Basel Committee
on Banking Supervision

Consultative Document

Review of the Credit Valuation Adjustment Risk Framework

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Contents

Review of the Credit Valuation Adjustment risk framework

Background to the current framework

This consultative paper presents a proposed revision of the Credit Valuation Adjustment (CVA) framework set out in the current Basel III capital standards for the treatment of counterparty credit risk.[1]

CVA is an adjustment to the fair value (or price) of derivative instruments to account for counterparty credit risk (CCR). Thus, CVA is commonly viewed as the price of CCR. This price depends on counterparty credit spreads as well as on the market risk factors that drive derivatives' values and, therefore, exposure. The purpose of the Basel III CVA capital charge is to capitalise the risk of future changes in CVA.

During the financial crisis, banks suffered significant counterparty credit risk (CCR) losses on their OTC derivatives portfolios. The majority of these losses came not from counterparty defaults but from fair value adjustments on derivatives. The value of outstanding derivative assets was written down as it became apparent that counterparties were less likely than expected to meet their obligations.

Under the Basel II market risk framework,[2] firms were required to hold capital against the variability in the market value of their derivatives in the trading book, but there was no requirement to capitalise against variability in CVA. The counterparty credit risk framework under Basel II was based on the credit risk framework and designed to capitalise for default and migration risk rather than the potential accounting losses that can arise from CVA.

To address this gap in the framework, the BCBS introduced the CVA variability charge as part of Basel III. The current CVA framework sets forth two approaches for calculating the CVA capital charge, namely the "Advanced CVA risk capital charge" method (the current Advanced Approach) and the "Standardised CVA risk capital charge" method (the current Standardised Approach). Both approaches aim at capturing the variability of regulatory CVA that arises solely due to changes in credit spreads without taking into account exposure variability driven by daily changes of market risk factors. Accordingly, the only CVA hedges that the current framework recognises are those that pertain to credit spread risk. Among those hedges, the only types that the framework deems eligible are single-name credit instruments that reference the counterparty directly and, under certain conditions, CDS index hedges.

The current Advanced Approach is available only to banks that have approval to use the Internal Model Method (IMM) for calculating exposure at default (EAD) for CCR capital calculations. This condition is necessary because the Advanced Approach employs a pre-defined formula for defining regulatory CVA that is based on market-observed credit spreads and IMM expected exposure time profiles for each counterparty. The capital charge for CVA risk is then determined by running the bank's internal model for specific credit spread risk on the portfolio of these regulatory CVAs and eligible CVA hedges, keeping IMM exposures that enter regulatory CVA calculations fixed.

1 Basel Committee on Banking Supervision, *Basel III: A global regulatory framework for more resilient banks and banking systems – revised version*, June 2011, www.bis.org/publ/bcbs189.htm.

2 Basel Committee on Banking Supervision, *Basel II International Convergence of Capital Measurement and Capital Standards – Comprehensive Version*, June 2006, www.bis.org/publ/bcbs128.htm.

Under the current Standardised Approach, a regulatory formula supplemented with a table of ratings-based supervisory risk weights is used to calculate the CVA risk capital charge. Bank-provided inputs to the formula include EADs used in the CCR framework, counterparty ratings, and the notional values of eligible CVA hedges.

Rationale for revising the current framework

The motivations for revising the current framework are threefold:

(i) Capturing all CVA risks and better recognition of CVA hedges

The current framework does not cover an important driver of CVA risk, namely, the exposure component of CVA. This component is directly related to the price of all the transactions that are within the scope of application of the CVA risk capital charge. As these prices are sensitive to variability in underlying market risk factors, the CVA also materially depends on those factors.

A recent study[3] shows that a large set of banks actively manage their CVA risk by mitigating the sensitivity of their CVA to market risk factors by entering into transactions linked to those risk factors. The current framework does not cover the exposure component of CVA risk, and, consequently, does not recognise the hedges that banks put in place to target the exposure component of CVA variability.

The proposed framework takes into account the exposure component of CVA risk along with its associated hedges in the capital charge. This approach should provide a better alignment between the economic risks and the capital charge for CVA and reduce the incentive banks currently have to leave some of their risks unhedged.

(ii) Alignment with industry practices for accounting purposes

Accounting CVA standards and industry best practices have evolved significantly over the last five years. The current regulatory CVA formula used in the Advanced Approach does not incorporate many of the hedging strategies banks now employ under various accounting regimes, particularly with regard to the market risk drivers of CVA, and has thus become outdated.

One of the aims of IFRS 13[4] is to harmonise the definition of fair value and, as a direct consequence, harmonise the practices used by institutions to determine accounting fair value. IFRS 13 accounting characterises fair value as an exit price that should correspond to a consensus across market participants in orderly transactions. In terms of CVA, this requires an exit price for all transactions inside the netting set to be determined.

IFRS 13 may not be binding in terms of the methodology used to calculate CVA, but auditors have observed that banks increasingly use market-implied (rather than historical) model calibration in their CVA calculations. This convergence in industry practice was partially anticipated when the current

[3] Deloitte and Solum Financial Partners, "*Current market practice around counterparty risk regulation, CVA management and funding*", Counterparty risk and CVA survey, 22 March 2013.

[4] International Financial Reporting Standards, *Fair Value Measurement*, entering into force on 1 January 2013.

CVA framework was designed, as banks were required to use market-observed spreads and market-implied recovery rates. However, for institutions using the current Advanced Approach, the exposure profiles are based on the IMM framework – which does not require model calibration to market-implied parameters (eg the drifts and volatilities for the diffusion processes of the risk factors do not need to be risk-neutral, they can be estimated from historical data).

The use of market-implied parameters is necessary not only for defining a common price for accounting CVA across market participants, but also for hedging efficiency for those banks that mitigate CVA sensitivities to market risk factors with trading instruments that are fair-valued in a risk-neutral environment.

Based on these considerations, the Basel Committee is proposing an approach to a new regulatory capital treatment of CVA that is based to some extent on accounting CVA. A new regulatory CVA would be calculated via the exposure models that banks also use to calculate their accounting (or front office) CVA. However, the proposal would impose several conditions on the accounting exposure models used: they must be risk-neutral, calibrated to market-implied parameters whenever possible, and account for a finite margin period of risk (with a floor of 10 business days) for margined counterparties. While these conditions may create deviations from the CVA that some banks currently use for accounting, they are intended to represent best and prudential practice in internal CVA calculations.

There are concerns that allowing internal CVA models could loosen the prudential standards of exposure calculation relative to the current IMM-based calculation and that excessive RWA variability could be transmitted due to not yet fully converged accounting standards. Accordingly, the Basel Committee is proposing an alternative option that would still base the CVA exposure calculation on the IMM exposure models, but also allow for the same hedges as accounting-based regulatory CVA without prescribing a specific CVA formula.

(iii) Alignment with proposed revisions to the market risk framework

Accounting CVA is fair-valued through the profit and loss (P&L) account and it is sensitive to the same risk factors as instruments held in the trading book. Revising the CVA framework to make it more consistent with the approaches used in the revised market risk framework set out in the recent consultation papers on the *Fundamental Review of the Trading Book* (FRTB)[5] would better align the regulatory treatment of CVA with banks' risk management practices and result in a more coherent framework for CVA.

As previously mentioned, CVA is a fair value adjustment to the price of a fair-valued instrument. Therefore, the capital charge that relates to it should be closely linked to the capital charge for market risk. The revised Basel framework for market risk under the FRTB relies on fair value sensitivities to market risk factors. As a consequence, the CVA capital requirements should be as consistent as possible with those set down under the FRTB. The proposed "FRTB-CVA framework" (Section B of the draft Accord text in Annex 1) is an adaptation of the FRTB framework for market risk in the trading book to the "CVA book", which includes CVA and its eligible hedges.

[5] Basel Committee on Banking Supervision, *Fundamental review of the trading book – second consultative document*, October 2013, www.bis.org/publ/bcbs265.htm.

Basel Committee on Banking Supervision, *Fundamental review of the trading book: outstanding issues*, December 2014, www.bis.org/bcbs/publ/d305.htm.

CVA risk is more complex in nature than the majority of the positions of the trading book, and it is therefore difficult for some banks to compute CVA sensitivities to a sufficiently large set of market risk factors on a regular basis. As it may not seem reasonable to impose the calculation of CVA sensitivities to risk factors on all banks, particularly those with limited derivative portfolios, the Basel Committee is proposing a "Basic CVA framework" (Section C of the draft Accord text in Annex 1) that does not require calculation of CVA sensitivities.

Under both proposed frameworks, the CVA capital charge would still be calculated on a standalone basis: no interactions between the CVA book and the trading book instruments would be permitted. All CVA hedging instruments would be taken into account and capitalised without double-counting. To this end, all eligible CVA hedges would be moved from the trading book to the CVA book, while all non-eligible CVA hedges would remain in the trading book and would have no impact on CVA risk capital calculations.

