Appendix A

Counterparty Risk Treatment of OTC Derivatives and Securities Financing Transactions

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ISDA – TBMA - LIBA

Introduction and background :

ISDA advocated the adoption of a new regulatory measure of future exposure (expected positive exposure-EPE) for OTC derivatives[1] in its response to the Committee's second consultation paper on the Capital Accord reform, dated May 2001[2]. Active dialogue followed with the Models Task Force (MTF), in the course of which ISDA provided further information on the treatment of wrong way risk and EPE validation[3]. We also agreed to conduct a Counterparty Risk Survey aiming at assessing the use of EPE in firms' internal economic capital models.

We were pleased to see that the Federal Reserve Board[4] had taken an interest in the theoretical parts of our 2001 proposal and sought to analyse the impact of relaxing the key assumptions we had made, in particular the appropriateness of postulating weak independence of exposures between counterparties. ISDA has undertaken additional research on the effect of granularity and exposure correlation on capital.

The purpose of the following document is to update the MTF on work conducted in the ISDA Counterparty Risk Working Group (CRWG) over the past eighteen months, including the research and Counterparty Risk Survey mentioned above.

We have organised the paper around six themes, most of which are raised in the FRB research paper :

I- Industry counterparty exposure measurement practice
II- Wrong way exposure
III- The effect of granularity and exposure correlation on capital
IV- Time horizon and maturity
V- Treatment of collateralised OTC derivatives and securities financing transactions
VI- Validation of EPE-based measures of future exposure

We understand that the MTF intends to review the capital treatment of counterparty risk soon after the adoption of the New Accord, with a view to implementing any necessary changes at the same time as the Accord itself. ISDA strongly supports this stance, and hopes that the information contained in this paper will assist the Task Force in achieving its objective.

We furthermore wish to reiterate our belief that the counterparty risk treatment of OTC derivatives cannot be reviewed in isolation, and certainly not without considering possible linkages with the treatment of securities financing transactions (such as repo and securities lending transactions). Like many OTC derivative transactions, repo and securities lending transactions involve the transfer of collateral,

[1] ISDA deliberately excluded credit derivatives from the scope of its 2001 proposal. Credit derivatives were studied separately and ISDA proposed a new set of credit default swap add-ons at Annex 5 of its commentary on the QIS3 Technical Guidance, dated December 20, 2002 –www.isda.org.
[2] ISDA's response to CP2, May 2001 –www.isda.org
[3] Letter to Daniele Nouy, dated August 7, 2001 –www.isda.org
Letter to Richard Gresser, dated September 7, 2001 –www.isda.org
[4] Regulatory capital for counterparty credit risk : A response to ISDA's proposal, by Michael S. Gibson, Federal Reserve Board

and are utilized by market participants for many of the same purposes, in particular to manage risk. As such, transactions are increasingly managed together with OTC derivatives, including under cross product netting arrangements, and should hence be subject to the same review process by the Basel Committee. The London Investment Banking Association and The Bond Market Association, who both endorse this paper, strongly support this view.

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I - Industry counterparty exposure measurement practice

ISDA, TBMA and LIBA have conducted a Counterparty Risk Survey aiming at assessing firms' internal practices with respect to (i) counterparty risk measurement; (ii) OTC derivatives' collateralisation and (iii) the degree of exposure correlation between counterparties. The contents of this survey had been discussed and agreed with the Models Task Force before its publication. Our findings are appended at Annex 1, but key messages are highlighted below (Questions 1 and 2) :

1- **A majority of respondents use EPE, or EPE based measures of future exposure in order to calculate economic capital.** Some advanced firms use a full joint simulation of market and credit risk factors; this advanced approach does not explicitly require an intermediate measure of exposure or Loan Equivalent Exposure (LEE) but is conceptually consistent with the use of EPE.
2- Clearly, the survey only provides a snapshot of industry practices in 2002. ISDA would be pleased to regularly update it should the Models Task Force find it helpful.
3- On average **33% of the respondents' exposure is collateralised, on an upward trend from previous years**. The range of collateral used has broadened, to include investment grade corporate bonds in addition to the more traditional cash/government bonds. It is expected that recognition of a wider range of collateral assets in the New Capital Accord will facilitate the diversification of collateral sources.

II - Wrong way exposure

ISDA acknowledges the existence of wrong way risk. We had proposed, in a letter to the Models Task Force dated September 7, 2001, to distinguish between two forms of such risk : **specific** wrong way risk, arising for certain types of transactions, which banks occasionally enter into while prudently measuring the transaction's potential exposure; for instance those collateralised by own or related party shares; and **general** wrong way risk, where the credit quality of the counterparty may be correlated with a macro-economic factor impacting on the value of the derivative portfolio itself.
Well managed banks are equipped to identify specific wrong way risk and use worst case exposure value in economic capital calculations for the positions concerned. ISDA would not recommend using expected exposure values where this type of risk is manifest.
We would however contend that general wrong way risk should be assessed via scenario analysis, not under Pillar 1 capital requirements, unless sufficient evidence of such correlation in particular markets is available. ISDA questions the assertion on page 2 of the FRB research piece, according to which "… exposure and default will typically be correlated". We would like to know which empirical data have been used to demonstrate the existence of such correlation.

