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Global

Cross Asset Volatility: Credit versus Rates

Use credit options to position for the coming rate hike

- **Rate hikes coming around mid-2015** — The Citi economics research team expects the first rate hike to occur sometime around the middle of next year, with a slower pace of hiking in this cycle compared to previous ones.

- **Credit spreads to experience subdued volatility in response** — Historical data suggests that credit spreads usually tighten during rate hikes. While it is unlikely that credit spreads will tighten further, we believe that the widening impetus we saw during the taper tantrum would be kept in check, keeping credit volatility subdued.

- **Position for the rate hike using long rate volatility, short credit volatility** — Rate volatility in parts of the curve directly exposed to Fed policy is priced cheap to credit volatility – we recommend going long rate volatility and funding it by shorting credit volatility, especially given our expectation of lower credit volatility in response to a rate hike.

- **We recommend using the 6m3y point in swaptions versus credit** — Using 6m3y swaptions is optimal, given the tendency of the short end of the curve to react sharply to rate hikes.

- **Using strangles instead of payers is also viable** — The rate strangle versus credit strangle trade is an interesting alternate implementation that can also protect against a scenario where rates continue to fall in response to disappointing economic data.

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Rates Higher and Credit Volatility Lower

Higher rates, and higher volatility....

Investors have been endlessly debating as to when the next Fed hiking cycle will occur, and how that will play out once it begins. For now, our economists expect the hiking cycle to start mid 2015 (see Where Treasury Yields Are Going: And should credit investors care?). Citi strategists are currently forecasting a 3.1% 10y yield and a 1.65% 2y yield a year from now, compared to a 2.85% 10y yield and a 1.53% 2y yield implied by market pricing (see Where Treasury Yields Are Going: And should credit investors care?). One driver of this is our expectation of higher volatility in rates compared to current levels, which will cause term premia to rise (see Where Treasury Yields Are Going: And should credit investors care?).

....Leading to range bound credit spreads?

For credit investors, the big question is how credit spreads will react once the hiking cycle starts – there is concern that rising rates will make credit products unattractive leading to reduced demand, and therefore widening spreads. Indeed the return of some term premium to the rate curve could provide a modest widening impetus to credit spreads as we saw during the taper tantrum last year.

On the other hand, historical data suggests that credit spreads tend to mostly tighten in anticipation of, and in reaction to, a rate hike[1]. For the 5 rate hike cycles since the early 80s, credit spreads mostly tightened during periods of rate hikes (see Figure 1 (left)). Specifically, for the 6 months prior period, IG spreads tightened 3 out of the 5 times, while HY spreads tightened 2 out of 2[2]. For the 6 months after period, IG spreads tightened 5 out of the 5 times, while HY spreads tightened 1 out of 2.

Figure 1. IG and HY credit spread moves in response to Fed rate hikes (left), and in response to a sharp rise in 10y treasury yields (right).

Initial Hike	6 Months Before		6 Months After	
	IG	HY	IG	HY
Aug-80	+1 bp		-6bp	
May-83	-41bp		-28bp	
Dec-86	+21bp		-59bp	
Feb-94	-8bp	-33bp	-13bp	+26bp
Jun-04	-2bp	-15bp	-14bp	-111bp
Median	**-2bp**	**-24bp**	**-24bp**	**-43bp**

Period*	10Y Tsy Yield Change	HG Spread Change	HY Spread Change
Mar-88 to Mar-89	+1.15%	-38bp	
Aug-89 to May-90	+1.22%	-20bp	+132bp
Oct-93 to Dec-94	+2.52%	-39bp	-66bp
Feb-96 to Sep-96	+1.36%	-13bp	-94bp
Oct-98 to Feb-00	+2.25%	-20bp	-122bp
Nov-01 to Apr-02	+1.16%	-31bp	-227bp
Jun-03 to Jun-04	+1.28%	-32bp	-228bp
Jul-05 to Jul-06	+1.22%	-7bp	-43bp
Jan-09 to Jan-10	+1.63%	-380bp	-962bp
Sep-10 to Apr-11	+1.00%	-39bp	-207bp
May-13 to Sep-13	+1.11%	+5bp	+41bp
Median	**+1.22%**	**-31bp**	**-108bp**

*All periods are as of month beginning

Source: Citi Research

We also looked at how credit spreads perform during periods of rising treasury yields, not necessarily due to rate hikes. Over the past 25 years, there were 13 periods during which the 10y treasury yield went up by 1% or more over a short

[1] This data was first published in S. Antczak et. al. Where Treasury Yields Are Going: And should credit investors care?

