

IMPROVING
COUNTERPARTY RISK MANAGEMENT
PRACTICES

Counterparty Risk Management Policy Group
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COUNTERPARTY RISK MANAGEMENT PROJECT

Working Groups

<i>I</i>	<i>II</i>	<i>III</i>
Risk Management Practices	Information Sharing and Reporting	Market Practices and Conventions
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COUNTERPARTY RISK MANAGEMENT PROJECT

Working Groups - Continued

<i>I</i>	<i>II</i>	<i>III</i>
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Summary and Recommendations

In January 1999, a group of 12 major, internationally active commercial and investment banks announced the formation of a Counterparty Risk Management Policy Group (CRMPG). The objective of the Policy Group, whose formation was endorsed by Chairman Greenspan, Chairman Levitt and Secretary Rubin, has been to promote enhanced strong practices in counterparty credit and market risk management. This was to be achieved by building on the self-improvement efforts being undertaken by individual firms in the immediate aftermath of last year's severe market disruptions, by extending those efforts through collective evaluation of potential new strong practices, by evaluating and proposing improvements in market-wide practices and conventions, and by compiling information on new strong practices and, where appropriate, sharing such information with regulators. This report sets forth the Policy Group's review of key risk management issues, its evaluation of emerging strong practices, and its recommendations for action.

The Policy Group approached its work as an initiative by market practitioners mainly targeted at improving internal counterparty credit and market risk management practices. It did so with appreciation for several important principles. First, those practices must not be thought of as either static or "one size fits all". Rather, they must be adapted to the circumstances and practices of individual firms and the markets in which they operate. They also require continuous adaptation and enhancement. As such, the Policy Group views many of its recommendations as suggestions for improvements best evaluated by the senior managers of each firm -- not as an all or none proposition, but rather in the context of their evolving policies, practices and risk profile. Second, the Policy Group's recommendations should not be viewed as a roadmap for new regulation or even as a mandated checklist for supervision. It would be a mistake to attempt to codify risk management practices in that fashion. Third, the Policy Group's recommendations are not in any way intended to standardize credit terms and conditions, as credit decision making must remain the domain of reasoned, professional credit risk managers at individual firms. Finally, since the intent is for this initiative to have a broad reach across many disciplines and types of firms, the Policy Group has reached out to involve directly in its various working groups senior practitioners from a broader cross section of U.S. and foreign financial institutions, including banks, investment banks, investment managers, insurance companies and hedge funds. The Policy Group appreciates the involvement and contribution of these people and firms. The Policy Group, of course, is responsible for this report and its recommendations.

This report is organized in four sections. The first explores initiatives to improve the effectiveness, transparency and quality of counterparty credit assessments. The second part evaluates techniques for improving important elements of internal risk measurement, management and information flows aimed

at improved risk awareness and decision making within individual firms. The third section focuses on aspects of common market practices and conventions which, if improved, would facilitate the management of counterparty credit risk, including as it relates to dealings with distressed counterparties. The final section explores a limited range of initiatives for improving the quality, timeliness and relevance of information flows between major market participants and their primary regulators. The appendices provide more detailed analysis of the key risk estimation and reporting issues.

The package of recommendations of the Policy Group represents a comprehensive set of proposals, many of which build upon improvements to risk management practices already initiated by individual firms. As such, many of the specific recommended practices may already be in place, to one degree or another, in different firms, even if no one firm presently utilizes all these practices. They also reflect new ideas for further enhancements, growing out of the creative interaction of the many skilled professionals who participated in our various working groups.

Overall, the Policy Group believes that its recommendations represent the basis for a significant further enhancement of risk management practices which will, in turn, help strengthen the market disciplines related to counterparty and market risk management. While each of the recommendations will contribute to meeting this objective, the Group wishes to emphasize a contextual framework that ties the key elements of the individual recommendations together. There are six significant building blocks to that framework. They are:

First, implementation of the significant enhancements to information sharing between counterparties, as better knowledge of one's counterparty (recommendation 1) represents the foundation upon which the other pillars of risk management rest;

Second, applying an integrated analytical framework to the evaluation of market risk, liquidity risk and leverage -- one that treats leverage not as an independent source of risk, but as a factor that can accentuate market and liquidity risk (recommendation 3);

Third, a systematic evaluation of the integrated elements of market, liquidity and credit risk factors to develop liquidation based estimates of potential counterparty credit exposures, as well as integrated efforts at market and credit risk stress testing (recommendations 5 and 6);

Fourth, a linking of all these pieces into stronger internal credit practices, which explicitly take account not only of current judgments of creditworthiness but also potential liquidation cost estimates in setting limits and collateral standards (recommendation 7);

Fifth, significant enhancements in the quality of risk information, both for the firm's senior management and Board of Directors, as well as, potentially, for the regulatory authorities (recommendation 10); and

Sixth, improvements to and harmonization of standard industry documents, as well as standards for better performance in the completion and control of documents. Of the many specific documentation recommendations, the two key elements are: ensuring that close-out arrangements using commercially reasonable valuations can be carried out in a practical and time critical fashion during periods of market distress, with a high degree of legal certainty; and harmonizing key provisions of standard industry documentation (recommendations 16 and 18).

Recommendations:

I Transparency and Counterparty Risk Assessment

A Information Sharing (pages 12 to 13)

- 1a Financial Intermediaries ("FI's") should perform robust credit evaluations of trading counterparties prior to engaging in dealings likely to entail significant credit exposure. In doing so, they should obtain and evaluate the following types of information from counterparties, particularly those whose credit worthiness depends heavily upon the performance of a leveraged portfolio of financial assets:

In the initial credit evaluation:

- Material financing and counterparty relationships;
- Specific trading and investment strategies and asset allocations;
- Operating controls, including valuation procedures, processing and settlement procedures, trade verification and margining procedures and collateral management procedures; and
- Information on risk management approach and controls, as well as risk measurement methods and risk measurements.

On an ongoing basis:

- Capital condition;
- Performance;
- Market risk;
- Asset liquidity risk and funding liquidity risk assessments; and
- Material events.

1b The scope, quality and timeliness of information availability should be an important ongoing consideration in determining the amount and terms of credit to be provided.

B Confidentiality (pages 14 to 16)

2a FI's should have internal written policies and procedures in place governing the use of and access to proprietary information provided to them by trading counterparties as a basis for credit evaluations.

2b To encourage the flow of adequate proprietary information, FI's should be prepared to reach understandings with their counterparties regarding the use of counterparty proprietary information and on safeguards against its unauthorized use.

C Leverage, Market Risk and Liquidity (pages 16 to 23)

3 FI's should deepen and strengthen the ongoing monitoring of their own risk and the risk posed by their large trading counterparties by utilizing an integrated framework for evaluating the linkages between leverage, liquidity and market risk. Specifically:

3a FI's and large trading counterparties should manage the risk arising from their use of leverage by considering, among other factors, the magnifying and interconnected effects of leverage, under normal and stress conditions, on their (i) market risk, (ii) funding arrangements and collateral requirements, and (iii) asset liquidity risk. They should also evaluate factors that may mitigate the effects of leverage.

3b FI's and large trading counterparties should prepare regular, comprehensive estimates of their market risk, applied systematically across their trading portfolios. They should be prepared to share with key credit providers, as appropriate, information on the methodologies employed and periodic updates on the level of their market risk.

3c FI's and large trading counterparties should conduct regular and rigorous assessments of their funding and asset liquidity risk that take into account: (i) the duration, stability and breadth of their funding, (ii) their degree of reliance on collateral, (iii) the strength and permanence of their capital, and (iv) the potential for market losses under stress conditions including the additional impact of partial asset liquidation. They should be prepared to share with key credit providers information on their liquidity risk assessment methods, periodic updates of summary results and key elements of their contingency funding plans.

4 FI's should ensure an appropriate level of experience and skills in the risk managers involved in credit decisions on trading counterparties for whom this expanded information is significant and provide those managers with access to: analytical capabilities in derivatives and other financial instruments; and risk management expertise sufficient to assess the robustness of the risk management frameworks and methods employed by such counterparties.

II Internal Risk Measurement, Management and Reporting

A Counterparty Exposure and Risk Estimation (pages 24 to 27)

5a When exposures to a counterparty are large or illiquid, the information provided by current mark-to-market replacement value should be supplemented by an estimate of liquidation-based replacement value. Such an estimate should incorporate:

- The potential for adverse price movement during the period until liquidation value of the contracts with the counterparty is set and value from the counterparty collateral can be realized; and
- The liquidity characteristics of the contracts and collateral involved under both normal and stressed market conditions.

5b FI's should upgrade their ability to monitor and, as appropriate, set limits for various exposure measures including:

Current Replacement Cost: measured at market to include the benefit of netting agreements if legally enforceable with high confidence but before consideration of any related collateral.

Current Net of Collateral Exposure: measured as current replacement cost minus the net value of collateral in respect of which there is high confidence about enforceability and perfection of security interest.

Current Liquidation Exposure: measured as current net of collateral exposure based upon estimates of liquidity-adjusted contract replacement cost, the liquidation value of collateral received and the buy-in cost of collateral pledged.

Potential Exposure: measured on the basis of potential future market moves adjusted for collateral rights, threshold agreements, optional unwind rights, as well as the shorter timeframes these rights imply.

B Market and Credit Risk Stress Testing (pages 27 to 28)

6a When measuring exposure to stress events, FI's should estimate both market and credit risks. Tests should assess:

- Concentration risk both to a single counterparty and to groups of counterparties;
- Correlation risk among both market risk factors and credit risk factors; and
- Risk that liquidating positions could move the market.

To make tests results useful, firms should select test procedures that reveal whether risks are material and facilitate tracing excessive risks to their sources.

6b Risk managers should work with trading and credit book managers to develop stress scenarios that probe for vulnerabilities within and across key portfolios, with particular analytical focus on the impact of stress events on large or relatively illiquid sources of risks.

C Credit Practices (pages 28 to 29)

7a Recognizing the need for individual counterparty creditworthiness assessments, FI's should, as a general practice, require initial collateral for credit intensive transactions with counterparties whose creditworthiness depends heavily upon the performance of leveraged portfolios of financial assets.

7b When initial collateral is called for, the amount may be set on a transaction or portfolio basis and should take into account the factors used to develop estimates of liquidation-based replacement values.

- 7c Especially when initial collateral is not called for, the credit decision should reflect explicit risk tolerance limits for the size of potential liquidation (close-out) costs.
- 7d In cases where documentation specifies a threshold level of exposure that triggers an obligation to transfer collateral, limits on unsecured exposure should reflect updated estimates of liquidation costs and not just current mark-to-market values.
- 7e In cases where FI's participate in two-way variation collateral arrangements, estimates of liquidation costs and related credit limits should take account of the buy-in costs of collateral pledged.

D Valuation and Exposure Management (pages 29 to 31)

- 8a FI's should establish internal counterparty credit risk cost allocation and valuation practices that provide incentives for trading business and credit risk managers to manage proactively their counterparty credit risks. This could include methods for recognizing the cost of credit risk in internal risk or capital charges, proactive adjustments to limits, as well as tools for periodically evaluating the adequacy of credit valuation adjustments to asset carrying values.
- 8b Both FI's and large trading counterparties should develop and apply strong, consistent independent price verification procedures. These procedures should include fair value adjustments to mid-market values which should be assessed dynamically and consistently to account for:
- Open risks that are marked to either the bid or offer side of the market;
 - Illiquidity characteristics of complex instruments or positions;
 - Credit valuation adjustments to address credit quality, generic credit market spreads and any substantial specific repayment concerns;
 - Operational and model risks associated with complex or large positions; and
 - Servicing costs associated with the ongoing hedging of transactions.

Efforts should be made to apply external sources, as well as independent valuation services, as appropriate.

E Management Reporting (pages 31 to 36)

- 9 *Responsibilities:* As part of its responsibility for overall risk management policies and practices, senior management should convey clearly information on its overall tolerance for risks, including loss potential in adverse markets. This type of information should also be conveyed to the firm's Board of Directors, as appropriate. The independent risk management function should be responsible for designing a flexible reporting framework to enable senior management to monitor its risk profile relative to its expressed risk tolerance.
- 10 *Large Exposure/Risk Reporting:* Senior management should receive periodic information on large counterparty exposures/risks. These reports should meet the following standards:
- Aggregate exposure to a counterparty should include all material on-and off-balance sheet exposures relating to such counterparty.
 - Exposures should be measured under conservative assumptions as to the efficacy of netting and collateral arrangements.
 - Position replacement cost and collateral values should be measured both at market and estimated liquidation value.
 - Potential exposure measures should be robust and appropriately reflect risk reduction and risk mitigation arrangements.

- Quantitative and qualitative analysis should be used to identify counterparties for which large moves in specific market risk factors would result in large exposure levels, a material deterioration in credit quality or both.

Where a firm has introduced credit risk measures that capture both exposure and credit quality, it could rely upon those measures to determine appropriate coverage in senior management reporting.

- 11 *Concentration Analysis*: Senior management information should highlight possible concentrations of market and credit risk resulting from positive correlation among the firm's own principal positions, counterparties' positions with the firm and collateral received or posted. In preparing such reports, due regard should be given to understandings reached with counterparties on access to and uses of counterparty proprietary information.
- 12 *Contextual Information*: Senior management should periodically receive contextual information sufficient to assess the degree of reliance placed on quantitative risk management information, to highlight key judgments and assumptions involved in developing the quantitative risk information, and to shed additional light on a firm's overall risk profile.

III Market Practices and Conventions

A Documentation Policies and Practices (pages 37 to 41)

- 13 FI's should have in place written policies to manage documentation risk. Such policies should be approved by senior management and reflect the nature and scope of their business and risk profile.
- 14a FI's should adopt a goal to execute new master agreements within 90 days of a transaction and, pending such execution, utilize a "long form" confirmation that incorporates the industry standard form of master agreement.
- 14b FI's should send out confirmations for privately negotiated OTC transactions by the business day following the trade date and, within five business days thereafter, assure themselves that there is agreement with their counterparty on the material terms of the trade and that they have written evidence of their binding agreement. There should also be agreement at the outset of a relationship on which party will initiate the confirmation.
- 14c FI's should track unexecuted masters, unsent confirmations and unaffirmed trades, develop a risk-based approach to clearing backlogs and report to senior management material deviations from internal documentation policy. Furthermore, they should develop incentives for business units and clients to correct material deficiencies in their documentation practices, which might include trading restrictions, mandatory unwinds and reserves for losses.
- 15 Industry participants should support efforts to introduce greater automation in the documentation process for privately negotiated OTC contracts. The Policy Group also encourages service providers to consider new opportunities that may exist in these markets, and it encourages regulators to work in cooperation with industry participants and service providers to facilitate these efforts and refrain from erecting regulatory barriers that may impede service innovations.

B Documentation Content (pages 41 to 49)

16a *Close-out and Valuation*: Documentation should be revised as necessary to ensure that a non-defaulting party has the flexibility to value transactions in a good faith and commercially reasonable manner. This should be a common industry standard, as is incorporated in the TBMA/GMRA, and FEOMA agreements and ISDA's Loss methodology.

16b To the extent that market quotations are employed to achieve commercially reasonable valuations, ISDA agreements should be modified to provide that:

- Potential quotes provided by third parties may include not only price, but also yields, yield curves, volatilities, spreads or other relevant inputs. These inputs should be based on the size of the transaction, the liquidity of the market and other relevant factors.
- The number of third parties from whom inputs are sought may be reduced.
- Third parties from whom inputs may be sought may include not only dealers, but also major end-users, third party pricing sources or other relevant sources.
- Market quotations are but one means to achieve good faith valuations and may be by-passed when, in the judgment of the non-defaulting party, they are unlikely to produce a timely and commercially reasonable result.

17 Credit features in standard industry documentation, and related firm documentation practices, should be strengthened by implementing the detailed specific suggestions discussed in Section III B. of this report (pages 44 to 47) regarding:

- Permissible form for delivery of notice;
- Payment netting documentation and practices;
- Cross-product obligation and collateral netting;
- Rights of set-off provisions;
- Events of default provisions;
- No-fault termination events;
- Acts of God provisions; and
- Coordination procedures between documentation control and credit risk management functions.

In addition, the recent ISDA recommendations on collateral management practices should be implemented.

18 *Documentation Harmonization*: Industry associations should undertake an initiative to harmonize standard documentation across products, and, where possible jurisdictions in areas including: clauses covering notices, grace and cure periods, definitions of events of default and insolvency, and close-out valuation standards.

IV Regulatory Reporting (pages 50 to 55)

A Qualitative Reporting

19 FI's with significant counterparty credit and/or market exposure should be prepared to meet informally with their primary regulator on a periodic basis to discuss their principal risks as well as market conditions and trends with potential market disruption or systemic effects. To be effective, such meetings should involve only a small number of senior officials from both sides.

B Counterparty Exposure Reporting

20a If requested by its primary regulator, FI's with significant counterparty credit exposures should voluntarily provide reports to that regulator detailing certain large exposure information on a consolidated group basis. A suggested uniform format, derived from suggested enhancements to senior management reporting, is provided for consideration.

20b Regulatory agencies requesting such information should reach clear understandings with providing institutions on permissible uses of such information, arrangements for sharing and aggregating such information, and safeguards against its misuse.

The recommendations flowing from the first two parts of the Policy Group's work can be largely, if not completely, acted upon by individual firms. Many of the recommendations for changes in industry practices and standard documentation will require concerted industry follow-up, to which the firms in the Policy Group commit their support. The suggestions for regulatory reporting improvements obviously require evaluation by the authorities. The Policy Group believes there should be extensive practitioner input to, and coordination with, the regulators in evaluating these and other proposals for improved reporting, as well as possible new public disclosure requirements. The firms in the Policy Group stand ready to provide assistance to those efforts.

The Policy Group also recognizes that significant resources will be required to implement a number of its recommendations, particularly those related to improved exposure measurement and reporting, stress testing and concentration analysis, as well as improved documentation practices and controls. A phased approach to implementation will be necessary, as resource needs are balanced against Y2K and other internal systems needs.

The Policy Group is under no illusion that the package of recommendations contained in this report will eliminate the bouts of volatility and market instability we occasionally experience. While the methods suggested here for improving evaluations of market and liquidity risk along with leverage and credit exposure will raise the bar in terms of risk estimation standards, we stress that risk management is not simply a matter of better computer models to measure volatility and correlations more rapidly and precisely. Indeed, too much public focus has been placed on the sophistication and precision of risk estimation models, and not enough on the more important managerial and judgmental elements of a strong risk management framework. In the end, experience, market knowledge, management discipline, internal risk transparency and strong internal controls will be the more important determinants of how well financial institutions fare when the next storm comes.

Nor should we expect any reversal of the trend toward increasingly complex and interdependent financial markets in which we operate. Change and innovation are constant and healthy aspects of a market based competitive financial system. With that innovation will come a reminder of the need for continuous enhancements to risk management practices, such that, in time, today's emerging best practices will have to be reviewed and strengthened further. While we cannot say today when that should occur or what will be the best forum to accomplish that future review, we strongly suggest that industry leaders not wait for another market crisis to take up these questions.

Finally, our market based system depends upon risk intermediation to facilitate an efficient and productive flow of savings into value adding investments. The vitality and effectiveness of that process is enhanced when private market firms are free to continuously evaluate risk/reward opportunities and commit their capital or the investment assets under their management. However, the essence of a market based system of discipline must also require that these participants face exposure to the ultimate discipline of failure. While implementation of the steps recommended here should help reduce somewhat the potential for such failures, their more important value lies in helping to improve our ability to manage and contain the risks of such failures when they do occur. This, of course, is central to the goal of reducing systemic risk. Indeed, while the probabilities of a financial shock occurring that has the potential to unleash systemic damage will never reach zero, the Policy Group strongly believes that, taken as a whole, its recommendations are consistent with achieving a further reduction in systemic risk over time.

I Improving Transparency and Counterparty Credit Assessment

Within this element of its review, the Group has focused on issues related to three important aspects of the counterparty risk management process: information sharing between credit providers and credit users; confidentiality arrangements for ensuring proper handling of proprietary client information; and improving the transparency and quality of understanding of the interplay between market risk, leverage and liquidity, and their impact on a counterparty's creditworthiness.

A Information Sharing

In approaching these issues, the group views the quantity, quality and timeliness of information sharing between credit users and credit providers as a continuum, with a credit user's positioning along that continuum ranging from near complete transparency (in the case of a "captive fund") to rather opaque. The Group believes that there must be flexibility to move along that continuum, in balancing degrees of credit availability and terms (especially collateral) with degrees of openness and risk. A number of factors will determine where along that continuum a credit provider should be. These include the credit intensity of the expected transaction activity, the liquidity of the underlying transactions and related collateral, the degree of independent oversight of the counterparty (such as by rating agencies, public securities markets, public disclosures, or regulators) and, of course, the underlying creditworthiness of the counterparty. Clearly the information needed to conduct delivery-versus-payment trading in liquid high quality assets will differ significantly from that required for long dated illiquid exposures. Also, at some level of perfected interest in excess liquid collateral, there is an adequate degree of protection to compensate for information shortcomings. Nevertheless, there is a broad based consensus among members of the Policy Group that there were significant weaknesses in the scope, quality and timeliness of information available to credit providers, relative to the nature and size of risks being taken with some highly leveraged counterparties. Those weaknesses relate not only to information available for due diligence prior to establishing credit facilities, but equally to the timing and scope of ongoing information used to monitor changing borrower circumstances.

In evaluating actions to improve this situation, the Group took into account both efforts underway by credit providers to strengthen information availability for their counterparty risk assessments, as well as the extensive suggestions from the regulators such as those incorporated in the Basle Committee on Banking Supervision's paper on "Sound Practices for Banks' Interactions with Highly Leveraged Institutions". While information sharing between credit counterparties must ultimately be a matter of mutual agreement, in the Group's view a healthy convergence is developing regarding the types of

information that should be available to credit providers, such that they would be at a sound position along the transparency continuum for normal credit sensitive dealings with highly leveraged counterparties.

In evaluating how best to frame its recommendation, the Policy Group concluded it should suggest what it regards as a benchmark for adequate levels of information sharing in support of normal levels of credit sensitive dealings. In doing so, the Group recognizes the particular sensitivity of information about specific portfolio positions held by a counterparty. The Group has sought to suggest arrangements which need not require that type of detailed information to be shared routinely with all credit providers. Nevertheless, there will be cases in which credit providers will and should feel a need for regular access to that type of information -- in effect moving further along a transparency continuum -- in order to manage properly more credit intensive activities, larger than normal exposures or exposures to high risk counterparties. The Group would encourage the sharing of that information in appropriate circumstances, provided adequate arrangements are in place to ensure its proper confidential handling.

Specifically, as regards credit evaluation and information sharing arrangements, the Policy Group recommends:

1a Financial Intermediaries ("FI's") should perform robust credit evaluations of trading counterparties prior to engaging in dealings likely to entail significant credit exposure. In doing so, they should obtain and evaluate the following types of information from counterparties, particularly those whose credit worthiness depends heavily upon the performance of a leveraged portfolio of financial assets:

In the initial credit evaluation:

- Material financing and counterparty relationships;
- Specific trading and investment strategies and asset allocations;
- Operating controls, including valuation procedures, processing and settlement procedures, trade verification and margining procedures and collateral management procedures; and
- Information on risk management approach and controls, as well as risk measurement methods and risk measurements.

