New CVA Capital Rules Under FRTB

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The Global Financial Crisis and Birth of xVA

Counterparty Risk and CVA Capital Requirements

Impact of Changing Methodologies

Impact for Banks and End-Users of OTC Derivatives
Long Before the Crisis

• In Berkshire Hathaway's 2002 annual report, Warren Buffet warns of derivatives:
  – Without collateralization their value depends on the creditworthiness of the counterpart
  – Their mark-to-market can be mark-to-myth and there are no incentives to assure otherwise
  – They often have downgrade triggers requiring greater collateralization, just at the worst time
  – They create a daisy-chain risk, thwarting prudent counterparty diversification

Derivatives are financial weapons of mass destruction
Warren Buffett, American business magnate and philanthropist (b. 1930)
Regulation and xVA

BASEL III

Strengthen Capital Bases
- Changes to Market Risk capital requirements (FRTB)
- Introduction of a CVA capital charge
  - Leverage ratio
  - Prudent valuation (EU)

Strengthen Liquidity Standards
- Liquidity Coverage Ratio (LCR)
- Net Stable Funding Ratio (NSFR)

Clearing Mandate

Mandatory central clearing of standardised OTC derivatives

Bilateral margin requirements for non-centrally cleared OTC derivatives (CPSS-IOSCO)

Banks

Large Financial Counterparties
The Birth of xVA

• Derivatives pricing was previously seen as pricing cashflows
• Now it is seen as being also related to
  – Credit risk
  – Funding
  – Collateral
  – Capital
  – Initial margin
• These aspects are not mutually exclusive and often require portfolio level calculations
  – The has led to the birth of the “xVA desk” or “central resource desk”
  – This desk typically deals with most of the complexity in derivatives pricing
Funding and Capital Costs

• Have traditionally been ignoring in pricing and valuation (e.g. Black-Scholes)
• The focus on correct credit pricing via CVA has led to other considerations
• Funding
  – LIBOR funding is no longer practical for banks, especially in light of new regulation (LCR/NSFR)
  – Overnight rate (e.g. OIS) specified in most collateral agreements is no longer close to LIBOR
  – Certain contractual terms are problematic (e.g. rating triggers due to NSFR)
• Capital
  – Regulatory capital requirements have increased dramatically (Basel 2.5, CVA capital charge, leverage ratio, Pruval, FRTB, ....)
  – Banks find that regulatory capital is more of a binding constraint and economic capital is much less relevant
The xVA Hierarchy

- **Capital**
  - PruVal
  - Leverage Ratio
  - CVA Capital Charge
  - CCR Capital Charge
  - Market risk

- **Initial margin**
  - Clearing mandate
  - CPSS-IOSCO rules

- **Funding**
  - NSFR
  - LCR
  - Treasury funding

- **Credit**
  - IFRS 13 Accounting
  - Credit line utilisation
  - Credit provisioning

- **Profit to generate return on capital**

- **Real costs**

**KVA**

**MVA**

**FVA**

**CVA**
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Prior to Basel III, there was a CCR capital charge covering potential defaults

BCBS Consultative document (December 2009)

- “Roughly two-thirds of CCR losses were due to CVA losses and only about one-third were due to actual defaults. The current framework addresses CCR as a default and credit migration risk, but does not fully account for market value losses short of default.”
- “Banks will be subject to a capital charge for potential mark-to-market losses (CVA) associated with a deterioration in the credit worthiness of a counterparty.”

There are now two credit related capital charges for derivatives:

- CCR capital charge
- CVA capital charge
The EU Exemptions

- Factors such as the doom loop led to EU exemptions for CVA capital charge under CRD IV (Europe only)
  - Corporates, sovereigns
  - Pension funds (temporary)

  "... 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 their hedging activity has reportedly been a factor pushing prices away from levels solely reflecting the underlying probability of sovereign default."

- These exemptions were significant
  - For example, HSBC reported a drop in RWAs of $22 billion as a result

- It seems likely that these exemptions will be reversed at some point
  - For example "Overall, the EBA is of the opinion that EU exemptions on the application of CVA charges should be reconsidered or removed, since they leave potential risks uncaptured"
**CCR (Default Risk) Capital Charge**

- This originated in Basel I and is similar to the market risk IRC charge
- It is based on a simple expected loss formula

\[
Capital_{CCR} = \sum_{i} LGD_i \times EAD_i \times \left[ p_i^{99.9\%} - p_i \right] MF(m_i, p_i)
\]

- For derivatives, determining the EAD (exposure at default) term is complex
- There are currently two main methods
  - Current exposure method (very simple)
  - Internal model method (model based, complex)
- A third method (SA-CCR) is being introduced from 2017
CVA Capital Charge – Current Standardised Approach

\[
\text{Capital}_{CVA} = 2.33\sqrt{h} \left( \rho \sum w_i M_i EAD_i \right)^2 + (1 - \rho^2) \sum w_i^2 M_i^2 EAD_i^2
\]

- **Confidence level (99%)**
- **Systematic term**
- **Idiosyncratic term**
- **Time horizon (1-year)**
- **Counterparty weight by rating**
- **Maturity factor**
- **Correlation parameter (50%)**

The future BA-CVA methodology will be similar to this but with an extra charge for market risk sensitivities which are not included here.

