Primer

Credit Strategy | Global
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CDX Primer

Bank of America Merrill Lynch

Rachna Ramachandran +1 646 855 7927
Quant Rel Value Strategist
MLPF&S
rachna.ramachandran@baml.com

Yuriy Shchuchinov +1 646 855 7209
Credit Strategist
MLPF&S
yuriy.shchuchinov@baml.com

CDX Indices are the most liquid traded credit products

CDX indices have been traded since at least 2005 and are now the most liquid credit instruments. The indices are contracts to buy or sell protection on standardized baskets of credit issuers, thus offering exposure to the broad market. In the US, CDX IG and CDX HY are the investment grade and high yield CDS indices respectively. The indices roll every six months, which involves updating the underlying basket of credits to incorporate the most liquid CDS names and extending the contract maturity by six months. Each roll creates a new series of the index, the latest of which is referred to as the On The Run series. A majority of trading activity is concentrated in the On The Run series, although investors can also transact on the older series.

CDX indices as hedges

Deep liquidity and their unfunded nature makes CDX indices attractive hedging instruments for credit portfolios. Short-term hedging and relative value trading activity is focused in the On the Run series of the index, where turn over is high. While both CDX IG and CDX HY are correlated with their respective cash benchmarks, differences in constituents, CDS-cash basis and other factors give rise to tracking error that in the past amplified during times of market stress.

Index construction and trading conventions

CDX indices roll into a new series in March and September each year, with the underlying constituents of the new index chosen based on transparent liquidity and rating criteria, among other rules. Although, the indices trade over-the-counter, the contracts are standardized and fungible. CDX IG and HY both trade with a standard fixed coupon that remains unchanged across series. Credit events in the underlying reference entities that can trigger the CDS include Bankruptcy and Failure to Pay, with settlement occurring through the Credit Event Auction.

CDX Indices are mandated to be centrally cleared

Under the Dodd-Frank Act, CDX index trading is now regulated by the CFTC, which has called for a phased-in mandatory central clearing of most index trades over the course 2013. In a cleared trade, both the client and the dealer face a well-capitalized Central Counterparty (CCP) rather than each other, reducing counterparty risk. In contrast to the world of uncleared trades, where mutual collateral posting rules were governed by bilaterally negotiated agreements, with a CCP, everyone plays by the same margin and collateral rules.

Refer to important disclosures on page 25 to 27. Link to Definitions on page 24.

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CDX Primer

CDX indices are traded instruments that offer investors a way to obtain long or short credit risk exposures to broad portfolios of high grade (Markit CDX North American Investment Grade, or CDX IG) and high yield (Markit CDX North American High Yield, or CDX HY) issuers. Deep liquidity is the defining feature of the CDX indices and they are currently by far the most traded instruments in credit. Trading the indices is equivalent to buying or selling CDS protection on standardized baskets of North American liquid credits. The baskets are updated semi-annually as part of the "index roll" in a process administered by Markit and the participating dealers. Available index maturities include 3, 5, 7 and 10 years, although the 5-yr maturity is most liquid. Finally, as required by the Dodd Frank Act, a majority of CDX index trades are cleared[1] to reduce counterparty risk.

CDX indices are contracts to buy or sell protection on standardized baskets of issuers.

CDX overview

CDX indices are contracts to buy or sell protection on standardized baskets of issuers, or referenced entities. Hence, buying protection on a CDX index is equivalent to simultaneously buying single-name CDS protection (with the same coupon and maturity) on each credit in the basket. The buyer, therefore, makes quarterly coupon payments and receives compensation in case of a single-name CDS credit event for any of the index reference entities.

Table 1: Basic characteristics of CDX indices

Item	CDX IG	CDX HY
Number of credits	125	100
Index coupon	100bps	500bps
Ratings restriction	BBB3 or higher	BB1 or lower

Source: BofA Merrill Lynch Global Research, Markit.

In the US[2] two types of indices are available: CDX IG, which references a basket of liquid North American high grade credits, and CDX HY, referencing a basket of liquid North American high yield credits. The baskets are equally weighed. Table 1 outlines the basic characteristics of each basket: the CDX IG index contains 125 investment grade reference entities and CDX HY has 100 reference entities with speculative-grade ratings. The ratings for each credit are based on the median of Moody's, S&P and Fitch ratings. Below we briefly describe the major characteristics of CDX indices that we address in more detail later in the report.

CDX indices roll into a new series every six months in March and September.

Roll

Each CDX index rolls every six months to update the reference baskets and extend maturities. Each roll is identified by a series number. For example, Series 20 CDX indices started trading in March of 2013 and have the 5-year maturity of June 20th 2018. Most of trading is concentrated in the latest, or on-the-run, series suggesting that rolling positions to the latest series is important to preserve liquidity.

Coupons

CDX indices trade with standardized coupons of 100bps for CDX IG and 500bps for CDX HY[3].

Index credit events include bankruptcy and failure to pay.

Credit events

Similar to single-name CDS the buyer of protection on a CDX Index receives compensation from the seller of protection in case of a credit event. A credit event for any of the constituent single-name CDS also triggers a credit event for the CDX index. Allowed credits events include Bankruptcy and Failure to pay.

[1] CFTC ruled that mandatory clearing requirement begins in phases for different type of market participants, starting on March 11 2013 for the most active market participants. See the section on clearing for more details.

[2] Indices on European and EM credits are also available.

[3] Please note that CDX index coupons were not standardized prior to Series 12. For example, the coupon on the CDX IG Series 9 10Y index is 80bps.

Quotation

While CDX indices trade on price, or up-front cost, the CDX IG index is quoted in spread terms and the CDX HY index is quoted in price terms. By convention a spread quote corresponds to a unique price and vice versa on a given day. The conversion between spreads and prices is determined by the ISDA Standard Upfront Model, available on the Bloomberg CDSW screen.

Valuation

Under normal market conditions CDX market price is close to the theoretical fair value.

The theoretical fair price (upfront cost) for a CDX index is simply the average price of the constituent single-name CDS with the same maturity and coupon (strike). Due to convexity (non-linear relationship between prices and spreads), the average CDS spread of the constituents is only approximately equal to the fair value spread of a CDX index. Arbitrage typically keeps the actual trading level within a few basis points of this fair value, although larger divergences are possible. Since 2010, the absolute value of the difference between the fair and market value averaged 3bps for CDX IG and $0.6 for CDX HY 5-yr indices. During the credit crisis, however, CDX traded as much as 50bps tighter from fair value for CDX IG and as much as $8pts higher for CDX HY.

Liquidity in CDX indices

Deep liquidity is the defining feature of the CDX indices, as they are by far the most traded instrument in credit. Trading volumes in CDX indices are an order of magnitude higher than those for even the most liquid single name CDS and bonds.

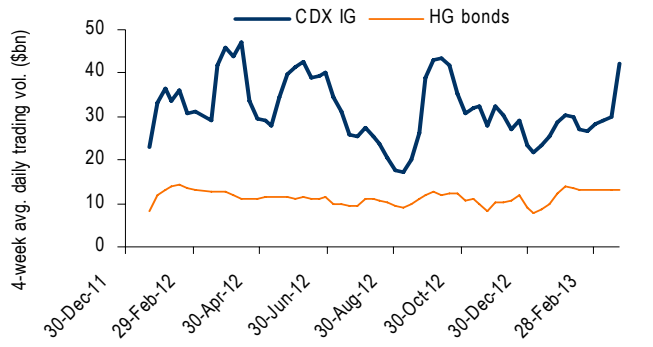
For example, the average daily trading volume over the last 12 months for CDX has been $32bn for IG and $5.5bn for HY (excluding tranches), with most of the trading concentrated in the on-the-run series. This compares to average daily trading volumes of less than $200mn for single-name CDS and about $400mn for bonds[4] of the most liquid individual issuers, such as GECC and MS. In fact, CDX IG trading volumes exceed secondary trading volumes for all high grade cash bonds[5] and CDX HY trading volumes average close to the total secondary trading volume in all high yield bonds (Chart 1 and Chart 2). Finally, CDX indices also offer significantly more liquidity compared to credit ETFs (Table 2).

Table 2: Average daily trading volume over the last 12 months, $bn

Instrument	CDX IG / High grade	CDX HY / High yield
CDX Indices	32.1	5.5
All cash bonds	11.7	5.1
Top ETFs	0.6	0.5

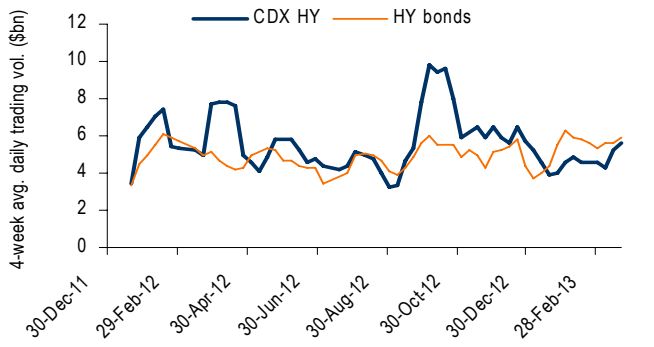
Note: top HG ETFs include LQD, BND, AGG, BSV, CSJ, VCSH. Top HY ETFs include HYG and JNK.
Source: BofA Merrill Lynch Global Research, Bloomberg, DTCC, TRACE.

Chart 1: Trading volume for CDX IG is almost three times higher than the trading volume for all high grade bonds ...



