

Basel Committee on Banking Supervision

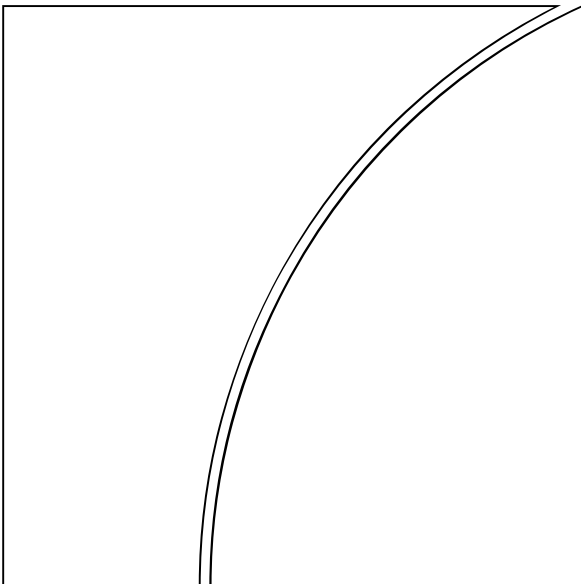
Consultative Document

Operational Risk

Supporting Document
to the New Basel Capital Accord

Issued for comment by 31 May 2001

January 2001



BANK FOR INTERNATIONAL SETTLEMENTS

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Operational Risk

Section A: Introduction

I. Background and Overview

1. The Committee is proposing to encompass explicitly risks other than credit and market in the New Basel Capital Accord. This proposal reflects the Committee's interest in making the New Basel Capital Accord more risk sensitive and the realisation that risks other than credit and market can be substantial. Further, developing banking practices such as securitisation, outsourcing, specialised processing operations and reliance on rapidly evolving technology and complex financial products and strategies suggest that these other risks are increasingly important factors to be reflected in credible capital assessments by both supervisors and banks.

2. Under the 1988 Accord, the Committee recognises that the capital buffer related to credit risk implicitly covers other risks. The broad brush approach in the 1988 Accord delivered an overall cushion of capital for both the measured risks (credit and market) and other (unmeasured) banking risks. To the extent that the new requirements for measured risks are a closer approximation to the actual level of those risks (as a result of the proposed changes to the credit risk calculation) less of a buffer will exist for other risks. It should also be noted that banks themselves typically hold capital well in excess of the current regulatory minimum and that some are already allocating economic capital for other risks.

Capital Framework Overview

3. The Committee believes that a capital charge for other risks should include a range of approaches to accommodate the variations in industry risk measurement and management practices. Through extensive industry discussions, the Committee has learned that measurement techniques for operational risk, a subset of other risks, remain in an early development stage at most institutions, but are advancing. As additional aspects of other risks remain very difficult to measure, the Committee is focusing the capital charge on operational risk and offering a range of approaches for assessing capital against this risk.

4. The Committee's goal is to develop methodologies that increasingly reflect an individual bank's particular risk profile. The simplest approach, the Basic Indicator Approach, links the capital charge for operational risk to a single risk indicator (e.g. gross income) for the whole bank. The Standardised Approach is a more complex variant of the Basic Indicator Approach that uses a combination of financial indicators and institutional business lines to determine the capital charge. Both approaches are pre-determined by regulators. The Internal Measurement Approach strives to incorporate, within a supervisory-specified framework, an individual bank's internal loss data into the calculation of its required capital. Like the Standardised Approach, the Internal Measurement Approach demands a decomposition of the bank's activities into specified business lines. However, the Internal Measurement Approach allows the capital charge to be driven by banks' own operational loss experiences, within a supervisory assessment framework. In the future, a Loss Distribution Approach, in which the bank specifies its own loss distributions, business lines and risk types, may be available.

5. An institution's ability to meet specific criteria would determine the framework used for its regulatory operational risk capital calculation. These criteria are detailed in the main body of the paper. The Committee intends to calibrate the spectrum of approaches so that

the capital charge for a typical bank would be less at each progressive step on the spectrum. This is consistent with the Committee's belief that increasing levels of sophistication of risk management and precision of measurement methodology should generally be rewarded with a reduction in the regulatory operational risk capital requirement.

II. Definition of Operational Risk

6. The Committee wants to enhance operational risk assessment efforts by encouraging the industry to develop methodologies and collect data related to managing operational risk. Consequently, the scope of the framework presented in this paper focuses primarily upon the operational risk component of other risks and encourages the industry to further develop techniques for measuring, monitoring and mitigating operational risk. In framing the current proposals, the Committee has adopted a common industry definition of operational risk, namely: **"the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events"**¹. Strategic and reputational risk is not included in this definition for the purpose of a minimum regulatory operational risk capital charge. This definition focuses on the causes of operational risk and the Committee believes that this is appropriate for both risk management and, ultimately, measurement. However, in reviewing the progress of the industry in the measurement of operational risk, the Committee is aware that causal measurement and modelling of operational risk remains at the earliest stages.² For this reason, the Committee sets out further details on the effects of operational losses, in terms of loss types, to allow data collection and measurement to commence. These are contained in Annex 4.

Direct vs. Indirect Losses

7. As stated in its definition of operational risk, the Committee intends for the capital framework to shield institutions from both direct *and* certain indirect losses. At this stage, the Committee is unable to prescribe finally the scope of the charge in this respect.³ However, it is intended that the costs to fix an operational risk problem, payments to third parties and write downs generally would be included in calculating the loss incurred from the operational risk event. Furthermore, there may be other types of losses or events which should be reflected in the charge, such as near misses, latent losses or contingent losses. Further analysis is needed on whether and how to address these events/losses. The costs of improvement in controls, preventative action and quality assurance, and investment in new systems would not be included.

8. In practice, such distinctions are difficult as there is often a high degree of ambiguity inherent in the process of categorising losses and costs, which may result in omission or double counting problems. The Committee is cognisant of the difficulties in determining the scope of the charge and is seeking comment on how to better specify the loss types for inclusion in a more refined definition of operational risk. Further, it is likely that detailed guidance on loss categorisation and allocation of losses by risk type will need to be

¹ This definition includes legal risk

² During 2000, the Risk Management Group of the Basel Committee conducted surveys to review industry practice and data on operational risk. The results are summarised in Annex 1.

³ One potential basis for the determination of the scope of the charge is the impact of the 'loss' on P&L.

produced, to allow the development of more advanced approaches to operational risk, and the Committee is also seeking detailed comment in this respect.

Expected vs. Unexpected Losses (EL/UL)

9. In line with other banking risks, conceptually a capital charge for operational risk should cover unexpected losses due to operational risk. Provisions should cover expected losses. However, accounting rules in many countries do not appear to allow a robust, comprehensive and clear approach to setting provisions, especially for operational risk. Rather, these rules appear to allow for provisions only for future obligations related to events that have already occurred. In particular, accounting standards generally require measurable estimation tests be met and losses be probable before provisions or contingencies are actually booked.

10. In general, provisions set up under such accounting standards bear only a very small relation to the concept of expected operational losses. Regulators are interested in a more forward-looking concept of provisions.

11. There are cases where contingent reserves may be provided that relate to operational risk matters. An example is costs related to lawsuits arising from a control breakdown. Also, there are certain types of high frequency/low severity losses, such as those related to credit card fraud, that appear to be deducted from income as they occur. However, provisions are generally not set up in advance for these.