As stated in previous consultation papers on the FRTB conducted by the Basel Committee, the primary reason for capitalising CVA risk separately from the trading book is that regulatory capital calculation of CVA risk entails a high degree of complexity and model risk. The Committee continues to have reservations as to whether CVA can be effectively captured within an internal model designed to capture market risks in the trading book (including the proposed internal models approach in this document) and may decide not to provide for a treatment based on the internal model approach to the trading book in the final standard. At a minimum, there should be careful supervisory scrutiny before a bank is permitted to use its internal models to calculate regulatory capital for CVA. In addition, the Debt Valuation Adjustment (DVA) component of bilateral CVA will not be recognised in the proposed framework.

Next steps

The Committee welcomes comments from the public on the specific refinements described in this document by **1 October 2015**. All comments will be published on the Bank for International Settlements website unless a respondent specifically requests confidential treatment. In parallel, the Committee will conduct a Quantitative Impact Survey in the second half of 2015 to inform deliberations on the final calibration of the framework.

1. Scope of application

The CVA capital charge would apply to all derivative transactions that are subject to the risk that a counterparty could default. These transactions would include all derivatives except those cleared through a qualified central counterparty, whether they are margined or not, and regardless of the accounting treatment (eg interest rate derivatives in the banking book that are eligible for cash flow hedge accounting treatment are also subject to CVA risk). They also encompass securities financing transactions (SFTs) that are fair-valued by a bank for accounting purposes.

2. Hierarchy of approaches

The current proposal sets forth two different proposed frameworks to accommodate different types of banks.

- First, a **"FRTB-CVA framework"** (named as such to reflect consistency with the proposals under the FRTB) is available to banks that satisfy several fundamental conditions related to the calculation and the risk management of their CVA. To use the FRTB-CVA framework, a bank would need to demonstrate to the satisfaction of its supervisor that it meets these conditions. The proposed FRTB-CVA framework consists of a proposed standardised approach for CVA ("SA-CVA") and a proposed internal models approach for CVA ("IMA-CVA").
- Second, a **"Basic CVA framework"** would apply to banks that do not meet the FRTB-CVA conditions or do not have the internal resources to apply the FRTB-CVA framework.

The Committee believes that two separate frameworks for determining capital requirements for CVA are necessary to accommodate the wide range of capabilities and resources available to banks that enter into derivative transactions. In the trading book application, the proposed FRTB market risk framework (comprising an internal models-based approach and a standardised approach) is based on a bank's ability to calculate the price sensitivity of traded instruments to market risk factors. It is universally understood that any bank that trades a given instrument should be able to calculate the instrument's sensitivities to all relevant market factors – hence a single FRTB framework would be sufficient. In the case of CVA, two separate frameworks are warranted because the calculation of CVA sensitivities, even for simple derivatives, is computationally intensive, given that each CVA calculation requires a simulation of exposure for all counterparties. As a result, many banks that trade derivatives (thus creating CVA risk) are unable to calculate CVA sensitivities to the potentially large set of market risk factors that drive CVA. Such banks would be unable to use the proposed FRTB-CVA framework, but would be able to compute the proposed Basic CVA framework.

The FRTB-CVA framework is designed for banks that are capable of managing their CVA risk by calculating CVA sensitivities to a sufficiently large set of risk factors. Similar to the trading book application, the FRTB-CVA framework includes an internal model approach (IMA-CVA) and a standardised approach (SA-CVA). Provided that a bank satisfies its supervisor that it meets basic conditions to use the FRTB-CVA framework, a bank would be allowed to apply the SA-CVA without further restrictions. In order to use the IMA-CVA, a bank must satisfy an additional set of general provisions (see Section B.3(a) of the draft Accord text in Annex 1) derived from the trading book application of the approach (referred to as the IMA-TB). A very important part of these provisions is the validation package that includes P&L attribution and back-testing requirements developed for the trading book and proven experience in an IMA for some significant trading desks.

For banks that do not calculate CVA sensitivities to market risk factors to the satisfaction of their supervisor, the Basic CVA framework provides a formula-based capital charge that relies on (i) characteristics of counterparties; (ii) EADs calculated according to Annex 4 of the current Basel framework; (iii) effective maturities used for calculation of CCR capital requirement; and (iv) notional and maturities of eligible hedges.

3. The proposed FRTB-CVA framework

3.1 Eligibility criteria

Section B.1(a) of the draft Accord text in Annex 1 provides a list of eligibility criteria that need to be met before a bank can be authorised to use the FRTB-CVA framework. There are three major eligibility criteria. The FRTB-CVA framework is derived from the revised market risk framework, the FRTB, which relies primarily on sensitivities of prices of traded instruments to market risk factors. In the CVA application, prices of traded instruments are replaced with CVA and their eligible hedges, so that CVA sensitivities are critical elements of the FRTB-CVA framework that a bank must be able to calculate in order to apply the framework. Thus, the first eligibility requirement concerns a bank's ability to calculate CVA sensitivities at the level required by the SA-CVA.

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.

3.2 Eligible hedges

Section B.1(g) of the draft Accord text provides the conditions under which hedges can be recognised in the FRTB-CVA framework.

There are two major improvements in the recognition of CVA hedges under the revised CVA framework. First, the range of single-name instruments recognised as hedges of counterparty credit spread risk of CVA has been widened to integrate "proxy hedges", ie hedges which do not directly reference the counterparty. The revised text rules specify how, in this situation, the basis risk between the counterparty's CVA and the proxy hedge has to be captured.

Secondly, "market risk" hedges (ie transactions that mitigate CVA sensitivities to market risk factors that drive exposure) are now also recognised. The primary eligibility requirement is that the purpose of the transaction is mitigating CVA risk. Therefore, such a transaction must be booked and managed by a bank's CVA desk (or a similar dedicated function). All hedges satisfying this requirement are considered eligible throughout the FRTB-CVA framework except for the instruments that cannot be included in the IMA-TB (such as tranched credit derivatives).

3.3 Regulatory CVA

Section B.1(c) of the draft Accord text provides general principles that banks need to follow to calculate regulatory CVA for the purpose of the FRTB-CVA framework.

In contrast to the current framework, the definition of regulatory CVA is based on a set of principles rather than on a regulatory formula. Most of these principles are used by best practice banks in calculating their accounting CVA: calculation of CVA as the expectation of future losses; use of market-implied probability of default and expected loss given default; use of simulated paths of discounted exposure. Banks, however, must also assume that they themselves are default risk-free. This assumption results in unilateral CVA, which is only one side of the bilateral CVA used in accounting. The DVA component of bilateral CVA is not recognised in the proposed framework.

A key input of the exposure calculation for netting sets covered by a margin agreement is the margin period of risk (MPoR). The Committee is of the view that, even if risk mitigation via margining is acknowledged, the remaining risks must not be underestimated. **Two alternatives** are currently considered for a supervisory floor on the MPoR: (i) the known 10 business days for daily re-margining; or (ii) the current supervisory floor, as specified in Annex 4 of the existing Basel III standards, which may go beyond that.

The Committee is interested in the industry's comments on alternatives (i) and (ii) as well as their view on MPoR for large netting sets, netting sets containing possibly illiquid transactions and netting sets whose valuation is often subject of disputes (refer to Question 1 and Question 2 on page 16).

The Basel Committee is also considering two options for generating scenarios of discounted exposures that are a key component of regulatory CVA.

- **Option A** (accounting-based CVA; refer to Section B.1(d) of the draft Accord text): Paths of discounted exposure are obtained via exposure models used by a bank for calculating front office/accounting CVA. Requirements for exposures underlying CVA under this option are based on:
  - The requirements in the current and proposed market risk framework (second CP of the FRTB) regarding the treatment of illiquid positions;
  - the general requirement on internal independent review of pricing models as outlined in Basel II; and
  - further requirements for exposure calculation corresponding to all those parts of Annex 4 independent of or prior to specific requirements for the counterparty default capital charge, which apply also for the exposure underlying the CVA of Option A.

  Several additional requirements are imposed to ensure that the approach is sufficiently prudent: use of risk-neutral drifts; calibration of volatilities and correlations to market data whenever possible; a 10-business-day floor for the margin period of risk (MPoR) for margined counterparties and a number of procedural and validation requirements similar to the IMM.

  - Because of the MPoR floor, a fourth eligibility condition for the FRTB-CVA framework is needed: the ability of a bank's accounting CVA exposure model to accommodate a non-zero value for the MPoR for margined counterparties.
- **Option B** (IMM-based CVA; refer to Section B.1(e) of the draft Accord text): Paths of discounted exposure are obtained via IMM exposure models. IMM exposure requirements for Option B are in Annex 4 of the Basel framework (together with default charge-specific requirements). Note that this includes Basel III-related enhancements in relation to margined trading, treatment of wrong way risk and validation.
  - Option B implies a fourth eligibility condition for the FRTB-CVA framework: existing IMM approval from a bank's supervisory authority.

