FEDERATION
BANCAIRE
FRANCAISE
Banking supervision
And Accounting issues Unit
The Director

Paris, September 27th 2013

French Banking Federation comments on the Basel Committees' Consultative document on the non-internal model method "NIMM" for capitalizing counterparty credit risk exposures (BCBS254)

Dear Sir,

The French Banking Federation (FBF) represents the interests of the banking industry in France. Its membership is composed of all credit institutions authorized as banks and doing business in France, i.e. more than 390 commercial, cooperative and mutual banks. FBF member banks have more than 38,000 permanent branches in France. They employ 370,000 people in France and around the world, and service 48 million customers.

We appreciate the opportunity to share our view on the consultative document on the non-internal model method "NIMM" for capitalizing counterparty credit risk exposures. We welcome the proposals made which are effective solutions to tackle the main issues regarding the Current Exposure Method (CEM) among which netting, diversification, moneyness and collateral treatments. The general structure seems to be a good compromise between simplicity and precision.

However we believe some technical adjustments are still needed to make the method both more accurate and less prone to regulatory arbitrage.

Mr. Wayne BYRES
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The major technical concerns we have with the NIMM approach are:

- **Moneyness multiplier**: We think that a symmetric multiplier, or more simply our proposed Formula (cf. page 2 of our response), for "in the money" portfolio should be used ;
- **Netting of options**: we propose to use trades spot delta instead of supervisory deltas to incorporate nonlinear products within a global portfolio;
- **Netting of positions with different maturities** we suggest requesting banks to compute a risk profile and to apply the same rules as for IMM model;
- **Global Add-on aggregation**: we think that a simple quadratic sum would be more realistic for the computation;
- **General level of regulatory Add-ons**: We would appreciate getting from the Committee some background information on the way add-ons have been calibrated in the NIMM approach.

You will find in the appendix attached our response to the consultation that is organized in 2 sections:

- The first section consists of general comments;
- The second one is dedicated to answers to the questions raised in the consultative document.

We thank for your consideration and remain at your disposal for any question or additional information you might have.

Yours sincerely,

Jean-Paul Caudal

French Banking Federation Response to BCBS 254 : The non-internal model method for capitalizing counterparty credit risk exposures

French Banks welcome proposals made in this consultative document which are elegant and effective solutions to solve the main issues regarding the Current Exposure Method (CEM) among which netting, diversification, moneyness and collateral treatments. The general structure seems to be a good compromise between simplicity and precision.

While, as noted above, we welcome proposals made, we believe that some technical adjustments are still needed to make the method both more accurate and less prone to regulatory arbitrage. However we are well aware that the method should be kept simple and conservative and accept that some compromise should be made. With this perspective in mind, we believe that the overall balance would be better served by allowing for smaller institutions or portfolios, an extremely simplified but conservative method (i.e. simplified NIMM or CEM) while NIMM itself would be amended to better reflect simple concepts as derivative expiry and underlying duration or the delta that would ensure a better balance to the text.

We set forth below some of the major technical concerns we have with the NIMM approach and propose some simple adjustments that could be introduced to avoid a too conservative measurement of risks or sometime could lead to a major underestimation.

In the next paragraphs we will review the following topics:

- Moneyness multiplier ;
- Netting of options ;
- Netting of positions with different expiries ;
- Global AddOn agregation ;
- General level of regulatory AddOns ;

Section I : General Comments

- **Moneyness multiplier**

The assessment of portfolio risk using only Replacement Cost and at the money AddOn through the multiplier formula is a good solution to take into account moneyness effect and over collateralization.

We understand that multiplier is derived from theoretical value of the expected positive exposure of a portfolio with a normally distributed MtM.

In this context we question the usage of the proposed approximation

$$E(\max(0;x)) = \max(0;x0) + \exp\left(\frac{-abs(x0)}{2 * \frac{\sigma}{2*\pi}}\right) * \frac{\sigma}{2*\pi} \quad (1)$$

