



Strategies For Managing CVA Exposures

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CVA Basics – Definitions

- The Credit Value Adjustment (CVA) is a **Fair Value Adjustment** made for the **Counterparty Risk** embedded in every derivative trade

$$PV_{risky} = PV_{risk\ free} - CVA$$

- CVA is a component of the fair value of the derivatives trade, such that a deal valued without its CVA component is effectively mispriced
- CVA (unilateral version) can be assumed (assuming spread / Recovery / exposure independence) as the amount of discounted future Expected Losses

$$CVA = LGD * \sum_{t=0}^{Maturity} PD_{t-1,t} * EPE_t * DF_t$$

Loss Given Default *Default Probability* *Exposure at Default (Discounted)*

CVA Basics – Key Ingredients

■ Expected Positive Exposure (EPE)

- Calculated via simulations process (Monte Carlo...)
- Computation including netting and collateral agreements
- Involves only the **Positive Exposures** in case of Counterparty Default
- Definition of Exposure linked to the mark to market of transaction
- Evaluated **Contingent** on the default of the counterparty
 - including right way / wrong way risks

■ Default Probability

- Implied from CDS spreads (market-implied), proxies, other relevant risk measures

■ Loss Given Default / Recovery Rate

- Market Implied (where possible) : LGD_{Market}
- Internal Recovery measure : LGD_{Internal}

Managing CVA

- CVA Mandates include Pricing / Hedging / Restructuring / Risk Transfers
- Focus on Hedging:
 - Local P&L Volatility / Tail Risks / Specific Situations
 - Jump to Default / Default Management at Horizon
 - Capital Optimization
- Management of a short credit-contingent options portfolio
 - Delta risks (exposure, credit, recovery)
 - Short Gamma / Vega
 - Cross-Gamma
 - Right-way / wrong-way



Delta	Gamma / Vega	Cross-Gamma / Correlations	Wrong-way Risks	Recovery	Legal / Documentation / Gap risk
<ul style="list-style-type: none"> ▪ IRS, FX, CDS... ▪ Bor/OIS, Xccy... 	<ul style="list-style-type: none"> ▪ Swaption, FX option ▪ CDS Option 	<ul style="list-style-type: none"> ▪ CCDS 	<ul style="list-style-type: none"> ▪ Quanto CDS ▪ OTM FX options 	<ul style="list-style-type: none"> ▪ Recovery Locks 	<ul style="list-style-type: none"> ▪ Close-out ▪ Break-clause ▪ Enforceability checks

Managing CVA

- Traditional replication approach: hedging P&L volatility locally
 - Deltas by bucket
 - Vanilla options for Gamma and Vega

- However
 - High-dimensional portfolio (# of underlyings, tenors...)
 - Greeks sensitive to model assumptions (incl. correlations or absence of correlations)
 - Large, unhedgeable cross-Gamma effects
 - Friction costs

