



A series designed to introduce readers to the tools used in the management of operational risk in today's financial services industry.

Quantifying Capital for Operational Risk

by Michael Haubenstock and Dan Mudge

Amidst a great debate over how to quantify capital for operational risk, this edition of "OR" presents an overview of the alternatives and key considerations in selecting an approach for both internal economic and regulatory capital.

From an allocation of the capital left over after quantifying market and credit risk, the quantification of operational risk has advanced to a statistically based model created from both hard data and qualitative factors.

The evolution of operational risk capital models was set in motion by the processes used to measure risk-adjusted returns on capital. Banks find value in strategic planning, risk analysis, pricing, and performance measurement. Given the variations among business lines, accurate performance comparisons require adding the operational risk dimension to market and credit risks. Capital methodologies provide the means to profile operational risk across the firm on an expected and unexpected loss basis.

The quantification of operational risk is characteristically different from market and credit risk, although they all share the perspective of expected and unexpected loss. More than ever, when we say "the risk is high," we must specify whether the risk is from expected or unexpected losses. While a downgrade from an A to a BBB rating would imply a higher expected loss and unexpected loss for credit risk, we cannot assume with operational risk that a risk with higher expected loss also has higher unexpected losses. The focus of this article is capital or unexpected loss related to operational risk.

Some common objectives and considerations in any operational risk capital methodology include:

- A stated level of confidence (e.g., 99.9%), so that figures can be consistent with market and credit risk methodologies.
- A stated time horizon (e.g., one year), indicating

the period for which capital is intended to cover the volatility of losses.

- Reflection of inherent risks, so that higher capital can be assigned to businesses historically proven to be riskier.
- Sensitivity to change, so that we can create behavioral incentives and capital can respond quickly up or down to changes in the risk profile.
- A forward-looking approach, so that current and anticipated risks (e.g., systems changes, mergers, and new products) are reflected in the risk profile.
- A comprehensive outlook covering all business areas, whether they have a history of operational risk experience or not.
- Transparency, so that all related managers can understand all assumptions as well as the methodology.
- Objectivity, to minimize potential influence on the results by subjective judgment.

The Basel Committee Recommendations

The Basel Committee has recommended three alternative approaches to quantification of an operational risk capital charge.¹ These three alternatives, ranging from the simple to the very sophisticated, are intended to offer institutions of all sizes and complexities a choice of what is right for each. The Basel recommendations, particularly the Advanced Measurement approaches, have captured leading practices used in the banking industry today in internal economic capital models.

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- Stage 1—The Basic Indicator approach. This is the simplest alternative, with operational risk capital being a factor (alpha) times gross revenue.
- Stage 2—The Standardized approach. This is similar to the Basic Indicator approach, but with different factors for each business line. Capital equals the sum of the factors (beta) times the gross revenue of each business line.
- Stage 3—Advanced Measurement approaches. These approaches are intended to be the most risk sensitive and to relate to the experience of each institution. The Committee has identified three example approaches, but has left open the options for additional development by the banking institutions.
 1. The Internal Measurement approach calls for a standard industry factor (gamma) at the business line and risk level to be multiplied by an institution's expected loss amounts related to operational risk.
 2. The Loss Distribution approach follows an actuarial methodology where distributions are constructed based on historical internal and external loss data.
 3. Scorecard approaches use a firm-wide capital charge and modify/allocate this amount over time, based on risk indicators or other qualitative criteria.

The Basic Indicator approach would likely be the choice of smaller institutions and those institutions without an operational risk framework. The Standardized approach tries to be more risk sensitive by having different factors for each business line and might appeal to institutions whose business mix is different from and less risky than the industry norm. The largest institutions would likely use the Advanced Measurement approaches to justify a lower capital charge based on their operational risk practices and their own loss experience.

Basel Acceptance Criteria

The Committee has outlined 10 qualitative principles relating to the operational risk framework that institutions must follow to be eligible to use the more advanced models.² These principles are

summarized below.

1. The board of directors should be aware of the major aspects of operational risk, approve the operational risk strategy and basic structure for managing operational risk, and ensure senior management is carrying out its risk management responsibilities.
2. Senior management is responsible for implementing the operational risk management strategy throughout the organization and for developing the relevant policies and systems.
3. Reporting should enable management to monitor the effectiveness of the risk management system and permit the board to oversee management performance.
4. Banks should identify the operational risk in all products, activities, processes, and systems for both existing operations and new products.
5. Banks should establish the processes necessary for measuring operational risk.
6. Banks should implement a system to monitor operational risk exposures and loss events by major business lines.
7. Banks should have policies, processes, and procedures to control or mitigate operational risk. They should assess the costs and benefits of alternative strategies and adjust their exposures appropriately.
8. Bank supervisors should require banks to have an effective operational risk management strategy as part of an overall approach to risk management.
9. Supervisors should conduct regular independent evaluations of banks' related operational risk management strategies.
10. Banks should make sufficient public disclosure to allow market participants to assess their operational risk exposure and the quality of their operational risk management.

