Selective Dispersion

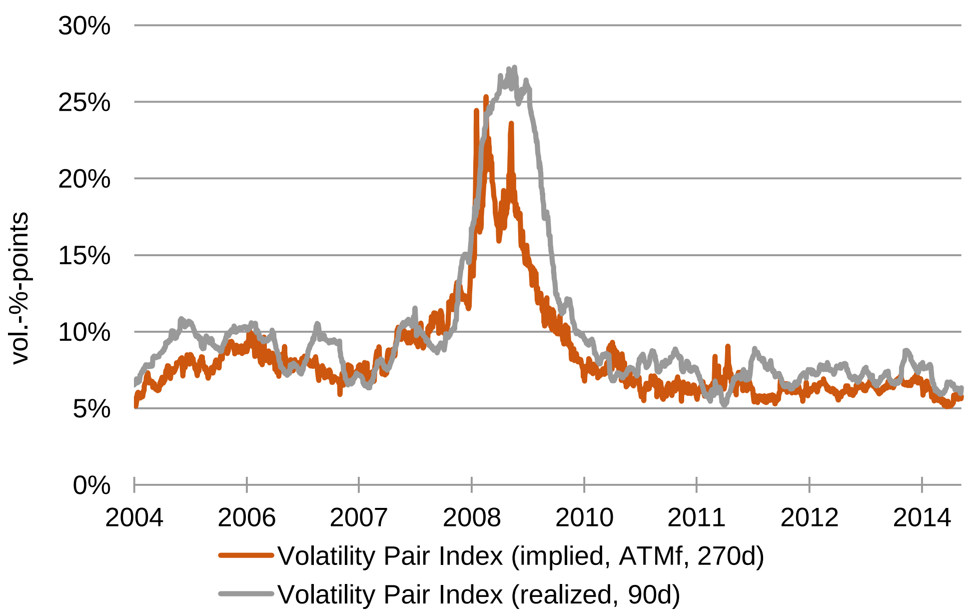
Creating an affordable Long Volatility Exposure in an Equity Portfolio

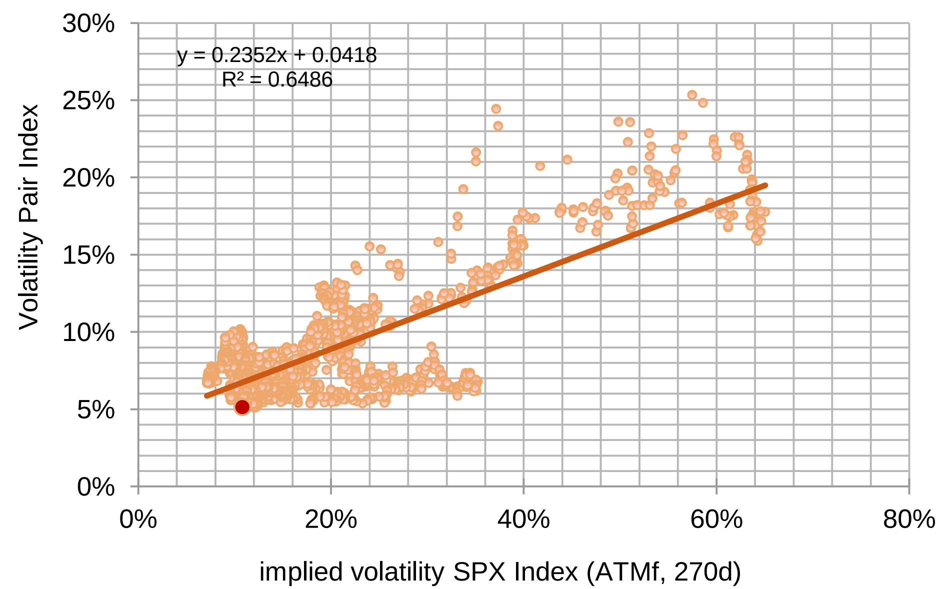
Assenagon Asset Management S.A.

Contents

1. Single Stocks Volatilities versus Index Volatilities

- **Standard dispersion investment:** Trading an index volatility versus the volatility of its components
  But where do we stand on a broader scale?
- **Volatility Pair Index (VPI)**
  - (Average implied volatility over 150 stocks worldwide) – (Average implied volatility over 5 main indices worldwide)
  - measured ATM forward with a maturity of 270 calendar days
  - Value of X% → average single stocks volatility trades X vol.-%-points above our basket of indices
- **Current VPI value** @ 5.5%
- VPI behaves positively wrt to volatility and offers a decent carry.
  How to gain such exposure? Can we further enhance carry and convexity of such a position?





