Previously published in the European Credit Alpha
10 February 2017

Surveying the global credit option landscape

European Credit Strategy
Soren Willemann
+44 (0) 20 7773 9983
soren.willemann@barclays.com
Barclays, UK

US Credit Strategy
Jigar Patel
+1 212 412 1161
jigar.n.patel@barclays.com
BCI, US

After a busy start in 2016, option market volumes have been subdued since then, with spikes around key risk events as investors implemented tactical hedges. Even so, option volumes have actually grown in proportion to index volumes, particularly for Main, which makes "pin risk" a more important issue for this index. This partly reflects yield-seeking behaviour in Europe, evidenced by larger amounts of ATM options traded, in contrast to CDX.IG where OTM payer options are relatively more active, likely due in part to regulatory hedging.

Option volumes – subdued, but with bouts of activity

The first place to look when trying to assess how the credit index option market has developed is reported trading volumes (Figure 1 and Figure 2). Most indices experienced an increase in option activity at the start of 2016, with trading activity in CDX.IG options particularly elevated. But activity for the rest of the year at first glance appears to have been relatively subdued.

Collecting option trading volumes

We rely on the Bloomberg SDR for collecting option trading volumes. In that dataset, trades above a certain threshold are censored and as such cannot be used directly as it would give a strong downward bias to trading volumes.

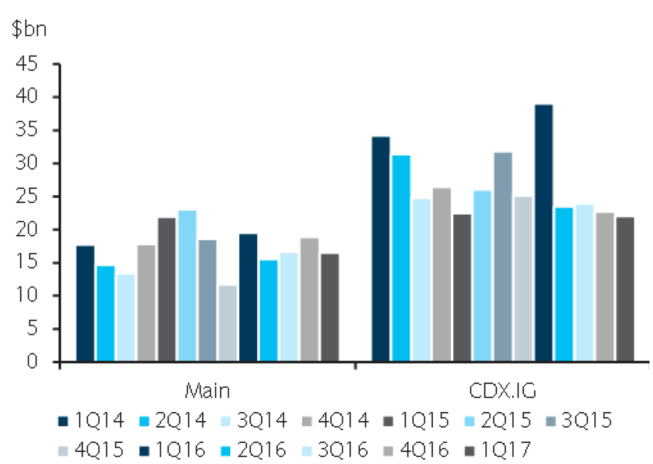
To remedy this, we analyse Barclays ticket sizes and calculate the average ticket size, conditional on being above the censoring threshold, and apply this to the censured trades in the Bloomberg SDR. We perform this calculation for each index, both for options and index trades.

Reported volumes are in native currency. For comparability all volumes are converted to USD at current exchange rates.

By the very definition, we can only track trades reported to Bloomberg SDR. While this is unlikely to be a problem for CDX where the vast majority of trades are reported, this is not the case for iTraxx. We estimate that perhaps 50% of trades in Europe are included in the Bloomberg SDR. This means that absolute volume measures are biased downwards for Europe by up to a factor of 2, although the trend is unlikely to be biased.

FIGURE 1

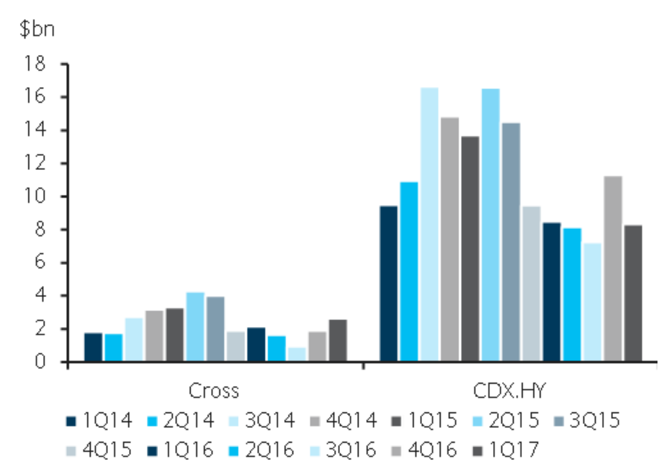
Average weekly option volume by quarter: Main and CDX.IG



Note: 1Q17 covers Jan '17. Source: Bloomberg SDR, Barclays Research

FIGURE 2

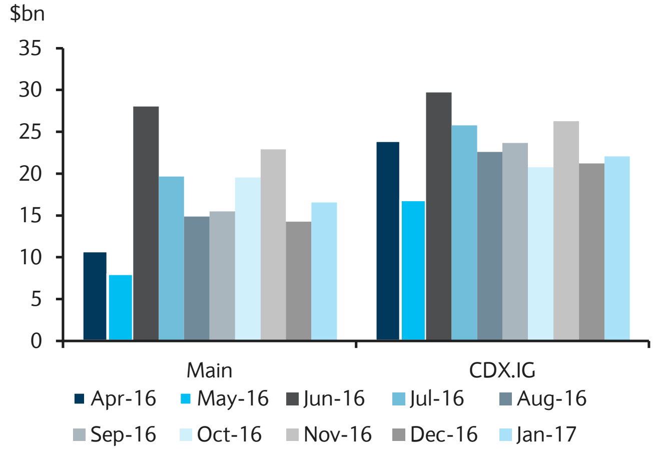
Average weekly option volume by quarter: Cross and CDX.HY



