JOHANNESBURG STOCK EXCHANGE
Equity Derivatives

Current Exposure Method for CCP's under Basel III

A discussion document by
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Exposure-at-default (EAD) is one of the most interesting and most difficult parameters to estimate in counterparty credit risk (CCR). Basel I offered only the non-internal Current Exposure Method (CEM) for estimating this quantity whilst Basel II further introduced the Standardized Method (SM) and an Internal Model Method (IMM). The Current Exposure Method relies on the Value at Risk (VaR) methodology and its characteristics are discussed in this short note [Tu 10].

1. Introduction

The proposed Basel III reforms seek to require banks to more appropriately capitalise their exposures to Central Counterparties (CCPs), including both trade and default fund exposures to CCPs[2].

The Basel II Framework[3] allows exposures to CCPs to be nil – and, as such, provides significantly reduced capital charges for banks. The G20 Leaders, at their Pittsburgh summit in September 2009, encouraged the Basel Committee, among others, to create incentives to use CCPs. The Committee has previously identified that the regulatory capital treatment for counterparty credit risk (CCR) was insufficient in a number of areas and that CCPs were not widely used to clear derivatives trades. With respect to CCPs, the Committee has been working to give effect to the creation of incentives for banks to increase the use of CCPs, while ensuring that the risk arising from banks' exposures to CCPs is adequately capitalised.

Where a bank acts as a clearing member of a CCP, either for its own purposes or as a financial intermediary between a client and a CCP, a risk weight of 2% must be applied to the clearing bank's trade exposure to the CCP in respect of OTC derivatives, exchange traded derivative transactions and Securities Financing Transactions (SFTs). The 2% risk weight for trade exposures also applies where the clearing member guarantees that the client will not suffer any loss due to changes in the value of its transactions in the event of a CCP default.

[1] A consultant to the JSE from Financial Chaos Theory (www.quantonline.co.za)
[2] http://www.bis.org/publ/bcbs206.pdf
[3] http://www.bis.org/publ/bcbs128.pdf

Basel III allows 3 methods in estimating the exposure of a bank to any counterparty: the Internal Model Method (IMM); the Standardised Method (SM) and the Current Exposure Method (CEM). However, Basel III only allows the CEM when estimating a bank's exposure to a CCP. This short note discusses the CEM and points to a possible discrepancy in the methodologies when excluding and including netting sets.

2. Default Fund Exposures

Default funds make CCPs safer from a systemic point of view, as they are used to mutualise losses when a CM defaults. In addition, default funds are frequently an important source of collateral that would be used to raise liquidity in the event of a participant default. Although CCPs have different waterfall structures to absorb and mutualise losses, the general order is the following:

a. posted collateral of the defaulted CM;
b. default fund contribution of the defaulted CM;
c. default fund contribution of the CCP; and
d. default fund contributions of non-defaulting CMs.

The fact that each CCP can set the level of its financial resources (margin and default funds) calls for a risk-sensitive approach that capitalises the default funds' exposure to each CCP according to the risk that the CM is facing[4].

To calculate the capital requirements for the default fund exposures, there are three steps:

Step 1 - Calculation of the "hypothetical capital" (KCCP)[5];
Step 2 - Calculation of aggregate capital requirements;
Step 3 - Allocation of aggregate capital requirements to individual clearing members.

This document only entails step 1.

3. Quantification of Risk

There is now some debate in relation to the quantification of risk and implementation. The risk weight, which is multiplied by the exposure to derive the capital charge, is that which applies to the counterparty under the Standardised Approach (SA) or Internal Ratings-Based Approach (IRB) for credit risk.

[4] See page 6 of http://www.bis.org/publ/bcbs206.pdf
[5] The rules require that CCPs use the Current Exposure Method (CEM) to perform this calculation, as this is the only simple approach that will ensure consistent and verifiable implementation.

However, banks are experienced with the current exposure method (CEM) calculation but may not have the necessary information; CCPs should have the necessary information but may not have the CEM experience and may have confidentiality restrictions preventing them from sharing data with members. Further, verification of such calculations will also be essential (e.g. bank supervisors will need to confirm that banks have correctly calculated their exposures to, and capital requirements in respect of, CCPs).

