Risk Metrics: Performance Through the Cycle

The Pro-Cyclicality of Value at Risk

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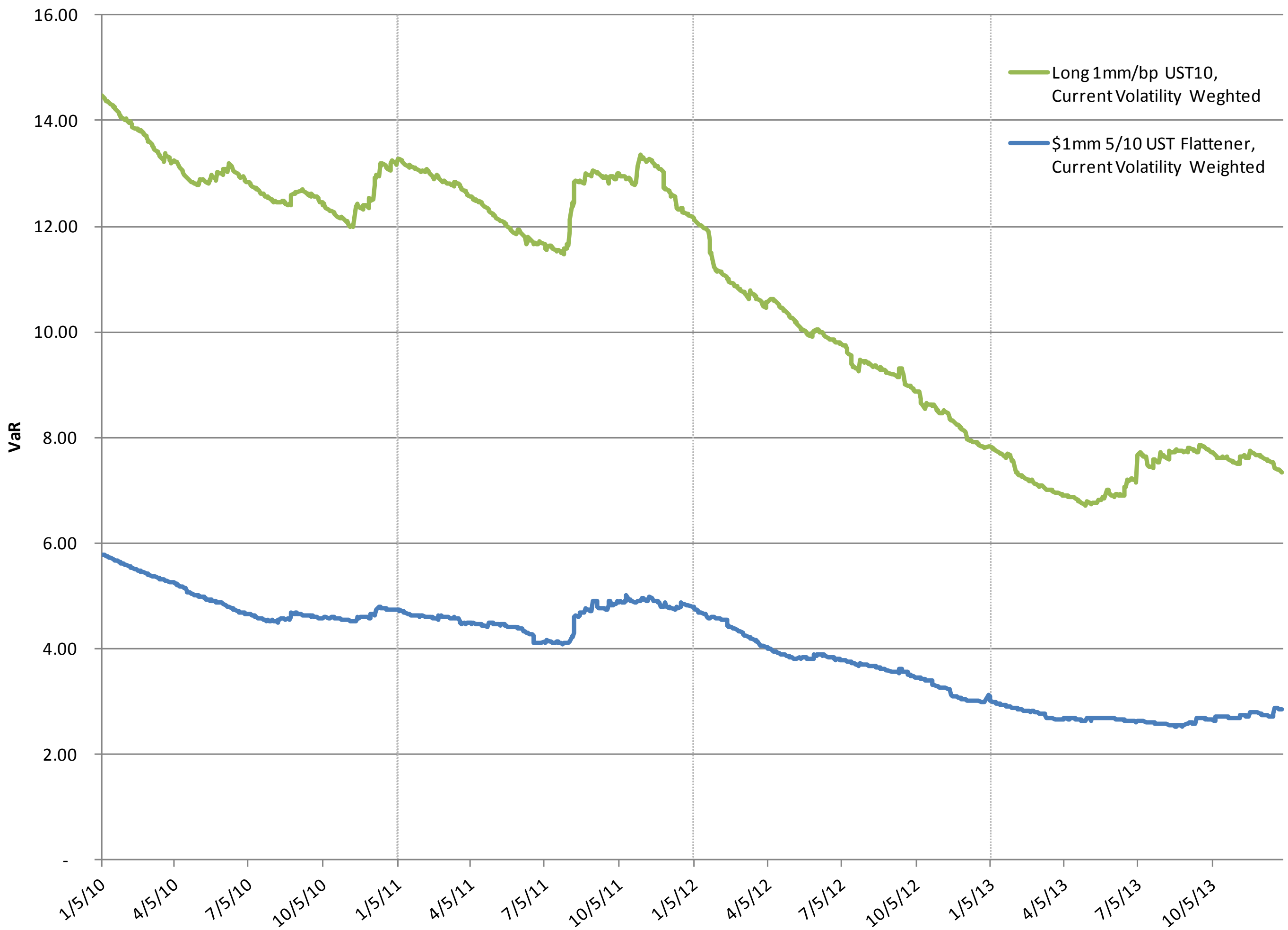
Morgan Stanley