On an ongoing basis:

- Capital condition;
- Performance;
- Market risk;
- Asset liquidity risk and funding liquidity risk assessments; and
- Material events.

1b The scope, quality and timeliness of information availability should be an important ongoing consideration in determining the amount and terms of credit to be provided.

B Confidentiality

A significant obstacle to improved information sharing has been concerns on the part of credit users as to how the information they provide might be used by a creditor firm. These concerns go beyond the possibility that such information might be unintentionally leaked into the market. They extend to include the following:

- The effectiveness of information barriers between the firm's traders, on the one hand, and the credit managers who determine counterparty credit and the market risk managers who set trading limits and review positions, on the other;
- Use of position or risk information by senior management to alter or reduce the credit provider's own market risk; and
- Use of information about contract terms with another credit provider to negotiate similar terms with the credit user.

Information confidentiality is not a new issue in banking and finance. Indeed, it has long been present and dealt with effectively in areas such as custody services, asset management services, prime brokerage and futures brokerage services, mergers and advisory practices and traditional commercial credit relationships. Two factors make the issue potentially complex in these situations: (a) the intensely competitive nature of the relationships between credit providers and credit users in other aspects of their respective market businesses; and (b) the advances being made in the integration of market and credit risk management and the improvements in internal risk transparency, which increase the likelihood that client sensitive market information would be available to managers outside the ranks of those making client specific credit decisions.

In seeking solutions to this issue, it is useful to recognize at least two different levels of information sensitivity. One is the sensitivity required in the handling of non-public information provided by a credit user which is not a by-product of direct transaction activity. This would include current information on risk levels, NAV, liquidity positions and detailed portfolio composition. Not only is this type of information generally regarded as the most sensitive by the provider, but it is also provided only to facilitate bilateral credit decisions. The other type of information is that which is a direct by-product of transaction activity between the two parties. This would include information on current trading flows, collateral margin calls, and the size and market sensitivity of receivables/payables associated with outstanding OTC derivative contracts. In this case, there are legitimate internal risk management uses of such information that go beyond direct credit risk decisions, but there are also legitimate limitations to be placed on those uses -- for example, in terms of availability to the firm's own proprietary risk takers.

In evaluating the balance to be struck between these considerations, there is general agreement within the Policy Group that the credit provider's risk management department may use all information provided by the credit user about the credit user's transactions with third parties for establishing, increasing or decreasing credit or trading lines to the counterparty, or for determining the terms of dealing with the counterparty, such as tenor, collateral, margin thresholds and haircuts. There is also agreement that the risk management department should not be allowed to share information about the counterparty's strategies or holdings to the credit provider's other risk taking businesses, so as to avoid the risk of those businesses reducing or adjusting positions based on information regarding the counterparty's portfolio. Questions concerning the appropriate scope for use of counterparty proprietary information in analyzing risk concentrations at the credit provider are best evaluated in the context of understandings with the counterparty.

Recognizing that the precise balance that needs to be struck between client interest and internal risk management needs is best left to private negotiations, the Policy Group recommends:

- 2a FI's should have internal written policies and procedures in place governing the use of and access to proprietary information provided to them by trading counterparties as a basis for credit evaluations.
- 2b To encourage the flow of adequate proprietary information, FI's should be prepared to reach understandings with their counterparties regarding the use of counterparty proprietary information and on safeguards against its unauthorized use.

In a number of cases, leveraged investors have developed formal confidentiality agreements for their credit providers to sign. While these have the benefit of providing a further degree of clarity and transparency regarding the expectations and responsibilities of the parties to the relationship, they can also create unintended or undesired consequences by either failing to anticipate all of the nuances to potential use of information or by restricting internal information sharing that has a legitimate risk management purpose. For this reason, the Policy Group is reluctant to endorse the use of these agreements as a general market practice, but recognizes that they may be appropriate in especially extensive and/or sensitive relationships.

As discussed below in the context of regulatory reporting, a somewhat related dimension of this issue concerns the potential impact of requests from official institutions to credit providers for access to proprietary and client sensitive information, including requests for information originating from host country regulators in foreign countries. These requests are most likely to arise regarding activities of unregulated counterparties that are viewed as aggressive market risk takers. When received, they pose

especially complex issues for regulated credit providers. While the authorities have an understandable interest in the activities of large participants in their markets, they need also to recognize the legitimate obligations credit providers have to their customers.

C The Effects of Leverage on the Assessment of Market and Liquidity Risks

One of the most complex challenges of counterparty risk assessment is to understand the effects of leverage through the measurement of market risk, funding liquidity risk and asset liquidity risk and their interactions. There are several sources of complexity. The first is the difficulty that exists in defining and measuring leverage. The second is the complexity of developing comprehensive measures of market and liquidity risks. The third is the considerable amount of judgment and experience required of risk managers to assess the level and interactions of these risks to arrive at an overall risk assessment. As information sharing improves and counterparties upgrade the quality and reliability of their risk measures, it will remain important to understand the methods used to estimate risks and the remaining inherent limitations in those methods, lest the information provide an undue sense of comfort. Toward this end, the Policy Group has prepared an appendix to this report (Appendix A) which describes a series of leverage, market risk and liquidity risk measures, discusses their usefulness and limitations as indicators of a counterparty's risk, and sets out a conceptual framework for relating the effects leverage can have on both market and liquidity risk.

Leverage and its Effects

Much of the analysis of 1998's market disruptions has focused on leverage as a primary source of problems. The Report of the President's Working Group on Financial Markets concludes that the "... principal policy issue arising out of the events surrounding the near collapse of LTCM is how to constrain excessive leverage". While that report and reports issued by various supervisory bodies stress the need for better measures of leverage, they also acknowledge that significant measurement difficulties exist. The Policy Group agrees that leverage, as a concept, presents both definitional and measurement difficulties, which are more fully discussed in Appendix A.

Leverage is generally considered to exist when: (a) an institution's financial assets exceed its capital; (b) an institution is exposed to the change in value of a position beyond the amount, if any, initially paid for the position; or (c) an institution owns a position with "embedded leverage", i.e., a position with a price volatility exceeding that of the underlying market factor. These definitions highlight aspects of leverage

– the first based on balance sheet concepts, the second on market-dependent future cash flows, and the third on market risk. No single definition is able to capture all aspects of leverage.

The measurement of leverage or, more precisely, the interpretation of leverage measures also poses problems. A high level of balance sheet leverage says little about the level of market risk of an institution. Conversely, a high level of market risk can co-exist with little or no balance sheet leverage. The characteristics of resources employed, other than capital, has a bearing on how risky leverage may be: long-term unsecured sources of funding attenuate the effects of leverage compared to short-term secured funding. Capital resources themselves bring a different perspective on the risk of leverage inasmuch as they depend upon shareholders' ability to withdraw capital. Likewise, the liquidity characteristics of a portfolio of positions affect the riskiness of leverage. Thus, the Policy Group believes that leverage, while an extremely important concept with broad intuitive appeal, is not an independent risk factor whose measure can provide useful insights to risk managers and supervisors alike. Rather, leverage is best assessed by its effects which can be observed in the possible amplification of market risk, funding liquidity risk and asset liquidity risk.

It is common wisdom that leverage has the potential to increase market risk. As a result, the general public associates high levels of leverage with high levels of market risk. Yet in a world of active portfolio management an increase in leverage may be associated with a decrease in market risk. For example, it is common for financial intermediaries to manage the market risks they assume from their customers by taking offsetting market risk positions. By the same token, a reduction in leverage (as traditionally measured) can be associated with a rise in market risks, a result that was seen at some institutions last year. Thus, in the context of market risk, leverage is best viewed as a tool to achieve a desired risk profile relative to capital, and its impact is best assessed by measures of market risk, such as VAR and stress testing discussed below under "Market Risk".

However, measuring leverage in terms of market risk alone is insufficient: two portfolios with identical measures of market risk, one leveraged and the other unleveraged, may differ greatly in other dimensions of risk. Leverage introduces third-party liabilities -- counterparty or direct financing obligations -- which introduce funding risk. Furthermore, the satisfaction of such liabilities and conditions thereon may require early liquidation of positions comprising the portfolio, thereby introducing asset liquidity risk. Therefore, the effect of leverage must also be examined along the dimensions of these additional two risks.

The link between leverage and funding liquidity risk is relatively straightforward: leverage amplifies funding liquidity risk. It can do so either directly, through its effects on collateral requirements or margin payments, or indirectly through its potential to amplify losses and accelerate the depletion of capital or erosion of net asset value which, in turn, may activate collateral threshold agreements, NAV triggers or other covenants, and prompt capital withdrawals. However, for a given level of leverage, the magnitude of funding liquidity risk will vary depending upon many factors. Some factors, such as low risk strategies, use of highly liquid instruments, solid access to long-term unsecured funding sources and protections against capital withdrawal, can be very effective in mitigating the effects of higher levels of leverage.

Beyond funding sources, the ultimate source of liquidity is the capacity to liquidate the assets comprising a portfolio. The ability to access market liquidity generally becomes more important as leverage, and hence third-party liabilities, increase especially when such liabilities are collateralized at current market prices. Furthermore, if leverage is employed to achieve higher levels of market risk, the potential reduction in net asset value is greater. Unless a leveraged investor is able to operate at higher levels of leverage subsequent to market losses, possibly accompanied by a partial withdrawal of capital, such an investor will have to liquidate a portion of its portfolio. A partial portfolio liquidation may result in realizations below market levels, especially under stressed market conditions, hence creating further realized and unrealized losses which, in turn, may force additional liquidations. At the same time, the situation on the funding side may grow worse, particularly if unrealized losses must be secured with collateral, as counterparties and creditors take steps to protect themselves. Further discussion of asset liquidity risk and its measures is set forth below under “Liquidity Risk”.

Avoidance of the scenario just described is not achieved by setting some exogenous limit on leverage but by careful balancing of the market and liquidity risks borne by a leveraged investor. This requires an appropriate assessment of these various risks, combining both quantitative measures and qualitative judgments. In addition, the interactions between these risks must be understood lest mitigation of one risk inadvertently exacerbate another. A sound assessment of counterparty risk includes the evaluation of the complete set of steps taken to contain these risks individually and collectively.

Accordingly, the Policy Group recommends that:

- 3 FI's should deepen and strengthen the ongoing monitoring of their own risk and the risk posed by their large trading counterparties by utilizing an integrated framework for evaluating the linkages between leverage, liquidity and market risk.

There are three substantial elements to that integrated framework, the first of which is:

3a FI's and large trading counterparties should manage the risk arising from their use of leverage by considering, among other factors, the magnifying and interconnected effects of leverage, under normal and stress conditions, on their (i) market risk, (ii) funding arrangements and collateral requirements, and (iii) asset liquidity risk. They should also evaluate factors that may mitigate the effects of leverage.

Market Risk

Most financial intermediaries and a growing number of leveraged investors utilize one or more variants of Value at Risk (VAR) methodologies to estimate, monitor and limit their market risk. VAR is a statistical estimate of the potential change in the value of a position or portfolio resulting from an adverse market move. It has become widely used because of its accuracy in assessing the normal changes in value of a portfolio, its capacity to aggregate risks across many asset classes, and show risk concentrations as they arise, and its adoption by supervisors in setting market risk capital standards. Although firms still use more traditional sensitivity measures, such as repricing gap and duration, the ability of VAR to express a wide range of risks in a common measure is a significant advantage.

If VAR's strength is in measuring a probability boundary – e.g., 99% -- it is less useful for estimating how great the loss will be for outlier events. Furthermore, since all forms of VAR estimates have limitations relating to assumptions used about market parameters, market normality and liquidity, many users of VAR estimates supplement them with the results from an array of stress tests. Stress tests attempt to provide information on potential outsized losses that could occur in the wake of extreme market moves and unusually large shifts in implied volatilities and market correlations. At present, firms are beginning to share information on how they determine which events should be simulated in their stress tests and no consensus has yet emerged: some simulate historical market shocks, some distill major market factors into a manageable set of largely independent factors and shock them individually and in combinations, some stress the factors underlying their major market or counterparty risk positions, and finally others stress those factors which exhibit the most volatility in the current market. As progress is made in the art of stress testing, firms will become comfortable supplementing their existing risk limits with ones based on stress tests.

The Policy Group believes it is best left to market participants to determine the combination of methods most appropriate under their own circumstances to measure their market risks and recommends, as the second element of the integrated framework, that:

3b FI's and large trading counterparties should prepare regular, comprehensive estimates of their market risk, applied systematically across their trading portfolios. They should be prepared to share with key credit providers, as appropriate, information on the methodologies employed and periodic updates on the level of their market risk.

Liquidity Risk

There are two separate but ultimately inter-related dimensions of liquidity. One is the ability to fund positions held and to meet, when due, the cash and collateral demands of counterparties, other credit providers and investors – so-called funding liquidity. The other is the ability to liquidate positions in various asset markets – so-called asset liquidity – which ultimately impacts the ability to manage and hedge market risk as well as the capacity to satisfy any shortfall on the funding side. The viability of a financial intermediary or large trading counterparty could be compromised by poor management of its liquidity risk, even if it is solvent on a mark-to-market basis or its leverage is relatively modest.

Funding liquidity risk is affected by many factors including the tenor of liabilities, the extent of reliance on secured sources of funding, the terms of financing and counterparty arrangements, including collateral trigger clauses, the existence of capital withdrawal rights, the availability of non-cancelable lines of credit, and the breadth of funding sources, including the ability to access public markets. In assessing funding liquidity risk one needs to understand not only what cash and credit resources are available during a period of market stress, but also what demands may arise from the providers of those resources.

On the supply side, conventional measures of cash and available credit resources include cash and cash equivalents, “buying power” and available credit lines. Buying power refers to the amount a trading counterparty can borrow against assets on a secured basis which, for purposes of assessing funding liquidity risk, is best measured assuming stress conditions. Cash capital is the term generally used to refer to capital resources needed to supplement buying power. Available credit resources are committed unsecured, undrawn credit lines. The availability of such lines under stress conditions should be critically examined.

The demand side of funding consists of potential realized losses, margin and collateral requirements, liabilities which cannot be rolled over and capital withdrawals, all assuming stressed market conditions. Margin and collateral requirements include variation margin, or mark-to-market collateral; potential increases in haircut levels, or initial margin requirements, which may occur when positions are rolled or, at other times, if counterparties or creditors have retained the right to change such requirements; additional collateral becoming due when thresholds are reached; and leads and lags in the movement of

collateral which may result from valuation disputes or the cautious behavior of creditors. Margin and collateral requirements may exceed potential unrealized losses by a considerable amount, especially if economically offsetting positions have different collateral implications or the counterparty has negotiated one-way margining arrangements.

While equity is generally thought of as permanent funding, many hedge funds allow for periodic withdrawals by investors subject to relatively short notice periods. While some funds attempt to mitigate this potential drain on liquidity by having the right to invoke an emergency to suspend such withdrawals or to make distributions in kind, these solutions present significant drawbacks and may be hard to implement.

The starting point for measuring funding liquidity risk may be a VAR calculation or stress test. However, the calculation should be adjusted to reflect the margin and collateral considerations discussed above, as well as liabilities which cannot be rolled over and potential capital withdrawals. This quantitative analysis should be supplemented by a review of the structure of liabilities and capital. Institutions should be encouraged to incorporate these elements into comprehensive contingency funding plans.

As previously stated, any funding shortfall must ultimately be satisfied through asset liquidations. Asset liquidity risk takes various forms. First, some markets are inherently illiquid or subject to frequent discontinuous shifts in liquidity. Credit providers should be especially aware of a client's normal involvement in these markets. Second, even normally liquid markets are vulnerable to temporary liquidity shocks that may be caused by such factors as major economic or political news, sudden supply shocks or unexpected official policy actions. These transient shocks ought to be expected from time to time in any market. Third, a market participant's exposure to a particular asset market may be so large that the liquidity in that market is at risk, and any attempt at position reduction triggers a liquidity disruption. Whatever the source, lack of liquidity in markets causes seemingly uneconomic and irrational decisions to be made because the price discovery process becomes dysfunctional.

There is consensus among market participants that single horizon VAR should be scaled up to account for differences in asset liquidation periods based on each asset's liquidity characteristics and the size of positions, but experts disagree on methodology. Likewise, stress tests should incorporate judgments as to price levels at which liquidity might be found. This may appear harsh for trading counterparties whose funding situation is such that, even under stress conditions, they would see no need to liquidate positions. However, since other counterparties might well be forced to liquidate similar positions,

market prices would still be depressed, resulting in an unrealized mark-to-market loss for the counterparty purportedly able to ride out the adverse market.

A robust stress test for a leveraged investor would incorporate the following elements: (a) an initial stress loss; (b) potential capital withdrawal; and (c) liquidation induced losses (both realized and unrealized). The extent of liquidation would be proportional to the percentage reduction in NAV, augmented as required by any shortfall in funding requirements not satisfied by the proceeds of such liquidation. The resulting NAV would then be compared to NAV trigger levels or to whatever minimum level would have been targeted.

Understanding the key elements of liquidity risk represents the third element of the integrated framework, and the Policy Group recommends:

3c FI's and large trading counterparties should conduct regular and rigorous assessments of their funding and asset liquidity risks that take into account: (i) the duration, stability and breadth of their funding, (ii) their degree of reliance on collateral, (iii) the strength and permanence of their capital, and (iv) the potential for market losses under stress conditions, including the additional impact of partial asset liquidation. They should be prepared to share with key credit providers information on their liquidity risk assessment methods, periodic updates of summary results and key elements of their contingency funding plans.

In summary, experience with past market crises suggests that the most useful way to evaluate leverage is not as an independent source of risk, but as a factor that can accentuate market, credit and liquidity risk. When those crises occur, these three elements of risk interact and the following forces are often set in motion:

- The distinction between market risk and credit risk blurs. That is, changes in market risk factors such as foreign exchange rates, interest rates, equity prices, and spreads, as well as in volatilities and correlations, become key determinants of how much a firm would lose if default occurs. In addition, changes in markets can affect the likelihood of default.
- Market liquidity is sharply reduced, or, as in 1998's events, virtually eliminated. Once this occurs, the amplitude and predictability of the size of financial asset price changes becomes much more uncertain; and
- Once seemingly adequate amounts of collateral and/or margin are quickly and substantially called into question, thus altering perceptions of both credit and liquidity risk and amplifying the effects of leverage, if it has not been prudently managed.

The combination of these forces represents perhaps the single greatest risk to the functioning of relationships between creditors and their trading clients. Having a conceptually sound analytical framework to understand the potential impact of these forces (as summarized here and set forth in

Appendix A), along with recommended improvements in information sharing to apply that framework, are critical elements of the Policy Group's recommendations for improved risk management practices.

Credit Risk Analysis Skills

While greater information availability and improved risk estimation tools will help, there is much more to risk management than improved data collection and risk measurement. The most important additional ingredients are experience and judgment. A lack of product and risk management expertise in the credit function, for example, might have added to the difficulties caused by the limited information obtained from hedge funds. A robust risk management process depends not only on the independence of the risk management function and the amount of information available to support their decisions, but on having the expertise necessary to analyze such information and to make informed recommendations to senior management.

In the past few years, firms have enhanced qualifications and formal training of their credit risk management staffs, but more remains to be done. Toward this end, the Group recommends:

- 4 FI's should ensure an appropriate level of experience and skills in the risk managers involved in credit decisions on trading counterparties for whom this expanded information is significant and provide those managers with access to: analytical capabilities in derivatives and other financial instruments; and risk management expertise sufficient to assess the robustness of the risk management frameworks and methods employed by such counterparties.

II Improving Counterparty Risk Estimation, Management and Reporting

In this section of the report, we shift our focus from issues related to improving the quality of counterparty credit risk assessments to opportunities for improving internal risk management tools for counterparty exposure and risk estimation and for using those tools to improve credit practices, risk analysis and senior management reporting. As noted in the prior section, when market shocks occur, three frequent interrelated consequences are: (a) a blurring of market and credit risk distinctions; (b) a sharp contraction in market liquidity; and (c) a sudden actual or potential shortfall in the adequacy of collateral. All three consequences have significant implications for internal counterparty risk management practices.

A Counterparty Exposure and Risk Estimation

As noted in the Group of Thirty's 1993 report on Derivatives: Practices and Principles, the generally prevailing market practice for measuring credit exposure related to OTC derivatives contracts starts with the use of two exposure measures: current exposure and potential exposure. Current exposure is the current market value of a derivative payable or receivable and is generally regarded as the current replacement cost. Potential exposure is an estimate of the future replacement cost. Two measures of potential exposure are typically estimated. One is expected exposure, which is an estimate of the average of (non-negative) market values over the (remaining) life of the transaction. When combined with some estimate of default probabilities, expected exposure can be used in pricing credit risk. The other is peak exposure, which is an estimate of the maximum future exposure over the (remaining) life of the transaction, using statistical analysis based on pre-determined confidence intervals. Peak exposure is typically used for limit setting and, when combined with default probabilities, for estimating the risk intensity of transactions. In cases where collateral is to be provided and updated, secured and unsecured calculations of these three exposure estimates are typically made. Finally, where multiple transactions exist with the same counterparty, and where a binding and enforceable netting agreement is in place, the transactions are typically aggregated into a portfolio and netted, with netted estimates of the exposure measures calculated. (For a more complete description of these measures and examples of how they are applied, see Appendix B.)

While there are a number of complex risk management issues raised by the application of these exposure measurement techniques to large, multi-counterparty credit portfolios, four particular issues stood out in the market crisis events of last year as warranting special attention. First, in some circumstances, current (net of collateral) exposure measures did not represent a realistic estimate of the replacement value of the

contract (or the liquidation value of the collateral), due to the impact that the size and illiquidity of the contract (and collateral) would have on market prices if immediate replacement (liquidation) had to occur. Second, peak exposure methods were generally unreliable, since they did not take adequate account of the extreme size of stress market moves or the ability to receive collateral. Third, net of collateral exposure measures did not capture either the operational and legal risks associated with collateral or the potential for limited availability of collateral. Fourth, often typical assumptions that the market risk and credit risk components of an exposure were independent proved inadequate, as there were, in a number of cases, very high and rising correlations between the size of counterparty credit exposures and the inability of those individual counterparties to meet their obligations under those exposures. In the latter case, this was further exacerbated by concentrations of similar exposure to what turned out to be highly correlated counterparties in a similar industry/country.

These are the counterparty exposure measurement issues upon which the Policy Group has focused. The stronger risk management practices which are developing to address these issues include:

- Measuring and setting limits on the degree of reliance upon collateral to mitigate credit risk, while controlling the operational and legal risk associated with collateral;
- Estimating current replacement cost and collateral value at potential liquidation (and buy-in) values, and not just current market prices;
- Using liquidation estimation techniques which reflect the potential for adverse price movements until a liquidation can occur (a VAR-type measure); as well as the potential impact liquidation might have on contract close-out and collateral valuations, either by applying judgmental stress tests or a liquidity adjusted VAR estimate which further extends time horizons;
- Evaluating initial collateral determination and any unsecured credit limits in light of the results of potential liquidation analysis;
- Estimating potential exposure based on a more realistic market model and reflecting risk reduction and risk mitigating arrangements, including the shorter timeframes these entail;
- Performing stress test evaluations of counterparty credit exposures which evaluate the potential correlation between market risk factors and the credit quality of the counterparty; and
- Establishing more comprehensive limit structures relating to (i) pre-collateral exposures; (ii) estimated liquidation exposures; and (iii) potential exposures.

