



## Financial Market Cognitive Dissonance

In psychology, cognitive dissonance is the mental stress or discomfort caused by holding two or more contradictory beliefs at the same time, or from receiving new information conflicting with existing beliefs, ideas or values.

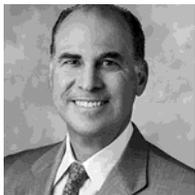
Presently, the financial markets are confronted with two conflicting pricing structures: a USD yield curve that anticipates a significant increase in interest rates over the medium term, and an options market that offers “rate insurance” at a historically low cost.

An investment conundrum ...

Woe to the investor who fails to heed the admonishment: “Don’t fight the Fed.”

And so it has been for the past five years that the Fed has implemented a grand scheme to *increase monetary velocity via financial repression (zero interest rate policy, or ZIRP, and asset substitution) to create inflation, depreciate nominal debt and delever both the public and private economies of the United States.*

Yet we have all seen this movie before; we know that the calm financial landscape the Fed has engineered will at some point become roiled. But let’s be clear, this is not a dire prediction for calamity, in our view, it is just a notification that today’s placid financial market will eventually return to a more normal risk profile.



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Mr. Bassman is an executive vice president and portfolio manager in the Newport Beach office, focusing on convexity products. Prior to joining PIMCO in 2014, he was a senior member of Credit Suisse’s global rates business. Prior to that, he was with Merrill Lynch for 26 years in a variety of senior roles, including creating, marketing and trading a wide range of derivative and structured products. Mr. Bassman helped create the trademarked OPOSSMS and PRESERV mortgage risk management products and helped design the MOVE Index, the benchmark interest rate volatility gauge. Subsequently, he managed the firm’s North American mortgage-backed securities and structured finance trading group and helped build the RateLab, the firm’s full-spectrum U.S. rates trading desk strategy group. He has 31 years of investment experience and holds an MBA from the University of Chicago and a bachelor’s degree in management science from the University of California, San Diego.

The yield curve appears to be fully awake to the possibility that the Fed could lift the heavy hand of financial repression – at least that is one interpretation of a still-steep yield curve. While substantially flatter than its peak earlier this year, the current (as of 8 October) level of the benchmark two-year Treasury versus 10-year Treasury spread of 176 basis points (bps) is well above its 20-year average of 124 bps.

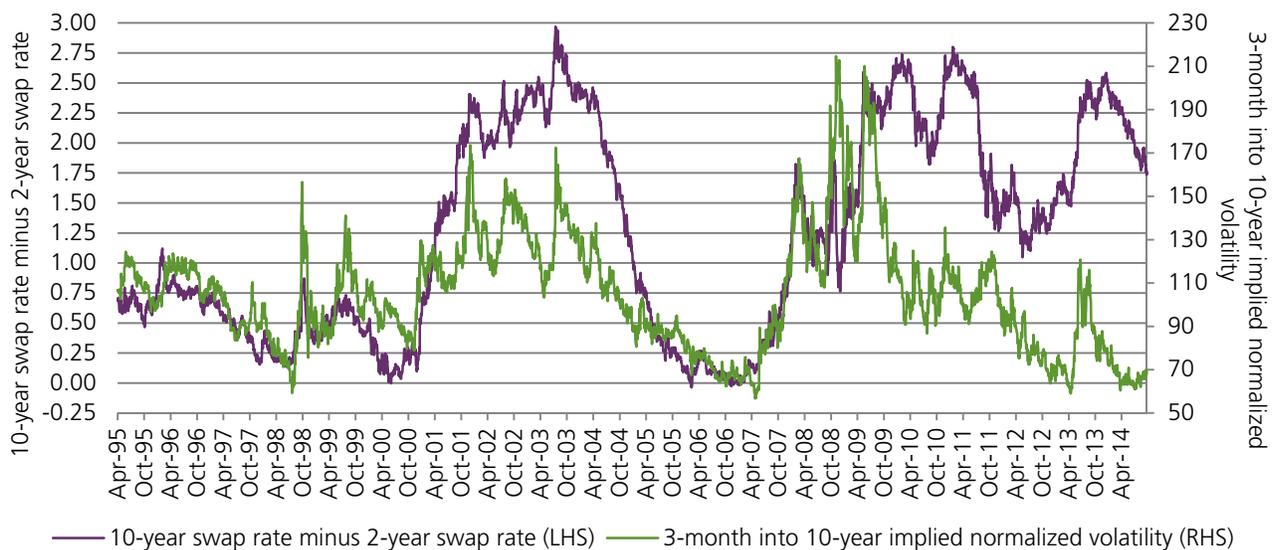
Yet this notice remains undelivered to the options market as the cost of interest rate insurance, quoted short-hand as the measure of implied volatility, is still near its “forever” low. Currently (as of 8 October) a three-month option on the 10-year swap rate sports an implied volatility of 69 bps versus its 20-year average of 105 bps. To apply some context to this statistical gibberish, an implied volatility at this level suggests a daily move of barely 4 bps. A more salient interpretation: Such a level of implied volatility creates a “break-even” range of less than +/- 16 bps for an entire month – a rather confounding number when one