Note: 1Q17 covers Jan '17. Source: Bloomberg SDR, Barclays Research

FIGURE 3

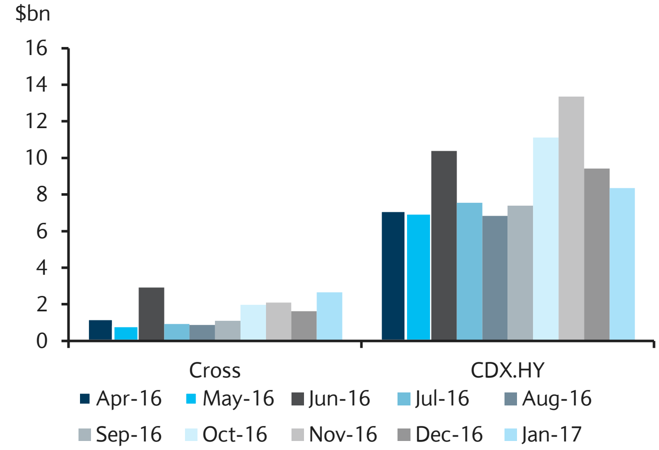
Average weekly option volume by month: Main and CDX.IG



Source: Bloomberg SDR, Barclays Research

FIGURE 4

Average weekly option volume by month: Cross and CDX.HY



Source: Bloomberg SDR, Barclays Research

However, the quarterly data mask spikes in activity around significant macro events – in particular, the UK EU referendum in June and the US presidential election in November. The monthly data in Figure 3 and Figure 4 show that investor concerns about these events did coincide with increased option activity, which is an encouraging sign for the market.

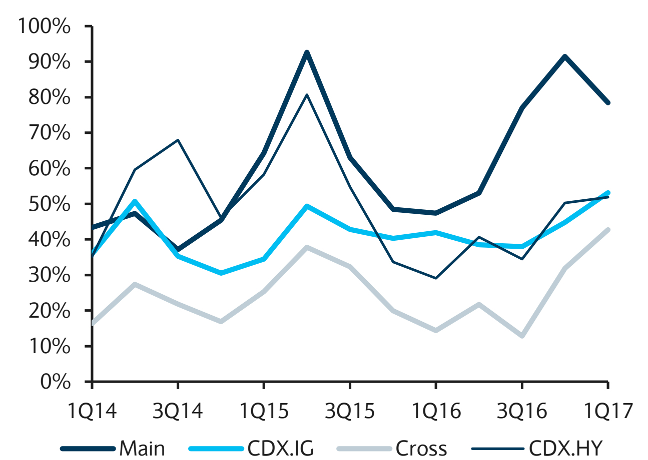
In addition, the absence of greater option activity outside of these periods does not surprise us. As credit markets rebounded from the significant weakness in 1Q16, the focus for investors shifted from protecting the downside to capturing the upside. Many investors were playing catch-up with their benchmarks for much of the year, and as a result we believe there was little appetite (or spare premium) for hedges.

Option vs index volumes – back to the tail wagging the dog

Beyond focussing on option volumes outright, it is revealing to look at how option trading volumes have changed in relation to index trading volumes. Figure 5 shows option volumes as a percentage of index volumes by quarter using data from the SDR.

FIGURE 5

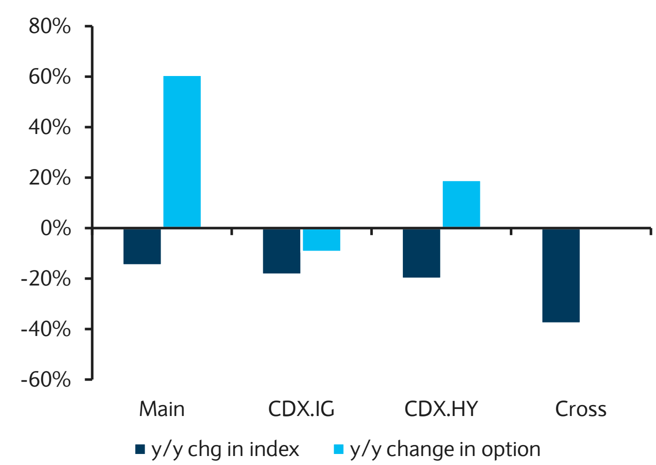
Option volumes as a percentage of index volumes



Source: Bloomberg SDR, Barclays Research

FIGURE 6

Change in index and option volume, 4Q16 vs 4Q15



Source: Bloomberg SDR, Barclays Research

Since the start of 2016, option activity has generally been increasing relative to index activity, with Main having the largest increase. This is a reversal of the prior trend for most of 2015, when the share of option volume relative to index volume had been decreasing.

