Attachment

Guidance on
Sampling-Enhanced Loan Review

(October 2002)

A thorough review of a bank's commercial loan and lease portfolio and related sources of credit risk is an essential element of the Federal Reserve's safety and soundness examination process and has traditionally included an evaluation of several classes of loans:[1]

- Loans for which problems are evident (e.g., past due, nonaccrual, restructured, impaired, watch list or internally classified loans).
- Loans posing potential conflicts of interest (e.g., insider loans).
- Loans posing a large exposure to the bank.
- Loans posing emerging weakness based on examiner judgment (e.g., new business lines or weak industries).

In addition to these "core" loan categories, examiners have often selected other loans somewhat randomly to achieve a level of coverage, generally 40 percent or more of the dollar value of the commercial loan portfolios, in order to assess or validate the vast majority of significant credit exposures.

This attachment describes a statistically based loan sampling approach that complements existing practices. As noted in SR letter 02-19, a statistically based sampling approach can serve as an alternative to the traditional "top-down" loan coverage approach when scoping certain bank examinations. In some cases, sampling requires fewer loans to be reviewed than required using the minimum coverage approach, while in other cases it requires more. The results depend heavily on the number of commercial and industrial loans (C&I) and commercial real estate (CRE) loans and the structure of the loan portfolio. Asset size and the level of Tier 1 capital affect the sampling methodology as well. Additionally, sampling may require fewer loans to be reviewed than under the traditional method in well-managed institutions whose portfolios are not dominated by a small number of relatively large exposures.

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[1] For the purposes of this SR letter, the term "loans" encompasses all sources of credit exposure arising from loans and leases, including guarantees, letters of credit, and other loan commitments. The sampling methods described in this letter select "loans" for review by obligor or related group of obligors (where identifiable). Thus, in the sampling procedures, the term "loan" refers to total credit exposure to an individual obligor or related group of obligors. As this implies, loan amounts referred to in this document should be determined on an exposure basis, including all outstanding notes and commitments.

Significantly, sampling may provide examiners with a broader perspective regarding the accuracy of the bank's classification process than is typically provided by the traditional approach. At present, the sampling approach should be directed towards banks currently rated CAMELS and asset quality "1" or "2" and having assets less than $1 billion. However, the statistical sampling approach is not recommended for use at de novo banks or other banks with unusually high or low capital ratios. Reserve Banks wishing to experiment with a sampling approach at worse rated or larger organizations are asked to contact Board staff so that experience gained in this area may be used to develop alternative sampling procedures for these types of institutions as well.

Concept and Structure of the Sampling Technique

The sampling approach builds on procedures currently used by examiners in evaluating loan portfolios and continues to require coverage of a similar "core" group of exposures. The principal difference relates to the manner in which loans outside the core group are selected for review. Traditionally, the largest remaining loans were selected until a desired coverage ratio was achieved. Using sampling, these remaining noncore loans are grouped into several strata, or buckets, based upon the size of the borrowing relationship. Loans are randomly selected from each of these buckets proportionate to the dollar value of each bucket relative to the total noncore portfolio. The total number of sampled loans required is determined by the number and size distribution of loans in the bank's portfolio.

The sampling approach is an effective means to determine if the examiner can rely on the bank's classification process or whether the examiner must determine the level of classifications by traditional means. Although sampling may, in some cases, require examiners to review more loans than required by the traditional loan coverage approach, it is more likely to detect problems among smaller loans and will provide a broader perspective of the bank's classifications across the entire portfolio.

