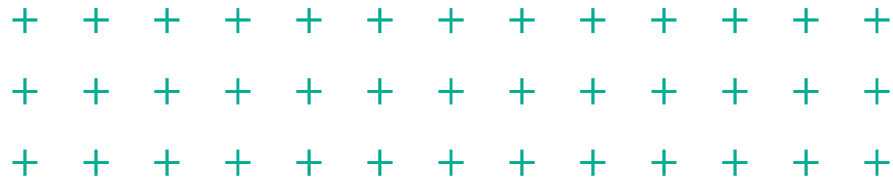




New CVA Capital Rules Under FRTB

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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



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

Banks

Large Financial Counterparties

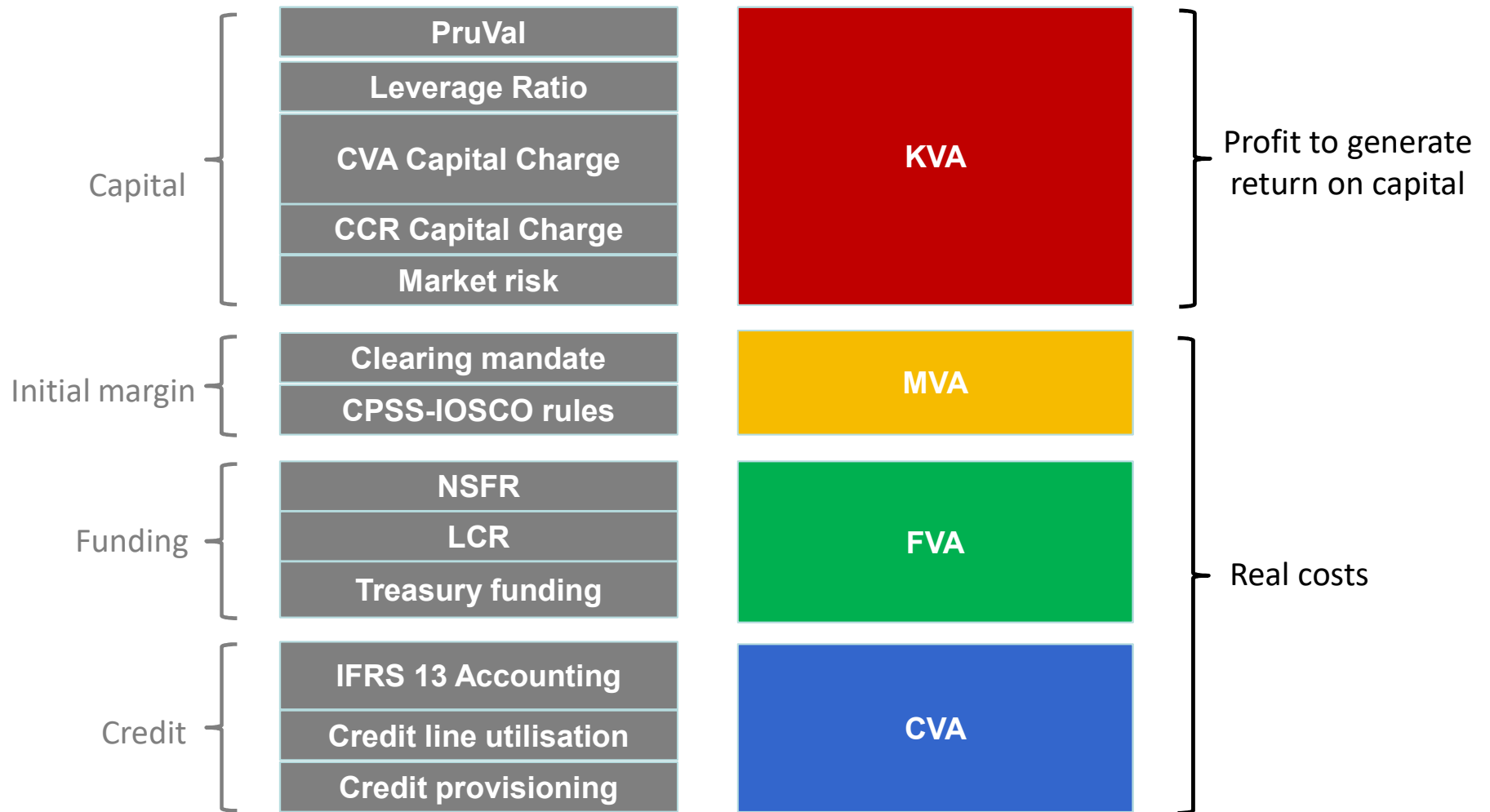
The Birth of xVA

- **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**
 - This 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, Prual, FRTB,)
 - Banks find that regulatory capital is more of a binding constraint and economic capital is much less relevant