12. Current practice for pricing for operational risk varies widely, and explicit pricing is not common. Regardless of actual practice, it is conceptually unclear that pricing alone is sufficient to deal with operational losses in the absence of effective reserving policies.

13. The situation may be somewhat different for banking activities that have a highly likely incidence of expected, regular operational risk losses that are deducted from reported income in the year. Fraud losses in credit card books are an example. In these limited cases, it might be appropriate to calibrate the capital charge to unexpected losses, or unexpected losses plus some cushion of imprecision. This approach assumes that the bank's income stream for the year will be sufficient to cover expected losses and that the bank can be relied upon to regularly deduct losses.

14. Against this background, the Committee proposes to calibrate the capital charge for operational risk based on expected and unexpected losses, but to allow some recognition for provisioning and loss deduction. A portion of end-of-period balances for a specific list of identified types of provisions or contingencies could be deducted from the minimum capital requirement (or recognised as part of an available capital cushion to meet requirements) provided the bank discloses them as such. Since capital is a forward-looking concept, the Committee believes that only part of a provision/contingency should be recognised as reducing the capital requirement. The capital charge for a limited list of banking activities where the annual deduction of actual operational losses is prevalent (e.g. credit card fraud) could be based on unexpected losses only, plus a cushion for imprecision. The feasibility and desirability of recognising provisions and loss deduction depend on there being a reasonable degree of clarity and comparability of approaches to defining acceptable provisions and contingencies among countries. The industry is invited to comment on how such a regime might be implemented.

III. General considerations

Interaction with Pillars 2 and 3

15. All three pillars of the New Basel Capital Accord – minimum capital requirements, the supervisory review process and market discipline – play an important role in the operational risk capital framework. The Committee intends to set a Pillar 1 minimum capital requirement and a series of qualitative and quantitative requirements for risk measurement and management will be used to determine eligibility to use a particular capital assessment technique. The Committee believes that a rigorous control environment is essential to prudent management of, and limiting of exposure to, operational risk. Accordingly, the Committee proposes that supervisors should also apply qualitative judgement based on their assessment of the adequacy of the control environment in each institution. This approach would operate under Pillar 2 of the New Basel Capital Accord, which recognises the supervisory review process as an integral and critical component of the capital framework. Pillar 2 sets out a framework in which banks are required to assess the economic capital they need to support their risks and then this process of assessment is reviewed by supervisors. Where the capital assessment process is inadequate and/or the allocation insufficient, supervisors will expect a bank to take prompt action to correct the situation. Supervisors will review the inputs and assumptions of internal methodologies for operational risk in the context of the firm wide capital allocation framework. The Committee intends to publish guidance and criteria to facilitate such an assessment process, and part XI previews sound practices in the area of operational risk exposures.

16. Market discipline (Pillar 3) has the potential to reinforce capital regulation and other supervisory efforts to promote safety and soundness in banks and financial systems. Market discipline imposes strong incentives on banks to conduct their business in a safe, sound and efficient manner. It can also provide a bank with an incentive to maintain a strong capital base as a cushion against potential future losses arising from its risk exposures. To promote market discipline, the Committee believes that banks should publicly, and in a timely fashion, disclose detailed information about the process used to manage and control their operational risks and the regulatory capital allocation technique they use. More work is needed to assess fully the appropriate disclosures in this area. It may be possible for banks to disclose operational losses in the context of a fuller review of operational risk measurement and management, and in the longer term such disclosures will form part of the qualifying criteria to use internal approaches.

The continuum concept

17. The framework outlined above presents three methods for calculating operational risk capital charges in a continuum of increasing sophistication and risk sensitivity. The Committee intends to develop detailed criteria as guidance to banks and supervisors on whether banks qualify to use a particular approach. An initial set of criteria are outlined in section VII below. The Committee believes that where a bank has satisfied the criteria it should be allowed to use that approach, regardless of whether it has been using a simpler approach previously. Also, in order to encourage innovation, the Committee anticipates that a bank could have some business lines in the Standardised Approach, and others in the Internal Measurement Approach. This will help reinforce the evolutionary nature of the new framework by allowing banks to move along the continuum on a piecemeal basis. Banks could not choose to move back to simpler approaches once they have been accepted for more advanced approaches and should, on a consolidated basis, capture the relevant risks for each business line.

Ongoing industry liaison

18. In view of substantive industry efforts to develop and implement systems for assessing, measuring and controlling operational risk, the Committee strongly encourages continuing dialogue and development of work among its Risk Management Group and individual firms, industry groups, and others on all aspects of incorporating operational risk into the capital framework. Continued contact with the industry is needed to clarify further a number of issues, including those related to definitions of loss events and data collection standards. In this regard, the Committee notes that by the time the New Basel Capital Accord is implemented banks will have had a meaningful opportunity to enhance internal control procedures and develop systems to support an internal measurement approach for operational risk.

19. With respect to data, on-going industry liaison has shown a number of important needs that should be addressed over the coming months. The Committee urges the industry to work on the development of codified and centralised operational risk databases, using consistent definitions of loss types, risk categories and business lines. A number of separate processes are currently in train, and the Committee believes that both the supervisory and banking community would be well served by industry supported databases for pooling certain industry internal loss data. This is important not only for operational risk management purposes, but also for the development of the Internal Measurement Approach (outlined below). A further related data issue is ensuring that “clean” operational risk data is collected and reported. In the absence of this, calibration will be difficult and capital will fail to be risk sensitive.

20. The Committee recognises the degree of co-operation that has already existed on this topic, and welcomes the work that the EBF, IIF, ISDA, ITWGOR⁴ and others have performed in conjunction with the Risk Management Group. The Committee believes that further collaboration will be essential in developing a risk sensitive framework for operational risk, and for calibrating the proposed approaches (both in themselves and as part of a risk sensitive continuum). The Committee looks forward to further work with the industry to finalise a rigorous and comprehensive framework for operational risk.

Section B: Approaches

21. This section of the paper outlines 3 broad approaches to the capital assessment of operational risk. The qualifying qualitative and quantitative standards for each approach are discussed in section VII. Based on a small sample of banks that have methods for determining and allocating economic capital and have provided data to the Committee, it has been estimated that operational risk accounts for an average of 20% of economic capital. In the absence of loss data, the Committee has used the figure of 20% of current minimum regulatory capital from a sample of banks to estimate a provisional multiplication factor (α) for the Basic Indicator Approach and to provide an approach to calibration of the Standardised Approach set out in Annex 3. The Committee invites banks during the consultative period to provide additional data to assist in more accurate calibration.

⁴ The Industry Technical Working Group on Operational Risk. This is a group of 10 internationally active banks that has worked extensively on the internal approaches to operational risk.

IV. Basic Indicator Approach

22. The most basic approach allocates operational risk capital using a single indicator as a proxy for an institution's overall operational risk exposure. Gross income⁵ is proposed as the indicator, with each bank holding capital for operational risk equal to the amount of a fixed percentage, α , multiplied by its individual amount of gross income. The Basic Indicator Approach is easy to implement and universally applicable across banks to arrive at a charge for operational risk. Its simplicity, however, comes at the price of only limited responsiveness to firm-specific needs and characteristics. While the Basic Indicator Approach might be suitable for smaller banks with a simple range of business activities, the Committee expects internationally active banks and banks with significant operational risk to use a more sophisticated approach within the overall framework.

