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**To hike or not to hike ... the real question is when?**

A key input into deciding how to position a portfolio is, of course, the future direction of interest rates. Given the recent low interest rate environment, market participants have been anticipating an increase in rates. However, the precise timing of such increase is much debated. The following article explains how one can use information from the futures market to develop an idea of when rates will rise.

Futures markets allow investors to gauge the expectations of participants regarding the direction of certain macroeconomic variables. For instance, one can ascertain where the market thinks the yield on a 10 year Treasury note will be next month by looking at the U.S. Treasury futures market. Effectively, markets aggregate participants' expectations. Using detailed data regarding the behavior of participants, an implied probability of a particular event can be gleaned.

This is the case for the Fed Funds futures market, for which the CME Group provides a 30-day contract based on the daily Fed Funds rate. The contracts are used by market participants to hedge interest rate exposure and to make predictions on the direction of the Fed Funds rate. Using information from these transactions, the CME Group puts together the "FedWatch Tool", which provides probabilities of a future rate hike event occurring.

The purpose of this tool is to offer a range of possible probabilities associated with each Fed Funds futures contract. The tool focuses on information from contracts that coincide with Federal Open Market Committee (FOMC) meetings. The tool then calculates the likelihood of where the target Fed Funds rate might be by the end of the month during which a meeting is held. In other words, it assigns probabilities, derived from the market's expectations, to the policy rate set by the FOMC. Every time a calculation is produced, the probability of a rate hike, by the end of the contract month, is derived by adding the probabilities associated with rates that are higher than the current target.

For example, table 1 below shows the implied probabilities associated with each possible rate in September. The probability of the target rate being 0%, 0.25%, 0.50%, 0.75%, and 1.00% by the end of September is currently 23.06%, 48.73%, 26.22%, 1.99%, and 0% respectively. Given these expectations, the probability of a rate hike by the end of September is 28.21%.

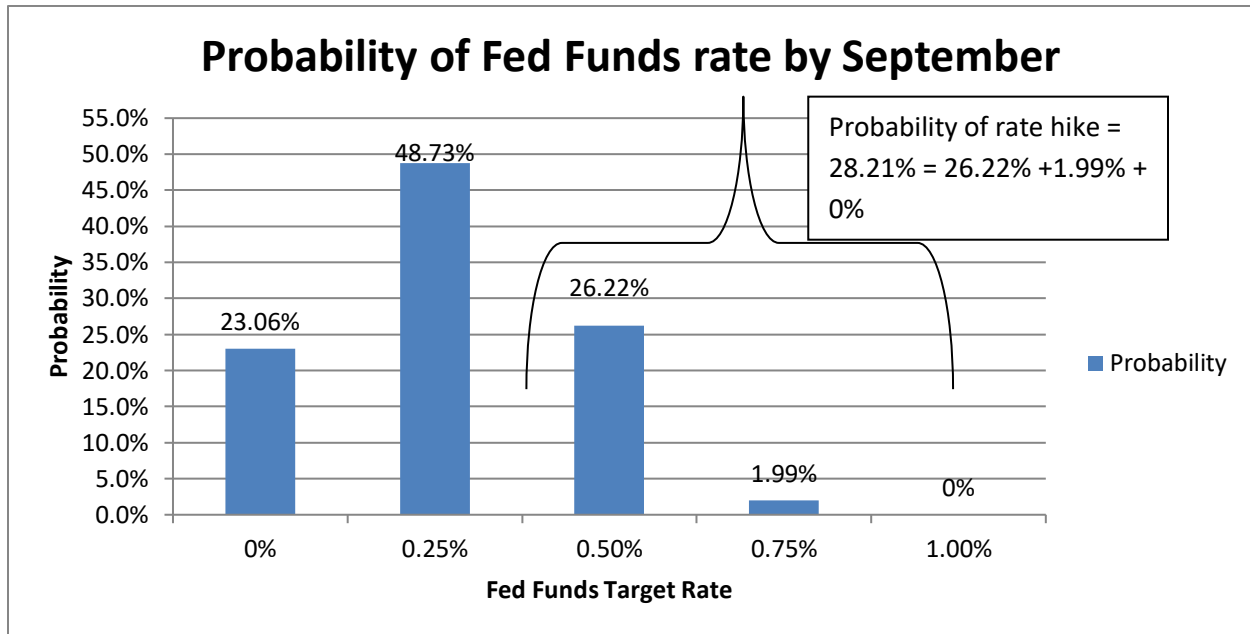
**Table 1 Fed Funds Rates and Corresponding Probabilities of Occurring for September**

Fed Funds Rate	0%	0.25%	0.50%	0.75%	1.00%
Implied Probability	23.06%	48.73%	26.22%	1.99%	0%

Source: CME Group FedWatch as of 6/16/2015

Figure 1 on the following page graphically demonstrates this.

Figure 1



Source: CME Group FedWatch as of 6/16/2015

Table 2 below shows the cumulative probabilities of a rate hike for each month that coincides with a FOMC meeting until December 2015.

Table 2 Cumulative Probabilities of a Rate Hike

FOMC Meeting Dates 2015	CME Group Implied Probability of Rate Hike (as of 6/16/2015)
Jul 28-29	5%
Sep 16-17	28%
Oct 27-28	48%
Dec 15-16	65%

Source: CME Group FedWatch as of 6/16/2015

The data above shows the implied probability of an interest rate increase after each upcoming FOMC policy meeting. As the table demonstrates, the market expects a Fed Funds hike by the end of December or perhaps sooner.

In sum, information from futures markets can be very useful in determining the market's expectation of the direction of interest rates and other macroeconomic variables.

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## **Chief Executive Officer Vanderbilt Avenue Asset Management**

Emad is the Managing Partner and Chief Executive Officer of Vanderbilt Avenue Asset Management LLC. Vanderbilt's client base includes Multi-national Corporations, Public Funds, Foundations/Endowments, and Taft Hartley accounts.

Previously, Emad was Chairman of Institutional Business at Pioneer Investments. Pioneer investments has more than \$300 Billion in assets under management. The parent of Pioneer, UniCredit S.p.A., is the largest bank in Italy and the second largest bank in Europe. Pioneer had purchased Vanderbilt Capital Advisors, of which Emad was the founder and Chief Executive Officer.

Emad has had numerous articles published in professional and academic journals such as *The Journal of Forecasting*, *The American Economist* and *The Journal of Fixed Income*. He is a Board member of The National Investment Company. Emad was a member of the Board of Advisors of the Pacific Institute, The Advisory Committee of Fulcrum Global Partners, The Chief Executive Officers Club and formerly a board member of The Foreign Policy Association. He also served on the Board of Directors of the University of Albany Foundation, NextGen Healthcare Inc., The Park Avenue Bank, AA Bank and The New Providence Fund and Associates LP.

Emad is an FINRA Arbitrator. He is also a member of the National Association for Business Economists and The Economic Club of New York. Emad served as an adjunct professor at the University of Kansas and St. John's University.

Emad holds a Bachelor of Science from the University of Albany, and a M.A. and Ph.D. in Economics from the University of Kansas.