Source: Assenagon Equity Derivatives Database, Bloomberg

2. Volatility Flows and their Impact on Correlation

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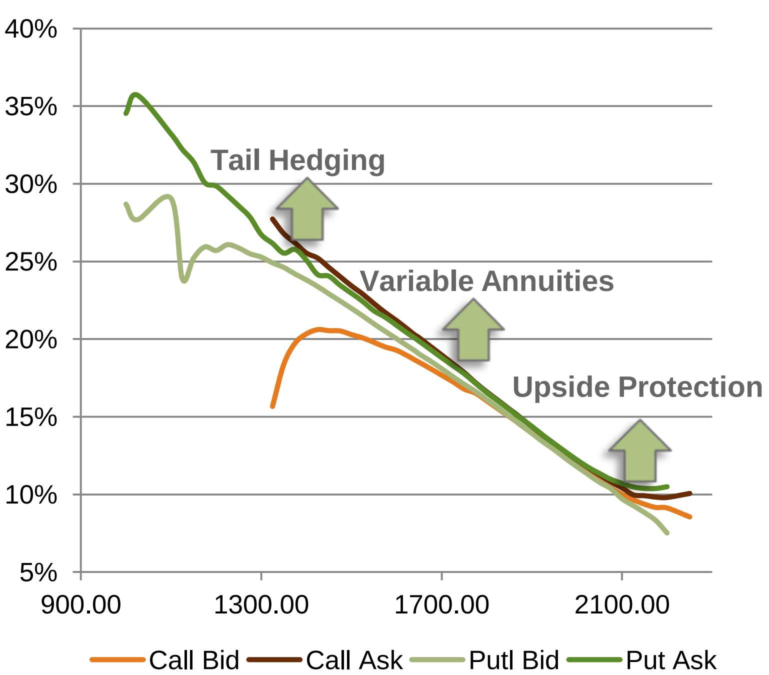
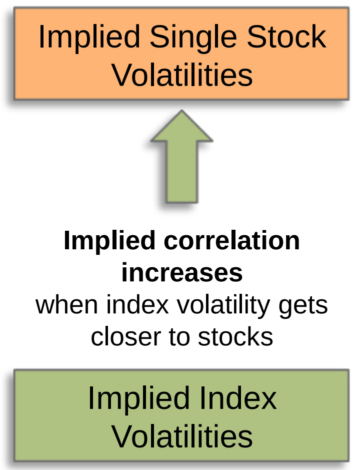
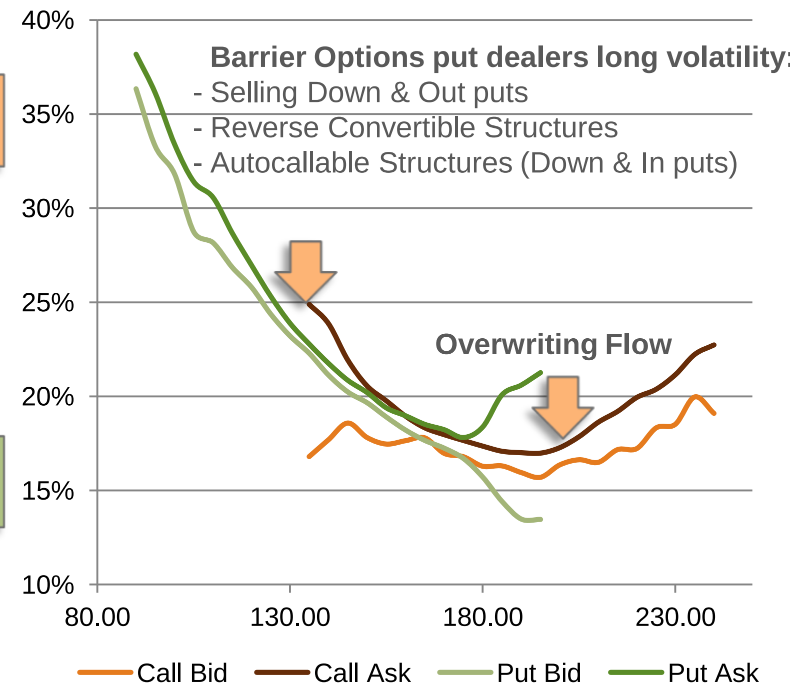
- **Contrarian flows explain distortions in correlation**
  - **On indices**
    - The protection and hedging flow is focused on liquid indices. Tendency to drive the volatility higher.
  - **On stocks**
    - Dealers get long single stocks volatility through the issuance of structured products.
    - Dealers books are short vol. convexity → need to sell more volatility in markets with decreasing volatilities
    - Overwriting flow for yield enhancement strategies







Source: Assenagon Equity Derivatives Database

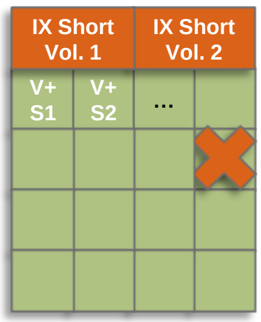
3. How to invest in Dispersion?

