Key considerations of efficient hedging strategies

Volatility and Tail Risk Educational Event

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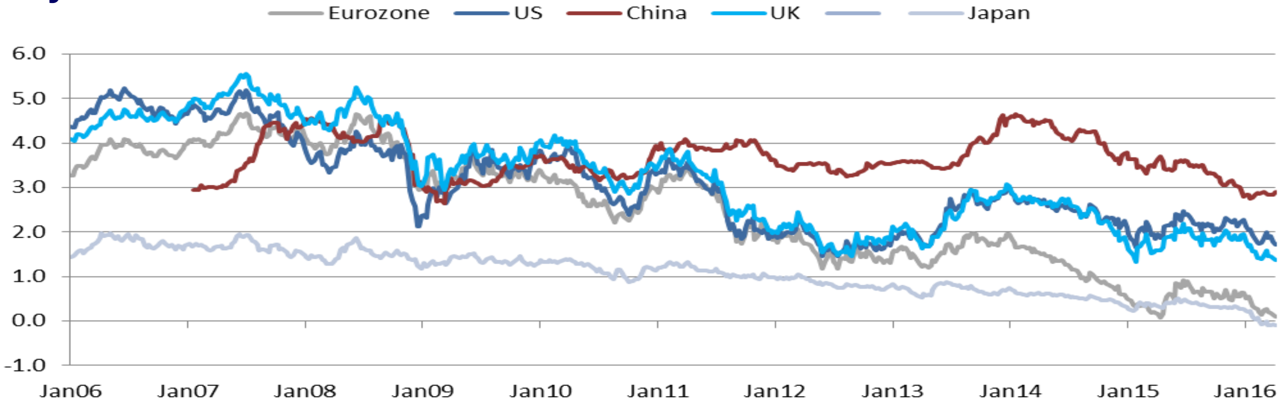
The State of Markets in 2016

Sectors	GDP YoY % Growth 2015	GDP YoY % Growth forecast 2016	CPI YoY % forecast 2016	10 Year %
World	3.10	3.20	3.30	
US	2.40	2.40	0.80	1.80
Eurozone	1.60	1.50	0.40	-0.51
China	6.90	6.50	1.80	2.91
Japan	0.50	0.50	-0.20	-0.10
UK	2.30	1.90	0.80	1.48