The rationale for proposing Option A is to favour the convergence between accounting and regulatory CVAs and, therefore, to favour the alignment of the capital charge with the economic risk related to CVA. Furthermore, better alignment with economic risk would result in a better recognition of hedging strategies used for accounting CVA for reducing the regulatory CVA capital charge. However, it is important to mention that, due to the difference of treatment of the DVA in the accounting and the regulatory contexts, and because DVA generally partially offsets CVA, banks cannot expect to have a full alignment of the capital charge to the economic risk related to bilateral CVA. A drawback of Option A is that it would require an extra supervisory effort to make sure that banks' accounting CVA exposure models meet the requirements set out in Section B.1(e) of the draft Accord text.

The rationale for proposing Option B is to keep the global set of frameworks across risks simpler and to avoid an additional supervisory burden. IMM exposure models have already been approved by banks' supervisors, so that the quality of exposure models is adequately assured without any extra supervisory effort. The drawback of Option B is a larger gap between accounting and regulatory CVA: hedging accounting CVA may not be as effective in reducing regulatory CVA capital charge as under Option A.

The Committee is seeking industry feedback on whether, under Option A, an IMM approval should be included as an additional eligibility requirement (see questions inserted in the draft Accord text). Industry feedback is also sought on the possible synergy between the IMM and accounting CVA calculation; and whether Option A or Option B is preferred for generating scenarios of discounted exposures in regulatory CVA (refer to Questions 3, 4 and 5 on page 18).

3.4 Standardised approach for CVA

The proposed standardised approach for CVA ("SA-CVA") (see Section B.2 of the draft Accord text) is an adaptation of the proposed sensitivity-based standardised approach for market risk in the trading book ("SA-TB") to the CVA book. The SA-CVA differs from the SA-TB in several important respects:

(i) Counterparty default risk is already accounted for in the CCR capital charge; therefore, the SA-CVA does not account for default risk.

(ii) CVA sensitivities to market risk factors are computationally very expensive; therefore, the granularity of supervisory market factors has been reduced in most cases. The list of these risk factors is specified in Section B.2(c) of the draft Accord text.

(iii) CVA counterparty credit spreads are major risk factors driving CVA with easy-to-compute sensitivities; therefore, an extra "asset class" of counterparty credit spreads is created. In contrast to reference credit spreads that drive exposure, the proposed counterparty credit spread risk treatment retains the full granularity of the SA-TB. Furthermore, because CVA is approximately linear in counterparty credit spreads, vega risk for counterparty credit spreads is not calculated.

(iv) To reduce the computation burden further, gamma risk has been excluded from the approach.

The exclusion of gamma risk and the reduction of risk factor granularity could result in inadequate risk capture. To compensate, the SA-CVA performs a more conservative aggregation of risks than the SA-TB:

- The SA-CVA does not allow any diversification benefit between delta and vega risks: the SA-CVA capital charge is calculated as the simple sum of the capital requirements for delta and vega[6] risks calculated for the entire CVA book (including eligible hedges).

6 Except for counterparty credit spread risk.

- Perfect hedging recognition is prevented via the use of disallowance correlation between aggregate CVA and CVA hedges for each risk factor.
- Aggregation across buckets within each asset class (referred to as "risk type" in the draft Accord text) is done in a more conservative way: quantities S_b that appear in the SA-TB bucket aggregation formula are replaced with quantities K_b.

3.5 Internal models approach for CVA

The proposed internal models approach for CVA ("IMA-CVA") (see Section B.3 of the draft Accord text) is an adaptation of the internal model-based approach for market risk under the FRTB ("IMA-TB") to the CVA book. The primary difference between the IMA-CVA and the IMA-TB are as follows:

(i) Absence of default risk in IMA-CVA (same rationale as for the SA-CVA);

(ii) Reduced granularity of market risk factors in IMA-CVA (same rationale as for the SA-CVA); and

(iii) Simplified expected shortfall (ES) calculations (refer to Section B.3(d) of the draft Accord text), as a consequence to a reduction of the granularity of market risk factors. In the IMA-TB, a reduced set of risk factors is used to determine the stress period and apply an adjustment to the current expected shortfall (ES) based on the full set of risk factors. The simplification therefore consists of defining the capital charge directly on the stressed ES based on a reduced set of risk factors.

To compensate for the less comprehensive risk capture resulting from the reduction of risk factor granularity and simplification of ES, the capital requirement is obtained by scaling up the measured ES via a conservative multiplier. The proposed default level of the multiplier is [1.5]. The value of the multiplier can be increased from its default value by a bank's supervisory authority if a bank fails to capture the dependence between counterparty credit quality and exposure in its CVA calculations, or if it determines that a bank's CVA model risk is higher than its peer's.

For the sake of consistency with the IMA-TB, the IMA-CVA introduces certain features that do not exist in the current advanced approach for CVA risk, amongst which a validation routine that includes P&L attribution and backtesting tools (refer to Section B.3(b) of the draft Accord text); and that takes into account varying time horizons for each risk factor (refer to Section B.3(c) of the draft Accord text).

Whereas the acceptance thresholds for the P&L attribution and backtesting exercises have been kept identical to those applying to the IMA-TB, the Committee is considering two options for the liquidity horizons to be used in the stressed ES (to keep the SA-CVA consistent with the IMA-CVA, two sets of risk weights corresponding to these two options are proposed in the SA-CVA).

- **Option 1** aims at fully replicating the FRTB setup, except for the idiosyncratic component of credit spreads of illiquid counterparties that is non-observable and is assigned a one-year liquidity horizon. As liquidity horizons are not the same for all types of counterparties, capital requirements related to counterparties with similar levels of credit spread and equivalent exposures would be different if they did not share the same liquidity horizon.
- **Option 2** differs from Option 1 as it proposes to use a unique liquidity horizon for credit spreads of liquid counterparties and for the systematic component of credit spreads of illiquid counterparties instead of those proposed in the FRTB. As a consequence, the CVA that is charged to clients would not depend on their industry sector. The drawback of this option, however, is that banks would need to derive separate CVA sensitivities to credit spreads, whether they refer to counterparty credit spread risk or to expected exposure risk.

The Committee seeks industry feedback on whether Option 1 or Option 2 is preferred for simulation time horizons (refer to Question 6 on page 29).

4. Basic CVA framework

The Basic CVA framework (Section C) of the proposed Accord text) is targeted at banks that are not willing or able to calculate regulatory CVA sensitivities to the satisfaction of their supervisory authorities. The Basic CVA framework consists of a single Basic CVA approach (BA-CVA) that is essentially an improved version of the current Standardised CVA method.

4.1 Eligible hedges

The Basic CVA framework does not recognise exposure hedges. The only hedges that would be eligible are single-name CDS, single-name contingent CDS and index CDS. 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 sector and region 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.

4.2 Basic CVA approach

The BA-CVA capital requirement is calculated as the sum of two terms: capital requirement for counterparty credit spread risk and capital requirement for exposure risk.

The formula for the counterparty credit spread risk capital charge is quite similar to the one defined in the current Standardised Approach for CVA risk. However, several important changes have been made:

- Factor 2.33, which is the 99% VaR of the standard normal distribution is replaced with factor 2.34, which is the 97.5% ES of the standard normal distribution. The factor does not appear explicitly in the formula – it is part of the risk weights.
- EAD is divided by the multiplier alpha to make the quantity, after multiplication by the remaining maturity, better approximate the area under the discounted EE curve. This is appropriate for both IMM and non-IMM banks, as EAD in both the IMM and the SA-CCR includes alpha.
- To capture the basis risk of non-perfect single-name hedges (ie single-name hedges that do not reference the counterparty directly) in a conservative manner, an idiosyncratic basis between the counterparty credit spread and the credit spread of the name referenced by the hedge is introduced in the formula.
- An explicit treatment of counterparties with multiple netting sets and multiple single-name hedges of the same counterparty is introduced in the formula.
- Rating-based risk weights are abandoned. Instead, risk weights are defined for the SA-TB single-name credit spread buckets plus two extra buckets for credit indices (one bucket for investment grade, and one for speculative grade). For single-name buckets, risk weight calibration is taken from the SA-TB, while calibration for the index buckets (that are not present in the SA-TB) is not finalised yet.

The Committee proposes to set the exposure risk capital requirement equal to a fraction of the counterparty credit spread risk capital charge calculated after excluding all the hedges. The proposed value of the scaling multiplier is [0.5].