- Main trades offering dispersion exposure for the buyside: A practical perspective.

Fixed Strike Options	Variance Swaps	Volatility Swaps
++ Liquid and transparent instruments ++ Allows for active position Mgmt -- Path dependency -- Heavy maintenance: daily delta hedging, changing Γ & V etc… -- Difficult to track the floating strike used when analyzing the correlation level	++ Low maintenance ++ Self delta hedging ++ Constant gamma +/- Vol. convexity -- Valuation concerns (OTC product) -- Difficult to actively manage the position due to liquidity constraints	++/-- Mostly the same arguments as for the variance swap trade

How to invest in Dispersion?

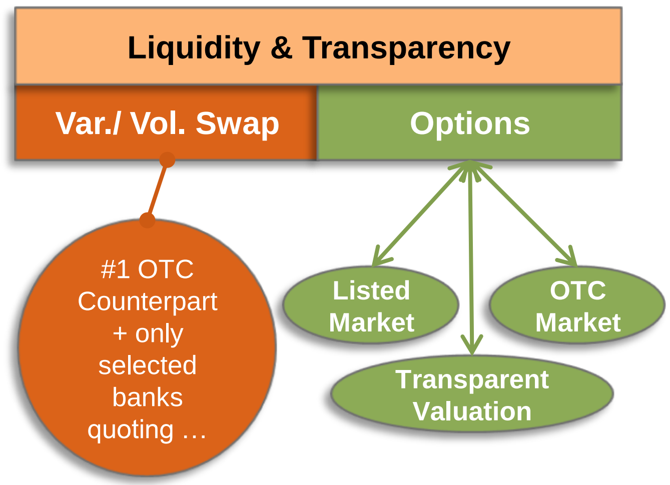
- From an actively managed perspective:
  - Instrument that can be frequently traded in & out
  - Instrument where valuation can be independently determined



Dispersion Exposure is generated through a sum of Volatility Pair Trades

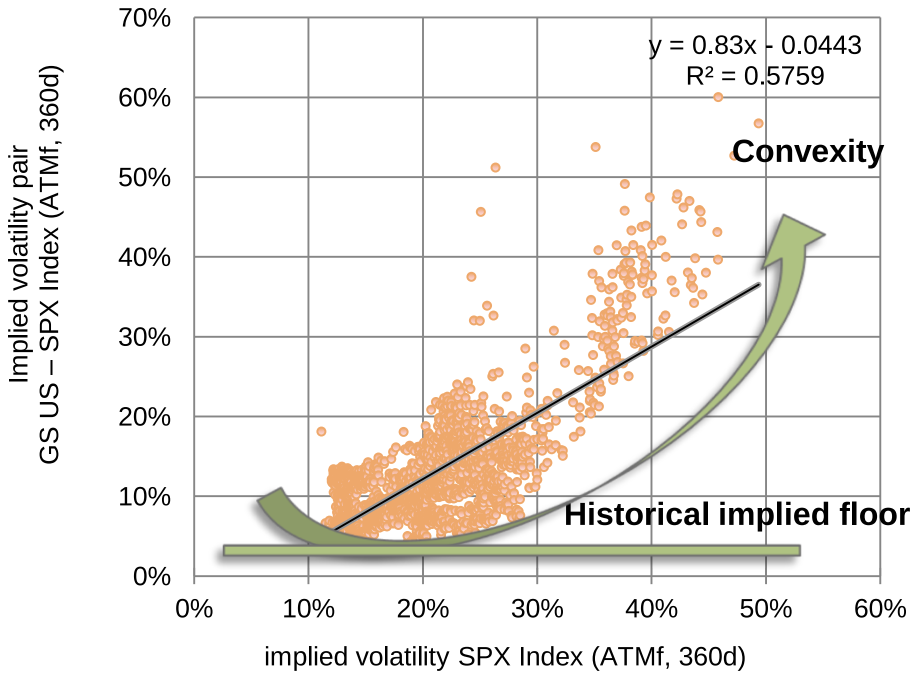
- Actively managing your pairs (profit or loss taking)
- Monitoring carry (realized – implied) on a micro level
- Keeping an optimized dispersion position at any time