Note: Trading volumes are for untranched CDX indices only.
Source: BofA Merrill Lynch Global Research, DTCC, FINRA Trace.

Chart 2: ... while for CDX HY the trading volume is similar to the total for all high yield bonds.



Trading volumes are for untranched CDX indices only
Source: BofA Merrill Lynch Global Research, DTCC, FINRA Trace.

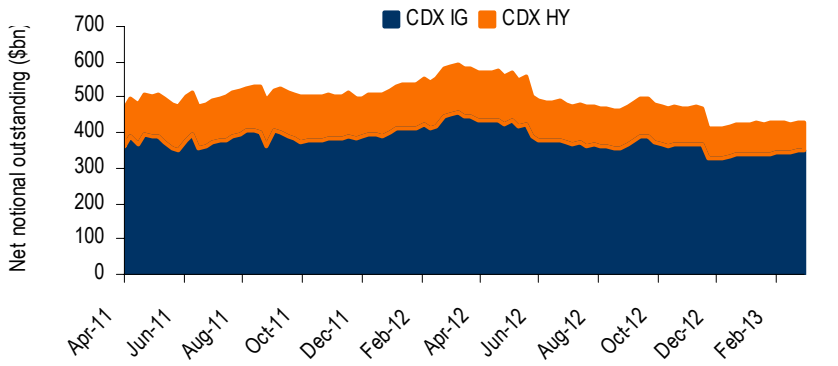
[4] Based on TRACE trading volumes capped at $5mn per trade.

[5] Bond trading volumes are for TRACE-eligible bonds only.

The amount outstanding of CDX indices, or the net notional amount, is relatively small compared to their very high trading volumes. This is similar to other financial products that are used for hedging, such as stock index futures. Over the last 12 months the net notional has averaged $375bn for CDX IG and $107bn for CDX HY (Chart 3). These amounts are significantly below the sizes of the corporate cash bond markets that we estimate at $6.5tr for high grade and $1.3tr for high yield.

Please note that the net notional amount includes only active positions that have not been closed out by offsetting trades. Another measure of the market size, the gross notional, includes all open trades and is 5 to 7 times higher than net notional.

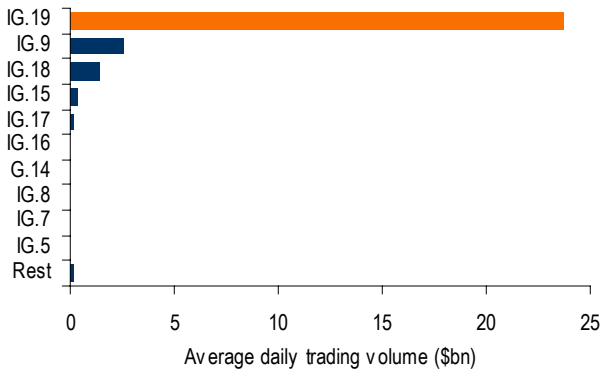
Chart 3: CDX net notional outstanding.



Source: BofA Merrill Lynch Global Research, DTCC.

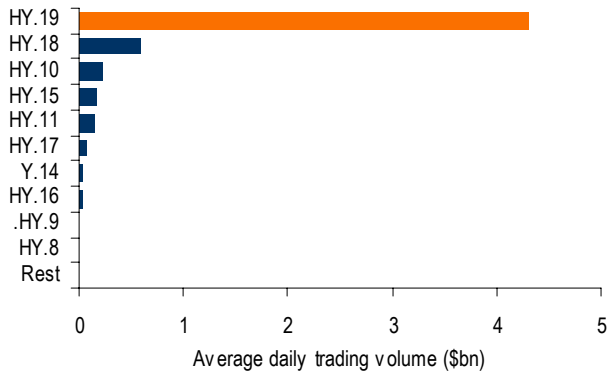
It is important to note that most CDX index liquidity is concentrated in the latest, on-the-run, series. Trading in Series 19 accounted for close to 80% of total CDX trading volumes when it was the on-the-run series from September 2012 through March of 2013, for example (Chart 4 and Chart 5). Such concentration of trading in the on-the-run CDX series highlights that to retain maximum liquidity investors should roll the positions to the latest series.

Chart 4: Average trading volume by series: CDX IG
Note: for the period from Sept 2012 through March 2013



Source: BofA Merrill Lynch Global Research, DTCC.

Chart 5: Average trading volume by series: CDX HY
Note: for the period from Sept 2012 through March 2013

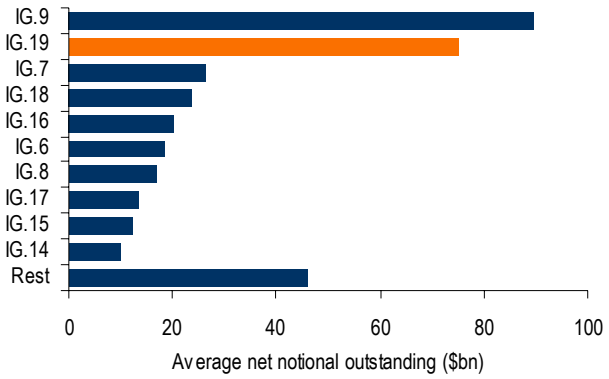


Source: BofA Merrill Lynch Global Research, DTCC.

While the on-the-run series is also typically the largest in terms of outstanding net notional, most of the net notional amount remains in the older series. Again using Series 19 as an example for the period from September 2012 through March 2013, net notional for the off the run series accounted for about 80% of the average total CDX net notional outstanding (Chart 6 and Chart 7).

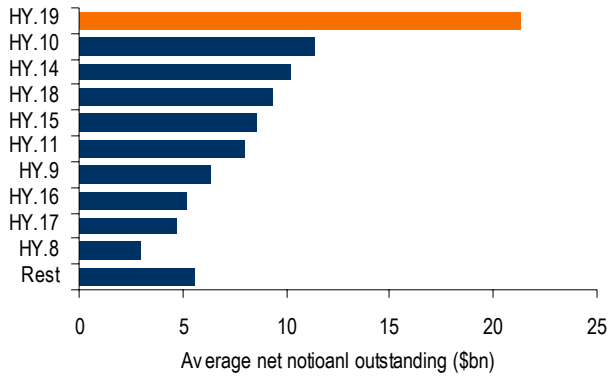
Hence, the on the run series (using Series 19 as an example) accounts for 80% of trading volumes and 20% of net notional outstanding. The daily turn-over ratios (the ratios of the average trading volumes to the average net notional) for Series 19 were 30% for IG and 20% for HY, compared to just 2% average turnover ratio for the off-the-run series. This suggests the latest series is mostly used for hedging as well as short-term investment strategies and relative-value trading, while the older series are mostly used for investment or long-term hedging.

Chart 6: Average net notional by series: CDX IG
Note: for the period from Sept 2012 through March 2013



Source: BofA Merrill Lynch Global Research, DTCC.

Chart 7: Average net notional by series: CDX HY
Note: for the period from Sept 2012 through March 2013



Source: BofA Merrill Lynch Global Research, DTCC.

Table 3: Correlation between returns on CDX and excess returns on the corresponding USD high grade and high yield indices.

Index	Since 2005	Since 2010
CDX IG	57%	63%
CDX HY	74%	80%

Note: C0A0 is the benchmark USD high grade cash index and H0A0 is the benchmark USD high yield index. Correlation based on weekly returns.
Source: BofA Merrill Lynch Global Research

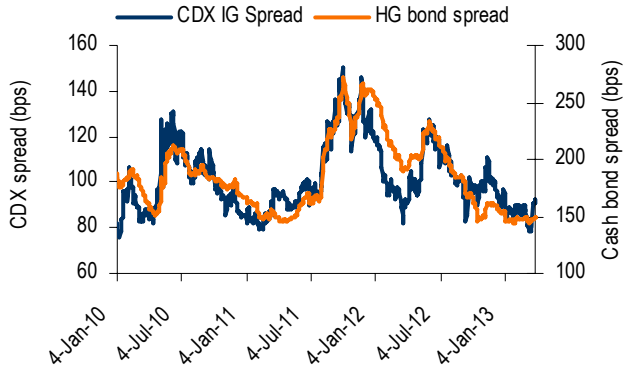
CDX relative performance

Including a relatively broad portfolio of credits (125 for CDX IG and 100 for CDX HY) makes the CDX indices diversified and representative of the general market trends. In addition, a number of CDX index members are bellwether issuers that drive the broader credit market performance. As a result, CDX spreads are correlated with the benchmark cash bond indices and broader markets despite their relatively simple equally-weighted structure.

Since 2005 the correlation between returns on CDX IG and excess returns on the corresponding USD benchmark cash indices has been 57% for CDX IG and 74% for CDX HY, respectively. The correlations have been higher since the credit crisis (Table 3).

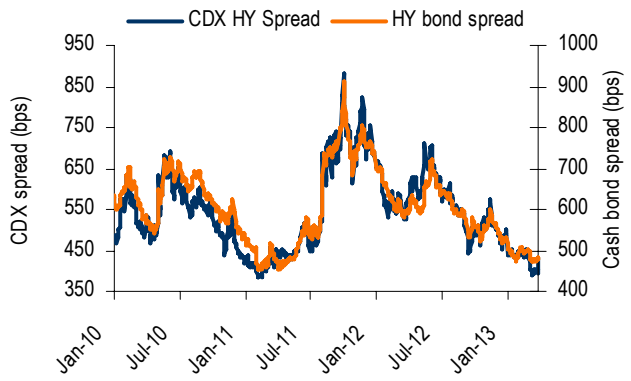
Chart 8 and Chart 9 illustrate the historical spread relationship between CDX and cash bond spreads since the credit crisis. Although CDX spreads are consistently tighter than cash index spreads, the correlation in spread performance is high. However, the correlation is clearly not perfect, and the performance of CDX and the benchmark cash indices can diverge significantly during times of market stress, such as during the credit crisis in 2008 and 2009 (see a the section on the credit crisis below for more details).

