Challenges in Managing Counterparty Credit Risk

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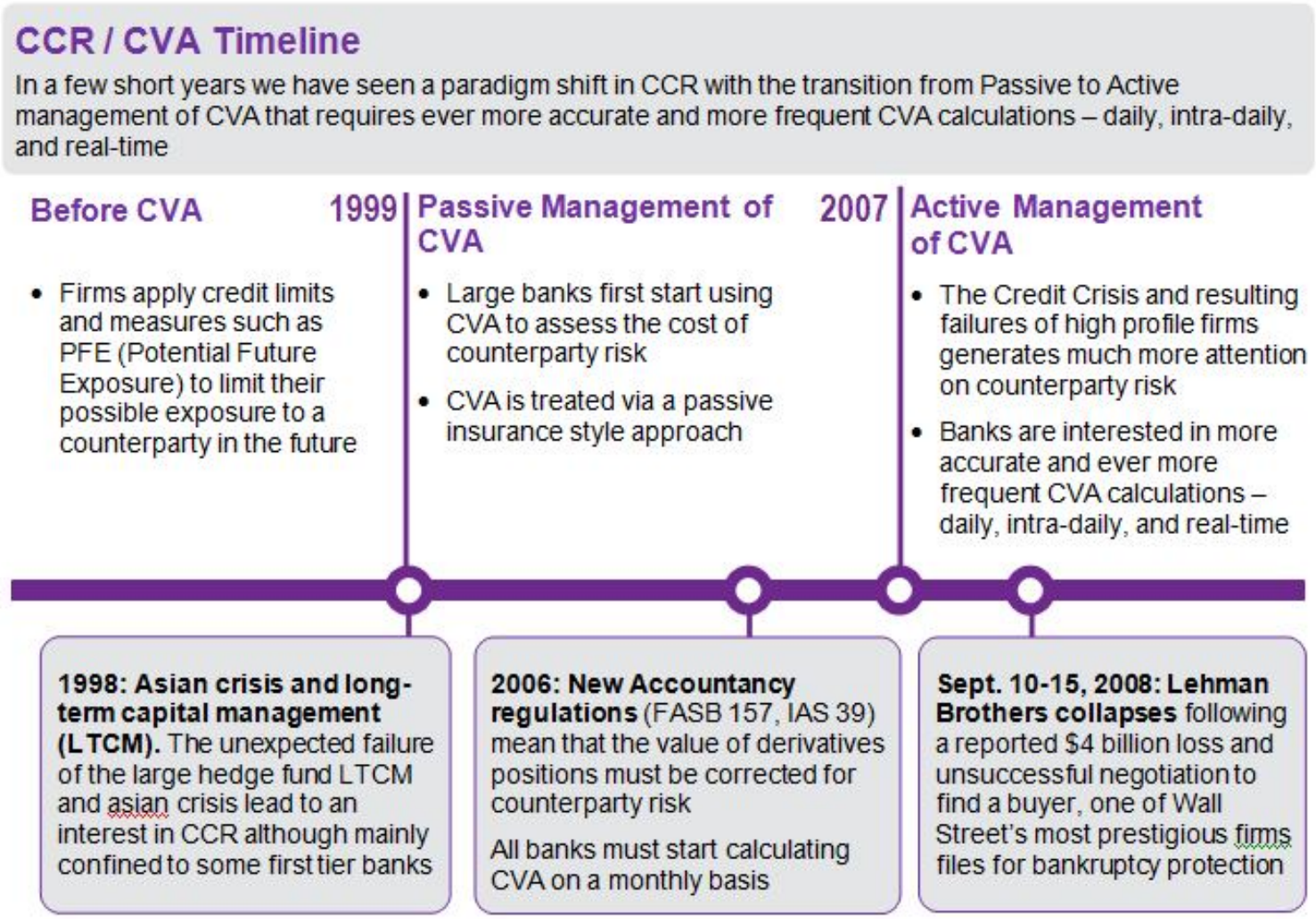
Counterparty Casino:
The need to address a systemic risk

By Jon Gregory

The Role of a CVA Group

History of Counterparty Risk and CVA



Source: Algorithmics

Why a CVA Group?

- 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 (specifically credit spreads and volatility)
- Creates the need for an institution to have a specialised group to tackle this across all businesses
  - Cross asset focus
  - Mostly trading (not risk management) driven

CVA

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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But CVA is Very Complex

- CVA represents an option on an underlying derivative
  - CVA calculation always harder than pricing the derivative itself
- Need the default probability (and recovery rate) of the counterparty
  - Often market implied probabilities are not known (no CDS market)
- Derivatives are subject to netting agreements
  - Need to price all other trades with this counterparty as well as trade in question
  - All correlations (same asset class, cross-asset class must be known)
- Wrong way risk
  - Linkage between default probability and exposure at default
- Collateral agreements, break clauses etc

CVA Trading is a Challenge

- Management of a cross asset credit contingent book
- Trade on only one side of the market
- Should give credit for all risk mitigants (netting, collateral, break clauses)
- Hedging CVA is challenging and often simply not possible

Trading Book CVA?

