Counterparty Credit Risk and CVA

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History

The Complexity of CVA

Impact of Regulation

Where Will This Lead Us?

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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

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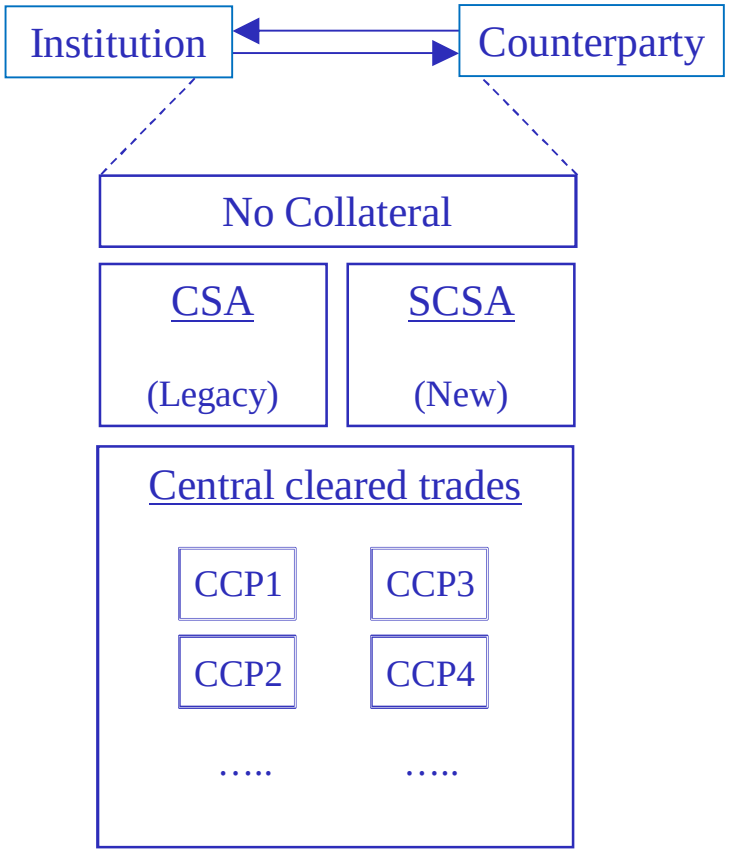
Trading Relationships



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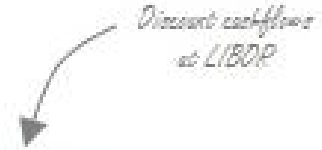
Derivatives Pre-2007



Value = Risk-free value

Exotics clearly more of a challenge
But we have some good models (especially for CDOs)