Reflecting these developing strong practices, the Policy Group recommends:

5a When exposures to a counterparty are large or illiquid, the information provided by current mark-to-market replacement value should be supplemented by an estimate of liquidation-based replacement value. Such estimate should incorporate:

- The potential for adverse price movement during the period until liquidation value of the contracts with the counterparty is set and value from the counterparty collateral can be realized; and

- The liquidity characteristics of the contracts and collateral involved under both normal and stressed market conditions.

5b FI's should upgrade their ability to monitor and, as appropriate, set limits for various exposure measures including:

Current Replacement Cost: measured at market to include the benefit of netting agreements if legally enforceable with high confidence but before consideration of any related collateral.

Current Net of Collateral Exposure: measured as current replacement cost minus the net value of collateral in respect of which there is high confidence about enforceability and perfection of security interest.

Current Liquidation Exposure: measured as current net of collateral exposure based upon estimates of liquidity-adjusted contract replacement cost, the liquidation value of collateral received and the buy-in cost of collateral pledged.

Potential Exposure: measured on the basis of potential future market moves adjusted for collateral rights, threshold agreements, optional unwind rights, as well as the shorter timeframes these rights imply.

The Policy Group notes that there is no one correct way to calculate liquidation based replacement cost measures. Most approaches to incorporate market liquidity considerations into VAR type measures do so by extending the time horizon of the estimate, rather than by directly estimating the illiquidity impact on market prices. In extending the time horizon (for example from one day to two weeks) one is still assuming that the size of market moves remains normal, as a position liquidation gradually works down an oversized position, but that the liquidator is exposed to the cumulative effect of potential adverse market moves over the assumed liquidation period. The liquidity adjusted VAR measure discussed in Appendix A to this report attempts to allow for this by scaling up a two week time horizon VAR estimate by an additional factor to take account of a longer potential liquidation time horizon, but still based on assumed normal market volatility.

In practice, when confronting the sudden failure of a large counterparty or other major market shocks, market price moves can (indeed most likely will) become quite abnormal, as the markets anticipate the potential for large forced position liquidation. Also in practice, once a default has occurred, a counterparty creditor is unlikely to want to assume the market risk of taking several weeks to do a gradual unwind of collateral and contract replacements in order to determine the adequacy of any collateral it holds or to limit the size of its unsecured claim on a failing counterparty. For these reasons, estimating liquidation based replacement values may be much more like conducting a judgmental stress test of instantaneous abnormal market moves, than by doing extended time horizon analysis of normal market moves. In conducting these judgmental evaluations, which will be a valuable but difficult internal risk management task, the three key factors to take account of are: (a) potential adverse price

movements over the period of liquidation; (b) the specific liquidity characteristics of the underlying contracts and collateral; and (c) the potential for market illiquidity based on position size or transient shocks. Given the highly subjective nature of the evaluations, great care will have to be taken in interpreting the results.

B Market and Credit Risk Stress Testing

In considering the extension of stress testing techniques, the Policy Group recognizes that stress testing consumes real resources and management time on the part of businesses and control groups. It is of little value if not integrated meaningfully into a firm's risk management process. Typical weaknesses include:

- Business managers do not "buy in" to the stress testing process.
- Stress tests involve scenarios that appear implausible to business managers.
- Pre determined stress scenarios do not lead to losses, so managers deem the portfolio "safe" and conduct no further tests.
- The source of vulnerabilities of a portfolio are hard to predict.
- The results are not evaluated by a manager with authority to take remedial actions.

These weaknesses are frequently associated with stress testing that is viewed more as an exercise in regulatory compliance than as an action in a firm's self-interest.

In order to make stress testing a more meaningful exercise, risk managers are not relying solely on pre-specified risk scenarios, but are constructing customized stress scenarios that probe for weaknesses in a specific portfolio. This indicates that stress testing is being used not just to help answer "how much could I lose if..." questions, but to answer "how could I lose more than X..." questions as well. Finally, firms are increasingly testing the economic effects of stress events not just on trading portfolios, but also on credit and investment portfolios, notwithstanding the accounting conventions for those assets.

Market participants are also constructing targeted stress tests of their counterparty credit exposure, based on the recognition that: (1) the market risk factors which cause exposures to change may be correlated to the credit risk factors which cause its quality to decline, as illustrated in the integrated analytical framework discussed in Section I; and (2) there may be further positive correlation between the firm's own positions and the market factors which would impair the quality of its counterparty exposures. Stress tests of this type attempt to assess these related forms of concentration risk.

In support of these practices, the Policy Group recommends:

6a When measuring exposure to stress events, FI's should estimate both market and credit risks. Tests should assess:

- Concentration risk both to a single counterparty and to groups of counterparties;
- Correlation risk among both market risk factors and credit risk factors; and
- Risk that liquidating positions could move the market.

To make tests results useful, firms should select test procedures that reveal whether risks are material and facilitate tracing excessive risks to their sources.

6b Risk managers should work with trading and credit book managers to develop stress scenarios that probe for vulnerabilities within and across key portfolios, with particular analytical focus on the impact of stress events on large or relatively illiquid sources of risks.

C Credit Practices

In linking stress testing back to their counterparty credit risk taking decisions, credit providers recognize that trading with relatively risky counterparties without an initial commitment of their capital raises the provider's exposure to loss, particularly when financial markets are volatile. Under such conditions, variation collateral, that is, exchanging collateral as the transaction market value fluctuates, is very likely to be insufficient protection against losses. Initial collateral can be useful both to cover exposures created during the normal delay periods in delivering variation collateral and to cushion the effect of large market moves during periods of high volatility and declining liquidity.

Based on assessments of transaction riskiness and counterparty credit quality, credit providers are increasingly requiring initial collateral, in addition to variation collateral. They are also developing guidelines for initial collateral requirements based not only on volatility but also on the size and liquidity of underlying instruments, as well as the creditworthiness of a trading counterparty. In cases where initial collateral is not judged essential, limits are being linked not just to potential exposure measures but also to liquidation estimates of exposure (as discussed earlier). Finally, where collateral thresholds are being employed to frame limits for unsecured exposure, firms are evaluating them in terms of estimates of potential liquidation cost, and not just current mark-to-market values.

Firms should have the flexibility to decide, based on individual circumstances and relevant credit considerations, whether to require initial collateral and how much if any to require. In the context of the emerging strong risk management practices described above, the Policy Group recommends:

- 7a Recognizing the need for individual counterparty creditworthiness assessments, FI's should, as a general practice, require initial collateral for credit intensive transactions with counterparties whose creditworthiness depends heavily upon the performance of leveraged portfolios of financial assets.
- 7b When initial collateral is called for, the amount may be set on a transaction or portfolio basis and should take into account the factors used to develop estimates of liquidation-based replacement values.
- 7c Especially when initial collateral is not called for, the credit decision should reflect explicit risk tolerance limits for the size of potential liquidation (close-out) costs.
- 7d In cases where documentation specifies a threshold level of exposure that triggers an obligation to transfer collateral, limits on unsecured exposure should reflect updated estimates of liquidation costs and not just current mark-to-market values.
- 7e In cases where FI's participate in two-way variation collateral arrangements, estimates of liquidation costs and related credit limits should take account of the buy-in costs of collateral pledged.

D *Valuation and Exposure Management*

As firms recognize the need for greater integration of market and credit risk management, and as they apply more market risk management tools to the assessment of counterparty credit exposures, those same firms are likely to explore ways in which they might become more proactive in the management of that type of credit exposure. To some degree, that is already occurring, as a number of structured credit securitizations have included within those structures claims represented by OTC derivative receivables.

In the past, prevailing market practices for managing counterparty credit risks have not provided incentives for proactive management of such risks. In part, this may reflect limited use of market-based internal risk transfer charges to reflect initial and ongoing differences in credit quality, as well as liquidity considerations. Large OTC derivative dealers face the challenge of providing incentives for business managers to pursue profitable business by assuming counterparty credit risk, while at the same time keeping such risk under control. While improved risk monitoring and internal controls will help, proper alignment of internal incentives could make counterparty risk management even more effective.

Many firms have taken the first step in this regard by recognizing and setting aside an estimate of the credit cost associated with these risks in the form of a credit valuation adjustment to the fair value of its receivables. An emerging strong practice is to charge this cost back to the relevant businesses, in order to give risk-taking businesses incentives to choose and adequately price the risks they incur. When exposure and expected loss estimates are updated as market factors and counterparty quality change, the impact is reflected in changes to the credit valuation adjustment and in the profit and loss of the relevant businesses.

For credit risk, expected losses are best viewed as a cost. The role of capital is to provide a buffer to cover unexpected losses. Capital, of course, also has a cost. In order to create incentives for managers of risk-taking businesses to take account of the capital at risk to support counterparty credit exposure, some firms are developing methodologies to charge businesses for their use of economic capital set aside to cover greater-than-expected counterparty losses at the confidence interval and time horizon appropriate to the firm. Because the purpose of economic capital is to absorb risk, an emerging strong practice is to allocate the firm's economic capital and its costs among various businesses according to the riskiness of each business. Much remains to be done before these practices reach full acceptance within the market and there is no one correct way to provide these incentives. Recognizing the need for different, firm specific approaches, the Policy Group recommends:

- 8a FI's should establish internal counterparty credit risk cost allocation and valuation practices that provide incentives for trading business and credit risk managers to manage proactively their counterparty credit risks. This could include methods for recognizing the costs of credit risks in internal risk or capital charges, proactive adjustments to limits, as well as tools for periodically evaluating the adequacy of credit valuation adjustments to asset carrying values.

Another element of valuation management concerns the extent to which both FI's and counterparties follow rigorous independent position valuation practices that reflect realistic estimates of the realizable value of their positions. Some FI's and many counterparties only mark securities and derivative contracts to internal mid-market prices, which may well overstate their realizable value. In addition, there may be a lack of clear and consistent procedures for making fair value adjustments to mid-market values, especially for instruments that lack readily observable secondary market prices.

The 1993 Group of Thirty report recognized the need for strong internal valuation practices at OTC derivative dealers. Since then, a number of firms have drawn on their experiences in a wide variety of market shocks and crises to further enhance and strengthen their internal practices. Specifically, firms are establishing clear guidelines for applying fair value adjustments to internal, mid-market valuations. Such practices are characterized by: (1) independent checks conducted by internal financial controllers; (2) the use of external third party price sources, primarily from the broker community; and (3) the growing use of independent derivative valuation services.

To reinforce the importance of strong internal valuation practices at dealers and to encourage the adoption of broadly similar practices at large trading counterparties, the Policy Group recommends:

8b Both FI's and large trading counterparties should develop and apply strong, consistent independent price verification procedures. These procedures should include fair value adjustments to mid-market values which should be assessed dynamically and consistently to account for:

- Open risks that are marked to either the bid or offer side of the market;
- Illiquidity characteristics of complex instruments or positions;
- Credit valuation adjustments to address credit quality, generic credit market spreads and any substantial specific repayment concerns;
- Operational and model risks associated with complex or large positions; and
- Servicing costs associated with the ongoing hedging of transactions.

Efforts should be made to apply external sources, as well as independent valuation services, as appropriate.

E Management Information Improvements

Senior management is ultimately responsible for determining the firm's capacity and tolerance for risk and for ensuring proper implementation of risk management policies, procedures and controls, including for its principal risk taking and counterparty credit activities. It is also responsible for ensuring a proper flow of risk information to the firm's Board of Directors to facilitate the Board's ability to conduct adequate oversight. An important attribute of a strong risk management framework is the degree of internal risk transparency, including the quality and timeliness of risk management information available to various members of a firm's senior management group. In most firms, the independent risk management unit is charged with responsibility for designing and enhancing a flexible risk reporting framework to achieve the desired degree of transparency. This inevitably entails finding a balance between information overload and oversimplified aggregate data; between consistent, integrated risk reporting and customized reports adapted to new product developments and changing market circumstances; between quantitative measures of risk and qualitative contextual information; and between timely, largely accurate risk information and stale but precise, verified reports.

The first step toward a strong internal risk reporting program is clarity on responsibilities. In this regard, the Policy Group recommends:

- 9 *Responsibilities*: As part of its responsibility for overall risk management policies and practices, senior management should convey clearly information on its overall tolerance for risks, including loss potential in adverse markets. This type of information should also be conveyed to the firm's Board of Directors, as appropriate. The independent risk management function should be responsible for designing a flexible reporting framework to enable senior management to monitor its risk profile relative to its expressed risk tolerance.

As firms enhance their risk management practices along the lines discussed in this report, opportunities will arise to refine and further improve on the considerable amount of risk information already provided to senior management. Among the risks that senior management information should help to assess are:

- Market risks that are large relative to allocated capital resources;
- Current and potential counterparty exposures that are large relative to allocated capital resources, including very large exposures associated with low probabilities of default and smaller exposures with high probabilities of default;
- Large correlated risks, including correlated market and counterparty credit risks; and
- Uncorrelated risks that may become large if they become correlated under stressed market conditions.

Most firms' internal risk reports provide good coverage of large market risk positions relative to internal limits and allocated capital resources. Moreover, as practical advances are made in stress testing for market risks, the results of those analyses typically are included in high level management reporting. The more complex management reporting issues arise from large credit exposure and risk reporting and the emerging correlations between market and credit risks. Specifically, with regard to large exposure reporting, the senior management reporting challenges include:

- Inconsistencies and deficiencies in the completeness of reported exposures, primarily caused by the complexities involved in aggregating exposures which arise from activities that are separately managed and use systems that are not fully integrated;
- Information that has been netted down to reflect netting agreements and collateral arrangements which depend upon judgments made as to enforceability of netting and collateral arrangements, not all of which may reflect high confidence in the enforceability mechanism;
- Reporting credit exposure measured only at current mid-market when the actual exposure to a counterparty may turn out to be substantially higher due to losses that may be incurred during the course of liquidating a counterparty position or associated collateral;
- Limited use of potential future exposure information because of misunderstanding about the nature of the calculation or lack of confidence in its methodology. In particular, the use of long horizon modeling without appropriate adjustments in situations involving collateral, mark-to-market agreements, or optional unwinds can lead to unrealistically large potential future exposure amounts; and
- Insufficient analysis of the market sensitivity of the size and quality of exposures to a large counterparty and across a group of correlated counterparties.

The complexity of many credit exposures requires that senior management information report different but complementary large exposure measures in order to develop a well-rounded assessment of aggregate credit risk. Ultimately, firms will move to an approach based on large risk reporting, not just large exposure reporting.

The definition of large exposure is relative. Large exposures might include exposures that are large in absolute size, large relative to their applicable limits, large within their rating categories or large in terms of economic capital usage (large risks). Exposure reporting should cover all activities with a counterparty and reflect the replacement cost of derivative contracts, repo agreements, stock borrow and loan agreements, margin loans, and nonregular-way settlement trades, as well as the market value or stated value, as appropriate, of other financial instruments such as loans and securities, in respect to which the counterparty is the obligor. Given the range and complexities of the different products that can give rise to exposure to a counterparty, as well as the different ways to regard collateral relative to those products, there is no easy way to aggregate exposures across products and to highlight excess or deficient collateral positions. Ideally, the information in senior management exposure reports should be sufficient to highlight follow-on questions, rather than seek to provide all product level detailed answers.

In this regard, it may be appropriate to exclude from routine senior management reports, or treat separately, highly transient and potentially very large exposures representing pre-settlement risk of regular-way transactions and settlement risk of all transactions - e.g., Herstatt risk and non-delivery-versus-payment risk. Regardless of how these exposures are treated in reports to senior management, they should be monitored against existing limits by business units and the credit department.

As set forth in Recommendation 5b, appropriate generic components of credit exposure to use for senior management information include current replacement cost, current net of collateral exposure, current liquidation exposure, and potential exposure. For any counterparty, each of these is best analyzed in combination with the others, each component providing a different and complementary insight about the nature of the exposure to the counterparty.

The credit quality of certain counterparties and the size of the exposures they create for their providers of credit are very sensitive to movements in specific market risk factors. Senior management information should contain qualitative and quantitative analysis that helps to identify such counterparties where the application of specified movements in certain market risk factors would cause either (i) an increase in the provider of credit's exposure to such counterparties beyond certain thresholds, (ii) a material deterioration in the credit quality of such counterparties, or (iii) a simultaneous material increase in exposure and deterioration in credit quality.

Developing such exposure, credit quality and market/credit correlation watch lists requires performing market stress tests on a firm's counterparty positions and potentially using the information obtained from

counterparties on their overall risk profiles. To the extent such information is confidential, FI's should conform to the agreed upon uses of such information and respect the safeguards against its misuse, all as discussed in Recommendations 2a and 2b of this report.

It should be recognized that few firms' credit risk management systems can now provide on a timely basis all of the information called for above. Firms should evaluate the need to upgrade their capabilities and, in the interim, senior management should receive the portion of this information that can be generated, even if that involves less extensive and more manual, approximate, and infrequent production than is ultimately planned. Specifically, the Policy Group recommends that:

10 *Large Exposure/Risk Reporting*: Senior management should receive periodic information on large counterparty exposures/risks. These reports should meet the following standards:

- Aggregate exposure to a counterparty should include all material on-and off-balance sheet exposures relating to such counterparty.
- Exposures should be measured under conservative assumptions as to the efficacy of netting and collateral arrangements.
- Position replacement cost and collateral values should be measured both at market and estimated liquidation value.
- Potential exposure measures should be robust and appropriately reflect risk reduction and risk mitigation arrangements.
- Quantitative and qualitative analysis should be used to identify counterparties for which large moves in specific market risk factors would result in large exposure levels, a material deterioration in credit quality or both.

Where a firm has introduced credit risk measures that capture both exposure and credit quality, it could rely upon those measures to determine appropriate coverage in senior management reporting.

Last year's market crisis has highlighted the risks resulting from positive correlation among a dealer's principal positions, counterparty positions and collateral received or posted, whether the counterparty defaults or merely is forced to liquidate certain positions. Traditional division of labor between credit and market risk management functions, as well as the inherent computational difficulties, have hampered the development of estimates of such risks. To remedy this, a firm should undertake integrated analyses of its own market and counterparty credit risk by exposing its counterparty positions (on a bilateral basis) and collateral and its principal positions to stress tests of the primary risk factors to which the firm's principal positions are sensitive. Firms need to consider the legitimate confidentiality needs of their counterparties as they build bridges between their counterparty exposure and market risk measurement competencies to facilitate the management and measurement of integrated risk concentration analyses. Specifically, the Policy Group recommends:

11 *Concentration Analysis*: Senior management information should highlight possible concentrations of market and credit risk resulting from positive correlation among the firm's own principal positions, counterparties' positions with the firm and collateral received or posted. In preparing such reports, due regard should be given to understandings reached with counterparties on access to and uses of counterparty proprietary information.

Advances in quantification of market and credit risk in recent years have substantially enhanced the ability of senior management to monitor and control a firm's aggregate risk profile. These quantitative measures, however, cannot be expected to encompass every risk facing the firm and they will generally involve the use of methodologies and assumptions that may not be robust in some circumstances. Without appropriate contextual information, senior management may not be able to interpret these measures correctly in light of their strengths and weaknesses. Furthermore, senior management information must avoid two common predicaments: oversimplification, which may give management false comfort, and undecipherable complexity, which may lead senior management to ignore the information altogether. Finally, there is a great need to avoid a "silo" approach to risk management and reporting, that is, an approach which treats often interdependent elements of risk as separate and independent categories. Avoiding such an approach involves coordination across traditional market and credit risk management disciplines as well as inclusion of the collateral management, client documentation, and operation control groups.

For these reasons, senior management should periodically receive and review relevant qualitative risk information that provides context for and supplements the quantitative risk information it receives.

Among the more important topics that should be addressed periodically are:

Data Integrity and Completeness: including the sources from which reported data is drawn; the quality, completeness and timeliness of data; and the nature of controls to ensure data integrity and completeness.

Model Assumptions and Limitations: including strengths and weaknesses of risk quantification and aggregation methods; what risks are not captured; what risks are poorly captured; and how models are back tested.

Valuation Methods and Limitations: including controls over the marking process; exceptions to normal mark-to-market policies; methodology for fair value adjustments, methodology of illiquidity and/or concentration adjustments; validation and calibration of valuation models; and valuation of collateral.

Legal Uncertainties: including enforceability assessments with regard to netting and collateral; assessments of ability to perfect security interests in collateral under the circumstances relevant to a firm's various positions; and how well judgments on such issues are reflected in exposure measurement systems.

Documentation: including the status of documentation covering, for example, the number and importance of undocumented transactions, unsigned masters or collateral agreements; the degree of

involvement of credit department in reviewing credit terms in documentation; and how well credit terms are reflected in exposure measurement systems.

Margin and Collateral Management: including the degree of involvement of credit department in setting margin and collateral terms for individual transactions; how well margin and collateral activities are integrated in exposure measurement systems; and the adequacy of monitoring of collateral concentration and liquidity.

Specifically, the Policy Group recommends:

- 12 *Contextual Information*: Senior management should periodically receive contextual information sufficient to assess the degree of reliance placed on quantitative risk management information, to highlight key judgments and assumptions involved in developing the quantitative risk information, and to shed additional light on a firm's overall risk profile.

III Improving Market Practices and Conventions

Within this part of its review, the Policy Group has evaluated opportunities for improving risk management through improvements in general market practices and conventions. The Group focused on three broad areas: (a) improvements in documentation policies and practices, with special attention to timeline issues; (b) improvements in documentation content, with special attention to close-out and valuation issues as well as the "basis risk" arising from inconsistencies across standard forms of industry documentation; and (c) improvements in collateral management practices, building upon the excellent review recently completed by ISDA. All of the many recommendations for change have two common objectives: (1) to improve a creditor's ability to deal in a timely and effective way with distressed/failing counterparties; and (2) to enhance the market's capacity to contain the risks of failures of large leveraged participants -- be they intermediaries or end investors. The Policy Group believes that all of these detailed recommendations have merit and warrant careful evaluation by firms and industry trade associations. The Group stresses the particular importance of enhancing standard industry close-out mechanisms. It is in the market's best interest to have close-out arrangements that produce commercially reasonable valuations that can be implemented quickly, even in stressed market conditions, and that have a high degree of legal certainty in the resulting claims.

