

Industry Position Paper

II. Scenario Analysis Practices

Introduction

This paper on Scenario Analysis¹ (SA) (Part II – Practices) is one in a series of industry position papers by the AMA Group² on the implementation of the Advanced Measurement Approaches (AMA) in United States. It is intended to aid in a continued dialogue between the industry and the regulatory community on this aspect of AMA implementation and associated business practices.

The AMAG is building upon a previous paper that it had issued in December 2011, and then refreshed in May 2012, entitled *Scenario Analysis - Perspectives & Principles*. The intention of the Group in issuing these two separate papers on Scenario Analysis was first to set out the overarching principles that its members believe should guide industry implementation and supervisory oversight in this area, and then continue on with a review of the more specific current and evolving range of practice within the context of those principles. In addition, AMAG members attribute a high priority to maintaining an open dialogue with regulators and communicating the reasons for the range of practice that exist. As such, a more complete discussion of the industry experience with SA that has given rise to the positions outlined herein was warranted in order to ensure an appreciation of them by regulators. The practices described herein reflect information reported by members in response to AMAG range-of-practice surveys in recent years, as well as discussions among them at various Risk Management Association (RMA) forums.

The following text is structured to provide AMAG observations regarding the range of Scenario Analysis practice, and then to set out a number of positions that the industry believes should guide the further evolution of SA practice and supervisory oversight.

¹ Scenario Analysis is one of four elements identified in Basel II, Pillar 1 that AMA institutions must consider in estimating their minimum capital requirement for operational risk. The other three are internal loss data, external loss data and business environment and internal control factors (BEICF). The U.S. Rule for Risk Based Capital Standards: Advanced Capital Adequacy Framework, published in the Federal Register on December 7, 2007, defines scenario analysis as “a systematic process of obtaining expert opinions from business managers and risk management experts to derive reasoned assessments of the likelihood and loss impact of plausible high-severity operational losses.” The most recent Interagency Guidance released on June 3, 2011 reiterates this definition. The Basel Framework contains similar language, but does not contain an explicit definition of scenario analysis. See Attachment C for current regulation on scenario analysis in the U.S.

² The Advanced Measurement Approaches Group (AMAG) was formed in 2005 to share industry views on aspects of Advanced Measurement Approaches (AMA) implementation with the U.S. financial services federal regulatory agencies. The members of AMAG are listed in Attachment D to this Paper. They are listed for identification purposes only. Support for the AMAG is provided by RMA and Operational Risk Advisors LLC (ORA). This Paper does not necessarily represent the specific views of RMA’s institutional membership at large, ORA, or the views of the individual institutions whose staff have participated in the AMAG.

Executive Summary of AMAG Observations and Positions on Scenario Analysis Practices

Observations

Based on many years of combined member experiences and resultant Scenario Analysis practices, AMAG has developed the following observations:

1. AMAG member banks have a broader working definition and wider range of application of Scenario Analysis in general than those implied by definitions from the regulatory community;
2. In practice all AMAG banks use Scenario Analysis to achieve both risk management and risk measurement objectives, but may do so in varying ways depending on their overall program and approach;
3. Scenario Analysis approaches can be summarized as a relatively small number of overall methods, which are differentiated largely by the way the information is used in the risk measurement process;
4. AMAG recognizes that there is some convergence of practice in Scenario Analysis, such as in scenario preparation and workshops, data generation, the constituents, governance and use in both risk measurement and management;
5. In other areas, there remains an appropriate broader range of practice, such as in the nature of the data collected, the level of granularity and aggregation, scope of scenarios, and the nature of the use of scenarios in risk measurement; and
6. There are particularly critical components of a Scenario Analysis program without which success is highly unlikely. These include the process used to effectively identify scenarios, the actions taken to mitigate participant bias, the implementation of risk mitigation strategies, and the way in which scenario data are defined to align with the risk measurement process.

An overall theme in this paper is that while there are some aspects of Scenario Analysis that are practiced in common across AMAG institutions, overall the range of practice remains diverse, reflecting the variation in the objectives and uses of SA, and the individual firm-specific business model and management processes. A broader range of practice continues to be evident in the manner in which SA output is used to support risk measurement. In contrast, where a more common and hence narrower range of practice has emerged, it has been evident mainly with regard to the process employed to identify and gather scenario data, and the use of Scenario Analysis information for risk management purposes.

