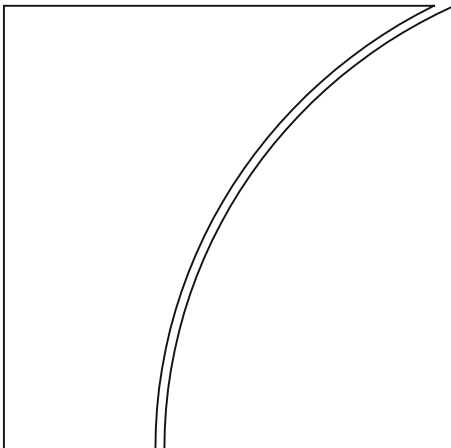# Basel Committee on Banking Supervision

Frequently asked questions on the Basel III standardised approach for measuring counterparty credit risk exposures

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BANK FOR INTERNATIONAL SETTLEMENTS

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The standardised approach for measuring counterparty credit risk exposures: Frequently asked questions

Introduction

The Basel Committee on Banking Supervision has received a number of interpretation questions related to the Standardised Approach for measuring counterparty credit risk (SA-CCR), as published in March 2014 (and revised in April 2014). To promote consistent global implementation of the standard, the Committee has agreed to periodically review frequently asked questions (FAQs) and publish answers along with any technical elaboration of the standards text and interpretative guidance that may be necessary.

This document presents a set of frequently asked questions that relate to the SA-CCR. The questions and answers are grouped to sections pertaining to (i) the general formula, (ii) the PFE add-on, and (iii) treatments for specific derivatives. FAQs that have been added since the publication of the previous version of this document in August 2015 are shaded <mark>yellow</mark>.

1. General formula

1.1 Capping of margined EAD at otherwise unmargined EAD

Q. We understand the capping of the exposure at default (EAD) at the otherwise unmargined EAD is motivated by the need to ignore exposure from a large threshold amount that would not realistically be hit by some small (or non-existent) transactions.

We have, however, come across a potential anomaly relating to this capping, namely in the case of margined netting sets comprising short-term transactions with a residual maturity of 10 business days or less. In this situation, the maturity factor (MF) weighting will be greater for a margined set than for a non-margined set, because of the 1.5 multiplier. That multiplier will, however, be negated by the capping. The anomaly would be magnified if there were some disputes under the margin agreement, ie where the margin period or risk (MPOR) would be doubled to 20 days but, again, negated by the capping to an unmargined calculation.

Answer: Yes, such an anomaly does exist. Nonetheless, this anomaly is generally expected to have no significant impact on banks' capital requirements. Thus, no modification to the standard is required.

1.2 Collateral taken outside of netting sets

<mark>*Q. Banks may take eligible collateral provided by clients outside netting sets. However, the SA-CCR sets out the treatment of eligible collateral taken within netting sets. In addition, the SA-CCR deleted and replaced paragraphs 186, 187 and 187 (i) of the Basel II framework. How should banks recognise eligible collateral taken outside netting sets?*</mark>

<mark>**Answer:** Eligible collateral which is taken outside a netting set, but is available to a bank to offset losses due to counterparty default on one netting set only, should be treated as an independent collateral amount associated with the netting set and used within the calculation of replacement cost under paragraph 136 or paragraph 144 of the SA-CCR standard depending on whether the netting set is margined or unmargined. Eligible collateral which is taken outside a netting set, and is available to a bank to offset losses due to counterparty default on more than one netting set, should be treated as</mark>

collateral taken under a margin agreement applicable to multiple netting sets, in which case the treatment under paragraphs 186 and 187 of the SA-CCR standard (and amended in the August 2015 SA-CCR FAQ publication) applies. If eligible collateral is available to offset losses on non-derivatives exposures as well as exposures determined using the SA-CCR, only that portion of the collateral assigned to the derivatives may be used to reduce the derivatives exposure.

2. PFE add-on

2.1 Definition of maturity (M_i), end date (E_i), start date (S_i) and latest contractual exercise date (T_i)

Q. The document defines parameters Mi, Ei, Si and Ti as dates. We think this is not technically correct, as from the examples and formulae these appear to be time periods (between two dates). Whilst the end date of each period is defined, could the Basel Committee please provide guidance as to what the start date should be? We think it is clear that for M the start date should be "Today" (because the text refers to "residual" maturity), and similarly for T (which is generally referred to as "time to maturity" in option pricing). However, we are unsure whether E and S should be calculated from the trade date or from "Today". We think "Today" would make sense (as the text clarifies that S should be set to zero for transactions that have already started), but would appreciate confirmation of this from the Basel Committee.

