Benefits and Costs of Active Counterparty Risk Management

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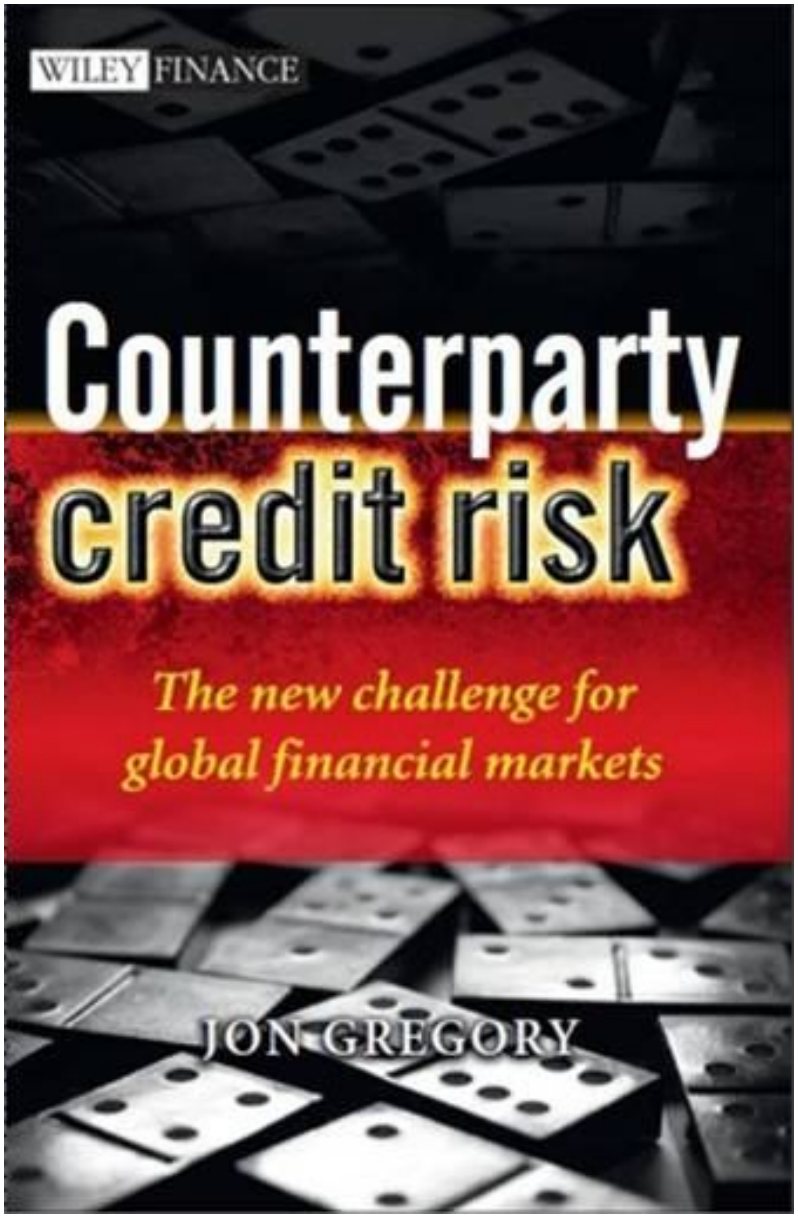

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Counterparty Casino:
The need to address a systemic risk

By Jon Gregory

A (Seemingly) Random Example

- The leveraged super senior (LSS) transaction
  - Popular way of buying super senior protection pre-crisis
  - But the structure was so complex that it was almost impossible to assess the risk
  - Which was rather convenient

CUTTING EDGE. CREDIT DERIVATIVES

A trick of the credit tail

*Leveraged super-senior (LSS) trades represent a mechanism for packaging senior credit risk. Many LSS structures have been issued to date and yet there seems to be no formal pricing approach. In this article, **Jon Gregory** discusses the valuation of LSS protection in a model-independent framework. He argues that the 'equivalence' approach to pricing that seems widely used is not appropriate*

The structured credit market has grown rapidly in recent years with the use of synthetic collateralised debt obligations (CDOs), which allow issuers to sell a particular tranche of a portfolio hedged with more simple instruments such as single-name credit default swaps. One problem in the early development of the CDO market was the fact that correlation was a key input to the pricing but was a rather opaque quantity. The development of the index tranche market in 2004 provided a solution to this problem of observability, and has led to correlation trading across the capital structure for corporate credit portfolios and other asset classes such as asset-backed securities (ABSs), leveraged loans and commercial mortgage-backed securities.