The xVA Hierarchy



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Basel III Capital Requirements

- **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**

Bank of England Q2 2010

- 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

$$Capital_{CCR} = \sum_i LGD_i \times EAD_i \times [p_i^{99.9\%} - p_i] MF(m_i, p_i)$$

- 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

$$Capital_{CVA} = 2.33\sqrt{h} \sqrt{\left(\rho \sum_i w_i M_i EAD_i \right)^2 + (1 - \rho^2) \sum_i w_i^2 M_i^2 EAD_i^2}$$

Confidence level (99%) points to 2.33
 Time horizon (1-year) points to \sqrt{h}
 Correlation parameter (50%) points to ρ
 Systematic term points to $\left(\rho \sum_i w_i M_i EAD_i \right)^2$
 Idiosyncratic term points to $(1 - \rho^2) \sum_i w_i^2 M_i^2 EAD_i^2$
 Counterparty weight by rating points to w_i
 Maturity factor points to M_i

Rating	Weight
AAA	0.7%
AA	0.7%
A	0.8%
BBB	1%
BB	2%
B	3%
CCC	10%

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

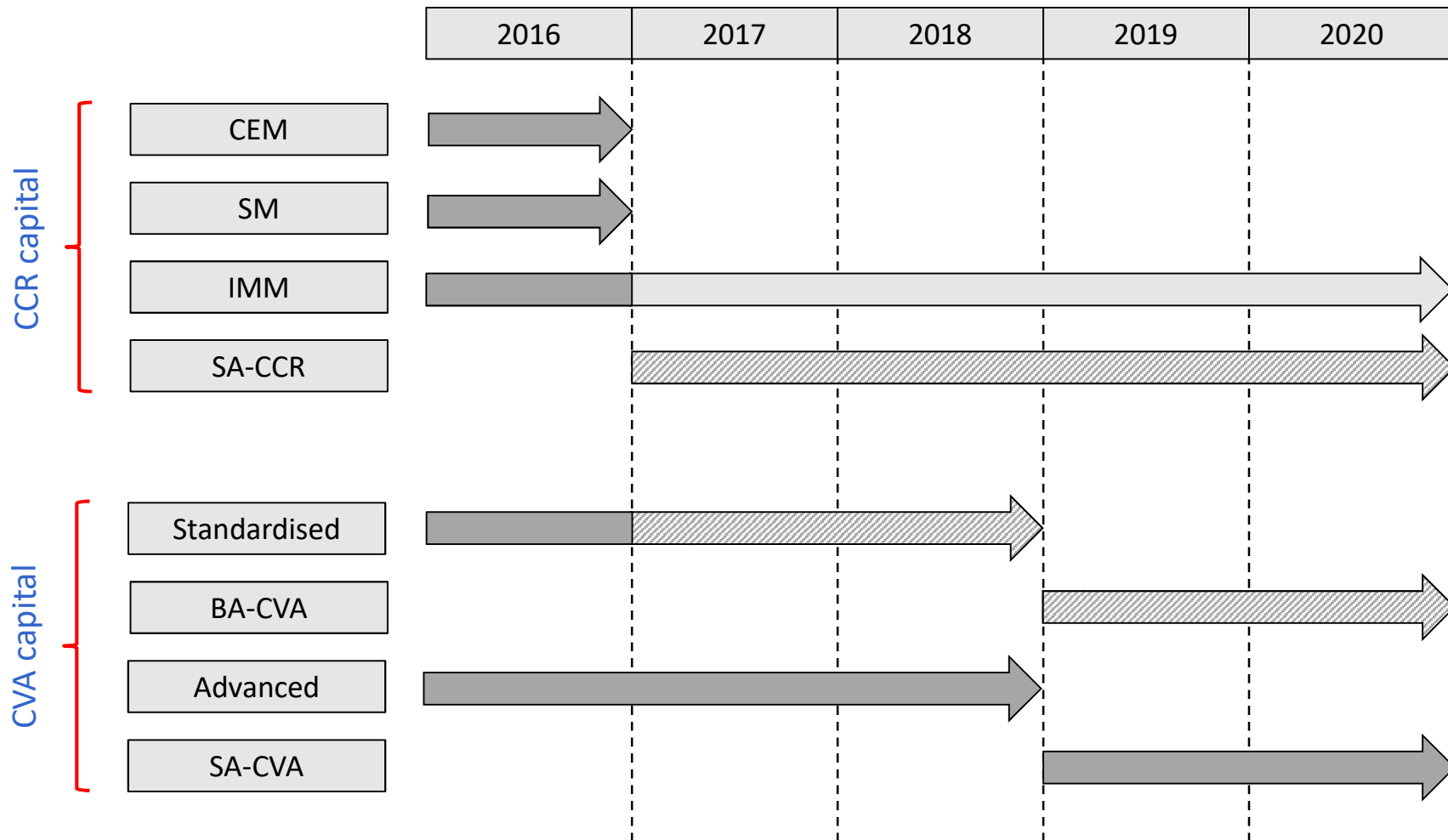
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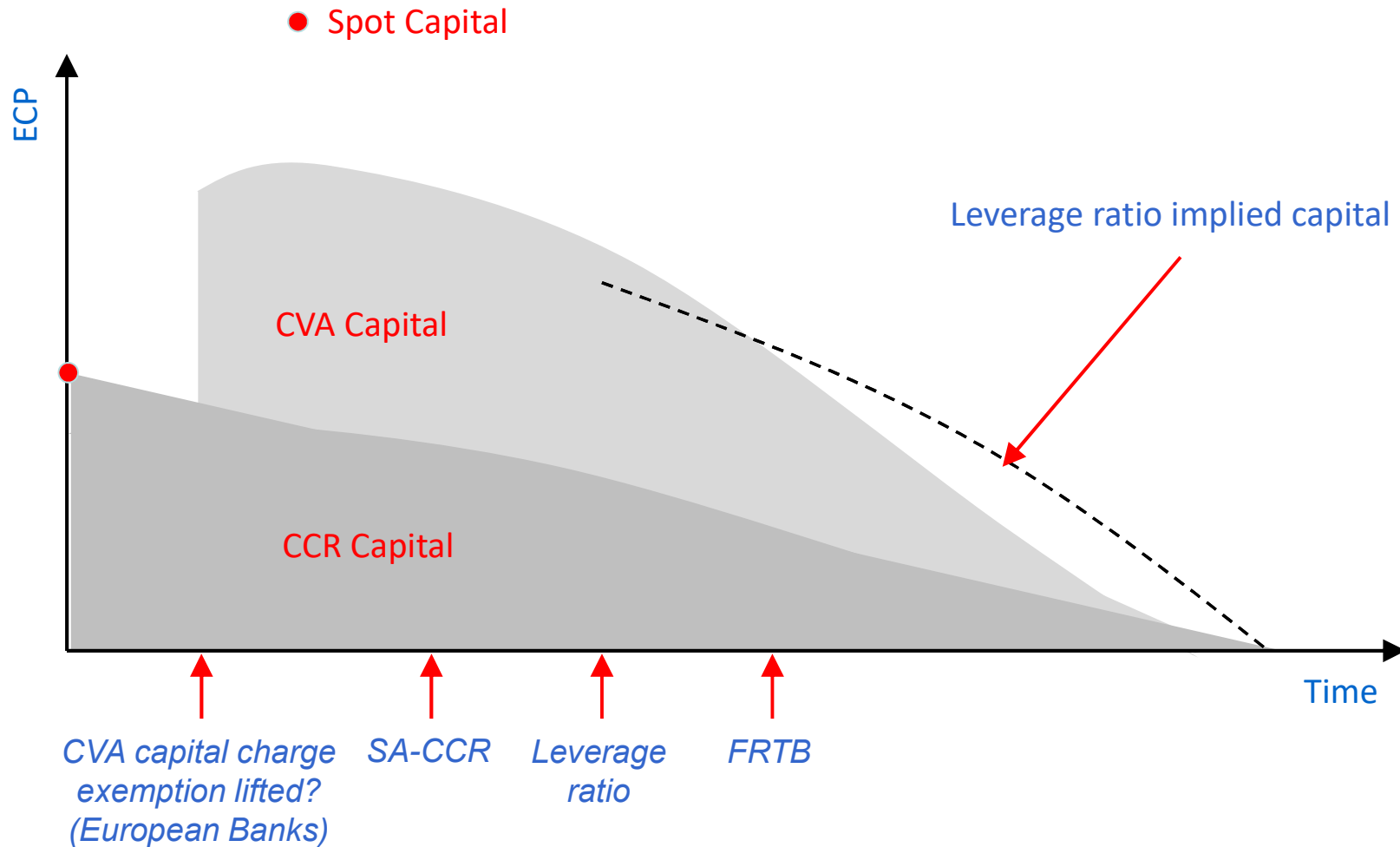
Methodologies