Chart 8: CDX IG and HY spreads closely track spreads for ...



Source: BofA Merrill Lynch Global Research

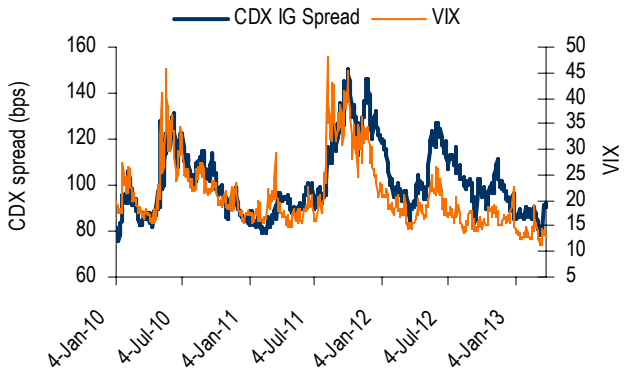
Chart 9: USD benchmark high grade and high yield cash indices.



Source: BofA Merrill Lynch Global Research

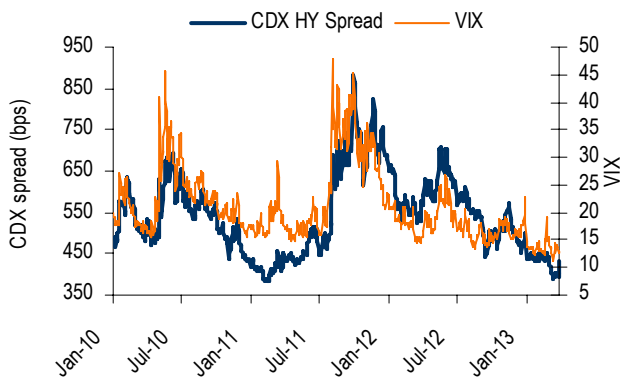
In addition to credit, CDX index performance is also correlated with the broader macro markets. For example, credit spreads, including CDX spreads, are closely correlated with the level of macro uncertainties as measured by the VIX (Chart 10 and Chart 11).

Chart 10: CDX indices are correlated to broader markets, ...



Source: BofA Merrill Lynch Global Research

Chart 11: ... such as VIX



Source: BofA Merrill Lynch Global Research

CDX tracking error relative to bond benchmarks

Under typical market conditions CDX index spreads track their corresponding cash bond benchmark indices fairly well. However, the performance correlation is not perfect and significant divergences in performance occurred at times of market stress. Three factors mainly drive the divergence in performance: differences in composition and, particularly during the credit crisis, CDS-cash basis and the fair value skew.

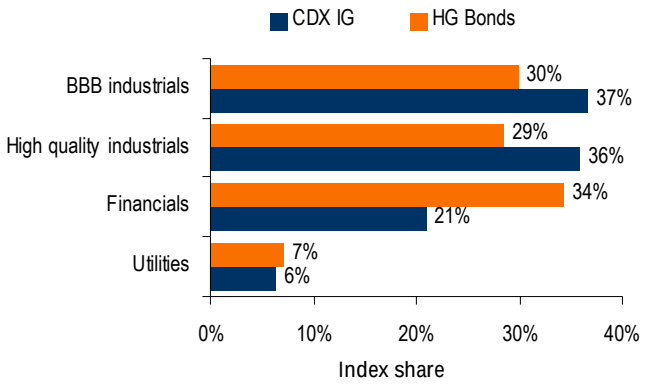
Composition differences

While the composition of CDX indices broadly overlaps with the composition of the benchmark cash bond indices, important differences also exist. By design CDX indices are composed of credits with the most liquid single-name CDS. Typically these same credits are also large issuers of bonds and hence prominent members in benchmark cash bond indices. However, this CDX index design also results in significant persistent differences. One such difference stems from the exclusion of dealers from CDX so that they avoid trading protection on themselves. However, dealers are large issuers in the cash bond market. Another difference is due to individual credit weightings. Credits are equally weighted in CDX, while the benchmark cash bond indices are market value weighted.

Chart 12 and Chart 13 summarize the resulting composition differences between CDX Series 20 and benchmark cash indices. For high grade, the CDX index holds significantly fewer financials and more industrials relative to the cash index. This divergence is due to the fact that, on average, financials are large issuers in the bond index while CDX index is equally weighted. Also some of the largest financials are excluded as they serve as CDX index dealers. Finally, note that USD bonds from non-US companies make up close to 30% of the high grade cash bond index, while the CDX index is restricted to North American credits.

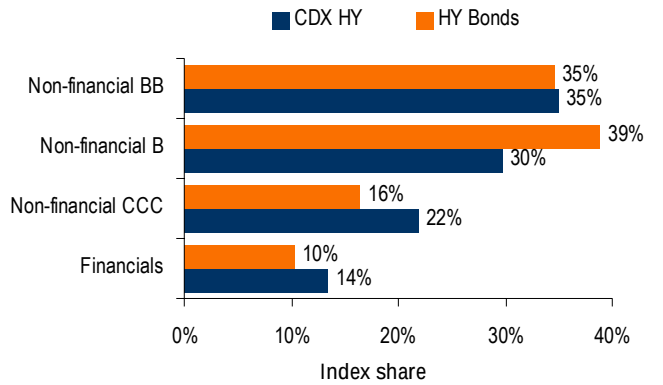
CDX HY, on average, has lower quality issuers than the high yield cash bond index. The share of CCC-rated credits in higher in CDX HY, while the share of single-B rated bonds is higher in the benchmark cash index.

Chart 12: CDX IG S20 has more weight in industrials and less in financials relative to the cash benchmark index.



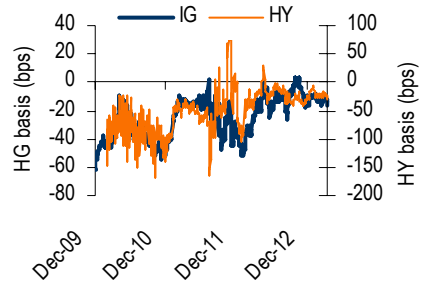
Note: data as of March 31 2013.
Source: BofA Merrill Lynch Global Research

Chart 13: CDX HY S20 is on average of a lower quality then the cash benchmark, with more weight in CCC-rated credits and less weight in B-rated credits.



Note: data as of March 31 2013.
Source: BofA Merrill Lynch Global Research

Chart 14: Cash – CDS basis has remained negative since the credit crisis



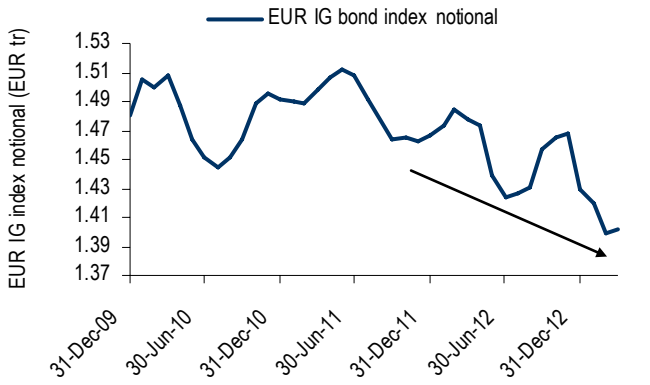
Source: BofA Merrill Lynch Global Research

CDS -cash basis

Fluctuations in the relative value between bonds and CDS are another reason for potential tracking error between CDX and the benchmark cash bond indices. Typically, spreads for cash bonds and CDS of the same issuer move closely together, but the spread performance can diverge, at times significantly. The divergence can be caused by differences in liquidity as well as a number of other factors, such as existence of certain bond covenants, bond dollar prices (see here for more details) and tenders and other market technicals. Such divergences lead to a difference in performance between bonds and CDS, and, by extension, CDX. Recall that arbitrage activity typically keeps CDX market values in line with the fair values based on single-name CDS spreads.

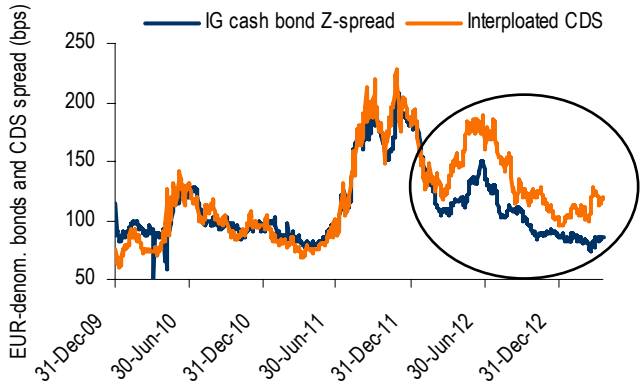
While in the US the CDS - cash basis has been range-bound, mostly staying below zero (Chart 14), European IG offers a recent notable example of a persistent performance divergence between CDS and cash. The sovereign crisis and the subsequent slowdown in growth in 2012 resulted in diminishing bond issuance needs from European credits, particularly financials. The benchmark European IG index notional fell by over 7% between the peak in May 2011 and March 2013 (Chart 15). This lack of bonds led to IG bond spreads trading at consistently tight levels relative to CDS starting in the first half of 2012 (Chart 16).