considers that the 10-year rate traversed 104 bps in two months during last year’s Taper Tantrum.

Some may view the shape of the yield curve and the level of implied volatility as two independent and separate observations, but in fact they are historically well-linked. While it might be easy to rely upon charts and graphs to support this notion, instead I would like to present a heuristic parable as to why the linkage between these two risk vectors may soon revert toward their more normal relationship.

In Figure 1, the *eggplant line* is the yield spread between the two-year swap rate and the 10-year swap rate while the *avocado line* is the level of implied volatility for a three-month expiry option on this same 10-year rate. While “conjoined twins” they are not, it is clear that these two risk vectors mostly have traversed a similar path over the past 20 years, at least until recently. While we might engage in a series of compounding differential equations to support this relationship, instead let’s just apply some common sense.

**FIGURE 1: IMPLIED VOLATILITY VERSUS YIELD CURVE**



Source: Credit Suisse data through 8 October 2014

A forward rate is often described as the market's "prediction" of where interest rates will be at some given time in the future. Let me please dispel you of that notion: No one paced the corner of Wall Street and Broad (or the local Newport Beach Starbucks) taking a poll. A forward is simply the mathematical discounting of the spot curve to produce an "arbitrage free" price, no more, no less. That said, I will concede that the spot curve does contain meaningful information about how market participants value risk, and as such, there is significant value to be gained by analyzing the shape of the forward surface.

In a brief digression for those who are unfamiliar with the concepts of spot and forward rates, let's consider this hypothetical decision process. You have been entrusted with investing your mother's retirement funds. You can buy either a one-year CD at 2% or a two-year CD at 3%: Which do you choose? The action you take depends upon where you think you can purchase another one-year CD next year to make this an apples-to-apples comparison (so both investments have a two-year horizon). You would take the former investment only if you were confident the one-year "forward" CD could be purchased at 4% (or higher). (2% for the first year plus 4% for the second year is roughly equal to 3% for both years.) In broad strokes, this is the definition of a forward rate: It is the level of rates in the future that creates indifference today.

Back to our main point: When the spot curve is flat, the forward curve will also be flat at about the same level. However, when the spot curve gains some shape, forward rates will diverge from spot rates. The steeper (or more inverted) the yield curve, the greater the distance between the spot price and the forward price.

