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Buy Cheap RTY Variance

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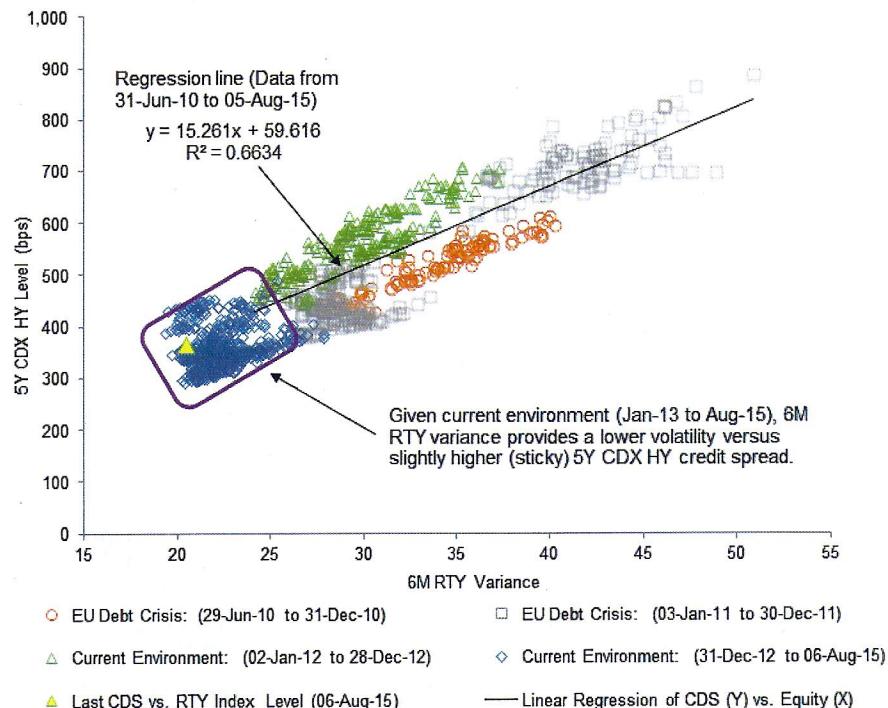
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Hedging: Buy 6M RTY variance**Relative Value: Buy 3M RTY variance & Sell 3M 5Y CDX HY straddles.**

- **Hedging:** Across most maturities, variance spreads of RTY vs. US indices or sector ETFs are near their lows (see Table 1). With uncertainty around a permanent Greek deal; uncertainty around the Chinese government program to protect their equity market; and uncertainty around when the Fed "lift-off" will occur, RTY variance swap can act as a low cost hedge at these low implied volatility levels and provide a higher beta if the US market drops, especially going into September and October of 2015.
- **Relative Value:** Figure 1 shows that both the 5Y CDX HY credit spread and the 6M Russell 2000 (RTY) variance are at their lows. This is also true for 3M, 1Y and 5Y RTY variance when compared against the CDX HY spread. The volatility compression in the Russell 2000 (RTY) combined with low but sticky (slightly higher) credit spreads for 5Y CDX HY has made credit/equity relative value trades attractive.

Figure 1: RTY 6M RTY Variance Swap vs. 5Y CDX HY at Low Levels

(29-Jun-10 to 6-Aug-15)



Source: SG Flow Strategy & Solutions, Bloomberg

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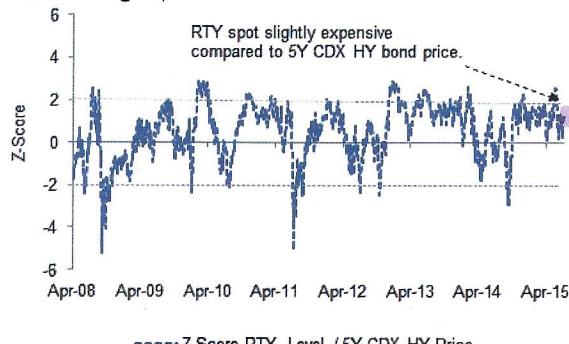
- **Table 1** shows that 1Y RTY variance is the least inexpensive to the variance of many US indices and ETFs. In addition, we looked at the ratio of 3M, 6M, 1Y and 5Y RTY variance versus 5Y CDX HY, which are also near their lows and indicates that RTY variance is inexpensive. As highlighted in **Table 1**, the lowest ratio is 6M RTY variance vs. CDX HY.
- **Figure 2** shows that 6M trailing price ratio Z-Score shows that spot Russell 2000 (RTY) is slightly expensive compared to both 5Y CDX HY. We may expect the RTY to sell-off.
- **Figure 3** shows that the 6M trailing ratio Z-Score of 3M, 6M and 1Y RTY variance is low versus 5Y CDX HY level making buying volatility on RTY attractive.
- The current 3M, 6m and 1Y RTY variance levels are near lows at the 15.3%- 3.4%- and 4.6%-tile ranges, respectively from Jun-14 to Aug-15.