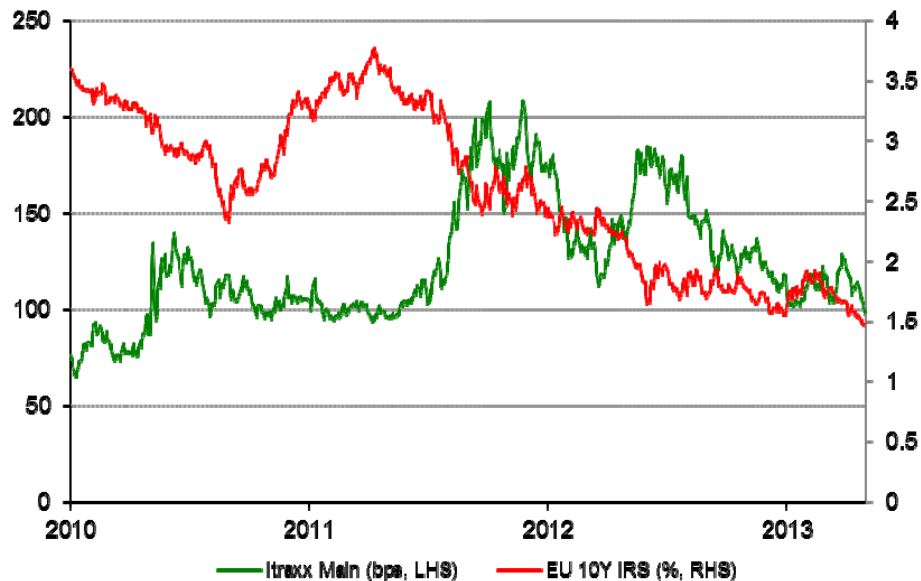
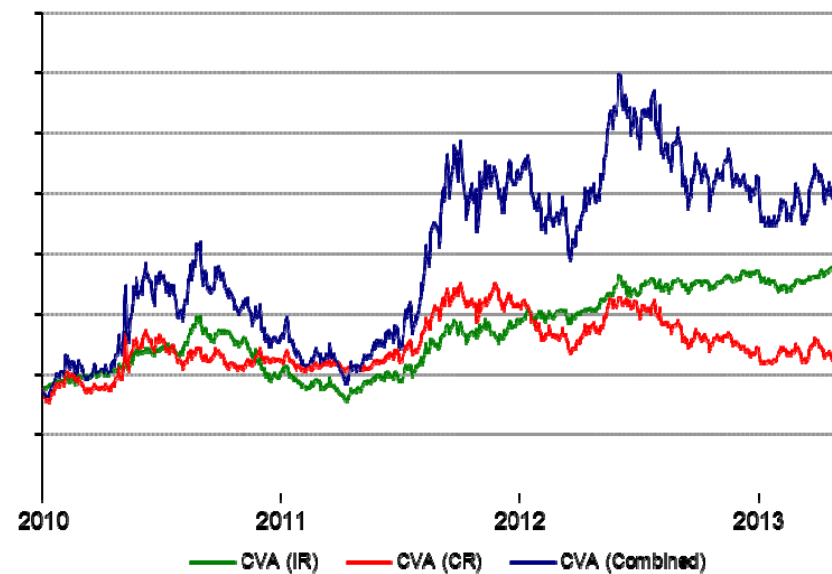
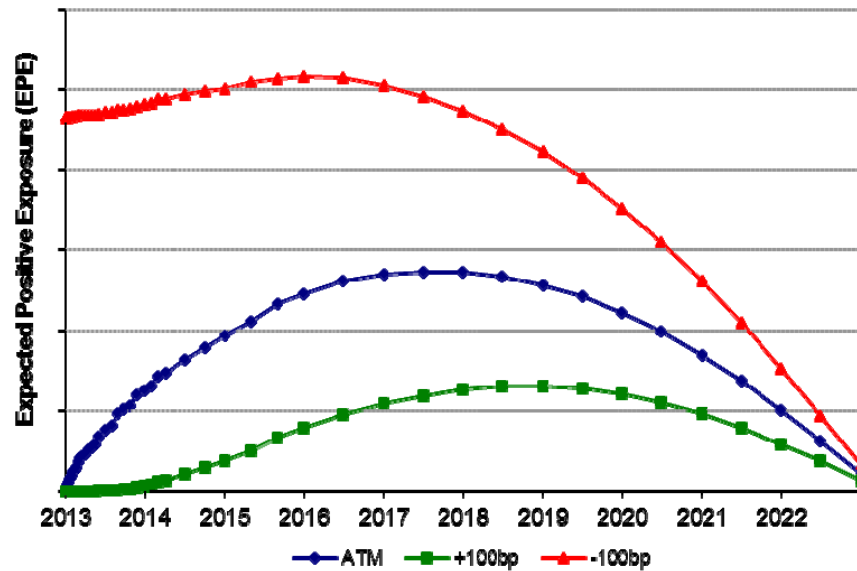
- Suitable strategy
 - Focus on available / most liquid underlyings / tenors
 - Complement simplified local hedging with macro-hedges
 - Trade-off between risk/carry profiles

- Essential: Prepare for more extreme scenarios
 - Anticipate higher than modelled correlations across asset classes
 - Deep OTM options as an overlay to hedging strategy to obtain desired tail risks profile

