CAPITAL MARKETS-STYLE RISK ASSESSMENT:
Testing Static Pool Analysis on Microfinance

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DISCLAIMER

The data and analysis presented herein was collected and compiled for the sole purpose of this study. We offer no opinion on the accuracy of the data we received from study participants, nor do we offer an opinion on the financial health of the individual study partners or the microfinance industry in general. The contents of this report are provided for informational purposes only; they are not intended for trading purposes or investment advice.

EXECUTIVE SUMMARY

This study was conceived in response to microfinance sector calls for capital market access as a path for greater microlending success. CDSF asserts that microfinance institutions (MFIs) will be better positioned to attract capital market investors when MFIs report on their performance using standard methods already used within the capital markets. One such method is static pool analysis.

This study sought to determine whether static pool analysis could be applied to microfinance, and whether the results met a standard consistent with that of capital markets-funded lending institutions. Two MFIs participated in the study, one operating in India and one in Tajikistan. CDSF determined that static pool analysis could be applied to their lending portfolios, and that the result, in both cases, was consistent with capital markets standards.

Static pool analysis can enhance MFI reporting activity and attract capital market funding because it provides a reliable measure of the frequency and severity of defaults of loans, and the pattern of diversity and homogeneity of the loans -- trends commonly tracked by investors. Static pool analysis requires greater historical data than that used in the compilation of standard financial statements used by MFIs, which may not provide sufficient information to many capital markets investors.

At question for the microfinance sector is whether sufficient data has been collected by MFIs to generate valid static pool results. Static pool analysis is undertaken in a sequential process. Historical loan data is grouped by calendar vintage, a select time period in which loans were originated. The vintage data is analyzed to quantify the rate of loan defaults over the life of the vintage. That data also is stratified by individual loan characteristic to determine the pattern of diversity and homogeneity of those characteristics.

For this study, CDSF received sufficient historical data to undertake static pool analysis. The participating MFIs delivered data on 603,338 loans and 22,796 loans covering 8 years and 6 years of operations, respectively. The rate of loan defaults was quantified, and for each MFI, a consistent pattern of loan diversity and homogeneity was revealed. The static pool analysis revealed rich, albeit distinctly different, pictures of the lending quality of each MFI.

Prior to commencing the study, CDSF interviewed individuals from 12 sectors affiliated with microfinance. Those most familiar with the workings of the capital markets affirmed the value of static pool analysis and of bringing such analytical techniques to the microfinance sector.

As further support to the study, CDSF undertook a literature survey to determine whether similar studies of MFIs had been completed. No published research was identified that documented the application of static pool analysis to MFIs.

This study affirms the importance of bringing capital markets tools to MFIs as a means of accessing capital. It also demonstrates that standardized analysis is feasible and requires only that an MFI has collected sufficient historical data in a consistent format. CDSF recommends that MFIs begin the practice of applying static pool analysis to their loans as a

first step toward gaining access to the capital markets. MFIs lacking sufficient historical data should begin to collect loan performance data in a consistent format that would lend itself to static pool analysis at a later date.

INTRODUCTION

Microlending gained world-wide attention when lending pioneer Muhammed Yunus of the Grameen Bank of Bangladesh was awarded the 2006 Nobel Peace Prize. Yunus founded Grameen in 1983. Since then it has earned a reputation for its successful lending practice to the very poor, and often to women typically denied access to loans. Yunus is currently the best-known practitioner of a global tradition of "self-help" lending and can be included among a wide array of community loan programs that have emerged over the past several decades.

The Microcredit Summit reported that as of December 31, 2005, 3,133 microlenders worldwide were serving more than 113 million clients, of whom more than 70% were first-time very poor borrowers.[1] Of these poorest clients, 84.2 percent were women. Lending to these poorest clients affected over 410 million family members.

According to Accion, microlenders are deploying $9 billion worldwide.[2] The money they lend comes from a variety of sources including deposits, bank loans, debt securities issued, equity shares sold, donations, and government aid programs. MicroCapital reports that 79 microfinance investment vehicles (funds) currently are supplying capital to MFIs as either investments or donations. Of the 79, only 13 are structured to receive external investments and offer investment returns. Those 13 funds are open to retail or private investors, and have total assets of $900 million.[3] The proportion of these assets invested in microfinance, however, is far smaller.

