

April 2014

US Credit Derivatives View

What to do now?

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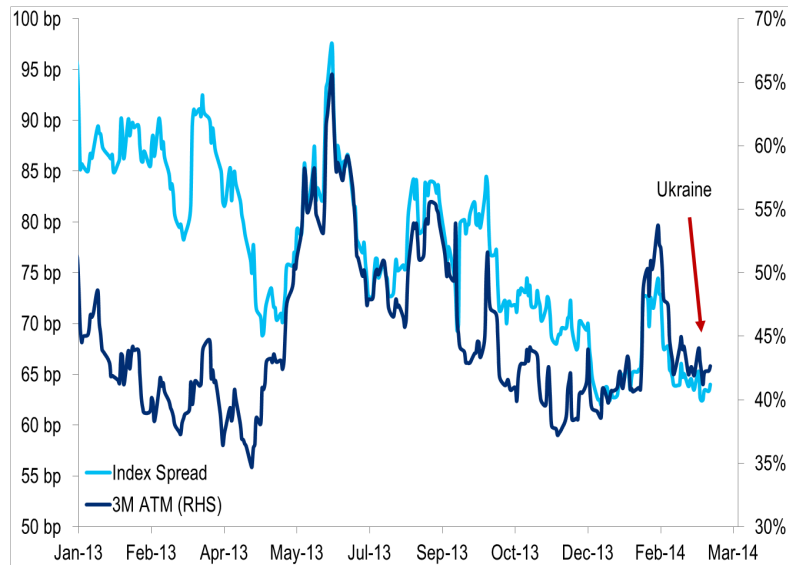
See Appendix A-1 for Analyst Certification, Important Disclosures and non-US research analyst disclosures

Published 15 April 2014

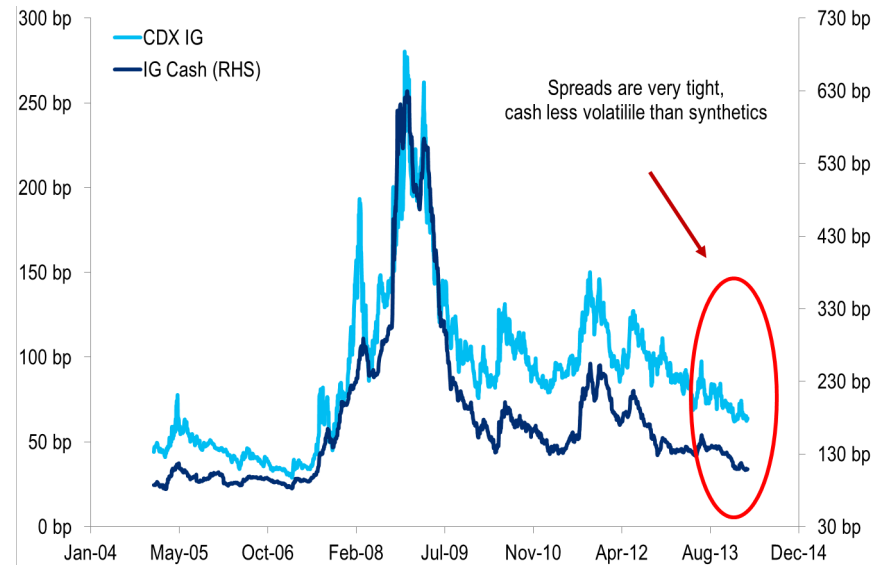
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Will Markets Ever React?

Not much reaction to Ukraine



Cash spreads anchoring synthetics?



- Reaction to the Ukraine crisis very short-lived first time around.
 - IG wider by 1.75bp, HY down by 0.5pt, reversed in a single day.
- Easy money policy by central banks feeding cash inflow into corporate credit funds.
 - Cash spreads remain stable due to perceived difficulty in sourcing risk.
 - Acting as anchor for slightly more volatile synthetic markets.
- Recommend “shorts with carry”.
 - Protects if spreads go wider.
 - Low or positive carry if markets fail to react.

Low cost shorts

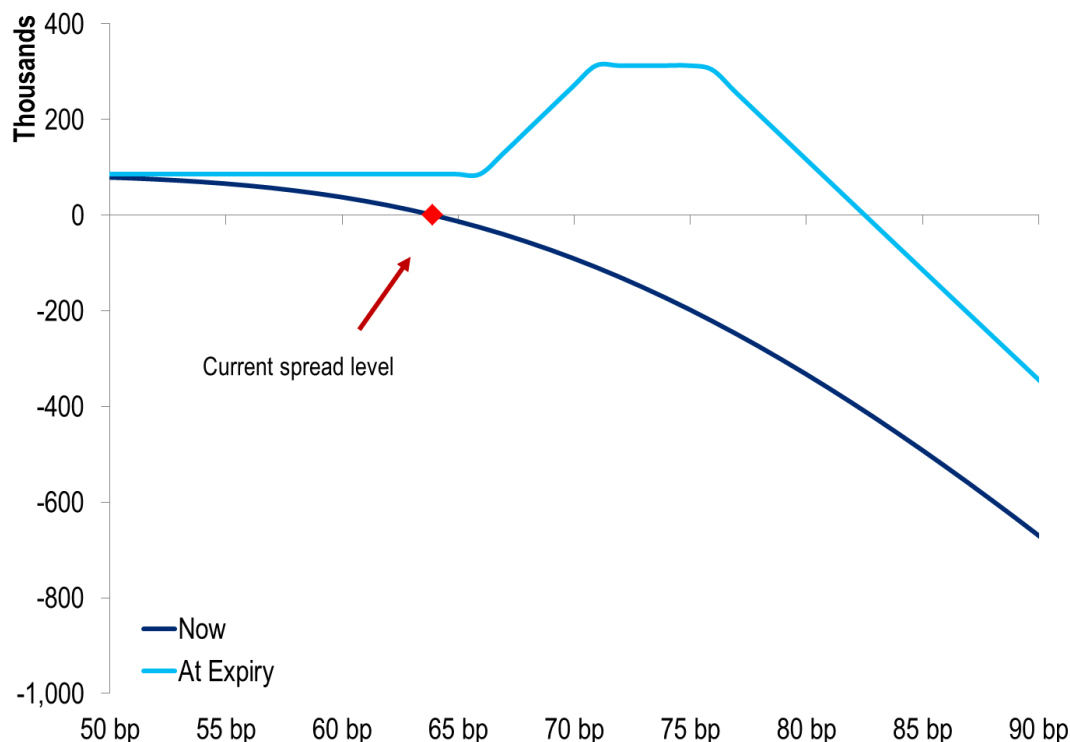
Generating alpha

Thinking about tail risk

Investing in options is not suitable for all investors. Please see the disclosures concerning the risks of investing in options below and discuss with your Financial Advisor whether this particular options strategy is suitable for you. Interested investors should contact our trading desk for updated price and liquidity information. Also, complex option strategies may entail higher commissions costs.

