TWO SIGMA

Street View

AUGUST 2015

BY JEFFREY N. SARET AND ALEX DEMENTIEV

EXECUTIVE SUMMARY The U.S. Federal Reserve will likely soon hike interest rates for the first time in almost seven years. The only question is "how fast?" The short-term answer to this question appears very uncertain, with the market implied probability of a September rate hike close to a coin flip. However, the longer-term outlook seems both more important and more stable, with the futures market implying that the Fed will hike rates twice between now and April 2016.

Inside:
Federal Reserve Rate Hike in September?

www.twosigma.com

NEW YORK HOUSTON
LONDON HONG KONG

Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.

FEDERAL RESERVE RATE HIKE IN SEPTEMBER?

JANET YELLEN, CHAIRPERSON of the U.S. Federal Reserve Board of Governors once noted in a speech, "The June and August FOMC [Federal Open Market Committee] statements made clear that the current policy stance is highly accommodative, so short-term interest rates have to go up to prevent an eventual increase in inflation. The policy challenge is to consider the question: 'how fast?' At this point, we still face some uncertainties about the strength of the economic expansion and the strength of job creation." These comments date back to September 2004 when Dr. Yellen was making her first public remarks as then president of the San Francisco Federal Reserve bank, but the comments seem nearly as apropos today.[1]

The U.S. Federal Reserve will likely soon hike interest rates for the first time in almost seven years, but many market participants seem to be focusing on the wrong issue. As in 2004, the question is "how fast?" This question consists of multiple components: when will the Fed first begin to raise rates, and at what pace will the Fed raise rates until the fed funds target reaches the Fed's estimated equilibrium rate? For many market participants, the "when" question (i.e., at the September 16-17, 2015 FOMC meeting or at a subsequent meeting) dominates the discussion, in part because the answer to that question remains more uncertain today than during the previous two episodes of Fed rate hiking. Data from the fed funds futures market suggests that the likelihood of a September rate hike resembles a coin flip, a level higher than the early July implied probability (20 percent) but below the 85-95 percent probabilities implied during the months before the Fed last hiked - June 2004 and June 1999.

1 See http://www.frbsf.org/our-district/press/presidents-speeches/yellen-speeches/2004/september/yellen-us-economy-monetary-policy-seattle/

For longer-term investors however, the "when" question seems of second-order importance. "At what pace" and "how much" (i.e., the equilibrium level) will the Fed raise rates during the foreseeable future should remain top of mind, because these issues have a more significant effect on the long-term economic and financial outcomes than whether the first rate hike occurs in September or a few months later. The consensus views of market participants to those latter two questions have not changed. Based on fed funds futures data, the market continues to expect two rate hikes of 25 basis points each between now and April 2016. Despite the recent volatility and increased global uncertainty, this consensus view has barely changed throughout the summer months. Simply stated, the long-term picture has remained stable even as the short-term outlook has become cloudier.

SHORT-TERM UNCERTAINTY

Janet Yellen's September 2004 speech also noted the importance of not surprising the markets with monetary policy decisions. "Clear communication can also help avoid financial disruptions when policy enters a new phase. I think that what happened in June [2004] is a perfect case in point. It was my first meeting, and the Committee voted to raise rates a quarter point for the first time in three years. Some people asked me afterwards if the discussion at the meeting had been kind of uninteresting, because the outcome had been very well anticipated by market participants. I responded, 'On the contrary. I take this as a mark of success of the FOMC's new strategy.'"

Based on this definition of success, the Fed might deem its communication efforts a failure if it decides to hike rates in September. The level of uncertainty today, one month prior to the next FOMC meeting, remains twice as high as the level of uncertainty before the past two comparable periods - June 2004 and June 1999.

First, consider the context to the June 2004 decision.

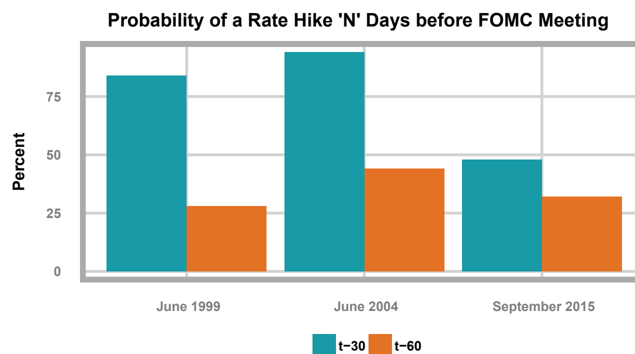
Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.