Advocates of developing markets view microlending as a vital tool in catalyzing economic development, asserting that such development will mitigate poverty and associated health and environmental issues as it has in the United States and other developed countries.[4] They point to two decades of microlending success in serving small populations in developing regions, but recognize an inherent challenge to its wider benefit: Can it be scaled to deliver more widely on its economic development promise? The answer centers on a key issue: access to capital.[5]

Before microlending institutions can expand to serve wider constituencies, microlenders must be able to consistently borrow the money they need at a cost that enables them to operate self-sufficiently. To accomplish this, microlenders require access to a large population of unbiased investors, i.e., investors who select investments, whether in microlending or other sectors, based solely on their objective investment potential.[6]

Rationale for This Study

This study was conceived with a key question: *Do MFIs undertake their lending activities according to standards that would enable them to draw on the large pools of capital circulating in the mainstream capital markets?*

CDSF sought to determine whether selected microfinance institutions (MFIs) structured their loans and collected loan data in a format consistent with lenders operating in the global capital markets, and if this data could be analyzed by a method known as static pool analysis, a risk-assessment tool used widely in the global capital markets.

Static pool analysis is critical to a meaningful study of MFIs because it provides a measure of the frequency and severity of defaults among a historical sample of loans. Such assessment provides a basis for evaluating the investment potential of a MFI or a portfolio of loans. To-date, default data typically provided by MFIs to investors has been insufficient to attract unbiased investors and their substantial investment dollars, which has limited the ability of MFIs to expand their lending activity.

MFIs in emerging regions have adopted a reporting process consistent with generic reporting requirements of regulating bodies around the world. They typically report point-in-time portfolio data using a historical accounting format. This data may include new loans, paid-off loans, delinquencies, and defaults. This data is of limited value in explaining the financial dynamics of a lending entity. In 2006, Fitch Ratings noted that static pool analysis, necessary for securitization, is typically not included in emerging market reporting.[7]

Detecting loan portfolio trends is crucial for capital market access.[8] Capital markets are efficient when investor confidence is high. Confidence in loan portfolios as investments is measured by the extent to which the performance (or loan repayment) adheres to expectations. The U.S. Securities and Exchange Commission (SEC) has affirmed the value of static pool analysis in calculating risk, and in 2004, ruled that static pool data be disclosed for investments in asset-backed securities when material to the securitization.[9]

The trend suggested by Fitch's observation and the SEC was affirmed in the initial exploration of this study. In preparation for this study, CDSF contacted 49 individuals representing 12 sectors affiliated with investment, finance, and MFI development. These included government-sponsored development organizations, microfinance and mutual fund investors, bankers, microfinance investment vehicles, microfinance networks, rating agencies, MFI transaction attorneys, foundations, microfinance trade groups, microfinance managers, and scholars. CDSF found that individuals most familiar with the workings of the capital markets affirmed the value of static pool analysis and of bringing such analytical techniques to the microfinance sector.

CDSF also undertook a literature survey to determine whether similar studies of MFIs had been completed. We surveyed web-published research, academic journals, capital markets journals and research reports, MFI industry research and news articles, and financial news articles.

CDSF did not identify substantial research or commentary generated by the global capital markets that specifically addressed static pool analysis in the context of microlending. The literature addressing microfinance focused on the need to access capital (without identifying viable, widely applicable solutions). Many discussions centered on defining microlending as either a charitable or business activity.

Where discussion argued for microlending as a business activity, authors considered the creation of bonds or securities as a means of accessing capital. One article was identified that specifically called for the adoption of analytical tools to facilitate such financing vehicles.[10] Based on the scarcity of publications on this topic, CDSF concluded that opportunities exist to advance microlending and MFI access to capital by introducing a capital market tool, static pool analysis.

This CDSF pilot study is a first effort to apply static pool analysis to the microlending sector, a necessary step to advance microlending into the global capital markets. This method is new to the microfinance sector for several reasons. The static pool analysis, while widely used by large finance institutions to calculate default risk, is not well-understood among the advocates and supporters of microlending, who have emerged from entrepreneurial business, investment, and philanthropic sectors, rather than global finance. In addition, the cost of undertaking static pool analyses is great for small MFIs: static pool analysis requires logistical support in the form of quantitative technology, data mining abilities, and expertise in their use and application.

CDSF has undertaken this study as a test case to determine the feasibility of applying this standard risk-assessment tool to microlending activities. It is our hope that the information gained here can contribute to the advancement and maturation of microlending.