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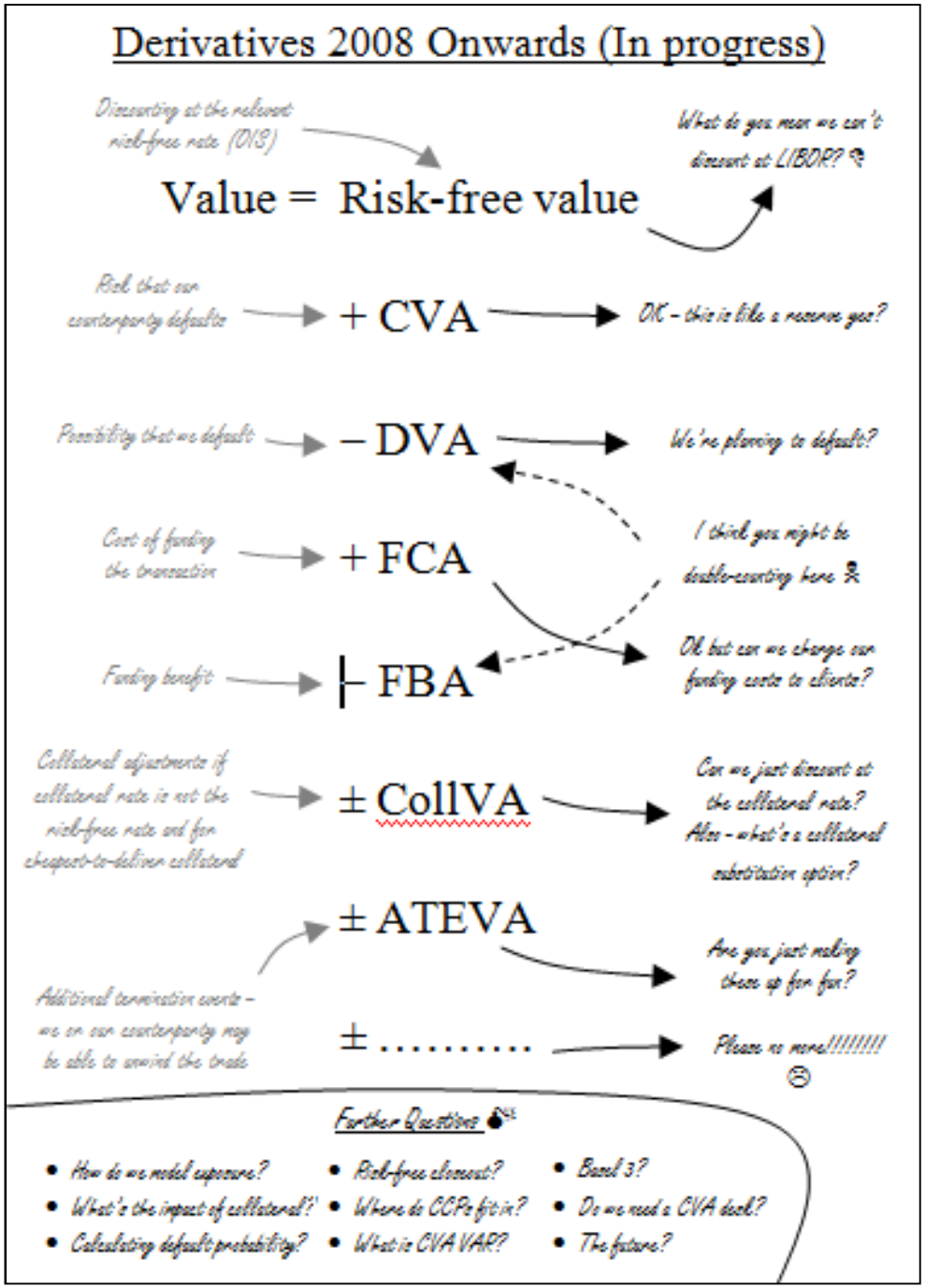

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CVA is a Challenge

- Credit exposure
  - More complex to model than VAR
- Default probability
  - Hard to define due to illiquidity in CDS market (need for proxies and generic curves)
- Wrong-way risk
  - Complex to quantify and creates cross-gamma in hedging CVA
- DVA
  - Can one monetise own default?
- Hedging
  - To what extent can we really hedge CVA? Economic risk? Accounting PnL? RWAs?
- Other related components
  - OIS discounting, funding value adjustment