The formulae using the above parameters (eg in paragraphs 157 and 159) also define S, E and T as dates. These formulae won't work with dates. It may also be worth clarifying that the time periods should be expressed in years (not days). While Table 1 in paragraph 156 makes this clear, the rest of the text should use the correct notation, rather than having to rely on examples.

Answer: The word "dates" should be interpreted as the time period from today to the date in question and should be measured in years.

2.2 Treatment of Eurodollar futures

Q. According to Table 1 in paragraph 156, the "3-month Eurodollar futures that matures in 1 year" has an Mi of 1 year and an Ei of 1.25 years. This is in accordance with paragraph 155. However, is this the correct treatment given that these contracts settle daily?

Answer: The example of the three-month Eurodollar future in Table 1 did not include the effect of margining or settlement and would apply only in the case where a futures contract were neither margined nor settled.

With regard to the remaining maturity parameter (M_i), the last paragraph of 158 states: "For a derivative contract that is structured so that on specified dates any outstanding exposure is settled and the terms are reset so that the fair value of the contract is zero, the remaining maturity equals the time until the next reset date." This means that exchanges where daily settlement occurs are different from exchanges where daily margining occurs. Trades with daily settlement should be treated as unmargined transactions with a maturity factor given by the first formula in paragraph 164, with the parameter M_i set to its floor value of 10 business days. For trades subject to daily margining, the maturity factor is given by the second formula of paragraph 164 depending on the margin period of risk (MPOR), which can be as short as five business days.

With regard to the end date (E_i), the value of 1.25 years applies. Margining or daily settlement have no influence on the time period referenced by the interest rate contract. Note that, per paragraph 166, the parameter E_i defines the maturity bucket for the purpose of netting. This means that

2.3   Margin period of risk under the SA-CCR

Q.   Paragraph 164 lists the criteria determining the margin period of risk (MPOR). Is this meant to be a summary of the Internal Model Method (IMM) rules introduced in Basel III (as could be implied by footnote 17), or a deliberate simplification of those rules? We note for example that there is no mention of the criteria relating to illiquid collateral or illiquid transactions; are such cases alluded to in footnote 17 as "circumstances requiring an extended margin period of risk", or were they deliberately excluded?

Answer: The standard extends to SA-CCR the minimum MPOR rules specified for the IMM. Thus, the criteria relating to illiquid collateral or illiquid transactions also apply to the SA-CCR.

2.4   MF$^{(margined)}$ denominator

Q.   Could the Basel Committee please confirm that the denominator for the MF(margined) calculation should be (say) 250? That is the number of business days in a year, considering the MPOR (numerator) is expressed in business days? Similarly, the flooring of the remaining maturity in the unmargined calculation to 10 business days can be specified as MAX(M, 10/250) (assuming M is expressed in years), effectively flooring MF(unmargined) to 0.2 (the square root of 10/250). Alternatively, the Basel Committee may wish to specify the remaining maturity floor as 14 calendar days rather than 10 business days.

Answer: The units of the numerator and denominator of the calculation must be consistent. For example, if MPOR and "M" are measured in business days, then the denominator must also be expressed in business days. If MPOR and "M" are measures in years, then "1 year" is literally 1.

2.5   Supervisory delta adjustments

Q.   Why doesn't the supervisory delta adjustment calculation take the risk-free rate into account? It is identical to the Black-Scholes formula except that it's missing the risk-free rate.

Answer: Whenever appropriate, the forward (rather than spot) value of the underlying in the supervisory delta adjustments formula should be used in order to account for the risk-free rate as well as for possible cash flows prior to the option expiry (such as dividends).

2.6   Supervisory delta adjustments for negative interest rates

Q.   How is the supervisory delta for options in paragraph 159 of the SA-CCR standard to be calculated when the term P/K is zero or negative such that the term ln(P/K) cannot be computed (eg as may be the case in a negative interest rate environment?

Answer: Per paragraph 159 of the SA-CCR standard, in such cases banks must incorporate a shift in the price value and strike value by adding λ, where λ represents the presumed lowest possible extent to which interest rates in the respective currency can become negative.[1] Therefore, the Delta δ_i for a transaction *i* in such cases is calculated as:

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[1]   This assumes, for the strike price, that $K_i + \lambda_j$ is also greater than zero, otherwise a greater value needs to be chosen for λ_j.