- **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



Assessing the Impact of Future Regulatory Change



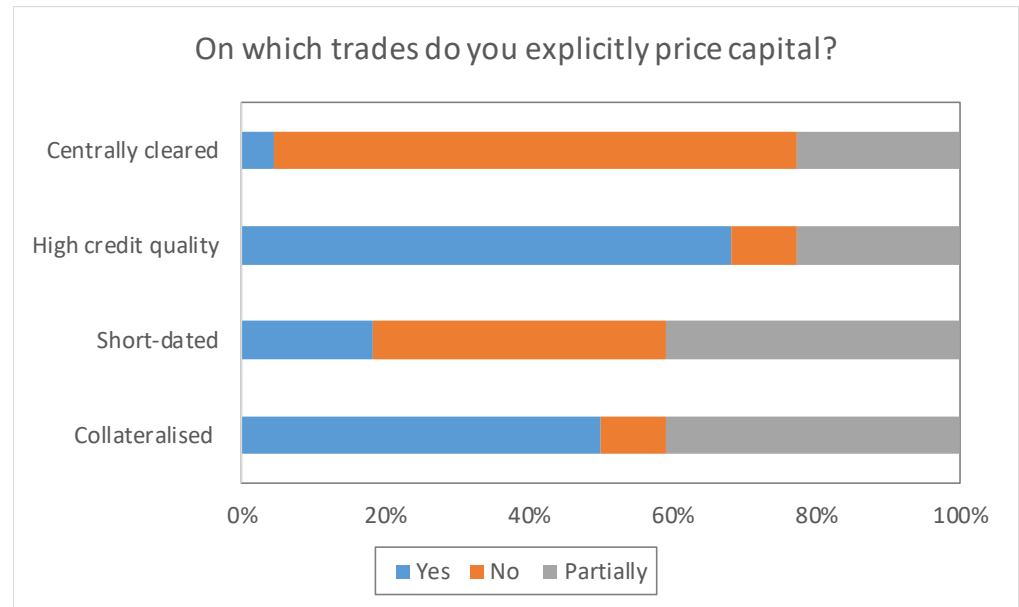
Changes in Capital Methodologies

- **SA-CCR**

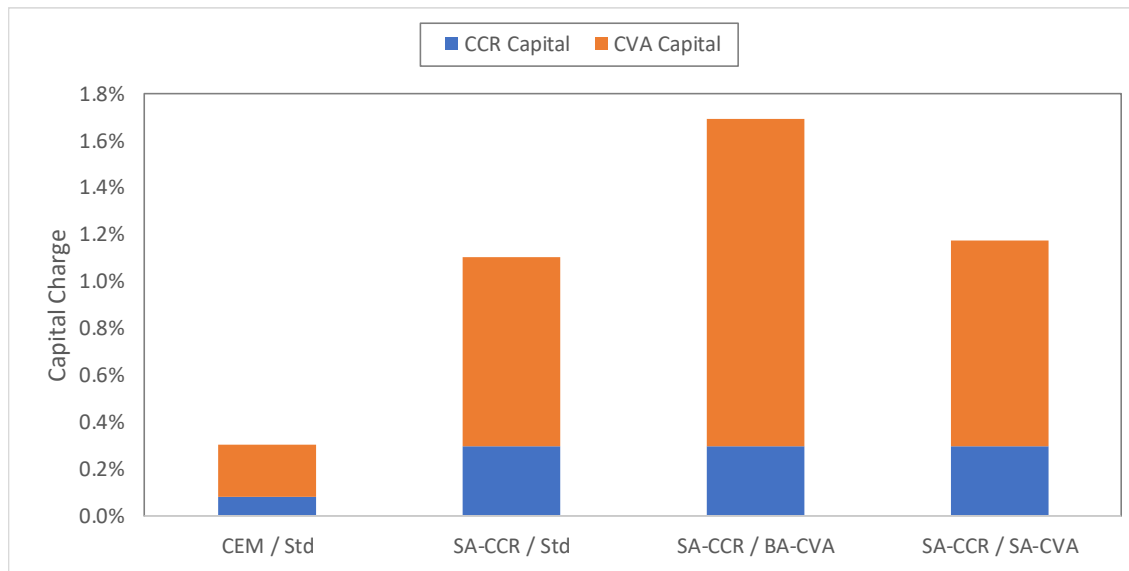
- Replaces CEM (and SM) from 2017 onwards
- Much better treatment of collateral and tenor netting
- More conservatively calibrated
- Long-dated uncollateralised trades will look bad

