

Due Diligence Guidelines for the Review of Microcredit Loan Portfolios

A Tiered Approach

Robert Peck Christen and Mark Flaming

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These guidelines were first developed by Robert Christen, with assistance from Patricia Mwangi, both of CGAP. Mark Flaming drafted the current version after testing the methodology. Richard Rosenberg of CGAP wrote the annex on yield gap analysis. Lynn Curran and Deborah Drake of ACCIÓN, Todd Farrington of MicroRate, and Mark Schreiner of Washington University contributed to earlier versions of a related document.

The authors and CGAP would be very grateful for feedback from people or organizations that have used this tool in testing the quality of a microloan portfolio. Please send any comments on your experience with it to rosenberg@worldbank.org. Your observations will help us improve future editions of the tool.

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CGAP
1818 H Street, N.W., MSN P3-300
Washington, DC 20433 USA
www.cgap.org
cgap@worldbank.org

ABSTRACT

Microfinance institutions (MFIs) operate with risks that investors need to be concerned about. Unfortunately, external audits, ratings, evaluations, and even supervision too often fail to identify the primary risk—inaccurate representation of portfolio quality. These due diligence guidelines are designed to help an analyst evaluate, with statistical precision, the accuracy of accounting and performance reports about the portfolio, as well as an MFI's compliance with its own portfolio management policies. The document guides the analyst through three increasingly robust levels of appraisal. This allows the analyst to adapt the exercise to a wide range of uses and requirements about levels of confidence. In the third level, the use of statistical sampling to validate conclusions from conventional appraisal techniques in the prior levels generates uniquely robust results that should satisfy the most demanding commercial investor or regulator.

Tier I is a five person-day review of the MFI's basic policies, procedures, and systems for managing and reporting on the performance of its loan portfolio. This review should be required as a part of any credible external assessment, appraisal, or ratings exercise.

Tier II is a 10–14 person-day assessment of whether operational practices are consistent with the MFI's policies and procedures and with standards of best practice in microcredit portfolio management. This normally would be a minimum requirement for donors, investors, and ratings agencies that evaluate and assess MFIs for potential investment.

Tier III is a 3–4 person-week exercise that includes an audit to confirm the portfolio quality through a sampling of loan files, accounting files, and the loan tracking software. Tier III due diligence is recommended for investors or regulators who need a quantitative and statistically certain measure of portfolio performance.

These due diligence guidelines provide a comprehensive checklist of what to analyze, some instruction about appraisal technique, and very little guidance about how to interpret the results. The Tier I review can be carried out by someone with general knowledge of microfinance but Tiers II and III rely heavily on the judgment of an analyst with extensive experience in the evaluation of MFIs and their loan portfolios.

For another microcredit portfolio testing tool, produced by MicroSave, see http://microsave.org/relateddownloads.asp?id=14&cat_id=313&title=Loan+Portfolio+Audit

INTRODUCTION

Microfinance institutions (MFIs) operate with risks that investors need to be concerned about. Unfortunately, external audits, ratings, evaluations, and even supervision too often fail to identify the primary risk—faulty representation of portfolio quality. These due diligence guidelines are developed to help investors, donors, and regulators verify the real level of risk in an MFI's loan portfolio.

Discrepancies between real and reported portfolio quality are common in MFIs. In fact, many well-known MFIs have experienced at least one significant portfolio crisis—sustaining delinquency and default rates well above what they reported to the public. Finansol, for example, was a Colombian MFI that was widely considered to be one of the top institutions in Latin America during the early 1990s. In November 1997, the Colombian bank superintendent required Finansol to inject several million dollars of capital to shore up reserves for bad debt. The intervention came after inspectors reclassified a significant number of Finansol's loans as “doubtful.” The additional reserve requirement put Finansol in technical insolvency, since the associated expenses decreased capital below acceptable adequacy levels.

Finansol's case was highly public, but certainly not unique. Because it was a supervised financial institution, its problems were a matter of public record. But there have been many cases that did not receive publicity. Most microfinance network organizations have discovered—more than once—that one of their most important affiliates had a far more serious problem with loan delinquency than previously stated. These incidents have cost many millions of dollars and, in some cases, have forced donor agencies to recapitalize or shut down operations they supported for years.

The occasional failure of MFI managers, donors, and investors to detect portfolio failures is simply part of the growing pains of a generally vibrant microfinance industry. Fortunately, most MFIs have been able to weather these episodes because they were only moderately leveraged, their portfolio problems did not create an acute liquidity crisis, or they were able to find another donor to recapitalize the institution. However, MFIs are integrating into regulated financial systems, taking deposits, and leveraging themselves with commercial sources of funding. The Finansol case demonstrates that poor oversight can lead to severe consequences in these conditions.

The purpose of these due diligence guidelines is to provide banking superintendents, donor agencies, and potential investors with a tool for a more accurate and deeper understanding of the underlying quality of an MFI's loan portfolio than current methods offer. This tool is designed to create the levels of confidence required for MFIs to leverage their capital with commercial funding and deposits.

These guidelines provide a comprehensive checklist of what to analyze, some instruction about appraisal technique, and very little guidance about how to interpret the results. **This is not a training manual for aspiring analysts; it is a checklist for an analyst with extensive experience in evaluating MFIs.** Earlier versions of this document attempted to annotate the checklist with guidance about how to interpret the results of the appraisal, but these proved to be unsatisfactory and cumbersome in practice. This version relies ultimately on the judgment of the analyst to use the checklist to sort out what matters most and to identify the root causes of risk in the loan portfolio.

THE DUE DILIGENCE PROCESS

Due diligence is the process of examining a company's performance. It is typically performed by or on behalf of investors who are primarily interested in verifying that performance is accurately reflected in the financial statements and company reports, and that management and operating systems are robust enough to sustain good performance into the future.

In the commercial financial industry, investors rely heavily on external appraisals of a financial institution to analyze performance trends. Audits, ratings reports, stock analyst reports, supervisory reports, and even media articles provide an array of appraisals of a financial institution's performance. This varied and ongoing measurement of performance provides incentive to the financial institutions, creates consensus around best practice metrics, and provides an evaluator with many sources of analysis. Thus the due diligence analyst typically arrives at a financial institution with considerable information.

The due diligence process itself typically entails a review of the basic management and operational systems and a careful analysis of the financial institution's business model. *The important point to make about due diligence methods in a commercial and regulated financial industry is that the analysts typically rely heavily on the information provided by management and by the accounting and performance reporting systems.*¹ They do this based on the assumption that an institution that operates successfully in such an industry has robust systems and competent management, and that gross deficiencies tend to get weeded out by competition, audits, supervision, or external appraisals.

This assumption is not always valid in the microfinance industry, so conventional approaches to audits or rating appraisals can fail to capture the peculiar weaknesses of MFIs. The microfinance industry has placed great emphasis on adapting appraisal and evaluation tools, audit and financial disclosure guidelines, and performance standards. There are assessment tools, such as ACCIÓN International's CAMEL, WOCCU's PEARLS, and CGAP's Technical Tool for appraising MFIs; assessments by rating agencies

¹ In researching due diligence practices, the authors interviewed many representatives from ratings agencies, investment banks, and commercial funders who confirmed that information risk is not typically addressed as a primary concern in traditional due diligence practice.

(MicroRate, M-CRIL, Microfinanza, CRISIL, and PlaNet Finance); credit ratings by credit rating agencies (Standard and Poor's, Fitch, Apoyo, Class, Pacific Credit Rating, and Equilibrium); guides for analysts, including the Technical Guide of the Inter-American Development Bank, CGAP's external audit manual, and minimum disclosure guidelines for MFI financial statements. There are also benchmarking projects, such as *MicroBanking Bulletin* and MIX Market. In addition, there are numerous local or national efforts to develop many of the same tools and capacities to support network reporting requirements, apex investment decisions, and inspection visits by bank superintendents.

These appraisal tools may effectively assess an MFI's overall financial performance. But they typically do not test the veracity of the underlying information. Appraisal work plans typically focus on loan portfolio administration without delving much into a detailed reconciliation of loan file documentation, accounting records, and loan tracking system reports. The appraisals typically assume that the information reported is correct, and make that assumption based on the existence of an acceptable audit report. Conventional audits usually include some tests of these systems, but they are seldom intensive enough to justify much confidence in the accuracy of system reports, particularly loan tracking reports.

The following example demonstrates this point. In a typical audit, letters are sent out to a random sample of loan clients asking them to verify the loan they received, their outstanding balance, their latest payment, and any other pertinent information. Clients are asked to send the letter back to the auditor if they disagree with any of the information provided in the letter. The auditor assumes that if no letters come back, there are no disagreements. The flaws in this assumption are obvious to anyone with experience with the typical clientele of an MFI.

Due diligence in an MFI must go further than conventional methods to verify performance precisely in the areas that typically challenge MFIs. These due diligence² guidelines are designed for that purpose.

A THREE-TIERED APPROACH

This document guides the analyst through a three-tiered approach for assessing how well an MFI's loan portfolio is performing and how well it is managed. The tiers build on each other, with each tier using more sophisticated analytical procedures and more evaluation staff resources than the

² These due diligence guidelines deal specifically with portfolio quality and management. A complete due diligence process in an MFI would involve the many other areas that are typically included in a full due diligence exercise.

previous tier. A due diligence process that incorporates all three tiers offers the greatest precision and highest degree of certainty about the actual level of loan portfolio risk.

Tier I. This is a five-day review of the MFI's basic policies, procedures, and systems for managing and reporting on its loan portfolio. It is both a high-level analytical review of portfolio trends and a stock-taking exercise. In the stock-taking exercise, the analyst collects the MFI's full inventory of credit policies, procedural manuals, key accounting policies, and financial and performance reports. The Tier I assessment is based largely on the completeness and coherence of this inventory and on interviews with management about portfolio trends and the policies, procedures, and systems for managing the loan portfolio. The collection of documents also provides the basic information for Tier II analysis.

Tier II. This is a 10–14 day assessment of whether MFI operational practices are consistent with policies and procedures and with standards of best practice in microcredit portfolio management. The analyst verifies that accounting policies and reporting formats are consistent and based on sound practices; that credit department staff conduct operations according to policy and procedural guidelines; and that the MFI does not regularly engage in practices that generate unmeasured credit risk, such as reclassifying loans, refinancing, and granting parallel loans. The Tier II assessment is based primarily on how closely the MFI's practices match internal policies and how reports match industry standards of best practice.

Tier III. This is a 3–4 week exercise that includes detailed testing of transactions to confirm the portfolio quality through a sampling of loan files, accounting files, and the loan tracking management information system (MIS). The Tier III audit uses statistical sampling methods that support conclusions, within acceptable levels of confidence and error, about real arrears levels and, more broadly, the risks related to accounting practices and credit policy. The Tier III conclusions are supported by the results of the audit—namely, whether portfolio performance is accurately reflected in accounting and performance monitoring reports.

The Tier I review should be required as a part of any credible external assessment, appraisal, or ratings exercise. It will give the analyst an overview of recent company trends that may affect the loan portfolio and a basic but comprehensive look at the MFI's policies, procedures, and reports. The evaluation incorporates enough discussion, cross-references of key performance indicators, and accounting and MIS review to provide a sense of whether the MFI at least has the basic tools to manage a portfolio. The analyst will make qualitative and subjective judgments in a Tier I review, so the value of

the conclusions will depend greatly on the analyst's level of expertise. It is often sufficient to detect glaring deficiencies. However, investors that require more robust evidence of actual performance will need to proceed at least to Tier II.

A Tier II review is a minimum requirement for donors, investors, and ratings agencies that evaluate MFIs for potential investment. The Tier II analysis confirms that the MFI's policies, procedures, systems, and reports comply with minimum industry standards and that they are in fact used in MFI operations down to the branch office level. Tier II conclusions about MFI performance and overall management and operational capacity are supported as well by an assessment of the accounting and portfolio tracking systems. The Tier II appraisal also draws on the subjective judgment of the analyst. However, the extensive interviews and systematic cross-checking of policies and actual practice provide the analyst with multiple channels of investigation into all parts of the organization.