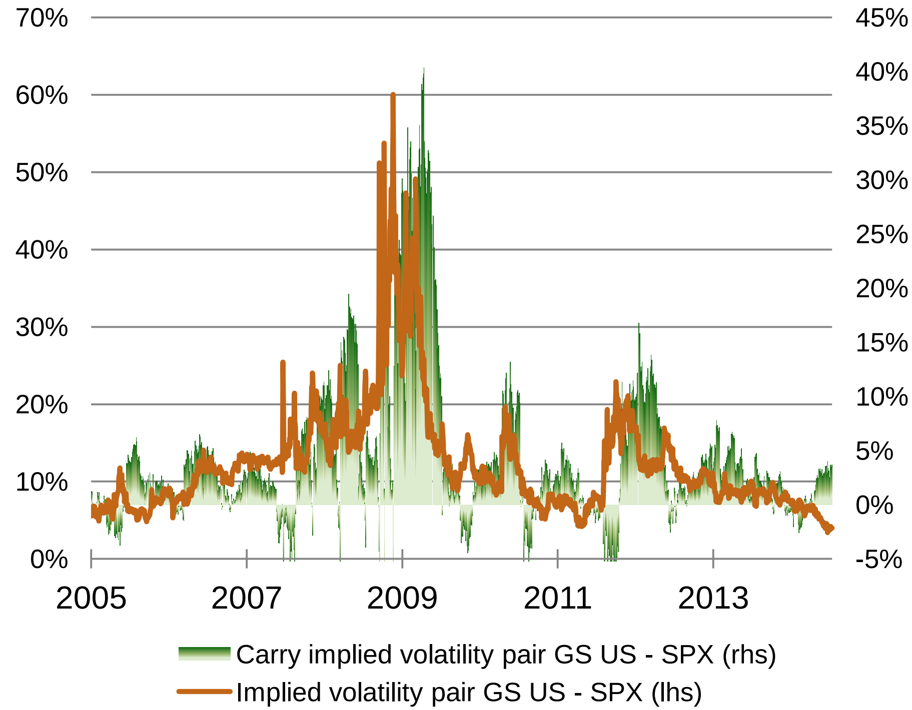
- Trading fixed strikes options (liquid, listed, transparent for valuation)
- Trading with some improvements taking into account the skew dynamics



4. From a Pair Trade to a Selective Dispersion Portfolio

- In order to get exposure to an optimized version of the "Volatility Pair Index", one can apply a comprehensive screening on all volatility pairs to detect those with the following properties:
  - **Long convexity** bias
  - **Minimizing implied draw downs** given volatility regimes
  - **Vega neutral** (long/short volatility in the same amount)
  - **Maximizing carry** (realized – implied volatility)
  - Diluting the **correlation risk**

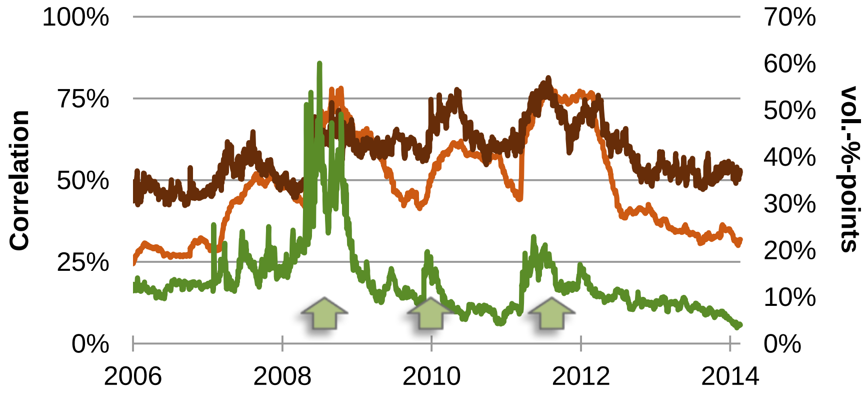




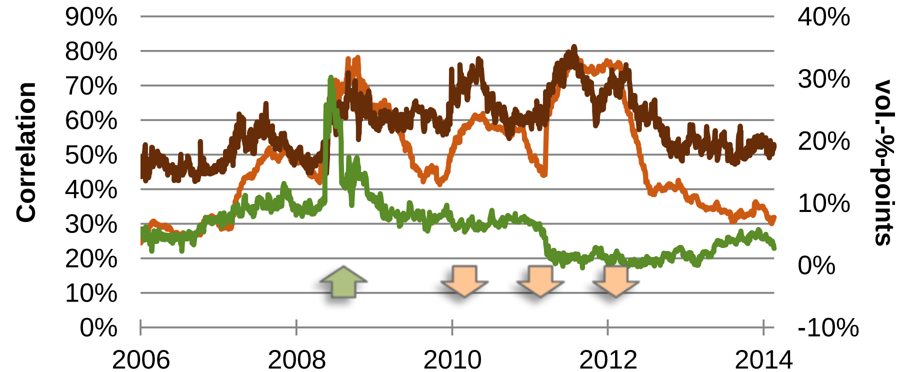
Source: Assenagon Equity Derivatives Database