4. Exposure at Default

Counterparty credit risk is the risk that the counterparty to a financial contract will default prior to the expiration of the contract and will not make all the payments required by the contract. Exposure at default (EAD) is a parameter used in the calculation of economic capital or regulatory capital under Basel II and III for a banking institution. It can be defined as the gross exposure under a facility upon default of an obligor[6]. In general EAD can be seen as an estimation of the extent to which a bank may be exposed to a counterparty in the event of, and at the time of, that counterparty's default i.e., counterparty credit risk. EAD is equal to the current monetary amount outstanding in case of fixed exposures like term loans.

What will happen in practice is the following: If a counterparty in a derivative contract defaults, the CM must close out its position with the defaulting counterparty. To determine the loss arising from the counterparty's default, it is convenient to assume that the CM enters into a similar contract with another counterparty in order to maintain its market position. Since the CM's market position is unchanged after replacing the contract, the loss is determined by the contract's replacement cost at the time of default [ZP 07].

If the contract value is negative for the CM at the time of default, the CM

- closes out the position by paying the defaulting counterparty the market value[7] (also known as the mark-to-market) of the contract;
- enters into a similar contract with another counterparty and receives the market value of the contract; and
- has a net loss of zero.

If the contract value is positive for the bank at the time of default, the CM

- closes out the position, but receives nothing from the defaulting counterparty;

[6] http://en.wikipedia.org/wiki/Exposure_at_default

[7] Note that the *market value* or *mark-to-market* (MtM) is its current value, however, for an instrument that is margined on a daily basis (e.g., exchange traded derivatives) the MtM is the variation margin flow from the previous day to today.

- enters into a similar contract with another counterparty and pays the market value of the contract; and
- has a net loss equal to the contract's market value.

Thus, the credit exposure of a CM that has a single derivative contract with a counterparty is the maximum of the contract's market value and zero.

5. The Current Exposure Method

The Basel documentation states: "Banks who do not have approval to apply the internal models method may use the Current Exposure Method." The Current Exposure Method (CEM) is used in determining the Exposure at Default (EAD) for a portfolio of instruments. The EAD is then used in determining the hypothetical capital. How do we determine the EAD using the CEM?

Definition of Current Exposure: The current exposure is defined as the amount at risk should the counterparty default now and is normally assumed to be the *market value* also called the *mark-to-market* (MtM) value [LR 08].

Definition of CEM: An investor's total exposure, under the current exposure method, is equal to the replacement cost of all marked to market contracts currently in the money, plus the credit exposure risk of potential changes in future prices or volatility of the underlying asset[8].

Basel II states: "Under the Current Exposure Method, banks must calculate the current replacement cost by marking contracts to market, thus capturing the current exposure without any need for estimation, and then adding a factor (the "add-on") to reflect the potential future exposure over the remaining life of the contract." We can state this differently: the CEM relies on the VaR methodology, and it has two components: the Current Exposure (CE) which is the current mark-to-market (MtM) value and a Potential Future Exposure (PFE) that is the maximum amount of exposure expected to occur on a future date, with a high degree of statistical confidence[9] [Tu 10], [LR 08].

MtM defines what could be potentially lost today with respect to a specific counterparty – this is known with certainty (see footnote 4 above). The PFE is derived by multiplying the notional value of each contract with its Credit Conversion Factor (CCF). These factors are fixed and specified in the Basel II accord[10]. The CCF is dependent on the asset class and on the remaining maturity of the

[8] http://www.investopedia.com/terms/c/currentexposuremethod.asp#axzz1vs4QsvSI
[9] See section 2.2 of Le Roux for a discussion on how the PFE is estimated [LR 08].
[10] See paragraph 92(i) on page 274

contract. In contrast to Basel I, Basel II and III allow for collateral deduction in the CEM. However, note that non-cash collateral is subjected to a type-dependant haircut [Tu 10].

Mathematically, we state this as follows

$$EAD = (RC + add\_on) - C_A \tag{1}$$

where

- RC = the current replacement cost (mark-to-market or variation margin that has to be paid by CM)
- add_on = the amount for potential future exposure (PFE). This term will include netting if it is allowed
- C_A = the volatility adjusted collateral amount

We will now scrutinise equation (1) and implement it practically.

