Counterparty Risk and CVA

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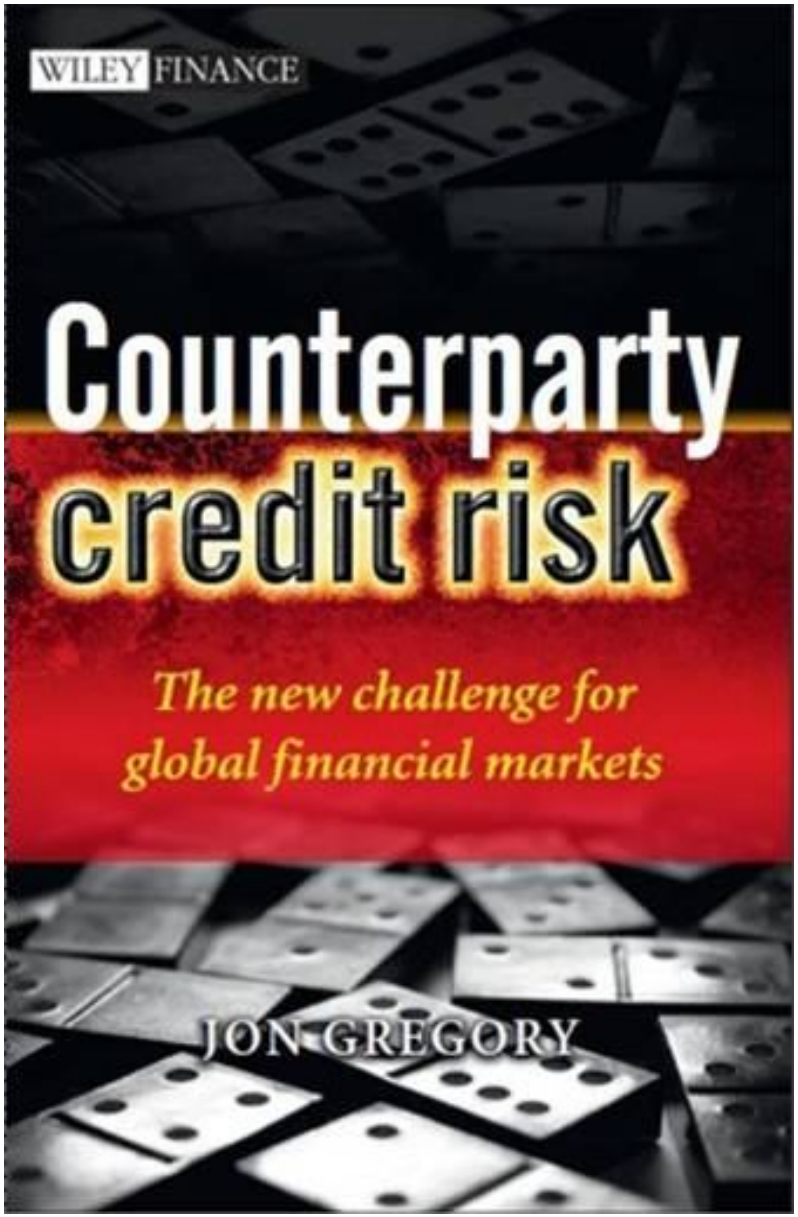

WILEY FINANCE
Counterparty credit risk
The new challenge for global financial markets
JON GREGORY

EPF
EUROPEAN POLICY FORUM
Counterparty Casino:
The need to address a systemic risk
By Jon Gregory
September 2010

A History of Counterparty Risk

History of Counterparty Risk and CVA

CCR / CVA Timeline

In a few short years we have seen a paradigm shift in CCR with the transition from Passive to Active management of CVA that requires ever more accurate and more frequent CVA calculations – daily, intra-daily, and real-time

Before CVA

- Firms apply credit limits and measures such as PFE (Potential Future Exposure) to limit their possible exposure to a counterparty in the future

1999

Passive Management of CVA

- Large banks first start using CVA to assess the cost of counterparty risk
- CVA is treated via a passive insurance style approach

2007

Active Management of CVA

- The Credit Crisis and resulting failures of high profile firms generates much more attention on counterparty risk
- Banks are interested in more accurate and ever more frequent CVA calculations – daily, intra-daily, and real-time

