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A Commentary by Harley Bassman:

The Convexity Maven

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Value Concepts from the Credit Suisse Trading Desk
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“Forwards are NOT a Prediction”



Few comments press my buttons harder than a repeat of the canard that “Forward Rates are the market’s best guess of Future interest rates”. I can assure you that Neal and Carl do not trot down to Madison Park, clipboard in hand, and take a poll of those in line at the Shake Shack before the next Payroll event. 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 some information about how market participants value risk, so considering the shape of the Forward surface is not totally without merit.

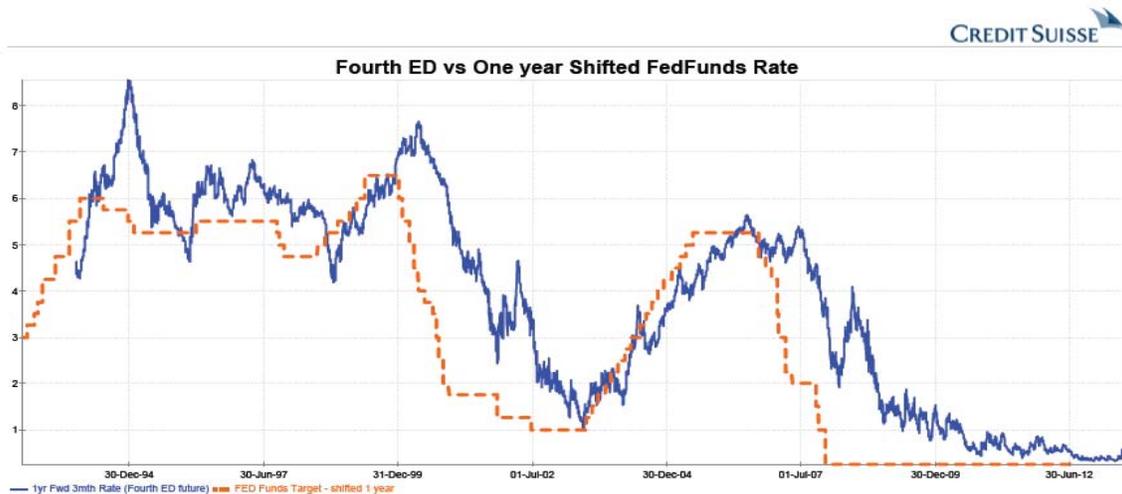
To review this concept in a bit more detail for our non-Rates readers, let's examine the classic investment conundrum faced by widows and orphans.

Grandma can either buy a one-year CD at 4% or a two-year CD at 5%, what should she do? Ignoring compounding (and other minutiae), she would only buy the one-year CD if she was sure she could roll-over this investment for the second year at a rate of at least 6%. [4% for the first year plus 6% for the second year equals an average 5% rate for the entire two year investment period.] This 6% breakeven rate is known as the one-year rate, one year forward. Since Wall Street derivative professionals can easily buy and sell these Forward rates, a Spot surface of 4% and 5% must create a 6% Forward rate or arbitrage opportunities will exist.

But the mere fact that one can buy (or sell) this Forward rate at 6% does not at all mean that this will be the rate that actually occurs one year hence; it is just the rate that must be available to traders to meet arbitrage-free conditions. {Fun tidbit: This is what the Sali Arb guys in "Liar's Poker" figured out thirty years ago and is how they made those enormous profits}