Positions

Following are positions that the AMAG has developed relative to Scenario Analysis practice, also based on extensive collective industry experience:

1. In order to accommodate the differing needs, objectives, and uses of Scenario Analysis across institutions, flexibility of implementation should continue to be a critical underlying element of SA practice;
2. While the AMAG has observed signs of convergence on certain aspects of Scenario Analysis, the Group believes that there should not be an expectation that all aspects of practice will eventually

converge, and hence the supervisory community should continue to apply a principles-based approach, as opposed to a prescriptive one, to the use of Scenario Analysis;

3. In light of the value demonstrated at institutions in a range of Scenario Analysis processes and practices, the definition of Scenario Analysis should be refined and the rigor and documentation of the process can and should be permitted to vary depending on measurement or management use; and
4. Appropriate use of Scenario Analysis benchmarking should be permitted to result in an upward or a downward adjustment to the operational risk capital amount.

Detailed Discussion – AMAG Observations

Observation 1: AMAG member banks have a broader working definition and wider range of application for Scenario Analysis in general than those implied by definitions from the regulatory community.

The U.S. Final Rule for Basel II sets forth a definition of Scenario Analysis that focuses on a systematic process for developing plausible high-severity operational losses. While AMAG members agree that this definition is applicable and appropriate for the development of scenarios for use in risk measurement, they also include alternative approaches for gathering scenario information to support risk management. These approaches do not necessarily require the same degree of formality, breadth of data collection, level of documentation, or emphasis on plausible high severity events as in the more formally-structured Scenario Analysis process. These types of less formal SA approaches include: *ad hoc* risk/control reviews undertaken in light of significant industry loss events; scenario development in support of planning for specifically-identified potential adverse business or economic developments including, but not limited to, disaster recovery and business continuity scenarios; and business area or corporate-wide stress testing. Thus AMAG members generally have a broader working definition of Scenario Analysis that encompasses a wider range of approaches than the supervisory definition.

Observation 2: In practice all AMAG banks use Scenario Analysis to achieve both risk management and risk measurement objectives, but may do so in varying ways depending on their overall program and approach.

The objectives that institutions give for conducting Scenario Analysis fall broadly under the categories of risk management and risk measurement. While all AMAG institutions use SA for both of these purposes and many institutions have multiple objectives, organizations may vary their emphasis within a set of objectives depending on their ultimate use of the Scenario Analysis data.

Following are objectives among those cited for conducting Scenario Analysis in the risk *management* area:

- To obtain a broad perspective and understanding of the plausible severe operational risk events that the company could experience;
- To gain insight into the potential severity of these events;

- To review controls and identify potential gaps;
- To identify and prioritize potential incremental risk mitigation strategies/actions; and
- To support other risk management efforts, such as *ad hoc* risk/control reviews, business planning, business line or corporate stress testing, and development of a corporate or business area risk profile.

Among the primary objectives emphasized from a risk *measurement* perspective are:

- To capture operational risk model inputs or parameters;
- To obtain information for benchmarking effectively and, if appropriate, adjust the results of the operational risk economic capital model; and
- To provide information to support an operational risk capital adjustment.

Observation 3: Scenario Analysis approaches can be summarized generally as a relatively small number of overall methods, which are differentiated largely by the way the information is used in the risk measurement process.

In an effort to summarize the diversity of Scenario Analysis practices being used by AMAG banking organizations, the various practices were organized within common themes that represent broadly and at a high level the range of approaches being employed. The approaches are described below. One aspect of them is that they are differentiated largely by the way the Scenario Analysis process is used relative to the risk measurement process.

- Risk Management and Qualitatively-Oriented Benchmarking

This grouping places emphasis on risk management-related output (detailed scenarios/identified control gaps/potential risk mitigation initiatives) with only modest emphasis on quantitatively-based frequency and severity outputs (*e.g.*, obtain only the plausible severe outcome) and the use of scenarios to perform qualitative benchmarking to capital model results in a general sense.

- Risk Management and Quantitatively-Oriented Benchmarking

Here the emphasis is on risk management-related output similar to that noted above, as well as generating more quantitatively-oriented risk measurement output (*e.g.*, distributional parameters; individual data points; both frequencies and severities), with emphasis on the use of the quantitative outputs in a benchmark scenario model.

