

Strengthening Financial Risk Management at the FDIC

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Strengthening Financial Risk Management at the FDIC – *Executive Summary*

INTRODUCTION

Since 1933, the FDIC’s mission has been to protect depositors and promote the “safety and soundness of insured depository institutions and the U.S. financial system by *identifying, monitoring, and addressing risks* to the deposit insurance funds.”¹ While the specific risks to the insurance funds have changed over time – overextension in the 1980s, consolidation in the 1990s, subprime lending today – the need for an effective risk management capability has not. The rapid pace of change in both the banking system and domestic and global capital markets presents special challenges to this mission and demands that the FDIC constantly and continually upgrade its risk management metrics, policies, systems, and organization to remain effective.

The economic climate in the United States has put mounting pressure on banks, their customers, and the FDIC. In 2002, more banks failed than in any year since 1994. The number of “problem institutions” on the FDIC’s reserve list, one of many indicators of financial strain in the banking system, rose significantly in each of the last 3 years, with aggregate assets at these institutions quadrupling since 1998 to \$39 billion at year end 2002. The FDIC’s Bank Insurance Fund (BIF) reserve ratio, meanwhile, has dropped markedly over the last 4 years to a current level of 1.28 percent – slightly above the legal minimum.

At the same time, deposit insurance reform legislation now under consideration may present new challenges and opportunities for the FDIC. While the final form of any new regulatory scheme remains to be determined, the general outlines are becoming clearer. The FDIC is likely to obtain greater latitude to manage a combined deposit insurance fund² within a range of reserve ratios (e.g., 1.15 to 1.50) rather than to a specific target number (i.e., 1.25). Moreover, the FDIC is likely to have increased authority to charge risk-based premiums to financial institutions that it insures. In a post-reform era, a heightened understanding of risk – both financial risk to the

¹ *FDIC 2002 Annual Report*, inside cover (emphasis added).

² Both the current House and Senate versions of deposit insurance reform legislation combine the BIF and the Savings Association Insurance Fund (SAIF) into a single fund.

FDIC as well as economic risk to the banking system – will be especially critical, not only for the effective and efficient management of the deposit insurance system but also for fair and accurate premium assessments on the banking industry.

Amid these developments, the FDIC has started to think more proactively about risk, initiating several major reforms over the last 18 months. In early 2003, it created the National Risk Committee (NRC), a cross-divisional body of senior managers established to identify and evaluate major business risks facing the banking industry and the insurance funds. The NRC provides coordinated policy guidance to the operating units, including on the development of appropriate strategies and operating policies. A network of similar committees in the FDIC regions delivers regular regional risk reports to the NRC. In addition, a state-of-the-art Risk Analysis Center (RAC) was created earlier this year to monitor emerging macro and micro risks on a daily basis and to recommend responses to the NRC. The NRC and the RAC complement a third cross-divisional risk committee, the Financial Risk Committee (FRC), whose broad mission is to quantify risks to the deposit insurance system for financial reporting and fund management purposes. In particular, the FRC sets a contingent loss reserve (CLR) to satisfy GAO accounting rules and estimates the total assets of banks that may fail within the subsequent eight quarters (the “2-year Projection”) for deposit insurance pricing and internal budgetary purposes.

Consistent with the growing importance of risk and risk management to the banking industry and the insurance funds, the FDIC has commissioned an independent evaluation of the processes and methodologies used to establish the CLR and the 2-year Projection. McKinsey & Company was selected to provide this assessment. Based on an in-depth analysis of financial models used by FRC, observations of the FRC decision-making process, and extensive internal and external interviews, we have developed recommendations to modify, supplement, and in some cases replace parts of the existing FRC processes. As part of our review, we have also had the opportunity to assess the risk management processes and procedures of the NRC and the RAC, and we similarly provide recommendations to strengthen these two risk management initiatives.

Our recommendations for improving the FDIC’s financial risk management practices span three overlapping time horizons. Beginning now and continuing over the next 3 to 6 months, a set of clear improvements to the existing financial risk reporting should be quickly and methodically implemented (Horizon 1) to address any industry uncertainty regarding the process’s accuracy, robustness, and transparency. Beginning now and continuing over the next 18 months, a new generation of financial risk management models under development should be finalized and a set of supporting organizational processes should be established

(Horizon 2). Beginning after the new risk models are in place and other organizational improvements are well underway and continuing indefinitely, the FDIC should regularly and systematically review its emerging risk management needs to determine whether an investment in a more substantial risk infrastructure is warranted (Horizon 3).

Improving financial reporting – Horizon 1

To improve financial reporting and quickly strengthen the FRC estimates and processes, the FDIC should pursue three recommended sets of actions in Horizon 1: refine the CLR methodology; replace the 2-year Projection with a confidence interval around the CLR and a 2-year loss estimate; and adopt a set of new organizational practices for the FRC.

Recommendation 1.1: Refine the CLR methodology. The FRC can enhance the accuracy, robustness, and transparency of the CLR process by:

- ¶ Developing explicit guidelines about when to deviate from historical failure rates
- ¶ Constraining subjective deviations in failure rates to a 90-percent confidence interval of the 2-year historical average
- ¶ Incorporating liability and asset structure into loss-rate estimates (e.g., commercial loans, consumer loans, real estate, cash versus securities)
- ¶ Updating the Research Model with more recent data, and expanding it to incorporate institution size and dispositions other than liquidation.

These proposed changes would have improved the accuracy of the CLR over the most recent 5-year period for which data is available by more than 20 percent, and they are likely to yield similar results going forward.³ Other potential enhancements to the CLR, such as reserving for institutions with CAMELS ratings 1-3, do not offer material benefits in accuracy and are not recommended.

Recommendation 1.2: Replace the 2-year Projection with a confidence interval around the CLR and a 2-year loss estimate. To better meet the FDIC’s risk-reporting needs, the 2-year Projection should be replaced with a confidence interval around the CLR and a new 2-year loss estimate:

- ¶ The FDIC should no longer calculate the 2-year Projection. The three supporting models should be either maintained for estimating the CLR

³ Exhibit 1-4 depicts improvements in accuracy from such a transition.

(Pro Forma) or migrated to other uses (SAM). Models that do not have a specific, well-defined role in this new environment should be abandoned (e.g., possibly Proportional Hazards).

- ¶ In place of the 2-year Projection, the Division of Insurance and Research (DIR) should calculate a confidence interval around the CLR, and the Division of Finance (DOF) should use the upper end of this confidence interval as an estimate of “reasonably possible” losses in its annual financial statements (Note 6 to the FDIC’s 2002 Annual Report).
- ¶ DIR should create a 2-year loss estimate using methodology similar to that of the CLR and investigate the sensitivity of this method to changes in the reserve list.

Recommendation 1.3: Adopt a set of new FRC organizational practices. To create a more effective and efficient process for financial reporting, the FRC should adopt and implement:

- ¶ A clear mission statement to better guide the committee, its participants, and other stakeholders
- ¶ A FRC dashboard of needed risk metrics to standardize its view of critical risk factors and simplify risk monitoring
- ¶ Formal voting, attendance, and meeting procedures to enhance decision-making and accountability
- ¶ Formal and systematic feedback loops to strengthen analysis, transparency, and effectiveness on a continuous basis.

The FRC should pursue these recommendations aggressively over the next 90 days, to enhance the FDIC’s financial risk reporting as soon as possible. Collectively, the adoption of these recommendations will give the FDIC and its external stakeholders a significantly improved understanding of the risks it faces, while building important organizational momentum to move toward the modeling and organizational improvements envisioned for Horizon 2.

Building best-practice financial risk management – Horizon 2

While efforts are underway to improve financial reporting in Horizon 1, the FDIC should expand and enhance two current initiatives to move toward best-practice financial risk management at Horizon 2. First, it should accelerate ongoing efforts to improve and integrate its risk models; and second, it should continue the integration of its risk management groups into a high-performing risk organization.

Recommendation 2.1: Accelerate development of the new integrated model for financial risk management. With respect to risk models, the FDIC should move aggressively to develop an integrated model for financial risk management in the near- to mid-term. By combining and synthesizing models of bank failures, investment income, deposit growth, and premium income, such an integrated model will enable the FDIC to monitor and manage its overall financial risks (e.g., likelihood of exhausting the BIF over a given time horizon, likelihood of falling below the reserve ratio over a given time horizon). The outputs of this integrated model should be captured in user-friendly “dashboard” formats with appropriate detail for the NRC, RAC, and FRC to help focus the organization on a timely basis on risk metrics that are significant, relevant, and actionable within its current risk management environment. The benefits of an integrated model can be realized in as little as 12 to 18 months with adequate project planning.

- ¶ Specifically, by the end of 2003, DIR should build a working prototype of a new bank failure model (the “credit risk model”) based on an initial set of assumptions about failure rates, loss rates, and correlation structures, while employing basic simulation software. Work now underway with Robert Jarrow, an outside consultant, will play an important role in shaping the prototype’s architecture.
- ¶ Subsequently, the results should be back-tested and any discrepancies resolved to develop an intermediate version of the credit risk model suitable for use in operations. Component inputs should be updated and refined in this version (e.g., failure rates and correlation structures). The intermediate model should be used for 6 months to shadow the current CLR methodology before being adopted by mid-2004.
- ¶ An advanced version of the credit risk model with additional variables should be developed by December 2004. Once in place, it should be improved continuously, based on existing and new FDIC research focusing on correlation between failures. Additionally, the new credit risk model should be extended to project losses over multiple years.
- ¶ Simultaneous with the development of the credit risk model, DIR should develop auxiliary models of investment results, premium growth, and deposit growth. These models together with the credit risk model will form an integrated financial risk management model that will allow the FDIC to monitor and manage risk to the insurance funds more effectively. The integrated model, for example, will provide the ability to run simulations on the likelihood of falling below (within) the reserve ratio (range), or on the probability of suffering a loss of any given size.

Recommendation 2.2: Build a more integrated risk management organization.

An integrated financial risk model is an important step toward best practices in risk management, but it is not sufficient. It must be complemented with an effective risk management organizational environment to ensure that its full potential is realized. The FDIC recently has taken important steps toward creating such an environment. With the creation of the National Risk Committee and Risk Analysis Center in 2003, along with the FRC in 1998, it has established the necessary units to meet its risk management objectives. Now, for each unit to play its appropriate role effectively, the FDIC needs to clearly and formally define the mission, responsibilities, and outputs of each. To ensure continuous progress toward integrated risk management, these committees need strong feedback mechanisms, to focus more deliberately on measuring and improving their performance against the FDIC's risk-management objectives. Improvements can be made within each committee:

Strengthening the NRC. The NRC should clarify its role, enhance its outputs and operations, and build feedback mechanisms to drive continuous improvements:

- ¶ **Clarifying the NRC's role.** The NRC should forge a consensus across divisions and provide policy advice on cross-cutting issues (e.g., subprime lending), oversee the RAC and the FRC, and provide guidance to DIR and the RAC about needed research.
- ¶ **Enhancing the NRC's outputs and operations.** The NRC should produce a monthly risk-guidance report, create a "dashboard" of the most important risk indicators (e.g., probability of losses exceeding a critical threshold within the next year), and enlist executive support to ensure execution against its decisions. The risk guidance report should be submitted on a monthly basis to the Chairman's office, and on a quarterly basis to the Board.
- ¶ **Building feedback mechanisms.** The NRC should adopt feedback mechanisms to assess its progress and drive continuous performance improvements

Strengthening the RAC. The RAC should clarify its role, enhance its operations, and adopt formal feedback mechanisms:

- ¶ **Clarifying the RAC's role.** The RAC should produce a weekly risk-guidance report for the NRC, regularly assess the FDIC's offsite models, and organize occasional briefing sessions for supervisors.

- ¶ **Enhancing the RAC’s operations.** The RAC should develop a dashboard of key indicators that it will track regularly and reduce its afternoon meetings to one or two sessions per week
- ¶ **Building feedback mechanisms.** The RAC should adopt feedback mechanisms to assess its progress and drive continuous performance.

Expanding the FRC’s long-term mandate. The FRC should broaden its mission to include estimating the long-term financial health of the FDIC, for dissemination in public forums such as FDIC’s Annual Report.

Anticipating future needs – Horizon 3

The improvements of Horizons 1 and 2 will deliver substantial value to the FDIC and external stakeholders, but the FDIC will have the option to go even further. After achieving Horizon 2, the FDIC may want to implement Horizon 3 capabilities like real-time risk management, programs for hedging or reinsurance, and the ability to carry out rapid scenario analyses. While none of these Horizon 3 capabilities is necessary now, each is likely to become more attractive over time. Accordingly, the FDIC should actively monitor its risk profile to determine whether or when to move to Horizon 3 tools and approaches. In addition, as integrated risk approaches become more common at the FDIC, it may eventually make sense to create a Chief Risk Officer position to support the NRC, RAC, and FRC.

- ¶ **Recommendation 3.1: Annually assess whether to move to Horizon 3.** Because moving to real-time risk management requires a significant investments to upgrade the organization’s IT and skills, the FDIC will need to monitor the results of its improvements in Horizons 1 and 2 to determine whether the benefits of moving to Horizon 3 outweigh the costs.

* * *

The three chapters that follow provide a detailed discussion of each recommendation.

Improving Financial Reporting – Horizon 1

The FDIC’s Financial Risk Committee is responsible for determining the FDIC’s reserves for failing depository institutions. The primary financial reporting outputs of the FRC are the Contingent Loss Reserve and the 2-year Projection of failed-bank assets. The CLR is the FRC’s estimate of the FDIC’s probable losses attributable to failures of FDIC-insured institutions in the coming 12 months while the 2-year Projection is an estimate of the assets of all FDIC-insured institutions whose failure is reasonably possible in the coming 24 months. The FRC reports these estimates at the end of each quarter, and they are incorporated into the FDIC’s annual report at the end of each calendar year. The CLR appears as a distinct entry in the financial statements; the 2-year Projection is used in a footnote to those statements and in FDIC deliberations regarding the level of semi-annual premiums necessary to maintain the funds at or above the reserve ratio.

There are three primary ways in which the FRC’s estimates and processes can be improved. First, the CLR methodology should be refined to: 1) place bounds on the subjectivity exercised by the FRC in establishing failure rate estimates, and 2) incorporate balance sheet composition into loss rate estimates. These refinements will enhance the accuracy, robustness, and transparency of the CLR estimate. Second, the 2-year Projection should be replaced with: 1) a confidence interval around the CLR; and 2) a 2-year loss figure based on the CLR methodology. These substitute methodologies will provide a better assessment of “reasonably possible” losses, the primary role of the 2-year Projection today. Lastly, a new set of FRC organizational practices should be adopted to ensure that the participants have the best available information to answer the most-important questions that the FRC faces in setting reserves for its financial reports.

FRC should pursue these enhancements aggressively over the next 90 days. Effectively implemented, these improvements will measurably increase the accuracy of the CLR, provide additional, meaningful measures of risk for the FDIC, and focus resources on the most important issues for the FRC. More broadly, implementing these changes will build organizational momentum for continuous migration to more sophisticated risk management. Each of the recommendations is described in more detail below.