10 years Government Yields

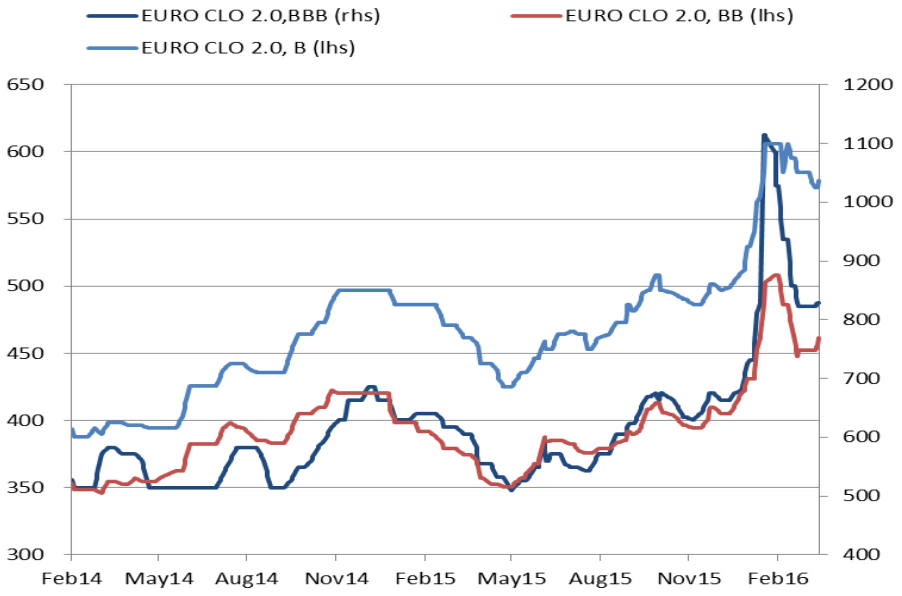


Source: Investment Management, Bloomberg

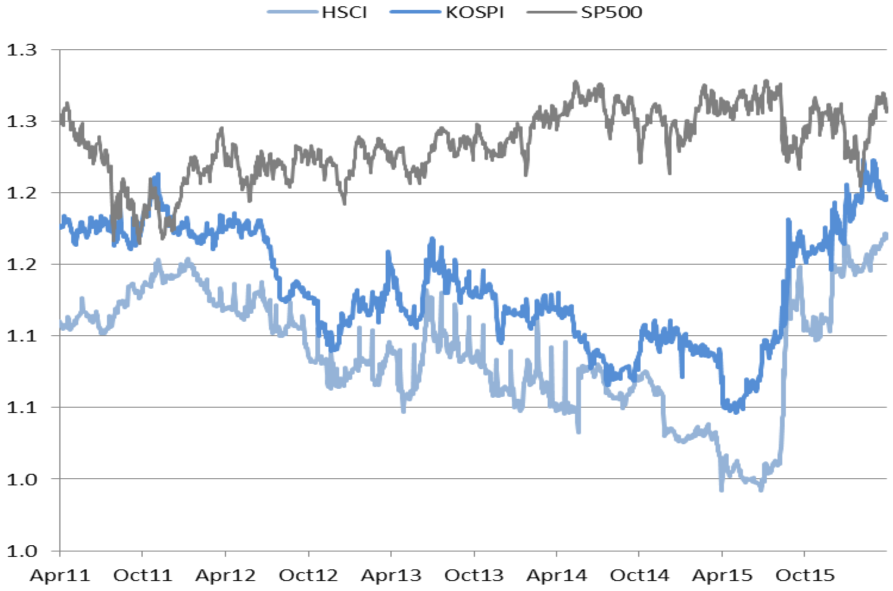
Market dynamics have changed – what are the main drivers today?

Position driven versus flow driven markets

EUR CLO Junior spreads



Volatility ratios (skews)



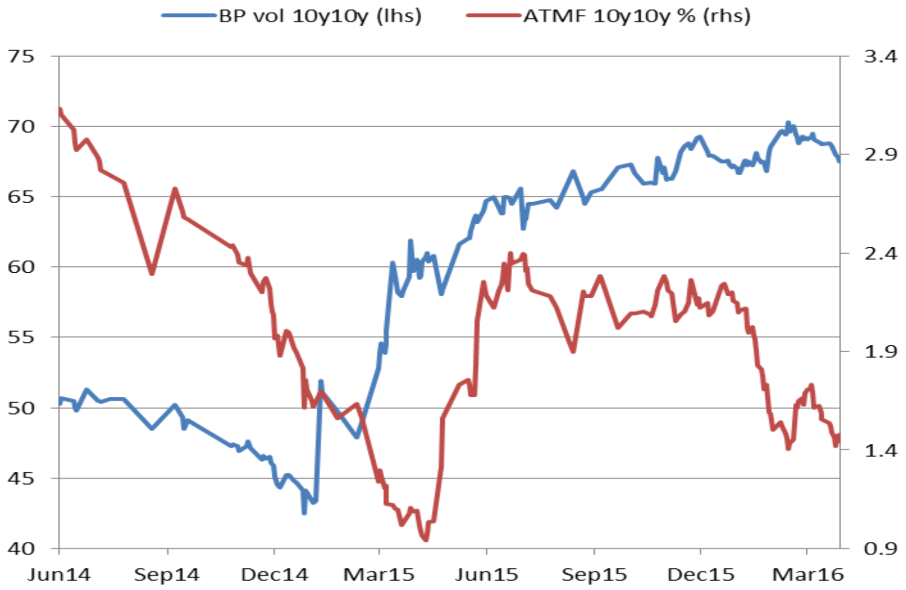
Source: Investment Management, Bloomberg

Unbalanced demand on 0% strike structures

Position driven versus flow driven markets

0% 10y10y EUR Receiver swaption

BP volatility and ATMF developments

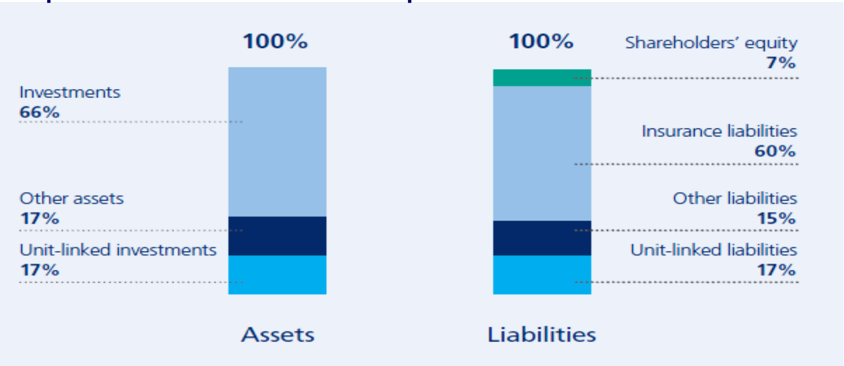


Source: Investment Management, Bloomberg

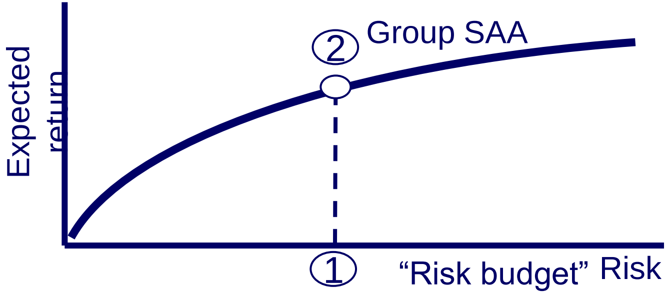
Group Strategic Asset Allocation maximizes expected return relative to liabilities for the given "risk budget"