Study Goals

The goals of the study were to answer the following questions:

- Is the microfinance community interested in the value of static pool analysis as a tool to help management manage and to help rationalize capital markets access for commercially viable MFIs?
- Does an interested MFI have the historical data necessary to undertake static pool analysis?
- Is the data available in an efficiently extractable format?
- Is the available data sufficient for statistical analysis in terms of data points and critical fields?
- Does the data have sufficient integrity to be of value?
- Does data reveal homogeneity of trends?
- Could data be applied to capital markets perspective?
- Are MFIs concealing defaults by restructuring loans?
- Are micro borrowers prone or encouraged to continue borrowing beyond their capacity to repay?

BACKGROUND ON STATIC POOL ANALYSIS

Static pool analysis is a method for evaluating the repayment rates and defaults, and detecting the emanation of positive and negative trends embedded within a portfolio of loans. Its value extends into broader management activities of a lending institution such as a MFI. Static pool analysis can be used in assessing cash flows (asset and liability management) and losses resulting from loan activity (credit management), and it can provide the information necessary to define and monitor loan production goals. It is especially valuable during periods of rapid growth when the addition of new loan balances to portfolios dilutes standard accounting performance ratios.[11]

Static pools are aggregated by the dates of loan origin, or "vintage," rather than by the total loan portfolio as in historical accounting. A vintage may be a year, a quarter, or a month. The designated pools are tracked over the total life of the pool, i.e., from the origination of the first loan to the pay-off of the last loan.

A static pool analysis examines the frequency at which various loan characteristics occur within a pool. Static pool analysis provides a foundation for modeling loss patterns based on historical trends using probability theory and actuarial methodologies. When a lending operation such as a MFI has collected a large pool of well-diversified, homogenous data sets, it becomes possible to generate reliable information about the performance of its loans.[12] This information can be used to generate models for predicting future performance of a pool of loans.

Static pool analysis consists of stratifying pool characteristics into homogeneous groups. The most important characteristic of a loan pool is its propensity for defaults. Information gleaned from a static pool analysis is typically depicted as a graphed curve of cumulative defaulted loans, with each curve representing a vintage, or pool of loans. The more curves generated, the more accurate the statistically-derived model curve used for predicting future losses. When the curves of multiple vintages follow similar patterns, a trend emerges that points to consistent performance.

Loan characteristics such as location, purpose, amount, term, repayment frequency, and interest rate are also included in a static pool analysis. These characteristics reflect portfolio diversity (the extent to which a portfolio has many characteristics) and homogeneity (the consistent frequency of the characteristics). Establishing a homogeneous distribution for each of these characteristics is important to the integrity of an expected default curve and the integrity of loan pricing and valuation. For example, a highly concentrated geographic distribution may place a pool at risk for a localized economic event.

STUDY PARTNER RECRUITMENT AND SELECTION

Recruitment Criteria

MFI study partners were recruited through MFI and social finance trade organizations, microfinance funds, postings on internet bulletin sites, and a press release.

To be considered as a study partner, candidate MFI portfolios could include no fewer than 2,000 loans originated over a minimum 5-year period, with data deliverable in an electronic format within the CDSF study window of September to November 2006. Study partners were required to deliver data that included the following:

- Loan number
- Original loan amount
- Current loan amount
- Origination date
- Last payment made date
- Maturity date
- Defaulted loan identifier
- Delinquent loan identifier
- Restructured loan identifier
- Interest rate
- Loan product identifier
- Origination office
- Loan officer
- Geographic identifier (town, state, region, country)
- Loan purpose identifier (purchase, working capital)
- Loan type identifier (agriculture, commercial, consumer)
- Borrower type identifier (individual, business, group)

Partner Selection

CDSF planned to recruit one MFI study partner. The recruitment process yielded a higher-than-expected interest among MFIs; therefore, it was decided to include two MFIs in the study. The inclusion of two MFIs provided an opportunity to compare and contrast study results, which may provide insights into MFI lending activities and standards.

During the recruitment process, CDSF evaluated eight MFI candidates. Analysis on the first MFI portfolio commenced before the second partner was selected.

Eight candidate MFIs were evaluated for inclusion on the basis of their responses to CDSF queries and sample data delivered. Six candidate MFIs were not selected for one or more of the following reasons:

- Response was not appropriate to the request.
- MFI was unresponsive after initial contact.
- MFI could not access the data in usable format.
- Loan portfolio was below the 2,000-loan threshold needed for inclusion.
- Qualifying MFI declined to participate, possibly due to unrelated operational issues.
- The data sample delivered by the MFI suggested a fraud trend that was not immediately disclosed (but which was later validated).
- MFI met CDSF candidate criteria but could not deliver data within the study window.

