REPORT OF THE WORKING GROUP ON OPERATIONAL RISK

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INTRODUCTION

In June 1999, the Basel Committee on Banking Supervision (the "Basel Committee") released its consultative document *A New Capital Adequacy Framework* that included a proposed regulatory capital charge to cover "other risks." In response to this proposal, the Institute of International Finance ("IIF") Steering Committee on Regulatory Capital (the "Steering Committee") formed the Working Group on Operational Risk (the "WGOR") in January 2000 to explore how a regulatory capital framework for operational risk, one type of "other risks," could be developed.

Dr. Thomas Fischer, Group Chief Risk Officer of Deutsche Bank AG, is Chairman of the WGOR and Mr. Christopher Roberts, Joint Chief Executive Officer of Tokai Bank (Europe) plc, is Vice Chairman. The WGOR is composed of senior operational risk managers at leading internationally active banks from the IIF membership. A list of the WGOR firms that have approved this report is attached as Appendix A. Both the Steering Committee (a list of members is attached as Appendix B) and the IIF Board of Directors (a list of members is attached as Appendix C) have approved this report.

The WGOR has engaged in vigorous and recurring discussions during 2000 and 2001 as the industry continues to develop its thinking regarding the appropriate methods for managing and measuring operational risk. The WGOR also held an ongoing dialogue with its counterpart in the Basel Committee structure, the Risk Management Group (the "RMG"). These constructive efforts led to an enhanced understanding, both within the industry and the supervisory community, about the nature of an appropriate operational risk regulatory capital framework. The release of the January 2001 *Operational Risk Supporting Document to the new Basel Capital Accord* (the "Consultative Proposal") reflected many of these efforts. As such, it is a very useful document for advancing the discussion of the treatment of operational risk for regulatory capital purposes.

The WGOR believes that the art and science of operational risk measurement and management are still developing quickly and will change significantly in the coming years. However, the WGOR also recognizes that the Basel Committee proposal to develop a risk-sensitive regulatory capital framework has led to the development of an operational risk minimum regulatory capital requirement. In general, the WGOR believes that additional precision in the identification of distinct risk types is beneficial. However, the desire to align operational risk minimum regulatory capital requirements with economic capital allocations and risk management practices must allow for flexibility given the evolving state of operational risk measurement and management. Thus, it will be a great challenge to develop an appropriate regulatory capital framework at this time. The WGOR believes that this can be done, but it also believes that supervisors must maintain a flexible attitude toward any future changes that may be required as a result of testing the proposals contained in the Consultative Paper and this WGOR report.

The WGOR is publishing this report both as a response to the official Consultative Proposal from the Basel Committee and to provide the public with an overview of the latest industry views on the appropriate structure for an operational risk regulatory capital framework. The WGOR believes that discussions between the industry and the supervisory community will need to continue well beyond the publication of this report. In addition, the WGOR believes that significant testing is required. The WGOR believes that an operational risk regulatory capital framework that enhances the comprehensiveness and risk sensitivity of the overall capital framework and that addresses the operational risks inherent in internationally active financial institutions is likely to be developed by the January 1, 2004, implementation date for the new Basel Accord. The WGOR looks forward to working with the supervisory community to develop such a framework.

The WGOR welcomes the Basel Committee's recognition of operational risk as a risk type distinct from credit, market, and banking book interest rate risks. Explicit treatment of operational risk will enhance transparency and facilitate the development of a truly risk-based regulatory capital framework for banks. In addition, the WGOR welcomes the Basel Committee's application of the Three Pillars framework (i.e., quantitative minimum capital requirements, qualitative oversight and supervisory judgment, market discipline through enhanced public disclosure). The WGOR believes that this framework is capable of recognizing all aspects of sound operational risk management.

The WGOR believes that the Consultative Proposal provides a major advancement in the thinking regarding an appropriate operational risk regulatory capital framework and reflects the useful dialogue that has occurred between the supervisory community and the industry. The WGOR is pleased to be able to offer this report both as a comment on specific issues raised in the Consultative Proposal, and as an overview of the latest industry views on an appropriate regulatory capital framework for operational risk. The WGOR has made significant progress in refining its views since the release of the Consultative Proposal, as reflected in this report. The WGOR offers this report in the spirit of an ongoing dialogue between the industry and the supervisory community. The WGOR believes that this dialogue must continue well beyond the end of 2001 to develop an appropriate operational risk regulatory capital framework by the January 1, 2004, implementation date for the new Basel Accord.

The WGOR does not believe that it has found "the answers" to developing a risk-sensitive, consistent, transparent, fair, and flexible *operational risk* regulatory capital framework. However, the WGOR does believe that this report will provide some useful ideas for how such a framework might be developed and for testing various elements and features of that framework. As the regulatory framework is developed, care is needed to ensure that the final framework does not result in excessive regulatory burdens. In addition, care must be taken to ensure that the operational risk minimum regulatory capital requirement is calibrated at the proper level. The WGOR does not believe that this will be easy to accomplish and believes that significant testing will be required. Thus, the WGOR urges the Basel Committee to release an additional consultative paper for industry comment later this year.

While this report will describe in detail the WGOR views, it may be useful to provide an initial overview of those views as a roadmap to the rest of the report. Thus, the following points summarize the major views of the WGOR described in this report.

1. Definition of Operational Risk: The WGOR recommends that *operational risk* be defined for regulatory capital purposes in general terms as "the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events that is not already covered by other regulatory capital charges (i.e., credit, market, and banking book interest rate risks). Business, strategic, and reputation risks are expressly excluded." The WGOR has developed a series of definitions to determine the specific losses that should be covered by the operational risk minimum regulatory capital requirement. These definitions may include some losses that are currently covered under the proposed credit risk minimum regulatory capital requirement. This potential overlap in definitions requires further clarification from the Basel Committee as to the appropriate definition of risk types in the new Basel Accord.

2. Scope of Regulatory Capital Charge: As a matter of principle, the minimum regulatory capital requirement should only cover unexpected losses. If regulators have decided to include expected losses within the intended coverage of the minimum regulatory capital requirement, then there must be recognition of the capacity of a firm's current period

revenue to absorb expected losses, especially in the calibration of the overall operational risk minimum regulatory capital requirement. Likewise, low correlations between operational risk losses should be recognized and considered in the overall calibration level. The WGOR notes that care must be exercised to ensure that the operational risk regulatory capital framework does not result in excessive compliance burdens and is aligned with risk management practices.

3.   Pillar One: The continuum concept outlined in the Consultative Proposal, which allows banks to use increasingly more sophisticated and risk-sensitive methods to determine their operational risk minimum regulatory capital requirement, is a good start to creating an appropriate operational risk regulatory capital framework. However, the continuum concept should contain explicit provision for the development of more advanced approaches for determining a minimum regulatory capital requirement beyond the currently proposed Internal Measurement Approach (Option 3). The WGOR will consider the qualifying criteria proposed for each option in the continuum concept and the possible need for a *de minimis* exception from some of these criteria after the publication of a sound operational risk management practices consultative paper by the Basel Committee. Risk mitigation, particularly that provided by insurance, should be recognized in the regulatory capital framework. The WGOR would be pleased to work with the Basel Committee to determine how this can be accomplished.

4.   Calibration of Capital Charge: The Basel Committee suggests an overall calibration of the operational risk minimum regulatory requirement at 20% of the total minimum regulatory capital requirement under the current Basel Accord. The WGOR believes that this figure is too high and is concerned about the principle on which it is based. The WGOR notes that this figure was derived from the results of a survey conducted over one year ago that examined the economic capital allocations for risks other than market and credit risk from a sample of institutions in which only four provided complete data sets. Because this figure reflects economic (and not regulatory) capital allocations for "other risks" (a broader term than operational), the suggested figure should not be taken as an indication of the appropriate level for the minimum regulatory capital requirement for operational risks. At the level currently proposed, the minimum regulatory capital requirement would likely cover stress losses and would be disproportionate when compared with an economic capital measure of the same risks and also when compared with the minimum regulatory capital requirement for credit and market risk. The WGOR urges the Basel Committee to revise the overall calibration of the minimum regulatory capital requirement and to consider the appropriate confidence interval and holding period for operational risk in doing so. The WGOR would be pleased to undertake a data-gathering exercise to help the Basel Committee determine an appropriate calibration level. The WGOR believes that an appropriate calibration will result in a significant reduction from the proposed 20% of current total minimum regulatory capital.

5.   Loss Data Collection and Testing of the Proposed Regulatory Capital Framework: The WGOR appreciates the effort of the Basel Committee to collect loss data through an operational risk Quantitative Impact Study (QIS). The WGOR believes that the data collected will be helpful in calibrating the minimum regulatory capital requirement. This data also will be helpful in analyzing some of the WGOR proposals regarding business lines, loss types, and exposure indicators for all options in the proposed regulatory capital framework. However, the current QIS that firms must complete by August 2001 may not capture data sets that are representative enough to fully evaluate many of the proposals and to calibrate the minimum regulatory capital requirement. The WGOR is pleased to

learn that the Basel Committee intends to undertake additional operational loss data surveys in the years ahead, especially in light of outstanding definitional issues. The WGOR encourages the Basel Committee to commit to revising the regulatory capital framework as appropriate based on data collected well beyond December 31, 2001. The WGOR believes that this data will be required to undertake the testing necessary to finalize the regulatory capital framework by the January 1, 2004, implementation date for the new Basel Accord.

6. Nonlinearity: The WGOR believes that operational risk is nonlinear with respect to firm size or activity level. As a result, based on the empirical research of PricewaterhouseCoopers, the intuitive understanding of operational risk developed by risk managers, and mathematical indications using reasonable distribution assumptions, the WGOR currently recommends that nonlinearity be addressed in Options 1, 2, and 3 by applying a square root function to the exposure indicator, or some part thereof, in the formula used in each of these options. The WGOR will continue to explore whether there are other, possibly more appropriate, ways to address its concerns about the nonlinear nature of operational risk.

7. Basic Indicator Approach (Option 1): A capital charge determined as a nonlinear fixed percentage of gross income is not risk sensitive but is not unreasonable as a basic indicator approach given the lack of better alternatives. Each firm should use a gross income figure calculated as the average of three yearly (i.e., 12 calendar months) figures as determined by their national generally accepted accounting principles (GAAP).

8. Standardized Approach (Option 2): A capital charge determined as a fixed percentage of a single nonlinear indicator across a number of business lines is the beginning of a risk-sensitive framework, but only if the chosen indicator appropriately reflects changes in the operational risk profile of each business line. In Option 2, the Level 2 business lines contained in the Consultative Proposal (excluding insurance) should be used to maximize risk sensitivity. However, additional work may be necessary on the current definitions of the business lines, particularly as loss data are collected. The WGOR preliminarily proposes that gross income, despite the possible existence of better indicators for some business lines in which its use may penalize profitable activities for which risk does not increase with income, be used as the exposure indicator in all business lines. This is proposed for simplicity and to ensure an appropriate calibration of Option 2 vis-à-vis Option 1. This recommendation should be reviewed after sufficient loss data are collected to determine if gross income is still an appropriate choice for all business lines.

9. Internal Measurement Approach (Option 3): An option that uses the actual loss experience of banks in determining the capital charge is significantly more risk sensitive than Option 2, provides an incentive to collect loss data and price operational risk, and promotes management measures designed to prevent and decrease operational losses that can be measured on an ex-post basis. The WGOR believes that the formula contained in the Consultative Proposal requires several modifications before it can be tested. Once modified, much work still remains to test a modified version of the proposed formula to determine whether it is an appropriate regulatory capital tool and whether further modifications are necessary. The WGOR has agreed that any testing should include an evaluation of two different sets of loss type categories (event categories and effect categories), although the WGOR currently favors the event categories for determining the regulatory capital charge. During this testing, possibilities for simplifying the business line/loss type matrix also should be considered. In applying the modified proposed

formula, the Basel Committee should allow for the adjustment of individual extreme loss data points when banks are able to demonstrate verifiable improvements in the internal controls designed to prevent such losses. There are still some concerns that, even with modifications, the proposed formula may be inappropriate for determining the regulatory capital charge. The WGOR will be attempting to address these concerns during the testing period.

10. Scorecard Methodology: An alternative methodology to the determination of the minimum regulatory capital requirement is being developed in the WGOR. This methodology emphasizes the scope and quality of the internal control environment, rather than the level of a firm's expected losses as derived from historical loss data. The determination of the regulatory capital charge is based primarily on assessments (appropriately scaled) of internal processes and operational controls for different risks across various business lines through the completion of a series of standardized "scorecards." The other factors influencing the capital charge are the size of the business lines (captured through the use of exposure indicators) and regulatory-determined factors indicating the amount of capital required per unit of exposure for an average-risk bank. The collection of loss data is required to calibrate and validate the approach. The Scorecard Methodology therefore may serve as an alternative for or qualitative adjustment to the currently proposed Option 3 formula. There are still some concerns that, even with modifications, the Scorecard Methodology may be inappropriate for determining the regulatory capital charge. The WGOR will be attempting to address these concerns during the testing period.

11. Advanced Approaches (Option 4): The WGOR believes that it is important that the regulatory capital framework provide incentives for developing truly risk-sensitive measures of operational risk by publicly and explicitly embracing Option 4. The Basel Committee should describe a process and timetable for developing and approving advanced methods for determining operational risk regulatory capital requirements, subject to resolution of issues regarding data sufficiency, definitional clarity, and methodological consistency. This is particularly important as the proposed Option 3 formula is a simplification of a full loss distribution approach. However, not all WGOR members believe that the loss distribution approach as described in the Consultative Proposal will be the only possible advanced approach. The WGOR believes that Option 4 should be available at the implementation date for the new Basel Accord.

12. Qualitative Adjustments: The regulatory capital framework should contain a qualitative adjustment factor in Pillar One based on the quality of the internal control environment of banks. This adjustment factor should be applied in all options of the continuum concept. The WGOR believes that it would be appropriate for a qualitative evaluation of internal controls to result in a material adjustment (upward and downward) in the capital charge determined through the application of the formula in each option. The WGOR has developed a set of principles that should guide the implementation of any qualitative adjustment factor and is continuing to review possible mechanisms for performing the adjustment.

13. Data Pooling: There are two potentially important uses for pooled data: calibrating the minimum regulatory capital requirement and supplementing internal loss data when using the modified proposed Option 3 formula. Some WGOR members are concerned about a potential requirement that a firm must join an industry data pool to use Option 3 because of possible competitive and strategic implications. The WGOR has identified a number

of concerns regarding any data pool, whether operated privately or by supervisors, that should be addressed, but it does not believe that these concerns present an insurmountable obstacle to the establishment of data pools. The WGOR does believe that it would be inappropriate for regulators to query private data consortia for information.

14.   Level Playing Field: The WGOR believes that one of the objectives for the regulatory capital framework should be to establish a level playing field among the firms that are subject to the operational risk minimum regulatory capital requirement. However, these firms may compete with firms that are not subject to the operational risk minimum regulatory capital requirement in the new Basel Accord or any other similar capital requirement. The potential for competitive and economic consequences from the imposition of an operational risk minimum regulatory capital requirement should not be ignored during the finalization of the regulatory capital framework.

15.   Pillar Two: All Pillar Two supervisory actions should be executed in a consistent and transparent fashion. All methods used to determine the minimum regulatory capital requirement should be specified under Pillar One. The WGOR looks forward to the publication of a paper on sound risk management practices by the Basel Committee to provide more specific input in this area.

16.   Pillar Three: The WGOR believes that enhanced public disclosure is beneficial, as long as the disclosures provide timely, relevant, and appropriate information about risk levels and risk management practices for which the market is adequately prepared. The WGOR will consider further whether the disclosure of actual operational losses can meet these criteria.