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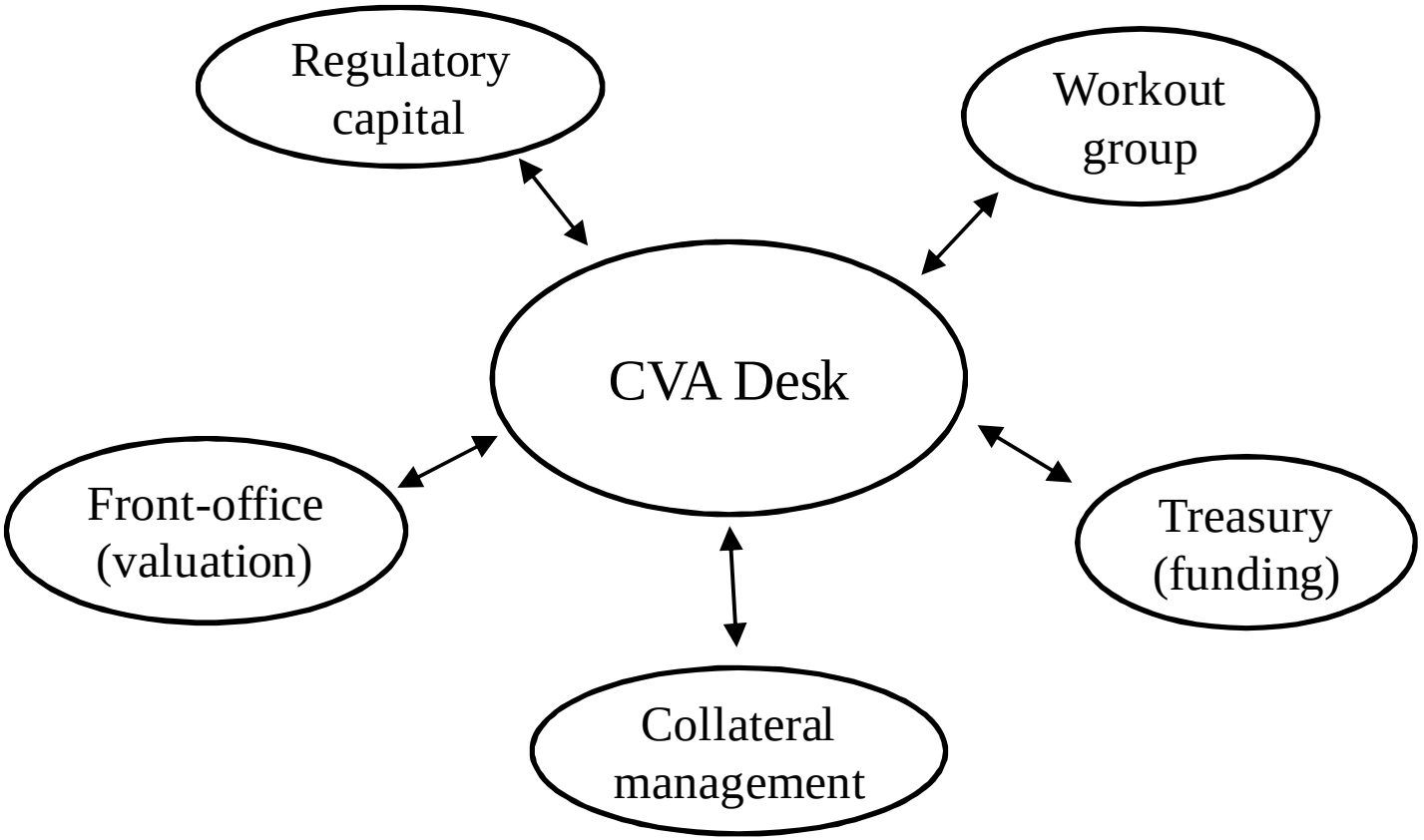
The CVA Desk



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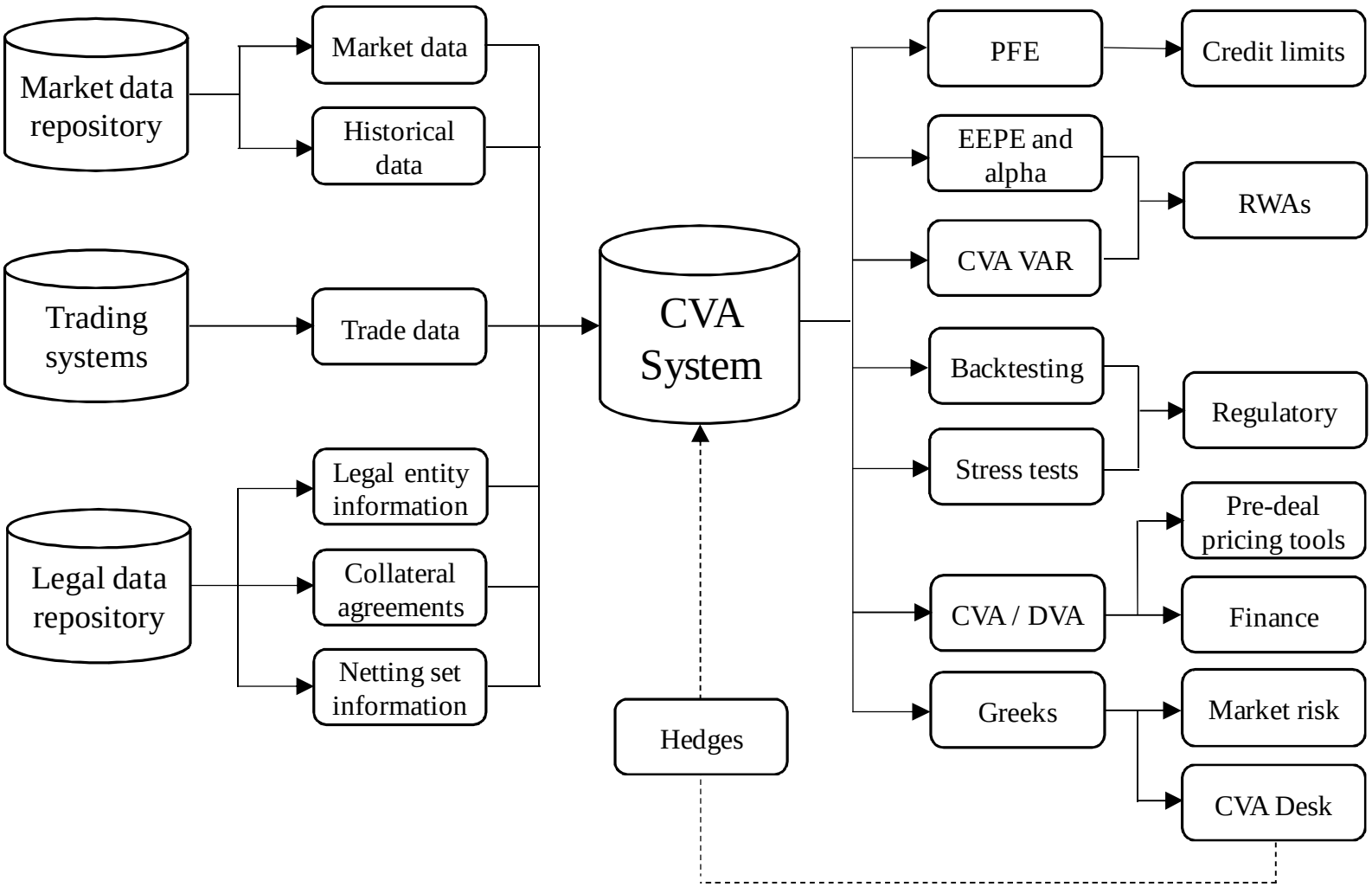
CVA From a Technology Perspective