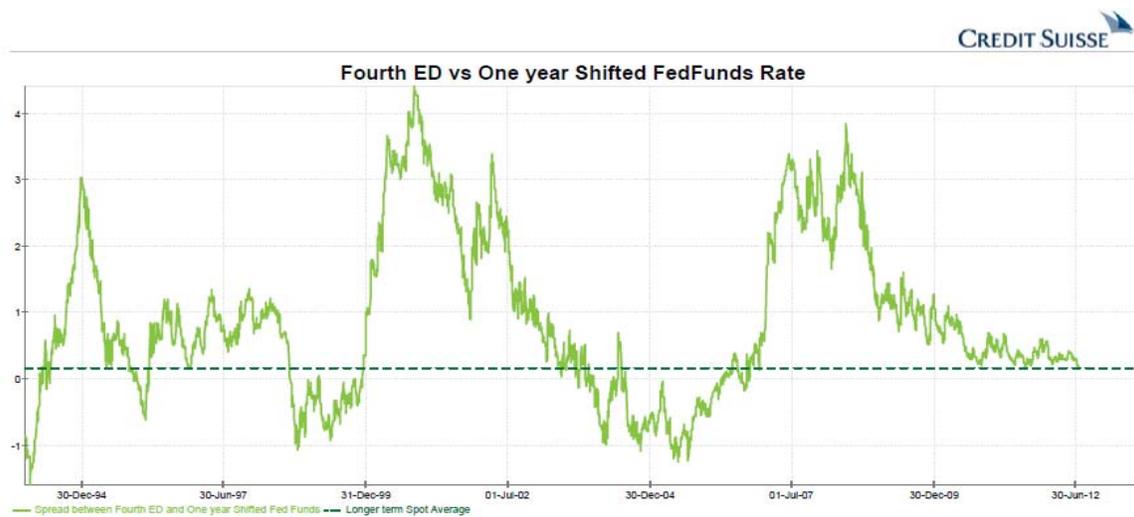
Since we do admit that there is a hint of future flavor contained in Spot prices, let's examine how prescient markets can be at sniffing out the path of events.

The interest rate prediction that should be the easiest might be divining changes in FED policy a mere twelve months ahead. Below, the **palatinate line** is the implied yield of the fourth Eurodollar Future Contract while the **melon line** is the Target Fed Funds Rate over the past twenty years, shifted by one year.



Recall that Eurodollar futures allow one to buy or sell the three-month Libor-rate at some distant time. Except in periods of high stress, this rate tracks the Fed Funds Rate (with a spread) nicely. Since each contract is for a three month period, the fourth contract will be the rate in one year. By shifting the actual Fed Funds Rate by twelve months, we can compare the “predicted rate” to what ultimately became the actual rate.

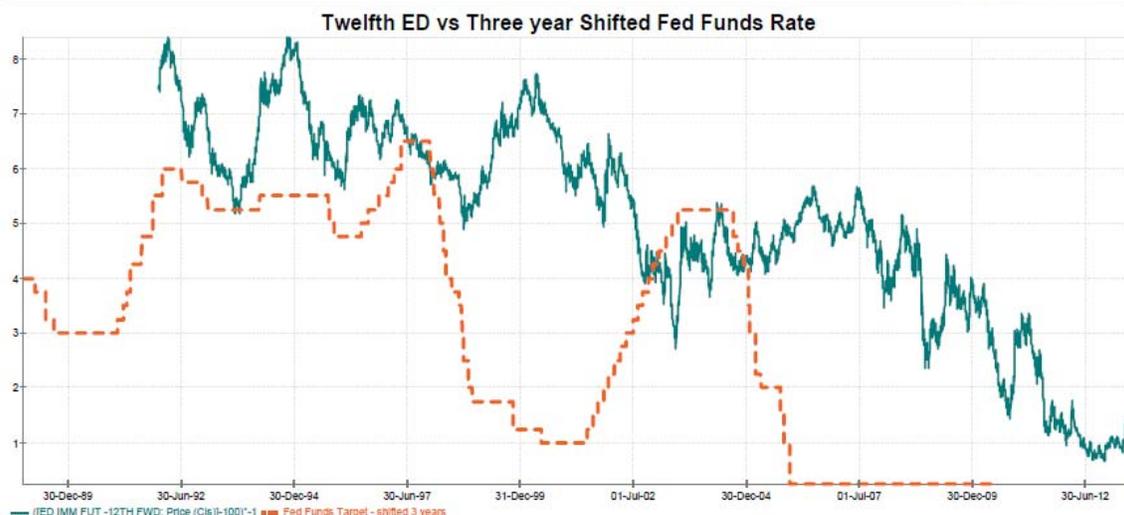
Optically, the lines seem to track each other quite well, however, upon closer inspection there is a wide divergence. Below, the **-mantis line-** is the vertical difference between the shifted Actual Fed Funds rate and the Eurodollar rate. To adjust for the credit basis between Fed Funds and Libor, we have added a dotted line at +17bp to represent the long-term spread between the two.