Annex 1

Draft minimum capital requirements for Credit Valuation Adjustments

A. General provisions

1. In the context of this document, CVA stands for credit valuation adjustment specified at a counterparty level. CVA reflects the adjustment of default risk-free prices of derivatives and securities financing transactions (SFT)[7] due to a potential default of the counterparty. This CVA may differ from CVA used for accounting purposes: (i) it excludes the effect of the bank's own default; (ii) potentially, a more conservative approach in exposure modelling (especially, for margined netting sets) must be used. Therefore, unless explicitly specified otherwise, the term "CVA" in this document means "regulatory CVA".

2. CVA risk is defined as the risk of losses arising from changing CVA values in response to changes in counterparty credit spreads and market risk factors that drive market prices of derivative transactions and, if applicable, SFTs.

3. The capital requirement for CVA risk must be calculated by all banks involved in covered transactions. Covered transactions include all derivatives except those cleared through a qualified central counterparty. Furthermore, covered transactions also include SFTs that are fair-valued by a bank for accounting purposes. In the remainder of this document, the terms "derivative transactions" or "derivatives" should be understood as "covered transactions".

4. The CVA capital requirement is calculated for a bank's "CVA book" on a standalone basis. The CVA book includes CVA for a bank's entire portfolio of derivative transactions and eligible CVA hedges. All derivative CVA hedges (whether eligible or not) must be included in the CVA calculation for the relevant counterparty.

5. Eligible CVA hedging instruments must be removed from a bank's market risk capital charge calculations in the trading book. CVA hedges must not be split between the trading book and the CVA book: the entire hedging instrument must belong to one of the books.

6. Two frameworks are available for calculating CVA capital:

- <u>FRTB-CVA</u>: an adaptation of the market risk framework specified in the Fundamental Review of the Trading Book (FRTB) to the CVA book;
- <u>BA-CVA</u>: the basic CVA framework.

7. Banks must use the B-CVA framework unless they receive approval from the bank's supervisory authority to use the FRTB-CVA framework.

[7] See Basel Committee on Banking Supervision, *Basel II: International Convergence of Capital Measurement and Capital Standards – Comprehensive Version*, June 2006, Annex 4, paragraphs 4 and 5, www.bis.org/publ/bcbs128.htm.

B. FRTB-CVA framework

1. General provisions

(a) Framework eligibility criteria

8. The minimum criteria for the FRTB-CVA framework eligibility include the following:

- A bank must be able to model exposure and regularly calculate (at least monthly) CVA and CVA sensitivities to a minimum set of market risk factors specified in Section 2(c). This is a fundamental requirement for the application of the FRTB-CVA framework.
- A bank must have a methodology for calculating the credit spreads of illiquid counterparties that satisfies the requirements of Section 1(f). This requirement is also fundamental to the FRTB-CVA framework because the framework capitalises CVA risk across all counterparties, including illiquid ones.
- A bank must have a CVA desk (or a similar dedicated function) responsible for risk management and hedging of CVA. CVA sensitivities that are not used by a bank in its risk management processes are not expected to be reliable.

(b) Hierarchy of approaches for FRTB-CVA

9. As in the FRTB framework for market risk, two approaches are available: (i) the Internal Model Approach (IMA-CVA) and (ii) the Standardised Approach (SA-CVA).

10. Both the IMA-CVA and SA-CVA rely on a bank's ability to calculate regulatory CVA and its sensitivities to market risk factors.

11. Regardless of whether a bank is currently allowed to use the IMA-CVA for the purposes of regulatory capital determination, the bank must calculate CVA capital charge according to the SA-CVA at least monthly.

(c) Regulatory CVA calculations

12. Regulatory CVA is the base for the calculation of the CVA capital requirement under both SA-CVA and IMA-CVA. Calculations of regulatory CVA must be performed for each counterparty with which a bank has at least one derivative transaction.

13. Regulatory CVA at a counterparty level must be calculated according to the following principles:

- Regulatory CVA must be calculated as the expectation of future losses resulting from default of the counterparty under the assumption that the bank itself is default risk-free.
- The calculation must be based on at least the following inputs: (i) term structure of market-implied probability of default (PD); (ii) market-implied expected loss given default (ELGD); (3) simulated paths of discounted future exposure.
- The term structure of market-implied PD must be estimated from credit spreads observed in the markets. For counterparties whose credit is not actively traded (ie illiquid counterparties), the market-implied PD must be estimated from proxy credit spreads estimated for these counterparties (see Section 1(f)).
- The market-implied ELGD value used for regulatory CVA calculation must be the same as the one used to calculate the risk-neutral PD from credit spreads unless it can be demonstrated that the seniority of the derivative exposure differs from the seniority of senior unsecured bonds.

- The paths of discounted future exposure are produced via pricing of all derivative transactions with the counterparty on simulated paths of relevant market risk factors and discounting the prices to today using risk-free interest rates along the path.
- All market risk factors material for the transactions with a counterparty must be simulated as stochastic processes for an appropriate number of paths defined on an appropriate set of future time points extending to the maturity of the longest transaction.
- For transactions that give rise to a significant level of dependence between exposure and the counterparty's credit quality, this dependence should be taken into account. Banks that fail to account for this dependence must use a higher value of multiplier m_{CVA}, as provided in Section 1(h).
- For transactions that are covered by a legally enforceable margin agreement, the simulation must capture the effects of margining collateral along each exposure path. All the relevant contractual features such as the nature of the margin agreement (unilateral vs bilateral), the frequency of margin calls, the type of collateral, thresholds, independent amounts, initial margins and minimum transfer amounts must be appropriately captured by the exposure model. To determine collateral available to a bank at a given exposure measurement time point, the exposure model must assume that the counterparty will not post or return any collateral within a certain time period immediately prior to that time point. The assumed value of this time period, known as the margin period of risk (MPoR), cannot be less than a supervisory floor.

  [Two alternatives are proposed for the floor value:

  <u>Alternative 1</u>: The supervisory floor is equal to 9 + N business days, where N is the re-margining period specified in the margin agreement (in particular, for margin agreements with daily exchange of margin, the minimum MPoR is 10 business days).

  <u>Alternative 2</u>: The supervisory floor is specified in paragraph 41(i)–(iii) of Annex 4 of the Basel framework.]

Q1. To what extent do large netting sets; potentially illiquid transactions inside a netting set; and recent disputes affect the internal assessment of the margin period of risk (MPoR)?

Q2. Is Alternative 1 or Alternative 2 preferred with regard to the calculation of MPoR?

14. [Two options for generating scenarios for discounted exposure are proposed: accounting-based (Option A) and IMM-based (Option B).]

(d) [Option A]: Accounting-based CVA

15. The paths of discounted exposure are obtained via exposure models used by a bank for calculating front office/accounting CVA. Model implementation (ie the software), model calibration process (with the exception of the MPoR), market and transaction data used for regulatory CVA calculation must be the same as the ones used for accounting CVA calculation.

16. The generation of market risk factor paths underlying the exposure models must satisfy the following requirements: Drifts of risk factors must be consistent with a risk-neutral probability measure, so that discounted derivative values are approximately driftless. Historical calibration of drifts is not allowed.

- The volatilities and correlations of market risk factors must be calibrated to market data whenever sufficient data exists in a given market. Otherwise, historical calibration is permissible.

- The distribution of modelled risk factors must account for the possible non-normality of the distribution of exposures, including the existence of leptokurtosis ("fat tails"), where appropriate.

17. Offsetting between simulated positive and negative market values is permissible only within legally enforceable netting agreements. The requirements of paragraph 67 of Annex 4 of the Basel framework apply.

18. The current requirements in the Basel market risk framework on the treatment for illiquid positions, which are accounted for at fair value, are retained in the [revised market risk framework] and extend to accounting-based CVA calculations. In particular, all components of accounting-based exposure models must be independently validated.