6. EAD without Netting[11]

The Basel II accord (paragraph 92(i) page 274) states the following:

> 92(i) Under the Current Exposure Method, banks must calculate the current replacement cost by marking contracts to market, thus capturing the current exposure without any need for estimation, and then adding a factor (the "add-on") to reflect the potential future exposure over the remaining life of the contract. It has been agreed that, in order to calculate the credit equivalent amount of these instruments under this current exposure method, a bank would sum:
>
> - The total replacement cost (obtained by "marking to market") of all its contracts with positive value; and
> - An amount for potential future credit exposure calculated on the basis of the total notional principal amount of its book, split by residual maturity as follows:

Stated differently: If counterparty credit risk is not mitigated in any way, the maximum loss that the CM can suffer, equals the sum of the contract-level credit exposures. This means we must determine the EAD for a particular CM by taking all the individual contracts that this CM clears, into account where netting or offsets are not allowed at all.

[11] Note that “netting” under Basel II is similar to the definition of “offset” for a portfolio of derivatives trades on the JSE i.e., for Class Spread Groups and Series Spread Groups as defined in the Safex Margining Technical Spec V3.03 found at http://www.jse.co.za/Markets/Equity-Derivatives-Market/Risk-management.aspx#Margin

Let's assume that the total portfolio of trades cleared by this CM consists of m instruments. Now, recall from section 3 that the credit exposure of a CM is the maximum of the contract's market value and zero. We are only interested in cash flows where the CM has to pay the variation margin (MtM) to another CM. We then define the CM's exposure at default as follows

$$EAD_{CM} = \sum_{i=1}^{m} \{\max[EAD_i, 0]\} \tag{2}$$

where

$$EAD_i = -\min[MtM_i, 0] + N_i f_i - I_i. \tag{3}$$

Equation (3) is the Exposure at Default for the i-th instrument in the portfolio. This is just equation (1) written in terms of Safcom data (extracted from Nuclears). In equation (3) we further define

- MtM_i = mark-to-market (variation margin) of the i-th instrument in the portfolio. Please note that the variation margin paid by a CM to Safcom, has a negative sign in the files obtained from Nuclears. We only take contracts into account where the CM pays margin to Safcom
- N_i = the notional value of the i-th instrument
- f_i= the *credit conversion factor* (CCF) as specified in the following table taken from page 274 paragraph 92(i) of the Basel II accord

	Interest Rates	FX and Gold	Equities	Precious Metals Except Gold	Other Commodities
One year or less	0.0%	1.0%	6.0%	7.0%	10.0%
Over one year to five years	0.5%	5.0%	8.0%	7.0%	12.0%
Over five years	1.5%	7.5%	10.0%	8.0%	15.0%

- I_i= initial margin (IMR) held against the i-th instrument (volatility based collateral C_A in equation (1)))
- m = the number of instruments in the portfolio under consideration

Note: $N_i f_i$ is the add_on mentioned in equation (1).

Note: when applying the CCF to interest rate derivatives like bond futures and bond index futures, one should use the maturity of the underlying cash bond as the tenor, e.g., for a 3 month R157 future, one should use the tenor of the R157 cash bond which is currently just over 3.25 years (maturity 15 Sep 2012). It will thus fall in the 1 – 5 year

segment and any future on the R186 bond falls in the “over 5 years” category (maturity 21 Dec 2026). For futures on bond indices, one should use the weighted average time to maturity (WATM) of all the bonds comprising the index. The Albi currently has a WATM of 10.56.

The first term on the left hand side of equation (3) is $\min[RC_i, 0]$. This implies, the only trades taken into account are those with a credit risk to the CM i.e., trades where the CM has to pay variation margin to the clearing house (Safcom in South Africa). However, when we add the add_on (the second term in equation (3)), we take all trades into account. In essence, this is a conservative view where we assume that all trades have the potential in moving against the CM over time.

Let’s look at a specific example taken from actual trades on 1 March 2011. This is set out in Table 1. These are all equity derivative instruments on the books of a particular CM.

By applying equations (2) and (3) we determine the EAD for this clearing member equal to R212,123.00 for these 20 instruments.