RECOMMENDATION 1.1: REFINE THE CONTINGENT LOSS RESERVE METHODOLOGY

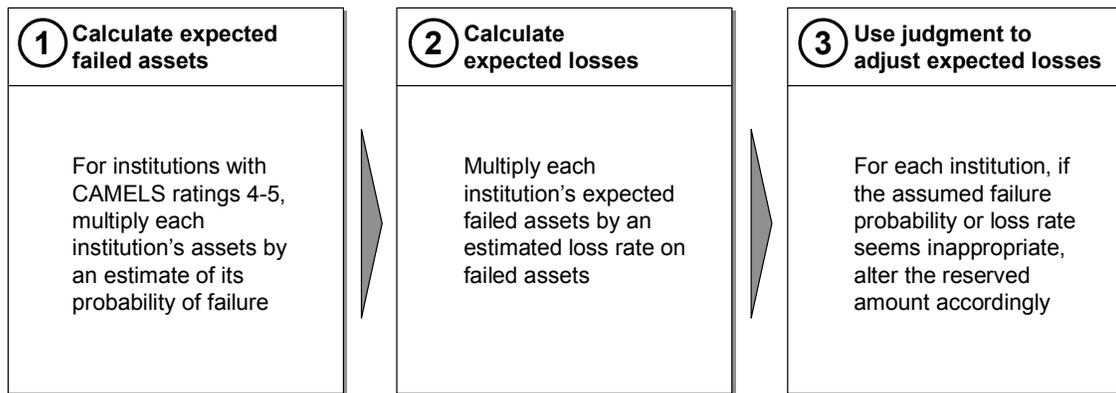
The CLR formula produces an output that is subject to review and alteration by the FRC, at its discretion. The accuracy, robustness, and transparency of the CLR stem from both the formula and any subjective deviation from it. To improve the performance of the CLR along these dimensions, the FRC should adopt changes to the CLR formula and bounds to the FRC’s subjectivity. This is explained in greater detail below, beginning with a description of how the CLR is calculated.

How the CLR is calculated

The CLR is the FDIC’s reserve for “probable and estimable” losses from the failure of FDIC-insured institutions over the following 12 months. In any given year, typically only a few of the roughly 8,500 insured institutions fail, and in most cases the FDIC’s losses are only a fraction of the insured deposits held by the failed institution. As such, the CLR hinges on FRC’s estimates of the probability that institutions will fail and the losses the FDIC will incur if they do. In particular, the CLR is based on a three-step process outlined in Exhibit 1-1.

Exhibit 1-1

THE THREE-STEP CLR METHODOLOGY



Source: FDIC; McKinsey analysis

The first step in the CLR calculation is to calculate expected failed assets. This calculation begins with a list of institutions that are at heightened risk of failure,

which the FRC measures using the institutions' composite CAMELS ratings.⁴ For institutions with CAMELS ratings 4-5 (the lowest ratings), the FRC calculates 2-year historical failure rates for institutions with similar ratings and capital adequacy (described below). For institutions whose failure is imminent,⁵ called the "100-percent failure" group, the formula uses a 100-percent failure probability. The FRC multiplies these failure probabilities by the institutions' assets to yield expected failed assets.

The second step in the CLR calculation is to translate expected failed assets into the FDIC's expected losses. The FRC multiplies the expected failed assets of each institution by an estimated loss rate on those assets, where loss rates are derived from historical experience, 1987 through the present, for institutions of similar size.⁶

The final step in the CLR calculations is to alter the result of the formula according to the judgment of the FRC. The FRC may adjust the failure probabilities used in Step 1, the loss rates used in Step 2, or the individual reserve for any given institution. In determining whether to deviate from the CLR formula, the FRC generally considers the current economic climate, input from the DSC on likely failure probabilities, an alternative loss-rate model, and loss estimates prepared by the DRR based on asset valuation reviews or cost-test analyses.

Performance of the CLR

The ideal CLR would be accurate, robust in reflecting changes in economic and financial conditions, and based on a methodology that was transparent to all stakeholders. Accuracy is an objective criterion that can be measured arithmetically; e.g., by calculating the mean squared error between the CLR and the FDIC's actual losses over time.⁷ Robustness refers to the ability of the

⁴ A CAMELS rating is a supervisory estimate of the safety and soundness of a depository institution. Each letter of CAMELS corresponds to a dimension considered by the supervisor. C is for capital adequacy; A is for asset quality; M is for management capabilities; E is for earnings quality and quantity; L is for liquidity; and S is for the sensitivity to market risk. Each dimension is scored one to five, with one being the best rating. The supervisor determines the overall, or composite, rating based on the six component ratings, and composite ratings also range from one to five; 1-rated institutions are deemed to be the safest, and they have in fact historically been much less likely to fail.

⁵ This determination is based on either the Division of Resolution and Receiverships' (DRR) scheduled closing date for the institution, the classification of the institution as "critically undercapitalized," or the Division of Supervision and Consumer Protection (DSC) identification of the institution as an imminent failure.

⁶ For each of five size groups, the FRC estimates the loss rate as the dollar amount of the FDIC's losses from failures in that size group divided by the sum of all the assets of institutions in that size group. This amounts to an average loss rate, weighted by each institution's size by assets.

⁷ Mean squared error (MSE) is the predominant measure of goodness of fit in statistics. When the MSE of a set of estimates is low, then the estimates are accurate, and an MSE of zero corresponds to a perfect fit. To calculate MSE, square the difference (error) between each estimate and its corresponding historical value, and then average these

methodology to respond to changing future conditions, rather than merely explaining what has happened before. Transparency is a function of both the method itself and how that method is applied. Simple methods applied without exception will generally be more transparent than complex methods with wide latitude for exceptions. The CLR can be improved on each dimension: accuracy, robustness, and transparency.

1. Each of the three steps in the CLR methodology (Exhibit 1-1) introduces errors that decrease the accuracy of the CLR.

In Step 1, the FDIC does not reserve for “unanticipated” failures, i.e., for failures of institutions with CAMELS ratings of 1-3, so any failure by such an institution leads to inaccuracy in the CLR. In 1990-2000, 18 percent of the FDIC’s losses from failed institutions were unanticipated, and the average annual loss from such failures was \$238 million. Reserving nothing for these failures tends to make the CLR underestimate actual losses in most years, although other types of errors described below may have offsetting effects.⁸

There are also errors in estimated failure probabilities for those institutions that are included in the calculations. The FRC forms estimates of failure probabilities for each of four risk groups based on CAMELS ratings and capital adequacy. The institutions are first divided into those with CAMELS ratings 4 or 5. These two groups are further divided into those projected to have capital above or below 2 percent of assets in 12 months’ time.⁹

The FRC’s estimated failure probability for each of these four groups is the average annual failure rate for institutions in that group over the prior two years, weighted by each institution’s assets. This methodology is subject to two types of inaccuracy: differences in failure probabilities between institutions within each risk group and changes in failure probabilities over time.

Institutions within each risk group may have different failure probabilities. For example, in the 1990-2000 interval, the annual failure rate for CAMELS 4 institutions with less than 2 percent capital (the “4-minus” group) was 0.051 percent, but within that group, the failure rate for the largest half of institutions, by

squares. By squaring the errors in this way, all errors are stated as positive numbers (the square of a negative is a positive), and large errors are penalized disproportionately ($4^2=16$ is more than twice as large as $2^2=4$).

⁸ As discussed later in this report, no analytically sound solution exists in Horizon 1 for correcting the inaccuracy introduced by not reserving for CAMELS 1, 2, and 3 institutions.

⁹ DIR forecasts an institution’s capital using the FDIC’s Pro Forma Model (Pro Forma), which simulates the future financial condition of the institution based on its current financial condition. For example, if the institution’s current income is not sufficient to cover its expenses, then it must be depleting capital to make up the difference, so Pro Forma forecasts that its capital will decline.

assets, was 0.090 percent, while that for the smallest half was 0.046 percent – a statistically significant difference. If these historical failure rates were accurate, rather than being random and anomalous, then the CLR method introduced inaccuracies by assuming the average failure rate for both halves of the 4-minus group. Specifically, 0.051 percent was too small a failure probability for the largest institutions and too large a failure probability for the smallest institutions. While such within-group differences no doubt exist and contribute to errors in the current CLR methodology, the magnitudes of such errors are difficult to quantify.

The second potential source of inaccuracy in the FRC's historical failure-probability estimates stems from changes in failure rates over time. Such changes can result from pure randomness (e.g., failure from fraud or poor corporate governance) or from changes in the characteristics of institutions within each risk group (e.g., capital degradation of every institution in the 4-minus group due to a change in the economic climate). These two effects combine to cause failure rates to differ substantially from year to year. For example, the failure rate of the 4-minus group was 0.052 percent in 1990-1994, but it fell to 0.045 percent in 1995-2000. Accordingly, using historical failure rates in 1995 would likely have led to overestimates of failures.

In general, any historical moving average, or “look-back period,” for failure rates will underestimate failure probabilities during a period of unusually high failure rates, since the look-back will estimate failure probabilities based on earlier experience, and similarly overestimate failure probabilities after the temporarily high failure rates have subsided, since the look-back will incorporate high failure rates that will have since passed.

There are additional costs to accuracy in Step 2 of the CLR calculation, when converting estimated failed assets into estimated losses. As described above, FRC uses losses from 1987 onwards to form estimates of loss rates for institutions based on their size, by assets, for five different size ranges. As with failure rates, there are two primary sources of error in these historical estimates of loss rates: differences in loss rates within any given size group and changes in loss rates over time.

Obviously, not all institutions of a given size will cause the same loss if they fail. For example, the asset composition of an institution will influence the FDIC's loss rates, with almost no losses realized on liquid assets like securities and substantial losses on less-liquid assets like commercial loans. This means that institutions of the same size often have predictably different loss rates, whereas the current CLR methodology assumes that those loss rates are the same.

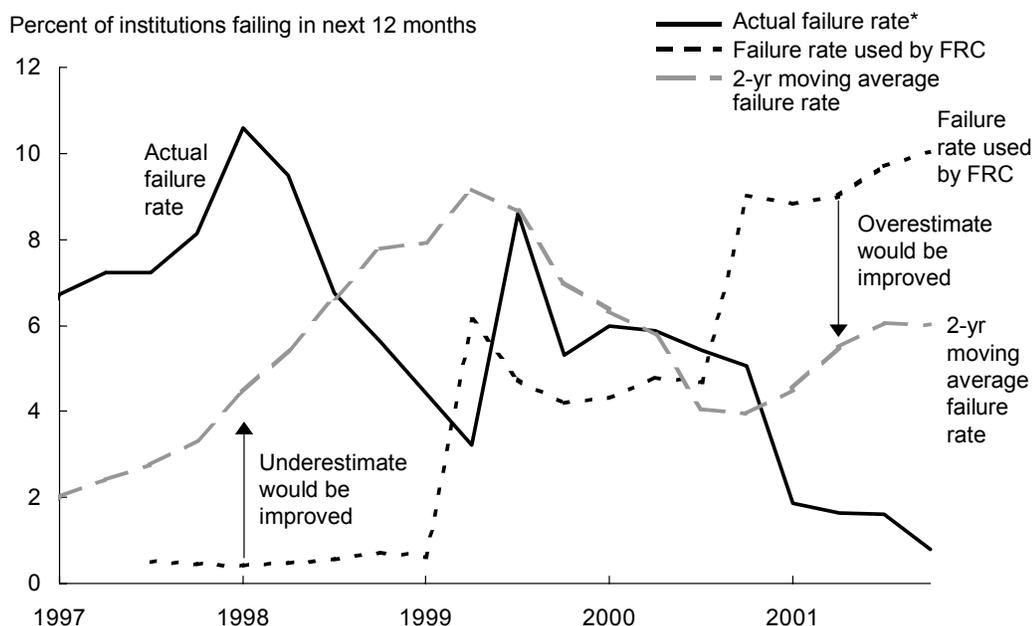
The other source of error in loss rates stems from changes in loss rates over time. Loss rates depend on a number of factors that are likely to change from one year to

the next, such as prevailing market conditions, the prevailing cause of failures, and the credit quality of the assets being liquidated. For example, the average loss rate for institutions with assets \$100 million to \$500 million was 17 percent for 1990-1994, but it was 27 percent for 1995-2000. Since the CLR uses average loss rates from 1987 to the present (23 percent in this size band), the CLR's loss estimates in the late 1990s incorporated the lower loss rates from the early 1990s, leading to reserves that were erroneously low for institutions in this size group.

The desire to have accurate and up-to-date loss rates must be traded off against the statistical challenges of estimating loss rates based on very few failures. In the example above, if the loss rate had been estimated with more-recent failures rather than those in the early 1990s, then the loss-rate estimate would have been based on just a handful of failures, so it would have been vulnerable to unusual failures that did not reflect prevailing conditions.

The final source of inaccuracy in the CLR comes in Step 3, when the FRC exercises its judgment in determining whether to deviate from the historical failure- and loss-rate estimates. In practice, this has led to wide departures from the historical estimates for failure rates (Exhibit 1-2). Loss rates are rarely overridden by the FRC.

COMPARISON OF FAILURE RATES



* Average failure rate over the 5 "buckets" (e.g., CAMELS 4 with more than 2% capital), weighted by the number of institutions in each bucket in the given quarter

Source: FDIC; McKinsey analysis

In all but two quarters from 1997 to 2001, the 2-year historical failure rate was closer to the actual failure rate than was the failure probability used by the FRC. As such, the subjectivity exercised by the FRC in setting failure probabilities has in general decreased the accuracy of the CLR.

2. Each of the three steps in the CLR methodology (Exhibit 1-1) affects the robustness of the CLR.

In Step 1 of the CLR methodology, the groupings for failure rates are based on CAMELS ratings and capital forecasts. Both of these criteria are fairly robust to changes in conditions. CAMELS ratings represent the best and most current knowledge of supervisors and are flexible enough to reflect new and emerging concerns. For example, if a new and risky lending practice emerged in the banking industry, then supervisors can incorporate the impact of that practice in the CAMELS ratings, especially as it affects asset quality and capital.

Likewise, capital is likely to remain a fundamental component of an institution's soundness, irrespective of innovations in the industry, so it is a robust measure of

probability of failure, even on a lagged accounting basis. In this area, the only lack of robustness may come from how capital is forecast, since the dynamics of balance sheets can change with industry practices, and the FDIC's Pro Forma Model may miss such changes.

In Step 2, the FRC's current loss-rate methodology is not robust, because the typical asset profile of the banking industry varies over time. For example, the 1990s saw rapid increases in the prevalence of syndicated loans, subprime lending, and credit derivatives. Since different assets have different loss rates, a robust CLR would adapt to introductions of new asset classes. The current CLR methodology does not, since it assumes that loss rates vary based only on the size of an institution, not on its asset composition.

Finally, in Step 3, the FRC may use its judgment to override the historical failure and loss rates used in the CLR calculations. Failure rates are overridden routinely, loss rates only infrequently. In theory this flexibility enhances the robustness of the CLR, since the FRC is composed of representatives from four divisions of the FDIC, with extensive experience and access to the most accurate and current information about possible losses from failures. As such, the FRC participants as a group are in a better position than anyone else to know whether the historical failure and loss rates may be inappropriate for the coming year. However, as described above, the robustness derived from this discretion comes at the expense of accuracy, since subjective deviations from historical failure and loss rates have usually enlarged CLR errors.

3. The formulaic part of the CLR methodology (Steps 1 and 2) is transparent, but subjective deviations from the formula (Step 3) are not.

The most transparent methodology would be simple and applied uniformly. The FDIC's current methodology is quite simple: it reserves for failing institutions and those with CAMELS ratings 4 and 5, based on the failure rates for the past 2 years and average loss rates for similar-sized institutions since 1987, unless the FRC judges that such historical estimates would be inappropriate going forward.

On the other hand, the discretion that FRC exercises to override historical failure and loss rates detracts from the transparency of the CLR. The FRC can deviate from the historical estimates for a variety of reasons.¹⁰ This latitude leaves room for outsiders to speculate about whether the CLR has been modified or adjusted for other than purely reporting purposes.