Delta (δ)	Bought	Sold
Call options	$+\Phi\left(\dfrac{\ln\left((P_i+\lambda_j)\big/(K_i+\lambda_j)\right)+0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$	$-\Phi\left(\dfrac{\ln\left((P_i+\lambda_j)\big/(K_i+\lambda_j)\right)+0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$
Put options	$-\Phi\left(\dfrac{-\ln\left((P_i+\lambda_j)\big/(K_i+\lambda_j)\right)-0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$	$+\Phi\left(\dfrac{-\ln\left((P_i+\lambda_j)\big/(K_i+\lambda_j)\right)-0.5*\sigma_i^2*T_i}{\sigma_i*\sqrt{T_i}}\right)$

The same parameter must be used consistently for all interest rate options in the same currency. For each jurisdiction, and for each affected currency j, the supervisor is encouraged to make a recommendation to banks for an appropriate value of λ_j, with the objective to set it as low as possible. Banks are permitted to use lower values if it suits their portfolios.

2.7 Adjusted notional for equity and commodity volatility transactions

Q. *Paragraph 157 states: "For equity and commodity derivatives, the adjusted notional is defined as the product of the current price of one unit of the stock or commodity (eg a share of equity or barrel of oil) and the number of units referenced by the trade." How should this definition be applied to volatility transactions such as equity volatility swaps mentioned in paragraph 163?*

Answer: For equity and commodity volatility transactions, the underlying volatility or variance referenced by the transaction should replace the unit price and contractual notional should replace the number of units.

2.8 Summary table of supervisory parameters (a)

Q. *Should a 50% supervisory option volatility on swaptions for all currencies be used?*

Answer: Yes.

2.9 Summary table of supervisory parameters (b)

Q. *Are the supervisory volatilities from the table in paragraph 183 recommended or required?*

Answer: Required – they must be used for calculating the supervisory delta of options.

3. Specific derivatives

3.1 Sold options

Q. *We would welcome clarification of the treatment of sold options. At the very least, we hope the BCBS could recognise that a netting set comprising only sold options (where premiums have been paid upfront) should have EAD set to zero.*

Answer: The EAD can be set to zero only for sold options that are outside netting and margin agreements.

3.2 Credit derivatives

Q. Please clarify whether Basel II paragraphs 707 and 708, which set out the Basel II treatment of counterparty credit risk in the trading book for credit derivatives, would similarly apply under the SA-CCR?

Answer: Paragraph 707 of the Basel II framework is not applicable for the purposes of SA-CCR. The table of add-on factors has been superseded by Table 2 of paragraph 183 in the SA-CCR standard. For netting sets containing credit derivatives where the bank is the protection seller, the general rules under SA-CCR shall apply. However, for credit derivatives where the bank is the protection seller and that are outside netting and margin agreements, the EAD may be capped to the amount of unpaid premia. Banks have the option to remove such credit derivatives from their legal netting sets and treat them as individual unmargined transactions in order to apply the cap.

Paragraph 708 of the Basel II framework is not applicable for the purposes of SA-CCR. Instead, first-to-default, second-to-default and subsequent-to-default transactions should be treated as CDO tranches under SA-CCR. For an nth-to-default transaction on a pool of m reference names, banks must use an attachment point of $A=(n-1)/m$ and a detachment point of $D=n/m$ in order to calculate the supervisory delta formula set out in paragraph 159 of the SA-CCR standard.

3.3 Forward rate agreement (FRA) example in Table 1, paragraph 156

Q. As FRAs are cash-settled at the start of the underlying interest rate period (the "effective date"), that date represents the "end-of-risk" date, aka "M" in the BCBS notation. Hence, in this example, M should be 0.5 years instead of 1 year.

Answer: In Table 1, paragraph 156, it is implicitly assumed that the payment is made at the end of the period (similar to vanilla interest rate swaps). If the payment is made at the beginning of the period, as it is typically the case according to market convention, M should indeed be 0.5 years.

3.4 Effective notional calculation

Q. How should the effective notional be calculated for options?

Answer: Per paragraph 159 of the SA-CCR standard, for the purposes of effective notional calculations, single-payment options must be treated as follows:

For European, Asian, American and Bermudan put and call options, the supervisory delta must be calculated using the simplified Black-Scholes formula referenced in paragraph 159. In the case of Asian options, the underlying price must be set equal to the current value of the average used in the payoff. In the case of American and Bermudan options, the latest allowed exercise date must be used as the exercise date T_i in the formula. For Bermudan swaptions, the start date S_i must be equal to the earliest allowed exercise date, while the end date E_i must be equal to the end date of the underlying swap.