19. The following requirements apply:

- Exposure models used for calculating regulatory CVA must be part of a CVA risk management framework that includes the identification, measurement, management, approval and internal reporting of CVA market risk. A bank must have a credible track record in using these exposure models for calculating CVA and CVA sensitivities to market risk factors.
- The board of directors and senior management should be actively involved in the risk control process and must regard CVA risk control as an essential aspect of the business to which significant resources need to be devoted.
- Banks must have a process in place for ensuring compliance with a documented set of internal policies, controls and procedures concerning the operation of the exposure system used for accounting CVA calculations.
- Banks must have an independent control unit that is responsible for the initial and ongoing validation of the exposure models. This unit must be independent from business credit and trading units (including the CVA desk), it must be adequately staffed and it must report directly to senior management of the firm.
- Banks must document the process for initial and ongoing validation of their exposure models to a level of detail that would enable a third party to recreate the analysis. This documentation must set out the frequency with which ongoing validation will be conducted, how the validation is conducted with respect to data flows and portfolios, what analyses are used and how representative counterparty portfolios are constructed.
- The pricing models used to calculate exposure for a given path of market risk factors must be tested against appropriate independent benchmarks for a wide range of market states as part of the initial and ongoing model validation process. Pricing models for options must account for the non-linearity of option value with respect to market risk factors.
- An independent review of the overall CVA risk management process should be carried out regularly in the bank's own internal auditing process. This review should include both the activities of the CVA desk and of the independent risk control unit.
- Banks must define criteria on which to assess the exposure models and their inputs and have a written policy in place to describe the process by which unacceptable performance will be determined and remedied.
- An exposure model must capture transaction-specific information in order to aggregate exposures at the level of the netting set. Banks must verify that transactions are assigned to the appropriate netting set within the model.
- The exposure models must reflect transaction terms and specifications in a timely, complete, and conservative fashion. The terms and specifications must reside in a secure database that is subject to formal and periodic audit. The process for recognising netting arrangements must

require sign-off by legal staff to verify the legal enforceability of netting and be input into the database by an independent unit. The transmission of transaction terms and specifications data to the exposure model must also be subject to internal audit, and formal reconciliation processes must be in place between the internal model and source data systems to verify on an ongoing basis that transaction terms and specifications are being reflected in the exposure system correctly or at least conservatively.

- The current and historical market data must be acquired independently of the lines of business and be compliant with accounting. They must be fed into the exposure model in a timely and complete fashion, and maintained in a secure database subject to formal and periodic audit. Banks must also have a well-developed data integrity process to scrub the data of erroneous and/or anomalous observations. To the extent that the exposure model relies on proxy market data, internal policies must identify suitable proxies and the bank must demonstrate empirically that the proxy provides a conservative representation of the underlying risk under adverse market conditions.

20. For margined counterparties, collateral can be recognised and modelled along a path under the following conditions:

- Collateral management requirements outlined in paragraph 51(i)–(ii) of Annex 4 of the Basel framework are satisfied.
- All documentation used in collateralised transactions must be binding on all parties and legally enforceable in all relevant jurisdictions. Banks must have conducted sufficient legal review to verify this and have a well-founded legal basis to reach this conclusion, and undertake such further review as necessary to ensure continuing enforceability.
- A bank's exposure models used for accounting CVA calculations must be able to accommodate a non-zero value for the margin period of risk (MPoR).

> Q3. Should IMM approval be included as an additional eligibility requirement for the FRTB-CVA framework under Option A (ie accounting-based CVA method for generating scenarios of discounted exposure?

(e) [Option B]: IMM-based CVA

21. A bank must be approved by its supervisory authority to use the IMM for CCR capital calculations to use this option. The following paragraph of Annex 4 does not apply in the CVA context:

- Paragraph 25(i): Stress calibration of exposure models is not used for calculating regulatory CVA.

22. Non-discounted exposure paths are obtained via the same exposure models used by a bank for calculating EAD under the IMM, as set out under Section V, Annex 4 of the Accord text. Discounted exposure paths are obtained via application of today's values of risk-free discount factors to all non-discounted exposure paths.

23. Alternatively, a bank may extend the capability of the approved IMM exposure models to apply stochastic discounting along the path, thus generating discounted exposure paths directly. A bank may also account for dependence between exposure and the counterparty's credit quality. Such extensions of IMM exposure models would require approval by the bank's supervisory authority.

24. To reduce the computational burden of calculating CVA sensitivities, a bank may reduce the granularity of the grid of future time points used for exposure calculations, subject to approval by the bank's supervisory authority.

Q4. To what extent is there synergy between the calculation of accounting CVA and the EAD calculation for IMM with respect to processes, data and methodology?

Q5. Is Option A (accounting-based CVA) or Option B (IMM-based CVA) preferred for exposure calculation?

(f) Credit spreads of illiquid counterparties

25. A bank should estimate the credit spread curves of illiquid counterparties from credit spreads observed in the markets of its liquid peers via an algorithm that discriminates on at least three variables: a measure of credit quality (eg rating), industry, and region.

26. In certain cases, mapping an illiquid counterparty to a single liquid reference name can be allowed. A typical example would be mapping a municipality to its home country (ie setting the municipality credit spread equal to the sovereign credit spread plus a premium). A bank must justify every case of mapping to single names.

27. When no time series of credit spreads is observed in the markets of any of the counterparty's peers due to its very nature (eg project finance, funds), a bank is allowed to use a more fundamental analysis of credit risk to proxy the spread of an illiquid counterparty. However, where historical PDs are used as part of this assessment, the resulting spread cannot be based on historical PD only – it must relate to credit markets.

(g) Eligible hedges

28. Only transactions used for the purpose of mitigating CVA risk, and managed as such, can be eligible hedges.

29. Hedges of both counterparty credit spread and exposure components of CVA risk can be eligible.

30. Instruments that cannot be included in the Internal Model Approach for market risk (IMA-TB) cannot be eligible CVA hedges. Such instruments belong to those types that are not allowed by the FRTB framework (eg tranched credit derivatives).

31. Non-eligible CVA hedges are treated as trading book instruments and are capitalised via market risk rules for the trading book.

(h) Multiplier

32. To compensate for a higher level of model risk in calculation of CVA and CVA sensitivities (in comparison to market value of trading book instruments and its sensitivities), the expected shortfall measure used in the FRTB is scaled up via a multiplier m_{CVA}.

33. Multiplier m_{CVA} has a default value of [1.5]. However, the default value of the multiplier can be increased by the bank's supervisory authority if it determines that the bank's CVA model risk is higher than its peer's. In particular, the default value will be increased if the bank does not account for the dependence between exposure and counterparty credit quality in its CVA calculations.

2. Standardised Approach for CVA Book (SA-CVA)

(a) General provisions

34. The standardised approach for CVA (SA-CVA) is an adaptation of the standardised approach for market risk under the FRTB (SA-TB) to the CVA book. The primary difference of the SA-CVA from the SA-

TB include: (i) reduced granularity of market risk factors; (ii) absence of default risk and gamma risk; (iii) use of more conservative risk aggregation; (iv) use of multiplier m_{CVA}.

35. The SA-CVA must be calculated by all banks under the FRTB-CVA framework and reported to supervisors at the same frequency as SA-TB (currently, monthly). In addition, all FRTB-CVA banks must calculate, and have the ability to produce to their supervisors, the SA-CVA calculations on demand.

36. The SA-CVA uses the sensitivities of regulatory CVA to counterparty credit spreads and market risk factors driving derivatives' values as inputs. Risk factors and sensitivities must meet the definition provided in the [proposed standardised approach for market risk]. Sensitivities must also be computed by banks in accordance with the sensitivity validation standards described in [the proposed standardised approach for market risk].

(b) Calculations

37. The SA-CVA capital requirement is calculated as the simple sum of the capital requirements for delta and vega risks calculated for the entire CVA book (including eligible hedges).

38. The capital requirement for delta risk is calculated as the simple sum of delta capital requirements calculated independently for the following six risk types: (i) counterparty credit spreads; (ii) interest rate (IR); (iii) foreign exchange (FX); (iv) reference credit spreads (ie credit spreads that drive exposure); (v) equity; (vi) commodity.

39. The capital requirement for vega risk is calculated as the simple sum of vega capital requirements calculated independently for the following five risk types: (i) interest rates (IR); (ii) foreign exchange (FX); (iii) reference credit spreads (ie credit spreads that drive exposure); (iv) equity; (v) commodity. There is no vega capital requirement for counterparty credit spread risk.

40. Delta and vega capital requirements are calculated via the same procedure.

41. For a given risk type, calculate the sensitivity of the aggregate CVA, s_k^{CVA}, and the sensitivity of all eligible hedges in the CVA book, s_k^{Hdg}, to each risk factor k in the risk type. 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. The CVA calculation with the shifted value of a risk factor must be performed using the same seed for the random number generator as the calculation without the shift.

42. 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. CVA always has material sensitivity to volatilities of the risk factors – even if there are no options in the portfolio.

43. Obtain the weighted sensitivities WS_k^{CVA} and WS_k^{Hdg} for each risk factor k by multiplying the net sensitivities s_k^{CVA} and s_k^{Hdg}, respectively, by the corresponding risk weight RW_k (the risk weights applicable to each risk type are specified in Section 2(c).

$$\text{WS}_k^{\text{CVA}} = \text{RW}_k \cdot s_k^{\text{CVA}} \qquad \text{WS}_k^{\text{Hdg}} = \text{RW}_k \cdot s_k^{\text{Hdg}}$$

44. The net weighted sensitivity of the CVA book s_k to risk factor k is obtained via: $\text{WS}_k = \text{WS}_k^{\text{CVA}} + \text{WS}_k^{\text{Hdg}}$

45. Weighted sensitivities must be aggregated into a capital charge K_b within each bucket b (the buckets and correlation parameters ρ_{kl} applicable to each risk type are specified in Section 2(c).

$$K_b = \sqrt{(1-R)\cdot\left[\sum_{k\in b}\text{WS}_k^2 + \sum_{k\in b}\sum_{l\in b;l\neq k}\rho_{kl}\cdot\text{WS}_k\cdot\text{WS}_l\right] + R\cdot\sum_{k\in b}\left[(\text{WS}_k^{\text{CVA}})^2 + (\text{WS}_k^{\text{Hdg}})^2\right]}$$

where R is the hedging disallowance parameter, set at [0.01], that prevents the possibility of perfect hedging of CVA risk.