- Risk Management and Use of Output in Core Model

This category places emphasis on risk management-related output, as well as more quantitatively-oriented risk measurement output (*e.g.*, distributional parameters; individual data points; frequencies and severities) to be used as inputs in the core operational risk model.

Observation 4: AMAG recognizes that there is some convergence of practice in Scenario Analysis.

As noted, when considering the three broad approaches outlined above, a number of underlying practices have become generally consistent among AMAG institutions.³ These include Scenario Analysis preparation activities, forums used to gather SA information, the data generation/review process, constituents, roles, the conduct of the scenario development process, the governance/challenge processes, and the use of SA information in one form or another in both risk measurement and risk management. Attachment A to this paper is an outline of additional descriptions and detail of the areas in which convergence has occurred.

Observation 5: In other areas there remains a broader range of practice, as is appropriate. This is particularly the case with the more complex process of determining what type of Scenario Analysis data to generate for use in risk measurement, and also as to the manner in which this information is incorporated into the operational risk measurement process.

Although a number of aspects of conducting SA and using the output in the risk management process have become common practice, there still remains a wide variety of practice with regard to the collection of quantitative data for specific scenarios and the use of scenario data in risk measurement. These variations in practice relate to the nature and granularity of the data collected, the scope of scenarios, and the nature of the use of SA data in the risk measurement process (e.g., variations in benchmarking, use of the Scenario Analysis information as an input to the core operational risk model). Attachment B outlines additional detail on these areas of range of practice and diversity.

Observation 6: There are particularly critical considerations for Scenario Analysis programs that, if left unaddressed, would render success highly unlikely. They include the process used to identify scenarios effectively, the actions taken to mitigate participant bias, the implementation of risk mitigation strategies, and the way in which scenario data is defined to align with the risk measurement process.

- Effective identification of significant tail risks – The most important consideration in this regard is that appropriate subject matter experts (SMEs) be in the room to generate and vet ideas. Generally, this requires individuals who are senior and experienced enough in the organization to know the business and, with transparency, are able and willing to discuss the possible severe but plausible events that could occur. The role of facilitator is also critical, especially with regard to the ability to present to participants the clear boundaries of what risk is within the scope of the discussion and what is not, and to define clearly for participants the process and expected outputs. Finally, an effective presentation of the relevant internal and external loss data and Business Environment and Internal Control Factors (BEICF) data to participants is key. These data provide both a source of information to stimulate discussion and also provide an independent view and objective context within which to assess the realism of the ideas and estimates being generated.

³ While these areas evidence a broad degree of consistency, it should still be noted that the actual approach for addressing or implementing these features can vary among institutions.

- Addressing bias – As behavioral research has shown, numerous factors can affect the ability of participants to provide unbiased estimates with regard to rare and large events. These can include phenomena such as anchoring, herding, and recency biases. In order to minimize these biases to the greatest extent possible, an institution must spend significant time and resources assessing and incorporating a number of bias mitigation techniques into their SA methodologies and practices.
- Identifying and prioritizing potential risk mitigation efforts – By their nature severe plausible events can often affect multiple aspects or areas of an organization, and implementing risk mitigation efforts or control enhancements directed at these events requires cross organization or cross functional efforts to be successful. While it can be relatively easy to identify potential mitigants for them, it can be far more difficult to implement them due to the complexity of the risk and its multi-faceted impact. In order to achieve both the necessary commitment to these types of often cross organizational initiatives and the necessary oversight and control to execute them successfully, it is critical to have strong executive sponsorship and project management.
- Capturing data for modeling – One of the most significant challenges of Scenario Analysis is to obtain information from participants who are experts in business but are not familiar or comfortable with statistical or quantitative approaches to data. When designing SA workshops, organizations must be cognizant of this and find ways of framing the conversation and soliciting the data that, while statistically sound, are also intuitive and non-technical.
- Ensuring Business Value - Along similar lines, the Scenario Analysis program must deliver practical business value more generally in order to win strong long-term management support and be successful. To do so and gain traction as a risk management tool, the program must produce perceived benefit to the participants over and above the generation of data or statistical information alone. The institutions reporting the most significant business value from SA generally target a broader set of risk management objectives for their program, such as those outlined in Observation 2 (e.g., broad understanding of plausible events, risk mitigation strategies/options), above. In addition, specific actions are taken to ensure that the SA process focuses on attaining these objectives, including: (1) maintaining the focus of discussions on the program's core objectives, (2) promoting the active engagement of SA participants in the scenario development process, (3) facilitating dialog and challenge among participants, and (4) providing the relevant background materials on operational risk, such as internal loss data, external loss data, and BEICF.