MFI Study Partners

Two MFIs were selected as study partners, SKS Microfinance Pvt. Ltd. (SKS) and International Micro Loan Fund (IMON). Their institutional traits are summarized below.

	SKS	IMON
Country	India	Tajikistan
National structure	Constitutional Federal Republic	Constitutional Republic
Legal System	English Common Law	Civil Law
Languages	Hindi plus 14 regional tongues; fluent in English	Tajik, fluent in Russian, can communicate in English
Corporate form	For-profit	Non-profit
Finance businesses	Lending only	Lending only
History	Founded in 1998 as Swayam Krishi Sangam and subsidiary SKS Microfinance Fund, reorganized as SKS Microfinance Pvt Ltd in 2005	Founded in 1995 as NABWT, partnered with Mercy Corp to establish microlending in 1999, reorganized as IMON in partnership with MEDA in 2004
Lending Currency	Indian Rupees (INR)	Somonis (TJS) and U.S. Dollars
Branches or regions	134	26
Last reported month's volume in data file	45,432 loans for INR305.8 million ($6.6 million)	645 loans for TJS3.8 million ($1.2 million)
Date data first delivered	November 2006	September 2006
Data file size	603,338 loan records	22,796 loan records
Data time frame	July 1998 to Oct 2006	May 2000 to August 2006
Unique traits	Payment calculation and rounding	Currency conversion and variable loan terms

STATIC POOL METHODS

Data delivered by the study partners was prepared for analysis. All data was migrated into a uniform electronic format, a process which involved concatenating data files and merging data from multiple sources. Data not relevant to this study, such as confidential borrower information, was removed from data files. Where necessary, data was translated to English and standard financial format.

Data Stratification

Data was stratified by the following variables: loan amount; interest rate; term (or tenor); product type; loan purpose; geographic location; and loan borrower cycle. Within each stratification, interest rate and tenor were calculated using weighted averages.

Diversity was assessed by evaluating the number of characteristics and identifying critical concentrations by loan amounts and locations. Homogeneity was assessed by evaluating the consistent pattern of characteristics.

Cumulative Default Analysis

A default is defined as a loan that does not pay according to the MFI payment policy or convention. For SKS, payments were weekly and any non-payment was deemed by SKS to be a default. No full or partial default recoveries were assumed for the analysis, so all cumulative curves were gross. For IMON, any loan computed to be delinquent by 90 days or more was deemed a default. Ninety days is a capital market convention for declaring default, and captures all restructured loans.

To determine the first date and amount of default, one of two algorithms was used. For SKS, an algorithm was devised that calculated the age of the loan and the hypothetical unpaid principle balance on the date of first default. This algorithm used the level yield method (see also SKS Summary of Results). For IMON, an algorithm was devised that calculated the date and age of the loan on the first default. Where the default amount was not provided, it was assumed to be 50% of the original loan amount.

Cumulative default curves were computed for each loan vintage analyzed. Default amounts were accumulated by loan by payment period. The accumulated amounts were divided by the total original loan amount of all loans originated in the vintage. The calculation was displayed as a percent of total.

In addition to a cumulative default curve, a synthetic cumulative default curve also was computed. This curve 1) provided an alternative to simple cumulative defaults when the number of observed statistical defaults was insignificant per vintage; 2) allowed for calculating defaults when the typical loan term was less than a year, but borrowers continued to revolve their credit; 3) helped to determine whether repeat borrowers eventually over-extend their credit and default; 4) enabled comparison to curves observed in the mainstream finance markets; and 5) could be replicated for comparative purposes across MFIs with significantly different loan terms.

A synthetic portfolio consists of term loans synthesized by borrower ID. Each borrower is assumed to borrow the entire amount of their cumulative historical borrowings as reflected in the data base. This amount is amortized on a level yield over 5 years.

The synthesis procedure is not perfect but is a valid method in an environment of very short-term repeat lending. For example, some borrowers included in the static pool curve started their borrowing relationship only recently; therefore, anticipating their repayment rate over an extended borrowing horizon is imprecise. However, if borrowing standards have improved over the past few years, this technique is a more accurate representation of the current situation than one derived exclusively from borrowers with five years of data, the population of which is statistically insignificant.