46. Bucket-level capital charges must then be aggregated across buckets within each risk type (the correlation parameters γ_{bc} applicable to each risk type are specified in Section 2(c).

$$K = m_{\mathrm{CVA}} \cdot \sqrt{\sum_b K_b^2 + \sum_b \sum_{c \neq b} \gamma_{bc} \cdot K_b \cdot K_c}$$

Note that this equation differs from the corresponding FRTB equation by the absence of a residual value and of quantities S_b and the presence of multiplier m_{CVA}.

(c) Buckets, risk factors, sensitivities, risk weights and correlations[8]

Interest rates

47. For interest rate delta and vega risks, buckets are individual currencies.

48. For interest rate delta and vega risks, cross-bucket correlation is $\gamma_{bc} = 0.5$ for all currency pairs.

49. Interest rate delta risk factors for a bank's domestic currency, USD, EUR, GBP or JPY:

- Interest rate delta risk factors are the absolute change of the inflation rate and the parallel shift of three pieces of the risk-free yield curve: up to one year, one to five years and greater than five years.
- Sensitivities to pieces of the yield curve are measured by shifting the relevant piece of all yield curves in a given currency by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point. Sensitivity to the inflation rate is obtained by changing the inflation rate by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point.
- Risk weights RW_k are given by:

Risk factor	0–1 years	1–5 years	> 5 years	Inflation
Risk weight	1.5%	1.2%	1.0%	1.5%

[8] See Basel Committee on Banking Supervision, *Fundamental review of the trading book: outstanding issues*, December 2014, www.bis.org/bcbs/publ/d305.htm.

The risk weights and correlations match the ones in the SA-TB as set forth in the CP published in December 2014, except for interest rate cross-tenor correlations that match the ones in the SA-CCR. The numbers in the tables are subject to change if calibration of the SA-TB changes.

- Correlations ρ_{kl} between pairs of risk factors are:

	0–1 years	1–5 years	> 5 years	Inflation
0–1 years	100%	70%	30%	40%
1–5 years		100%	70%	40%
> 5 years			100%	40%
Inflation				100%

50. Interest rate delta risk factors for any of the other currencies:

- Interest rate risk factors are the absolute change of the inflation rate and the parallel shift of the entire risk-free yield curve for a given currency.
- Sensitivity to the yield curve is measured by shifting all yield curves in a given currency by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point. Sensitivity to the inflation rate is obtained by changing the inflation rate by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point.
- Risk weights for both yield curve and inflation rate are set at $\mathrm{RW}_k = 1.5\%$.
- Correlations between yield curve and inflation rate are set at $\rho_{kl} = 40\%$.

51. Interest rate vega risk factors for any currency:

- Interest rate vega risk factors are a simultaneous relative change of all implied volatilities for the inflation rate and a simultaneous relative change of all implied interest rate volatilities for a given currency.
- Sensitivity to the interest rate (or inflation rate) volatilities is measured by simultaneously shifting all interest rate- (or inflation rate-) implied volatilities by 1% relative to their current values value and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%.
- Risk weights for both interest rate and inflation volatilities are set to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{6}$, where RW_σ is set at [55%].
- Correlations between interest rate volatilities and inflation volatilities are set at $\rho_{kl} = 40\%$.

Foreign exchange (FX)

52. For FX delta and vega risks, buckets are individual currencies except a bank's domestic currency.

53. For FX delta and vega risks, cross-bucket correlation is $\gamma_{bc} = 0.6$ for all currency pairs.

54. FX delta risk factors for any foreign currency:

- The single FX delta risk factor is the relative change of the FX spot rate between a given foreign currency and a bank's domestic currency (ie only foreign-domestic rates are risk factors).
- Sensitivities to the FX spot rate are measured by shifting a given foreign-domestic rate by 1% relative to its current value and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%. All foreign-foreign rates involving the currency of the shifted foreign-domestic rate are shifted accordingly via the representation of the foreign-foreign rate via the ratio of two foreign-domestic rates.
- Risk weights for all foreign-domestic rates are set at $\mathrm{RW}_k = 15\%$.

55. FX vega risk factors for any foreign currency:

- The single FX vega risk factor is a simultaneous relative change of all implied volatilities for a given foreign-domestic rate.
- Sensitivities to the FX volatilities are measured by simultaneously shifting all market-implied volatilities for a given foreign-domestic rate by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%. Volatilities of all foreign-foreign rates involving the shifted currency are shifted accordingly via the representation of two foreign-domestic rate volatilities and the relevant implied correlation (the latter is assumed to be fixed).
- Risk weights for FX volatilities are set to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{6}$, where RW_σ is set at [55%].

Counterparty credit spread

56. For counterparty credit spread, vega risk is not calculated. Buckets for delta risk are:

Bucket number	Credit quality	Sector
1	Investment grade (IG)	Sovereigns including central banks, multilateral development banks
2		Financials including government-backed financials
3		Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying
4		Consumer goods and services, transportation and storage, administrative and support service activities
5		Technology, telecommunications
6		Health care, utilities, local government, government-backed non-financials, education, public administration, professional and technical activities
7	High yield (HY) & non-rated (NR)	Sovereigns including central banks, multilateral development banks
8		Financials including government-backed financials
9		Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying
10		Consumer goods and services, transportation and storage, administrative and support service activities
11		Technology, telecommunications
12		Health care, utilities, local government, government-backed non-financials, education, public administration, and professional and technical activities
13	(Not applicable)	Other sector

57. For counterparty credit spread delta risk, cross-bucket correlations γ_{bc} applying within the same credit quality category (ie either IG or HY&NR) are given by

Bucket	1	2	3	4	5	6
1	100%	10%	20%	25%	20%	15%
2		100%	5%	15%	20%	5%
3			100%	20%	25%	5%
4				100%	25%	5%
5					100%	5%
6						100%

- For cross-bucket correlations γ_{bc} applying across IG and HY&NR categories, these correlations are divided by 2.
- For cross-bucket correlations γ_{bc} applying across bucket 13 and another bucket, γ_{bc} = 0%.

58. Counterparty credit spread delta risk factors for a given bucket:

- Counterparty credit spread delta risk factors are absolute shifts of credit spreads of individual counterparties at the following tenors: 0.5 years, one year, three years, five years and 10 years.
- For a given counterparty and tenor point, the sensitivities are measured by shifting the relevant credit spread by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point.
- For the IMA-CVA, two options for liquidity horizons are proposed in paragraph 85. To maintain consistency with the IMA-CVA, two sets of risk weights scaled to the liquidity horizons are proposed for the SA-CVA. Risk weights RW_k are the same for all tenors and depend on the counterparty's bucket according to:

  [Option 1 for liquidity horizons:]

IG bucket	1	2	3	4	5	6
Risk weight	2.5%	5.0%	3.5%	3.0%	2.5%	2.0%

HY/NR bucket	7	8	9	10	11	12	13
Risk weight	10%	12%	9%	10%	9%	6%	12%

  [Option 2 for liquidity horizons:]

IG bucket	1	2	3	4	5	6
Risk weight	4.3%	5.0%	3.5%	3.0%	2.5%	2.0%

HY/NR bucket	7	8	9	10	11	12	13
Risk weight	10%	8.5%	6.4%	7.1%	6.4%	4.2%	8.5%

- Correlations ρ_{kl} between different tenors for the same counterparty are set to 65%.
- Correlations ρ_{kl} between any tenors of different counterparties are set to 35%.