Detailed Discussion - AMAG Positions

The details on Scenario Analysis practices set forth above are based on AMAG's collective experience implementing SA programs over a number of years, across a broad range of institutions and operating environments, and as have been reflected in AMAG range-of-practice surveys. As such, the AMAG believes that the following positions should form the foundation of the future evolution of Scenario Analysis practice:

Position 1: In order to accommodate the differing needs, objectives, and uses of Scenario Analysis across institutions, flexibility of implementation should continue to be a critical part of the foundation of Scenario Analysis practice.

As a risk management tool Scenario Analysis has not and is not likely to evolve towards a single defined or uniformly applicable end-to-end implementation process. The optimal use of Scenario Analysis within a given firm is dependent on the unique aspects of its business environment, culture, risk management framework and risk measurement approach. Examples of these firm-specific aspects of implementation include the targeted objectives, the varying degrees of granularity desired in the collection of SA data, and the different ways in which Scenario Analysis is viewed as valuable and effective in supporting the risk measurement process. Given that these differing objectives and uses will drive appropriate variation in implementation, AMAG believes that continuing to permit such flexibility is critical to success both individually and industry wide. The result will be that Scenario Analysis will continue to be an extremely effective and useful risk assessment tool in many circumstances and provide numerous risk management benefits.

Position 2: The AMAG has observed signs of convergence on certain aspects of Scenario Analysis, however the Group believes that in other areas a range of practice is appropriate. That is, there should not be an expectation that all aspects of practice will eventually converge, and hence the supervisory community should continue to take a principles-based approach, versus a prescriptive one, toward the use of Scenario Analysis by institutions.

Some aspects of Scenario Analysis practice, such as what SA data are collected and how they are used in the risk measurement process, continue to see a wide range of practice. This range should not be expected to narrow or cease to exist over time inasmuch as it reflects the varying objectives, characteristics and programs of individual organizations. Because of the underlying drivers, there is likely to be diversity in some aspects of practice on a long-term basis. In such an environment, it is important that institutions continue to be permitted to operate within a framework of broad principles as opposed to a granular and prescriptive set of rules that would likely not be appropriate in all circumstances. Flexibility will allow organizations, within the broad framework of acceptable SA practice, to align and tailor practice to the individual objectives, business model, and culture of an organization. This alignment is a key to maximizing the benefits of Scenario Analysis as both a risk management and measurement tool.

Position 3: In light of the demonstrated value institutions find in a range of Scenario Analysis processes and practices, the definition of Scenario Analysis should be refined and the rigor and documentation of the process can and should be permitted to vary depending on use.

A wider range of Scenario Analysis processes has proven to be beneficial from a risk management standpoint than simply performing a single monolithic approach focused on producing quantitative information on plausible severe events for risk measurement. These other types of Scenario Analysis approaches include practices such as *ad hoc* risk/control reviews undertaken in light of significant industry loss events and scenario development in support of planning for specifically identified potential adverse business or economic developments. They have proven useful because of their more flexible,

nimble and tailored approach to a particular risk management issue or situation. It is important to acknowledge these broader uses and to incorporate them into a refined definition of Scenario Analysis that reinforces its use as a flexible risk management tool useful in a variety of ways to support both risk management and measurement processes. One potential approach would be to classify the scenario analysis process and results conducted to specifically meet AMA requirements as “Risk Measurement Scenarios,” while classifying the output from other scenario related activities as “Management Scenarios.”

The AMAG also believes that it would then follow from this refined definition that the nature of the Scenario Analysis process can and should be allowed to vary based on the objectives of these various practices. For example, where the exercise is performed to generate “Risk Measurement Scenarios” in order to support or benchmark the operational risk quantification process, the degree of rigor and documentation should be significant, whereas in those cases where the Scenario Analysis practice supports a purely risk management-focused objective and generates “Management Scenarios” the approach could appropriately deviate from this degree of rigor and documentation consistent with the intended use.

A refined definition of Scenario Analysis would also have the benefit of clarifying that there can be scenarios that an institution generates from its “Management Scenario” processes that would not be required to be utilized as part of the operational risk measurement process.