Variation Margin per Instrument / trade	Variation Margin PAID by CM	Notional Exposure Value	Expiry Time	Credit Conversion Factor	Basel Add-on	IMR per Trade	Total Exposure	Basel III Exposure
-33,083	33,083	2,311,485	0.79178	6.00%	138,689	1,151,275	-979,504	-
-501	501	45,351	0.04384	6.00%	2,721	5,582	-2,360	-
-50	50	61,555	0.04384	6.00%	3,693	7,753	-4,009	-
5,680	-	19,071	0.29041	6.00%	1,144	41,505	-40,361	-
23,310	-	4,321,650	0.04384	6.00%	259,299	334,916	-75,617	-
-3,040	3,040	271,290	0.04384	6.00%	16,277	31,011	-11,693	-
6,600	-	172,500	0.04384	6.00%	10,350	15,505	-5,155	-
-2,020	2,020	223,320	0.04384	6.00%	13,399	28,530	-13,111	-
-5,100	5,100	576,220	0.04384	6.00%	34,573	22,803	16,870	16,870
5,100	-	576,220	0.04384	6.00%	34,573	44,656	-10,082	-
-75	75	5,790	0.04384	6.00%	347	930	-508	-
-4,460	4,460	419,000	0.04384	6.00%	25,140	54,579	-24,979	-
-13,311	13,311	753,678	0.04384	6.00%	45,221	105,437	-46,905	-
-29,500	29,500	925,325	0.04384	6.00%	55,520	97,684	-12,664	-
4,004	-	241,644	0.04384	6.00%	14,499	45,152	-30,653	-
-1,830	1,830	188,250	0.04384	6.00%	11,295	26,049	-12,924	-
-237	237	163,955	0.04384	6.00%	9,837	16,126	-6,051	-
-6,112	6,112	3,857,597	0.29041	6.00%	231,456	42,315	195,253	195,253
46	-	34,001	0.04384	6.00%	2,040	4,342	-2,301	-
-63	63	24,369	0.04384	6.00%	1,462	3,535	-2,010	-
							EAD	212,123

Table 1: Calculating the EAD according to equation (2) and (3)

7. EAD Incorporating Netting

The exposure or EAD can be reduced greatly by means of netting agreements. A netting agreement is a legally binding contract between two counterparties that, in the event of default, allows aggregation of transactions between two counterparties – i.e., transactions with negative value can be used to offset the ones with positive value and only the net positive value represents credit exposure at the time of default [PZ 07]. In the South African derivatives world we talk about "offsetting." The portfolio scanning margining methodology used when trading derivatives on the JSE allows for offsetting as explained in the technical documentation on margining[12]. Offsetting is only allowed on a client basis and only for certain groups of instruments. Netting's scope can be wider if there are bilateral contracts in place between different clients or members of a particular CM.

Let's now incorporate netting according to the Basel II accord. Paragraph 96(iv) on page 275 of the accord states

> 96(iv). Credit exposure on bilaterally netted forward transactions will be calculated as the sum of the net mark-to-market replacement cost, if positive, plus an add-on based on the notional underlying principal. The add-on for netted transactions (A_{Net}) will equal the weighted average of the gross add-on (A_{Gross})[251] and the gross add-on adjusted by the ratio of net current replacement cost to gross current replacement cost (NGR). This is expressed through the following formula:
>
> $$A_{Net}=0.4*A_{Gross}+0.6*NGR*A_{Gross}$$
>
> where :
>
> NGR=level of net replacement cost/level of gross replaceent cost for transactions subject to legally enforceable netting agreements[252]
>
> [251] A_{Gross} equals the sum of individual add-on amounts (calculated by multiplying the notional principal amount by the appropriate add-on factors set out in paragraph 92(i) of this Annex) of all transactions subject to legally enforceable netting agreements with one counterparty.

The equation above (giving the add-on or PFE) has since been amended to read

$$A_{net} = add\_on = ((1-\rho) + \rho * NGR) * A_{Gross}. \quad (4)$$

where

[12] http://www.jse.co.za/Markets/Equity-Derivatives-Market/Margining-methodology.aspx

- A_{Gross} = the sum of all individual add_on amounts (calculated by multiplying the notional principle amount by the appropriate factors as set out in Paragraph 96(iv) on page 275 of the Basel II accord – see equation (1))
- NGR = the level of net replacement cost divided by the gross replacement cost
- ρ = the correlation factor determining the amount of offset available.

The following holds for ρ:

$$0 \leq \rho \leq 1.$$

We currently have $\rho = 0.85$ as set out in the newest document. NGR determines the ratio of long contracts to short contracts. Thus, the total credit exposure created by all transactions in a netting set (i.e., those under the jurisdiction of the netting agreement) is reduced to the maximum of the net portfolio value and zero such that

$$EAD_{netset} = \max[EAD_{Net}, 0] \tag{5}$$

where

$$EAD_{Net} = RC_{Net} + A_{Net} - C_{Net}. \tag{6}$$

We now have

$$RC_{Net} = -\sum_{i=1}^{m} \min(0, MtM_i) \tag{7}$$

and the complement of RC_{Net} is

$$RC'_{Net} = \sum_{i=1}^{m} \max(0, MtM_i) \tag{8}$$

where MtM_i is the mark-to-market (variation margin) for the i-th instrument in the netting set. RC_{Net} is the net replacement cost or the total variation margin paid by the CM. If the CM receives variation margin $RC_{Net} = 0$. Furthermore we have

$$C_{Net} = \sum_{i=1}^{m} I_i + max\left[0, \sum_{i=1}^{m} MtM_i\right] \tag{9}$$

with I_i the initial margin (IMR) or collateral held against the i-th instrument. The second term is the positive cash flow (variation margin) a CM receives from the mark-to-market of this instrument.

