

# Sell European and Buy US Credit Vol

## Options offer a good entry point for long Europe - short US trades

- **Europe to outperform US** – The long risk Europe vs. short risk US (spread) trade continues to look attractive for a variety of reasons, mainly the likely opposite direction of monetary policy actions in both regions (tighter in US, looser in Europe).
- **Play it via options: sell European vs. US vol** – The options market represents a very attractive way to play long risk Europe vs. US, especially after the recent price action taking European credit vols substantially higher than US vols.
- **European implied vol is currently 10% higher than US vol, barely a month after trading below it** (Figure 1).

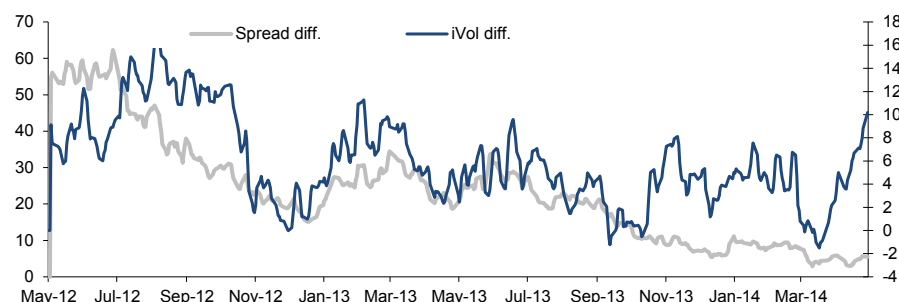
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**Figure 1. Main vs. CDX IG spread and 3m implied vol difference**

LHS: spread difference, in bp, 5y on-the-run. RHS: 3m implied vol difference, in %.



Source: Citi Research, Markit. 3d moving average.

- **Justified, but not sustainable** – The surge in European implied vol vs. US implied vol has been predominantly driven by the higher realised vol in European credit markets. However, we do not think this differential will last long. The outperformance we expect in the European market in spread terms in a tightening environment should soon translate into European implied vols becoming one of the most attractive ways to take risk, especially among fast money clients. Moreover, we do not expect daily movements in Main to be around 2bp for much longer – we expect the market to stabilize at current levels before we attempt to break through the tights of the year.
- **Trade: Sell 3m (August) vol in iTraxx Main and buy 3m vol in CDX IG**, via ATM delta-hedged straddles with an equal notional, in € equivalent terms. The Vega on each leg is around 11c of notional; which means that if the implied vol difference was to collapse to zero (from the current 10% level) the trade would make above 1%. Links to: [Main](#) and [CDX](#) trades in our pricing tool.

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

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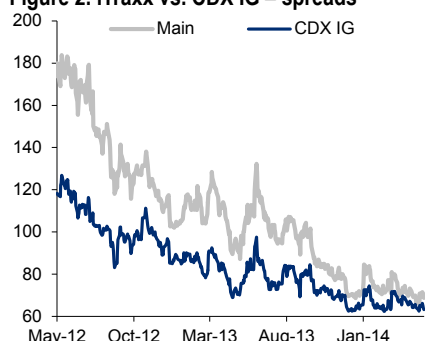
## Europe to outperform US

The options market represents a very attractive way to play long risk Europe vs. US

Despite the recent tightening, our market view remains **constructive**, as we highlighted in our latest [credit weekly](#). Moreover, on a relative basis, there is still room for **European markets to continue outperforming US** markets going forward.

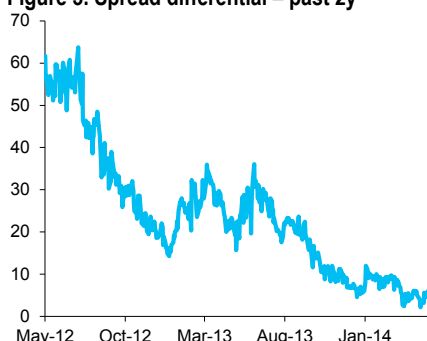
In a recent piece ([6 reasons to favour € over \\$ credit](#), H. Lorenzen) we argue that the long risk Europe vs. short risk US trade continues to look attractive for a variety of reasons, mainly the likely opposite direction of monetary policy actions in both regions (tighter in US, looser in Europe). In our view, the US credit cycle is more advanced than the European one and it will be more sensitive to movements in yields.