Table 1: 1Y RTY Variance is Near Lows versus Many Indices and ETFs; and 3M, 6M, 1Y and 5Y Variance is Near Lows versus the 5Y CDX HY (29-Jul-14 to 6-Aug-15)

1Y Var Spread	06-Aug-14 to 06-Aug-15				15 Jun 14 to 06-Aug-15				
	%tile Rank	Implied Spread	Avg.	3M Carry	RTY Variance	%tile Rank	Current Ratio	3M Carry (Ratio Reduction)	
SPX vs RTY	77.7%	-4.3	-5.1	-1.7	3M Var RTY vs. 5Y CDX HY	15.3%	4.8	6.1	-0.9
SX5E vs RTY	50.3%	-1.7	-2.2	10.4	6M Var RTY vs. 5Y CDX HY	3.4%	5.8	6.6	-0.7
NKY vs RTY	70.7%	0.4	-0.3	3.1	1Y Var RTY vs. 5Y CDX HY	4.6%	6.2	7.0	-0.7
RTY vs NDX	0.3%	2.3	3.9	-0.7	5Y Var RTY vs. 5Y CDX HY	9.5%	7.6	8.1	
RTY vs UKX	53.7%	5.2	5.1	-0.9					
RTY vs HSI	16.2%	0.9	3.1	-10.5					
RTY vs KOSPI2	12.1%	4.9	5.8	-0.3					
RTY vs EEM	1.3%	-3.1	0.9	-6.3					
RTY vs EFA	5.4%	1.7	5.2	-4.2					
XLF vs RTY	94.9%	.2	-4.3	-0.2					
XLE vs RTY	98.2%	1.2	-2.6	4.4					

Source: SG Flow Strategy & Solutions, Bloomberg

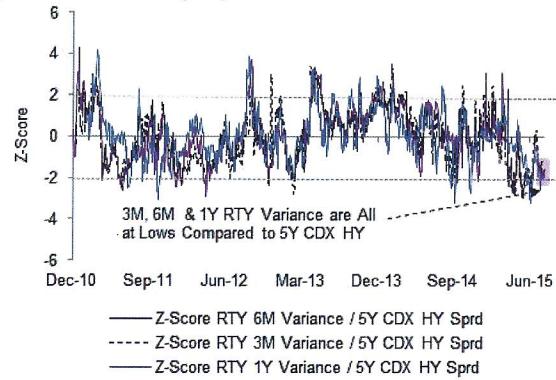
Figure 2: 6M Rolling Z-Score of RTY Spot is Still Slightly Expensive Relative to 5Y CDX HY Level (2-Apr-08 to 6-Aug-15)



----- Z-Score RTY Level / 5Y CDX HY Price

Source: SG Flow Strategy & Solutions, Bloomberg

Figure 3: 6M Rolling Z-Score of 3M, 6M and 1Y Variance of RTY Spot Relative to 5Y CDX HY Level (10-Dec-10 to 6-Aug-15)



— Z-Score RTY 6M Variance / 5Y CDX HY Spred

— Z-Score RTY 3M Variance / 5Y CDX HY Spred

— Z-Score RTY 1Y Variance / 5Y CDX HY Spred

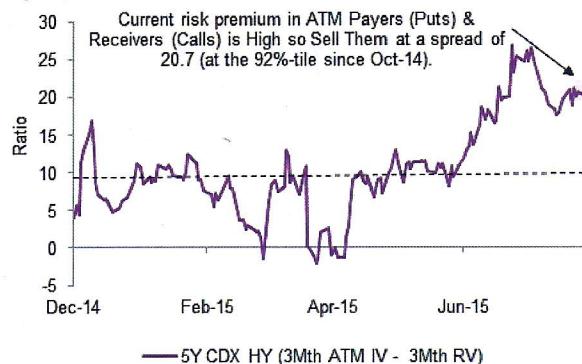
Source: SG Flow Strategy & Solutions, Bloomberg