¹⁰ The FRC must document and explain any failure rate deviations in a written memorandum to the FDIC's CFO and the Division of Finance's Deputy Director responsible for the FDIC's financial statements.

Specifics of Recommendation 1.1 (Refining the CLR methodology)

The FRC can improve the accuracy, robustness, and transparency of its CLR methodology by adopting the following eight recommendations. The first three relate to bounding the FRC's subjectivity in estimating failure probabilities, while the remaining four explain how the FRC should use more information from institutions' balance sheets in estimating loss rates. The FRC and DIR should implement all of the recommendations during the next 3 months.

1.1.a. The FRC should develop explicit guidelines about when it will deviate from historical failure rates. The current CLR methodology uses a 2-year look-back for estimating failure probabilities. This period was chosen to minimize the mean-squared error of the CLR relative to other possible look-back windows, enhancing the overall accuracy of the CLR. Nevertheless, the FRC has often used its broad discretion to depart from the 2-year failure rates and substitute its own estimates of expected failure rates not strictly grounded in historical experience. Although well-intended, these deviations typically have increased the error in the CLR.

Developing explicit guidelines governing when to deviate from the 2-year look-back will help the FRC adhere more often to historical failure rates and guide DIR's ongoing research into anticipating future failure rates. Preliminary analysis suggests that historical failure rates may be too low when high-yield bond default rates have recently increased, vacancy rates in commercial real estate are increasing, or subprime lending makes up a larger-than-average fraction of assets for institutions on the reserve list. Making this research and FRC's deviation guidelines public would enhance the transparency of the CLR while maintaining its robustness.

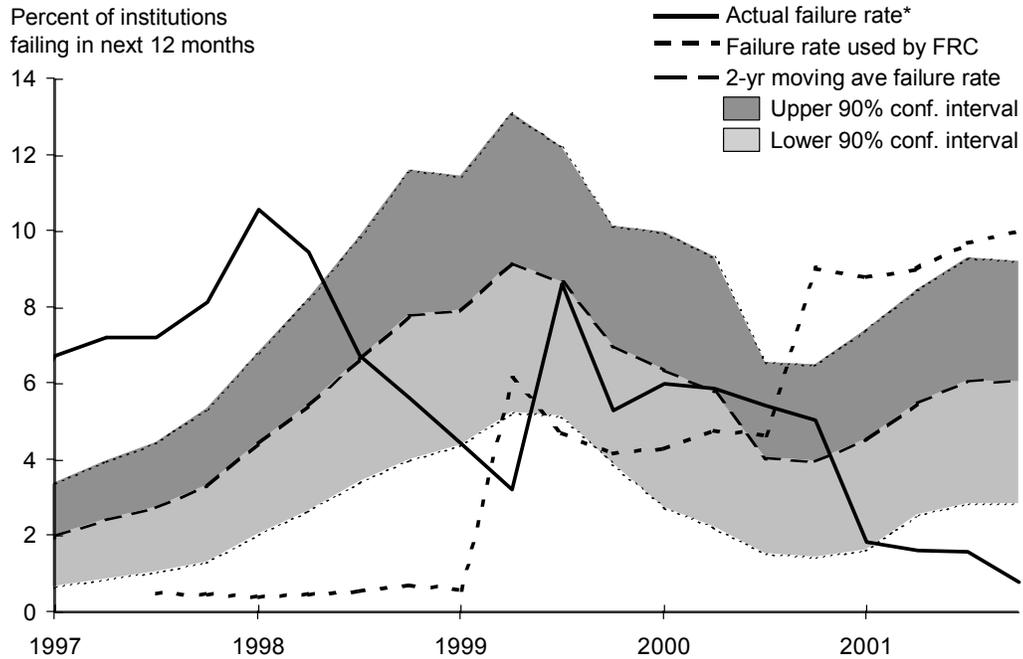
1.1.b. When estimating failure probabilities, the FRC should constrain itself to a 90-percent confidence interval of the 2-year historical average.¹¹ This recommendation would allow the FRC to apply judgment while limiting its scope, and thereby likely increase both the accuracy and robustness of the CLR. As Exhibit 1-3 shows, restricting the FRC's discretion to the 90 percent confidence interval would have improved the accuracy of the FRC's failure-probability

¹¹ Within each risk bucket (e.g., 4-minus), there were a given number of failures (X) and a given number of institutions (Y) over the prior 2 years. The historical failure rate (F) is the ratio of the two (X/Y). This ratio is a binomial random variable with well-understood statistical properties, making it possible to construct a confidence interval for the true 2-year failure rate. Specifically, Y is almost always greater than 30, so the distribution of the true 2-year failure rate can be closely approximated by a normal random variable with mean F and variance $S = [(F)(1-F)/Y]^{1/2}$. The 90-percent confidence interval for the true failure rate is then $F \pm (1.96)(S)$.

estimates in all but one quarter since 1997. The net impact is depicted in Exhibit 1-4, which shows the improved accuracy (approximately 23 percent over the 5-year period shown) that bounding subjectivity confers to the CLR.¹²

Exhibit 1-3

BOUNDING THE FRC'S SUBJECTIVITY



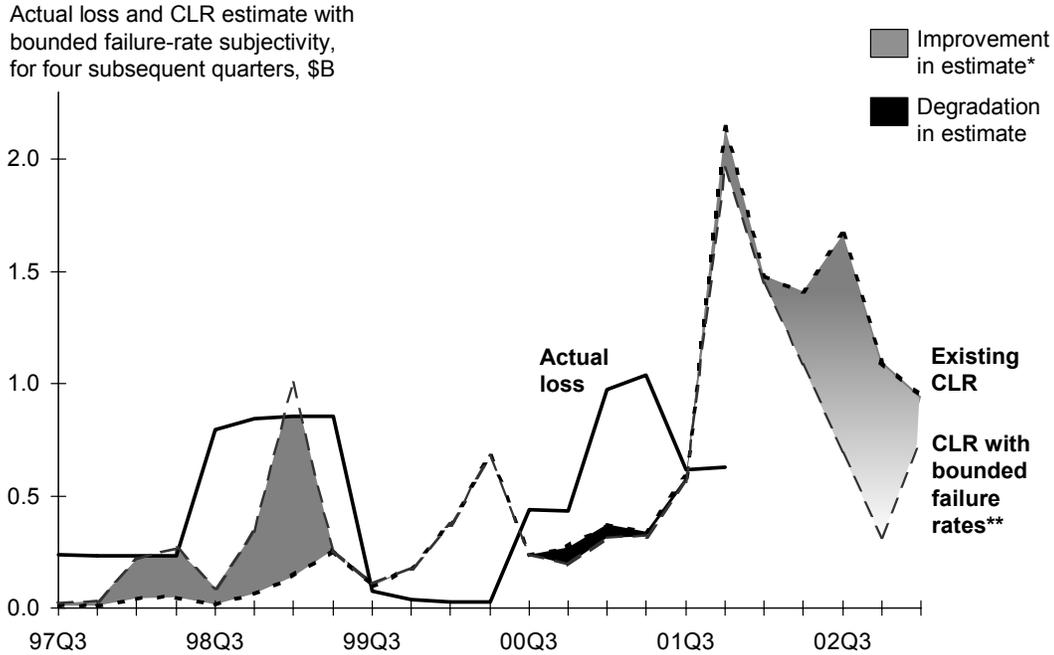
* Average failure rate over the 5 "buckets" (e.g., CAMELS 4 with more than 2% capital), weighted by the number of institutions in each bucket in the given quarter

Note: Actual failure rate and 2-year moving average failure rate are not weighted for institution size.

Source: FDIC; McKinsey analysis

¹² We recommend using unweighted averages in calculating historical failure rates, and we have done so in our analysis. The current FRC methodology determines historical failure rates using an asset-weighted average.

NET IMPROVEMENT TO THE CLR



* Lighter shading starting in 01Q4 indicates probable improvements
 ** Before any subjective override the FRC may make to account for new information about specific institutions
 Source: McKinsey analysis

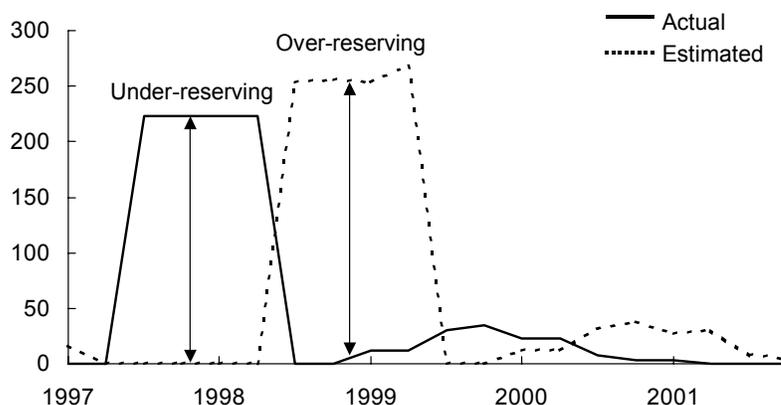
1.1.c. The FRC should continue not to reserve for unanticipated failures.

Although institutions with composite CAMELS ratings 1-3 represent a substantial fraction of failures, losses from these failures do not appear to be “probable and reasonably estimable” in any given year, since the annual loss is usually either zero or a large amount. Reserving based on an historical moving average of past unanticipated losses, regardless of the length of the look-back, would decrease the accuracy of the CLR¹³ because it would result in under-reserving at the time of an unanticipated loss and over-reserving after the loss has occurred (Exhibit 1-5). However, this topic warrants further study, especially if the FDIC begins to experience more than a couple of failures of institutions rated 1-3 in each year.

¹³ For example, the mean squared error would be higher.

THE CHALLENGE OF RESERVING FOR UNANTICIPATED FAILURES

Actual versus estimated* loss in coming year, for institutions rated CAMELS 1-3, \$M



* One-year moving average of actual quarterly losses

Source: FDIC RIS data; McKinsey analysis

1.1.d. The FRC should use the FDIC's Research Model for loss-rate estimates.

FRC's current CLR methodology takes no explicit account of liability structure in estimating loss rates. Any loss in asset values is considered a loss to the FDIC. In reality, however, the shareholders and creditors of the failed institution share in these losses, in order of their seniority. Because the Research Model specifically accounts for institutional liability structures, it is a better model of the FDIC's expected losses given failure.

1.1.e. DIR should update the Research Model with more recent data. In current form, the Research Model does not offer a material improvement in accuracy over the existing approach to estimating loss rates, but its accuracy can be improved. The research model was last updated based on data for 1990-97. More recent data almost certainly better reflect current conditions, so additional years of data should be included. Furthermore, DIR should investigate whether loss rates in the early 1990s are still applicable, and if not, DIR should drop those earlier observations from its loss-rate estimates.

1.1.f. DIR should expand the Research Model to incorporate institution size.

The current CLR methodology recognizes a strong inverse relationship between institution size and loss rate given failure, assigning a loss rate to the smallest institutions that is three times the rate of very large institutions (24 percent versus 8 percent). Asset size is likely to retain predictive power even when controlling for asset composition, because larger institutions tend to have better internal controls, and because the FDIC often enjoys economies of scale in disposing of larger

institutions. It follows that the overall predictive power of the asset-composition-based Research Model is likely to be enhanced with the addition of a variable representing institution size, and the FRC should explore this possibility. For reasons of sample size, it may be advisable to restrict the analysis to two size categories, large and small.

1.1.g. DIR should expand the Research Model to account for dispositions other than liquidation. The FDIC often is able to dispose of an institution, or part of it, via a Purchase and Assumption (P&A) transaction that captures some of the franchise value and avoids some liquidation costs. By ignoring these kinds of transactions, the current Research Model is biased toward overstating actual losses from failures. Although issues of availability and scope of historical data present analytical obstacles, DIR should thoroughly study the feasibility of expanding the Research Model to account for dispositions other than liquidation.

RECOMMENDATION 1.2: REPLACE THE 2-YEAR PROJECTION WITH A CONFIDENCE INTERVAL AROUND THE CLR AND A 2-YEAR LOSS ESTIMATE

The 2-year Projection of failed bank assets is the FDIC's estimate of the sum of the assets of all FDIC-insured institutions whose failure is reasonably possible in the coming 24 months. Compared with the CLR, the 2-year Projection provides a slightly longer-term perspective and a somewhat weaker threshold for the likelihood of failure. Until recently, its use was twofold: as a key component of the semi-annual rate case, and as a basis for a footnote to the Annual Report describing "reasonably probable" losses to the deposit insurance funds. Today, it is used only for the latter purpose.

The methodology of the 2-year Projection could be improved, but it is fundamentally not the best estimate for FDIC's needs, and it should be replaced. The first step in this reasoning is to explain how the 2-year Projection is calculated.

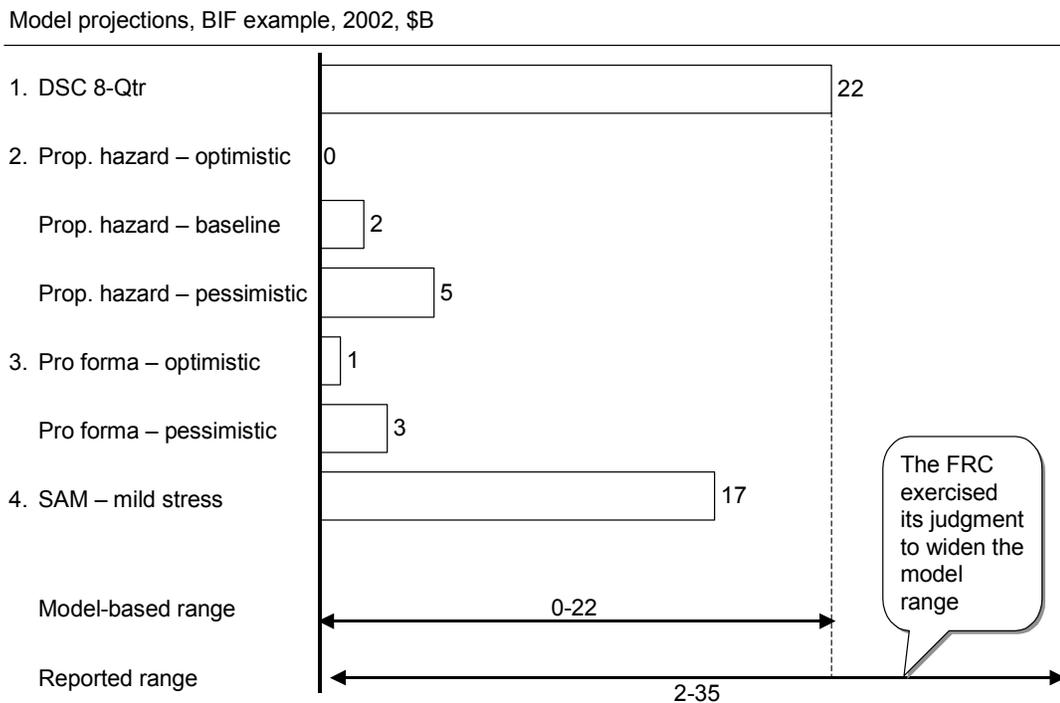
How the 2-year Projection is calculated

The 2-year Projection is based on the DSC's 8-Quarter List and three DIR models, with six different scenarios between them. Each of these seven inputs (DSC's list and six model scenarios) yields a list of institutions expected to fail in the coming 2 years, which in turn yields seven estimates of the sum of 2-year failed-bank assets.

The FRC creates a “model range” as the band between the largest and smallest of these seven estimates. The FRC participants then use their judgment to determine whether that range should be altered, for example by raising the upper end of the range. It is this modified range, the “reported range,” that the FRC disseminates to the rest of the FDIC and that is used in the FDIC’s annual report. As depicted in Exhibit 1-6, the current model range for BIF-insured institutions is \$0 to \$22 billion, and the FRC currently has raised and widened its reported range, to \$2 billion to \$35 billion.

