

A Simple Bet On The Fed

What springs to mind on the word, “digital?” No, think of something else, like a binary option, also known as a digital option. These options have been common for years in over-the-counter instruments, especially in currency and interest-rate markets, and with good reason. Their payoff matrix is simple and fixed. You win a fixed amount if you win and you lose a fixed amount if you lose, and no more on either side regardless of how much the underlying asset exceeded the strike price in either direction.

Chances are you are quite familiar with binary options in your everyday life. Let’s assume, just for the sake of argument, you know someone craven enough to have bet the over/under on a football game. The usual structure of this bet is a fixed payoff to the winner; that is a binary win-lose payoff. And even if the payoff on the bet is structured so that each point over or under adds to the wager, we can restate it in financial engineering terms as a package of binary options with each point constituting an individual bet.

Target Federal Funds Rate

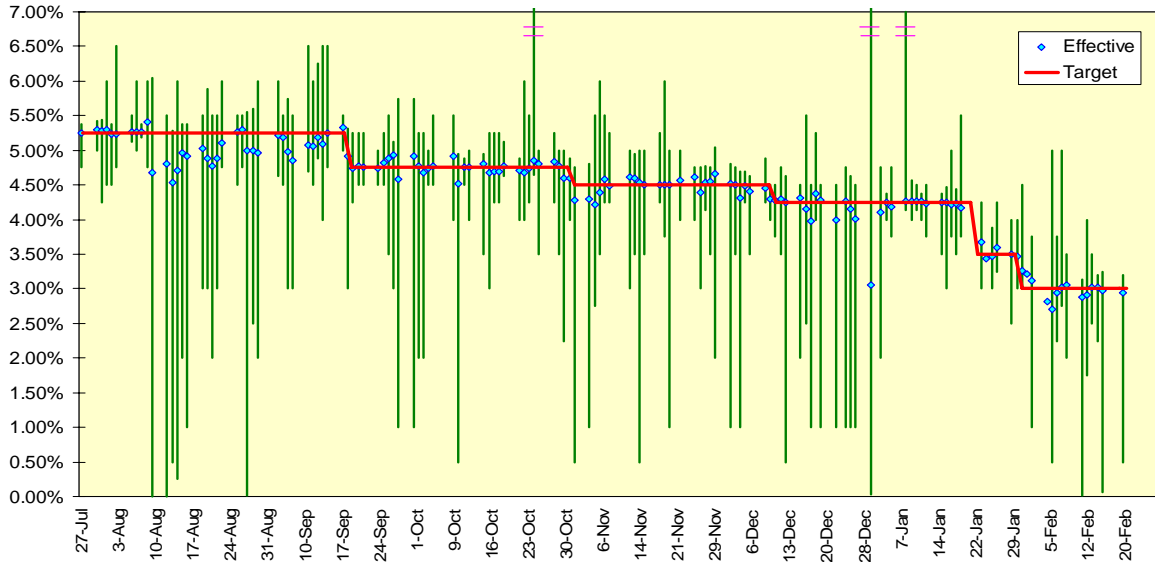
Let’s ask ourselves a question: If the Federal Open Market Committee (FOMC), the rate-setting body within the Federal Reserve, did not exist would we have to invent it? Restated, why if we allow markets to set the prices for just about everything in the global economy do we need someone to fix the overnight lending rate between member banks of the Federal Reserve system?

The question becomes more acute when we consider the FOMC’s track record of success or lack thereof. The history of the Federal Reserve system has been one of policy errors, of booms, busts and bubbles. We have lurched from the late 1990s stock market bubble to the dotcom implosion to the real estate bubble to the subprime lending fiasco all within the space of a decade, and the litany can be extended back in time through the Great Depression. It is a sad story, really. We allow this body to set rates in the absence of any evidence of deterministic outcomes. Translation: When they turn the steering wheel to the right, not even they know in which direction the car will move and when the turn will be completed.

