, 2016 and the likely market impact in 2017 of each candidate's victory on the performance of five asset classes: US treasury bonds, US equities, the US dollar, energy commodities, and precious metals (e.g. gold, silver) in each scenario.

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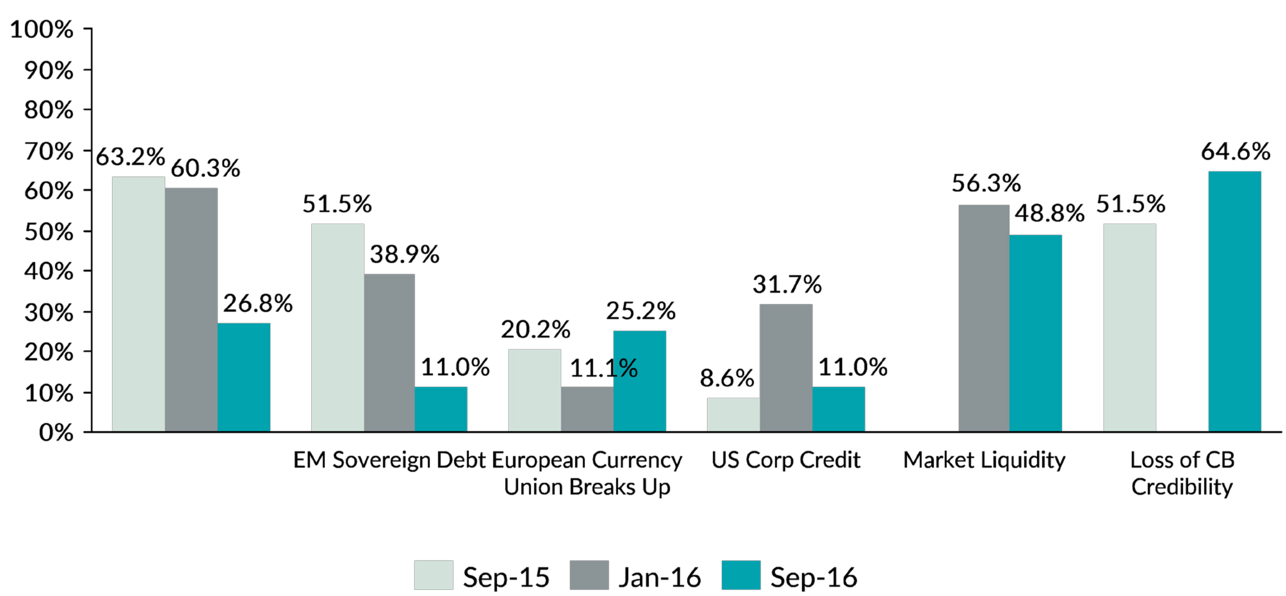
CHART 4: CHANGE IN CONCERN LEVELS FOR MACRO EVENT RISKS



Note: Based on 127 respondents, a subset of the full Two Sigma Macro Alpha Capture panel.

4 The Macro Alpha Capture Trade Ideas Platform is a component of Two Sigma's broader Alpha Capture System, which aggregates long and short trade ideas from institutional sell-side sales professionals (not analysts) around the world and seeks to screen such data for legal and regulatory compliance. By their nature, these data points reflect the subjective assumptions and judgments of the contributors to the Two Sigma Alpha Capture system (and, in certain circumstances, as interpreted by the authors of this report).