1998: Asian crisis and long-term capital management (LTCM). The unexpected failure of the large hedge fund LTCM and asian crisis lead to an interest in CCR although mainly confined to some first tier banks

2006: New Accountancy regulations (FASB 157, IAS 39) mean that the value of derivatives positions must be corrected for counterparty risk

All banks must start calculating CVA on a monthly basis

Sept. 10-15, 2008: Lehman Brothers collapses following a reported $4 billion loss and unsuccessful negotiation to find a buyer, one of Wall Street's most prestigious firms files for bankruptcy protection

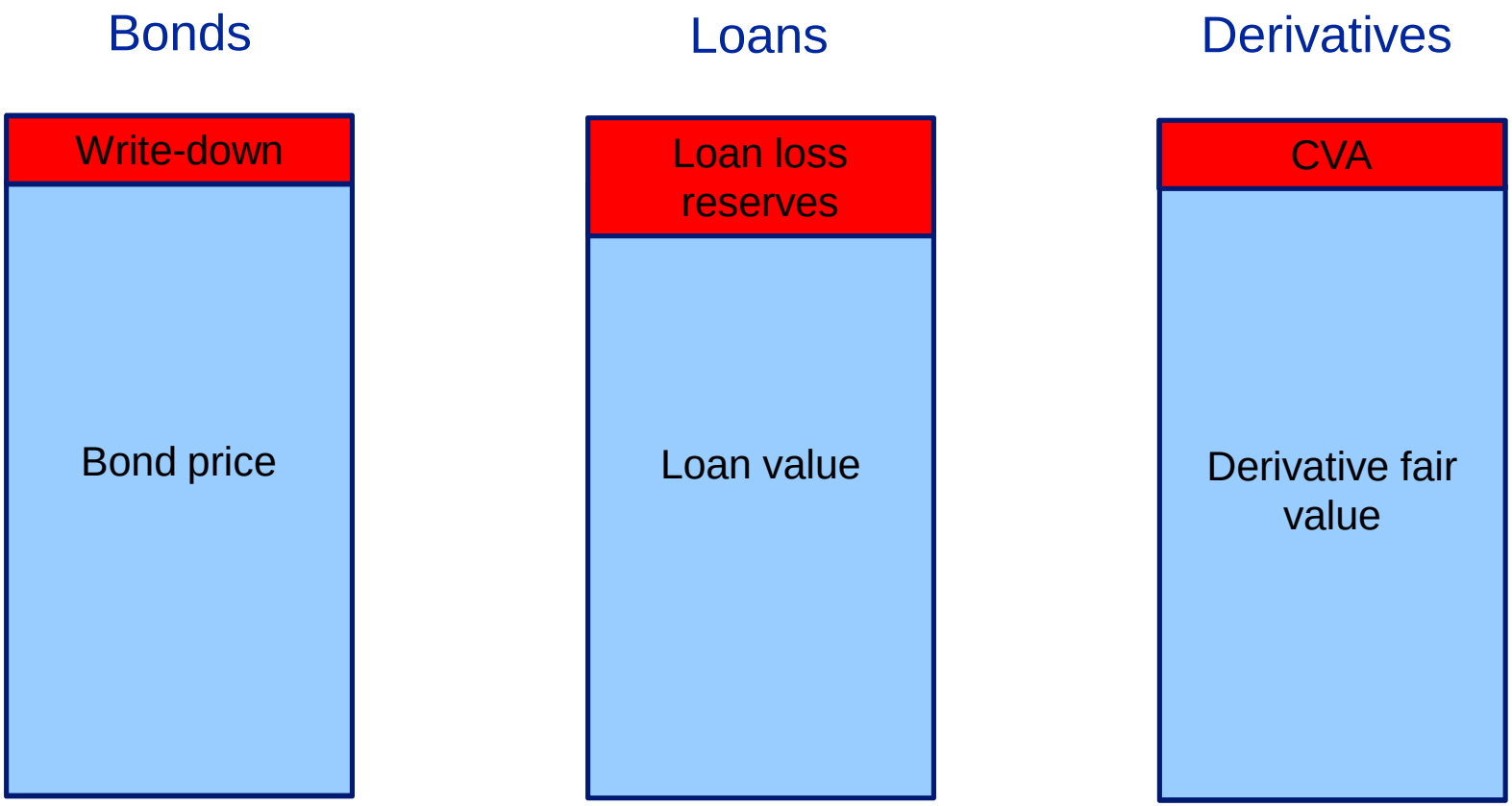
Source: Algorithmics

CVA History

- 1999/2000 period
  - Banks first start using CVA to assess the cost of counterparty risk **passively**
  - Limited to a number of large dealers
- 2005 onwards
  - Accountancy regulations (FAS 157, IAS 39) mean that the value of derivatives positions must be corrected for counterparty risk
- 2007 onwards
  - Large CVA losses
  - Lots more attention on counterparty risk being treated **actively**
- 2010/2011
  - Lots of regulatory interest

The Birth of CVA

Credit Risk in Banks



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)

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

Basel III Impact on CVA

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 VAR

CVA Risk Capital Charge (Basel III)

- CVA definition is based on spreads NOT default probabilities

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

- 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."*

The Problems With CVA VAR

- 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 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."