SECTION I. DEFINITION, SCOPE, CALIBRATION, AND TESTING OF THE OPERATIONAL RISK REGULATORY CAPITAL FRAMEWORK

A.   Definition of Operational Risk

Operational risk is a risk type distinct from credit, market, and banking book interest rate risk. To develop an appropriate regulatory capital framework for operational risk, it is necessary to agree on a defined set of risks encompassed within the term. This will allow firms to manage risk exposures and supervisors to evaluate firms' capital adequacy and risk management practices.

One of the first attempts to define operational risk was the comprehensive study of operational risk practices by the British Bankers' Association, Risk Management Association (formerly Robert Morris Associates), and the International Swaps and Derivatives Association. Their 1999 report, *Operational Risk Management—The "Next" Frontier*, defined *operational risk* as "the risk of direct or indirect loss resulting from inadequate or failed internal processes, people, and systems or from external events."

This general definition was adopted by the Basel Committee for regulatory capital purposes. The Consultative Proposal further states that strategic and reputation risks are not included within the definition of operational risk for the purpose of a minimum regulatory capital requirement.[1] The WGOR believes that the Consultative Proposal definition is a good starting point for defining operational risk for regulatory capital purposes. However, the WGOR would suggest some modifications to the definition to ensure clarity. **Thus, the WGOR proposes the following general definition of *operational risk* for regulatory capital purposes:**

> *Operational risk is the risk of loss resulting from inadequate or failed internal processes, people, and systems or from external events that is not already covered by other regulatory capital charges (i.e., credit, market, and banking book interest rate risks). Business, strategic, and reputation risks are expressly excluded.*

The WGOR proposes to modify the Consultative Proposal definition by eliminating the words "direct or indirect." The WGOR believes that these terms may cause confusion because they are imprecise in their meaning. The WGOR instead believes that the losses covered by the operational risk regulatory capital framework should be defined in terms of the immediacy and measurability of the losses resulting from an operational risk event.

The WGOR has developed a series of definitions that can be used to determine the specific losses that should be covered by the *operational risk* regulatory capital framework. These definitions, offered in direct response to the Consultative Proposal's request for comment on how to further specify the coverage of operational risk regulatory capital[2], are as follows:

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[1]   Consultative Proposal, para. 6. The WGOR agrees that it is appropriate to exclude strategic (sometimes termed "business") risks and reputation risks from the definition of operational risk for regulatory capital purposes. The WGOR is not aware of any immediate losses suffered by depositors as a result of strategic and reputation risks. In addition, market forces provide an orderly mechanism (i.e., mergers and acquisitions) for absorbing those firms that do not effectively manage these risks. Finally, with respect to reputation risk, there is a concern for double-counting of regulatory capital as reputation risks arise after the losses associated with market, credit, banking book interest rate, or operational risk loss events impair market confidence in an institution. Thus, the assignment of additional regulatory capital for the reputation risks associated with these losses would effectively mean that regulatory capital had been required to cover the same losses twice.

[2]   Consultative Proposal, para. 7-8.

1. An *operational risk loss* is the <u>amount charged net of recoveries</u> to the profit and loss account in the <u>resolution</u> of the operational risk event.

2. *Amount charged net of recoveries* is determined in accordance with national generally accepted accounting principles (GAAP). Recognition of an operational risk loss as a data point for regulatory capital purposes is triggered by the recording of a charge to the profit and loss accounts. The date attributed to the loss is the date on which the profit and loss account charge is first recorded. If the loss amount changes in future periods (e.g., when a recovery is made), adjustments are recorded as changes to the original loss data point and do not result in a new data point.

3. *Resolution* is a correction of an individual event (e.g., through external costs, write-downs, or costs to fix)[3] that results in a return to a position and standard comparable to the original.

These definitions only determine the scope of the losses for which the operational risk regulatory capital framework should cover. The WGOR notes that these definitions may include some losses that are currently covered under the credit risk regulatory capital requirement. The WGOR believes that further clarification regarding the inclusion of credit losses associated with operational failures and inadequacies is required from the Basel Committee before the new Basel Accord is finalized. The WGOR notes that the Steering Committee has formed a special Task Force to examine this issue.

Once the scope of operational risk loss has been defined, there may be a need to develop a method for classifying losses into different loss categories. The WGOR has developed a decision tree and loss category descriptions for this purpose. These are described more fully in Section III of this report.

Two final points must be made with respect to the definition of operational risk for regulatory capital purposes. **First, the WGOR proposes that where losses arising from external events experienced by the firm (e.g., fires, floods, earthquakes) fit the definitions above, such events should be included within the scope of the operational risk regulatory capital framework.** If such events lead to operational risk loss, then there is no justification for excluding them from the regulatory capital framework.

Second, the WGOR recommends that the definition of operational risk for regulatory capital purposes should not include latent losses, near misses, and contingent events because of the difficulty in measuring such losses. Excluding such losses will help ensure consistency and comparability in the determination of a minimum regulatory capital requirement given the difficulty in defining the terms, detecting that an operational loss has occurred, and estimating the resulting operational loss amount. This does not mean that firms will not manage the risk of such events and seek to limit any losses that might result from such events. It merely means that such events should not be targeted by the operational risk regulatory capital framework for pragmatic reasons.

B.   Scope of the Regulatory Capital Framework

1.   Connection with Other Capital Requirements

There should be no overlap in the scope of the regulatory capital frameworks for different risk types to avoid double-counting in arriving at the total minimum regulatory capital requirement for a firm. Thus, the WGOR definition of operational risk for regulatory capital purposes clearly states that it does

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[3]   More detail on the particular financial effects that are included within the scope of a resolution for regulatory capital purposes can be found in Appendix G.

not include any risk of loss already covered by the minimum regulatory capital requirement for market, credit, and banking book interest rate risk. Conversely, to the extent that losses are included within the operational risk minimum regulatory capital requirement, they should not be covered elsewhere.

To avoid overlaps, clear definitions of the risk types in each regulatory capital framework are required. The goal of the regulatory capital framework should be to ensure consistency in distinguishing those losses that are treated as market, credit, banking book interest rate, and operational risk losses. As previously noted, the WGOR definition of operational risk loss may include some losses that are currently covered under the proposed credit risk and current market risk regulatory capital frameworks. **The WGOR recommends further clarification regarding the proper scope of operational risk for regulatory capital purposes from the Basel Committee before the finalization of the new Basel Accord.** This will help ensure transparency and risk sensitivity in the new Basel Accord.

2.   Expected and Unexpected Losses

The WGOR proposes that the minimum regulatory capital requirement should only address unexpected losses and that it is inappropriate to require regulatory capital to cover expected losses. The WGOR agrees that expected losses are adequately covered through product pricing, business revenue, and loss provisions. The WGOR is pleased to see in the Consultative Proposal that the Basel Committee is willing to recognize some provisions through a deduction from the minimum regulatory capital requirement upon disclosure, though the WGOR's principled position is that capital should not be required to cover expected losses.[4]

However, the WGOR would appreciate further clarification from the Basel Committee on how such recognition for provisioning would occur. The WGOR notes in this regard that the rules on provisioning for operational loss may differ from the rules for provisioning for other types of losses (e.g., credit losses) in many national accounting regimes. If the regulatory capital charge is designed to cover both expected losses and unexpected losses, then there must be recognition of the capacity of a firm's current period revenue to absorb expected losses, especially in the calibration of the overall operational risk minimum regulatory capital requirement.

3.   Consolidation and Insurance

The WGOR notes that the Consultative Proposal would require banks to fully deduct equity participations in insurance subsidiaries.[5] Thus, all activities conducted in those subsidiaries should not be subject to an operational risk minimum regulatory capital requirement.

C.   Calibration of the Minimum Regulatory Capital Requirement

The Basel Committee concluded from a survey of a very limited number of institutions that banks allocate 20% of total economic capital for "other risks." The Basel Committee then used a figure equal to 20% of current minimum regulatory capital requirements to estimate a provisional multiplier for the Basic Indicator Approach (Option 1) and to generate initial calibrations of some of the beta values in the Standardized Approach (Option 2).[6] The WGOR is pleased to see that the Basel Committee has attempted to calibrate the overall operational risk minimum regulatory capital requirement by examining bank allocations for economic capital. The WGOR supports any effort to align the regulatory capital

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[4]   Consultative Proposal, para. 14.
[5]   The new Basel Accord Consultative Document, para. 9.
[6]   Consultative Proposal, para. 21.

framework with bank economic capital allocation processes. **However, the Basel Committee's initial efforts to calibrate the minimum regulatory capital requirement are misguided and inappropriate.**

Given its concerns, the WGOR undertook a survey to compare two figures: (1) 20% of total minimum regulatory capital and (2) 30% of gross income. Banks were asked to use the current minimum regulatory capital requirement (i.e., 8% of risk-weighted assets) to determine the first figure and to use their own definition of gross income to determine the second figure. The purpose of the survey was to examine the calibration of the proposed minimum regulatory capital requirement for Option 1 (i.e., 30% of gross income) given the Basel Committee's stated goal (i.e., 20% of current total minimum regulatory capital).

The results, produced by 28 banks from Europe (20), North America (5), and Asia/Pacific (3), appear in Appendix D of this report. As can be seen, the 30% of gross income number is greater than the 20% of minimum regulatory capital number for 22 out of 28 banks. The amount by which the 30% number exceeds the 20% number ranges from 2% to 110%, with an average overestimation of 43%. Across all 28 banks, the weighted average overestimation of the 30% number vis-à-vis the 20% number is 35%. The WGOR believes that this result shows an inappropriately high calibration of Option 1. Because the Consultative Proposal does not provide all the beta values for Option 2, it is not possible to compare the 20% figure with the Option 2 capital charge to determine if Option 2 has been calibrated properly.

In any case, the WGOR believes that 20% of current minimum regulatory capital would be inappropriate for calibrating Option 2. According to the Consultative Proposal, this figure was chosen based on a sample of institutions in which only a small number (i.e., four) provided complete data sets. Most importantly, many of the firms providing this data provided the amount of economic capital allocated to cover all "other risks," a much broader term than operational risk. It would be highly inappropriate for the operational risk minimum regulatory capital requirement to be calibrated to cover "other risks" when the definition of operational risk explicitly excludes nonoperational "other risks." This would destroy any clarity achieved by further specifying the risk types covered by the regulatory capital framework.

The risks of using the wrong figure to calibrate the minimum regulatory capital requirement for operational risk are significant. Overcharging for and improperly defining operational risk will create the same kinds of arbitrage opportunities that exist under the current framework for credit risk. In addition, creating capital requirements inconsistent with true risks will redirect capital, possibly away from investments in risk management systems. Finally, continued reliance on the 20% figure for calibration purposes may place the level of unexpected operational losses covered by the minimum regulatory capital requirement in the realm of stress losses (i.e., catastrophic losses that could arise from highly unlikely events), for which capital is not intended.

The WGOR believes that any calibrations for Options 2, 3, and 4 also should take into account the lack of recognition of the independence of loss events across business lines that arises from the determination of the minimum regulatory capital requirement as a linear summation across business lines. In addition, the Basel Committee should consider taking into account the experience of some regulatory regimes that have had capital requirements for "other risks" for some business activities or specialized firms for a number of years.[7] Finally, the Basel Committee should take into account the potential for adverse competitive or economic consequences resulting from the calibration of the operational risk minimum regulatory capital requirement at any particular level.

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[7]   Capital Adequacy Directive, Annex IV "Other Risks" (EEC/93/6, 15 March 1993).

The WGOR proposes that an appropriate calibration will result in a significant reduction from the proposed 20% of current minimum regulatory capital. The WGOR would be pleased to undertake a data-gathering exercise to help the Basel Committee determine an appropriate calibration level for the minimum regulatory capital requirement for operational risk.

D.   Testing and Revision of Proposals for the Regulatory Capital Framework

The WGOR appreciates the effort of the Basel Committee to collect loss data through an operational risk Quantitative Impact Study (QIS). The WGOR believes that the data collected will be helpful in calibrating the minimum regulatory capital requirement as noted above. In addition, as will be noted throughout this report, the WGOR believes that this data will be helpful in testing proposals regarding the options in the regulatory capital framework. The WGOR notes that significant testing will be necessary to determine an appropriate regulatory capital framework by the January 1, 2004, implementation date for the new Basel Accord.

One issue that should be examined during the collection of loss data and testing period is the appropriate data collection threshold for regulatory capital purposes. The WGOR also notes that the Basel Committee has yet to specify an appropriate solvency rating, confidence level, and holding period for determining the minimum regulatory capital requirement to cover operational risk. All of these will materially affect the calibration of the minimum regulatory capital requirement and therefore should be the subject of discussion during the testing of the proposals for the regulatory capital framework.

The WGOR cautions that, because many firms are just beginning to collect loss data internally and because many of the definitional recommendations have only been recently agreed within the WGOR, the current QIS that firms must complete by August 2001 may not capture data sets (not only loss data but also exposure indicators) that are representative enough to fully evaluate many of the recommendations made in this report. The WGOR is pleased to learn that the Basel Committee intends to undertake additional operational loss data surveys in the years ahead.

The WGOR recommends that the Basel Committee commit to revising the regulatory capital framework as appropriate based on these future data collections and the testing that will occur with this data. The WGOR agrees that data collection, testing, and modification of the regulatory capital framework will need to extend well beyond the end of 2001 but can be completed prior to the January 1, 2004, implementation date for the new Basel Accord.

SECTION II. BASIC STRUCTURE OF THE REGULATORY CAPITAL FRAMEWORK

The WGOR has developed the following set of key requirements for the operational risk regulatory capital framework: risk-based, transparency, consistency, level playing field, and flexibility. These requirements can be explained as follows.

The operational risk regulatory capital framework should align regulatory capital requirements with bank risk management processes and therefore be risk based. The regulatory capital framework should contain transparent methods for determining a minimum regulatory capital requirement that can be consistently applied. This will help create a level playing field across jurisdictions. Finally, the regulatory capital framework should be flexible enough to ensure that it does not result in excessive regulatory compliance and reporting burdens.

The following text will discuss how the WGOR believes that these key requirements should be reflected in each of the Three Pillars proposed by the Basel Committee.

A.   Pillar One

The WGOR believes that the continuum concept outlined in the Consultative Proposal[8] can meet its key requirements with modifications. The following will outline the WGOR views on the general framework of the continuum concept. Details regarding the separate modifications that the WGOR believes are necessary for each option within the continuum concept will be more fully developed in Section III of this report. However, thorough evaluation of the Consultative Proposal and the WGOR's proposed modifications will require testing.

The WGOR notes that the continuum concept contains three approaches for determining a regulatory capital requirement for operational risk: (1) Basic Indicator Approach (Option 1); (2) Standardized Approach (Option 2); and (3) Internal Measurement Approach (Option 3). An alternative methodology that may be used to determine the minimum regulatory capital charge, in whole or in part, using scorecards is being developed in the WGOR. Additional details on this Scorecard Methodology are contained in Section VII of this report.

The WGOR would like to ensure that an Option 4 (termed "Advanced Approaches") is part of the initial regulatory capital framework and is made available, with appropriate supervisory approval, at the implementation date of the new Basel Accord. The eventual goal for operational risk measurement may be the development of models that estimate risk based on reliable distributions that reflect actual or predicted losses. Thus, the loss distribution approach outlined in the Consultative Proposal[9] is one possible form of an Advanced Approach. However, some WGOR members do not wish to presuppose the form of future approaches and therefore do not wish to be limited to the loss distribution approach as described in the Consultative Proposal. Thus, the term *Advanced Approaches* is used to preserve flexibility in the regulatory capital framework.