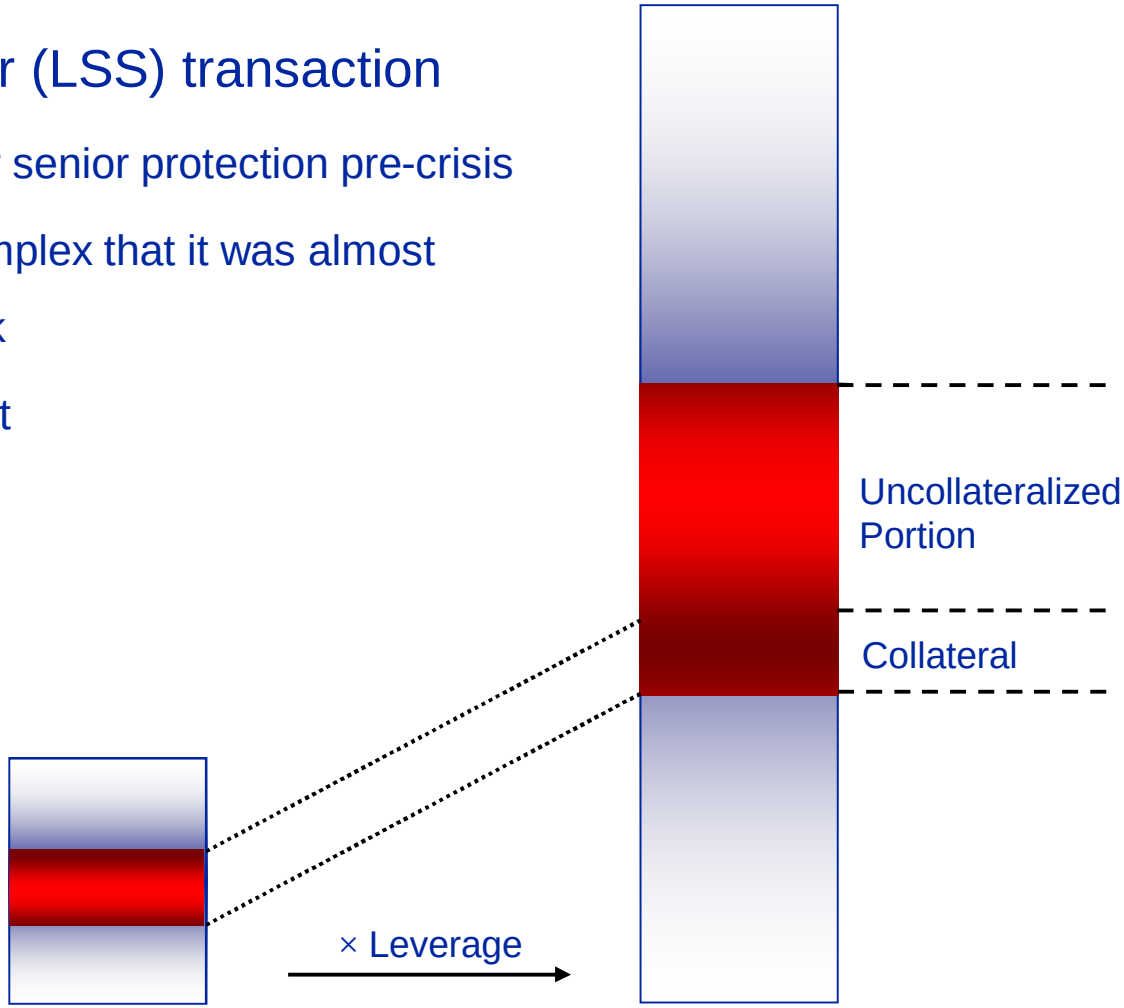
problems arising from the market turbulence of July and August 2007, which created significant mark-to-market losses from a position taking super-senior credit risk (a result of spread widening and increases in implied correlation). Our focus will be a robust theoretical pricing study and not other qualitative aspects such as rating agencies' approaches and problems arising from the disruption in the Canadian conduit market.