23. The calibration of this approach is on a similar basis to that outlined in Annex 3 for the Standardised Approach. The current provisional estimate is that α be set at around 30% of gross income. This figure needs to be treated with caution as it is calibrated on a limited amount of data. Also, it is based on the same proportion of capital (20%) for operational risk as the Standardised Approach and may need to be reviewed in the light of wider calibration. For instance, in order to provide an incentive to move towards more sophisticated approaches, it may be desirable to set α at a higher level, although alternative means of generating such an incentive are also available, for instance under Pillar 2 or by making the Standardised Approach the entry point for internationally active banks. It is also worth noting that a sample of internationally active banks has formed the basis of this calibration. As it is anticipated that the Basic Indicator Approach will mainly be used by smaller, domestic banks, a wider sample base may be more appropriate.

V. Standardised Approach

Description of Approach

24. The Standardised Approach represents a further refinement along the evolutionary spectrum of approaches for operational risk capital. This approach differs from the Basic Indicator Approach in that a bank's activities are divided into a number of standardised business units and business lines. Thus, the Standardised Approach is better able to reflect the differing risk profiles across banks as reflected by their broad business activities. However, like the Basic Indicator Approach, the capital charge would continue to be standardised by the supervisor.

25. The proposed business units and business lines of the Standardised Approach mirror those developed by an industry initiative to collect internal loss data in a consistent manner. Working with the industry, regulators will specify in greater detail which business lines and activities correspond to the categories of this framework, enabling each bank to map its structure into the regulatory framework. Annex 2 presents such a mapping. This mapping exercise is yet to be finalised and further work, in consultation with the industry, will

⁵ The proposed definition is as follows: Gross Income = Net Interest Income + Net Non-Interest Income (comprising (i) fees and commissions receivable less fees and commissions payable, (ii) the net result on financial operations and (iii) other gross income. This excludes extraordinary or irregular items.) It is intended that this measure should reflect income *before* deduction of operational losses. The Committee will conduct further work to refine this definition.

be needed to ensure that businesses are slotted into the appropriate broad categories to avoid distortions and the potential for arbitrage.

26. Within each business line, regulators have specified a broad indicator that is intended to reflect the size or volume of a bank's activity in this area. The indicator is intended to serve as a rough proxy for the amount of operational risk within each of these business lines. The table below presents the business units, business lines and size/volume indicators of the Standardised Approach.

Business Units	Business Lines⁶	Indicator⁷
Investment Banking	Corporate Finance	Gross Income
	Trading and Sales	Gross Income ⁸
Banking	Retail Banking	Annual Average Assets
	Commercial Banking	Annual Average Assets
	Payment and Settlement	Annual Settlement Throughput
Others	Retail Brokerage	Gross Income
	Asset Management	Total Funds Under Management

27. Within each business line, the capital charge is calculated by multiplying a bank's broad financial indicator by a "beta" factor. The beta factor serves as a rough proxy for the relationship between the industry's operational risk loss experience for a given business line and the broad financial indicator representing the banks' activity in that business line, calibrated to a desired supervisory soundness standard. For example, for the Retail Brokerage business line, the regulatory capital charge would be calculated as follows:

$$K_{\text{Retail Brokerage}} = \beta_{\text{Retail Brokerage}} * (\text{Gross Income})$$

28. Where $K_{\text{Retail Brokerage}}$ is the capital requirement for the retail brokerage business line, $\beta_{\text{Retail Brokerage}}$ is the capital factor to be applied to the retail brokerage business line (each business line has a different beta factor), and Gross Income is the indicator for this business line.

⁶ A business line for agency services (custody, corporate agency and corporate trust) is intended to be included in the final proposal. An insurance business line may also be included in both the Standardised and Internal Measurement Approach, where insurance is included in a consolidated group for capital purposes. The choice of business lines and indicators is discussed further in Section VI

⁷ The indicator is the data for that business line, i.e. for Corporate Finance, it is gross income for that business line, not the whole bank.

⁸ An alternative may be VaR

29. The total capital charge is calculated as the simple summation of the capital charges across each of the business lines. Annex 3 outlines a possible calibration mechanism based on existing data and 20% of current minimum regulatory capital.

30. The primary motivation for the Standardised Approach is that most banks are in the early stages of developing firm-wide data on internal loss by business lines and risk types. In addition, the industry has not yet been able to show a causal relationship between risk indicators and loss experience. As a result, banks that have not developed internal loss data by the time of the implementation period of the revised New Basel Capital Accord and/or do not meet the criteria for the Internal Measurement Approach will require a simpler approach to calculate their regulatory capital charge. In addition, certain institutions may not choose to make the investment to collect internal loss data for all of their business lines, particularly those that present less material operational risk to the institution. A final important feature of the Standardised Approach is that it provides a basis for moving, on a business line by business line basis, towards the more sophisticated approaches and as such will help encourage the development of better risk management within banks.

VI. Internal Measurement Approach

Methodology

31. The Internal Measurement Approach provides discretion to individual banks on the use of internal loss data, while the method to calculate the required capital is uniformly set by supervisors. In implementing this approach, supervisors would impose quantitative and qualitative standards to ensure the integrity of the measurement approach, data quality, and the adequacy of the internal control environment. The Committee believes that, as the Internal Measurement Approach will give banks incentives to collect internal loss data step by step, this approach is positioned as a critical step along the evolutionary path that leads banks to the most sophisticated approaches. However, the Committee also recognises that the industry is still in a stage of developing data necessary to implement this approach. Currently, there is not sufficient data at the industry level or in a sufficient range of individual institutions to calibrate the capital charge under this approach. The Committee is laying out, in some detail, the elements of this part of the approach and the key issues that need to be resolved (discussed below). In particular, in order for this approach to be acceptable, the Committee will have to be satisfied that a critical mass of institutions have been able individually and at an industry level to assemble adequate data over a number of years to make the approach workable.

Structure of Internal Measurement Approach

32. Under the Internal Measurement Approach, a capital charge for the operational risk of a bank would be determined using the following procedures.

- 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:

$$\text{Required capital} = \sum_i \sum_j [\gamma(i,j) * EI(i,j) * PE(i,j) * LGE(i,j)]$$

(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, 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.

Business lines and loss types

33. The Committee proposes that the business lines will be the same as those used in the Standardised Approach. It is also proposed that operational risk in each business line then be divided into a number of non-overlapping and comprehensive loss types based on the industry’s best current understanding of loss events. By having multiple loss types, the scheme can better address differing characteristics of loss events, while the number of loss types should be limited to a reasonable number to maintain the simplicity of the scheme. The Committee’s provisional proposal on the grid for business lines, loss types and exposure indicators, which has reflected considerable discussion with the industry, is shown in Annex 4. Whilst further work will be needed to specify the indicators for each risk type per business line, the Committee has more confidence that the business lines and loss types are those which will form the basis of the new operational risk framework. The Committee believes that there should be continuity between approaches, and that the indicators under the Standardised Approach and Internal Measurement Approach should, where possible, be similar. The Committee therefore welcomes comment on the choice of indicators under both approaches, including whether a combination of indicators might be used per business line in the Standardised Approach, and if so, what these might be. The Committee also welcomes comment on the proposed loss categories.