Figure 2. iTraxx vs. CDX IG – spreads



Source: Citi Research, Markit. 5y on-the-run spreads, in bp.

Figure 3. Spread differential – past 2y



Source: Citi Research, Markit. 5y on-the-run spreads, in bp.

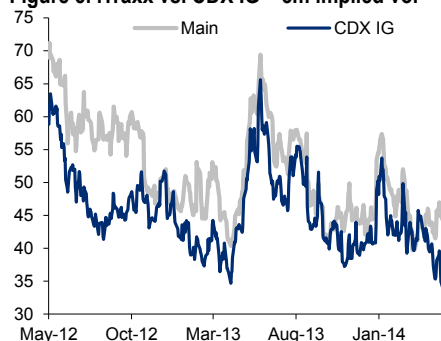
Figure 4. Spread differential – past 9m



Source: Citi Research, Markit. 5y on-the-run spreads, in bp.

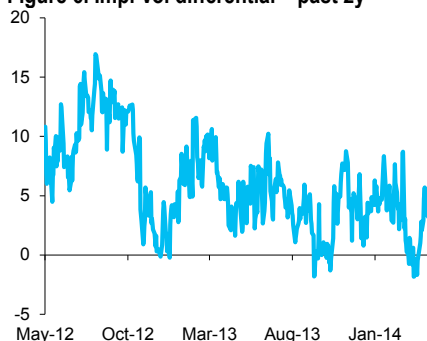
In the piece above we recommended positioning via cash bonds. However, the options market represents a potentially more attractive way to play long risk Europe vs. US, especially after the recent price action taking European credit vols substantially higher than US vols.

Figure 5. iTraxx vs. CDX IG – 3m implied vol



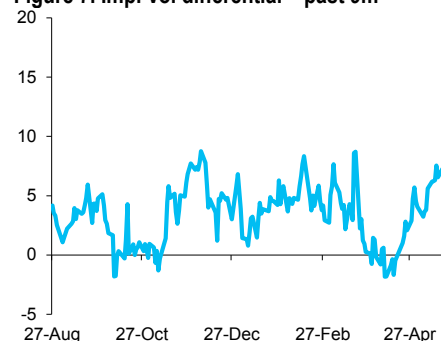
Source: Citi Research, Markit. In %.

Figure 6. Imp. Vol differential – past 2y



Source: Citi Research, Markit. In %.

Figure 7. Imp. Vol differential – past 9m



Source: Citi Research, Markit. In %.

Track cross-asset implied vol trends and dislocations with our [Cross-Asset Volatility Report](#)

## Options provide a good entry point

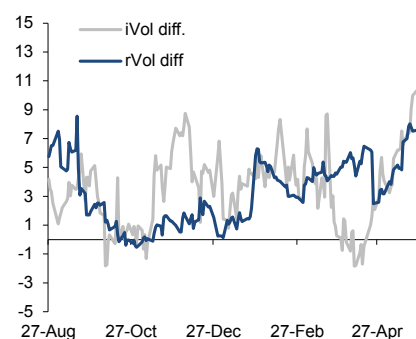
Implied volatility in European credit indices has lagged both the tightening in spreads as well as the sharp fall in US implied volatility, as Figure 5, Figure 6 and Figure 7 show. The 3m implied vol differential has recently reached 10%, its highest level since 2012, and the 12m Z-score of the vol ratio is close to 3.5. In daily bp terms, iTraxx 3m implied vol is close to 2bp vs. 1.4bp for CDX IG.

**European implied vol is currently 10% higher than US vol, barely a month after trading below it** as Figure 7 shows. Although, as we show next, this vol differential has a clear justification, we do not think it is sustainable and view it as a good way to play the long Europe vs. short US view we referred to above.

## Why the recent discrepancy in implied vol?

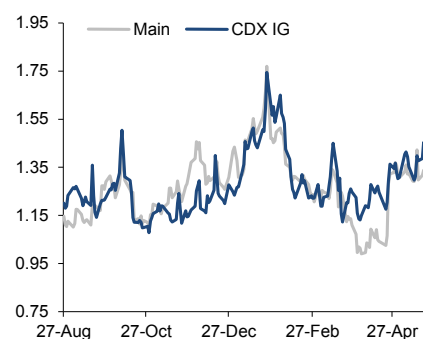
Yesterday's price action, with Main moving 2.25bp and CDX IG moving 0.75bp (close-to-close) has been the norm recently. The surge in European implied vol vs. US implied vol has been predominantly driven by the higher realised vol in European credit markets, as Figure 8 shows. The implied to realised ratio in both markets has moved in tandem (Figure 9).