Notably, for the two indices that saw the greatest increase in option activity relative to index activity from 4Q15 to 4Q16 – CDX.HY, which went from 34% to 50%, and Main, which went from 47% to 91%, the increase was driven by a combination of higher option volumes and lower index volumes (Figure 6). This could be indicative of investors increasingly using options to replicate index risk.

We believe the current trend of greater option activity relative to index activity once again increases the possibility of the "option tail wagging the index dog," whereby delta-hedging of option positions could have an outsized influence on the underlying index. One way in particular that this hedging technical could manifest itself is via "pin risk," particularly if an index is trading near a strike with large open interest close to option expiration.

What is "pin risk"?

The concept of "pin risk" or "gamma effects" is tied to option hedging activity (typically by dealers), particularly when option expiry is imminent.

Imagine a scenario where a dealer has bought a payer option and delta-hedged it by selling protection in the underlying index. Suppose spreads widen. In that case, the delta of the option goes up (more likely to end up in-the-money at expiry). To hedge this, the dealer will sell protection – in the amount reflecting the change of delta. Suppose then that spreads tighten. The delta then drops again, and the dealer would buy protection back, again reflecting the change in delta.

In short, the hedging activity of a dealer buying options will lead them to sell protection after a spread widening and buy protection after a spread tightening. As is often the case, investors on the other side of the trade will not hedge (but hold the options outright), so the dealer hedging activity (when buying options) tends to have a "pinning" effect on the index: causing the index to tighten after any widening and vice versa.

The increase in option activity relative to index activity across indices increases the importance of being aware of developments in the option market, even for those investors that do not trade the product.

While anecdotal evidence suggests that there has been less hedging of late via options (especially as implied volatilities continue to decline), there may have been an increase in strategies that involve selling options to generate carry. As explained in the box above, when dealers buy options and delta-hedge them this has the effect of dampening spread moves wider or tighter. This would be consistent with the low level of realized volatility that has characterized the market recently.

Pin risk – more than just "anecdotal evidence"

While high option volumes relative to index volumes would indicate an increased prevalence of pin risk, only an analysis of market dynamics around option expiry will give us more solid evidence.

For that, we seek to examine whether two measures of realized volatility (intraday ranges and close-to-close volatility) are generally lower just before option expiries compared with both before and after this period. We outline the precise methodology in the box below.

Methodology – calculating the impact of pin risk

Pin risk should present itself as reduced volatility or a reduced propensity for an index to move "much" ahead of option expiry. But how can this be quantified?

For each index and for each option expiry date since 2014, we look at three periods: a) "gamma period": 5 business days immediately before option expiry; b) "pre gamma period": 5 business days before the "gamma period"; and c) "post expiry period": the 5 business days after option expiry.

For each period, we calculate two measures of volatility: average intraday trading range and realized volatility based on close-to-close prices.

We then look at the ratio of the "gamma period" to the average of the "pre gamma" and "post expiry" periods for each measure to gauge whether the "gamma period" is special.

Across all option expiries we then take the median ratio as a general measure to compare the "gamma period" with the periods before and after.

With this methodology the hope is that any market events around option expiry will be washed out by looking both at periods just before and after as well at many expiries over time.

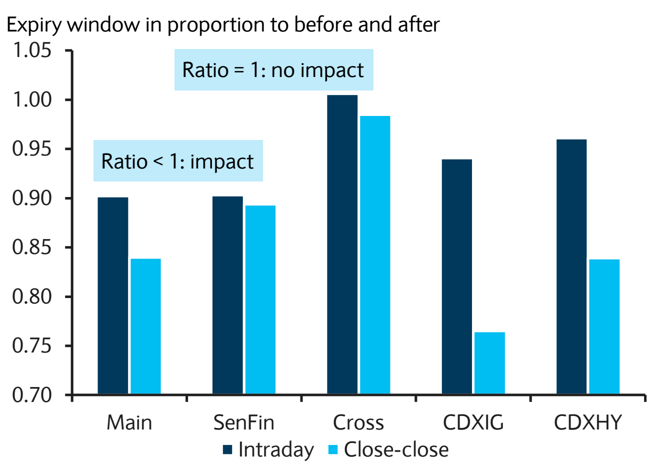
Examining this "pin risk ratio" for the two measures across indices (Figure 7) gives us many insights. For Cross we find almost no impact from pin risk, which also fits with our calculations before, which showed that Cross option volumes are the lowest in proportion to index volumes.