Parameters

34. The **exposure indicator (EI)** represents a proxy for the size of a particular business line’s operational risk exposure. The Committee proposes to standardise EIs for business lines and loss types, while each bank would supply its own EI data. Supervisory prescribed EIs would allow for better comparability and consistency across banks, facilitate supervisory validation, and enhance transparency.

35. **Probability of loss event (PE)** represents the probability of occurrence of loss events, and **Loss given event (LGE)** represents the proportion of transaction or exposure that would be expensed as loss, given that event. PE could be expressed either in “number” or “value” term, as far as the definitions of EI, PE and LGE are consistent with each other. For instance, PE could be expressed as “the number of loss events / the number of transactions” and LGE parameters can be defined as “the average of (loss amount / transaction amount)”. While it is proposed that the definitions of PE and LGE are determined and fixed by the Committee, these parameters are calculated and supplied by individual banks (subject to Committee guidance to ensure the integrity of the approach). A bank would

use its own historical loss and exposure data, perhaps in combination with appropriate industry pooled data and public external data sources, so that PE and LGE would reflect each bank's own risk profile.

Risk weight and gamma (scaling factor)

36. The product of $EL \cdot PE \cdot LGE$ produces an Expected Loss (EL) for each business line/risk type. The term γ represents a constant that is used to transform EL into risk or a capital charge, which is defined as the maximum amount of loss per a holding period within a certain confidence interval. The scale of γ will be determined and fixed by supervisors for each business line/loss type. In determining the specific figure of γ that will be applied across banks, the Committee plans to develop an industry wide operational loss distribution in consultation with the industry, and use the ratio of EL to a high percentile of the loss distribution (e.g. 99%).

Correlations

37. Current industry practice and data availability do not permit the empirical measurement of correlations across business lines and risk types. The Committee is therefore proposing a simple summation of the capital charges across business line/loss type cells. However, in calibrating the gamma factors, the Committee will seek to ensure that there is a systematic reduction in capital required by the Internal Measurement Approach compared to the Standardised Approach, for an average portfolio of activity.

Further evolution

38. While the Committee believes that the definitions of business lines/loss types and parameters should be standardised at least in an early stage, the Committee also recognises such standardisation may limit banks' ability to use the operational risk measures that they believe most accurately represent their own operational risk (although banks could map their internal approaches into regulatory standards). As banks and supervisors gain more experience with the Internal Measurement Approach and as more data is collected, the Committee will examine the possibility of allowing banks greater flexibility to use their own business lines and loss types.

Key issues

39. In order to implement the Internal Measurement Approach for regulatory capital calculation, there are a number of outstanding issues to be resolved. The Committee will be examining the following issues in close consultation with the industry.

- In order to use a bank's internal loss data in regulatory capital calculation, **harmonisation of what constitutes an operational risk loss event is a prerequisite for a consistent approach**. Developing workable supervisory definitions, in consultation with the industry, of what constitutes an operational loss event for different business lines and loss types will be key to the robustness of the Internal Measurement Approach. In particular, this includes issues such as what constitutes a direct loss versus an indirect loss, over what holding period losses are considered, over what observation period historical losses are captured, and the role of judgement in data collection and consolidation.

- In order to calibrate the capital calculation, an industry wide distribution will be used. This raises questions on data collection and consolidation and the confidence limits used. It underscores the importance of accelerating industry efforts to pool loss data, under supervisory guidance on loss data collection processes.
- **The historical loss observation may not always fully capture a bank's true risk profile**, especially when the bank does not experience substantial loss events during the observation period. To ensure that the required capital calculated using the Internal Measurement Approach appropriately covers the potential loss, including low frequency high impact events, the Committee will conservatively set out elements of the scheme, including factors for each business lines/risk type combination and holding period.
- As noted previously, a regulatory specified gamma term γ , which is determined based on an industry wide loss distribution, will be used across banks to transform a set of parameters, such as EI, PE and LGE, into a capital charge for each business line and risk type. However, **the risk profile of a bank's loss distribution may not always be the same as that of the industry wide loss distribution**. One way to address this issue is to **adjust the capital charge by a Risk Profile Index (RPI), which reflects the difference between the bank specific risk profile compared to the industry as a whole**. The Committee plans to examine the extent to which individual bank's risk profile will deviate significantly from that of the types of portfolios used to arrive at the regulatory specified gamma term, and the cost/benefits of introducing a RPI to adjust for such differences. A more detailed explanation of RPI is in Annex 5.
- More work is needed to determine if there is a **stable relationship between EL and UL and what the role of external data (to include severity) should be in assessing this relationship**. Further, it will be necessary to determine this relationship for each business line and risk type which raises data and conceptual issues.

Loss Distribution Approach (LDA)

40. A more advanced version of an "internal methodology" is the **Loss Distribution Approach**. Under the LDA, a bank, using its internal data, estimates two probability distribution functions for each business line (and risk type); one on single event impact and the other on event frequency for the next (one) year. Based on the two estimated distributions, the bank then computes the probability distribution function of the cumulative operational loss. The capital charge is based on the simple sum of the VaR for each business line (and risk type). The approach adopted by the bank would be subject to supervisory criteria regarding the assumptions used. At this stage the Committee does not anticipate that such an approach would be available for regulatory capital purposes when the New Basel Capital Accord is introduced. However, this does not preclude the use of such an approach in the future and the Committee encourages the industry to engage in a dialogue to develop a suitable validation process for this type of approach. The LDA is discussed further in Annex 6.

VII. Qualifying criteria

41. In the proposed evolutionary framework of the approaches to determine capital charges for operational risk, individual banks are encouraged to move along the spectrum of

available approaches as they develop more sophisticated operational risk measurement systems and practices. Additional standards are intended to ensure the integrity of the measurement approach, data quality and the risk management control environment. The minimum standards that the Committee sees as essential for recognising a bank to be eligible for each stage are as follows:

Basic Indicator Approach

42. The Basic Indicator Approach is intended to be applicable by any bank regardless of its complexity or sophistication. As such, no criteria for use apply. Nevertheless, banks using this approach will be urged to comply with the forthcoming Committee guidance on “*Operational Risk Sound Practices*” (in progress), which will also serve as guidance to supervisors under Pillar 2.

The Standardised Approach

43. As well as meeting the Committee’s “*Operational Risk Sound Practices*”, banks will have to meet the following standards to be eligible for the Standardised Approach:

Effective risk management and control

- Banks must meet a series of qualitative standards, including: the existence of an independent risk control and audit function, effective use of risk reporting systems, active involvement of board of directors and senior management, and appropriate documentation of risk management systems.
- Banks must establish an independent operational risk management and control process, which covers the design, implementation and review of its operational risk measurement methodology. Responsibilities include establishing the framework for the measurement of operational risk and control over the construction of the operational risk methodology and key inputs.
- Banks’ internal audit groups must conduct regular reviews of the operational risk management process and measurement methodology.