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MARKET PARAMETERS:

- **Figure 4** shows that the current 3M risk premium (implied – realized) is high; indicating it can be an attractive sell of call and puts on CDX HY Price index.
- Finally, **Table 2** shows the summary of RTY and 5Y CDX HY levels and current statistics.
- **Table 2** shows that the spread between 3M ATM implied volatility for CDX HY vs. 3M realized volatility is much higher than for RTY.
- 3Mth ATM RTY variance is 18.7% and 48.3% for ATM 5Y CDX HY, making the current IV ratio 2.6 (near its highs at the 92%-tile historically). Current 3Mth CDX HY IV is much higher than RTY IV due to strong bids for CDX HY protection in October. However, as shown in the **Figure 5**, the historical ratio has been closer to 2.3 for 5Y CDX HY ATM IV / RTY ATM IV.
- Finally, see **Appendix** for why Russell 2000 volatility is low compared to other indices.

Figure 4: Current Risk Premium in ATM Payers & Receivers is High, so Sell It
(7-Oct-14 to 6-Aug-15)



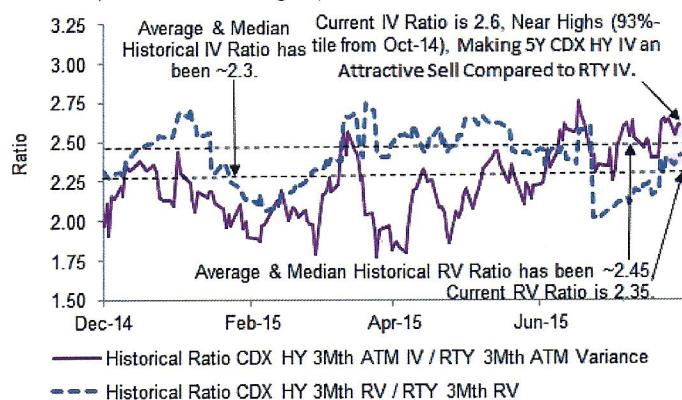
Source: SG Flow Strategy & Solutions, Bloomberg

Table 2: Summary of RTY and C5Y CDX HY Statistics (29-Jun-10 to 05-Aug-15)

Summary of 3Mth RTY and CDX HY Stats (29-Jun-10 to 05-Aug-15)					
Field	Spot 5Y CDX HY Price (USD)	5Y CDX HY 3M ATM IV (%) [Oct-14 to Aug-15]	5Y CDX HY 3M RV (%)	RTY 3M Variance	3M RTY RV (%)
Current	106.1	48.2	29.8	18.8	12.1
%-tile	67.0%	54.2%	5.8%	4.6%	1.0%
2W Chg	-0.2	1.6	1.1	0.34	-0.73
1M Chg	-0.1	-3.8	3.9	-2.31	-0.34

Source: SG Flow Strategy & Solutions, Bloomberg

Figure 5: Historical Ratio of 3Mth IV CDX HY / RTY Variance and 3Mth Realized Volatility of 5Y CDX HY / RTY (7-Oct-15 to 05-Aug-15)



Source: SG Flow Strategy & Solutions, Bloomberg

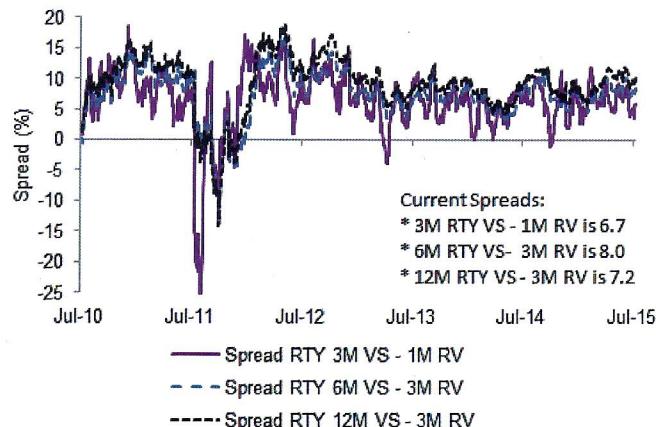
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Buy Cheap RTY Variance

