Regulatory Note

New CVA capital framework: FRTB-CVA

axis alternatives

27 March 2019

Key Takeaways:

CVA is the adjustment to the market value of a derivatives associated with the credit risk of the counterparty.

CVA risk is has been introduced by the Basel Committee in the aftermath of the 2007-2008 financial crisis where many banks experienced severe losses due to widening of counterparty credit spreads. The treatment of CVA risk is transposed into European law since January 2014 (see CRR articles 381-386) along with other post-crisis reforms.

In July 2015, the Basel Committee has launched a consultation on a proposal to revise the regulatory treatment of CVA risk (BCBS 325) whose main objective were to:

- Capture all important risk drivers of CVA risk and CVA hedges while reducing model risk
- Better align capital standards with accounting best practices
- Ensure consistency with the new market risk framework (FRTB)

According to the Basel timeline, the revised framework for calculating the CVA Risk capital charge is expected to enter into force in January 2022, together with the new market risk framework (FRTB).

The main enhancement of this new set of rules, dubbed FRTB-CVA, is the **abandon of the internal approach for capitalizing CVA risk**. Instead, banks can choose between two simpler approaches:

- A basic CVA (BA-CVA) approach for banks with small and rather unsophisticated trading activities
- A Standard Approach (SA-CVA) based on CVA sensitivities to multiple risk factors and inspired from the FRTB standardized approach

Context and Objectives

During the financial crisis of 2007-2008 many losses incurred by banks were caused by CVA moves. Volatility of underlying market factors drastically increased as did credit spreads of counterparties. Both effects led to a significant increase in CVA, which is accounted for loss to the bank. As a response, the Basel Committee published in 2010 the regulatory framework for the treatment of CVA within the Basel III (BIS, December 2010, finalised June 2011) framework and implemented in European law with the Basel III implementation under the CRR on 1 January 2014.

In July 2015, the Basel Committee launched a new consultative paper (BCBS 325) to review CVA capital framework and develop a more robust framework with the objectives to:

1) Incorporate exposure and associated hedges, as well as credit spread hedges
2) Better align capital standards with fair value assessment of accounting CVA
3) Bring CVA Capital closer in line with FRTB market risk capital framework.

The proposed CVA risk framework introduces two new approaches: i) a standardised approach (SA-CVA) and ii) a basic approach (BA-CVA). Consistent with other regulations, banks can choose to implement either basic regulatory method or the SA-CVA, which requires regulatory approval and is based upon meeting certain prescribed criteria. The new framework does not allow anymore the use of internal model.

Implementation Timeline

According to the initial timeline, Banks were expected to comply with the new framework by January 2021, meaning a transposition into European law (CRR2) two years in advance to leave banks with enough time for detailed implementation.

However, industry participants and supervisory authorities raised alerts with regard to this aggressive timeline and the Basel Committee accepted to postpone the reform and took the opportunity to address several flaws in the model design, especially with regard to FRTB.

Banks are now required to start reporting CVA capital charges under the new FRTB-CVA framework by January 2022. They must calculate and report CVA capital charges at the same frequency as their SA market risk, ie on a quarterly basis.

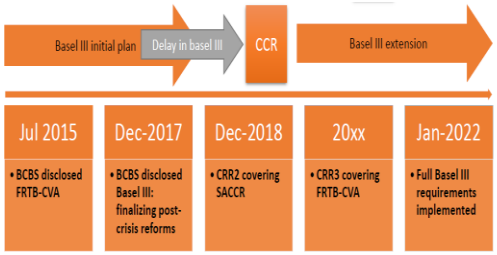

Figure 1 – Implementation timeline

Standardised approach (SA-CVA)

The standardised approach for determining the CVA risk capital charge within the FRTB-CVA framework is a cut-down version of the new sensitivity-based method used market risks (FRTB-SBM). It relies on i) regulatory CVA valuation formula; ii) CVA sensitivities to market risk factors; and iii) counterparty credit spreads. To be eligible to SA-CVA, banks must fulfil the following conditions:

- Being able to calculate CVA sensitivities to the level required by SA-CVA
- Have proxy spread methodology for illiquid counterparties
- Have a dedicated CVA Risk Management function

SA-CVA vs FRTB-SBM

Compared to FRTB-SBM, since counterparty default risk is already included in the CCR (Credit Counterparty Risk) capital charge, the SA-CVA approach does not account for default risk (DRC). Also, recognizing the fact that calculating CVA sensitivities is computationally time consuming, regulators reduced granularity of market risk factors in most cases and excluded curvature risk (gamma). To compensate for the reduction of these sensitivities, which can lead to inadequate risk capture, risk aggregation for SA-CVA is more conservative than it is for FRTB-SBM. In particular two parameters have been introduced: i) a "disallowance factor" (set at 1%) preventing the possibility of perfect hedging of

CVA risks and ii) a multiplier (set at 1.25) capturing the existing model risks.