In most cases, examiners should expect to find very few misclassifications within the sampled buckets, since those segments would exclude any credits that the bank's internal procedures have identified as weak and those that the examiner has otherwise identified for specific review (i.e., the "core" loans). When the examiner's classifications agree with the bank's internal loan classifications, then internal classification totals can be relied upon in calculating the total and weighted asset classification ratios. However, if misclassifications are found within the sample, internal classifications may underestimate the true extent of problem loans, and adjustments must be made to estimate the actual extent of problems. To make that estimate, the rate of misclassification is applied to the remaining loans in the sampled bucket to derive an estimate of other problems that examiners would likely find if all the loans were read. This extrapolated amount of problem loans is then added to the total of specifically identified problems to evaluate the significance of credit weaknesses at the institution. Depending upon the severity of misclassifications and the magnitude of problems specifically identified, expansion of the examination scope will probably be necessary to better assess the accuracy of loan grading.

Specific Procedures

Using electronic files provided by the bank and the System's loan sampling software, a variety of core and noncore borrower groups are constructed (see Table 1). The "Core" group -- Bucket 1-- consists of several categories of loans that examiners have traditionally reviewed and would continue to review using sampling. These core borrowers include, for instance, the largest exposures and certain large problem or insider loans. The sampling program also permits examiners to select any additional borrower(s) for review based on the examiner's experience and judgment. These individually selected loans would be placed in the "Examiner Selected" group --Bucket 2. All loans contained in Buckets 1 and 2 would be individually reviewed, not sampled, and examiners would not extrapolate their findings to other loans. All remaining internally identified problem borrowers are included in a separate "Problem" group -- Bucket 3-- designated as "discuss only" and are not incorporated into the commercial loan coverage ratio nor are their findings extrapolated. However, any borrower in the "Problem" group -- Bucket 3 -- may be individually selected for review by the examiner. Additionally, if the number of "discuss only" borrowers in the "Problem" group -- Bucket 3-- is large, the examiner may select a number of borrowers to be randomly sampled. Buckets 4 through 8 are discussed below.

The remaining noncore categories represent "pass" or creditworthy loans, grouped by the size of the borrowing relationship. Buckets 4 through 8 are comprised of loans to be randomly sampled. The number of loans selected from Buckets 4 through 8 is proportional to its total dollar value relative to the total noncore portfolio. Thus, if loans in a particular category represent 30 percent of the bank's total noncore exposures, then approximately 30 percent of the number of sampled credits will be drawn from that category. A "Custom" group -- Bucket 4 -- is available for examiners to target specific borrowers meeting a variety of selection criteria. Buckets 5 through 8 represent all remaining loans in the commercial loan portfolio, segregated by size relative to the bank's tier 1 capital and loan loss reserve. The results of examiner's findings for these sampled buckets would be extrapolated to the entire group of borrowers not reviewed.

Table 1

	Bucket	Description
Non Sampled Buckets	Bucket 1 Core	**1A:** 10 largest non-insider non-problem borrower exposures
		1B: 5 largest non-insider non-problem borrower exposures underwritten in the previous 12 months
		1C: 10 largest non-insider problem borrower exposures
		1D: 5 largest insider borrower exposures
	Bucket 2 Examiner Selected	Examiner optional core group. Examiners may manually select any borrower to review.
	Bucket 3 Problem	Problem Loans (Watch List, >59 days past due, Internal Ratings, and Previously Classified). Discuss only borrowers.
Sampled Buckets	Bucket 4 Custom	Examiners may select to target specific borrowers meeting a variety of criteria.
	Bucket 5 >3% T1	Remaining borrower exposures greater than 3 percent of tier 1 capital plus the ALLL.
	Bucket 6 2%-3% T1	Remaining borrower exposures between 2 and 3 percent of tier 1 capital plus the ALLL.
	Bucket 7 1%-2% T1	Remaining borrower exposures between 1 and 2 percent of tier 1 capital plus the ALLL.
	Bucket 8 0.1%-1% T1	Remaining borrower exposures between 0.1 and 1 percent of tier 1 capital plus the ALLL.
	Bucket 9 <0.1% T1	Remaining borrower exposures less than 0.1 percent of tier 1 capital plus the ALLL. These loans are not included in the sample.
	Bucket 10 Non Commercial	All non-commercial Borrowers. Examiners may scope into Bucket 2.

