



BASEL COMMITTEE ON BANKING SUPERVISION

BANK FOR INTERNATIONAL SETTLEMENTS

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Dear Emmanuelle,

As the temporary coordinator of the Credit Risk Mitigation Subgroup of the Basel Capital Group, I am sending this letter to update you on the Subgroup's progress on the treatment of collateralised transactions. The comments of your group have been helpful in advancing our work in this area, and we wish to continue the informal process of soliciting your views and insights, particularly with regard to repo-style transactions. The development of our thinking on several aspects of collateralised transactions is described below. We would appreciate your views on these issues, particularly with regard to ways to address supervisory concerns related to use of a VaR-based measure for counterparty credit risk exposure.

Simplification of the Formula for Collateralised Transactions

The Subgroup has been working to simplify the proposed formula for collateralised transactions and make it more intuitive. Conceptually, the reformulation attempts to convey that the credit risk a bank is exposed to in the event of a counterparty default arises from the potential during the liquidation period for the value of the exposure to increase or for the value of the collateral to decrease, or both. Credit risk exposure thus would be calculated as the difference between the exposure—grossed up, where appropriate, by a haircut reflecting volatility in the market price of the exposure over the holding period—and the collateral, reduced by a haircut reflecting volatility in its market price.

The formula for the calculation of the exposure amount after taking into account the risk mitigation of the collateral would be as follows:

$$E^* = \max \{0, [E \times (1 + H_E) - C \times (1 - H_C - H_{FX})]\}$$

Where:

- E* = the exposure value after risk mitigation
- E = current value of the exposure
- C = the current value of the collateral received
- H_E = haircut appropriate to the exposure

H_C = haircut appropriate to the collateral
 H_{FX} = haircut appropriate for currency mismatch between the collateral and the exposure

To determine the risk-weighted amount for the transaction, E^* would be multiplied by the risk weight appropriate to the counterparty.

Using the same variables, this formula can be restated in a manner that offers an alternative way to view the amount of credit risk exposure in the event of counterparty default. That is, it can be viewed as the sum of the current exposure on the transaction plus an add-on for the potential increase in that exposure over the holding period. This can be expressed as:

$$E^* = \max \{0, [(E-C) + (E \times H_E) + (C \times H_C) + (C \times H_{FX})]\}$$

The above formulations would appear to be best suited to secured exposures that are most appropriately measured on a transaction by transaction basis such as a loan to a company or an individual secured by cash or securities. In such transactions, it is likely that the settlement currency is that of the exposure. Accordingly, applying the haircut for foreign currency mismatch to the collateral is an appropriate simplification. The CRM Subgroup also believes that these formulations are suitable for determining the amount of credit risk exposure a bank has on derivative transactions that are collateralised by the counterparty. In that case, E would equal the credit equivalent amount of the derivative transactions (after taking into account netting effects) and no haircut would be applied.

Repo-Style Transactions and Holding Periods

The CRM Subgroup recognises that the above restyling of the basic formula for collateralised transactions does not fully respond to industry comments with regard to repo-style transactions, defined to include repurchase and reverse repurchase agreements and securities lending and borrowing. Upon further reflection of the issues raised, it has been agreed that repo-style transactions have certain characteristics such as long-established standardised documentation and legal enforceability and prudent industry practices that warrant special consideration. For example, widespread industry practices appear to support the assertion that, upon a borrower default event, banks do in fact promptly liquidate collateral. For this reason, the Subgroup has determined that where repo-style transactions are subject to daily mark-to-market and daily remargining, a holding period of five days rather than ten days may be used. (Institutions using the standard supervisory haircuts, which are based on a ten-day holding period assumption, would be able to scale down to five days using the square root of time.) The CRM Subgroup is not prepared at this time to support a shorter liquidation period for other collateralised transactions.

Master Netting Agreements for Repo-Style Transactions

The CRM Subgroup has also given considerable thought as to whether and how to treat repo-style transactions subject to master netting agreements. In this regard, neither the second consultative paper of January 2001 (CP2) nor the above formulations address the situation where a portfolio of collateralised transactions to a single counterparty is subject to a master netting agreement. In principle, master netting agreements have salutary risk-reducing effects, which should be reflected in the capital requirements. As a result of the CRM Subgroup's deliberations, it has been agreed that applying a transaction-by-transaction capital charge to a portfolio of repo-style transactions with a single counterparty that is covered by a robust, legally enforceable master netting agreement would be inconsistent with this principle.