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Debt Value Adjustment (DVA)

- Accounting rules allow an institution to value their own default risk
  - FASB 157 and IFRS13 make this mandatory
- Some evidence that this is real and can be monetised
  - Unwinds/novations, buying back own debt, selling CDS protection on correlated names
- But this is imperfect and tends to create unintended consequences
  - Wrong-way risk, systemic risk, risky firms trying to sell protection and unwind trades
- Banks have little choice but to embrace DVA
  - However this is because of Basel III imposing that CVA must be marked-to-market under any circumstances

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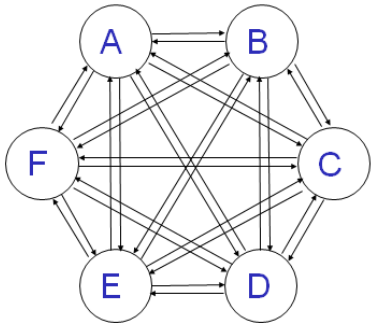
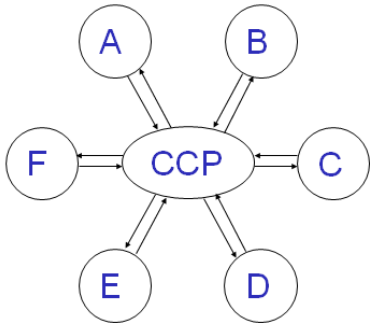
Impact of Regulation

- Basel II
  - A number of changes that will make quantification more complex and increase capital (stressed data, increased margin period of risk, wrong-way risk)
  - IMM approval more important due to expensive capital
- CVA VAR
  - Basel 3 document (Dec 2009) recognises that two thirds of CCR losses may be mark-to-market (not default) related **– the variation of CVA is twice as important as CVA!**
  - Capital relief from hedging (only partial relief from indices) but no DVA
- Central counterparties
  - CVA disappears!
  - Relatively small capital charges to incentivise move to central clearing
  - What about CCP risks?