Determination of Reliance on Bank's Internal Classifications

Once the commercial loans have been selected for review, examiners are expected to use existing credit analysis techniques as described in the *Commercial Bank Examination Manual* to evaluate the borrower's creditworthiness, determine the level of adverse classifications, and identify any discrepancies with the bank's internal classifications.

In performing their analysis of the accuracy of classified credits, examiners should start with the assets internally classified by the bank's rating system and add any pass credits that were misclassified by the bank and downgraded to a classified status during the examiner's credit review. These classified assets should serve as the basis for a "base" weighted asset classification ratio.

Under the sampling approach, the "base" weighted asset classification ratio must be adjusted upward (extrapolated) to the extent misclassifications were uncovered within the randomly sampled loan buckets. The resulting extrapolated weighted asset classification ratio is necessary to account for the likelihood that misclassifications uncovered from the sampled loans represent only a small portion of the total misclassified loans throughout the rest of the portfolio that was not reviewed. The extrapolated value provides examiners with a more comprehensive picture of the magnitude of the institution's credit problems.

In many cases there will be no disagreements between the examiner's credit analysis and the bank's internal classifications, and consequently there will be no difference between the weighted asset classification ratio and the extrapolated ratio. While generally no additional sampling would be necessary, other types of credit administrative weaknesses may be discovered that warrant additional review and, as a result, an additional sample of loans may be selected. In this case, the number of loans selected is left to the examiner's judgment.

In other cases, either minor or significant disagreements will require examiners to more fully investigate the reliance that can be placed on the internal classifications. In cases where there are only a minor number of disagreements within the sampled loans, examiners should be aware that those seemingly minor disagreements may translate into fairly large differences between the base and extrapolated problem loan figures. When those differences are significant enough that they would alter an examiner's overall conclusion regarding the accuracy of the bank's loan grading system, follow up work is required. In particular, significant differences between the "base" and extrapolated weighted classification ratios should raise concerns as to whether the institution is systematically misreporting credit problems.

For example, a situation may arise where there is a disagreement between an examiner's analysis and the bank's internal classification of a single credit that was drawn from the sample buckets. Assuming a "base" weighted asset classification ratio of 4 percent, the disagreed upon sample loan, when extrapolated, could increase the weighted asset classification ratio to 7 percent. Where the difference between the "base" and extrapolated ratios is not material, it would not be necessary to select additional loans if the ratio difference would not alter the examiner's conclusions regarding the condition of the loan portfolio.

However, in another situation there may be disagreement between the examiner's analysis and the bank's internal rating on two small dollar loans sampled from Bucket 8 (borrower exposures between 0.1 and 1 percent of tier 1 capital plus the ALLL). In this example, the bank's "base" weighted asset classification ratio is calculated to be 3% and individually, these loans do not play a significant role in the level of the "base" ratio. However, when these same disagreed upon classifications are extrapolated, the result is a significant difference between the "base" ratio and the extrapolated classification ratio of 18.5%. This can occur when there are only four loans sampled from bucket 8 and the two loans in disagreement account for 40% of the dollar volume of the sampled loans. Through extrapolation, 40% of the remaining Bucket 8 would be considered classified, thereby increasing the extrapolated ratio to a level where an examiner may question the reliability of the bank's classification system.

In the preceding instance, to rule out the possibility that misclassifications were identified as a matter of chance, examiners should expand their loan coverage by pulling an additional sample from the bucket where misclassifications were identified. If the examiner selected four additional borrowers from Bucket 8 to review and there were no new misclassifications found, the extrapolated ratio would decline to 11 %. As the base and extrapolated ratios move much closer together, the examiner may have greater confidence in the bank's internal loan rating system and place greater reliance on bank identified problems in evaluating the bank's asset quality. However, when reviewing the additional four back-up loans, if the examiner found one new misclassification, then the extrapolated ratio would be 15%. In these cases it is highly unlikely that the misclassifications were by chance, and it is probable that a systematic problem exists in the ability of bank management to correctly risk rate their commercial loans. Consequently, examiners should closely review the misclassifications and determine if any pattern exists, such as loans generated from a specific originating office or loan officer, or by type of credit extension. In these cases internal classifications should be deemed unreliable and further credit review should be performed to evaluate the full extent of problem assets. That expanded review should be consistent with the minimum loan coverage of 55-65 percent or more required for banks posing supervisory concerns as set forth in SR letter 94-13, entitled *Loan Review Requirements for On-site Examinations*.