4. From a Pair Trade to a Selective Dispersion Portfolio

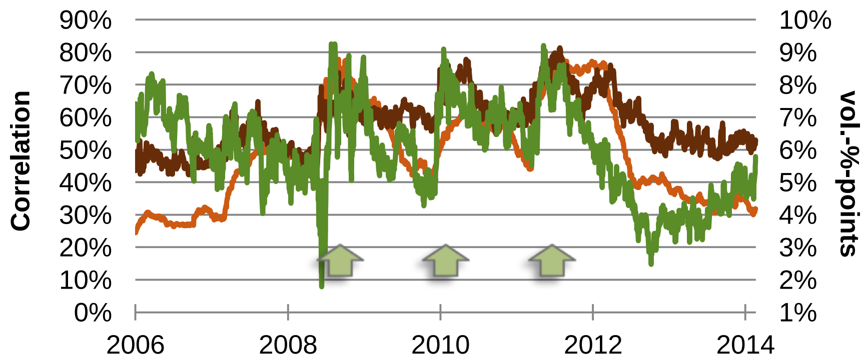
- One can understand and quantify how each pair reacts to correlation movements



SPX 1y realized correlation
SPX 1y implied correlation
Implied volatility pair GS US – SPX Index (ATMf, 1y)



SPX 1y realized correlation
SPX 1y implied correlation
Implied volatility pair SIE GY – DAX Index (ATMf, 1y)