The WGOR agrees with the Consultative Proposal that internationally active banks should be required to use the Standardized Approach or higher. **To ensure sufficient flexibility for firms to align regulatory capital requirements with their internal risk management processes, this requires that all options be available for use at the time of implementation of the new Basel Accord. These options (except Option 1) should be available for use on a business line basis.**

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8   Consultative Proposal, para. 17.
9   Consultative Proposal, Annex 6.

The WGOR proposes that capital benefits be created to reward firms when moving to more sophisticated options in the continuum concept. These benefits should be significant enough to create incentives for banks to make the investments necessary to qualify for the more sophisticated approach. At the same time, the WGOR recognizes that a number of banks may need to use Options 1 and 2 for a long time. Therefore, a significant disadvantage should not result for those banks that will appropriately use Options 1 and 2. This will require a delicately balanced and well-founded calibration of the regulatory capital framework.

The WGOR notes with interest the criteria that the Basel Committee has proposed that banks must meet to qualify for each option in the continuum concept.[10] The WGOR is unable to comment on these criteria until the release of the Basel Committee's proposed sound practices for operational risk management. **The WGOR recommends that further consideration be given to the development of *de minimis* exceptions, such as those currently proposed for data collection in Option 3,[11] within the qualifying criteria for cases in which the compliance costs of meeting the criteria in all areas of a bank may not be matched by the capital benefits resulting from using a particular option.** Thus, the WGOR will consider this issue along with its examination of the qualifying criteria after publication of the sound practices paper. Pending that, the WGOR notes the absence of any proposed qualifying criteria for Option 4.

The WGOR believes that any tool that provides proven and effective protection against the risk of or impact arising from an operational risk event should be considered for recognition in the regulatory capital framework. **In particular, the WGOR proposes that the mitigation provided by risk transfer products (e.g., insurance) should be taken into account in determining the minimum regulatory capital requirement under Pillar One. The WGOR is pleased to see in the Consultative Proposal that the Basel Committee agrees in principle.[12] The WGOR would be pleased to work with the Basel Committee to develop specific proposals for recognizing the risk mitigation effects of insurance and other risk transfer mechanisms.**

The WGOR appreciates the recognition by the Basel Committee that many banks outsource operational activities within their organizations and that, therefore, these activities should not be subject to a minimum regulatory capital requirement when the bank no longer retains the risk of the activities.[13] The WGOR believes that additional work is needed to clarify the criteria for such a "clean break" to ensure that the regulatory capital framework does not distort business incentives. The WGOR would be pleased to work with the Basel Committee to develop appropriate standards for determining when a "clean break" has occurred.

Finally, the WGOR recommends that the regulatory capital framework include a behavioral component reflecting the quality of internal control environments in Pillar One. Such a "qualitative adjustment factor" will provide additional incentives for firms to improve their operational risk management practices. Specific proposals regarding a qualitative adjustment factor that can be applied in all options will be discussed in Section V of this report.

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[10]   Consultative Proposal, para. 42-44.
[11]   "Systems should be able to gather data from all appropriate sub-systems and geographic locations. Missing data from various systems, groups or locations should be explicitly identified and tracked." Consultative Proposal, para. 44, 3rd bullet point.
[12]   Consultative Proposal, para. 50.
[13]   Consultative Proposal, para. 48.

B.   Pillar Two

The WGOR agrees with the Consultative Proposal that supervisors should assess the adequacy of the control environment in each institution. In addition, the WGOR agrees that where the environment is deemed inadequate or the capital allocation insufficient, supervisors should expect banks to take prompt action to correct the situation. The WGOR looks forward to the publication of the upcoming paper on sound operational risk management practices and expects to engage the Basel Committee in a discussion regarding operational risk management practices at that time. Thus, the scope of comments in this paper will be limited to the appropriate separation between Pillar One and Pillar Two and the importance of maintaining a level playing field across jurisdictions.

The WGOR proposes that Pillar One contain all elements necessary to determine the minimum regulatory capital requirement. This includes the criteria that each firm must meet to qualify to use a particular option to calculate the minimum regulatory capital requirement. This also includes the method to determine an adjustment factor to account for the quality of internal control environments. The WGOR acknowledges that the actual approval of a particular bank to use a particular option for determining its minimum regulatory capital requirement is a Pillar Two determination. However, the WGOR believes that all methods used to determine the actual capital charge should be specified under Pillar One.

The WGOR agrees that all Pillar Two actions should be executed in a consistent and transparent fashion on the basis of published guidelines. It is essential that supervisors strive for consistency across jurisdictions. Thus, the WGOR supports any organizational structure (e.g., a college of supervisors) that will facilitate this result.

C.   Pillar Three

The WGOR believes that enhanced public disclosure is beneficial, as long as the disclosures provide timely, relevant, and appropriate information about risk levels and risk management practices for which the market is adequately prepared. **The WGOR recommends that additional work be done on designing appropriate disclosure of operational risk profiles, including whether to disclose actual operational losses.**

A.   Basic Indicator Approach (Option 1)

The WGOR agrees that a simple approach to determining an operational risk minimum regulatory capital requirement is necessary for those banks that may have only limited product and geographic reach and/or for which the cost of complying with the criteria necessary to qualify for more advanced options may outweigh the benefits of using those options.

The WGOR believes that a minimum regulatory capital requirement determined as a nonlinear percentage of a single variable (e.g., gross income) is not risk sensitive and does not provide incentives for improving operational risk management. However, the WGOR also recognizes that the Basic Indicator Approach is not designed to be risk sensitive and therefore agrees that it is transparent and consistent. **Thus, the WGOR agrees that the use of gross income as the Basic Indicator outlined in the Consultative Proposal is not unreasonable, given the lack of better alternatives.**

However, the WGOR believes that several changes are required to the Basic Indicator Approach. First, the WGOR believes that the Basel Committee's attempt to develop a standard definition of gross income, while laudable, is inappropriate. [14] The WGOR notes that an attempt to reconcile differences in accounting regimes would lead to a level of complexity that is not matched by an increase in the comparability of the resulting minimum regulatory capital requirements across firms. **Therefore, the WGOR recommends that gross income be defined according to the generally accepted accounting principles (GAAP) in each national jurisdiction.**

Each firm using Option 1 to determine its minimum regulatory capital requirement should use the amount of gross income (i.e., revenues less interest expense) required to be reported in their financial statements in the jurisdiction in which the firm or entity is incorporated. This gross income figure should be determined as the average of three yearly (i.e., 12 calendar months) figures. While this may result in some differences based on differences in national accounting regimes, the WGOR believes that these differences are not so significant to require the imposition of a standard definition for gross income.

A second change is that the formula proposed for the Basic Indicator Approach (i.e., exposure indicator * α) should be modified to account for the nonlinear nature of operational risk. The WGOR's current proposals to address nonlinearity will be discussed more thoroughly in Section IV of this report. **With respect to the Basic Indicator Approach, the WGOR's current proposal to address nonlinearity is to alter the form of the function so that the total regulatory capital charge (K) is calculated using the following function:**

$$K_{firm} = (EI_{firm})^{1/2} * \alpha$$

where EI = gross income (i.e., revenues less interest expense) according to national GAAP.

Finally, the WGOR proposes that a qualitative adjustment factor be included in the determination of the final minimum regulatory capital requirement in the Basic Indicator Approach. This adjustment factor would result in a material adjustment to the charge (both upward and downward) determined by the formula above based on an objective assessment of the quality of the

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[14]   Net interest income + net non-interest income (comprising (i) fees and commissions receivable less fees and commissions payable, (ii) net results on financial operations, and (iii) other gross income). Consultative Proposal, fn. 5.

internal control environment of an individual firm. The WGOR's proposals regarding the qualitative adjustment factor will be described further in Section V of this report.

B.   Standardized Approach (Option 2)

The WGOR believes that the second option in the continuum concept should offer a significant increase in risk sensitivity when compared with Option 1. This can be accomplished by determining the minimum regulatory capital requirement as a function of an exposure indicator across a number of business lines rather than across the entire firm (as in Option 1), provided that the exposure indicator chosen for each business line appropriately reflects changes in the operational risk profile of each business line.

Option 2 differs from the Internal Measurement Approach (Option 3) in that it does not rely on the use of firm-specific loss data to any degree. Thus, the WGOR believes that the methodology outlined in the Consultative Proposal (i.e., exposure indicator * β_i for predetermined business lines) is appropriate for Option 2. However, the WGOR believes that some modifications to this proposal are necessary. These will be described in the following sections.

1.   Business Lines

The WGOR undertook a survey on business lines early in 2001. In this survey, WGOR members were presented a set of business lines and asked to indicate which business lines should be consolidated for purposes of calculating a minimum regulatory capital requirement under the Standardized Approach. In making this decision, WGOR members were advised to consolidate only those business lines that were believed to have similar risk profiles based on risk management experience. The results of this survey, summarized in Appendix E, form the basis for the WGOR recommendations on business lines for both the Standardized and Internal Measurement Approaches.

The survey results indicated that WGOR members preferred a more granular set of business lines for Option 2 than the eight business lines suggested in the Consultative Proposal. The survey results indicated that, on average, WGOR members preferred using 17 business lines (excluding insurance) to calculate capital under Option 2. The range of business lines preferred by WGOR members varied from 7 to 22, with 17 being the most frequently chosen. **After reviewing the list of preferred business lines, WGOR members concluded that the Level 2 business lines contained in the Consultative Proposal were a suitable approximation to the survey results and should therefore be used in Option 2.[15]**

The WGOR understands the preference of the Basel Committee for maintaining a consistent set of business lines in both Option 2 and Option 3.[16] WGOR members' preference for a more detailed set of business lines under Option 2 results from a desire to increase risk sensitivity in Option 2. In particular, WGOR members note that risk sensitivity in Option 2 derives solely from the business line specific β values that are applied to the relevant exposure indicator for each business line. Therefore, the only way to enhance risk sensitivity in Option 2 is to allow for additional β values, as applied to the relevant exposure indicator, that reflect the specific risk profile of individual business lines. This is appropriate given the significant differences that may occur in the risk profile between some of the Level 2 business

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[15]   These business lines (excluding insurance) are as follows: Corporate Finance; Municipal/Government Finance; Merchant Banking; Advisory Services; Sales; Market Making; Proprietary Positions; Treasury; Retail Banking; Private Banking; Card Services; Commercial Banking; External Clients; Custody; Corporate Agency; Corporate Trust; Discretionary Fund Management; Nondiscretionary Fund Management; Retail Brokerage.
[16]   Consultative Proposal, para. 33.

lines (e.g., discretionary and nondiscretionary fund management) that would not be captured if only the corresponding Level 1 business line (e.g., asset management) was used.

It is in the interests of both WGOR members and their supervisors to optimize the risk sensitivity of Option 2 in the regulatory capital framework, providing that it does not increase the comparative level of complexity. The use of the Level 2 business lines for Option 2 will not increase the complexity of the capital framework, as banks will have to map their own business activities onto whatever set of regulatory business lines is used given that no bank's business lines are likely to match the regulatory ones. Thus, there will be little additional effort necessary in using the Level 2 business lines for Option 2. In addition, banks are likely to collect loss data at least at the Level 2 business lines level. [17]

The WGOR believes that clear definitions and specification of the business lines are required. It is currently not clear where some activities would be captured in the current set of Level 1 and Level 2 business lines. For example, by definition, wholesale futures brokerage activities would not strictly qualify for inclusion in the current Level 1 Retail Brokerage business line. Such activities might be incorporated into the Level 1 Trading & Sales business line. However, this classification may not be suitable because wholesale futures brokerage activities typically rely on complex products traded using automated processes that are monitored with strong day-to-day controls (e.g., straight-through processing of transactions, daily legal and compliance checks, independent monitoring by exchanges) and therefore may have a different risk profile from Trading & Sales activities.

Another example of uncertainties regarding the current set of business lines can be observed in the Level 2 Commercial Banking business line. In this business line, it may be the case that different activities have different risk profiles in terms of the duration and timing of the operational risk exposure and the severity of operational risk loss. For example, the risk profiles of Project Finance/Real Estate, Export/Trade Finance, Leasing, and Guarantees may differ significantly.

The WGOR believes that as data are collected and categorized, additional examples such as these should be examined to determine if it would be appropriate to introduce further granularity in the business lines. On the other hand, data collection and analysis may prove that the risk profiles of some business lines that are currently separated in the list of Level 2 (or even Level 1) business lines may be similar. In such cases, it would be appropriate to consolidate business lines and assign them a common β value.

Therefore, the WGOR recommends that the Basel Committee should revisit its business line definitions before the regulatory capital framework is finalized.

2. Exposure Indicators

WGOR members were asked two questions about exposure indicators in the WGOR business line survey. The first question was whether WGOR members preferred a common single indicator across all business lines in Option 2 or a single indicator that varied across business lines. The second question asked WGOR members to name their preferred indicator for each Level 2 business line.

The survey results indicated that the majority of WGOR members preferred the concept of a single indicator that varied by business line in Option 2. However, when asked to name their preferred indicator for each business line, WGOR members named gross income (i.e., revenues less interest expense) most frequently for every business line except for Asset Management, where gross income and

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[17]   It should be noted at this point in the report that the WGOR recommends the use of Level 1 business lines for Option 3 because it is believed that risk sensitivity under Option 3 is derived from the use of actual loss data in the capital calculation.

funds under management were nearly equally preferred. Many WGOR members indicated that they named gross income across all business lines because of the practical difficulties of collecting detailed exposure indicator data other than gross income for the Level 2 business lines.

After considering these results, the WGOR reached a <u>preliminary</u> agreement that gross income should be used as the exposure indicator for all business lines in Option 2. The WGOR believes that use of the same exposure indicator in Options 1 and 2 would have several beneficial effects. First, it would facilitate the calibration of Option 2 vis-à-vis Option 1. Second, it would help simplify Option 2 without necessarily decreasing risk sensitivity (although it is recognized that gross income is not necessarily a risk sensitive indicator), because risk sensitivity in Option 2 derives solely to the business line specific β values. Finally, it would be beneficial because gross income is transparent, easy to document, capable of being allocated across business lines, and auditable.

After reaching this preliminary agreement, WGOR members discussed the application of gross income across all business lines in Option 2 with experts in their own institutions. After doing so, some WGOR members reported that there may be certain drawbacks to using gross income as the indicator in certain business lines. For example, with respect to the Trading & Sales and Commercial Banking Level 2 business lines, the use of gross income could penalize profitable activities for which there is not necessarily any increased level of operational risk as income increases. In these business lines, it is often the case that high margin activities reflect increased credit risk or market risk (which is already subject to a separate minimum regulatory capital requirement) and do not reflect an increased level of operational risk.

Therefore, as with its business line recommendations, the WGOR would strongly encourage the Basel Committee to re-examine the choice of any particular indicator after sufficient loss data have been collected. Supervisors and the industry will then be able to evaluate the potential for distortions that may result from the choice of gross income and, possibly, be able to propose alternative indicators for some business lines, if appropriate.

Finally, the WGOR applies its recommendations regarding gross income outlined in Option 1 to Option 2 as well. Therefore, gross income should be determined according to the national GAAP in the jurisdiction in which the legal entity is incorporated on the basis of an average of three yearly (i.e., 12 calendar months) figures.

3. Nonlinearity

As noted with respect to Option 1 and discussed more fully in Section VI of this report, the WGOR believes that operational risk has a nonlinear relationship with firm size and activity level. **The WGOR's current proposal to address nonlinearity with respect to the Standardized Approach is to alter the form of the function so that the minimum regulatory capital requirement (K) is calculated using the following function:**

$$K_i = \beta_i * (EI_i)^{1/2}$$

where i represents an individual business line.

4. Qualitative Adjustment

The WGOR proposes that a qualitative adjustment factor be included in the determination of the final capital charge in the Standardized Approach. This adjustment factor would result in a material adjustment to the charge (both upward and downward) determined by the formula above based

on an objective assessment of the quality of internal control environments of an individual firm. The WGOR's proposals regarding the qualitative adjustment factor will be described further in Section V of this report.