For months leading up the June 2004 rate hike, the Fed seemed to telegraph its policy. In August 2003, the Fed promised "policy accommodation...for a considerable period."[2] The Fed's meeting minutes only amended that language in January 2004 when the committee promised to "be patient in removing its policy accommodation."[3] In May 2004, the Fed again revised its language to reveal that "the Committee believes that policy accommodation can be removed at a pace that is likely to be measured."[4]

These communications proved effective in shaping market expectations. Two months prior to the June 2004 meeting, the fed funds futures market assigned only a 44 percent probability that the Fed would hike rates in June (see Figure 1). Two days after the Fed released its May 2004 meeting minutes, the market implied probability of a June rate hike increased to more than 90 percent. When the Fed finally raised rates in June, the event proved uneventful and marked a "success of the FOMC's new strategy" of clearly communicating its intentions.

The situation in 1999 appears similar, though the Fed operated more opaquely during that era.[5] Two months prior to the June 1999 FOMC meeting, the fed funds futures markets implied a 28 percent probability of a rate hike. Amid a slow trickle of newly available

FIGURE 1



Notes: Implied probability of a rate hike based on the fed funds futures market. Bar charts note the probability one month ("t-30") and two months ("t-60") prior to the announcement. Data and methodology from Bloomberg through August 15.

economic data, the probability drifted higher for several weeks and nearly reached 85 percent thirty days before the June FOMC meeting. When the FOMC finally announced a 25 basis point change in the fed funds target rate on June 30, 1999, few market participants seemed surprised.

The market today appears far more uncertain about a rate hike in September than during the month before the June 2004 and June 1999 rate hikes. While 82 percent of economists polled by the Wall Street Journal believe the Fed will hike rates next month, the fed funds futures market implies a probability of less than fifty percent.[6] That probability has fluctuated during the summer, falling as low as twenty percent during the most recent Greek Crisis, but has remained consistently between 40 and 50 percent for most of the past three months. Whatever the FOMC decides next month, it appears that approximately half of the

2 http://www.federalreserve.gov/monetarypolicy/files/FOMC20030812meeting.pdf

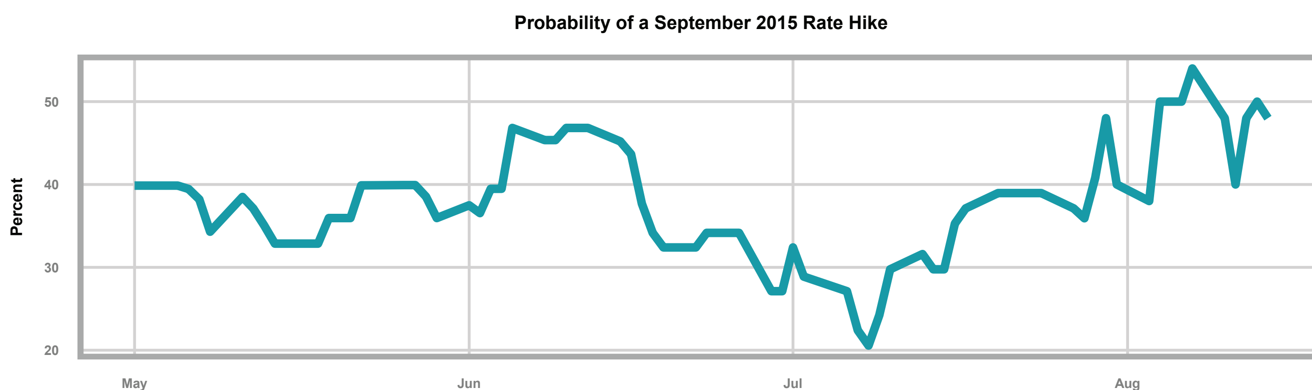
3 http://www.federalreserve.gov/boarddocs/press/monetary/2004/20040128/default.htm

4 http://www.federalreserve.gov/boarddocs/press/monetary/2004/20040504/default.htm

5 Before 2004, the Fed the released its meeting minutes only after the conclusion of the subsequent meeting, rendering such communications useful only for historical context

6 http://blogs.wsj.com/economics/2015/07/16/wsj-survey-most-economists-expect-fed-will-raise-rates-in-september/

FIGURE 2



Notes: Implied probability of a rate hike based on the fed funds futures market. Data and methodology from Bloomberg through August 15.

Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.

market will not have anticipated the decision.

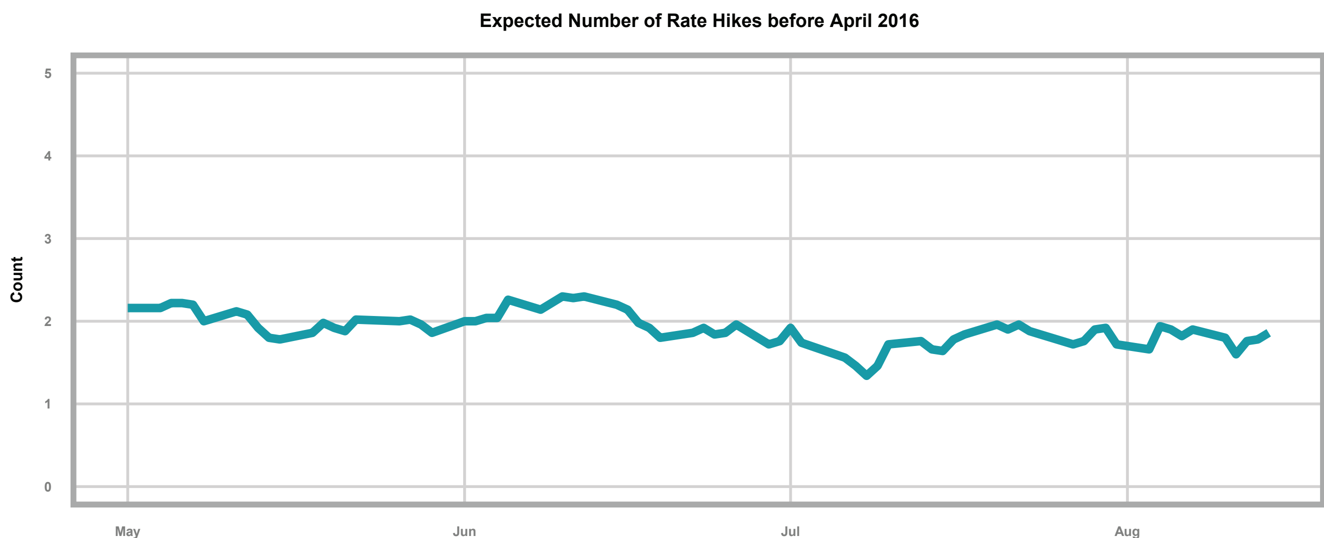
LONGER-TERM CONSENSUS AND IMPLICATIONS

This short-term uncertainty may not matter. For asset allocators making decisions with multi-month horizons, longer-term rates prove more significant. Janet Yellen in September 2004 concluded her first public remarks as a Federal Reserve Bank president by arguing, “Economic developments are affected by longer-term interest rates, equity values, the exchange rate, and other asset values - and these factors depend not only on the current funds rate, but more importantly on the expected future path of the funds rate.”

In contrast to the short-term uncertainty about Fed policy, the market’s outlook over longer horizons has remained steady (Figure 3). For the past three months, the market has expected only two 25 basis point hikes before April 2016. That value has hardly budged, even as the probability of a “liftoff” rate hike in September fluctuated during the summer.

Based on guidance from the current Chairperson of the Federal Reserve, asset allocators may be well served by shifting their focus from the confusing “when” question - i.e., will fed funds rates rise in September or later - to the seemingly less confusing “over what time period” and “how much” questions.

FIGURE 2



Notes: Expected number of rate hikes based on the fed funds futures market. Data from Bloomberg through August 15.

Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.

INTERESTING TECHNOLOGY-RELATED ARTICLES

Two Sigma is a technology company that applies a rigorous, scientific method-based approach to investment management. We draw upon a diverse set of fields to inspire our technology, 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.

"Why Some Start-Ups Are Called Tech Companies and Others Are Not" by Jim Kerstetter, *The New York Times,* August 2, 2015 (http://bits.blogs.nytimes.com/2015/08/02/in-search-of-the-slippery-definition-of-the-modern-tech-company/?smprod=nytcore-iphone&smid=nytcore-iphone-share&_r=0).