- **FRTB-CVA**

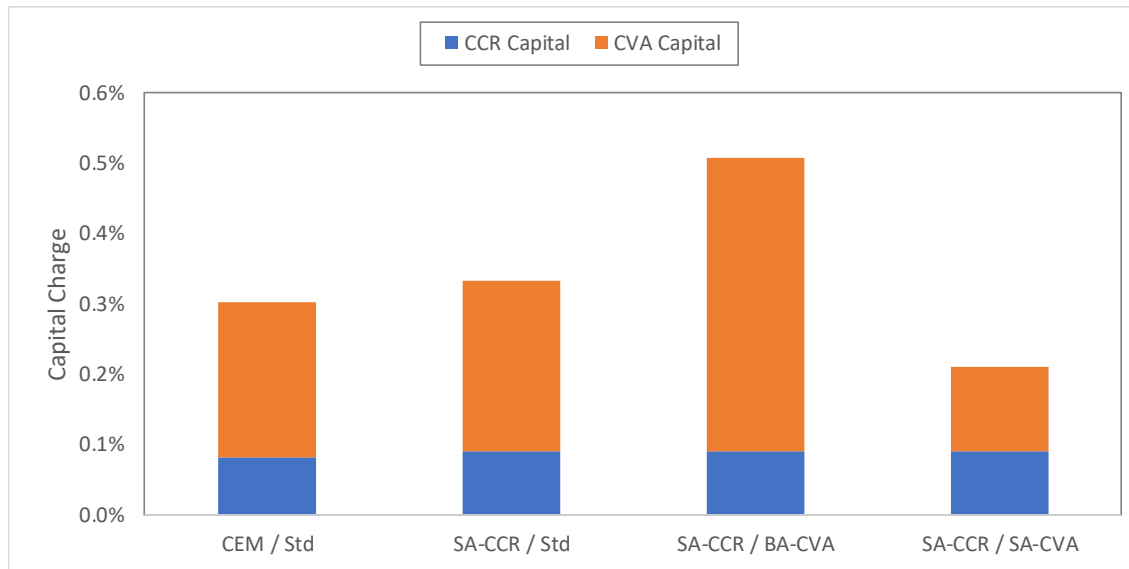
- Implementation 2019 earliest
- Basic approach (BA-CVA)
 - Likely to be more conservative than current standardised approach
 - Combined with SA-CCR may lead to very punitive capital charges with limited hedging relief
- Standardised approach (SA-CVA)
 - Uses sensitivities (greeks) and regulatory formulas
 - 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.

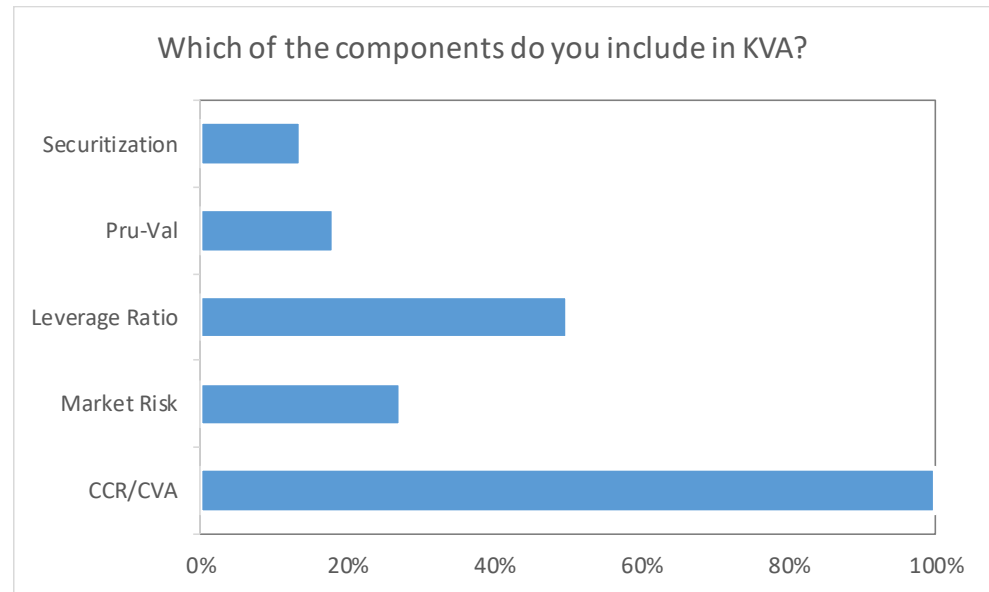
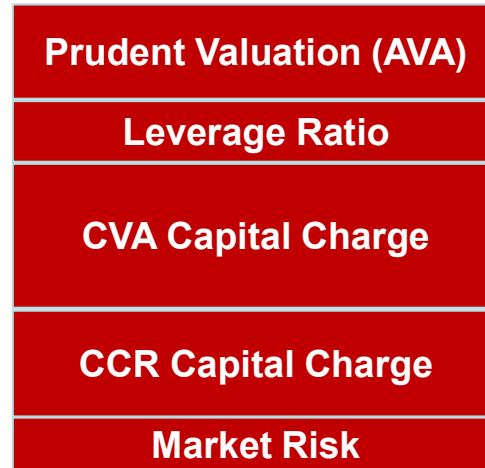
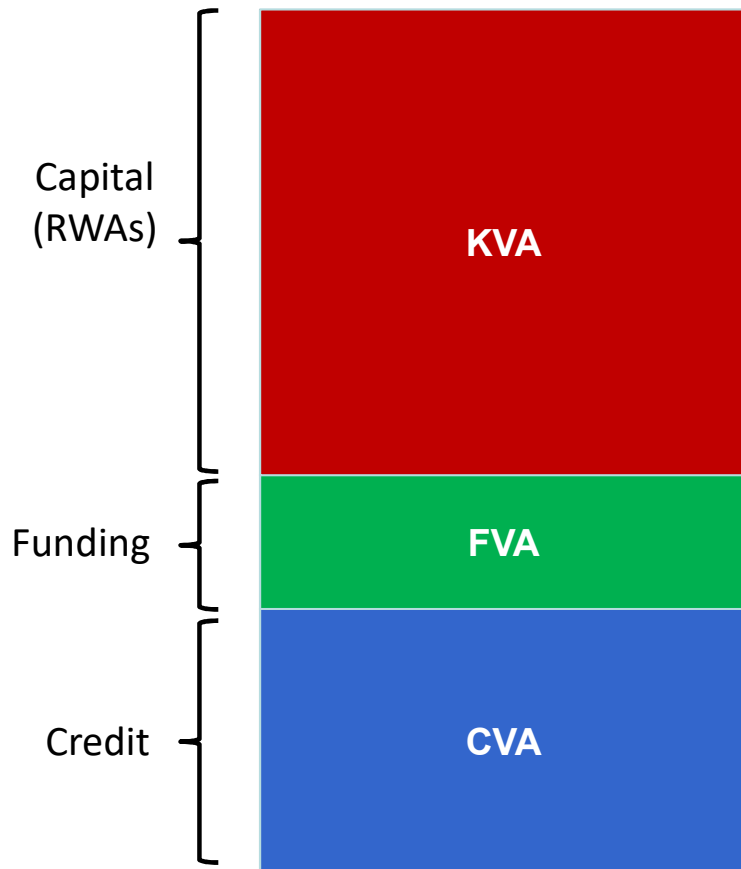
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Regulatory Capital for Counterparty Risk*