rather than the option price formula

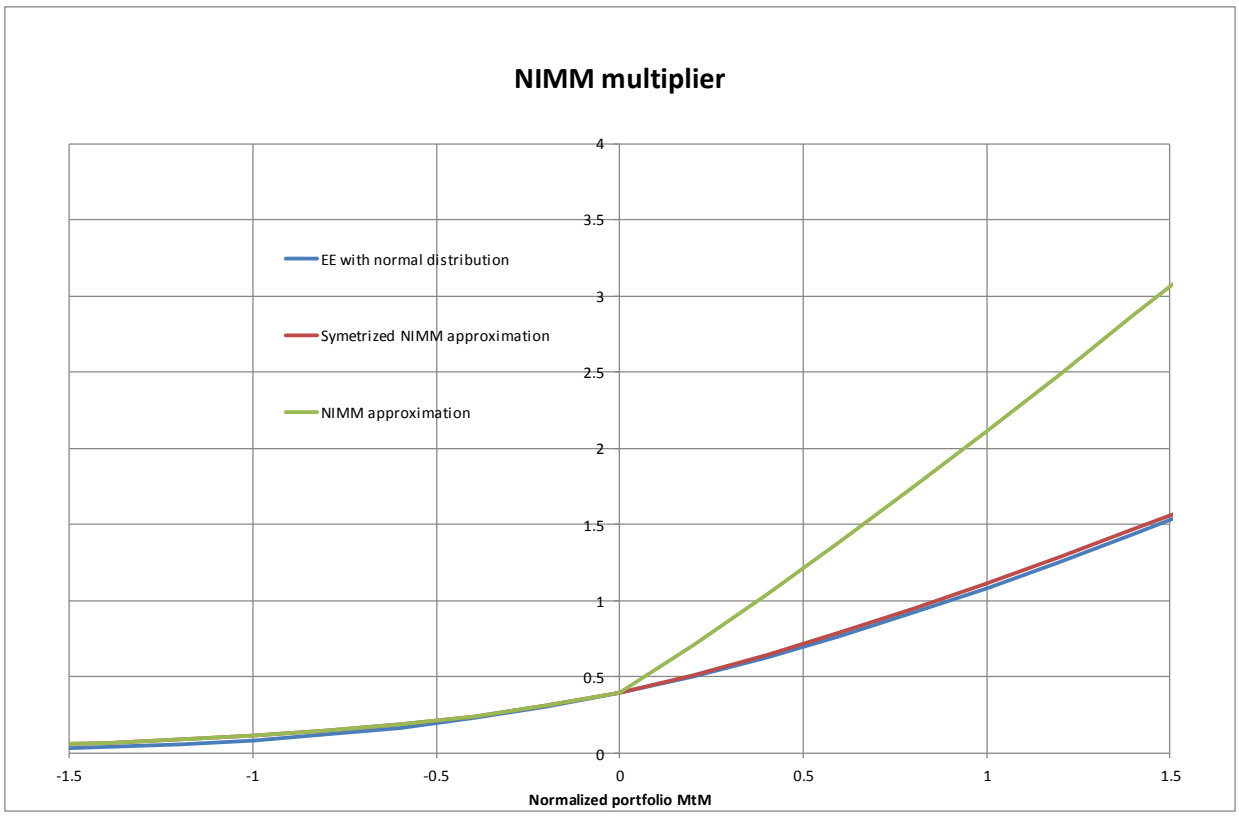
$$\boldsymbol{E(\max(0;x)) = x0 * N\left(\frac{x0}{\sigma}\right) + \sigma * g\left(\frac{x0}{\sigma}\right)} \quad \boldsymbol{(2)}$$

where x is supposed to be normally distributed with mean x0 and standard deviation σ while g(u) and N(u) are respectively the probability and the cumulative probability of the normal law. In consultative document term x0=V-C and σ =AddOn.

We suggest using Formula (2) for 3 reasons (please see also answer to Q8) :

- Implementation of formula (2) is as easy as formula (1) in every software;
- Formula (1) introduces some conservatism (see graph below) which will be added to proposed 5% floor and other prudent calibrations of parameters. We suggest not adding this new conservatism in favor of an explicit and well defined mechanism;
- Formula (2) could be used to define a normalized delta for options (see next paragraph).

More importantly, consultative document proposes to floor the multiplier to 1 for portfolios with positive MtM. As depicted in the next graph the estimation of AddOn following BCBS 254 would be the green line where coherent value, within the retained framework, would be the red line. **We think that a symmetric multiplier, or more simply the Formula (2), for in the money portfolio should be used.** Eventually some conservatism could be introduced using the same mechanism as for the 5% floor.



- **Interest rate and credit products duration**

The consultative document proposes to use deal maturity as a proxy for interest rate or credit product duration, defining effective notional as the product of trade notional amount and the remaining maturity. This is a particularly rough estimate for long dated products. **We suggest defining a vlookup table giving trade duration for different maturities and interest rate levels.**

- **Netting of options**

Finding a solution to incorporate nonlinear product within a global portfolio is very challenging so we welcome the NIMM proposal.

But the usage of a supervisory delta of 0.5 whatever is the option maturity or moneyness could dramatically distort the appreciation of true risk.

The examples depicted in Annex 1 show that due to the usage of a supervisory delta for options, NIMM AddOns could overestimate or underestimate EEPE. It is particularly the case for margined portfolios where EEPE is quite proportioned to spot delta. A long forward position which would be hedged by a

well out of the money call could have a zero NIMM AddOn when the true value is equal to the single long position.

To correct this effect, we propose to use trades spot delta. Simply replacing the supervisory deltas by their true values in AddOn and multiplier formulas, all other terms being unchanged, lead to AddOns much closer to EEPE than NIMM ones.

If regulators are reluctant using bank's delta, one solution would be to retrieve it using nominal, maturity and option price by inverting the Formula (2) rewrote in the following form

$$ratio = \frac{Option\ Price}{N * \sigma * \sqrt{T}} = \mathrm{X} * \mathrm{N}(\mathrm{X}) + g(\mathrm{X})$$

where σ could be set to regulatory AddOn for corresponding product, N nominal amount, T is the remaining option maturity and X the unknown.

After solving this equation in X the normalized delta could be set to N(X). More simply table for different value of *ratio* giving corresponding delta could be used to avoid solving the preceding formula.

ratio	<0.02	0,05	0,11	0,19	0,29	0,40	0,54	0,73	0,95	1,33	>2
delta	0%	10%	20%	30%	41%	50%	60%	71%	80%	90%	100%

This seems to be acceptable because exactly in line with multiplier introduction. **But we insist that usage of own bank's delta[1] would be more exact and simpler.**

- **Maturity mismatches**

Another simplification which could lead to under or overestimation of EEPE using NIMM AddOns is the treatment of deal expiry mismatches.

In the following table we show the EEPE value for a 1 year long position (at the money forward with effective notional equal to 100) and a second position with effective notional given in first column and maturity given in first line. In last column is the corresponding NIMM AddOn.