III - The effect of granularity and exposure correlation on capital

The CRWG's proposals on Expected Positive Exposure make two key assumptions about the portfolio, namely:

- Infinite granularity;
- Negligible pairwise correlation between counterparty exposures.

When these assumptions are valid, EPE is an appropriate measure of counterparty risk consistent with IRB concepts, but in a real portfolio, finite granularity and the tendency of positions to have non zero pairwise correlations, even if these average to zero, create more risk and mean that the pure calculations of the original proposal will understate risk to some extent.

To quantify understatement and facilitate discussion, the CRWG adopted the symbol α for the ratio A/ B where:

- A: = 99.9% loss with correlated market positions and stochastic exposures.
- B: = 99.9% loss for a corresponding portfolio with fixed exposures equal to EPE (see Annex 2 for detail on this definition, proposed by Evan Picoult, Citigroup).

Members of the CRWG have worked on quantifying α for realistic portfolios, using simulation (see Annex 3 for full details) and – with similar results - using an analytic technique (see Annex 4). Independently, analysis by Michael Gibson (FRB) in response to the CRWG proposal, sheds light on the analytic nature of these risks and of α.

Work performed by the CRWG

Simulations

In a memo to the CRWG, Evan Picoult (Citigroup) suggested quantifying any understatement of risk due to missing correlation and granularity. Eduardo Canabarro (Goldman Sachs) undertook the proposed work performing simulations under a variety of scenarios, using a finite portfolio and allowing correlations between market positions to be non zero. Results are presented in terms of α defined above, and are repeated in full at Annex 3.

Eduardo's results indicated the degree to which understatement of risk occurs when using EPE in a finite portfolio (N = 200 names) and in the presence of correlation between exposures caused by dispersion of correlation between market positions.

The central value obtained for α in the simulation is **1.09**, for a portfolio representative of a large dealer's.

Theoretical results

Thereafter, by applying a variant of the granularity adjustment method[5] in connection with the IRB approach, Tom Wilde (CSFB) performed analytic calculations for α, obtaining good agreement to the simulation results. These results are presented at Annex 4.

Counterparty Risk Survey (Question 3)

The simulations and theoretical results naturally assume a particular structure of market risk correlations in the test portfolio; essentially, pairwise correlations are assumed to be distributed in the random fashion that would result from random positions being taken in a small number of underlying random variables, where that number of variables is much less than the number of counterparties in the portfolio.

There is insufficient direct evidence to calibrate the effective number of market factors or equivalently, the variability of pairwise correlations in typical portfolios, and accordingly ISDA has presented simulations for a range of possible values for the number of market variables underlying the portfolio.

However, the Counterparty Risk Survey provides strong evidence that correlations within banks' derivative portfolios do, in general, assume the form expected, namely a wide scattering around an average of zero with positive and negative correlations equally likely.

Work at the Federal Reserve Board

Michael Gibson at the Federal Reserve has provided an extensive review and analysis of ISDA's original proposals. His review includes theoretical calculations which can be used to assess understatement U of risk arising from using EPE. Moreover, Michael Gibson's U parameter and ISDA's α have the simple relation $\alpha = 1 + U$ and

[5] The granularity adjustment method in its original context is described in Michael Gordy "A risk factor model foundation for ratings based capital rules", Federal Reserve Board, October 2002.

so are amenable to direct comparison. ISDA has performed this comparison, as detailed in Annex 4 and summarised here.

Comparison of the approaches

ISDA's key conclusions on our work and its relation to Michael Gibson's analysis are as follows:

- The conceptual approaches in Gibson and ISDA's work are the same, as explained in detail in Annex 4. There is agreement as to the nature of the additional risks and the correct means of quantifying them. Accordingly, ISDA believes there is full agreement on the technical issues involved.
- The key practical difference is that Gibson's results concentrate on correlation, while ISDA's results incorporate additional risk due both to correlation and to finiteness of the portfolio.
- Gibson does not give actual values for understatement *U,* although these can be provided based on his approach. Then we find that ISDA's values for α or equivalently for *U*, are larger than those obtained using Gibson's formulae i.e. suggest slightly higher levels of capital may be needed. This is due to the additional concentration risk in a finite portfolio.