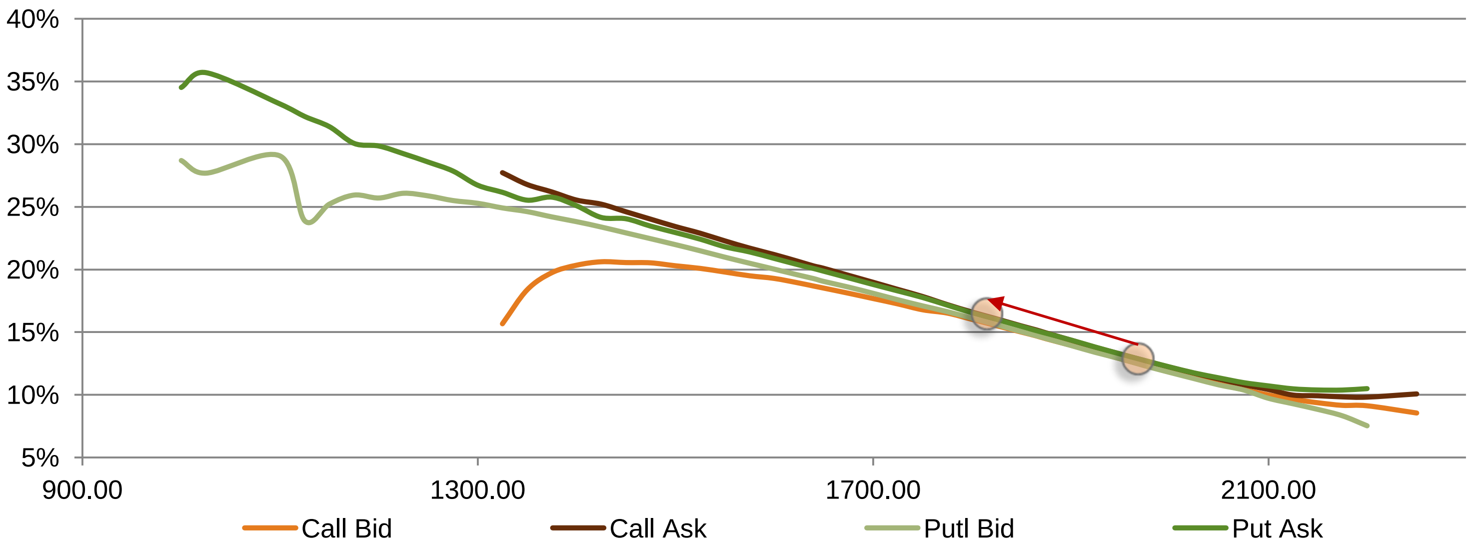


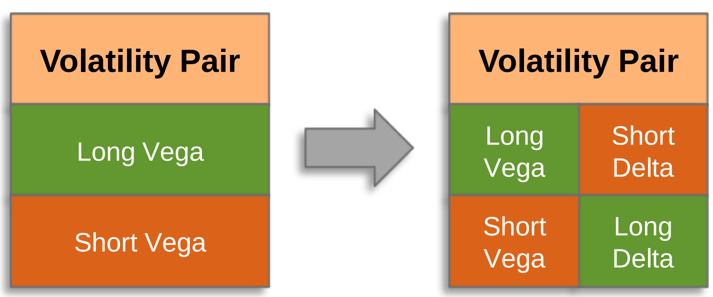
SPX 1y realized correlation
SPX 1y implied correlation
Implied volatility pair RTY Index – SPX Index (ATMf, 1y)

Source: Assenagon Equity Derivatives Database

4. From a Pair Trade to a Selective Dispersion Portfolio – What about the skew?

- Buy Optionality:
  - Sell an amount of Δ to compensate the skew effect
  - In its magnitude, this Δ is similar to a Variance Swap Δ





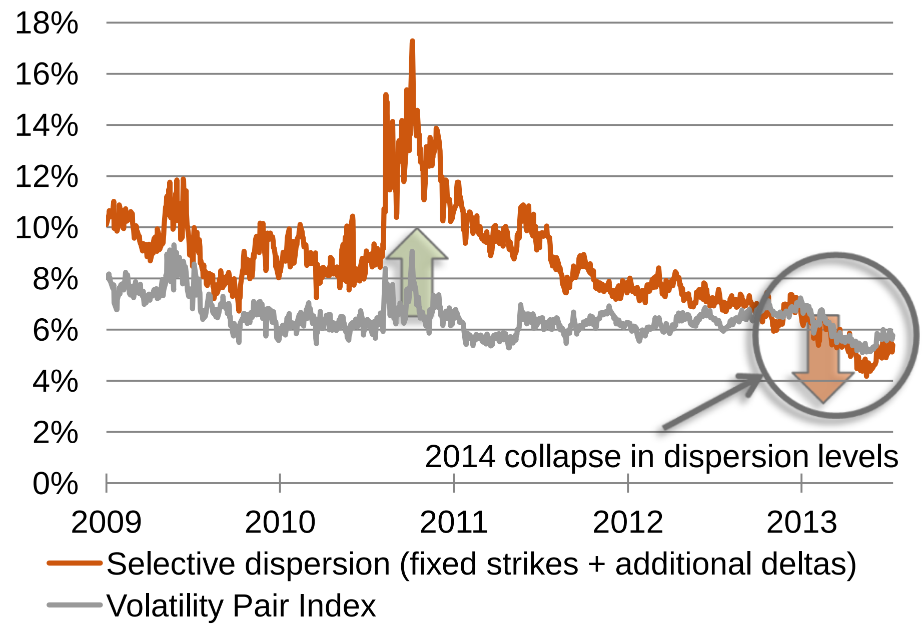
Source: Assenagon Equity Derivatives Database

5. Dispersion Portfolio – An example

- With Fixed Strike Options
  - Managing the skew effect is essential to mitigate tracking errors
  - Residual long Δ (skew difference index vs. stocks)
- Note: variance swap dispersion is showing similar long Δ net exposure

Plain Vanilla Selective Dispersion	
Position	Additional Δ
SPX -400k USD Vega	+7.2M USD
AFL US	-141k USD
BHP US	-122k USD
CAT US	-115k USD
CMCSA US	-89k USD
CMI US	-100k USD
…	…
Total net Δ	**+3.9M USD**

Variance Swap Selective Dispersion	
Position	Additional Δ
SPX -400k USD Vega	+5.7M USD
AFL US	-100k USD
BHP US	-110k USD
CAT US	-100k USD
CMCSA US	-90k USD
CMI US	-80k USD
…	…
Total net Δ	**+2.7M USD**