Figure 8. Main minus CDX IG vol



Source: Citi Research, Markit. 3m volatility, in %.

Figure 9. Main vs. CDX IG implied to realised



Source: Citi Research, Markit. Ratio of 3m implied to realised volatility.

## Do we think the implied vol difference is sustainable?

No, we don't. In our view, the outperformance of the European market in spread terms in a tightening environment should soon translate into European implied vols becoming one of the most attractive ways to take risk, especially among fast money clients. Moreover, we do not expect daily movements in Main to be around 2bp for much longer – we expect the market to stabilize at current levels before we attempt to break through the tights of the year. Thus, we expect Main implied vol to fall, closing the gap to CDX IG implied vol. The picture in Xover vs. CDX HY vol is similar.

## Trade

We recommend investors to sell 3m (August) vol in iTraxx Main and buy 3m vol in CDX IG, via delta-hedged straddles with an equal notional, in € equivalent terms, on both legs. Figure 11 and Figure 12 show the details of each leg, and Figure 10 shows the trade sensitivities (on a €100m notional). The trade has a small net positive gamma and theta. The Vega on each leg is around 11c of notional; which means that if the implied vol difference was to collapse to zero (from the current 10% level) the trade would make above 1%. The risk of this trade idea comes mainly from the current difference between implied vols increasing further from the current (stretched) levels, and from realised vol in Main remaining very high compared to CDX IG.

**Figure 10. Trade sensitivities – sell Main vs. buy CDX IG August ATM straddles, delta-hedged**  
Equal notional straddles, €100m equivalent. See next two tables for details.

	Delta	Gamma	Theta	Vega
Main S21	2	-2,873	3,053	-11,912
CDX IG S22	-0	3,572	-2,341	10,888
<b>Total</b>	<b>2</b>	<b>699</b>	<b>712</b>	<b>-1,024</b>

Source: Citi Research.

**Figure 11. Trade leg 1 – sell Aug 70bp Main straddles, delta-hedged**

Type	Strike	Expiry	Position	Notional	Vol	Price (c)	Upfront	% Notional	Delta	% Notional	Gamma	Cents	Theta	Cents	Vega
									Ccy		Ccy		Ccy		Ccy
receiver	70	20-Aug-14	Sell	100,000,000	42.22%	28.0c	280,000	46%	23,383	-2.89%	-1,458	0.06	622	-0.60	-5,956
payer	70	20-Aug-14	Sell	100,000,000	42.38%	27.5c	275,000	-53%	-26,908	-2.80%	-1,415	0.26	2,571	-0.60	-5,956
Index			Buy prot.	6,990,000	66.5	101.6c	115,197	100%	3,527	0.00%	0	-0.20	-140	0.00	0
Total trade							670,197	0%	2	0.00%	-2,873	0.00	3,053	0.00	-11,912

Source: Citi Research, Markit. Implied prices shown.

**Figure 12. Trade leg 2 – buy Aug 65bp CDX IG straddles, delta-hedged** - Notionals in € equivalent

Type	Strike	Expiry	Position	Notional	Vol	Price (c)	Upfront	% Notional	Delta	% Notional	Gamma	Cents	Theta	Cents	Vega
									Ccy		Ccy		Ccy		Ccy
receiver	65	20-Aug-14	Buy	100,000,000	34.60%	19.3c	-193,000	-44%	-21,663	3.63%	1,807	-0.03	-302	0.54	5,444
payer	65	20-Aug-14	Buy	100,000,000	34.57%	23.9c	-239,000	56%	28,075	3.55%	1,765	-0.23	-2,306	0.54	5,444
Index			Sell prot.	12,890,000	62.750	101.8c	-233,633	-100%	-6,412	0.00%	0	0.21	267	0.00	0
Total trade							-665,633	0%	-0	0.00%	3,572	0.00	-2,341	0.00	10,888

Source: Citi Research, Markit. Implied prices shown.

We are adding a trading strategy to our model portfolio where we sell/buy 3m ATM delta-hedged straddles in Main/CDX IG, keep them until they are no longer 3m and enter new 3m ones then.