[2] We do not have HY spread data for the first 3 periods of Fed rate hikes.

time period (see Figure 1 (right)). In response, IG spreads tightened during 12 out of 13 periods while HY spreads tightened during 10 out of 12 periods[3].

Given how tight credit spreads are right now, it is difficult to argue for a substantial tightening in response to rising rates. Furthermore, the credit spread widening we observed during the taper tantrum last year raises the question if credit spreads will actually widen as rate hikes come, instead of the traditional tightening behavior.

We think not, for two reasons. First, we argue that the lack of institutional investor demand for corporate credit on the back of rising rates is not necessarily a foregone conclusion. This is because a rising rate environment does not affect all investors in the same way. For example, based on our model predictions (see Where Treasury Yields Are Going: And should credit investors care? and Where Will the Money Go in '14: Into credit, but… for details), a rise in rates will result in net outflows from mutual funds, but this should be offset by increased demand from life insurance companies.

Second, the liquidity generated by the ECB has the potential to partially offset the effects from the ending of Fed QE and rate hikes in the US – low yields elsewhere in the world could also keep US credit spreads anchored.

We judge that on balance, the widening and tightening impulses net out, and credit spreads are likely to stay mostly range-bound as rates rise. In other words, we are likely to see a period of subdued volatility in credit spreads.

[3] HY spread data was not available for the first period.

How to Position Using Options

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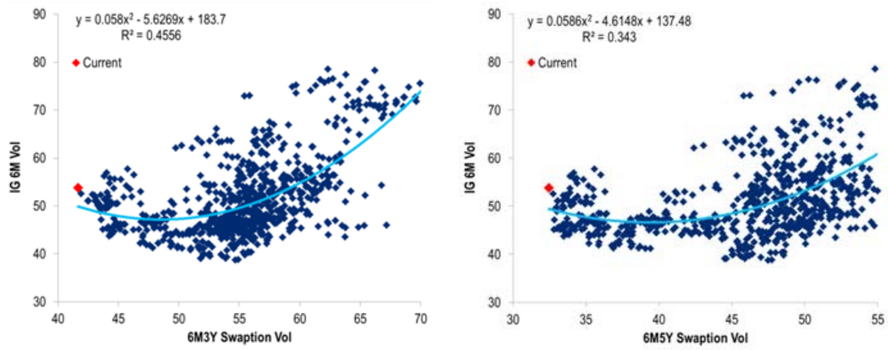
We believe that the best way to express our view of a range bound environment in credit spreads as rates rise is via options. Given our take on the relationship between rates and credit, we could suggest paying fixed in swaps and selling credit protection in a linear trade. An option implementation further expresses the view that credit volatility is rich to rate volatility (see Figure 2) – especially in the 3y sector which is the area of Fed activity.

Additionally, an option implementation in payers versus payers offers the benefit of conditionality, where the expressed view plays out when the cyclical growth story results in stable credit spreads and higher rates in the 3y part of the curve.

Figure 2. 6m CDX IG volatility appears rich when compared to 6m3y (left) and 6m5y (right) swaption volatility.



Source: Citi Research
We have converted the swaption volatilities to log volatility rather than the usual bpvol to compare "like-to-like".
Data used during the period of Sep 2011 – Sep 2014.

Note that in the scatter plots, we have used log volatility for the rate swaps instead of the usual bpvol. This ensures that we are comparing "like to like" because credit option volatility is quoted as log volatility.

The core trade….

Our first trade recommendation is shown in Figure 3. We now point out some key aspects of the trade.

First, we like going long 6m3y payer swaptions against like expiry payers on IG21. We prefer the 3y part of the curve in rates as this part of the curve has the largest potential to move in the face of a hawkish Fed, and the refusal of the market to price rates near Fed guidance.

Figure 3. Trade details, all prices/spreads are as of EOD 23-Sep-2014, does not include transaction costs.