[1] Relying on internal data may lead to methodological issues for delta calculation and data management issues especially where options are deep out of money and then prices not available.

	EEPE								NIMM
	1 week	2 weeks	1 month	2 months	3 months	6 months	9 months	1 year	
30	0.02	0.04	0.08	0.17	0.25	0.50	0.75	1.00	
-500	55	77	108	184	227	292	322	331	267
-250	30	30	40	91	112	145	160	164	100
-100	**30**	29	28	35	44	57	63	64	0
-50	30	30	29	19	23	29	32	33	33
-20	30	30	30	24	24	24	24	24	53
-10	30	30	30	27	27	27	27	27	60
0	30	30	30	30	30	30	30	30	67
10	30	30	30	33	33	33	33	33	73
20	30	30	32	36	36	36	36	36	80
50	30	30	40	45	45	45	45	45	100
100	**30**	39	54	60	60	65	71	73	133
250	48	68	94	105	118	150	166	170	233
500	82	116	162	188	232	297	327	336	400

A global long position with average maturity lower than 1 year has an EEPE which could be far less than what is proposed in NIMM (underlined green cells).

On contrary a long term position hedged by a short term position with same effective notional will have a zero NIMM AddOn when EEPE should be almost equal to the single long position (underlined red cells).

To avoid such under or overestimation **we suggest requesting banks to compute a risk profile** and to apply the same rules as for IMM model (usage of a non-decreasing EE profile and averaging it up to the minimum between 1 year and portfolio maturity).

For that, the NIMM determination of aggregate AddOns should be done for different time horizons (for example 1 day, 2 weeks, 1 month, 3 months, 6 months, 1 year) in each computation taking into account non matured operations at this time horizon.

For **non-margined portfolios, a** time horizon AddOn would be computed multiplying the regulatory 1 year value by the square root of corresponding time horizon.

With a small number of time horizons, profile for trades maturing between 2 time horizons will be truncated. We suggest, for trades maturing within 1 year, a nominal adjustment such as multiplying trade nominal amount by a function of the ratio of the trade maturity over the largest time horizon capturing the trade. For example nominal amount of a 7 months trade would be multiplied by square root of 7/6 because risk profile for this deal will be truncated at the 6 months time horizon.

For **margined portfolios** the time horizon AddOn should be computed using the corresponding supervisory holding period. The a priori non increasing deal profile will require no any nominal adjustment for truncation correction.

NB : In this case regulatory AddOns should be defined as 1 year underlying volatility, not applying the 2/3 coefficient which is introduced in consultative document to take into account the averaging of implicit profiles.

Additionally to the possible avoidance of regulatory arbitrage offered by the current proposal in the consultative document, the usage of a profile would have at least two other advantages:

- **Maturity adjustment:**

In the consultative document AddOns are not taking into account deal maturity[2]. This is correct for operations having a maturity over 1 year but could be very conservative for short term deals. The computation of a risk profile as described above would correct this approximation.

- **CVA charge:**

One of the most conservative impacts for computation of VaR on CVA using standard method or the flat profile one is the usage of average maturity of portfolio floored by half of the maturity of the trade having the longest one in the portfolio. Following the logic of building a profile using different time buckets, this could be done up to the portfolio maturity. In this case banks would have the choice to use the advanced method.

- **Margined netting sets exposures**

The proposed accounting of threshold (TH) and minimum transfer amount (MTA), adding them in the expression of the replacement cost, is not satisfactory as:

- It can be overly conservative. For instance a netting set of value zero for which no collateral has been collected will have its exposure increased by TH+MTA, i.e. more than what it would be for posted collateral (with a symmetrical multiplier as suggested above).
- It can also underestimate the exposure. When collected collateral is in excess of TH+MTA, the impact on the exposure in the proposed framework is nil.

In fact, the sum of TH and MTA is equal to the maximum exposure at the time of the last payment of variation margin, while the current exposure can be seen as a first day of the slippage period. Consequently, we suggest setting the current exposure to TH+MTA and adjust the add-on expression accordingly.

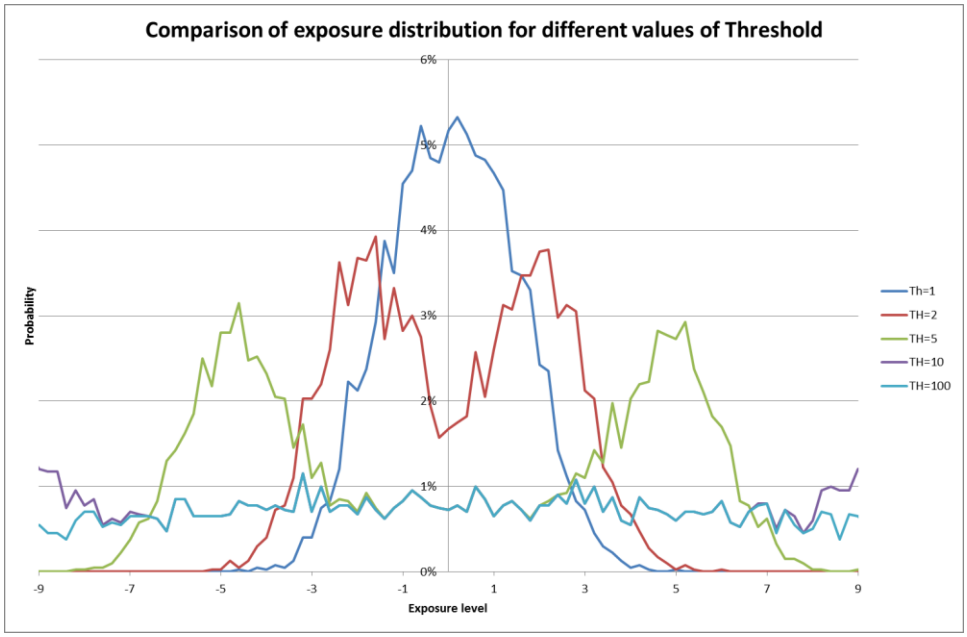
$$EEPE_{Margined} = \mathrm{Max}(0; TH + MTA - NICA) + AddOn^{Aggregate}_{Margined} \cdot Exp\left(-\frac{1}{2} \cdot \left| \frac{TH + MTA - NICA}{AddOn^{Aggregate}_{Margined}} \right| \right)$$