Position 4: Appropriate use of Scenario Analysis benchmarking should be permitted to result in an upward or a downward adjustment to the operational risk capital amount.

In practice, the use of Scenario Analysis results for benchmarking against capital results has in practice led to situations where the scenario benchmarking could have resulted in an upward or a downward adjustment to the capital amount. However, supervisors have strongly suggested that adjusting capital downward on the basis of this benchmarking would be inappropriate.

Scenario Analysis often provides very useful information in determining an organization’s exposure to operational risk. In the context of data limitations and modeling issues in the operational risk field, SA-based results can provide as accurate or better estimates of capital requirements for a particular Unit of Measure (UOM) as a base model using internal and/or external historical loss data. The logical extension of developing consensus on this point is that if Scenario-based results can have equal standing with historical data-based results, then the Scenario Analysis benchmarking process should be permitted to have either an upward or downward adjustment to capital results that were based solely on a data driven model. While AMAG institutions strongly support this viewpoint, they also understand that placing some limit on the extent of the downward adjustment may be sensible given regulatory conservatism.

Attachment A

Convergence of Practice in Scenario Analysis

AMAG Range-of-practice surveys indicate that quite a few practices are broadly consistent among AMAG institutions.⁴ These include the following features of the Scenario Analysis process:

- Scenario Process Preparation – A number of decisions are required in advance of the overall process such that individual scenario activities produce results consistent with the overall program requirements. These decisions relate to developing the Scenario Analysis (SA) methodology, addressing potential biases; identifying objectives for the SA process; determining the frequency of the scenario process; defining the business unit / event category or other unit of measure for which scenarios will be generated (*e.g.*, corporate-wide scenarios); defining the roles of the parties involved in the process; and performing scenario data management and maintenance (such as annually reviewing whether existing scenarios need to be retired, *etc.*).
- Frequency of Process – Nearly all institutions perform their core Scenario Analysis programs on an annual basis, with virtually all also having criteria in place that if triggered require an intra-year update to an existing scenario or generation of a new scenario. The criteria that trigger an update are most often a significant internal or external loss event, but other events, such as an updated risk assessment or adverse BEICF finding can also be the cause of the update.
- Forum – In most cases the venue to collect Scenario Analysis information is a workshop setting in which ideas are brainstormed and then refined.
- Data Generation / Review - Relevant operational risk-related materials are generated and provided to participants in advance of the forum to educate and inform them about the risks that will be discussed. These materials generally include: 1) internal loss data (ILD); 2) external loss data (ELD); and 3) business environment and internal control factor (BEICF) data.
- Constituents involved – Participants in the process generally include senior management from the business line, staff from business line and corporate support functions, and risk professionals from the corporate operational risk group.
- Roles – There are usually three roles that individual attendees assume, along with the functions that they perform: 1) participants whose expertise will be drawn upon to identify and develop the scenarios (senior business line management and support function staff); 2) facilitator(s) whose role is to facilitate the discussion and assist with the organization and execution of the process (corporate ORM staff); and 3) meeting recorders whose task is to document the proceedings.
- Data Gathering – These activities generally include reviewing the resultant data, brainstorming and prioritizing relevant scenarios, discussing controls, potential control gaps and risk mitigation opportunities, and developing quantitative information with regard to the frequency and severity of the scenario event. In addition, the process and results are documented.

⁴ While these areas evidence a broad degree of consistency, it should still be noted that the actual approach for addressing or implementing these features can still vary among institutions.

- Decision Making Process – Virtually all institutions use a consensus decision making process to arrive at the final selected scenarios and related details.
- Scenario Library – Nearly all institutions also maintain a library that represents a set of potential scenarios accumulated over a number of cycles.
- Governance / Challenge – Results are reported through the operational risk governance and oversight structure, and results are independently reviewed and challenged. The challenge function is performed by a number of groups, including business line management, business area and corporate operational risk management, and independent corporate oversight groups. In almost all cases the Operational Risk Committee or a business line risk committee is the governance body ultimately responsible for reviewing and approving the set of scenarios.
- Use of Results in Risk Management – Scenario results are used to inform a variety of risk management processes, including developing the risk profile of the organization, identifying and funding initiatives to enhance risk mitigation efforts relative to plausible severe events, and providing information to support stress testing and ICAAP processes.
- Use of Results in Risk Measurement – Although the exact use varies, scenario results are used by all institutions as part of the process of quantifying the appropriate level of operational risk capital to hold.