IG Payer Ladder

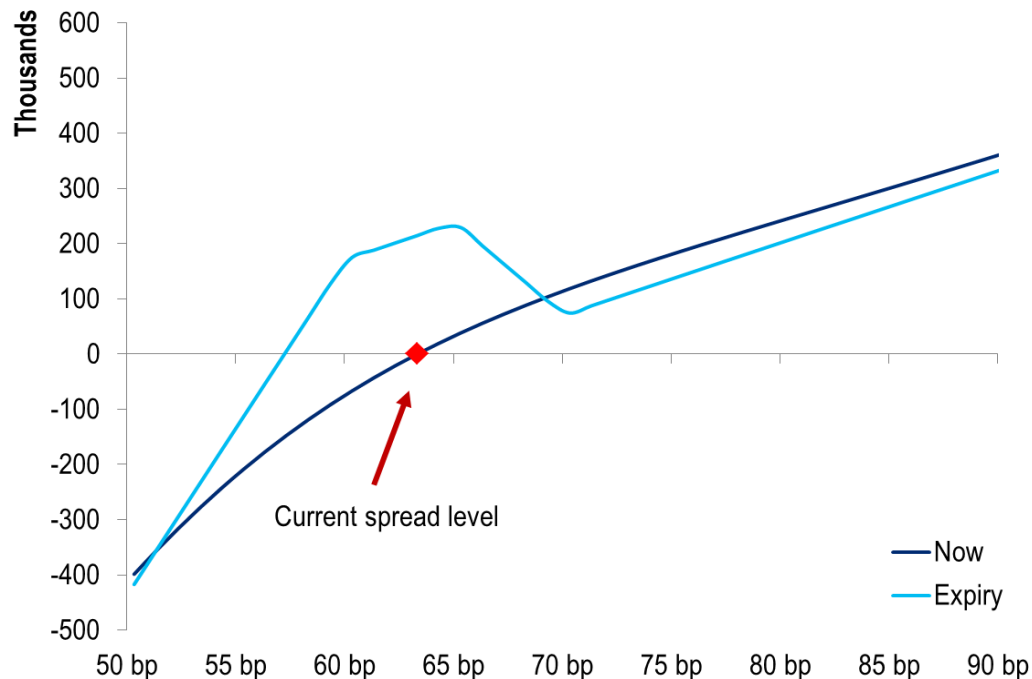
Trade	Index	Strike	Expiry	Notional	Vol	Price	Upfront	Delta	Gamma	Theta	Vega
Buy Payer	IG21	65	18-Jun-14	100MM	41.35%	29.46c	-294,619	27,218	1,254	-2,515	5,343
Sell Payer	IG21	70	18-Jun-14	100MM	44.56%	21.67c	216,699	-21,546	-1,208	2,341	-5,487
Sell Payer	IG21	75	18-Jun-14	100MM	47.95%	16.37c	163,718	-17,021	-1,078	2,135	-5,250
Net							85,798	-11,349	-1,031	1,961	-5,393



- Positive carry if CDX IG spreads remain at current levels or tighten further.
 - Tightening below 60bp a possibility given the upcoming roll.
- Upside potential if CDX IG widens to 72bp, but downside risk if spreads widen beyond 82.5bp.
 - 10% probability of such a move in 3 months based on distribution of realized 3 month moves since Jan 2011.

IG Receiver Ladder + Index Short

Trade	Index	Strike/Spot	Expiry	Notional	Vol	Price	Upfront	Delta	Gamma	Theta	Vega
Buy Recv	IG21	70	18-Jun-14	100MM	44.56%	34.85c	-348,513	-24,513	1,267	-364	5,730
Sell Recv	IG21	65	18-Jun-14	100MM	41.55%	21.19c	211,852	18,694	-1,299	484	-5,542
Sell Recv	IG21	60	18-Jun-14	100MM	38.25%	10.61c	106,060	12,174	-1,171	486	-4,687
Buy Prot	IG21	63		30MM		101.69c	506,081	14,115		-565	
Net							475,481	20,470	-1,204	42	-4,498



- More geared towards spread widening, with positive carry if CDX IG spreads roll down the curve normally.
- Unlimited upside if CDX IG spreads widen, but downside risk if spreads tighten below 57bp.
 - Less than 25% probability of a 6bp move tighter from current levels, based on distribution of realized 3 month moves.

Source: Citi Research, prices/spreads as of EOD 10-Mar-2014.

Note: Transaction costs and other fees not included in calculations.

Tranches: 2005 all over again?

Base correlation coming down



P&L by scenario

Trade 1 Long 10mm HY21 35-100, short 25mm HY21 index
Trade 2 Long 10mm HY21 35-100, short 25mm HY21 25-35

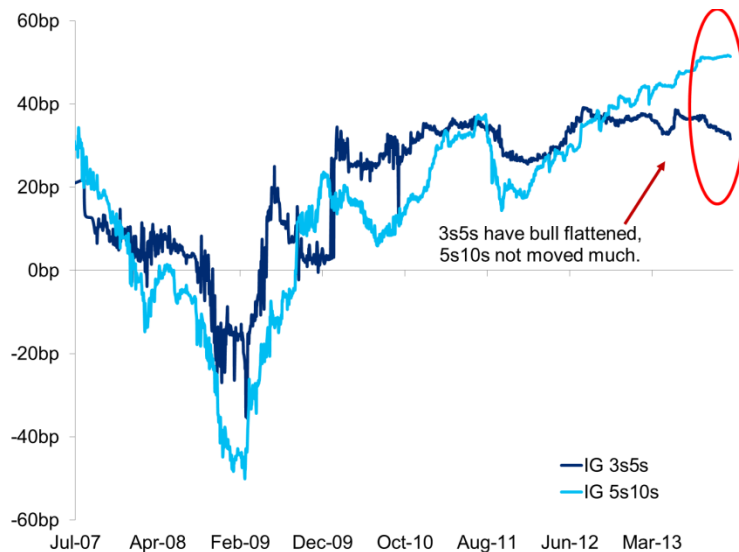
Scenario	Trade 1			Trade 2		
	Now	Now + 1y	Now + 2y	Now	Now + 1y	Now + 2y
Unch	0	-115,852	-251,225	0	22,191	74,742
HY +50bp	167,039	39,632	-120,484	75,968	67,683	89,362
HY +100bp	324,235	189,319	7,602	225,646	165,843	127,926
HY +200bp	603,429	465,472	252,222	789,212	561,747	304,143
HY +300bp	822,381	698,991	475,395	1,682,455	1,236,736	642,272
1 default	21,788	-24,740	-153,943	-184	31,595	77,387
2 defaults	35,040	-7,911	-130,570	-8,159	21,551	64,646
3 defaults	36,938	-265	-106,044	-14,075	7,934	42,456
4 defaults	48,859	14,338	-84,980	-29,930	-11,150	18,583
HY -50bp	-175,908	-276,062	-383,827	-20,410	15,116	76,873
HY -100bp	-360,108	-440,047	-517,478	-4,160	32,463	89,399
HY -150bp	-552,358	-606,753	-651,260	32,652	62,724	107,379

Prices/Spreads as of EOD 14-Apr-2014

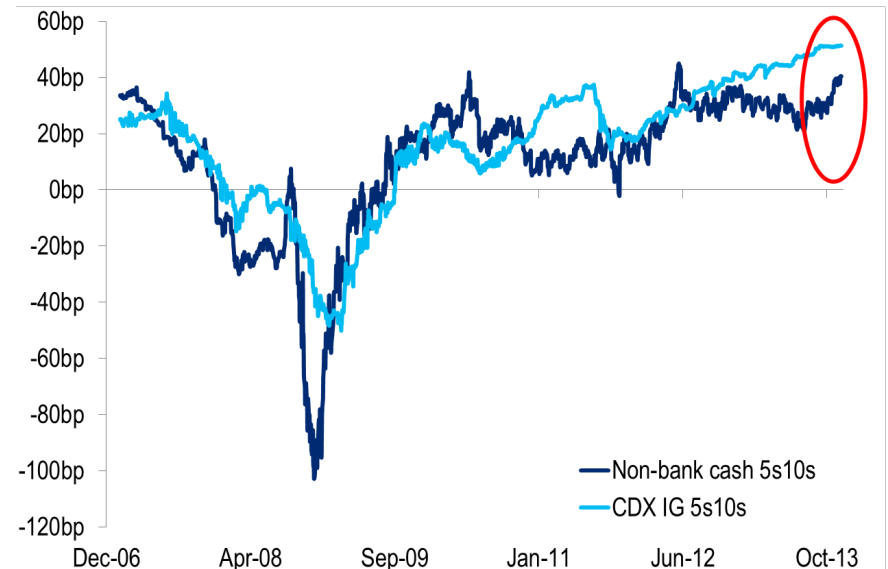
- Idiosyncratic risks on the rise, especially in HY portfolios.
 - Back up in rates over the medium term could make it difficult for stressed credits to refinance.
- We like short correlation trades to hedge against such scenarios.
 - Long HY21 super-senior, delta hedged (68bp annual carry).
 - Long HY21 super-senior, long (delta adjusted) HY21 25-35 (18bp annual carry).