## Analytics, Past Trade Ideas & Publications

### Analytics – Available at Citi Velocity

<b>Options</b>	<a href="#">iTraxx Volatility Report</a> <a href="#">CDX Volatility Report</a> <a href="#">European Cross-Asset Volatility Report</a> <a href="#">Volatility P&amp;L Report – Credit Indices</a>	<b>Tranches</b>	<a href="#">iTraxx Series 9 Tranche Report</a> <a href="#">iTraxx Series 19 Tranche Report</a> <a href="#">iTraxx Series 21 Tranche Report</a>
<b>Curves</b>	<a href="#">iTraxx Curve P&amp;L Report</a>	<b>Indices</b>	<a href="#">CDS Indices Positioning Report</a> <a href="#">CDS Indices Trading Volumes Report</a>
<b>Returns</b>	<a href="#">European Credit Derivatives Returns</a>		

### Recent Trade Ideas

Tranches -	<a href="#">Sell 0-3% Jun-15 S9 protection: outright, vs. CDX IG 5y or vs. SX5E</a>	21-May-15
Indices -	<a href="#">Sub/Senior Financials compression</a>	20-May-15
Curves -	<a href="#">5s10s Main Flatteners</a>	25-Apr-14
Options -	<a href="#">Main 70-75 May Receiver 1x2</a>	2 Apr 2014
Options -	<a href="#">Buy SenFin vs. Sell CDX IG straddles</a>	18 Mar 2014
Single names vs. Index	<a href="#">Releveraging Trade</a>	24 Feb 2014
Tranches vs. Options -	<a href="#">Sell protection and monetize the positive convexity by selling straddles</a>	20 Feb 2014
Tranches -	<a href="#">Buy 9-100% S9 Jun-18 protection, delta-hedged</a>	20 Feb 2014
Tranches -	<a href="#">Sell 3-6% S9 Jun-18 protection, delta-hedged</a>	20 Feb 2014
Options vs. Curves -	<a href="#">Flatteners vs. OTM payers</a>	13 Feb 2014
Options -	<a href="#">Sell Main vol, buy SenFin vol</a>	21 Jan 2014
Tranches -	<a href="#">More mezz, less seniors - 3-6% vs. super senior</a>	15 Jan 2014
Options -	<a href="#">SenFin vs. Xover Recs</a>	9 Jan 2014
Options -	<a href="#">Payer spread vs. index long</a>	9 Jan 2014
Options -	<a href="#">Sell 1m Main straddles</a>	9 Jan 2014
Options -	<a href="#">Sell Crossover Receiver</a>	9 Jan 2014
Options -	<a href="#">Sell strangles and go on holidays: Position for spreads to stay in the recent range in mid-January</a>	9 Dec 2013
Tranches -	<a href="#">Sell S9 Jun-18 6-9% protection vs. Xover 5y S20</a>	15 Nov 2013
Tranches -	<a href="#">Sell S9 Jun-18 22-100% protection vs. light delta</a>	15 Nov 2013
Indices -	<a href="#">Long risk Senior Fins. vs. short risk Main</a>	5 Nov 2013
Options -	<a href="#">Crossover receiver ladders</a>	23 Oct 2013
Options -	<a href="#">Long risk CDX IG vs. Main via Receivers</a>	15 Oct 2013
Options -	<a href="#">Buy Senior Financials straddles vs. sell Crossover straddles</a>	9 Oct 2013
Tranches -	<a href="#">Long risk equity vs. short risk 3-6% in S19 Jun-16 (3y)</a>	26 Sep 2013
Tranches -	<a href="#">Long risk S19 Jun-18 (5y) 3-6% vs. 5y S20 Crossover</a>	26 Sep 2013
Tranches -	<a href="#">Long risk iTraxx S9 Jun-18 (10y) super senior vs. short risk CDX IG S9 Dec-17 (10y) super senior</a>	26 Sep 2013
Indices -	<a href="#">Equal Notional 3s5s Flatteners: Adding cautious longs by selling forward protection</a>	5 Sep 2013
Single Names -	<a href="#">Sub/Senior compression trades in European banks</a>	13 Aug 2013
Options -	<a href="#">iTraxx Senior Financials vs. CDX IG via Receivers</a>	7 Aug 2013