A_{Net} is given in equation (4). From this we define

$$A_{Gross} = \sum_{i=1}^{m} N_i f_i \tag{10}$$

where (see description below equation (3))

- N_i = the notional value of the i-th instrument
- f_i= the credit conversion factor as specified in the following table on page 274 paragraph 92(i) of the Basel II accord

NGR is defined to be the ratio of net replacement cost to gross replacement cost of transactions subject to the netting agreement. In other words, it is the net Mark-to-Market divided by the gross Mark-to-Market value of the transactions or the *full netted position* divided by *position under no netting.* Let's define the total variation margin either paid or receives as follows

$$MtM_T = \sum_{i=1}^{m} MtM_i. \tag{11}$$

MtM_T can be positive or negative. The following holds

$$MtM_T < 0 \; then \; CM \; pays \; variation \; margin \; away$$
$$MtM_T \geq 0 \; then \; CM \; receives \; variation \; margin$$

We now define NGR as follows (using equations (8), (9) and (11)),

$$NGR = \frac{ABS(MtM_T)}{-\sum_{i=1}^{m}\{min[0, MtM_i]\} + \sum_{i=1}^{m}\{max[0, MtM_i]\}} = \frac{|MtM_T|}{RC_{Net} + RC'_{Net}} \tag{12}$$

In essence it is the percentage of longs to shorts in a portfolio or percentage of variation margin paid to Safcom versus the total gross variation margin cash flow. It is a measure of the amount of offset (or netting) allowed in a particular netting set. As an example, let's assume that $NGR = 40\%$. From equation (3) we then have $(0.15 + 0.85 * 40\%) = 49\%$ and an offset of 49% will be allowed.

Let's look at an example where we use the same data shown in Table 1. We now assume we can net across all 20 instruments in this portfolio. The results are given in Table 2.

8. Basel Netting versus Safcom Offsets

Netting should be implemented in a similar way to the offsets that are currently achieved through the JSE's portfolio margining system. This means we need to go down to client level and netting will only be allowed per client, and only for the groups of instruments as defined by the JSE. In practice this means a client's trades will only be netted if those instruments are allowed to have offset margins in the margining system e.g., calendar spreads can be netted and a EURZAR contract can be netted against a USDZAR contract. However, there is no netting between a USDZAR and an ALSI contract or between most single name futures.

BASEL III Exposure incorporating NETTING	
RC (Variation Margin Paid OUT)	**54,641**
Net Replacement Cost	54,641
Gross Replacement Cost	144,121
NGR	**37.91%**
A_gross	911,536
A_net (Add-On)	**430,486**
RC + Add-On	570,019
Variation Margin Received	**-**
Initial Margin on Deposit	**2,079,684**
C_net (total collateral)	**2,079,684**
RC + Add-On - Collateral	**-1,509,665**
EAD_netset	**0**

Table 2: Calculating the EAD by netting across instruments

Table 2 shows the EAD for this set of instruments is equal to zero. Netting can thus reduce the EAD substantially.

If there are p netting sets in the total portfolio for a particular CM, the total EAD for this CM is given by

$$EAD_{CM} = \sum_{i=1}^{p} EAD_i \tag{13}$$

with EAD_i given in equation (5) being the EAD for a particular netting set i – group of instruments for a particular client. Further we need the total PFE or add-on for a particular CM defined by

$$A_{CM} = \sum_{i=1}^{p} A_{Net}^{i} \tag{14}$$

where A_{Net}^{i} is given in equation (4) being the add-on for netting set i.

9. Discrepancy between Methodologies

The way the Basel accord prescribes the CEM has a discrepancy. There is no continuous mapping in going from excluding netting to a netting methodology – going from estimating the EAD as described in section 5 to the methodology set out in section 6. This is explained through the following data set. Table 3 lists 20 trades done on 1 March 2012. If we exclude any netting, and use equations (2) and (3) we estimate the EAD = R27,253,882.