Exhibit 1-6

CONSTRUCTING THE 2-YEAR PROJECTION



Source: FDIC; McKinsey analysis

The seven input estimates of failed-bank assets are derived from the DSC 8-Quarter List and three DIR models. Those models are the Pro Forma Model, the Stress Analysis Model (SAM), and the Proportional Hazards and Logistic Model (treated here as a single model, the “PH Model”).

DSC’s 8-Quarter List contains the FDIC’s best supervisory assessment of which institutions are likely to fail in the coming 24 months, along with the quarter of

expected failure. An institution is put on the list whenever supervisors judge its likelihood of failure to be more than 50 percent.

The Pro Forma Model was discussed above. This model provides fairly straightforward forecasts of the balance sheets of depository institutions. It uses accounting ratios and rules to estimate an institution's future financial condition based on its current financial condition. For the 2-year Projection, Pro Forma is run in two different scenarios: "Optimistic" and "Pessimistic." The primary difference between the two scenarios is in their assumptions about the share of an institution's assets that are non-performing. In either scenario, an institution is projected to fail if the Pro Forma forecast of the institution's capital falls below two percent of its assets.

SAM, like Pro Forma, is a balance-sheet simulation model, but SAM incorporates additional financial data and has more-sophisticated rules about how balance sheets evolve. Furthermore, SAM has 14 parameters (e.g., loan charge-off rates) that are calibrated to fit historical data. Like Pro Forma, SAM projects that an institution will fail whenever its capital falls below 2 percent of assets.

The PH Model is based on a set of statistical regressions about the causes and timing of failures of depository institutions. Specifically, it uses a logistic regression to estimate the probability that an institution will fail, based on nine measures of its current condition. These variables range from CAMELS ratings to the change in its capital over time. For the 2-year Projection, the PH Model is run in three different scenarios: "Optimistic," "Baseline," and "Pessimistic," where the optimistic and pessimistic scenarios are 90 percent confidence bounds around the baseline scenario. In each case, the PH Model reports an institution as expected to fail whenever the failure probability from the regressions is above 50 percent.

Performance of the 2-year Projection

The performance of the 2-year Projection should be measured based on how the estimate is actually used. The 2-year Projection is referred to in the Rate Case and is an input to a DOF calculation that is reported in Note 6 of the FDIC's Annual Report. In crafting Note 6, the Division of Finance uses the upper end of the reported range (\$35 billion for the BIF example), multiplies by an assumed 20 percent loss rate on assets ($\$35 \text{ billion} \times 0.2 = \7 billion) and subtracts the current CLR ($\$7 \text{ billion} - \$1 \text{ billion} = \$6 \text{ billion}$). The result is explained as follows:

“Due to the uncertainty surrounding future economic and market conditions, there are other banks for which the risk of failure is less certain, but still

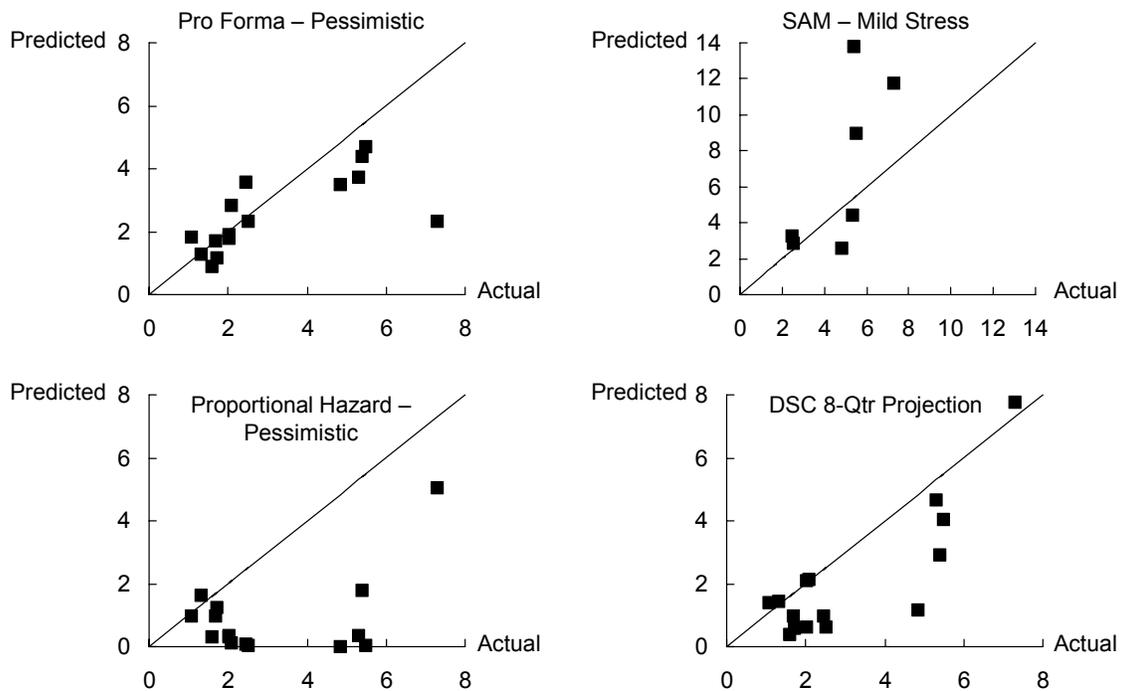
considered reasonably possible. Should these banks fail, the BIF could incur additional estimated losses up to \$6.0 billion.”¹⁴

The 2-year Projection and the calculations described above are not an ideal way to arrive at “possible” losses over and above the CLR, for three reasons. First, the seven input estimates are not equally valid measures of possible losses, and using the largest of them takes no account of the meaningful information contained in the others. As depicted in Exhibit 1-7, all the input estimates except SAM generally underestimate actual losses, so they would be poor estimates of the FDIC’s downside risk. Second, the 1-year loss estimate in Note 6 is derived from a longer, 2-year estimate. Third, the current method for arriving at Note 6 assumes a flat 20 percent loss rate on failed assets, while average loss rates are typically lower and depend on an institution’s size, asset composition, and liability structure.

Exhibit 1-7

PREDICTIVE POWER OF INPUT MODELS TO 2-YEAR PROJECTION

Assets in failing depository institutions in subsequent 2 years, 1997-2001, \$B



Note: Scale for SAM – Mild Stress differs from other three scatter plots
Source: FDIC; McKinsey analysis

¹⁴ FDIC 2002 Annual Report, at 51.

Specifics of Recommendation 1.2 (Replacing the 2-year Projection)

Since the 2-year Projection is not well suited to the FDIC's needs, the FRC should not expend its limited resources improving the estimate. Instead, the 2-year Projection should be abandoned, and two better-suited estimates calculated in its place.

1.2.a. The FDIC should no longer calculate the 2-year Projection. The 2-year Projection should be replaced with two other estimates, detailed below, that will better serve FDIC's needs.

1.2.b. DIR should decide whether to keep, revise, or eliminate the three models supporting the 2-year Projection:

- ¶ **DIR should keep the Pro Forma model as it is today.** That model is inexpensive to maintain and is used appropriately in the risk groupings for the CLR calculations.
- ¶ **SAM would be better suited to offsite monitoring and should be migrated to that use.** SAM is a useful research model and shows promise as a tool to screen for at-risk institutions that deserve further attention, which is precisely the objective of offsite models.
- ¶ **The PH Model should be abandoned.** The statistical methods that it uses have some merit, but those methods can and should be implemented afresh with the new credit risk model that DIR is developing as its next-generation risk management model (described in the second chapter). While the methods embodied should be retained in this manner, the model itself should be abandoned as a vehicle for supporting risk reporting requirements.¹⁵

1.2.c. DIR should calculate a confidence interval around the CLR, and DOF should use the upper end of this confidence interval in Note 6 to the FDIC's annual report. There are two stated objectives in Note 6 of the FDIC's annual report. The first is to report losses that are "probable and reasonably estimable." This is met by the CLR itself. The second objective is to report additional losses that are "possible." A confidence interval about the CLR would be the natural basis for such possible losses. For example, suppose the CLR was \$1 billion and the

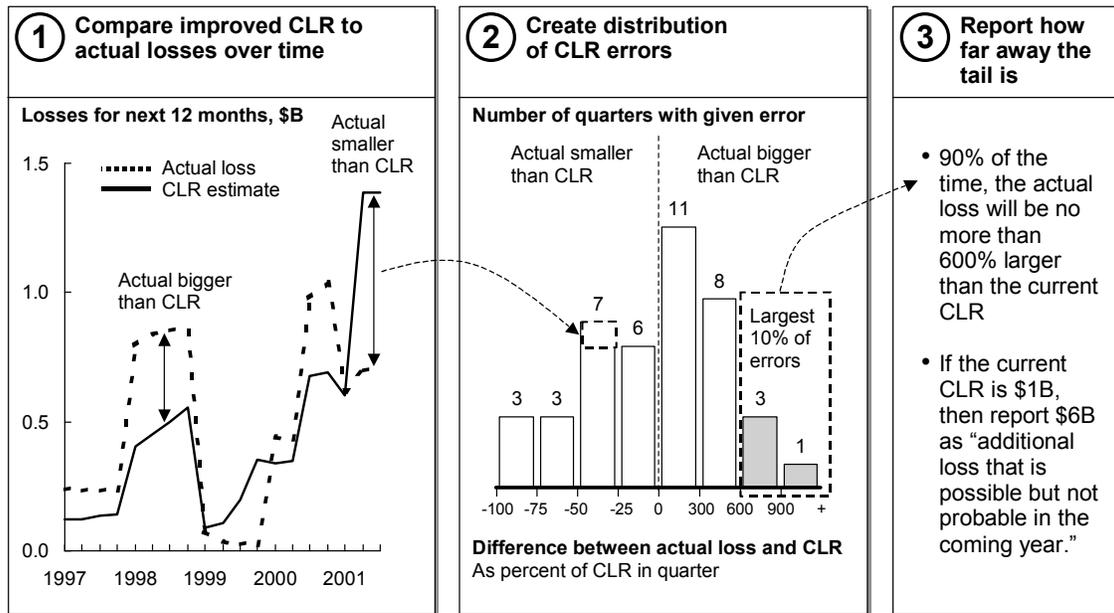
¹⁵ This model and others may well have value in other contexts, but a decision by DIR to retain such models should hinge on an explicit identification of what those contexts may be and a clear description of what corresponding value the models will create.

upper 90 percent confidence bound for the CLR was \$7 billion. Then 90 percent of the time the true 1-year loss would be less than \$7 billion, so DOF would report \$6 billion (\$7 billion less the \$1 billion CLR) as possible additional losses.

There are a variety of ways to calculate a confidence interval around the CLR. The simplest and most robust method would be to track the differences between the CLR and the FDIC’s actual losses over time. Sometimes the CLR will be very close to the actual loss. Other times, the CLR and actual losses will diverge. The distribution of these errors gives a sense for how likely it is for the actual loss to be far from the reported CLR. Exhibit 1-8 depicts this methodology in more detail.

Exhibit 1-8

CREATING A CONFIDENCE INTERVAL FOR THE CLR



Source: FDIC; McKinsey analysis

The first step in creating such a confidence interval will be for DIR to compute pro forma CLR’s for as far back as possible, e.g., to 1990, using the revised methodology described in the previous section. DIR should then tabulate the distribution of errors between this CLR and the FDIC’s actual losses over that time

period.¹⁶ This computation would then form the basis for a robust confidence interval around the CLR going forward.

1.2.d. DIR should create a 2-year loss estimate using methodology similar to that of the CLR. The calculations will be identical to those of the CLR, but using 2-year rather than 1-year failure rates. Such an estimate can be used to inform the internal budgetary planning process, the semi-annual rate assessment, and/or other organizational processes that may benefit from an extended loss outlook.

1.2.e. DIR should investigate the sensitivity of such a 2-year loss estimate to changes in the reserve list. Since the CLR methodology estimates losses only for institutions with current CAMELS ratings of 4 and 5, the proposed 2-year loss estimate would not account for failures that were unanticipated a full two years in advance. As such, it may be necessary to adjust the proposed 2-year loss estimate upward to account for institutions that may have their CAMELS ratings downgraded from 1-to-3 to 4-to-5 after the first year.

RECOMMENDATION 1.3: ADOPT A SET OF NEW FRC ORGANIZATIONAL PRACTICES

The antecedent of the FRC was the FDIC’s Failure Projection Working Group, an informal, interdivisional forum for discussing various failure-projection models and their implications for the FDIC. This working group developed initial contacts and working relationships between divisions at a time when the FDIC had what one participant described as a “stove-pipe culture.”¹⁷ The FDIC culture of the time and the evolving composition and objectives of the working group warranted an informal, open, and flexible process.

In 1998, the FDIC converted the working group into the Financial Risk Committee. Most of the FRC’s organizational processes and practices were inherited from the informal working group rather than being deliberately chosen, so the FRC’s processes are generally informal. These processes are described and assessed below.

¹⁶ The methodology in Exhibit 1-9 assumes that the distribution of errors in percentage terms does not depend on the level of the CLR, e.g., that the FRC is just as likely to be 10 percent off when the CLR is \$1 billion as when it is \$1 million. In statistical terms, Exhibit 1-9 assumes that the errors are homoskedastic, when in fact they may be heteroskedastic. After calculating a larger set of historical errors (e.g., by back-testing the CLR to 1990), DIR should explore whether there is a systematic relationship between the level of the CLR and the size of the error. If such differences exist, DIR should control for them, either by a) creating error distributions for CLRs in different size bands or b) using statistics to fit a functional relationship between the variance of the error and the level of the CLR (e.g., the variance of the errors might be a linear function of the CLR).

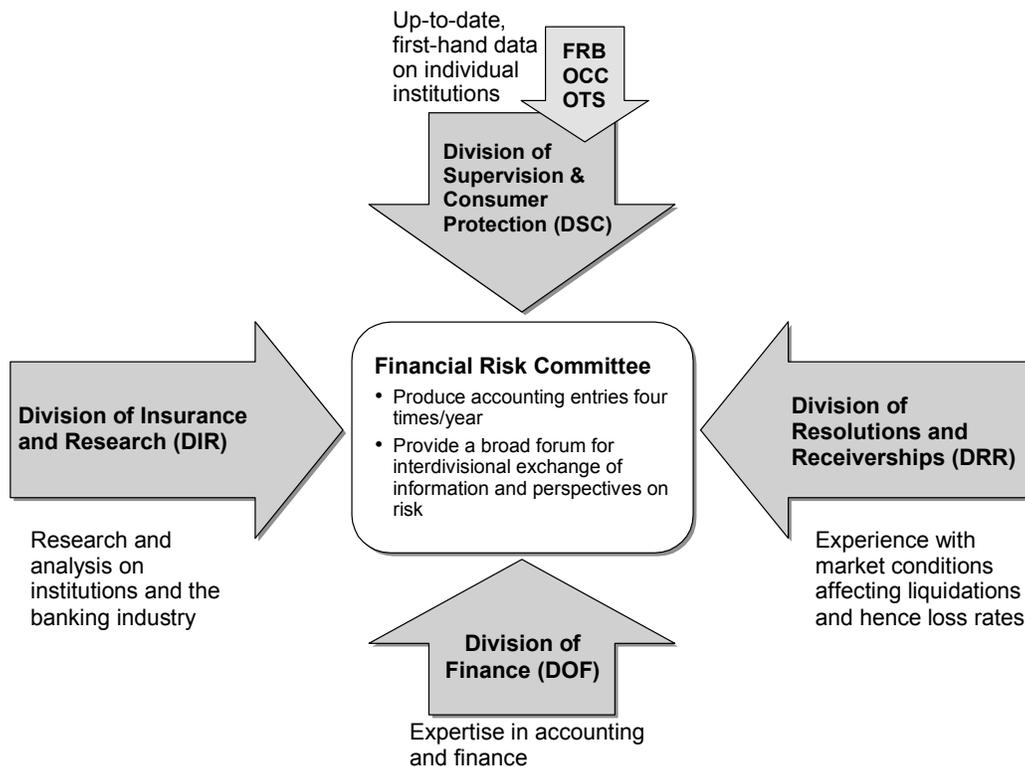
¹⁷ Interview with original participant in the FDIC’s Failure Projection Working Group.