Documentation Policies and Practices

The global financial markets operate through an interconnected series of contracts among market participants ranging from global commercial and investment banks, to corporate end-users, to individual investors. Although written documents may not be, per se, necessary to establish a contract, they are the best evidence of the terms of a contract and the best way to ensure that parties agree on the specific terms of a transaction. Failure to document a transaction appropriately or expeditiously, therefore, creates risk. To that end, lapses between the time a transaction is entered into and the execution of documents evidencing the transaction can give rise to the risk that one of the parties could walk away from the trade or dispute its terms. In a related manner, inaccurate or incomplete documents could lead to litigation when parties misunderstand their obligations and, as a result, fail to perform as expected. Equally significant, market participants can confront unexpected market and credit risk as a result of misunderstandings about how documents work, particularly in disrupted markets. Close-outs of transactions in which trading desks experience unanticipated market and credit losses during contractual grace and notice periods provide a good example of this risk. In addition, in litigation, documents are frequently put under a microscope and any flaw is magnified and used as an excuse for non-performance.

Documentation risk can be controlled with adequate staffing and strong practices. These practices have several benefits. First, they can effectively reduce the time between trade date and the codification in writing of the trade. Second, the documentation process permits parties to address, upfront, issues that may seem distant or irrelevant at the time of negotiation, but could become material in the event of a dispute. Third, the process provides a forum for parties to agree upon numerous issues in a non-litigious setting. Finally, it permits the discussion of the legal nature of the relationship between the parties and codification of that relationship before problems arise.

Recognizing that documentation risk is controllable, the Policy Group recommends that:

13 FI's should have in place written policies to manage documentation risk. Such policies should be approved by senior management and reflect the nature and scope of their business and risk profile. Such policies should address the following factors:

- Creation and execution of documents pertaining to privately negotiated OTC transactions, including master agreements and confirmations;
- Sensitivity to documentation risk factors, such as counterparty credit quality, jurisdiction and transaction complexity;
- Procedures for identification of principals acting through agents;
- Timelines for completion of master agreements and confirmations;
- Procedures for granting exemptions and exceptions; and
- Procedures for tracking backlogs and violations.

Individual firms will, of course, make different determinations regarding the provisions contained in such policies, the nature and weight of risk factors, as well as the application of risk factors in implementing and enforcing the policy.

Timeframes and Monitoring

With respect to documentation practices, the Policy Group noted that completing confirmations and master agreements sometimes takes longer than expected, both in transactions between FI's and with end-users. Delays in the documentation process can delay the identification and resolution of misunderstandings, potentially increasing risk. Delays in executing master agreements with counterparties, for instance, can contribute to increased legal uncertainty that may undermine the potential benefits of netting in the event of a close-out. In certain cases, the failure to obtain appropriate evidence of counterparty authorization could expose dealers to the risk that a counterparty disavows a losing trade on the basis that it was unauthorized. Some firms have developed internal policies requiring specified time frames for executing master agreements and sending out confirmations. In the latter

regard, many cash and securities products and some plain vanilla OTC derivative products already benefit from short, well-established time frames for initiating confirmations.

The Policy Group believes that executing master agreements and sending out confirmations in a timely fashion are key factors in reducing documentation risk. At the same time, the Group recognizes that prudent credit and related considerations should not be sacrificed for timeliness alone and that timeliness is but one element of an effective documentation policy.

Mindful that timeframes cannot and should not apply on a “one size fits all” basis, the Policy Group recommends that:

14a FI's should adopt a goal to execute new master agreements within 90 days of a transaction and, pending such execution, utilize a "long form" confirmation that incorporates the industry standard form of master agreement.

14b FI's should send out confirmations for privately negotiated OTC transactions by the business day following the trade date and, within five business days thereafter, assure themselves that there is agreement with their counterparty on the material terms of the trade and that they have written evidence of their binding agreement. There should also be agreement at the outset of a relationship on which party will initiate the confirmation.

The Policy Group emphasizes that these timeframes are aspirational. Firms make risk-based trade-offs between adhering to set timeframes for completing largely standard documents and seeking enhanced credit or other contractual provisions that may require extended negotiations. For example, there will be some circumstances where it is appropriate to execute masters prior to entering into a new counterparty transaction relationship, as well as other instances where longer timelines may be appropriate to ensure adoption of customized credit terms or to address complexities specific to a counterparty or jurisdiction. These types of risk-based decisions should be encouraged, so long as senior management understands the nature and extent of the trade-offs. Documentation policies should be expected to reflect such trade-offs, including exemptions or exceptions for new or complex products or counterparties from jurisdictions that present language or cultural hurdles to expeditious completion of documentation. Examples could include exemptions from standard deadlines for confirmations for structured credit and equity derivatives, for which industry standard templates do not yet exist or are not widely accepted.

The Policy Group, nevertheless, believes that it is fundamental to confirm the terms of a binding contract between counterparties swiftly after the transaction. The Group accordingly wishes to use this opportunity to raise the bar on timeframes as a goal, recognizing that some policies will differ and that appropriate and soundly based exceptions and exemptions play a critical role in the process.

The process for confirming trades can also be improved in several additional respects. For instance, with respect to certain OTC derivatives products (e.g., equity derivatives and credit derivatives), FI's often prefer to use their own confirmation template or to modify a standard industry template. Reasons for doing so include legal risk tolerance, regulatory considerations, organizational structure, and internal policies. Also, standard industry templates often do not keep pace with the rapid innovation that characterizes the privately-negotiated OTC derivatives market. These considerations can significantly lengthen the confirmation process.

Recognizing the risks inherent in delayed confirmations, the Policy Group encourages industry associations (e.g., TBMA, ISDA, EMTA, BBA, IBMA) to identify and address potential obstacles to timely confirmations in their market segments and consider developing market conventions regarding who prepares the confirmation. For products that are simple, well understood or standardized, many firms already operate well within short time frames through automated means. The Policy Group encourages expansion of these practices.

A particularly important element in an effective documentation policy is clarity on procedures for granting exemptions and exceptions to policy. Exemptions may be thought of as classes of activities, transaction types or counterparties for which elements of general policy need not apply (i.e., an exemption from the requirement for an approved credit facility to conduct regular way DVP trading of government bonds). Exceptions represent situations where the elements of general policy should and would normally apply but a conscious risk based decision is made to waive or delay the application of policy to a specific transaction or counterparty. Firms with strong documentation practices have developed internal policies specifying roles and responsibilities for granting exemptions and exceptions, for identifying factors to be considered in the process (e.g., counterparty credit rating, maturity, existence of related documentation, and operational risks), and quickly elevating disputes. Adopting a workable exemption and exception process is critical to an effective documentation policy. Once this is established, firms can put in place effective risk-based monitoring and reporting mechanisms, as well as incentives and/or constraints on future business dealings to reinforce desired behavior. Reflecting these considerations, the Policy Group recommends that:

14c FI's should track unexecuted masters, unsent confirmations and unaffirmed trades, develop a risk-based approach to clearing backlogs and report to senior management material deviations from internal documentation policy. Furthermore, they should develop incentives for business units and clients to correct material deficiencies in their documentation practices, which might include trading restrictions, mandatory unwinds and reserves for losses.

Similarly, the Policy Group notes that manual processes involved in some market segments (e.g., equity derivatives, credit derivatives and non-deliverable forwards) also contribute to documentation delays. A number of market segments already benefit from automation in the matching/confirmation process (e.g., FX spot, cash debt and equities in several countries). The Policy Group believes there is scope for further improvements, both for risk management and control efficiency, by extension of these automation techniques to additional segments of the OTC markets. Accordingly, the Policy Group recommends that:

- 15 Industry participants should support efforts to introduce greater automation in the documentation process for privately negotiated OTC contracts. The Policy Group also encourages service providers to consider new opportunities that may exist in these markets, and it encourages regulators to work in cooperation with industry participants and service providers to facilitate these efforts and refrain from erecting regulatory barriers that may impede service innovations.

B. Documentation Content

Over time, various trade associations have developed standard form documentation, such as the 1996 TBMA Master Repurchase Agreement, PSA/ISMA Global Master Repurchase Agreement, 1992 ISDA Master Agreement, and the 1997 FEOMA Agreement. These industry-wide standard documents are all aimed at particular market segments; market participants expended extensive efforts in helping to draft these documents. The Policy Group reviewed all of these documents in light of market practices and the market disturbances of 1998 to determine instances in which: (i) provisions of agreements did not function as expected, (ii) lack of consistency among product documentation led to incongruous results, (iii) certain provisions which are not commonly included in such documentation were identified as necessary, or (iv) as a result of documentation provisions, credit or market exposure was greater than intended or previously understood.

The Policy Group focused on the following areas involving documentation content: (i) close-out and valuation procedures, (ii) risk reduction arrangements, including netting, and (iii) contract termination provisions. These areas presented the greatest challenges in the market environment of 1998. The Policy Group engaged in extended discussions with working group member firms, as well as end-users and certain of the trade association sponsors of the standard documents.

Close-Out and Valuation

The events of 1998 revealed that close-out and valuation procedures do not always function well, particularly in adverse market conditions. Market disruptions also underscored inconsistencies among agreements that led to differences in the valuation of functionally equivalent transactions documented with different standard agreements, giving rise to documentation “basis risk”. Parties had difficulty valuing transactions, were unable to do so, and, in some cases, confronted contractual provisions that specified procedures that could have produced manifestly inappropriate valuations. For example, under ISDA’s Market Quotation valuation methodology, which is prevalent in the swaps market, parties generally are required to obtain five dealers’ price quotes for closed-out transactions. This mechanism proved difficult and sometimes impossible to implement when trading desks at dealers across the globe struggled to manage their own positions and could not value trades for others, and when irregular, illiquid or non-transparent markets were involved, such as the Russian markets in the summer of 1998. When the Market Quotation method did not work, market participants became concerned that they might be second-guessed by defaulting parties in litigation as to the appropriate or permissible steps to be taken to value affected transactions. In particular, market participants had concerns that questions would arise regarding their decisions as to when it was appropriate to revert to the Loss method (based on a commercially reasonable and good faith standard) contained in ISDA documentation as an automatic fallback. Some market participants perceived that these questions added a dimension of legal risk that further complicated an already difficult situation.

Inconsistencies across standard documents also gave rise to documentation “basis risk”, particularly in the case of close-outs of ISDA-documented swap transactions based on a particular asset using Market Quotation, hedged by TBMA-documented repos on that same asset. In that scenario, firms valued close-outs of repos in a commercially reasonable, good faith manner as prescribed by the applicable TBMA form and were able to do so quickly and efficiently, while the swap valuation was subject to delays and, in some instances, produced an implied value of the underlying asset that was different from that produced in the repo hedge valuation.

As an emerging practice, individual dealers have begun to address close-out and valuation concerns on a cross product basis. Some dealers have begun to select ISDA’s Loss method instead of Market Quotation.

As a guiding principle, the Policy Group believes that there should be a common standard for close-out and valuation procedures across documents and related financial instruments. In the Policy Group’s view, this standard should be that such procedures are commercially reasonable, expeditious and

practically workable, in addition to maintaining a high degree of legal certainty. The Policy Group notes that ISDA's Market Quotation method sometimes failed to operate in a workable, expeditious fashion during the market disruptions of 1998. Moreover, it is significant that the Market Quotation method, as a prescribed technique, is the exception to the standard contained in TBMA/GMRA and FEOMA documentation. The flexibility granted non-defaulting parties under the TBMA/GMRA and FEOMA documents, as well as the ISDA Loss method, plays an extremely important role in promoting well-functioning markets. Again, as a guiding principle, the Policy Group believes the use of a market quotation technique should be viewed as one way to achieve, via contractual agreement, a commercially-reasonable, good faith valuation of damages under a loss method standard, rather than as a competing methodology. In that regard, the flexibility to value or close-out defaulted transactions for purposes of assessing damages in good faith and in a commercially reasonable manner under these standardized documents should be maintained and should be respected by courts and in other dispute resolution contexts.

The Policy Group, therefore, recommends that:

16a *Close-out and Valuation*: Documentation should be revised as necessary to ensure that a non-defaulting party has the flexibility to value transactions in a good faith and commercially reasonable manner. This should be a common industry standard, as incorporated in the TBMA/GMRA, and FEOMA agreements and ISDA's Loss methodology.

In many instances, an effective way to achieve the commercially reasonable valuation contemplated by the Loss method will involve reliance upon market quotations. For that reason, the Policy Group believes that the effectiveness of a market quotation technique should be enhanced. Specifically, the Policy Group recommends that:

16b To the extent that market quotations are employed to achieve commercially reasonable valuations, ISDA agreements should be modified to provide that:

- Potential quotes provided by third parties may include not only price, but also yields, yield curves, volatilities, spreads or other relevant inputs. These inputs should be based on the size of the transaction, the liquidity of the market and other relevant factors.
- The number of third parties from whom inputs are sought may be reduced.
- Third parties from whom inputs may be sought may include not only dealers, but also major end-users, third party pricing sources or other relevant sources.
- Market quotations are but one means to achieve good faith valuations and may be by-passed when, in the judgment of the non-defaulting party, they are unlikely to produce a timely and commercially reasonable result.

These clarifications of, and improvements to, the market quotation technique will prove useful to parties with ISDA Masters already in place or those selecting that technique, while at the same time facilitating a move to common industry standards for close-out. The Policy Group wishes to emphasize that these enhancements should not reduce the flexibility to value transactions without third-party inputs under TMBA, FEOMA, Loss or any other commercially reasonable, good faith standard. In that connection, the Policy Group notes that parties selecting Loss may wish to use the mechanics of market quotation to evidence a commercially reasonable good faith valuation, although they should not be required to do so. Equally significant, the Policy Group emphasizes that market quotation in its current form is legally enforceable and future revisions to the market quotation method should not undermine this enforceability. Finally, the Policy Group recognizes that achieving enhancements and harmonization to standard industry close-out procedures could take considerable time. Given the importance of these procedures, all relevant industry associations are urged to turn their attention to this, and the twelve member firms in the Group commit their support to such a joint effort.

Other Credit Related Provisions

While improving close-out practices is the single most important change in documentation content, there are a number of other credit related features of industry documentation in which the Policy Group feels significant improvements can be made. As noted in summary Recommendation 17, this covers a broad range of both complex legal issues as well as detailed operational risk controls. Taken together, the specific suggestions for improvement which follow represent a comprehensive framework for significant reductions in counterparty credit related legal and operational risk. These particular points should be viewed as representing the detailed elements in support of that summary recommendation:

- 17i *Delivery of Notice*: Documentation should be revised as necessary to permit delivery of notice by any commercially reasonable method that is legally sound in the relevant jurisdictions (e.g., facsimile or e-mail sent with telephone confirmation satisfying sender's burden of proof as to delivery).
- 17ii *Payment Netting*: Documentation should be revised as necessary to provide for the netting of all amounts (in a single currency) that are payable on the same day. At the most elementary level, documentation should provide for payment netting across like kind transactions. To be more effective, documentation should provide for payment netting across multiple products appropriately linked under a master agreement, or by a master-master.

The Policy Group also recognizes that netting and set-off are extremely valuable methods of reducing risk. Specifically, with respect to payment date netting, there generally exists the ability to net same day payments. Some firms have modified TBMA/GMRA annexes to reinforce and implement payment date

netting. Even where the ability exists in the governing agreement, many parties have limited systems capabilities to calculate net payments. Failure to net same day payments for either reason leads to potentially increased exposures. The Policy Group understands that not all firms' systems can currently support payment date netting. In such cases, other settlement risk mitigation measures could be developed which require less extensive systems support. These might include: (a) use of escrow arrangements to ensure that deliveries or amounts are released only against receipts; and (b) supplemental collateral requirements to cover intraday settlement risk.

17iii Cross-Product Obligation and Collateral Netting: Parties should make the best possible use of multi-product master agreements, and master-masters, to facilitate obligation netting and collateral netting across product lines. Where the parties do not have the ability to net collateral, documentation should be modified, subject to applicable law, to entitle the secured party to retain excess collateral to secure other obligations of the pledgor to that party.

As in the case of payment date netting, parties should develop the systems support needed to calculate, on as close to a real time basis as is practical, the net amount of collateral deliverable to or by a counterparty on any given day under all outstanding agreements and in respect of all product categories. As enhanced systems support becomes available, documentation should be modified to effect, to the fullest extent possible, cross-product collateral netting. The scope of such netting ultimately should be as broad as the legally supported scope of close-out netting.

17iv Set-off: Where permissible under applicable law, documentation should be modified to allow the non-defaulting party to exercise broad rights of set-off. These include:

- The right of the non-defaulting party to set-off against obligations of the defaulting party.
- Obligations of the non-defaulting party to the defaulting party under other transactions or other documentation.
- Collateral or property of the defaulting party held by the non-defaulting party in connection with other transactions or under other documentation.
- Obligations of affiliates of the non-defaulting party to the defaulting party under other transactions or under other documentation.
- Collateral or property of the defaulting party held by affiliates of the non-defaulting party in connection with other transactions or under other documentation.
- Obligations of the non-defaulting party to affiliates of the defaulting party under other transactions or under other documentation.
- Collateral or property of affiliates of the defaulting party held by the non-defaulting party in connection with other transactions or under other documentation.
- The right of the non-defaulting secured party to transfer excess collateral to an affiliate of the secured party to secure obligations of the pledgor to such affiliate.

Despite the best use of master agreements, parties may have to rely on post close-out set-off rights to net termination amounts attributable to (i) products beyond the scope of those master agreements or (ii)

transactions involving non-parties to the master agreements (most importantly, affiliates). The enforceability of these set-off rights under current laws may be more limited than is consistent with the need to manage risk exposure on a cross-product, cross-affiliate group basis. Accordingly, market participants should work to change existing law to permit increased cross-product, cross-affiliate set-offs. In this connection, the Policy Group endorses the recommendation to strengthen netting and set-off legislation set forth in the Report of the President's Working Group on Financial Markets.

17v *Events of Default*: Cross-default provisions in each agreement should, at a minimum, include as an event of default thereunder any default by the counterparty under any other transaction or agreement with the non-defaulting party or the non-defaulting party's affiliates. Parties should consider the need for broader cross-default provisions in individual cases.

Cross-default provisions exist in some, but not all, agreements, rendering non-defaulting parties uncertain of their ability to terminate agreements in certain circumstances, notwithstanding concurrent defaults under other agreements with the defaulting counterparty. Existing cross-default provisions vary in breadth of application; some are limited to counterparty default, while others may be triggered by counterparty affiliate defaults. Some are limited to defaults between the parties (or perhaps their affiliate groups), while others reach defaults under agreements with unaffiliated third parties. Generally speaking, the Policy Group believes that documentation should expand the use of cross-default provisions.

17vi *No-Fault Termination*: Documentation should be modified as necessary to specify the consequences of events such as changes in law, changes in tax rules, regulatory changes, or governmental actions that render performance substantially more difficult or expensive or introduce substantial uncertainty.

The concept of "no-fault" termination events (such as a change in tax laws), exists in ISDA's standard documentation, but not in TBMA/GMRA or FEOMA. The Policy Group believes it is appropriate to include this concept in all standard documentation, and its corollary of mid-market termination pricing of transactions should be evaluated by each association for possible use.

17vii *Acts of God*: Documentation should be modified as necessary to define and capture various such events to the extent that they are not clearly covered by existing provisions. It is imperative that contracts remain enforceable according to their terms, notwithstanding the occurrence of such events and that counterparties have a clear agreement at the time the contract is made as to the consequences of such events and the method of valuation in the case of such events. In no event should either party be entitled to walk away from its obligations as a result of the occurrence of such an event.

During 1998, it became apparent that contractual provisions regarding the consequences of “Acts of God” or “impossibility” of performance play a key role in ensuring contractual expectations are fulfilled. Trade associations should study the recommendations to be proposed by the FMLG/FXC/ISDA/EMTA working group to address this issue and develop and implement similar recommendations and procedures for other markets.

17viii *Coordination*: The documentation and credit functions within each firm should be coordinated to ensure that any required credit condition, such as an obligation to provide specified financial information, to maintain a specified financial condition, or to provide notice of any failure to maintain a specified financial condition, is appropriately incorporated in the firm's documentation and the consequences thereof specified.

Strong documentation content is of limited value if there is an absence of effective coordination between the credit function and the documentation control group. This last point becomes particularly important given the increased emphasis on improved information sharing. That is, financial information and documentation (as opposed to authorization information and documents) are not consistently requested, provided or reviewed. Adequate penalties for the failure to deliver financial and other credit related information and documents generally do not exist or are not enforced. The Policy Group believes that to encourage transparency, documents should specify the kinds of information that a firm should provide (along the lines suggested in Recommendation 1 of this report) so that its counterparty can make an informed credit judgment, as well as the consequences of not providing agreed to information.

Harmonization

As noted earlier, an important potential source of credit problems is the lack of consistency of key provisions across standard documentation. There are differences not only with respect to valuation procedures, but also, time-sensitive notice periods for close-outs following a failure to make payments or deliver collateral. These inconsistencies give rise to discrepancies between the market risk to which parties were actually exposed and the measurement of those risks by internal risk monitoring systems, diminishing the reliability of the risk management process. This lack of uniformity in timing accordingly exacerbates documentation basis risk, which is the risk that one leg of a transaction could be unwound at a different time and at a different price from a related leg, in a way that is not reflected in firms' risk management systems. This is particularly true where there is a payment or margin failure and the documents contain different grace periods. Individual dealers have begun to address these problems through the use of master-masters that encompass multiple master agreements and by revising individual master agreements to include cross-default provisions. The Bond Market Association is developing a standardized cross-product master netting agreement that will trigger a cross-default and preempt notice

periods in the event of a default under a document. The Policy Group supports the TBMA's efforts and encourages other trade associations to endorse the final document.

Events of Default are another example of the lack of consistency across products that results in anomalies in close-outs. Different standard agreements contain different events of default, leading to incongruous results or unexpected risks upon close-out. The differences across agreements regarding Events of Default present another example of documentation basis risk.

A clear example of inconsistencies concerning Events of Default relates to insolvencies, which are addressed differently across standardized documentation. Events of Default with respect to financial condition also vary among standard documentation, with respect to both the scope of the coverage and the consequences of the defaults. Indeed, Events of Default with respect to financial condition can differ from document to document with respect to the same firm.

Given the extent and significance of the inconsistencies between key provisions of these standard forms of industry documentation, the Policy Group recommends that:

18 *Documentation Harmonization*: Industry associations should undertake an initiative to harmonize standard documentation across products, and, where possible jurisdictions in areas including: clauses covering notices, grace and cure periods, definitions of events of default and insolvency, and close-out valuation standards.. The focus should be to:

- Reduce notice and grace periods and make both more consistent where appropriate;
- Ensure that the grace period for failure to make a payment or delivery or to transfer collateral should not exceed one business day after notice;
- Clarify the specific points at which grace periods commence and expire to avoid confusion arising from differences in time zones, currencies of payment and close of business conventions, and the timing of notices of non-performance;
- Harmonize definitions of events of default and insolvency and include as a broad range of such events as possible (i.e., general inability to pay debts, written or oral admission of inability to pay, failure to pay debts as they come due, etc.);
- Provide for a consistent 15 day maximum cure period for involuntary insolvencies, with the ability to close-out if the counterparty has not challenged the insolvency within five days; and
- Improve and harmonize close-out valuation standards.

Collateral Management

The Policy Group also briefly examined collateral management arrangements, mainly in light of the recent study of those arrangements conducted by ISDA.

The Policy Group observes that procedures available under standard documentation in combination with market practice for valuing transactions for purposes of determining the sufficiency of collateral may not function well in certain circumstances, may lack certainty of application and may lack consistency.