* 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

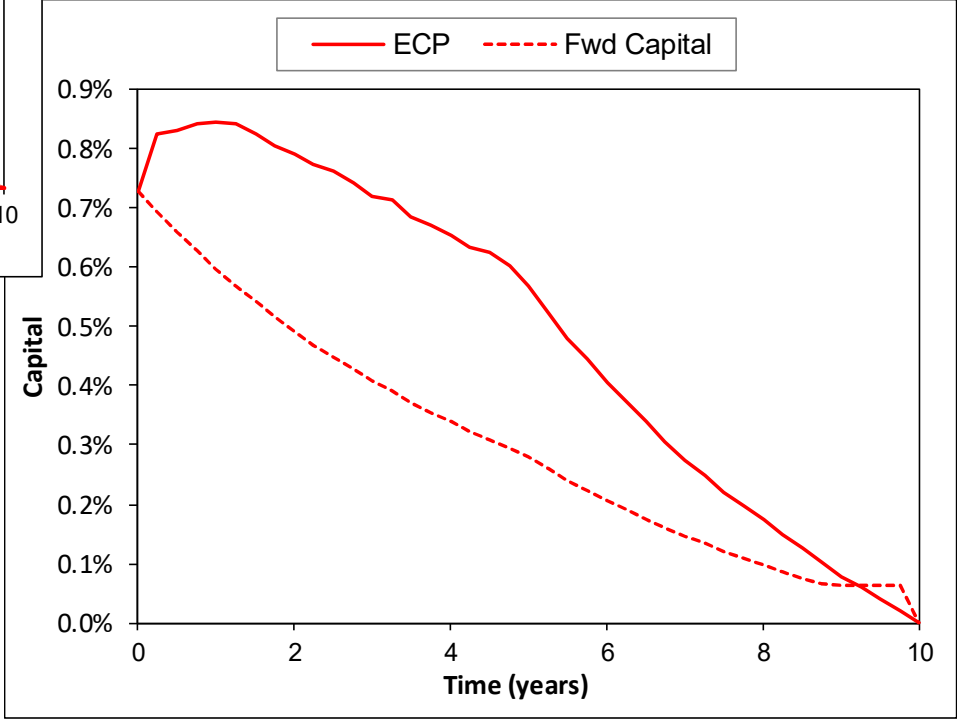
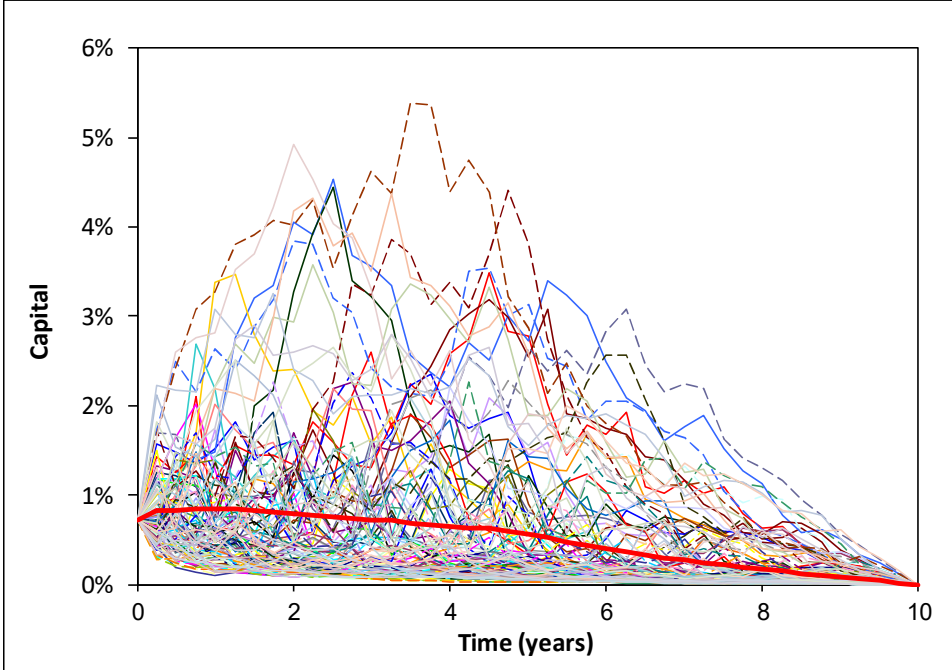
Cost of capital