C.   Internal Measurement Approach (Option 3)

The WGOR believes that it is important to have an option within the continuum concept that uses actual loss data in determining the minimum regulatory capital requirement. This not only results in a more risk-sensitive charge than that determined under Option 2 but also provides an incentive for firms to collect loss data. **The WGOR agrees that the formula contained in the Consultative Proposal provides a basis for developing an Option 3 formula for calculating the regulatory capital charge that relies on historical loss data. However, the WGOR proposes modifying the proposed formula, as described below, to address several technical issues. In addition, the WGOR agrees that any proposed formula must be tested with actual loss data to determine its likely performance before it is included in the regulatory capital framework.** Only through testing will the supervisory community and the industry be able to determine the appropriateness of the formula and whether any further modifications are necessary.

The WGOR also proposes that the loss type categories proposed for the business line/loss type matrix used with the Option 3 formula be tested. The WGOR currently has developed two different sets of loss type categories (event categories and effect categories) that could be used in the loss type axis of the matrix. These two sets of categories are described below. The WGOR believes that during any data collection and testing period, loss data should be classified according to both sets of categories (i.e., using two different business line/loss type matrices). **The WGOR currently favors the event categories for determining an Option 3 regulatory capital charge but believes that both sets of loss categories should be included in the testing process.** The WGOR believes that an appropriate set of loss type categories can then be chosen for use in the regulatory capital framework.

While testing the proposed formula, the WGOR recommends that simplification in the business line axis of the business line/loss type matrix be considered. This could be a standardized simplification applied to all firms, or it could be allowed on a firm-specific basis according to defined standards and requirements. Simplification of the matrix may be desirable to reduce regulatory burdens and to allow firms to rely more heavily on their internal data. Simplification of the matrix along the business line axis will be discussed in more detail below.

Finally, as with all options in the regulatory capital framework, the WGOR proposes to include a material qualitative adjustment factor (both upward and downward) in the determination of the minimum regulatory capital requirement in Option 3. The qualitative adjustment factor applicable to all options in the regulatory capital framework will be discussed in more detail in Section V. In addition, the WGOR also believes that an additional adjustment of individual loss data points should be allowed in Option 3. This particular adjustment will be discussed below.

Much work remains to be done to develop and test a modified version of the proposed Option 3 formula. The WGOR is committed to undertaking this work. There are still some concerns about the ultimate appropriateness of the formula for determining a minimum regulatory capital requirement. These will be noted below, along with the benefits of the formula that may balance out these concerns.

1.   Modifications to the Proposed Formula

The WGOR believes that the basic structure of the proposed Option 3 formula outlined in the Consultative Proposal for determining the Option 3 regulatory capital charge is a starting point for

developing a modified proposal that should be tested. Before describing the modifications proposed by the WGOR, it may be helpful to quote the structure for Option 3 as proposed by the Basel Committee in paragraph 32 of the Consultative Proposal:

- A bank's activities are categorised into a number of business lines, and a broad set of operational loss types is defined and applied across business lines.
- Within each business line/loss type combination, the supervisor specifies an exposure indicator (EI), which is a proxy for the size (or amount of risk) of each business line's operational risk exposure.
- In addition to the exposure indicator, for each business line/loss type combination banks measure, based on their internal loss data, a parameter representing the probability of loss event (PE) as well as a parameter representing the loss given that event (LGE). The product of EI*PE*LGE is used to calculate the Expected Loss (EL) for each business line/loss type combination.
- The supervisor supplies a factor (the "gamma term") for each business line/loss type combination, which translates the expected loss (EL) into a capital charge. The overall capital charge for a particular bank is the simple sum of all the resulting products. This can be expressed in the following formula:
  Required capital = $\Sigma i\ \Sigma j\ [\gamma(i,j) * EI(i,j) * PE(i,j) * LGE(i,j)]$
  (i is the business line and j is the risk type).
- To facilitate the process of supervisory validation, banks supply their supervisors with the individual components of the expected loss calculation (i.e., EI, PE, and LGE) instead of just the product EL. Based on this information, supervisors calculate EL and then adjust for unexpected loss through the gamma term to achieve the desired soundness standard.

The WGOR proposes that the following modifications be made to this basic structure.

a.   Gamma Term (γ)

In the proposed Option 3 formula, γ is used to determine an estimate of unexpected loss (UL) from an expected loss (EL) amount that is itself the product of an exposure indicator (EI) value, a loss frequency rate (PE) estimate, and a loss severity rate (LGE) estimate. Thus, γ is intended to represent the estimated relationship between EL and UL for any particular business line/loss type combination based on a chosen confidence interval and time horizon. In Option 3, it is assumed that a firm does not have sufficient data to estimate this relationship internally, so it must rely on a standard industry average value for γ. It is assumed that the γ value will be estimated by supervisors using a set of industrywide loss data and an appropriate confidence level and time horizon.

The WGOR agrees that the γ factor should be recalculated frequently (perhaps at least every three years) to maintain an appropriate relationship with current operational risk management practices and loss data. Because γ will be standardized across the industry, any distortion in the term would result in a systematic distortion in the minimum regulatory capital requirements for all firms in the industry. This could have potentially damaging effects on a wide scale. Therefore, supervisors should carefully monitor γ to ensure that it continues to have an appropriate value.

b.   Exposure Indicator (EI)

In the proposed Option 3 formula, the EI parameter functions as an estimate of the risk exposure in any particular business line/loss type combination. This exposure amount is multiplied by an estimate

of the loss frequency rate (PE) and the loss severity rate (LGE) to arrive at an expected loss (EL) amount. It is this EL amount that is multiplied by γ to determine the amount of regulatory capital required for a particular business line/loss type combination.

The WGOR has not yet agreed on appropriate exposure indicators for each business line/loss type combination. The WGOR believes that exposure indicators should be selected based on an agreed set of criteria. The WGOR suggests the following set of criteria for choosing exposure indicators:

1. Should be relevant to operational risk.
2. Should provide an appropriate measure of the change in risk profiles.
3. Should have clear definitions.
4. Should be transparent and capable of being documented and audited.
5. Should be easy to obtain.
6. Should not result in perverse incentives.

The WGOR believes that the collection of loss data will help in the analysis of potential exposure indicators. **Thus, the WGOR recommends that the Basel Committee closely examine the data collected in the August 2001 operational risk QIS and subsequent data collection surveys before deciding on final exposure indicators for the business line/loss type matrix in Option 3.**

c. Loss Frequency (PE)

The WGOR believes that it will be necessary, in certain cases, to use external (i.e., industry) data in conjunction with internal (i.e., firm-specific) data to estimate the expected frequency of losses (i.e., PE value) for each business line/loss type combination. The need to combine internal and external data will be necessary where there are a small number of observed internal losses over the required time horizon, as the lack of internal data will create an inherent statistical uncertainty that the frequency of internal losses represents the "true" expected frequency of losses. **Thus, the WGOR proposes that internal and external data be combined to ensure confidence in the PE value.**

The statistical uncertainty of the PE value could be reduced by having a sufficiently long time horizon (e.g., five years). However, the WGOR believes that the appropriate time horizon for estimating a PE value should be limited to three years as older data may no longer be relevant to the operational risk profile of the particular business line/loss type combination for the firm. **Thus, the WGOR recommends that each firm use a three-year average when determining the PE value in each business line/loss type combination.**

The WGOR is currently examining a specific methodology for computing a three-year average PE value that integrates both internal and external data in such a way that the more credible internal data are relied on more heavily as the number of internal frequency data points increases. It is currently believed that there should be some threshold number of loss data points beyond which only internal data will be used to determine the PE factor. Below the threshold level, a combination of internal and external data is used, with a heavier reliance on the internal data to the extent that it is available. **The WGOR will provide additional details on this proposal once it has been examined more thoroughly.**

d. Loss Severity (LGE)

As with the frequency estimate, the WGOR believes that it will be necessary, in certain cases, to use external loss data in conjunction with internal loss data to estimate the expected severity of losses

used to determine the LGE value for each business line/loss type combination. This will occur in cases in which a bank does not have enough internal data to obtain a statistically significant estimate of the expected loss severity over the required time horizon. **As with the frequency estimate, the WGOR recommends that the appropriate time horizon for estimating loss severity be set at three years.**

The WGOR proposes the following formula for determining the LGE value in any particular business line/loss type combination:

$$LGE = \theta * LGE_{firm} + (1 - \theta) * LGE_{industry}$$

where LGE is the loss rate used by the bank for the regulatory capital calculation, LGE_{firm} is the LGE as determined using internal firm-specific data only, and $LGE_{industry}$ is the LGE as determined using industry average data.

The WGOR is currently examining the appropriate value for the weighting factor θ in the above formula. It is believed that the weighting factor should be set by supervisors for each business line/loss type combination (perhaps varying by business line/loss type combination) and should be based on the number of losses recorded over the required three-year calculation period. **The WGOR will provide additional details once they have been examined more thoroughly.**

e. Nonlinearity

As noted for Options 1 and 2 and explained more thoroughly in Section IV of this report, the WGOR believes that all formulas in the regulatory capital framework should take into account the nonlinear nature of operational risk. **The WGOR is currently considering two methods for addressing nonlinearity in the proposed Option 3 formula.**

One method would apply a square root function to the frequency part of the exposure indicator for each business line/loss type combination. This does require that the EI term in the proposed formula be split into separate frequency and severity components. Splitting the exposure indicator into frequency and severity components does not necessarily imply using two different exposure indicators, as the same indicator could be used for each component. However, it does allow for different indicators to be used for each component. In addition, it should be noted that separate exposure indicators are required to determine the PE and LGE rates used in the formula. **Thus, under this method, the form of the proposed Option 3 formula is as follows:**

$$K = \Sigma i \ \Sigma j \ \{ \ \gamma(i,j) * [\ EI_{frequency}(i,j) * PE(i,j) \ ]^{1/2} * [\ EI_{severity}(i,j) * LGE(i,j) \ ] \ \}$$

where i is the business line and j is the risk type, $EI_{frequency}$ is the frequency exposure indicator, and $EI_{severity}$ is the severity exposure indicator.

A second method to account for nonlinearity would add an additional term, a "Risk Profile Index" (RPI), to the proposed Option 3 formula. The RPI term was suggested in the Consultative Proposal as a term to account for the difference between an individual firm's risk profile and the industry risk profile.[18] Assuming that severity distributions are similar across firms, the RPI factor can be based on the ratio of an individual firm's frequency of losses and the industry average frequency of losses. This term also can be used to account for nonlinearity of operational risk by introducing a square root function into the calculation of the RPI. **Thus, under this method, the form of the proposed Option 3 formula is as follows:**

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[18]   Consultative Proposal, Annex 5.

$$K = \Sigma i \; \Sigma j \; \{ \gamma(i,j) * EI(i,j) * PE(i,j) * LGE(i,j) * [(EI_{industry} * PE_{industry}) / (EI_{firm} * PE_{firm})]^{1/2} \}$$

where i is the business line and j is the risk type, EI_{firm} and PE_{firm} are the EI and PE as determined using internal firm-specific data only, $EI_{industry}$ and $PE_{industry}$ are the EI and PE as determined using average industry average data, and $[(EI_{industry} * PE_{industry}) / (EI_{firm} * PE_{firm})]^{1/2}$ is the RPI factor.

The WGOR will continue to investigate whether one of these two proposals, or some other proposal, is the most appropriate solution to its concerns about nonlinearity in Option 3.

2. Choosing Loss Categories for the Business Line/Loss Type Matrix

The WGOR has developed two sets of loss categories that may be used in the business line/loss type matrix required for determining the minimum regulatory capital requirement using the proposed Option 3 formula. These two sets of loss categories are termed "event" categories and "effect" categories. The first of these, the event categories, classifies losses according to the event associated with a particular operational loss. The second of these, the effect categories, classifies losses according to the profit and loss statement effect of an operational loss. It should be noted that the loss categories themselves do not clearly determine which losses should be considered operational risk losses for regulatory capital purposes. As noted in Section I, the WGOR has developed definitions of operational loss for this purpose.

It is recognized that only one set of loss categories is necessary for the business line/loss type matrix for Option 3. The WGOR currently favors the event categories for the matrix but believes that data should be collected using both sets of loss categories (i.e., using both a business line/event category matrix and a business line/effect category matrix) while the modified proposed Option 3 formula is tested. The WGOR believes that it will be able to recommend one set of loss categories once this testing is complete.

The two sets of loss categories are as follows:

Event Categories	Effect Categories
Employment and Workplace Safety	Legal Liability
Fraud, Theft, and Unauthorized Activity	Regulatory, Compliance, and Taxation Penalties
Physical, Asset, Infrastructure, and System Related	Loss of or Damage to Assets
Execution, Delivery, and Process Management	Restitution
Clients, Products, and Business Practices	Loss of Recourse
	Write-downs

The WGOR has developed mechanisms for ensuring the consistent classification of losses in these two sets of loss categories. For the event loss categories, this consists of a decision tree that contains yes/no questions that can be used to categorize a particular operational loss. This decision tree is contained in Appendix F of this report, along with a description of the event categories.

The description of the event categories not only contains the "Level 1" event categories listed above but also "Level 2" categories for mapping purposes and "Activity Examples" to provide guidance in classifying losses. **The WGOR proposes that data collection should occur using the Level 2 categories, although the minimum regulatory capital requirement calculation will occur using the Level 1 categories.** The WGOR notes that some of the activity examples currently contain losses that may be covered by the proposed credit risk regulatory capital requirement. The inclusion of these examples requires clarification with supervisors regarding the proper scope of operational risk regulatory

capital to avoid double-counting in arriving at the total minimum regulatory capital requirement for a firm.

For the effect categories, the WGOR has developed a series of yes/no questions that can be used to categorize operational loss. These questions are contained in a chart that also provides definitions for each category and examples of what losses are included and excluded from each category. This chart is contained in Appendix G of this report. As with the event categories, the WGOR notes that the inclusion of particular items in the charts requires clarification with supervisors regarding the proper scope of operational risk regulatory capital.

The WGOR notes that the effect categories, while appearing similar to accounting categories, cannot be mapped directly to general ledger entries. Thus, it should not be anticipated that the effect categories automatically can be reconciled with accounting books. It should further be noted that the decision tree used to classify losses in the event categories makes use of the effect categories. That is, the effect categories are used to determine whether the complete dollar amount of a loss has been captured for any particular loss event. Thus, it may be the case that both sets of loss categories are required.

Some WGOR members note that it may be more difficult to agree on exposure indicators for effect categories than for event categories. Others note that the effect categories would result in splintering of the effects related to one single event so that no category captures the total loss amount (i.e., a $600 million loss resulting from a single event may be spread across multiple effect categories). In addition, some WGOR members note that, without event categories, there is no methodological "bridge" to the causal variables and root cause analysis that will be important for developing advanced approaches to measuring operational risk. For these reasons, the WGOR currently prefers to use the event categories in the business line/loss type matrix.

However, the WGOR agrees that it is important to determine how the modified proposed Option 3 formula behaves using both sets of loss categories before recommending event categories over effect categories. It is not clear, however, what empirical method can be used to determine which particular set of loss distributions (i.e., those resulting from the use of the event categories or those resulting from the use of the effect categories) is more "correct" or "accurate" using short-range statistical comparisons. **Thus, the WGOR will consider further how and whether an appropriate set of testing criteria can be developed.**

3. Simplifying the Business Lines in the Business Line/Loss Type Matrix

As noted above, the WGOR has considered the subject of business lines through a survey. The WGOR currently believes that the Level 1 business lines contained in the Consultative Proposal (excluding insurance) are appropriate for Option 3. **Thus, the WGOR agrees that the business line/loss type matrix should initially contain the following set of eight business lines:**

1. Corporate Finance
2. Trading & Sales
3. Retail Banking
4. Commercial Banking
5. Payment and Settlement
6. Agency Services
7. Asset Management
8. Retail Brokerage

However, to limit the difficulties related to data collection and to enhance the ability of a firm achieving the data sufficiency necessary to use only internal data for determining PE and LGE values, the WGOR also agrees that it may be useful to simplify the Option 3 matrix along the business line axis. This would preserve and reinforce the analytical advantages of Option 3 over Option 2 while also facilitating its implementation and accessibility. Thus, the WGOR believes that the possibility for simplification along the business line axis should be considered while the modified proposed Option 3 formula is tested.