Tier III due diligence is recommended for investors or regulators that need a quantitative and statistically certain measure of portfolio performance and management. This includes banking superintendents, investors considering a significant equity investment, and investment banks preparing the MFI for accessing capital markets. Tier III provides statistically significant tests of loan quality and the integrity of reporting and internal control systems.

The incremental approach to due diligence enables the potential investor or donor to confine the analysis to the level of certainty they need, thereby avoiding unnecessary time and expense. The analysis can be halted when the desired level of certainty is obtained. If, for example, a Tier I examination reveals incoherent credit policies and accounting practices that are not transparent, there may well be no point in a strict statistical analysis of the full portfolio. For some investors, there will be no need to extend the analysis beyond the point that significant portfolio problems are detected. However, should it be necessary to quantify more precisely the extent of the arrears, refinancing, or fraud, the analyst can employ the next level of analysis.

CONTRACTING GUIDELINES

The due diligence sponsor is advised to follow three basic guidelines for contracting an analyst to use this methodology:

- Select an analyst, or analyst team, with the requisite skill set.
- Work with the analyst to define the scope of work and workplan.
- Clearly define expectations about what the sponsor needs to know to make its decision, and the desired levels of precision when supporting conclusions based on statistical sampling.

Contracting for a Tier I exercise should be fairly straightforward. The scope of work is already explicit in these guidelines and will not vary significantly.

The Tier II guidelines also provide a comprehensive scope of work. However, the Tier II exercise is more dynamic in that the analyst must be able to direct efforts toward problem areas as they are discovered. The sponsor and analyst should develop a workplan that combines the Tier I and Tier II instructions and that anticipates mid-course adaptation at key points. The first checkpoint will be just before the field visit, when the analyst knows the condition of the MFIs' basic operating documents. The second will be after the analyst has interviewed headquarters management staff. At this point, both the sponsor and the analyst should expect to review and adapt the remaining workplan based on initial findings.

The Tier III exercise includes carefully selecting the analyst team and defining the scope of work. These elements will vary depending on the objectives of the sponsor and the characteristics of the MFI. The lead analyst or analysts must have the capacity to organize the Tier III procedures to test the conclusions of the Tier II assessment. This requires extensive experience with MFI management and evaluation. The Tier III team must also have the requisite skills in financial and statistical analysis, spreadsheet use, and auditing procedures. The most feasible way to construct such a team is to hire a lead analyst, who in turn hires a supporting analyst and/or a local auditing firm that is familiar with the microfinance industry and with statistical sampling methods. As in the Tier II exercise, the scope of work should anticipate review and adaptation of the workplan at the key checkpoints. In Tier III, this is especially important as the analyst makes decisions about how to sample the portfolio in the audit. The analyst, audit sponsor, and the MFI are encouraged to design the sample method with clear expectations about the levels of certainty in the results.

Due diligence sponsors should make a special effort to clarify all expectations when working with audit firms. The three-tiered approach is more extensive and more detailed than the scope of conventional audits. The contract with the auditor should specify both the procedures and the auditor's responsibility for formulating conclusions on the results. Many auditors are disinclined to use any but the standard procedures employed by their firm. Even firms that agree to conduct the procedures may not be willing to issue an opinion on their results. In these circumstances, sponsors will do well to hire a lead analyst who is responsible for formulating final conclusions and for subcontracting and managing the audit firm.

Sponsors that require a precise valuation of the portfolio may need to contact an audit firm and discuss the level of sampling required to achieve the desired results. The design and cost of such an audit will likely surpass the typical scope of a Tier III audit. Statistical conventions for population stratification and sample sizes will require fairly large samples by branch office, lending product, client type, and even credit officer. Large audit firms have their own way of designing samples and will probably insist on using their internal systems as a condition for issuing an official opinion.

1. TIER I DUE DILIGENCE

Tier I due diligence encompasses what should be the first step in any assessment of an MFI's performance, credit operations, and accounting practices. The primary objective of this review is to determine if the MFI has adequate policies, operating systems, monitoring, and management capacity to sustain portfolio quality. The analyst will collect documents and reports, conduct a basic review, and interview top management about the basic business model of the MFI and recent trends. This assessment should not require more than two days in the head office, plus preparation time of approximately three days.³

Potential investors and donors should be aware that the Tier I assessment does not attempt to determine whether the MFI complies with its own policies, or whether its reporting systems are accurate. However, a Tier I assessment will provide a basic understanding of portfolio management that is considerably better than the results achieved through a mere desk review of reports and documents. On-site interviews with senior management, combined with an earlier desk review, are often sufficient to detect material deficiencies, or to confirm the consistency and comprehensiveness of the MFI's basic organizational infrastructure.

The Tier I process will typically consist of four steps:

- Gather information before the field visit.
- Conduct a desk review.
- Conduct a field visit.
- Prepare the final analysis.

1.1. Information Requirements

The process of gathering information is the lengthiest step in Tier I, and it will provide the analyst with important clues about the capacity of the MFI to manage its portfolio operations. The analyst should gather as much

³ The time required to collect the necessary documents from the MFI before the field visit can vary greatly. If documents are not collected before the visit, more in-country days will be required.

information as possible from sources both inside and outside the MFI. The following is a summary of the required documents. (See Section 1 tables in Annex I.)

Financial reports

- **Audited financial statements** (balance sheet, profit and loss, and cash flow) for the past two complete fiscal years. The audited financials serve as a benchmark for the other sources of information in the desk review, as they represent an outside validation of the information provided by MFI management. The audited financial statements report should consist of an auditor's opinion, financial statements, and notes to the financial statements. The analyst should ask for the complete report, including the management letter if the auditor provided one, and the MFI management's response to the auditor's report.⁴
- Current year-to-date financial statements if more than one quarter has elapsed
- Supporting internal financial reports for the same periods that provide sufficient detail of the loan portfolio (classification by risk/reserve categories), reserves, income, and expenses
- Current liquidity and asset and liability management report

Accounting policies. This will consist of an accounting policy manual and memos related to the following transactions:

- Accounting of loan balances by arrears classification
- Rescheduled loans
- Loan loss provisions,⁵ loan loss provision expenses, loan write-offs, and recoveries (it is particularly important to get a clear statement of the MFIs policies in these areas)
- Fee and interest income on loans, including the accrual of interest
- Allocation of client payments to outstanding balances
- Liquidation of collateral
- Any noncash methods of loan repayment (e.g., in-kind, refinancing old loans with new ones)

⁴ For further detail on the audit of MFIs, see *External Audits of Microfinance Institutions: A Handbook*, CGAP Technical Tool No. 3 (Washington, D.C.: CGAP, December 1998), especially pages 22–23.

⁵ This is sometimes referred to as impairment allowance, impairment expense, or impairment loss.

Credit policies and procedures. The MFI should have documents that provide clear and comprehensive guidelines for portfolio and delinquency management. These documents should include any credit-related policies and procedures manuals or memos to staff.

Portfolio reports. The loan portfolio reports are typically produced by the MFI's management information system (MIS)⁶ and provide detailed information about lending activities. The MIS should be able to produce the following reports for the analyst:

- Portfolio classification of loans and amounts by number of days delinquent
- Comparison of actual loan repayments to scheduled repayments (during the past year or quarter)
- Breakdown of portfolio by loan product (lending methodology), including number of active loans, total portfolio, and portfolio quality for each category
- Portfolio reports by branch and/or loan officer (including portfolio size, details on products, portfolio quality)
- Detailed reports on restructured and refinanced loans
- Summary portfolio performance reports for branch managers, senior management, and board of directors

Agent banking policies and procedures. Some MFIs contract with third-party agents who execute some aspects of the portfolio management on the MFI's behalf—for instance, formation and management of borrower groups. In such cases, the analyst will have to assess the policies and procedures that the MFI employs to manage the agent, and the risks associated with the agent's participation. MFIs may use agents for any combination of services and therefore the analyst must be able to identify the policies and procedures that are necessary in each case. The analyst should be able to gain a basic understanding of the role of the agent from the following documents:

- Contracts or other agreements with agents
- MFI guidelines for the agent (e.g., client eligibility requirements, reporting requirements, etc)
- MFI internal policies and procedures for management of the agent's services

⁶ For further information on the development of quality MIS for MFIs, see *Management Information Systems for Microfinance Institutions*, CGAP Technical Tool No. 1 (Washington, D.C.: CGAP, February 1998).

- Agent and MFI reports on agent activity

Assessments, appraisals, and external evaluations. The MFI should send the analyst the report generated by any assessment, appraisal, or external evaluation that has been done during the two previous years. This information is generally confidential and should be treated as such by the analyst. Increasing numbers of these reports are being prepared by ratings agencies for affiliate networks, donors, and investors.

1.2. Desk Review

The analyst should prepare for the site visit with a desk review organized around three objectives. One objective is for the analyst to gain an understanding of the business model and operations of the MFI, including the most recent growth, provisioning, and write-off trends. This will guide the analyst's interviews with senior management. The analyst should also discuss any major changes in the market or in MFI operations and determine how these might affect portfolio management. A second objective is to determine if the MFI has adequately documented policies, procedural manuals, and financial and portfolio performance reporting. The ability of the MFI to provide these documents is the first indication of the management capacity and professionalism of the institution. Anything short of immediate delivery of a complete set of documents and reports should guide the analyst toward areas that require special attention during the field visit. And the third objective of the desk review is to identify policies or performance that deviate substantially from best practices of similar MFIs.

The Section 1 tables in Annex I serve as an appraisal guide for the analyst. The main components of the analysis are summarized as follows:

The MFI Operating Environment. Most of this information will be gathered from interviews with senior management during the field visit. However, the analyst should gather information from www.themix.org to compare the MFI to competitors in the market (or similar MFIs elsewhere) and to general market trends.

Financial Reporting and Performance. The analyst should assess the overall financial performance of the MFI as well as the quality of the underlying information.

- Accounting policies and financial reports

It is very important to confirm that accounting policies and report formats use accepted standards for the key variables that reflect portfolio performance (e.g., interest accrual, arrears classification, loan loss provisioning, write-offs, etc.).

■ **Reporting consistency**

It is important to verify that the amounts are consistent among reports, especially the portfolio balances reported in the loan tracking system and on the balance sheet. Discrepancies are common because data often come from different sources or data flows. The analyst should discuss discrepancies with MFI management to determine whether management actively reconciles discrepancies and whether the discrepancies represent a material deficiency in the reporting system.

■ **Financial Performance—Assets**

The financial analysis should focus on the evolution of key indicators over time, looking for abrupt changes or performance that deviates from normal standards. Key indicators include the following:

- Growth rates of loan disbursements and portfolio balance
- Portfolio in arrears
- Loan-loss provisions
- Write-offs

■ **Financial Performance—Income and Expenses**

- Yield on portfolio, including a yield gap analysis that compares actual with expected income⁷
- Cost of funds
- Provisioning and write-off expenses as a percentage of the average loan portfolio
- Operating expenses

The analyst will be guided to a great extent by his or her own judgment about the indicators that best reveal portfolio quality in each particular case.

⁷ This quick and very effective check for hidden arrears in the portfolio is discussed in Annex II.

There may be good reason to make use of additional indicators of financial performance.⁸

The analyst will also want to consider the MFI's performance against peer institutions. MFIs differ widely in the clients they serve, their methods of managing portfolio risk and delinquency, their institutional structure, and the legal and regulatory environments in which they operate. In addition, contextual factors, such as geographic location, local market conditions, and age of the institution, influence performance indicators.

In recent years, *MicroBanking Bulletin* (MBB) has begun to address the problems of peer group analysis. MBB tracks the financial performance of over 700 MFIs worldwide (www.mixmbb.org). Although individual program results are confidential, MBB displays results for peer groups of similar institutions that the analyst can use as a guide to determine where the performance of given institutions fall. In addition, affiliate networks, such as ACCIÓN International, FINCA, CASHPOR, MFN, and SEEP, may have internal databases on which to draw peer comparisons. Finally, the analyst can look at the performance of other individual MFIs in the country at MIX Market (www.mixmarket.org).