The formulation the Subgroup has been developing for measuring the amount of risk exposure for a portfolio of repo-style transactions to a single counterparty subject to a master netting arrangement is a variation of the second formulation given above. That is, it is expressed as a sum of current exposure and the potential increase in that exposure over a five-day holding period a bank would face in the event of counterparty default. The potential increase depends upon the net long or short position the bank has in each security and each foreign currency, rather than the full value of the exposure and the collateral. This formula can be expressed as:

$$E^* = \max \{0, [\Sigma(E) - \Sigma(C) + \Sigma(E_s \times H_s) + \Sigma(E_{FX} \times H_{FX})]\}$$

Where:

- E* = the exposure value after risk mitigation
- E = current value of the exposure
- C = the current value of the collateral received
- E_s = the absolute value of the net position in a given security
- H_s = the haircut appropriate to the security given in E_s
- E_{FX} = the absolute value of the net position in a currency different from the settlement currency
- H_{FX} = the haircut appropriate for the foreign currency given in FX

The Subgroup believes that the above formulation provides a workable method for factoring into the measure of credit risk exposure for repo-style transactions netting agreements with single counterparties, as well as situations where both the exposure and collateral may be denominated in currencies other than the settlement currency. Further, this formulation would be applicable regardless of whether an institution chose to use the standard supervisory haircuts or their own internal estimates for haircuts.

Own Internal Estimates of Haircuts

With regard to the use of own estimates for individual haircuts, CP2 indicated that it would be limited only to banks that have received supervisory recognition for an internal market risk model under the 1996 Market Risk Amendment. Upon further reflection, however, agreement has been reached that a broader range of institutions could use own estimates. A bank that does not have an internal market risk model for its trading book could nonetheless qualify for use of own estimates if the bank's supervisor determines that the bank has appropriate methods for internally estimating market price volatility for each instrument type, as well as foreign exchange volatility. The haircuts must be calibrated to a 99th percentile, one-tailed confidence interval using a minimum one-year effective historical observation period. Banks will be required to update their data sets and compute their haircuts at least every three months. Approval of a bank's use of own internal estimates of haircuts would be conditioned on the bank meeting certain risk management criteria. Among these would be the requirement that the bank should use the own internal estimates of haircuts in its daily risk management, including the setting of internal exposure limits.

VaR-Based Measure for Repo-Style Transactions

The Subgroup has also considered whether it would be acceptable to recast the above formulation for master netting agreements as a measure of current exposure plus a VaR-based measure of the potential increase in the current exposure over a five day holding period. Thus, the formulation for the measure of credit risk exposure to each counterparty with which the bank has repo-style transactions subject to a master netting agreement would be presented as:

$$E^* = \max \{0, [\Sigma(E) - \Sigma(C) + \text{VaR}]\}$$

The VaR-based measure, like the own estimates haircuts would have to be calibrated to a 99th percentile, one-tailed confidence interval, using a five-day holding period. The model used to estimate VaR would have to meet the qualitative and quantitative requirements and the relevant market risk factors set forth in the 1996 Market Risk Amendment. In principle, a bank that already uses a supervisory-approved internal model for purposes of calculating its market risk capital charges would not need to seek separate approval to use an internal model for measuring VaR for purposes of calculating its potential exposure related to repo-style transactions. A bank that does not use VaR for market risk purposes would need to have its internal model approved by its supervisor in order to use it for calculating exposure on repo-style transactions.

The use of a VaR measure would allow institutions to recognise correlation effects between securities lent and borrowed, as well as among the securities. Recognition of such effects for capital purposes could have a positive supervisory outcome because it would encourage banks to further reduce their risk by taking correlated collateral. To preserve this incentive, the Subgroup believes that any use of a VaR model would have to incorporate the effects of all securities employed in the transaction and, thus, the proposed carve-out for domestic government repos should not apply.

Notwithstanding the potentially positive benefits of recognising correlation effects, many in the CRM Subgroup have reservations about the use of VaR in connection with repo-style transactions. These concerns center mainly on the potential for model error and the instability of correlations over time. The Subgroup has discussed the use of an *ex ante* multiplier on the VaR measure to address this concern. In this regard, under the Market Risk Amendment, the VaR measure for the trading book is subject to an *ex ante* multiplier of three, and it is scaled up where backtesting exceptions exceed a certain threshold.

Backtesting VaR Measures

The Subgroup recognises that the use of VaR for market risk and its use for measuring exposure in repo-style transactions are not directly analogous. In the Market Risk Amendment, the VaR serves as an estimate of potential trading losses that may be incurred. For repo-style transactions, on the other hand, VaR would be used to estimate potential unsecured credit exposure in the event the counterparty should default. For this reason, too, the Subgroup does not believe that the backtesting required for the market risk VaR is necessarily appropriate for backtesting the VaR generated for repo-style transactions.