Conclusions – capital needed for extra risks

Based on this work by CRWG members and by the Federal Reserve, and the evidence of the ISDA Counterparty Risk Survey, we can conclude that :

- The type of market value correlation structure typical in a bank portfolio is a wide dispersion of pairwise correlations, having a mean of approximately zero.
- In a finite portfolio with this correlation structure, there is general agreement that capital based on EPE alone is not adequate to cover all risks.
- Work by the various parties suggests that, subject to other considerations, a value for α, of not more than about 120 % should suffice to cover these risks, and so be applied to EPE to generate a viable capital calculation in the absence of other effects leading to the increase of correlation between exposures or between systemic default events and exposure, e.g. wrong way risk.
- Some firms have performed alpha calculations taking into account not just default risk but also the impact of valuation changes due to credit migration, and have reported results that still fall within the conservative 120% value proposed here.

IV – Time horizon and maturity

ISDA proposes to address below some of the issues raised in the paper prepared by Michael Gibson.

Maturity

It is important to note, as emphasized in Michael Gibson's paper, that the maturity of a derivative impacts on its EPE : the longer the maturity, the larger the market risk volatility underpinning the EPE calculation.

The question of whether or not a maturity adjustment should apply on OTC derivative contracts is distinct however. Maturity theoretically impacts on the value of an OTC derivative, as the credit quality of each counterparty (discount spread) is influenced by maturity. However, research on swap contracts has shown that a change in the credit quality of one of the parties has virtually no impact on the swap rate. Market practice supports this finding: swap dealers tend to ignore credit quality where quoting swap rates. The insensitivity of swap rates to credit ratings may be attributed to the nature of the swap, which can be alternatively an asset or a liability to either counterparty. This is also true in the case of repos. In the light of the above, ISDA would caution against applying a maturity adjustment in the calculation of OTC derivative or repo counterparty risk charges.

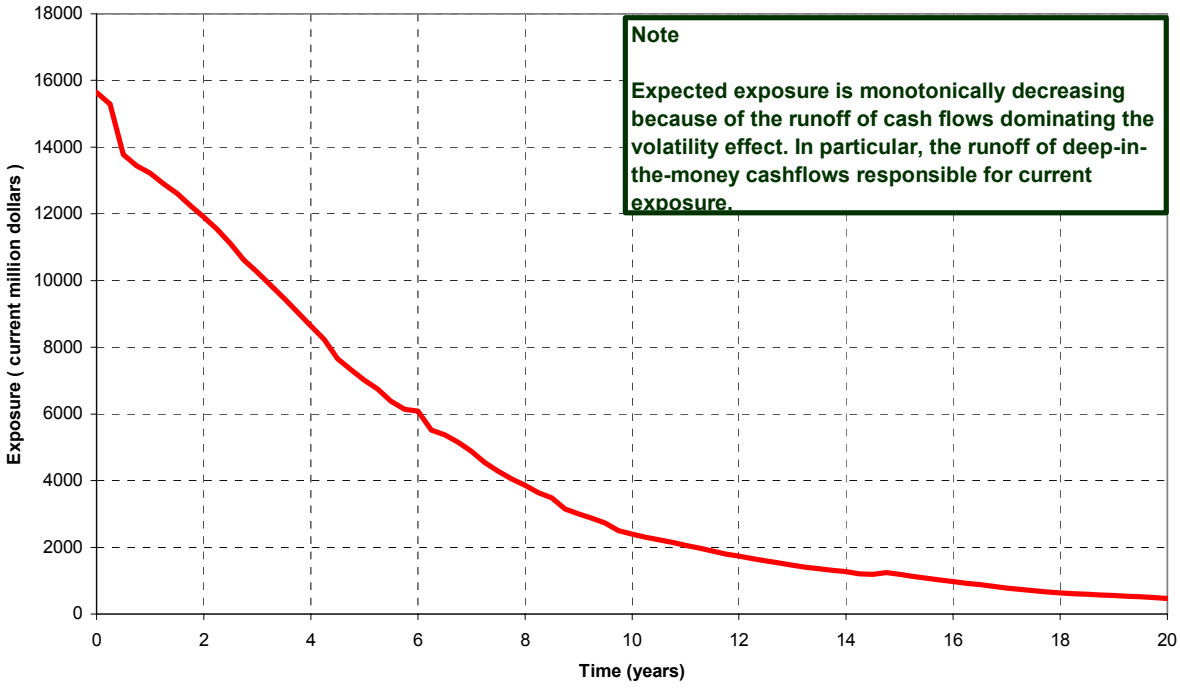
Time horizon

The time horizon retained under the New Accord for calculating credit risk capital requirements is one year, and ISDA sees little rationale for applying a different one for OTC derivatives.

