The Benefits and Dangers of Mitigating CVA

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OTC Derivative Trading Relationships

- Institution
- Counterparty

No Netting

- CSA (Legacy)
- SCSA (New)

Central cleared trades
- CCP1
- CCP2
- CCP3
- CCP4
- CCP5
CVA is a Challenge

• Quantification
  – Calculation of exposure as option position
  – Portfolio position implies a multi-asset underlying
  – Hard to determine credit curves for many counterparties
  – Wrong-way risk
  – Debate over DVA

• 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
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

- 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?
Counterparty Risk Mitigation Methods

• Netting
  – Payment and closeout netting very well used and standard in most jurisdictions
  – Some legal risk exists but minor

• Trade compression
  – Allows multilateral netting up to a point (diminishing returns)
  – Small operational risk exists

• Collateral
  – CSAs allow further reduction of exposure, technically to zero
  – But risk mitigation is problematic and can lead to significant operational and liquidity risk

• Central clearing
  – Gets rid of CVA
  – But creates a new too big to fail problem and potentially severe liquidity problems
The Impact of Collateral

Reduce Counterparty Risk

No CSA → CSA → SCSA → Centrally Cleared
Collateral

• Issues?
  – Operational risk / liquidity risk
  – Cash? Rehypothecation? Cheapest to delivery optionality
  – Margin period of risk, jumps and high volatility
Calculating Exposure with Collateral

\[ E_t = \max(V_t - C_{t-k}, 0) \]

- Positive exposure at time \( t \)
- Positive MtM at time \( t \)
- Total collateral account \( k \) days ago

\begin{itemize}
  \item Obvious problems
    \begin{itemize}
      \item Can’t ask for enough collateral
      \item Can’t get it quickly enough
      \item Have to post collateral ourselves
    \end{itemize}
\end{itemize}
Taking Collateral Reduces Risk

- Zero threshold – impact of delay and minimum transfer amount
Returns Increase Risk

- Zero threshold, two-way CSA
A CSA Reduces PFE more than CVA

- Impact of two-way CSA on PFE and EE (CVA)
CSA Impact on CVA

- Impact of CSA on exposure assuming 20-day remargin period (Basel 3)
CVA With Independent Amount / Threshold

![Diagram showing the relationship between independent amount (initial margin) and CVA (GBP) against the threshold.](image_url)
CVA and Collateralised Trades

Are collateralised trades included in the universe?

- Yes
- No

Solum CVA Survey July 2010
Central Counterparties

- Impact of CCPs (and initial margin requirements) in the future
  - CCPs overcollateralise and do not charge CVA
  - Strong incentives and/or requirements to centrally clear OTC derivatives
  - Moral hazard – CCP members *could* be exposed to default losses if a member defaults no matter what their positions with that member were
  - A new “too big to fail” problem
CCP Loss Waterfall

- Allocation of losses after CCP has closed out trades and liquidated variation margin

- Initial margin
- CCP equity
- CCP Reserve Fund
- Additional capital contribution from CCP members
- CCP Capital
- Liquidity Support or CCP Fails

Defaulter pays

Moral hazard
Logistical Questions for a CCP

- How many CCPs should there be?
  - **Netting** benefits, regional and product issues

- What about end-users of derivatives
  - Cannot be CCP members
  - If they trade through a member what happens if that member (or their clients) default?

- Should CCPs be linked?
  - Cross-margining benefits
  - But now one CCPs failure can impact another CCP (**political risk**)

- Are CCPs too big to fail?
  - Not clear, depends on who you ask (US, Europe) – **systemic risk**
Impact of CCPs

- CCPs centralise operational and legal risks and allow multilateral netting
  - Can lead to efficiencies of scale
  - Multilateral netting may reduce systemic risk if it dominates loss in bilateral netting benefits although this seems unlikely (Duffie and Zhu)

- Loss mutualisation creates moral hazard

- Increase **funding liquidity risk**
  - From significant initial margin and CCP capital requirements

- Increase in **systemic risk**
  - Multilateral netting potentially increases exposure in multi-CCP world
  - CCPs may increase margin requirements in volatile markets
Basis for Optimisation

- Arrow denotes the ideal situation

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<tr>
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<th>Overcollateralised (CCP)</th>
<th>Collateralised (Two-way CSA)</th>
<th>Uncollateralised (No CSA)</th>
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<tr>
<td>CVA</td>
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Meet the Family

Value = Risk-free Value

- CVA + DVA - FCA + FBA ± CollVA + ...........

Counterparty risk
Funding liquidity risk
Other components

“Risk-free” valuation
CVA, DVA and FVA

Impact of independent amount (initial margin)

Overcollateralised (CCP)  Collateralised (Two-way CSA)  Uncollateralised (No CSA)
Combining CVA, DVA and FVA

• Consider the combined impact of counterparty risk and funding
  – Counterparty spread = 500 bps, own spread = 250 bps, CDS bond basis = -50 bps

• What about DVA and FBA?
  – Different theoretical assumptions can allow derivation with one or the other but not both (e.g. Burgard and Kjaer) – double counting
  – We’ll consider the symmetric funding + CVA (CVA + FCA + FBA)

• CVA with independent amount?
  – In theory could be large since if CCP fails lose initial margin + reserve fund contribution
  – But in reality CCPs are “risk-free” so assume no CVA with an independent amount
  – We don’t therefore account for riskiness of a CCP and potential loss of reserve fund if another CCP member defaults
Overall Effect

- Push to central clearing
- Two-way CSA with low threshold

Independent amount / Threshold (GBP millions)

CVA + FCA + FBA (GBP)

Trade with risk-free CCP but with very small initial margin 😊
Conclusion

Reduce Counterparty Risk (but debateable how much)

- No CSA
- CSA
- SCSA
- Centrally Cleared

Increase Funding Liquidity and Systemic Risk

- Legal risk, political risk, moral hazard may all pose greater problems