

November 2012

Of barbecues and bonfires

A recipe for structured credit?

Matt King

Credit Products Strategist

matt.king@citi.com

+44 207 986 3228

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

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Markets are a complex system

A match too far

"But the first, second, and third matches did nothing"



Characteristics of complex systems

1. Systemic crises are inevitable
2. It is almost impossible to predict exactly when they start
3. The magnitude of the crisis bears almost no resemblance to the catalyst which starts it

Source: "Credit crises and the shortcomings of traditional policy responses", W. White, Jan 2012. See also "Tails of the unexpected", A. Haldane, June 2012.

Tiny changes in initial conditions lead to
massively different results

Why investors are skewered

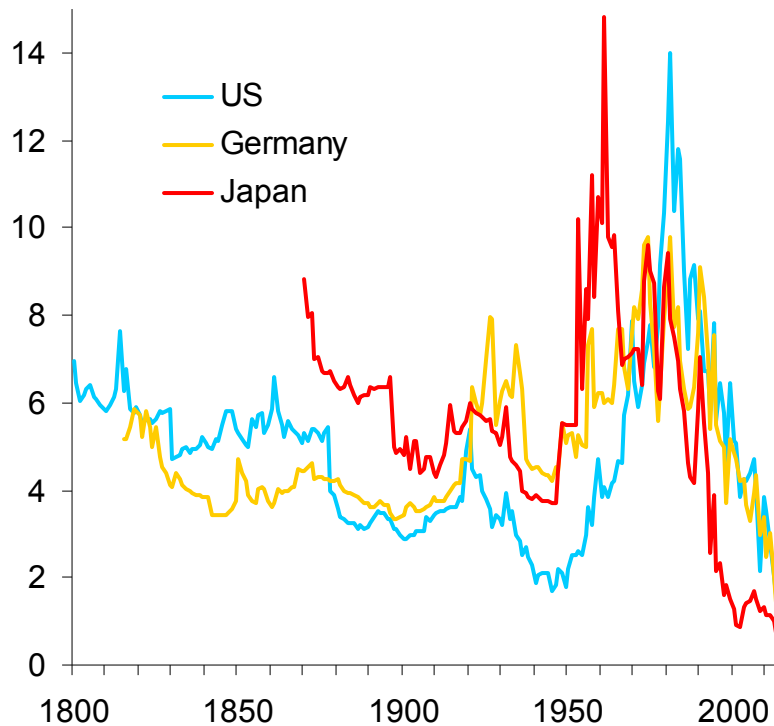
Sizing up the sausages

Building a firebreak

Low yields

Race to the bottom

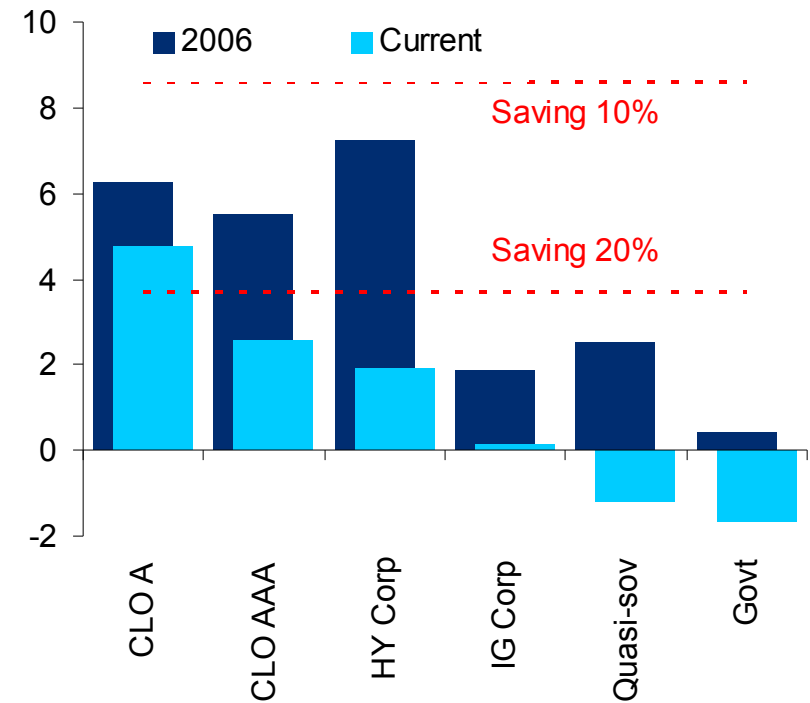
Bond yields, %



Source: Global Financial Data, Inc; Citi.

There's a hole in your pension

Real yields by asset class vs required yields*, %



Source: Citi Research, Bloomberg, Yieldbook

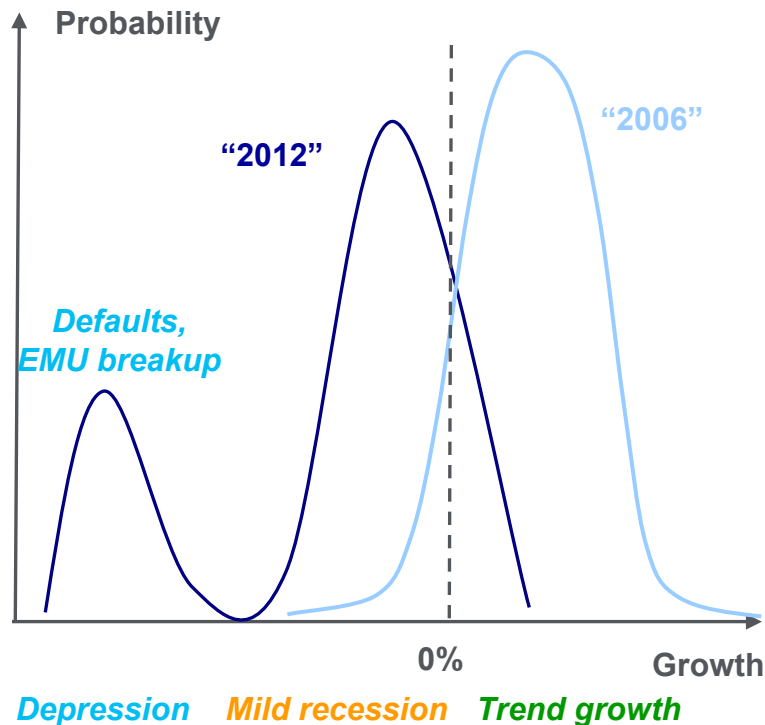
*: Required salary contribution for a 40-year-old retiring at 65 and targeting a pot of 8x annual salary upon retirement. Real yields calculated using 30-year TIPS breakevens. High yield level assumes 2% losses through defaults.

Everyone is desperate for yield

Unstable equilibria

Modal forecasts can be misleading

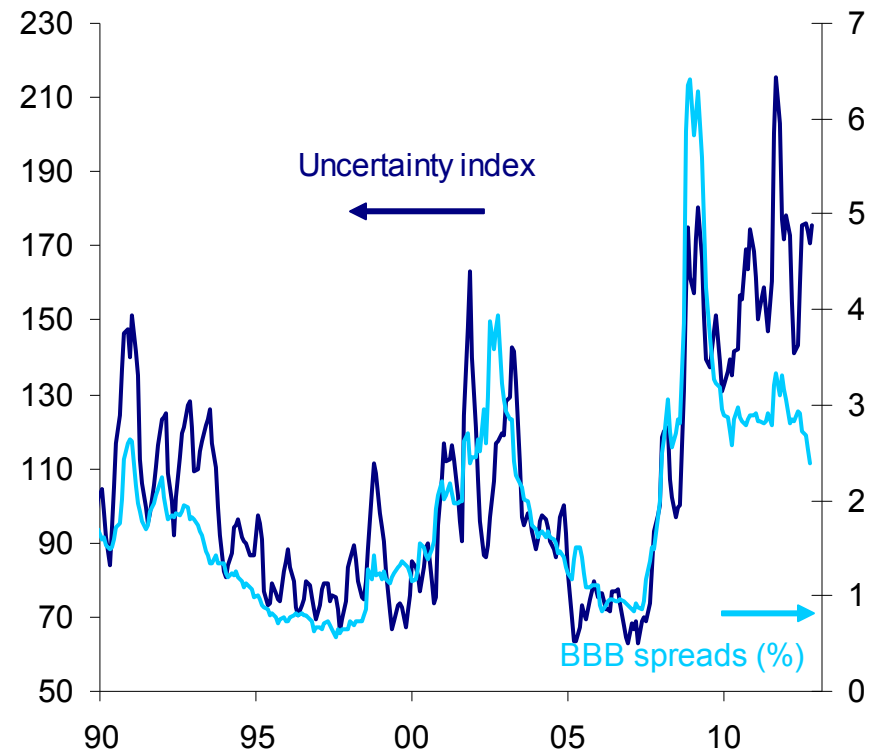
Stylised distribution of growth probabilities



Source: Citi Research. For a non-schematic equivalent, see [Unlucky '13?: An imperfect world priced for perfection](#), H. Lorenzen, Nov 2012.