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Basel 3 Definition of CVA

- 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."*

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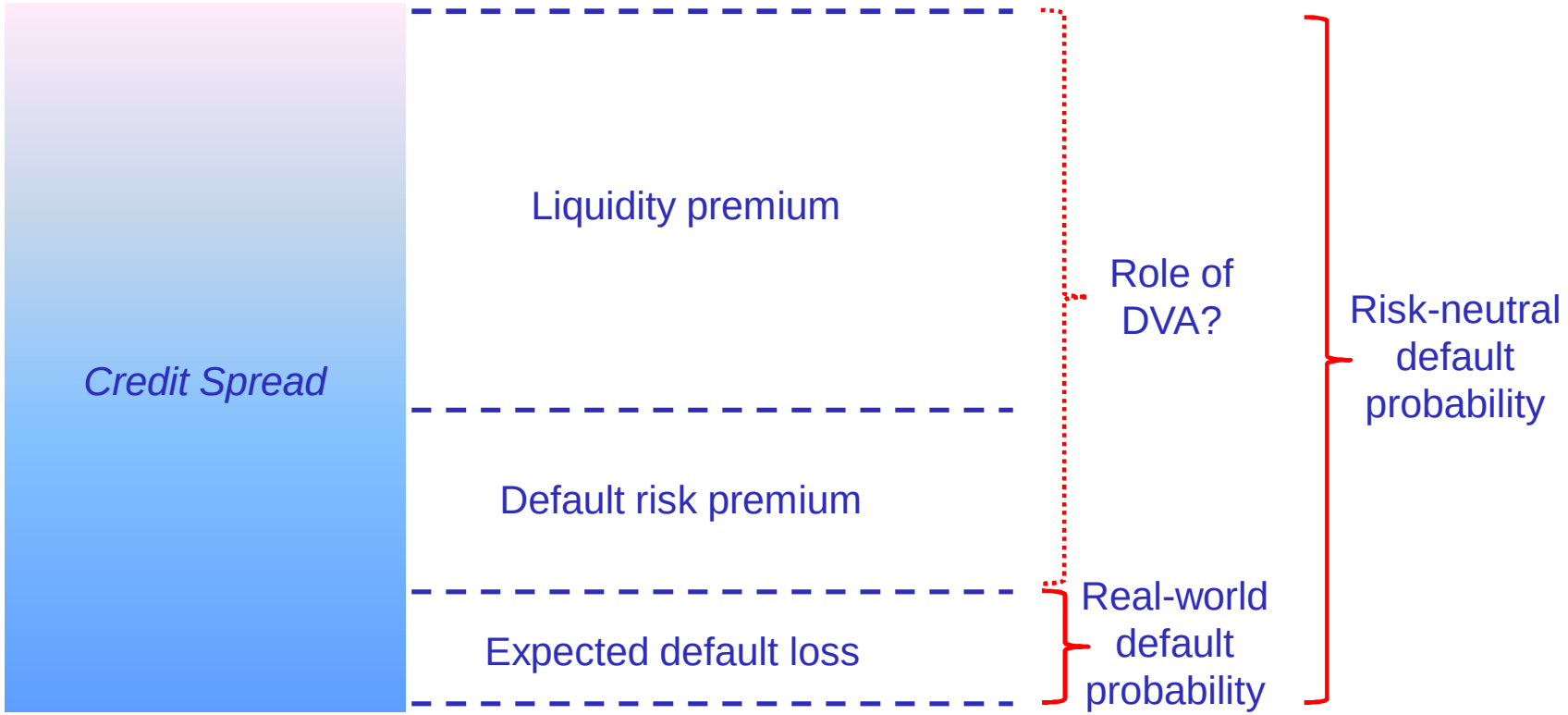
What's in a Credit Spread?