The Basel Committee also has defined criteria related to quantification for institutions to qualify for using any of the Advanced Modeling approaches. Ultimately, each local regulator will have to approve each model. While subject to change as the Accord is finalized, the relevant quantitative criteria are:

- **Floor level of capital.** The actual capital charge will not be less than 75% of that calculated by the Standardized approach.
- **Capture infrequent but severe events.** The methodology must consider rare events that might not be reflected in the internal loss history of any one institution.
- **Five years of loss data.** Sufficient history must be present to have reasonable confidence of a complete loss distribution. Three years of data may be considered for a transition period.
- **Disciplined override process.** If, for any reason, any of the historical data points are deleted from the dataset, there should be a sound reason, documentation, and an approval process to ensure objectivity in the results.
- **Extensive stress and scenario testing.** This should test the sensitivity to the underlying assumptions and parameters and ensure the adequacy of the overall model results.
- **Disciplined incorporation of external data.** Data from other firms is necessary to understand the full extent of the tails of the distributions. Internal and external data should be combined only in statistically valid manners. Scaling criteria should be defined.
- **99.9% level of confidence and one-year holding period.** This implies a statistical framework where the level of confidence and holding period are direct inputs into the approach.
- **Correlations may be taken into account.** Systems for measuring correlations have to be sound and must demonstrate integrity.
- **Benefits of insurance may be considered.** The methodology used to quantify the benefits of insurance must be well documented and subject to review.
- **Qualitative adjustments are permitted.** The institution would need standards to address the structure, comprehensiveness, and rigor of the adjustments.

Factors in Selecting an Approach

The new Basel Accord will provide the industry with an opportunity to unify its internal economic capital methodologies with the regulatory capital requirements. Selection of an approach requires careful consideration in order to balance cost with

accuracy, transparency, and potential benefits in minimum regulatory capital. Key considerations are:

- **Data availability.** Advanced models are data intensive. LDA models require an organizational commitment for thorough, ongoing data collection.
- **Commitment to implement an operational risk framework.** All of the Advanced Measurement approaches require a comprehensive risk management framework with assessments, indicators, data collection, and reporting. Whether required by the regulators or simply for economic capital, integration with a framework is critical. Without this commitment, a simpler methodology should be considered.
- **Available technology.** The framework and capital methodology require technology, primarily to support the data collection efforts and the analytics. Plan on an appropriate budget.
- **Size of firm.** Larger firms tend to be able to justify the investment, and the benefits from lower capital levels would more than offset this charge. Smaller firms would have less of a benefit, and for approaches such as LDA, the number of events is not sufficient to be conclusive.
- **Degree of sophistication in relation to economic capital.** Firms committed to economic capital and its use as a management tool will be driven to accurate models and ones that are risk sensitive. They should consider the Advanced Measurement approaches.
- **Level of complexity.** Firms with complex products and operations will have exposure to more extreme events (tail risk). Advanced models will provide more insight into the true risk profile and consequently into how to manage and price these risks.
- **Quantitative vs. qualitative orientation.** Organizations with a strong quantitative bias and access to the related skills will be attracted to the LDA approach. Others will consider scorecards for their intuitive appeal.
- **Ability to defend the results.** LDA approaches are more bottom-up and fact based; consequently, they are easier to defend. Scorecards are more direct in creating behavioral change, but the subjective nature of the allocation results is difficult to defend.

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- **Cost.** Basic Indicator and Standardized approaches are surely inexpensive to implement. Any Advanced Measurement approach will require a significant investment in staff and technology.

In fact, the LDA and scorecard approaches have complementary strengths and weaknesses. Many leading firms are combining the two approaches to build methodologies with the bottom-up, objective benefits of LDA and the forward-looking responsiveness of scorecards.

Summary

Quantification models for operational risk have evolved exponentially in sophistication over the past few years. With their increased regulatory emphasis, we can expect many further developments. Nevertheless, the models that exist today get the job done, and the related data collection and operational risk infrastructure are necessary for any advanced

approach. Organizations that have gone down this path have realized tremendous benefits in improved awareness and quality and in lower operational risk losses. □

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Notes

1 Working Paper on the Regulatory Treatment of Operational Risk, Basel Committee on Banking Supervision, September 2001, www.bis.org/publ/bcbs_wp8.pdf.

2 "Sound Practices for the Management and Supervision of Operational Risk, Basel Committee on Banking Supervision," December 2001, www.bis.org/publ/bcbs86.htm.

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