Reference credit spread

59. For reference credit spreads, both delta and vega risks are calculated. Buckets for delta and vega risks are:

Bucket number	Credit quality	Sector
1	Investment grade (IG)	Sovereigns including central banks, multilateral development banks
2		Financials including government-backed financials
3		Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying
4		Consumer goods and services, transportation and storage, administrative and support service activities
5		Technology, telecommunications
6		Health care, utilities, local government, government-backed non-financials, education, public administration, professional and technical activities
7	High yield (HY) & non-rated (NR)	Sovereigns including central banks, multilateral development banks
8		Financials including government-backed financials
9		Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying
10		Consumer goods and services, transportation and storage, administrative and support service activities
11		Technology, telecommunications
12		Health care, utilities, local government, government-backed non-financials, education, public administration, and professional and technical activities
13	(Not applicable)	Other sector

60. For reference credit spread delta and vega risks, cross-bucket correlations γ_{bc} within the same credit quality category (ie either IG or HY&NR) are given by

Bucket	1	2	3	4	5	6
1	100%	10%	20%	25%	20%	15%
2		100%	5%	15%	20%	5%
3			100%	20%	25%	5%
4				100%	25%	5%
5					100%	5%
6						100%

- For cross-bucket correlations γ_{bc} applying across IG and HY&NR categories, these correlations are divided by 2.
- For cross-bucket correlations γ_{bc} applying across bucket 13 and another bucket, γ_{bc} is set to 0%.

61. Reference credit spread delta risk factors for a given bucket:

- The single reference credit spread delta risk factor is a simultaneous absolute shift of credit spreads of all tenors for all reference names in the bucket.
- Sensitivity to reference credit spreads is measured by shifting the credit spreads of all reference names in the bucket by 1 basis point and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point.

- Risk weights RW_k depend on the reference name's bucket according to:

IG bucket	1	2	3	4	5	6
Risk weight	2.5%	5.0%	3.5%	3.0%	2.5%	2.0%

HY/NR bucket	7	8	9	10	11	12	13
Risk weight	10%	12%	9%	10%	9%	6%	12%

62. Reference credit spread vega risk factors for a given bucket:

- The single reference credit spread vega risk factor is a simultaneous relative shift of volatilities of credit spreads of all tenors for all reference names in the bucket.
- Sensitivity to volatility of reference credit spread is measured by shifting the volatilities of credit spreads of all reference names in the bucket by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1 basis point.
- Risk weights for reference credit spread volatilities are set to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{25}$, where RW_σ is set at [55%].

Equity

63. For equity delta and vega risks, buckets are defined as:

Bucket number	**Size**	**Region**	**Sector**
1	Large	Emerging market economies	Consumer goods and services, transportation and storage, administrative and support service activities, healthcare, utilities
2			Telecommunications, industrials
3			Basic materials, energy, agriculture, manufacturing, mining and quarrying
4			Financials including gov't-backed financials, real estate activities, technology
5		Advanced economies	Consumer goods and services, transportation and storage, administrative and support service activities, healthcare, utilities
6			Telecommunications, industrials
7			Basic materials, energy, agriculture, manufacturing, mining and quarrying
8			Financials including gov't-backed financials, real estate activities, technology
9	Small	Emerging market economies	All sectors described under bucket numbers 1, 2, 3, and 4
10		Advanced economies	All sectors described under bucket numbers 5, 6, 7, and 8
11	(Not applicable)		Other sector

64. For equity delta and vega risks, cross-bucket correlation γ_{bc} = 15% for all cross-bucket pairs that fall within bucket numbers 1 to 10. γ_{bc} = 0% for all cross-bucket pairs that include bucket 11.

65. Equity delta risk factors for a given bucket:

- The single equity delta risk factor is a simultaneous relative shift of equity spot prices for all reference names in the bucket.

- The sensitivities are measured by shifting the equity spot prices for all reference names in the bucket by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%.
- Risk weights RW_k depend on the reference name's bucket according to the following table:

Bucket number	Risk weight
1	55%
2	60%
3	45%
4	55%
5	30%
6	35%
7	40%
8	50%
9	70%
10	50%
11	70%

66. Equity vega risk factors for a given bucket:

- The single equity vega risk factor is a simultaneous relative shift of market-implied volatilities for all reference names in the bucket.
- The sensitivities are measured by shifting the market-implied volatilities for all reference names in the bucket by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%.
- Risk weights for equity volatilities are set to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{2}$ for large capitalisation buckets and to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{12}$ for small capitalisation buckets, where RW_σ is set at [55%].

Commodity

67. For commodity delta and vega risks, buckets are defined as:

Bucket	Commodity group
1	Coal
2	Crude oil
3	Electricity
4	Freight
5	Metals
6	Natural gas
7	Precious metals (including gold)
8	Grains & oilseed
9	Livestock & dairy
10	Softs and other agriculturals
11	Other commodity group

68. For commodity delta and vega risks, cross-bucket correlation γ_{bc} = 20% for all cross-bucket pairs that fall within bucket numbers 1 to 10. γ_{bc} = 0% for all cross-bucket pairs that include bucket 11.

69. Commodity delta risk factors for a given bucket:

- The single commodity delta risk factor is a simultaneous relative shift of commodity spot prices for all commodities in the bucket.
- The sensitivities are measured by shifting the spot prices of all commodities in the bucket by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%.
- Risk weights RW_k depend on the reference name's bucket according to the following table:

Bucket	1	2	3	4	5	6	7	8	9	10	11
RW	30%	35%	60%	80%	40%	45%	20%	35%	25%	35%	50%

70. Commodity vega risk factors for a given bucket:

- The single commodity vega risk factor is a simultaneous relative shift of market-implied volatilities for all commodities in the bucket.
- The sensitivities are measured by shifting the market-implied volatilities for all commodities in the bucket by 1% relative to their current values and dividing the resulting change in the aggregate CVA (or the value of CVA hedges) by 1%.
- Risk weights for commodity volatilities are set to $\mathrm{RW}_k = \mathrm{RW}_\sigma \cdot \sqrt{12}$, where RW_σ is set at [55%].

3. Internal Model Approach for CVA Book (IMA-CVA)

(a) General provisions

71. The IMA-CVA is an adaptation of the Internal Model Approach for market risk under the FRTB (IMA-TB) to the CVA book. The primary differences of the IMA-CVA from the SA-TB include: (i) reduced granularity of market risk factors; (ii) simplified expected shortfall (ES) calculations; (iii) absence of default risk; and (iv) use of multiplier m_{CVA}.

72. The use of the IMA-CVA by an FRTB-CVA bank for the purposes of regulatory capital determination will be conditional upon the explicit approval of the bank's supervisory authority. The approval conditions outlined in [paragraph 177 in Annex 1 of the second CP of the FRTB][9] should apply to the IMA-CVA. Only banks that have received a general approval[10] from their supervisory authority to

[9] Basel Committee on Banking Supervision, *Fundamental review of the trading book – second consultative document*, October 2013, www.bis.org/publ/bcbs265.htm.

[10] IMA-TB approval of specific trading desks is not required.

use the IMA-TB to calculate market risk capital for the trading book can be considered for the IMA-CVA approval.

73. Supervisory authorities will be able to insist on a period of initial monitoring and live testing of a bank's internal model of CVA risk before it is used for supervisory capital purposes.

74. Banks using the IMA-CVA for the purposes of regulatory capital determination must satisfy the qualitative standards described in [paragraph 180 in the second CP of the FRTB].

75. Banks using the IMA-CVA for the purposes of regulatory capital determination must satisfy model validation standards described in [paragraph 182 in the second CP of the FRTB].

76. At any given time, a bank can use the IMA-CVA for the purposes of regulatory capital determination only if the internal models of CVA risk satisfy the backtesting and P&L attribution requirements described in [paragraph 183 in the second CP of the FRTB]. If one of the requirements is not satisfied, the bank must use the SA-CVA to determine CVA capital.

(b) Quantitative standards

77. Banks will have flexibility in devising the precise nature of their models, but the following minimum standards will apply for the purpose of calculating their capital charge. Individual banks or their supervisory authorities will have discretion to apply stricter standards.

78. Expected shortfall for CVA risk must be computed on a daily basis.

79. In calculating the expected shortfall for CVA risk, a 97.5th percentile, one-tailed confidence interval is to be used.

80. A bank must model at least all risk factors corresponding to the regulatory risk factors specified under the SA-CVA or prove to its supervisory authority the immateriality of these risk factors for its CVA book.

81. A bank's internal models must capture at least delta risk and vega risk for all modelled risk factors. Vega risk for credit spreads of individual counterparties can be ignored – unless these spreads drive CVA exposure component.

82. When modelling the risk of credit spreads of illiquid counterparties, banks must include both systematic and idiosyncratic components of their credit spreads. The idiosyncratic component is a random variable independent from all other random variables in the model. The size of the idiosyncratic component must be chosen so that volatilities and correlations of credit spreads of illiquid counterparties match the ones of liquid counterparties.

83. The dynamics of market risk factors must be calibrated to a period of stress. Specifically, the expected shortfall measure produced by an internal model should be representative of the expected shortfall charge that would be generated on the bank's current portfolio if the relevant risk factors were experiencing a period of stress.

84. The stress period is defined as a 12-month time period that maximises the target measure over the observation horizon, which should go back to at least 2005. The target measure is defined as the standard deviation of daily changes of the *unhedged* bank-wide CVA calculated with EE profiles fixed at their today's levels. Banks must update their 12-month stressed periods at least monthly.