Probability of no
defaults

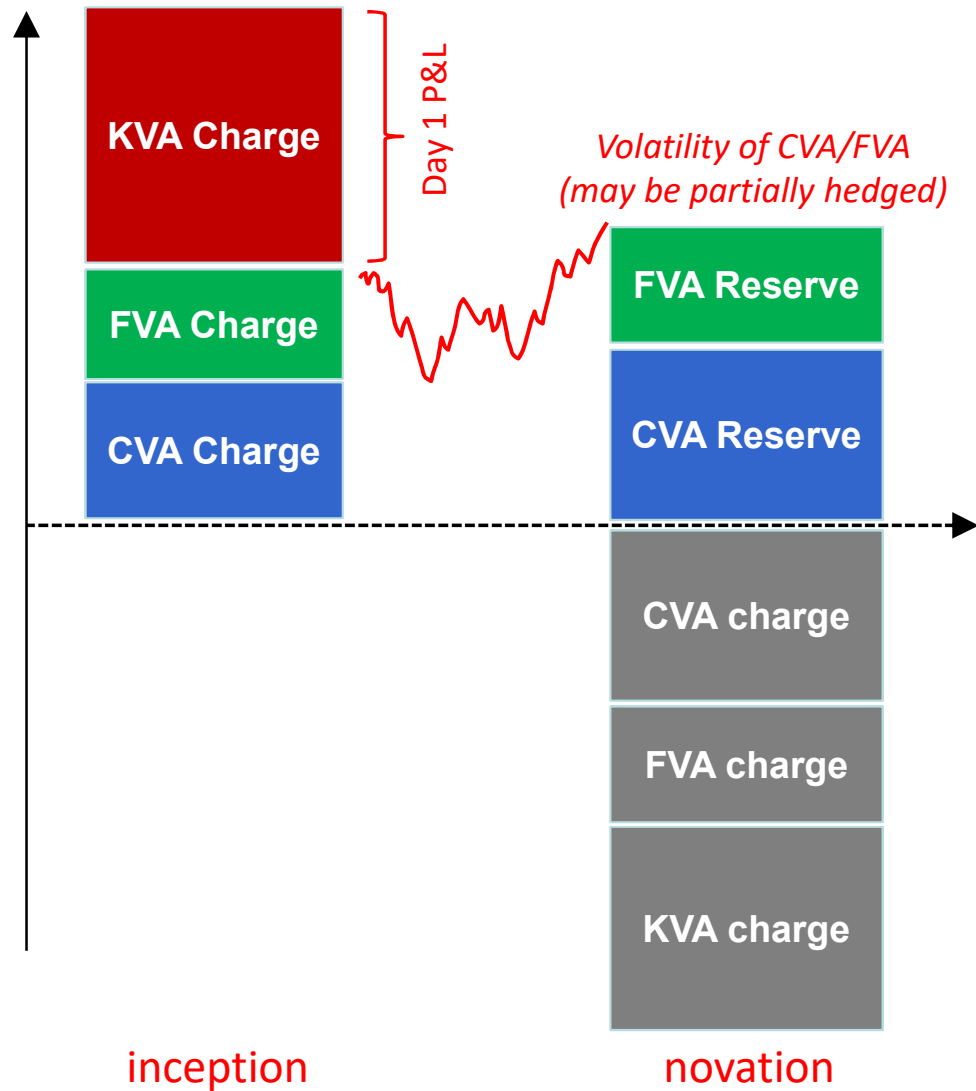
- **Aim of KVA**

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

ECP and Forward Capital



KVA is still a Day 1 profit



Leverage Ratio

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

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

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