Credit Policies and Procedures. A clearly documented credit policy is a necessary condition of prudent lending. The MFI's lending policies should establish the necessary authority, rules, and framework to operate and administer its loan portfolio and manage risk. The policies should be appropriate to the size of the institution and the nature of its activities, and they should be consistent with prudent banking practices and relevant regulatory requirements. The policies should be broad and not overly restrictive in setting guidelines to maintain sound credit appraisal and approval standards and control, manage risk, and deal with problem loans.⁹

The desk review of credit policies and procedures should focus on four key questions:

- Are the eligibility criteria and appraisal and approval procedures adequate and clearly documented to ensure consistent loan analysis?

⁸ Several publications explain the indicators commonly used in the microfinance industry: See Tillman Bruett, ed., *Measuring Performance of Micro-finance Institutions: A Framework for Reporting, Analysis, and Monitoring*, SEEP and ACT (Washington, D.C.: USAID/Accelerated Microfinance Advancement Project, forthcoming); CGAP, *Selected Definitions of Financial Terms, Ratios and Adjustments for Microfinance*, Microfinance Consensus Guidelines (Washington, D.C.: CGAP, 2003); Joanna Ledgerwood, "Sustainable Banking with the Poor" in *Microfinance Handbook: An Institutional and Financial Perspective* (Washington, D.C.: IBRD/The World Bank, 1998); CGAP, *Measuring Microcredit Delinquency*, Occasional Paper 3. (Washington, D.C.: CGAP, 1999).

⁹ Board of Governors of the Federal Reserve System, *Commercial Bank Examination Manual*. Division of Supervision and Regulation (Washington, D.C., March 1994).

- Do the application and approval forms reflect the loan analysis and approval procedures?
- Is the approval process structured with adequate levels of authority and control?
- Does the MFI have loan policies commonly associated with poor performance?

Portfolio Reporting. The desk review of portfolio reports is primarily a stock-taking exercise. The analyst reviews the key reports to determine whether the MIS generates a complete set of reports that covers all necessary areas of credit operations, and whether the balances match the financial reports.

Agent Banking.

Table 1.7 presents a framework that the analyst can use to identify the key risks associated with the MFI's use of third-party agents and assess the mechanisms that the MFI employs to manage them.

Management Control of Portfolio Performance. Even in a Tier I exercise, the analyst should be able to find evidence of management oversight and control of portfolio performance. The level of detail and frequency of portfolio reports, and the manner in which they are actually used, will provide important clues. The analyst should pay close attention to level of development of internal control and audit systems.

1.3. The Field Visit

The field visit provides the analyst with an opportunity to gather missing information and ask clarifying questions, to check for consistency between MFI policy and management's understanding of those policies, and ultimately to form an opinion about senior management capacity.

The desk review should prepare the analyst with a list of missing documents and reports as well as questions around key issues. It is not uncommon for the analyst to devote a significant share of the field visit to simply completing the document inventory and asking clarifying questions about the policy documents and reports. The analyst may need to spend time with junior staff in the organization to understand exactly how key ratios relating to loan portfolio performance are generated and the basis for their calculation.¹⁰ Managers rarely understand the exact manner of their calculation,

¹⁰ For further information on the various methods of measuring delinquency and the pros and cons of each indicator, see Rosenberg, *Measuring Microcredit Delinquency: Ratios Can Be Harmful to Your Health*, CGAP Occasional Paper 3 (Washington, D.C.: CGAP, 1999).

even if they think they have given clear orders for how they should be calculated. It is worth stating again that the analyst may learn the most about the MFI from managers' ability to produce a complete set of these documents and reports and explain how they are used.

The field visit should begin with a meeting with the MFI's senior management team. The meeting should include discussions of the economy, regulatory environment, the state of the microfinance market in the country, and the institution's clients. Through these discussions, the analyst should gain an understanding of the context in which the MFI operates and disburses credit.

The analyst should then hold subsequent meetings with members of the management team to discuss the MFI's loan portfolio performance and management. These face-to-face meetings should cover all of the policies and practices of the institution that are listed in the Section 1 tables in Annex I. This process is iterative in that the analyst will ask similar questions of the general manager, chief financial officer, credit manager, and credit officers of the head office. Answers to these questions should be consistent among all members of the team and should correspond to the stated policies of the institution.

Analysis of credit policy should be grounded in discussions with both management and credit department staff and with reference to the credit manuals. The analyst must look at the principles underlying an MFI's credit methodology to answer this essential question: Are there clearly defined and consistently applied credit policies? There is frequently a difference between what is printed and what is practiced. For this reason, what management and staff say and do is always more important than what is printed in the manual.

1.4. Final Analysis

The analyst needs to form an overall impression of the MFI's portfolio risk. Much of this impression depends on the analyst's confidence about the trustworthiness of the information and the senior management team. The analyst should consider the following:

- Transparency of data
- Ease with which data are provided
- Top managers' familiarity with loan portfolio quality indicators and reports
- Consistency of information across several MIS reports
- Staff commitment to ironing out inconsistencies

- General environment of orderliness and internal control
- Presence of actual *ex-post* control mechanisms
- Clarity in all aspects of the MFI's operation

If the analyst concludes the Tier I exercise with an uncomfortable feeling, chances are high that the results of Tiers II and III exercises will be substantially worse. Rarely do microcredit portfolios look better on closer examination than they do at the outset.

2. TIER II DUE DILIGENCE

Tier II due diligence builds on the Tier I exercise.¹¹ After completing all of the tasks for Tier I, the analyst completes five additional areas of analysis:

- Integrity and completeness of the MIS
- Verification of loan classification, provisioning, and write-off procedures
- Actual performance of credit operations, especially in branch offices
- Degree to which the work of individual loan officers reflects MFI policy
- Integrity and completeness of individual loan files

The essential question of Tier II is whether or not the policies and procedures presented by senior management and in MFI documents is reflected in practice at the operational level and whether those operational practices are sound. In Tier II, the analyst engages staff in the credit, accounting, and information technology departments and, most importantly, the branch offices. The process is iterative, sometimes requiring the analyst to consult with several departments to confirm how transactions are recorded, how reports are generated, and how all loan management procedures are actually carried out.

A Tier II exercise may be more effective if conducted by a team of two analysts, for example one with financial analysis skills and the other with credit operations experience, to bring a wider range of experience to the task. The analysts are likely to benefit from comparing perspectives and discussing findings.

¹¹ For the sake of simplicity, the remainder of this section will refer only to the additional work required in a Tier II exercise. It is also important to clarify that a Tier I analysis conducted in a Tier II exercise will usually be more robust than if carried out alone. Although the analyst asks the same questions in both cases, in a Tier II exercise the analyst has more opportunities to collect, verify, and analyze information.

2.1. MIS Review

In Tier II due diligence, the analyst will focus on verifying the accuracy of reports and the capabilities of the accounting and portfolio tracking systems. The Tier I review will likely guide the analyst toward the areas of these systems that merit further study. A lack of clarity around accounting practices, or discrepancies among reports, provide important clues for further investigation.

The most effective method for testing accounting practices and reporting accuracy is to audit the transactions on a sample of loans, following each transaction through the portfolio tracking and accounting system. The analyst will need to first develop a spreadsheet template that replicates all of the transactions associated with a single loan: disbursements, fee assessments, interest calculation, distribution of principal, interest and fee payments, arrears calculation, and so forth. The formulas must precisely reflect the policies and procedures for these transactions. The analyst then selects a sample of loans from the accounting system, collects the corresponding contracts, and prints a report from the portfolio tracking system that has a full transaction history for each loan. The analyst enters the disbursement and payment transaction information from the loan report manually into the spreadsheet template so that the spreadsheet formulas calculate the running balances, principal, interest and fee allocation, and arrears status. The analyst compares the result of the spreadsheet template to reports generated by the portfolio tracking system.

The analyst confirms that the transactions are passed accurately into the accounting system. The analyst should also inspect the physical receipts associated with the disbursements and client loan payments. This completes a full audit of the transactions that are reflected in the balances that appear in the financial statements and portfolio reports.

In this exercise, the analyst will confirm whether the portfolio tracking system (*i*) reflects the exact terms and conditions of the individual loan contracts, (*ii*) accurately calculates and reports principal, interest, and fee distributions, (*iii*) accurately calculates the arrears classification of the loans, (*iv*) produces accurate reports, and (*v*) passes the information accurately to the accounting system.

The analyst should conduct the transaction audit on a sample of loans that includes examples of all the MFI's lending products. This sampling technique makes no attempt at statistical significance. It simply helps the analyst understand the details of the loan products, focuses discussion with staff, and detects systematic deviations from stated policies.

The analyst should also comment on whether the accounting and loan tracking system are capable of expanding with the MFI. The challenges and potential of these systems vary significantly. Custom-designed software, off-the-shelf software, and systems purchased from other MFIs require different skill sets to operate and maintain. The analyst should assess whether the MFI has the resources, or access to the resources, to maintain the system it is using.

2.2. Loan Classification, Provisioning, and Write-offs

The Tier II analysis should evaluate the MFI's method for classifying its portfolio, estimating and provisioning for loan losses, and writing off and recovering bad loans. The evaluation should compare real losses to provisioning levels. For most MFIs, the risk classification system should be based on repayment performance as well as historical patterns associated with factors such as specific lending products, guarantee coverage, economic sectors, geographic location, and branch office. MFIs with finely tuned classification criteria use classifications not only for provisioning but also to set differential risk-based interest rates.¹²

2.3. Branch Office Management

This part of the Tier II exercise focuses on how well the MFI manages credit operations through the branch offices. Most of the information for this analysis is gathered through interviews with credit department management and branch office staff. The analyst should structure the analysis around five basic areas.

Distribution of authority and responsibility. The analyst should map how the key credit activities and decisions are organized between headquarters and the branch offices. Ultimately, the analyst will be looking for an appropriate balance of operational efficiency and control in the MFI's management of lending targets, loan approvals, cash management, accounting, and reporting.

Performance management. The analyst should pay special attention to how branch office performance is managed. The mapping exercise should reveal how responsibility is distributed for setting performance targets, gathering performance indicators, performance reporting, performance review, and management response to performance achievements. The analyst should

¹² The ACCIÓN CAMEL, Technical Note, Microenterprise Best Practices, p. 42.

expect to find robust systems for measuring performance and decisive management response to both good and poor results.

Core operational policies. The operations most directly related to portfolio quality are loan analysis and delinquency management. The interviews should reveal staff understanding and competency in these areas.

Consistency between policies and practice. The analyst should pay special attention to the consistency between how things are done at the branch and how headquarters management thinks things are done, in all areas of credit operation. Discrepancies reflect lack of management control.

Branch office morale. Staff morale is an important indicator of current and future portfolio performance. Low morale is often a product of staff frustration over ineffective policies, inadequate management, poor compensation, or chronic poor portfolio performance. Sustained portfolio performance is unlikely with demoralized staff.

2.4. Loan Officer Performance

Loan officers are one of the most important sources of information about lending operations. They carry out most of the procedures, and they are closest to the clients. The analysts should expect to spend at least three full days with the loan officers, away from senior management, to capture the reality of field operations. The analyst should use informal conversations with loan officers to cover the topics of portfolio quality, how closely lending policies are followed, how flexible they are, routine contact with current clients, loan rescheduling/refinancing, and delinquent loan procedures. Analyst should be careful how they question loan officers to avoid intimidating field staff and impeding the discussions.

Analysts should also accompany loan officers on client visits to witness first-hand how procedures are followed in the field. On these visits, analysts should be able to get a sense of the client's history with the MFI, level of satisfaction, relationship with loan officer, and so forth. Discussions with clients should be brief and unstructured with a few open-ended questions.

The analyst should also review the MFI's training program for credit officers and any incentive systems to encourage good performance. Incentive systems should be based primarily on portfolio quality. Incentive systems that reward portfolio growth without quality will undermine rigor in loan selection and eventually portfolio performance.

2.5. Agents

If a non-employee agent or agents carry out some part of the MFI's portfolio management, the analyst should discuss the arrangement with senior MFI management and visit the agent or agents. In the case of a formally organized agent, the analyst ideally would conduct an appraisal similar to the assessment of MFI branch office operations. However, given the independent status of agents, and in some cases the large number of them, however, the analyst will have to work with whatever access channels and data are available.

2.6. Loan Files

The loan file review will reveal whether loans are adequately documented and whether lending operations comply with MFI credit policies. Analysts prepare for the loan file review by developing a *procedural audit template* for each type of loan. The template consists of a step-by-step checklist of all procedures and policy guidelines associated with the analysis, approval, conditions, disbursement, and management of a loan. Analysts typically construct this checklist from credit manuals and interviews with credit department staff.