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Counterparty Risk and CVA Capital Requirements

Impact of Changing Methodologies

Impact for Banks and End-Users of OTC Derivatives
Methodologies

- CEM (current exposure method)
- SM (standardised method)
- IMM (internal model method)
- Standardised CVA
- Advanced CVA
- BA-CVA (basic CVA)
- SA-CVA (standardised CVA)
Capital Methodologies and Timescales

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CCR capital

CVA capital
Assessing the Impact of Future Regulatory Change

- Spot Capital
- CVA Capital
- CCR Capital

Leverage ratio implied capital

CVA capital charge exemption lifted? (European Banks) SA-CCR Leverage ratio FRTB
Changes in Capital Methodologies

- **SA-CCR**
  - Replaces CEM (and SM) from 2017 onwards
  - Much better treatment of collateral and tenor netting
  - More conservatively calibrated
  - Long-dated uncollateralised trades will look bad

- **FRTB-CVA**
  - Implementation 2019 earliest
  - Basic approach (BA-CVA)
    - Likely to be more conservative than current standardised approach
    - Combined with SA-CCR may lead to very punitive capital charges with limited hedging relief
  - Standardised approach (SA-CVA)
    - Uses sensitivities (greeks) and regulatory formulas
    - Better treatment of hedges
Analysis of BA-CVA and SA-CVA (With QIS Guidelines)

10-year par IRS (Uncollateralised)

10-year par IRS (Collateralised)
Not all counterparties have traded credit spreads. However, the FRTB-CVA framework must capitalise CVA risk arising from dealing with all counterparties, including ones that are not actively traded in credit markets ("illiquid counterparties"). Therefore, in order to use the FRTB-CVA framework, a bank is required to have a methodology for approximating the credit spreads of illiquid counterparties (see Section B.1(f) of the draft Accord text).

Banks normally develop the capability of calculating CVA sensitivities in order to manage their CVA risk. Typically, CVA risk management is performed by a dedicated function, such as the CVA desk. CVA sensitivities calculated by a bank without any internal function to use them would not be deemed reliable. Thus, the existence of a dedicated CVA risk management function will be a requirement.
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Impact of Changing Methodologies

Impact for Banks and End-Users of OTC Derivatives
Regulatory Capital for Counterparty Risk*

* No clearing or initial margin assumed

Which of the components do you include in KVA?

- Securitization
- Pru-Val
- Leverage Ratio
- Market Risk
- CCR/CVA

* No clearing or initial margin assumed
KVA (Capital Value Adjustment) Formula

\[ KVA = - \int_{t}^{T} ECP(u)CC(u)S_{CI}(u) du \]

- **Discounted expected capital profile**
- **Cost of capital**
- **Probability of no defaults**

**Aim of KVA**

- To provide a profit that can be released over time and matches (in expectation) the cost of regulatory capital requirements
ECP and Forward Capital

![Graph of ECP and Forward Capital over time](image-url)
KVA is still a Day 1 profit

Volatility of CVA/FVA (may be partially hedged)

inception  novation
Leverage Ratio

- **Restricts leverage of a bank via a standard formula (from Jan 2018)**

\[
\text{leverage} = \frac{\text{capital}}{\text{exposure}} \geq 3\%
\]

- **Definition of exposure is complex for OTC derivatives**
  - Uses CEM method (regulatory capital) which is very basic (probably replaced with more advanced SA-CCR later)

- **Other problems with treatment of collateral**
  - Received collateral does not generally reduce the exposure (since it does not reduce the inherent leverage) – exception for cash variation margin in “settlement currency”
  - Increased collateralisation suggests leverage ratio will become more of a constraint

- **What if a bank breaches the leverage ratio for derivatives but not for other activities (e.g. corporate lending)?**

Can vary – for example, 6% for G-SIBs in US, 3%+ in UK
KVA Management

- We can rationalize the trend towards active CVA management as price optimisation in light of regulatory changes
  - But for many banks CVA losses will feel “wrong”

ANZ's CVA loss flags challenge for regional banks
Many smaller dealers thought to be out of step with market practice and new capital rules

Three Japanese banks consider new CVA approach
Industry working group formed to discuss introducing accounting adjustment

Need for KVA desk?
The Future?

What do you think is the most optimal KVA management for your bank in the future?

- Hurdle rate with immediate P&L release
- Static - no KVA hedging but profits are released over time
- Dynamic - profits are released via KVA formula and KVA hedging is optimal
- Other
Impact for Banks and End-Users of OTC Derivatives

• **Banks**
  – Capital requirements are increasingly significantly
  – Optimisation strategies are critical
  – Important to make use of beneficial methodologies
  – Probably important to see capital as a real cost (KVA just another xVA)
  – FRTB-CVA may force all major banks to fully embrace CVA as part of derivatives valuation

• **End-users**
  – Cost of OTC derivatives has risen and will continue to do so
  – Optimisations may be helpful where funding and liquidity allow them (restrike, restructure, resetables, collateral posting, ...)
  – May need to think carefully about balance between flexibility vs. cost of derivatives
  – The best price is not always the best price