Index: “Long” the long end?

CDX IG 5s-10s still steep, 3s-5s not so much



CDX IG 5s-10s steeper than non-bank cash 5s-10s



- Synthetic curves currently at their steepest in history.
 - Expectations of rates backing up in the medium to long term is pushing risk out the curve.
 - CDX IG 5s10s steeper than comparable non-bank 5s-10s cash curve.
- Long 10Y CDX IG attractive as current steepness offers attractive roll down characteristics.
- Duration neutral 5s-10s flattener a possible hedge against eventual rate backup.
 - Almost flat carry (~3bp/year), because of how steep curves are.

Agenda

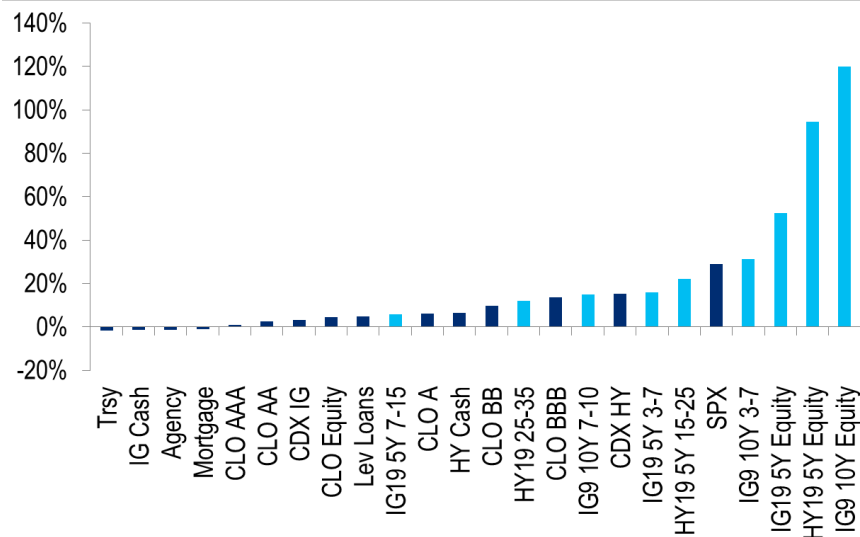
Low cost shorts

Generating alpha

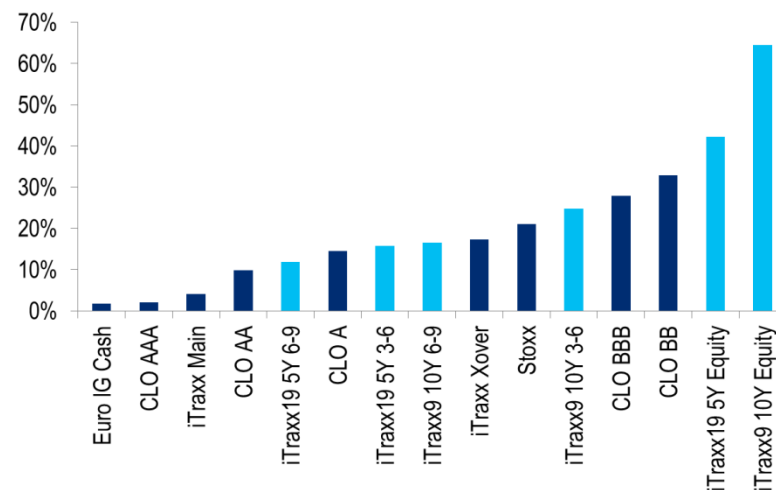
Thinking about tail risk

Structured synthetic credit catching up....

US Assets



European Assets



- Synthetic structured credit has benefitted in 2013 from
 - Non-recourse structural leverage, given the high cost of financial leverage post financial crisis.
 - Low default, low volatility environment during most of 2013.
 - Short duration of a large part of the available securities.
- Delayed recovery in this asset class following the 2008 crisis also a possible driver of outperformance relative to other asset classes.

Duration and carry

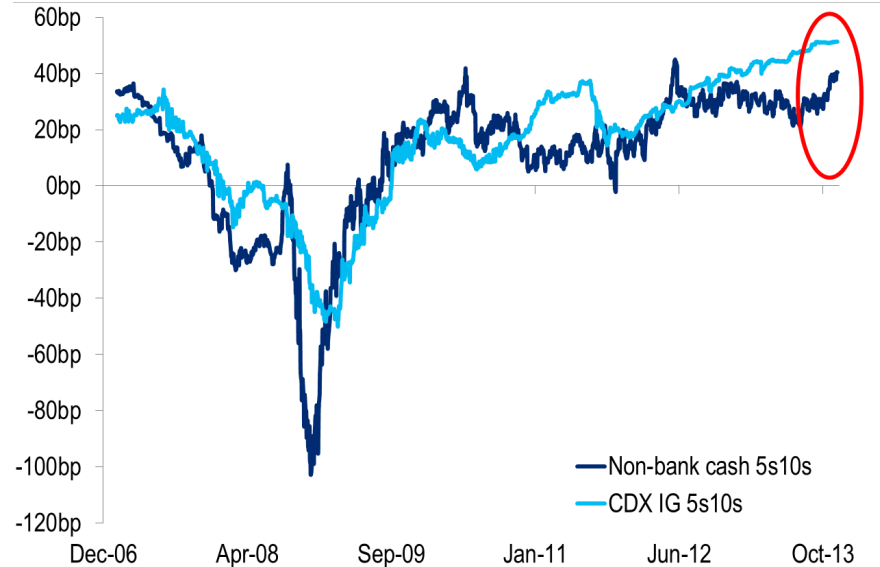
Maturity ranges

CLO Tranche	Avg WAL (years)*
AAA	6.5
AA	7.5
A	8.0
BBB	8.5
BB	9.0
Equity	7.0

*CLO 2.0, can be less due to calls

Synthetic Portfolio	Maturity	Time to Mat (years)
3Y IG19	20-Dec-15	1.9
5Y IG21	20-Dec-16	2.9
5Y HY19	20-Dec-17	3.9
5Y HY21	20-Dec-18	4.9
7Y IG21	20-Dec-19	5.9

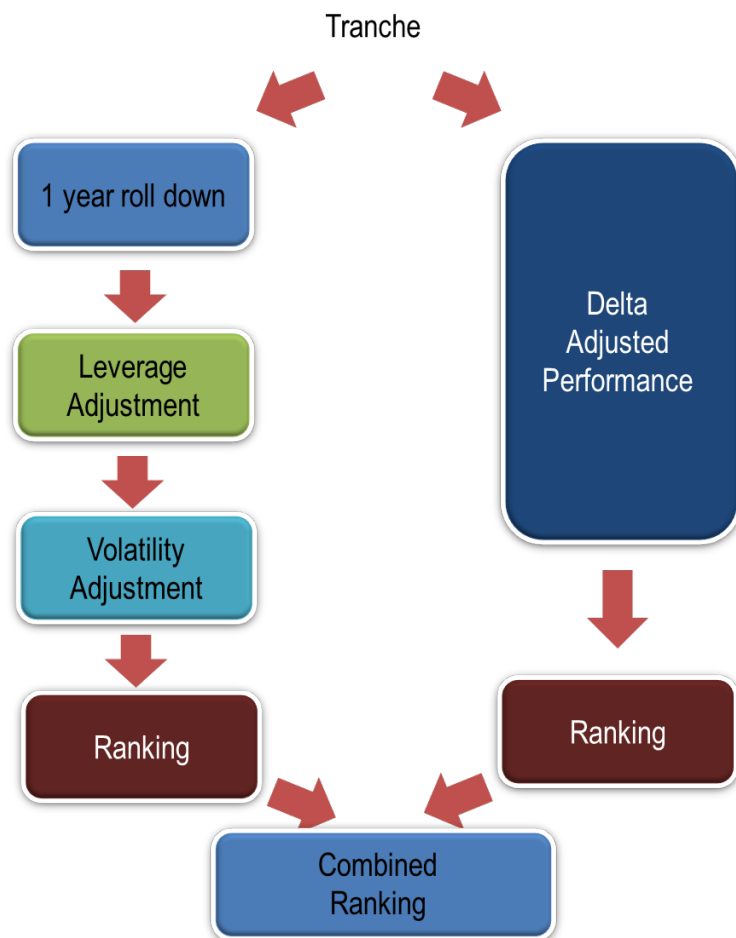
Synthetic curves steeper than cash at long end



