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Supervisory Letter – Citi-2007-43

FEDERAL RESERVE BANK OF NEW YORK
NEW YORK, N.Y. 10045-0001

October 26, 2007

Mr. David Bushnell
Chief Administrative Officer
Citigroup
399 Park Avenue, 2nd Floor
New York, New York 10043

Dear Mr. Bushnell:

During August 2007, examiners from the Federal Reserve Bank of New York and the Office of the Comptroller of the Currency evaluated the overall quality of Citigroup's operational risk management, its progress in implementing the advanced operational risk measurement framework, and responses to our 2006 examination. As part of this review, we evaluated the quantification methodologies, including model validation and the collection and use of loss data, as well as governance aspects implicit in the framework. Our scope included a review of the operational risk management practices of the Corporate Markets and Banking (CMB), Global Consumer Group (GCG), and Global Wealth Management (GWM) business sectors. As in previous years, our procedures were partially drawn from standards articulated in existing risk based capital proposals. This examination will enable us to update the comparative analysis of large bank operational risk frameworks provided you in previous years, and should facilitate our evaluation of your gap analysis and implementation plan once new risk based capital rules are finalized.

Conclusions

- Operational risk management remains satisfactory.
- Citigroup continues to make progress in implementing its advanced risk measurement framework. We identified a matter requiring attention (MRA) in the area of quantification that needs to be addressed.

Matters Requiring Attention

Quantification – models and loss data. The quantification methodology used by Citigroup to estimate capital attributable to operational risk needs to be re-evaluated in that reliance on the model in selecting final tail parameters has been reduced. Approved tail parameters are often outside of the range of parameters established by the model. While we note that subjective factors have resulted in higher operational risk capital charges in most cases, management should revisit the quantification methodology and its application to ensure that model output is relevant. Final models must be properly validated consistent with regulatory standards and Citigroup's own revised model validation policy.

As noted during the last examination, Citigroup's current measurement methodology uses internal data for frequency estimation and exclusively external data for severity estimation. Management is making progress in addressing our concern that information regarding the nature of the operational risk profile will be overlooked if internal data is not used in severity estimates.

Specific concerns and technical issues regarding the use of models and data are discussed in the comments below.

Supporting Comments

General

Citigroup continues to make progress in implementing its operational risk management framework and overall operational risk management remains satisfactory. Enhancements tend to be evolutionary and include a revised and simplified Risk and Control Self-assessment (RCSA) process, as well as the firmwide emergence of the Business Risk Compliance and Control (BRCC) committees with their comprehensive reporting of risk and control issues.

Sector operational risk management processes are consistent with corporate standards. Risk management tools like KRIs and identification of significant top-down risks continue to evolve. Stress testing methodologies and procedures are now being developed. A scenario analysis policy was put in place in July 2007, and business sectors had until the end of September to propose plans for using it. However, during this examination, we noted an undercurrent of sentiment that scenario analysis is largely a regulatory requirement of uncertain value. With proper guidance and encouragement from the senior risk management, scenario analysis could become another mechanism to help in identifying and understanding low frequency / high significance events.

Quantification

--Tail Parameter Selection

During this examination, we directed significant attention to the quantification methodology and its application as part of the operational risk management framework and the attendant risk capital calculations. The methodology was evaluated in 2006 and progress against matters requiring attention at that time is noted. However, new evidence based on the work done in selecting the 2007 final tail parameter (FTPs) indicates a need to more fundamentally reassess and revalidate the quantification methodology and its application.

Citigroup established an Industry Events Selection Standard (IESS) for the tail parameter selection process in response to last year's MRA requiring more formality, structure and documentation around the selection of the final tail parameter. The tail parameter is arguably the key parameter in the operational risk model, given its impact on the final capital estimates. The IESS defines a statistical range of tail parameter estimates, and now requires a documented rationale if selected tail parameters fall outside of the model-prescribed range.

For the 2007 cycle, selected tail parameters fell outside the statistical range established by the methodology in six of nine business portfolios. It is noted that while five of the six were above the range, this raises questions regarding the use of the model. There is a valid role for management judgment within an operational risk measurement framework. It is unrealistic to expect that a model will produce results that are always accurate and relevant. However, the preponderance of out-of-range FTPs suggests that in management's view, the current model is not providing reasonable estimates. As a result, management should review its quantification methodology based on the experience in selecting 2007 FTPs. This would include a reconsideration of assumptions (e.g., that loss severity follows a power law), exploring and benchmarking against alternate approaches (e.g., relying more on internal loss data and alternative model specifications), and identifying model limitations and vulnerabilities.