[2] Indeed interest rates or credit products are using trade maturity, but it is as a proxy for duration, not for assessing the maximum risk within the 1 year time bucket.

Besides, for large thresholds or minimum transfer amounts the margined "EEPE" can be higher than the one that would have been calculated if the netting set was un-margined. We propose to cap the value of the margined netting set EEPE to the un-margined netting set EEPE.

In graph below we depicted exposure distribution for different level of supposed symmetric thresholds. These distributions have been built using Monte Carlo simulations.

NB: Here non margined portfolio volatility is 10, so line with TH=1 is exposure distribution with a very small threshold compared to non-margined portfolio volatility, and conversely line with TH=100 is exposure distribution with threshold which is 10 time higher than non-margined portfolio volatility.



A simple vlookup table could be used to define final AddOn knowing non margined portfolio moneyness and volatility, supervisory holding period and threshold level. For example the following table gives AddOn multiplier levels for at the money portfolios for thresholds defined as multiplier of non-margined portfolio volatility computed using supervisory AddOns.

Threshold as multiplier of portfolio volatility	no threshold	0,00	0,01	0,05	0,10	0,20	0,50	1,00	10,00
AddOn multiplier	1,00	0,10	0,10	0,11	0,14	0,24	0,50	0,78	1,00

- **FX product diversification**

The simplified treatment proposed in consultative document for FX derivatives is very conservative. We suggest using the same framework as for equity or commodity products. The FX portfolio should be treated as a basket of assets against the bank reporting currency.

For that, netting of long and short positions coming from the different FX trades should be netted by currency using the proposed modified delta approach described above to compute an AddOn by foreign currency. For example a GBP/USD trade for a bank reporting in EUR should be decomposed as a long position in GBP and a short position in USD.

At the end a formula like the one proposed in paragraph 70 could be used to take into account correlations which should not be systematically equal to 1.

- **Interest rate hedging sets diversification**

The proposed bucketing of interest rates positions for diversification purposes (approach 2) is a step in the right direction. However, it has shortcomings: it allows full netting within a bucket and introduces a cliff effect, when one position hedging another falls in a different bucket.

We would like to propose a solution that has the merit to avoid both problems without adding undue complexity. The idea is to correlate all positions one with another. However, to avoid a large number of operations, the correlation factor between two positions is expressed as the product of one number attached to the first position and another attached to the other.

$$\rho_{i,j} = r_i \cdot r_j$$

The effective notional is derived and is expressed as a sum of n values, one per positions:

$$EffectiveNotional = \left[\sum_i \sum_j r_i \cdot r_j \cdot D_i \cdot D_j \right]^{\frac{1}{2}} = \left| \sum_i r_i \cdot D_i \right|$$

Where r_i is the correlation factor attached to the i^{th} position and D_i is its effective notional.

The expression of the correlation factor r_i must satisfy some properties:

- It should be larger as the difference between the position maturity and portfolio maturity increases.
- It should increase as the position maturity increases (long positions are more correlated one with each other than short positions are).

Empirically, we found that the below expression works well and leads on average to very similar interest rates netting sets add-ons. The quantity T is the average positions duration.

$$r_i = 1.05 \cdot \sqrt{0.3 + 0.7 \cdot \exp\left(- \frac{0.6}{(t_i + T)/2} \cdot |t_i - T| \right)}$$

- **Global AddOns aggregation.**

The proposed aggregation in paragraph 88 is the most conservative one. We understand that a generalization of variance covariance approach at this last phase of computation which would need to keep for example the signed sensitivity of each asset would be too complex. But we must also recognize that level of prices or variabilities are not perfectly correlated. So we think that a simple quadratic sum would be more realistic.

It is worth to note that a too conservative computation of AddOns would overestimate the at the money risk of the portfolio but would also largely mitigate the proposed moneyness treatment through the multiplier.

- **General level of regulatory AddOns**

In the following table we have translated the proposed regulatory AddOns in term of volatilities.

		AddOn	Equivalent 1 year standard deviation	Reference level	1 year volatility
Interest rate		0,50%	1,9%	2%	94%
Foreign exchange		5,00%	18,8%	100%	19%
Credit Single name	AAA	0,19%	0,7%	1,0%	71%
	AA	0,19%	0,7%	1,0%	71%
	A	0,21%	0,8%	1,2%	66%
	BBB	0,27%	1,0%	1,5%	68%
	BB	0,53%	2,0%	3,0%	66%
	B	0,80%	3,0%	6,0%	50%
	CCC	3,00%	11,3%	20,0%	56%
Credit Index	IG	0,19%	0,7%	1,2%	59%
	SG	0,53%	3,0%	4%	75%
Equity Single Name		32,00%	120,0%	100%	120%
Equity Index		20,00%	75,0%	100%	75%
Commodity	Electricity	40,00%	150,0%	100%	150%
	Oil/Gas	15,00%	56,3%	100%	56%
	Metals	15,00%	56,3%	100%	56%
	Agricultural	15,00%	56,3%	100%	56%
	Other	15,00%	56,3%	100%	56%

The 1 year implied volatilities are very high even compared to the observed one during 2008 crisis.