This is a general phenomenon; comparing the median ratio for intraday volatility to option volumes as a percent of index volumes for 2014-2016 (Figure 8) we get a revealing pattern. Briefly ignoring SenFin, indices that exhibit a large effect from delta hedging also tend to have large option volumes as a percent of index volumes.

Focussing on the intraday measure first, Main and SenFin show a 10% median decline (ratio of 0.9x) in volatility around option expiry, whereas these numbers are less pronounced for CDX.IG and HY, which show only a 5% decline. While there is a systematic pattern and the numbers are non-zero, we do not find them particularly large, leading us to conclude that while pin risk can have a meaningful effect on the market, it is not an outsized effect.

FIGURE 7

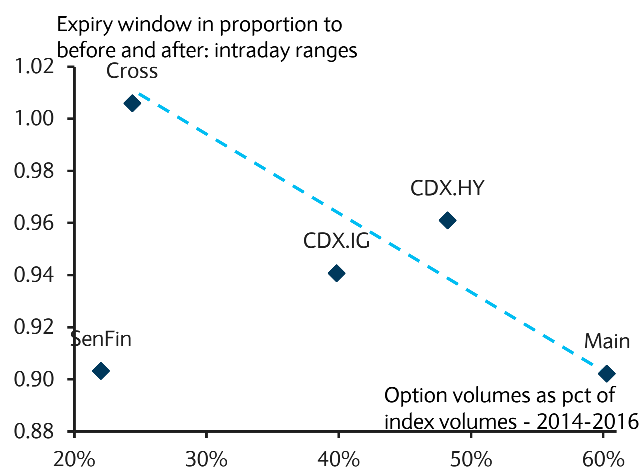
Main and SenFin show meaningful impact from "pin risk" – Cross none, CDX indices little – unless measured as C-C vol



Source: Bloomberg SDR, Barclays Research.

FIGURE 8

Pin risk measured as changes in intraday ranges correlates well with option volumes as percent of index volumes



Source: Bloomberg SDR, Barclays Research.

Using the realized volatility measure we get similar conclusions for iTraxx indices, but a much more pronounced effect on the CDX indices, with volatility 20-25% lower around option expiry in this measure – notably different than the conclusions from using intraday volatility. While we generally favour the intraday measure (primarily because it is less exposed to headlines over the weekend), one reason for the apparent outsized effect on close-to-close realized volatility for CDX is that closing prices for CDX are formed without any European "non option-related" trading interest, allowing for the delta-hedging effect from market makers in CDX to be more pronounced than in Europe.

Expiry and strike profile

We believe it is also instructive to examine the trends in the expiry and strike profile of options traded. For this, we again use SDR data, but we remove observations where there appear to be errors in the reporting of expiry and strike.

Expiries – higher focus on sub 2mth options in Europe vs US

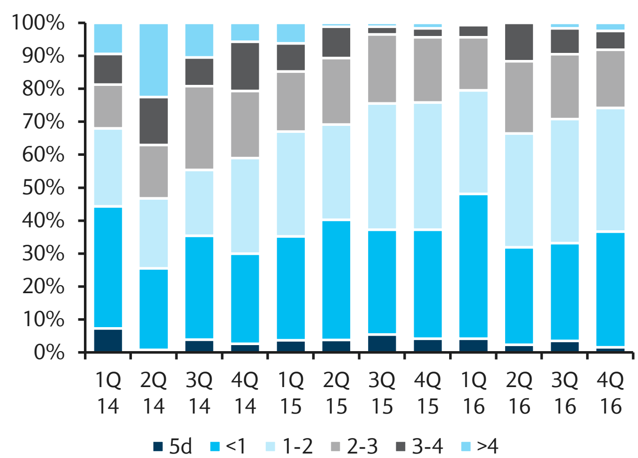
In our previous publication on trends in trading volume in options in Europe (*The evolving option landscape*, 6 May 2016), we noted the high concentration of short-dated options for Main (Figure 9) into 1Q16. This pattern is largely unchanged, with about 70% of trading volumes for Main options concentrated in the 2mths and under bucket. In contrast, CDX.IG (Figure 10), which had seen a similar increase in shorter-dated activity in 1Q16 (75% of overall volume was in the sub 2mth bucket), has since become less concentrated in the shorter dates, with only 55% of overall activity in the sub 2mth bucket over the past three quarters.

There is also a pronounced "blip" in 1Q16 where sub-1mth options were more active, fitting with the discussion in the previous section of the volatile start to 2016, motivating investors to trade short-dated options for a near-term catalyst.