Attachment B

Broader Range-of-Practice Aspects of Scenario Analysis

Although some aspects of conducting Scenario Analysis (SA) have become common, others still represent a wide variety of practice with regard to the collection of quantitative data for specific scenarios and the incorporation of scenario data into the risk measurement process. These variations can be categorized in the following areas:

- Nature of the data collected - As evidenced in the description of the main approaches outlined in Observation 3, the types of data collected varies significantly depending on the nature of the modeling process and the use of scenario data in that process. The range of practice covers the spectrum from generally non-statistical data (e.g., a single severity estimate for a scenario under a plausibly severe circumstance), to more statistically-oriented data (distribution parameters or more detailed frequency and severity data that can be translated into model parameters) to the generation of scenario based data points for inclusion in the data set that is used in the quantification process.
- Granularity of the data collected – The number and granularity of the business line / event category or other units of measure for which scenarios are generated can vary significantly. This decision is driven by the overall approach to modeling operational risk; however it does have a significant impact on the extent of the corresponding granularity of the SA process. In practice, the range in the number of scenarios generated can vary substantially, from low double digits to one hundred or more. In addition, while roughly half of the AMAG institutions gather scenarios at a level equivalent to or at a less granular level than the Unit of Measure (UOM), the other half choose to develop scenarios at a more granular level than their UOM.
- Loss Size Focus – AMAG institutions report that for the most part they focus the scenario program on tail events; however, a number of institutions also use the process to gather risks across the entire risk spectrum.
- Use of Scenario Analysis data in the risk measurement process - While all AMAG institutions use Scenario Analysis results in some manner in the risk measurement process, there is significant range of practice, including benchmarking capital results against scenario results for individual UOMs, using a more formal statistical approach of developing a scenario benchmark model to generate results to compare to the core model, and using Scenario Analysis-generated data as an input in the core model.
- Use of All Scenarios in Risk Measurement - Although the majority of institutions use all of the scenarios generated through their scenario analysis programs in risk measurement, a number do not and argue various justifications for this decision. Some use well-documented and sufficiently-credible scenario selection processes to select scenarios for risk measurement uses from the pool of available scenarios. Others argue that the scenarios not used in risk measurement are not intended to be part of the risk measurement scenario analysis process but rather are generated for other risk management related purposes (e.g., business continuity planning scenarios).
- Nature of Benchmarking – Those AMA institutions that use Scenario Analysis output to benchmark against their operational risk model output report a wide range of approaches to benchmarking, with some using Scenario Analysis results to benchmark against the frequency and severity inputs to the model separately, while others benchmark against the capital output of the model.

Attachment C

Scenario Analysis Regulation in the U.S.

The U.S. Rule

Excerpts from the Final U.S. Rule for Risk Based Capital Standards: Advanced Capital Adequacy Framework (Published in the Federal Register, December 7, 2007)

- “Scenario analysis means a systematic process of obtaining expert opinions from business managers and risk management experts to derive reasoned assessments of the likelihood and loss impact of plausible high-severity operational losses. Scenario analysis may include the well-reasoned evaluation and use of external operational loss event data, adjusted as appropriate to ensure relevance to a [bank]’s operational risk profile and control structure.” (p. 491)
- “Scenario analysis. The [bank] must have a systematic process for determining its methodologies for incorporating scenario analysis into its operational risk data and assessment systems.” (p. 511)

U.S. Interagency Guidance

Section on Scenario Analysis from the 2011 U.S. Guidance on The Advanced Measurement Approaches for Operational Risk (June 3, 2011)

“Scenario analysis under the advanced approaches rule is a systematic process of obtaining expert opinions from business managers and risk-management experts to derive reasoned assessments of the likelihood and loss impact of plausible, high-severity operational losses. Scenario analysis may include the well-reasoned evaluation and use of external operational loss event data adjusted, as appropriate, to ensure relevance to a bank’s operational-risk profile and control structure. Scenario analysis provides a forward-looking view of operational risk that complements historical internal and external data. The scenario analysis process and its output are key risk-management tools that are especially relevant for assessing potential risks to which the bank may be exposed.