- Decomposition of a typical spread



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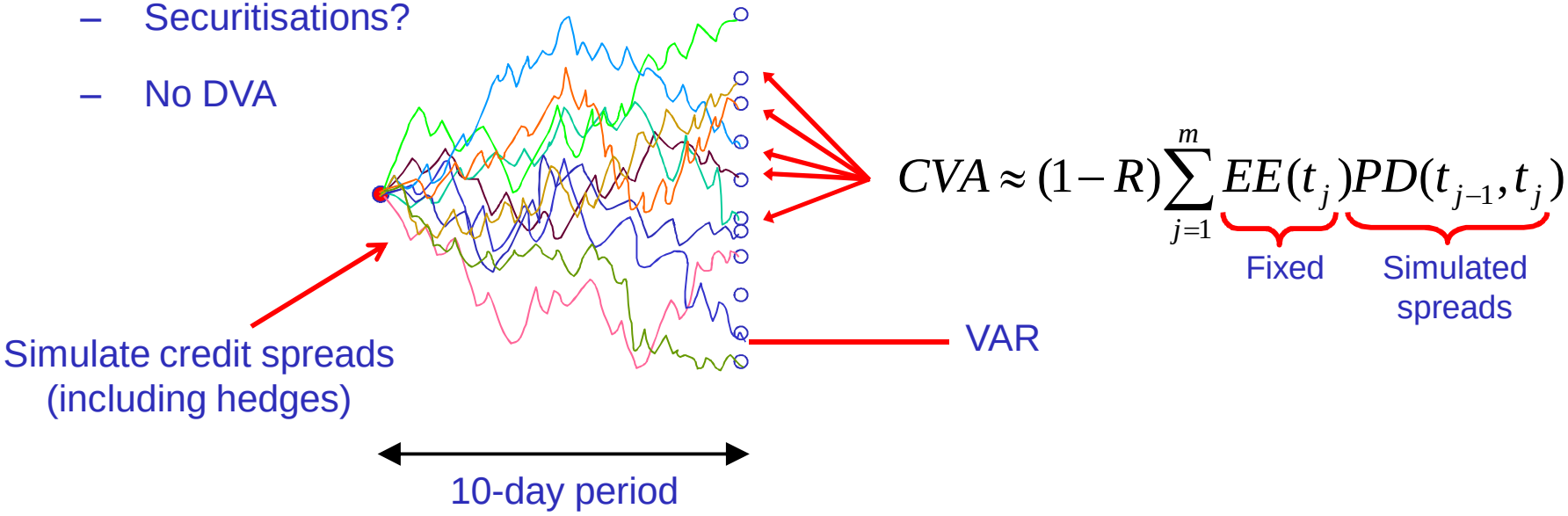
Advanced CVA Risk Capital Charge

- Only credit spreads are simulated
  - Ignores other market factors (interest rates, FX, commodity, …….)
  - Capital relief for single-name CDS and partial relief for indices
  - Split hedge issue for market risk hedges
  - Sovereign exemptions?
  - Securitisations?
  - No DVA



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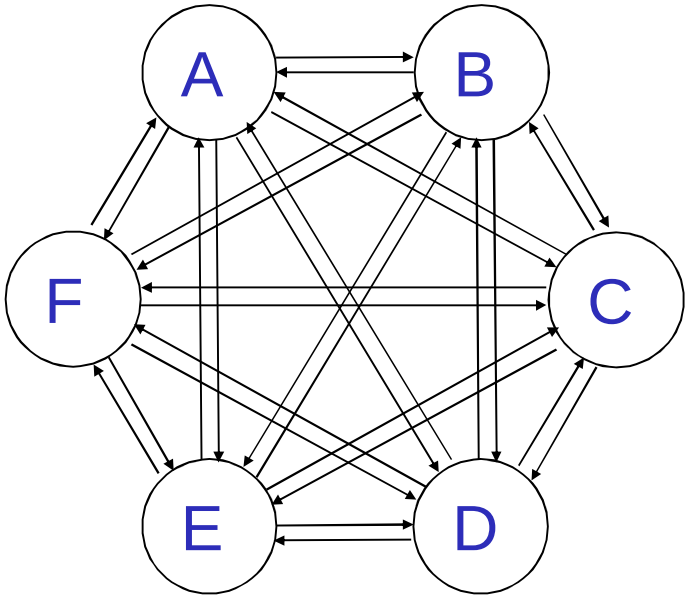
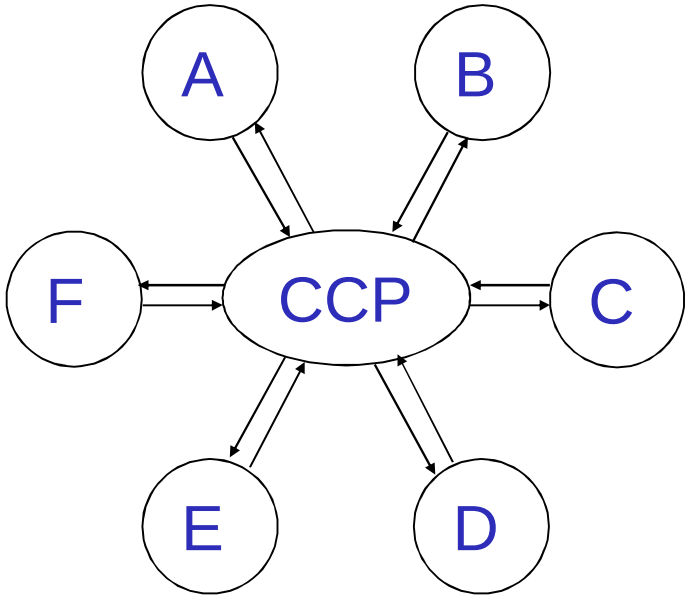
Central Counterparties





- 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

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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**

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Functions of a CCP

- Pricing / market data, settlement, transparency
  - CCPs provide the settlements and 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
- Loss 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

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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?