- Synthetic tranches can have shorter duration.
 - CLO 2.0 tranches have WAL of 6.5 – 9.0 years, early calls can reduce this somewhat.
 - Synthetic tranches on standard indices available with maturity in 2-4 years.
- Synthetic tranches benefit from steeper synthetic credit curves.
 - Allows investors to benefit from faster price appreciation with the passage of time.
 - Non-equity synthetic tranches benefit from passage of time more than equity tranches.
 - Risk of non-equity tranches being hit by default falls quickly as tranche approaches maturity.

Relative Value Across Tranches

How to compare tranches



Tranche rankings using our method

Index	Tranche	Ranking			
		Proj Perf	Del Adj	Perf	Combined
7Y IG19	3-7	9	3	1	1
7Y IG19	0-3	13	1	2	2
7Y IG19	7-15	5	9	2	2
3Y IG21	15-100	3	11	2	2
7Y IG21	3-7	11	4	5	5
7Y IG21	0-3	15	2	6	6
7Y IG21	7-15	7	10	6	6
5Y IG21	15-100	4	14	8	8
5Y IG21	3-7	12	8	9	9
5Y IG19	3-7	14	7	10	10
7Y IG19	15-100	1	20	10	10
5Y IG21	0-3	16	5	10	10
7Y IG21	15-100	2	19	10	10
5Y IG19	7-15	6	17	14	14
3Y IG21	7-15	10	13	14	14
5Y IG19	0-3	18	6	16	16
5Y IG21	7-15	8	18	17	17
3Y IG21	0-3	19	12	18	18
3Y IG21	3-7	17	16	19	19
5Y IG19	15-100	20	15	20	20

Index	Tranche	Ranking			
		Proj Perf	Del Adj	Perf	Combined
5Y HY19	25-35	1	5	1	1
3Y HY21	25-35	6	3	2	2
5Y HY19	15-25	2	8	3	3
5Y HY21	25-35	3	7	3	3
5Y HY21	35-100	10	1	5	5
3Y HY21	35-100	11	2	6	6
5Y HY21	15-25	4	9	6	6
3Y HY21	15-25	8	6	8	8
5Y HY19	35-100	12	4	9	9
5Y HY21	0-15	5	11	9	9
5Y HY19	0-15	7	10	11	11
3Y HY21	0-15	9	12	12	12

Selectively move up the capital structure

Tranche Statistics

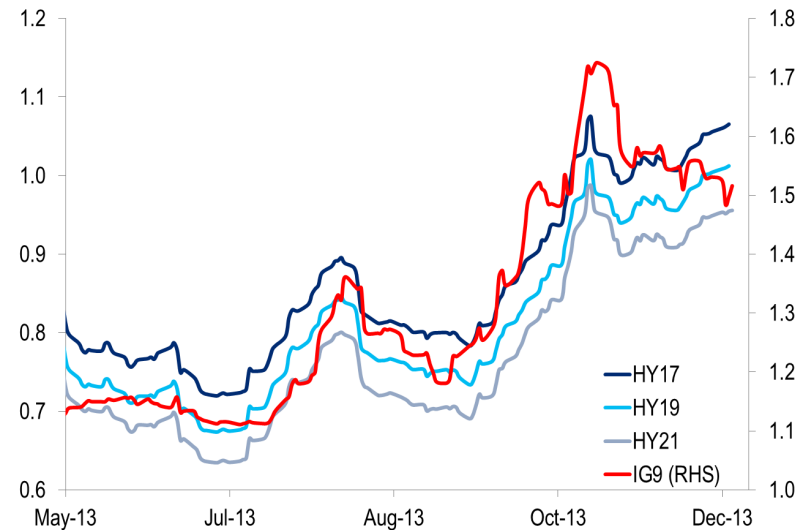
Index	IG21		5Y HY19		5Y HY21	
Tranche	5Y 0-3%	7Y 0-3%	15-25%	25-35%	15-25%	25-35%
Maturity	20-Dec-18	20-Dec-20	20-Dec-17	20-Dec-17	20-Dec-18	20-Dec-18
Spread (bp)	866	380	261	117	416	184
Upfront (pt)	14.4	16.6	-8.6	-14.0	-3.7	-14.3
Bond Eq Px	85.6	83.4	108.6	114.0	103.7	114.3
Portfolio Spread	57	84	252	252	310	310
Defaults to hit**	1	5	22	36	22	36
1Y Return*	15.19%	7.19%	4.78%	2.41%	9.53%	4.10%

*Projected return from coupon and roll down

**Assuming 40% recovery on each IG default and 30% recovery on each HY default

Prices/Spreads as of EOD 9-Apr-2014.

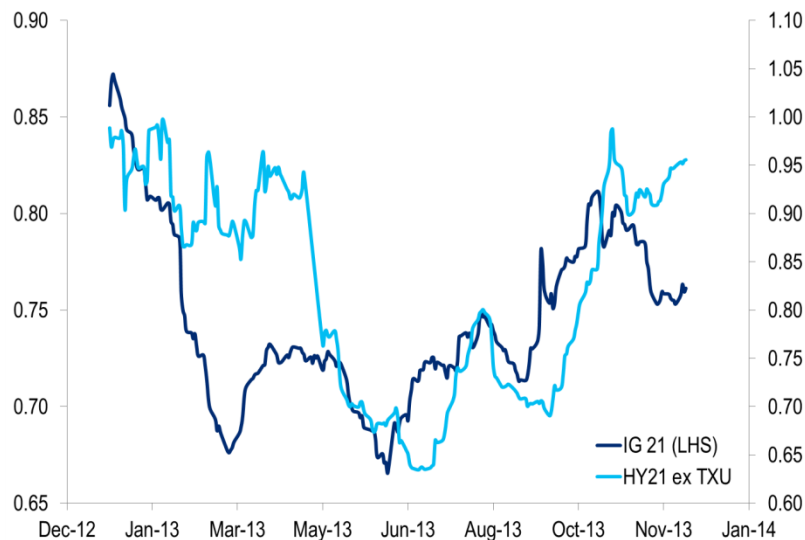
Index Portfolio Spread Dispersion



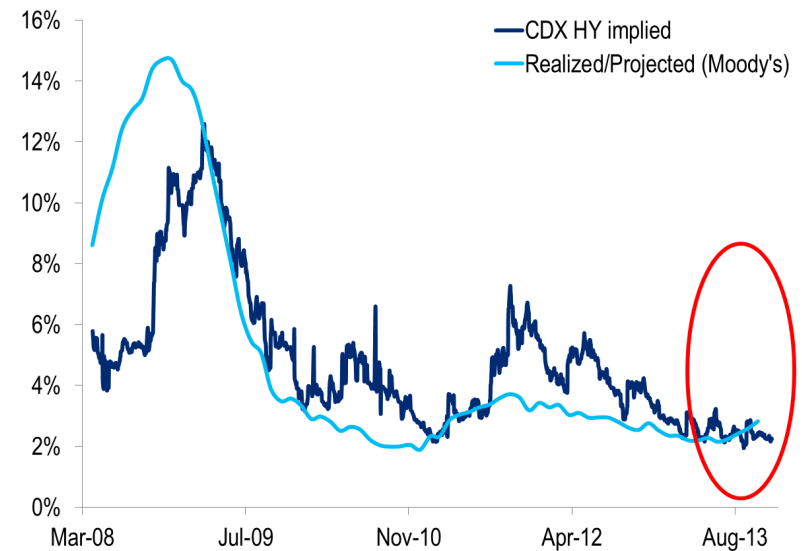
- Move up the capital structure for legacy IG and all HY indices.
- Equity tranches in these portfolios have massively outperformed in 2013.
- Rising idiosyncratic risk to hurt performance going forward, as the Fed withdraws liquidity.
 - Spread dispersion (represents idiosyncratic risk) rising in HY and IG9 portfolios (see graph).
- HY19/21 15-25%/25-35% tranches are attractive.
- In IG19/21, 5Y equity tranches continue to be attractive due to steep roll downs and low default risk.
 - 7Y 3-7% tranches are beginning to look attractive for investors looking for spread risk.