“Scenarios are typically developed through workshops that produce multiple scenarios at both the line of business and enterprise levels. Scenario development exercises allow subject matter experts to identify potential operational events and their impacts. Such exercises allow those experts to better prepare to identify and manage the risk exposures through business decisions, risk mitigation efforts, and capital planning. Inclusion of scenario data with other data elements in internal risk-management reporting can support development of a comprehensive operational risk profile of the bank.

“There are significant challenges with the development of scenario analysis. Some of these challenges include mitigation of bias and justification for loss frequency and severity estimates. Sound scenario analysis development and output depend on the skill and expertise of facilitators and participants. By its nature, scenario

analysis typically includes some degree of bias and subjectivity. Biases in scenario analysis development processes can include overconfidence, motivational bias, availability bias, partition dependence, and anchoring.

“Scenario analysis should be governed by a consistent process to ensure the integrity of the estimates produced. A sound scenario process should be clearly defined, repeatable, and transparent. It should be responsive to changes in both the internal and external environment. The process should involve appropriate representation of the business lines and subject matter experts, with oversight by the ORMF. Participants should be trained in the scenario generation process, and should receive relevant and detailed background information (including internal and external loss data) that is derived through a systematic selection process.

“Given the subjective nature of scenario analysis, banks should implement mechanisms for identifying and mitigating biases inherent in scenario development processes. Such mechanisms include carefully structured questions, a well-defined decision-making process, and consideration of a range of possible loss frequencies and severities. Scenario estimates should be supported by high-quality documentation of the reasoning and the rationale underlying the estimates. In addition, banks should implement a robust independent challenge process to ensure that key risks have been captured and scenario estimates are appropriate and well-supported. Banks also should have a process to evaluate and improve upon the results of past scenario workshops.

“There are significant challenges in using scenario analysis data as a direct input to the modeling process given the subjective nature of scenario analysis data. For example, it is difficult to mix synthetic (scenario) data and observational (internal and external) data elements in a credible manner. Supervisors will closely scrutinize a bank’s approach to mixing internal and scenario data at the observation level, and will review statistical evidence confirming that such an approach is valid. In addition, to address the inherent subjectivity involved in scenario analysis development, banks should have sufficiently transparent processes that explain the judgments used in the development and weighting of scenario analysis data. A bank may consider indirect methods for the use of scenario analysis in its operational-risk quantification systems, including using scenario analysis to develop benchmark models or to adjust operational risk exposure estimates as described below.

Scenario Analysis as a Benchmark

“In a scenario benchmark model, scenario analysis data are used as a direct input into a model that is separate from the primary (base) operational-risk quantification model (such as a model based on internal and/or external data). The outcome of the benchmark model may result in an adjustment to the operational-risk exposure estimate generated by the base model. When scenarios are used for benchmarking, it is critical to demonstrate the credibility of the benchmark model through validation and appropriate documentation. In addition, the bank should be able to show that: (i) scenario output can be credibly and transparently translated into an estimate of operational-risk exposure for the bank’s units of measure; and (ii) for a given UOM, the risk exposure can be appropriately estimated using internal and relevant external data.

“The method chosen for comparing the results from the benchmark scenario model with those of a base model should incorporate a range of possible outcomes, such as the calculation of a confidence interval around the point estimate of the base model. While values that lie in the confidence interval may differ numerically from the point estimate, those differences may be small enough that they do not provide convincing evidence of an inaccurate point estimate.

“Thus, scenario analysis may be used either to select a different outcome from within this range or, more generally, to select among candidate distributions (or models) that reasonably fit a given collection of data and therefore are considered statistically indistinguishable and equally valid.

“When using scenario analysis as a benchmark, there are two possible results:

- i. A scenario benchmark result that falls within the confidence interval generated by the base model generally would not be viewed as statistically different from the base model and the estimate of operational risk exposure would equal the output of the benchmark model. Supervisory scrutiny would increase as the benchmark result moves toward the limits of the confidence interval or as the confidence level increases (for example, a 95 percent versus a 90 percent confidence interval).
- ii. A scenario benchmark result that falls outside of the confidence interval should prompt the bank to thoroughly investigate the credibility of the results of both the base model and the benchmark model. The investigation may conclude that the base model and/or benchmark model are flawed and a correction to one or both of the models is warranted. A bank’s process for modifying the model(s) to address deficiencies must be credible, transparent, systematic, and verifiable in accordance with the requirements of the advanced approaches rule.