The WGOR initially believes that it may be appropriate to simplify along the business line axis for two main reasons. First, collapsing around the number of business lines reduces the difficulties that may result from classifying losses in a discrete set of business lines. As was seen above, the WGOR has devoted significant time developing a method for ensuring consistent classifications in loss type categories. Simplification along the business line axis would avoid the need for a similar exercise for business lines. It also may remove some of the uncertainty that will result in any mapping of business activities into the eight business lines.

Second, a simplification along the business line axis would allow for some recognition of the fact that loss events are more likely to be independent across business lines than across loss types. Thus, a reduced number of business lines will diminish the distortion that results from having the capital charge determined as a simple summation across business lines. This may be an additional method by which the independence of loss events across business lines can be effectively taken into account in the determination of the regulatory capital charge.

The WGOR recommends that simplification (whether through the business line axis as described above or even possibly through the loss categories) should be pursued wherever it is desirable or beneficial on the basis of usability or cost/benefit analyses. The WGOR also believes that supervisors should consider whether it may be appropriate to allow individual firms to simplify the business line/loss type matrix on an individual basis, subject to regulatory approval. If such simplification were permitted, the WGOR believes that firms would still need to be required to collect loss data at the most granular regulatory-specified level of the matrix to preserve the possibility of data sharing for determining γ and for combining internal and external data in determining PE and LGE values. The WGOR recommends that simplification of the matrix be considered during the data collection and testing period.

4. Adjusting Individual Loss Data Points

As noted above, the modified proposed Option 3 formula attempts to establish an explicit relationship between risk profiles, loss experience, and the regulatory capital charge. This provides an incentive in the regulatory capital framework for firms to collect and analyze operational loss data. However, the formula does not take into account the fact that firms may take immediate action after an extreme loss to prevent the recurrence of that loss. Thus, distortions in the regulatory capital charge may occur as one particularly large loss may inordinately influence a firm's historical loss data, particularly if that firm has taken steps to address the problems that may have led to the loss.

Therefore, to avoid this distortion, the WGOR recommends that the modified proposed Option 3 formula allow for the adjustment of large and highly infrequent losses that might unfairly distort loss histories after a firm has made internal control improvements. The WGOR believes that

such a mechanism is in line with the proposed qualifying criteria for using Option 3, which appears to explicitly recognize the value of judgment and overrides in the analysis of loss data.[19]

The particular mechanism for adjusting loss data points recommended by the WGOR is to recognize extreme losses (defined as losses in some predefined top percentile of all losses experienced by the bank) only up to some maximum level. In effect, this would allow banks to include extreme losses at a lower amount in their internal loss database used for regulatory capital purposes than is recorded under national GAAP requirements.

The WGOR proposes that all such adjustments of extreme loss data points be subject to strict regulatory approval after demonstrable and verifiable mitigating actions specifically designed to reduce the frequency and/or severity of such losses occurring again have been taken. Firms should be required to prepare a report outlining the causes of the extreme loss, the mitigating controls required to control the cause in the future, and the timetable for improvement of these controls. Supervisors should review these reports and determine whether it is necessary to verify that controls have improved. External auditors may be useful in this regard. In addition, a waiting period should be imposed to verify that changes in controls have been implemented. **The WGOR would be pleased to help the Basel Committee design additional specific standards for these extreme loss data point adjustments.**

5.   Benefits of and Concerns with the Proposed Option 3 Formula

The proposed Option 3 formula creates a risk-sensitive capital charge by ensuring that the charge is based on the amount of expected operational losses (adjusted with an industry factor to determine an unexpected loss amount) experienced by a firm, thereby reflecting the internal control environment and risk culture of a firm in the minimum regulatory capital requirement. The proposed formula calibrates the capital charge using developing bank practices for collecting loss data and measuring operational risk. The proposed formula provides an incentive for firms to improve internal controls because the quality of controls is ultimately reflected in the loss data used to determine the regulatory capital charge. The formula also provides a natural stepping-stone to a loss distribution approach in which the regulatory capital charge is determined according to an analysis of the complete distribution of operational loss. Finally, the formula can be made forward-looking by adding a qualitative adjustment factor as described in Section V of this report.

However, concerns regarding the use of the Scorecard Approach have been articulated within the WGOR. The use of historical loss data is not always relevant for determining the amount of capital necessary to protect against future risks. There also is a question regarding the validity of estimating a firm-specific unexpected loss amount from a firm-specific expected loss amount and a gamma factor based on industry loss experience. The insufficiency of loss data for low-frequency/high-severity events makes accurate calibration and validation of the formula difficult. The formula also requires strict clarification of the definition of operational risk and collection of loss data according to a uniform definition across the industry. There is a limited direct connection between the capital requirement determined according to the formula and operational risk management practices.   The WGOR will be considering how to address these concerns during the testing period.

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[19]   "Bank management should incorporate experience and judgment into an analysis of the loss data and the resulting PEs and LGEs. Banks have to clearly identify the exceptional situations under which judgment or over-rides may be used, to what extent they are to be used and who is authorized to make such decisions. The conditions under which these over-rides may be made and detailed records of changes should be clearly documented and subject to independent review." Consultative Proposal, para. 44.

D.   Advanced Approaches (Option 4)

The WGOR believes that it is important that the regulatory capital framework provides incentives for developing more advanced, truly risk-sensitive approaches for determining the operational risk minimum regulatory capital requirement. **Thus, the WGOR wishes to express its concern about the continual absence of comment or apparent commitment to Option 4. The WGOR requests that the Basel Committee publicly and explicitly embrace Option 4, not just conceptually, but by describing a process and timetable for achieving it subject to the resolution of issues regarding data sufficiency, definitional clarity, and methodological consistency.**

The WGOR specifically wishes to have it acknowledged by the Basel Committee that Option 4 is within the continuum of options in the regulatory capital framework and that future development and approval of Option 4 methodologies will not require a formal revision of the new Basel Accord on a scope comparable to that currently being undertaken. This is particularly important, as the proposed Option 3 formula is a simplification of a full loss distribution approach. However, the WGOR is not in full agreement that a full loss distribution approach as described in the Consultative Proposal[20] will be the only type of possible advanced approach.

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[20]   Consultative Proposal, para. 40 and Annex 6.

The proposed formula for determining the regulatory capital charges in Options 1, 2, and 3 generate a regulatory capital charge that is linearly proportional to the exposure indicator used in each formula. At a basic level, this suggests that operational risk is expected to double as the size of the bank doubles. The WGOR strongly believes that this relationship is not intuitively correct and is not supported by the research conducted to date. **Thus, the WGOR strongly agrees that a nonlinear function (the WGOR currently recommends a square root function) should be incorporated into each formula for the following reasons**.

A.   Empirical Research on Nonlinearity of Operational Loss

It is commonly believed that required capital ultimately is more sensitive to low-frequency/high-severity events than high-frequency/low-severity events. Empirical research published by the consulting firm PricewaterhouseCoopers has found that operational risk losses do not increase linearly with size.[21] In fact, this research suggests that loss is proportional to the size of an institution to the power of 0.25. Thus, the WGOR recommendation of a square root function is intended to be a conservative measure given the absence of a substantial body of empirical research confirming this study.

B.   Independence of Loss Events Across Business Lines

Financial institutions are typically composed of a number of different business lines generating independent income streams. Due to the nature of operational risk events, the occurrence of an event in one business line is unlikely to have an effect on the income stream of the other business lines. Therefore, not only does operational risk affect a small part of the entire group, but also profit streams from other businesses effectively mitigate the financial impact of the size of any loss. It is believed that independent risks do not generally increase additively but instead typically follow a function that is closer to a square root sum of the squares in form.

C.   Control Expectation and Size of the Institution

As an institution increases with size and complexity through the addition of business lines, additional control processes are often implemented to manage the resulting business. These additional controls are likely to reduce the level of additional risk that may occur through the expansion into new business lines. In addition, as an institution becomes larger or more complex, it typically attracts additional regulatory scrutiny. This often results in an expectation that the firm will implement additional controls. Therefore, the operational risk capital of such an institution should not necessarily be required to increase linearly with size as the level of controls may increase also.

D.   Mathematical Relationship

In the Basic Indicator Approach (Option 1) and the Standardized Approach (Option 2), the regulatory capital requirement is determined as a function of a size indicator. As noted in the discussion of Option 1 and Option 2, the currently proposed modification for nonlinearity is to apply a square root function to the exposure indicator. This proposal is deliberately conservative with respect to the current empirical findings.

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[21]   *Is the Size of an Operational Loss Related to Firm Size?*, Jimmy Shih, Ali Samad-Khan, and Pat Mendapa, <u>Operational Risk</u> (February 2000).

In the proposed Option 3 formula, the modification for nonlinearity is also made through the application of a square root function. As noted in the discussion of the proposed Option 3 formula, this may be achieved either by separating the exposure indicator into frequency and severity components and applying a square root to the frequency component or by applying a risk profile index to the proposed formula. The WGOR continues to examine which may be more appropriate. Appendix H contains a mathematical derivation of the first approach (i.e., applying a square root function to a frequency exposure indicator) using reasonable distribution assumptions. The following will provide a descriptive explanation of the mathematical concepts outlined in Appendix H.

Operational risk capital is driven by a combination of the frequency (PE) distribution and the severity (LGE) distribution of operational risk losses. It is assumed that the severity distribution does not change with the frequency distribution (i.e., the two distributions are independent). It is also assumed that the occurrence of one loss event does not impose any effect on any other loss events (i.e., all loss events are mutually independent). Finally, it is assumed that the severity rate is constant across firms (i.e., the volatility of severity changes in the same manner as the change in the average severity across firms). These assumptions, while admittedly simple in nature, are not unreasonable for the type of mathematical analysis described in Appendix H.

Distributional assumptions can then be made for the frequency (Poisson distribution) and the severity (Lognormal or Weibull distribution) components of both a firm's individual operational risk profile and the industry operational risk profile. The known properties of these distributions are used to derive the proposed square root relationship applied to the frequency exposure indicator in the modified Option 3 formula. Again, the distribution assumptions, while simple in nature, are not unreasonable given this type of mathematical analysis.

The WGOR will continue to study the appropriateness of the assumptions made in this analysis and the impact of its proposal to account for nonlinearity of operational risk through the application of a square root function during the data collection and testing period.

The WGOR believes that, in addition to a quantitative measurement of operational risk as determined under one of the options under the continuum concept, Pillar One of the regulatory capital framework should contain a qualitative adjustment factor based on the quality of the internal control environment of banks. **The WGOR agrees that a qualitative adjustment factor should be included in all options under the continuum concept, as a purely quantitative measure largely ignores the importance of control environments for the management of operational risk.**

In addition, a purely quantitative methodology would allow banks with poor risk management processes, but with access to loss data, to achieve lower capital charges than banks with strong risk management that do not have access to loss data.   This creates an inconsistency with sound risk management practices and places too large a focus on quantitative techniques, as many banks believe that loss data alone do not provide a good estimate of overall risk levels. Thus, a regulatory capital framework that does not include a qualitative factor would be substantially less valuable to the industry and to regulators as it would not contain a behavioral element that might provide additional incentives for improving internal control environments.

The following text will first outline reasons why employing a qualitative adjustment factor in the determination of the operational risk minimum regulatory capital requirement is necessary. Then, the considerations that must be taken into account when developing a specific proposal for a qualitative adjustment factor will be discussed.

A.   **Reasons for a Qualitative Adjustment**

1.   **Operational Risk Differs from both Market and Credit Risk**

There are two fundamental differences between operational risk and both market and credit risk. With both market and credit risk, (a) there is a much greater understanding of the relative stability of various distinct underlying loss distributions, and (b) the level of the risk exposure of the portfolio can be adjusted quickly by management action. While it is currently believed that different operational risks also have underlying loss distributions that may be stable through time, these distributions are less well understood at the present time. Thus, for operational risk there may be some question as to the relevance of all but the most recent historical data. In addition, management does not have the ability to make rapid portfolio changes to adjust the operational risk level, as is the case for market and credit risk.

It follows then that operational risk level is determined in part by the adequacy of the internal controls (e.g., policies, risk awareness, good quality of staff) designed to limit operational risk levels. Therefore, direct actions to improve controls will lower the bank's operational risk. However, under the current proposals, such risk reduction will not immediately result in a lower minimum regulatory capital requirement. Instead, any improved operational risk profile will only be recognized after a relatively long period, presumably several years, once the consequences of these improvements manifest themselves in loss data and, in this case, only when a firm uses the modified proposed Option 3 formula.

2. **The Capital Charge Should Provide Incentives To Improve Operational Risk Management**

Insight into the nature of operational risk and the techniques that can be used to manage risk has improved greatly in recent years. As with every investment decision, however, banks undertake cost-benefit analyses before implementing any new risk management techniques. Under the proposed regulatory capital framework, there is no clear and direct benefit to management to make the investments

necessary to improve internal control frameworks. The only way in which the benefits of improved operational risk management can be realized are indirectly through the likely reduced levels of operational losses that may be used to determine the capital charge under Options 3 and higher. The WGOR believes that this recognition is insufficient and will often be too late to provide adequate incentives to management to make the investments necessary to improve internal control environments.

The WGOR therefore believes that there should be a direct linkage between improvements in internal control environments and the regulatory capital charge. In this way, management can be assured that investments in strengthening operational risk controls will result in a tangible and direct benefit in the short term. A capital charge based on historical losses only will not provide the proper incentives for management to improve operational risk controls. Given the currently developing science of operational risk measurement, one of the most important goals of the operational risk capital charge should be to provide management with incentives to improve their level of control over operational risks.

A proactive bank will monitor its business activities on a continuous basis whether through self-assessments, key risk indicators, benchmarking, or escalation procedures for reporting of risk issues to senior management. Although losses cannot be predicted with certainty, monitoring and tracking metrics that alert management to rising levels of risk best allow for any potential threats to be understood and managed. Therefore, a forward-looking element in the regulatory capital framework will assist firms in maintaining the proper focus for managing future risk exposures. This will be critically important as banks move into new businesses or business channels (e.g., e-commerce) where loss experience will not be available. In such situations, the internal control structure and control culture surrounding these new businesses or new business channels is the best predictor of future operational incidents and losses.

B.   Method for Performing the Qualitative Adjustment

The WGOR is currently considering possible methods for performing an adjustment of the quantified capital charge determined by the formulas in Options 1, 2, and 3. When considering a qualitative adjustment factor there are three basic questions that must be answered:

1.   How large should the adjustment be?

The WGOR initially proposes that there should be a material (upward and downward) adjustment to the capital charge (e.g., possibly on the order of 20%-30%) determined according to the formula used in any option of the regulatory capital framework. However, calibration of the formula used to calculate the regulatory capital requirement in each option should occur before these adjustments are applied. This initial proposal is not based on statistical evidence but rather on an intuitive belief among some WGOR members as to how much the capital charge should be allowed to vary based on qualitative evaluations.