The leveraged super-senior structure

The premise of the LSS structure is that super-senior spreads in unleveraged form do not have the correct risk-return profile for many investors since their premium is too small and the issuer therefore applies leverage to the product to create a more attractive return. The leverage in a LSS transaction reflects the fact that the investor's cash participation is less than the notional of the super-senior tranche. For example, a $10 million investment may be leveraged 10 times into a super-senior tranche with a notional of $100 million. The investor has sold protection on $100 of protection but posted only $10 initial collateral. Generally, for a leverage of x times, the investor will initially commit $1/x$ units of collateral, as illustrated in figure 1. LSS trades have mostly been structured on corporate credit but also, more recently, on ABS portfolios.

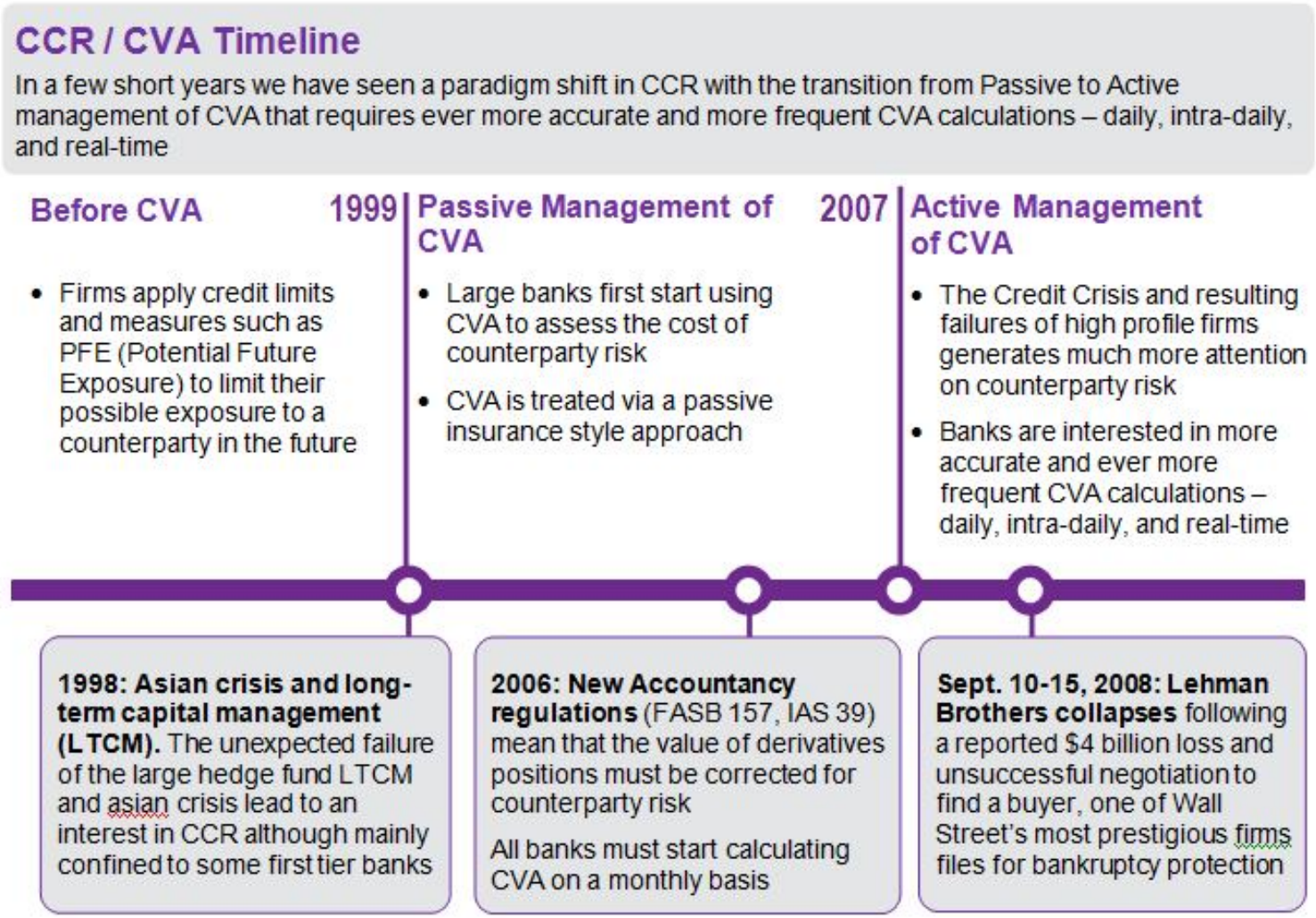
There needs to be a mechanism to mitigate the risk that the LSS issuer retains via the uncollateralised exposure. This is achieved using a 'trigger event', where the investor might have the option to de-leverage by posting more collateral but will otherwise face the structure being unwound by the issuer at prevailing market rates.