In addition to calculating historical cumulative defaults, the empirical cumulative gross default curve was interpolated. This was tested for IMON, and it was determined that a piece-wise linear fit was the optimal method.

For SKS, a test was created to determine whether new loan branches experienced more defaults sooner in their lives than established branches. A default rate per day was established for branches with more than 20 historical defaults.

RESULTS

This study was framed within the context of several questions for which CDSF sought answers. The first question centered on the level of MFI interest in static pool analysis as management tool. Based on the response of MFIs to limited queries in the MFI community, we believe that there is an interest among MFIs to adopt such tools, and that similar efforts will find willing candidates.

	SKS	IMON
Was historical data sufficient?	Yes. Loan system is a custom Access data base.	Yes. Loan system is a Kredits off–the-shelf product. Data was migrated from old systems.
Was data collected in an extractable format?	Yes. Access data queries exported to Excel spreadsheets.	Yes. Kredits reports exported to Excel or printed in word and parsed in Excel.
Was data sufficient for analysis?	Yes. Necessary data fields exist or can be calculated.	Yes. Necessary data fields exist or can be calculated.
Was data integrity sufficient for analysis?	Yes. Reasonableness test was completed on data samples.	Yes. Reasonableness test was completed on data samples.
Were loans diverse and homogenous?	Yes. Lending had diverse characteristics; diversity was homogeneous and consistent with type of lending operation.	Yes. Lending had diverse characteristics; diversity was homogeneous and consistent with type of lending operation.
Could data be applied to capital markets transactions?	Yes. Lending operation has the traits of a mass production lender.	Yes. Lending operation has the traits of a boutique lender.
Are defaults concealed by restructuring loans?	No evidence identified.	No evidence identified.
Was evidence of borrower over-extension identified?	No	No

This study also sought to characterize the participating MFIs by lending organization categories generally accepted within the global capital markets. The traits of the participating MFIs, by which lending institutions are categorized, are summarized below:

	SKS	IMON
Loan business type	Mass production lender	Boutique lender
Loan product offering	Limited terms	Variable terms
Loan size	High concentration in low balances	Varied concentration with higher balances
Loan origination volume	High	Low
Loan gross margin	Low	High
Loan risk	Low	High
Loan handling	Low	High
Operating capital requirement	Low	High
Capital markets access	Simple to execute	Complex to execute

The experience of working with the two subject MFIs was not unlike that of working with a United States lender preparing for its first static pool analysis. The data necessary for this project differed from that currently collected for operational and regulatory accounting purposes and sometimes lacked key fields necessary for static pool analysis. To generate the full range of data necessary, files were reconstructed from a variety of sources in a painstaking process.

The initial data-gathering process required more time and effort than would be characteristic of a lender experienced with static pool analysis; nonetheless, once the data was assembled and analyzed, a picture of the study partner MFIs emerged. Data indicated that both MFIs operated in a manner that is scalable and replicable.

SKS possessed the attributes of a high-volume, low-yield mass-production lender, while IMON possessed the attributes of a low-volume, high-yield boutique lender. These models are common in the U. S. capital markets and are financed differently. Both MFIs studied here reported increased loan volume and geographical extension while maintaining the degree of consistency expected for each type of lending business.

Study findings are summarized by MFI. Figures and tables summarizing study results begin on page 24. The large volume of data prohibits publication of all stratifications for each vintage in this brief report.

For each vintage selected, CDSF analyzed diversification and homogeneity by loan amount, rate, tenor, purpose, product, cycle, and geography. Each of these characteristics was stratified into tables containing logical increments of the analyzed characteristic followed by computed loan counts; loan amount totals; mean loan amounts; tenor and rate weighted

averages; and where meaningful, minimums and maximums by characteristic and stratification.

SKS monthly loan origination was sufficiently large to necessitate stratifying the data by month of vintage; therefore, stratifications were compiled for the most recent 6-month (May 2006 to Oct 2006) vintages and compared to a 48-month cumulative vintage. For IMON, loan origination volume necessitated stratifying the data by year of vintage; therefore, stratifications were completed for the most recent 6 years (2001 through the first 8 months of 2006).