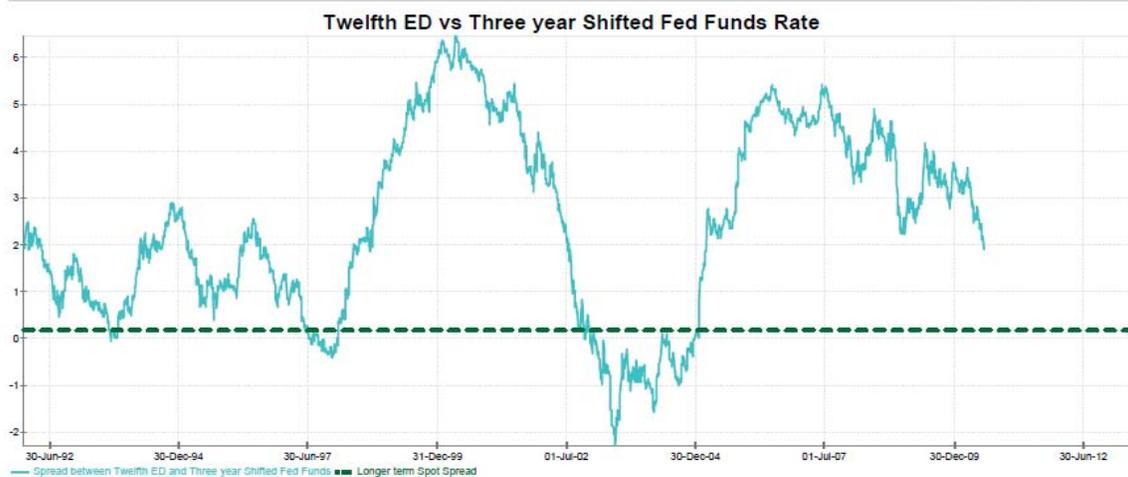
It has only been twice that the market seems to have successfully “predicted” the future. The first was during Mr. Greenspan’s “measured pace” period where he effectively promised to raise rates by 25bp every six weeks. The second has been the FED’s extremely well-advertised promise of a somewhat endless Policy of Zero Interest Rates (ZIRP).

But while the professional corps of FED watchers usually feels somewhat confident about FED policy six FOMC meetings ahead, even the most arrogant would pause before making a prediction with confidence out three years.