To understand the LSS trigger mechanisms, note that the value



- History of CVA
- Why Manage CVA?
- The Benefits
- The Costs
- Future Trends

History of Counterparty Risk and CVA



Source: Algorithmics

CVA (Credit Value Adjustment)

- CVA is the price of counterparty risk (expected loss) and is a **cost**

$$\text{Risky Derivative} = \text{Derivative} - \text{CVA}$$

- Crucial to be able to separate valuation of derivatives and their CVA (below formula assumes no wrong way risk)

$$CVA(t) = (1-\delta_C)\int_t^T EE(u)\,dPD_C(u)$$

Percentage recovery value

Expected exposure including discounting (how much we expect to lose)

Default probability (how likely is counterparty to default at this time)

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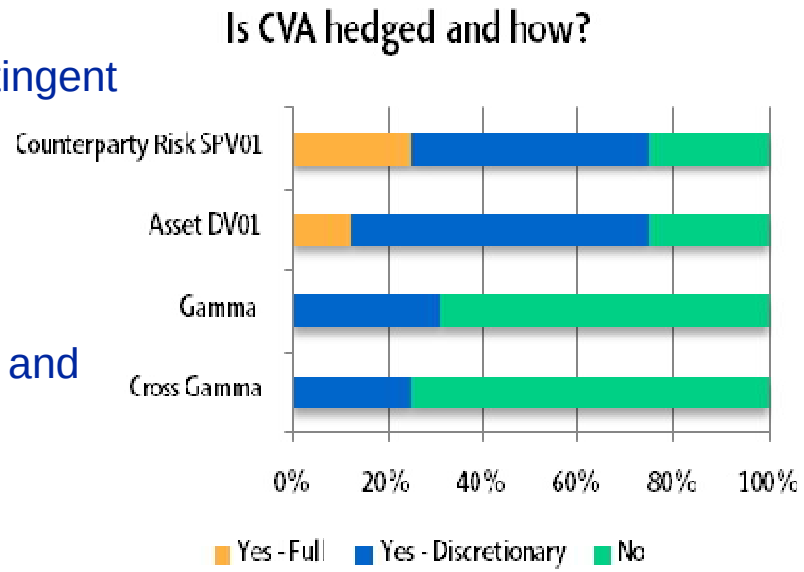
The Birth of the CVA Desk