"These days, every company is at least a little bit of a tech company. Some Wall Street banks employ more tech workers than all but the biggest Silicon Valley companies...So why then are some start-ups called tech companies and others just ... companies?" The answer, according to this article, depends on how innovative and R&D focused a company is, and whether that company is focused on the long-term. For example, a logistics company that matches customers with transportation services can call itself a "tech company." However, "in a few years, maybe being labeled a logistics company won't be such a bad thing."

"Summon the Comfy Chairs" *The Economist,* August 8, 2015 (http://www.economist.com/news/science-and-technology/21660510-domestic-furniture-may-soon-have-mind-its-own-summon-comfy-chairs).

Advances in home automation continue to make progress. "Furniture that collaborates, [Mary] Poppins-like, with its owners may be just around the corner. If groups of researchers working on the idea in America and Europe have their way, you may soon be able to call a robot footstool, so that you can put your feet up at the end of a long day, make use of a robotic toolbox when doing-it-yourself of a weekend and even—yes—install a robot toybox in the nursery that will encourage your children to tidy up after themselves." One might wonder how long it would take children to either hack such a robot toybox or break it.

Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.

IMPORTANT DISCLAIMER AND DISCLOSURE INFORMATION

This document has been prepared by the author(s) and is provided for informational and educational purposes only. Under no circumstances should this document or any information herein be construed as investment advice, or as an offer to sell or the solicitation of an offer to buy any securities or other financial instruments, including an interest in any investment fund sponsored or managed by Two Sigma Investments, LLC, Two Sigma Advisers, LLC or any of their affiliates (collectively, "Two Sigma"). Further, this document does not constitute and shall not be construed as an advertisement, or an offer or solicitation for any brokerage or investment advisory services, by Two Sigma.

The views expressed herein represent only the current opinions of the authors of this document, which may be different from, or inconsistent with, the views of Two Sigma and/or any of their respective market positions. Such views (i) may be historic or forward-looking in nature, (ii) reflect significant assumptions and subjective judgments of the author(s) of this document, and (iii) are subject to change without notice. While the information herein was obtained from or based upon sources believed by the author(s) to be reliable, Two Sigma has not independently verified the information and provides no assurance as to its accuracy, reliability, suitability or completeness. Two Sigma may have market views or opinions that materially differ from those discussed, and may have a significant financial interest in (or against) one or more of such positions or theses and/or related financial instruments.

In some circumstances, this document may employ data derived from third-party sources. No representation is made as to the accuracy of such information and the use of such information in no way implies an endorsement of the source of such information or its validity. All information is provided as of the date of this document, and Two Sigma undertakes no obligation to update the information herein.

Any discussion of past performance is not necessarily indicative of future results, and Two Sigma makes no representation or warranty, express or implied, regarding future performance or events. Any statements regarding future events constitute only the subjective views or beliefs of the author(s). Words like "believe," "expect," "anticipate," "promise," "plan," and other expressions or words of similar meanings, as well as future or conditional verbs such as "will," "would," "should," "could," or "may" are generally intended to identify forward-looking statements. Certain assumptions have been made in the course of preparing this document. Two Sigma makes no representations or warranties that these assumptions are accurate. Any changes to assumptions made in the preparation of this document could have a material impact on the information presented.

The information contained herein is not intended to provide, and should not be relied upon for, investment, accounting, legal or tax advice. This document does not purport to advise you personally concerning the nature, potential, value or suitability of any particular sector, geographic region, security, portfolio of securities, transaction, investment strategy or other matter and the information provided is not intended to provide a basis upon which to make an investment decision. The recipient should make its own independent decision regarding whether to enter into any transaction, and the recipient is solely responsible for its investment or trading decisions.

In no event shall the author(s), Two Sigma or any of its officers, employees or representatives, be liable for any claims, losses, costs or damages of any kind, including direct, indirect, punitive, exemplary, incidental, special or, consequential damages, arising out of or in any way connected with any information contained herein. This limitation of liability applies regardless of any negligence or gross negligence of the author(s), Two Sigma, its affiliates or any of their respective officers, employees or representatives. The reader accepts all risks in relying on this document for any purpose whatsoever.

No part of this material may be reproduced in any form, or referred to in any other publication, without express written permission.

© 2015 Two Sigma Investments, LLC | ALL RIGHTS RESERVED | "Two Sigma" and "***2σ***" are trademarks of Two Sigma Investments, LLC.

Copyright © 2015 TWO SIGMA INVESTMENTS, LLC. All rights reserved. This document is distributed for informational and educational purposes only. Please see the back of this report for important disclaimer and disclosure information.