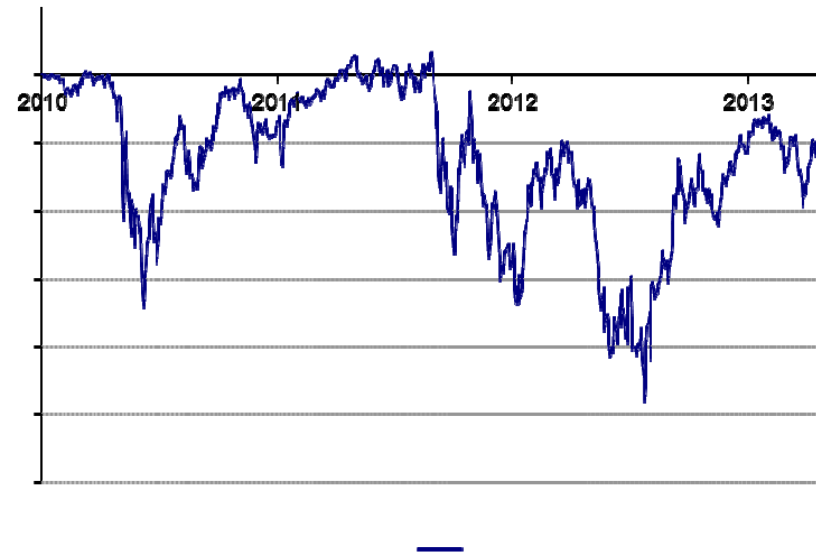
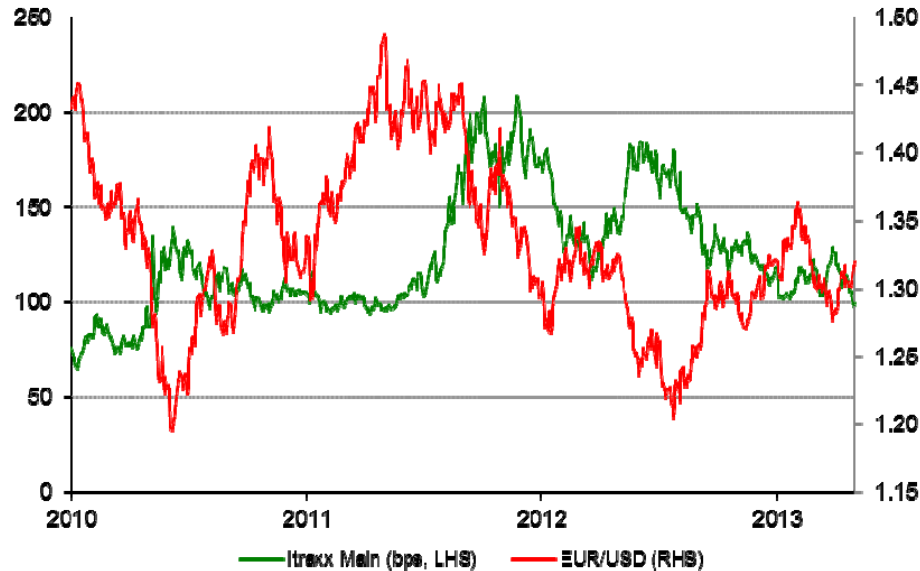
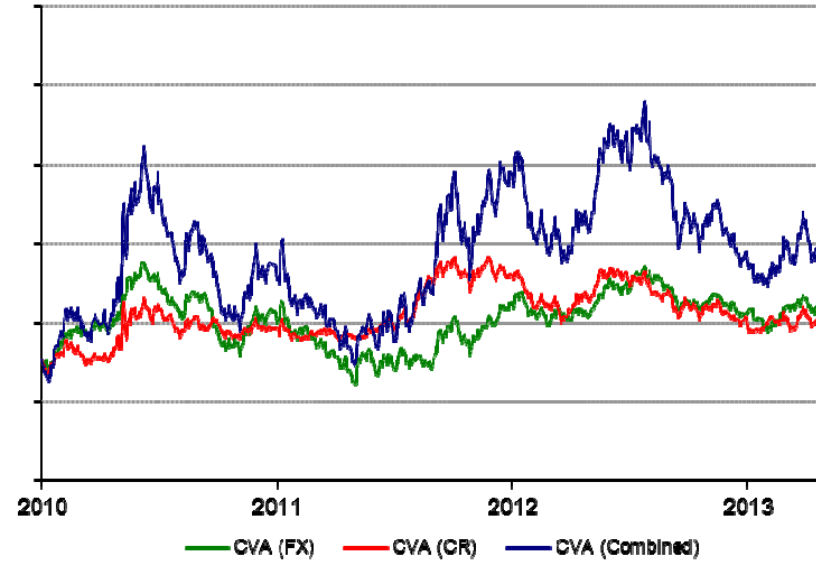
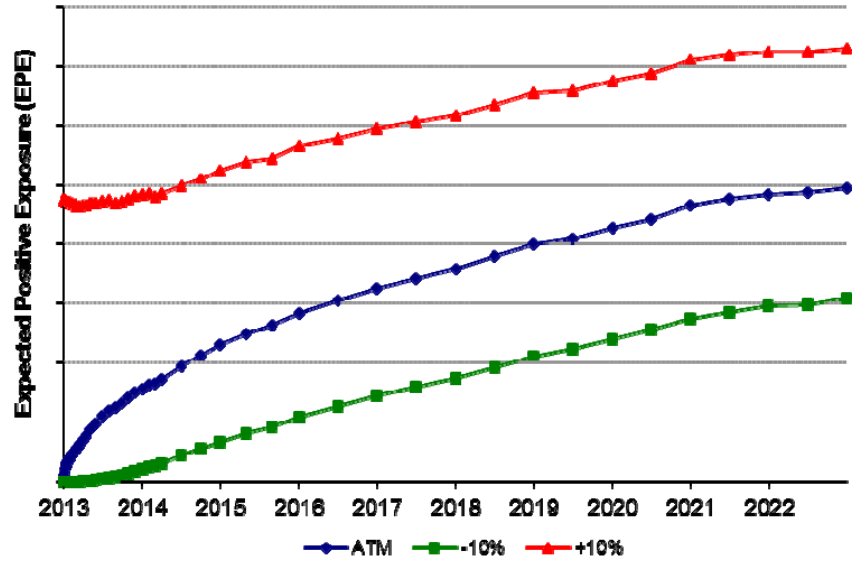
Managing CVA