Strrrrrretched valuations

Econ policy uncertainty index* vs US BBB spreads, %



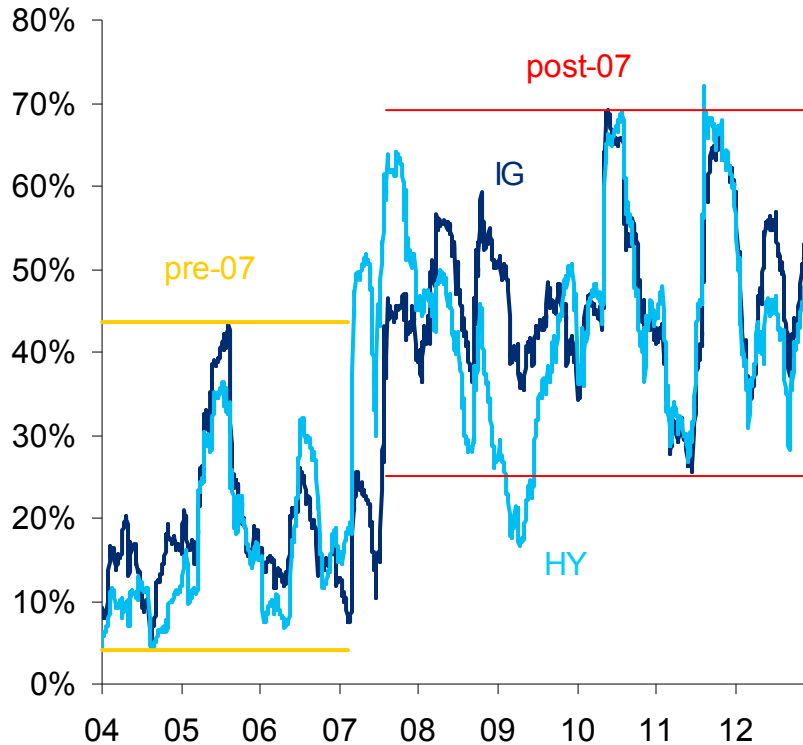
Source: Citi Research, Haver Analytics, "Measuring Economic Policy Uncertainty", Baker, Bloom & Davis. Uncertainty index based on frequency of news references to uncertainty, expiring tax codes and disagreement among economic forecasters.

It hasn't snapped yet. But that doesn't mean it won't

The effect of systemic risk

There is only one trade

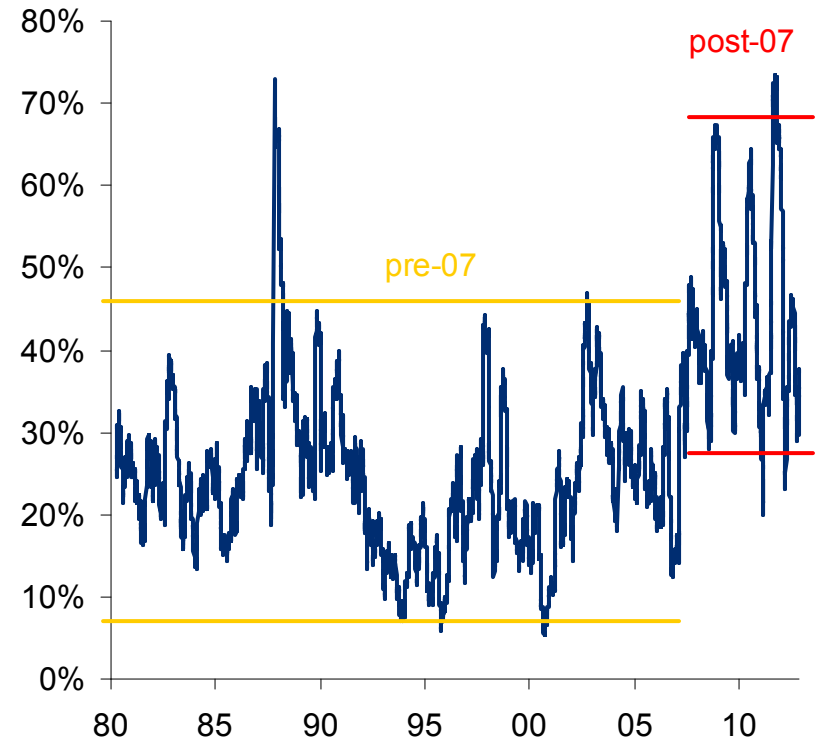
Average pairwise correlation, CDX IG/HY, 3m



Source: Markit, CIRA.

Not much of a stock pickers' market

Average pairwise correlation, S&P 100, 3m



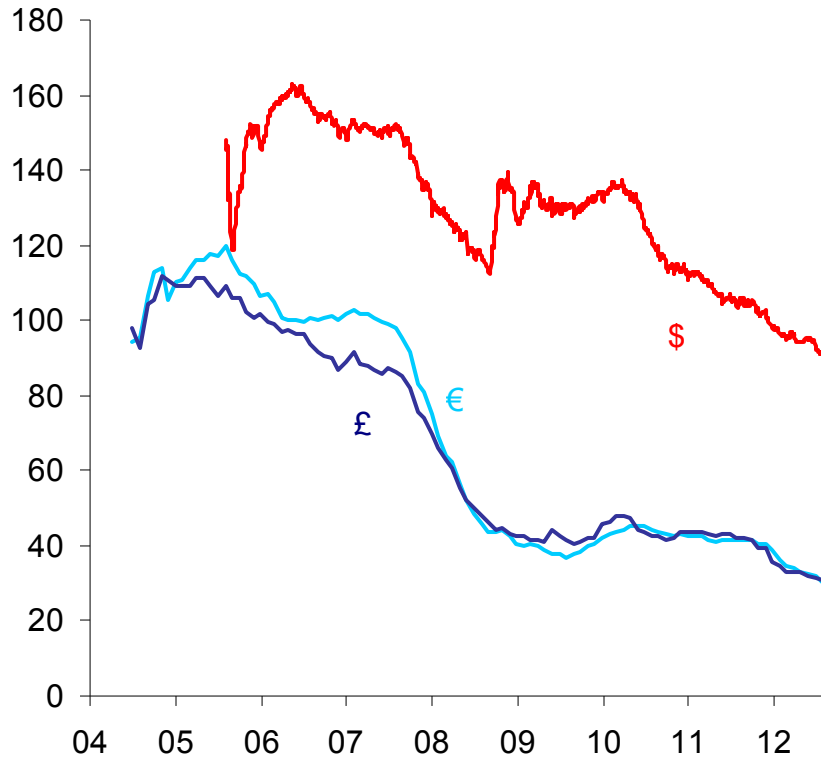
Source: Bloomberg, CIRA.

Systemic risk makes for correlated markets

Inflows + uncertainty = illiquidity

Large and illiquid

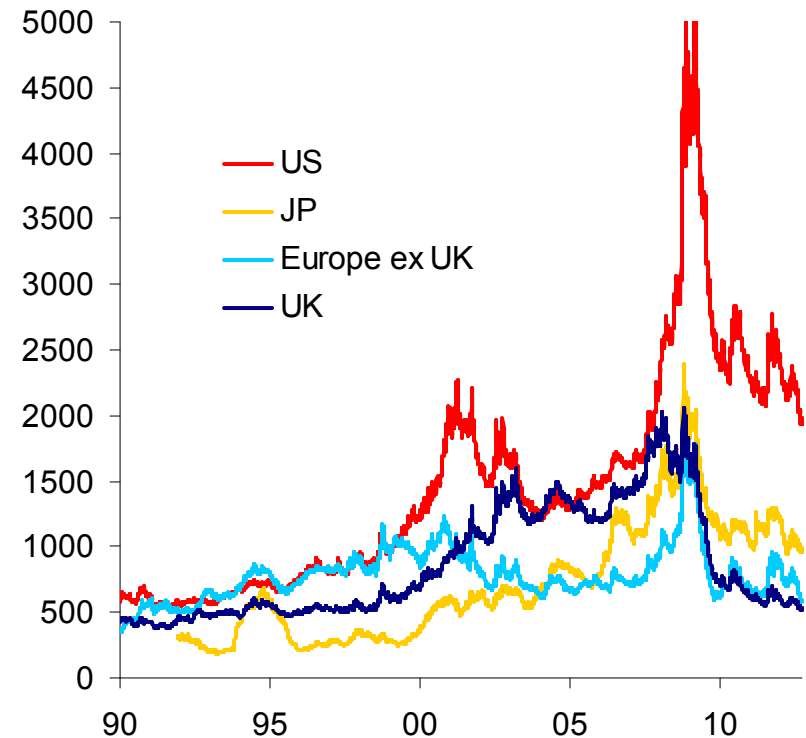
Turnover in IG corporate bonds, 12m rolling, % outstandings



Source: ICMA, Markit, TRACE, Citi Research. For an even more alarming illustration of inflows vs dealer balance sheets, see [Why good gardeners should take credit](#), M. King, Nov 2012.