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- **HEDGING TRADE: Buy Russell Variance.** **Figure 6** shows the historical carry of the realized minus the variance. Currently, the 3M VS - 1M RV, 6M VS – 3M RV and 1Y VS – 3M RV RTY carry are at the 37%-tile, 53%-tile and 55%-tile, respectively.
 - **Buy RTY Dec-15 (~6M) variance swap offered 21.1** (as of close 6-Aug-15)
 - Alternatively for 6 months, one could buy an RTY 19-Dec-15 1220 straddle for \$103.20 (premium of 8.5%, with RTY ref. 1215.8). Call ask IV is ~17.2 and put ask IV is ~17.2.
- **RELATIVE VALUE TRADE: Vega Neutral vs. CDX HY: Buy Oct-15 variance swap on RTY and sell Oct-15 straddle on 5Y CDX HY vega neutral.**
 - **Credit/Equity:** We sell \$100 million total notional of a 5Y CDX HY 16-Oct-15 (3Mth) 104 strike straddle at 222 cents (generating \$2.22 million, \$50 million per leg) and we buy \$64.4K of vega using an RTY Oct-15 (~3Mth) ATM variance swap at 20.2. See Appendix for details on the sizing of this trade. We got our pricing from and coordinated with both Thomas Schreck and Ruben Marciano of US credit trading.
 - Net credit is \$2.1556K (2.16% credit on \$100 million notional CDX HY; RTY ref. 1215.8; and 5Y CDX HY Prc @ 105.625 and ATM @ 104).

Figure 6: Historical Carry (Variance - Realized) for 3M, 6M and 1Y Maturities
 (29-Jun-10 to 06-Aug-15)



Source: SG Flow Strategy & Solutions, Bloomberg

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APPENDIX:

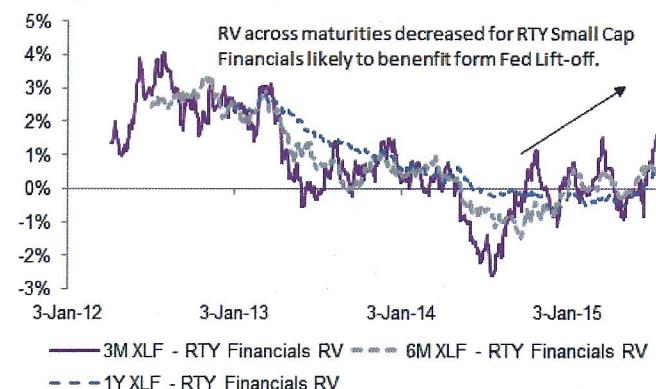
1. **Sizing the buy Russell 2000 (RTY) 3Mth var vs. selling 5Y CDX HY 3Mth straddles.**
 - As shown in the **Figure 4**, the historical average ratio has been 2.3 for 5Y CDX HY ATM IV / RTY ATM IV.
 - Combined vega for 5Y CDX HY 16-Oct-15 straddle is 2.8 cents on \$100 million total (\$50 million notional per leg) or \$28K. Therefore, we need to buy 2.3 times the amount of the 3Mth variance on the RTY or \$64.4K in vega of the RTY.
2. **Why is the Russell 2000 (RTY) volatility low?**
 - **Appendix Table 3** breaks-out the difference between the weights in the CDX HY vs. Russell 2000 and the Russell 2000 vs. the S&P 500. The RTY has more Financials and Health Care and less Consumer Discretionary and Staples than the CDX HY; and the RTY has more Financials and less Consumer Staples and Technology than the S&P 500 (SPX)
 - Part of the reason that RTY has a lower realized volatility with 8.9% and 12.7% more financials than the SPX and CDX HY, respectively.
 - As shown in **Figure 7**, the Russell 2000 Financial index has seen lower realized volatility (RV) levels since early 2015 due to a potential Fed lift-off that may likely benefit the small cap commercial banks (RTY Financials). In addition, we have seen RV in the financials for the large caps slightly increase (XLF, SPDR Financials), creating a positive spread between XLF (S&P 500 Financials) and Russell 2000 Financials for the 3M to 1Y RV maturities. This reduced the overall RV in the RTY since it is 25.7% Financials.