2.   How should the adjustment be done?

The WGOR is currently considering two ideas for how the adjustment might occur. The first would be to multiply the outcome of the formula calculation in any option by an adjustment factor. The second is to form a weighted average of the formula calculation and a qualitative assessment score. The advantage of the latter is that a multiplier risks amplifying any errors that may occur in the formula calculation. Either of these approaches could be done in Options 2 and 3 on the total capital charge or on a business line or business line/loss type combination basis.

3. How should the adjustment amount be calculated?

The WGOR believes that the particular aspects of internal control environments used to determine the size of the adjustment should be operational risk–focused and only distinguishable from those that would lead to supervisory action under Pillar Two in their degree (e.g., a complete lack of or failure of certain controls should lead to Pillar Two action, while a deliberate corporate strategy to use certain controls on a limited basis because of cost–benefit analysis should lead to an upward adjustment in the minimum regulatory capital requirement). **The WGOR has not yet developed a recommendation for a specific mechanism for performing the adjustment. However, the WGOR has developed a set of principles that should be applied to any qualitative adjustment process in the regulatory capital framework. These principles are as follows:**

- Level playing field: Any qualitative adjustment must be applied in a manner that is objective and predetermined, independently verifiable, and not susceptible to inconsistent application or manipulation.
- Independent validation: The qualitative adjustment should be independently validated.
- Clear and transparent: The qualitative adjustment should be based on clear and transparent mechanisms.
- Scalability: The qualitative adjustment should be applicable to institutions of all sizes.
- Related to sound practices: The qualitative adjustment should be linked to the sound operational risk management practices recommended by the Basel Committee.
- Gradual adjustments: The qualitative adjustment should result in a smooth or graduated change in minimum capital requirements to avoid potential volatility.
- Flexibility: The qualitative adjustment should be capable of being implemented in a variety of regulatory environments.
- Recognition of internal risk management practices: The qualitative adjustment should recognize existing, albeit varied, internal management practices.

There are a number of alternative mechanisms that might be used to calculate the actual adjustment factor. One alternative is to use risk assessments (either by business managers, dedicated risk management professionals, internal auditors, external auditors, or regulators). A second alternative is to use a regulatory multiplier as in the market risk regulatory capital framework. The WGOR continues to examine possible methods for determining the amount of the qualitative adjustment factor. The WGOR hopes to provide additional information on specific proposals in the future.

A major challenge for developing the operational risk regulatory capital framework is the collection of loss data. Industrywide loss data may be needed not only to calibrate the operational risk capital charge but also to supplement internal data for at least some business line/loss type combinations if using the modified proposed Option 3 formula. Given these reasons for the pooling of loss data, the WGOR has considered both the technical and practical implications of using pooled data in the regulatory capital framework. The technical issues related to data pooling, particularly for the Option 3 formula, have been discussed in Section III of this report. This section will describe the practical concerns of the WGOR concerning data pooling.

Some WGOR members are concerned about the possibility that regulators might require banks to join an external (i.e., industry) data pool to qualify to use the modified proposed Option 3 formula. Many of these concerns are related to the possible competitive effects that may result from the sharing of loss data. **The WGOR does agree that it is appropriate to use industrywide pooled data to set the gamma factors in the modified proposed Option 3 formula. Thus, WGOR members believe that the supervisory community should establish its own regular data collection process to calibrate the regulatory capital framework (including the gamma factors) initially**. As noted above, the gamma factor should be revised occasionally. This may argue for the establishment of a loss database continually maintained by a supervisory body.

The WGOR has a number of concerns regarding any data pool, whether privately operated or maintained by supervisors. **The WGOR has agreed that the issues discussed below should be considered in any data pooling effort. The WGOR does not believe that any of them represent an insurmountable obstacle to the establishment of either a private or supervisory industrywide data pool.**

A.   Repelling Plaintiffs' Interrogatories

Pretrial discovery capabilities in many legal systems (e.g., the United States and the United Kingdom) may allow plaintiffs to obtain data contained in any part of a legal entity irrespective of the geographic location of the data. For example, a writ of discovery served on a branch office in New York may enable plaintiffs to obtain data held outside the United States relating to activities conducted outside the United States. This is an issue for each individual firm, regardless of whether it joins a data pool. However, the WGOR is concerned that, even if an individual firm has taken steps to protect itself against such discovery, data pools may not. Thus, the WGOR believes that data pools should provide the capability for individual members of a data pool to provide resources (e.g., funds and legal expertise) to repel plaintiffs' interrogatories. This may be viewed as an extension of arrangements currently in place for insurance companies and their insured firms.

B.   Regulatory Protection from Civil Litigation

To strengthen the protections for banks contributing to data pools with respect to civil litigation, the WGOR believes that national regulators should extend the protection from civil litigation currently given to auditors' notes to include internal operational risk data and data pools. This should be done on a uniform basis across all supervisory jurisdictions to avoid a situation in which the combining of information from various jurisdictions would result in the loss of the protection provided by the particular jurisdiction from which any data originate.

C.   Discouraging Inquiries into Private Data Pools

If firms do decide to use external data from private data pools when using the modified proposed Option 3 formula, supervisors will need to be provided with some comfort level regarding the nature and quality of that data. The Consultative Proposal refers to this in the qualifying criteria for Option 3.[22] The WGOR believes that the appropriate role for supervisors should be to ensure that each firm using external data has satisfied itself regarding the validity, appropriateness, accuracy, and applicability of any external data used by that firm. The WGOR does not believe it is appropriate for supervisors to make inquiries into private data pools to make these judgments.

D.   Confidentiality of Privileged Loss Information

In some circumstances (e.g., as the result of a lawsuit settled without formal legal judgment), there may be confidentiality agreements or privilege requirements that govern operational loss information. If these agreements or requirements tend to occur more frequently with low-frequency/high-severity events, then there may be implications for determining the true shape of the operational risk loss distribution. Some WGOR members have consulted legal counsel and have been advised that the legal challenges presented by sharing confidential or privileged loss information should be capable of being managed to avoid distortions of the loss information contained in data pools.

E.   Antitrust and Competition Law Issues

Some WGOR members in their capacity as data pool sponsors or shareholders have also consulted legal counsel regarding possible antitrust and competition law issues related to pooling of industry data. These WGOR members have been advised that a requirement for firms to join a data pool in the regulatory capital framework is not likely to present an antitrust issue, as such, as long as any "admission" criteria are transparent and objective and the data pool has an "appeals" process for cases in which membership is denied. These WGOR members have also been advised that the physical location of the data pool is not likely to influence the potential exposure to antitrust or competition law actions, as such. However, as noted above, the WGOR is concerned about jurisdictions with extensive pretrial discovery.

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[22]   Consultative Proposal para. 44 states that one of the criteria for the use of Option 3 will be that supervisors "examine the data collection, measurement, and validation process and assess the appropriateness of the operational risk control environment of the institution." Para. 44 also states that "sources of external data must be reviewed regularly to ensure the accuracy and applicability of the loss data" but does not specify who must perform this review.

The WGOR is currently researching the potential to use a qualitative set of "scorecards" in Pillar One of the regulatory capital framework. These scorecards are currently intended as the primary component of an alternative methodology for determining the regulatory capital requirement. This "Scorecard Methodology" emphasizes the scope and quality of the internal control environment rather than the level of a firm's expected losses as determined by historical loss data. The Scorecard Methodology might therefore serve as an alternative for or a qualitative adjustment to the modified proposed Option 3 formula. **The WGOR is developing and testing the Scorecard Methodology while it is developing and testing the modified proposed Option 3 formula.**

The Scorecard Methodology is designed to incorporate forward-looking elements into the direct calculation of the regulatory capital charge by identifying and prioritizing the primary drivers of operational loss for each business line and risk category. The level of the capital charge is based on an evaluation of the existence and effectiveness of the associated controls (relative to a bank with average controls) designed to mitigate the potential for operational loss. These evaluations occur through the use of scorecard-based questions. The answers to the scorecard questions are then used to generate "Risk Scores" for each business line and risk category combination, which are appropriately scaled to determine the minimum regulatory capital requirement. This is designed not only to produce a risk-sensitive capital charge but also to provide targeted incentives to improve controls where specifically necessary.

A.   Proposed Formula

The proposed formula for determining the minimum regulatory capital requirement under the Scorecard Methodology follows. Each of the components of the formula is explained in the sections that follow.

$$K_{firm} = \Sigma i \ \Sigma j \ \{ \ EI(i,j) * \omega(i,j) * RS(i,j) \ \}$$

where i is the business line and j is the risk type, ω is the industry weighing factor, EI is the exposure indicator, and RS is the risk score

1.   Industry Weighting Factor (ω)

The formula contains unique industry weighting factors for each business line and risk category combination. The factors are set by regulators and calibrated using industry loss data and a regulatory evaluation of the required level of minimum regulatory capital for a bank with an "average" control environment. The units of the factors are the amount of capital per unit of corresponding exposure indicator.

2.   Exposure Indicator (EI)

Exposure indicators are chosen for each business line and risk category combination to reflect the most appropriate measure of risk drivers for each particular combination. Consistent with the other options in the continuum concept, it is fully expected that most, if not all, of the exposure indicators will be nonlinear.

3.   Risk Score (RS)

The risk scores are determined from the scorecard answers and are normalized to a value of 1. The higher the quality of the control environment (as determined from the scorecard answers), the lower

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the risk score and vice versa (subject to a cap and a floor). The risk scores provide behavioral incentives, the strength of which can be controlled by the permissible values for the risk scores (e.g., 0.5-1.5, 0.8-1.2, etc.).

4.   Risk Types and Business Lines

The Scorecard Methodology would use the Level 2 business lines contained in the Consultative Proposal. This would provide a level of granularity that maximizes the risk sensitivity of the methodology. Following the recommendation of the modified proposed Option 3 formula, the Scorecard Methodology would use the event loss categories as risk type categories.

B.   Validation of Scorecard Answers and Risk Scores

It is important to provide assurances to regulators that the scorecard responses are accurate. This can be accomplished by requiring different levels of independent review and oversight of responses to scorecard questions. Possible candidates for this review function include internal independent risk managers, internal auditors, and external auditors. It is likely that appropriate levels of such independent review will minimize the need for extensive regulatory scrutiny to ensure the quality of scorecard responses.

An individual bank's internal loss data are used to perform an ex-post validation of that bank's risk scores. Such a validation process would provide a direct feedback mechanism between the forward-looking assessment of the control environment and historical losses. That is, the risk scores calculated at the beginning of a given period would be validated using the loss data subsequently collected from the same period. In the event of a significant discrepancy between the level of control indicated by the risk score and the actual level of losses subsequently experienced, a number of actions could be taken (e.g., the imposition of a capital buffer and/or a revision of the scorecard responses).

C.   Benefits of and Concerns with the Scorecard Methodology

The Scorecard Methodology is desirable because it uses forward-looking self-assessments to determine the minimum regulatory capital requirement, thereby providing strong incentives to invest in internal controls. The approach bases the capital requirement on qualitative assessments that are explicit, transparent, and subject to audit or supervisory review. The approach also attracts capital when vulnerabilities and weaknesses are revealed (i.e., when the probability of an event is high) and not after a loss has already occurred (i.e., when the probably of the event recurring is likely greatly reduced). The approach does not depend on the existence of standardized industry loss data to calibrate but still requires firms to collect loss data to validate scorecard answers. The approach also does not require a standardized definition of operational risk applied uniformly across firms.

However, concerns regarding the use of the Scorecard Methodology have been articulated within the WGOR. Any qualitative assessment process is subject to potential "gaming," thereby potentially distorting the minimum regulatory capital requirement. The need to validate qualitative self-assessments would require duplicative internal processes and would subject banks to additional regulatory compliance burdens without any risk measurement benefit. The initial scorecard questions would be based only on implicit assumptions about the drivers of operational risk and would require data, collected over a period of time, to validate. The Scorecard Methodology also does not create an incentive for, and may hamper the ability of, banks to develop standardized industrywide loss databases that may be helpful in developing statistical modeling approaches to measure operational risk. Finally, there may be other means of introducing forward-looking qualitative elements into the minimum regulatory capital requirement. The WGOR will be considering how to address these concerns during the testing period.

SECTION VIII. CONCLUSION

The WGOR believes that the development of a regulatory capital framework for operational risk that provides incentives to improve both operational risk management and measurement will be a valuable addition to the current regulatory capital framework. However, such a framework will require time for its thoughtful development. The long-term goal of both the industry and the regulatory community should be the development of an intellectually sound and risk-based regulatory capital framework for operational risk.

Thus, the WGOR firmly believes that a collaborative effort between the regulatory community and the industry lasting well beyond the end of 2001 will be necessary to develop a truly risk-sensitive operational risk regulatory capital framework that ensures a consistent and transparent minimum regulatory capital requirement across jurisdictions. The WGOR is committed to engaging in continual dialogue with the supervisory community and significant testing to develop such a framework by the January 1, 2004, implementation date of the new Basel Accord. **The WGOR urges the Basel Committee to issue an additional consultative proposal this year to allow for additional industry comment.**

Appendix A

Institute of
International
Finance, Inc.

Working Group on Operational Risk

Abbey National plc
ABN AMRO Bank NV
Australia and New Zealand Banking Corporation
Bank of New York
Bank of Nova Scotia
Barclays Bank plc
BNP/Paribas Group
CIBC
Citigroup
Commerzbank AG
Commonwealth Bank of Australia
Credit Lyonnais
Credit Suisse Group
Deutsche Bank AG
Dresdner Bank AG
FleetBoston Financial
Fortis Bank
Fuji Bank
HSBC Holdings plc
HypoVereinsbank AG
J.P. MorganChase
Lloyds TSB Group plc
Merrill Lynch & Co., Inc.
Mizuho Holdings, Inc.
Nordea
Rabobank Nederland
Royal Bank Financial Group
Sanpaolo IMI S.p.A.
Skandinaviska Enskilda Banken
Société Générale
Standard Chartered Bank Plc
Sumitomo Mitsui Banking Corporation
The Bank of Tokyo-Mitsubishi, Ltd.
Tokai Bank Europe plc
UBS AG
UFJ Holdings, Inc.
Unibanco-União de Bancos Brasileiros S/A

Appendix B

IIF STEERING COMMITTEE ON REGULATORY CAPITAL

Chairman: **Mr. Jan Kalff**
Member of Supervisory Board
ABN AMRO Bank N.V.

Vice Chairman: **Mr. Peter C. Godsoe**
Chairman of the Board
and CEO
Bank of Nova Scotia

Members:

Mr. Antony Elliott
Group Risk Director
Abbey National Plc

Dr. Tom de Swaan
Member of the Board of Managing
  Directors
ABN AMRO Bank N.V.

Mr. Ghazi Abdul-Jawad
President and Chief Executive Officer
Arab Banking Corporation

Dr. Mark Lawrence
Group General Manager, Risk
  Management
ANZ Bank

Dr. Roberto Setúbal
President
Banco Itaú S.A.

Mr. Gustavo A. Marturet
Chairman and Chief Executive Officer
Banco Mercantil C.A., S.A.

Mr. Jose del Valle
Director General
Banco Santander Central Hispano

Mr. J. Chandler Martin
Executive Vice President
Bank of America Corporation

Mr. Mao Xiaowei
General Manager
Bank of China

Mr. Masaharu Hamakawa
Member of the Board of Directors
Bank of Tokyo-Mitsubishi

Ms. M. Eileen Kennedy
Head, Treasury Department
Bank One

Sir Andrew Large
Deputy Chairman
Barclays Bank PLC

Mr. Daniel Dumas de Rauly
Executive Vice President
BNP Paribas Group

Mr. Guy Whittaker
Treasurer
Citigroup

Mr. Wolfgang Hartmann
Member of the Board of Managing
 Directors and Chief Risk Officer
Commerzbank AG

Mr. Hans-Ulrich Doerig
Vice Chairman
Credit Suisse Group

Mr. Jesper Ovesen
Chief Financial Officer
Danske Bank A/S

Dr. Thomas Fischer
Member of the Board of Managing
 Directors
Deutsche Bank AG

Dr. Heinrich Linz
Member of the Board of Managing
 Directors
Dresdner Bank

Mr Erik van de Merwe
Advisor
Fortis Bank

Mr. Tosaku Harada
Deputy President
The Fuji Bank, Ltd.