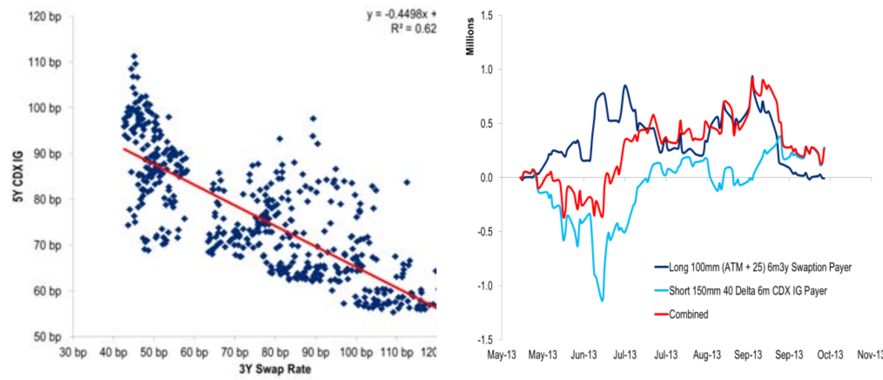
Trade	Underyling	Expiry	Notional	Spot (bp)	Strike (bp)	Type	Price (c)	Upfront	Delta	Vega	Gamma
Buy Payer	3y Swap	18-Mar-15	100,000,000	125.80	193.5	ATM + 25	27.9	-279,007	8,662	7,532	202
Sell Payer	IG21	18-Mar-15	150,000,000	60.58	80.0	40 Delta	27.8	417,666	-28,503	-10,450	-1,067
Net								138,659			

Source: Citi Research

Second, our sizing of the trade adjusts for the duration and the relative beta between the 3y swap rates and the CDX IG 5y spreads using spread levels. We use a look back period of 2 years, which we assume will replicate the environment going forward in the near term – indeed, a regression between the two (see Figure 4. (left)) shows the inverse relationship between swap and credit spreads.

The positive net premium suggests the investor is paid to hold the trade. As we discuss above, the trade benefits if spreads stay in range even as rates rise on Fed activity. The possible downsides are a) a downturn in the economy with the rate-payer expiring out of the money, while the credit payer expires in the money, and b) credit spreads widening more than their historical relationship from the prior two years would suggest, which is akin to what we observed during the taper tantrum last year.

Figure 4. Correlation between 3y swap rates and CDX IG spreads for the past 2 years is quite strong (left), and the performance of the proposed trade during a taper tantrum like scenario is reasonably decent (right).



Source: Citi Research

Past performance is no guarantee of future results.

To understand the performance of the trade under taper-tantrum like conditions, we run the exact same trade from mid-May through mid-September of last year. The results are shown in Figure 4 (right) – we see that at the peak of the taper tantrum cycle, the losses from the short credit leg are significantly mitigated by the long rates leg. Note that this represents our stress scenario, while our base case is a more benign environment in credit spreads than we saw back during the taper tantrum.

Side Note: We have used spread levels to compute the relative beta here because our positions are unhedged. This implies that the relative beta should be determined by the relative size of actual moves in swap rates versus credit spreads.

If we were to use spread and level changes to compute the relative beta for this case, we would need to construct time series of spread changes over non-

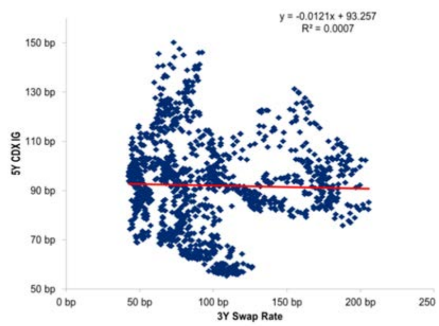
overlapping 6 month periods. Using daily spread changes would only capture the short term relationship between spread moves, which is not what we want.

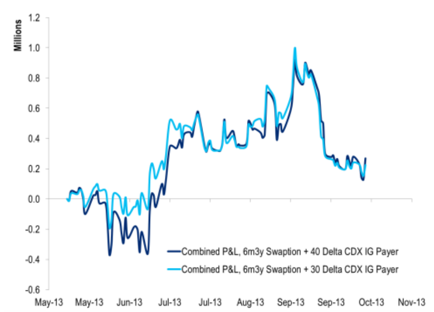
Unfortunately, constructing a long enough time series of non-overlapping 6 month periods requires a very long daily time series, which we do not have. Therefore, we use the actual spread levels as a proxy for moves over long enough periods of time, which is 6 months in this instance.