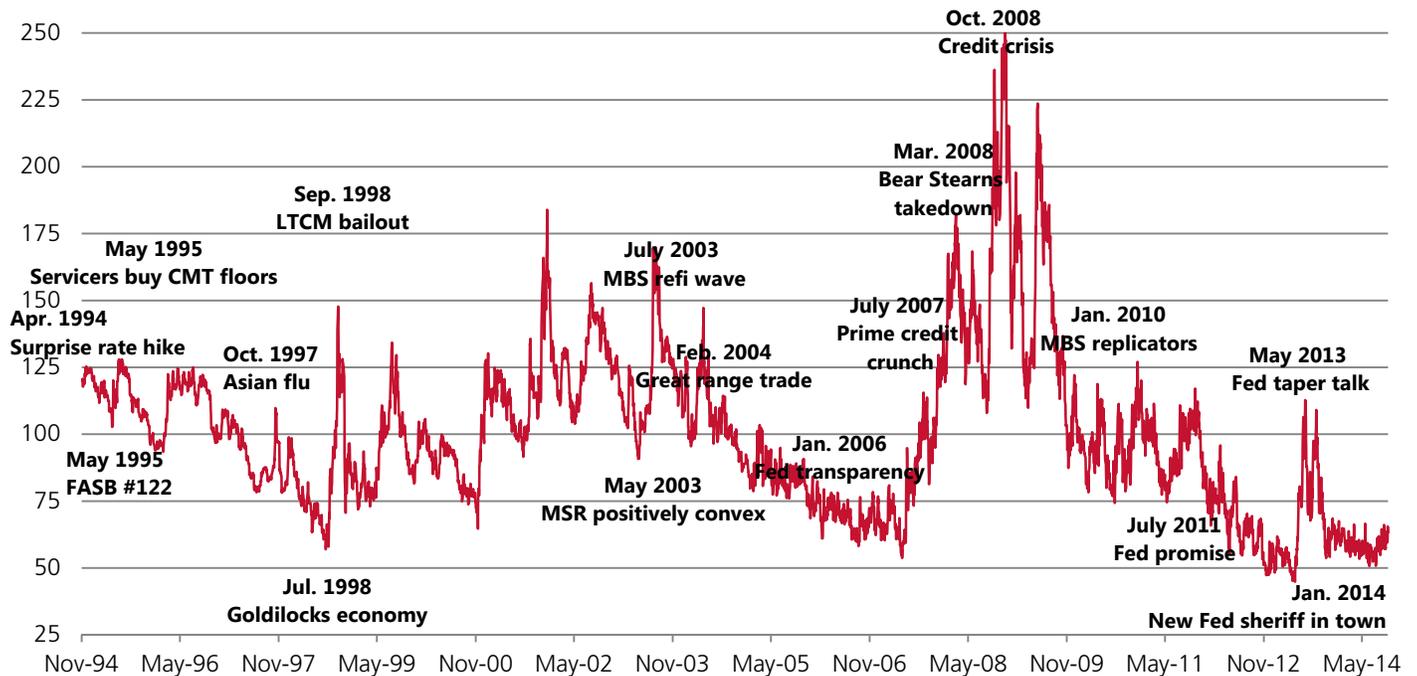
Until Brian Greene can find a wormhole into the multi-verse, time only can travel forward and the future must become the present. With no consideration as to whether the forward grinds to the spot or a spot price heads to its forward, a larger spread reasonably implies a greater uncertainty of the outcomes. *And since implied volatility tends to be a function of uncertainty (risk), option prices tend to rise in conjunction with a steeper (or more inverted) yield curve.*

The current situation is nearly the dictionary definition of cognitive dissonance: the discomfort experienced when one tries to hold two contradictory beliefs at the same time.

The yield curve is presently so steeply sloped that the one-year rate is implied to double in six months and the two-year rate seems slated to triple in two years. Even the less volatile five-year rate might be over 100 bps higher as spring turns to summer in 2016. Yet despite this uncertainty embedded into the yield curve, most measures of implied volatility are near their "forever" lows.

The *hemoglobin line* in Figure 2 is a cousin of the well-known MOVE Index (the VIX of interest rates). Annotations show the events that locally drove volatility over the past 20 years; the current reading of 63 is extraordinarily low. Moreover, even a cursory glance would inform one that on the few times this index has breached 60, some sort of significant event has soon followed to pressure option prices higher.