The current FRC organization and process

The FRC is tasked with determining reserves the FDIC should set aside for depository institutions that may fail. The FRC obtains the most accurate, current, and complete information by bringing together a wide group of constituencies, from within and outside the FDIC (Exhibit 1-9). The primary participants of the FRC are four divisions – DIR, DSC, DRR, and DOF – each of which is represented by one to three “FRC principals,” numbering eight in total. The FRC also formally receives input from the Office of the Comptroller of the Currency (OCC), the Federal Reserve Board (FRB), and the Office of Thrift Supervision (OTS).

Exhibit 1-9

FDIC CONSTITUENCIES REPRESENTED ON THE FRC



The FRC operates on a quarterly cycle for two reasons. First, much of the analysis is based on data in Call Reports and Thrift Financial Reports that depository institutions file quarterly. Second, the FRC is tasked with computing the CLR, which is included in the FDIC’s quarterly financial results.

Each quarter, the FRC process begins when DIR finishes entering the Call Report data into its databases and cleaning the data to remove errors. This clean data is

generally available 2 months after the start of each quarter. In the next 3 weeks, DIR and DSC calculate the input estimates (e.g., the Pro Forma Model) and compile background materials that the FRC will consider. In the last week of the quarter, the FRC holds a preliminary meeting with other federal bank regulators and a final meeting to decide on the CLR and 2-year Projection.

Calculating estimates and compiling materials. In the last month of each quarter, DIR continuously updates the reserve list,¹⁸ which is the basis for the CLR calculations. As described above, DIR runs the Pro Forma Model to project which of these institutions will have capital above and below two percent of assets after one year. DIR then gathers these results into a spreadsheet to compute the CLR estimate according to the established CLR methodology. At the same time, DIR personnel run the three models that provide inputs into the 2-year Projection of failed-bank assets, and DSC compiles its 8-Quarter list based on its supervisory assessments.

All these results are disseminated to FRC participants along with various other reports that speak to the health of insured institutions. These reports typically consist of: DSC's Quarterly Lending Alert, DSC's report on the Real Estate Stress Test (REST) Model, DSC's report on the Statistical CAMELS Offsite Rating (SCOR) Model, DIR's Market Trends Report, a report from DIR comparing the CLR for the quarter using the Research Model to the CLR as calculated under the prevailing methodology, DIR's CAMELS Migration report, DSC's report on Large Insured Depository Institutions (LIDI), and DIR's Risk Case. Altogether these materials comprise 60 to 100 pages, with a 2- to 4-page summary up front.

Preliminary FRC meeting. At the beginning of the last week of each quarter, the FRC principals meet with representatives from the OCC, FRB, and OTS. The purpose of this "preliminary FRC meeting" is to gather supervisory perspective on insured institutions for which failure is reasonably possible. The other federal bank agencies provide information on the majority of insured institutions that FDIC does not supervise. During this meeting, the FRC principals are briefed on the most important at-risk institutions, and the FDIC's reserve list is updated to reflect any recent status changes (e.g., changes in CAMELS ratings).

Final FRC meeting. In the final 1 to 3 days of each quarter, the FRC principals and some of their supporting staff meet for the "FRC decision meeting" at which the group decides on the CLR and 2-year Projection of failed-bank assets. Typical attendance at these meetings is 25 to 30 people. Discussion is informal and open to

¹⁸ Institutions with CAMELS ratings 4 to 5, and those designated as certain failures.

all. At the end of the meeting, the group comes to a consensus about the CLR and 2-year Projection, and these decisions are reported formally to DOF within 1 day.

Performance of the FRC process

The remainder of this section assesses the FRC's organization and processes on nine dimensions. It scores well for using the most current information and for fostering constructive interdivisional debate. On the remaining seven dimensions, the FRC lacks formal processes and procedures that could make it more efficient.

- ¶ **Purpose.** All the FRC participants understand that the primary purpose of the FRC is to produce the CLR and 2-year Projection, but there is less clarity about what would constitute improvements to these estimates. For example, the trade-off between accuracy and smoothing volatility is not well understood.¹⁹ Furthermore, there is an outstanding issue about whether the FRC should report additional measures of the financial risks faced by the FDIC.
- ¶ **Pace and frequency.** FRC processes are compressed into the final few days of each quarter. That compression is largely dictated by data availability (which takes the first 8 weeks of the quarter) and reporting needs (which requires an output by the end of the quarter).
- ¶ **Preparation and materials.** The briefing materials distributed in advance are comprehensive, but they typically are too voluminous for the participants to read in the short time available before the FRC meeting. There is a summary memo, but it does not digest the materials into an easy-to-read “dashboard” of key indicators. Additionally, some of the backup material is unnecessary.
- ¶ **Participants.** The FRC meetings are essentially open to all who are interested, so the process is inclusive, fosters interdivisional contacts, and incorporates the best information from all parts of the FDIC. However typical attendance is 25 to 30, and this large size distracts from key issues and dampens meaningful discussion.
- ¶ **Procedures.** There are few formal procedures at FRC meetings. This allows substantial flexibility and fosters a collegial atmosphere, but it also leads to inefficiencies. For example, some participants do not know who is to present what material, leading to costly delays. More

¹⁹ For example, by making the estimates correct on average (i.e., unbiased) or correct more often (e.g., with smaller mean squared error).

importantly, the consensus-driven approach sometimes makes it difficult for the FRC to come to a decision in a timely manner.

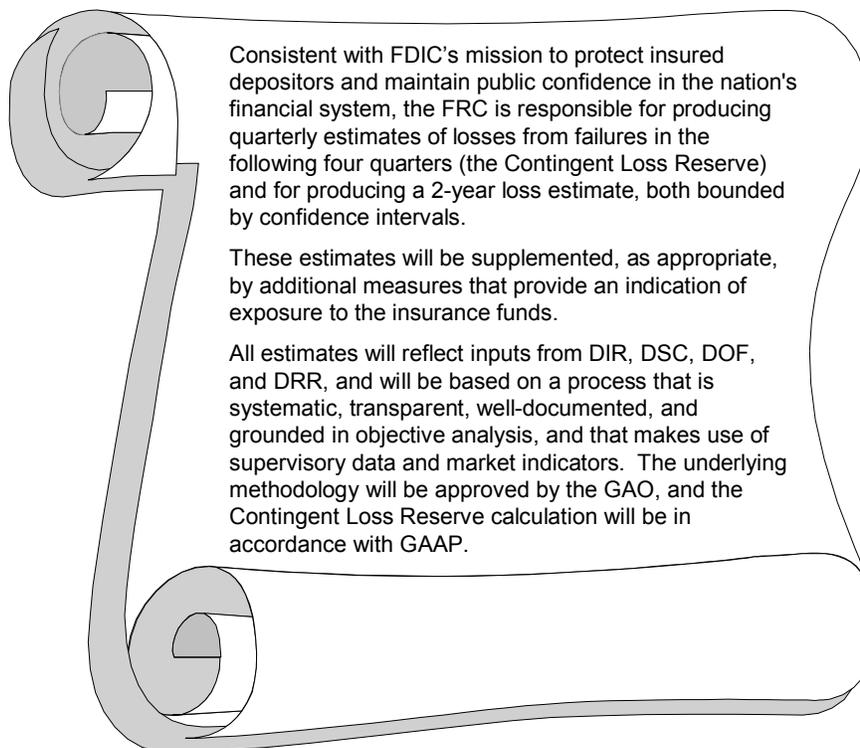
- ¶ **Feedback loops.** DIR recently instituted a 360-degree review of the FRC, which produced meaningful insights about FRC methodologies and procedures, but there are no systematic feedback loops in place to continuously measure the FRC's progress and guide future improvement efforts.
- ¶ **Support systems and documentation.** The briefing materials are created by hand and distributed as hard copies. No central, electronic repository exists for these briefing materials or for the detailed minutes taken at each FRC meeting.
- ¶ **Currency of information.** The FRC relies on a variety of information to reach decisions about reserves, some of which changes daily (e.g., the status of recently downgraded institutions). The preliminary FRC meeting injects the most recent information into the FRC process, but that meeting occurs just a few days before the final meeting, which does not allow FRC participants much time for deliberation.
- ¶ **Culture.** The FRC has succeeded in breaking down divisional barriers, with joint problem solving, constructive criticism, and vigorous debate common.

Specifics of Recommendation 1.3 (Adopting a new set of FRC organizational practices)

The FRC will become more efficient if it adds some formal procedures and processes. At the next FRC meeting, the FRC principals should adopt the recommendations listed below. None of the proposals requires substantial effort to implement, so they can be implemented immediately.

1.3.a. *The FRC should adopt a clear mission statement.* The example in Exhibit 1-10 will help to clarify the activities and objectives of the FRC participants and steer their efforts toward a common goal, particularly regarding any mandate for the FRC beyond computing the CLR and 2-year Projection.

EXAMPLE FRC MISSION STATEMENT



1.3.b. The FRC should create a standardized meeting agenda and distribute it well in advance. Discussions at FRC meetings would be more focused if the group worked from a detailed agenda that listed discussion topics (e.g., names of particular institutions), along with a designated discussion leader for each item. To ensure that all FRC principals can adequately prepare for these discussions, this agenda should be distributed one week in advance.

1.3.c. The FRC should create standardized, synthesized briefing materials and distribute them well in advance. The first page of the briefing materials should be a “FRC dashboard” depicting the most essential facts and statistics for FRC principals to consider (Exhibit 1-11). Immediately thereafter, DIR should include a synthesized memorandum interpreting what the FRC dashboard and any other relevant information imply for the FRC’s decisions at the coming meeting. The remaining briefing materials should include only those items that are relevant to specific decisions that the FRC will make. For example, if the FRC will discuss whether to reserve less for a particular institution, then the specifics of that institution should be included. If the FRC will discuss whether to deviate from

historical failure rates, then materials on leading indicators of failure rates would be appropriate. All these materials should be distributed at least 2 business days in advance.

Exhibit 1-11

SAMPLE FRC DASHBOARD AT HORIZON 1

	Current	Prior	Change*	Limit
Projections				
• CLR 1 year	\$1.0b	\$2.0b	50%	25%
• Confidence interval (90%)	\$1.0b	\$1.0b	0%	25%
• CLR 2 years	\$3.0b	\$3.0b	0%	25%
• Confidence interval (90%)	\$2.0b	\$2.0b	0%	25%
Realized results				
• Insurance losses (LTM)	\$1.50b	\$0.5b	300%	25%
• Related CLR	\$1.0b	\$0.75b	NA	NA
• CLR error	33%	300%	NA	NA
Banking credit information				
• CAMELS (re-rated banks)	2.6	2.90	10%	5%
• σ ** CAMELS (re-rated banks)	1.5	1.0	50%	5%
• Average Default Probability, KMV, top-20 money center	0.01	0.005	100%	10%
FDIC information				
• BIF (net of CLR)	\$39b	\$40b	2.5%	5%
• BIF Ins. Dep.	\$3,000b	\$3,000b	0%	2%
• BIF Ratio	1.33%	1.33%	0%	10%
• SAIF (net of CLR)	\$2.0b	\$2.0b	0%	33%
• SAIF Ins. Dep	\$100b	\$100b	0%	2%
• SAIF Ratio	2.0%	2.0%	0%	33%
Largest contributors to reserve				
• Big Bank 1	\$.1b	\$.05	100%	25%
• Big Bank 2	\$.1b	\$.1b	0%	25%
• Big Bank 3	\$.05b	\$.05b	0%	25%
• Big Bank 4	\$.03b	\$.03b	0%	25%
• Big Bank 5	\$.05b	\$.05b	0%	25%

* Exceptions and over limit conditions indicated in bold

** Standard deviation

1.3.d. The FRC should limit attendance at its meetings. Attendance at the FRC decision meetings should be restricted to the eight FRC principals and one to two supporting participants per division. The presence of five FRC principals (or their designees) will constitute a quorum. To streamline discussions, FRC principals should discourage other participants from speaking unless recognized by the chair.

1.3.e. A chairperson should be formally designated to manage FRC meetings. A formal chairperson would increase efficiency of FRC meetings by keeping discussions on point and managing the group's decision-making. DIR's Deputy Director of Financial Risk Management and Research should formally chair each FRC meeting.

1.3.f. The FRC should come to each decision by a vote of the FRC principals. A formal process for reaching decisions would help the committee to restrict its

attention to areas of genuine uncertainty and disagreement. As such, for each needed decision, the FRC chairperson should call for a quick voice vote by the FRC principals in attendance, with the chairperson casting the deciding vote if necessary.

1.3.g. *The FRC should set thresholds for when it will discuss whether to override the CLR reserve for a given institution.* One way to focus deliberations would be to decide on override criteria in advance. For example, the FRC should set thresholds that will automatically put an institution on an “override list.” The FRC would discuss each institution and vote on whether to deviate from the failure rate or loss rate applied to that institution under the CLR formula. The FRC should set such thresholds based on institution size (e.g., any institution with over \$750 million in assets) and the amount of reserves under the CLR formula (e.g., the 10 institutions with the largest reserve amounts). The FRC may elect to discuss additional institutions that are nominated by FRC members because of unique characteristics (e.g., an institution whose franchise value is so large that its loss rate will likely be zero). In discussing overrides for failure rates, DSC has the most relevant information, so it should lead the discussion and take primary responsibility for informing the group. DRR should do the same for loss rates.

1.3.h. *The FRC should institute formal and systematic feedback loops to assess and improve its performance.* On a regular basis (e.g., March and September) DIR should provide the FRC with a brief assessment of the performance and development of the FDIC’s reserve models (e.g., the CLR methodology, the Credit Risk Model, etc.). Based on these briefings, the FRC should convey to DIR what additional improvements would most benefit the FRC. In addition, the FRC should regularly (e.g., June and December) look back on any of its departures from the CLR methodology (e.g., altering failure probabilities within the 90 percent confidence interval) to determine whether, in retrospect, those departures improved the accuracy of the FRC’s reserving decisions.

1.3.i. *The FRC should decide systematically on next steps.* At the end of each FRC meeting, the group should discuss and approve a set of next steps, focusing on unresolved issues that warrant further investigation and action before the next FRC meeting. The FRC Chair should take the lead role to ensure the required execution prior to the next meeting.