- Requirements to mark-to-market CVA in all derivatives positions
- This creates two obvious key problems
  - How to allocate the CVA across businesses / trading desks
  - How to avoid the volatility of all the CVA due to market movements (especially specifically credit spreads and volatility)
- Creates the need for an institution to have a specialised group to tackle this across all businesses
  - Transfer price CVA from point of origination
  - But will banks be better off trying to hedge their CVA?
  - Basel III and future changes in accounting practices may make this argument somewhat academic

CVA Trading is a Challenge

- Pricing
  - Must price via a transparent and industrialised methodology
  - Cannot reject trades without strong justification
  - Should give credit for all risk mitigants (netting, collateral, break clauses)
- Hedging
  - Management of a cross asset credit contingent book
  - Trade on only one side of the market
  - Some risks are not directly hedgeable
  - Wrong way risk causes negative gamma and cross gamma



CVA Charges Are Too High

- Most banks agree that a basic CVA calculation gives a “charge” that is simply too high
  - Corporate clients (for example) will not pay their entire credit spread in a CVA because banks have material credit spreads
  - Interbank market – cannot both charge for counterparty risk
- There are many ways in which the CVA is reduced (hidden?)
  - DVA
  - Ignoring CSA counterparties (CVA treated as zero even though it isn’t)
  - Use of a higher “ultimate” recovery (Lehman effect CDS auction recovery ~9%, ultimate recovery potentially up to 30-40%)
  - Central counterparties
  - Use of historical or blended default probabilities (does this suggest that some banks prefer not to dynamically hedge CVA?)

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Motivation for CVA

- Risk management need
  - An institution should consider counterparty risk as with other financial risks
  - CVA should be priced into trades to avoid adverse selection (traders find it more profitable to trade with weaker counterparties)
  - Trading should be judged on profit **after** CVA has been accounted for
  - But banks find it hard to lose PnL / franchise value
- Financial accounting
  - Periodic CVA calculation to quantify fair value of derivatives for accounting purposes
  - But precise calculation not well-defined, different standards exist (e.g. IAS39, FASB157..)
- Regulation
  - Achievement of optimum regulatory capital relief through good management of CVA
  - No ambiguity around the Basel 3 requirements (but depends on implementation process)

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Regulatory Reaction to the Credit Crisis

- Stressed EPE
  - IMM Banks must calculate exposures using stressed market data
- Wrong way risk
  - Must identify “general” WWR and assume a higher exposure for “specific” WWR
- Systemic risk
  - Correlation multiplier (1.25) for large regulated / unregulated financial firm exposure
- Collateral.
  - A “margin period of risk” of 20 days must be applied for certain transactions
- Central counterparties
  - Risk weighting of 2% for CCPs which meet various rigorous conditions
- CVA VAR
  - Banks must hold additional capital to capture the volatility of CVA

CVA Risk Capital Charge (Basel III)

- CVA definition is based on spreads NOT default probabilities

$$CVA \approx LGD_{mkt} \sum_{i=1}^{T} \max\left(0; \exp\left(-\frac{s_{i-1}t_{i-1}}{LGD_{mkt}}\right) - \exp\left(-\frac{s_i t_i}{LGD_{mkt}}\right)\right)\left(\frac{EE_{i-1}D_{i-1} + EE_i D_i}{2}\right)$$

Default probability term

Exposure term

- What if we can't find the spread of a counterparty?
  - *"Whenever the CDS spread of the counterparty is available, this must be used. Whenever such a CDS spread is not available, the bank must use a proxy spread that is appropriate based on the rating, industry and region of the counterparty."*
  - **This could become self-fulfilling when hedging with the index!**