If we allow netting across all 20 trades we estimate the EAD to be zero by applying equation (5) – see Table 4. However, if we use the methodology described in section 6, but we set NGR=100% (i.e., we exclude any netting), we estimate the EAD = R22,711,516 (see Table 5). This is far from zero.

Variation Margin per Instrument/trade	Variation Margin PAID by CM	Notional Exposure Value	Expiry Time	Credit Conversion Factor	Basel Add-on	IMR per Trade	Total Exposure	Basel III Exposure
1,250	-	861,250	0.21918	10.00%	86,125	37,500	48,625	48,625
-137,950	137,950	21,394,500	0.21918	10.00%	2,139,450	969,000	1,308,400	1,308,400
-13,500	13,500	2,143,000	0.38630	10.00%	214,300	95,000	132,800	132,800
198,791	-	32,857,000	0.21918	10.00%	3,285,700	1,236,000	2,049,700	2,049,700
4,800	-	1,129,800	0.38630	10.00%	112,980	42,000	70,980	70,980
-500	500	153,000	0.80548	10.00%	15,300	6,000	9,800	9,800
783,020	-	163,151,100	0.38630	10.00%	16,315,110	9,643,813	6,671,298	6,671,298
2,100	-	3,399,900	0.21918	10.00%	339,990	205,188	134,803	134,803
1,822,600	-	155,903,200	0.38630	10.00%	15,590,320	8,348,366	7,241,954	7,241,954
-95,800	95,800	10,974,600	0.05753	10.00%	1,097,460	610,634	582,626	582,626
-2,301,000	2,301,000	181,071,000	0.33425	10.00%	18,107,100	14,754,075	5,654,025	5,654,025
-2,000	2,000	3,660,000	0.50411	10.00%	366,000	333,425	34,575	34,575
-3,200	3,200	661,200	0.38630	10.00%	66,120	68,212	1,108	1,108
83,795	-	2,095,503	0.55890	10.00%	209,550	1,756,455	-1,546,905	-
4,880	-	2,903,551	0.38630	10.00%	290,355	669	289,686	289,686
-41,250	41,250	1,977,250	0.05753	10.00%	197,725	83,866	155,109	155,109
-52,000	52,000	35,828,000	0.21918	10.00%	3,582,800	1,585,824	2,048,976	2,048,976
125	-	436,375	0.38630	10.00%	43,638	19,060	24,577	24,577
-20,300	20,300	419,500	0.21918	10.00%	41,950	19,000	43,250	43,250
94,100	-	13,500,900	0.38630	10.00%	1,350,090	598,500	751,590	751,590
								27,253,882

Table 3: Calculating the EAD according to equation (2) and (3) for a portfolio of commodity derivatives.

BASEL III Exposure incorporating NETTING	
RC (Variation Margin Paid OUT)	**0**
Net Replacement Cost	2,667,500.02
Gross Replacement Cost	5,662,961.02
Incorporate NETTING	YES
NGR	**47.10%**
A_gross	63,452,062.88
A_net (Add-On)	**39,957,688.59**
RC + Add-On	39,957,688.59
Variation Margin Received	**327,960.98**
Initial Margin on Deposit	**40,412,586.14**
C_net (total collateral)	**40,740,547.12**
RC + Add-On - Collateral	**-782,858.53**
EAD_netset	**0**

Table 4: Calculating the EAD by netting across instruments

BASEL III Exposure incorporating NETTING	
RC (Variation Margin Paid OUT)	**0**
Net Replacement Cost	2,667,500.02
Gross Replacement Cost	5,662,961.02
Incorporate NETTING	NO
NGR	**100.00%**
A_gross	63,452,062.88
A_net (Add-On)	**63,452,062.88**
RC + Add-On	63,452,062.88
Variation Margin Received	**327,960.98**
Initial Margin on Deposit	**40,412,586.14**
C_net (total collateral)	**40,740,547.12**
RC + Add-On - Collateral	**22,711,515.76**
EAD_netset	**22,711,515.76**

Table 5: Calculating the EAD by excluding netting

10. Conclusion

In this short note we discussed the current exposure method as set out in the Basel II and III accords. We explained the CEM when we exclude and include netting. Also emphasised were the similarities between the JSE's definition of "offset margins" and "netting sets." We further highlighted a discrepancy between the methodologies when we incorporate and exclude netting across instruments as defined in the Basel accord.

11. References

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