- Wrong-way risk
 - Materialises when exposure is positively correlated with credit spread
 - Recent example:
 - INR depreciation coupled with Indian names widening
 - Cross-currency positions where dealer lends USD / borrow INR is negatively impacted
 - **Dependence** must be priced properly at inception otherwise P&L losses will occur when re-hedging
 - Quanto CDS (when available) an appropriate hedge for FX/Credit cross-gamma
- Gap risk
 - Large underlying PV moves upon default
 - Specific scenarios or modelling (e.g. recovery distribution) to alter deltas i.e. hedging strategy
- When hedging is difficult/impossible:
 - Design tighter limits with specific monitoring framework
 - E.g. limited envelope to trade. When limit is reached, new business allowed only if position is deleveraged
 - Encourage use of risk mitigants:
 - CSA
 - Independent amounts
 - Recouping mechanisms
 - Consider turning down some business...
- Using DVA
 - Systemic credit risk mitigation
 - Left with idiosyncratic risk on own name (difficult to hedge)
 - Offsets some convexity offset

Managing CVA Correlation - 10y EUR Receiver swap



Managing CVA Correlation - 10y EUR/USD Xccy swap



Hedging Credit Risk

■ Idiosyncratic Risk

- Single-name CDS
 - Reference entities perfect match
 - Good proxy (Hold Co v. Op. Co, Region v. Sovereign, etc.)
 - Peers
- Bonds
 - Useful for marking purposes but difficult to short
- Basket of single-names
 - Attractive proxy but costly to replicate / can create more idiosyncratic risk
- Beware of jump-to-default / recovery risk
 - Event of default trigger mismatch (Borrowed Money for CDS vs. larger universe for ISDA)
 - Recovery determination timing and process (CDS auction vs. liquidation process)

■ Systemic Risk

- Projection on indices (simple beta-weighted projection or PCA)
- Options on indices / Index tranches
- Portfolio approach:
 - Balance risk across regions/countries and industries

CVA Management – Basel III impact

- Apparent initial alignment between Economic and Regulatory CVA definitions
 - Extensive use of CDS and CDS-based proxy baskets for default probability and recovery
 - EPEs computed using internal model

- However the Regulatory approach significantly differs from the Economic one:
 - Constrained mapping of exposures onto CDS and proxy baskets (EBA definitions)
 - Different quantities to hedge (Expectation vs. Quantile)
 - Only selected credit instruments eligible for a CVA VaR reduction:
 - CDS single-name, CDS index, Bonds, CCDS, CDS options
 - Exposure hedges (e.g. IR swaps, options...) can't mitigate CVA VaR
 - Applies to non-US banks, as they are currently recognised under the US implementation
 - No correlation between credit and exposures
 - No DVA
 - Exemption applied to Sovereigns, Corporates and Pension Funds
 - US implementation doesn't include it
 - Still being debated as some European regulators are likely to reject it

- Undesired consequences:
 - Exposure hedges generate Market VaR for European banks
 - Incentive to use Basel III eligible hedges only to reduce capital charge
 - Arbitrage between P&L volatility / cost of hedging and cost of capital

CVA Management – Alternatives to Hedging

- CSA Agreements
 - Residual risk (slippage risk) even with a daily cash margining, zero-threshold contract however small
 - New standard contracts, re-negotiation of existing contracts
- Novating trades under unfavourable terms (e.g. no collateral or one-way CSAs) to another counterparty
 - Difficult to agree on a price as fee will include other elements such as funding or capital costs
 - Package made of two transactions – one risk-increasing and one risk-reducing may facilitate the execution
- Backloading clearable trades into CCPs
 - Carefully selected package can both decrease CVA/RWA and Initial Margin requirements
 - CVA/RWA risk is recycled into liquidity risk (assuming RWA charge against CCPs are small)
- Bilateral initiatives
 - For instance exchanging an in-the-money swaption for an out-the-money swaption and a swap
 - Recouping
- Trades compression
- And more:
 - Illiquid collateral posting
 - Mark-to-market reset mechanisms
 - ...

Questions