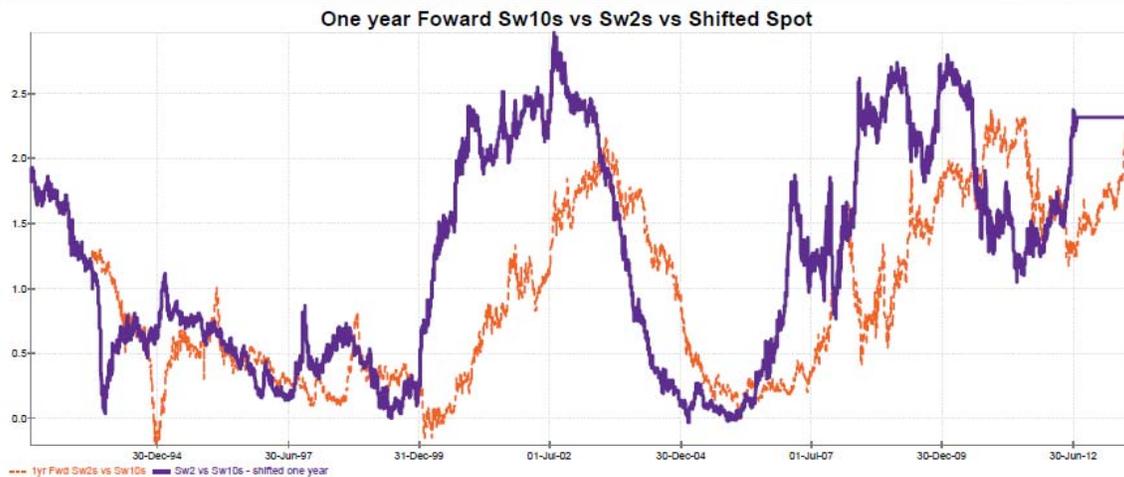
On the next page, we use a similar paradigm to compare the actual Fed Funds Target Rate to the “market implied rate”. Again, the **-melon line-** is the actual Fed Rate, shifted by three years, while the **-teal line-** is the twelfth Eurodollar future.



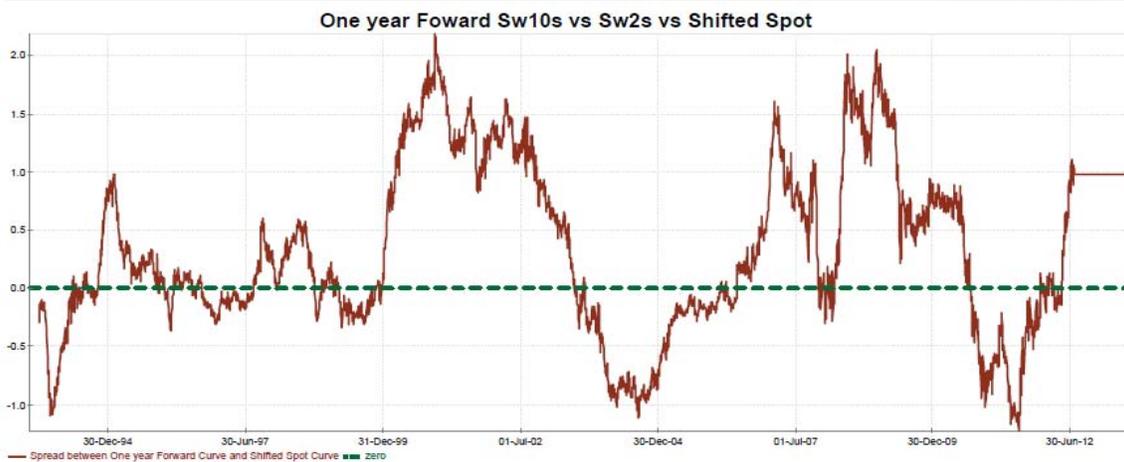
For completeness, we can spill a bit of *-Tiffany ink-* to show how wide from the mark the “implied market rate” has been from the actual level. By comparison, the one year “prediction” is positively clairvoyant. The FED implemented ZIRP over four years ago, and they have continually promised to keep rates low, yet even now the markets have had a hard time taking “yes” for an answer.



Another risk vector frequently pointed to as a market divining rod is the Yield Curve, yet this metric too is rather hapless at “predicting” the future for even a period as short as a year. The *-gamboge line-* is the one-year Forward Spread between the Sw2yr rate and the Sw10yr rate while the *-purpleus line-* is the Spot Yield Curve, shift by one year.