But as long as we allow this folly to persist, which appears indefinitely, the rate-setting actions of the FOMC create a great betting – oops, trading – opportunity. A cottage industry has arisen to read the entrails of all economic data and of policymakers’ utterances and to assess the probabilities of FOMC action or inaction. The principal tool for this to-date has been the federal funds futures (see “Discretion Is The Better Part of Policy,” March 2007).

These have a significant flaw, however, one that was exposed for all to see once the credit crunch got underway in July 2007. The futures settle to the average effective federal funds rate over a month; the Federal Reserve Bank of New York’s assessment is used in the compilation of this average. This effective rate, which is set in the market by trading in federal funds between Federal Reserve member banks, can deviate significantly from the target federal funds rate set at discrete intervals by the FOMC, as seen in Chart 1. The day’s range for the effective federal funds rate is highlighted with the green bars.

Chart 1: Target And Effective Federal Funds Rates



Let's narrate some history. The June 2007 contract settled at 94.75, a perfect match to the 5.25 percent target rate set by the FOMC (the 100- 100*rate convention is used in the contract). Then the fun, if you wish to call it that, began. While the FOMC did not get around to changing its target rate until September 18, 2007, the Federal Reserve kept injecting reserves into the banking system all through August to keep market liquid; note the wide ranges and large downside deviations of the effective rate from the target rate during August. What did this mean for the August federal funds futures contract? It settled at 94.98, or 5.02 percent, even though the target rate never budged from 5.25 percent during the month.

The story was similar for September 2007. The September federal funds futures contract settled at 95.025, or 4.975 percent. The weighted average of the month's target rate was (17 days * 5.25 percent + 13 days * 4.75 percent) ÷ 30 days, or 5.033 percent.

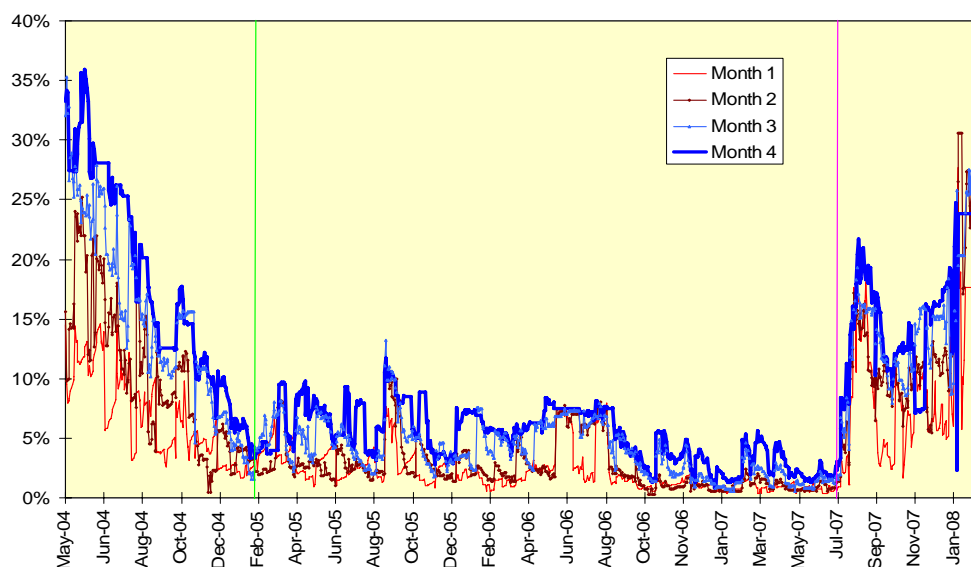
While these two months occurred during a time of unusual market turmoil, we should not lose sight of one very simple fact: The purpose of the federal funds futures contract is for banks to price and hedge a 30-day strip of federal funds, not to bet on the FOMC's changes in the target federal funds rate. Recovering the forward-looking probabilities of a discrete action by using a backward-looking average of a market price which can deviate from policymakers' intentions is inappropriate at best.