Liquid but becoming less so

Turnover in equities, 12m rolling, % outstandings



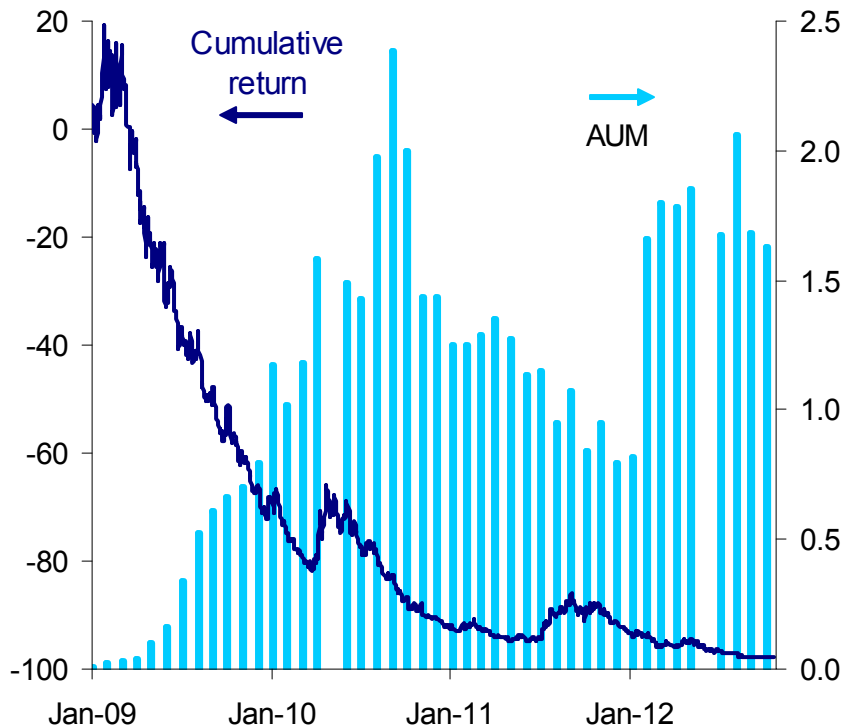
Source: Datastream, Citi Research.

Falling volumes, and not just in credit

Tail risk hedging

97% down – and still taking in money

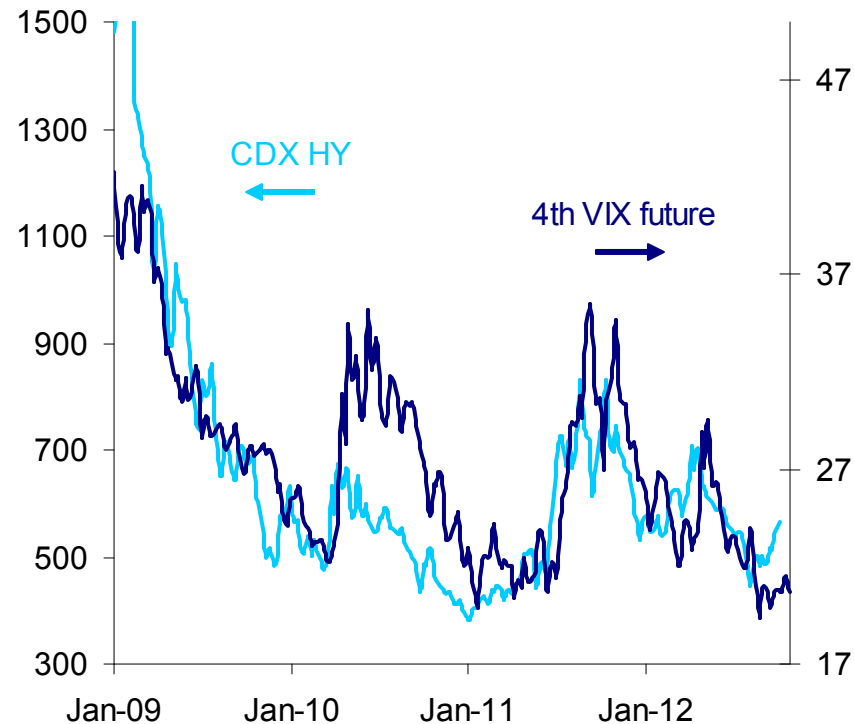
Vix 1st future ETF return (%) vs assets invested (\$bn)



Source: Bloomberg (VXX US Equity).

Untidy hedging

CDX HY (bp) vs 1y VIX future (%)



Source: Bloomberg, Citi Research.

Everyone wants protection – yet buying it has often proved disastrous

Why investors are skewered

Sizing up the sausages

Building a firebreak

Ways to feed the masses

	What's cooking	Credit equivalent	Likely effect
	Single sausage	Stay unlevered	Possibly prudent, but people will go hungry
	Pad out with junk	Down in quality	Fills you up, but risk of feeling sick later
	Hot dogs	Lever alpha	Good ones fantastic, but typically just a sausage underneath
	Put more sausages on	Lever beta	Definitely good in moderation, but beware gluts in supply & demand
	Frankfurters	CLNs	High quality, but some find too synthetic
	Salami	Structured credit	Processed to make the meat go farther

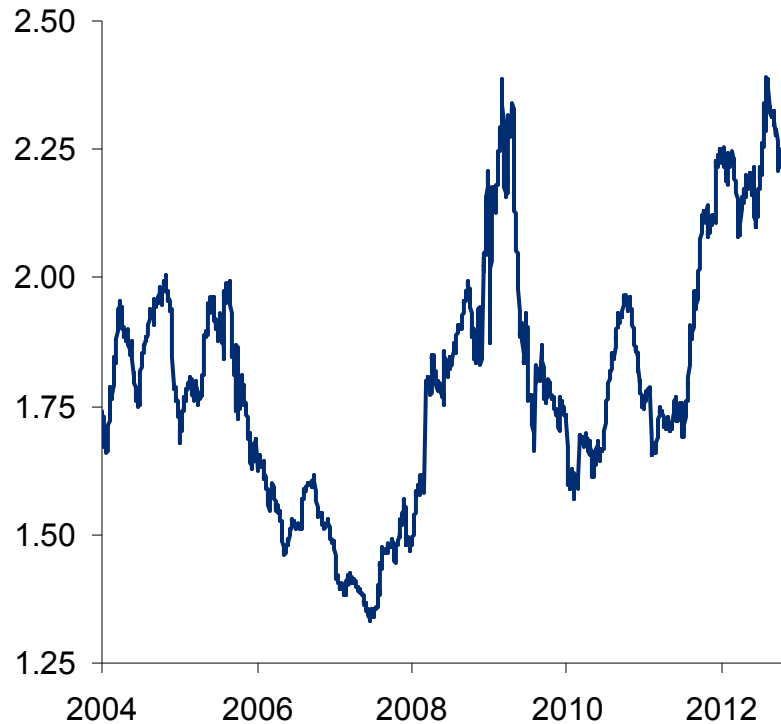
Source: Citi Research.

What investors can't earn, they will lever

Down in quality

Tough for BB/B to rally much further...

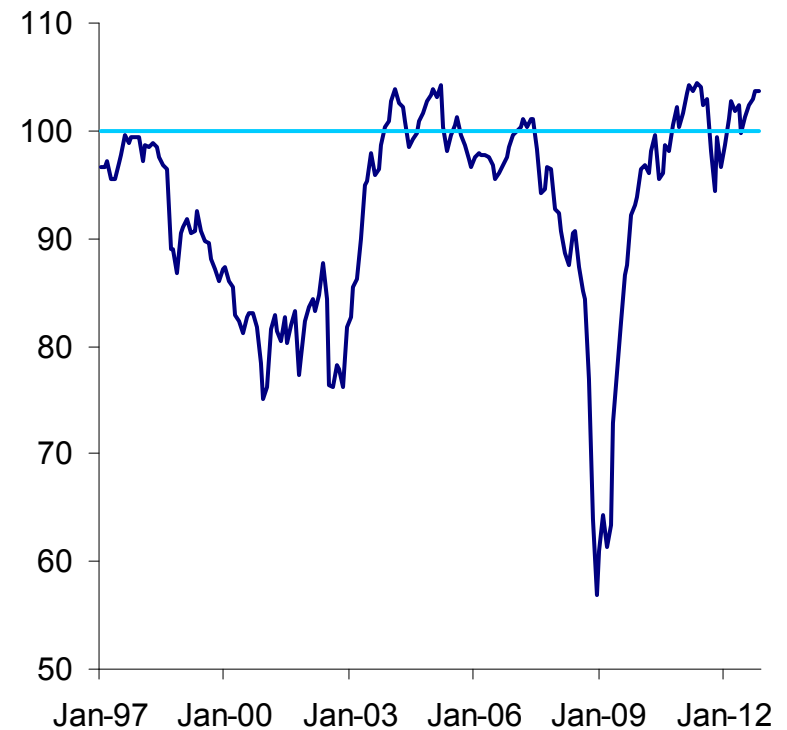
CCC/BB bond yield ratio, US, times



Source: Citi Research.