CDX IG versus beta-adjusted CDX HY

Idiosyncratic risks rising in HY



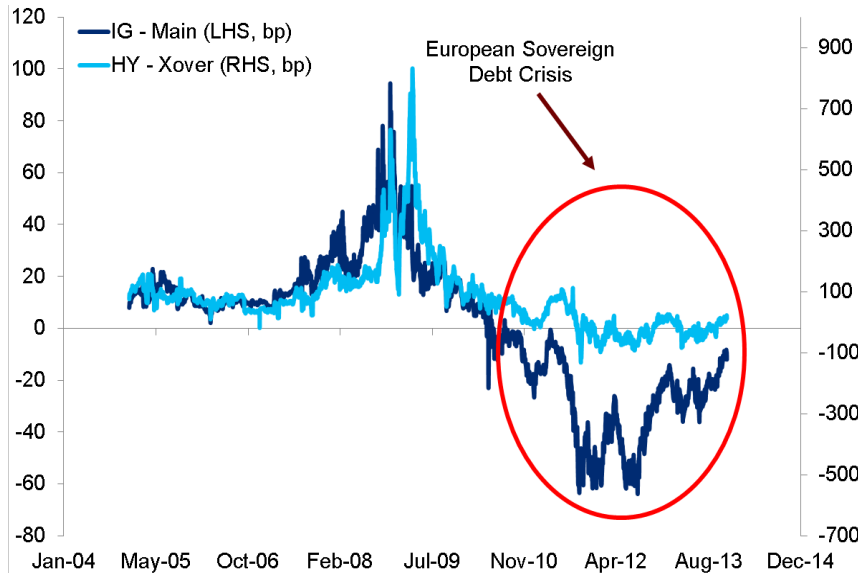
CDX HY implied defaults too low



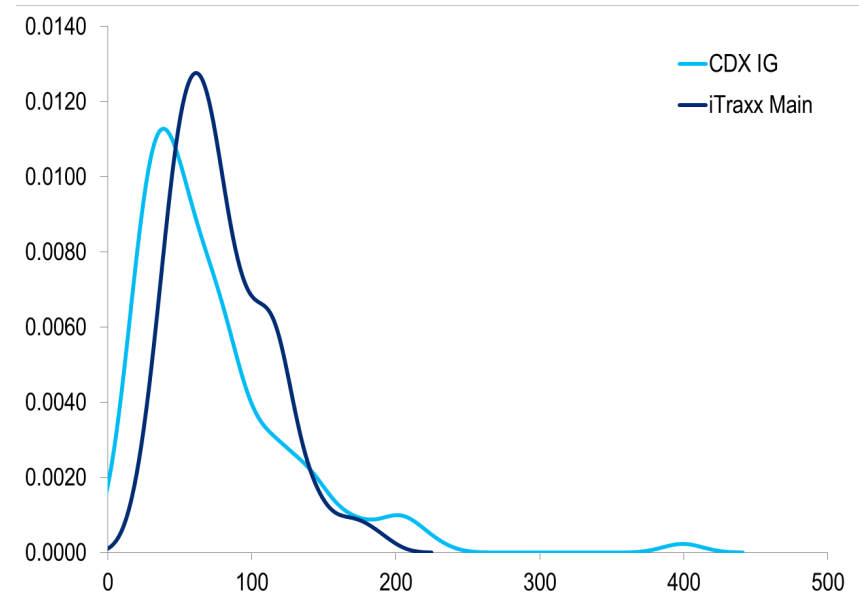
- As tightening momentum in indices ends, CDX IG to outperform beta-adjusted CDX HY.
 - Range-bound spread environment with a slightly widening bias to favor IG outperformance.
- Idiosyncratic credit risk on the rise in CDX HY portfolio compared to CDX IG.
 - Time series of dispersion in credit spreads reflects this.
- 1Y defaults implied by CDX HY credit spreads too low compared to realized/projected Moody's rates.
 - “Implied default” premium has only recently come down.
- Current YTD performance: CDX HY +1.12%, CDX IG (beta-adj): +1.72%.

Europe versus US

IG/Main spread & EU debt crisis



Main portfolio has lower idiosyncratic risk



- Tighter monetary policy in US vs easier stance in Europe.
 - Fed started taper in Jan 2014, expected to end QE3 by Sep 2014.
 - ECB expected to maintain easy monetary policy, including a slightly negative deposit rate and extra liquidity.
- IG/Main spread has compressed significantly as peripheral risks have abated.
 - Expect further compression as ECB keeps peripheral/systemic risks at bay through easing.
- Tighter dispersion for Main portfolio compared to IG indicates mostly systemic risk.
 - De-levering financial names in Main will add to tail wind.
- Current YTD performance: CDX IG: +0.44%, iTraxx Main: +0.54%.