SKS Summary of Results

Growth rate *Figure 1*	SKS monthly loan origination increased dramatically in November 2004 and continued through the subsequent 24 months. October 2006 originations of 45,432 loans were 7.85 times the 5,790 loans originated in November 2004.
Synthetic cumulative default *Figure 2*	A synthetic pool was developed from data derived from five branches: the three oldest branches and two randomly selected branches. (The quantity and age of data from all 134 SKS branches was too great to synthesize all data within the scope of this study.) Data covered the period July 1998 to October 2006. The five synthetic default curves demonstrate similar 3-phase slope characteristics of rapid early defaults, followed by gradual mid-term defaults, and minimal end-of-term defaults.
Cumulative default *Figure 3*	Loans were categorized by individual month of origination, and 24 static pool loss curves were generated for the period November 2004 to October 2006. An all-time static pool loss curve also was completed on data from July 1998 to October 2006. The SKS results are consistent with that expected for homogenous lending. Historical defaults have been low, relative to unsecured lending in the United States at a range of 0.012% to 1.5% for the range of static pools. This finding is consistent with the synthetic default analysis, which indicates a high of 1.22%. An exogenous event at one branch caused significantly higher defaults during the months December 2004, January 2005, and February 2005, with a consistent shape to those defaults. The speed of defaults (the rate of accumulation) is higher for static pools March 2005 and later versus November 2005 and earlier, which corresponds to the rapid growth of SKS during the latter period. Under such conditions, a sacrifice in quality would be expected. The shape of the static pool default curves for the current production is consistent and would predict cumulative defaults in the 1% range. An exogenous event at a branch during the May/June/July/August/ September 2004 periods caused static pool defaults of 1.9% to 8.8%, but the number of new loans originated during that period was 10% to 20% of current levels. (Not summarized in Figure 3).
Mean loan and weighted average rate *Figure 4*	During the elapsed 48 months, SKS mean loan amounts have ranged from 6,000 INR to 8,200 INR, with greatest consistency in the 12 months ending October 2006. Loans originated during the period April to October 2006 followed a similarly consistent pattern. The loan rate history shows two distinct patterns split around November 2004 when SKS reduced interest rates in Andhra Pradesh territory from 15% to 12.5%. Since then, the increased loan origination volume in the 15% product in other territories has slowly recouped the effective rate on loan origination.
Loan amounts *Table 1/Figure 5*	The distribution of loan origination by loan amount has remained consistent over the period analyzed. In the stratification (Table 1), a minor aberration is noted in three loans with rates of 174%, a likely data error.
Loan rates	Interest rates were limited to 15%, 12.5%, or 0% for special accommodations. Sample stratifications did not reveal any meaningful trends; therefore the rate was not specifically analyzed in any stratification.

Loan tenors	SKS issues all loans at a tenor of 50 weeks; therefore, tenor was not specifically analyzed in any stratification.
Loan products	SKS offers three loan products whose differences are not material to the purposes of this analysis.
Loan purpose *Figure 6*	The purpose of loans was stratified by the top 15 purposes, which comprised 66% of all loans issued. The loan purpose was consistent from month-to-month. The results for May through October 2006 and for the 40-month history were similarly consistent.
Loan geographic location *Table 2*	The geographic location of loans was stratified by the top 20 concentrations. The results for May through October 2006 demonstrated concentrations of less than 2% per region.
Borrower cycles *Figure 7*	The borrower cycle identifies repeat borrowers by product. As expected the trend illustrates the effect of significant lending expansion via the weighting toward first time borrowers. However the pattern is consistent from month-to-month and over the 48-month history.
Default rate by loan characteristic	The original loan size, default week, default amount, and effective interest rate characteristics of the defaulted loans were stratified. The analysis revealed a distribution pattern similar to the patterns of characteristics found for each vintage.
Branch default rates *Table 3*	SKS has experienced rapid growth and expansion during the period studied. It is therefore prudent to consider whether newer branches exhibited higher defaults in their early life versus more established branches. Beyond the two branches affected by exogenous socio-political events (Nizamabad-B and Madhira), we believe the Sambalapur and Bhubaneswar branches deserve more detailed analysis based on their relatively higher rates of default.

Discussion of SKS

SKS is a for-profit organization founded in 1998 as the Swayam Krishi Sangam and its subsidiary, SKS Microfinance Fund. The microlending operations were restructured in 2005 as SKS Microfinance Pvt. Ltd, a private company. SKS began operations in southeast India and from there expanded geographically.

India has a national government and 35 provincial governments. The national currency is the rupee with an exchange rate of 46 INR to $1 U.S. India is a diverse country marked by significant political, economic, cultural, climatic, and geographic differences.

For this study, SKS provided individual data files on 134 loan branches covering loan histories from July 1998 to October 2006. The data files were concatenated into a single data base of 603,338 loans.