...in particular given their callability

Average price in US HY



Source: Citi Research, Markit. See "Hitting Rock Bottom", M. Hampden-Turner.

Any upside in cash credit will have to come from CCCs

Down in quality

Ways to make 4%...

Everything in BBs, or 75 IG:25 CCC?

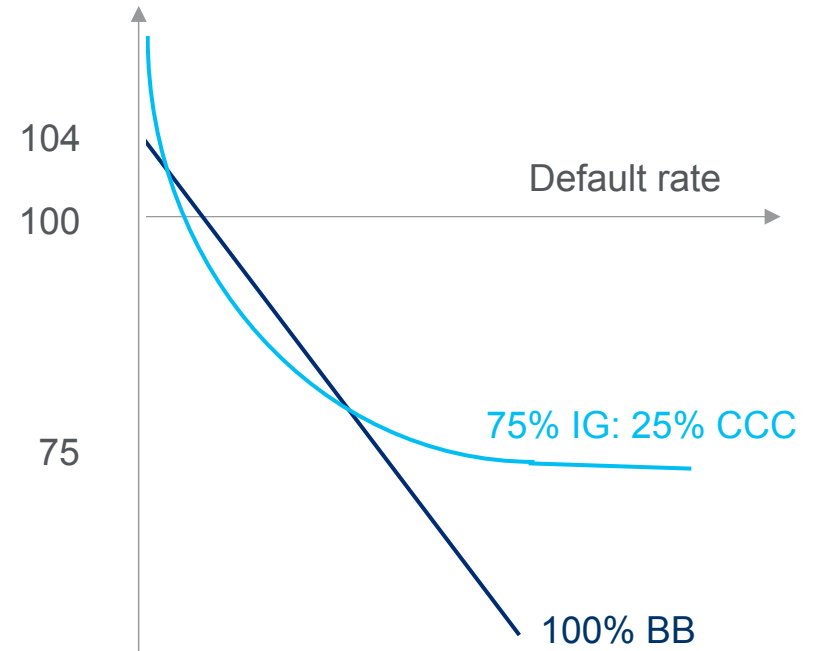
	IG	BB	CCC	Total yield
Yield	2%	4%	10%	
Portfolio A allocation	0	100	0	4%
Portfolio B allocation	75	0	25	4%

Source: Citi Research.

...and their associated risk profiles

Schematic

Expected portfolio value



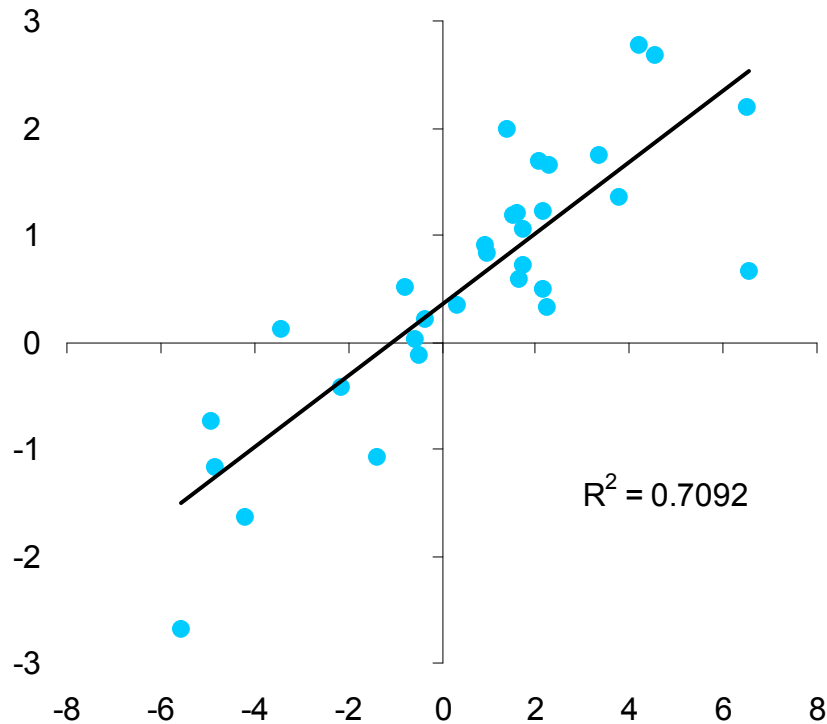
Source: Citi Research.

Better to barbell than to overreach

Lever up alpha

So much for being hedged!

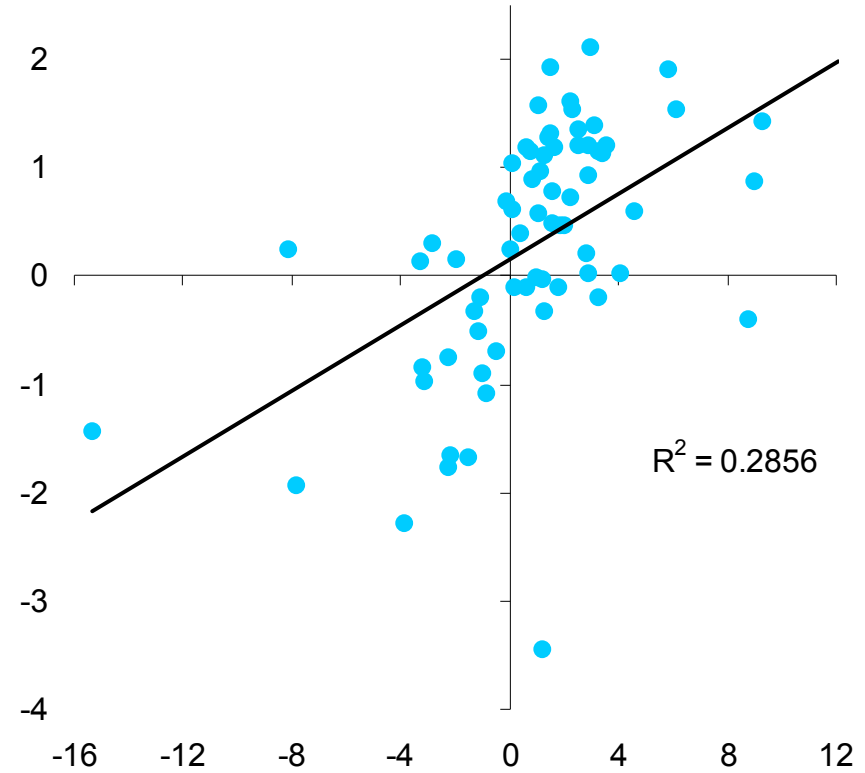
€ credit hedge fund monthly performance vs iBoxx HY (%)
Jan07-



Source: Eurohedge, Markit, Citi Research.

US funds slightly less correlated

\$ credit hedge fund monthly performance vs US HY Index (%)
Jan07-



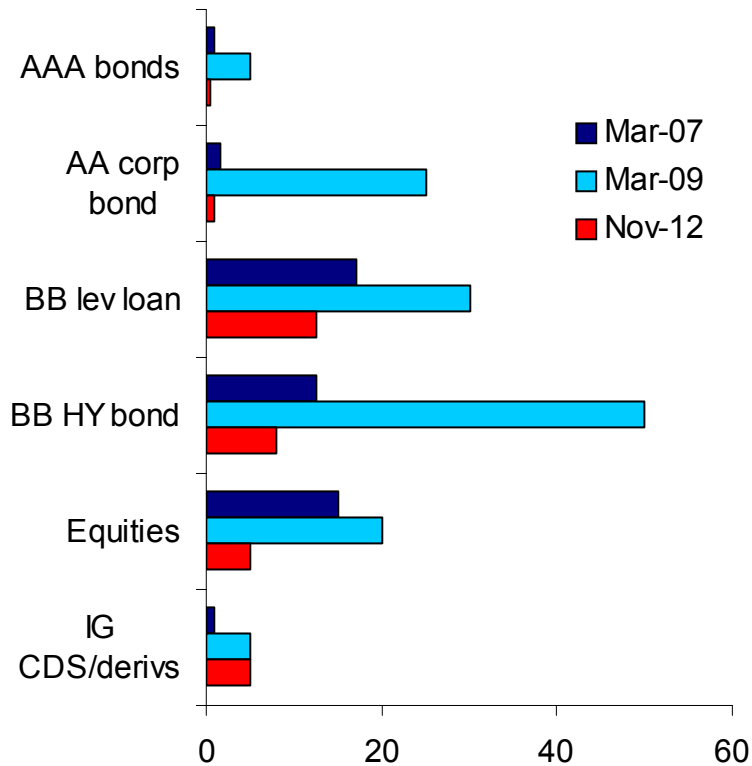
Source: Eurohedge, Citi Research.