A review of various standardized documents indicates that the timing of calls for and delivery of collateral differs across documentation and, especially in the case of adverse market conditions, may not function in a timely fashion. This is particularly dangerous when transactions documented on different standardized forms are used to “hedge” one another. For instance, last year some parties hedged GKO-linked swaps documented on ISDA with Ruble options documented on FEOMA or GKO repos documented on GMRA. This is another form of documentation basis risk that is not included in the normal market and credit risk calculations.

An emerging practice has developed where individual dealers have begun to address such problems on a product by product basis, such as through the use of dealer created master-masters that encompass multiple master agreements, by establishing consistency and standardization across documentation and by revising individual master agreements.

The 1999 Collateral Review prepared by ISDA set forth a variety of proposals for improving collateral procedures. The Policy Group generally endorses those proposals and stresses particularly the importance that documentation be modified to afford parties calling for collateral or its return greater flexibility in determining the measures that are appropriate in light of prevailing circumstances. Valuations concerning existing transactions or collateral should be made in a commercially reasonable manner.

IV Regulatory Reporting

In approaching its evaluation of steps that might be taken to improve the quality and timeliness of information available to regulatory authorities, the Policy Group focused on two basic objectives. The first was to suggest ways to facilitate the timely sharing of qualitative information on market conditions and trends, and not just quantitative information on recent firm specific performance and risk profile developments. This reflects the judgement that few, if any, standardized forms of regulatory reporting can anticipate emerging sources of significant potential market problems, let alone systemic risks. The second was to respond to the desire, expressed in the report of the President's Working Group, to facilitate regulatory monitoring of counterparty credit risk management developments, as they relate to the range of issues and subjects discussed in this report, with particular emphasis on issues of leverage and concentrations of risks.

In considering how best to meet these objectives, the Policy Group was guided by a few basic principles. First, the most useful potential source of regular information for these purposes should be the relevant information firms provide to their own senior management. Second, any regular provision of information for these purposes should be on a consolidated, group wide basis, not disaggregated by the various different legal entities into which the group is organized for regulatory and tax related purposes. It also should be reported only once to the group's principal regulator. Third, utilizing internal management sources of information entails placing a premium on relevance, flexibility, timeliness and low costs, at the expense of accepting differences in methodology and limitations as to the ability to aggregate information which may not be exactly comparable. Fourth, greater regulatory access to internal risk management information requires increased discipline on the part of regulators to limit tendencies to interfere in matters best left to management and to have clear understandings with those providing information on how the regulators might use and share that information. Finally, greater information availability to the regulators is a two edge sword, in that having greater information without the means to properly evaluate it or clear authority to act upon it can create unrealizable expectations as to what the regulators can do to prevent or contain future problems.

The members of the Policy Group believe that it is very difficult to expect any formal standardized reporting system to provide all the information needed to spot emerging trouble spots capable of giving rise to systemic risk issues. A potentially more useful channel of early warning information could be to build on informal contacts between senior risk managers at the key financial intermediaries and appropriate senior counterparts at the regulatory agencies. In order to promote frank discussion between

institutions and their regulators, such meetings should be limited to no more than three or four senior representatives on each side, with the market participants represented by officials with responsibility for global risk taking businesses or firmwide risk policy matters. Such meetings should enable institutions and regulators to share informally their views on issues of current concern and aid the primary regulator in determining risk trends and market sector developments of particular interest in the future. This would be more useful than a forum that just focuses on firm specific information such as recent financial performance and risk profile changes. Specifically, the Policy Group recommends:

- 19 FI's with significant counterparty credit and/or market exposure should be prepared to meet informally with their primary regulator on a periodic basis to discuss their principal risks as well as market conditions and trends with potential market disruption or systemic effects. To be effective, such meetings should involve only a small number of senior officials from both sides.

In considering the expressed regulatory interest in better means to monitor and evaluate credit practices related to large leveraged trading counterparties, the Policy Group has considered steps that could be voluntarily undertaken to improve this information flow. To begin with, current regulatory approaches to collecting information on large counterparty exposures suffer from many of the same limitations described earlier as regards internal management reporting of such exposure information. Just as the expanded information being recommended should be useful to senior managers, a subset of that information could also improve existing regulatory information sources on large exposures. If requested by its lead regulator, the Group believes financial intermediaries with significant credit and/or market exposure should voluntarily provide large counterparty exposure reports on a consolidated group basis. Such reports would include a list of counterparties comprising the firm's ten largest exposures in any of four dimensions: (1) current replacement cost (measured at market), including the benefit of netting agreements if legally enforceable with a high degree of confidence, but before consideration of any relevant collateral, (2) current net of collateral exposure, measured as replacement costs minus the market value of collateral, where there is a high degree of confidence about the enforceability of the security interest, (3) current liquidation exposure, measured as net of collateral exposure using estimated liquidation values of contracts and collateral, rather than current market values, and (4) potential exposure of OTC derivatives positions and non-regular way settlement trades (i.e. forward). Within each such exposure dimension, the report would list the ten largest exposures for counterparties internally rated investment grade (or equivalent) and the ten largest exposures with non-investment grade ratings. For any counterparty appearing as one of the ten largest exposures in any exposure dimension, the report would show such counterparty's exposure for each of the four exposure dimensions.

There are a great many complex definitional issues to be addressed in structuring such a report. These include how best to combine exposures that arise from a vast array of different market products; how to account for different assumptions as to legal and operational treatment of these varied products; and how to understand the methods of aggregation used in estimating different measures of exposure for any given counterparty, where there are a large number of underlying contracts being combined and netted. There would be even greater complications associated with any attempt at aggregation of such information across counterparties. Notwithstanding these issues, and to provide a common starting reporting framework (but not a mandated common measurement methodology), the Policy Group has prepared a sample potential report form and product exposure definitions (see Appendix C).

In designing the report form, the Policy Group assessed the difficulties of aggregating different product exposures given the objective of providing useful high-level exposure statistics. In deciding to aggregate exposures across products, the Policy Group recognizes that the various suggested calculations are subject to interpretative dangers. In choosing to report current replacement cost exposure without the benefit of collateral as one dimension of exposure, the Policy Group opted for a presentation that is consistent with a structural and legal analysis of products being aggregated, more so than one based on an economic analysis, which could lead to potentially significantly different exposure estimates. For example, the credit terms of a margin loan and a derivative transaction may be economically similar, but the margin loan will tend to have a much higher pre-collateral exposure. Yet, for margin loans, a large pre-collateral exposure number could be associated with substantial excess collateral, in which case the net of collateral, liquidation or potential exposures would be negligible. Thus, it should be clear that no single exposure measure can provide a reliable assessment of the credit risk of a counterparty. A more comprehensive assessment requires an analysis of all four exposure measures shown in the report. The report should be regarded as a starting point for raising questions, rather than as the last word on the detailed nuances of a firm's counterparty risk profile. Consistent with the earlier recommendation that senior management evaluate quantitative exposures in the context of various qualitative risks, firms are encouraged to provide explanatory notes to the report, especially if they believe there is a particular danger of misinterpretation of the information by the regulators.

In offering the possibility of initiating voluntary regulatory reports along these lines, the Policy Group is very mindful of the limitations of any reporting system, even one based on internal management reports. As noted above, in evaluating the report from any one firm, the information needs to be viewed in its entirety and with the benefit of contextual information, rather than focus on any one dimension of exposure. Also, it would be a mistake for the regulators to simply sum the liquidation exposure estimates and potential exposure estimates across counterparties of the same firm, since the market factor

movements reflected in those estimates will be different for each individual counterparty (as explained further in Appendix B). For all these reasons, the Policy Group wishes to emphasize that the information contained in the report must remain confidential and that the report, or any modified version, should not be used as a blueprint for public disclosure. Any release of client specific information would represent a breach of confidentiality. Furthermore, even if names were withheld, the inherent complexity of judgments made for various estimates, as well as the difficulties of the interpretations of the information provided, makes its use much more suitable for supervisory purposes rather than for public disclosure.

There are even broader limitations involved in attempting to use this information on a cross-firm basis. For example, given the global nature of the markets --not only the market participants but the instruments in which they trade -- it seems improbable that reports from even a key subset of one country's large participants will give regulators a true picture of the entire market. Consequently, if regulators determine to request global exposure reports from FI's, they will need to develop the systems and personnel to take advantage of the new information, and to create domestic and international information sharing agreements to give regulators a more complete picture of the global financial system. Yet those very same arrangements would have to deal not only with the limitations noted above in aggregating information provided by one firm, but also the fact that liquidation and potential exposure estimates cannot be added across firms, even for the same counterparty. This is because the counterparty is likely to have different underlying positions with the various reporting institutions (for example, fixed income market positions with one firm and equity market positions with another; or even two off-setting legs of a fixed income arbitrage position, one in futures with one firm and the other in cash markets with another). Simply adding these position specific estimates of liquidation or potential exposure across reporting firms could well present a very misleading picture. Moreover, if regulatory information sharing arrangements are not structured with care, they can give rise to serious client confidentiality concerns about appropriate use of that information, as well as potential national legal obstacles to sharing information in some centers. Finally, there is the open question posed earlier about the risk of unrealizable expectations being created based on regulators receiving this information.

The Policy Group is also sensitive to that fact that many forms of regular regulatory reports quickly outlive their usefulness, either because the perceived need is diminished or because market innovations and changes render the information less relevant. Too often, however, the reporting requirements live on, burdening both sides with the expense of preparation, processing and evaluation. By suggesting this report as voluntary and by linking it to management reports, perhaps it will be easier to adapt it or sunset it if it loses its value.

Reflecting all these considerations and limitations, the Policy Group believes, on balance, that it would be helpful to provide regulators with voluntary access to reports with information along these lines and so the Group recommends:

20a If requested by its primary regulator, FI's with significant counterparty credit exposures should voluntarily provide reports to that regulator detailing certain large exposure information on a consolidated group basis. A suggested uniform format, derived from suggested enhancements to senior management reporting, is provided for consideration.

20b Regulatory agencies requesting such information should reach clear understandings with providing institutions on permissible uses of such information, arrangements for sharing and aggregating such information, and safeguards against its misuse.

Finally the Policy Group discussed the two key public disclosure recommendations in the report of the President's Working Group. One such recommendation is that:

"Public companies, including financial institutions, should publicly disclose a summary of direct material exposures to significantly leveraged financial institutions. To the extent covered, these entities should be aggregated by sector (e.g. commercial banks, investment banks, insurance companies, hedge funds and others). Public companies' exposures to significantly leveraged financial entities, including commercial banks, investment banks, finance companies, and hedge funds, may be in the form of equity, loans, or other credit exposures. Currently, neither SEC rules nor generally accepted accounting principles directly address disclosure requirements for companies with material exposures to significantly leveraged financial institutions. The interlocking nature of the financial exposures of highly leveraged financial institutions with each other leads to the potential contagion effect of financial difficulty originating initially in one firm. Requiring public companies to disclose their direct material exposures to significantly leveraged financial entities could serve to reinforce private market discipline upon these firms.

- The proposed disclosure could be required to be incorporated in the Management's Discussion and Analysis or Description of Business in periodic financial statements. Such disclosures should be accompanied by appropriate information and analyses regarding how exposures are measured as well as the quality and diversification of exposures to highly leveraged institutions. The disclosures would be included in the periodic reports (e.g., Form 10-K, Form 10-Q) filed by public companies with the SEC.
- The proposed disclosures would be expected to apply to all public companies, including non-financial public companies, that have direct exposures to significantly leveraged financial institutions, as defined, that are individually or in the aggregate (a) material to the investor's financial statements, or (b) could have a material effect on the investor's financial statements resulting from losses due to possible economic events or conditions.
- The precise nature of these regulations would be determined by the SEC, taking into account public comments through the normal rule-making process."

Any such form of mandated public disclosure will raise all the complex definitional and aggregation issues noted earlier, as well as additional issues about public use of information which may rest upon

very judgmental assessments of future, uncertain market events. More importantly, in the Policy Group's view, it is very unlikely that aggregate information on exposures to broad classes of financial counterparties would prove at all useful to investors in trying to monitor independently the counterparty risk profile of the disclosing institutions. For these reasons, the Policy Group feels it is very important that, before any new regulatory disclosure requirements are proposed, the regulators work informally with market practitioners to develop a full grasp of the complex definitional and aggregation issues these reports and disclosures will entail. The firms in the Policy Group are prepared to provide such assistance, if requested by the regulators.

The other proposed new public disclosure requirement would apply directly to private, unregulated leveraged investment funds and to existing commodity pool operators. While the President's Working Group report is not specific on the type of information which would be required to be disclosed, the broad suggestion is that it be top-down risk (rather than proprietary position or strategy) information. The intent of such disclosure presumably is not to protect private investors in the funds, or to protect creditors or substitute for information that should be available to creditors. Rather, it appears intended to help better inform markets, in order to limit the potential for future market disruptions.

In the Policy Group's view, there are major questions as to the likely usefulness of this information for its presumed intended purpose. There are also questions of uneven application of such a rule, since other forms of regulated active institutional asset managers would presumably have no such disclosure requirement, yet manage positions which could also pose market disruption potential. There is also some concern that the funds in question would regard any such disclosure requirement as a substitute for the more robust and customized creditor information sharing proposals contained in this report. Thus, it may well be that the combination of improved creditor information sharing, along with the improved risk analysis and senior management and regulatory reporting contemplated in this report, would provide more effective risk control mechanisms than new public disclosure rules.

V *Implementation*

Broadly speaking, there are two dimensions to implementation considerations for the recommendations in this report: authority and resources. As regards authority, essentially all the recommendations in Section I (Transparency and Counterparty Risk Assessment), Section II (Internal Risk Measurement, Management and Reporting) and some of the recommendations in Section III (Market Practices and Conventions) can be acted upon on a firm-by-firm basis or in bi-lateral negotiations with specific counterparties. While the Policy Group urges all market participants to consider positively these recommendations, it is important that these remain firm specific decisions, best made by senior management in the context of their evolving risk management policies, practices and risk profiles. While the Policy Group would also welcome positive support for its recommendations from interested regulators, it urges that the authorities take a flexible, judgmental approach to evaluating the responses of regulated market participants to these recommendations.

Several key recommendations in Section III can only be implemented with coordinated industry support via the key trade associations whose documents have become basic industry standards. In this regard, the Policy Group has benefited from informal cooperation and support from both ISDA and the Bond Market Association in its evaluation of these documentation issues. With the consensus that is developing around the value of both harmonizing key features of those documents and strengthening their key credit control features (most especially close-out provisions), the Policy Group urges that a high priority joint industry association effort be organized to carry forward with further evaluation and implementation of these recommendations. Such an effort will, of course, take time to complete and, given the practical considerations involved in wholesale replacement of existing executed documents with new, improved versions, it will be important to consolidate all intended documentation changes in one new updated version of each standard agreement.

The recommendations on voluntary regulatory reporting obviously require consideration by the authorities, as well as extensive systems changes by the reporting organizations. The Policy Group believes there should be substantial practitioner input to, and coordination with, the regulators in evaluating these and other proposals for improved reporting, as well as possible new public disclosure requirements, as suggested in the President's Working Group Report. The firms in the Policy Group stand ready to assist in those coordination efforts.

The second dimension of implementation relates to resource considerations. A number of the recommendations related to exposure measurement, stress testing, concentration analysis, management reporting and documentation policies and controls will require internal systems changes, the scope of which will vary considerably from firm-to-firm. In just about all cases, however, the timing considerations for making these changes will have to be evaluated in the context of on-going Y2K preparations, including pending internal policy freezes on changes to Y2K compliant systems. Thus, the Policy Group feels it should stress that there will be meaningful time lags before certain of its recommendations can be implemented. In regard to the proposed goals for timely completion of key documents, the Policy Group emphasizes the stretch nature of these goals, relative to current general practices, and the importance of a risk based approach to the use of policy exceptions and exemptions.

Appendix A: Risk Measurement, Liquidity Risk and Leverage Estimation

Introduction

Many commentators have characterized leverage as a contributor to firm instability and as a source of systemic risk. Indeed, the President's Working Group has concluded that the central public policy issue raised by the LTCM episode is how to constrain leverage more effectively.

Leverage exists whenever an institution is exposed to changes in the value of an asset over time, without having first disbursed cash equal to the value of that asset at the beginning of the period. As the main Policy Group report suggests, funds and their creditors should not focus strictly on the nominal level of leverage, however measured, but rather on how leverage amplifies market risk, funding risk and asset liquidity risk. This Appendix offers an analysis of the relationships among these risks, first describing various measures and identifying their respective strengths and weaknesses. The intent is not so much to prescribe better technical measures of leverage, but to suggest a better framework for analysis.

Traditionally, leverage measures have related a notional or gross exposure to equity. This treatment helps to measure the degree to which a change in the value of a portfolio would affect the value of equity (Net Asset Value), but does nothing to illuminate the probability of change occurring, or the likely magnitude of change in portfolio value. By contrast, risk measures are intended to estimate potential adverse change based on the specific characteristics of the portfolio. Two portfolios of like size may have quite different risk. For a given portfolio or strategy, higher leverage implies higher risk. However, evaluating the risk of the portfolio is a necessary first step because a leveraged portfolio of low risk assets may have less aggregate risk than an unleveraged portfolio of high-risk assets. The framework for risk analysis which follows attempts to reflect the underlying risk of the positions in a portfolio, and the economic and funding structure of the portfolio as a whole.

The analysis takes as a starting point the observation that, broadly speaking, there are two ways in which highly leveraged financial institutions fail:

1. They become insolvent – that is, their liabilities exceed assets ("capital insolvency"). While historically some highly leveraged institutions– for example, savings and loans in the early 1980s – continued to operate with mark-to-market negative equity, today most leveraged institutions would find it difficult, if not impossible, to continue in business if their net asset value approached, let alone dipped below, zero. We define risk measures which attempt to estimate the potential risk of NAV becoming negative as measures of *leverage*.
2. They run out of cash and are unable to raise new funds, even though, on an economic basis, they still have positive capital. This is the cause of financial distress far more frequently than actually becoming capital insolvent, although ultimately the reluctance of credit providers to extend more financing may often be traced to a fear of impending capital insolvency. Most of the hedge funds which experienced distress during the fall of 1998 did so because they were unable to meet margin calls in a timely fashion, even though their mark-to-market NAV appeared to be well above zero. We define measures which attempt to estimate the potential of an institution running out of cash as measures of *funding liquidity*. Because most highly leveraged institutions obtain much of their financing on a mark-to-market basis, the greater the size of a portfolio of assets relative to an institution's funding sources, the greater its

funding liquidity risk (a given percentage change in the price of the assets will deplete the funding faster). Broadly speaking, funding sources scale with an institution's capital, so increased leverage amplifies funding liquidity risk.

A more leveraged portfolio may accumulate larger positions for a given amount of capital. These positions, if they need to be liquidated, may take longer to wind down, or may cause greater market impact during liquidation. Moreover, the presence of greater leverage makes it more likely that such a liquidation will have to occur, as the institution either approaches capital insolvency or has to meet margin calls in an adverse market environment. We refer to the risk that the liquidation value of assets may differ significantly from their current mark to market value as *asset liquidity risk*.

Because some of the leverage and funding liquidity measurement frameworks we describe are based on value at risk (VAR) and stress tests, the following section describes the evolution of market risk measures and some of their shortcomings. Next, the section on liquidity discusses how the interaction of leverage with asset liquidity can make simplistic uses of VAR and stress tests break down; it then suggests some funding liquidity risk measures. The final section describes a series of leverage measures, shows how traditional balance sheet measures fail to reflect the true risk of insolvency, and suggests improved leverage measures.

Risk Measurement

Prior to the advent of risk quantification, the most commonly used figure for measuring the size of a loss contingency which might be sustained by a financial institution was the total assets of the firm. This is not to say that everyone thought all assets were equally risky; it was simply that the tools for distinguishing risk were not well established. The Basel Accord in 1988 promulgated a set of the risk distinctions: three in terms of counterparty quality (0% for sovereigns, 1.6% for OECD banks, and 8% for all other counterparties) and one in terms of collateral quality (4% for mortgages). The total for each asset class was multiplied by its respective percentage, and these risk amounts were summed across the bank's entire loan portfolio. The resultant "risk weighted assets" number quickly supplanted "total assets" as a more meaningful measure of the risk of a bank, although US banks are still held to a simple leverage ratio requirement as one test of capital adequacy. The Basel Committee also took great care to insist that the percentages were not indicative of default probability, potential asset deterioration or any other particular contingency. The Accord included capital charges for OTC derivatives, using current exposure plus add-ons (reflecting potential future exposure) as a loan-equivalent surrogate. The risk weights applied to derivative current exposure were allowed to be half of the risk weight of an unsecured loan to the same counterparty; the rationale was that only high-quality counterparties were engaged in derivatives business. In July 1994, the Accord was amended to include bilateral netting agreements, substituting net for gross replacement value in the calculation of current exposure and reducing the add-ons for potential future exposure.

The reduced credit exposure of swaps and options (current exposure averaging between 1.5% and 2.5% of notional value) was ultimately accompanied by additional charges for market risk as set forth in the Market Risk Amendment to the Accord in January 1996. This amendment split each bank's portfolio into two segments – the investment book and the trading book. The investment book continued to be capitalized under the original provisions of the Accord covering credit risk; banks were urged to measure the interest rate risk on their investment books but were not required to assign capital explicitly to it. The trading book, containing nearly all of the securities and derivatives positions, was required to be marked-to-market daily and to be capitalized for market

risk at a minimum of three times the Value at Risk (VAR) calculation for a 2-week holding period, with a 99%-confidence interval. (The credit risk charge for OTC derivatives remained unchanged, and a “specific risk” charge for the credit risk of securities was introduced.) The volatilities and correlations underlying the VAR model, as well as the choice of aggregation method (variance-co variance, historical simulation, or Monte-Carlo simulation), was left to each individual firm. Models were to be validated by back-testing: if the daily P&L variation forecast by the model understated the actual P&L on more than a handful of days per year, the multiplier put to the basic VAR number would rise from three to four or even five. At present, all major international banks have implemented this regime.

Much of the discussion of market risk since this Capital Amendment was adopted has centered on stress-testing, which was a qualitative requirement in the Amendment but not included in the capital computation. In contrast to VAR, which weights each outcome by its probability and then sums these increments across a portfolio, stress-testing considers the consequences of particular outcomes, without regard to their forecast probability of occurrence. VAR’s strength is in measuring the 99%-probability “boundary”; VAR is less useful for saying how great the loss will be for outlier events beyond that boundary. For example, if a firm’s risk profile leaves it fatally vulnerable to a potential market shock, it is of scant comfort to predict that such a shock will happen on average “only” once per year. However, attempting to fix capital requirements at such “worst-case” figures is generally considered unrealistic, as it would lead to a severe contraction in financial intermediation. Nevertheless, banks must be aware of their potential vulnerability to market shocks and many consider placing limits on their aggregate exposure to potential stress events.