Measurement and validation

- Banks must have appropriate risk reporting systems to generate data used in the calculation of a capital charge and the ability to construct management reporting based on the results.
- Banks must begin to systematically track relevant operational risk data by business line across the firm. It should be noted that the ability to monitor loss events and effectively gather loss data is a basic step for operational risk measurement and management and is a pre-requisite for movement to the more advanced regulatory approach.
- Banks will have to develop specific, documented criteria for mapping current business lines and activities into the standardised framework. In addition, a bank should regularly review the framework and adjust for new or changing business activities and risks as appropriate.

Internal Measurement Approach

44. In this approach, business lines, risk types and exposure indicators are standardised by supervisors and individual banks are able to use internal loss data. In addition to the standards required for banks using the Standardised Approach, banks should meet the following standards to use the Internal Measurement Approach:

Effective risk management and control

- Accuracy of loss data, and confidence in the results of calculations using that data, (including PE and LGE), have to be established through “use tests”. Banks must use the collected data and the resulting measures for risk reporting, management reporting, internal capital allocation purposes, risk analysis, etc. Banks that do not fully integrate an internal measurement methodology into their day-to-day activities and major business decisions should not qualify for this approach.

Measurement and validation

- Banks must develop sound internal loss reporting practices, supported by an infrastructure of loss database systems that are consistent with the scope of operational losses defined by supervisors and the banking industry.
- Banks must have an operational risk measurement methodology, knowledgeable staff, and an appropriate systems infrastructure capable of identifying and gathering comprehensive operational risk loss data necessary to create a loss database and calculate appropriate PEs and LGEs. 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.
- Banks need an operational risk loss database extending back for a number of years (to be set by the Committee) for significant business lines. Additionally, banks must develop specific criteria for assigning loss data to a particular business line and risk types.
- Banks must have in place a sound process to identify in a consistent manner over time the events used to construct a loss database and to be able to identify which historical loss experiences are appropriate for the institution and are representative of their current and future business activities. This entails developing and defining loss data criteria in terms of the type of loss data and the severity of the loss data that goes beyond the general supervisory definition and specifications.
- Banks must develop rigorous conditions under which internal loss data would be supplemented with external data, as well as a process for ensuring the relevance of this data for their business environment. Sound practices need to be identified surrounding the methodology and process of scaling public external loss data or pooled internal loss data from other sources. These conditions and practices should be re-visited on a regular basis, must be clearly documented, and should be subject to independent review.
- Sources of external data must be reviewed regularly to ensure the accuracy and applicability of the loss data. Banks must review and understand the assumptions used in the collection and assignment of loss events and resultant loss statistics.
- Banks must regularly conduct validation of their loss rates, risk indicators and size estimations in order to ensure the proper inputs to the regulatory capital charge.

Banks must adhere to rigorous processes in estimating parameters such as EI, PE and LGE.

- As part of the validation process, scenario analysis and stress testing would help banks in their ability to gauge if the operational environment is accurately reflected in data aggregation and parameter estimates. A process would need to be developed to identify and incorporate plausible historically large or significant events into assessments of operational risk exposure, which may fall outside the observation period. These processes should be clearly documented and be specific enough for independent review and verification. Such analysis would also assist in gauging the appropriateness of certain judgements or over-rides in the data collection process.
- Bank management should incorporate experience and judgement into an analysis of the loss data and the resulting PEs and LGEs. Banks have to clearly identify the exceptional situations under which judgement or over-rides may be used, to what extent they are to be used and who is authorised 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.
- Supervisors will need to examine the data collection, measurement, and validation process and assess the appropriateness of the operational risk control environment of the institution.

Section C: Review of Other Issues

VIII. The “floor” concept

45. As banks move along the continuum of approaches in this paper, it is intended that improvements in risk management would be reflected in a lower capital charge. This will be obtained through the calibration of the multiplication factors (α, β, γ) and, assuming that risk management improves, through bank specific data reflecting a better control environment. However, the Committee will limit the reduction in capital held when a bank moves from a Standardised Approach to Internal Measurement Approach by setting a floor, below which the required capital cannot fall. The Committee will review the need for the existence and level of the floor, two years after the implementation of the New Basel Capital Accord.

46. There are two possible techniques for setting the level of the floor. One is to take a fixed percentage of the capital charge under the Standardised Approach and to specify that the charge calculated under the Internal Measurement Approach cannot fall below this level (at least for a period of time). In the second approach the Committee would create the floor by setting minimum levels for elements of the Expected Loss (EL) calculation⁹ based on industry wide loss data and distributions.

47. Both methods are crude. The first has the benefit of simplicity, but suffers from the problem that it is assuming that the Standardised Approach is a more reliable measure of risk than the Internal Measurement Approach. The second approach benefits from the fact that the data to calculate the charge will feed into the setting of the level of the floor, but is

⁹ See equation Section B Part VI

still dependent on a broad supervisory judgement. The Committee invites comment on these different approaches.

IX. Outsourcing

48. Outsourcing by banks is increasing, both in terms of the volume of business involved and the range of functions outsourced. There are sound business reasons why a bank may outsource functions. These include a reduction in both fixed and/or current expenditure and compensation for a lack of expertise or resources. The Committee believes that banks engaged in outsourcing should aim to ensure that a “clean break” in their outsourced activities is established, if there is to be a reduction in operational risk capital, mainly through arranging robust legal agreements with outside service providers through a Service Level Agreement. Banks should also develop appropriate policies and controls to assess the quality and stability of outside service providers¹⁰. Where outsourcing is conducted between banks, it is the entity that bears the ultimate responsibility for the operational loss that should hold the capital. In order to benefit from a reduction in regulatory capital, the bank conducting the outsourcing would need to demonstrate to the satisfaction of the supervisor that effective risk transfer has occurred.

X. Risk Transfer and Mitigation

49. In an effort to encourage better risk management practices, the Committee is keenly interested in efforts by institutions to better mitigate and manage operational risk. Such controls or programs have the potential to reduce the exposure, frequency, or severity of an event. Due to the crucial role these techniques can play in managing risk exposures, the Committee intends to work with the industry on risk mitigation concepts over the next several months. However, careful consideration needs to be given to whether the control is truly reducing risk, or merely transferring exposure from the operational risk area to another business sector.

Insurance

50. One growing risk mitigation technique is the use of insurance to cover certain operational risk exposures. During discussion with the industry, the Committee found that firms were using, or were considering using, insurance policies to mitigate operational risk. These include a number of traditional insurance products, such as bankers’ blanket bonds and professional liability insurance. Specifically, insurance could be used to externalise the risk of potentially “low frequency, high severity” losses, such as errors and omissions (including processing losses), physical loss of securities, and fraud. The Committee agrees that, in principle, such mitigation should be reflected in the capital requirement for operational risk. However, it is clear that the market for insurance of operational risk is still developing.

¹⁰ The Committee pointed out that outsourcing may offer benefits but it “does not relieve the bank of the ultimate responsibility for controlling risks that affect its operation. Consequently, banks should adopt policies to limit risks arising from reliance on outside provider. For example, bank management should monitor the operational and financial performance of their service providers” *‘Risk Management for Electronic Banking and Electronic Money Activities’*, Basel Committee in Banking Supervision, March 1998.

Moreover, banks that use insurance should recognise that they might, in fact, be replacing operational risk with a counterparty risk. There are also other questions relating to liquidity (i.e., the speed of insurance payouts), loss adjustment and voidability, limits in the product range, the inclusion of insurance payouts in internal loss data and moral hazard. The Committee welcomes further industry analysis on the robustness of such mitigation techniques in the context of a discussion about regulatory capital requirements. The Risk Management Group will continue to develop its existing dialogue with the industry on this topic.

