

What is the Credit Option Market Telling Us?

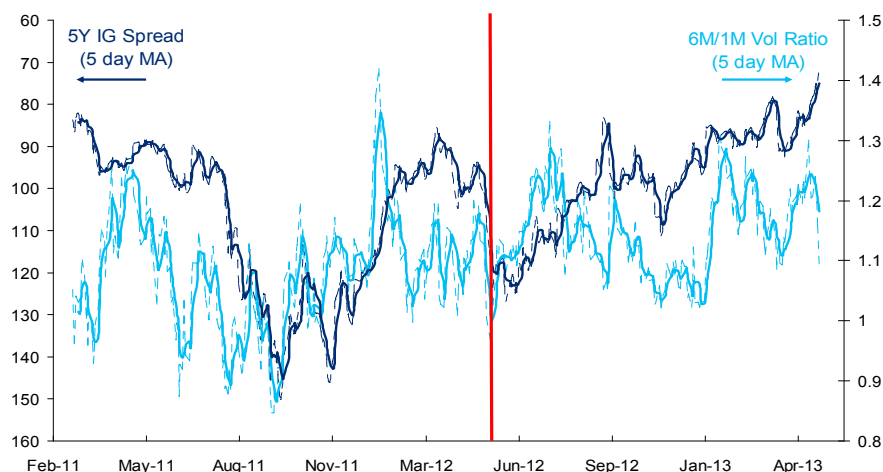
ANALYZING THE CREDIT VOLATILITY TERM STRUCTURE

The shape of the volatility term structure curve can be an important market signal. A flattening of the volatility term structure is usually a precursor to market distress and this has been observed both in equity and credit markets. Interestingly enough, the term structure in credit volatility curves for most major credit indices has been rather flat lately, despite the fact that markets have been rallying during the same period. So why are we seeing these conflicting signals?

We try to analyze the cause of this phenomenon for the CDX IG index and find that the two ends of the term structure have been subject to different dynamics. At the long end (6M), investor expectations of intermediate term volatility have stabilized in a narrow range on the back of central bank activism and better macro data in the US. In contrast, at the short end (1M), implied volatility has risen on the back of higher realized volatility due to tighter index spreads. We therefore believe that volatility curve flatteners can make sense in the current environment.

Is the Current Term Structure Flattening a Sign of Future Distress?

Fig 1. CDX IG spreads (reverse scale) versus 6M/1M ATM Volatility Ratio – the solid lines are the 5 day moving average to show the relationship clearly



Source: Markit, Citi Research

In Fig 1, we show that ratio of 1M versus 6M ATM volatility for CDX IG plotted next to the CDX IG 5Y spreads (reverse scale). We observe that a flattening of

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Anindya Basu
+1-212-723-6453

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the curve (i.e. downward move in the ratio) is usually an indicator of a future spread widening. This is especially true of the period prior to May 2012 (left of the red line), where we find a high correlation between a lagged version of the 1M/6M volatility ratio and the spread level.

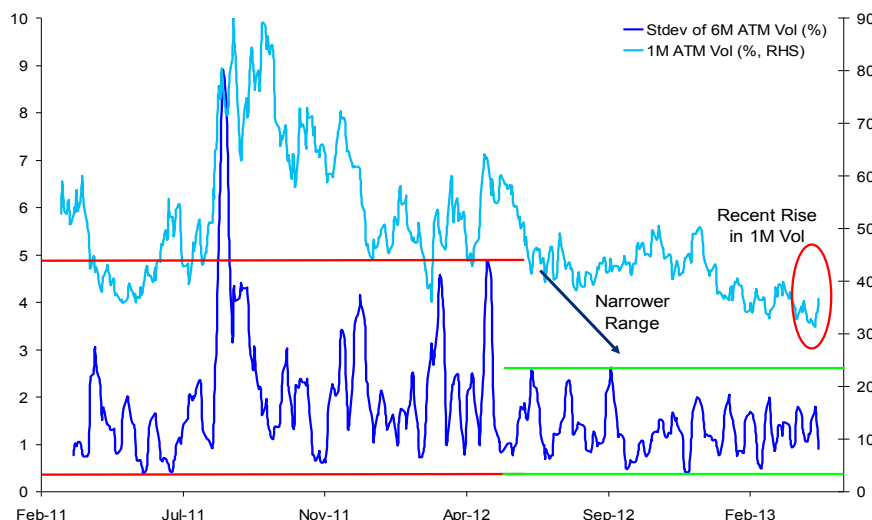
However, this correlation breaks down in the more recent period (post May 2012, right of the red line) and we currently observe a tightening of credit spreads occurring simultaneously with a flattening of the term structure. Does this mean that the volatility market is indicating a risk off period in the near term? Or is there a different driver to this move?