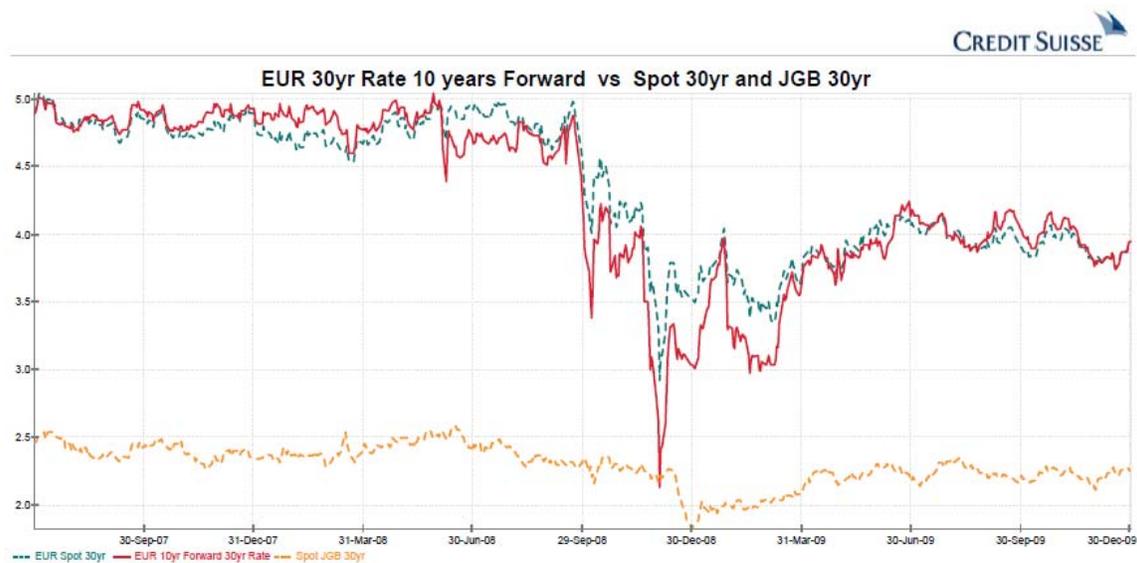


For ease of analysis, the *chestnut line* is the vertical difference between the Forward Curve and the shifted Spot Curve. While it is certainly progress that the “implied market level” nicely rotates around zero, it must be said that the end result is not much better than a synchronous random number generator.



While it should come as no surprise that Forward prices do not moonlight as the Amazing Kreskin, what is nifty is that one can easily transact at Rate and Price levels that seem to defy fundamental logic. Forwards can become irrational when various regulatory or accounting situations force risk managers to take opposing positions on different locations of the Yield, Credit or Volatility term surface.

One of the more amazing situations where Forward Rates seemed to utterly defy logic occurred in June of 2008. At the time, Wall Street was awash in Digital Yield Curve options as a residual of the massive issuance of various structured notes. As EUR rates declined into what would become the Global Credit Crisis, Pension and Insurance clients were forced to buy (receive) long-term interest rates to maintain regulatory ALM mandates. Exotic option dealers, short convexity on these rates, soon joined them as buyers. As limits were breached and risk managers fretted, the EUR Sw30yr rate dipped below the EUR Sw10yr rate. As seen in the **-hemoglobin line-** below, the EUR 30yr rate ten years forward nearly touched 2.0% and actually dipped below the JGB 30yr rate. After positions were squared up and the losses were duly recorded, markets promptly reverted.



While nice profits can be earned by short-term trading of the zigs and zags of various financial instruments, the Big Bucks tend to accrue to those who “bet against the Forwards”. These investors recognize that the structure of the Spot Term Surface, as revealed by the risk-free Forwards, does not match their rational and fundamentals-based expectations of the future.

A more current example would be the implied forward “prediction” of the presently “Helicoptered” currency of Japan. When the Spot rate was circling around a 78-handle early last year, a properly qualified financial manager could have purchased the JPY versus USD at a rate of less than 65 for a February 2022 settlement. This seemed extremely unlikely in light of the demographic and financial fundamentals. (Please read Commentary – “Grabbing the Wrong Tail”, February 14, 2012, for a detailed study and a trade that still makes sense.)