Analysts will then perform the audit on a small, random sample of loan files in each branch that reflects a range of loan products, credit loan officers, loan size, delinquency, and refinance status. These may be the same files used for the MIS audit. The selection makes no attempt at statistical precision, but rather it is an informal reflection of the composition of the branch portfolio. The analyst runs through the checklist and fills out a template for each loan, noting compliance or deviation from every policy and procedure. It is important to classify each procedure so that the analyst can focus on material discrepancies and determine whether they are clustered in a specific stage of the process (i.e., analysis, approval, disbursement, etc.). Analysts should be especially watchful for evidence of rescheduling or refinancing loans, or other means of "evergreening."¹³ This should be done early in the branch office visit so the analyst can discuss significant discrepancies with staff.

2.7. Final Analysis

Like the Tier I analysis, the Tier II analysis will be guided by judgment. However, the Tier II exercise will provide the analyst with a wide range

¹³ A loan may be rescheduled by changing the original amortization schedule. In a refinanced loan, the original loan is "paid-off" by the new loan, which has a new amortization schedule.

of opportunities to evaluate whether the MFI conducts business according to its policies as well as to observe signs of success or failure. Ultimately, the analyst should be able to present a well-formed opinion about the core performance areas, substantiated by observation and analysis.

3. TIER 3 DUE DILIGENCE

Tier III due diligence aims to achieve a **quantifiable level of certainty** regarding the quality of the loan portfolio that would satisfy a commercial investor. The exercise uses statistical methods to verify individual account balances, measure the level of compliance with lending policies and procedures, and check for material discrepancies and fraud.

The exercise will enable the analyst to answer three basic questions with statistical certainty:

- Do the portfolio tracking and accounting systems accurately reflect loan balances, transaction activity, and portfolio risk?
- Does the MFI rigorously follow sound lending policies and procedures?
- Does the MFI have adequate systems of internal control to ensure robust performance monitoring and compliance with policies and procedures?

A Tier III analysis is appropriate for a third party that requires a higher level of certainty about portfolio performance than is normally available from an audit or ratings report. This certainty may be necessary for commercial investors, bank regulators, or a strategic investor, any of whom may want to establish clear benchmarks with MFI management about improvements to lending policies and operating systems.

3.1. Audit Scope

Analysts define the scope of the Tier III audit based on their assessment of the Tier II results. Specifically, analysts must use judgment to determine which reports, accounting policies, and loan management procedures have significant impact on the risk of portfolio performance, and then identify the specific data to audit. These decisions will likely require some modifications to the scope and organization of the MIS and procedural audit templates used in Tier II.

At a minimum, the Tier III MIS audit will go further than the Tier II exercise by confirming the payment vouchers and general ledger entries asso-

ciated with each of the disbursements and payments that appear in the loan tracking system.

- For each sample loan, compare the disbursements and payments that appear on the loan summary report with the accounting vouchers that support actual disbursements and payments. Take note especially of how payments are made (cash, check, post-dated check, new loan, repossession of collateral, other).
- Follow each of these payments through to the general ledger, and check compliance with the MFI's policies for recording interest and principal amounts, and policies for noncash payments.

The Tier III procedural audit should include an audit of second or third loans to the same client. The audit should confirm that the previous loans were paid off according to MFI policies.

- Determine whether the client's prior loan was repaid by a noncash or partial cash payment (through rescheduling, refinancing, post-dated or third-party checks, or receipt of collateral or equipment). This is done by reviewing the final two or three payments of the client's prior loan to determine repayment behavior. The final payment voucher of the prior loan should be checked to determine actual means of repayment.
- Determine whether the increase in loan and payment amounts is consistent with MFI policy, and generally reasonable.

The analyst will also need to create a sample specifically for making field visits to the clients. This is especially important if loan officers manage cash payments in the field. The MFI should help introduce the analyst to the clients by presenting these visits as a "client-service evaluation."

- The main objective of the visit is to compare the client's records or recollection with the repayment history and arrears status in the loan summary report. Compare their understanding of their repayment status with the loan portfolio delinquency report.
- If a sample client is unavailable, the analyst should visit the sample client's neighborhood to ask other clients in that vicinity to confirm the sample client's existence and business activity.
- Determine how cash payments are actually made to the MFI. For example, are payments made to loan officers in the field? Do group leaders make the group's payment to the MFI office or to a bank? Determine what documentation is provided to clients for the cash

payments. It is particularly important to focus on the time between the actual repayment and when that repayment is entered into the MIS of the MFI.

- Determine the veracity of the basic information on the loan application and loan report.
- Look for evidence of fraud, such as loans granted to nonexistent groups, kickbacks of any of the loan amount to the originating loan officer, bribery, or other forms of malfeasance.
- The analyst should **not** be accompanied by the client's loan officer.

In the Tier III audit, the analyst will need to take special care to organize the results of the audits so that the information can be analyzed quantitatively. Two organizational methods are recommended. First, the results of each loan audit should be entered into a separate worksheet template. Second, each template should have a summary table that quantifies the audit results. In the MIS audit, for example, the summary table should capture the loan amount, type, actual versus reported days in arrears, and an indicator for the validation of payment vouchers and accounting entries. In the procedural audit, the summary table should capture the type and number of material deviations from policy. The analyst will want to finalize the audit templates after carefully planning which data and calculations will be required for the analysis.

3.2. The Tier III Sampling Method

The Tier III sampling methodology is designed to provide levels of certainty that are adequate for most investors or regulators to make decisions, without incurring the enormous costs required to achieve high levels of certainty about the precise value of the portfolio. The primary objective of this sampling method is to validate the findings of the Tier II exercise. Specifically, the analyst will weight the sample to test the areas of high risk detected during the Tier II analysis. This added level of statistical certainty makes Tier III conclusions uniquely robust. The Tier III results can, for example, support the following statement:

In our opinion, the MFI's practices comply in all material respects with its policies and procedures for loan portfolio management; internal control systems are sound, adequate, and effective; and, accounting and portfolio reports can be relied upon to generate accurate component balances.

OR

In our opinion, the MFI's practices deviate substantially from its policies and procedures for loan portfolio management; internal control procedures are inadequate to guarantee compliance; and, accounting and portfolio reports exaggerate actual operating income and underreport the portfolio in arrears by as much as 20 percent.

Investors should be aware that the discretionary sampling in Tier III limits to some degree the robustness of inferences about performance levels in the entire portfolio. A focused sample can be very effective at detecting problems and estimating their dimensions, but because it is not statistically representative of the entire population the results cannot be extrapolated to quantify a value adjustment to the balances that appear on the MFI reports. That level of precision is possible with larger sampling methods, but at a cost that exceeds the marginal benefits for most investors or regulators. For most investors, the results of the discretionary sampling will be adequate. For example, a sample of a specific loan product that constitutes 65 percent of the entire portfolio could show that the MFI's reports are inaccurate in over 20 percent of the loans, that over 15 percent loan files show material deviations from lending policies, and that the analyst detects widespread indications of management deficiencies. In such a case, an investor or regulator has sufficient information to take action—declining investment or launching an aggressive corrective intervention.

3.3. Defining the Sample

The Tier III analyst makes two basic decisions about how to sample the loan portfolio. One decision is about what part of the portfolio to sample and the other is how many loans to include in the sample. This means that the analyst uses his or her judgment to select the types of loan to sample and then uses statistical models to create the sample. So for example, the analyst may decide to sample the loans of a specific branch office and then use statistical tables to determine the sample size and a statistical program to randomly select the sample loans.¹⁴

¹⁴ For random selection of loans, the analyst can import a list of loans generated by the MFI's portfolio tracking system into EXCEL, SPSS, or similar off-the-shelf software. When using EXCEL with the "Analysis Toolpak" add-in, click on "Tools>Data Analysis>Sampling." In SPSS, go to "Data>Select Cases" and use the option "Random."

The analyst makes the first decision based on the findings of the Tier II exercise. Portfolio performance deficiencies are typically concentrated in certain branch offices, types of loans, credit officers, or accounting methods. A key advantage of the Tier III sampling method is precisely that it allows the analyst to base the sample on an informed Tier II opinion about likely problem areas. The general guiding principle is to oversample the loans that are likely to reveal practices associated with poor performance. Typical problem areas are

- larger loans
- delinquent loans
- loan types with a history of problems
- loans to clients who were delinquent on previous loans
- loans made by loan officers with higher than average loan write-offs
- loans with peculiar amortization schedules that may be miscalculated in the portfolio tracking system
- loans that are originated or managed by third-party agents

Typically, the analyst will want to design the sample so that it represents the entire portfolio as well as focuses on probable problem areas. For example, the analyst might randomly select well-performing branch offices in addition to branch offices selected specifically for their historic poor performance. Likewise, the global sample of loans might include a random selection from each loan type in addition to a more robust sample of a loan type with known problems. It is important that the analyst justify the rationale for the discretionary sampling and its extrapolation to the portfolio.

The following is an illustrative example of Tier III sampling.

MFI Micronova has three loan products. Business loans were Micronova's first loan product and still make up 45 percent of the portfolio. They are collateral-based loans and significantly larger than any other loan product. Microcredit loans are the newest and make up only 10 percent of the portfolio. They were developed with the help of internationally experienced technical partners and are based on a cash flow analysis of the client's household. Salary loans are 30 percent of the portfolio. Micronova has 12 branches. Five are at least four years old, and together they have 70 percent of the entire portfolio. The other seven branches have been in operation less than 18 months.

The analyst is particularly concerned about the business loans, which have higher reported arrears rates than the other loans, especially in the five oldest and largest branches. Therefore, the analyst decides to sample three of the five large branches and two of the seven newer branches. Within each group, the branches are selected randomly. In each branch, the analyst decides to sample each loan product separately. The analyst is also concerned about follow-up loans and therefore decides to create a sample for each loan product that is half first-time loans and half follow-up loans. Within these categories, the loans are selected randomly.

3.4. Sample Sizes

The choice of sample size depends on the desired level of certainty in interpreting the findings.¹⁵ The relationship of sample size to confidence levels is strictly mathematical: larger sample sizes will produce higher confidence levels and smaller margins of error in extrapolating the sample results to the portfolio. Nevertheless, the analyst will use judgment to determine how much certainty is required. This manual recommends a standard sizing strategy that will probably be sufficient for most situations, but the analyst can adjust it as needed.

The Tier III exercise uses an incremental approach to sampling that allows the analyst to stop when the results produce the desired level of certainty. An initial sample set of 50 loans may return results that are sufficient for some populations. For example, if a sample of 50 loans contains 10 cases of unre-

¹⁵ Refer to the statistical tables in the annex to determine the margins of error associated with different combinations of sample size and proportions.

ported loan rescheduling, the analyst may infer, with 95 percent certainty, that the incidence in the entire portfolio is between 10 percent and 33.7 percent, or a proportion of about 20% with a margin of error of roughly 11% on either side of that value. The range of this estimate is indeed large. However, the analyst may decide that even the lower bound is unacceptable and that the results are sufficient to confirm the initial hypothesis that serious rescheduling problems exist. The analyst has the option of pulling another set of 50 loans for a combined sample of 100. If the analyst were to find 22 cases in the sample of 100, the range would be 12.2–27.8 percent, or a proportion of 22 percent with a lower margin of error of about 8 percent. The analyst may continue to enlarge the sample size and further reduce the margin of error. However, in many cases where problems are detected in the first 50 loans, the slightly smaller margin of error that could be achieved with a larger sample size will not be worth the cost.

Larger sample sizes may be desirable when the analyst wants to gain more precision for good results in the initial sample. For example, if the analyst only finds one problem case in a sample of 50 loans, the 2 percent finding can be extrapolated to the portfolio with a margin of error that places the incidence between 0.1 percent and 10.7 percent. A sample of 300 with six cases would render a smaller margin of error with the incidence in the entire portfolio between 0.7 percent and 4.3 percent. The analyst can use the tables in the Annex I to select the appropriate sample size.