Chart 15: A shrinking universe of EUR-denominated IG bonds ...



Source: BofA Merrill Lynch Global Research

Chart 16: ... led to tighter bonds spreads relative to CDS



Source: BofA Merrill Lynch Global Research

Index skew: CDX market vs. fair values

CDX market spreads not trading in line with the underlying single-name CDS is another source of tracking error in addition to CDS - cash basis. Moreover, as the example of the credit crisis illustrates, these two sources of tracking error can overlap reinforcing the total impact.

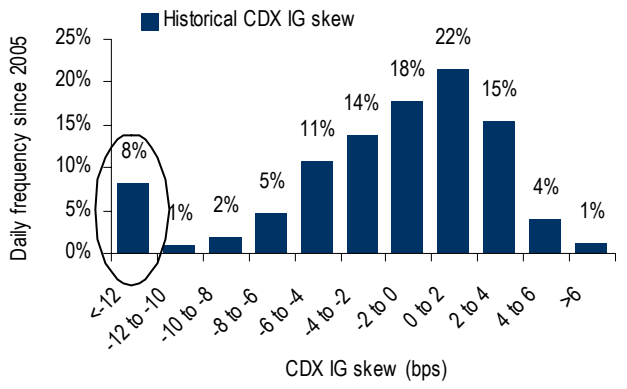
Skew is the difference between market and fair values for a CDX index

As discussed earlier, CDX indices typically trade close to the fair value implied by the underlying single-name CDS spreads and prices. The theoretical fair value price (upfront cost) for a CDX index is simply the average price of the underlying single-name CDS with the same coupon and maturity. The term index skew refers to the difference between market and fair values of a CDX index. When the skew is significantly different from zero, market participants can arbitrage the difference by trading in the underlying CDS as well as the CDX index. For example, if the CDX index is trading too wide (at a lower price) relative to single names (skew is positive), market participants can profit by selling protection on the CDX index and simultaneously buying protection on the underlying single name CDS at a tighter average spread (lower average price). Such activity would lead to tighter spreads (higher prices) for CDX relative to the underlying single-name CDS, bringing CDX valuations closer to fair value.

Under normal market conditions arbitrage trading keeps CDX market value close to fair value

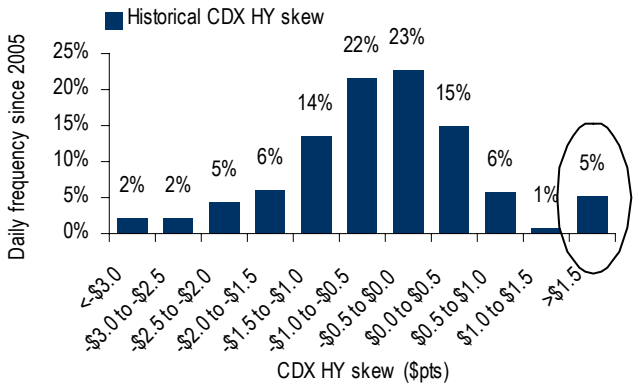
Under normal market conditions this arbitrage is generally limited by the cost of trading or bid / asks spreads. Hence, since 2005 the median of the absolute value of the skew for the on-the-run series has been 2.6bps for CDX IG and $0.7pts for CDX HY. However, during the periods of poor market liquidity the CDX trading levels can diverge from the fair value level as market participants are no longer able to transact efficiently in the less liquid single-name CDS. This causes “fat tails” at the rich-CDX (negative spread skew, positive price skew) point of the skew distribution. This happens when single-name CDS trade wide relative to CDX due to higher liquidity premium. At the same time poor liquidity constraints arbitrage and results in CDX trading rich to fair value (Chart 17 and Chart 17).

Chart 17: CDX IG skew (market spreads less fair value) since 2005.



Source: BofA Merrill Lynch Global Research

Chart 18: CDX HY skew (market price less fair value) since 2005



Source: BofA Merrill Lynch Global Research

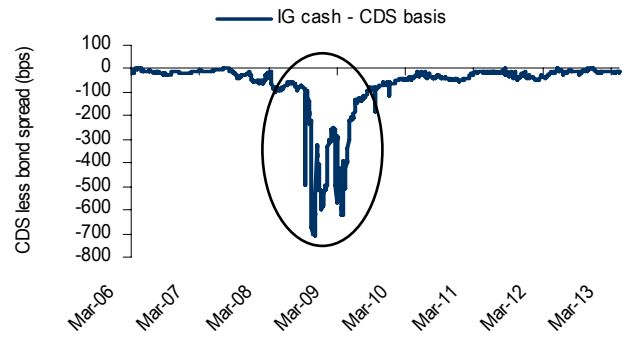
CDX IG outperformed cash during the credit crises

All three factors discussed above – differences in composition, CDS - cash basis and skew – added to a significant outperformance of CDX IG relative to cash bonds during the credit crises period in the second half of 2008 and in 2009.

The breakdown of short-term funding markets during the credit crisis led to the largest market-wide disruption in CDS - cash basis in history that goes back to 2006. Following the Lehman failure in September of 2008 IG bond spreads widened significantly in part because a number of market participants lost access to the funding markets necessary to purchase or hold bonds. Due to its unfunded nature CDS was not affected by this liquidity crunch. As a result, bond spreads widened as much as 500bps relative to their respective CDS (Chart 19).

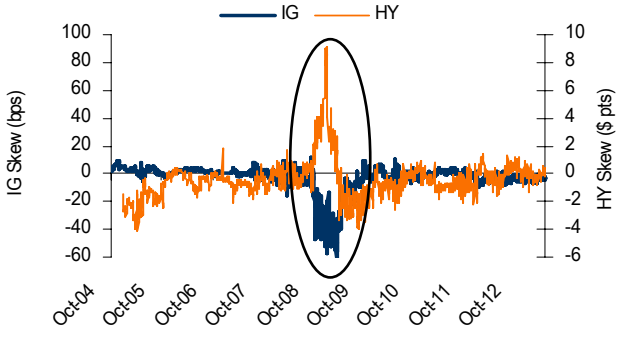
At the same time, the failure of Lehman, a major dealer in CDS, as well capital and risk-management constraints faced by the remaining dealers in the midst of the crisis lead to much tighter liquidity conditions. That coincided with strong demand for single-name CDS protection, as selling bonds was particularly difficult due to the funding crisis. Exacerbated by their weaker liquidity, single-name CDS widened relative to the CDX. With a arbitrage opportunities constrained by the market-wide liquidity freeze, CDX spreads traded at record tight levels relative to fair value for both CDX IG (about 50bps) and CDX HY (about $6pts, Chart 20).

Chart 19: CDS spreads outperformed cash during the credit crisis ...



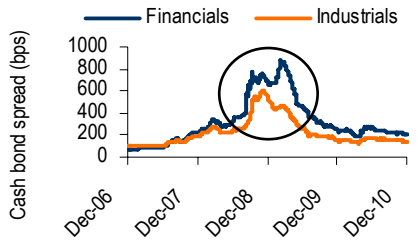
Source: BofA Merrill Lynch Global Research

Chart 20: ... while CDX outperformed single-name CDS.



Source: BofA Merrill Lynch Global Research, Markit.

Chart 21: Financials spreads underperformed in 2009

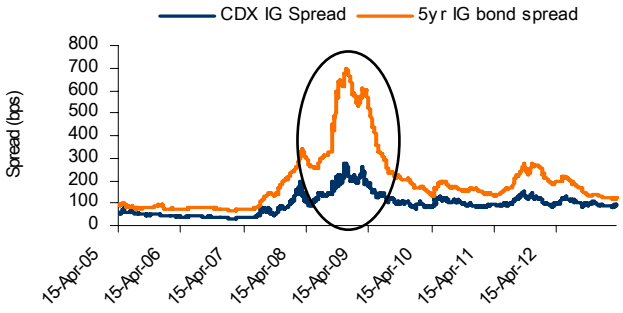


Source: BofA Merrill Lynch Global Research

Finally, by 2009 cash bond spreads for financial issuers widened relative to industrials by as much as 400bps (Chart 21). Recall that due to the exclusion of the dealers as well as equal weighting of constituents the CDX IG indices have lower exposure to financials than the cash benchmark. Thus the underperformance of financial spreads contributed to the outperformance of CDX IG relative to cash.

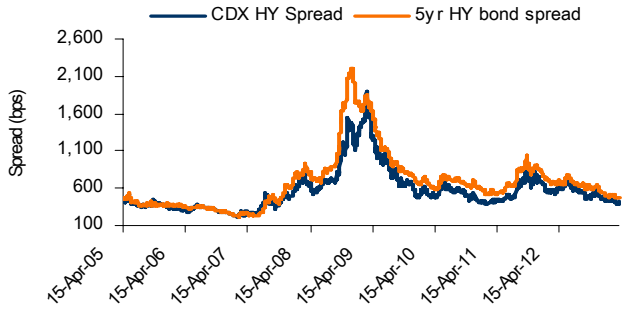
Therefore, all three factors combined to add to the widening pressure on IG cash bond spreads relative to CDX during the credit crisis (Chart 22). The CDX HY index, on the other hand, did not experience a similarly large tracking error at that time, as it was not affected by the sector mismatch between financials and non-financials and the short-term funding crisis was less of an issue for holders of HY bonds (Chart 23).