The evolution of risk measurement techniques – from balance sheet totals, to risk weights, to inclusion of off-balance sheet products, to netting, to marking-to-market, to market risk VAR, to stress-testing, to more rigorous credit risk weights, and ultimately to a VAR which captures both market and credit risk – is, in essence, the search for increasingly precise delineation of the distribution of future returns (or values) of a given portfolio. The value of any portfolio of tradable assets (including off-balance-sheet liabilities) will fluctuate over time. Understanding the range of possible variations and the probability of each is equivalent to capturing the risk profile of that portfolio. Although the full depiction for any portfolio of the distribution of future returns over a given time period is still years in the future, it is already clear that there are three fundamental components to this analysis. These three methods of examination correspond to the three basic parameters of a probability distribution: the mean, the standard deviation, and the downside tail.

Valuation. Techniques of valuation seek to uncover the *mean* of the distribution of future returns in a portfolio. Marking-to-market is an accepted tool of valuation because efficient market prices have proven to be far better predictors of future value than historical-cost or accrual-accounting figures. Marking-to-model may have similar advantages to the degree the model can be anchored against market prices. The recent development of applying counterparty default probability to the amount owed by that counterparty and then summing across counterparties to an “expected credit loss” for the entire portfolio, is an overt attempt to forecast the mean of the distribution of future credit losses. A lively debate is in progress over whether all current valuation information should be imported into the financial accounts of an institution; skeptics argue that doing so will only exacerbate market shocks when they occur. However, valuation methods will continue to evolve, even if the results are not required to be shown in the financial accounts, because discovering the mean is the first result of a successful investigation into the details of any distribution.

Value at Risk. Measuring the *standard deviation* of a distribution is the most helpful step in understanding the possible future variation of a portfolio. (Valuation deals essentially with historical risk, that which a portfolio has already endured.) Indeed, the ascendance of market risk VAR in the 1990's was due to its accuracy in assessing the ordinary changes in value of a trading portfolio. Efforts are now being made to translate VAR concepts into the realm of credit risk. These attempts to calculate the potential "unexpected losses" in a credit portfolio show much promise but face unique validation challenges. VAR is often used in management accounting to attribute "economic" or "risk" capital and the costs of that capital to a particular business activity. Supervisors rightly chose VAR as the basis for regulatory capital because a firm must be able to withstand the ordinary variation in its positions. Moreover, the best practices in the industry included using VAR measures, and supervisors recognized the advantages of harmonizing internal processes for risk management with supervisory standards. (The analogy with "initial margin" on a futures exchange, which is also a VAR-style calculation, is evident. If listed futures exchanges required initial margin large enough to cover every conceivable contingency, the initial margin would approach the notional size of the contract itself.)

Stress-Testing. The purpose of stress testing is to learn more about the *downside tail* of a return distribution. All styles of VAR rely at some point on explicit or implicit forecasts of the volatility (standard deviation) and correlation of underlying market factors. The distributions of these financial factors are rarely bell-curves; the frequent arrival of new information distinguishes the financial marketplace from truly random settings. In addition, the correlations of these factors are notoriously non-stationary. One of the benefits of normal (bell curve) distributions with stationary correlations is that once the standard deviation is computed, the entire distribution can be specified. For example, one can conclude that, in a normal distribution, a move larger than three-standard-deviations has a 1% chance of occurring. However, in less well-behaved distributions, it is very dangerous to reason from the standard deviation to any conclusion about tail probabilities. Further, because the standard deviation and all "confidence interval" analyses are probability-weighted,¹ the sizes of individual outcomes in the downside tail are hidden, because they only contribute to the calculation after being multiplied by their (small) probabilities.

In other words, VAR does not yield information about whether a particular downside event might be catastrophic for the firm in question; that can only be ascertained by examining the events individually. The challenge here is choosing a set of events for intensive analysis (i.e. stress-testing) from the nearly infinite universe of possible events. At present, firms are only beginning to share information on how they determine which events are simulated in stress testing, and no consensus has yet emerged: some simulate historical market shocks, some distill market risks to a manageable set of independent factors and shock the factors individually and in combinations, and some stress the factors underlying their major risk positions, some stress those factors which show the most current volatility in the market. As progress is made in the art and science of stress-testing, the results are increasingly being used for setting risk limits, and, in some judgmental fashion, are a factor in determining internal capital allocation. (Using stress-test results exclusively or mechanically for capital allocation would be the rough equivalent of requiring every resident of an earthquake zone to conduct daily activities as if the earthquake were occurring today; ordinary business would come to a standstill.)

The real benefit in stress-test analysis comes from studying the correlation of risks that in ordinary times appear independent, for instance, market and credit risk. This type of knowledge

¹ The variance (i.e. the square of the standard deviation) is mathematically equal to the sum of the probability of each outcome multiplied by the square of the difference between that outcome and the mean.

can assist a firm in creating an integrated limit structure across all risks (analogous to speed limits on certain roads which are one level when the pavement is dry and a lower level when wet). Recent events have demonstrated beyond doubt that stress limits must cover all types of risk in order to be effective.

In applying this framework of risk measurement to leveraged investment funds, it is important to note that they are not generally counterparty credit providers; rather, such funds are generally sources of counterparty credit risk. Hence, the total risk of a hedge fund is dominated by its market risk and liquidity risks, with relatively little additional counterparty credit risk. (Of course, a number of funds hold significant positions in credit sensitive instruments, the risks of which are broadly subsumed within their market and liquidity risks.) The measures of market risk are relatively well-developed compared with measures of credit risk, and many have been adopted voluntarily by a significant number of funds. For example, the calculation of periodic NAV and its dissemination to credit providers has been a standard in the industry almost since its inception. VAR methods and stress tests have been used internally for risk management purposes, even when confidentiality concerns made funds reticent to share that information with credit providers. The central issue going forward is to link the dissemination of NAV information with equivalent information about the risk profile; indeed, it is now clear that NAV information without contemporaneous risk information is incomplete at best. This is why the Policy Group recommends that financial institutions and large trading counterparties should prepare regular, comprehensive estimates of their market risks, applied systematically across their trading portfolios. These estimates should include both VAR and stress-testing results. Further, they should be prepared to share with key credit providers information on the methodologies employed and periodic updates on the level of market risk. The detail of this information sharing will depend on the nature of the credit relationship.

Liquidity

Liquidity has two dimensions – asset liquidity (ability to sell or unwind positions), and funding liquidity (ability to meet obligations when due) – in both cases focusing on stress environments rather than on normal market environments. The concepts are closely related, in that a leveraged institution that is unable to sell positions in a timely manner, or for which short-term sales could cause large gaps in prices, will need to ensure its funding is appropriately structured.

Asset Liquidity

Value at risk and stress tests generally apply standard estimates of risk to positions by asset class. That is, for each underlying asset class – interest rate, equity market, foreign currency, and so on – users estimate by how much that asset might move either in the form of a volatility estimate for VAR, or a stress move for stress testing, and calculate the results of such a move on the value of positions sensitive to that asset class. In the case of a VAR calculation, the user also calculates a total risk measure by using correlations among the various asset classes; in the case of stress tests, the correlations are implicit in the way stress moves in different asset classes are combined into one or more stress scenarios. The implicit assumption in each case is that positions could be liquidated before the underlying asset classes had moved by more than the amounts estimated. In fact, in VAR calculations the liquidation assumption may be even more explicit, since the calculation often starts with annual volatilities, which are scaled to some assumed liquidation horizon (two weeks in the case of the BIS calculation). Generally, the same time horizon is applied to all asset classes and hence positions, regardless of the nature of the underlying asset

class, the size and nature of positions sensitive to changes in that asset class, and the economic and funding structure of the entity holding those positions.

There are four potentially serious problems with this approach:

1. Even normally liquid asset classes may undergo transient shocks to their liquidity due to unexpected economic or political news, sudden supply shocks, or policy changes. While liquidity will return to these markets in due course, in the interim transactions may be harder to execute, take longer to complete, and have greater market impact than before. This makes estimation of appropriate volatility inputs to a VAR calculation, and of stress moves for a stress test, quite challenging. An institution liquidating positions in such an environment, whether due to a depletion in capital requiring reduction in risky positions or because of a need to raise funds to meet margin calls, may be unpleasantly surprised by the proceeds the liquidation generates.
2. Some asset classes are inherently more liquid than others. A \$1 billion position in on-the-run Treasury notes could be liquidated with relatively little impact on prices in all but the most difficult of market conditions. The same is not true of a \$1 billion position in high-yield corporate bonds, even in normal markets and especially in disrupted markets. Some very illiquid asset classes such as real estate show relatively little volatility in historic time series of their prices, partially because infrequent trading makes it hard to obtain reliable, frequent price data points. Two week VAR measures based on historical volatility would make investments in such assets look rather safe. As we will see in the section on leverage below, one of the possible uses of VAR estimates is to compare them with economic capital to assess the risk of an institution becoming capital insolvent. The idea is to measure the risk that, in an adverse market, the institution's positions could not be liquidated before its NAV had become negative. Such a risk would be understated if liquidation would take longer than the time horizon used in the VAR measure.
3. Very large positions, even in normally liquid asset classes, could take significantly longer than the standard assumed period to liquidate. Alternatively, efforts to liquidate the position within the assumed time horizon could cause tremendous market impact, invalidating risk estimates based on the normal volatility or perhaps even an assumed stress move for that time horizon. Similarly, highly structured positions such as exotic options, even if their value is derived from a liquid asset, may be significantly less liquid and harder to dispose of than the underlying asset.
4. In an adverse market, the greater a leveraged institution's risk of insolvency or the less adequate its sources of funding, the sooner it will be forced to liquidate positions as its NAV declines or as it is required to post collateral on mark-to-market losses. This liquidation will have an impact on the prices received as positions are liquidated. This means that not only the liquidity of the asset and the size of the position should be taken into account in assessing risk, but also the overall risk profile of the institution. In fact, this can lead to circular arguments: if we use VAR estimates adjusted for asset liquidity to measure risk, but the results of those risk measures themselves affect the liquidity adjustments used in the VAR calculation, it will not be possible to arrive at a final estimate of risk.

One useful way to address this is to measure risk by assuming that positions are being liquidated in an adverse market, even if the institution is actually structured such that it would not have to. This will produce overly conservative risk measures for less leveraged or more prudently funded

institutions, but these measures will still indicate clearly that the risk of their becoming insolvent is negligible.

In order to correct for these problems, the simple, single horizon VAR measure can be adjusted by scaling each asset class's volatility by the time it would take to liquidate the actual positions held in that asset class.² For example, a position in an asset class with a volatility of 10% which would take three times as long as the standard two week time horizon to liquidate would receive a volatility of 30% in the VAR calculation. Stress tests can be similarly scaled. As mentioned before, such an approach arguably penalizes institutions that would not have to liquidate in an adverse market. Since others might well be forced to liquidate similar positions, however, the observed market prices for the underlying asset classes would still be depressed, leading to a mark-to-market loss for the institutions purportedly able to ride out the adverse market. As long as this loss were still small compared to their NAV, and as long as their liquidity needs calculated using this assumption were adequately covered by their available sources, their claim to be able to withstand bad markets would be corroborated.

Funding Liquidity

Poor funding or liquidity management may threaten the viability of a counterparty, even if it is solvent on a mark-to-market basis. Failure is ultimately triggered by an inability to meet obligations (payments, delivery of collateral, etc) when due. Following an event of default, creditors may close out positions and liquidate collateral. In order to understand a leveraged institution's liquidity risk, one needs to understand not only what cash and near-cash resources are available during a period of market stress, but also what demands may arise for those resources. The demands can arise from variation margin requirements due to position losses, mismatches in the contractual requirements for delivery of or receipt of collateral, unwillingness of lenders to extend financing positions, desire by lenders to increase collateral requirements, or permitted withdrawals of capital by investors. Creditors may also discontinue financing based on breaches of agreed financial covenants. The potential losses, mismatches and margin increases should be conservatively measured assuming periods of market stress and relative position illiquidity.

Funding liquidity and leverage are closely related elements of risk and, in general, an institution with a high level of leverage would be likely to have lower liquidity coverage. This is because leverage is generally provided to financial institutions on a mark-to-market basis. That is, as the institution's positions lose money, the institution is required to post cash to cover these losses to the relevant counterparty. An institution that runs the risk of losing large amounts relative to its capital base will also have large funding needs relative to its capital base. Its funding sources are in turn likely to be scaled relative to capital. One would therefore expect to see a correlation between leverage and liquidity.

Within that broad relationship, however, there can be wide variations between the two elements of risk. For example, two institutions with the same capital might take the same position in an underlying asset, one through margin loans, and the other through leveraged notes. The leverage, properly measured, of each institution will be the same, because the same decline in the value of the underlying assets will reduce their capital equally. The first institution however, has

² If asset class returns are independently, identically distributed the scaling should actually be by the square root of time, not directly proportional to time. But extensive research indicates this is a dangerous assumption. In particular, the liquidation of a large position, even if the liquidator is attempting to do so at a "normal" rate, is likely to depress the market. For further discussion of this issue see for example "Scale Models", *RISK Magazine*, January 1998

significantly greater liquidity needs because it will be required to post mark-to-market losses on the underlying assets. At the same time, the second institution has essentially no extra demands on liquidity. This could have a significant effect on other counterparties' credit assessments of the two institutions.

The following is a (by no means exhaustive) list of the factors that can cause liquidity stress. The examples are intended to highlight the differences in liquidity needed to sustain otherwise economically equivalent positions.

Haircuts

Haircuts (also referred to as initial collateral requirements) are the proportion of an underlying asset's value that a counterparty is required to commit in order to gain economic exposure to that asset through a transaction with a credit provider. The transaction can be a simple margin loan or reverse repurchase agreement, where the credit provider lends the counterparty some proportion of the asset's value, or a derivative, such as a total return swap, where the counterparty posts initial collateral. A leveraged note implicitly incorporates a haircut in the form of the price of the note relative to the value of the underlying asset(s) to which its return is linked. A leveraged note can also result in higher funding costs to the extent creditors feel more exposed to risk and lack the protection of potential collateral payments from the note issuer.

Haircuts limit the amount of leverage a counterparty can obtain since they ultimately limit the value of the underlying assets, and hence losses, to which it can be exposed. Because they are set at the time a transaction is executed they would not appear to be sources of unexpected liquidity stress. But, different transactions have different rules affecting whether a credit provider can raise haircuts after the transaction has been executed. For example, a total return swap or term repurchase agreement typically has a set haircut for its entire life, while a margin loan is subject to a daily change in haircut. For this reason, counterparties need to be aware of those transactions that are subject to unilateral increases in haircuts, and of the amount by which the haircuts might reasonably be expected to rise in a stress market environment.

The possibility that haircuts may be raised also affects the potential sources of liquidity. Unpledged assets are typically thought of as potential sources of liquidity because they could be sold for cash or borrowed against. In a stress market the assets' prices may have dropped, however, and credit providers may have increased the haircuts they require, reducing these assets' value as sources of funds whether sold or used as collateral for borrowing.

To mitigate this risk, institutions should consider entering into longer term secured financing arrangements with fixed haircuts for the term of the financing. In addition, they may wish to consider arranging back up, secured financing facilities from high quality credit providers with predetermined haircuts on pre-specified collateral.

Mark to market

Most credit is provided to highly leveraged institutions on a mark-to-market basis. This means that once a counterparty has agreed to provide exposure to a particular asset with the counterparty putting up less than the full asset value at the time the transaction is entered, the counterparty will be required to post cash to cover declines in the value of the underlying asset over the life of the transaction. Counterparties need to ensure that they have funds available to cover potential declines in the asset's value under stressed market conditions. (As noted above, declines in mark-to-market value will also reduce the value of currently unleveraged assets as potential sources of funds.)

Mismatch in terms

Transactions with essentially the same economic exposure may have radically different credit terms. For example, a counterparty may have entered into a swap with one institution on a two-way mark-to-market basis, and an identical, offsetting swap with another institution on a one-way mark-to-market basis (the counterparty posts to the institution but not vice versa). If the first swap declines in value to the counterparty, it will be required to post mark-to-market collateral but will not be receiving it on the second swap. Even if both swaps are transacted on a two-way mark-to-market basis, there exists the risk of a delay in receiving collateral because of operational error or pricing disputes. The latter risk also exists if a different transaction with similar economics is used as a hedge. For example, a swap might be hedged with futures contracts: futures contracts require daily posting of variation margin with no opportunity for disputes, while swap contracts typically allow for delays in collateral posting, along with minimum transfer amounts and thresholds that may differ significantly from those of futures exchanges.

Stability of funding sources

Although different sources of funding have different levels of stability, the differences are not always apparent. Equity is generally thought of as “permanent capital and funding” that may not be withdrawn. However, many leveraged funds permit regular withdrawals by investors, thus reducing the reliability of this source of funds. Some funds mitigate this risk by restricting withdrawals for extended periods, or by providing for distributions in kind (withdrawals are met by distributing a share of the fund's positions, though this presents a problem if the fund has large indivisible positions such as over-the-counter derivatives). Funds and their credit providers should analyze carefully the permitted frequency, size, and terms of equity withdrawals. Term debt may, under these circumstances, actually be a more stable funding source than equity. Credit providers and users need to bear in mind, however, that many debt covenants contain NAV triggers, which again make this source of funding potentially unreliable in a stress market environment.

For those reasons leveraged institutions need to structure their funding so as to provide a core level of non-callable funding consistent with the risk and funding requirements of their positions. This core level of funding would include committed credit lines and locked-in equity financing.

Set forth below are three calculations that credit providers and their counterparties could perform to improve their understanding of the potential risk that an institution might run out of cash to meet short term obligations. The calculations are increasingly aggressive in terms of the sources of cash for which they give an institution credit. In each case they attempt to compare sources of cash with potential uses. In this regard, the definitions are similar to the leverage definitions which follow, in that they compare the amount of cash a fund can raise with the amount it might need to raise (as opposed to “the amount a fund can lose versus the maximum amount it can afford to lose”). The examples noted below illustrate how the definitions might work in practice.

Cash Liquidity

We define **Cash Liquidity** as:

Unencumbered cash and cash equivalent /VAR adjusted for timing mismatches and potential changes in terms.

The numerator in this fraction is straightforward. It includes only actual cash and high quality short term instruments readily saleable for cash. The denominator needs some elucidation. Basically, it attempts to reflect the fact that the cash a fund might be required to raise in the short term is a function of the potential decline in value of positions on which it is required to post variation collateral, along with any increase in initial collateral requirements which its counterparties are entitled to demand. One implication is that unsecured transactions present no additional liquidity risk. Another is that transactions where the mark-to-market arrangement is one-way, with the leveraged institution posting to its credit provider but not vice versa, present significant liquidity risk. If the institution enters two identical transactions on a one-way mark-to-market basis with different counterparties, it will have no economic risk but will be required to post mark to market collateral to one or the other counterparty as one or the other transaction moves into the money.

The matrix below illustrates how the cash liquidity ratio would be calculated for five hypothetical leveraged investment funds, each pursuing an identical, very closely hedged strategy where each fund is long a ten-year swap with one dealer and short a ten-year swap with another. The economic risk (and VAR leverage) for each fund is quite low. But the cash liquidity ratios are different, reflecting both the unencumbered cash available to each fund and the terms of the swaps. Example 5 has the highest cash liquidity ratio: both swaps are on a two-way mark-to-market basis and its assets consist of cash and unleveraged securities. Therefore, its only liquidity needs would arise from delays in receiving mark-to-market collateral from the counterparty against whom the swap happened to move on any given day, while the fund is being required to post the same amount of collateral to the other counterparty, in whose favor the trade would have moved on the same day. The fund would also have to consider whether either counterparty might have the right to move them onto an initial collateral basis (e.g., as a result of declines in net asset value), and take this into account in their calculation.

Example 1 has a much lower cash liquidity ratio, reflecting the fact that the Fund’s swaps have asymmetrical credit terms. Its potential cash needs are essentially the potential change in value of the swap transacted on a mark-to-market basis. If this swap moves against the fund, it will have to use available cash to post collateral because the counterparty to the swap moving in the fund’s favor is not required to post collateral. The denominator of the fraction is the same for the other three examples as for Example 1 because they also have asymmetrical credit terms. In each case, however, they have invested half of their cash in securities, resulting in a lower cash liquidity ratio than in Example 1.

Buying Power Liquidity

Buying power liquidity again compares potential sources of cash with potential cash requirements. The potential requirements are calculated as described above to determine cash liquidity, giving the same denominator. However, the numerator in this approach now includes a more conservative estimate of the cash a fund could borrow against unleveraged assets.

We define ***Buying Power Liquidity*** as:

Cash Liquidity Numerator + Buying Power / VAR adjusted for timing mismatches and potential changes in terms

The estimate of buying power should be based on commitments from lenders to lend against securities at a predetermined haircut, even in a stress market environment. In addition, the estimate of buying power needs to recognize that, in a stress market environment, the value of the security against which the institution is borrowing may well have already declined. Buying power should therefore be calculated using the committed haircut against a security value, decreased by an amount consistent with the assumptions used in the VAR calculation.

In the examples, different funds generate different buying power liquidity depending both on how much of the asset side of their balance sheet is invested in securities, and at what haircut they could borrow against those securities. Thus, examples 2 and 3 give different results in spite of the fact that their balance sheets are the same since Example 3 is assumed to be able to borrow at only a 40% haircut rather than a 25% haircut.

Credit Line Liquidity

Credit Line Liquidity again uses the same denominator as the other liquidity measures, but gives credit for committed unsecured undrawn credit lines as potential sources of cash.

We define ***Credit Line Liquidity*** as:

Buying Power Liquidity Numerator + Committed Unsecured Undrawn Credit Lines/ VAR adjusted for timing mismatches and potential changes in terms

Users of this measure need to be extremely careful in assessing the extent to which credit lines are firmly committed. Many credit lines contain contingencies and covenants which are sufficiently broad to call into question whether an institution will be able to draw on them when they are most needed. Accordingly, this measure of liquidity should be seen as the most aggressive. A credit provider would probably wish to be circumspect in extending credit to an institution whose liquidity profile was weak based on the first two measures, even if it appeared adequate based on credit line availability.

Example 4 produces a significantly lower result for this measure than the other examples since it has no credit line available.

Note that the above calculations help measure funding risk without reliance on liquidation of core, longer-term, or relatively illiquid holdings.

Any reduction in equity (through losses or withdrawal of investor capital) or increase in borrowing (whether or not secured) will increase leverage and may increase risk. Rather than use cash or increase borrowings to meet new cash demands, funds may choose to liquidate core holdings or longer-term positions. In fact, funds seeking to maintain a given level of leverage or risk relative to capital may be required to liquidate longer-term assets as they experience valuation losses. With greater leverage, there is a greater likelihood that losses or withdrawals will trigger a need to sell core holdings. Thus it is important to examine asset liquidity risk. For this reason, all the VAR calculations used in the liquidity measures (both as they pertain to mark-to-market losses which need to be funded, and to losses in value of assets which could be used as collateral) should be carried out on an asset liquidity adjusted basis, with volatilities scaled for the likely liquidation horizon for a position. As with leverage, market participants should also examine the impact of stress scenarios on their liquidity position.