3.5. Quantifying the Results

The final output of the audit should be a set of spreadsheets that quantify the results for each loan. The analyst needs to compile the results of the sample and extrapolate the results to the portfolio. The results need to be expressed in two variables. The first is the incidence of error. The analyst can calculate the proportion of negative findings in the sample and then consult the tables in Annex I to determine the margin of error for extrapolating the sample findings to the entire portfolio.

The second variable is the magnitude of the error. Here again, the analyst needs to use judgment to determine the appropriate metric. As an example, the magnitude of discrepancies in the arrears status of a loan should probably be measured in days (e.g., *the arrears status of loans is, on average, underreported by 17 days*). The increment in loan sizes between first, second, and third loans may be measured as a percentage of the previous loan, or in nominal amounts, depending on how the MFI measures the increments in its own policies. In any case, when calculating the average error, the analyst

should consider the standard deviation in the data set for clues to the underlying cause of the error.¹⁶

The incidence and magnitude variables enable the analyst to quantify the discrepancies. For example, the MIS audit might show that the portfolio tracking system misstates the arrears status in 15 percent of all loans and that the average error is 34 days (arrears is typically underreported). Furthermore, a small standard deviation in the errors (meaning that the errors are fairly consistent) might also lead the analyst to investigate whether the MFI is consistently performing an adjustment that produces the understatement of arrears.

In the procedural audit, the results might show that 35 percent of loan files reflect an average of three material incidents of failure to comply with MFI policies. If the analyst has segmented the procedures into operational categories (e.g., loan analysis, approval, disbursement, file management, etc.), he or she can determine whether the compliance failure is concentrated in specific procedures or spread randomly throughout all phases of loan management.

3.6. Final Discussion with Management

At this stage of the Tier III exercise, the analyst will formulate preliminary conclusions about the overall performance of the MFI, loan management, the integrity of policies and procedures, and the accuracy of the portfolio reporting and accounting systems. The final step in the investigation phase is to present these tentative conclusions to MFI management for discussion.

The final consultation with management serves at least three purposes. First, it engages management in the final interpretation and this helps generate management buy-in to the final report and recommendations. Second, it gives management an opportunity to correct misconceptions and provide perspective that adds important nuance to the final interpretation. Finally, the discussion gives the analyst a final look at management capacity and attitude.

3.7. Analysis and Write up

The quality of Tier III due diligence depends ultimately on the ability of the analyst to interpret audit results together with the more subjective discoveries of the Tier I and Tier II exercises. The analyst should be able to quantify

¹⁶ Excel (or SPSS or any statistical audit package) will calculate the median or mean and the standard deviation. In Excel, use the appropriate @ functions, or in the Analysis Toolpak “Tools > Data Analysis > Descriptive Statistics”; in SPSS, use “Analyze > Descriptive Statistics > Explore.”

material deviations and trace them to their root cause in deficiencies of management capacity, policies and procedures, and systems.

The Tier III report needs to be explicit about the objective of the due diligence sponsor and the sampling method. The rationale for discretionary sampling and extrapolation should be clearly supported by the Tier I and II findings. And the precision and confidence levels of statistical sampling should be clearly explained.

4. GENERAL COMMENTS ON PORTOFOLIO DUE DILIGENCE

In many MFIs, the due diligence exercise will reveal that actual loan portfolio performance is weaker than it appears in official reports. The microfinance industry is still relatively young, and few investors or regulators have developed robust systems for oversight. MFIs, just like banks, have a strong incentive to put their best face forward when it comes to the quality of their assets. And sometimes, their donors or investors or regulators have strong incentives for not questioning strong performance reports. Ultimately, the analyst has to determine whether the weaknesses or discrepancies create material risks that threaten the interests of the MFI's donors, creditors, investors, regulators, or depositors. The analyst's biggest challenge is how to present the findings in a constructive manner. The following observations are meant to provide general guidelines:

- While there is a cure for ignorance, deceit is cancerous. Most MFIs are truly ignorant about the degree or consequences of their poor MIS performance, but once trained, they can become ardent disciples of transparency. In contrast, MFIs that deliberately hide portfolio performance effectively eliminate the possibility of accurate measurement and undermine their own credibility. In practice, an analyst can usually distinguish between those MFIs that think transparency is good management practice and those that think transparency threatens their access to funds.
- A weak MIS will inevitably lead to deterioration of loan portfolio performance. There should be no doubt about this. Anytime there is a basic failure to reconcile the loan tracking system results with the accounting system, or loan delinquency reports do not reflect transactions in a timely or accurate manner, quality will eventually degrade, no matter if current quality looks high.
- The way MFI management deals with a weak MIS says much about its commitment to accurate portfolio reporting. Ad hoc measures

to monitor the portfolio may be adequate while the MFI prepares for a long-term solution. However, hope is not a method: faith in a future, unproven system is no substitute for a well-informed plan for creating a robust MIS.

- There is almost never an easy fix for high levels of systemic portfolio delinquency—for instance, when loans with payments late by more than 30 days constitute over 10 percent of a microloan portfolio or when annual microloan losses are above 5 percent of that portfolio. Even if current levels are not yet extreme, a trend of deteriorating repayment performance is symptomatic of systemic problems in management, policies and procedures, and human resources. Once a portfolio has become significantly contaminated, it takes a long time and draconian measures to bring it back under control. These measures often include replacing loan officers and their immediate supervisors, re-engineering basic credit methodology, removing substantial numbers of existing clients, writing off a large amount of unrecoverable debt, and even changing top management. Analysts should beware of management promises to “get repayment levels up” over the short term if they do not have an aggressive and concrete plan to do more than have their loan officers “work a bit harder” on this aspect of portfolio administration.
- Organizational commitment to portfolio management starts at the top. Analysts should be concerned about MFI managers who do not seem well informed or actively involved in monitoring all aspects of loan recovery.
- There is often disparity between what management believes it has directed loan officers to do and what officers actually do in the field. Many top MFI managers regard a due diligence exercise as an opportunity to reconnect with actual practice in the field and re-establish basic operating principles and procedures, no matter how negative the ensuing results. The analyst should make every effort to present the findings in a way that enables management to take constructive action.
- An astute analyst looks at trends and patterns to interpret individual findings. A problem that is getting better is a very different matter than one that is getting worse. A due diligence sponsor certainly deserves an accurate measure of portfolio performance. Nevertheless, the analyst’s interpretation of management commitment to performance and the trajectory of the MFI will be the decisive factor for most investors. The analyst should be explicit

about the key factors that influence the final recommendation to an investor or regulator.

- Some potential donors or investors may want to engage in a two-step approach to the loan portfolio due diligence process. The first step examines practice in an initial visit, discusses negative findings with management, and allows management time to resolve unhealthy practices. In the second step, the analyst can delve into deeper due diligence once basic issues have been addressed. The appraisal process of can be instructive to MFI management, showing it better ways to manage its organization.

ANNEX I: Appraisal Tables

Table 1.1

Tier I Review: MFI Operating Environment	
KEY ISSUES	APPRAISAL GUIDELINES
What is the growth potential of the MFI's target market?	<ul style="list-style-type: none"> • Profile the size of the target market
Are the MFI's lending products appropriate for the target market?	<ul style="list-style-type: none"> • Profile the lending methodology, including loan conditions for the client (size of loan relative to GDP per capita and effective interest rate) • Review drop out rates
How is the MFI managing competition in its market?	<ul style="list-style-type: none"> • Account for other MFIs offering similar services • Identify competitive advantage of MFI services vis-à-vis competitors (pay special attention to scope and price of services, funding and operational costs of the MFI, and long-term funding capacity) • Assess management strategies for dealing with competition
Do local MFIs generally comply with standards of best practice?	<ul style="list-style-type: none"> • Focus on financial performance, arrears levels, operating cost margins, and adoption of institutional forms capable of funding sustained growth

Table 1.2

Tier I Review: Financial Reports and Accounting Policies	
KEY ISSUES	APPRAISAL GUIDELINES
Annual financial statements are audited by a reputable firm and published in a timely manner.	<ul style="list-style-type: none"> Anything less than publication of the full auditor's report on www.themix.org and the MFI's website requires further investigation into management/owner commitment to transparency and disclosure.
In addition to audited summary financial statements, the MFI has monthly financial reports that provide adequate detail on income sources, expenses, portfolio classification and provisioning, loan products, and branch operations.	<ul style="list-style-type: none"> The level of detail in the financial reports reflects the MFI's ability to manage the loan portfolio and measure financial performance by operational departments, lending and funding products.
The MFI produces daily or weekly reports for liquidity positions, asset and liability management, funding, and any other time-sensitive operations.	<ul style="list-style-type: none"> This level of reporting will depend on the financial structure of the MFI. The analyst should also assess whether management makes adequate use of these reports in the respective areas.
The balances of the detailed monthly reports reconciles precisely with the balances in the audited financial statements.	<ul style="list-style-type: none"> Any discrepancy in the balances of detailed financial reports vs. audited financial statements is an indication of integration problems between components of the accounting system. Management should be able to explain and reconcile any differences.
The portfolio balances in the loan tracking reports reconcile precisely with the balances that appear on the balance sheet.	<ul style="list-style-type: none"> Any discrepancies here warrant careful scrutiny to ensure consistent and verifiable accounting of loan performance from the loan registers all the way to the balance sheet.
The portfolio report classifies the outstanding balance of every loan by arrears categories (this is a portfolio-at-risk classification of the entire portfolio).	<ul style="list-style-type: none"> PAR reports are necessary for an accurate accounting and management of loans in arrears. The arrears classification categories and corresponding loss provisions must be consistent with international standards or the MFI's documented historical experience.
Refinanced or rescheduled loans are clearly segmented in the portfolio classification.	<ul style="list-style-type: none"> These loans should be classified separately and subject to specific provisioning policies.
Accounting for loan loss provisions, provision expenses, write-offs, write-off recoveries, and interest accrual on non-performing loans are clearly presented in the financial statements.	<ul style="list-style-type: none"> These policies and procedures should be clearly documented and their application readily verified in the financial statements. A comprehensive set of policies will enable the analyst to calculate all key indicators related to PAR and loan provisioning/loss expenses over several accounting periods. Policies that obscure clear accounting in this area are a sign of inadequate portfolio management.

Tier I Review: Financial Reports and Accounting Policies

KEY ISSUES	APPRAISAL GUIDELINES
<p>What are the accounting entries related to an individual loan? Are disbursement, interest accrual and repayment transactions precise enough to ensure accurate individual loan tracking and aggregate portfolio reporting?</p>	<ul style="list-style-type: none"> • A robust accounting system will be reflected in portfolio reports that reconcile individual account detail with the global amounts that appear on the financial statements. Anything less is a limit on management's ability to supervise the performance of loan officers and their individual loans.
<p>Is accrued interest income reversed when a loan falls into arrears? How is interest income accrued? What is the treatment of accruals?</p>	<ul style="list-style-type: none"> • Policies governing reversal of accrued income should be consistent with the nature and tenor of the loan. As a general rule, accrued interest should be reversed after no more than 90 days of arrears.
<p>How is cash related to loans paid out, received, and controlled?</p>	<ul style="list-style-type: none"> • Is unrecorded cash in the hands of loan officers for any amount of time between the point of payment and recording in the loan tracking system? (Controls should exist to ensure that cash is accounted for immediately and accurately.)
<p>Can loans be paid off through "in-kind" payments, receipt of collateral guarantees, post-dated checks, rescheduled loans, or any other non-cash means?</p>	<ul style="list-style-type: none"> • Widespread practice of booking loan repayments before the cash is received can significantly exaggerate actual income. The accounting of these transactions should provide a clear trail to the actual cash receipt or write-down.

