The Role of Counterparty Risk in the Credit Crisis

Jon Gregory
jon@oftraining.com
www.oftraining.com
Lessons Learned (2007-2009)

• “Too big to fail” concept is flawed
• Triple-A counterparties do not necessarily represent minimal counterparty risk
• Legal risks need to be carefully considered (rehypothecation of collateral, SPVs, netting)
• Market participants will inevitably create wrong-way risks (hedge funds, monolines, banks)
• You can easily disguise and repackage counterparty risk (CCDS, gap risk, legal risk, …) but you cannot easily get rid of it
The Role of Counterparty Risk in the Credit Crisis

i) *The OTC derivatives market in the context of counterparty risk*
The Birth of OTC Derivatives

- OTC dominate exchange traded derivatives
- But credit crisis has curtailed strong growth in derivatives markets
OTC Derivatives Market

• Characteristics of the OTC derivatives market
  – Dominated by a relatively small number of large “dealers”
  – Potentially highly complex and customised products
  – Strong reliance on risk mitigation methods to allow gross credit exposure to grow exponentially

• The “too big to fail” assumption
  – Many market participants, consciously or not, considered the probability of many institutions failing to be zero
  – Monolines, large banks etc
  – This had the impact of obscuring a lot of counterparty risk
Mitigating Counterparty Risk

• There are many methods available to mitigate counterparty risk in the OTC derivatives market
  – Netting
  – Close-out
  – Additional termination events
  – Collateral
  – Hedging
  – (Central counterparties)

• Yet we still ended up in a major counterparty risk crisis
Birth of the Crisis

• Both exposure and default probability were underestimated

• Default probability
  – Lehman, monolines will never fail
  – Sometimes based on backwards looking rating based methods

• Exposure
  – Rehypothecation of collateral
  – Collateral quality
  – Poor assessment of wrong-way risk
The Role of Counterparty Risk in the Credit Crisis

ii) Unilateral and bilateral counterparty risk
Unilateral Credit Value Adjustment (CVA)

• Allows the risky value of a derivative(s) to be represented as the risk-free value less a specific term

• This term is often referred to as the credit value adjustment (CVA)

\[ CVA_{\text{unilateral}} \approx \text{LGD}_C \times \text{PD}_C \times EPE \]

- Loss given default
- Default probability
- Discounted expected positive exposure

• This can be thought of as the expected value of the possible future losses on the contract or “netting set” of contracts

• Unilateral CVA is a cost
Unilateral CVA in the Old Days

<table>
<thead>
<tr>
<th>Credit Rating</th>
<th>Credit spread (bps)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bank</td>
<td>Aa1/AA+</td>
</tr>
<tr>
<td></td>
<td>10-15</td>
</tr>
<tr>
<td>Corporate</td>
<td>A3/A-</td>
</tr>
<tr>
<td></td>
<td>200-300</td>
</tr>
</tbody>
</table>

- Bank is “too big to fail”
  - Bank charges corporate unilateral CVA
  - If corporate asks for banks default probability to be taken into account, they get laughed at
- No CVA charges in interbank market (all too big to fail)
- When bank credit quality deteriorates, market becomes gridlocked
Bilateral CVA

\[ CVA_{bilateral}^I \approx LGD_C \times PD_C \times EPE - LGD_I \times PD_I \times EN \]

- Bilateral CVA is symmetric so counterparties agree on a price
- Example

<table>
<thead>
<tr>
<th></th>
<th>Our point of view</th>
<th>Counterparty point of view</th>
</tr>
</thead>
<tbody>
<tr>
<td>CVA</td>
<td>3.480%</td>
<td>1.235%</td>
</tr>
<tr>
<td>Adjusted CVA</td>
<td>2.766%</td>
<td>0.799%</td>
</tr>
<tr>
<td>BCVA</td>
<td>1.967%</td>
<td>-1.967%</td>
</tr>
</tbody>
</table>
Does Bilateral CVA Make Sense?