		<u>Example 1</u>	<u>Example 2</u>	<u>Example 3</u>	<u>Example 4</u>	<u>Example 5</u>
<u>Assets</u>						
Cash		10	5	5	5	5
Securities	10 year Govts	0	5	5	5	5
TOTAL ASSETS		10	10	10	10	10
<u>Liabilities & Equity</u>						
Securities sold short	10 year Govts	0	0	0	0	0
Total Liabilities		0	0	0	0	0
Equity		10	10	10	10	10
TOTAL LIABILITIES & EQUITY		10	10	10	10	10
Derivatives Notionals	Long 10 year swap with Dealer 1	90	90	90	90	90
	Short 10 year swap with Dealer 2	90	90	90	90	90
Derivative Credit Terms	Dealer 1	Unsecured	Unsecured	Unsecured	Unsecured	2Way MTM
	Dealer 2	2Way MTM	2Way MTM	2Way MTM	2Way MTM	2Way MTM
Buying Power	Haircut on Securities	25%	25%	40%	40%	40%
Credit Line	Unsecured	10	10	10	0	0
Liquidity Ratios						
Cash Liquidity		3.38	1.78	1.78	1.78	29.25
Buying Power Liquidity		3.38	3.08	2.82	2.82	46.24
Credit Line Liquidity		6.77	6.64	6.38	2.82	46.24

Leverage

Leverage may be used to increase or offset exposure to a financial asset. In a simple example, an investor may obtain funding from a lender to acquire a financial asset. With the size of borrowing obligation independent of the asset's performance, the investor can enhance its return on equity (or increase its loss) for a given gain or loss in the financed asset. An investment, and by extension, a portfolio of investments, is said to be *highly leveraged* when a relatively large proportion of invested funds are borrowed. It follows that leverage can be directly observed by calculating the ratio of invested funds (assets) to investor funds (equity).

Financial measures of leverage vary widely. The PWG notes two different definitions - balance sheet (assets-to-net worth) and risk-based (economic risk relative to capital). The latter concept, which we will later define as Value at Risk Leverage, can be alternatively described as "the amount a fund can lose versus the maximum amount it can afford to lose." The Basel Supervisors Committee in its recent report took this approach by defining leverage as the ratio of risk to capital but did not discuss how the risk measure might be constructed.

As stated, we define measures of leverage as estimates of the risk of an institution's mark-to-market net worth becoming negative. Traditional measures of leverage attempted to estimate this risk by making the implicit assumption that the amount of money an institution could lose was a function of its total on-balance-sheet assets, and that its capital was simply the book value of its equity. This on-balance-sheet test of leverage has been widely used. It gained favor in part because it is relatively straightforward to calculate based on data presented according to fairly objective (but not economically consistent) accounting rules. An independent outside auditor periodically validates the data. The advent of modern financial products, many of which are carried off-balance sheet (such as swaps) or carry embedded leverage (such as structured notes), has made this approach inapplicable for complex leveraged institutions.

For reference we offer a spectrum of existing and suggested leverage definitions – expanding on those used by the PWG – with examples to demonstrate their various strengths and weaknesses. *It should become clear that the utility in applying the tests lies not in pinpointing riskiness but in raising questions about the nature of underlying assets, liabilities and capital that, when answered, will help to illuminate performance risks more fully.* The Policy Group does not suggest any single formula, or group of formulas, as the "best" definition of leverage, but rather seeks to encourage financial intermediaries and their counterparties *to focus on the relationship between real risk of loss and the capital available to absorb it, as opposed to simplistic and misleading accounting based measures.*

Gross On-Balance-Sheet Leverage

This is the ratio of on-balance-sheet assets to equity. This is the simplest leverage ratio to compute because it requires only GAAP data from an institution's balance-sheet, which is normally readily available.

We define ***Gross On-Balance-Sheet Leverage*** as:

Total On-Balance-Sheet Assets/Equity

Some of the problems with this measure were noted above: it does not take into account the risk of off-balance sheet items such as swaps and forwards, it does not correctly reflect the risk of on-balance sheet items such as leveraged notes which carry embedded leverage, it ignores risky

liabilities, it does not give credit for the fact that certain assets, such as matched book assets, may be perfectly hedged with offsetting liabilities, and it fails to distinguish between assets with the same balance sheet value, but widely differing risk.

Examples 1, 2, and 5 in the table below show some of the implications of using this measure. Example 1 is an institution which is long and short ten year Treasury bonds, and also has a substantial matched book. Example 2 illustrates an institution pursuing a similar strategy, but through the swap market rather than the cash bond market. Example 5 is an institution following a so-called directional strategy involving a long position in ten-year swaps. Each institution has the same amount of capital. It should be clear that the real risks in Examples 1 and 2 are very similar, while the risk in Example 5 is much higher because the potential for a significant adverse move in ten year interest rates is much higher than for an adverse change in the relationship between two almost identical ten-year instruments. However, as the Leverage Ratios at the bottom of the table show, the gross on-balance sheet leverage ratio tells a different and rather misleading story. Example 1 shows the highest ratio of assets/equity because its investment strategy is carried out through instruments carried on the balance sheet, and its large matched book is included, even though this has essentially no market risk (it does have counterparty credit risk). Further, Examples 2 and 5 give the same result even though the underlying risk in Example 5 is higher.

Net On-Balance-Sheet Leverage

We define ***Net On-Balance-Sheet Leverage*** as:

$$(Total\ Assets - Matched\ Book\ Assets)/Equity$$

We refer to the numerator in this fraction as Adjusted Assets. This measure is also fairly simple to calculate, but, other than the removal of some perfectly hedged assets, suffers the same shortcomings as Gross On-Balance-Sheet Leverage. This is the measure favored by some analysts (and by rating agencies).

Example 1 gives a lower value for Net On-Balance-Sheet Leverage than for Gross On-Balance Sheet Leverage because its large matched book is no longer included. However, it still shows substantially more leverage than Examples 2 and 5 because of the presence on its balance-sheet of instruments with effectively the same level of risk as positions carried off-balance-sheet by the latter two examples. And, once again, Examples 2 and 5 appear equally leveraged even though Example 5 carries substantially more risk relative to its capital.

Gross Economic Leverage

We have noted that the accounting rules used to present balance sheet data treat financial products with similar economic performance characteristics quite differently. For instance, a loan secured by marketable securities (e.g., a margin loan) will be included on-balance-sheet at full loan value while a total return swap on the same securities will be included at its comparatively small mark-to-market value. To correct for these, the non-economic differences between different financial products can be adjusted by substituting the full contract or notional value for the market value of any listed futures or over-the-counter derivatives.

We define **Gross Economic Leverage** as:

$$(Risky\ Assets + Risky\ Liabilities + Gross\ Off-Balance-Sheet\ Notional)/Equity$$

The resulting leverage calculation will provide a more useful though still suboptimal measure of risk because it treats on- and off-balance-sheet positions similarly. Note that this measure looks at both sides of the balance sheet, including all assets other than cash, and all liabilities other than short-term borrowings.

With this risk measure, Example 2 no longer appears unleveraged because the notional amounts of the swaps are included. However, it still appears less risky than Example 1 because of the latter's matched book. Example 3 appears more leveraged than Example 2, because the combined notional of the long and short swaps is higher. However, its true risk is lower because the difference in notional between the long and short swap is less than in Example 2, to which it is otherwise identical. Example 4 shows the same gross economic leverage as Example 2, even though its true risk is higher (the short swap has a five-year tenor as opposed to ten-years for the long swap, and the potential for a sizable difference in performance between a ten- and five-year swap is larger than for two ten-year swaps, though it is lower than for a ten-year swap alone). Finally, Example 5 shows gross economic leverage about half of that of Examples 2 and 4, even though, as discussed, its true risk is the highest.

It should be clear that while gross economic leverage addresses the simple shortcomings of balance sheet leverage measures – their failure to take into account off-balance sheet risk-producing activities – it has serious problems of its own. In addition to the issues illustrated by these examples, as a practical matter it is difficult to decompose instruments such as options and structured notes into notional equivalents. If credit providers were to use gross economic leverage, a detailed set of guidelines for conversion of off-balance sheet positions into notional amounts would be needed. A further shortcoming of this measure is the significant subjectivity with which different institutions designate assets and liabilities as matched. Different firms may have different standards as to how great a difference between the maturity of the asset and matching liability may exist before they are deemed to be unmatched, making matched book comparisons between firms difficult at best.

Net Economic Leverage

Many leveraged institutions choose to reduce the risk of an open position (whether cash or derivatives) by establishing an exactly offsetting position with a different counterparty or dealer. As Example 3 showed, such a transaction would actually increase Gross Economic Leverage. As the combination of the offsetting positions poses no market risk, the Economic Leverage measure can be refined to eliminate these offsetting positions. To be comfortable that market risk is fully mitigated, the offsetting positions must have identical underlying, quantity and maturity. The remaining Net Economic Leverage calculation will then more fairly present open risk positions, whether directional or relative value, in relation to equity.

We define **Net Economic Leverage** as:

$$(Risky\ Assets - Matched\ Book\ Assets + Risky\ Liabilities - Matched\ Book\ Liabilities + Gross\ Off-Balance\ Sheet\ Notional - Hedges)/Equity$$

In practice, however, the identification and segregation of exactly offsetting positions may prove difficult.

As the examples show, this measure does a better job of correctly ordering the institutions in terms of their true riskiness. The very substantial extent to which Examples 1, 2, and 3 are hedged is reflected in their low net economic leverage numbers. However, Example 4 still appears more risky than Example 5 because only exactly offsetting positions are netted. The fact that the values of the ten- and five-year swaps included in Example 4 are likely to move together, even though their maturity is not identical, is not reflected in the leverage measure. Again, it is also important to note that credit providers would need rather detailed and robust data from their counterparties to calculate this measure themselves.

It is also worth noting that net economic leverage ignores the counterparty risk of offsetting positions, and the possibility that margin or collateral terms on economically equivalent positions can be different, creating liquidity stress for the institution.

VAR Leverage

Each of the preceding economic leverage measures provides, in combination, some insight into the size of positions relative to equity. However, the calculations alone still say nothing about actual risk. As noted, Example 5 shows lower Net Economic Leverage than Example 4, although the risk that its capital could be wiped out by adverse market moves is higher. To take an even more extreme example, a fund with a single large position in an illiquid emerging market equity and a different fund with a like amount of 3-month Treasury bills, each using 25% equity and 75% debt, would have identical Net Economic Leverage calculations. Yet the risk of those positions, and therefore the likelihood of default of the funds, is quite different. To better assess risk relative to capital, funds and creditors should use a better measure of risk. We suggest, with caveats, Value at Risk. Users should evaluate appropriate confidence levels and time horizons (BIS uses 99% confidence level over two weeks) and fully understand the inputs (correlations, volatilities) to the VAR model.

We define *VAR Leverage* as:

Correlated VAR/Equity

It should be noted that the optimal definition of equity is the mark to market net asset value of the institution, with explicit recognition of the time horizon over which capital withdrawals may occur.

Since VAR both ignores non-economic product distinctions and provides market-based insight into potential losses, VAR leverage is an improvement on the more blunt balance sheet or notional calculations discussed above. However, even the most robust VAR models have their limitations, since they may not adequately measure the impact of infrequent or never-experienced extreme adverse market events. Thus, VAR must be supplemented by stress-testing (as discussed earlier). Also, as described in the section on Asset Liquidity, it is dangerous to use a standard time horizon in VAR calculations. For a mark-to-market institution, the question is whether its positions could be unwound before its NAV becomes negative, or even declines to a liquidation threshold. If it would take far longer than the assumed horizon to complete such an unwind, the positions could undergo adverse moves significantly greater than the VAR calculation would indicate, making it much more likely than estimated that the fund would become insolvent in the meantime.

For the most part, VAR leverage correctly reflects the relative risks in the examples. The most closely hedged institution – Example 3, where the notional amounts for two otherwise identical swaps differ by only 3 – shows the lowest VAR leverage. Examples 1 and 2 are next lowest; the sizes of their long and short positions are different by 5 in both cases, and the VAR leverage is almost identical for the two funds (the small difference reflects the differences in volatility between cash and swap markets). Example 4 shows substantially greater leverage, reflecting the greater potential for a large difference in performance between a five-year and a ten-year instrument, as opposed to two ten-year instruments. Example 5 shows the greatest VAR leverage reflecting the directional nature of its portfolio. However, Example 6, which is identical to Example 1 but ten times larger, misleadingly shows the same VAR leverage as Example 1 because of the use of the standard two-week time horizon. In reality, liquidating positions ten times larger would take longer (resulting in more time for market deterioration) and/or have greater market impact, making it more likely that the proceeds would not cover all the fund's liabilities.

It is important to stress that the limitations of VAR probably make it more useful as a measure of relative risk among institutions pursuing reasonably similar strategies, rather than as a measure of absolute risk. The many assumptions a VAR calculation requires are each subject to their own uncertainty, which affect the final result. However, using consistent assumptions across counterparties can give a better picture of their relative riskiness than the easily distorted balance sheet measures, or other measures which ignore the true riskiness of different assets.

Asset Liquidity Adjusted VAR Leverage

As discussed under Asset Liquidity, the assumption that all positions could be liquidated within in the same period is unrealistic and potentially very dangerous. Moreover, some institutions will be forced to liquidate more quickly than others, impacting the market for the positions being liquidated. For this reason, risk to capital should be measured taking into account the liquidity of the different positions, and assuming that in an adverse market some forced liquidation is taking place, leading to mark-to-market losses even for institutions that are conservatively positioned with regard to leverage and funding.

We define *Asset Liquidity Adjusted VAR Leverage* as:

Correlated VAR with liquidation horizon scaled volatilities/ Equity

The results of this calculation in our examples are identical to the VAR Leverage calculation, except that Examples 3 and 6 now show higher results. This is because we assume that it would take at most two weeks to liquidate positions of the size held by the other funds. Example 6 produces a result ten times larger than Example 1 because its positions are ten times larger, resulting in 100 times as much Asset Liquidity Adjusted VAR (ten times as large positions which take ten times as long to liquidate) but has only ten times as much capital. Example 3, although better hedged economically than Example 2, has gross positions in ten year swaps of 403 versus 185. The calculation therefore assumes that it would take just over twice as long to liquidate the positions. Because the fund in Example 3 is better hedged, however, the potential loss is less than twice as large (the rate of loss during liquidation is lower).

In addition to these leverage measures, funds and their credit providers should use stress tests to further investigate the adequacy of capital to cover losses under stress market scenarios.

		A-19					
		1	2	3	4	5	6
		Cash long & short 1	Swaps long and short 1	Swaps long and short 2	Swaps long and short 3	Swaps long	Cash long & short 2
Assets							
Cash		5	10	10	10	10	50
Securities	10 year Govts	95	0	0	0	0	950
Reverse Repo		100	0	0	0	0	1000
TOTAL ASSETS		200	10	10	10	10	2000
Liabilities & Equity							
Securities sold short	10 year Govts	90	0	0	0	0	900
Repo		100	0	0	0	0	1000
Total Liabilities		190	0	0	0	0	1900
Equity		10	10	10	10	10	100
TOTAL LIABILITIES & EQUITY		200	10	10	10	10	2000
Off-balance sheet items							
Derivatives Notionals	Long 10 year swap with Dealer 1		95	203	95	95	
	Short 10 year swap with Dealer 2		90	200			
	Short 5 year swap with Dealer 1				90		
Leverage Ratios							
On Balance Sheet							
Gross On-Balance Sheet Leverage ¹		20.0	1.0	1.0	1.0	1.0	20.0
Net On-Balance Sheet Leverage ²		10.0	1.0	1.0	1.0	1.0	20.0
Economic Leverage							
Gross Economic Leverage ³		38.50	18.50	40.30	18.50	9.50	38.50
Net Economic Leverage ⁴		0.50	0.50	0.30	18.50	9.50	0.50
VaR Leverage ⁵		1.60%	1.64%	0.99%	18.88%	31.21%	1.60%
Asset Liquidity Adjusted VaR Leverage ⁶		1.60%	1.64%	2.15%	18.88%	31.21%	15.97%

¹Assets /Equity

²(Assets - Matched Book Assets)/Equity

³(Risky Assets + Risky Liabilities + Gross Off-Balance Sheet Notional)/Equity

⁴(Risky Assets – Matched Book Assets + Risky Liabilities – Matched Book Liabilities + Gross Off-Balance Sheet Notional - Hedges)/Equity

⁵Correlated VaR/Equity: incorporates different volatilities of, and correlations among, different instruments

⁶Correlated Liquidity Adjusted VaR/Equity: incorporates different volatilities of, correlations among, and time to liquidate, different instruments

Appendix B: Counterparty Credit Exposure and Risk Estimation

Introduction

As the volume and complexity of traditional bank lending, OTC derivatives trading, and other credit intensive activities continues to grow dramatically, most Financial Intermediaries (FI's) have developed systems to more quickly and accurately measure and manage credit risk. Such models are meant to aid FI's in quantifying and managing risk across counterparty, product, portfolio, and geographic lines. Comprehensive and accurate credit risk modeling is one of the more challenging aspects of credit risk management in that it requires the combination of 1) complex and highly quantitative risk estimation which captures the broad range of potential value outcomes in a portfolio with 2) in-depth counterparty credit analysis which measures the probability of credit deterioration and default.

Because of these difficulties and challenges, no one universally accepted approach to counterparty credit risk modeling has been developed to date. There are a number of policy initiatives addressing the various credit risk modeling alternatives, including the Group of Thirty's 1993 report, "Derivatives: Practices and Principles" and, most recently, the Basle Committee on Banking Supervision's April 1999 paper entitled, "Credit Risk Modeling: Current Practices and Applications." A review of market practices indicates two different, but not competing, processes – risk utilization and capital allocation – have emerged as the primary tools used for these purposes.

The purpose of this appendix is to outline the two processes in practical application and to identify and discuss issues associated with the use of each.

Alternative Approaches to Credit Risk Estimation

Credit risk measurement and management processes have evolved partly as a function of the type of business executed by an FI. For example, institutions with a historical trading emphasis have tended to focus on "worst case" Potential Future Exposure (PFE) combined with individual counterparty credit analysis as their primary risk measurement tool. Such firms engage in *risk utilization*, that is, they allocate capital based on measures of trading risk, set Potential Exposure (PE) limits according to a counterparty's creditworthiness, and measure risk based on PE to the counterparty. Institutions that have historically emphasized direct lending (and its associated regulatory and capital requirements), in contrast, have tended to focus on the risk characteristics of the aggregate portfolio of exposures across different products. Such firms engage in *capital allocation*, that is, they manage exposure by allocating capital to trading desks (and other business units) and then charge for the capital according to the creditworthiness of a counterparty and how well the transaction fits with the existing portfolio. FI's using risk utilization have tended to focus on credit risk from a counterparty perspective while FI's using capital allocation have focused on credit risk from a firmwide portfolio perspective.

Before discussing the methods and issues of risk utilization and capital allocation, it is important to address briefly the terminology of exposure common to both processes. As mentioned above, both methodologies have strengths and weaknesses but they generally complement each other. The most notable commonality between the two is their use of a modeled estimate of PFE. Models which use PFE focus on two particular exposures: Potential and Expected:

1. *Potential Exposure (PE)* is an estimate of the future credit exposure of derivative transactions using statistical analysis based upon broad confidence intervals over the remaining terms of the transactions

2. *Expected Exposure (EE)* is an average future exposure. When combined with expected default rates, an estimate of *Expected Loss* can be derived.
3. Usually models calculate PE and EE net of margin. *Collateralized Exposure (CPE, CEE)* measures the future credit exposure of a portfolio, giving effect to collateral terms applied to a portfolio.

While PFE looks at what may happen, exposure measures which look at what has happened are useful, too:

4. *Current Exposure (CE)* is the measure of the current value of a portfolio today, taking into account current netting and margin information
5. *Notional Exposure* is used less and less as a primary risk management tool, although it is still used for reporting. Notional amounts may also be useful at the level of the individual counterparty as an indicator of volume.

Risk Utilization. As stated above, the fundamental building blocks of risk utilization are PE combined with individual counterparty credit analysis. PE is an exposure measure which is typically calculated on a counterparty basis. Calculating PE can be a five-step process: 1) Detailed trade information from various front and back office systems is aggregated into a portfolio. 2) Distinct risk factors used to price the trades in the portfolio are compiled. 3) Risk factors are simulated using the appropriate model, with particular attention paid to modeling of dominant risk factors. 4) Instruments in the portfolio are priced for multiple simulations of the underlying risk factors for the duration of the portfolio. 5) Instrument prices are used to calculate exposures for distinct counterparty portfolios, giving affect to legally enforceable netting and offsetting trade positions. PE is best represented graphically as a time-sequenced line graph of potential exposure at a selected confidence interval or intervals for the life of the portfolio. CPE is an exposure measure that incorporates collateral terms with a counterparty to measure exposure giving affect to collateral held in future exposure scenarios.

While PE, as an exposure measurement tool, does not easily facilitate the aggregation and comparison of risk measures across products and counterparties, it does enable managers to measure, pinpoint, stress, and limit risk factors in a portfolio against individual counterparties. Furthermore, when combined with individual counterparty credit analysis, PE can be used as a limit setting tool, in which a firm's credit department rations capital to trading desks in the form of PE. That rationing or allocation process is based primarily on counterparty creditworthiness but can be adjusted on a case by case basis depending on trade profitability, trade risk, trade risk mitigants or other factors.

Capital Allocation. Managing credit risk from a firmwide perspective requires a firm to compare and aggregate exposures arising from different products and counterparties. An appropriate measure of credit risk is economic capital. Economic capital is defined as potential for unexpected losses estimated at some confidence interval (e.g. 99.97%)

Some firms have adopted portfolio methodologies and various analytical tools to translate the individual exposure numbers into marginal economic capital contributions. The sum total of these marginal economic capital contributions is approximately the total economic capital consumed by the credit portfolio. The marginal economic capital number enables the use of a single measure to be used in various decision-making processes such as:

1. Limit setting
2. Risk charging/reserving
3. Economic/profitability analysis

4. Allocating capital equitably between market and credit risk
5. Measuring concentration risk

While there are a number of different capital allocation methodologies available, the following is meant to be a generic description of these methodologies in order to illustrate the typical data requirements and results.

In general, a firm's credit portfolio comprises of traditional credit products, credit exposures from OTC derivatives, and hedges including individual credit default swaps and portfolio hedges. The portfolio analysis tools estimate the annual loss distribution of the portfolio due to defaults and possible downgrades. In addition, the marginal contribution to the portfolio loss distribution is tabulated for each counterparty in the portfolio.

Portfolio tools fall into two general categories depending on whether they include the risk of downgrades in estimating the annual loss distribution. The default-only models evolve default scenarios at the end of the risk horizon (say, one year). The loss in case of default is then determined from the assigned recovery value. The second category of models incorporates the risk of downgrade by evolving both default scenarios as well as rating change scenarios at the end of risk horizon. For each year-end rating scenario, the potential mark-to-market (MTM) impact is calculated for each exposure. This MTM calculation requires credit spreads (to value in the non-default states) and recovery values (to value in case of default). The spread risk is not separately included in the computation because the models typically take a longer-term view of credit risk and implicitly capture the default probability element of spreads in the estimation of downgrade risk. The inclusion of losses on downgrades fully accounts for the NPV of credit losses beyond the first year, so it is not necessary to simulate losses past the first year in these models. The default-only models, on the other hand, are often run to the stated maturity of the deals.