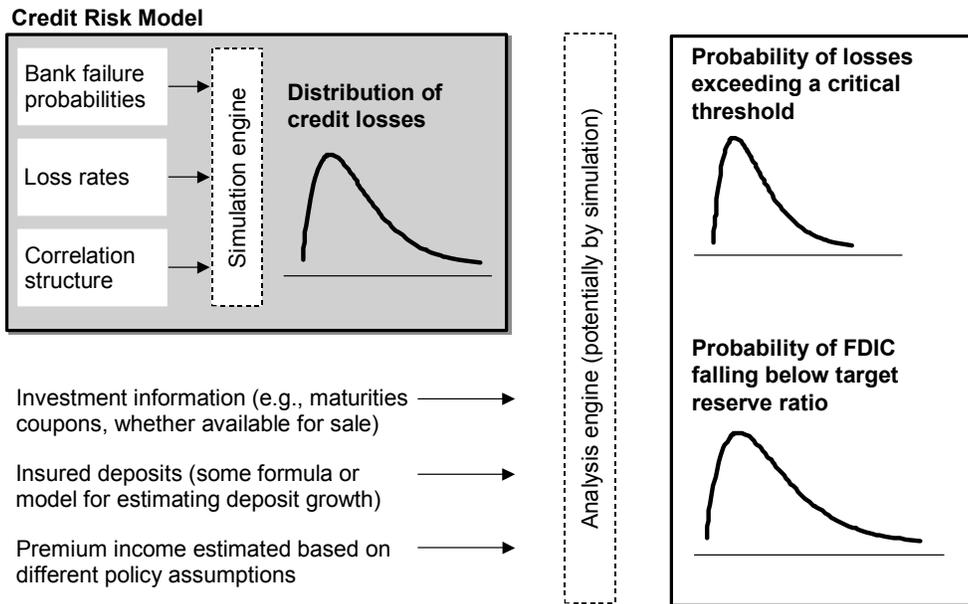
Building Best-Practice Financial Risk Management – Horizon 2

While efforts are underway to improve financial reporting in Horizon 1, the FDIC should continue to move toward best practices in risk management more broadly in Horizon 2. In particular, it should accelerate development of its new integrated model for financial risk management and strengthen its risk organization and processes, focusing primarily on the NRC, RAC, and FRC.

RECOMMENDATION 2.1 – ACCELERATE DEVELOPMENT OF THE NEW INTEGRATED MODEL FOR FINANCIAL RISK MANAGEMENT

To reach best practice risk management techniques over the next 12 to 18 months, the FDIC should aggressively develop an integrated model for financial risk management (Exhibit 2-1). By combining and synthesizing models of bank failures, investment income, deposit growth, and premium income, such an integrated model will enable the FDIC to monitor and manage its overall financial risks (e.g., declines in the deposit-to-reserve ratio). The outputs of this integrated model should be captured in user-friendly “dashboard” formats with appropriate detail for the NRC, RAC, and FRC. These dashboards, detailed below, will help focus the organization on a timely basis on risk metrics that are significant, relevant, and actionable within its current risk management environment.

RISK MODEL CONCEPT AND METHODOLOGY AT HORIZON 2



The most important component of the FDIC’s integrated model will be its model of projected losses from bank failures. DIR is currently beginning development of a credit risk model for this purpose. This will be a sophisticated and flexible econometric model that will generate a loss distribution – the likelihood of experiencing any given insurance loss over a particular time horizon – based on a simulation engine and a set of assumptions about failure probabilities, loss rates, and correlation structures. The credit risk model will also provide the ability to run a broad range of scenario and ‘what if’ analyses quickly and easily without extensive human intervention, capabilities that can facilitate resource planning and allocation across the organization. DIR has already committed some initial resources to developing its credit risk model. As detailed below, these efforts should be accelerated and expanded over the next 18 months.

In order to complete its integrated model of financial risk management, the FDIC will need to complement the credit risk model with additional models of investment income, deposit growth, and premium income. These three auxiliary models should be developed and refined in parallel. Once all four pieces are in place, the

integrated model will give a comprehensive picture of the FDIC's overall risks, allowing it to manage and mitigate those risks in the future.

The credit risk model concept

A credit risk model is a method of producing a statistically valid distribution of credit losses over various time horizons. In FDIC's case, such a model should incorporate four essential elements:

- ¶ A statistical model of the **probability of failure** for individual institutions. The FDIC should develop a state-of-the-art econometric model that estimates bank failure probabilities on a per bank basis using CAMELS ratings, pertinent financial metrics drawn from Call Report data (e.g., capital ratios), and relevant market data (e.g., bond yield spreads and equity volatility).
- ¶ A statistical model of **loss given failure** for individual institution. The model should incorporate institution size, asset composition (e.g., cash, securities, consumer loans, commercial loans), liability structure (e.g., quantity of insured deposits), and speed of deterioration of the institution.
- ¶ A **correlation structure** reflecting the relationships between bank failures, as such events are not truly independent. A deterioration of consumer credit, for example, is likely to cause subprime institutions as a group to face an increased chance of failure. An understanding of how and to what extent the fortunes of particular groupings of banks are correlated is crucial for accurately estimating the likelihood of the most severe systemic outcomes (i.e., the tail of the distribution), itself a critical component of scenario analysis.
- ¶ A rigorous Monte Carlo-based **simulation engine** to integrate these three components into a distribution of credit losses over any given time period. The simulation engine must be capable of handling correlations of arbitrary complexity, in a reasonable amount of time, with a workable user interface, and thorough integration into FDIC IT infrastructure.

Specifics of Recommendation 2.1 (Accelerate development of the integrated model)

DIR has in place plans to develop a basic credit risk model to replace the CLR and 2-year failed-asset models. These plans represent a significant first step toward

Horizon 2, and this effort should be accelerated and expanded into the full-blown credit risk model, such as that described above. The FDIC should develop the credit risk model in three phases over the next 18 months: A working prototype by the end of 2003, an “intermediate” model by June 2004, and an “advanced” model by December 2004. The FDIC should simultaneously develop the three auxiliary models of investment income, deposit growth, and premium income.

2.1.a. DIR should build a working prototype capable of generating a basic loss distribution by December 2003. Although the tails of the resulting distribution will contain limited information due to the need to employ a basic correlation structure at this stage, the prototype will demonstrate the feasibility of the model and serve as a platform for future improvements. Failure probabilities should be based on an implementation of the work now being performed through collaboration between the FDIC and Robert Jarrow, an economics professor at Cornell University, but extended to include CAMELS ratings as a variable. (The ongoing work is aimed at developing estimates of failure probabilities using market and Call Report data.) Loss rates should be derived not from the current methodology but from the Research Model, as revised and recalibrated in Horizon 1 and extended to cover not only institutions on the problem list (i.e., those rated CAMELS 4 or 5, and failing institutions) but all banks. A simple correlation structure that includes a limited degree of bucketing (e.g., up to 25 categories) should be employed. Similarly, the simulation engine should be basic – either an inexpensive off-the-shelf solution or an in-house approach (e.g., built with SAS or MATLAB). The ongoing work with Professor Jarrow is relevant to all of these components, and should enable a working prototype to be created in 90 days with only a modest shift of existing DIR staff and within the existing DIR budget.

2.1.b. DIR should develop an intermediate credit risk model to replace the current CLR methodology by June 2004. The prototype will need to be back-tested, and any obvious problems resolved to develop an intermediate model suitable for use in operations. Integrated and flexible, the intermediate model will combine updated approaches to failure probabilities, loss rates, and the other components into a single architecture with an enhanced user interface and convenient report-generation capability. The integrated model will provide a greatly enhanced ability to conduct “what if” analyses through its use of more-sophisticated correlation structures, while the associated loss distributions – the tails in particular – will provide additional insight into risks to the insurance funds. The model should be used for several months to shadow the current CLR methodology before being adopted for that use by June 2004.

Within the model itself, failure probabilities should represent an extension of those used in the prototype, with additional testing and calibration to more systematically incorporate market-based offerings such as KMV for public institutions and RiskCalc for private institutions. Loss rates should be refined to incorporate institution size as a variable.

The limited correlation structure used by the prototype should be expanded to include multiple scenarios and refined to incorporate additional data. A more sophisticated correlation structure could, for example, shed light on how proposed consumer-bankruptcy legislation would affect the likelihood of subprime lenders failing as a group. Another possible correlation structure might reflect the possible progression of a liquidity crisis through the banking sector and how that might impact failure probabilities. These efforts to improve the model's correlation structures will require both statistical analysis (e.g., examining historical data for potential relationships between depository institutions) and qualitative, forward-looking analysis of potential future correlations.

Even with these improvements, enhanced credit loss distributions will not be assured without a more robust simulation engine. The increasing need to run simulations frequently and the "curse of dimensionality" (i.e., the size of the problem increases exponentially with the number of correlations) will require a solution more sophisticated than the ad hoc simulation engine crafted out of SAS, MATLAB, or similar software for the prototype. The FDIC should purchase an advanced commercial Monte Carlo simulation package or build a similarly capable simulation program in-house.

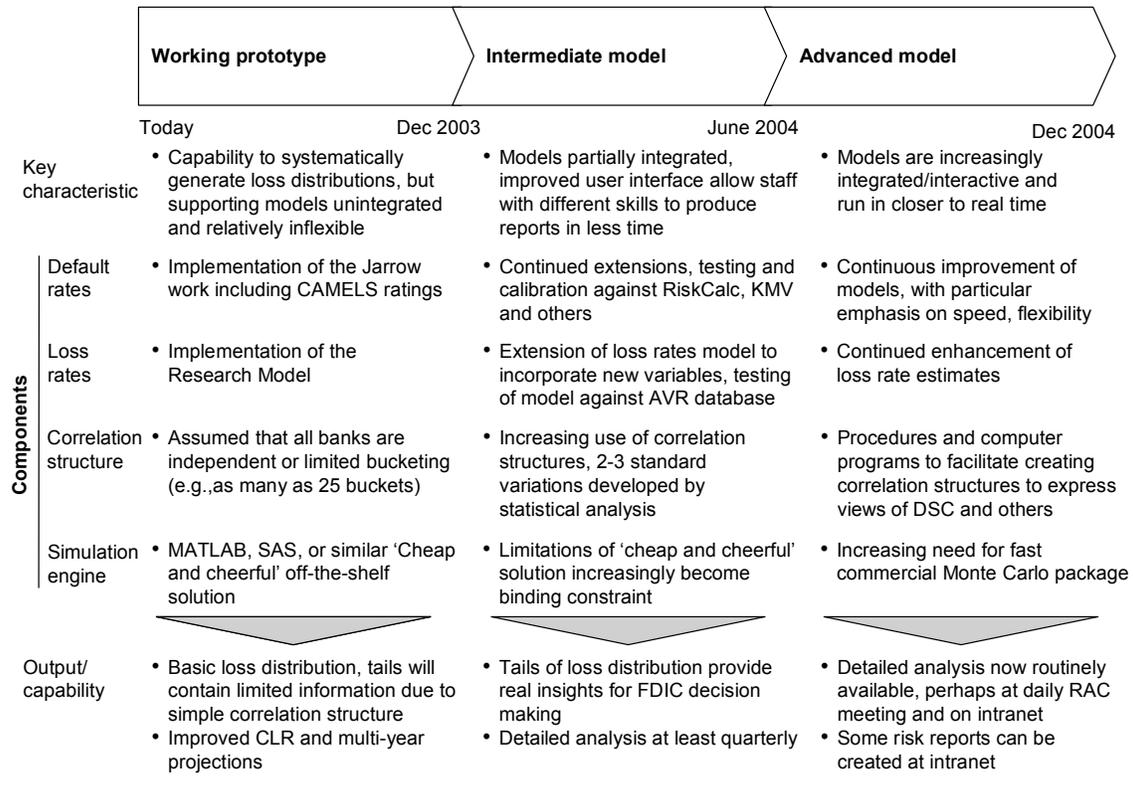
2.1.c. By December 2004, DIR should develop and adopt an advanced credit risk model capable of reliably estimating loss distributions over multiple years. Once firmly established as the basis for estimating necessary one-year reserves (the CLR), the intermediate model should be updated with new and ongoing FDIC research into model inputs, such as the impact of region and size on correlations among bank failure probabilities. Loss rates similarly should be refined to add new variables, such as the rate at which an institution deteriorates and its asset-to-liability ratio. Also, the model should be extended to project losses over multiple years.

Pursuing this coordinated three-phased approach to the development of a credit risk model will require a considerable degree of project management and planning that may strain DIR's existing organizational structure. DIR should create a risk management modeling group, with detailed work schedules and regular progress review meetings, to ensure the delivery and continuous improvement of the various models used in Horizon 2. Much as Exhibit 2-2 presents a high-level summary of

the credit risk model schedule, detailed supporting schedules should be created for each of the model components. In addition, the risk management modeling group should be charged with conducting further research into available outside solutions – not as replacements for internal products, but as additional benchmarks for the FDIC’s own work on an ongoing basis in the future.

Exhibit 2-2

DEVELOPING THE CREDIT RISK MODEL



2.1.d. Simultaneous to the development of the credit risk model, DIR should develop auxiliary models of investment results, premium growth, and deposit growth. While the credit risk model will be the most difficult and complex component to deliver, other risk management metrics will be required to produce a fully integrated risk model. Although these are simpler problems, they will nonetheless require specific efforts. These efforts will allow the FDIC to generate simulations beyond the credit risk model’s loss distributions, to include the probability of falling below (within) the designated reserve ratio (range), as well as the probability of losses exceeding a critical threshold level of the funds. These two probabilities represent the core risk metrics that the FDIC should monitor on a regular basis.

Further, the resulting models should be coordinated with the credit risk modeling effort. Specific, action-oriented plans should be developed by the credit risk modeling group to ensure model compatibility and to help overcome what are likely to be challenging issues of implementation.

The contemplated frequency of risk reporting, and increased use of scenario analysis in Horizon 2 will create increased demands on DIR. The division should assume that one FTE would be dedicated to report production by year-end 2003 and possibly two to three FTEs by the end of 2004. The greater the investment in building robust, user-friendly systems, the less the need for dedicated report production staff.

RECOMMENDATION 2.2 – BUILD A MORE INTEGRATED RISK MANAGEMENT ORGANIZATION

Fully integrated risk management allows an organization to optimize risk mitigation with focused effort, clear accountabilities, and an appropriate division of labor. All parts of the organization work together systematically to detect, understand, and mitigate every risk. The organization quickly adapts to its changing environment and continuously improves by regularly measuring performance and implementing targeted changes.

This kind of integrated risk management is an appropriate aspiration for the FDIC. Indeed, risk management is at the heart of the FDIC's self-stated mission:

“The FDIC promotes the safety and soundness of insured depository institutions and the U.S. financial system by identifying, monitoring and addressing risks to the deposit insurance funds.”²⁰

Meeting these objectives will require coordinated and systematic efforts from across the FDIC's divisions.

The FDIC recently has taken important steps in the direction of integrated risk management. With the creation of the National Risk Committee and Risk Analysis Center in 2003, along with the formalization of the Financial Risk Committee in 1998, the FDIC has set up an organizational structure that is capable of meeting its risk-management objectives.

The stated mission of the NRC²¹ is:

²⁰ *FDIC 2002 Annual Report*, inside cover.

“To identify and evaluate the most significant external business risks facing the FDIC and the banking industry. Also, where necessary, the NRC would develop a coordinated response to these risks, including appropriate policies and operating strategies with regards to FDIC supervised and insured institutions.”²²

The NRC meets once per month, or more often as necessary, and is chaired by the Deputy to the Chairman and Chief Operating Officer. The other members of the NRC are the Directors of DIR, DSC, and DRR; the CFO; the Deputy to the Chairman; and the Special Advisor to the Chairman. The General Counsel is an advisory member. This group represents almost all of the most senior leadership at the FDIC.

The FDIC’s Risk Analysis Center was created as “an interdivisional forum charged with coordinating risk identification and prioritization processes of the three operating divisions,”²³ i.e., DSC, DIR, and DRR. The RAC has rotating representatives from each of these divisions. It meets every morning for a 30-minute risk briefing and every afternoon for one hour to discuss new research or risk-management findings.