All this is not to say the Forward prices produced by the Spot Curve do not come to pass; in fact, I suspect they occur with odds better than a coin flip. But the skillful financial manager is the one who can recognize the divergence, ex ante.

We would propose that presently a huge divergence exists between the Implied Forward Value of an important risk vector and its ultimate price. Moreover, we can pinpoint the genesis of the opportunity directly to fear and regulation.

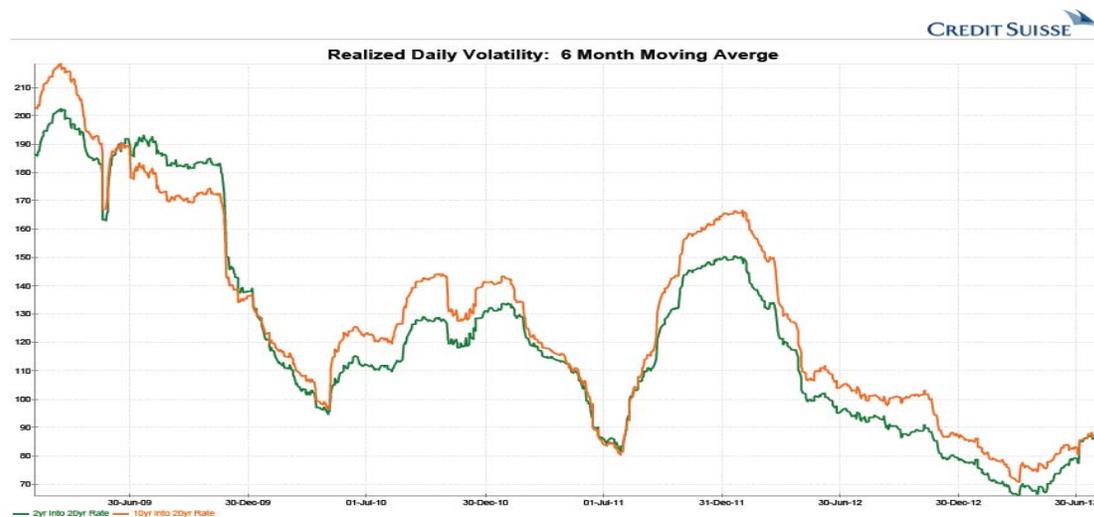
Before the word “taper” entered the lexicon of the market in May, selling options and employing leverage as a way to enhance short-term returns was rife. And under the rubric of the “Bernanke Put”, many investors, particularly Mortgage focused Hedge Funds and REITs, enjoyed stellar returns and high yields. This all changed as spring rolled into summer and rates increased by over 100bps in less than seven weeks. MBS investors reached for options as a way to tourniquet a hemorrhaging position, and the risk bucket of choice was the “Belly of the Volatility Surface”. This was entirely rational as the PCA weighted Vega of an MBS centers around two-year into ten year swaptions. And while “Gamma options” rose the most in terms of Normal Volatility, it was the front “Vega options” that increased the most in terms of price.

On the other side of the grid, the Implied Volatility of long expiry options on long maturity tails actually declined, despite an increase in realized rate movements. This occurred because option dealers who traffic in the structured note business found this risk bucket increasing as rates rose. (A risk dynamic known as D'vega / D'rates.) As a sterner regulatory environment has limited risk parameters, dealers had to reduce their exposure which drove prices down even as other option prices rose. The [-sapphire line-](#) below is the spread between the IVol of two-year expiry options and ten-year expiry options on twenty year tails.



This huge inversion of the volatility Surface is somewhat anomalous when one examines the individual risk vectors. The 2yr-20yr Ivol at 92nv is equal to its Actual Volatility over the past month while 10yr-20yr at 69nv is only 81% of its similar Realized Volatility.