XI. Operational Risk Management Standards

51. As discussed above, the Committee is offering a range of options for assessing the Pillar 1 capital charge for operational risk. An institution's ability to meet specific criteria will determine the specific capital framework for its operational risk calculation. To the extent they can demonstrate to supervisors increased sophistication and precision in their measurement, management and control of operational risk, institutions are expected to move into more advanced approaches. This will generally result in a reduction of the operational risk capital requirement.

52. Pillar 2 is an integral and critical component of the New Basel Capital Accord and directly complements the Pillar 1 operational risk charge. Pillar 2 is intended not only to ensure that banks have adequate capital to support all risks in their business, but also to encourage banks to develop and use better risk management techniques in monitoring, managing and controlling those risks. Pillar 2 strongly emphasises the importance of bank management developing an internal capital assessment process and setting targets for capital that are commensurate with the bank's particular risk profile and control environment. This internal process will be subject to supervisory review and intervention, where appropriate.

53. The qualitative judgements by supervisors inherent in the Pillar 1 operational risk framework increase the relative importance of the supervisory assessment of a bank's strategies, policies, practices and procedures contemplated under Pillar 2. This independent evaluation of operational risk by supervisors should incorporate a review of the following:

- The bank's particular capital framework for determining its Pillar 1 operational risk capital charge (i.e. Basic Indicator, Standardised Approach, or Internal Measurement Approach);
- The bank's process for assessing overall capital adequacy for operational risk in relation to its risk profile and its internal capital targets;
- The effectiveness of the bank's risk management process with respect to operational risk exposures;
- The bank's systems for monitoring and reporting operational risk exposures and other data quality considerations;
- The bank's procedures for the timely and effective resolution of operational risk exposures and events;
- The bank's process of internal controls, reviews and audit to ensure the integrity of the overall operational risk management process; and
- The effectiveness of the bank's operational risk mitigation efforts.

54. Deficiencies identified during the supervisory review may be addressed through a range of actions. Supervisors should use the tools most suited to the particular circumstances of the bank and its operating environment. Possible supervisory responses include:

- Increased monitoring of the bank's overall operational risk management and assessment process;
- Requiring enhancements to internal measurement techniques;
- Requiring improvements in the operational risk control systems and/or personnel;
- Requiring the bank to raise additional capital immediately; and
- Requiring changes in responsible senior management.

55. The Committee expects that the concepts discussed above will be included within a more encompassing sound practice paper for operational risk. As with other aspects of the operational risk proposal, the Committee will continue to solicit the views of the industry on these guidelines.

Annex 1

Recent Industry Developments

In June 2000, the Risk Management Group (RMG) of the Basel Committee, through its Other Risks Technical Working Group (ORTWG), issued a survey to review the feasibility of different elements of the proposals and assess industry practices. The responses to this survey gave a useful snapshot of the state of play and also showed the path of future developments in the area of operational risk. A second leg of the survey was conducted during August. **Overall, the survey indicated that the quantification of operational risk is, for most institutions, at an early stage although progress is envisaged at many banks. Many banks did, however, provide some indication of the relative significance of operational risk within the institution. The data (based on a range of allocation methods) suggests that economic capital allocation for operational risk ranges between 15-25% for the majority of banks.** For most banks the tracking of risk indicators appears to be in its infancy, and a large number are not tracking indicators of any kind. Where indicators are tracked, the use to which they are put is often unclear for either risk management or economic capital allocation purposes. There are a few banks which have carried out correlation tests between indicators and actual losses, but the results have not yet been conclusive. A small number of banks currently use statistical approaches, of varying degrees of sophistication, to assess elements of operational risk. A much larger number of banks fall into an intermediate category, including those banks which are in the process of developing statistical approaches, intend to do so, or view such a project as valid (but as yet have made no plans to do so). Those banks working on an internal approach cited a lack of data as an impediment. However, a number of institutions have begun recent data collection exercises.

In most cases, it does not appear that banks have processes in place to integrate fully their risk definition, data collection exercises, risk assessment and management, capital allocation and governance mechanisms. Some banks stressed the qualitative nature of their approach to operational risk, which did not lend itself to capital allocation. At present, it appears that few banks could avail themselves of an internal methodology for regulatory capital allocation. **However, given the anticipated progress and high degree of senior management commitment on this issue, the period until implementation of the New Basel Capital Accord may allow a number of banks to develop viable internal approaches. Therefore, the development of both a rigorous standard approach and criteria for approval of internal approaches is of fundamental importance.**

While the survey indicated that a range of definitions are presently used, there has been a high degree of convergence during the past 1-2 years. **The following definition of operational risk, or close variants of it, is used by a large number of banks: “the risk of direct or indirect loss resulting from inadequate or failed internal processes, people and systems or from external events”.** While some banks included legal risk in their definitions, almost all institutions reject the idea of including strategic and business risk in a regulatory capital charge (although many allocate economic capital for this). Institutions differ on whether indirect losses should be incorporated to reflect reputational losses. Many institutions define operational risk as above, but have focussed data collection and other internal exercises on a narrower basis.

Annex 2

Example mapping of business lines

Business Unit	Level 1	Level 2	Activity Groups
INVESTMENT BANKING	Corporate Finance	Corporate Finance	Mergers and Acquisitions, Underwriting, Privatisations, Securitisation, Research, Debt (Government, High Yield) Equity, Syndications, IPO, Secondary Private Placements
		Municipal/Government Finance	
		Merchant Banking	
		Advisory Services	
	Trading & Sales	Sales	Fixed Income, equity, foreign exchanges, commodities, credit, funding, own position securities, lending and repos, brokerage, debt, prime brokerage
		Market Making	
		Proprietary Positions	
Treasury			
BANKING	Retail Banking	Retail Banking	Retail lending and deposits, banking services, trust and estates
		Private Banking ¹¹	Private lending and deposits, banking services, trust and estates, investment advice
		Card Services	Merchant/Commercial/Corporate cards, private labels and retail
	Commercial Banking	Commercial Banking	Project finance, real estate, export finance, trade finance, factoring, leasing, lends, guarantees, bills of exchange
	Payment and Settlement ¹²	External Clients	Payments and collections, funds transfer, clearing and settlement
	Agency Services	Custody	Escrow, Depository Receipts, Securities lending (Customers) Corporate actions
		Corporate Agency	Issuer and paying agents
Corporate Trust			
OTHERS	Asset Management	Discretionary Fund Management	Pooled, segregated, retail, institutional, closed, open, private equity
		Non-Discretionary Fund Management	Pooled, segregated, retail, institutional, closed, open
	Retail Brokerage	Retail Brokerage	Execution and full service
	Insurance	Life Insurance and Benefit Plans	
		Property and Casualty Insurance	
		Health Insurance	
		Reinsurance	
	Brokerage and Advisory		

¹¹ Private banking has been allocated to the retail banking business line. The Committee intends to consider if, given the nature of private banking, it might be more appropriate to include some (or all) private banking functions in the asset management business line.

¹² Payment and settlement losses related to a bank's own activities would be incorporated in the loss experience of the affected business line.