Chart 22: IG cash bond spreads underperformed CDX IG spreads during the credit crisis ...



Source: BofA Merrill Lynch Global Research

Chart 23: ... while CDX HY tracked the performance of HY cash bonds more closely

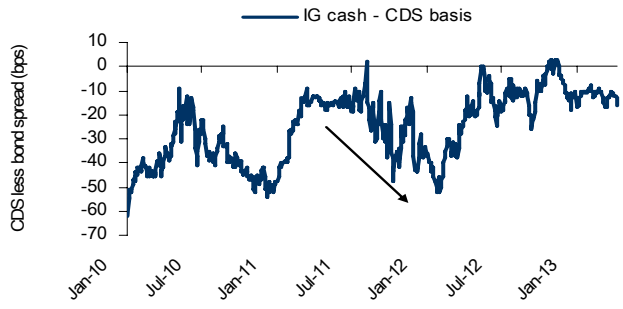


Source: BofA Merrill Lynch Global Research

Tracking error since the credit crisis

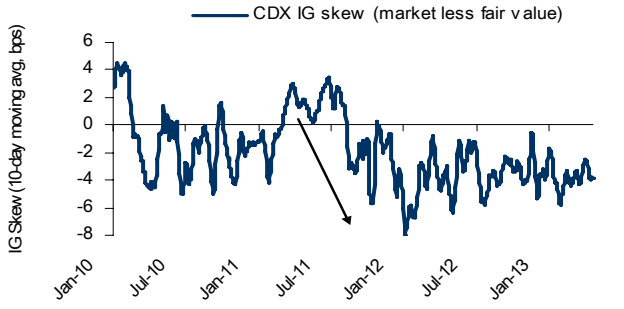
The major factors responsible for the tracking error between the benchmark cash bond indices and CDX indices have continued to affect relative performance since the credit crisis. For example, the sell off in the second half of 2011 also resulted in widening of bond spreads relative to CDS (Chart 24) and CDX IG trading tight to fair value (Chart 25). Not surprisingly, the magnitude of these divergences was much lower compared to 2009. However, the experience highlights that CDX has remained an imperfect hedge for the cash portfolios even outside of the credit crisis.

Chart 24: In the second half of 2011 CDS - cash basis became more negative ...



Source: BofA Merrill Lynch Global Research

Chart 25: ... and CDX IG traded tight to fair value



Source: BofA Merrill Lynch Global Research

Table 4: CDX roll dates

	March Roll		September Roll	
	CDX IG	CDX HY	CDX IG	CDX HY
Roll Date	20-Mar	27-Mar	20-Sep	27-Sep
New Maturity	20-Jun	20-Jun	20-Dec	20-Dec

Source: BofA Merrill Lynch Global Research, Markit

Constructing the index

The CDX indices roll twice a year in March and September. At each roll, a new series of the index starts trading incorporating the most liquid eligible CDS reference entities. Maturity dates for the new series are extended by six months compared to the previous series (Table 4). For example, the 5y and 10y tenor maturities for Series 19, which rolled in Sep 2012, are Dec 20th 2017 and Dec 20th 2022. In March, when the index rolled into Series 20, the 5y and 10y maturities for this series were Jun 20th 2018 and Jun 20th 2023 respectively.

Note on single-name versus index roll

Single-names roll every quarter i.e. the On The Run maturity for a particular tenor moves forward by three months on the 20th of March, June, September and December. For example, 5y CDS quoted in April 2013 will have a maturity of June 20th 2018. From June 20th 2013 onwards, the 5y CDS quotes will correspond to a maturity of Sep 20 2013. In effect, on each single-name roll date, the new On The Run 5y contract starts with a maturity of 5.25y. This ensures that the average maturity of the contract over the three months until the next roll is in fact five years. The implication of having quarterly single-name rolls and semi-annual index rolls is that for two 3-month periods (June 20th – September 20th and December 20th to March 20th), the maturity of On The Run single-name CDS contracts will not match the maturity of the On The Run index.

The Roll Process

Over time, the process for determining the constituents of the new index at each roll has become almost entirely rule-based. This has been facilitated in particular by the trade repository maintained by the Depository Trust and Clearing Corp (DTCC) which provides data on single-name CDS liquidity. While there is some amount of discretion left to the index providers and the participating dealers, the rules themselves have been updated to take into account many suggestions or objections that the parties involved have had in the past.

At each roll, a new series starts with 125 names for CDX IG and 100 names for CDX HY. Prior to the roll, the DTCC provides trading volume data for North American reference entities, which is used to create a liquidity list for each of CDX IG and CDX HY, comprising index eligible names, arranged from most liquid to least liquid. Entities in the most recent series which do not meet the rating (BBB- and up for CDX IG, BB+ or lower for CDX HY) and/or liquidity criteria (explained in Figure 1) are excluded from the new series. Their replacements are picked from among the most liquid CDS names according to the liquidity list that meet the criteria for each index. The broad rules used to determine the constituents for the new series are outlined below[6] (Figure 1).

Note that, CDS Reference Entities that act as swap dealers are not eligible for index inclusion (since they make markets in CDX indices, if included, they would in effect be buying/selling credit protection against their own default).

[6] Please visit www.markit.com for the most up to date and accurate rulebook for the indices.

Figure 1: Index Roll Process – Rules for determining constituents

CDX IG	CDX HY
General Criteria for Inclusion: ▪Entity must not be a swap dealer in products that reference the IG index. ▪Entity must have issued/guaranteed at least $100mn publicly traded debt. ▪Certain affiliate restrictions (explained below) ▪Entity must be rated Investment Grade (median rating)	**General Criteria for Inclusion:** ▪Entity must not be a swap dealer in products that reference the HY index.. ▪Certain affiliate restrictions (explained below) ▪Entity must be rated High Yield (median rating)
Step 1: DTCC Liquidity List ▪Prior to each roll date, DTCC publishes the list of most liquid CDS entities based on the previous 6 months of trading data. ▪The IG Liquidity Ranking list is derived from this by filtering for North American names, rated BBB-/Baa3 or above and ranking them from most liquid to least.	**Step 1: DTCC Liquidity List** ▪Prior to each roll date, DTCC publishes the list of most liquid CDS entities based on the previous 6 months of trading data. ▪The HY Liquidity Ranking list is derived from this by filtering for North American names, rated below BBB-/Baa3 and ranking them from most liquid to least.
Step 2: Exclusions ▪Entities in the current index are excluded from new series if they: (i) have had a corporate event (e.g. M&A) that makes them ineligible or (ii) have undergone a credit event in the last 6 months (or there is a potential Credit Event) or (iii) fall in the lowest 30% of rankings in the IG Liquidity List	**Step 2: Exclusions** ▪Entities in the current index are excluded from new series if they: (i) are rated BBB-/Baa3 or above or (ii) have less than $100 million publicly traded debt or (iii) have not been part of the two most recent DTCC Liquidity lists or (iv) have undergone a credit event in the last 6 months or (v) have had a corporate event (e.g. M&A) that makes them ineligible
Step 3: Inclusions ▪New entities for inclusion are picked according to below criteria, to reach 125 names in total. (i) Entities in the highest 20% of the IG Liquidity Rankings that are not already part of the index and (ii) Average CDS spread over the preceding 90 day period (from the day when the Roll inclusion process is carried out) is less than 5 times the average spread of the most recent IG series over the same period (iii) Entity must not have a rating of BBB-/Baa3 and be on Negative watch (iv) if the entity is an affiliate of a current IG entity and is ranked higher on the liquidity list, it will replace the less liquid affiliate if its average volumes have exceeded that of the less liquid affiliate by more than 30% for two consecutive DTCC Liquidity Reports ▪If the Liquidity list does not provide enough names to reach 125 entities in total, new inclusions are chosen from the Markit iBoxx USD Liquid Investment Grade index that meet the debt and rating criteria above, picked in the order of highest debt outstanding.	**Step 3: Inclusions** ▪New entities for inclusion are picked according to below criteria- to reach a 100 names in total. (i) Highest ranking entities in the HY Liquidity Ranking that are not already in the index (ii) Must have at least $500 million publicly traded debt (iii) If entity has two or more ratings, the highest one cannot be better than BB+/Ba1 i.e. exclude crossover names (iv) if the entity is an affiliate of a current HY entity and is ranked higher on the liquidity list, it will replace the less liquid affiliate if its average volumes have exceeded that of the less liquid affiliate by more than 30% for two consecutive DTCC Liquidity Reports ▪If the Liquidity list does not provide enough names to reach 100 entities in total, new inclusions are chosen from the Markit iBoxx USD Liquid High Yield index that meet the debt and rating criteria above, picked in the order of highest debt outstanding.

Source: BofA Merrill Lynch Global Research, Markit

Trading the Index

Trading convention and terminology

Trading the index is equivalent to trading an equally weighted basket of single-name CDS. For example, buying $100mn protection on CDX HY offers the same risk profile as buying $1mn (=1/100 * $100mn) protection on each of the underlying 100 names, to the same maturity and with the same coupon as the index. Below we detail the trading conventions followed in the market.