US Treasury VaR Time Series

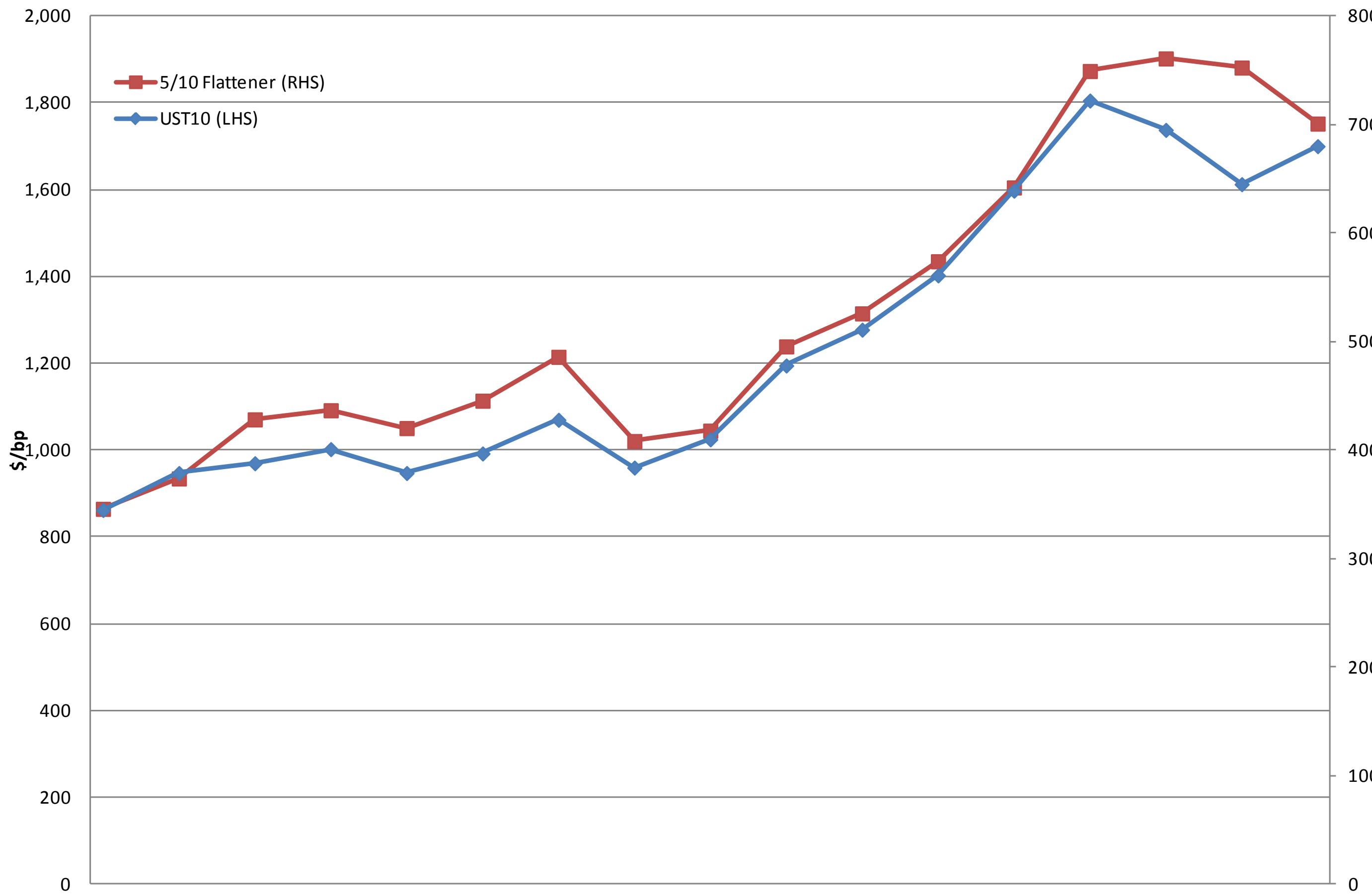
- The chart shows the Value at Risk of a $1mm/bp position in UST10 and a 5y10y UST flattener
- The VaR model uses 4y of history and is current volatility weighted, ie more recent data is weighted more heavily
- As volatility has fallen the VaR of the positions has steadily fallen



Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

US Treasury: PV01 Consistent with $5mm of VaR

- The chart shows the PV01 of each position consistent with $5mm of VaR consumption
- As the VaR of a position falls the PV01 capacity increases

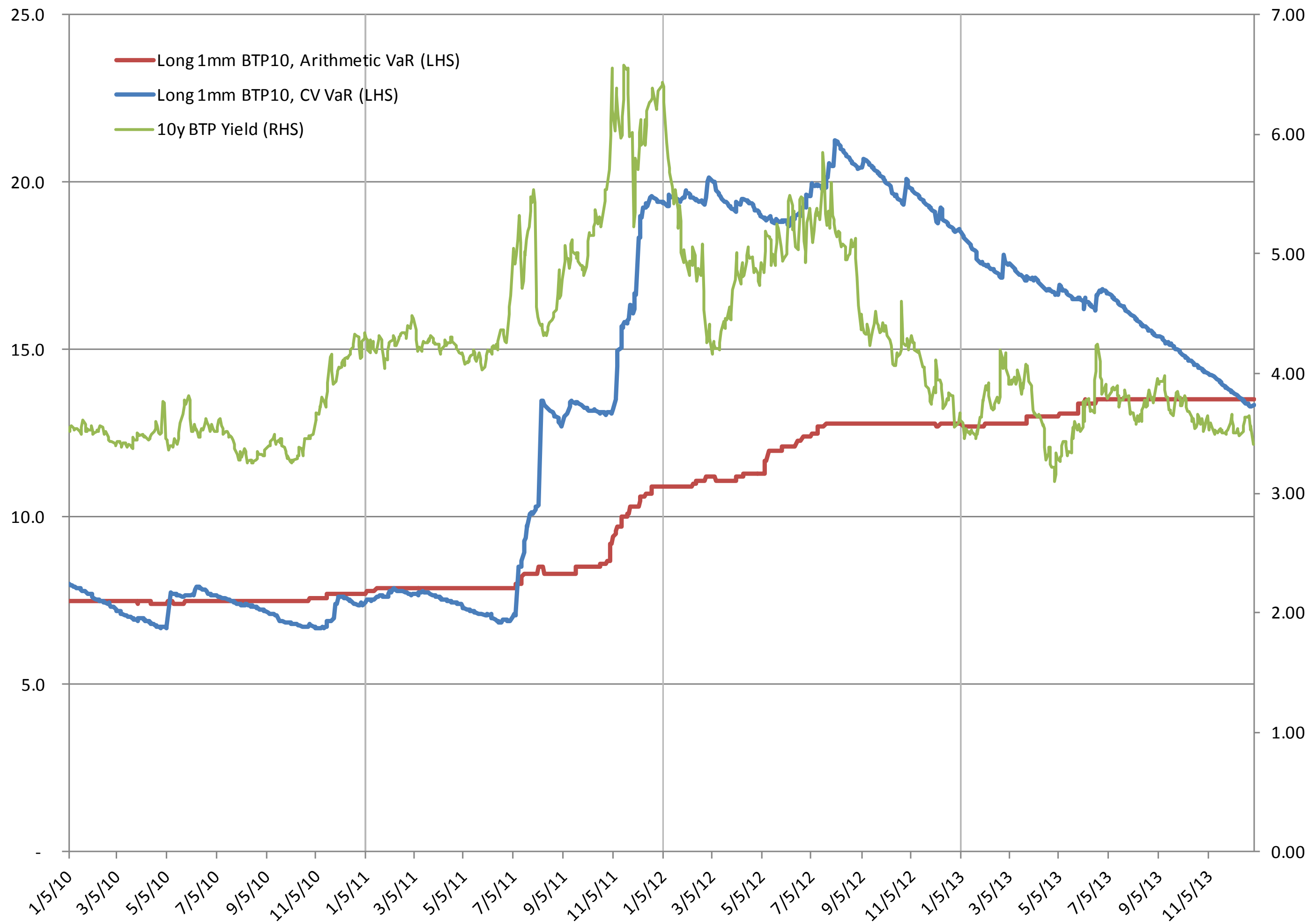


	Jan 10	Apr 10	Jul 10	Oct 10	Jan 11	Apr 11	Jul 11	Oct 11	Jan 12	Apr 12	Jul 12	Oct 12	Jan 13	Apr 13	Jul 13	Oct 13	Jan 14
5/10 Flattener (RHS)	865	935	1071	1092	1051	1114	1215	1021	1045	1239	1315	1435	1605	1873	1902	1881	1752