We recognise that one key difference between exposure on loans and exposure on derivatives is that the latter can increase beyond the chosen time horizon, while the former usually decreases (setting aside the case of lines of credit). We acknowledge that this might be a source of concern for the Committee and have sought to identify a solution below.

Importantly, we would strongly argue against assigning maturity adjustments by derivative type. What is relevant in the context of counterparty risk is the global shape of a firm's exposure to each of its counterparties. This tends to be fairly standardised, and concentrated at the short dated end of the spectrum.

Typical Expected Exposure Profile of a Large Derivatives Dealer to ALL Counterparties



As shown in the graph above, EPE one year generally stands consistently above longer measures of EPE, due to the monotonically decreasing shape assumed by the curve. In the light of this, and bearing in mind the need for implementing simple regulatory rules, ISDA would recommend using one year EPE in the counterparty risk calculation.

V - Treatment of collateralised OTC derivatives and securities financing transactions

Collateralised derivatives

1) EPE x α is a suitable measure of exposure for collateralised derivatives where the bank's internal model is fine enough to reflect the details of the collateral agreement in the EPE value. EPE should in this case be calculated using a shorter horizon than for unsecured exposures, typically 10 days for derivatives. The exposure profile under a margin agreement would be defined as the potential exposure over the margin period of risk (10 days), calculated each day over the regulatory modelling horizon of one year, and averaged. EPE will reflect changes in both the value of the OTC derivative portfolio and that of the collateral posted.

ISDA notes that in a real portfolio there will be a mixture of secured and unsecured exposures, and that in this situation, additional risk will arise if instead of netting out to zero, the positions with unsecured counterparties tend to be aligned, each tending to be offset against a margined position. This might be the case where for instance interbank exposures are margined and corporate exposures are not, or if a dealer predominantly paid fixed in interest –rate swaps with customers (unmargined) and hedged its market risk by receiving floating in offsetting swaps with other dealers (margined). In that case, the exposures to counterparties would be concentrated in scenarios where interest rates go up. A simulation of the impact on alpha values of blending margined and unmargined transactions in a portfolio was undertaken in Annex 3, which shows that alpha is mildly impacted by this source of heterogeneity, increasing from 1.09 for our base case, to 1.33 in the extreme case that all unmargined counterparties take the same directional positions (for a more precise explanation of this scenario, see Annex 3).

The firms who have calculated alpha for their own portfolios, where both collateralised and uncollateralised exposures are found, obtain values close to 1.09, i.e. the central value produced in the simulation described in part III above for unsecured exposures.

	Alpha
Base case	*1.09*
Firm 1	1.08
Firm 2	1.1
Firm 3	1.07
Firm 4	1.07

ISDA would therefore conclude that the same alpha factor can be used for both collateralised and uncollateralised portfolios of derivative exposures.

EPE for portfolios mixing collateralised and uncollateralised exposures is simply the sum of EPE collateralised and EPE uncollateralised.

2) Where the firms' EPE does not reflect every detail of the collateral agreement and as a result overestimates the impact of collateral taking, ISDA agrees, as proposed by Michael Gibson, that a reasonable means of rendering the EPE measure more conservative would simply consist in lengthening the margin period of risk. The specific risk period retained by the firm should be subject to supervisory approval.

Securities financing transactions

Securities financing transactions (SFTs), such as repo and securities lending transactions, are collateralised transactions, with a liquidation period broadly equal to 5 days (though often shorter, in some instances equalling one to three days). The same reasoning developed above in the case of collateralised derivatives is therefore applicable, leading to the identical conclusion that applying an alpha value of 1.09 to SFTs is reasonable.

VI - Validation of EPE-based measures of future exposure

Because of the horizon used for calculating EPE (one year for unsecured exposures), it is difficult to conceive of a methodology that could be used to backtest estimates of EPE against observed exposures. The difficulty encountered in this regard is of a nature similar to that found by regulators seeking to validate exposure at default (EAD) estimates used by banks under the Advanced Internal Ratings Based Approach. Because EADs are estimated over a long period, it is impossible to apply a formal backtest. The models used to derive them can however be validated via the use of statistical techniques (statistical tests on regression models for example). A very similar approach, relying on model validation, should be used for EPE.

One further consideration worth bearing in mind is the fact that, from a counterparty risk perspective, regulators should be focusing not on exposure generally speaking, but on exposure in default of the counterparty. It is possible for firms to compare exposure in default with EPE estimated for the defaulted exposure, but the small number of OTC derivatives or securities financing transactions defaults means that little significance will be derived from these tests. Here, a parallel can be drawn with the validation of probabilities of default (PDs) and loss given default (LGD) estimates for highly rated counterparties under IRB. No test is available for firms to validate PD and LGD estimates for AAA rated exposures.

In view of the above, ISDA would recommend relying on model validation (validating the model itself and the parameters used) and stress-testing instead of backtesting.