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Fig 2. Swings in 6M ATM volatility have come down since May 2012 (left axis), while 1M volatility has been rising recently (right axis)



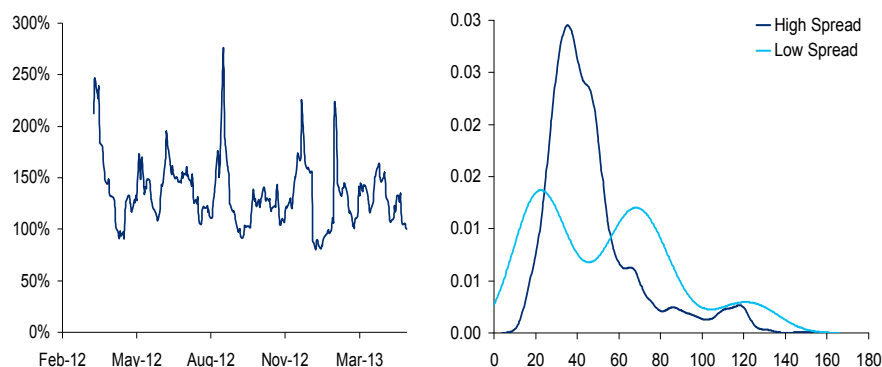
Source: Markit, Citi Research

We first look at the long end of the volatility term structure (6M). What we find is that as the 6M implied volatility has been grinding lower, the swings in volatility have gone down. Fig 2 shows that the rolling 10 day standard deviation of 6M volatility (a measure of how volatile the 6M implied volatility measure is) has been significantly dampened since May 2012. In other words, investor expectations of volatility in the intermediate term have come down and stabilized within a narrower range. We believe this is due to increased central bank activism that has maintained liquidity in the system, as well as gradual improvements in US macro data as indicated by the recent housing, unemployment and retail sales data.

We believe that the recent flattening of the term structure has been mostly driven by rising 1M ATM volatility (see Fig 2). Indeed, the 6M/1M volatility ratio shows a much higher dependence on the 1M ATM volatility (regression $R^2 = 48\%$) compared to the 6M ATM volatility (regression $R^2 = 18\%$). So the next question we ask is why? It turns out that this has to do with the recent moves (mostly tighter) in the CDX IG spread levels – in Fig 3 (left), we show that 1M realized volatility has been increasing relative to implied volatility (implied to realized ratio has been coming down).

Consequently, investors have been buying front month volatility in the hope of picking up gamma. Therefore, in this instance, we find that the recent flattening in the volatility term structure is not necessarily a precursor of distressed markets – rather it is reflecting an entirely different market dynamic as spreads grind tighter.

Fig 3. Ratio of 1M Implied to Realized Volatility for CDX IG (left), Probability distribution of realized volatility for high (> 75bp) and low (\leq 75bp) spread buckets (right)



Source: Citi Research

Can this dynamic continue? *Surprisingly, we believe that the answer is yes, provided spreads continue to grind tighter.* This is because there is a certain minimum quantum by which credit spreads can be moved by a market maker – conversations with our traders indicate that this quantum varies roughly between $1/16^{\text{th}}$ through $1/8^{\text{th}}$ of a bp depending on whether we are in a low or high volatility environment. The fact that there is a floor on the minimum possible move in spreads indicates that as spreads tighten, the minimum possible move, expressed as a percentage of the spot level rises. In other words, realized volatility goes up.

Our theory is confirmed by CDX IG spread data going back to 2007, when the index traded near its all time tights. We divided the data into 2 buckets – the first includes the days when the spread level was below 75bp (low spread bucket) and the second bucket includes the days when the spread level was 75bp or more (high spread bucket). If we now look at the distribution of 30 day realized volatility for each bucket (see Fig 3 (right)), we find that overall, when spread levels are lower (i.e. below 75bp), realized volatility tends to be higher.