Mr. M. Bert McPhee
General Manager
HSBC Holdings plc

Mr. Dieter Rampl
Member of the Management Board
HypoVereinsbank AG

Mr. Cees Maas
Executive Board Member and
 Chief Financial Officer
ING Group N.V.

Mr. Michael Green
Director of Group Risk Management
Lloyds TSB Group plc

Sir David Walker
Senior Advisor
Morgan Stanley International

Ms. Suzanne Labarge
Vice Chairman and Chief Risk Officer
Royal Bank Financial Group

Mr. Fred Watt
Group Finance Director
Royal Bank of Scotland Group

Dr. Rainer Masera
Chief Executive Officer
Sanpaolo IMI S.p.A.

Mr. Didier Hauguel
Director of Global Risk Management
Société Générale

Mr. David Edwards
Head of Group Risk Management
Standard Chartered Bank

Mr. Christopher Roberts
Joint Chief Executive Officer
Tokai Bank Europe plc

Mr. Walter Stürzinger
Group Chief Risk Officer
UBS AG

Mr. Jiri Kunert
Chairman of the Managing Board
Zivnostenska Banka a.s.

Appendix C

THE INSTITUTE OF INTERNATIONAL FINANCE, INC.
BOARD OF DIRECTORS
May 2001

Chairman
Sir John Bond*
Chairman
HSBC Holdings plc

Vice Chairmen

Josef Ackermann*	William R. Rhodes*	Tasuku Takagaki*
Member of the Board of Managing	Vice Chairman	Senior Advisor to the President
Directors	Citigroup/Citibank	The Bank of Tokyo–Mitsubishi, Ltd.
Deutsche Bank AG		

Mohammed Abalkhail
Chairman of the Board of Directors
Riyad Bank

Daniel Bouton*
Chairman and Chief Executive Officer
Société Générale

Edward J. Brown III
President, Global Corporate and
  Investment Banking
Bank of America Corporation

Yavuz Canevi*
Chairman
Türk Ekonomi Bankasi, A.S.

Charles H. Dallara *(ex officio)**
Managing Director
The Institute of International
  Finance, Inc.

David Eldon
Chairman
Hongkong and Shanghai Banking
  Corporation Limited

Bernd Fahrholz
Chairman
Dresdner Bank AG

Jacob Frenkel
President
Merrill Lynch International

Yoshiyuki Fujisawa
Chairman
The Industrial Bank of Japan, Ltd.

Peter C. Godsoe*
Chairman of the Board and
  Chief Executive Officer
Bank of Nova Scotia

Hirokazu Ishikawa
Deputy President
Sumitomo Mitsui Banking Corporation

Sir Andrew Large
Deputy Chairman
Barclays Bank PLC

Cees Maas*
Executive Board Member and
  Chief Financial Officer
ING Group, N.V.

Rainer S. Masera
Chief Executive Officer
Sanpaolo IMI S.p.A.

Manuel Medina Mora
President and Chief Executive Officer
Grupo Financiero Banamex-Accival

Liu Mingkang*
Chairman and President
Bank of China

Gerhard Randa
Chairman and Chief Executive Officer
Bank Austria CA Gruppe

Frank Savage
Chairman
Alliance Capital Management
  International

Roberto Egydio Setúbal
President
Banco Itaú S.A.

Chartsiri Sophonpanich
President
Bangkok Bank Public Company, Ltd.

Remi Vermeiren
President
KBC Bank NV

Marko Voljc
President and Chief Executive Officer
Nova Ljubljanska Banka d.d.

Sir David Walker*
Senior Advisor
Morgan Stanley International

Jacob Wallenberg
Chairman
Skandinaviska Enskilda Banken AB

Peter Wuffli
Chief Executive Officer and
  Member of UBS Group Executive Board
UBS Asset Management

Secretary of the Board
Michael Bradfield, Esq.

* Member of the Executive Committee

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Appendix D

Comparison of Proposed Operational Risk Capital Charges

Bank	20% of Reg Cap (USD million)	30% of Gross Income (USD million)	Delta as % of Reg Cap
A	3318	3049	-8.11%
B	3107	6524	109.98%
C	2745	3224	17.45%
D	2125	3143	47.91%
E	3156	2233	-29.25%
F	1767	1587	-10.19%
G	264	473	79.17%
H	2242	1937	-13.60%
I	778	915	17.61%
J	4260	1590	-62.68%
K	2332	3677	57.68%
L	1504	2000	32.98%
M	2041	2085	2.16%
N	3766	4933	30.99%
O	1372	1516	10.50%
P	2124	2650	24.76%
Q	4197	7470	77.98%
R	2513	3325	32.31%
S	2706	2781	2.77%
T	1403	2232	59.09%
U	6139	7476	21.78%
V	2550	4154	62.90%
W	1000	1500	50.00%
X	7200	9880	37.22%
Y	11000	23000	109.09%
Z	2534	3611	42.50%
AA	1570	1830	16.56%
BB	2075	1915	-7.71%
TOTAL	81788	110710	35.36%

Appendix E

ANALYSIS OF BUSINESS LINE SURVEY RESULTS

Table 1. Granularity of Business Lines (14 responses)

Number of Level 1 Business Lines Included in Response	**Number of Respondents**
1 – 12	5
13 – 18	4
19 +	5

Note:

Mean = 13.3
Mode = 17 (3 times)
Median = 17
Range = 7-22

Table 2. Preferences for Form of Indicator (15 responses)

Indicator Choice	**1st choice votes**	**2nd choice votes**	**No votes**
The Same Single Indicator for all Business Lines	4	4	2
A Different Single Indicator for Different Business Lines	**6**	**7**	0
A Combination of Indicators for Different Business Lines	3	1	7

Note: While the survey results (Table 2 above) showed that WGOR members have a clear preference for having a single indicator that varies by business line, the survey results (Table 3) also showed that WGOR members chose income/revenue as the most preferred single indicator in all business lines except for Asset Management. Thus, in effect, the survey responses showed a preference for the same single indicator for all business lines except for Asset Management.

Table 3. WGOR 1st Choice Preferences for Indicators Compared with Basel Proposals (12 responses)

Basel Level 0	**Basel Level 1**	**Basel Indicator**	**Suggested WGOR Level 1**	**Suggested WGOR Indicators**
BANKING	Retail Banking	Annual Average Assets	Private	**Income/Revenue – 7** # of Accounts/Transactions – 3 Average Assets – 1 Admin Expense - 1
			Personal (Banking, Lending, Mortgage, Trust & Fiduciary)	**Income/Revenue – 6** Average Assets/Balances - 3 # of Accounts/Transactions – 2 Admin Expense – 1
			Cards	**Income/Revenue – 6** # of Accounts/Transactions – 4 Receivables – 1 Admin Expense – 1
	Commercial Banking	Annual Average Assets	Commercial Banking Services	**Income/Revenue – 6** # or Vol. of Transactions – 3 Avg. Balances/Assets – 2 Admin Expense - 1
			Commercial Lending	**Income/Revenue –7** Avg. Balances/Assets – 2 # of Accounts – 1 Vol. of Transactions – 1 Admin Expense - 1
			Finance (Trade, Asset, & Structured)	**Income/Revenue – 7** Vol. of Transactions – 2 # of Accounts – 1 Avg. Assets – 1 Admin Expense – 1
	Payment & Settlement	Annual Settlement Throughput	Payments & Settlement for 3rd Parties (including Correspondent Banking)	**Income/Revenue – 6** # of Accounts or Transactions – 2 Throughput – 1 Turnover – 1 Admin Expense – 1
	Agency Services		Commercial Trust	**Income/Revenue – 6** Assets – 1 Admin Expense – 1
			Custody	**Income/Revenue – 6** # of Accounts or Transactions – 2 Vol of Transactions – 1 Assets – 1 Admin Expense – 1

INVESTMENT BANKING	Corporate Finance Gross Income	Advisory	**Income/Revenue – 8** Vol. of Transactions – 2 # of Accounts – 1 Admin Expense – 1
		Venture Capital	**Income/Revenue – 6** Vol. of Transactions – 1 Admin Expense – 1
	Trading & Sales Gross Income	Trading & Sales	**Income/Revenue – 6** # or Vol of Transactions – 3 # of Accounts – 1 Average Gross Position – 1 Admin Expense – 1
		Fixed Income	**Income/Revenue – 7** # or Vol. of Transactions – 3 # of Accounts – 1 Admin Expense – 1
OTHER	Retail Brokerage Gross Income	Stockbroking	**Income/Revenue – 5** # or Vol. of Transactions – 4 Average Assets – 1 Admin Expense – 1
	Asset Management Total Funds Under Management	Passive Asset Management	**Avg. Assets or Funds under Manag. – 6** Income/Revenue – 4 # of Accounts – 1 Vol. of Transactions – 1 Admin Expense – 1
		Active Asset Management	**Avg. Assets or Funds under Manag. – 6** Income/Revenue – 4 # of Accounts – 1 Vol. of Transactions – 1 Admin Expense – 1

Note: 16 WGOR Level 1 Business Lines were used (i.e., all Level 1 business lines named 8 times or more)

Determination of Primary Loss Events for Regulatory Purposes

1
Did the primary event adversely change the economic results of the firm and was it recognized per GAAP?
(see Guidance Notes a and b)

No →

Not an event for regulatory purposes

Yes ↓

2
Was the consequential financial impact of the event one or more of the following effects:
•Write-down
•Legal costs
•Regulatory action
•Restitution
•Loss of recourse
•Loss or damage to physical assets
(see Guidance Note c)

No →

Would the event be classified for risk management purposes?

No →

Yes ↓

ISSUE:
Possible effect category definition error - test over
next 12 months to confirm effect categories
(see Guidance Note f)

Yes ↓

3
Is the sum of the losses above the threshold amount?
(see Guidance Note d)

No →

Yes ↓

4
Did the primary loss event reduce the revenue or increase the cost base that arose from a tactical or strategic business decision?
(see Guidance Note a)

Yes →

Business/ Strategic event

No ↓

5
Is the loss recognized in calculation of credit or market capital?

ISSUE: Clarity of definition required

Yes →

Not an operational loss pending clarification

No ↓

Page 2

Classification of Primary Loss Events for Regulatory Purposes

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Page 1  →
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6 — Has apparent or actual intent to defraud, circumvent regulations, break the law or company policy been determined, established, or alleged? (see Guidance Note e)

— Yes →

7 — Was it an intentional act or omission or a pattern of behavior that was inconsistent/against employment laws or health and safety laws?

From 6 — No ↓

8 — Was the unintentional act or omission inconsistent with/in violation of employment law or health and safety laws OR a payment/settlement for personal injury?

— Yes →

From 7 — Yes ↓ **(Employment and Workplace Safety Event)**

From 7 — No ↓ **(Fraud, Theft and Unauthorized Activity)**

Employment and Workplace Safety Event

Fraud, Theft and Unauthorized Activity

From 8 — No ↓

9 — Was there loss or damage to physical/fixed assets OR unintentional destruction of intellectual property (including data) OR a utilities failure/outage or disruption?

— Yes →

Physical Asset & Infrastructure Events

From 9 — No ↓

10 — Was there a technology, telecommunications (hardware and software) failure? (see Guidance Note g)

— Yes →

From 10 — No ↓

12 — Was there an unintentional or negligent failure to meet a professional obligation to client(s), [i.e., failed to act in the best interests of the client (fiduciary and suitability responsibilities)], OR did clients suffer a loss as a result of nature or design of products?

— Yes →

13 — Was the customer impacted from a routine error in client documentation, account management, or transaction processing?

From 12 — No ↓

From 10 — Yes ↓

Execution, Delivery & Process Management Event

From 13 — Yes →

From 13 — No ↓

Clients, Products & Business Practices

(see Guidance Note h)

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Determination and Classification of Primary Loss Events for Regulatory Purposes

Guidance Notes

a)   Events describe the nature of the event (what happened) not the ultimate cause. Before proceeding ensure you have defined what the primary event was. All other ancillary events related to the first event form part of the initial event. An event is not necessarily a single incident, but could be several incidents linked to the primary incident. An event may lead to one or more loss effects, which are recognized over time according to national generally accepted accounting principles (GAAP). In the case of insured items, treat them in terms of how they would be treated under GAAP in the absence of insurance.

b)   Recognition refers to the inclusion of losses in the Statutory Profit and Loss Statement in accordance with GAAP. Recognition requires that the loss has an appropriate basis for measurement and a reasonable estimate can be made of the amount involved. Losses recognized in financial statements must be determined using accruals-based accounting.

c)   Was there a payment to someone outside of the organization or was the bank unable to recover funds/assets or did the bank have to write-down or write-off assets? This includes external costs to fix. External costs to fix is not an effect category but instead such costs are included in each of the six effect categories.

d)   Presumably a threshold amount would be necessary as it is not cost effective to collect all loss data and small losses are considered to be the cost of doing business. The WGOR has not agreed on an appropriate threshold amount.

e)   The intention must be for personal or organization gain (direct or indirect) or malice to the organization

f)   The WGOR has some concerns about whether all the effect types have been described. Gaps in the effect types would result in the either the inability to classify losses or misclassifications.

g)   The WGOR believes that it is appropriate to combine system-related events with execution and delivery, as the main purpose of systems is to deliver products or services to clients.

h)   This includes where the product/service was designed and offered in good faith, but it was subsequently found that the bank was not not legally authorized to offer or engage in such products/services. This category includes modeling errors.

Clarifications

1)   Aggressive sales under Client-Related Events refers to unintentional practices

2)   Unapproved access under Execution, Delivery and Process Management refers to inadvertently giving access to funds/accounts to one party on a joint account

Event-Type Category	Definition	Level 2 Categories	Activity Examples
Fraud, Theft & Unauthorized Events	Losses due to acts of a type intended to defraud; misappropriate property; or circumvent regulations, the law or company policy, excluding diversity/ discrimination events.	Unauthorized Activity	Transactions not reported (intentional)
			Transaction type unauthorized (w/monetary loss)
			Mismarking of position (intentional)
		Theft and Fraud	Fraud / credit fraud / worthless deposits
			Theft / extortion / embezzlement / robbery
			Misappropriation of assets
			Malicious destruction of assets
			Forgery
			Check kiting
			Smuggling
			Account takeover / impersonation / etc.
			Tax noncompliance / evasion (willful)
			Bribes / kickbacks
			Insider trading (not on firm's account)
		Systems Security	Hacking damage
			Theft of information (w/monetary loss)
Employment Practices and Workplace Safety	Losses arising from acts inconsistent with employment, health or safety laws, or agreements, from payment of personal injury claims, or from diversity / discrimination events.	Employee Relations	Compensation, benefit, termination issues
			Organized labor activity
		Safe Environment	General liability (slip and fall, etc.)
			Employee health & safety rules events
			Workers' compensation
		Diversity & Discrimination	All discrimination types
Clients, Products & Business Practices	Losses arising from an unintentional or negligent failure to meet a professional obligation to specific clients (including fiduciary and suitability requirements), or from the nature or design of a product.	Suitability, Disclosure, & Fiduciary	Fiduciary breaches / guideline violations
			Suitability / disclosure issues (know-your-customer, etc.)
			Retail consumer disclosure violations
			Breach of privacy
			Aggressive sales (unintentional practices)
			Account churning
			Misuse of confidential information
			Lender liability

Event-Type Category	Definition	Level 2 Categories	Activity Examples
Clients, Products, & Business Practices (cont'd.)		Improper Business or Market Practices	Antitrust Improper trade / market practices Market manipulation Insider trading (on firm's account) Unlicensed activity Money laundering
		Product Flaws	Product defects (unauthorized, etc.) Model errors
		Selection, Sponsorship, & Exposure	Failure to investigate client per guidelines Exceeding client exposure limits
		Advisory Activities	Disputes over performance of advisory activities
Physical Asset & Infrastructure Events	Losses arising from loss or damage to physical or intangible assets (including data) from natural disaster or major utility events.	Disasters / Business Disruption	Natural disaster losses Utility outage / disruptions
Execution, Delivery, & Process Management	Losses from failed transaction processing or process management, from relations with trade counterparties and vendors, or from systems failures.	Transaction Capture, Execution, & Maintenance	Miscommunication Data entry, maintenance, or loading error Missed deadline or responsibility Model / system misoperation Accounting error / entity attribution error Other task misperformance Delivery failure Collateral management failure Reference data maintenance
		Monitoring and Reporting	Failed mandatory reporting obligation Inaccurate external report (loss incurred)
		Customer Intake and Documentation	Client permissions / disclaimers missing Legal documents missing / incomplete
		Customer / Client Account Management	Unapproved access given to accounts (includes inadvertent access to one party on a joint account) Incorrect client records (loss incurred) Negligent loss or damage of client assets

Event-Type Category	Definition	Level 2 Categories	Activity Examples
Execution, Delivery, & Process Management (cont'd.)		Systems	Hardware Software Telecommunications
		Trade Counterparties	Nonclient counterparty misperformance Misc. nonclient counterparty disputes
		Vendors & Suppliers	Outsourcing Vendor disputes

*NOTE: THE CLASSIFICATION OF CREDIT LOSSES DUE TO OPERATIONAL FAILURES/INADEQUACIES IS TO BE CLARIFIED WITH THE REGULATORS.