In their brief tenures, the NRC and RAC have had some notable successes. The NRC deliberated what the FDIC’s public position should be on derivatives during a recent controversy on that topic. The RAC has substantially increased the readiness of the FDIC to respond to emerging crises and recently stimulated new research on interest-rate risk. During the somewhat longer existence of the FRC, it has helped to break down interdivisional barriers, developed new techniques for predicting failures of depository institutions, and successfully executed its reporting obligation to estimate the FDIC’s reserve needs in accordance with GAO and GAAP requirements.

The FDIC is in an excellent position to build on these successes and further develop its risk-management organization. To help identify specific opportunities for improvement, the following section outlines four general characteristics of world-class, fully integrated, risk-management organizations and discusses where the FDIC stands today.

²¹ Initially known as the Washington Risk Committee.

²² Charter of the National Risk Committee, 2003.

²³ Ibid.

Observations on the FDIC's risk management today

A fully integrated risk-management organization has clearly allocated risk-management responsibilities, uses best information and latest thinking to understand and communicate the nature of risks, consistent and coordinated follow-through to respond to risks, and strong feedback mechanisms to ensure continuous improvement. The FDIC has made commendable strides on all four of these dimensions, but there are additional opportunities for improvement.

1. Clearly allocated responsibilities. The newly formed RAC has a clear purview to monitor short-term developments in risk, while the FRC has a mandate to report on overall losses and longer-term risks. At that level, the division of labor seems clear. On the other hand, the current NRC charter seems to charge both the RAC and the FRC with risk identification, while off-site models – key risk-management tools – lack a single, structured forum for collecting input from the divisions involved in their creation, use, and maintenance.

2. Risk identification. As discussed in above, DIR and the FRC are starting to build world-class models that will yield a better understanding of short- and long-term risks, but there are still tangible improvements that can be made. The RAC has embraced its mission to monitor short-term risks and has cast a very wide net for information on risks, but to date it has done little to synthesize and distill information and to assess implications for the FDIC. The RAC could add even more value by going the additional step of recommending actions for FDIC to mitigate emerging risks.

3. Follow-through. The NRC, RAC, and FRC do not have explicit line authority within FDIC. Rather, their primary duty is to provide information and make recommendations to the operating divisions (DSC, DIR, and DRR). The ongoing challenge for the NRC, RAC, and FRC will be to ensure that FDIC responds appropriately to the information and recommendations that they individually and jointly convey.

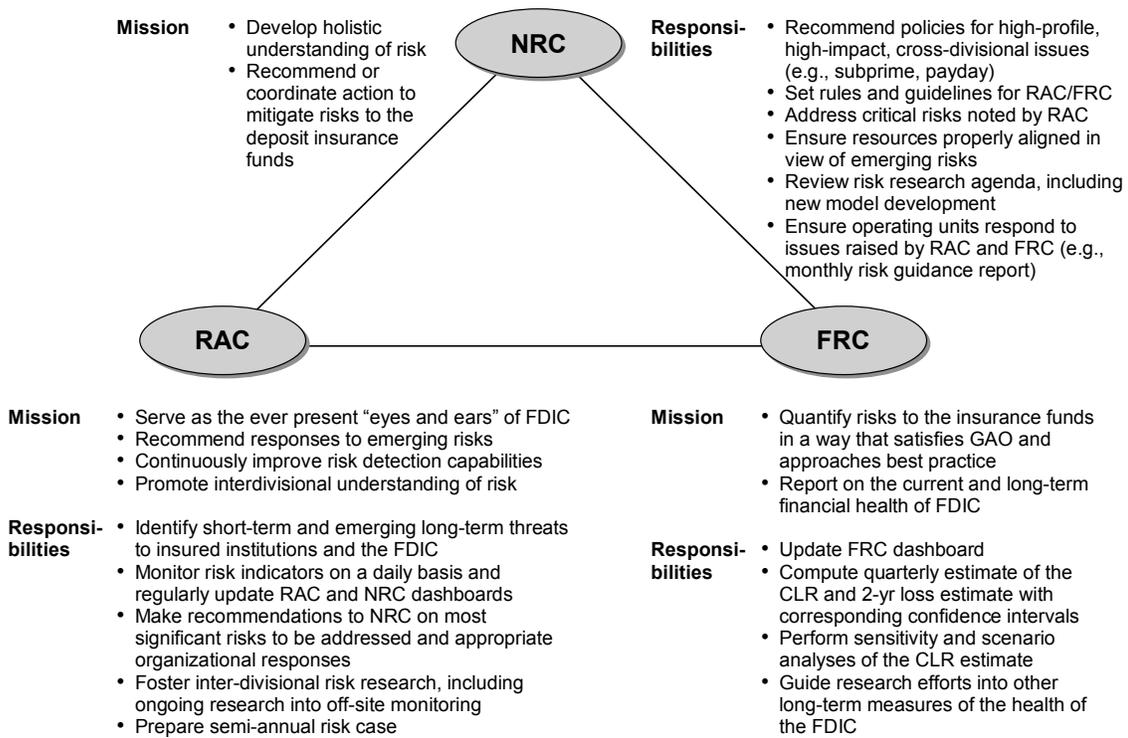
4. Feedback mechanisms. The FDIC has formal feedback mechanisms for individual personnel, but it is less systematic about evaluating and improving organizational performance. For example, on an ad hoc basis the FDIC has shown how its various models differ, but it has generally not performed systematic, head-to-head comparisons on the merits (e.g., by measuring accuracy). While individual models have been improved continuously, such efforts have been only loosely coordinated and have not always been targeted to the ultimate objectives of end users. The recent creation of the NRC and the RAC provide an opportunity to

institute formal feedback processes to put the FDIC on a path of continuous improvement.

To realize the full potential benefits of its system of risk committees (NRC, RAC, and FRC), the FDIC needs to clearly and formally define the mission, responsibilities, and especially outputs of each. To ensure continuous progress toward integrated risk management, these committees need strong feedback mechanisms, to focus more deliberately on measuring and improving their performance against the FDIC’s risk-management objectives. (See Exhibit 2-3.)

Exhibit 2-3

STRUCTURING TO DELIVER ON FDIC’S OVERALL OBJECTIVES



Specific recommendations for strengthening the NRC

The newly created NRC is well positioned to develop a holistic understanding of the risks faced by the FDIC and to coordinate the efforts of the operating divisions to redress those risks. For the NRC fully to meet this potential, it will need to clarify its role, improve its operations and outputs, and develop formal feedback mechanisms to monitor the FDIC's progress toward fully integrated risk management. Several concrete actions will help the NRC achieve these objectives.

2.2.a. *The NRC should forge a consensus across divisions and provide policy advice on cross-cutting issues.* When a potential risk emerges, there is often uncertainty about its severity and what, if anything, could be done to redress it. For example, when subprime lending became more prominent in the late 1990s, there was debate within the FDIC, across other bank regulatory agencies, and within the banking industry about the magnitude of the risk and how to address it. When faced with such situations, the FDIC should bring all its knowledge and expertise to bear to assess the situation, and the NRC would be an ideal forum to do so. Having come to a mutual understanding, the NRC could then make recommendations to coordinate the responses of the Corporation. For example, it might recommend that DSC could gather additional data on subprime exposure, DIR add subprime lending to offsite models and scenarios, and DRR develop expertise in managing and disposing of subprime assets. This kind of policy role for NRC is most important in areas that involve more than one division of FDIC.

2.2.b. *The NRC should oversee the RAC and the FRC to assess whether they are meeting the needs of the FDIC.* The holistic, interdivisional perspective of the NRC puts it in a unique position to judge how well the RAC and the FRC are fulfilling their missions and serving the Corporation as a whole. This perspective would be valuable to the division managers ultimately responsible for the RAC and the FRC. Furthermore, the prospect of having to defend decisions and performance to NRC would impel the RAC and the FRC to provide thorough, well-reasoned analysis on a consistent basis.

2.2.c. *The NRC should provide guidance to DIR and the RAC about needed research.* The NRC is a forum for senior managers to share their perspectives and concerns about risk, so it is in an excellent position to identify the FDIC's blind spots, to recommend areas that warrant additional attention, and to coordinate research needs that cut across divisional boundaries. For example, the NRC might conclude that payday lending represents only a minimal threat to the FDIC and advise the RAC to focus elsewhere. On the other hand, the NRC might believe that

payday lending could threaten the solvency of particular institutions and suggest that DIR pursue targeted research into offsite models that would help DSC identify at-risk institutions.

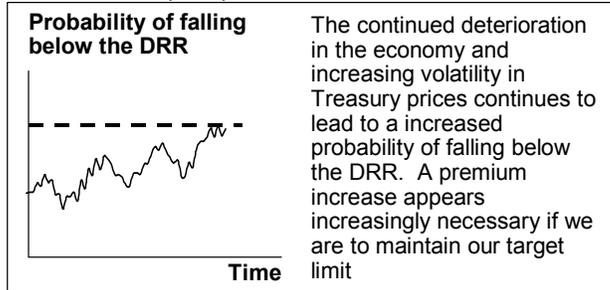
2.2.d. *The NRC should produce and circulate a monthly risk-guidance report.* At each of its meetings, the NRC should keep a record of what issues it considered and what, if anything, it recommended to do about them. For example, the NRC might recommend that DSC gather additional data on a particular type of risky asset held by depository institutions. This will focus the NRC's attention on considering the right set of issues and on making recommendations to proactively manage and mitigate the risks faced by the Corporation. The risk-guidance report should be submitted to the Chairman's office monthly, and to the Board quarterly.

2.2.e. *The NRC should create a risk management dashboard and request that the RAC update it in advance of each NRC meeting.* To set the stage for each NRC meeting and foster a common understanding of the holistic risk environment, the NRC should create a short, standardized set of briefing materials, to be updated by the RAC and distributed in advance of each NRC meeting. This "NRC dashboard" would likely include information on the probability of exhausting the FDIC funds, the current status of the deposit-to-reserve ratio, and recent market developments that affect the banking sector. Exhibit 2-4 depicts an example. The exercise of determining what belongs on such a dashboard would prompt valuable discussions about where the NRC should focus its attention. Additionally, revisiting the design of the dashboard at each meeting would appropriately draw the NRC's attention to generating better risk estimates (e.g., continuously improved models).

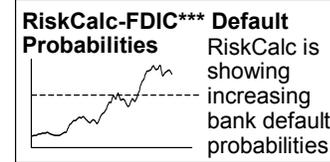
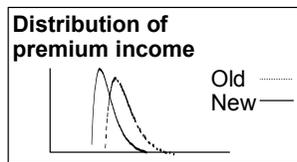
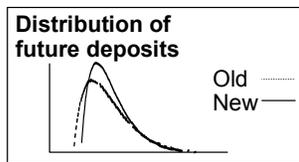
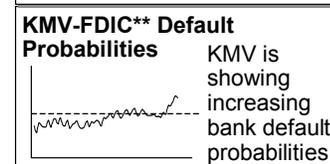
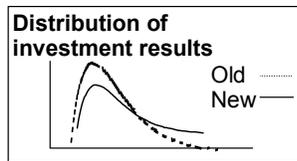
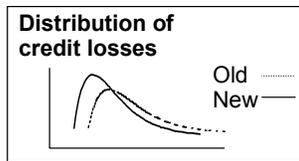
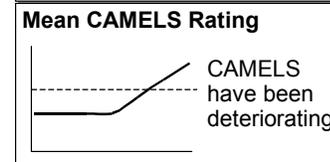
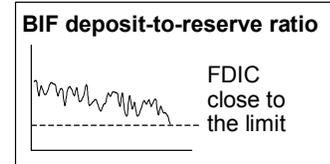
SAMPLE NRC DASHBOARD AT HORIZON 2

-- Limit*

Probability of FDIC Falling Below the Designated Reserve Ratio (DRR) and Constituent Items



Additional Risk Metrics



*Additional attention is warranted when the variable reaches the pre-set limit
 **Mean KMV minus FDIC default probabilities for major money center banks
 ***Mean RiskCalc minus FDIC default probabilities for non-public banks

2.2.f. The NRC should enlist two mid-level executives to support the NRC part time to ensure execution against its decisions. Most of the NRC’s decisions will be recommendations to the RAC, the FRC, or the operating divisions. The NRC will need experienced executives to convey such recommendations, encourage action, monitor progress, and report back the NRC. The appropriate resources would probably be one Deputy Director from DSC and one from DIR, each working with the NRC 1 or 2 days per month.

2.2.g. The NRC should adopt feedback mechanisms to assess its progress and drive continuous performance improvements. The NRC dashboard would be an effective feedback mechanism. With each emerging risk or crisis, the NRC should ask to what extent it had sufficient information and knowledge to foresee that risk. If there were no specific warning signs on the NRC dashboard for the newly emerging risks, then that dashboard could and should be improved. More generally, the NRC should request that the RAC and the FRC periodically report on the performance of the indicators on the NRC dashboard and plans to improve those

indicators on a continuing basis. This would ensure that all three committees remained engaged in generating better intelligence about risks.

Other, broader feedback mechanisms are equally important. For example, the NRC should follow up on its recommendations to determine their impact on the Corporation. For example, suppose the NRC recommended a new policy (e.g., use an enhanced offsite model to target deeper exams at a new set of at-risk institutions). If that policy has mixed results or is followed only sporadically, then the NRC should revisit its how its policy recommendations are formed or conveyed.

Specific recommendations for strengthening the RAC

The RAC promises to add considerable value as the FDIC's clearinghouse for risk-related information. Indeed, this was one of the main reasons for the RAC's formation. In its first few months, the RAC has made substantial progress on this front, but it has room to improve. In particular, the RAC will need to clarify its role, improve its operations, and develop the formal feedback mechanisms to measure its progress and guide continuous improvement. The remainder of this section spells out a variety of proposals that would help the RAC fulfill its potential along those lines.

2.2.h. *The RAC should produce a weekly risk-guidance report for the NRC.* The RAC currently sends a daily internal email summarizing the newly released economic indicators and news items related to the banking industry. Many find this service to be useful, so it should be continued, but the RAC could do more to synthesize information and help the Corporation to act on it. Specifically, the RAC should send the NRC a weekly "risk-guidance report" listing emerging issues and crises, along with a recommended response. The RAC might also convey key insights from its deeper investigations into thematic issues ("theme weeks"), with particular emphasis on implications for the FDIC – the "so whats" that emerge from the analysis. The framework of this new risk-guidance report would help the RAC focus more effectively on determining the relevance of each risk issue to the FDIC and how the FDIC might measure, monitor, and ultimately mitigate such risks over time.

2.2.i. *The RAC should regularly assess FDIC's offsite models and recommend to DIR and DSC how they could be improved.* Offsite monitoring is by nature a joint effort of DIR and DSC. DIR builds the models, while DSC interprets them and puts them to use in the field. The interdivisional structure of RAC and its purview to assess risk make the RAC an ideal forum to discuss the performance of offsite models and how to improve them. The RAC should regularly (e.g., every 6 months) use its afternoon sessions to assess how well the various offsite models

have flagged at-risk institutions, paying particular attention to identifying particular types of failures that are not being identified in advance. As new risks emerge, the RAC should proactively work with DSC and DIR to develop recommendations for model enhancements that will identify risks before they result in failures.

2.2.j. *The RAC should organize occasional briefing sessions for interested parties.* In the RAC's role as the interdivisional clearinghouse for information, it should occasionally schedule briefing sessions to share key findings with the relevant parties who would find them useful. Such briefings might be based on new results from off-site modeling (e.g., a new scenario that suggests that particular institutions are at risk), analysis of market data or news (e.g., a legal development that could affect a group of institutions), or lessons from recent or ongoing resolutions (e.g., the lack of a particular supervisory control function or data point was a contributory factor in a failure).