Annex 3

Standardised Approach

The purpose of this annex is to:

1. Demonstrate how the Standardised Approach can work in practice; and
2. Suggest on how business lines might be weighted and calibrated.

It should be said, by way of a warning, that the following analysis is preliminary and is based on data and methods that still need to be consistently verified. For this reason, and in order to avoid giving any sense of false precision, the results are presented in terms of bands or a range of numbers, as well as averages. At this stage even these bands etc. cannot be taken to be anything other than initial rough numbers. Considerable further work is required.

Calibration

The central problem that the Standardised Approach faces, as outlined in the paper, is to determine the β factor for each business line. Ideally, this should be calibrated according to loss experience, and it is the intent of the Committee to revise the following procedure as credible loss experience information becomes available. Given the information currently available to the Committee, the Standardised Approach as described below caters for an environment where precise calibration is impossible. For the purposes of illustrating the approach, this annex assumes an overall operational risk charge, based on 20% of current overall minimum regulatory capital (MRC).

Ideally, there should be a clear methodology for determining the β factor for each business line. In practice, this is difficult to achieve. However, there are obvious sources for arriving at some idea as to how much operational risk is in each business line. In particular there are the currently available databases of operational losses provided by some consultants. These databases are biased, for instance to larger losses, to data that is publicly available, to regulatory regimes that encourage operational loss transparency etc. Also, such databases cover loss experience from all types of financial firms and not just large internationally active banks. Another source is the internal loss data provided by our current sample of banks. However, this too is biased. The sample is small, the loss data imperfect in quality, often has a short time run, and is biased towards small operational losses. Finally, given the problems noted for both the above data sources, it would seem reasonable to use a reality check, based on supervisory perception of relative risks. Consequently, in this area, any analysis is bound to be very subjective.

Nonetheless, on the basis of above sources, it is possible to arrive at a set of weightings that as a first approximation are based on some quantitative evidence. In order to reflect the imperfect nature of these figures, these weightings are presented here as broad bands:

Table 1: Calculation of relative weightings of the business lines¹³

Business Line	Range (%)
Corporate Finance	8 – 12
Trading and Sales	15 - 23
Retail Banking	17 - 25
Commercial Banking	13 - 20
Payment and Settlement	12 - 18
Retail Brokerage	6 - 9
Asset Management	8 - 12
Total	80 - 120

The broad bands have an average value which corresponds to 100%.

The Beta Factor

Using the sample base of banks, 20% of total current MRC is expressed as a dollar sum. This amount is allocated along the business lines according to the mid-points in Table 1. This capital allocation is then divided by the sum of the financial indicator from the bank sample for that business line. The resulting number is the beta factor. Each institution then multiplies its own actual financial indicator data by the appropriate beta factor, to derive the capital charge for each business line. The overall operational risk capital charge is the sum of the business line charges.

Mathematically the beta factor of each business line is the product of 20% of current MRC from the bank sample (the proxy for total operational risk capital) and the business line weighting, divided by the summation of the financial indicator for that business line. Equation 1 shows this:

$$\beta = \frac{[20\% \text{ current total MRC } (\$)] \times [\text{Business Line Weighting } (\%)]}{\Sigma \text{ financial indicator for the business line from bank sample } (\$)} \quad (\text{Equation 1})$$

¹³ Insurance has been excluded here. The reason for this is that presently there are doubts whether the sample banks included regulatory capital numbers for insurance companies within the group; especially as insurance is usually excluded from consolidated regulatory returns for banks. It is also intended that an agency services business line will exist in the final proposal. Clearly the ranges would change as a result of these modifications.

Table 2: Proposed financial indicators for the business lines

Business Line	Indicators
Corporate Finance	Gross Income
Trading and Sales	Gross Income
Retail Banking	Annual Average Assets
Commercial Banking	Annual Average Assets
Payment and Settlement	Annual Settlement Throughput
Retail Brokerage	Gross Income
Asset Management	Total Funds Under Management

The Committee has estimated preliminary β factors, based on data from a sample of 23 internationally active banks. The level of these factors vary widely, reflecting the different weightings of the business lines (as shown in Table 1), the choice of different indicators (which vary in terms of their volume) and the size of the sample. For instance, the throughput indicator is estimated at a few 1/1000ths of a percent, the funds under management and asset indicators range from tenths of a percent to single digit percentages, e.g. for commercial banking the β is estimated at 0.4-0.6%, whilst the income indicators give higher double digit percentages. At present, the sample size is such that the inclusion or exclusion of a single bank from the sample can lead to significant shifts in the β factors, as the sample includes only 4 banks which provide data for all 7 business lines. The Committee therefore intends to collect further data prior to implementation to allow the β factors to be specified with more certainty.

Conclusions

Given the shortcomings of the current data, the small sample size, and the preliminary nature of the proposals, the Committee has not yet fully tested this approach to calibration of the Standardised Approach. However, the Committee has conducted an initial assessment of this calibration technique, and the results suggest that there is a very wide dispersion of operational risk capital charges for individual banks above and below the assumed industry average of 20% of current minimum regulatory capital. The preliminary findings suggest that some banks would be required to hold more than twice the assumed industry average, while others face a charge well below that average. This outcome is expected in a more risk sensitive framework. Further assessment of the results for individual banks, including a review of the differential impact on specialist and multi-functional banks is needed, along with wider testing and verification of the approach over the coming months, as part of the calibration of the New Basel Capital Accord.

Annex 4

Business lines, loss types¹⁴ and suggested exposure indicators¹⁵

BUSINESS UNITS	LEVEL 1 BUSINESS LINES	WRITE-DOWNS	LOSS OF RECOURSE	RESTITUTION	LEGAL LIABILITY	REGULATORY AND COMPLIANCE (INC. TAXATION)	LOSS OF OR DAMAGE TO ASSETS
INVESTMENT BANKING	Corporate Finance (including Municipal/Gov't Finance and merchant banking)	Volume of new deals	Volume of new deals	Volume of new deals	Volume of new deals	Volume of new deals	value of fixed assets
	Trading & Sales	Volume of trades	Volume of trades	Volume of trades	Volume of trades	Volume of trades	value of fixed assets
BANKING	Retail Banking	Volume of transactions	Volume of transactions	Volume of transactions	Volume of transactions and value of salaries	No. of transactions	Value of fixed assets
	Commercial Banking	Volume of transactions	Volume of transactions	Volume of transactions	Volume of transactions and value of salaries	No. of transactions	Value of fixed assets
	Payment and Settlement	Volume of transactions	Volume of transactions	Volume of transactions	Volume of transactions (client liability)	No. of transactions	Value of fixed assets
	Agency Services	Value of assets in custody	Value of assets in custody	Value of transactions	Value of corporate actions (client liabilities)	No. of corporate actions	Value of fixed assets
OTHERS	Asset Management	Value of assets under management (av. Value of each portfolio * no. of portfolios)	Value of assets under management (av. Value of each portfolio * no. of portfolios)	Value of transactions	Value of transactions	Value of assets under management	Value of fixed assets
	Retail Brokerage	Value of transactions	Value of transactions	Value of transactions	Value of transactions	Value of transactions	Value of fixed assets

¹⁴ *Write-downs*: direct reduction in value of assets due to theft, fraud, unauthorised activity or market and credit losses arising as a result of operational events; *Loss of Recourse*: payments or disbursements made to incorrect parties and not recovered; *Restitution*: payments to clients of principal and/or interest by way of restitution, or the cost of any other form of compensation paid to clients; *Legal Liability*: judgements, settlements and other legal costs; *Regulatory and Compliance (incl. Taxation Penalties)*: fines, or the direct cost of any other penalties, such as license revocations; *Loss of or Damage to Assets*: direct reduction in value of physical assets, including certificates, due to some kind of accident (e.g. neglect, accident, fire, earthquake).