Factoring Sampling Results into Examination Findings

An evaluation of a bank's asset quality rating within CAMELS is to take into account both financial and managerial factors as detailed in SR letter 96-38. Using the sampling approach, the extrapolated weighted classification ratio is to be used as a tool for assessing the extent to which examiner's may rely upon the bank's internal classifications. To the extent loan sampling indicates that the bank's internal classifications are not reliable, the severity of that fundamental risk management weakness should be factored into the asset quality rating as well as the management and the risk management rating.

In terms of documentation, the traditional weighted classified asset ratio should appear in the open section of the examination report and the extrapolated ratio should appear in the confidential section of the report. In cases where an expanded review was called for, the initial "base" classified asset ratio should also be noted, along with the final classified asset ratio resulting from the expanded review.

Discussions with Management Regarding the Sampling Procedures

The sampling procedure produces an extrapolated estimate of weighted classified assets. The principle use of extrapolation is to provide an **estimate** of what the weighted asset classification ratio would be if applied to the entire loan portfolio. The extrapolated ratio will differ significantly from the traditional weighted asset classification ratio when errors in the bank's internal classification system are detected through random sampling. Examiners may want to discuss how the errors led to a widening of the loan review scope and the degree of errors found in loans pulled beyond the initial sample. Any uncertainties regarding the integrity of the institution's classification system or the extent of its asset quality problems uncovered from sampling due to rating errors should be discussed with management and included in the examination report, along with any necessary follow up work required to gain more certainty. Those discussions may center around the number of errors uncovered in sampled and core loans.

Frequently Asked Questions

The appendix provides answers to frequently asked questions regarding the use and understanding of the statistical loan sampling method.

Appendix

Frequently Asked Questions

(October 2002)

What does loan sampling do?

Loan sampling provides an alternative method for selecting some of the loans reviewed in the community bank loan review process. It substitutes a statistical formula for determining the overall number of borrowers reviewed in place of the current coverage target method and substitutes some randomly selected loans in place of some loans currently included by "down-the-line" methods.

Which loans are substituted?

Loan sampling leaves intact much of the loan selection process currently in use. Problem, insider, and large "pass" loans will continue to be included in the review samples. The major change will be the substitution of randomly selected loans for the pass loans that are currently included in the review sample to achieve a 40 percent or higher loan coverage ratio. As is currently the case, examiners will be free to add any additional loans to the review sample that they want to read.

Won't this mean that examiners will have to read many very small loans?

No. A minimum cutoff, such as 1/10th of one percent of capital, can be used to exclude loans (borrowers) with very small exposures from the sample. Further, the random sampling of loans is based upon the institution's lending practices. Borrowers are sampled in proportion to the dollar volume in each bucket. For example, if fifty percent of an institution's loans (excluding the core) are between two and three percent of Tier 1 capital, then half of the sampled borrowers will be drawn from this bucket.

Under current procedures examiners are able to ask banks to add loans to the scope, such as other credits associated with the same relationship. Will this be affected by the proposed procedure?

No. With the use of loan sampling, any credit not included in the original sample may be selected and added to the scope. Loans of this nature would generally be included in the "Examiner Selected" group -- Bucket 2.

Will "discuss only" reviews, such as those used for smaller problem loans, be affected?