Table 1.3

Tier I Review: Financial Performance	
KEY ISSUES	APPRAISAL GUIDELINES
Overall financial performance is consistent with industry standards for similar MFIs	<p>Key performance indicators are:</p> <ul style="list-style-type: none"> • Portfolio yield • PAR • Provisioning and loan loss expenses • Operating cost ratio, or cost per borrower as a percent of per capita GDP • ROA
Portfolio quality is good over time, as measured by portfolio at risk (PAR).	<ul style="list-style-type: none"> • Persistent arrears are a sign of management complacency and poor credit culture. • Portfolio trends should be consistent. The analyst should watch for signs of abrupt changes in performance. • As a general rule, MFIs that have total loans more than 30 days in arrears that are greater than 10 percent of the portfolio, or annual loan losses greater than 5 percent, are unlikely to maintain delinquency at sustainable levels.
The effective portfolio yield is consistent with expected yields.	<ul style="list-style-type: none"> • Yield gap analysis is a quick check on hidden non-performing loans in the portfolio.
Is the institution growing at a sustainable rate?	<p>Rapid growth inevitably leads to stress on systems and collection performance. Growth stress is typically evident in these indicators:</p> <ul style="list-style-type: none"> • Portfolio quality • Return on portfolio • Number of clients or disbursements • Number of clients per credit officer • Staff turnover • Client turnover
Is the MFI facing liquidity constraints that affect its ability to disburse loans?	<ul style="list-style-type: none"> • Significant restriction in credit disbursements breaks implicit contracts and is usually associated with deterioration of credit discipline.

Table 1.4

Tier I Review: Credit Policies and Procedures	
KEY ISSUES	APPRAISAL GUIDELINES
Are loan appraisal and approval criteria and procedures clearly documented and adequate to ensure consistent loan analysis?	<ul style="list-style-type: none"> Guidelines may need to be specific to different loan products.
Do the application and approval forms reflect the loan analysis and approval procedures?	<ul style="list-style-type: none"> Forms should be comprehensive and organized to facilitate efficient loan processing.
Is the approval process structured with adequate levels of authority and control?	<ul style="list-style-type: none"> The analyst should be able to diagram the different levels of approval authority and readily identify the control mechanisms. Authority levels should be appropriate to loan amounts and related risk exposure. The system should reinforce the accountability of the credit officer who recommends loans for approval.
How are loan restructuring and renegotiation defined and treated?	<ul style="list-style-type: none"> The definition should include all loans that have had their original terms altered either in amount, interest rate, or amortization period. Check to see if the MFI allows new loans to a client whose prior delinquent loans have not been paid off.
What is the institution's policy regarding multiple, concurrent loans to an individual client?	<ul style="list-style-type: none"> Multiple lending that is not clearly reported to show the total borrowing by an individual client is a recipe for high default.
Does the MFI have clear policies about the size of loans and loan payments relative to the client's ability to pay?	<ul style="list-style-type: none"> Lack of analysis of client repayment capacity will typically lead to eventual repayment problems.
What is the rate of increase in loan amounts and average size of payments for repeat borrowers?	<ul style="list-style-type: none"> Increases should be incremental. The history of arrears will indicate whether the increments are appropriate.
How big are any obligatory savings requirements relative to loan amounts?	<ul style="list-style-type: none"> Obligatory savings reduce the effective loan amount and at some level lead to high client turnover.

Table 1.5

Tier I Review: MIS and Performance Reporting	
KEY ISSUES	APPRAISAL GUIDELINES
Does the MIS generate a complete set of reports that cover all necessary areas of credit operations?	<ul style="list-style-type: none"> • The MIS should be able to generate a client report with a complete history of loans and transactions. • Credit officers should have current reports on applicants and clients. • Credit supervisors should have reports on the activities of each credit officer. • Credit managers should have reports by branch and lending products. • Senior Management and the Board of Directors should have summary reports.
Are the reports timely and accurate?	<ul style="list-style-type: none"> • The analyst should be alert to any comments from the operations, accounting or internal control staff that the credit reports are outdated or not accurate. Claims of inaccuracy should be followed up.
Can the MIS produce reports to show trends over time?	<ul style="list-style-type: none"> • This is critical for trend analysis and strategic decision making.
Is access to the MIS strictly controlled by a hierarchy of access privileges.	<ul style="list-style-type: none"> • Access policies and procedures should facilitate efficient data entry and report generation while guarding against fraud or data manipulation. • Management and staff attitudes about control provide important clues to the integrity of the system.
Does the IT department follow a strict protocol for back up and safeguarding of electronic records?	<ul style="list-style-type: none"> • Infrastructure security must be robust enough to safeguard records in case of catastrophe.
Does the MFI ask its external auditors to carry out MIS audits?	<ul style="list-style-type: none"> • MIS audits should be included in annual audits as a fraud control measure. • Check the terms of reference for the last audit.
Is the IT infrastructure and MIS software adequate for the MFI's next phase of growth?	<ul style="list-style-type: none"> • The analyst should consider whether the MFI has the capacity to expand its system.

Table 1.6

Tier I Review: Portfolio Monitoring and Control	
KEY ISSUES	APPRAISAL GUIDELINES
Does senior management set targets and monitor loan delinquency on a routine basis?	<ul style="list-style-type: none"> This will be reflected in widespread understanding of the targets, frequent delinquency reports, and well-defined action plans for the different levels of staff involved in credit operations.
Can senior management clearly explain the causes and cycles of arrears?	<ul style="list-style-type: none"> The analyst should make the subjective assessment of whether management's understanding of loan performance is supported by portfolio reports and the views of operational staff.
Do the portfolio reports show performance by loan product, branch, and credit officer?	<ul style="list-style-type: none"> It is important that management and staff can track portfolio performance by these key factors. Without this breakdown, management is not able to identify the sources of strength or weakness in credit operations.
Does the institution track payment performance in ways that help it understand client behavior?	<ul style="list-style-type: none"> This capacity will also be reflected in loan appraisal methods and lending products that are specific to client groups.
Do staff incentives include loan portfolio quality as a primary performance marker.	<ul style="list-style-type: none"> Staff who are not held accountable will not produce optimal results over time. Incentive systems that reward growth without quality will encourage poor loan selection and lead to poor performance.
What are the <i>ex-post</i> internal controls employed by the institution, independent of the operations department, that review loan approvals, scrutinize problem credits, evaluate provision coverage, look at trends, and cite documentation exceptions?	<ul style="list-style-type: none"> In a maturing MFI, internal control systems must be robust and well supported by management and the board of directors.
Who handles collection of late payments, the original loan officers or a specialist?	<ul style="list-style-type: none"> The analyst needs to determine if the credit officer has sufficient incentive to ensure that his or her loans are performing.
At what point is a loan sent for collection through the legal system? How effective is this remedy and how long does it usually take to collect?	<ul style="list-style-type: none"> The legal remedy must be efficient and cost-effective. If not, problems will likely accumulate over time and result in large periodic write-offs.
Has fraud played a role in losses?	<ul style="list-style-type: none"> Fraud control and remedies should be robust. The analyst should ask about past cases.

Table 1.7

Agent Banking Policies and Procedures

In cases where the MFI or its staff have outsourced some aspects of portfolio management to a third-party agent or agents, the analyst is advised to follow a three step appraisal process.

1. Identify the precise role of the agent.

A simple mapping exercise can be useful to clarify the respective roles of the MFI and the agent in the different levels of portfolio management:

- Client identification and recruitment;
- Loan appraisal;
- Loan approval;
- Loan disbursement and payment collection;
- Post disbursement client management;
- Portfolio information management.

2. Identify the risks associated with the agent's role.

The analyst will need to consider how any of the following risks might materialize in the agent's role:

- Poor agent performance;
- Inadequate MFI oversight of agent performance;
- Fraud;
- Customer abuse, including collecting unauthorized commissions;
- Lack of customer loyalty to the MFI; and,
- Cash handling risks (theft, loss, miscounting, etc).

3. Assess the mechanisms the MFI employs to manage the risks. The following table summarizes the typical mechanisms.

MECHANISM	APPRAISAL GUIDELINES
Does the MFI have a clear legal contract with the agent?	
The MFI should have a contract or some other agreement document that defines all important aspects of the agent's role, responsibilities, and compensation.	
Does the arrangement generate appropriate incentives for all three parties – the clients, the agent and the MFI – to act in the MFI's interest?	<p>Are measures in place to ensure that the client repays and cannot access future services in case of default?</p> <p>Does the agent have incentive to select good clients and keep those clients loyal to the MFI?</p> <p>Do MFI staff have adequate incentive to monitor agent performance?</p>
Is the MFI able to define clear operational guidelines for the agent role?	The MFI must have an appropriate level of say over the operating procedures of the agent (e.g., eligibility screening, appraisal criteria, collection procedures, etc.)
Does the MFI have adequate control mechanisms to audit agent performance?	<p>This will vary depending on the agent's role. If the agent is conducting appraisals or managing clients, then the MFI should be able to review files and verify the existence of the clients.</p> <p>The MFI needs ways to check whether its staff are using external agents (for instance, group organizers) without its knowledge or in violation of its policies</p> <p>The MFI needs to be able to determine whether its agents are also managing clients for competing lenders, a situation posing serious conflict-of-interest risk.</p>
Does the MFI have adequate reports to monitor agent activities?	The MFI should have access to reports on key agent activities. It may also be relevant for the MFI to generate special portfolio reports for all loans associated with the agent.

Table 2.1

Tier II Review: MIS Review

Note: This table guides the comparison of the results from the analysts' MIS spreadsheet template and the MIS loan report.

KEY ISSUES	APPRAISAL GUIDELINES
Does the MIS accurately classify individual loan principal balances by arrears status?	This is primarily a test to see if the MIS internal calculations on arrears are accurate.
Does the MIS accurately assign individual loans to the correct provisioning category?	Check to see that the classification of individual loans is consistent with MFI policy.
Do individual MIS loan accounts accurately reflect the contractual conditions of the loan contract?	Using the spreadsheet template, the analyst will verify consistency in the following loan conditions:
Do individual MIS loan accounts accurately reflect MFI lending guidelines and accounting policies?	loan amortization interest calculation fees distribution of payments between principal, interest and fees
Does the system generate a schedule for each client that compares actual payment dates and amounts to the original amortization schedule? And does the system generate a consolidated actual vs. scheduled repayment report?	These reports are necessary for tracking client and portfolio performance against the expected repayment schedules. This information is necessary for performing the yield gap analysis.
Are actual disbursements and payments accurately entered into the MIS?	This comparison requires a confirmation of the dates on the physical payment and disbursement vouchers.

Table 2.2

Tier II Review: Loan Classification

KEY ISSUES	APPRAISAL GUIDELINES
Does the MFI have clearly defined criteria for assigning loans to risk categories?	Some MFIs may consider other factors in addition to arrears.
Are risk categories applied consistently to individual loans?	The analyst can test for this on the small Tier II sample of loans; robust assessment will require Tier III analysis.
Are provisioning levels consistent with historic write-off activity?	This will involve calculating write-offs as a percentage of portfolio and tracking the evolution of risk category balances over time. If the MFI has not done such an analysis, are provisioning levels appropriately conservative in relation to international benchmarks?

Table 2.3

Tier II Review: Branch Office Management	
KEY ISSUES	APPRAISAL GUIDELINES
Does the distribution of decision making authority and operational responsibility between headquarters and the branch offices facilitate efficient and controlled operations?	Specific areas of importance: determination of lending targets loan approvals disbursement and payment cash management data entry into loan tracking system accounting reconciliation
Does the MFI have a robust system for managing the performance of branch office operations?	Specific areas of importance: determination of lending and delinquency targets performance data collection performance data reporting performance review follow up actions for good and poor performance
Does the MFI adequately manage the core functions related to portfolio quality?	The analyst should assess management and staff understanding and commitment to loan analysis delinquency management
Are branch office practices consistent with headquarters policy and expectations?	Check for discrepancies or disagreements around policies Are there significant differences between branch offices?
Is staff morale positive?	Check branch office staff attitudes about headquarter policies and management; Note level of staff enthusiasm for reaching performance targets

Table 2.4

Tier II Review: Loan Officers	
KEY ISSUES	APPRAISAL GUIDELINES
Are loan officers adequately trained?	What is the typical education and employment background of a credit officer? Are the MFI training programs adequate?
Do loan officers have an accurate understanding of policies related to each lending product?	Lack of clarity on lending products should alert the analyst to the possibility of widespread problems in the portfolio.
Do loan officers speak knowledgably about the credit risk of their clientele and how to evaluate and control those risks?	This can be observed in discussions about how the credit officer uses personal judgment during loan analysis and dealing with delinquent clients.
Do loan officers receive frequent reports on their portfolio performance?	Report frequency should be daily or weekly to keep the credit officer up to date on pending loan applications, arrears status, and priority cases.
Do loan officers follow vigorous procedures for dealing with delinquent loans?	Credit officers should be very clear about procedures and remedies and show dedication to their implementation. Policies should specify how quickly a delinquent borrower must be contacted, and by whom.
How often do credit officers see clients, and is this in the office or at their place of business?	In general, credit officers should be spending the majority of their time with clients at their place of business, or at their group meeting site. Any deviation from this norm should be well justified.