....With some modifications

If we extend our look back period for computing spread betas further, we find that the correlation between swap rates and credit spreads becomes much weaker (see Figure 5 (left)). In other words, if we revert to the regime that existed immediately following the 2008 crisis, the trade may need more cushion to absorb losses.

Figure 5. Correlation between 3y swap rates and CDX IG spreads grows weaker if we go back to 2009 (left), using farther OTM credit payers can protect better against a taper tantrum like scenario (right).





Source: Citi Research

Past performance is no guarantee of future results.

For investors who would like to protect against such a regime change, we propose giving up the net positive premium and constructing the trade with a slightly negative upfront. The details are shown in Figure 6 – we basically move the credit leg of the trade further out-of-the-money such that the trade can absorb some amount of credit spread widening as rates rise. We show how such a trade would perform during the taper tantrum in Figure 5 (right) – note how the maximum drawdown is significantly less compared to the previous trade which had a high positive upfront premium.

Figure 6. Sacrificing the positive premium can provide better protection by moving the strike for the credit payer farther out-of-the-money, in case there is a regime change in the relationship between credit spreads and swap rates. All prices/spreads are as of EOD 23-Sep-2014, does not include transaction costs.

Trade	Underlying	Expiry	Notional	Spot (bp)	Strike (bp)	Type	Price (c)	Upfront	Delta	Vega	Gamma
Buy Payer	3y Swap	18-Mar-15	100,000,000	125.80	193.5	ATM + 25	27.9	-279,007	8,662	7,532	202
Sell Payer	IG21	18-Mar-15	150,000,000	60.58	95.0	30 Delta	18.2	272,937	-19,632	-9,296	-852
Net								-6,070			

Source: Citi Research

Risk scenario – faltering growth/wider spreads

As we discuss above, if the recovery is not as robust as we expect, and rate forwards do not materialize, then spreads could either tighten or widen, depending on the degree of disappointment.

If the recovery slows sharply, and the 3y rates decline, there is some potential for widening in credit spreads. This scenario could hurt our proposed trade as the rate-payer would expire worthless, but the short position in credit could expire in-the-money. To guard against this outcome, one could buy a rate receiver which pays off if the economy tanks, and pay for it by selling a credit receiver.

In the case of a lukewarm recovery, if the Fed does not hike on their currently expected schedule in June next year, and credit spreads continue to tighten further in a search for yield, the rate receiver could still pay off, offsetting the potential losses against the credit receiver.

Our proposed trade (see Figure 7) uses a suitably OTM strangle in credit spreads for the short leg. Given the break evens for the short (credit) leg (50bp and 105bp), we expect a low probability of loss on this leg if spreads tighten further. Still, investors concerned about further credits spread tightening may want to wait till the next index roll[4], given the general tendency of off-the-run indices to move tighter as shorts get rolled to the on-the-run index.

Figure 7. The credit versus rate swaption trade using strangles. All prices/spreads are as of EOD 23-Sep-2014, does not include transaction costs.

Trade	Underyling	Expiry	Notional	Spot (bp)	Strike (bp)	Type	Price (c)	Upfront	Delta	Vega	Gamma
Buy Payer	3y Swap	18-Mar-15	100,000,000	125.80	193.5	ATM + 25	27.9	-279,007	8,662	7,532	202
Buy Recv	3y Swap	18-Mar-15	100,000,000	125.80	143.5	ATM - 25	25.5	-255,482	-8,514	7,017	237
Sell Payer	IG21	18-Mar-15	150,000,000	60.58	95.0	30 Delta	18.2	272,937	-19,632	-9,296	-852
Sell Recv	IG21	18-Mar-15	150,000,000	60.58	60.0	30 Delta	23.9	357,712	21,474	-9,210	-1,148
Net								96,160			

Source: Citi Research

Conclusions

We believe that a rising rate environment does not necessarily indicate wider credit spreads with increased volatility. In fact, historical evidence suggests that despite the ending of QE, widening pressure on credit spreads should be limited resulting in lower volatility. In order to position for this, we recommend a long/short position in rates versus credit using options – current volatility levels in rates versus credit provides for an attractive entry point right now.

[4] The next index roll is scheduled for October 6, 2014, per Markit.

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