The default-only models rely on historical or modeled default rates to propagate the default scenarios. Models incorporating downgrade risk rely on transition matrices that incorporate both historical default rates as well as historical rating change rates. In addition, credit spreads are an integral part of these latter models. The credit spreads are generally derived from bond, asset swap, and credit default swap markets. Spread grids are prepared for different region/industry pairs. Recovery rates are critical for both kinds of models. These rates are derived from a combination of published studies and a high degree of internal experience/judgement. These rates can be set anywhere between 20% and 100% based on seniority type, region, and industry.

For OTC derivatives, it is important to consider both CE as well as PE due to market moves. This exposure profile is further adjusted upwards for a premium that reflects the dynamic nature of the exposure (also determined judgmentally). Once the scaling of the exposures has been done, the exposure profile is converted into equivalent loans. As many equivalent loans result as there are time bands. These equivalent loans are then incorporated in to the portfolio analysis. Thus the best estimate of the expected exposure profile is used for OTC derivatives, including any "wrong way" effects.

Since historical default and rating change data are limited, the default and rating migration correlations are generally implied from asset correlations. The rationale here is that default and rating migrations are driven by the asset value of the firms. Therefore asset correlations drive the joint likelihoods of default or rating migration. Again, there is room for judgement here due to lack of adequate historical data.

Capital grids derived from the portfolio tool can then be used to assess properly the marginal capital consumed by potential new transactions. These grids are updated

periodically and are obtained by combining hypothetical standardized transactions with the credit portfolio. The marginal capital grids are obtained for different regions, ratings, and maturities. In addition, these grids are also produced for different asset types (i.e., traditional loan products, OTC derivatives, and credit default swaps). This is because these asset types differ in recovery assumptions and therefore warrant different levels of capital. Also, the credit default swaps grids are different from the other two since they include the risk of swap counterparty defaulting as well.

Issues Associated with the use of Risk Utilization and Capital Allocation

There are myriad operational, theoretical, and practical issues related to the use of either type of model. In the paragraphs below, we discuss those issues which appear to have the greatest impact on the productive use of either process. There are issues common to both Risk Utilization and Capital Allocation and there are issues specific to each. We address the issues common to both first.

1. **PE versus replacement cost.** While the CE definition itself is self-explanatory, there is an important issue related to the concept: *CE does not equal true replacement cost.* Contract replacement cost in declining or illiquid markets will usually be materially different from measured CE. Position replacement cost and collateral values should be measured both at current market prices and at the prices that a firm anticipates receiving in the case of liquidation of its positions and collateral with the counterparty. Liquidation value should reflect both the adverse price movement which may occur with respect to positions and collateral during the period until the decision to liquidate is taken, as well as the market impact of liquidating the specific positions and collateral involved. For any counterparty, a comparison of market and liquidation calculations yields useful information with respect to the sensitivity of a firm's exposure to that counterparty to adverse market price movements and the liquidity characteristics of the underlying positions and collateral.
2. **Appropriate confidence levels of PE.** PE is often displayed as a curve which shows potential exposure out to a certain confidence level, say 97%. Determination of the appropriate confidence level used in the measurement of future exposures is an institution specific decision that will encapsulate the institutions philosophy on credit risk management. Measuring PE out to too low a confidence level may provide a false sense of security in that it can portray unrealistically low risk levels, whereas measuring PE out to too high a confidence level can cause management to reduce the business levels to protect the FI from very bad, but highly improbable outcomes. PE can be illustrated using a single curve or two curves, which would have the effect of demonstrating the sensitivity of the portfolio to moderate and extreme scenarios.
3. **Material events not captured in the models.** Simulations used to produce future exposures and possible defaults will not always capture rare events caused by structural social, economic, or political changes. Management will be required to use judgement in the decision process to include potential events not captured in historical data. In order to make informed judgements, management must understand the assumptions behind the PE measurements.
4. **Systems and complexity risk.** The introduction of new trade types and products can be difficult operationally and theoretically. From an operational standpoint, the integration of additional back office systems increases the risk that information is not captured or displayed in a manner that can be properly handled by existing exposure calculation infrastructure. Very often, new complex trades and products that cannot be modeled, due to simulation and pricing limitations, entail the most credit risk and are, arguably, the most critical to measure exposure for. Incorrectly modeled trades are also an issue.

While most systems can identify unmodelled trades, they cannot point out incorrectly modeled trades. Also, limit setting and monitoring credit risk can be systems intensive and complex. Understanding the impact of new trades on risk or exposure measures is also a complex process. Providing “What If” calculators to traders, sales people, and credit professionals is integral in managing exposure.

5. **Use of collateral.** Using collateralized measures implies the acceptance of collateral as a credit substitute. As a result, it is prudent to calculate both collateralized and uncollateralized measures. Since CPE assumes there is no limit to the amount of liquidity that a counterparty will be able to provide over the life of a portfolio, it is important that exposure is calculated on an uncollateralized basis to provide information about the level of liquidity that a counterparty would have to provide.
6. **Operational and legal issues associated with collateral.** The use of collateralized measures highlights other operational and legal issues. The assumptions about collateral collection and close-out periods are essential to an accurate representation of exposure. Legally, enforceability of collateral is not always clear; uncertainty varies by country, type of legal entity, and type of asset held. Similarly, close-out periods and legal rights may not be clear. Operational issues such as making and tracking calls, mark-to-market calculations, and reconciliation are all issues that need to be recognized as a user of CPE to understand potential limitations.
7. **Wrong way trades.** There can be a correlation between worst case exposure and probability of default. Unlike loans, swaps and other forward trades have uncertain credit exposure that will depend on the movement of market rates. Where there is strong correlation between market rates and the solvency of counterparties, “wrong way” trades can occur. The collapse of the Ruble that accompanied the defaults on Russian debt is an example of wrong way risk. Other general examples of wrong way trades include buying a put option on an emerging market bond from a sovereign or financial institution of the same country, or arranging a foreign exchange forward contract (paying the foreign currency receiving USD) with a central bank or other financial institution of the same country. Wrong way features in trades can have an enormous impact on both expected exposure and loss. In such cases, the PE method (as well as other methods) can lead to a gross underestimation of exposure and expected loss. Extreme worst cases may generate suitability issues as well. While it may be possible to model correlations to identify wrong way trades, wrong way trades will typically be identified in the course of trade and counterparty analysis. Pricing for wrong way trades should be adjusted to account for much higher potential for sizable exposure in the event of a loss.

In addition to those issues addressed above, there are also issues specific to Risk Utilization:

1. **Comparability.** PE measures are not always comparable across counterparties. For example, given two sets of exposures where the first set contains a \$100mm PE to a AA-rated counterparty and a \$100mm PE to a BB-rated counterparty and the second set contains exposures to the same counterparties but in \$190mm and \$10mm proportions respectively, in both cases the total exposure amount is \$200mm but set one is obviously more risky because of greater exposure to the lower credit quality counterparty.
2. **Ability to aggregate.** Because peak PEs occur at different times for different trades and/or portfolios within different counterparties the ability to aggregate PE measures is limited. For example adding the \$10mm peak PE of a 5 year interest rate swap (occurring in year 3) to the \$10mm peak PE of a 10 year cross-currency swap (occurring in year 10) to calculate that the peak PE of the portfolio as \$20mm is meaningless. This problem is valid only if PE is produced as a single number rather

than as a time sequenced curve. Furthermore, because the risk factors of trades in portfolios will invariably differ, the scenario resulting in a specific confidence level will be different for different counterparties. For example, it is meaningless to add a 95% confidence exposure arising from an increase in rates with a 95% confidence exposure arising from a decrease in rates. One way to calculate the potential exposure of a portfolio is to simulate the exposure of the entire portfolio using the same set of scenarios. Even when that is done, the usefulness of that number is limited because we would be adding exposures with different default risks. Firms can also simulate exposure to portfolios of similar credit quality, but then comparability is limited to a subsection of the entire portfolio.

Finally, there are issues specifically related to capital allocation:

1. **Precision of PE.** As mentioned above, in a portfolio risk calculation, OTC derivative expected exposures are adjusted upwards for a premium that reflects the dynamic nature of the exposure. This calculation is not an exact science and may obscure the fact that some exposures are extremely sensitive to underlying market rate moves and therefore may not capture risks which lie at the outer limits of the probability spectrum. A joint credit/market risk model would address this problem, and would effectively incorporate the full range of potential exposures in to the loss distribution.
2. **Data availability.** Default models require a great deal of data - transition matrices, correlations, credit ratings, spread data, and recovery rates. The quality and completeness of the data tends to vary by region.
3. **Ability to aggregate.** The capital allocation model assumes that total economic capital can be aggregated directly by adding marginal economic capital contributions. While this is generally true, this approximation may produce results significantly different from true total economic capital for volatile and less well diversified portfolios. In an extreme case, given a firm portfolio of 2 counterparties of the same credit quality but with directionally opposite positions, true economic capital will equal the economic capital of each counterparty while direct aggregation of the two will produce economic capital of twice that amount.

Conclusions

As stated at the outset of this appendix, risk utilization and capital allocation are both rigorous and widely used methods of credit risk measurement although neither should be considered fully comprehensive on a stand-alone basis. To summarize, the capital allocation process, by combining the measurement of credit exposure with credit migration and default risk models, generally permits:

1. The aggregation of comparable exposures across products and counterparties,
2. the ability to charge business units for capital usage, thus facilitating profitability analysis and,
3. the ability to limit trading by pricing capital according to risk and portfolio constraints.

At the same time, the risk utilization method, by combining sophisticated PE modeling with intensive trade and counterparty credit analysis, permits:

1. More accurate forecasts of PE and CPE,
2. the ability to more readily identify potential large exposures, correlations, wrong way trades and suitability issues and,

3. the ability to ration capital to business units on a specific trading counterparty basis.

Put another way, because of its counterparty focus, the risk utilization method does not readily facilitate comparability of exposure measures or aggregation of exposures on a firmwide portfolio basis, as the capital allocation model does. Nor does it facilitate profitability analysis. However, risk utilization's intense focus on trade and counterparty specifics makes the model valuable in its ability to identify potential large exposures and protect firms against catastrophic loss, while providing a framework for risk utilization and management.

As FI's further refine their credit risk measurement processes and continue to allocate resources to the development of credit risk models, they will have to balance the strengths and weaknesses of each process against the needs of the FI's broad range of credit requirements. Firms should make a continuing effort to combine the best practices of both processes into their credit risk modeling systems.

Appendix C: Model Regulatory Report Formats and Definitions

1. The Large Counterparty Exposure Report would provide aggregate credit risk information for counterparties whose positions meet specific exposure size thresholds.
2. The report would be submitted by reporting firms to their primary regulator on a consolidated basis.
3. The report would cover all activities with a counterparty and reflect the replacement cost of derivative contracts, repo agreements, stock borrow and loan agreements, margin loans and non regular-way settlement trades (i.e. forward or extended settlement trades), as well as the market value or stated value, as appropriate, or other financial instruments such as loans and securities in respect of which the counterparty is the obligor or issuer. Any material exception to this list should be identified and described.
4. Counterparties would be grouped in two credit classes based on internal ratings or, by default, external ratings: investment grade (or equivalent) and below investment grade. For each counterparty listed, relevant external ratings, if any, would also be shown.
5. Counterparties to be reported are those ranking among the top 10 counterparties of their credit class in any of the following measures:
 - (a) *Current Replacement Cost*, measured at market, including the benefit of netting agreements if legally enforceable with high confidence but before consideration of any relevant collateral.
 - (b) *Current Net of Collateral Exposure*, measured as Current Replacement Cost minus the market value of collateral in respect of which there is high confidence about enforceability and perfection of security interest.
 - (c) *Current Liquidation Exposure*, measured as Current Net of Collateral Exposure where market values are replaced by estimated liquidation values. Liquidation value should consider the adverse price movement which may occur with respect to positions and collateral during the period until the decision to liquidate is taken, the market impact of liquidating the specific positions and collateral involved and general market illiquidity risk.
 - (d) *Potential Exposure*, measured, for OTC derivatives, as peak potential exposure over the tenor of the positions with the counterparty, using a confidence level of at least 95%, adjusted for collateral rights, threshold agreements, optional unwind rights, as well as the shorter timeframes these rights imply. For non-regular-way settlement trades, potential exposure should also be calculated at a confidence level of 95% or higher.
6. Market value is derived, as appropriate, from observable transactions or from the present value of cash flows evaluated at current market prices, interest rates and foreign exchange rates.
7. When aggregating exposures across instruments, negative replacement costs and excess collateral are ignored, unless enforceable set-off rights exist.
8. Further refinements, such as incorporation of recovery rates, could also be included.

9. It is acknowledged that given the complexities of exposure measurement yet the need for simplicity, there is inevitably a certain amount of arbitrariness in the proposed classification and the suggested product exposure definitions (see Annex). Reporting firms are encouraged to provide explanatory footnotes. Even with such notes, care must be employed when interpreting this report and the different exposure measures presented should be viewed together rather than separately.

REPORTING INSTITUTION
LARGE COUNTERPARTY
EXPOSURE REPORT

As of xx/xx/xxxx
(Dollars in Millions)

<u>Counterparty Name</u>	<u>Internal Rating</u>	<u>External Ratings</u>	<u>Current Replacement Cost</u>	<u>Current Net of Collateral Exposure</u>	<u>Current Liquidation Exposure</u>	<u>Potential Exposure</u>
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I Investment Grade

II Below Investment Grade

[Explanatory Notes]

Annex: Product Exposure Definitions

Type of Instrument	Current Replacement Cost (1)	Current Net of Collateral	Current Liquidation Exposure	Potential Exposure
OTC Derivatives	Market value	Market value less market value of collateral	Current Uncollateralized Exposure where market value is replaced by estimated liquidation value	Peak potential exposure
Listed Futures	Difference between market value and cost	Difference between market value and cost, less margin received	Current Uncollateralized Exposure where market value is replaced by estimated liquidation value	
Repos / Reverse Repos	Market value, or stated value less market value of repoed securities	Same as Current Replacement Cost	Current Uncollateralized Exposure where market or stated value is replaced by estimated liquidation value	
Stock Borrow / Stock Loan	Market value of stock loaned minus value of cash received	Same as current Replacement Cost	Current Uncollateralized Exposure where market or stated value is replaced by estimated liquidation value	

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Type of Instrument	Current Replacement Cost (1)	Current Net of Collateral	Current Liquidation Exposure	Potential Exposure
Margin Loans	Stated value	Stated value less market value of collateral	Stated value less estimated liquidation value of collateral	
Non regular-way settlement trades	Difference, if unfavorable, between the settlement amount and market value	Same as Current Replacement Cost	Current Uncollateralized Exposure where market value is replaced by estimated liquidation value	Pre-settlement exposure
Loans	Market value or stated value	Market value or stated value, less market value of collateral	Current Uncollateralized Exposure where market or stated value is replaced by estimated liquidation value	
Securities	Market value	Same as Current Replacement Cost	Estimated liquidation value	

Note

- (1) The Current Replacement Cost of contracts or transactions for which there is a reasonable possibility of bifurcation, with one element being treated as collateral subject to enforceability and stay risks, should be calculated gross of the value of such deemed collateral. The Current Net of Collateral Exposure should be net of the market value of such deemed collateral. For instance, the Current Replacement Cost of non-qualifying repos in the U.S. should generally be shown at stated value (i.e., gross), and the Current Net of Collateral Exposure at stated value less the market value of collateral.

Appendix D: Glossary of terms used in report

Italicized terms defined elsewhere in Glossary.

Affirmation The process by which parties to a transaction verify that they agree with each other on the terms of the transaction.

Basis risk Normally, risk associated with differences in changes of two related prices or with imperfect matching between hedge and underlying risk. In the context of this report, also refers to risks arising from inconsistencies across standard forms of industry documentation.

Close-out Steps taken by a non-defaulting party to accelerate and *terminate* a contract prior to its maturity when the other party fails to perform according to the contract's terms.

Concentration A buildup of exposure to a market or to a counterparty or group of counterparties susceptible to losses caused by common market or economic events.

Confirmation One or more documents exchanged between two counterparties acknowledging a transaction and setting forth its terms.

Credit event A defined occurrence that can trigger action under a financial contract between two parties. See *event of default*.

Credit exposure The amount of receivable or payable on a contract, consisting of *current exposure* and *potential exposure*.

Credit provider An entity that has extended credit to another and that holds itself out as being in the business of making credit available to other entities.

Credit risk The degree of uncertainty surrounding a counterparty's ability to fulfill its contractual obligations. It encompasses both the probability of loss and the probable size of the loss net of recoveries and collateral.

Credit user The client or counterparty of a *credit provider*.

Cross-default provision Contractual terms between two parties specifying that a default by one of the parties on its obligations to a third party will be treated as a default between the two parties to the contract. For example, a contract between A and B provides that a default by B against C will be treated as if it were a default by B against A.

Current exposure The amount of receivable or payable on a contract; the simplest measure of current exposure is current *mark-to-market value*.

Delivery versus payment (DVP) Settlement in which cash payment occurs at the same time as delivery of a purchased instrument.

Disclosure Information that an entity makes available to the public.

Economic capital Amount available to absorb losses. In the context of credit risk, providing protection up to a specified probability of insolvency (e.g., probability of insolvency of an AA-rated firm). Also called **risk capital**.

Event of default An occurrence, defined in a *master agreement*, that entitles the non-defaulting party to *terminate* all transactions covered by the agreement. Cf. *termination event*.

Exception A decision by senior management to waive or delay the application of certain policies to a specific transaction or counterparty, even though the policies would normally apply to similar situations.

Exemption A decision by senior management to release an activity, transaction, or counterparty from the obligation to comply with certain policies.

Expected loss The amount a firm can expect to lose in an average year on a transaction or portfolio over a period of time. In its simplest form, expected loss is equal to the probability of loss times the exposure net of recovery.

Financial intermediary (FI) An entity that is in the business of bringing together providers and users of financial resources and managing the associated risks.

Information sharing The exchange of information between two private counterparties to facilitate credit decision-making.

Leverage The amplification of return (positive or negative) that occurs when a party takes on exposure that is not completely funded by the party's own equity. Leverage can exist when: (a) financial assets exceed capital; (b) the change in value of a position can exceed the amount paid for it; or (c) a position's price volatility exceeds that of the underlying market factor (**embedded leverage**).

Liquidation exposure *Current exposure* adjusted for the expected realizable value of collateral and liquidity-adjusted contract *replacement cost*.

Liquidity The ability to raise cash easily, with minimal delay and little or no loss of capital. **Asset market liquidity** is the ability to transact business in necessary volumes without unduly moving market prices. **Funding liquidity** is the ability of an entity to fund its positions and meet, when due, the cash and collateral demands of counterparties, credit providers, and investors.

Loss Method One of the alternative measures of damages under a *master agreement*. The Loss Method assigns values to terminated transactions based on a party's good faith determination of the amount it lost or gained as a result of the termination. Loss does not require that a determining party obtain quotations from other dealers to calculate termination value. Cf. *Market Quotation Method*.

Mark-to-market value The most recent price at which a firm could buy or sell a financial instrument in normal size. Mark-to-market value might equal current market value or present value of expected cash flows.

Market Quotation Method One of the alternative measures of damages under the *ISDA Master Agreement*. The Market Quotation Method assigns values to terminated transactions based upon quotations from other dealers for replacement transactions.

Master agreement An agreement between two counterparties that specifies many of the terms of transactions they will conduct with each other subject to the agreement.

Master-master agreement An agreement pursuant to which two parties agree to net out the termination values determined under other master agreements in order to net all offsetting exposures between the two parties.

Net asset value (NAV) The market value of an investment fund's assets minus the market value of its liabilities; NAV per share divides NAV by number of shares outstanding.

Netting Combining offsetting obligations between two or more parties in order to reduce them to a single net payment or receipt for each party. **Close-out netting** combines offsetting *credit exposures* between two parties under a *master agreement*. **Cross-product netting** allows positive and negative *mark-to-market values* to offset each other across trades in different financial instruments. **Collateral netting** combines exposures subject to collateral under a *master agreement*. **Payment netting** is the process of reducing all payments due on the same date and in the same currency to a single net payment.

Non-deliverable forward (NDF) contract A synthetic currency forward contract that does not involve actual delivery of both currencies. Instead, the parties settle any appreciation or depreciation in a currency by means of a compensating net payment in terms of the fully convertible currency. NDFs are typically used to hedge currencies for which local forward markets do not exist or to which access by foreign entities is restricted.

Potential exposure An estimate of the additional receivable or payable beyond current *replacement cost* over the life of a contract; also called **potential future exposure (PFE)**. **Expected future exposure (EE)** is an estimate of the average of non-negative market values over the remaining life of a transaction. **Potential peak exposure (PE)** is a statistical estimate of the maximum exposure over the remaining life of a transaction based on a specific confidence interval.

Regular-way trades Transactions that settle within timeframes that are normal for a specific contract.

Replacement value *Current exposure* adjusted to reflect the cost of replacing a defaulted contract; also called **replacement cost**. Replacement value normally is equal to the *mark-to-market value* of a transaction calculated at either the bid or offer side of the market, depending on where the non-defaulting party would be able to obtain a replacement transaction, plus any adjustment for illiquidity in the markets for the underlying or for pledged collateral.

Set-off In a *termination* or liquidation, the practice of allowing obligations under a *master agreement* and those not covered by the agreement to offset each other.

Stress test A simulation of the potential loss to a portfolio resulting from a hypothetical extreme market event or credit event or both.

Termination event An occurrence, defined in a *master agreement*, that entitles one party to the agreement to terminate transactions, prior to their scheduled maturity, that are covered by the agreement and affected by the event (*cf. event of default*). In a **termination**, one party pays the *mark-to-market value* of the contract to the other, in exchange for which the contract is extinguished.

Transparency The availability of reliable, timely, and easily understood information regarding an entity's financial condition and performance, business activities, risk profile, and risk management practices.

Unexpected loss A measure of the range of possible losses on a contract or portfolio beyond the *expected loss*.

Unwind A negotiated cancellation of a contract prior to its scheduled maturity. Unwind can take the form of *termination*, assignment of rights and obligations under the contract, or entering into an offsetting contract.

Value at Risk (VaR) A statistical estimate of the potential mark-to-market loss to a trading position or portfolio from an adverse market move over a given time horizon (holding period). VaR reflects a selected confidence level, so actual losses during a period are not expected to exceed the estimate more than a pre-specified number of times.

Wrong-way risk Correlation between *potential exposure* of a contract and the probability of counterparty default.

Abbreviations used in report:

BBA	British Bankers Association
EMTA	Emerging Market Traders Association
FEOMA	Foreign Exchange Options Master Agreement
FMLG	Financial Markets Lawyers Group
FXG	Foreign Exchange Group
GMRA	Global Master Repurchase Agreement
IBMA	International Bond Markets Association
ISDA	International Swaps and Derivatives Association
ISMA	International Securities Markets Association
PSA	Public Securities Association (now IBMA)
TBMA	The Bond Market Association