Much 'alpha' is in fact heavily correlated with the market

Lever up beta

Margins are back to 2007 levels

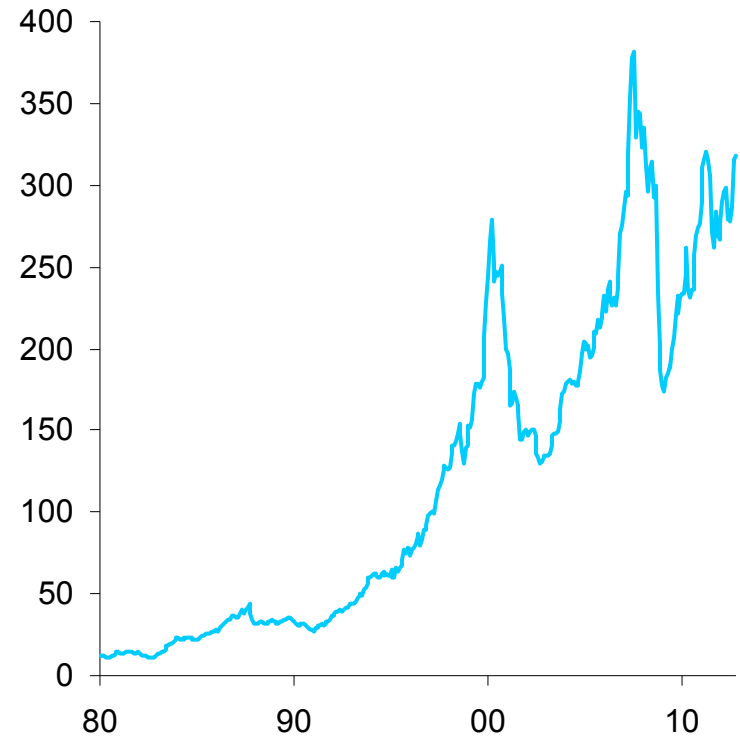
Indicative street repo haircuts by asset (%)



Source: Citi Research.

2007 here we come!

Debit balances in margin accounts at broker-dealers, \$bn



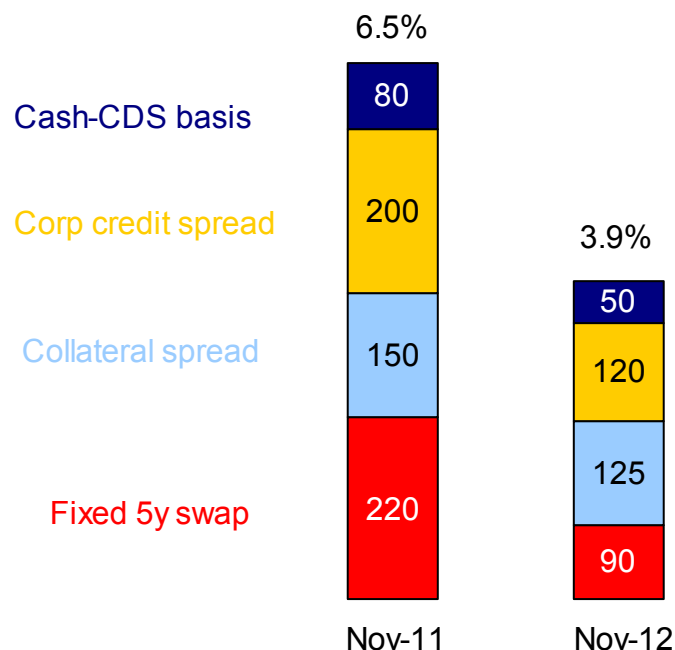
Source: NYSE, Haver Analytics.

Quite feasible – but watch for mark to market

Pick up spread in synthetics

What's in a CLN?

Typical CLN yield decomposition (IG collateral)



Source: Citi Research.

Fancy 50bp just for going synthetic?

A selection of positive CDS-cash bases

Name	Cpn	Maturity	Basis
Veolia Environ.	6.75%	Apr-19	111
Alstom	3.63%	Oct-18	94
Bouygues	3.63%	Jan-23	72
Daimler	2.38%	Sep-22	71
Solvay	4.63%	Jun-18	68
France Télécom	3.88%	Jan-21	67
Auto. du Sud	7.38%	Mar-19	65
Groupe Auchan	6%	Apr-19	64
Carrefour	3.88%	Apr-21	62
Saint Gobain	4%	Oct-18	62
Gdf Suez	6.38%	Jan-21	60
EdF	5%	Feb-18	57

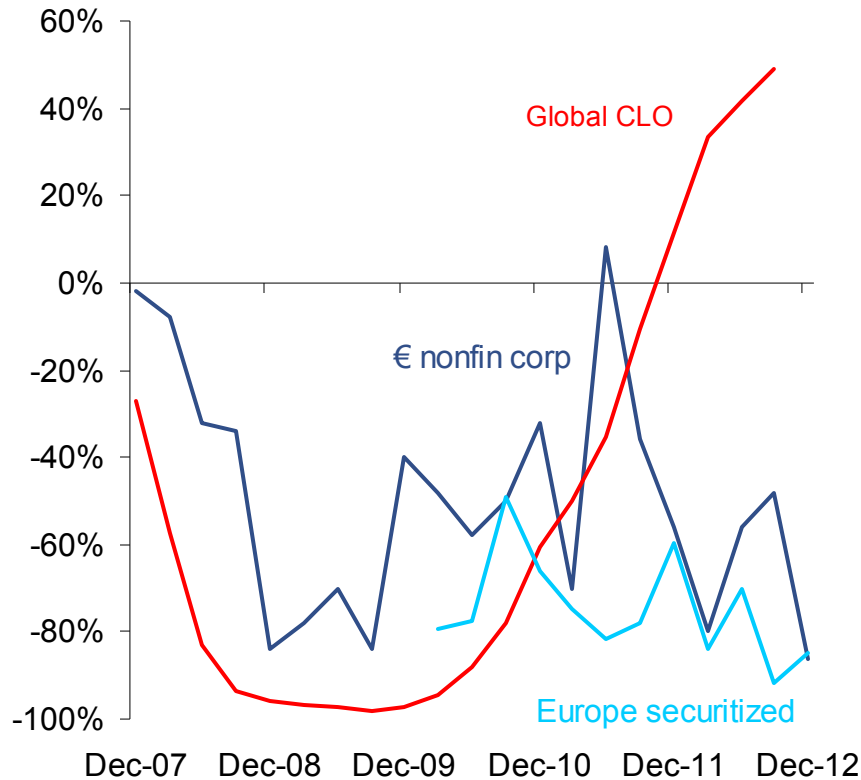
Source: Citi Research.

Even humble CLNs offer a substantial yield pick-up

Securitized credit in Europe

Unfairly victimized?

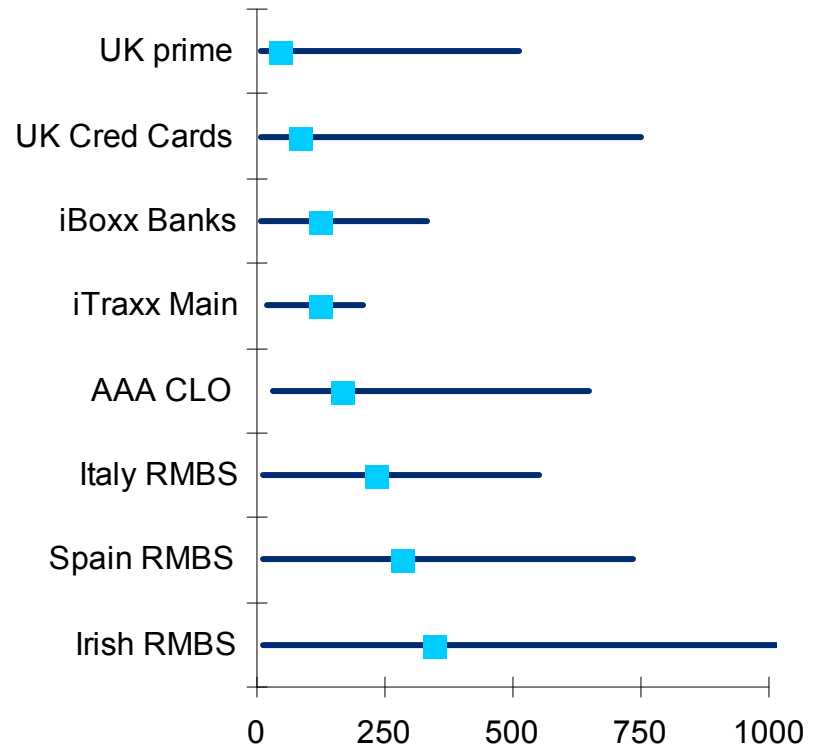
Upgrades-downgrades (% of all rating changes, quarterly)



Source: S&P, Moodys, Bloomberg, Citi Research.