Agenda

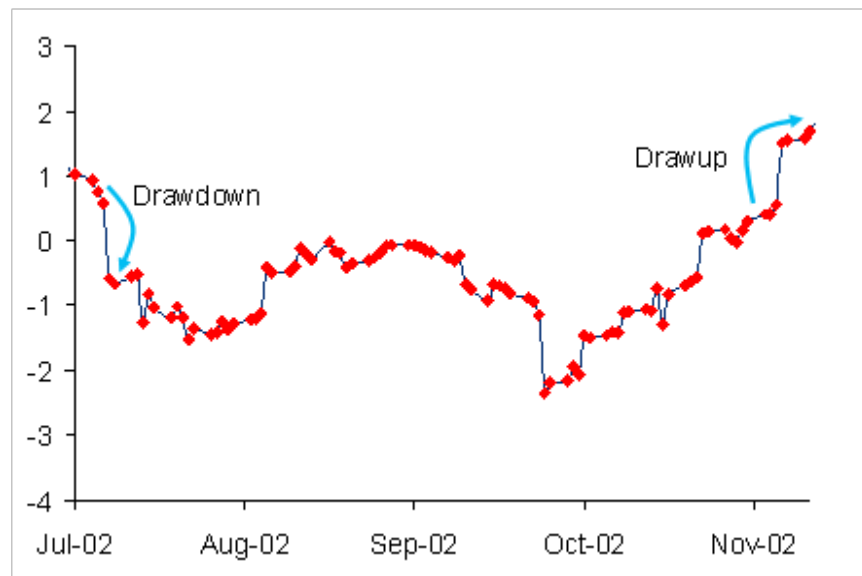
Low cost shorts

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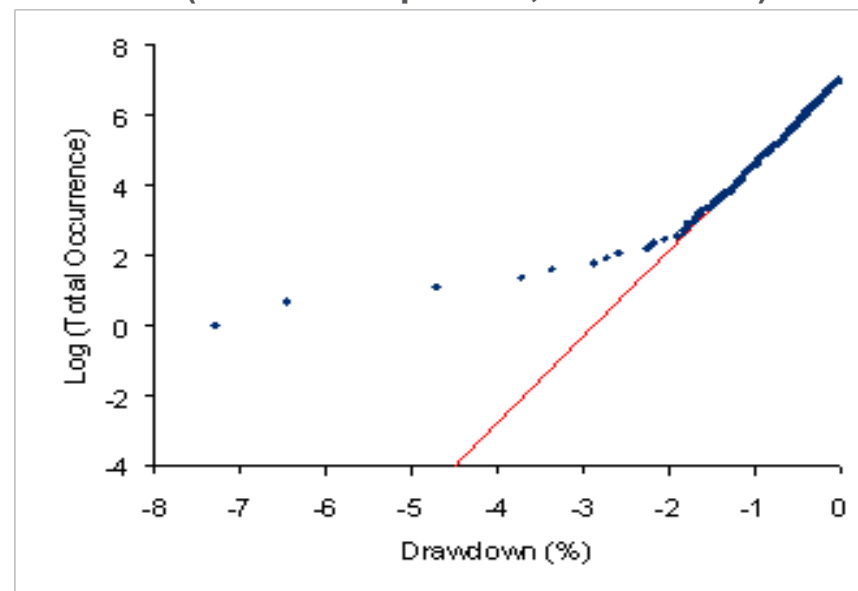
Thinking about tail risk

Tail-risk Hedging Using Drawdowns

Drawdowns in the US BIG Corp Index



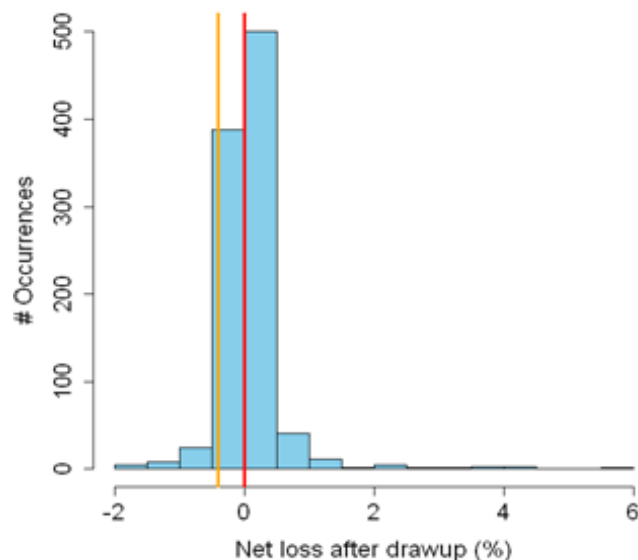
Drawdown distributions are different
(US BIG Corp index, 1995 – 2003)



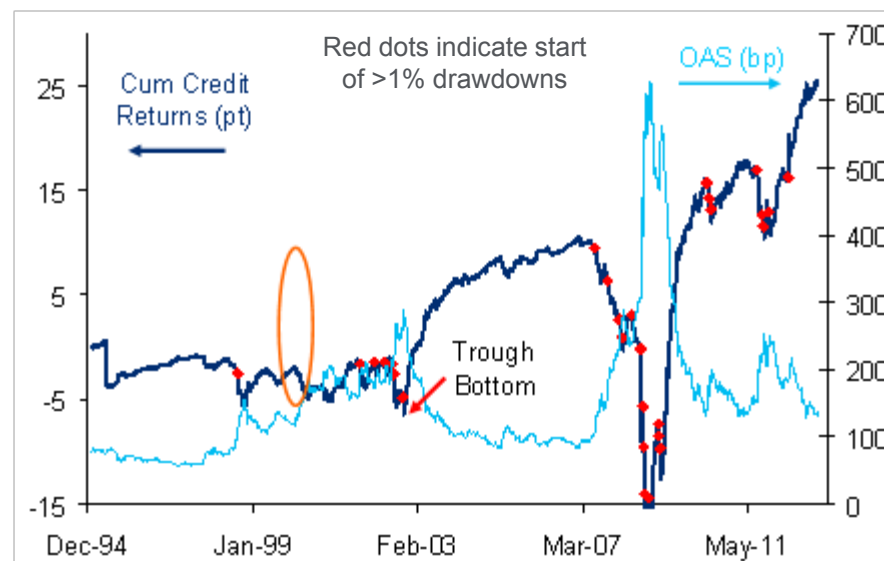
- Hedging decisions based on analyzing daily return distributions can be misleading.
 - Credit markets in a down turn usually have feedback effects that prolong periods of spread widening.
- Momentum/feedback effect in downturns are better captured by drawdowns.
- Large drawdown moves are much more frequent than daily returns would indicate.
 - Large deviations from usual power-law distributions that describe daily return distributions (red line).

Go after the Large, but Rare Moves

Most “small” drawdowns are reversed quickly



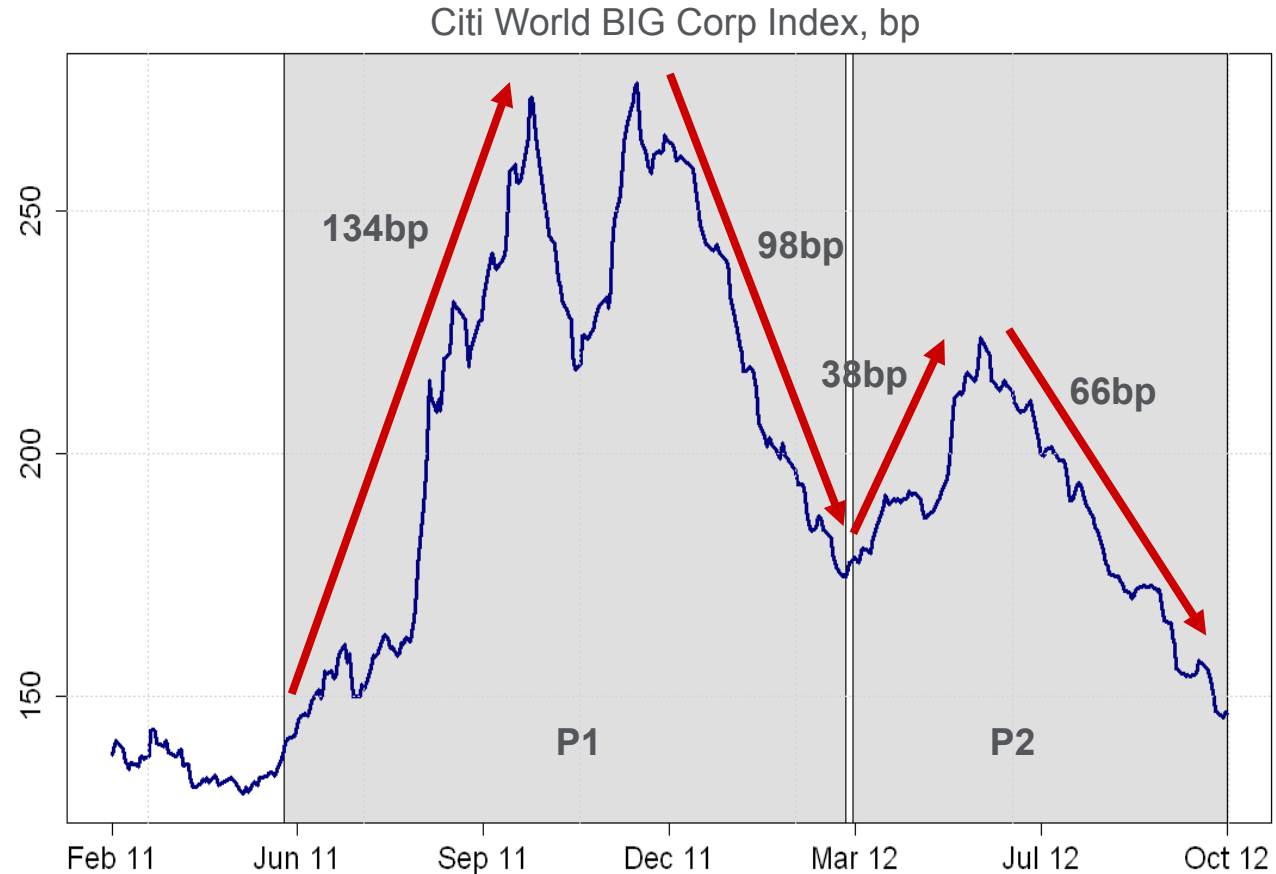
Cum daily returns for US BIG Corp



- Large, rare moves happen around 1% of the time, and lose ~2% or more.
- Small, but frequent moves are usually self correcting (left chart).
 - 57% of the time, drawdowns are followed “drawups” that fully reverse the drawdown.
 - 95% of the time, the net loss 0.4% or less.
- Hedge only the large moves (>1% or more, to be conservative).
 - Most significant moves downward start with such drawdowns (right chart).
 - Short dated very OTM options are best, in our view.