UST10 (LHS)	345	379	388	401	379	397	428	384	410	478	511	561	639	722	695	645	680

Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

Italian BTP: Yield and VaR History

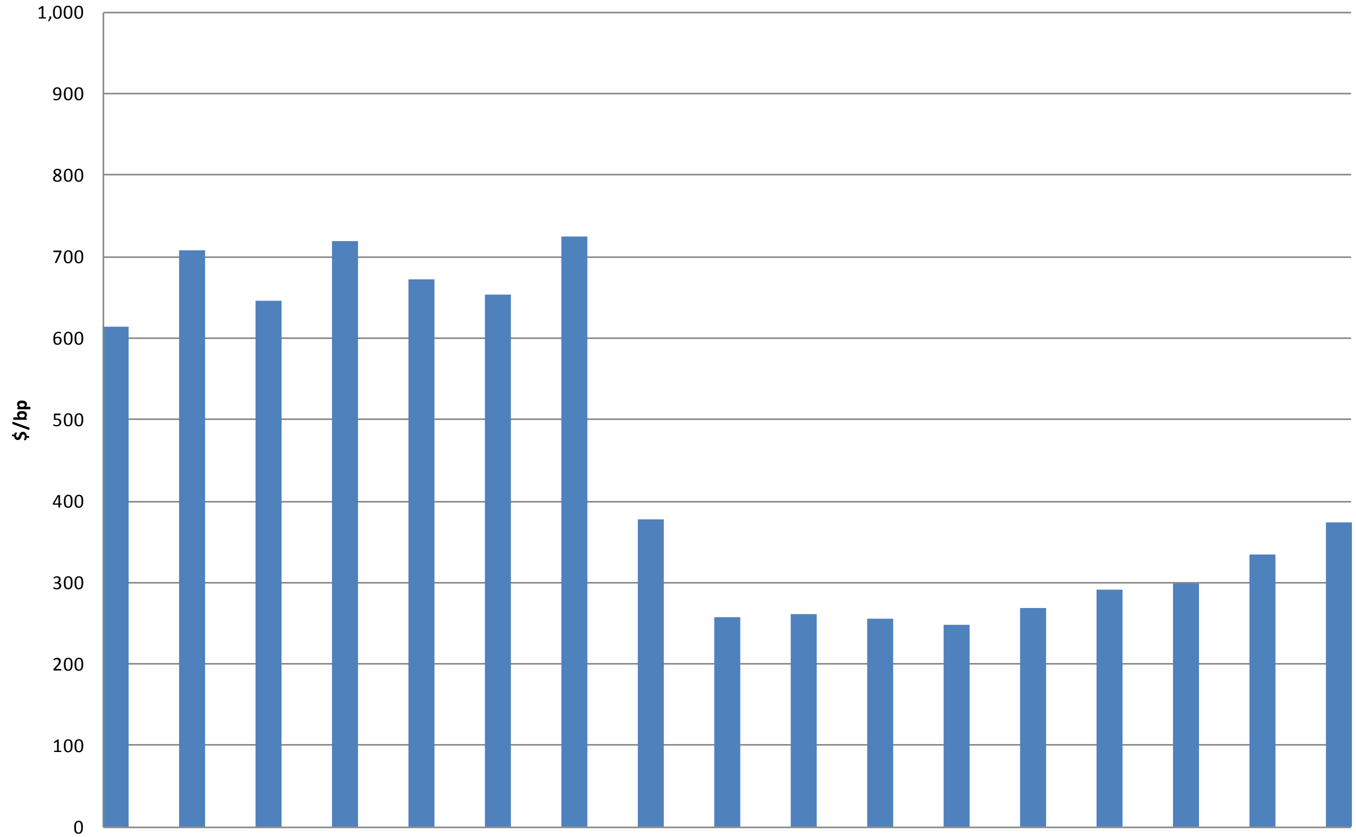
- As the European sovereign crisis worsened, BTP yields rose and became more volatile
- CV VaR is considerably more reactive than a simple arithmetic model- volatility increases are quickly reflected in the risk measure
- Arithmetic models are much slower to react and hold the volatile time series much longer



Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

BTP: PV01 consistent with $5mm CV-VaR

- Increased volatility in BTP yields in mid-2011 caused a sharp reduction in PV01 capacity

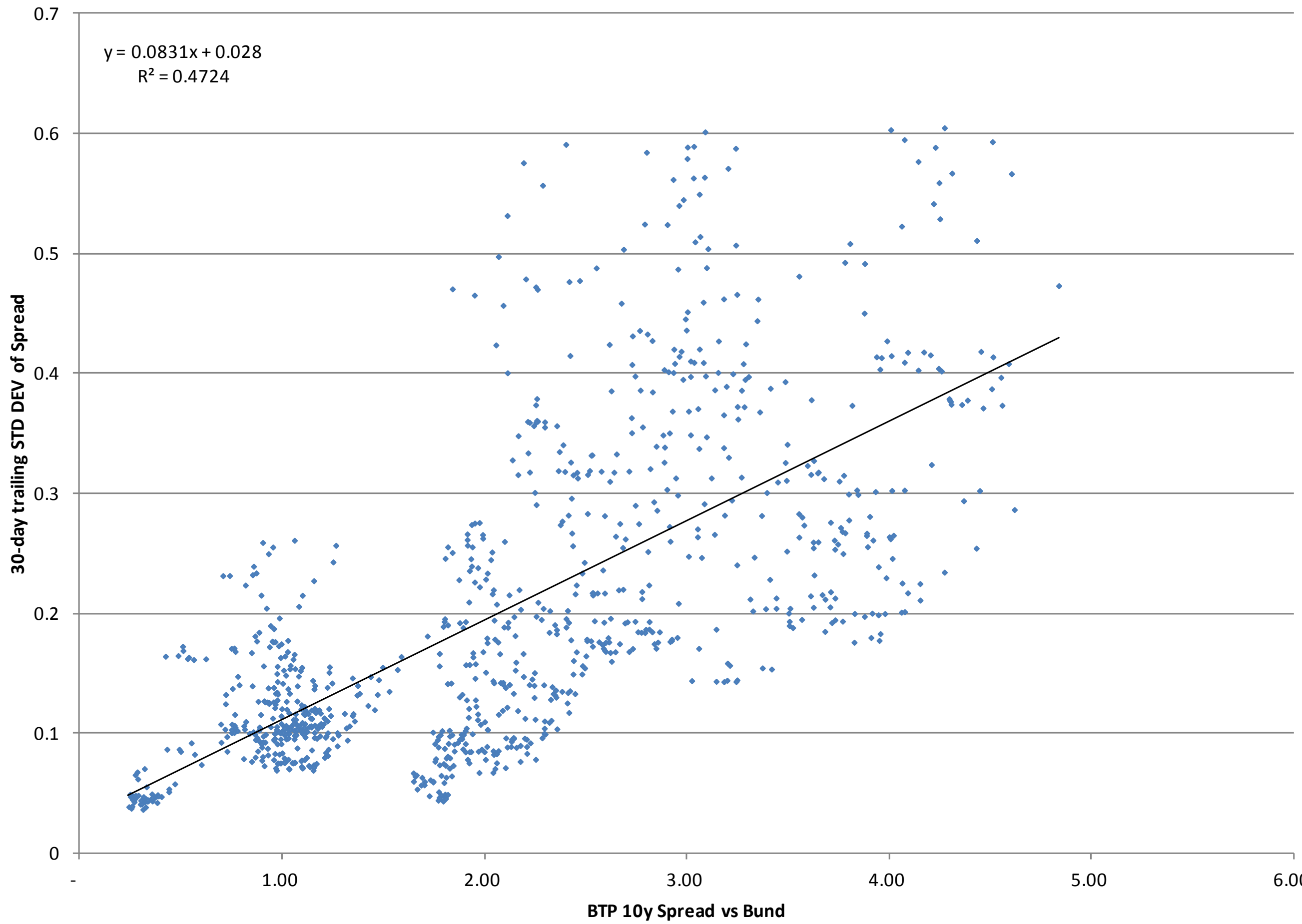


	Jan 10	Apr 10	Jul 10	Oct 10	Jan 11	Apr 11	Jul 11	Oct 11	Jan 12	Apr 12	Jul 12	Oct 12	Jan 13	Apr 13	Jul 13	Oct 13	Jan 14
BTP10	613	707	645	719	672	654	725	378	257	261	255	248	269	292	298	335	374

Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

Correlation: Volatility vs BTP Spread to Bund

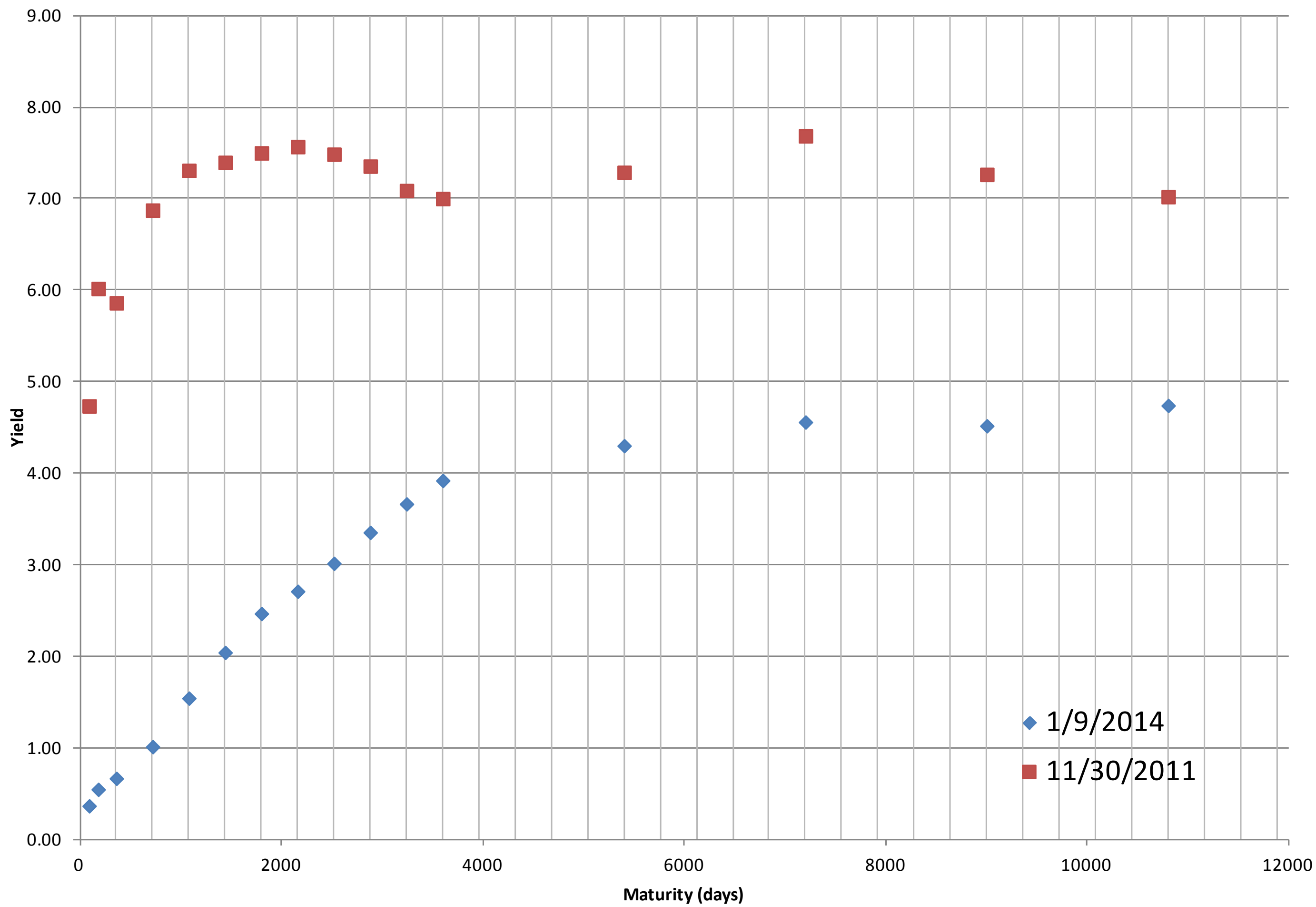
- The chart shows the strong correlation between the volatility and the level of spread
- The correlation means that as spreads widened the risk capacity of the investing community decreases
- As spreads widen the trade becomes more crowded



Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

Curve dislocation peaked after VaR shock

- The maximum dislocation in the BTP market came at the end of November 2011
- During Nov 2011 95% arithmetic VaR jumped almost 20% from 8.7mm to 10.3mm
- Was this massive dislocation caused by VaR based forced liquidations?



Source: Bloomberg, Morgan Stanley Liquid Flow Rates Trading

Summary

- **Dealer risk capacity is now improving as volatility comes down**
  - I expect this trend to continue absent new vol. shocks
  - But VaR consumption for BTPs for example still twice as high as in early 2011
- **The risk of model driven extreme illiquidity remains however**
  - The model/regulatory driver of illiquidity in 2011-2012 remains the standard
- **In fact, markets are likely to “trade” the risk of illiquidity in future crisis/ a self-fulfilling prophecy**
  - Risk managers have learned that its best to cut risk at earliest possible time
  - Market makers have also personally internalized through experience how quickly liquidity dries up
  - I have seen short speculative trades put in place in EM precisely to capture VaR shock moment that causes illiquidity and drives asset prices sharply down/ risk premia sharply up
- **Investor composition now becomes important to evaluate the resilience of different markets**
  - How many investors are marked to market ?
  - How important is the dealer community to specific market functioning
    - How resilient are the key market-makers
  - What is the regulatory treatment of the asset class (collateral haircuts, capital charges)

Topics for discussion

- **Do dealer members of the BMCG feel that their ability to take risk in periods of elevated volatility is better or worse than a year before**
  – Will liquidity be "triaged" among certain clients and markets if we see episodes of high volatility
- **How are investing members of the BMCG preparing for episodes of heightened volatility**
  – What are the remedial actions that are being discussed
- **What are the possible policy responses**

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