A similar relationship exists for Cross (Figure 11) and CDX.HY (Figure 12) options, with Cross trading volumes exhibiting a high degree of concentration in the sub 2mth bucket (nearly 70% of overall activity over the past three quarters), while activity in CDX.HY has been less concentrated in the shorter dates (only 50% of overall activity over the same period). Note that both indices did see a spike in short-dated option trading in 1Q16, especially Cross.

FIGURE 9

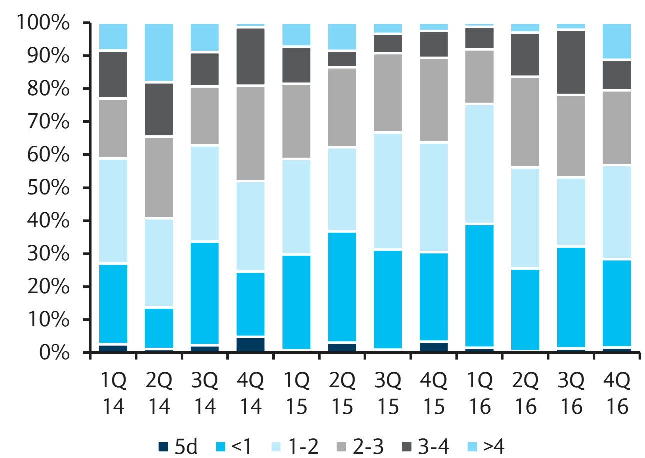
Main: Expiry split of options traded by quarter



Note: Showing months to expiry at trade inception, with a bucket for sub 5 day trades. Source: Bloomberg SDR, Barclays Research

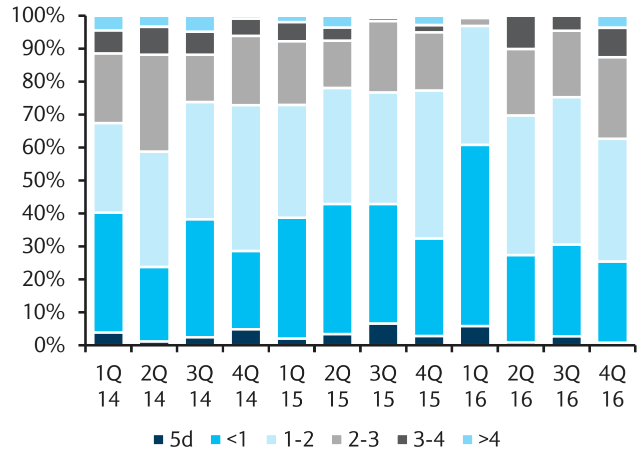
FIGURE 10

CDX.IG: Expiry split of options traded by quarter



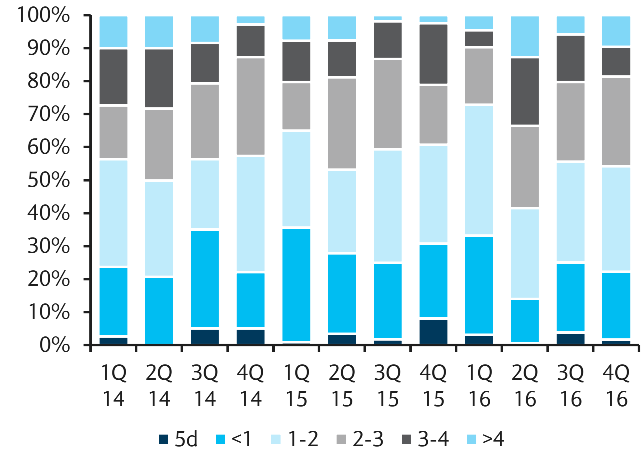
Note: Showing months to expiry at trade inception, with a bucket for sub 5 day trades. Source: Bloomberg SDR, Barclays Research

FIGURE 11
Cross: Expiry split of options traded by quarter



Note: Showing months to expiry at trade inception, with a bucket for sub 5 day trades. Source: Bloomberg SDR, Barclays Research

FIGURE 12
CDX.HY: Expiry split of options traded by quarter



Note: Showing months to expiry at trade inception, with a bucket for sub 5 day trades. Source: Bloomberg SDR, Barclays Research

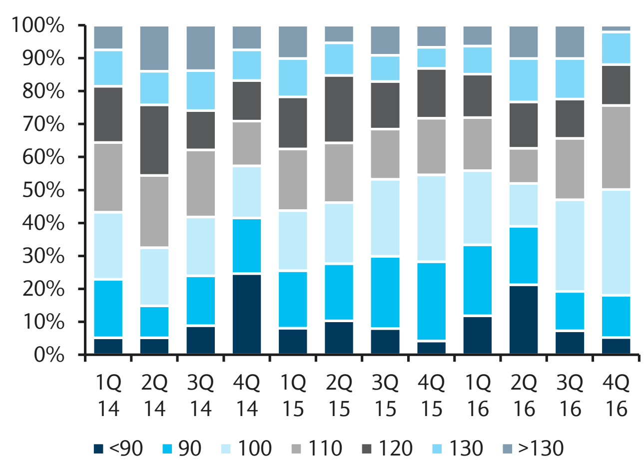
Strikes – less tail activity in Main and CDX.HY