Investment Management process based on a systematic and structured approach

Simplified balance sheet of an European Insurer



Holistic SAA Process



"Risk budget" 1

- Group plans risk taking by risk type thereby optimizing ROE while considering strategic, liquidity and solvency objectives

Group SAA 2

- IM's mission is to create economic value for the Group by outperforming liabilities for a given "risk budget"
- IM formulates and implements Strategic Asset Allocation on Group level for the assets relative to liabilities and for the given "risk budget"

Implementation 3

- Group SAA is cascaded down to local balance sheets considering local constraints and specific balance sheet requirements

Assets Inventory – what tools are at our disposal?

Minimising unrewarded risks - Focus on the risk inventory that can be quickly shifted based on tested experience

- Core assets / Cash securities
  - Focus on Developed Markets Equities and Government & Government Guaranteed
  - Credit market is expected to **not** be sufficiently liquid based on experience, but can provide some manoeuvrability if actions are sufficiently anticipatory in specific sectors

- Derivatives
  - Linear and option based strategies dominate cash solutions and hence are preferred for speed and rapid build up
  - On an opportunistic basis, derivatives can act as a bridge solution to cash based solutions (i.e. credit)
  - Gap risk calls for increased convexity providing tools. Basis risk will emerge

Key principles of efficient hedging strategies

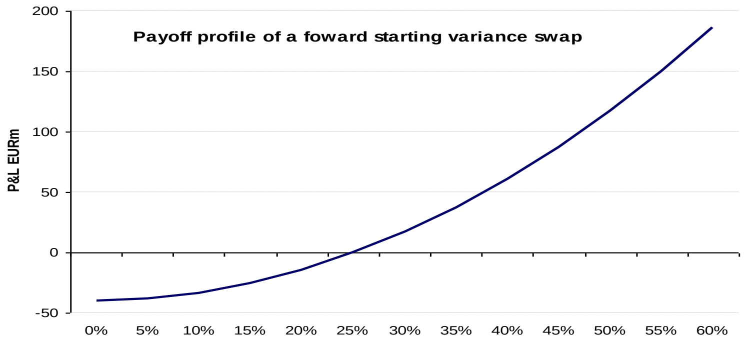
- Identification of the undesired risks
- Estimate the target drawdowns and timing of the events
- Markets and relevant indices – assessment of the prevailing liquidity
- Sizing the hedging Budgets (how much premium / budget should be spent and for what notional?) Cross asset strategies will bring basis risk that needs to be quantified and monitored
- Choosing the ideal hedging strategy – aligning hedge payoff to the view on the risk development based on a cost benefits analysis
- In house implementation requires **pricing capabilities** for execution and frequent dialogues with banks

- ***Exante* portfolio management rules** (management of the way out as opposed to a buy and hold strategy)

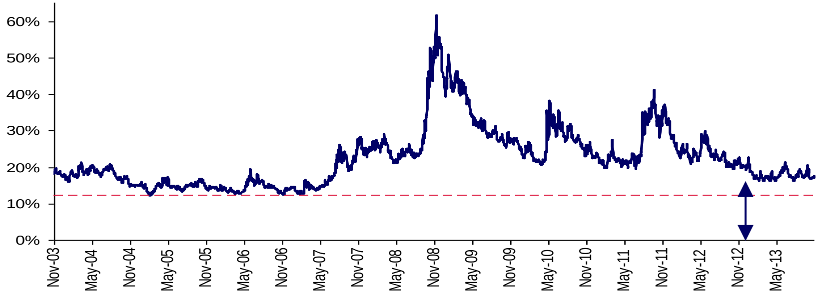
Forward starting swap – Sizing the volatility budget

Variance swap allows investors to obtain exposure to volatility with no directional view

- They don't imply any delta management as opposed to straddles and have a convex payoff as opposed to volatility futures
- Using a forward starting swap to hedge an equity portfolio requires to size the volatility positions to suit risk tolerance
- Two approaches can be used in the determination of the notional:
  - Driven by a rolling beta (bearing the risk that beta changes overtime)
  - Sizing the notional to the maximum possible loss (hence mirroring the purchase of put option)



Volatility never goes to zero – Lowest historical value can be used as a floor



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