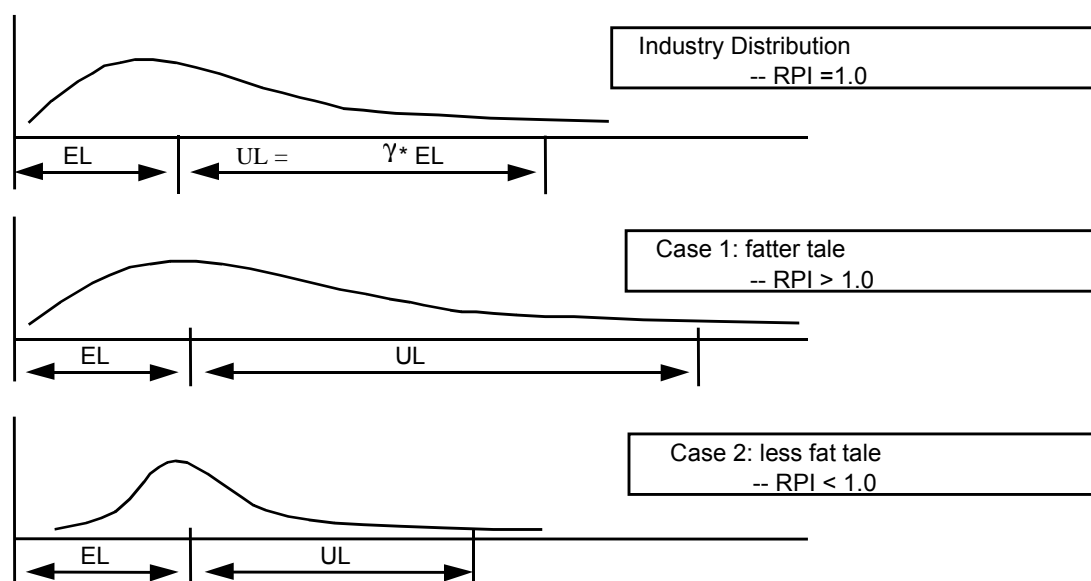
¹⁵ Values should be reported in the appropriate local currency

Annex 5

Risk Profile Index

This annex explains features of a Risk Profile Index (RPI), which is a possible way to adjust an operational risk capital charge calculated by the Internal Measurement Approach.

As noted in the section on the Internal Measurement Approach, a regulatory specified gamma term (γ), which is determined based on an industry wide loss distribution, will be used to transform a set of parameters (EI, PE and LGE) into a capital charge for each business line and risk type. However, the risk profile of each bank may not always be the same as that of industry wide loss distribution. To capture the difference in the risk profile of an individual bank, the RPI will be devised to reflect the ratio of UL to EL of the bank's loss distribution compared to that of the industry wide loss distribution. The relationship between the UL and EL can depend on a number of factors, such as the distributions of the size of transactions, the frequency of losses, or the severity of losses, each of which in turn could be a function of the quality of the control environment. For example, if the standard deviation of the frequency of loss events of the bank is small, the ratio of UL to EL of the bank is expected to be small. Also, operational risk could be dependent on the extent to which the size of individual transactions is appropriately controlled. This feature is shown in the following charts:



As shown in the chart, by definition, the RPI of the industry loss distribution is 1.0, as the γ term is determined using the industry loss distribution. On the other hand, the RPI for a bank with fatter tail distribution will be larger than 1.0 (case 1), while the RPI for another bank with a less fat tail distribution will be smaller than 1.0 (case 2). The overall capital charge for a particular bank with RPI adjustment, can be expressed in the following formula:

$$\text{Required capital} = \sum_i \sum_j [\gamma(i,j) * EI(i,j) * PE(i,j) * LGE(i,j) * \mathbf{RPI(i,j)}]$$

(i is the business line and j is the risk type.)

To ensure consistency across banks, the Committee could develop a standardised formula to calculate RPI for each business line/risk type combination. More work is needed to assess the primary factors that determine the ratio of EL to UL for different business lines and risk

types and the appropriate base for calculating the RPI (e.g. distribution of transactions size, the standard deviation of the frequency of losses and/or severity of losses).

Introducing this index could give banks an incentive to improve the management of their operational risk profile (whether severity or frequency) in relation to the average industry performance.

The Committee welcomes comments on what types of formula can better capture the operational risk profile of individual banks. The Committee will also examine the extent to which individual banks' exposures will deviate significantly from the types of portfolios used to arrive at the regulatory specified γ factors and the cost/benefits of introducing a RPI to adjust for such differences.

Annex 6

Loss Distribution Approach (LDA)

Under the Loss Distribution Approach, the bank estimates, for each business line/risk type cell, the probability distribution functions of the single event impact and the event frequency for the next (one) year using its internal data, and computes the probability distribution function of the cumulative operational loss. The capital charge is based on the simple sum of the operational risk VaR for each business line/risk type cell. Correlation effects across the cells are not considered in this approach. The loss distribution approach has the potential advantages of increased risk sensitivity. This method differs from the Internal Measurement Approach in two important respects. It aims to assess unexpected losses directly and not via an assumption about the relationship between expected loss and unexpected loss, and the structure of business lines and risk types is determined by the bank itself. There is no need for the supervisor to determine a multiplication (gamma) factor under this approach.

At present, several kinds of measurement methods are being developed and no industry standard has yet emerged. In this circumstance, basing the capital charge on the bank's own methodology will cause comparability problems because the outcome may differ depending on the method used. Further, it is not clear that many banks yet have the data or methodology to perform the necessary estimations. However, by accepting only those measurement methods that attain a certain level of robustness, over time, it may be possible to establish a set of standards on the basis of which supervisors can secure the overall prudence of the capital framework.

Further work is needed by both banks and supervisors to develop a better understanding of the key assumptions of internal measurement techniques, the necessary data requirements, the robustness of estimation techniques and appropriate validation methods (e.g. goodness-of-fit tests of the distribution types and interval estimation of the parameters) that could be used by banks and supervisors. Among others, the following specific topics will need to be addressed:

- Operational risk is decomposed into a number of sub risks using business lines and risk categories defined by the bank. Supervisors will need to develop standards to ensure that banks internal measurement methodologies capture all material elements of its operational risk.
- In each sub risk, data will need to be collected and robust estimation techniques (for event impact, frequency and aggregate operational loss) will need to be developed.
- The assumptions on the distribution types and estimations of the parameters are made and validated by the bank. Supervisors will need to design guidance to ensure appropriate validation has been applied.

It is not envisaged that this approach will be available at the outset of the New Basel Capital Accord, but the Committee does not rule out the use of such an approach in the future. The industry is therefore encouraged to continue its work on developing such approaches. Banks may seek to test such approaches for internal capital allocation purposes.