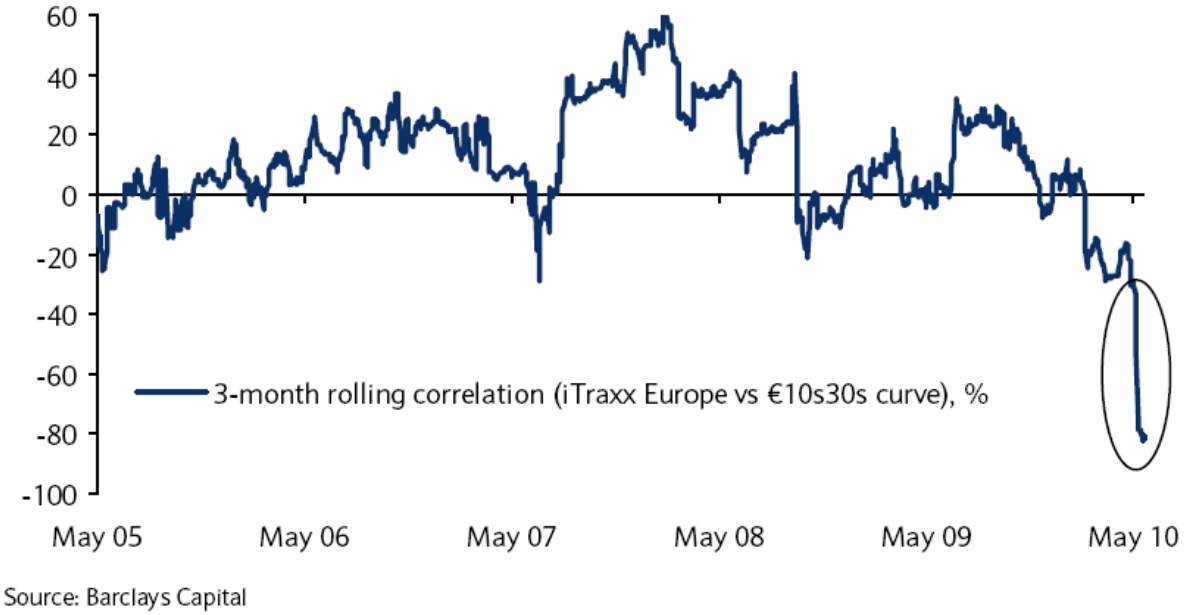
The Problems With CVA VAR

- Index hedges
  - Self-fulfilling with respect to mapping of credit spreads
  - Encourages procyclicality?
- Methodology
  - Intended to capture in a simple way the credit spread risk within CVA but gives no incentive for hedging other factors (IR, FX, …..)
- Motivation
  - OTC derivatives are relatively precisely valued, their VAR is much harder to quantify
  - CVA itself is hard to quantify so CVA VAR is surely a major challenge?

Unintended Consequences of CVA

"… given the relative illiquidity of sovereign CDS markets a sharp increase in demand from active investors can bid up the cost of sovereign CDS protection. CVA desks have come to account for a large proportion of trading in the sovereign CDS market and so their hedging activity has reportedly been a factor pushing prices away from levels solely reflecting the underlying probability of sovereign default."