Not surprisingly we can observe that for simple operations the NIMM EAD is generally 2 to 3 times higher than IMM general agreed levels.

We would appreciate getting from the Committee some background information on the way add-ons have been calibrated in the NIMM approach.

Regarding specific add-ons, we wonder why Gold seems to be included in the Commodities category, whereas market practice generally categorizes Gold in the FX category. Furthermore, within the Commodities category, there is no add-on distinction between precious and non-precious metals, which is not consistent with market practices.

Section II : Answers to specific questions

Q1 : Should the Basel Committee replace the CEM and SM with the NIMM in all areas of the capital framework? What are the benefits and drawbacks of using the NIMM in each of these areas?

The NIMM approach is really a progress compared to the CEM or SM methods, so it would be welcomed to replace those methods for any areas of capital framework. But as demonstrated in our general comments some technical issues should be corrected and the method should be appropriately calibrated.

Nevertheless we advocate strongly for keeping the use of our internal models in all areas when it is been approved

Moreover we think CEM is still appropriate for small entities or portfolios, so we would be favorable of keeping it, or at least if the BCBS could introduce a specific treatment for these small portfolios, for instance with a “simplified NIMM”.

Q2 : Is the proposed approach of retaining the general structure of the CEM with respect to replacement cost and the potential future exposure add-on appropriate? Is the division of the broad asset classes appropriate?

We agree with this approach of retaining the general structure of the CEM.

But the proposed treatment of deltas and of maturity mismatches is too rough to describe correctly the risks. The measure could be easily arbitrated. We have suggested a few enhancements to correct these possibilities.

Concerning the different asset classes we have some interrogations:

- How would be treated multi-asset products?

- In the commodity asset class, there is no distinction between metals and basis products, and no specification concerning gold (i.e. is it a currency or a commodity). We want to remind that regarding market risk we currently treat gold as a currency.

Q3 : Are there specific product types that are not adequately captured in the outlined categories?

Yes it is the case with the option asset class (see our general comments). But also, the treatment of multi-asset products (the definition of notional is unclear), gold, and amortizing products (we ask for using the real duration).

Q4 : Does the above approach reflect the replacement cost of margined transactions? Are there any other collateral mechanics that the Basel Committee should consider?

We think that RC for margined trades (Paragraph 30) TH+MTA-NICA[3] seems inconsistent with the definition of RC and causes inconsistency between margined and un-margined calculations.

The way thresholds and MTAs are accounted for could be greatly improved. Realising that TH plus MTA represent the maximum portfolio value net of variation margin leads to a more satisfactory solution as exposed above.

Q5 : Of the options under consideration for recognising offset across hedging sets, which treatment is preferred? What number of maturity buckets is appropriate to consider?

As stated above, we favour "approach 1" as the main risk driver of interest rates products is yield curve parallel shifts. Therefore some diversification effect must be recognised between remaining maturity buckets. However, we would prefer a solution avoiding bucketing as it is prone to cliff effects such as the one we have suggested.

Q6 : Is the proposed approach of using a different methodology for determining the add-on for each asset class appropriate? Is each proposed add-on methodology for each asset class effective at capturing the main risk driver of that asset class?

We think that the global approach is quite relevant:

- A first order risk approach using a delta like measurement of product MtM sensitivity to its main risk factor.
- Capturing netting effects for strongly correlated products.
- Recognizing diversification through variance covariance approach for less correlated factors.

  However we believe that the actual remaining duration should be used in all cases (instead of remaining maturity floored by one year as proposed in paragraph 47 for interest rates and credit derivatives) so that the formula reflects real positions.

[3] Threshhold + Minimum Transfer Amount - Net Independant Collateral Amount

We also suggest to use better approximation for delta as a duration for interest rate and credit products, own bank's delta for options or the normalized approach describe above, asset like treatment for FX portfolios… For diversification the variance-covariance approach could be extended to all asset categories and cross asset aggregation.

Q7 : Are the proposed minimum time risk horizons for each transaction category (unmargined, non-centrally cleared, centrally cleared) appropriate? Should the Basel Committee consider factors other than the IMM for determining the appropriate time risk horizon for the NIMM (eg harmonising with other international or national legislation)?

We have no comments.

Q8 : Do the suggested formula and 5% floor appropriately recognise the benefits of overcollateralisation?

We proposed another formula (formula (2) above) which has no conservatism bias, which should be used for out of the money and in the money portfolios. Knowing that supervisory factors and correlation levels are already prudent we question the addition of the 5% floor.

Q9 : Is the proposed approach to aggregate across asset classes appropriate?

The simple summation of asset class add-ons is an over conservative approach. We suggest using a quadratic summation knowing the low level of correlation between prices of 2 different asset classes.

Q10 : Are there any risk factors that should be included in their own category or accounted for in another manner?

The approach seems to capture adequately different risk factors, and needs to remain simple.

Q11 : Is the proposal to introduce the multiplier in order to allow reduction of the PFE add-on in the IMM shortcut method appropriate?