2.2.k. *The RAC should develop a "dashboard" of key indicators that it will track regularly.* As with the proposed NRC dashboard, described above, the RAC could benefit from deliberate thinking about what variables are the best indicators of the risks faced by the FDIC, how they should be measured, and how often they should be tracked. Creating an "RAC dashboard" would be an excellent way to codify that thinking and focus RAC's day-to-day attention on fewer, more relevant pieces of information. Exhibit 2-5 shows an example of such a dashboard. It would likely include some measures that change rarely (e.g., the probability of exhausting the BIF would be based on Call Report data that would change quarterly). Other measures would change daily (e.g., bank failure probabilities implied by equity volatility). The RAC should update this dashboard daily or weekly and use it to guide the RAC's morning call. This would help to keep the briefing short and on point and would allow time during the call to discuss any unusual developments.

SAMPLE RAC DASHBOARD AT HORIZON 2

	Current	Prior	Change*	Limit
Probabilities of Default/Limit violation				
• 1-year prob. of default	0.50%	0.45%	11%	5%
• 1-year prob. of dropping below target ratio	75%	68%	7%	5%
• 2-year prob. of default	0.75%	0.49%	0.50%	5%
• 2-year prob. of dropping below target ratio	90%	81%	9%	5%
Expected Losses				
• Expected loss 1 year	\$1.0b	\$2.0b	50%	25%
• 1 year confidence interval (90%)	\$1.0b	\$1.0b	0%	25%
• Expected loss 2 years	\$3.0b	\$3.0b	0%	25%
• 2 year confidence interval (90%)	\$1.5b	1.5b	0%	25%
Banking credit information				
• CAMELS (re-rated banks)	2.6	2.90	10%	5%
• Std. Dev. CAMELS (re-rated banks)	1.5	1.0	50%	5%
• Subprime loans	\$65b	\$64b	1.5%	5%
• Average Default Probability, KMV, top-20 money center	0.01	0.005	100%	10%
FDIC information				
• BIF (net of CLR)	\$39b	\$40b	2.5%	5%
• BIF Ins. Dep.	\$3,000b	\$3,000b	0%	2%
• BIF Ratio	1.33%	1.33%	0%	10%
• SAIF (net of CLR)	\$2.0b	\$2.0b	0%	33%
• SAIF Ins. Dep.	\$100b	\$100b	0%	2%
• SAIF Ratio	2.0%	2.0%	0%	33%
Miscellaneous macro data				
• Residential vacancy rate	6%	5%	20%	10%
• Commercial vacancy rate	7%	5%	40%	10%
• Unemployment rate	5%	4%	25%	10%
• Junk bond defaults	10%	8%	25%	10%
• S&P 500	990	1000	11%	5%
• Treasuries				
– 1	1%	1.0%	0%	2%
– 5	1.5%	1.0%	0%	2%
– 10	2.0%	2.0%	0%	2%

* Exceptions and over limit conditions are indicated in bold

** CLR may not equal one year expected losses due to FRC discretionary authority

2.2.1. The RAC should reduce its afternoon meetings to one or two sessions per week. The RAC currently meets every afternoon for a longer session to share new research or interesting findings. These meetings are an effective forum for disseminating knowledge between divisions and driving the Corporation's thinking in particular areas. While these meetings are constructive, the RAC should schedule fewer of them. RAC participants are now stretched in their dual roles as divisional employees and RAC members, so limiting the number of RAC meetings would give them more time to prepare research. It would also enable the RAC to focus on those risk topics that were most relevant to the FDIC, and to synthesize and draw out implications and recommendations in its weekly risk-guidance report to the NRC.

2.2.m. The RAC should adopt feedback mechanisms to assess its progress and drive continuous performance. The RAC dashboard and offsite models are two vehicles for RAC to create feedback mechanisms to improve performance. The RAC should regularly schedule assessments of these sorts of risk-assessment capabilities and use the results of those assessments to determine how to improve.

For the dashboard, the feedback would likely involve seeking the best set of leading indicators to include on the dashboard and the most accurate ways to measure them. As with FDIC's offsite models, the RAC should regularly (e.g., every 6 months) review the RAC dashboard and challenge itself to improve the dashboard's content and accuracy.

Specific recommendations for strengthening the FRC

The FRC has had a notably positive impact on the FDIC as it has evolved from an informal working group to a well-established forum for setting the FDIC's reserves. Along the way, the FRC has fostered interdivisional information sharing and advanced the Corporation's understanding of failures of depository institutions. The proposals regarding FRC that were outlined for Horizon 1 would help to solidify and extend these achievements, but there are additional opportunities for the FRC in the medium and long term. Specifically, the FRC could add more value to the FDIC by developing broader and more-accurate measures of the financial risks faced by the Corporation.

2.2.n. The FRC should broaden its mission to include estimating the long-term financial health of the FDIC, for dissemination in public forums such as FDIC's annual report. If the FRC undertakes the recommendations outlined for Horizon 1, then the FDIC's annual report will include an estimate of the FDIC's losses from depository institutions that are expected to fail in the coming year (i.e., the CLR), as well as a confidence interval around this estimate. Reporting these estimates is essential, but the FRC can and should go further. In particular, the FRC should aspire to report estimates of the probability that failures would cause the FDIC to exhaust its funds (i.e., the BIF or SAIF, or a newly combined fund) at any time in the coming 1 to 50 years. Such longer-term measures of capital adequacy would enrich public discussion about the performance of the FDIC, the fair cost of deposit insurance, and the general health of the deposit insurance system.

Anticipating Future Needs – Horizon 3

As the FDIC moves over the next 18 months to implement the recommendations for Horizons 1 and 2, it also will need to consider the impact and implications of a possible future move to Horizon 3 – an environment in which risk to the deposit insurance system is not only monitored and measured in near real-time, but also managed in a more interactive, more fully-automated manner throughout the organization. The decision to move to such an environment will depend on the FDIC's assessment of its future needs, and whether the benefits of an upgrade in risk management practices outweigh the costs to the Corporation and the deposit insurance system.

The kinds of potential benefits – individually or collectively – that the FDIC will need to consider include: enhanced institutional risk analysis; better knowledge management; enhanced public policy knowledge and positions; fuller understanding of risk-based pricing; better documentation; and a greater ability potentially to offload or hedge risks. The likely costs include substantial information technology (IT) expenses as well as organizational realignment considerations.

RECOMMENDATION 3.1 – ANNUALLY ASSESS WHETHER TO MOVE TO HORIZON 3

While the recommendations from Horizons 1 and 2 are being implemented, the FDIC will need to anticipate and assess its future risk management needs implied by an evolving deposit insurance environment. Specifically, the NRC, based on the advice of a cross-divisional team of managers and starting during Horizon 2, should annually assess the advisability and implications of moving to Horizon 3.

The Horizon 3 environment

Horizon 3 differs from Horizon 2 on three principal dimensions: the degree of system access and availability; the timeliness of underlying data; and the size and importance of the risk group in the organization. At Horizon 3:

- ¶ Risk systems are broadly accessible to individuals throughout the Corporation through a user-friendly interface – at desktops, in the

field, on the road – and all risk models and inputs run on a single, fast IT platform

- ¶ Data is available real-time or near real-time through automated links to market and other information, producing more current risk analyses
- ¶ Risk analysis is the province of a dedicated risk management group comprised of half a dozen or more professionals and headed, potentially, by a Chief Risk Officer.

The potential benefits of Horizon 3

The potential benefits of moving to an integrated IT environment and investing in organizational and other changes contemplated in Horizon 3 are manifold. They include:

- ¶ **Enhanced institutional risk analysis.** In practice, Horizon 3 means an ability to deliver a broader set of customized reports in an interactive environment. A DSC professional, for example, could create customized dashboards for automated delivery by e-mail at any desired time frequency (e.g., daily, weekly, monthly). Or a DSC supervisor interested in targeting institutions for greater scrutiny could use the FDIC’s intranet to produce a list institutions satisfying a particular query, e.g., all institutions rated below CAMELS 2 in the North East that have been downgraded in the past 3 years and have expected probabilities of failure exceeding 5 percent. The ability to do “what if” scenario analysis would become more interactive and available on-demand (e.g., if a question were to arise at the RAC about the impact on the BIF of increased failure rates among institutions rated CAMELS 4 or higher, the analysis could be run in real time and presented at the meeting).
- ¶ **Better knowledge management.** The reduced barriers to information distribution²⁴ and the rapid, customized reports in an integrated Horizon 3 environment are likely to yield new insights into risk that will aid in the prevention potential problems before they occur. Improved insights will allow FDIC and other regulators to intervene in troubled institutions earlier, propose new and innovative solutions, and become more efficient in resource allocation and planning.

²⁴ For example, in a recent interview with a large private sector financial guarantee company, the chief risk officer noted that making risk reports and supporting data available over the firm intranet resulted in substantially increased usage, positive feedback from users, correction of errors in the database, and vastly improved risk monitoring.

Improved abilities in risk management will also better equip the FDIC to detect and respond to poor risk management practices at insured banks. **Enhanced public policy advocacy.** Arguably, at this stage the FDIC would understand risks in the domestic banking system in a unique and superior way relative to other industry participants and observers. Distinctive expertise would enhance the FDIC's leadership in public policy discussions directly affecting risk management in the banking sector in general and insured institutions in particular.

- ¶ **Fuller understanding of risk-based pricing.** With a Horizon 3 infrastructure, the FDIC could not only allocate reserves internally on an individual institution basis – a distinct advantage as the FDIC moves to more targeted risk-based pricing in the future – but also measure the impact of emerging risks on these reserves (e.g., expressed as changes in the correlation structures). As a result, the new capability would allow true risk-based underwriting and pricing on an institution-by-institution basis; e.g., a bank could be charged its marginal contribution to the FDIC's expected loss.²⁵
- ¶ **Better documentation.** The substantial IT investments required of Horizon 3 offer an important ancillary benefit favored by financial regulators: a well-documented audit trail. If the FDIC or an outside auditor wishes to understand, for whatever reason, the FDIC's risk profile as of a particular date in the past, that day can be easily "recreated" in a virtual setting.
- ¶ **Potential ability to offload risk.** An advanced risk management structure will put the FDIC in a position to consider potential strategies to offload risk, including through hedging or reinsurance. To that end, Horizon 3 provides the requisite ability to measure and report risk in hedgeable components (e.g., interest rate risk, credit risk), with additional detail down to the individual institution level (e.g., exposure on a per bank and tenor basis with estimated costs of hedging). Any decision of the FDIC regarding hedging should be considered carefully, as all hedges include some element of risk. Additionally, since the FDIC's credit exposure relates in some cases to institutions it oversees as the primary federal regulator, great care would need to be taken in setting hedging policy to avoid

²⁵ See, e.g., materials from the Deposit Insurance Pricing Conference (September 2001).

compromising FDIC's statutory duties as insurer and regulator.²⁶ While these and other substantial obstacles must be overcome to develop a legitimate hedging capability, an investment in Horizon 3 will at a minimum provide an option value in this respect.

The likely costs of Horizon 3

The current information technology (IT) infrastructure, and the likely infrastructure over the next 12 to 18 months, is characterized by a patchwork of computer programs, desktop spreadsheets, and individual analyses prepared by different researchers. This environment is conducive to exploring research issues and developing prototypes quickly, but it is neither automated nor user friendly, and it is not sufficiently flexible to support a Horizon 3 capability, even with the Horizon 2 modifications.

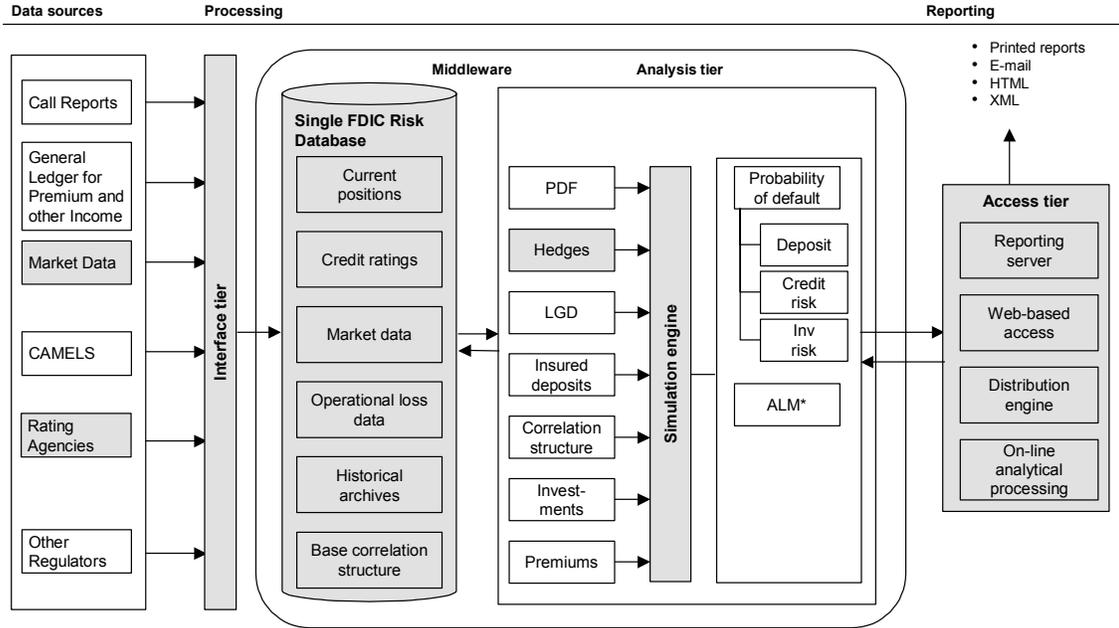
A move to Horizon 3 will require a substantial investment in IT infrastructure. Specifically, FDIC would be well advised to migrate all operational risk models from DIR onto an integrated IT platform accessible throughout the organization. Models under development would continue to be built and tested separately. Exhibit 3-1 provides an illustration of a sample well-functioning IT architecture in Horizon 3, including the manner in which data inputs might feed into the models on an automated basis to produce reports and analyses. In this type of environment, a single programming language standard (e.g., C++) should be employed, perhaps using a commercial risk management platform (e.g., Risk Vision, Summit, Sungard) as a core.²⁷ Input and output data should be stored in a relational database (e.g., Oracle, Sybase) that continuously tracks inputs and outputs and creates an audit trail. Any of the potential hedging strategies described above will require further investments in systems and procedures to properly track and monitor performance.

²⁶ For example, many credit hedges on publicly traded banks involve, directly or indirectly, shorting the underlying bank's stock. This activity, even if conducted only indirectly on the FDIC's behalf, raises difficult questions for a bank regulator. For an analysis of reinsurance options available to the FDIC, see *Reinsurance Feasibility Study*, Marsh & McLennan (December 2001).

²⁷ Once the basic models are prototyped, the FDIC might decide to migrate to an IT environment developed and maintained in-house, or to an outsourcing arrangement of some kind, or to an application service provider (ASP) model.

RISK MODEL ARCHITECTURE AND METHODOLOGY AT HORIZON 3

☐ Horizon 3



* Asset and Liability Management

Source: Team analysis

The transition to Horizon 3 may additionally require a substantial reorientation or reorganization of the existing risk management organization. Typically a dedicated risk group of perhaps a half dozen professionals headed by a Chief Risk Officer would be assembled to handle the increased workload, which would include not only cutting edge analyses and ongoing synthesis, but also an orchestration of efforts to instill a risk management culture within the organization. If a hedging capability were developed, an individual with capital markets experience would be necessary to assist with evaluation and execution.