- CVA is a market price *by association* to the underlying OTC derivative
  - Consistent with derivatives valuation
  - But trading function for CVA is very difficult to run
  - Hedging is extremely difficult or impossible
- Derivatives are essentially exotic loans and so *by association* some CVA could be treated outside the trading book
  - Consistent with loan book management
  - Pricing / provisioning / regulation is easier
  - Little or no hedging required
- Insisting on the market approach may just lead to worse problems

Active Management of CVA?

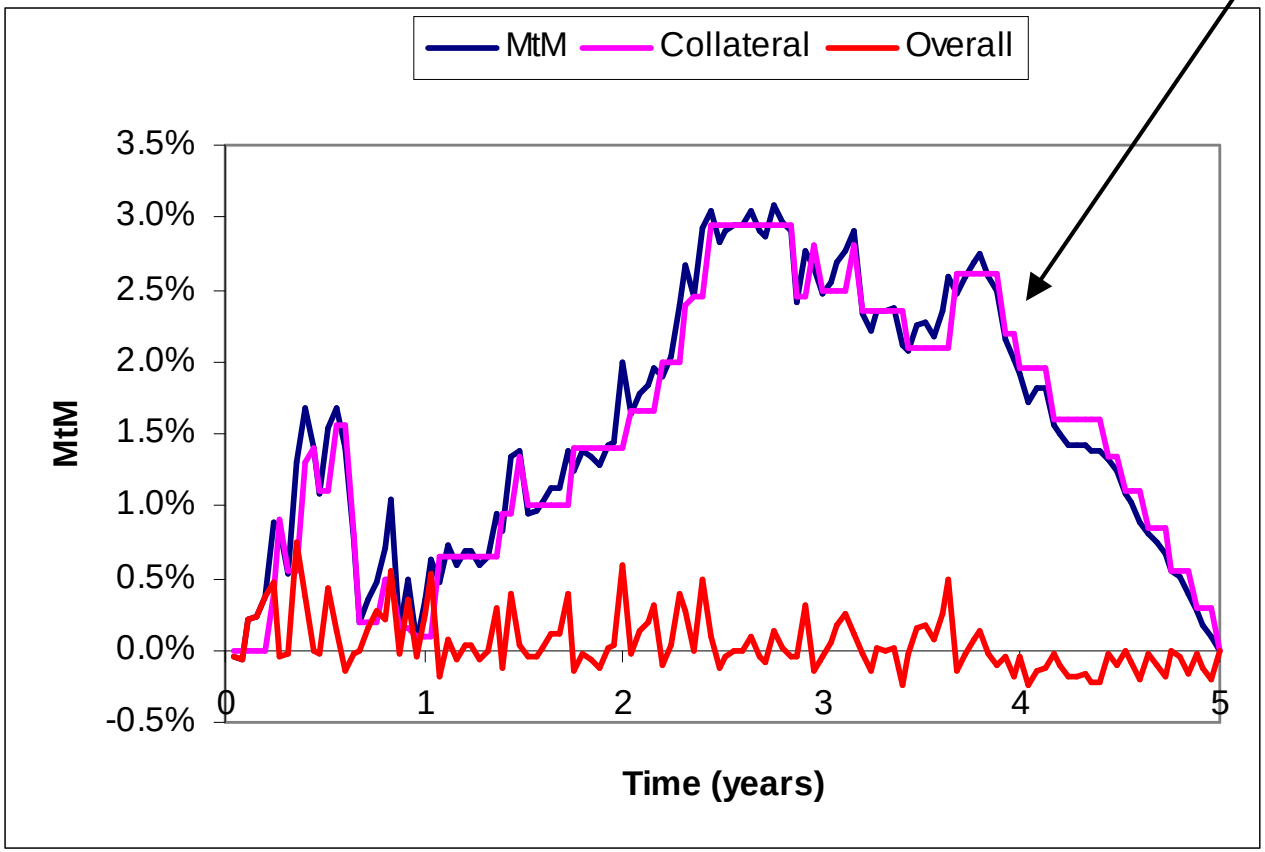
"… *given the relative illiquidity of sovereign CDS markets a sharp increase in demand from active investors can bid up the cost of sovereign CDS protection. CVA desks have come to account for a large proportion of trading in the sovereign CDS market and so their hedging activity has reportedly been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

Bank of England Q2

The Growing Use of DVA

CVA for CSA Counterparties

10-day remargin period assumed



Collateralised CVA Example

Assumption	CVA (bps)
10-day remargin period	0.51
+ Minimum transfer amount of 0.5%	0.69
+ Threshold of 1.0%	1.57
No collateral	2.79

Unilateral CVA in the Old Days

	Credit Rating	Credit spread (bps)
Bank	Aa1/AA+	10-15
Corporate	A3/A-	200-300

- Bank has no default risk
  - 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 (collateralised, banks won't default)
- When bank credit quality deteriorates, market becomes gridlocked