- Bilateral CVA has been widely adopted
  - Many banks base CVA on their own default
  - Accountancy rules permit this (e.g. FASB 157)

- Bilateral CVA has some potentially unpleasant features
  - Total amount of CVA in the market sums to zero
  - Risky value may exceed risk-free value
  - Netting and collateral may increase CVA
  - Hedging this component is problematic

- How to monetarise bilateral CVA to justify paying for counterparty risk
  - Most institutions do this by selling CDS protection on correlated names
The Role of Counterparty Risk in the Credit Crisis

iii) Counterparty risk in credit default swaps and tranches
CDS Counterparty Risk

• Long protection CDS position has wrong-way risk
  - Positive MtM due to reference entity spread widening means counterparty credit quality is likely to be deteriorating

• Counterparty risk is easy to pass around but not easy to get rid of

Jon Gregory (jon@oftraining.com), Credit Risk Summit, 15th October 2009
Counterparty Risk on Tranches

- More complicated problem, depends when counterparty would default compared to the other names in the portfolio or index

- 39.3 defaults upwards
- 10.7 to 16.1 defaults
- Up to 5.4 defaults

125 name portfolio, 30% recovery rate assumption

DJ iTraxx Europe

- [22-100%]
- [12-22%]
- [9-12%]
- [6-9%]
- [3-6%]
- [0-3%]
Counterparty Risk on Tranches

• Counterparty risk varies substantially across capital structure

Massive wrong-way risk - worth little more than recovery value (40%)
The Role of Counterparty Risk in the Credit Crisis

iv) Why monolines failed
Leveraged Super Senior Transactions

- Popular way of buying super senior protection via creation of triple-A product based on a super senior tranche in leveraged form

- Essentially, the wrong-way counterparty risk inherent in buying super senior protection is converted into so-called “gap risk”
  - Gap risk is market risk from being potentially unable to unwind the leveraged transaction in time

- But the gap risk was more severe than assumed by rating agencies and issuers
  - This can be proved theoretically via a thorough analysis of the cashflows
  - Was also shown empirically during the first period of the crisis (August 2007)
Monolines and CDPCs

• Super Senior Tranches of Credit Portfolios have (arguably) little or no default risk
• Monolines aim to take advantage of this “Free Lunch”
• To generate a good return they will need to be highly leveraged
• They therefore have to avoid the mark-to-market volatility of these tranches which can be significant
• They do this by attaining a triple-A rating but not posting collateral
Problem with Monolines

- Rating agency mistakes
  - It’s not the absolute credit quality that is important
  - Seniority of tranche and correlation are more important
  - Basis for quantitative assessment of triple-A rating is flawed
Monoline Purchased Protection

- A monoline is a complex LSS structure
  - LSS with multiple clients and so overall leverage vis à vis a single client is unknown
- Monolines run a very concentrated portfolio
  - creating severe wrong-way risk
- They achieve a good rating via not posting collateral
  - Doesn’t make sense
- Protection purchased from monolines is practically worthless
  - Can be proved theoretically
  - Like LSS has been proved empirically (e.g. Merrill Lynch $10.8 billion in writedowns)
The Role of Counterparty Risk in the Credit Crisis

v) Will central counterparties improve the situation?
Advantages of Central Clearing (I)

• Multilateral netting reduces overall exposure in the market

Bilateral netting

Multilateral netting

• Other advantages of a central counterparty (CCP)
  - Loss mutualisation
  - Independent valuation
  - Capital reduction
  - Legal and operational efficiencies
  - Liquidity
  - Standardisation
Disadvantages of Central Clearing

• Homogeneity is not necessarily a good thing
  - No incentive to monitor the credit quality of your counterparty
  - Poor credit quality institutions may find it easier to build up large positions
  - Institutions with better than average risk management will lose out

• Cost
  - Cost of entry (margin requirements etc) may be prohibitive for some counterparties, overall costs in CCP cleared markets higher than bilateral ones (Pirrong [2009])

• Standardisation
  - Custom products not possible (even small changes such as non-IMM maturity date)

• Legal and operational risks
  - Integrity of netting is absolutely critical across all jurisdictions

• CCP failure
  - Would be catastrophic

• Will CCPs turn into another monoline story?
Conclusions

• Counterparty risk was always there but was not fully appreciated
• A VAR like revolution in counterparty risk management and CVA is required
• Simple ways of reducing counterparty risk don’t work (for the market)
  – LSS trades
  – Monolines
  – Use of bilateral CVA
• Proper ways of reducing counterparty risk are not cheap or easy
  – Strong collateral requirements
  – Hedging
• Central clearing may offer some benefits but is not a magic solution