EFFECT TYPES: DEFINITIONS & EXAMPLES			
Category	**Definition**	**Includes**	**Excludes**
<u>Legal Liability</u> Does the loss result from a legal dispute?	*Judgments, settlements, and other legal costs.*	• Costs incurred in connection with litigation in a court proceeding or arbitration (including external attorneys' fees, settlements, judgments paid, etc.) • External legal costs directly associated with event • Write-down based on GAAP	• External legal costs related to improvements in documentation / processing
<u>Regulatory Action</u> If not, does the loss result from payments to regulatory bodies?	*Fines or the direct payment of any other penalties such as license revocations.*	• Fine paid for regulatory violation • Attorneys' fees paid for representation at hearing on regulatory violation	• Loss of revenue due to license revocation • Attorneys' fees paid in testifying before regulators or seeking change in a regulatory provision that would favor bank
<u>Loss or Damage to Assets</u> If not, does the loss result from property destruction or damage?	*Direct reduction in value of physical assets due to some kind of accident (e.g., neglect, accident, fire, earthquake).*	• Cost to relocate short term for business continuity reasons • Use of third-party supplier to continue business • Costs associated with making premises fit for business after fire, flood, or other disaster • Write-downs / write-offs of assets due to fire, flood, or other natural disaster • Loss/destruction of intangible property (e.g., data)	• Improvements made in the course of making premises fit after fire, flood, or natural disaster (i.e., improved relative to predisaster condition)
<u>Restitution</u> If not, does the loss involve payments to third parties?	*Payments to third parties on account of operational losses for which the bank is legally responsible.*	• Claim from client due to business interruption loss (for which bank is responsible) • Pricing error results in claim from client for compensation by the bank • Net interest cost due to delays in settlement • Confidential client information lost in burglary and client makes claims against bank after suffering loss • Employee fraud results in bank replacing lost client funds/assets • External fraud results in loss of client funds requiring the bank to make a payment to the client to make good the loss	• Reduction in bank's own revenues due to business interruption (opportunity costs are not included) • External security breach results in reputational damage • Reimbursement of client for loss to preserve relationship

EFFECT TYPES: DEFINITIONS & EXAMPLES			
Category	**Definition**	**Includes**	**Excludes**
Loss of Recourse If not, does the loss result from a bank's inability to enforce its claims on third parties, other than credit losses?	*Losses experienced when a third party does not meet its obligations to the bank, and which are attributable to an operational mistake or event (i.e., which could have been avoided even though the counterparty refused or was unable to pay).*	• Funds transferred by mistake to incorrect party, or duplicate payments made and funds are unable to be recovered • Credit-related operational loss: loan documentation errors, monitoring inadequacies, failure to perfect security interest [subject to discussion] • Inability to enforce netting agreement due to inadequacies in documentation or failure to verify counterparty [subject to discussion]	• Anything recorded separately as "credit risk" under final new Basel Accord • Loss after implementing netting agreement in bankruptcy (credit risk)
Write-down If not, write-down	*Direct reduction in the value of assets due to theft, fraud, unauthorized activity, or market or credit losses arising as a result of operational events.*	• Failure to deliver / acquire asset in time and market price moves • Losses from unauthorized trade ("rogue trading") • Loss from excession trades (in excess of established market exposure limits) • Pricing error results in lower-than-expected revenue • Employee fraud results in bank writing off the loss • External fraud or theft results in loss of bank assets/revenues • External security breach results in hiring of consultants to determine nature of problem and fix it	• Anything recorded separately as a "market risk loss" under final new Basel Accord

*NOTE: THE CLASSIFICATION OF CREDIT LOSSES DUE TO OPERATIONAL FAILURES/INADEQUACIES IS TO BE CLARIFIED WITH THE REGULATORS.

	EFFECT TYPES: DEFINITIONS & EXAMPLES

	Items Included	**Items Excluded**
Further Considerations (not category specific)	• Costs related to consultants / third parties to investigate/fix (may be in various categories) • External costs associated with failed outsourcing assignment (may be in various categories) • Control breakdown that leads to an operational loss, requiring consultants to understand the cause of the problem and propose remedies (may be in various categories)	• Management time to investigate/fix a problem • Costs of internal support department to investigate/fix (e.g., Audit, IT support) a problem • System upgrade costs included in fixing a problem • Improvement in compliance/controls to prevent recurrence of problem • Purchase of new equipment due to failure of old equipment • Cost to replace staff • Reduction in revenues due to loss in key staff (business risk) • Reduced revenues due to reputation damage • Control breakdown that *does not* lead to a loss, but requires hiring resources (e.g., consultants)

Appendix H

Part I

For most continuous distribution families, a number of the family usually can be written as

$$Y = A + B * Z$$

where Y is a number of the distribution family, and Z is served as a standard in the underlying distribution families. A is the location of Y, B is the scale of Y. Usually, but not mandatory, the number with location equals to zero and scale equal to one is selected as the standard (i.e., Z).[23]

Thus, the 99th percentile of Y (denoted as Y99) is:

$$Y99 = A + B * Z99$$

or

$$Y99 = A * (1 + \frac{B}{A} * Z99)$$

Being more rigorous, the transformation rule stated above means that we assume that the aggregated loss distribution satisfies:
-   A linear transformation rule $T_1: x \mapsto A + B \bullet x$ and that this will affect the first moment of the distribution (i.e. $\mu \mapsto A + B \bullet \mu$)
-   Also, T implies for the second central moment of the distribution the transformation rule $T_2: s^2 \mapsto B^2 \times \bullet s^2$

Thus, for any two numbers (X, Y) from the same distribution family that satisfies the transformation rules, A and B can be determined by

$$A = \mu - \mu_0 \frac{\sigma}{\sigma_0}$$

$$B = \frac{\sigma}{\sigma_0}$$

where the distribution X has mean μ_0 and standard deviation σ_0 and the distribution Y has mean μ and standard deviation σ.

Applying these rules to the 99th percentile of Y leads us to the following expression

$$Y_{99} = \mu + \frac{\sigma}{\sigma_0} (X_{99} - \mu_0) \tag{1}$$

In the IMA approach, for a given business line and risk type

$$C = E_i \, x \, PE_i \, x \, LGE_i \, x \, \gamma_i$$

where PE_i is the annual frequency rate for the loss events and LGE_i is the expected amount of the single loss event and γ_i is a factor determined by the regulators.

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[23]   A good and simple example here is the Normal distribution family. The standard normal distribution is a normal distribution with mean = 0 and standard deviation = 1. Its 99th percentile stands firmly 2.326 times standard deviations right to the mean. For any other number of Normal distribution, its 99th percentile can be estimated by taking Z99 = 2.326. For example, the 99th percentile of normal distribution with mean = 2 and standard deviation = 3 is 8.979, which equals 2*(1+3/2*2.32).

If the aggregated loss distribution generated by the selected pairs of severity distribution and frequency distribution belongs to a continuous distribution family that satisfies the transformation rule in (1) we can define for the industry (X) and the firm (Y) the following variables

$$\zeta^I = \frac{X_{99}}{\mu_0}$$

$$\zeta^f = \frac{Y_{99}}{\mu} = 1 + \frac{\sigma}{\mu}\left(\zeta^I - 1\right)\frac{\mu_0}{\sigma_0}$$

where, all along the text, the superscript *f* refers to the firm and the superscript *I* refers to the industry average.

If we define the coefficient of variation (i.e. σ/μ) with α we obtain

$$\zeta^f = 1 + \frac{\alpha^f}{\alpha^I}\left(\zeta^I - 1\right).$$

If the frequency distribution is Poisson or negative binomial, then, according to formula (2) derived in Appendix H, Part II, the coefficient of variation (α) of the aggregated loss distribution can be decomposed as:[24]

$$\alpha^I = \frac{\sigma_0}{\mu_0} = \frac{1}{\sqrt{\mu^I_{frequency}}}\Phi$$

$$\alpha^f = \frac{\sigma}{\mu} = \frac{1}{\sqrt{\mu^f_{frequency}}}\Phi$$

Since ϕ is a constant under the hypotheses stated in Part II, we have

$$\alpha^f = \alpha^I \frac{\sqrt{\mu^I_{frequency}}}{\sqrt{\mu^f_{frequency}}}$$

Therefore,

$$\zeta^f = 1 + \sqrt{\frac{\mu^I_{frequency}}{\mu^f_{frequency}}} \times \left(\zeta^I - 1\right)$$

Denote $\sqrt{\dfrac{\mu^I_{frequency}}{\mu^f_{frequency}}}$ by RPI, then we have

$$\zeta^f = 1 + RPI \times \left(\zeta^I - 1\right) \tag{2}$$

---

[24]   Please find the detailed derivation in Part II.

An approximation of ζ^f can be:

$$\zeta^f = RPI \times \zeta^I \qquad (3)$$

For a given business line and risk type, the formula for the capital, interpreted as a definite percentile of the cumulative loss distribution, now turns out to be:

$$C_{\text{firm}} = E_i \text{ x } PE_i \text{ x } LGE_i \text{ x } \zeta^I \text{ x } RPI_i$$

Because the RPI is the square root of mean industry frequency to mean firm frequency and, consistently with the proposed interpretation[25] of the exposure indicator, defining $E_i = E_i^{frequency} \times E_i^{severity}$, we can recast the previous expression in the following form:

$$C = \left(E_i^{frequency} \times PE\right)^{\frac{1}{2}} \times \left(E_i^{severity} \times LGE\right) \times \zeta^I \times \sqrt{\mu_{frequency}^I}$$

Because $\zeta^I \times \sqrt{\mu_{frequency}^I}$ is only dependent on the industry average data set and has to be determined by the regulators we can rename this constant factor γ^I. Thus the expression for the capital becomes

$$C = \left(E_i^{frequency} \times PE\right)^{\frac{1}{2}} \times \left(E_i^{severity} \times LGE\right) \times \gamma^I$$

which explicitly shows the nonlinear dependence of the charge with respect to the exposure in the frequency domain.

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[25]   It should be noted that the QIS proposes the collection of separate frequency and severity exposure indicators for the Employment Practices and Workplace Safety loss category.

Part II

To model the operational losses over a long time horizon, the collective risk model is usually used. The mathematical formulation is as follows: Let N denote the number of operational loss events occurred in a given time period (e.g., one year). Let $X_{i, i=1..N}$ denote the dollar amount of the i*th* loss event. Then,

$$S = X_1 + X_2 + \ldots + X_N$$

represents the aggregate operational losses for the given time horizon. The number of operational loss events, N, is a random variable and is associated with the frequency of loss events. The individual loss amounts, X_i, are also random variables and are associated with the severity of losses.

Two fundamental assumptions are made in this collective model:
1. The dollar amounts of loss events are identically distributed.
2. The random variables N and $X_{i, i=1..N}$ are mutually independent.

Based on these two assumptions, the first and second moments of aggregated loss can be obtained by:[26]

$$E[S] = E[N]E[X]$$

$$Var(S) = E[N]Var(X) + E[X]^2 Var(N)$$

The coefficient of variation of the aggregated losses, denoted by α, is:

$$\alpha = \sqrt{\frac{Var(S)}{E[S]^2}}$$

or

$$\alpha = \sqrt{\frac{E[N]Var(X) + E[X]^2 Var(N)}{E[N]^2 E[X]^2}} \qquad (1)$$

When it comes to modeling operational risk, it is reasonable to *assume the frequency distribution is the Poisson distribution or negative binomial distribution*, which is supported by the large body of frequency data available from insurance where the Poisson distribution is the most commonly fitted distribution. Therefore, in formula (1),

$$Var[N] = E[N]*(1 + \varepsilon)$$

$\varepsilon = 0$, for Poisson distribution

Assume ε is a positive constant for firms and for industry, for negative binomial distribution

Hence, (1) can be simplified as:

$$\alpha = \sqrt{\frac{1}{E[N]} * \frac{Var(X) + E[X]^2 * (1+\varepsilon)}{E[X]^2}}$$

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[26]   See *Loss Models*, page 298, formula (4.6), by S.A. Klugman, H.H. Panjer, and G.E. Wilmont, John Wiley & Sons Inc., 1998.

$$\alpha = \frac{1}{\sqrt{E[N]}} * \sqrt{\left(\frac{STDEV(X)}{E[X]}\right)^2 + 1 + \varepsilon} \tag{2}$$

Where STDEV(X) stands for the standard deviation of X. Thus we can recast the previous expression in a simpler form as follows:

$$\alpha \quad = \quad \frac{1}{\sqrt{E[N]}} * \phi$$

where ϕ is a constant under our assumptions.

Part III

Comparison of the nonlinear Standardized Approach (SA) with the current version of the Internal Measurement Approach (IMA)

1) Nonlinear SA

$$C = \left(E_i\right)^{\frac{1}{2}} \times \beta$$

2) Current version of IMA

$$C = \left(E_i^{frequency} \times PE\right)^{\frac{1}{2}} \times \left(E_i^{severity} \times LGE\right) \times \gamma^I$$

If we examine the first factor in both the approaches, we note a common square root dependence highlighted below.

a) $\left(E_i\right)^{\frac{1}{2}}$

b) $\left(E_i^{frequency} \times PE\right)^{\frac{1}{2}}$

The b) form easily can be interpreted as a modification of the a) form, which can be mapped if the firm-specific *PE* is common industrywide and absorbed in the β factor.

In the same way, we can examine the latter part of the expression 1) and 2) from Part I and specifically find that given

c) β

d) $\left(E_i^{severity} \times LGE\right) \times \gamma^I$

we can interpret the severity distribution as a systemwide distribution [i.e., $\left(E_i^{severity} \times LGE\right)$ representing the average severity being common industrywide]. Thus, we get that the d) form is constant and therefore can also be reabsorbed in the definition of the β factor.

It is clear from these observations that there is a continuous evolutionary path that leads from the SA to the IMA, adding the loss types dimension to the analysis space and letting the firm specificity be included directly into the capital charge formula by means of the *PE* and *LGE* factors.