Table 2.5**Tier II Review: Loan Files**

Note: This table provides general guidelines for interpreting the results of the procedural audit on the loan files.

KEY ISSUES	APPRAISAL GUIDELINES
Does the MFI's loan file template adequately document the essential components of loan appraisal, approval and management?	This is ultimately a judgment about whether the files have the appropriate level of documentation.
Are the loan files complete?	This is a question of whether the loan files actually contain the documents they are supposed to. A complete assessment is only possible in Tier III.
Do deviations from policy or incomplete files constitute a material deficiency?	Typically, the level of compliance will be consistent with the analyst's other findings about how well the MFI conducts business according to well defined policies and procedures.

TABLE FOR EXTRAPOLATING SAMPLE RESULTS TO TOTAL PORTFOLIO

AT 95% CONFIDENCE LEVEL

CASES	SAMPLE SIZE											
	25			50			75			100		
	lower	P	upper	lower	P	upper	lower	P	upper	lower	P	upper
0	0.0%	0.0%	12.0%	0.0%	0.0%	6.0%	0.0%	0.0%	4.0%	0.0%	0.0%	3.0%
1	0.1%	4.0%	20.4%	0.1%	2.0%	10.7%	0.0%	1.3%	7.2%	0.0%	1.0%	5.5%
2	1.0%	8.0%	26.0%	0.5%	4.0%	13.7%	0.3%	2.7%	9.3%	0.2%	2.0%	7.0%
3	2.6%	12.0%	31.2%	1.3%	6.0%	16.6%	0.8%	4.0%	11.3%	0.6%	3.0%	8.5%
4	4.5%	16.0%	36.1%	2.2%	8.0%	19.2%	1.5%	5.3%	13.1%	1.1%	4.0%	9.9%
5	6.8%	20.0%	40.7%	3.3%	10.0%	21.8%	2.2%	6.7%	14.9%	1.6%	5.0%	11.3%
6	9.4%	24.0%	45.1%	4.5%	12.0%	24.3%	3.0%	8.0%	16.6%	2.2%	6.0%	12.6%
7	12.1%	28.0%	49.4%	5.8%	14.0%	26.7%	3.8%	9.3%	18.3%	2.9%	7.0%	13.9%
8	15.0%	32.0%	53.5%	7.2%	16.0%	29.1%	4.7%	10.7%	19.9%	3.5%	8.0%	15.2%
9	18.0%	36.0%	57.5%	8.6%	18.0%	31.4%	5.6%	12.0%	21.6%	4.2%	9.0%	16.4%
10	21.1%	40.0%	61.3%	10.0%	20.0%	33.7%	6.6%	13.3%	23.2%	4.9%	10.0%	17.6%
11	24.5%	44.0%	63.5%	10.5%	22.0%	33.5%	6.7%	14.7%	22.7%	4.9%	11.0%	17.1%
12	28.4%	48.0%	67.6%	12.2%	24.0%	35.8%	7.7%	16.0%	24.3%	5.6%	12.0%	18.4%
13	32.4%	52.0%	71.6%	13.8%	26.0%	38.2%	8.8%	17.3%	25.9%	6.4%	13.0%	19.6%
14	36.5%	56.0%	75.5%	15.6%	28.0%	40.4%	9.8%	18.7%	27.5%	7.2%	14.0%	20.8%
15	38.7%	60.0%	78.9%	17.3%	30.0%	42.7%	10.9%	20.0%	29.1%	8.0%	15.0%	22.0%
16	42.5%	64.0%	82.0%	19.1%	32.0%	44.9%	12.1%	21.3%	30.6%	8.8%	16.0%	23.2%
17	46.5%	68.0%	85.1%	20.9%	34.0%	47.1%	13.2%	22.7%	32.1%	9.6%	17.0%	24.4%
18	50.6%	72.0%	87.9%	22.7%	36.0%	49.3%	14.3%	24.0%	33.7%	10.5%	18.0%	25.5%
19	54.9%	76.0%	90.6%	24.5%	38.0%	51.5%	15.5%	25.3%	35.2%	11.3%	19.0%	26.7%
20	59.3%	80.0%	93.2%	26.4%	40.0%	53.6%	16.7%	26.7%	36.7%	12.2%	20.0%	27.8%
21	63.9%	84.0%	95.5%	28.3%	42.0%	55.7%	17.8%	28.0%	38.2%	13.0%	21.0%	29.0%
22	68.8%	88.0%	97.5%	30.2%	44.0%	57.8%	19.0%	29.3%	39.6%	13.9%	22.0%	30.1%
23	74.0%	92.0%	99.0%	32.2%	46.0%	59.8%	20.2%	30.7%	41.1%	14.8%	23.0%	31.2%
24	79.7%	96.0%	99.9%	34.2%	48.0%	61.8%	21.4%	32.0%	42.6%	15.6%	24.0%	32.4%
25	88.0%	100.0%	100.0%	36.1%	50.0%	63.9%	22.7%	33.3%	44.0%	16.5%	25.0%	33.5%
26				38.2%	52.0%	65.8%	23.9%	34.7%	45.4%	17.4%	26.0%	34.6%
27				40.2%	54.0%	67.8%	25.1%	36.0%	46.9%	18.3%	27.0%	35.7%
28				42.2%	56.0%	69.8%	26.4%	37.3%	48.3%	19.2%	28.0%	36.8%
29				44.3%	58.0%	71.7%	27.6%	38.7%	49.7%	20.1%	29.0%	37.9%
30				46.4%	60.0%	73.6%	28.9%	40.0%	51.1%	21.0%	30.0%	39.0%
31				48.5%	62.0%	75.5%	30.2%	41.3%	52.5%	21.9%	31.0%	40.1%
32				50.7%	64.0%	77.3%	31.5%	42.7%	53.9%	22.9%	32.0%	41.1%
33				52.9%	66.0%	79.1%	32.8%	44.0%	55.2%	23.8%	33.0%	42.2%
34				55.1%	68.0%	80.9%	34.1%	45.3%	56.6%	24.7%	34.0%	43.3%
35				57.3%	70.0%	82.7%	35.4%	46.7%	58.0%	25.7%	35.0%	44.3%
36				59.6%	72.0%	84.4%	36.7%	48.0%	59.3%	26.6%	36.0%	45.4%
37				61.8%	74.0%	86.2%	38.0%	49.3%	60.6%	27.5%	37.0%	46.5%
38				64.2%	76.0%	87.8%	39.4%	50.7%	62.0%	28.5%	38.0%	47.5%
39				66.5%	78.0%	89.5%	40.7%	52.0%	63.3%	29.4%	39.0%	48.6%
40				66.3%	80.0%	90.0%	42.0%	53.3%	64.6%	30.4%	40.0%	49.6%
41				68.6%	82.0%	91.4%	43.4%	54.7%	65.9%	31.4%	41.0%	50.6%
42				70.9%	84.0%	92.8%	44.8%	56.0%	67.2%	32.3%	42.0%	51.7%
43				73.3%	86.0%	94.2%	46.1%	57.3%	68.5%	33.3%	43.0%	52.7%
44				75.7%	88.0%	95.5%	47.5%	58.7%	69.8%	34.3%	44.0%	53.7%
45				78.2%	90.0%	96.7%	48.9%	60.0%	71.1%	35.2%	45.0%	54.8%
46				80.8%	92.0%	97.8%	50.3%	61.3%	72.4%	36.2%	46.0%	55.8%
47				83.5%	94.0%	98.8%	51.7%	62.7%	73.6%	37.2%	47.0%	56.8%
48				86.3%	96.0%	99.5%	53.1%	64.0%	74.9%	38.2%	48.0%	57.8%
49				89.4%	98.0%	100.0%	54.6%	65.3%	76.1%	39.2%	49.0%	58.8%
50				94.0%	100.0%	100.0%	56.0%	66.7%	77.3%	40.2%	50.0%	59.8%

TABLE FOR EXTRAPOLATING SAMPLE RESULTS TO TOTAL PORTFOLIO

AT 95% CONFIDENCE LEVEL (continued)