No. Problem loans can be treated as "discuss only". Alternatively, examiners can sample smaller problem loans and have a full review for only a portion.

What advantages does this new procedure offer?

Sampling may provide examiners with a broader perspective regarding the accuracy of the bank's classification process than is typically provided by the traditional approach. In addition, because the loan sampling process contains elements of random selection, it may detect problem loans that would otherwise not be evident.

Why are changes being proposed now?

A pilot version of the proposed procedure was tested a few years ago. At that time, however, not all Reserve Bank districts had the ability to access loan files electronically for most examinations. Now, however, some or most Reserve Banks routinely receive electronic loan files, generally in ALERT format, for reviews. Thus, the new procedure can be implemented more easily now.

How is the sample size for loan review determined?

The formula used to determine sample size is set to ensure that enough loans will be reviewed such that the bank's weighted classified assets ratio estimated after the review will be within 5 percentage points of the "true" ratio (the ratio that would be calculated if all loans were reviewed) at least 95 percent of the time. The formula assumes that the bank is a "1" or "2" rated bank with a good internal rating system. An alternative sample size can be used for "l" or "2" rated banks where the examiner is either uncertain about the bank's internal rating system or has some concerns. The alternative sample size will typically be about 50 percent larger than the size for the normal exam.

The proposed procedure produces an "extrapolated" estimate of the bank's weighted classified assets ratio. This extrapolation includes estimates of misclassifications in loans not reviewed. If the extrapolated ratio varies from the traditional weighted asset classification ratio, how should the examiner proceed?

The procedure produces an extrapolated estimate of weighted classified assets. However, this need not alter the examiner's interaction with the bank. Discussion of classifications will still be restricted to loans actually reviewed. The only use of the extrapolation is to give the examiner an idea of what the weighted classified assets ratio would be if they "counted the whole bank." If the extrapolated estimate varies significantly from the bank's traditional weighted asset classification ratio, it indicates that the bank's internal classifications may not be accurate. In that case, the examiner should determine the extent that additional loans need to be reviewed or if the guidance in SR letter 94-13 should be followed. If the difference between the two ratios is minimal, no additional review may be necessary. Field testing indicates that relatively few misclassifications in non-problem loans are encountered in the typical exam. If only one or two misclassifications are encountered, then the extrapolated results should not be materially different from the direct count.

How do I document my findings in the examination report when using the loan sampling tool?

The traditional weighted asset classification ratio is to be included in the open section of the examination report. The extrapolated weighted asset classification, the traditional asset classification ratio, and the number of errors found in the sampled buckets are to be shown in the confidential section of the report. In addition, if an expanded sample was undertaken due to misclassification errors, the number of additional loans selected, any errors from the expanded sample and the adjusted weighted and extrapolated asset classification ratios should be listed. Detailed below is a sample table format that may be used in the confidential section to highlight the sampling findings.

Traditional Weighted Asset Classification Ratio	%
Extrapolated Weighted Asset Classification Ratio	%
Number of Borrowers Sampled	
Number of Errors in Sampled Buckets	
IF APPLICABLE:	
Number of Sampled Borrowers in Expanded Review	
Number of Errors in Expanded Review	
Adjusted Weighted Asset Classification Ratio	%
Adjusted Extrapolated Weighted Asset Classification Ratio	%

Will the sampling procedure reduce the resources used for loan review?

Not necessarily. The overall scope of loan review can be set at virtually any level depending on how the procedure parameters are set in accordance with System or Reserve Bank policy. Banks with a large number of homogenous medium-sized loans may see a reduction in review requirements relative to a 40 percent coverage target. However, banks with significant loan concentrations and large loans could see a potential increase in the number of loans that have to be reviewed. However, there will probably be no reduction in sample size for those banks where the examiner is not confident that the bank has a good classification system.

How will the procedure be implemented?

A version of the procedure has been programmed for use as a supplement to ALERT. Examiners receiving loan files in an ALERT format should able to apply the procedure with little effort.