Is Italian real estate really that bad?

Spread range 2006-2012 vs current, bp



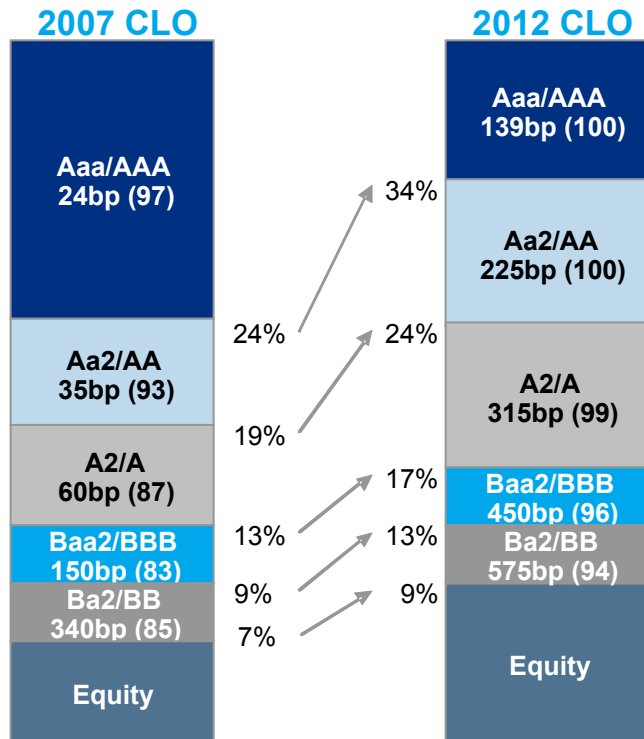
Source: Citi Research.

Like the security; but bargains getting harder to find

CLOs

Capital structure and coupon changes

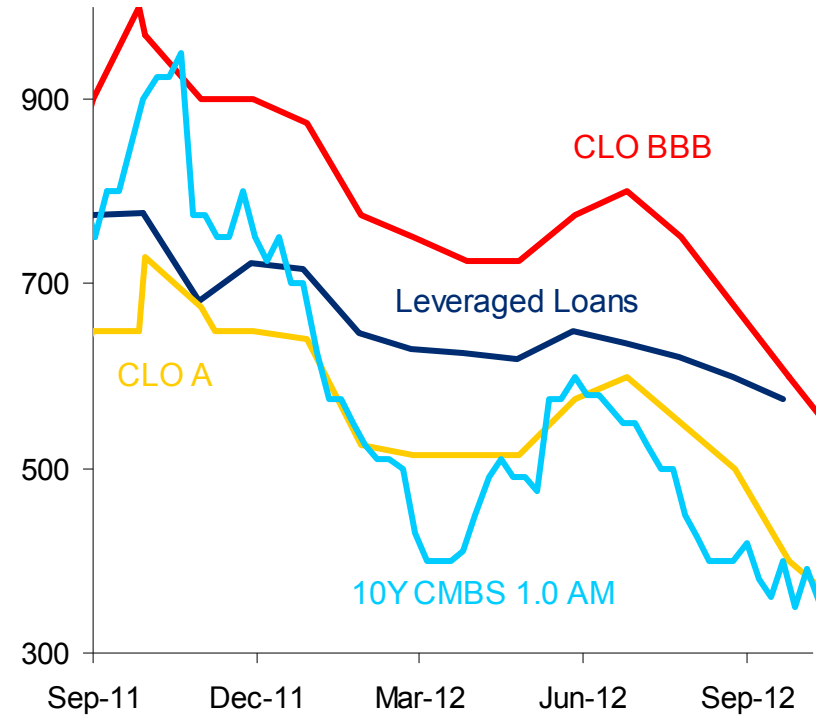
CLO 1.0 (2007) versus CLO 2.0 (2010 and later)



Source: Citi Research

B lev loans, or a BBB tranche?

CLO mezz tranches vs CMBS and loans, US, bp



Source: Citi Research.

Protection through subordination

Why investors are skewered

Sizing up the sausages

Building a firebreak

What's in a hedge?

In search of the right match

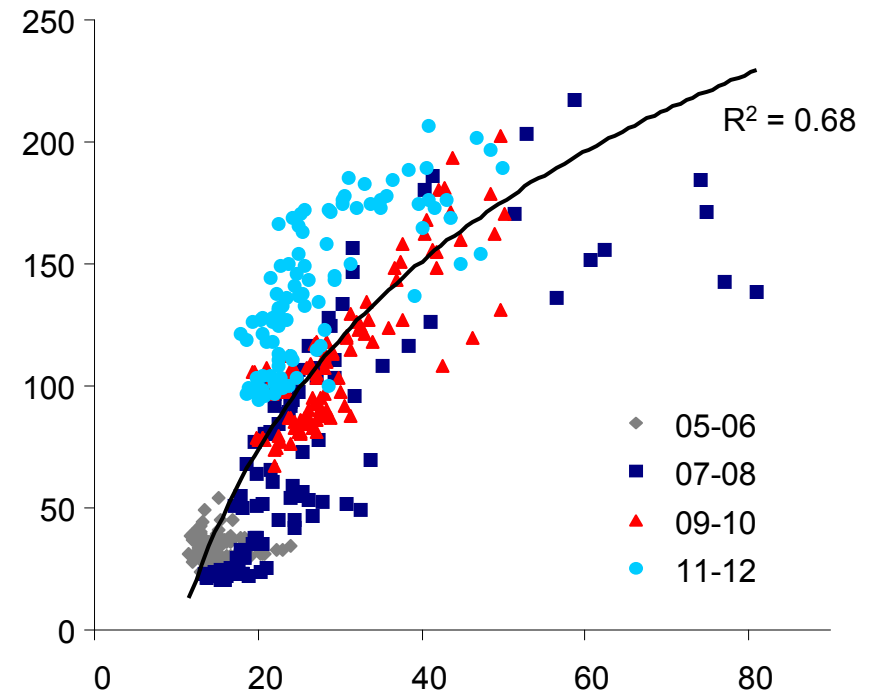
Characteristics of the ideal tail hedge

	Credit options	Equity options	Tranches
• Long-dated	✗	=	✓
• OTM / low cost	✗	=	=
• Positive convexity	✓	✓	✓
• Highly correlated	✓	=	=

Source: Citi Research.

Curved the right way

€ Stoxx 50 implied volatility (x-axis, %) vs iTraxx Main (y, bp)



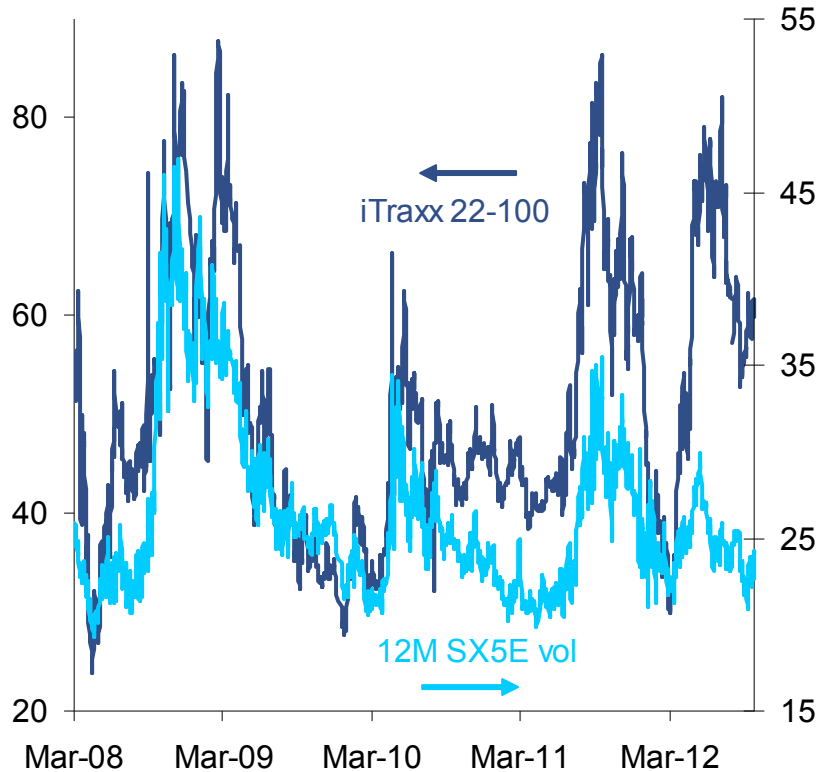
Source: Citi Research, Bloomberg.