Activity across strikes for Main options (Figure 13) has seen a meaningful change over the last two quarters in 2016, with volumes becoming increasingly concentrated in ATM and slightly out of the money (110% moneyness) payer options. This has come at the expense of far out-of-the money payer options with moneyness above 120%. To us, this reflects both a yield-seeking behaviour (selling of ATM structures by investors) as well as a lack of interest in far OTM options – in spite of the uncertain environment with the Trump election and Brexit. We think part of the reason for this is that people still have faith in central bank "puts" and therefore do not see a need to hedge the tail.

Over the course of 2017, we believe that investors will become increasingly less inclined to buy into an ECB put, which could spur interest in OTM payer options again.

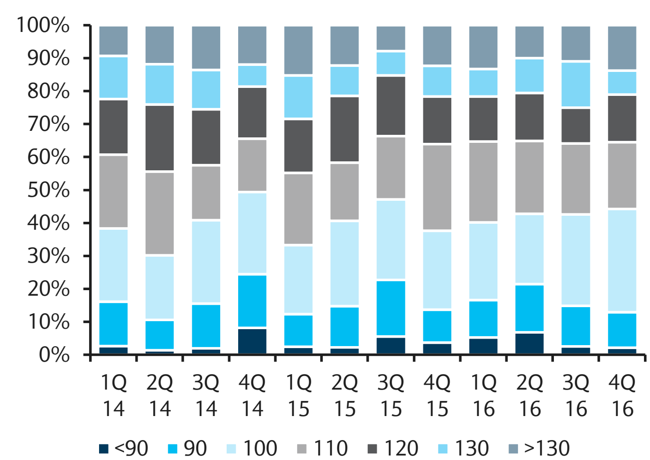
In contrast, for CDX.IG options (Figure 14), we see a fairly steady picture across Moneyness – with no sign of "crowding out" of OTM payer options. In fact, trading in far OTM payers has consistently accounted for 20-25% of overall CDX.IG option activity. Based on anecdotal

FIGURE 13
Main: Moneyness split of options traded by quarter



Note: Showing ATMF moneyness at trade inception.
Source: Bloomberg SDR, Barclays Research

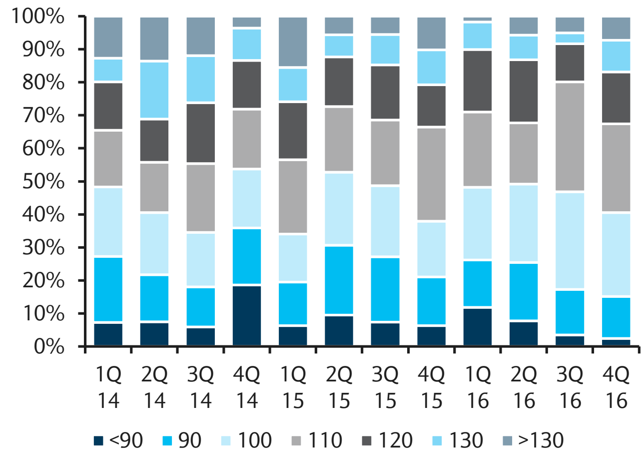
FIGURE 14
CDX.IG: Moneyness split of options traded by quarter



Note: Showing ATMF moneyness at trade inception.
Source: Bloomberg SDR, Barclays Research

FIGURE 15

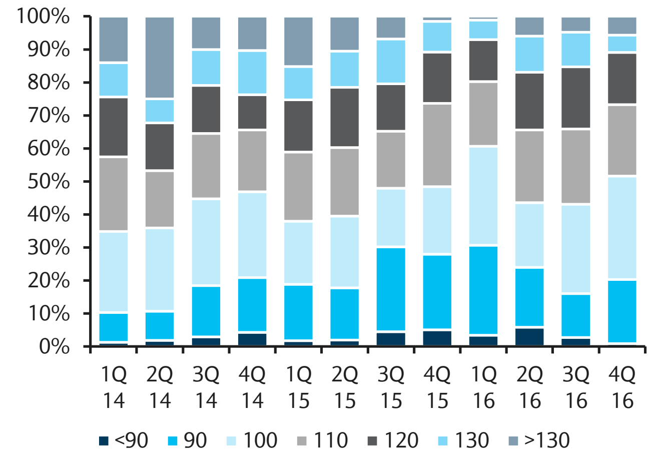
Cross: Moneyness split of options traded by quarter



Note: Showing ATMF moneyness at trade inception.
Source: Bloomberg SDR, Barclays Research

FIGURE 16

CDX.HY: Moneyness split of options traded by quarter



Note: Showing ATMF moneyness at trade inception, converted into spread equivalents. Source: Bloomberg SDR, Barclays Research

evidence, we believe one reason for this consistent level of activity is that banks are using far OTM CDX.IG payers for regulatory (e.g., CCAR) hedging purposes. As long as banks continue using CDX.IG to hedge, we would expect OTM payers to remain reasonably active.