For digital options (also known as binary options), the following instruction replaces FAQ number 11 in the August 2015 version of this FAQ publication and the first bullet of paragraph 158 in *The standardised approach for measuring counterparty credit risk exposures* (March 2014). The payoff of each digital option (bought or sold) with strike K_i must be approximated via the "collar" combination of bought and sold European options of the same type (call or put), with the strikes set equal to 0.95·K_i and 1.05 K_i. The size of the position in the collar components must be such that the digital payoff is reproduced exactly outside the region between the two strikes. The effective notional is then computed for the bought and sold European components of the collar separately, using the option formulae for the supervisory delta referenced in paragraph 159 (the exercise date T_i and the current value of the underlying P_i of the digital option must be used). The absolute value of the digital-option effective notional must be capped by the ratio of the digital payoff to the relevant supervisory factor.

If a trade's payoff can be represented as a combination of European option payoffs (eg collar, butterfly/calendar spread, straddle, strangle), each European option component must be treated as a separate trade.

For the purposes of effective notional calculations, multi-payment options must be treated as follows:

Multiple-payment options may be represented as a combination of single-payment options. In particular, interest rate caps/floors may be represented as the portfolio of individual caplets/floorlets, each of which is a European option on the floating interest rate over a specific coupon period. For each caplet/floorlet, the start date S_i and the exercise date T_i must be set equal to the start of the coupon period, while the end date E_i must be set equal to the end of the coupon period.

3.5   Average notional calculation for variable notional swaps

Q.   The third bullet point of paragraph 158 may need to clarify that the variable notional calculation should use the weighted average over time (see for example the definitions of EPE and EEPE in Annex 4). Also, we would assume this rule should apply to any transactions with variable notional amounts, not just swaps.

Answer: Yes, the average should be calculated as "time-weighted". The rule in question should be interpreted as referring to all interest rate and credit derivatives with variable notional amounts specified by the contract. The rule does not cover those transactions where the SA-CCR notional varies due to price changes (typically, FX, equity and commodity derivatives).

4.   Miscellaneous edits

4.1   Put options footnote

Q.   There appears to be a footnote 7 applicable to the supervisory delta calculation for put options (paragraph 159, top of page 12). This footnote does not seem to reference anything. We guess it should be 13.

Answer: The existence of footnote 7 is a typo. There should be no footnote after "Put options".

4.2   Reference to paragraph 111 in footnote 17

Q.   Does this refer to a paragraph number in Annex 4 (as with the previously mentioned paragraph 41), or a paragraph number in the Basel III document?

Answer: Footnote 17 refers to paragraph 111 of Annex 4 as modified by the BCBS document *Capital requirements for bank exposures to central counterparties*, July 2012 ("interim rules" for exposures to CCPs).

Technical amendment to the SA-CCR framework

The following is a technical amendment to the rules text related to situations where the perimeters of the margin agreement and the netting set differ. In particular, when a single margin agreement covers multiple netting sets, paragraph 186 sets out a special rule for the calculation of the replacement cost.

The equation specified in paragraph 186 works well in situations where the bank is a net receiver of collateral, allowing the collected collateral to offset an overall positive mark-to-market value of the derivatives included in the margin agreement. On the contrary, when the bank is a net poster of collateral, the current equation does not allow an overall negative mark-to-market value of the derivatives in the margin agreement to offset the exposure generated by the posted (non-segregated) collateral.

To ensure accurate treatment of the calculation of the replacement cost and consistency in the general SA-CCR framework, paragraph 186 is hereby amended as follows:

> *"186. If a single margin agreement applies to several netting sets, special treatment is necessary because it is problematic to allocate the common collateral to individual netting sets. The replacement cost at any given time is determined by the sum of two terms. The first term is equal to the unmargined current exposure of the bank to the counterparty aggregated across all netting sets within the margin agreement reduced by the positive current net collateral (ie collateral is subtracted only when the bank is a net holder of collateral). The second term is non-zero only when the bank is a net poster of collateral: it is equal to the current net posted collateral (if there is any) reduced by the unmargined current exposure of the counterparty to the bank aggregated across all netting sets within the margin agreement. Net collateral available to the bank should include both VM and NICA. Mathematically, RC for the entire margin agreement is:*

$$RC_{MA} = \max\left\{\sum_{NS \in MA} \max\{V_{NS};\ 0\} - \max\{C_{MA};0\};\ 0\right\} + \max\left\{\sum_{NS \in MA} \min\{V_{NS};\ 0\} - \min\{C_{MA};0\};\ 0\right\}$$

> *where the summation NS $\in$ MA is across the netting sets covered by the margin agreement (hence the notation), V_{NS} is the current mark-to-market value of the netting set NS and C_{MA} is the cash equivalent value of all currently available collateral under the margin agreement."*