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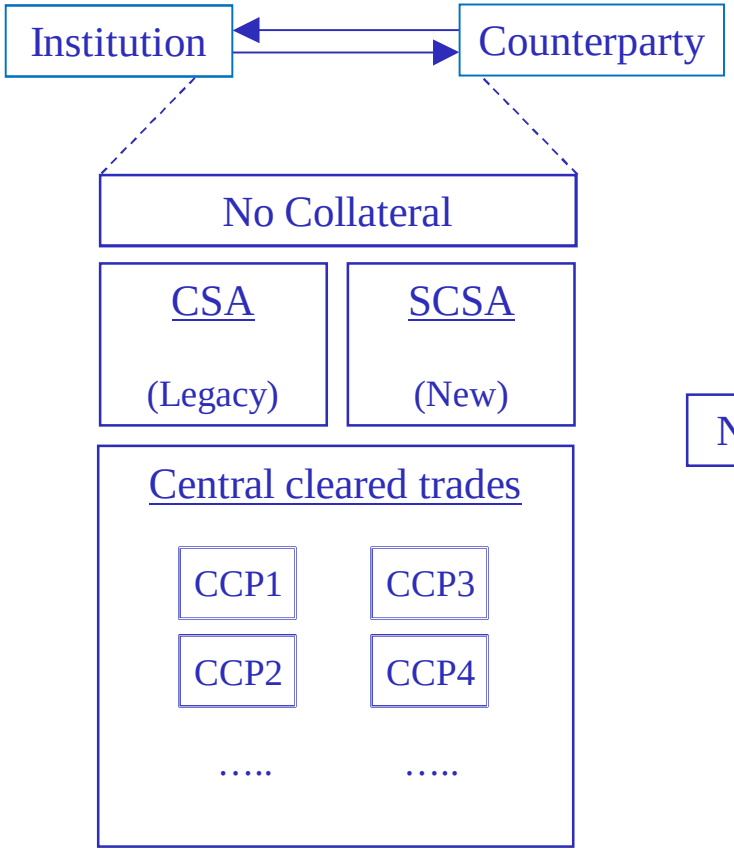
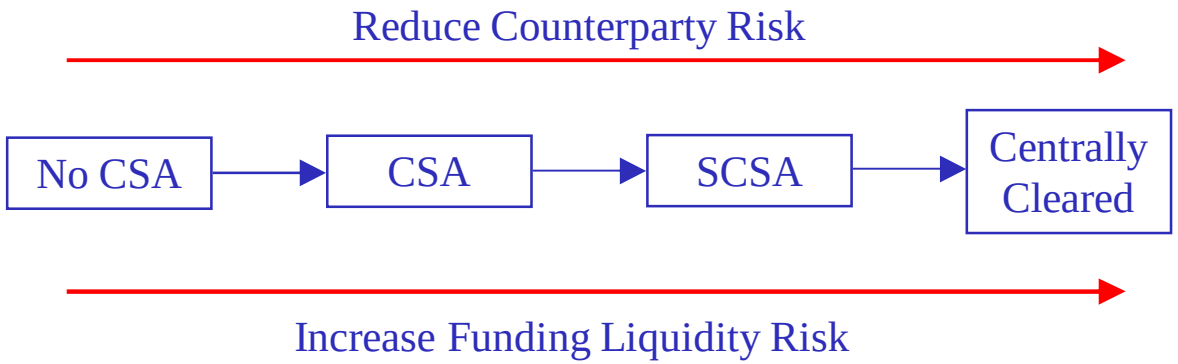
The Complexity and Dangers of Risk Mitigation





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Optimisation of CVA, DVA and Funding Costs

	Overcollateralised (CCP)	Collateralised (Two-way CSA)	Uncollateralised (No CSA)
CVA			
DVA			
Funding			
Regulatory Capital			