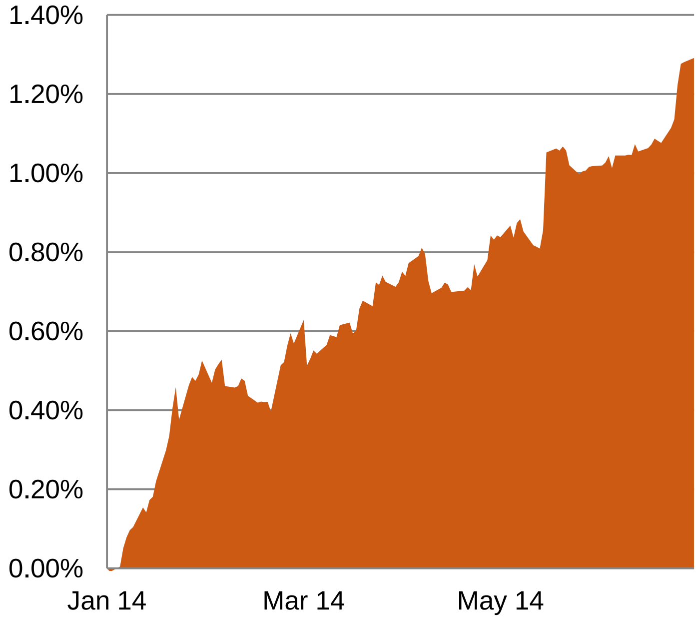


Source: Assenagon Equity Derivatives Database

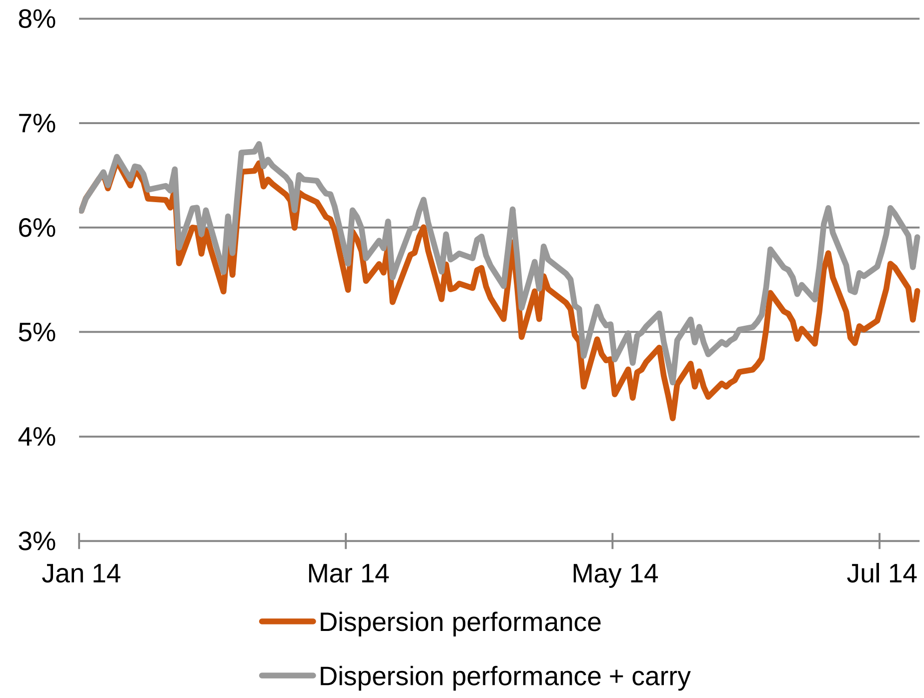
5. Dispersion Portfolio – Cost of Carry

- Managing the cost of carry in the portfolio is essential for the long-term sustainability of the position.
- Carry is produced through realized volatilities and captured by means of daily delta hedging.
- Despite a challenging year 2014 with shrinking implied levels of dispersion, the carry was a constant source of return.

Selective dispersion in 2014 (net carry)