- **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)?**

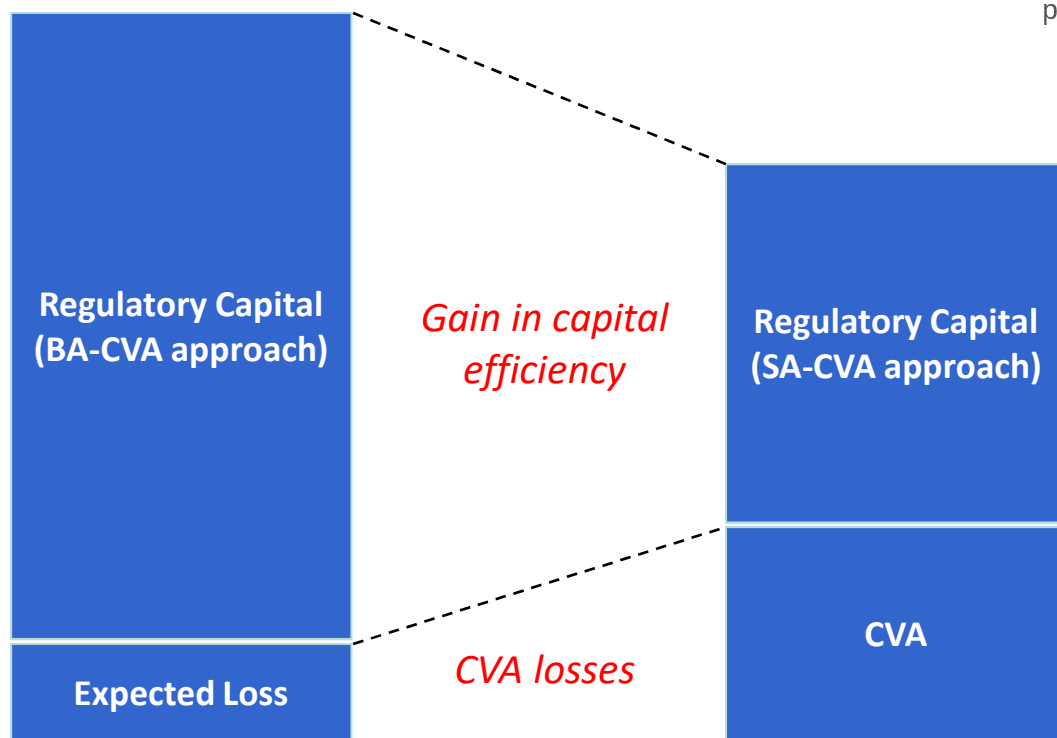
KVA Management

- 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



Warehousing Approach

Risk-neutral approach

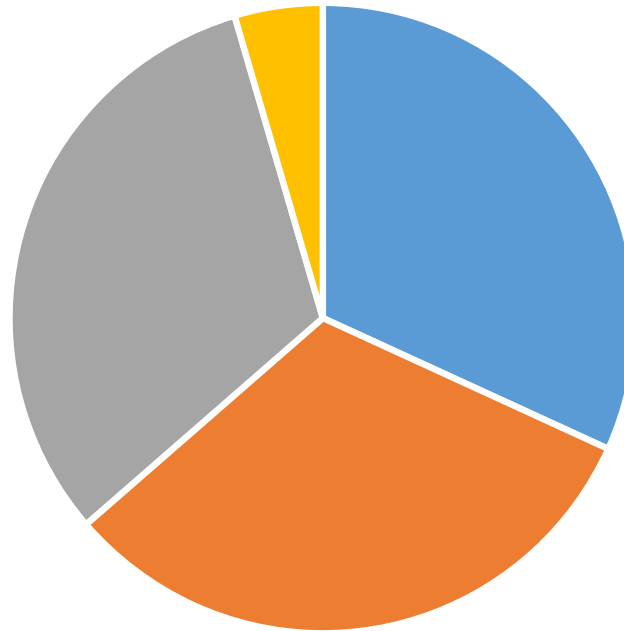
Three Japanese banks consider new CVA approach

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