### Latest [“European Credit Derivatives Views & Trades”](#) Investor Presentation

### Other publications

<a href="#">Where do we expect iTraxx rolls to trade?</a>	19 Mar 2014
<a href="#">Our preferred carry trades in indices, options and tranches</a>	11 Mar 2014
<a href="#">New 2014 CDS Definitions - What's new? What's changing? Why? When? How?</a>	26 Feb 2014
<a href="#">iTraxx Roll - Potential Changes: Crossover number of constituents will increase to 60 names</a>	10 Feb 2014
2014 European Credit Outlook: <a href="#">Strategy</a> // <a href="#">Positioning and Trades</a>	13 Jan 2014
<a href="#">Global Structured Credit Outlook: A Rockier Ride</a> (R Roy, A Basu, K Malhotra, R Brauchler)	20 Dec 2013
<a href="#">2013 Trading Volumes in European Credit: CDS Indices, Single Name CDS and IG Bonds</a>	5 Dec 2013
<a href="#">Credit Options - What did investors do in 2013?: What will they do in 2014?</a> (2013 European Credit Conference Presentation)	4 Dec 2013
<a href="#">Credit Index Options 1-0-1: Launching our option pricing tool @ CitiVelocity</a> (2013 European Credit Conference Presentation)	2 Dec 2013
<a href="#">Europe Returns: Assessing value across flow and structured credit assets</a>	22 Nov 2013
<a href="#">iTraxx Tranches Views &amp; Trades: Mezz may be back next year</a>	15 Nov 2013
<a href="#">Financial CDS to get a re-vamp</a>	7 Aug 2013
<a href="#">Hedging menu: payer spreads, 3s5s flatteners and Jun 15/18 equity tranche flatteners</a>	28 Mar 2013
<a href="#">What bail-in means for CDS</a>	11 Feb 2013

Source: Citi Research.

## Trade Recommendations Summary

We are opening the trade recommended in this report, and closing two trades: 3s5s flattener vs. OTM payer and Senior Fin vs. CDX IG straddle.

Figure 13. Open trades – Summary and P&L

Trade Description	Leg	Format	Direct.	Notnl.	Entry Upfront	Entry Spread	Coupon	Current Upf.	Current Spread	P&L*
Sell 1m Main straddles *** 09-Jan-14	Sell 1m Main straddles	Price	Buy	1.00	0.00%			0.90%		0.90%
									<b>Total</b>	<b>0.90%</b>
Payer spread vs. index long *** 09-Jan-14	Buy 3m 25-60% pay spread	Price	Buy	1.00	0.00%			-0.39%		-0.39%
	Sell index prot.	Price	Buy	1.00	0.00%			0.92%		0.92%
									<b>Total</b>	<b>0.53%</b>
SenFin vs. Xover Recs *** 09-Jan-14	Buy 3m SenFin Recs	Price	Buy	1.00	0.00%			0.37%		0.37%
	Sell 3m Xover Recs	Price	Buy	0.29	0.00%			-1.88%		-0.55%
									<b>Total</b>	<b>-0.19%</b>
Equity tranche vs. straddle *** 20-Feb-14	Sell Jun-18 S9 equity prot., DH	Price	Buy	1.00	0.00%			-0.37%		-0.37%
	Sell 1m Main straddles, DH	Price	Buy	0.50	0.00%			0.24%		0.12%
									<b>Total</b>	<b>-0.25%</b>
Releveraging trade 24-Feb-14	Basket of low spread/leverage CDS	Prot.	Buy	1.00	-3.14%	35	100	-3.15%	35	-0.26%
	Main NonFins	Prot.	Sell	0.50	-1.54%	67	100	-1.75%	65	0.24%
									<b>Total</b>	<b>-0.03%</b>
iTraxx Main 5s10s flattener 25-Apr-14	Main S21 5y	Prot.	Buy	1.36	-1.42%	71	100	-1.65%	67	-0.44%
	Main S21 10y	Prot.	Sell	1.00	1.48%	117	100	0.90%	110	0.67%
									<b>Total</b>	<b>0.23%</b>
Series 9 Jun-15 0-3% 21-May-14	Series 9 Jun-15 0-3%	Prot.	Sell	1.00	-0.75%	430	500	-0.92%	413	0.25%
									<b>Total</b>	<b>0.25%</b>
Main vs. CDX IG *** 28-May-14	Sell 3m Main DH straddles	Price	Buy	1.00	0.00%					
	Buy 3m CDX IG DH straddles	Price	Sell	1.00	0.00%					
									<b>Total</b>	

Source: Citi Research. Spreads and coupons in bp. \* P&L expressed as % of the leg with notional equal to 1. \*\* Over the last month. Prices as of COB yesterday. \*\*\* We track the trade P&L by using an initial 0% upfront and a current upfront equal to the trade P&L in %. DH = delta hedged.