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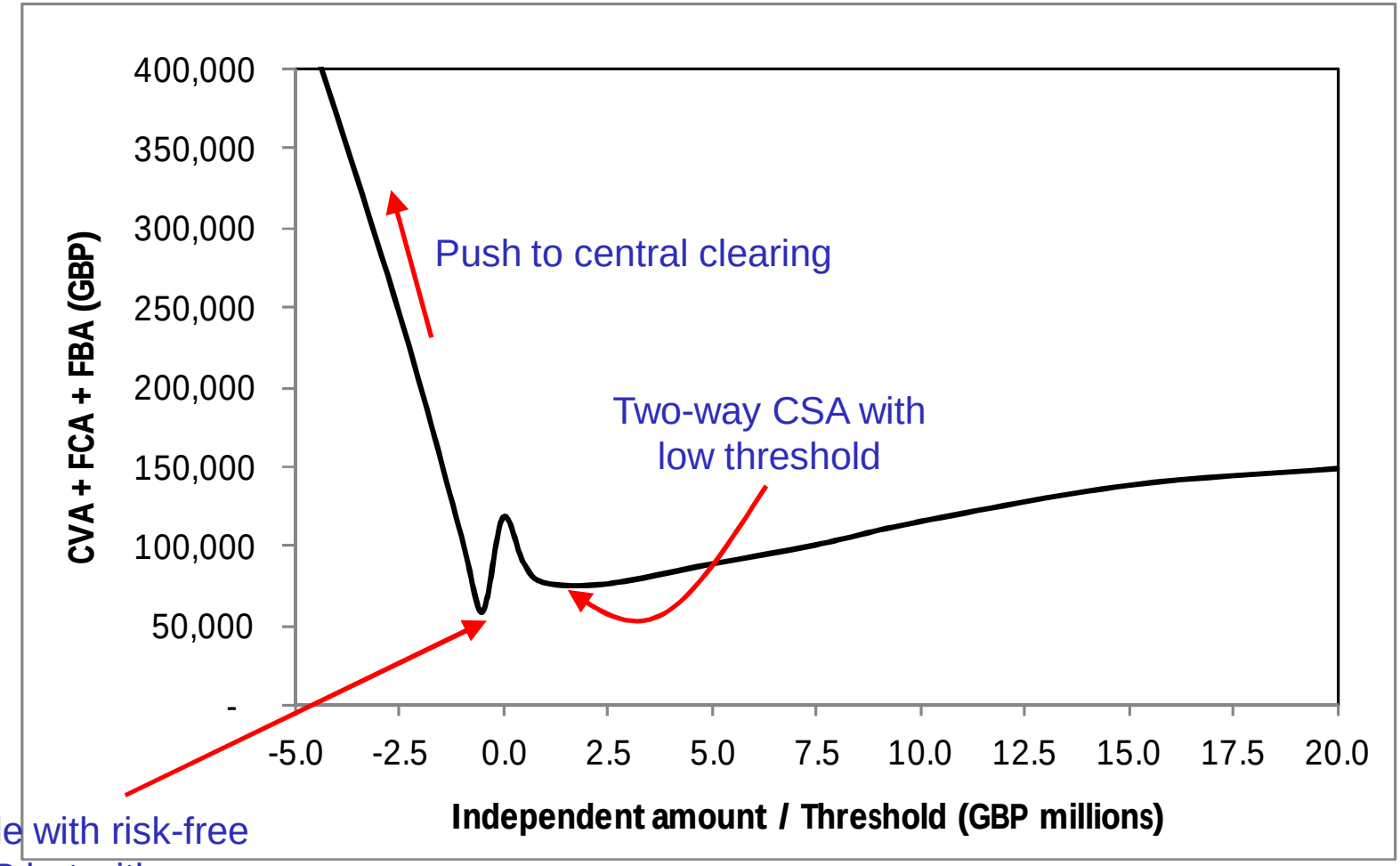
Overall Effect



Trade with risk-free CCP but with very small initial margin ☺

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Conclusions

- CVA is highly complex
  - Exposure, default probability, wrong-way risk, DVA, CVA VAR, ……
- Regulation seems to try and minimise CVA where possible
  - Tightening CSAs, Basel III hedging CVA for capital relief, CCPs
- But mitigating CVA is potentially even more dangerous
  - Funding liquidity risk from the need for more collateral
  - Systemic risk from CCPs
  - Unintended consequences from hedging CVA
- We shouldn't forget
  - CVA is an illiquid credit risk from non-collateral posting entities
  - Banks historically have a role in taking such risks (and diversifying and hedging)
  - Away from banks there is really no-where for the CVA to go

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