There is no perfect firebreak

Super senior tranches

Senior hedge no longer looking super

iTraxx 10Y 22-100 (bp) vs 1y Stoxx50 vol (%)



Source: Bloomberg, Citi Research.

Though US prices little risk anywhere

CDX 10Y 30-100 (bp) vs 1y S&P 500 vol (%)

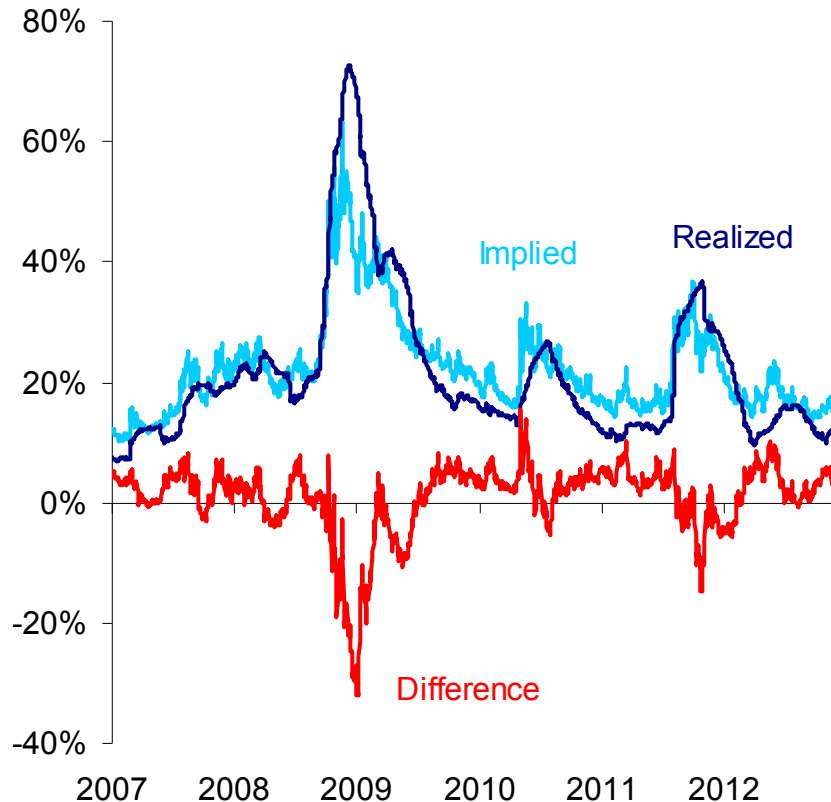


Source: Bloomberg, Citi Research.

Europe prices in a lot, US very little

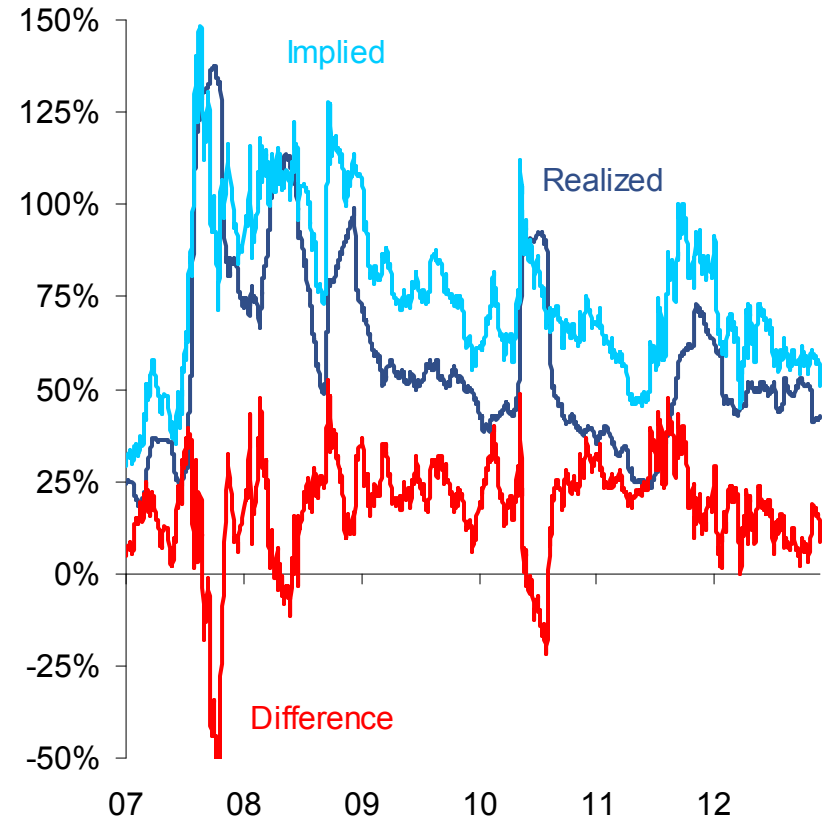
Credit and equity vol

In equities, implied is higher than realized
S&P 500 3m implied, realized, and implied-realized volatility (%)



Source: Bloomberg.

In credit, it's even worse
iTraxx Main implied vs realized, 3m (% of spread)



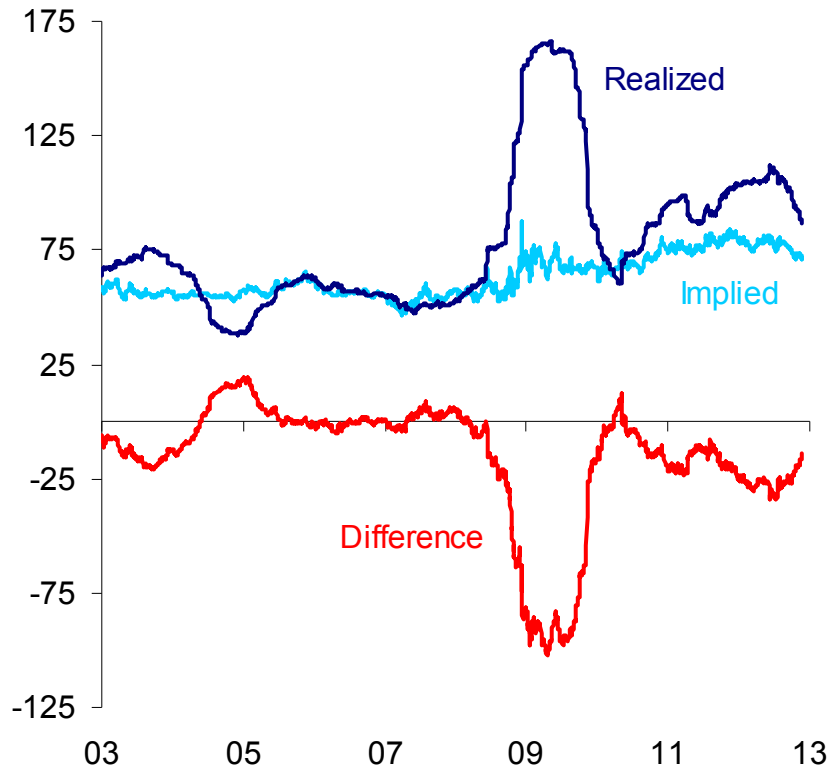
Source: Citi Research. See "Profiting from the Credit Volatility Premium", A. Basu, Sep 2012.