As said in our general comments we welcome this proposal which solve one of the main issues of CEM. Nevertheless we proposed some amendments for threshold treatment, the usage or formula (2) in particular to have the right treatment for in the money portfolios.

Annex 1 :

Comparison of NIMM AddOn, IMM value and a proposed modified AddOn for different portfolio structure;

In next graphs we compare the EEPE values to the NIMM AddOns for simple combinations of linear and non linear products.

NB: computation is done using Black & Scholes formula and a pricing volatility supposed to be equal to the regulatory volatility used to determine the theoretical underlying AddOns. In current market conditions underlying price is 100.

For a given portfolio composition, EEPE and AddOns are computed for different level of strike for the first operation and a fixed strike value for other assets if any. For example, in first graph, portfolio is reduced to a long Forward of nominal 1. Lines in the graphs correspond respectively to RC, EEPE and NIMM or a modified NIMM AddOn after application of multiplier for different strike values. In the fourth graph, portfolio is composed of a long Forward with strike 100 and a short Call of nominal 2 and RC, EEPE and AddOns are computed for different strike values for the Call.

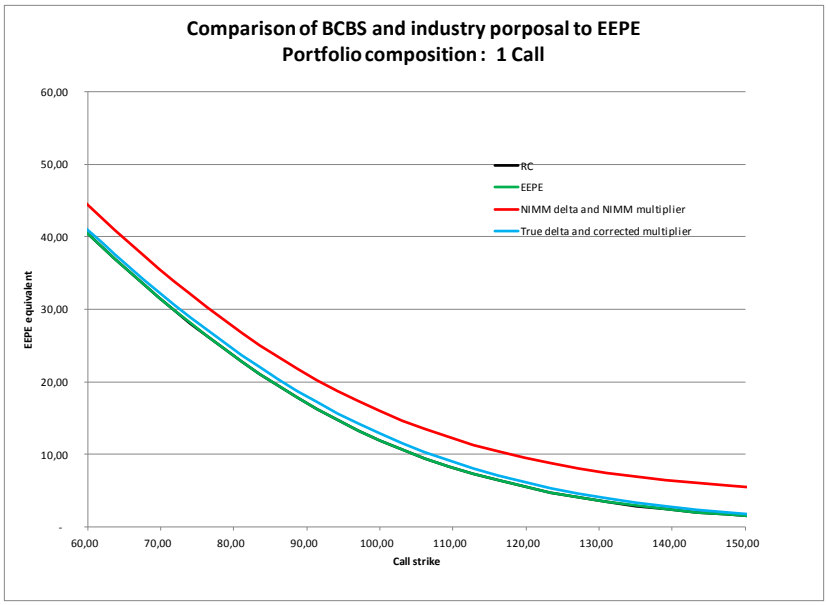
The first set of graphs is for unmargined portfolios. The second set corresponds to the same portfolios but RC is supposed to be perfectly collateralized. EEPE and AddOns are computed before any adjustment of 1 year volatility.

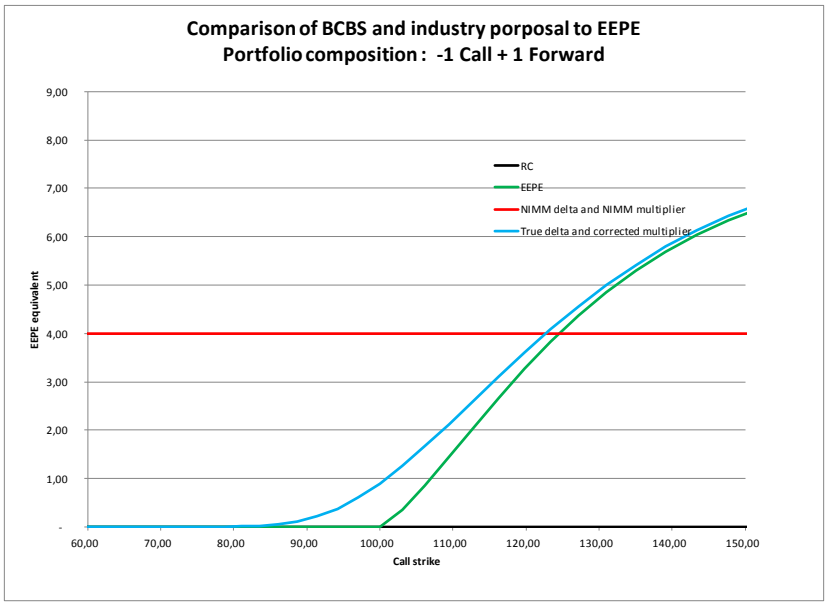
We can see that the proposed NIMM AddOn (red line) could differ from IMM computation (green line).