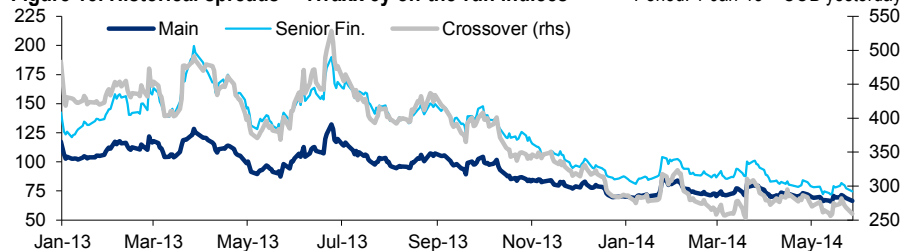
Figure 14. Open and closed trades summary statistics

Number	Open	Closed*	Percentage	Open	Closed*
In profit	4	19	In profit	57%	73%
In loss	3	7	In loss	43%	27%
	7	26			

Source: Citi Research. \* Since 1-Jun-13. Excluding the trade ideas opened in the current publication.

### Representative Market Conditions

Figure 15. Historical spreads – iTraxx 5y on-the-run indices



Source: Citi Research, Markit. In bp.

Figure 16. Closed trades since Oct-13 – Summary and P&L

Trade Description	Leg	Format	Direct.	Notnl.	Entry Upfront	Entry Spread	Coupon	Final Upfront	Final Spread	P&L* Total
Senior Fin vs. Xover straddle	Xover Dec-13 400bp straddle	Price	Sell	1.00	2.64%			2.63%		0.00%
Opened: 9-Oct-13	SenFin Dec-13 140bp straddle	Price	Buy	2.05	1.29%			1.48%		0.40%
Closed: 15-Nov-13									<b>Total</b>	<b>0.40%</b>
325-350-375 Nov. Crossover Receiver Ladder	325 Xover Nov Rec	Price	Sell	2.00	0.18%			0.02%		0.32%
Opened: 23-Oct-13	350 Xover Nov Rec	Price	Sell	1.00	0.61%			0.47%		0.14%
Closed: 15-Nov-13	375 Xover Nov Rec	Price	Buy	1.00	1.45%			1.46%		0.01%
									<b>Total</b>	<b>0.47%</b>
CDX IG vs. Main Receivers	CDX IG S21 Nov 85 Receiver	Price	Buy	1.00	0.47%			0.62%		0.15%
Opened: 15-Oct-13	Main S20 Nov 100 Receiver	Price	Sell	1.00	0.52%			0.91%		-0.39%
Closed: Expired 20-Nov-13									<b>Total</b>	<b>-0.24%</b>
S19 Jun-16 0-3% vs. 3-6%	Main S19 0-3% Jun-16	Prot.	Sell	1.00	8.00%	839	500	3.88%	725	5.11%
Open: 26-Sep-13	Main S19 3-6% Jun-16	Prot.	Buy	2.00	-7.00%	234	500	-9.75%	132	-7.47%
Closed: 9-Dec-13									<b>Total</b>	<b>-2.36%</b>
SenFin vs. Main	Senior Fin. 5y S20	Prot.	Sell	1.00	0.60%	112	100	0.07%	102	0.61%
Open: 26-Sep-13	Main 5y S20	Prot.	Buy	1.35	-0.79%	84	100	-0.94%	81	-0.32%
Closed: 9-Dec-13									<b>Total</b>	<b>0.29%</b>
S9 super senior vs. light delta	Main S9 22-100% Jun-18	Prot.	Sell	1.00	0.18%	30	25	0.03%	26	0.19%
Open: 15-Nov-13	Main S9 index Jun-18	Prot.	Buy	0.33	-3.65%	93	175	-4.24%	77	-0.29%
Close: 14-Jan-14									<b>Total</b>	<b>-0.10%</b>
75-85 Main January strangle	75bp Jan Main receiver	Price	Sell	1.00	0.08%			0.19%		-0.11%
Open: 9-Dec-13	85bp Jan Main Payer	Price	Sell	1.00	0.13%			0.00%		0.13%
Close: 14-Jan-14									<b>Total</b>	<b>0.02%</b>
Sell Crossover Receiver	275bp Feb. Receiver	Price	Sell	1.00	0.32%			0.17%		0.15%
Open: 9-Jan-14									<b>Total</b>	<b>0.15%</b>
Close: 13-Feb-14										
iTraxx Main Eq. Notional Flatteners	Main S19 3y	Prot.	Buy	1.00	-0.97%	65	100	-1.57%	33	-1.04%
Open: 5-Sep-13	Main S19 5y	Prot.	Sell	1.00	0.24%	105	100	-1.47%	65	2.15%