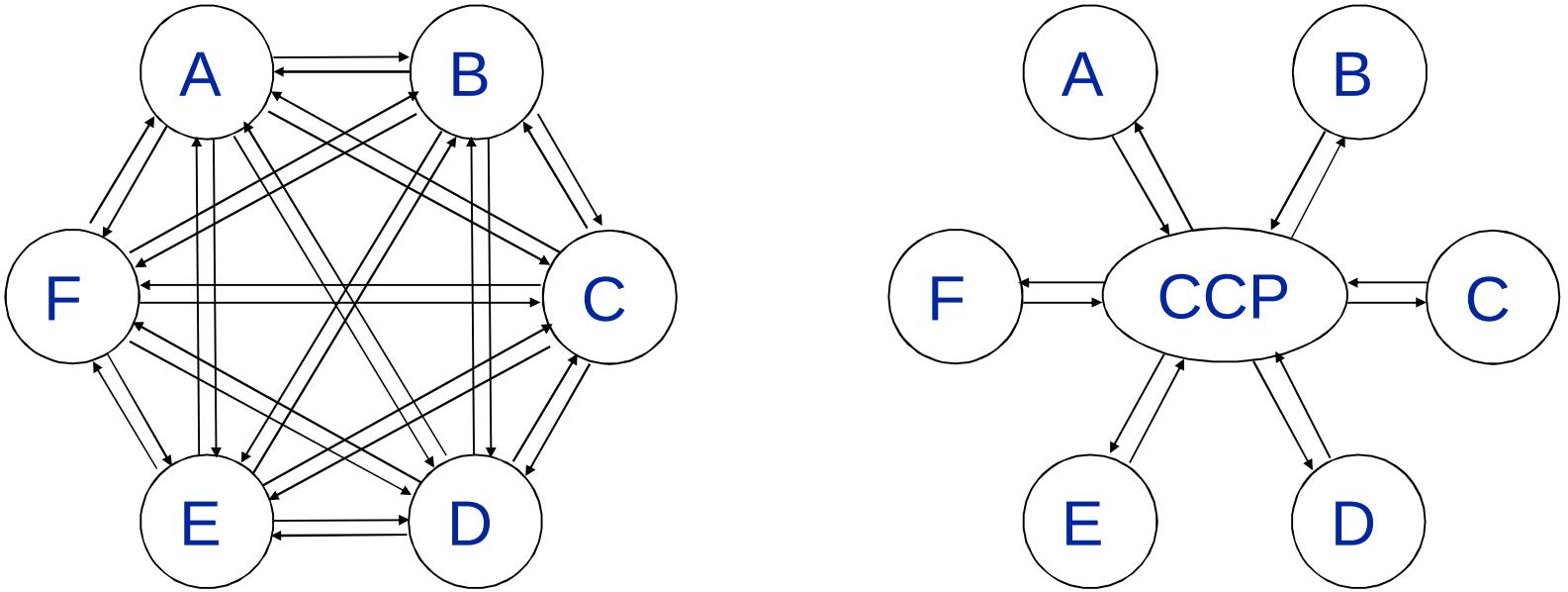
Bank of England Q2



Source: Barclays Capital

- CVA desks with similar hedging requirements
  - Extreme moves in a single variable (e.g. spread blowout)
  - Sudden change in co-dependency between variables (creating cross gamma issues)
  - At this point do we stop hedging bear the pain?