CASES	150			200			250			300		
	lower	P	upper	lower	P	upper	lower	P	upper	lower	P	upper
0	0.0%	0.0%	2.0%	0.0%	0.0%	1.5%	0.0%	0.0%	1.2%	0.0%	0.0%	1.0%
1	0.0%	0.7%	3.7%	0.0%	0.5%	2.8%	0.0%	0.4%	2.2%	0.0%	0.3%	1.8%
2	0.2%	1.3%	4.7%	0.1%	1.0%	3.6%	0.1%	0.8%	2.9%	0.1%	0.7%	2.4%
3	0.4%	2.0%	5.7%	0.3%	1.5%	4.3%	0.3%	1.2%	3.5%	0.2%	1.0%	2.9%
4	0.7%	2.7%	6.7%	0.6%	2.0%	5.0%	0.4%	1.6%	4.1%	0.4%	1.3%	3.4%
5	1.1%	3.3%	7.6%	0.8%	2.5%	5.7%	0.7%	2.0%	4.6%	0.5%	1.7%	3.9%
6	1.5%	4.0%	8.5%	1.1%	3.0%	6.4%	0.9%	2.4%	5.2%	0.7%	2.0%	4.3%
7	1.9%	4.7%	9.4%	1.4%	3.5%	7.1%	1.1%	2.8%	5.7%	0.9%	2.3%	4.8%
8	2.3%	5.3%	10.2%	1.7%	4.0%	7.7%	1.4%	3.2%	6.2%	1.2%	2.7%	5.2%
9	2.8%	6.0%	11.1%	2.1%	4.5%	8.4%	1.7%	3.6%	6.7%	1.4%	3.0%	5.6%
10	3.2%	6.7%	11.9%	2.4%	5.0%	9.0%	1.9%	4.0%	7.2%	1.6%	3.3%	6.0%
11	3.2%	7.3%	11.5%	2.3%	5.5%	8.7%	1.9%	4.4%	6.9%	1.5%	3.7%	5.8%
12	3.7%	8.0%	12.3%	2.7%	6.0%	9.3%	2.2%	4.8%	7.4%	1.8%	4.0%	6.2%
13	4.2%	8.7%	13.2%	3.1%	6.5%	9.9%	2.4%	5.2%	8.0%	2.0%	4.3%	6.6%
14	4.7%	9.3%	14.0%	3.5%	7.0%	10.5%	2.7%	5.6%	8.5%	2.3%	4.7%	7.1%
15	5.2%	10.0%	14.8%	3.8%	7.5%	11.2%	3.1%	6.0%	8.9%	2.5%	5.0%	7.5%
16	5.7%	10.7%	15.6%	4.2%	8.0%	11.8%	3.4%	6.4%	9.4%	2.8%	5.3%	7.9%
17	6.3%	11.3%	16.4%	4.6%	8.5%	12.4%	3.7%	6.8%	9.9%	3.1%	5.7%	8.3%
18	6.8%	12.0%	17.2%	5.0%	9.0%	13.0%	4.0%	7.2%	10.4%	3.3%	6.0%	8.7%
19	7.3%	12.7%	18.0%	5.4%	9.5%	13.6%	4.3%	7.6%	10.9%	3.6%	6.3%	9.1%
20	7.9%	13.3%	18.8%	5.8%	10.0%	14.2%	4.6%	8.0%	11.4%	3.8%	6.7%	9.5%
21	8.4%	14.0%	19.6%	6.3%	10.5%	14.7%	5.0%	8.4%	11.8%	4.1%	7.0%	9.9%
22	9.0%	14.7%	20.3%	6.7%	11.0%	15.3%	5.3%	8.8%	12.3%	4.4%	7.3%	10.3%
23	9.6%	15.3%	21.1%	7.1%	11.5%	15.9%	5.6%	9.2%	12.8%	4.7%	7.7%	10.7%
24	10.1%	16.0%	21.9%	7.5%	12.0%	16.5%	5.9%	9.6%	13.3%	4.9%	8.0%	11.1%
25	10.7%	16.7%	22.6%	7.9%	12.5%	17.1%	6.3%	10.0%	13.7%	5.2%	8.3%	11.5%
26	11.3%	17.3%	23.4%	8.3%	13.0%	17.7%	6.6%	10.4%	14.2%	5.5%	8.7%	11.9%
27	11.9%	18.0%	24.1%	8.8%	13.5%	18.2%	7.0%	10.8%	14.6%	5.8%	9.0%	12.2%
28	12.4%	18.7%	24.9%	9.2%	14.0%	18.8%	7.3%	11.2%	15.1%	6.0%	9.3%	12.6%
29	13.0%	19.3%	25.7%	9.6%	14.5%	19.4%	7.6%	11.6%	15.6%	6.3%	9.7%	13.0%
30	13.6%	20.0%	26.4%	10.1%	15.0%	19.9%	8.0%	12.0%	16.0%	6.6%	10.0%	13.4%
31	14.2%	20.7%	27.1%	10.5%	15.5%	20.5%	8.3%	12.4%	16.5%	6.9%	10.3%	13.8%
32	14.8%	21.3%	27.9%	10.9%	16.0%	21.1%	8.7%	12.8%	16.9%	7.2%	10.7%	14.2%
33	15.4%	22.0%	28.6%	11.4%	16.5%	21.6%	9.0%	13.2%	17.4%	7.5%	11.0%	14.5%
34	16.0%	22.7%	29.4%	11.8%	17.0%	22.2%	9.4%	13.6%	17.8%	7.7%	11.3%	14.9%
35	16.6%	23.3%	30.1%	12.2%	17.5%	22.8%	9.7%	14.0%	18.3%	8.0%	11.7%	15.3%
36	17.2%	24.0%	30.8%	12.7%	18.0%	23.3%	10.0%	14.4%	18.8%	8.3%	12.0%	15.7%
37	17.8%	24.7%	31.6%	13.1%	18.5%	23.9%	10.4%	14.8%	19.2%	8.6%	12.3%	16.1%
38	18.4%	25.3%	32.3%	13.6%	19.0%	24.4%	10.7%	15.2%	19.7%	8.9%	12.7%	16.4%
39	19.0%	26.0%	33.0%	14.0%	19.5%	25.0%	11.1%	15.6%	20.1%	9.2%	13.0%	16.8%
40	19.6%	26.7%	33.7%	14.5%	20.0%	25.5%	11.5%	16.0%	20.5%	9.5%	13.3%	17.2%
41	20.2%	27.3%	34.5%	14.9%	20.5%	26.1%	11.8%	16.4%	21.0%	9.8%	13.7%	17.6%
42	20.8%	28.0%	35.2%	15.4%	21.0%	26.6%	12.2%	16.8%	21.4%	10.1%	14.0%	17.9%
43	21.4%	28.7%	35.9%	15.8%	21.5%	27.2%	12.5%	17.2%	21.9%	10.4%	14.3%	18.3%
44	22.0%	29.3%	36.6%	16.3%	22.0%	27.7%	12.9%	17.6%	22.3%	10.7%	14.7%	18.7%
45	22.7%	30.0%	37.3%	16.7%	22.5%	28.3%	13.2%	18.0%	22.8%	11.0%	15.0%	19.0%
46	23.3%	30.7%	38.0%	17.2%	23.0%	28.8%	13.6%	18.4%	23.2%	11.3%	15.3%	19.4%
47	23.9%	31.3%	38.8%	17.6%	23.5%	29.4%	14.0%	18.8%	23.6%	11.6%	15.7%	19.8%
48	24.5%	32.0%	39.5%	18.1%	24.0%	29.9%	14.3%	19.2%	24.1%	11.9%	16.0%	20.1%
49	25.2%	32.7%	40.2%	18.5%	24.5%	30.5%	14.7%	19.6%	24.5%	12.2%	16.3%	20.5%
50	25.8%	33.3%	40.9%	19.0%	25.0%	31.0%	15.0%	20.0%	25.0%	12.4%	16.7%	20.9%

NOTES ON STATISTICAL TABLES

The statistical tables show that for each sample size, the proportion of “cases” of error or of other occurrences can be extrapolated to the entire portfolio within a specific margin of error. There are three columns in the table for each sample size. The middle (shaded) column shows the proportion of the sample represented by the number of cases. The left column shows the lower bound of what the proportion may actually be in the total portfolio; the right column shows the upper bound (both of these are at a 95 percent confidence level).

The following example illustrates how to use the table:

- an analyst draws a sample of 75 loans and finds 6 cases of error (for example, the arrears classification is incorrect)
- where the row that begins with six cases intersects with the middle column in the 75 Sample Size section, the table shows the proportion of 8 percent
- the left column of the section shows a lower bound of 3.0 percent and the right column an upper bound of 16.6 percent.
- this means the following: *The sample tests indicate that the most probable rate of incorrect arrears classification in the portfolio is 8 percent. The margin of error for the estimate indicates that the true proportion of the portfolio may be as low as 3 percent or as high as 16.6 percent, with a 95 percent confidence level—that is to say, there is only a one in twenty chance that the true proportion is below 3 percent or above 16.6 percent.*

The analyst may also be able to use the underlying formulas to calculate proportions and margins of error for sample sizes that do not appear in the chart. The following statistical conventions apply:

- Most of the table is derived from the normal approximation to the distribution of proportions, using a 95 percent confidence interval:

$$\pi_L = p - 1.96 \cdot \sqrt{p(1-p)/n}$$

$$\pi_U = p + 1.96 \cdot \sqrt{p(1-p)/n}$$

Where:

π_L = lower bound of distribution in the population

π_U = upper bound of distribution in the population

p = proportion of the sample

n = sample size

Example: In a sample of 75 with 11 cases, the margin of error would be:

$$1.96 \cdot \sqrt{\frac{.1467(1 - .1467)}{75}} = .08$$

Therefore, the proportion of the population is 14.67 percent (11/75), with an 8 percent margin of error. This means that the actual proportion is between 6.67 percent and 22.67 percent, with 95 percent confidence .

- However, a more precise formula¹⁷ based directly on the binomial distribution is used where the accuracy of the normal approximation breaks down,¹⁸ which is where:

$$p(1-p) \leq 8$$

For example, in a sample of 40 with three cases, the approximation formula is not accurate enough to calculate the margins of error because $40 \cdot .075 \cdot (1 - .075) = 2.775$, which is well below eight. In this case, the analyst is advised to use one of the sample sizes in the table or consult a statistician capable of running the precise formula. In the tables above, all sample results with 10 or less cases are calculated with the precise formula.

- Finally, for samples of any size with 0 cases, the table uses the rule of thumb that the 95 percent confidence interval runs from 0 to $3/n$.¹⁹ For example, in a sample of 50 with zero cases, the proportion in the population is between 0 percent and 6 percent.

¹⁷ The formula is implemented as an iterative process. See Clopper, C. J., and E.S. Pearson. 1934. Use of confidence or fiducial limits illustrated in the case of the binomial. *Biometrika* 26: 404-413.

¹⁸ Van Belle, G., L. Fisher, P.J. Heagerty, and T. Lumley. 2004. *Biostatistics: A Methodology for the Health Sciences*, 2nd edition. Wiley. Note: the authors actually recommend using the precise formula when result of the equation is less than 10. However, the precision above 8 is adequate for auditing purposes.

¹⁹ Joseph L. and Reinhold C., *Statistical Inference for Proportions*. AJR 2005;184: 1057.

ANNEX 2: Yield Gap Analysis

Yield gap analysis determines how the cash that the MFI is collecting on its loans (i.e., actual yield) compares with the cash the MFI should be collecting if all the loan contracts are honored in full (i.e., expected yield). The basic formula is

$$1 - \left(\frac{\text{Cash received during the period}}{\text{Cash due during the period}} \right)$$

It is usually best to include only cash receipts when computing the actual yield. Noncash loan repayments such as seizure of collateral, acceptance of post-dated checks, or retirement of the old loan by executing a new one, often simply defer recognition of losses. For purposes of the yield gap computation, such non-cash payments are recognized only if and when they are converted into cash (e.g., when collateral is actually sold).

Depending on the information available, calculating a yield gap can be more or less complicated. This Annex does not try to provide detailed instructions; rather, it presents a general approach that the analyst may need to fine-tune to fit individual circumstances.

The analysis is normally conducted on interest and fee income, or on interest income only if all fees are collected or netted out at the time the loan is disbursed. Late payment penalties (as opposed to late payment of scheduled interest) are normally excluded from the calculation. In exceptional cases where the MFI's accounting system cannot reliably separate interest from principal in individual loan payments, the analysis can be done using total payments rather than just the portion attributable to interest income.

The main challenge is calculating the denominator of the fraction, cash due. The best way to calculate this expected yield for a period is to cumulate the payments that fall due for the first time during that period, in accordance with the original amortization schedules of the individual loans. The concept here is that the MIS maintains a register with a series of "buckets," one for each month, to record expected payments that are due during that month. At the time a loan is issued, each of its expected payments is added to the appropriate bucket. If the borrower later misses a payment, that payment obligation stays in its original cash-due bucket, rather than being moved to a later one. Likewise, when a loan is pre-paid, the original amortization schedule as distributed among the buckets is not changed. This treatment of late payments

and prepayments prevents double-counting. However, it will make the ratio of cash paid to cash due jump around from month to month, rising above 100 percent in months when unusual amounts of late payments or prepayments are received. Thus, the yield gap analysis using this method would normally be done for a full year, to even out random fluctuation and seasonal variations.

This analysis is similar to the calculation of a “current repayment rate” as discussed in Rosenberg, *Measuring Microcredit Delinquency*, CGAP Occasional Paper 3, June 1999, pp. 8-13. Treatment of renegotiated loans is discussed there.

If the MIS cannot produce the above-described register of expected payments (i.e., a cumulative amortization schedule), a less precise alternative is to generate an expected yield by analyzing the effective yield of the MFI’s loan contracts.²⁰ This is easiest when all of the MFI’s loans have the same effective interest yield. Where there are multiple products and multiple yields, the analyst needs to multiply the yield for each product times the average outstanding balance for that product over the period. Note that annual average balance (computed by adding the balances at the beginning and end of the year, and dividing by two) is not precise enough to be useful. At a minimum one would need a monthly average balance for the year (the sum of the balances at the beginning of the year and at the end of each month, divided by 13). This method of estimating the expected yield needs to be implemented with great care, including assurance that the actual recognition of interest income when it is booked into the MFI’s accounting system corresponds to the way interest is treated in calculating the expected yield.

An alternative to the above methods is to (1) draw a random sample from each category of loan, (2) calculate repayment rates for each category by comparing actual cash received during the year with the cash that was due under the original loan terms, (3) subtract the collection rates from 1.00 to generate a yield gap for each category in the sample, (4) multiply these yield gaps by the average annual outstanding balance of the corresponding part of the total portfolio, and (5) divide the result by the annual average balance of the total portfolio.

²⁰ Calculation of an annual “effective interest rate” normally includes two operations: (1) determining what the interest rate for a single period would be if calculated on a declining-balance basis, and (2) compounding that interest rate over the number of periods in the year. For yield gap purposes, one would calculate an “effective yield,” by which we refer to an un compounded annual rate: i.e., the period rate determined in step (1) is simply multiplied by the periods per year. If the declining balance rate is 2 percent per month, the annual effective interest rate would be $1.02^{12} - 1 = 26.8$ percent, while the annual effective yield would be $.02 \times 12 = 24$ percent. For a discussion of the calculation of effective yield, see Rosenberg, *Microcredit Interest Rates*, CGAP Occasional Paper No. 1, revised November 2002, pp. 5-10.

Once the yield gap is calculated, the final step is to determine whether it is in line with the level of delinquency/default that the MFI is reporting.²¹ If the yield gap is substantially larger than what it should be, the explanation must be determined. The commonest explanations in order of frequency are unrecognized delinquency/default, accounting problems, and fraud.

²¹ One approach to doing this can be found in Holtmann and Mommartz, *Technical Guide for Analyzing the Efficiency of Credit-Granting Non-Governmental Organizations*, Saarbrücken 1996, pp. 106 ff.