SKS provided a marker in the data files that designated 4,981 defaulted loans during the period July 1998 to October 2006. This represented 1 in 121 loans made. Using an algorithm, it was determined that SKS experienced 39,649,000 INR of gross defaults during the reported period. Gross is defined as not accounting for partial or complete recoveries.

Analysis of the defaults revealed useful consistency. The rate at which loans defaulted (slope of the default curve) was similar for each vintage. The stratification of characteristics of the defaulted loans was consistent with the pattern of stratifications for all loan vintages.

SKS loan origination volume increased significantly during the period studied. The steep production increase can be attributed to the start-up of 96 new branches during the final 12 months studied, which accounted for 42.8% of loan volume for that period.

SKS demonstrated remarkable loan origination consistency over its lifetime including the explosive growth period ending October 2006. This consistency likely results from a very limited loan product menu. All loan terms were 50 weeks with all loan payments due weekly. Interest rates were limited to 15%, 12.5%, or 0% for special accommodations.

This study identified two SKS practices that may work effectively within the institution, but which are inconsistent with the practices of the wider capital markets. These relate to the calculation of loan payment principle, and interest and loan payment rounding.

SKS interest rates are not immediately comparable to developed market rates. The calculation of interest rates derived from traditional lending activities in developed capital markets is based on a level-payment, level-yield method. SKS uses a method common to other MFIs, whereby the borrower repays a loan in fixed weekly payments comprised of 1/50th of the original loan amount of the loan plus 1/50th of the interest rate times the original loan amount according to the formula:

$$\text{Payment} = [\text{Original Principle} \div 50 \text{ weeks}] + [\text{Original Principle} \times \text{Rate} \div 50 \text{ weeks}]$$

The level-yield method, which is the common method employed within the capital markets, shifts the composition of the weekly payment between interest and principle as the loan balance pays down:

$$\text{Payment} = \text{Current Loan Balance} \times [\text{Rate } (1+\text{Rate})^{\text{Periods}}] \div [\{(1+\text{Rate})^{\text{Periods}}\} - 1]$$

Under the two methods, the decline in outstanding loan balances over time differs, which is critical for calculating defaults. When considering the interest collected during the same period, the results derived from the two methods may differ significantly depending on the point in time at which the default occurs.

The importance of this difference in methods for SKS is that the 15% loan has an internal rate of return (IRR) or effective rate of 28.13%, while the 12.5% loan has an effective rate of 23.6%. For the purposes of this study, all data points were converted to the level-yield method of computing outstanding principle and effective rates to provide a meaningful basis for comparison with capital markets data for similar loan activities. This approach is crucial to understanding the context of defaults and cash flows in this analysis.

SKS allows borrowers to prepay loans, but charges a fixed 2% fee on the original loan balance. This fee effectively acts as a "make-whole" premium. (Within the capital markets, a make-whole premium is one that compensates investors for lost future income.) A test of the 2% fee revealed that investors were generally fairly compensated regardless of when the loan repays.

A second area where SKS differs from capital markets lenders is in a subtle accounting method for rounding non-whole numbers. SKS lends in rupees (INR), the lowest currency denomination. Uneven loan amounts such as 5,000 INR with a 12.5% interest rate result in a

weekly loan payment of 112.5 INR. SKS rounds this payment down to 112 INR. Rounding down reduces the yield by 1-2% depending on the loan amount.

Rounding is a problem for all lenders. Traditionally the developed markets have rounded payments up to the next whole currency denomination for all payments except the last payment, which is adjusted to compensate. Using the hypothetical loan amount of 5,000 INR, the loan would be repaid with 49 payments of 113 INR plus a 50th payment of 88 INR. While half a rupee may seem insignificant, on a volume of 50,000 loans per month it amounts to 15 million INR per year, or 38% of the principle of SKS cumulative defaults.

These inconsistencies notwithstanding, the SKS data could be analyzed in static pool format. This study found that the data possessed the homogeneity and consistency that would give confidence to a capital market investor with regard to the certainty of repayment cash flows from the portfolio. No pattern was identified that suggested restructured loans concealing technical defaults, nor was a pattern of evidence found suggesting that borrowers repeatedly borrowed until they could not repay their loans.