In short, this is what the credit volatility market is telling us for now – intermediate term expectations of volatility remain well anchored within a narrow range on the back of central bank actions and improving macro data in the US. However, the short term volatility expectations have been fluctuating and can rise as a result of increasing realized volatility on the back of further spread tightening. This reflects a somewhat benign macro view in keeping with the movements in the rest of the markets.

Overall, we would tend to agree with the markets at this point. As we have seen, most of the disappointing macro data has failed to fade the rally, and we expect that to continue. Then there remains event risk – the most immediate of is the debt limit in the US, which comes back into force on May 19th. The Bipartisan Policy Center estimates that the Treasury department can push the actual day of reckoning to early September or early October using extraordinary measures, which gives Congress more time to enact new debt limit legislation. The timeline is therefore consistent with the market expectations of low and stable volatility in the intermediate term, unless there is a complete gridlock in Congress.

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Is There a Trade in Here?

So what can one do under such circumstances? We would argue that it makes sense to position for higher realized volatility in the near term by buying gamma in the form of front month or 2M strangles. As we have said before, realized volatility should rise as spreads tighten, and our strategists have estimated that the IG spreads do have further room to tighten, to the tune of $60 \pm 5\text{bp}$ (see [US Credit Weekly - How low can IG CDX go?](#)).

Fig 4. Trade details, prices using mids as of 13-May-2013 – all options are on CDX IG 20

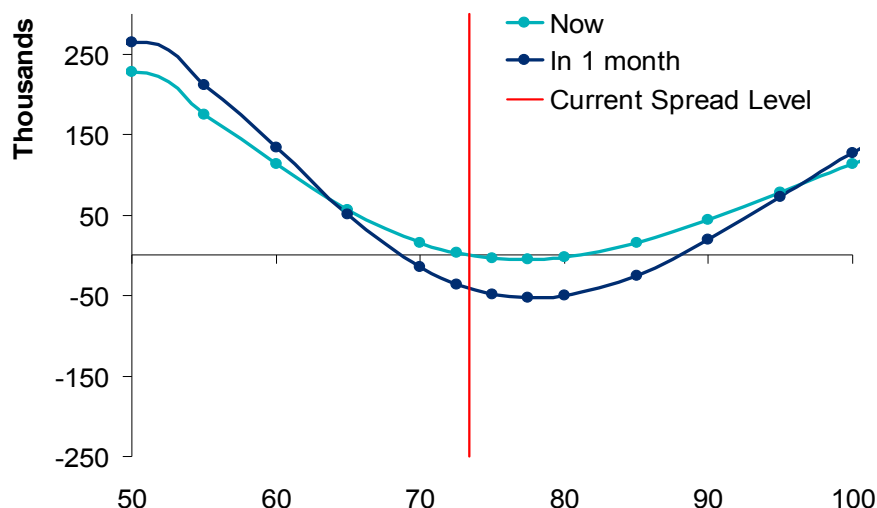
Trade	Security	Notional	Strike	Maturity	Cost*	Delta	Gamma	Vega	Theta
Long Strangle	Buy Payer	70MM	85	17-Jul-13	99,120	-11,462	861	3,742	-1,839
	Buy Recv	70MM	70	17-Jul-13	89,149	10,121	936	3,556	-746
Short Strangle	Sell Payer	100MM	125	20-Nov-13	-150,101	10,169	-448	-7,240	1,467
	Sell Recv	100MM	60	20-Nov-13	-74,765	-6,050	-458	-4,866	277
Net					-36,597	2,778	891	-4,808	-841

Source: Citi Research

* This works out to a cost of -5.2 cents (investor is paid to put on the position) per \$10,000 of notional on the long strangle leg.

The core position can be funded by selling intermediate term (6M) strangles to reflect our view of a stable volatility regime in the medium term. In effect, this is equivalent to a term structure flattener. The details of a sample trade are shown in Fig 4. The P&L profile after 1 month is shown in Fig 5. The breakeven spreads are 68.9bp (for tightening) and 87.8bp (for widening) – given our view of spreads grinding tighter in the near term, the asymmetry in the breakevens would work in favor of the trade.

Fig 5. P&L Profile, \$USD versus spread (bp)



Source: Citi Research

The P&L profile that we show in Fig 5 assumes that the implied volatility levels remain unchanged, i.e. the volatility term structure remains the same as now. However, should the term structure to flatten further as we expect, we believe that the net P&L will be further enhanced, driving the breakeven spreads closer to spot, at least on the tightening side.

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