Close: 13-Feb-14									<b>Total</b>	<b>1.11%</b>
S9 6-9% vs. S20 Crossover	Main S9 6-9% Jun-18	Prot.	Sell	1.17	-0.25%	294	300	-3.19%	223	4.37%
Open: 15-Nov-13	Crossover S20 Dec-18	Prot.	Buy	1.00	-7.07%	344	500	-9.80%	274	-4.06%
Close: 19-Feb-14									<b>Total</b>	<b>0.31%</b>
3-6% vs. super senior	Main S9 3-6% Jun-18	Prot.	Sell	1.00	-5.50%	366	500	-5.34%	367	0.34%
Open: 14-Jan-14	Main S9 22-100% Jun-18	Prot.	Buy	9.00	0.03%	26.625	25	0.12%	28	0.60%
Close: 19-Feb-14									<b>Total</b>	<b>0.94%</b>
Main vs. SenFin vol ***	Sell Feb 70 Main straddles, DH	Price	Buy	1.00	0.00%			-0.02%		-0.02%
Open: 21-Jan-14	Buy Feb 80 SenFin straddles, DH	Price	Buy	0.50	0.00%			0.02%		0.01%
Close: Expired									<b>Total</b>	<b>-0.01%</b>
Senior tranche short ***	Buy Jun-18 S9 9-12% prot., DH	Price	Buy	0.03	0.00%			0.26%		0.01%
Open: 20-Feb-14	Buy Jun-18 S9 12-22% prot., DH	Price	Buy	0.10	0.00%			0.24%		0.02%
Close: 20-May-14	Buy Jun-18 S9 22-100% prot., DH	Price	Buy	0.78	0.00%			-0.05%		-0.04%
									<b>Total</b>	<b>-0.01%</b>
Mezz tranche long ***	Sell Jun-18 S9 3-6% prot., DH	Price	Buy	1.00	0.00%			-0.55%		-0.55%
Open: 20-Feb-14									<b>Total</b>	<b>-0.55%</b>
Close: 20-May-14										
Main May Rec 1x2s	Main May 75bp Rec	Price	Buy	1.00	0.24%			0.16%		-0.08%
Open: 2-Apr-14	Main May 70bp Rec	Price	Sell	2.00	0.10%			0.02%		0.16%
Close: 20-May-14									<b>Total</b>	<b>0.09%</b>
Flattener vs. OTM payer ***	3s5s flattener Main	Price	Buy	1.00	0.00%			0.36%		0.36%
Open: 13-Feb-14	Sell 3m 120bp Main payer	Price	Buy	0.75	0.00%			0.12%		0.09%
Close: 27-May-14									<b>Total</b>	<b>0.44%</b>
Senior Fin vs. CDX IG straddle	SenFin Jun-14 90bp straddle	Price	Buy	1.00	0.97%			0.79%		-0.18%
Open: 18-Mar-14	CDX IG Jun-14 65bp straddle	Price	Sell	1.90	0.51%			0.19%		0.61%
Close: 27-May-14									<b>Total</b>	<b>0.43%</b>

Source: Citi Research. Spreads and coupons in bp. \* P&L expressed as % of the leg with notional equal to 1. \*\*\* We track the trade P&L by using an initial 0% upfront and a final upfront equal to the trade P&L in %.

**Notes:** The list of open trades reflects our current views; we have no plans to provide regular coverage or updates to these trades. P&L on trade ideas includes carry and roll costs but not trading commissions/costs. Results should not, and cannot, be viewed as an indicator of future performance.

**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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## Appendix A-1

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