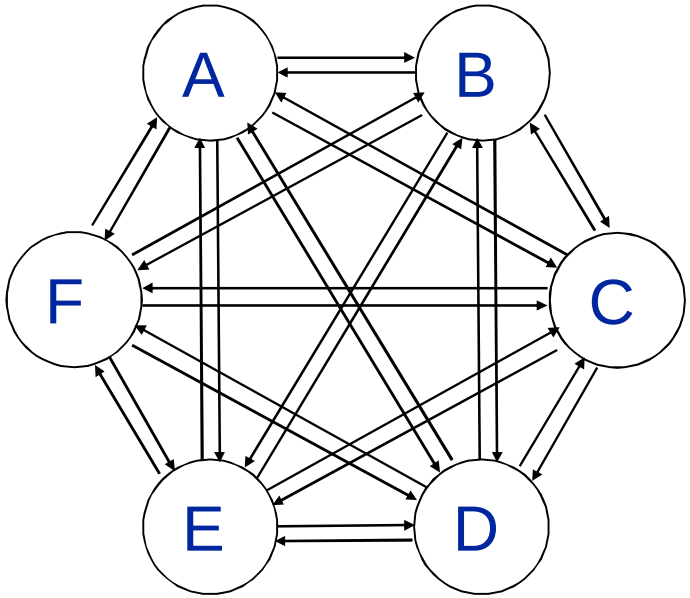
Bank of England Q2

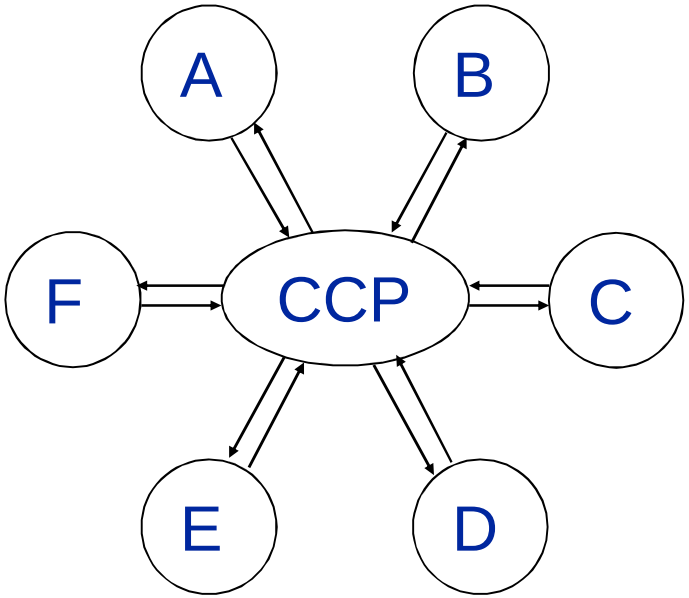
Source: Barclays Capital

- 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

Central Counterparties

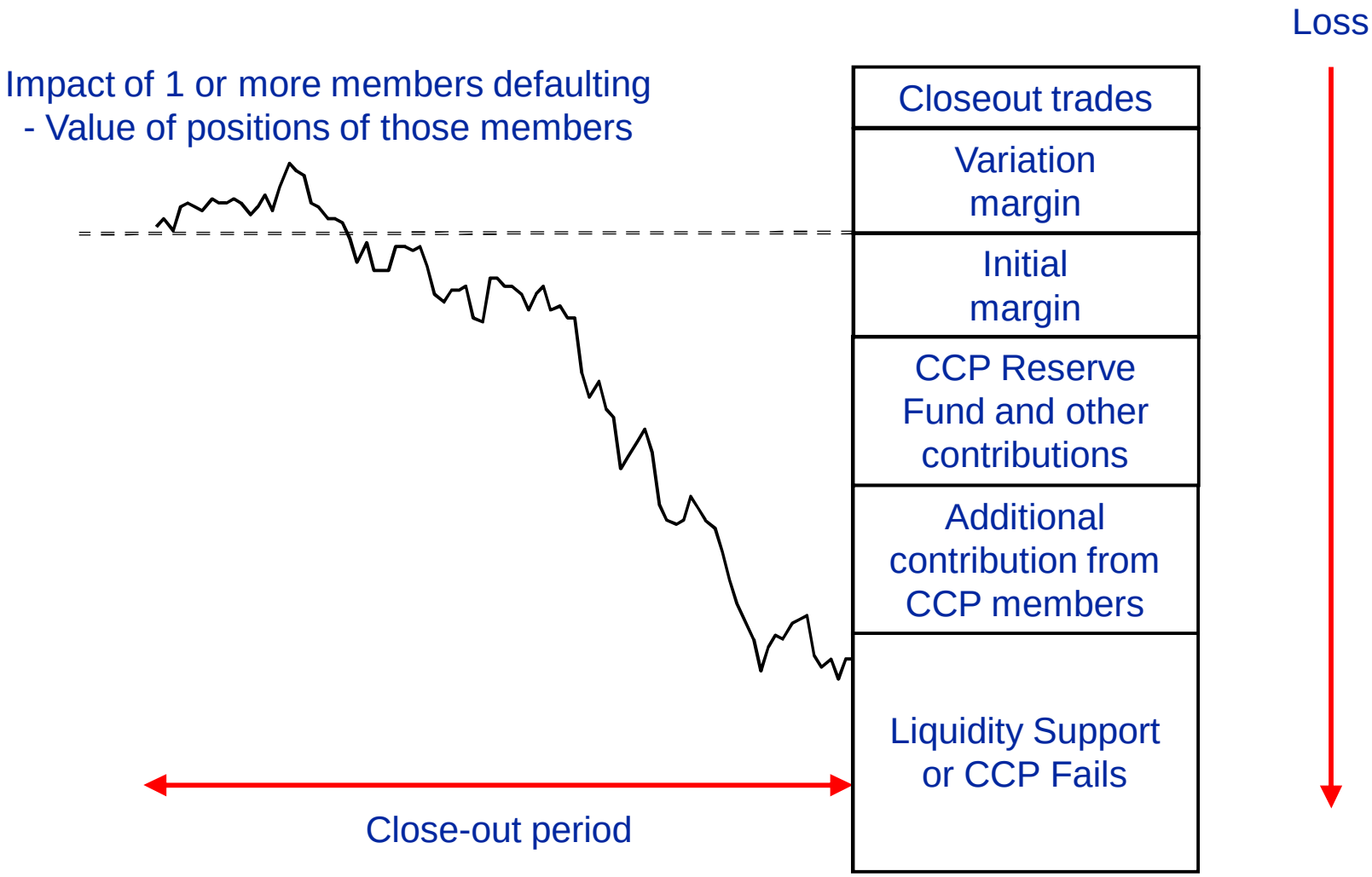




Functions of a CCP

- 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?



Conclusions

What Can We Do With CVA?

- Basel III forces banks to price and manage CVA actively
- What can we do with our CVA then?
- Trade out of it (hedging)?
  - Hedging - possible but limited single name CDS market makes this difficult
  - Securitize it – not if regulators have anything to do with it
- Trade through central counterparties?
  - Then the CCPs take all the CVA and create a new too big to fail problem
- Key conclusions
  - Traditional management of counterparty risk (netting, collateral etc) still very important
  - Basel III rules are not necessarily incentivising better management of CVA