Finally, recognizing that CVA is almost linear to the counterparty credit spread and relatively straightforward to compute, an extra asset class of counterparty credit spreads is created which retains the full granularity of buckets used for the delta charge, but, has no vega charge.

Hedges recognition under SA-CVA framework

Compared to the current CVA framework, the new SA-CVA has two major improvements related to the recognition of CVA hedges:

1) First, the scope of eligible hedges for counterparty credit spread has widened to include proxy hedges, i.e. those that do not directly reference the counterparty.
2) Second, it recognises hedges that are in place to mitigate sensitivities to market risk factors driving changes in price for derivatives and SFT (Securities Financing Transaction).

SA-CVA capital charge computation

Basically, the SA-CVA capital charge is a simple sum of the capital charge for delta and vega risks calculated for the entire CVA book (including eligible hedges).

In order to determine the risk content of positions, the six (or five) risk classes split into buckets of similar risk factors, used as a first layer of risk aggregation (Figure 2).

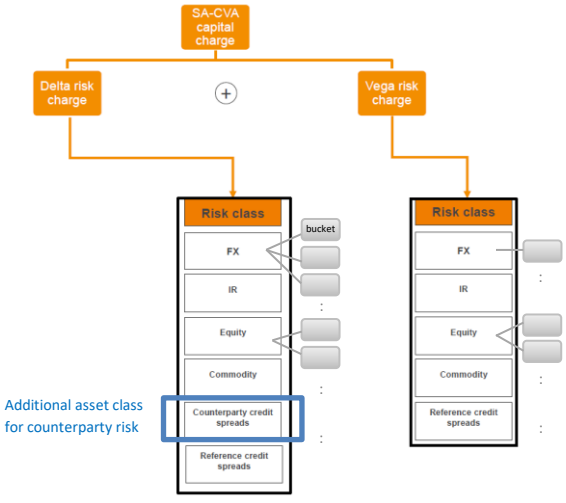

Figure 2: SA-CVA detailed risk class

The following buckets are prescribed by the supervisory authority for each risk class:

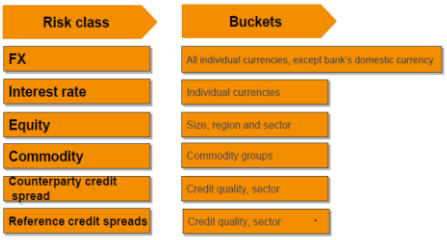

Figure 3: SA-CVA risk class buckets

The capital requirement for the delta and vega risks for all buckets within a risk class is then determined by aggregating the risk position values using the corresponding prescribed correlations between buckets. The computation steps are synthetized as follow:

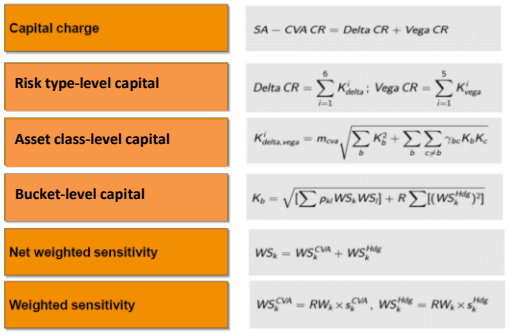

Figure 4 : SA-CVA computation steps

Sensitivities used for SA-CVA capital charge computation, must meet FRTB sensitivity validation standards defined as finite difference. The sensitivities are defined as the ratio of the change of the quantity in question (aggregate CVA or market value of all CVA hedges) caused by a small change of the risk factor current value to the size of the change. When CVA sensitivities for vega risk are calculated, the volatility shift must apply to both generating risk factor paths and pricing options in exposure models.

The SA-CVA approach may be an attractive method in reducing capital charges for CVA risk, provided banks have an active CVA desk to manage CVA and CVA risk.

Basic CVA approach (BA-CVA)

The basic approach (BA-CVA) capital charge is a closed form formula, quite similar to the current standardised CVA capital charge. Inputs remain regulatory EAD, effective maturities and supervisory risk weights. However, compared to the current standard CVA capital framework, under this approach:

- Exposure (EAD) can be determined either based on the new standardised approach for counterparty risk (SA-CCR) or based on the Internal Model Method (IMM)
- Risk weights assignment is based on a new segmentation that takes into account counterparties sector and credit quality

The BA-CVA framework is for banks that do not have approval for the application of the SA-CVA. Contrary to the SA-CVA, no inherent sensitivities must be determined for market risk factors within the scope of the BA-CVA.