“If the review and investigation of the base model and the scenario analysis benchmark model indicates that the methodologies of both appear sound but a discrepancy between the outcomes persists, then the bank should consider alternative means for incorporating scenario analysis into its operational-risk quantification process. For example, a bank may consider using scenario analysis data to adjust its operational-risk exposure estimates. However, supervisors expect significant support and documentation for this approach. Such a qualitatively based adjustment to the results of the base model may be appropriate in limited instances (e.g., if internal and external data do not provide a sufficient number of relevant large loss results). When using a scenario-based adjustment, banks should provide the rationale for adjusting their exposure estimate as well as evidence that:

- i. The methodology is credible, transparent, systematic, and verifiable;
- ii. Adjustments to quantified exposure estimates are subject to an independent review and approval process that confirms whether key judgments and any resulting changes to exposure estimates are credible; and
- iii. The original model and its outcomes are statistically sound prior to any adjustment and the size of the adjustment is appropriate.

“The agencies recognize that, in principle, a credible process could produce both upward and downward qualitative adjustments. A qualitative reduction in exposure estimates may be acceptable only in extremely limited circumstances. As such, a downward adjustment generally is not consistent with a conservative risk assessment. As with upward adjustments, a bank should provide the rationale for a downward adjustment and ensure that the adjustment meets the three criteria above. Furthermore, the magnitude of any adjustment to the quantitatively estimated operational-risk exposure should always be governed and justified by policy thresholds that conform to conservative risk assumptions.

Scenario Analysis as the Base Model

“In rare cases, a bank may have insufficient internal data and relevant external data to derive an operational-risk exposure estimate for a UOM. Provided that the bank has documented and demonstrated that insufficient data exist, a bank may consider using a scenario-based approach. In this approach the other three data elements must

be inputs into the scenario analysis process. However, the bank also should continue its efforts to collect internal and external data in order to address the paucity of data.”

The Basel Accord

International Convergence of Capital Measurement And Capital Standards: A Revised Framework

Updated November 2005

Scenario analysis

675. A bank must use scenario analysis of expert opinion in conjunction with external data to evaluate its exposure to high-severity events. This approach draws on the knowledge of experienced business managers and risk management experts to derive reasoned assessments of plausible severe losses. For instance, these expert assessments could be expressed as parameters of an assumed statistical loss distribution. In addition, scenario analysis should be used to assess the impact of deviations from the correlation assumptions embedded in the bank’s operational risk measurement framework, in particular, to evaluate potential losses arising from multiple simultaneous operational risk loss events. Over time, such assessments need to be validated and re-assessed through comparison to actual loss experience to ensure their reasonableness.

Attachment D

About the AMA Group

The Advanced Measurement Approaches Group (AMAG) was formed in 2005 by the Risk Management Association (RMA) at the suggestion of the U.S. AMA-BQT (formerly the Inter-Agency Working Group on Operational Risk). The RMA is a member-driven professional association whose purpose is to advance the use of sound risk management principles in the financial services industry.

The AMAG is committed, in particular, to successful implementation of the Basel Advanced Measurement Approaches (referred to as “AMA” or “the Approaches”) in the U.S. The purpose of the Group is to foster a dialogue with the federal U.S. financial services regulatory agencies and share industry views on implementation aspects of AMA. The Group supports the fundamental AMA goals of improving operational risk management practice and ensuring capital adequacy. To achieve these goals AMAG believes that the Approaches should remain principles-based vs. prescriptive in nature; and that a proper balance between management and quantification must be maintained.

AMAG institutions develop and participate in a regular series of Range-of-Practice (ROP) survey exercises and focused working groups, and share the products of their efforts including, but not limited to, Industry Position Papers (IPPs), with one another and with industry regulatory agencies. The Group is open to any banking and/or financial institution regulated in the United States that is either mandated, opting in, or considering opting in to the Advanced Approaches. A senior officer responsible for risk management represents each member institution on the AMAG. The members of AMAG, as of the date of this Paper, are listed below.

Bank of America Merrill Lynch
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Keycorp
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AMAG member names are provided for identification purposes only. This paper does not necessarily represent the specific views of the individual institutions whose staff have participated in the AMAG, RMA’s institutional membership at large, or Operational Risk Advisors LLC (ORA). Support for the AMAG is provided by RMA and ORA.