CHART 5: PROBABILITY OF OCCURRENCE

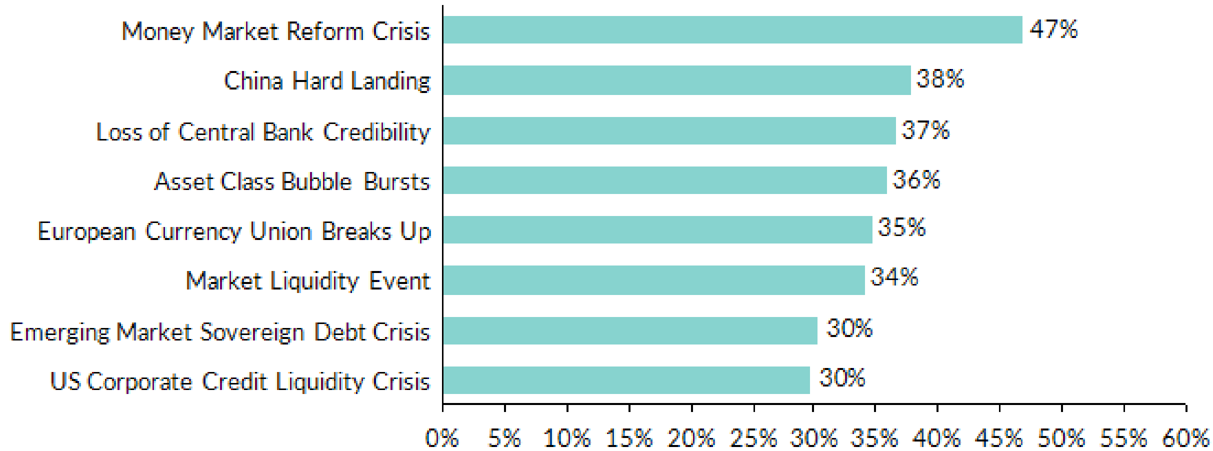


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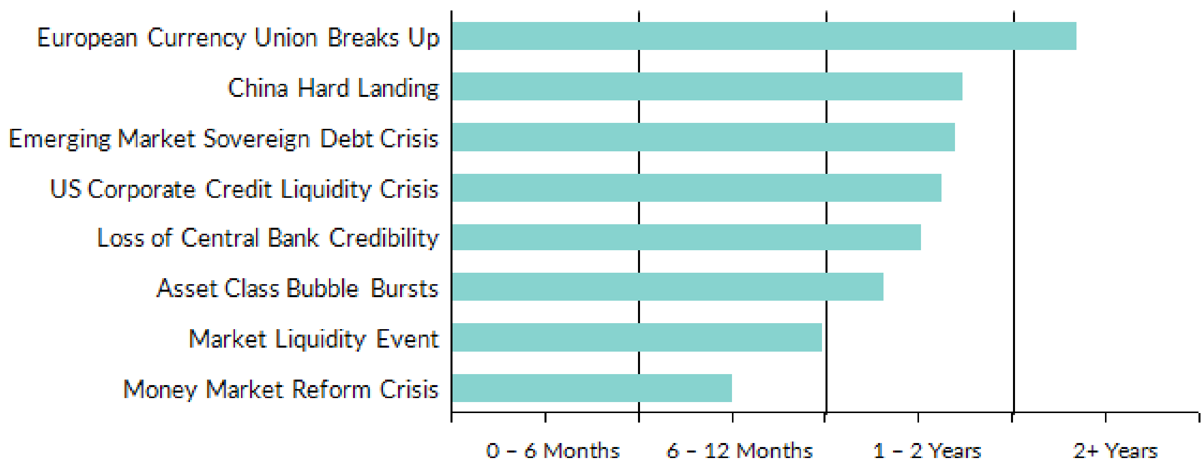
CHART 6: LIKELY TIMING FOR EACH EVENT



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INTERESTING TECHNOLOGY-RELATED ARTICLES

Two Sigma views itself as a technology company that applies a rigorous, scientific method-based approach to investment management. Our technology is inspired by a diverse set of fields including artificial intelligence and distributed computing. Occasionally, we read articles in the popular press that describe applications of technology that we find interesting, thought-provoking, and relevant for people thinking about improving the investment management process. Below is a subset of the articles we read this month. Please do not view the inclusion of these articles as an endorsement by Two Sigma of their viewpoints or the companies discussed therein. Two Sigma welcomes discussions (and contributions) about these and other such technology-related articles.

"Facebook and Google Will Stretch Internet Cable from LA to Hong Kong" by Klint Finley, Wired, October 12, 2016 (https://www.wired.com/2016/10/facebook-google-wil-stretch-internet-cable-la-hong-kong/)

Like the coal and other early miners of the American west, industry behemoths are building their own infrastructure. "Two Internet giants announced they will build the longest and highest capacity undersea fiber-optic cable between the two continents. Once completed, the Pacific Light Cable Network—PLCN for short—will stretch 8,000 miles from Los Angeles to Hong Kong with an estimated capacity of 120 terabits-per-second. That's about twice the capacity of the Oregon-to-Japan cable 'Faster,' which Google recently launched with several telco partners." No report yet on whether anyone will host a ceremony to hammer in a golden spike to complete the buildout.

"Unlike Basically Always, The Cubs Didn't Lose" by Neil Paine, FiveThirtyEight, October 12, 2016, (http://fivethirtyeight.com/features/unlike-basically-always-the-cubs-didnt-lose/)

The Law of Large Numbers took on the Curse of the Billy Goat, and statistics (finally!) won. Down three runs during the fourth game (out of five) in a playoff series against the San Francisco Giants, "Chicago's series win probability dwindled to just 55 percent after Conor Gillaspie singled to lead off the Giants' half of the inning; that was down from a peak of 96 percent early in Game 3. Nine other times in franchise history, the Cubs had a series win probability of 55 percent or greater and saw it drop from its peak by at least 40 percentage points — and all nine times, they ended up losing the series." Many Cubs fans still expect the team to not just break their hearts, but to clean up the Goat waste afterwards.

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