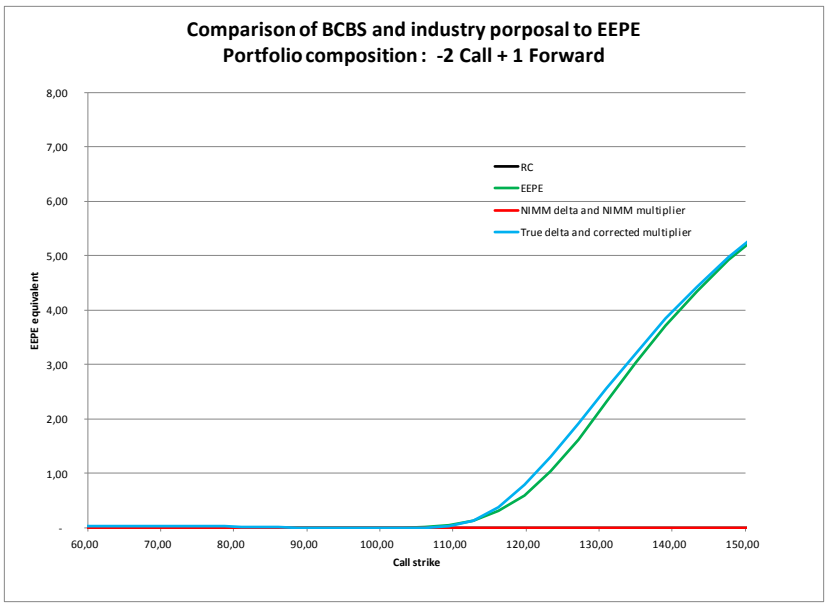
We observe cases of over estimation in particular due to the cap at 1 of the multiplier as discussed in preceding paragraph. This is the case for the left part of the graph for the forward and systematically the case for a long call position.

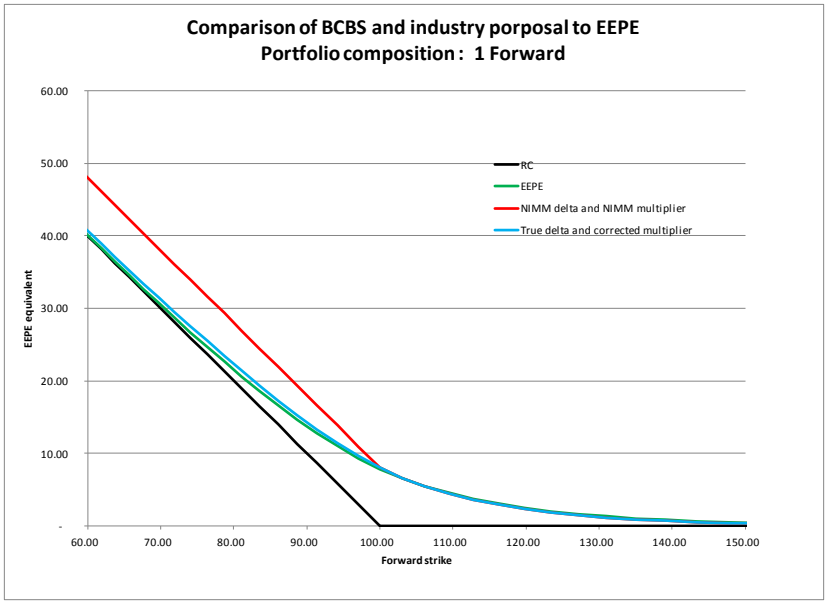
To correct this effect, we propose to use trades spot delta. Simply replacing the regulatory deltas by their true values in AddOn and multiplier formulas, all other terms being unchanged, lead to AddOns much closer to EEPE than NIMM ones (blue lines in the graphs).