Better to sell equity and credit vol than to buy it

Rates vol: less time decay, different market structure

Rates investors are vol sellers, not buyers

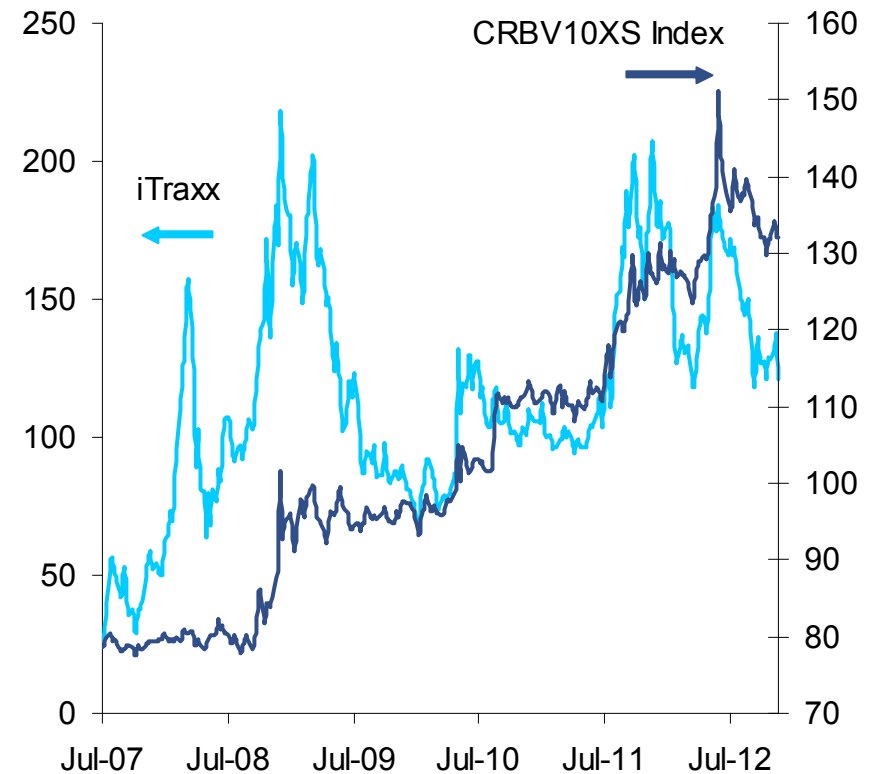
€ 10y10y swaption vol (realized measured over 1y window), bp



Source: Citi Research.

Step-by-step hedging

Rates volatility index* total return vs iTraxx Main (bp)



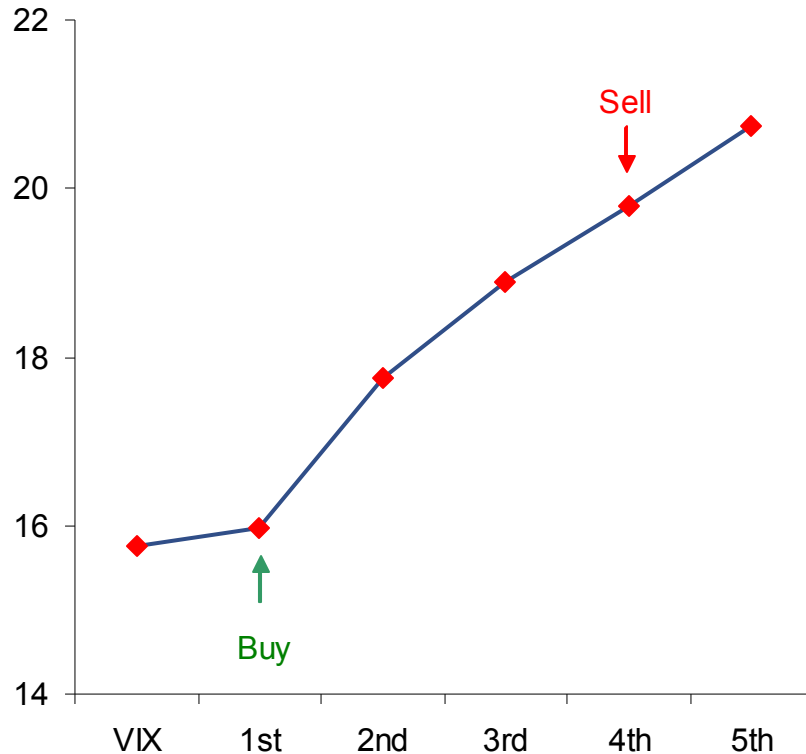
* Rates volatility index constructed from rolling purchase of 10y10y € swaption straddles. See "Macro-Hedging: Volatility Strategy", Citi Rates Structuring & Solutions, Oct 2012.

Rates vol trades systematically *cheap* to realized

Mitigating the cost

VIX curve is sharply upward sloping...

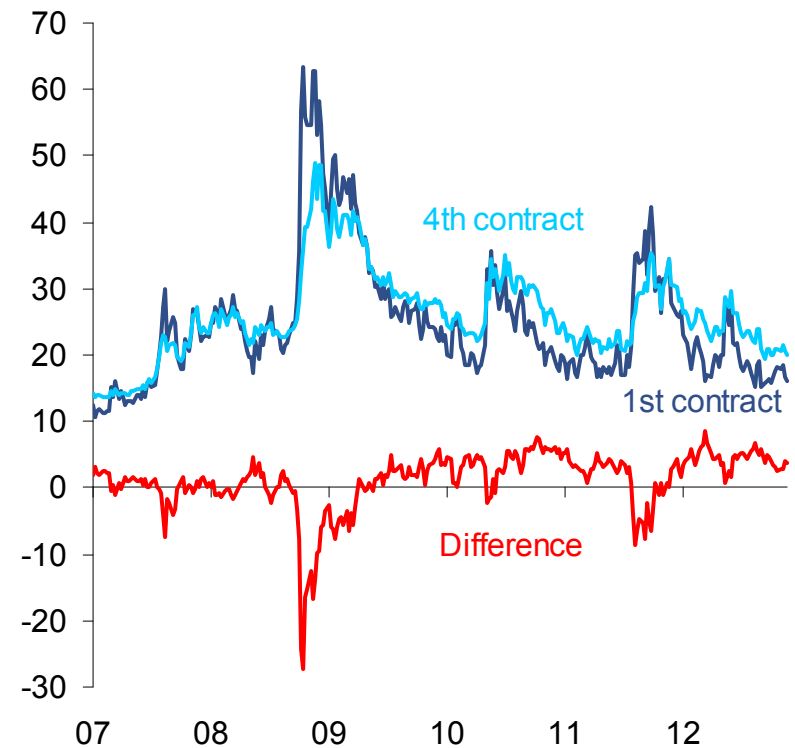
VIX spot and futures levels (%)



Source: Bloomberg.

...but tends to invert when stressed

VIX contract levels, %

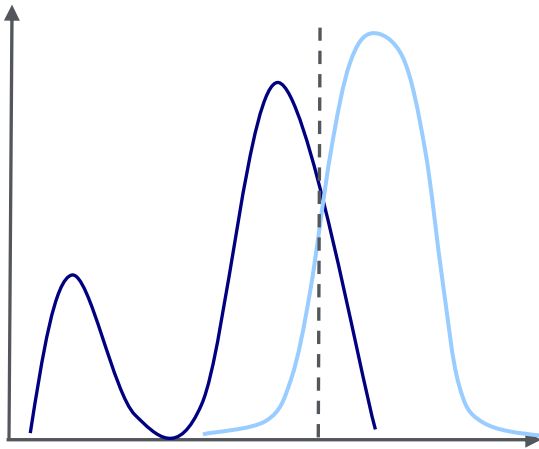


Source: Citi, Bloomberg. See Why Credit Hedge Funds Use Equity Derivatives, O. Sarfati et al, Nov 2012. Recommended roll date is 1 week prior to expiry.

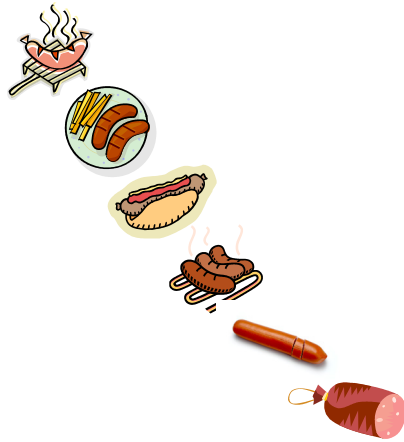
Use calendar spreads to mitigate the cost of time decay

Conclusion

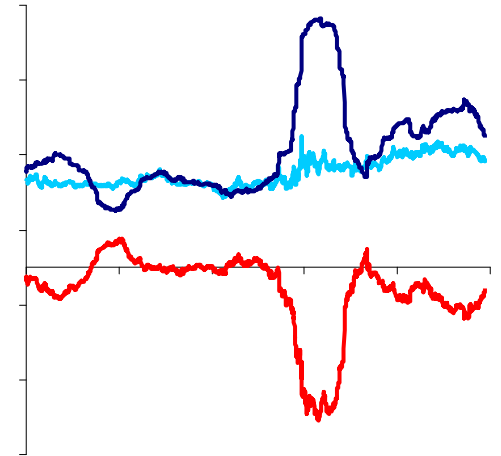
Markets less stable
than they look



No choice but to
reach for yield



But keep a close eye
on the nearest exit



By all means put another sausage on,
but don't leave the barbie unattended

Appendix A-1

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