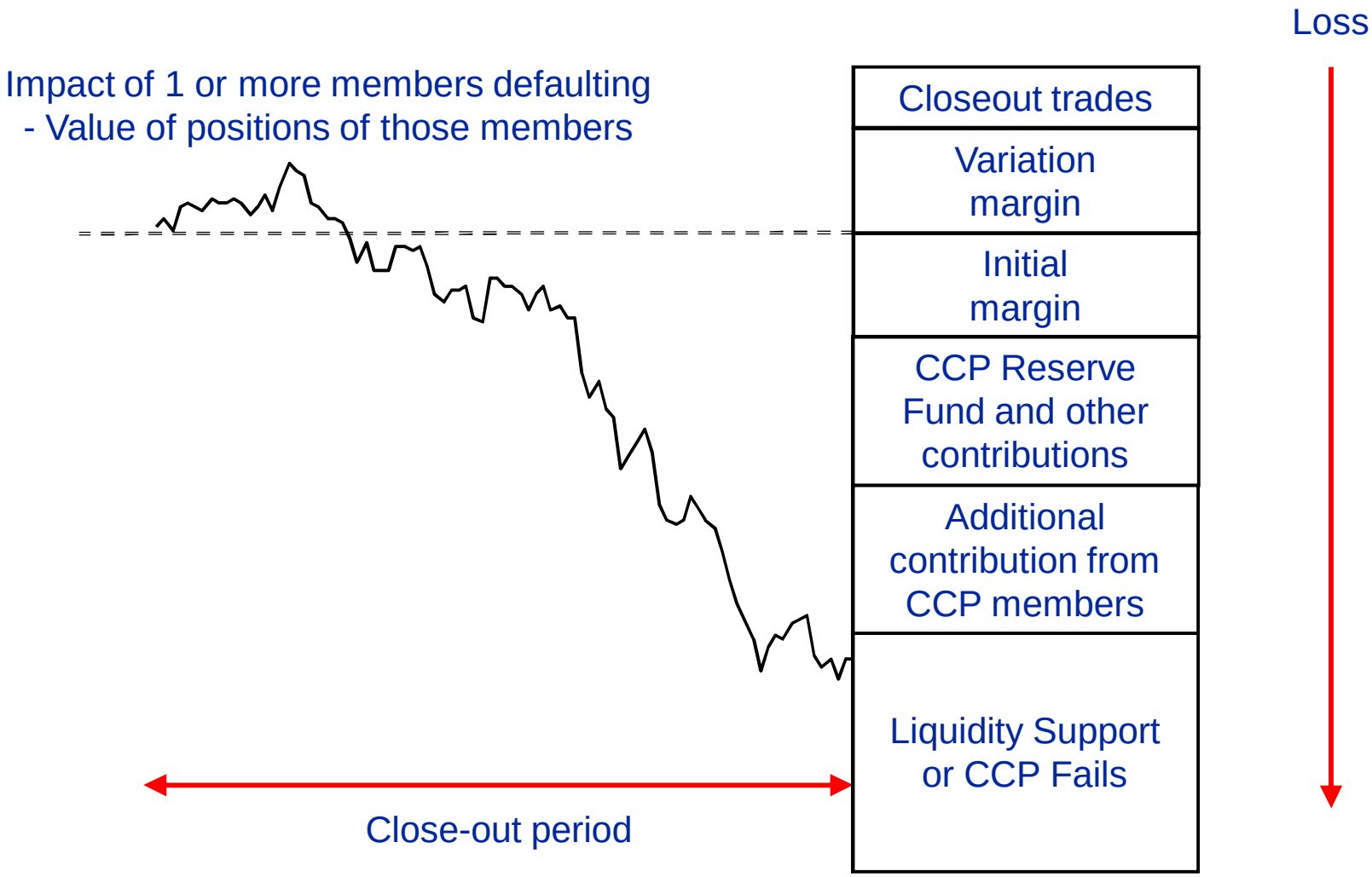
Central Counterparties



Functions of a CCP

- Pricing, market data
  - CCPs provide the valuation of the relevant the OTC derivatives
  - This limits the complexity of the derivative
- Netting / trade compression
  - CCPs can give lower margin requirements for offsetting trades
- Collateral management
  - A CCP performs the collateral management function by making margin calls
- Insurance / Mutualisation
  - A CCP provides insurance via loss mutualisation process where any loss caused by the default of a CCP member is absorbed by all other CCP members
- Auction process
  - In the event of default of a member, a CCP will auction their positions
  - CCP members are normally required to participate in this auction

Can a CCP Fail?



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What Can We Do With CVA?

- Basel III forces banks to price and manage CVA actively - what can you do?
- Trade out of CVA?
  - Hedging - possible but limited single name CDS market makes this difficult
  - Securitize it – might not be an easy idea to sell to the regulators
- Take more collateral?
  - Converts CVA into funding liquidity risk and residual unhedgeble “gap risk”
  - Limitations over counterparties who can sign CSAs (e.g. corporates, sovereigns)
- Trade through central counterparties?
  - More funding requirements than CSAs
  - Then the CCPs take all the CVA and creates a new too big to fail problem

Benefits of Collateral

	Uncollateralised (No CSA)	Collateralized (2-way CSA)	Overcollateralized (CCP)
CVA	←	←	←
DVA	→	→	→
Funding	→	→	→
Regulatory Capital	←	←	←

Conclusion

- Hedging according to Basel III, CSAs and Central Counterparties all convert CVA into other risks (funding, liquidity, gap, systemic, ……)
- Like the LSS trade, all these things make the underlying risk more complex and hard to quantify
- Key focus will be on balancing
  - how best to manage CVA from a purely economic point of view
  - how best to manage CVA from a regulatory perspective
- CVA VAR and CCPs do not obviously provide a sound alignment of the above