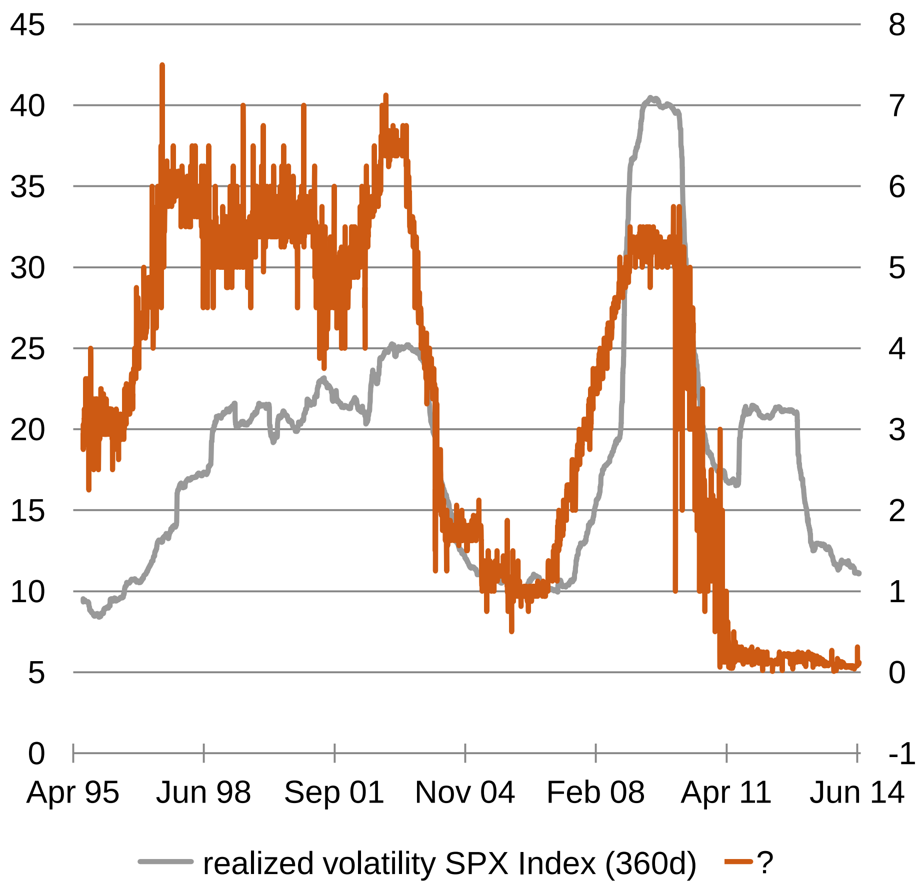
Dispersion Performance YTD



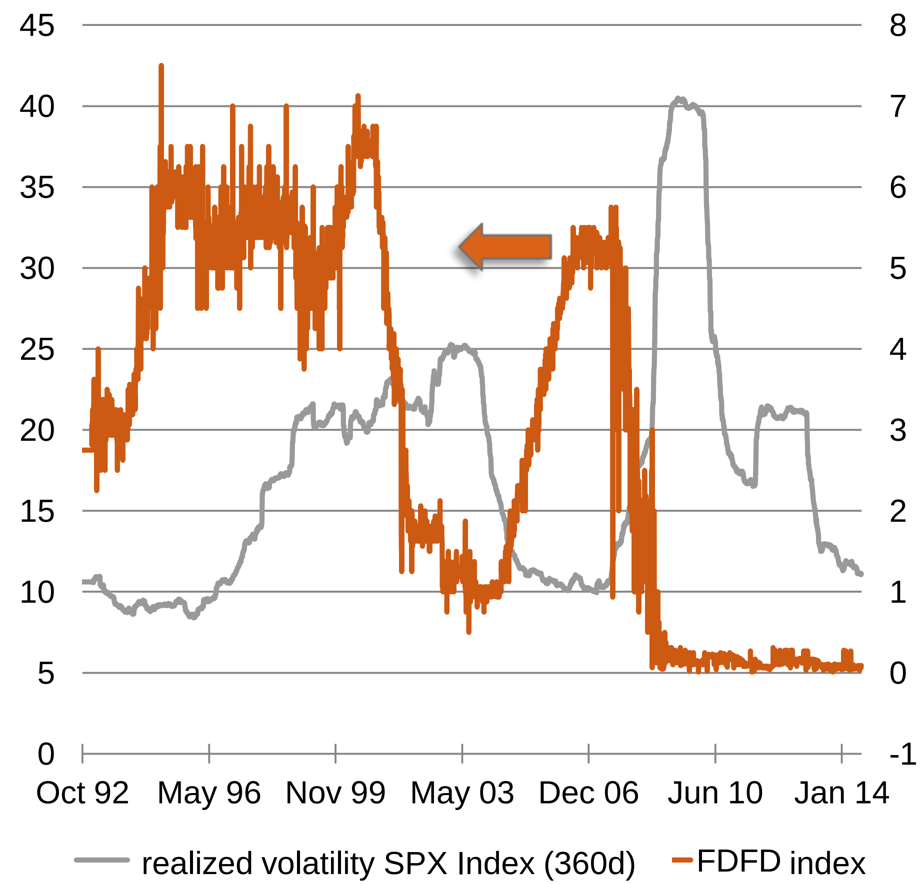
Source: Assenagon Equity Derivatives Database

6. A "small" Digression

- **What is that?**



- **Without a 30 months shift forward in FDFD Index**



Source: Bloomberg

7. Summary

Trading dispersion can offer both long volatility and positive carry

Current dispersion levels are very attractive compared to recent years

Practical implementation can be tricky and cumbersome (but not impossible)

Ensuring liquidity in the dispersion portfolio is crucial

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