Transparency, We Hardly Knew Ye

The willingness of the Federal Reserve to let the effective federal funds rate trade far away from its target rate constituted a major policy change, and not one for the better. Once the target federal funds rate was pushed down to 1.00 percent in May 2003, the FOMC knew it had to prepare the market for the inevitable string of rate increases to follow, a string that reached 17 consecutive 25 basis point rate hikes by June 2006. The policy of telling the market what and when it was going to do, dubbed transparency, drove the volatility of American options on federal funds futures down below 5.00 percent by early 2005, marked with the green line in Chart 2.

The stock market had several major downturns after that point, but as the market assessed these would have no policy content, volatility remained low. It was not until the credit crunch and the Federal Reserve's willingness to engage in an ad hoc policy of rate changes, marked with the magenta vertical line, did volatility jump.

Chart 2: Continuous At-The-Money Volatility Of Federal Funds Futures



The abandonment of policy transparency will keep policy uncertainty higher going forward, and as volatility represents the price of insuring against uncertainty, we can expect continued deviation between the effective and the target federal funds rate. The utility of federal funds futures and the American options on those futures for assessing FOMC policies will be reduced as a result.

Betting On The Target Rate

Fortunately, there is a tool for traders to make a direct bet on the target federal funds rate, the binary options on the target federal funds rate. These options pay a fixed \$1,000 if they settle in-the-money and \$0 if they do not. Their prices reflect the assessed probability of the target federal funds rate exceeding (for a put option) or falling short of (for a call option) the strike price.

That is it; the problems caused by the divergence between the monthly average effective federal funds rates are eliminated, as are the vexing problems caused when multiple outcomes are possible. We should note there is a regression technique, the Bredeen-Litzenberger model, that can be used to recover the probabilities of multiple FOMC outcomes from the American options, but no amount of statistical estimation can eliminate the fact these options settle into the federal funds futures and thus are priced off the monthly average federal funds rate.

We can construct a small case study comparing the federal funds futures and the binary options for the period between the December 2007 and January 2008 FOMC meetings. This seven-week period constituted the epitome of ad hoc policymaking. No fewer than eight different target rates were assigned non-zero probabilities of occurring. The final outcome, a 50 basis point cut to a target rate of 3.00% did not exist until January 22, 2008, a week prior to the meeting and the day of an emergency 75 basis point cut in the target rate we now know to be the result of Jérôme Kerviel's €4.9 billion losses at Société Générale.

The histories of how probabilities changed over time for both the binary options and the futures are displayed in Charts 3 and 4, respectively.

Chart 3: Binary Option Assessment Of January 30, 2008 FOMC Meeting

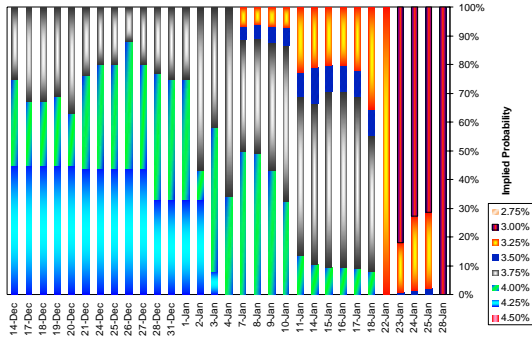
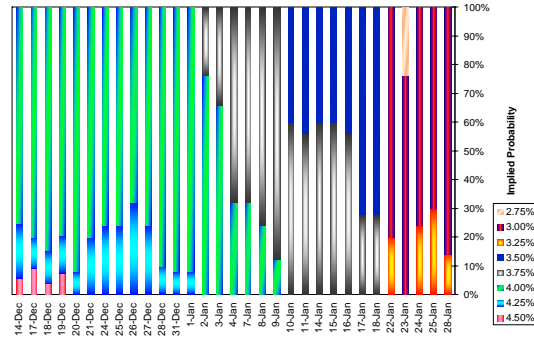


Chart 4: Federal Funds Futures Assessment Of January 30, 2008 FOMC Meeting



We all have exchanged the witticism, “that’s why we have a market,” in reference to differences of opinion. Now we have a simple and direct way to put a little money where our mouths are – and this is an industry where both money and mouths are in excess supply – and be sure we are betting directly on the outcome in question.