Similar to CDX.IG, and in contrast to Main, Cross options (Figure 15) have not seen a persistent crowding out of OTM payer options, which in fact have gained in relative trading size. We believe this could be due to demand for OTM Cross options to hedge CLO warehouses by dealers and also hedging against sold protection in mezzanine Cross tranches.

On the other hand, CDX.HY options (Figure 16) saw volumes decline in deep OTM payers in 4Q16, mostly to the benefit of ATM option volumes. Given the circumstances we described earlier (low levels of realized volatility, investors playing catch-up to their benchmarks for much of 2016), one possible explanation for this shift is that investors reduced their use of tail-risk hedges in CDX.HY as the market rallied, and increased their use of carry-generating option strategies.

SenFin options – not forgotten

In the previous section we have focussed on IG/HY, US/Europe, and option flows, ignoring SenFin, which we discuss in this section.

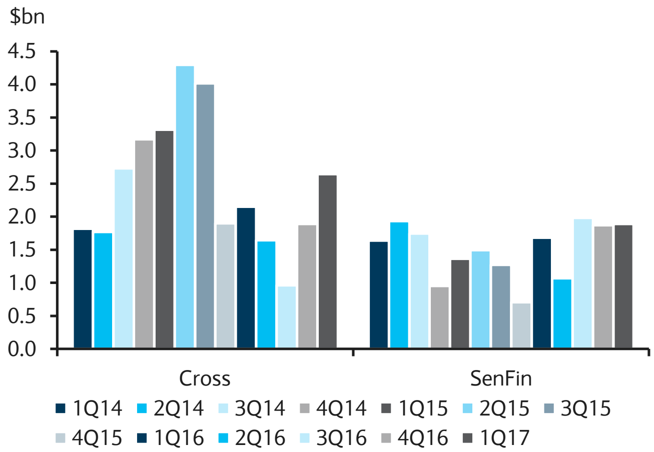
Having been a fraction of Cross option volumes in 2014-2015, SenFin option volumes have been fairly steady recently, with similar sizes traded as Cross (Figure 17) – with just below $2bn per week reported in the Bloomberg SDR.

Given the events around Deutsche Bank, Brexit and the Trump election last year, it is not surprising that SenFin option volumes held up well. Furthermore, despite concerns around the efficacy of SenFin in a “post TLAC” world, we expect SenFin option volumes to remain healthy, especially with the heavy political calendar in Europe this year.

Comparing option volumes to index volumes for SenFin (Figure 18) also shows that SenFin option activity has been similar in style to Cross, with a similar proportion of option volumes relative to index volumes – although much lower in proportion compared with Main (Figure 5).

FIGURE 17

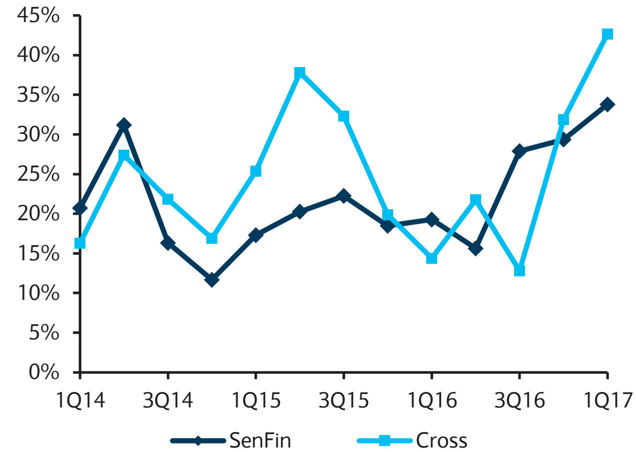
Average weekly option volume by quarter: SenFin and Cross



Note: 1Q17 covers Jan '17. Source: Bloomberg SDR, Barclays Research

FIGURE 18

Option volumes as a pct of index volumes



Source: Bloomberg SDR, Barclays Research

Analyst Certification

We, Jigar Patel and Soren Willemann, hereby certify (1) that the views expressed in this research report accurately reflect our personal views about any or all of the subject securities or issuers referred to in this research report and (2) no part of our compensation was, is or will be directly or indirectly related to the specific recommendations or views expressed in this research report.