Table 3: Breakout of Index Sector Weighting for CDX HY vs. Russell 2000 (05-Aug 2015)

Sector	5Y CDX HY	Russell 2000 (RTY)	S&P 500 (SPX)	Diff RTY - HY	Diff RTY - SPX
Information Technology & Telecommunication Svc	14.0%	14.2%	22.0%	0.2%	-7.8%
Materials	10.0%	5.8%	2.9%	-4.2%	2.9%
Financials	13.0%	25.7%	16.8%	12.7%	8.9%
Consumer Discretionary	32.0%	15.3%	13.0%	-16.7%	2.3%
Industrials	8.0%	12.1%	9.9%	4.1%	2.2%
Consumer Staples	10.0%	2.9%	9.7%	-7.1%	-6.8%
Utilities	4.0%	4.4%	2.9%	0.4%	1.5%
Energy	5.0%	2.6%	7.0%	-2.4%	-4.4%
Health Care	4.0%	17.0%	15.6%	13.0%	1.4%

Source: SG Flow Strategy & Solutions, Bloomberg

Figure 7: Russell Financial RV has Recently been Lower due to Potential Fed Lift-off (Benefiting Small Cap banks); while the S&P 500 Financial RV (XLF) has been the Same to Slightly Higher (7-Oct-15 to 05-Aug-15)



Source: SG Flow Strategy & Solutions, Bloomberg

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Buy Cheap RTY Variance

- As shown in **Figure 8**, the Russell 2000 Technology index has seen lower realized volatility (RV) levels since early 2015; while we have seen a bit of an increase in RV in the technology stocks for the large caps (XLK), compressing the spread between XLK RV and Russell 2000 Technology RV across the 3M to 1Y RV maturities. This reduced the overall RV in the RTY since it is 14.2% technology & telecommunications while the S&P is now 22% technology & telecommunications.
- Finally, as shown in **Figure 9**, realized correlation has been at lower levels historically for the Russell 2000 than some other indices (like the SPX).

Figure 8: Russell Technology RV has Recently been Lower; while the S&P 500 Technology RV (XLK) has been the Same to Slightly Higher due to AAPL, MSFT and others (7-Oct-15 to 05-Aug-15)

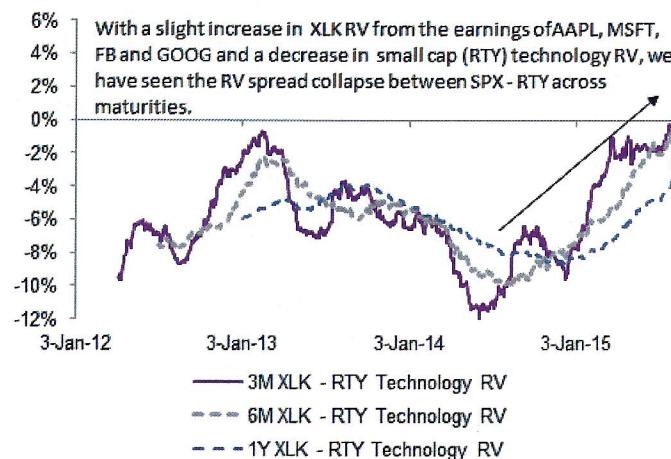
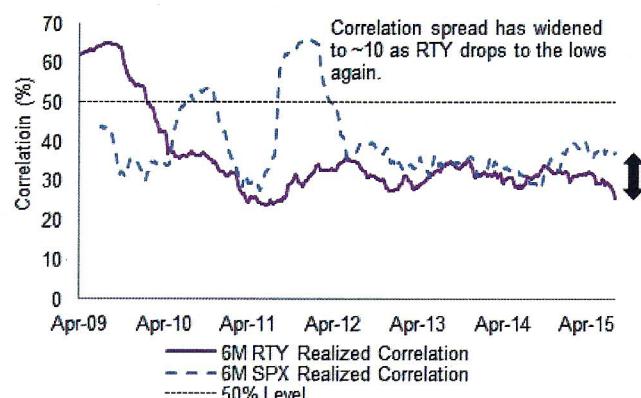


Figure 9: Russell 2000 (RTY) Realized Correlation has been Dropping (7-Oct-15 to 05-Aug-15)



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