We also note that the IESS defines a statistical range of parameter estimates obtained using industry data, and specifies the cases where tail parameter estimates based on internal data will be provided to management. The IESS relies heavily upon documentation and a formal approval process as the means of ensuring the appropriateness of the FTP selections. However, there are no specific rules or guidance governing the relationship between model results and the FTPs, nor are there any clear limits on the role of judgment in the process. We also note that the new standard came into effect after the 2007 tail parameters were selected. As such, it was not yet possible to observe and critique how the IESS will actually impact the tail parameter selection process.

During this examination, we identified the following additional areas of concern regarding the selection of tail parameters that should be addressed for the 2008 process:

- The IESS defines the tail parameter range as falling between the Hill and the maximum likelihood estimation (MLE) tail parameter estimates. The standard currently indicates a unique range for each business unit. The unique range is determined by applying the Hill and MLE estimators to relevance-filtered industry data. In practice, however, alternate tail parameter ranges are often considered, such as ranges that incorporate standard errors around the Hill and MLE point estimates, ranges based on raw (unfiltered) industry data, ranges based on excluding a large loss from the filtered dataset, and ranges that span several lines of business. The IESS does not discuss these alternate formulations of the range, and it is unclear whether a tail parameter that lies outside the "standard" range but inside an alternate range would be subject to the enhanced review and documentation requirements outlined in the Standards. There appears to be flexibility in the definition of the range that allows management increased latitude in choosing a tail parameter. This should be clarified.
- In explaining why certain tail parameters fell outside that statistical range, businesses present two related arguments. First, tail parameters that are near the range need not be modified since the difference would be immaterial. Second, tail parameters that were significantly outside the range need not be modified since it would result in anomalous or unreasonable capital estimates. Taken together, these arguments suggest that changes in the selected tail parameter from one year to the next will be rare. This emphasis on stability reduces the framework's overall risk sensitivity. This tradeoff should be addressed within the IESS.

--Use of Internal Loss Data in Severity Estimates

In response to last examination's MRA regarding the use of internal loss data in the severity distribution, management is undertaking a series of actions intended to resolve this issue when 2008 tail parameters are selected. In order to address this issue, a statistical test was created to determine if the internal loss experience is consistent with the tail parameters selected by business line management. The test will result either in a "pass" (internal losses are consistent with the selected tail parameter estimate) or a "fail". In the case of a "pass," the selected tail parameter estimate would be deemed final. In the case of a "fail," Citigroup would report two additional pieces of information to business line management: a point estimate of the tail parameter based purely on internal data, as well as a "break-even" tail parameter. The break-even tail parameter would be the smallest (or largest) value of the tail parameter that management could have selected such that the statistical significance would yield a "pass" result.

We recognize the efforts in developing a statistical test to benchmark the selected tail parameters using internal data, and believe this is potentially a useful way to address our concerns. However, the following issues should be addressed as development continues:

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- A 1% significance level is used in the statistical test. Such a low significance level minimizes the likelihood that relevant internal data would be reflected in the final tail parameter. Management has agreed to explore using a higher significance level. More broadly, we encourage Citigroup to undertake a thorough analysis of the power of their proposed test, which would provide a sounder basis for selecting a significance level.
- The break-even tail parameter is not based on any statistically relevant methodology. Management responded that this "parameter" was simply an informational point of reference.
- What action is to be taken in the event of a "failed" test is unclear. Tail parameter estimates based on internal data would be provided to management, but only in instances where these estimates are "meaningful." This criterion needs to be defined. If the point estimates are not considered meaningful, the alternative course of action needs to be described.

Please provide a written response to this letter within 45 days that specifically addresses the matters highlighted above. Additionally, as part of the ongoing supervisory process, we will continue to evaluate your operational risk management framework as well as changes to your process and organization to ensure their ongoing effectiveness. In closing, please note that this letter contains confidential material and should be treated accordingly by your organization. As such, the contents of this letter are subject to the rules and regulations of the Office of the Comptroller of the Currency and of the Board of Governors of the Federal Reserve System regarding the disclosure of confidential supervisory information. Under no circumstances shall the company, its agencies, or any of its directors, officers, or employees disclose or make this information public in any manner. If you have any questions about this letter or facets of this examination, please do not hesitate to contact either John Fleming, National Bank Examiner, Comptroller of the Currency at 212-527-1036, or Glen Snajder, Examining Officer, Federal Reserve Bank of New York at 212-537-2319.

Very truly yours,

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