**FIGURE 2: INTEREST RATE IMPLIED VOLATILITY INDEX**



Source: Credit Suisse data as of 8 October 2014

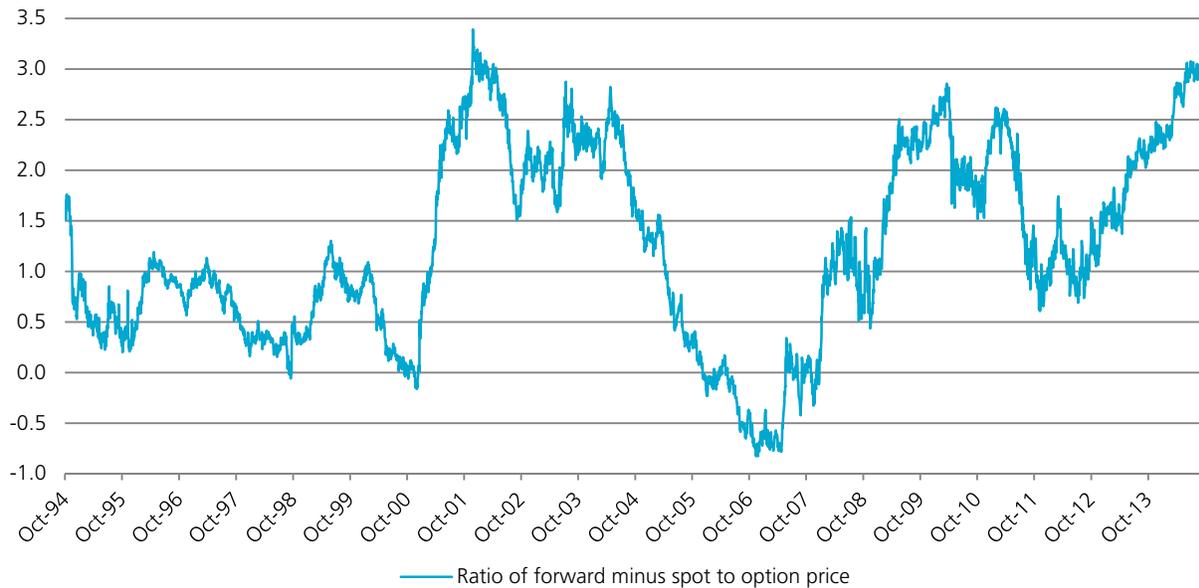
While anecdotal, this evidence suggests there is a limit as to how far the shape of the yield curve can diverge from the level of volatility. The *malibu line* in Figure 3 charts the ratio between the difference of the two-year rate today and one-year forward (often called the “carry”) and the cost of a one-year option on the two-year rate.

A Wall Street aphorism for option traders describes the “three-to-one rule.” Here, one measures the interest rate income embedded in the yield curve (the “carry”) and compares this to the cost of an option of similar tenor. When this ratio reaches three to one, the trader should buy the option.

What is the source of this rule? Let’s skip the math and just consider this as a game. Assume one has no opinion

as to whether the spot or forward price will be realized in the future. So if asked to weigh the odds of either outcome, the only rational ex ante guess is a “coin flip.” Unless you can employ a trick coin, the fair payoff for a “flip” should be two to one. As such, it is completely anomalous that one could buy an option for one dollar that will pay out three dollars if the rate structure remains unchanged (forwards accrete to spot). In essence, one is being offered a three-to-one payoff for a two-to-one risk. *The option price is simply too low for the risk embedded in the yield curve.* It is this notion that underpins the usually tight correlation between the yield curve and implied volatility, and why payoff ratios tend to remain below two to one.

**FIGURE 3: EXAMPLE OF THE THREE-TO-ONE RULE**



Source: Credit Suisse data as of 8 October 2014, showing ratio between the difference of the two-year rate today and one-year forward and the cost of a one-year option on the two-year rate.

As much as it distracts from a good story, the fact of the matter is that it is never “different this time.” Risk and return are tightly linked except for those rare periods when investor emotion overwhelms financial concentration. While one could justify the present yield curve/volatility dynamic as a manifestation of the Fed’s efforts at “guidance,” I would retort that while it may be possible to land a jumbo jet onto a football field, it is still highly unlikely.

While we can debate when the journey to the terminal federal funds rate will begin, what may be more certain is that the divergence between the yield curve and implied volatility will dissolve. Markets may appear confounded by cognitive dissonance, but forward-looking investors can peer through the fog: A return to a more recognizable risk/return profile, even if market returns are lower overall (as may well be the case over the secular horizon), could help investors more confidently align longer-term objectives with strategies.

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