Fixed Coupon: CDX IG trades with a fixed coupon of 100bps (annualized) and CDX HY with 500bps (annualized). The coupons are paid quarterly on the 20th of March, June, September and December. The day count convention used for calculating accruals is the actual number of days between two coupon payment dates divided by 360.

Recovery: A market convention governs the conversion between CDX spreads and prices (upfront costs). The convention has been implemented as the ISDA Standard Upfront Model, which is available on Bloomberg CDSW screen. That model assumes a recovery of 40% for CDX IG and 30% for CDX HY. Note that this is simply an assumption made to facilitate conversion between spread and price and actual realized recoveries on default may be different from these assumptions.

Trade Effective Day: Trade effective day is T+1.

Quoting Convention: IG is spread quoted and HY is price quoted. The convention follows the bond market where investment grade issues are often quoted in spread while high yield bonds in price.

Terminology: The different quoting conventions also yield opposing meanings for the term “buy the index” or “sell the index”. For IG, buying (selling) the index means buying (selling) protection and hence entering a short (long) risk position. For HY, buying (selling) the index means buying (selling) risk and hence entering a long (short) risk position or selling (buying) protection.

Table 5: Index trading convention and terminology

	CDX IG	CDX HY
Fixed Coupon	100 bp	500 bp
Coupon Frequency	Quarterly	Quarterly
Day Count	Actual/360	Actual/360
Recovery	40%	30%
Quoting Convention	Spread	Price
Buying Index means	Short Risk (buying protection)	Long Risk (selling protection)
Selling Index means	Long Risk (selling protection)	Short Risk (buying protection)

Source: BofA Merrill Lynch Global Research

Roll Terminology: When the CDX indices roll in March/Sep, investors often “roll their trades” into the new series i.e. transfer their risk position to the latest series of the index to remain in the most liquid contract. So if an investor were short IG19, he/she would roll into IG20 by buying protection on IG20 and selling protection on IG19. In this context, for IG, buying (selling) the roll means buying (selling) protection on the new series while simultaneously selling (buying) protection on the old series. In HY, buying (selling) the roll means buying (selling) risk on the new series i.e. selling (buying) protection on new series and buying (selling) protection on the old series.

Trade cash flows and P&L

We run through the mechanics and cash flows of a trade with the help of two simple examples below. In these examples, the protection seller is referred to as counter-party L (Long risk) and the protection buyer is S (Short risk). Note that while we treat these examples as bilateral trades between L and S, under central clearing, one of the counterparties (either L or S) will always be a clearing house or central counterparty.

Trade at Inception

The net cash flow at trade inception consists of an upfront payment and a coupon accrual adjustment and both can be calculated on Bloomberg's CDSW screen.

Upfront

At trade inception, the buyer and seller of the index exchange an upfront amount. The value of the upfront and whether it's the buyer or seller of protection that pays the upfront depends on the index quote relative to the index fixed coupon. The expressions below detail the calculation of the upfront payment made by the protection buyer to the protection seller. Hence, a negative upfront indicates that the protection seller pays the buyer an upfront at trade inception.

For IG: UF_{IG} = (Quoted Spread – Coupon)/10000 * RiskyBPV * Notional, where Quoted Spread is the IG market quote in basis points, Coupon = 100bps, RiskyBPV is the present value of 1bp of risky annuity.

This implies that if the IG quoted spread is less than the fixed coupon of 100bps, then the protection seller pays the upfront to the protection buyer at trade inception and vice versa. In the example in Table 6, where we assume that the spread for CDX IG is 120bps as of Feb 14th 2013, the upfront is calculated as (1.2% - 1%)*4.6 * $100mn, resulting in protection buyer S_{IG} having to pay L_{IG} $920,000 upfront.

The intuitive reason for the protection buyer paying the protection seller in this case is that, while the index itself is quoted at 120bps, the quarterly coupon that S_{IG} will pay L_{IG} is only 100bps. The upfront amount is in effect the present value of the 20bps that the quote is above the coupon that S_{IG} must compensate L_{IG} for.

Table 6: IG trade example - cash flows at inception

Notional	$100,000,000	
Trade Date	14-Feb-13	
IG Index Spread	120bp	
Index Coupon	100bp	
RiskyBPV	4.6	
Upfront	$920,000	S_{IG} pays, L_{IG} receives
Last Coupon Date	20-Dec-12	
Trade Effective Date	15-Feb-13	T+1
Days since last coupon	57	
Accrual	-$158,333	L_{IG} pays, S_{IG} receives
Total	$761,667	S_{IG} pays, L_{IG} receives

Source: BofA Merrill Lynch Global Research

Table 7: HY trade example - cash flows at inception

Notional	$100,000,000	
Trade Date	14-Feb-13	
HY Index Price	104	
Index Coupon	500bp	
Upfront	-$4,000,000	L_{HY} pays, S_{HY} receives
Last Coupon Date	20-Dec-12	
Trade Effective Date	15-Feb-13	T+1
Days since last coupon	57	
Accrual	-$791,667	L_{HY} pays, S_{HY} receives
Total	-$4,791,667	L_{HY} pays, S_{HY} receives

Source: BofA Merrill Lynch Global Research

For HY: UF_{HY} = (100 - Quoted Price)/100 * Notional

If the index trades above par (above 100 points) then the protection seller pays the buyer the upfront amount and vice-versa. In the example in Table 7, we assume that the index is trading at 104 and hence L_{HY} must pay S_{HY} an upfront amount equal to 4/100 * $100mn = $4,000,000.

Accrual

The protection seller receives a "full" coupon on each of the quarterly coupon dates through the life of the contract, irrespective of when the trade was executed. This implies that if the trade was conducted in between two coupon dates, the first coupon would compensate the seller for providing protection through the entire three month period between the two coupon dates, even though the trade was executed at some point in between. Hence, the seller compensates the buyer for this "extra" coupon amount at trade inception.

The coupon accrual that the protection seller must pay is calculated as:
Accrual at inception = $(D_{T+1} - D_{lc})/360$ * Fixed Coupon * Notional,
where D_{lc} is the date of the last coupon payment (one of 20th March, June, September or December, whichever is the most recent one preceding the trade date) and D_{T+1} is the trade effective date. For IG the Fixed Coupon is 1% or 100bps and for HY it is 5% or 500bps.

Trade P&L

The total P&L of the index trade consists of the mark-to-market due to spread /price change and the coupons paid/received. Intuitively, the P&L at any point in time should equate to the cost of entering an offsetting trade relative to the cost incurred at trade inception.

An IG example

In the first example below, we calculate the gain/loss for counter-party L_{IG} that went long IG or sold protection on the index. On March 22nd, the index spread is at 110bps (assume) and the RiskyBPV is 4.7. Since the spread is tighter than the 120bps it was at trade inception, L_{IG} should have a positive mark-to-market.

One way to approximate the P&L is to think of it as the spread income earned over the period of the trade i.e. 120bp of $100mn notional over 36 days = $100,000 plus the gain due to the 10bps tightening which is given by 10bps times 4.7 duration times $100mn notional = $470,000, which is $570,000 in total. Because the indices are traded on an upfront/price basis, the actual calculation is slightly different as we detail below.

Table 8: IG trade example - evaluate P&L through offsetting trade

Cost of entering offsetting trade		
Date	22-Mar-13	
IG Index Spread	110bp	
RiskyBPV	4.7	
Upfront on 22-Mar	-$470,000	Upfront L_{IG} would pay to go short
Last Coupon Date	20-Mar-13	
Accrual on 22-Mar	$8,333	L_{IG} would receive accrual to go short
UF + Accrual	-$461,667	Total L_{IG} would pay to go short
Cash flows at trade inception		
Upfront on 14-Feb	$920,000	
Accrual on 14-Feb	-$158,333	
Total on 14-Feb	$761,667	Amount L_{IG} received at inception
Coupon cash flow		
Coupon Received	$250,000	Coupon payment received on 20-Mar
Total P&L	$550,000	

Source: BofA Merrill Lynch Global Research

We can calculate P&L for L_{IG} by examining the costs of entering an offsetting position i.e. buying protection. The cash-flows in Table 8 are represented from L_{IG}'s perspective, such that a negative number means L_{IG} pays and a positive number means L_{IG} receives.

On March 22nd, L_{IG} would have to pay (1.1% – 1%) * 4.7 * $100mn = $470,000 in upfront payment to go short the index.

In addition, since our calculation date is the March 22nd, L_{IG} would receive 3 days worth of accrual (effective date Mar 23rd– last coupon date Mar 20th) to go short the index. This evaluates to 3/360 * 1% * $100mn = $8,333.

In total, L_{IG} would have to pay $461,667 to go short the index on the 22nd of March, compared to receiving $761,667 at trade inception. This represents a gain of $300,000 for L_{IG}.

Finally, to calculate the total P&L we must also take into account any coupon payments that were already received by L_{IG}. On the previous coupon date, March 20th, L_{IG} received 90/360 * 1% * $100mn = $250,000, where 90 is the number of days between March 20th and the previous coupon date December 20th.

In total, the cash flow to L_{IG} would be $761,667 - $461,667 + $250,000 = $550,000, which is the total P&L as of March 22nd.

A HY example

Here, we evaluate the trade P&L from the perspective of the protection buyer on the HY index. Recall that on February 14 S_{HY} bought protection when the index price was at 104. On the 22nd of March, let's assume the index price is at 103. Since the price is lower, S_{HY} should have a mark-to-market gain.