Without margin calls

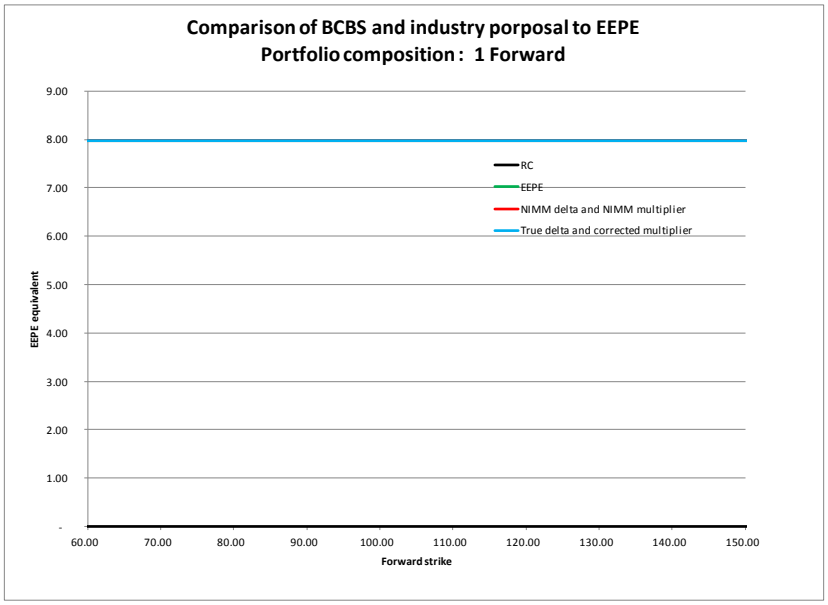


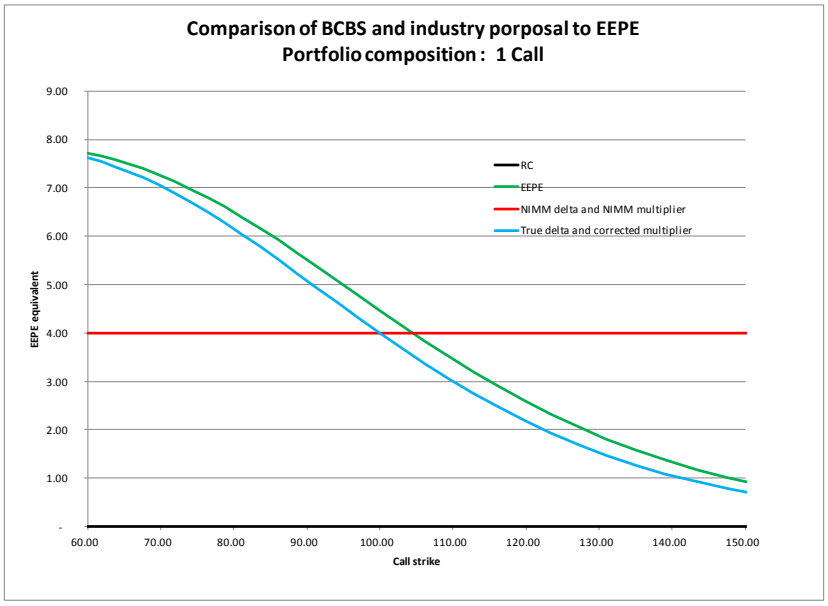


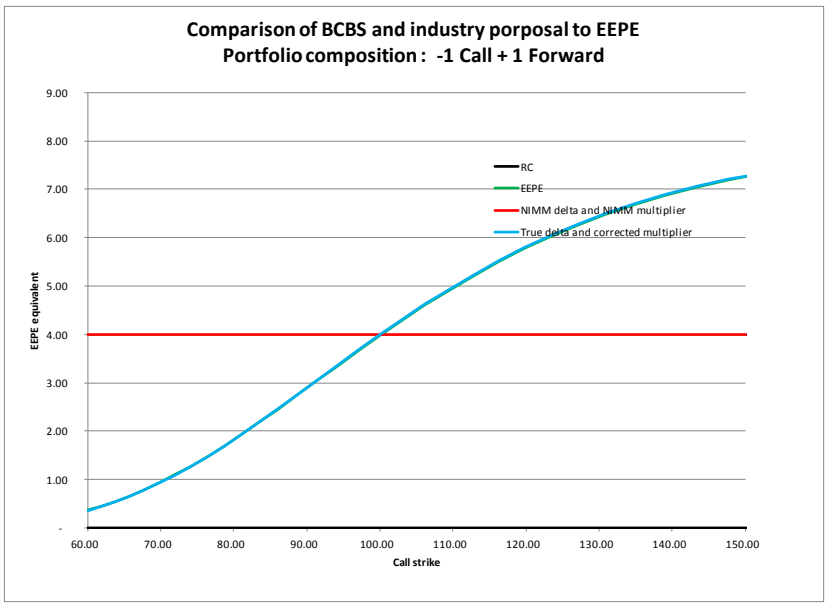

Comparison of BCBS and industry porposal to EEPE
Portfolio composition : -2 Call + 1 Forward
8,00
7,00
6,00
5,00
4,00
3,00
2,00
1,00
-
EEPE equivalent
60,00
70,00
80,00
90,00
100,00
110,00
120,00
130,00
140,00
150,00
Call strike
RC
EEPE
NIMM delta and NIMM multiplier
True delta and corrected multiplier

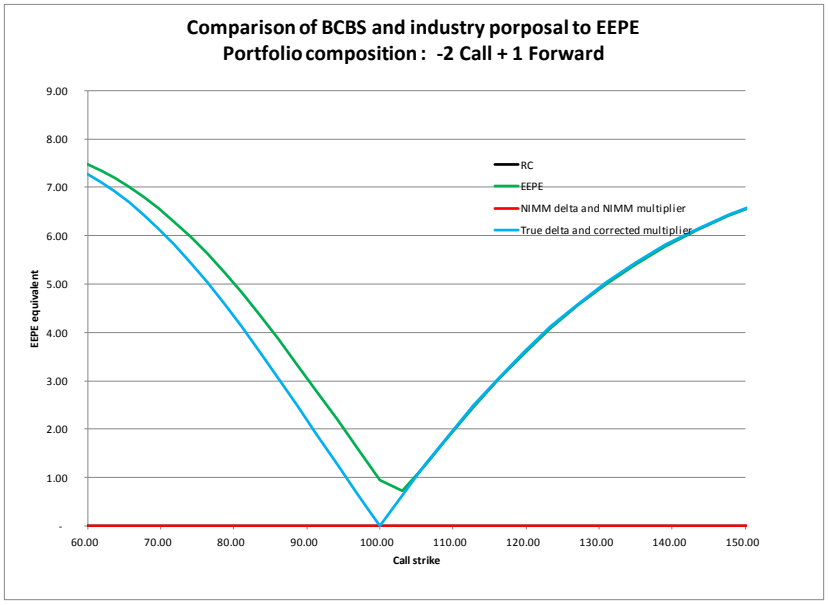

Comparison of BCBS and industry porposal to EEPE
Portfolio composition : 1 Forward
60.00
50.00
40.00
30.00
20.00
10.00
-
EEPE equivalent
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Forward strike
RC
EEPE
NIMM delta and NIMM multiplier
True delta and corrected multiplier

With margin calls






Comparison of BCBS and industry porposal to EEPE
Portfolio composition : -1 Call + 1 Forward
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
-
EEPE equivalent
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Call strike
RC
EEPE
NIMM delta and NIMM multiplier
True delta and corrected multiplier


Comparison of BCBS and industry porposal to EEPE
Portfolio composition : -2 Call + 1 Forward
9.00
8.00
7.00
6.00
5.00
4.00
3.00
2.00
1.00
-
EEPE equivalent
60.00
70.00
80.00
90.00
100.00
110.00
120.00
130.00
140.00
150.00
Call strike
RC
EEPE
NIMM delta and NIMM multiplier
True delta and corrected multiplier