Important Disclosures:

Barclays Research is a part of the Investment Bank of Barclays Bank PLC and its affiliates (collectively and each individually, "Barclays")
All authors contributing to this research report are Research Analysts unless otherwise indicated. The publication date at the top of the report reflects the local time where the report was produced and may differ from the release date provided in GMT.

Availability of Disclosures:

For current important disclosures regarding any issuers which are the subject of this research report please refer to https://publicresearch.barclays.com or alternatively send a written request to: Barclays Research Compliance, 745 Seventh Avenue, 13th Floor, New York, NY 10019 or call +1-212-526-1072.

Barclays Capital Inc. and/or one of its affiliates does and seeks to do business with companies covered in its research reports. As a result, investors should be aware that Barclays may have a conflict of interest that could affect the objectivity of this report. Barclays Capital Inc. and/or one of its affiliates regularly trades, generally deals as principal and generally provides liquidity (as market maker or otherwise) in the debt securities that are the subject of this research report (and related derivatives thereof). Barclays trading desks may have either a long and / or short position in such securities, other financial instruments and / or derivatives, which may pose a conflict with the interests of investing customers. Where permitted and subject to appropriate information barrier restrictions, Barclays fixed income research analysts regularly interact with its trading desk personnel regarding current market conditions and prices. Barclays fixed income research analysts receive compensation based on various factors including, but not limited to, the quality of their work, the overall performance of the firm (including the profitability of the Investment Banking Department), the profitability and revenues of the Markets business and the potential interest of the firm's investing clients in research with respect to the asset class covered by the analyst. To the extent that any historical pricing information was obtained from Barclays trading desks, the firm makes no representation that it is accurate or complete. All levels, prices and spreads are historical and do not represent current market levels, prices or spreads, some or all of which may have changed since the publication of this document. The Investment Bank's Research Department produces various types of research including, but not limited to, fundamental analysis, equity-linked analysis, quantitative analysis, and trade ideas. Recommendations contained in one type of research may differ from recommendations contained in other types of research, whether as a result of differing time horizons, methodologies, or otherwise. In order to access Barclays Statement regarding Research Dissemination Policies and Procedures, please refer to *https://publicresearch.barcap.com/static/S_ResearchDissemination.html*. In order to access Barclays Research Conflict Management Policy Statement, please refer to: *https://publicresearch.barcap.com/static/S_ConflictManagement.html*.

All pricing information is indicative only. Prices are sourced from Thomson Reuters as of the last available closing price at the time of production of the research report, unless another time and source is indicated.

Explanation of other types of investment recommendations produced by Barclays FICC Research:

Trade ideas contained herein that have been produced by the Credit teams within Barclays Research are valid at current market conditions and may not be otherwise relied upon.
Trade ideas contained herein that have been produced by other research teams within Barclays FICC Research shall remain open until they are subsequently amended or closed in a future research report.

Disclosure of previous investment recommendations produced by Barclays FICC Research:

Barclays FICC Research may have published other investment recommendations in respect of the same securities/instruments recommended in this research report during the preceding 12 months. To view previous investment recommendations published by Barclays FICC Research in the preceding 12 months please refer to *https://live.barcap.com/go/research/ResearchInvestmentRecommendations*.

Barclays legal entities involved in publishing research:

Barclays Bank PLC (Barclays, UK)
Barclays Capital Inc. (BCI, US)
Barclays Securities Japan Limited (BSJL, Japan)
Barclays Bank PLC, Hong Kong branch (Barclays Bank, Hong Kong)
Barclays Capital Canada Inc. (BCCI, Canada)
Absa Bank Limited (Absa, South Africa)
Barclays Bank Mexico, S.A. (BBMX, Mexico)
Barclays Securities (India) Private Limited (BSIPL, India)
Barclays Bank PLC, India branch (Barclays Bank, India)
Barclays Bank PLC, Singapore branch (Barclays Bank, Singapore)

Disclaimer

This publication has been produced by the Investment Bank of Barclays Bank PLC and/or one or more of its affiliates (collectively and each individually, "Barclays"). It has been distributed by one or more Barclays legal entities that are a part of the Investment Bank as provided below. It is provided to our clients for information purposes only, and Barclays makes no express or implied warranties, and expressly disclaims all warranties of merchantability or fitness for a particular purpose or use with respect to any data included in this publication. To the extent that this publication states on the front page that it is intended for institutional investors and is not subject to all of the independence and disclosure standards applicable to debt research reports prepared for retail investors under U.S. FINRA Rule 2242, it is an "institutional debt research report" and distribution to retail investors is strictly prohibited. Barclays also distributes such institutional debt research reports to various issuers, regulatory and academic organisations for informational purposes and not for the purpose of making investment decisions regarding any debt securities. Any such recipients that do not want to continue receiving Barclays institutional debt