Once again, we look at the cost of entering an offsetting trade - in this case S_{HY} would have to go long or sell protection on HY. The cash-flows in Table 9 are represented from S_{HY}'s perspective, such that a negative number indicates a payment for S_{HY} and a positive number is a cash inflow.

Table 9: HY trade example - evaluate P&L through offsetting trade

Cost of entering offsetting trade		
Date	22-Mar-13	
HY Index Price	103	
Upfront on 22-Mar	-$3,000,000	Upfront S_{HY} would pay to go long
Last Coupon Date	20-Mar-13	
Accrual	-$41,667	S_{HY} would pay accrual to go long
UF + Accrual	-$3,041,667	Total S_{HY} would pay to go long
Cash flows at trade inception		
Upfront on 14-Feb	$4,000,000	
Accrual on 14-Feb	$791,667	
Total on 14-Feb	$4,791,667	
Coupon cash flow		
Coupon Paid	-$1,250,000	Coupon payment on 20th Mar
Total P&L	$500,000	

Source: BofA Merrill Lynch Global Research

With the index at 103, S_{HY} would have to pay $3,000,000 upfront to go long the index. S_{HY} would also have to pay 3 days of accrual of the 500bps index coupon. This equates to -$41,667. In total, the cost of going long on the 22nd equates to -$3,041,667 compared to the $4,791,667 received at trade inception.

Also, on March 20th, S_{HY} would have made a coupon payment of 90/360 * 5% * $100mn = $1,250,000.

The total P&L for S_{HY} on March 22nd is given by $4,791,667 -$3,041,667 - $1,250,000 = $500,000.

Monetizing an index swap trade

As we discuss in the section on Clearing, a majority of index swaps will soon be centrally cleared as mandatory deadlines are phased in through the course of 2013. A cleared trade can be monetized by simply offsetting the position with an equal and opposite trade. Since both the existing trade and the offsetting trade will be cleared, the counterparty risks borne by monetizing a bilateral trade through an offset (discussed below) are now eliminated.

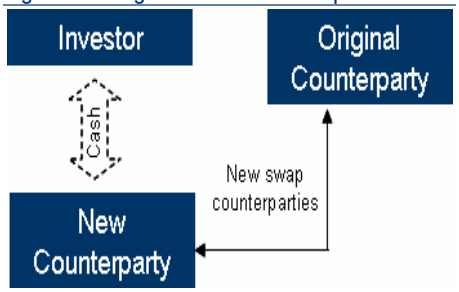
Bilateral, uncleared index swap trades can be monetized in three ways.

1. **Terminate contract with original counterparty**
   The investor receives/pays the current mark-to-market value of the index default swap from/to the current counterparty. One of the benefits of terminating (or 'tearing up') an existing trade is that all future cash-flow streams are cancelled and any ongoing legal risk or dispute is removed.

2. **Assignment to another counterparty**
   The index default swap can also be assigned to a new counter-party that simply 'replaces' the investor in the default swap (Figure 2). In this case, the investor receives/pays the current mark-to-market value from/to the new counterparty. The original counterparty and the new counterparty become parties to the CDS contract, with the investor ending its involvement.

3. **Entering into an offsetting transaction**
   Another alternative is to enter into an offsetting long or short position with another counterparty. Monetizing through an offsetting transaction may be the most desirable option for holders of illiquid positions where better unwind terms may be available away from the original counterparty and where an assignment is not possible. Bear in mind, that with the investor now holding offsetting long and short positions with a different counterparty for each leg, he/she is exposed to counterparty risk – if one of the counterparties defaults, then the trade is not "offset' anymore.

Figure 2: Assignment of index swap



Source: BofA Merrill Lynch Global Research

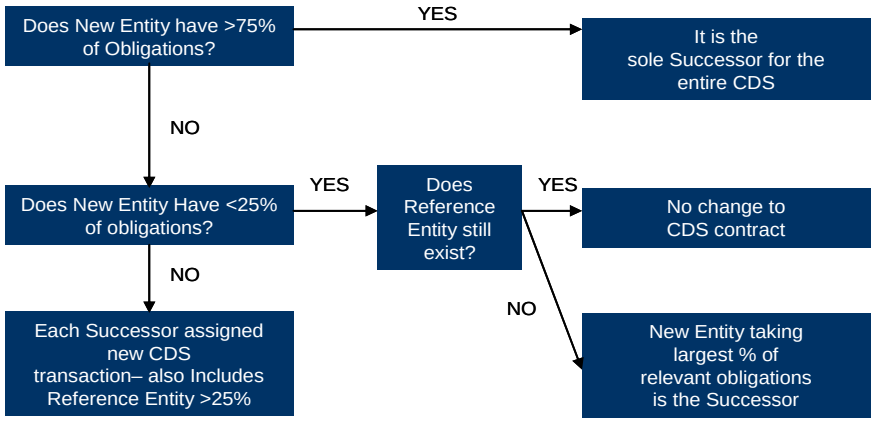
Corporate events

Over time the composition of a particular index series can undergo a change due to two types of events – succession events and credit events. The former is a result of a corporate action, like a merger or acquisition, which modifies the capital structure and the entities liable for the debt. Credit events are triggered when a company defaults, say by filing for bankruptcy or missing a debt payment.

Succession event

In the event of a merger, consolidation, amalgamation or transfer, the Reference Entity of a CDS contract could change based on the new company structure and in particular where the debt now sits. This is referred to as a Succession Event. The "Successor" entity in a CDS can be determined based on the decision tree in Figure 3. Any entity that inherits more than 25% of the original reference's entity's debt is usually a Successor.

Figure 3: Corporate Successor Entity - Summary decision tree



Source: BofA Merrill Lynch Global Research, Reference Entity refers to the original entity referenced in the CDS.

If the Determinations Committee (DC)[7] decides that a Succession Event has occurred with respect to a reference entity in a CDS index, the entity in the index is replaced accordingly. If the contract is unchanged, the original reference entity remains in the index. If one or more successors are determined then the entity in the index is replaced by these successors with the notional split between them e.g. if company A CDS in CDX IG splits into Company C and Company D, the index will now include 0.4% notional in each of C and D, to replace the 0.8% (1/125) in Company A. If only one successor is determined, the original entity in the index will be replaced by this new successor entity.

Credit Event

Standard North American CDS contracts, which make up the CDX indices, can be triggered with two types of credit events- Bankruptcy and Failure to Pay. If the DC decides that one of the two has occurred with respect to an entity in the indices, then the counterparties to CDX trades participate in the Credit Event Auction. This usually takes place within a month from the default date, but could be longer in some cases. The Auction determines the recovery value for the defaulted credit and helps in the settlement mechanism between the buyer and the seller. After entity has had a credit-event, it is removed from the index.

[7] The Determinations Committee is a committee comprised of dealer and buy-side firms that is responsible for declaring Credit Events and Succession Events, among other things.

Index convention

Removal Date: Index convention is to continue to trade the indices with the triggered CDS until the Auction date. The indices begin trading without the name the day after the auction and are referred to by their new version number. For example, CDX HY S18 rolled in March 2012, this was V1 (version 1) of the index. A default occurred in one of the underlying entities in June. The index that began trading after the auction, without this defaulted entity, is referred to as CDX HY S18 V2. If another credit event occurs, the index with 98 names will be referred to as V3 of S18 and so on.

Index Factor: Each index has an Index Factor that indicates the notional amount of the index that is still intact relative to the total notional at start. This is given by (1- Number of defaults/Total number of names in the index originally). For example, CDX IG S9 which has had 4 credit events so far, trades with a factor of (1 – 4/125) = 0.968. Version 1 of each index has an index factor of 1. Each credit event further reduces the factor value. A trade of notional N on an index is in effect a trade of N X Index Factor. For CDX IG S9 V4, with a factor of 0.968, this implies that a $100mn trade is actually a $96.8mn trade, with a notional exposure of $0.8mn per name in the index (the index has 121 names left after 4 defaults).

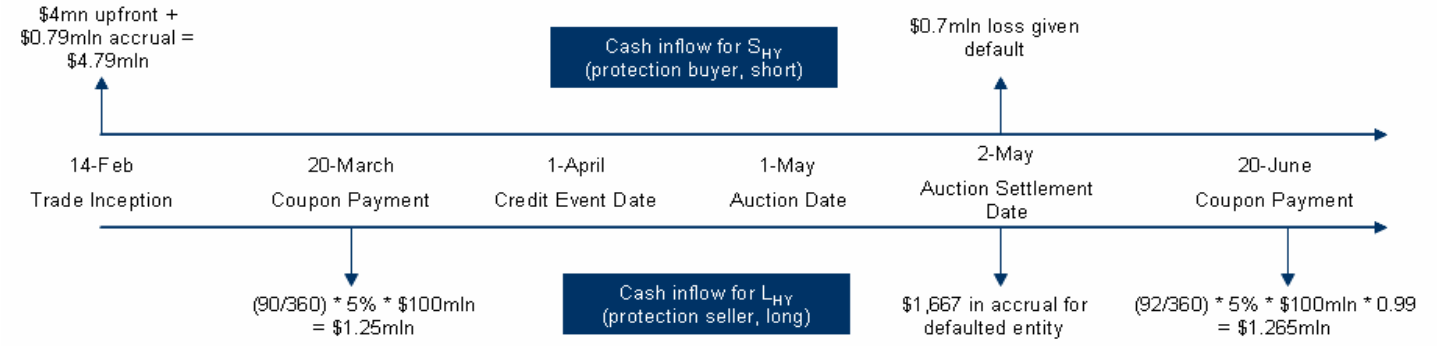
Trade mechanics

On the occurrence of a Credit Event, counterparties to a CDX transaction settle through the Credit Event Auction. This process determines the recovery rate for the triggered CDS, which is used to settle payments related to the default. This recovery rate closely reflects the market price of the Reference Entity's bonds.