Back-testing Option Hedges

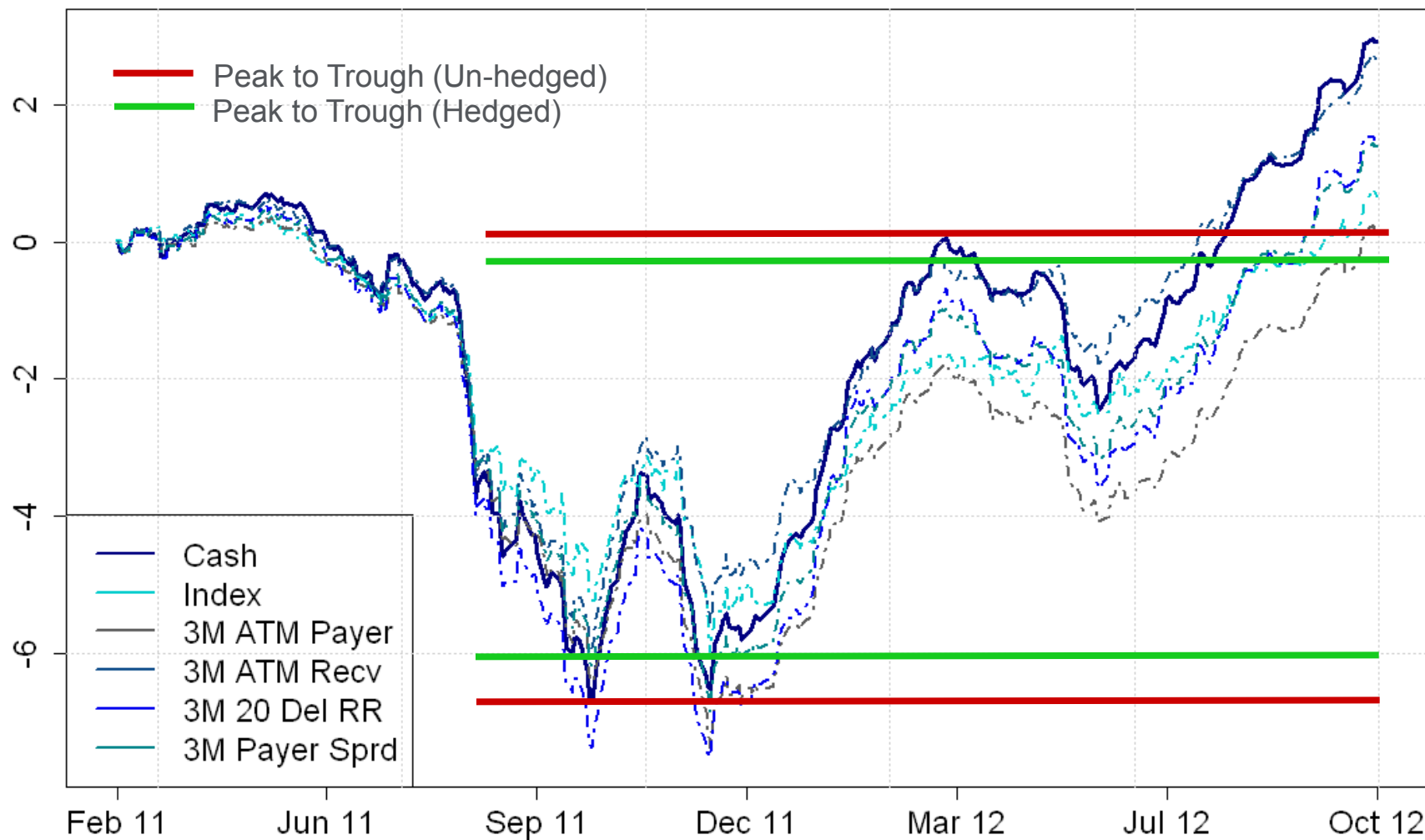
- Use Citi World BIG Corp Index as proxy for long cash portfolio.
- Examine two full cycles of spread widening followed by tightening.
- 100MM notional cash index hedged with 100MM notional options.
- All options have 3M expiries.
- Hedging with OTR index included for comparison.



Source: YieldBook, Citi Research
Past performance is no guarantee of future results.

Hedges Reduce Peak To Trough Moves in P&L

P&L in \$MM, Solid line is Un-hedged 100MM Portfolio

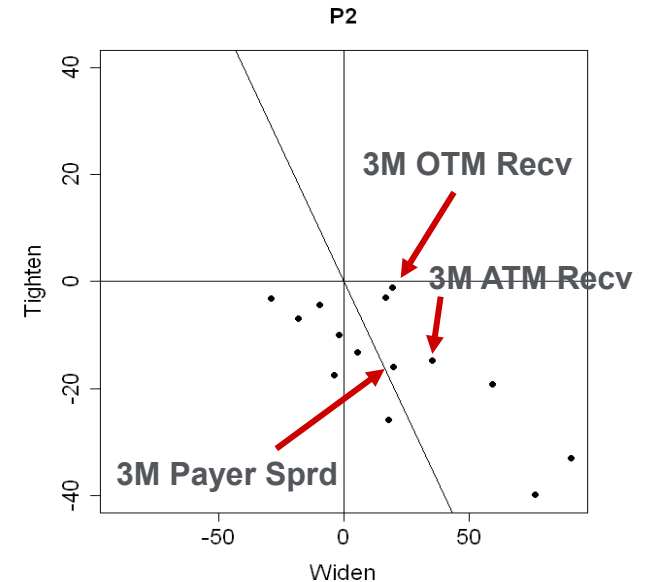
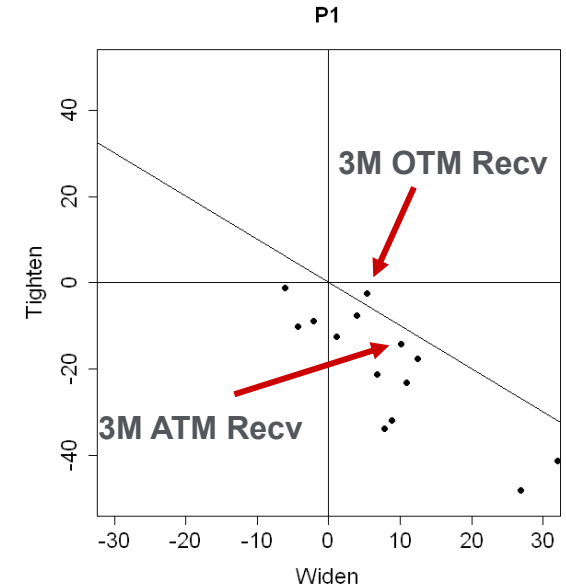


Source: Citi Research

Past performance is no guarantee of future results.