Pricing Bilateral Counterparty Risk

- Bilateral CVA considers also an institutions own default (this formula assumes independent of defaults)

$$BCVA(t) = (1-\delta_C)\int_t^T EE(u)\left[1-PD_I(u)\right]dPD_C(u) - (1-\delta_I)\int_t^T NEE(u)\left[1-PD_C(u)\right]dPD_I(u)$$

CVA

DVA

Expected exposure

Probability we haven't yet defaulted

Probability counterparty defaults

Negative expected exposure

Probability **counterparty** hasn't yet defaulted

Probability **we** default

Own percentage recovery value

How to Realise DVA

- Go bankrupt
  - Usually not a popular choice
- Unwinds or novations
  - An institution may realise a DVA gain if a trade is unwound in the future (e.g. banks unwinding transactions with monolines)
- Hedging
  - DVA much harder to hedge than CVA - cannot sell CDS protection on yourself!
  - Buy back your own debt (not really a dynamic hedge) – do you have the cash?
  - Sell CDS on another counterparty (who is highly correlated with you) – give wrong-way risk to buyer of protection – careful who you choose (Lehman)
- Funding arguments
  - Double counting of DVA and funding

Regulatory Aspects

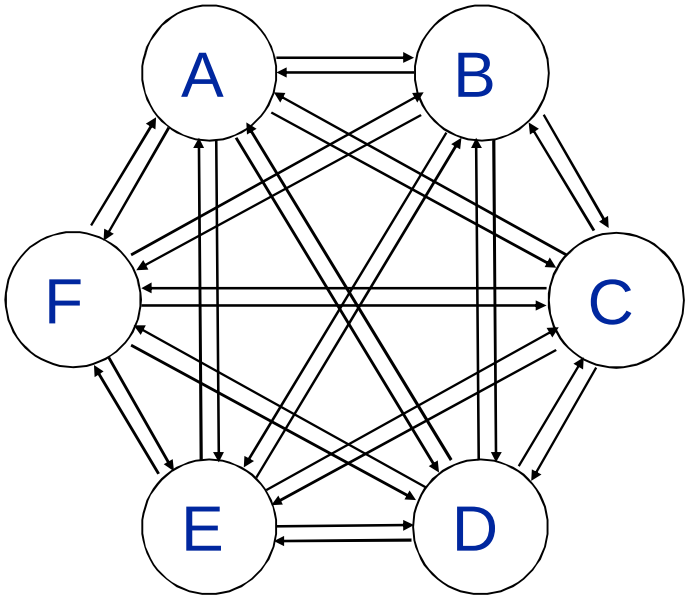
Regulatory Reaction to the Credit Crisis

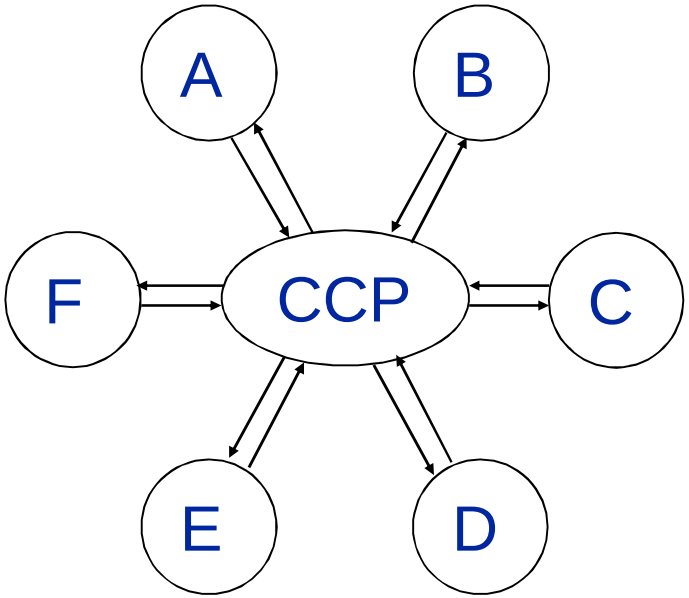
- BCBS Committee (Dec 2009)
  - …. where current treatment did not adequately capitalise for risks during the crisis ☺
- Key problems identified
  - Capitalisation of CVA volatility (2/3 of counterparty risk related losses during crisis?)
  - Initial margining (capital to give incentive for adequate initial margin through cycle)
  - Central counterparties not utilised
  - Close-out periods
  - Interconnection of financial institutions
  - Lack of back-testing and stress testing
  - Wrong-way risk

The Problems With CVA VAR

- Recent changes
  - Remove the multiplier of 5 (scaling from 10 days to 1 year) ☺
- Only single name hedges (CDS, CCDS) given capital relief
  - Now seemingly will give some relief for index hedges
  - But how? And will this not be encourage procyclicality?
- Methodology
  - Intended to capture in a simple way the credit spread risk within CVA
  - Actually, it is not the optimal way to do this and can lead to non economic results (Rebonato et al.)
- 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?

Central Counterparties





CCPs

Closeout all positions with member in default
Liquidate collateral of member in default
CCP Reserve Fund and other contributions
Possible additional contribution from CCP members