An example

We go back to our HY trade example where S_{HY} bought $100mn protection on CDX HY from L_{HY} on 14th Feb, when the index price was 104 points (Table 7). The index at trade inception includes all 100 names. On 1st April, entity D in the index files for Bankruptcy. The Determinations Committee decides that a Credit Event has been triggered, with a Credit Event date of 1st April and that an Auction will be held to settle credit derivative transactions referencing entity D on the 1st of May. The auction process results in a recovery of 30% for entity D. Auction cash settlements occur on a T+1 basis i.e. on 2nd May. The timeline of cash flows is illustrated in Figure 4.

Figure 4: CDX HY trade example – trade cash flow



Source: BofA Merrill Lynch Global Research

As CDX HY is equally weighted, a $100mn trade equates to $1mn exposure to each of the underlying constituents i.e. S_{HY} is short $1mn entity D, while L_{HY} is long $1mn entity D. There are two payments that will occur between S_{HY} and L_{HY} on the auction settlement date.

1. Loss given default: This is paid by the protection seller to the protection buyer and calculated as (1 – Recovery Rate) * Notional Exposure. In our example, with a recovery rate of 30%, S_{HY} will receive (1 – 0.3) * $1mn = $700,000 to compensate for its loss given entity D's default.

2. Accrual: Once a CDS has been triggered, coupon payments related to that entity will cease. In this case, for protection against the default of entity D alone, S_{HY} owes a coupon payment to L_{HY} from the previous coupon date (March 20th) to the Credit Event date (April 1st). This equates to (12/360 * 5% * $1mn) = $1,667. Since the entity defaulted on April 1st, no coupons related to entity D will be made after this date. In practice, this coupon payment is settled along with the post-auction default settlement, rather than on the next coupon payment date.

The trade notional reduces to $99mn after the auction settlement or the index factor is now 0.99. On the next coupon payment date, the amount paid by the protection buyer will be calculated using this new notional. In our example, on 20th June, S_{HY}'s coupon payment would be based on the number of days between March 20th and June 20th, using a notional of $99mn or $100mn times the index factor of 0.99.

On Clearing

With an objective to mitigate counterparty and liquidity risks, and to bring forth more pricing transparency, the Dodd-Frank Wall Street Reform and Consumer Protection Act (Dodd-Frank Act) requires mandatory clearing through a regulated central clearing counterparty of all swap trades that the CFTC/SEC determine should be cleared.

The CFTC regulates the CDS index market and in late November 2012 issued a list of products that would be subject to mandatory clearing (Table 10). Mandatory clearing of index products has been gradually phased-in for various counterparties – (i) as of 11th March 2013, CDX trades (in the series in Table 10) between Swap Dealers & Major Swap Participants and Active Funds (executing 200 or more swaps per month) were required to be cleared , (ii) Commodity pools, Private Funds other than the Active Funds above, Financial Entities including Insurance companies and Mutual Funds will have to start clearing by the 10th of June, 2013 (iii) and most other swap participants are expected to start clearing by the final deadline of 9th Sep 2013.

Table 10: Indices covered by mandatory clearing

Tenor	CDX IG	CDX HY
3Y	S15+	
5Y	S11+	S11+
7Y	S8+	
10Y	S8+	

Source: BofA Merrill Lynch Global Research, CFTC

Why Centrally Clear?

In a typical Over-the-counter (OTC) index credit default swap, the client and the dealer face each other as counterparties (Figure 5). They enter into an ISDA Master agreement and a Credit Support Annex (CSA) that sets out the terms of collateral posting. Since the financial crisis, it has become far more common for OTC trades to be fully collateralized. In the event that one of the parties defaults, the other can lay claim to the collateral in lieu of payments owed to it.

Figure 5: Uncleared bilateral OTC trade

Source: BofA Merrill Lynch Global Research

Decrease counter-party risk

This does not however preclude counterparty risk entirely. If the dealer defaults, with the trade terminated, the client's risk profile is altered. If a systemic tail event occurs, such as the default of a major dealer as experienced in 2008, the lack of transparency afforded by these bilateral trades exacerbates the panic – the total exposure to the defaulted counterparty and subsequent collateral flows can take days to figure out and liquidity in the market can be severely impaired as a result. Central clearing aims to reduce these risks by introducing a well-capitalized and regulated counterparty to all trades.

By design a clearing house poses lower counterparty risk to market participants than any individual dealer member. The clearing house is capitalized by its members, who in turn are themselves required to be regulated and well capitalized institutions. Each clearing house member contributes capital in proportion to the amount of business it has with the clearing house. In case the clearing house capitalization falls below the required minimum level, as a result of a failure of a member, for example, the remaining members are required to provide additional capital to make up for the shortfall. This setup allows the clearing house to diversify risk among all members and hence protects market participants from an individual counterparty failure.

Market Standardization

Trades on CDX indices have tended to be fairly standardized for the most part – they follow the same coupon convention across contracts, there is an agreed upon mechanism to deal with credit-events, etc. However, CSAs are bilaterally negotiated and could be different between different counterparties. The terms of the CSA have an impact on the allowed collateral and the valuation of the credit default swap – an offsetting trade or hedge is only as good as how well matched

Impact of CSAs on valuation

Quantitative Portfolio Strategist, 04 February 2013

the agreements covering each leg are. (See piece in sidebar for more details.) Central clearing eliminates this problem as all market players face the same counterparty and are bound by the same collateral rules.

How does it work?

In a cleared trade, both the client and the dealer face a Central Counterparty (CCP) rather than each other. The figure in Figure 5 is replaced by the one in Figure 6. This means that trade coupon payments, settlement on a credit event and collateral posting are all done with the CCP.

Figure 6: Cleared OTC trade

Source: BofA Merrill Lynch Global Research

Clearing houses impose very high capital requirements on their direct members. For this reason, most clients choose to clear through their "clearing broker" (CB) rather than being a clearing member themselves (Figure 7). The CB acts as an agent between the client and the CCP, but the client and CCP are still principals to the trade. If the CCP makes a margin call related to a cleared trade in a client's account, it is the responsibility of the CB to post the required collateral with the CCP. The CB will in turn demand the margin from the client. By acting as an agent, the CB guarantees the payments owed to the CCP by the client.

Figure 7: Clients interact with the CCP through their clearing broker

Source: BofA Merrill Lynch Global Research

The clearing broker offers the client a service by committing its own capital to guarantee the client's margin payments and interacting with the CCP on the client's behalf. In return the CB charges a fee for the service. This represents an addition to trading costs due to central clearing. A CB will typically impose a limit on the total size of the client's exposure that it is willing to facilitate clearing for i.e. the CB may be unwilling to clear a new trade if the total exposure through existing trades the client clears with the CB has breached pre-set limits. For this reason and also to diversify any remaining counterparty risk, clients will often use more than one clearing broker.

Documentation

Bilateral OTC trades usually require an ISDA Master Agreement between counterparties. Under central clearing, this is no longer necessary. Instead, the client would have an Execution agreement with the dealer that outlines certain terms of trading. The client will also have a bilaterally negotiated agreement with their clearing broker setting out the terms and conditions of collateral posting and fees. Finally, clients are also required to sign a terms of use document with each CCP that they intend to use.

Margin Requirements

Among the implications of central clearing is the requirement for all counterparties in a trade to post margin according to their cleared positions. In the "uncleared" world, collateral posting was governed by bilaterally negotiated CSAs and was also driven by the relative credit quality (ratings) of the trade counterparties. In addition, large, well-capitalized money managers/sovereign entities often had one-way CSAs where they were not required to post initial margin to dealers. In the CCP's eyes however, no counterparty is more equal than others – everyone abides by the same margin rules and requirements. There are two margin requirements at the CCP, as discussed below.

Initial Margin

The initial margin is set up to compensate for a position's daily P&L under most circumstances in the event that the trade counterparty defaults and fails to post the daily variation margin. This is usually a model based number that takes into account various risk scenarios and their impact on the trade. In the CDS context this may include spread and curve shocks and also risk due to the default of any reference entity (jump-to-default risk). In addition, in case a trade counterparty defaults, the clearing house would have to liquidate the counterparty's positions at market prices. As a result, the initial margin will also account for the liquidation cost (bid-ask) of the trade.

The initial margin is calculated daily at the portfolio level. This means that investors will get some margin benefits from offsetting cleared positions e.g. index versus single-names or say a long/short in two index series with many entities in common.

The initial margin is payable in cash or a proportion of cash and Treasuries. The margin is calculated on a daily basis, but is unlikely to have large daily variations provided positioning remains unchanged. Since credit risk is asymmetric (the potential loss for protection sellers is much larger than for protection buyers), selling protection will typically incur a higher initial margin than buying protection.

Variation margin

The variation margin accounts for the mark-to-market of the trade and is calculated daily by the CCP based on end-of-day pricing (EoD). The EoD pricing is based on dealer submissions. If the client position is out-of-the-money, then the client posts margin to the CCP (through the clearing broker) and vice versa. This margin must be posted in cash, in the currency of the underlying trade.

Link to Definitions

Credit

Click here for definitions of commonly used terms.

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