(c) Time horizons for simulation

85. [Two options for simulation time horizons are proposed. Under both options, the risk factors driving exposure are simulated for time horizons set equal to the liquidity horizons specified in

paragraph 181 of the FRTB. The two options differ in simulation horizon values for counterparty credit spreads:

- Option 1: Use the FRTB liquidity horizons for credit spreads of liquid counterparties and the systematic components of credit spreads of illiquid counterparties. Use a single one-year horizon for idiosyncratic components of credit spreads of illiquid counterparties.
- Option 2: Use a single 60-day liquidity horizon for credit spreads of liquid counterparties and the systematic components of credit spreads of illiquid counterparties. Use a single one-year horizon for idiosyncratic components of credit spreads of illiquid counterparties.]

Q6. Is Option 1 or Option 2 preferred for simulation time horizons?

(d) Capital calculations

86. A bank must calculate its internally modelled CVA expected shortfall charge with no supervisory constraints on cross risk factor correlations, denoted by $\mathrm{ES}_{\mathrm{net}}$.

87. A bank must also calculate six partial expected shortfall values for each of the following risk types: (i) counterparty credit spread; (ii) interest rate; (iii) FX; (iv) reference credit spread; (v) equity; and (vi) commodity. When a partial expected shortfall is calculated for a given risk type, all other risk factors should be held constant. These partial expected shortfall values will then be summed to provide the gross expected shortfall charge, $\mathrm{ES}_{\mathrm{gross}}$.

88. The aggregate expected shortfall measure is calculated via

$$\mathrm{ES} = w \cdot \mathrm{ES}_{\mathrm{net}} + (1-w) \cdot \mathrm{ES}_{\mathrm{gross}}$$

where [$w = 0.5$] is the parameter quantifying the allowed degree of diversification benefits across risk types.

89. The capital requirement *K* on a given date is determined via

$$K = m_{\mathrm{CVA}} \cdot \max\left\{\mathrm{ES}_{\mathrm{yesterday}};\ m_{\mathrm{TB}} \cdot \mathrm{ES}_{\mathrm{average}}\right\}$$

where

- $\mathrm{ES}_{\mathrm{yesterday}}$ is the most recent ES measure produced by the internal model;
- $\mathrm{ES}_{\mathrm{average}}$ is the average ES measure over the previous 12 weeks;
- m_{TB} is the multiplier described in paragraph 189 of the FRTB;
- m_{CVA} is the multiplier addressing CVA model risk.

C. Basic CVA framework

1. General provisions

(a) Framework eligibility criteria

90. All banks that do not have approval from their supervisory authority to use the FRTB-CVA framework must use the Basic CVA framework.

(b) Eligible hedges

91. Only transactions used for the purpose of mitigating the counterparty credit spread component of CVA risk, and managed as such, can be eligible hedges.

92. Only single-name CDS, single-name contingent CDS, and index CDS can be eligible.

93. 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 sector and region as the counterparty.

(c) Hierarchy of approaches

94. A single Basic Approach is available.

2. Basic Approach

(a) Calculations

95. The basic CVA capital charge is calculated according to

$$K = K_{\text{spread}} + K_{\text{EE}}$$

where K_{spread} is the contribution of credit spread variability and K_{EE} is the contribution of EE variability to CVA capital.

96. For banks that do not hedge CVA risk (which may be the case for many smaller banks), K_{spread} is calculated via

$$K_{\text{spread}}^{\text{unhedged}} = \sqrt{\left(\rho \cdot \sum_c S_c\right)^2 + (1-\rho^2) \cdot \sum_c S_c^2}$$

where

- $S_c = \dfrac{\text{RW}_{b(c)}}{\alpha} \cdot \sum_{\text{NS} \in c} M_{\text{NS}} \cdot \text{EAD}_{\text{NS}}$ is the supervisory ES of CVA of counterparty *c*, where the summation is performed over all netting sets with the counterparty.
- $b(c)$ is the supervisory risk bucket of counterparty *c*
- RW_b is the supervisory weight for risk bucket b
- EAD_{NS} is the EAD of netting set NS calculated according to the Annex 4 of the Basel framework and used for default capital calculations for counterparty credit risk;
- M_{NS} is the effective maturity for netting set NS;
- α is multiplier used to convert EEPE to EAD (its SA-CCR and default IMM value is 1.4)
- ρ is the supervisory correlation between the credit spread of a counterparty and the systematic factor;

97. In the most general case, when direct and indirect single-name CDS as well as index hedges are present, K_{spread} is calculated according to

$$K_{\text{spread}} = \sqrt{\left(\rho \sum_c \left(S_c - \sum_{h\in c} r_{hc} S_h^{\text{SN}}\right) - \sum_i S_i^{\text{ind}}\right)^2 + (1-\rho^2)\sum_c \left(S_c - \sum_{h\in c} r_{hc} S_h^{\text{SN}}\right)^2 + \sum_c \sum_{h\in c}(1-r_{hc}^2)(S_h^{\text{SN}})^2}$$

where

- $S_h^{\text{SN}} = \text{RW}_{b(h)} M_h^{\text{SN}} B_h^{\text{SN}}$ is the supervisory ES of price of *single-name* hedge h
- $S_i^{\text{ind}} = \text{RW}_{b(i)} M_i^{\text{ind}} B_i^{\text{ind}}$ is the supervisory ES of price of *index* hedge i
- $b(e)$ is the supervisory risk bucket of entity e (single-name or index)
- B_h^{SN} is the discounted notional[11] of *single-name* hedge h
- M_h^{SN} is the remaining maturity of *single-name* hedge h
- B_i^{ind} is discounted notional of *index* hedge i
- M_i^{ind} is remaining maturity of *index* hedge i
- r_{hc} is the correlation between the credit spread of counterparty c and the credit spread of a single-name hedge h of counterparty c.

98. The three major terms under the square root in the general formula have the following interpretation:

- The first term aggregates the systematic components of CVA along with the systematic components of single-name hedges and index hedges. Note that only a part of indirect single-name hedges is allowed to offset counterparty-level CVA via $r_{hc} < 1$
- The second term aggregates the idiosyncratic components of CVA along with the idiosyncratic components of single-name hedges. Note that only a part of indirect single-name hedges is allowed to offset counterparty-level CVA via $r_{hc} < 1$.
- The third term aggregates the components of indirect hedges that are not aligned with counterparties' credit spreads. This term is non-zero only for indirect single-name hedges, for which $r_{hc} < 1$. The term ensures that perfect hedging is impossible: whenever indirect hedges are present, K_{spread} cannot reach zero value.

99. All banks must calculate EE variability component of the CVA capital by a simple scaling of $K_{\text{spread}}^{\text{unhedged}}$. The EE variability multiplier β is set at [0.5]:

$$K_{\text{EE}} = \beta K_{\text{spread}}^{\text{unhedged}}$$

[11] For single-name contingent CDS, the notional is determined by the current market value of the reference portfolio or instrument.

(b) Parameter values

100. Supervisory risk weights RW_b are given in the table below. Single-name risk weights are obtained by scaling the SA-CVA risk weights for counterparty credit spreads to a one-year horizon. Broad index risk weights are set equal to the minimum of the single-name risk weights across sectors.

[Note: The risk weights in the table below reflect the preliminary view of the Basel Committee and will be subject to further calibration after the quantitative impact assessment is conducted and as the proposed standardised approach for market risk is finalised.]

Risk bucket	**Investment grade**	**Non-investment grade**
Sovereigns including central banks, multilateral development banks	8.8%	20.4%
Financials including government-backed financials	10.2%	17.3%
Basic materials, energy, industrials, agriculture, manufacturing, mining and quarrying	7.1%	13.0%
Consumer goods and services, transportation and storage, administrative and support service activities	6.1%	14.4%
Technology, telecommunications	5.1%	13.0%
Health care, utilities, local government, government-backed non-financials, education, public administration, professional and technical activities	4.1%	8.7%
Indices spanning multiple buckets	4.1 %	8.7 %

101. For sector indices, RW_b for the appropriate risk bucket from the table above should be multiplied by 0.7 to account for diversification of idiosyncratic risk within the index.

102. The correlation ρ between a counterparty credit spread and the systematic factor that drives all indices is set to 50%. Therefore, the correlation between credit spreads of any two counterparties is $\rho^2 = 25\%$.

103. The correlation r_{hc} between the credit spread of counterparty c and the credit spread of its single-name hedge h are set as follows:

Single-name hedge *h* of counterparty *c*	**Value of r_{hc}**
references counterparty *c* directly	100%
has legal relation with counterparty *c*	80%
shares sector and region with counterparty *c*	50%