An emerging view is that recognition of VaR for repo-style transactions should be accompanied by a rigorous and separate backtesting regime for calculated counterparty VaRs, accompanied by a schedule of multipliers that would be applied where exceptions occur. A separate backtesting regime for counterparty VaRs would appear to be appropriate from the point of view of risk management. As a preliminary matter, several Subgroup members believe that an *ex ante* multiplier on the counterparty VaR may not be necessary if rigorous backtesting requirements could be developed. Other members, however, believe an *ex ante* multiplier is prudent from a supervisory point of view, particularly given the current lack of information on the conceptual framework and practice of backtesting regimes.

The Subgroup is now looking to the industry for its thoughts on how a regulatory framework for a backtesting regime that is both prudent and operationally feasible could be developed. By way of reference, the Market Risk Amendment requires that a bank backtest its internal model for its trading book positions by comparing each of its most recent 250 business days' actual net trading profit or loss with the corresponding daily VaR measure generated for internal risk management purposes, calibrated to a one-day holding period and a 99th percentile, one-tailed confidence level. Once each quarter, the bank must identify the number of exceptions over the previous 250 business days where the magnitude of the actual daily net trading loss, if any, exceeded the corresponding VaR measure. Where the number of exceptions exceeds certain thresholds, the bank's VaR is subject to an increasingly higher multiplier, which is capped at four.

Again, the Subgroup recognises that the VaR calculation for repo-style transactions would not be directly comparable to the one for trading book positions. In the case of the trading book, for example, where trades are conducted continuously, a one-day holding period assumption for internal risk management purposes is reasonable. For repo-style transactions, however, the

holding period used for internal management purposes should reflect a reasonable period for liquidating the collateral. Another difference relates to the number of VaR measures calculated. For trading book positions, a bank calculates only one VaR daily for the entire book. For repo-style calculations, on the other hand, the bank would have to conduct a daily VaR measure for each counterparty, of which a bank may have several hundred. Backtesting each counterparty VaR generated on a daily basis could pose operational challenges to institutions.

With these thoughts in mind, the Subgroup invites industry participants in the repo markets to share any ideas they may have on how best to construct a regulatory framework for backtesting VaR measures of counterparty credit risk. However constructed, the framework should be sufficient to ensure high quality in the risk measurement model and integrity of correlations among a wide variety of securities over time. In assessing the operational feasibility of any regulatory framework that might be proposed, the Subgroup would find helpful any information or experience banks could share on current backtesting regimes. In addition, we would be interested in views the industry would have on appropriate *ex post* multipliers of the VaR measure based on the number of exceptions identified through backtesting. The Subgroup believes that if a satisfactory backtesting regime and multiplier schedule cannot be constructed, it may be difficult to obtain supervisory comfort with a VaR-based measure of counterparty credit risk.

Residual Risks

As mentioned in the Basel Committee newsletter released in September 2001, it has now been agreed to alter significantly the proposed treatment set forth in CP2 for the treatment of residual risk. As you will recall, this risk was addressed through Pillar 1 by a floor charge on collateralised transactions in the form of a variable, w , whose value was set at 15 percent. The view now is that the residual risks to which a bank is exposed when lending on a basis where credit risk is mitigated by financial collateral, guarantees, or credit derivatives are perhaps best addressed through the Pillar 2 the supervisory review process. The Credit Risk Mitigation Subgroup is working to develop a robust framework in Pillar 2 for addressing residual risks, with an emphasis on appropriate risk management policies and procedures, as well as actions supervisors should take where these are found to be deficient.

Conclusion

We would appreciate receiving a response by May 17 on the backtesting question, as well as on any other aspects of the treatment of repo-style transactions that are discussed in this letter. We recognise that this is a relatively short time to respond to a fairly complicated issue, but it would be extremely helpful to our deliberations if you could provide ideas, if only an informal basis, on a reasonable and prudent conceptual approach to a backtesting framework by that time. The Subgroup would be happy to follow up suggestions in greater depth with conference calls in June.

Thank you for continued interest in this issue and for the helpful comments and insights you have provided to date to the Credit Risk Mitigation Subgroup.

Yours sincerely,

A handwritten signature in black ink, appearing to read "Norah Barger".

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Norah Barger
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Credit Risk Mitigation Sub-group