To cut off the finger pointing that we are comparing kiwis to kumquats by using a one-month Realized window verses a much longer Implied expiry, this differential is present for nearly every look back parameter. The **pea line** below is the trailing six-month Actual Daily Volatility for the 2yr-20yr rate while the **apricot line** is the trailing Volatility for the 10yr-20yr rate. Over the past three years, the actual 2yr-20yr rate has been 7% LESS volatile than the actual 10yr-20yr rate, yet the Implied Volatility of the shorter expiry option is presently 31% GREATER than the longer-dated expiry option.



We would suggest that the 20Nvol increase in the spread between these two expires has been driven by the usual impulses of fear, greed and self-preservation rather than by a shift in the economic and risk fundamentals.

Thus we come to an interesting conundrum. While Implied Volatility has indeed risen over the past two months, it is still below its ultra long-term average by nearly 10%. This is not too shocking when one recognizes that the FED is still compressing risk via the heavy hand of Financial Repression. However, when the Spot Volatility surface is tossed into the options "veg-o-matic", the result two years hence is a "predicted" Forward Volatility as much as 15% lower along some risk vectors.

This seems totally anomalous to what should be an accepted fundamental that the markets will be much more volatile in the years ahead, after the FED becomes less accommodative and slowly releases the market from the grip of

Financial Repression. Whether “taper” occurs in two months or six months, unless we dip back into recession it is clear that QE3 will no longer be “infinite”.

The Opportunity:

Presently, an 8 year into 20 year swaption straddle costs about 1925bp, which corresponds to a spot IVol of 75.5nv. However, a similar FVA straddle is offered two years forward at only 1650bp, a spot IVol of about 65nv. (See footnote)



The **-shamrock line-** is the Implied NVol of a spot starting 8yr-20yr straddle since the start of the millennium. This straddle has traded below the **-pumpkin line-** of 65nv only twice, both times preceding huge jumps in Volatility.

As detailed in Commentary – *“Building a Better Volatility Mousetrap”*, buying options as a Forward Volatility Agreement (FVA) is the only way to trade Volatility as an Asset Class with no Delta, Gamma, Theta or Skew management.

Various forces have pressured the Option Surface to levels that will clear the market; however, the resultant forward prices are likely not predictive of the actual investment climate.

The market is “predicting” new lows in Volatility: I don’t think so.....

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August 12, 2013



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Note: A Forward Volatility Agreement (FVA) is a relatively standard financial derivative that is more common in the FX market than in the Rates market. It is executed under your current ISDA document; Credit Suisse can provide a sample term sheet upon request.

On the trade date, the client commits to buy (or sell) from Credit Suisse on the “look date” an agreed upon notional amount of what will become a vanilla at-the-money (ATM) straddle at a fixed price. Except for upfront margin, no cash will change hands until the “look date”. Upon the “look date”, at the standard ISDA time, the strike will be set at the corresponding mid-market rate and a regular way option trade will be transacted at the previously agreed upon fixed price. In the alternative, the FVA can be Cash Settled versus the bid (offer) side of the market for a matching straddle.

Since the strike is not set, nor the fee paid until the “look date”, an FVA has practically NO EXPOSURE to delta, gamma, theta or skew. There is only vega risk; as such, the FVA is the best way to buy or sell “Vega as an Asset Class” and the only manner to do so with no daily management. Only upon the “look date” does the option become “live” and acquire exposure to the various “Greeks” of a vanilla option.

An FVA is less liquid than its corresponding vanilla straddle. Moreover, the mark-to-market profile is not linear relative to the vanilla option. However, the risk profile cannot be created via a replication of simple vanilla options without being exposed to substantial delta, gamma, theta and skew risk. Additionally, only an FVA offers a reasonably constant exposure to vega.

While an FVA is one of the simplest financial derivatives available, please be sure you fully appreciate their risk vector dynamics before transacting.

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