Hedging Efficiency: Tradeoff Loss Avoidance with Gains Surrendered

- Hedge performance analyzed for two cash spread widening/tightening cycles, P1 & P2 (see slide 12).
- Look at % of losses averted during widening part of cycle (w) versus % of gains given up during tightening part (t).
- Efficient hedges are those for which (w) is higher than (t) – this provides positive convexity.
- Graphs to right show (t) plotted on Y-axis versus (w) on the X-axis, for each hedging strategy.
- Points above (or close to) 45 degree diagonal line are efficient hedges – selling receivers and buying payer spreads.



Source: Citi Research
Past performance is no guarantee of future results.

Brief introduction to option hedging

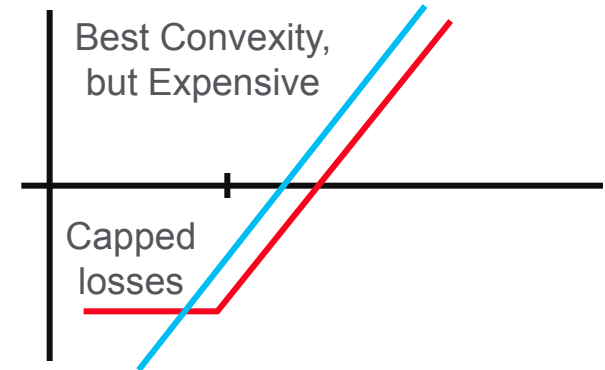
How to Hedge with Options

Possible alternatives

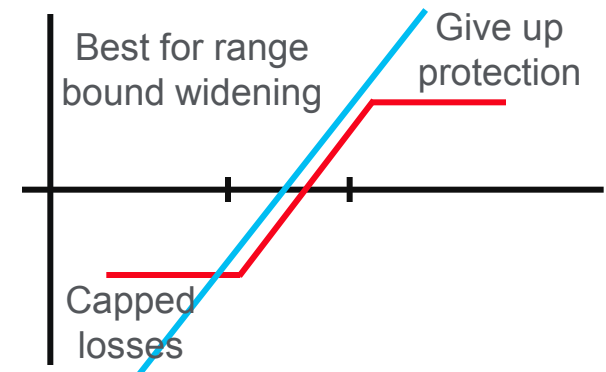
- Buy ATM/OTM Payers
 - High positive convexity, but considerable cost.
 - Capped downside (cost of premium).
 - Unlimited upside (as spreads widen).
 - OTM payers cost less but protect only for extreme tail events.
- Buy Payer Spreads
 - Buy ATM payer financed by selling OTM payer.
 - Give up protection in case of extreme moves for lower cost.
 - Both upside and downside are capped.
 - Best when spreads expected to remain range bound with a widening bias.

Short Index P&L (blue), Option P&L (red)

Long Payer Hedge



Payer Spread Hedge



Source: Citi Research

Hedging with options can provide customized risk reward tradeoffs

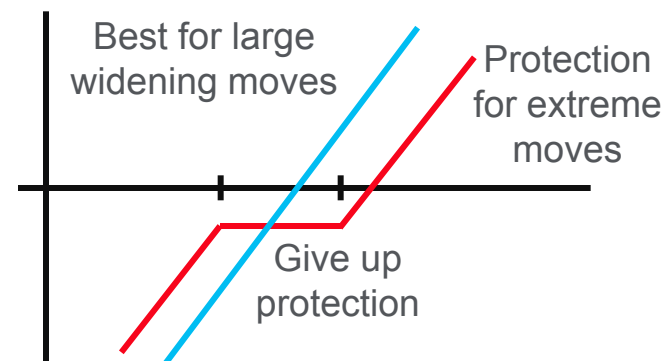
Hedging with Options

Possible alternatives

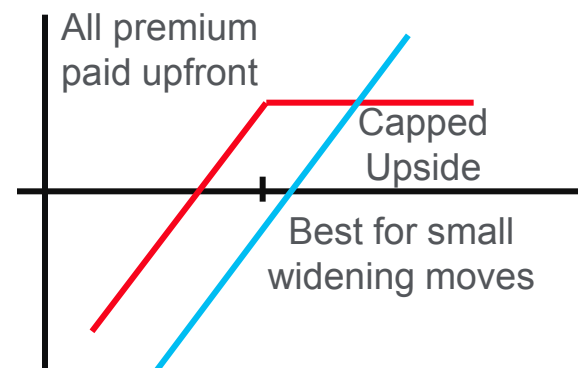
- Buy Bearish Risk Reversals
 - Buy OTM payer financed by selling OTM receiver.
 - Lower net cost, give up protection for small widening.
 - Both upside and downside are unlimited.
 - Best when spreads expected to make large moves wider.
- Sell ATM/OTM receivers
 - Collect premium to protect against wider spreads.
 - Unlimited downside if spreads tighten.
 - Similar to a covered equity call when paired with a long credit portfolio.

Short Index P&L (blue), Option P&L (red)

Bearish Risk Reversal Hedge



Short Receiver Hedge



Source: Citi Research

Hedging with options can provide customized risk reward tradeoffs

RISKS

When buying calls and puts (or receivers and payers) the maximum loss is the premium paid. When selling calls (or receivers), the maximum potential loss would occur as the index spread decreases but is limited by the index spread being floored at zero. For puts (or payers), the maximum potential loss (amount below the strike) would eventuate should the index price fall to zero. Sector index options are cash settled. The above calculations do not include any additional fees or transaction costs. Note that ratio writing would leave the writer uncovered in one leg of the trade.

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This section discusses possible options strategies that you may choose to employ in conjunction with the company securities discussed herein. If you choose to engage in the options transactions discussed within this document, you must have an approved options account and will be subject to certain criteria which may ultimately prevent you from engaging in certain option strategies. It is important for you as an investor to know and understand that Options do involve risk and sometimes, significant risk, therefore may not be appropriate for all investors. If you buy options, the maximum loss is the premium. If you sell put options, the risk is the entire notional below the strike. If you sell call options, the risk is unlimited. The actual profit or loss from any trade will depend on the price at which the trades are executed. The prices used herein are historical and may not be available when you order is entered. Commissions and other transaction costs are not considered in these examples.

Please speak to your Financial Advisor to ensure you have a full understanding of the risk and reward of the strategy you are considering. Strategies that are opened or closed differently than what is discussed in this document could have a significantly different outcome from what is described. It should be noted that certain Index options might have special settlement dates or settlement requirements that are different from traditional equity options. Commissions, taxes, and margin costs have not been included but will affect the outcome of any option transaction and should be considered. However, they can have a significant impact on the profitability of options transactions and should be considered carefully before entering into any option strategy. Because of the

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For a more complete description on the uses and risks of options, please see the document titled Characteristics and Risks of Standardized Options. If you would like an additional copy of this document please contact Citigroup Global Markets Inc., Options Department, 390 Greenwich Street, New York, NY 10013. Options are not suitable for all investors. Before entering into any transaction using listed options, investors should read and understand the current Options Clearing Corp. Disclosure Document (Characteristics and Risks of Standardized Options) at <http://www.theocc.com/about/publications/character-risks.jsp>, http://www.theocc.com/components/docs/January_2011_ODD_Definitive_Supplement.pdf, http://www.theocc.com/components/docs/March_2011_ODD_Definitive_Supplement.pdf, and http://www.theocc.com/components/docs/January_2012_ODD_Definitive_Supplement.pdf

Investing in options other than Standardized Options may entail additional risks.

Appendix A-1

Analyst Certification

The research analyst(s) primarily responsible for the preparation and content of this research report are named in bold text in the author block at the front of the product except for those sections where an analyst's name appears in bold alongside content which is attributable to that analyst. Each of these analyst(s) certify, with respect to the section(s) of the report for which they are responsible, that the views expressed therein accurately reflect their personal views about each issuer and security referenced and were prepared in an independent manner, including with respect to Citigroup Global Markets Inc and its affiliates. No part of the research analyst's compensation was, is, or will be, directly or indirectly, related to the specific recommendation(s) or view(s) expressed by that research analyst in this report.

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