The BA-CVA capital charge can be computed either via i) the reduced version (capital reduced) or ii) full version (capital full). The reduced version is designed to simplify BA-CVA implementation for less sophisticated banks that do not hedge CVA, while the full version recognized counterparty spread hedges and is intended for banks that hedge CVA risk.

The reduced version of the BA-CVA (hedges are not taken into account) is computed as follow:

$$K_{reduced} = \sqrt{\left(\rho \cdot \sum_c SCVA_c\right)^2 + \left(1-\rho^2\right) \cdot \sum_c SCVA_c^2}$$

ρ (set at 50%) is the supervisory correlation between credit spread and systemic factor whereas SCVA is the standalone capital per counterparty given by:

$$SCVA_c = \frac{1}{\alpha} \cdot RW_c \cdot \sum_{NS} M_{NS} \cdot EAD_{NS} \cdot DF_{NS}$$

The alpha factor (set at 1.4) is applied within the scope of the SA-CCR as well as within the IMM in order to convert the EEPE (Expected Effective Positive Exposure) into an EAD.

Banks that hedge their CVA risk can use the full version, which recognises counterparty credit spread hedges. Single-name CDS, single name contingent CDS and index CDS are the allowable eligible hedges under this approach. For single-name hedges, there is an additional eligibility requirement: eligible single-name credit instruments must: i) reference the counterparty directly or ii) reference an entity legally related to the counterparty or iii) reference an entity that belongs to the same region and sector as the counterparty. This is an extension of the eligibility criteria of the current framework that requires the counterparty to be referenced directly for any single-name hedge.

Under the full version, the CVA capital charge is given by:

$$K_{full} = \beta \cdot K_{reduced} + (1-\beta) \cdot K_{hedged}$$

where:

$$K_{hedged} = \sqrt{\left(\rho \cdot \sum_c (SCVA_c - SNH_c) - IH\right)^2 + \left(1-\rho^2\right) \sum_c (SCVA_c - SNH_c)^2 + \sum_c HMA_c}$$

This formula includes separate parameters to realise the hedging benefit of single name hedge, index hedge and indirect hedges, and a supervisory parameter β (set at 25%) to limit the capital benefits from these hedges.

BA-CVA is likely to be more conservative than current CVA standardised approach. Combined with SA-CCR, it may lead to very punitive capital charges with limited hedging relief.

Operational complexity

Under the new SA-CVA, banks have to compute CVA sensitivities to a large number of market risk factors, which are typically in the hundreds or even thousands. Therefore, the use of automatic differentiation methods such as AAD (Automatic Adjoint Differentiation) for the massive computational effort of calculating CVA sensitivities may seem like a no-brainer. However, if AAD is not allowed under the SA-CVA framework, banks will have to fall back on traditional methods such as bumping, which aligns with a strict interpretation of FRTB, but requires a lot of investment in IT infrastructure to meet its heavy computational demands.

Also, as mentioned earlier, in order to adopt the SA-CVA approach, banks will need to meet certain prescribed criteria. One of the key pre-requisites is that banks that do not already have an

active CVA desk in place, will need to set one up for the 'risk management and hedging of CVA'. This will require non-trivial investment in software systems and skilled CVA expertise.

Conclusion

The review of the CVA risk capital regulation will have a huge impact on bank methodologies, systems, data and processes. The greatest challenge will be to achieve the significant increase in software performance and computing power required to provide the sensitivities for the SA-CVA, or otherwise fund extra capital charge under BA-CVA.

Reference

[1] Basel committee on Banking Supervision. Basel III : Finalising post-crisis reforms, December 2017.

[2] Basel committee on Banking Supervision. Review of the Credit Valuation Adjustment Risk Framework, July 2015.

[3] Martin Neisen, Stephan Roth. Basel IV : the Next Generation of Risk Weighted Assets, 2nd edition, July 2018.

axis alternatives

Contacts:

Aubry MIENS

Partner
+33 (0) 6 98 70 43 48
a.miens@axisalternatives.com

Samuel CHESNEL

Partner
+33 (0) 6 67 25 74 79
s.chesnel@axisalternatives.com

Ichak KOUTCHOUKALI

Director
+33 (0) 6 52 46 37 72
i.koutchoukali@axisalternatives.com