IMON Summary of Results

Growth rate *Figure 8*	IMON monthly loan origination volume increased during the final 24 months of data analyzed. August 2006 originations of 645 loans were 1.94 times the 313 loans originated in September 2004.
Synthetic cumulative default *Figure 9*	Cumulative gross defaults were 6.4%
Cumulative default	Not calculated. The ratio of defaults to the total loan data provided was insufficient to derive statistically meaningful conclusions.
Mean loan amount and weighted average rate *Figure 10*	The mean loan amount and weighted average rate shows a steady shift from a mean loan amount of 3,425 TJS in 2001 to a mean loan amount of 6,438 TJS in 2006, with a commensurate drop in interest rates from 40.6% to 38.2% over the same time frame. Interest rates peak in 2004 before declining.
Loan amounts *Table 4/Figure 11*	Distribution by loan amount shows a shift away from loans of 3,000 TJS or less to loans between 3,000 and 6,000 TJS, with business also shifting into the 6,000 to 9,000 TJS range.
Loan rates *Figure 12*	Distribution by loan rate shows a major shift into the 30% to 39% range, with IMON charging 33.6% to 39.2% on loans, with a weighted average of 38.8%
Loan tenors *Figure 13*	IMON consistently originates a predominant number of 12- to 24-week loans. Short term loans increased slightly in 2004 and then declined. 24- to 36-week loans increased in 2006.
Loan products *Figure 14*	Distribution by loan product reflects a re-categorization of group lending into the Purfaiz product. Group lending remains the core product, while lending to individuals has remained relatively flat.
Loan purpose	The data provided by IMON lacked sufficient consistency to enable evaluation by loan purpose.
Loan geographic location *Table 5*	IMON has diversified its geographic distribution. No area accounts for greater than 15% of lending, two areas account for 25%, and 12 areas account for 80%
Borrower cycles *Figure 15*	Despite the geographic expansion, distribution by previous loans show a trend to higher repeat lending, which can be interpreted as a function of short loan tenor and limited alternatives.
Default characteristics	Not calculated. The data provided was insufficient to derive statistically meaningful conclusions.
Branch default rates	Not calculated. The data provided was insufficient to derive statistically meaningful conclusions.

Discussion of IMON

International Micro Loan Fund (IMON) is a non-profit organization founded in 1995 by the National Association of Business Women in Tajikistan (NABWT). In 1999 NABWT formed a partnership with Mercy Corps to establish a microlending fund. In 2004 it restructured itself as IMON in a partnership with the Mennonite Economic Development Association of Canada (MEDA).

Tajikistan is a former Soviet Bloc country located in Central Asia. Its predominant language is Russian although the official language is Tajik. Tajikistan is a constitutional republic. The national currency is the Somoni with an exchange rate of approximately 3 TJS to $1 U.S. IMON borrowers are typically traders and livestock raisers for whom cross-border travel and foreign currency access are necessary to their livelihoods.

As the basis for this static pool analysis, IMON provided 3 database export files from their Kredits loan system. Kredits is an off-the-shelf system to which IMON converted all branches commencing in 2000. The data included information on closed loans, active loans, and loans disbursed during the report period. All files were concatenated. IMON also provided periodic reports on defaults and delinquencies. The data from these reports was parsed and merged with the loan data.

Much of the descriptive data in the file required translation to English or recoding to terms understandable by U.S. analysts. Financial amounts and rates were converted into standard western formats. Information on 3,046 loans was delivered in U.S. dollar amounts; these were converted to TJS amounts ($1 = 3 TJS).

Data review revealed 432 loans (1.9%) with one or more data errors that would distort the analysis and were therefore eliminated. Their errors were as follows: 4 loans recorded no scheduled payment amount; 42 loans recorded a term of zero; 185 loans recorded no interest rate; 203 loans recorded a balance greater than 30,000 TJS, which suggested file conversion or transcription problems. (Two loans reflected two fatal errors.)

The initial analysis of IMON data suggested a flexible loan operation. The Kredits system collected data on a variety of loan structures and the data pointed to a changing slate of products over the analyzed period. Loan payment terms were structured on a 2-week, 4-week, or monthly basis. IMON operated in a boutique fashion, tailoring loans to meet client needs. This flexible strategy would seem suitable to the population and economy of Tajikistan.

The flexibility of IMON loan activities was further confirmed through validation of payment amount, loan rate, default date, and default amount. The variability in loan data indicates that IMON made small accommodations to borrowers. In addition, several inconsistencies in data were identified that pointed to special accommodations to borrowers: 6 loans with an illogical combination of terms; 128 loans where the payment amount would not amortize the loan for the periods given; and 270 loans where a calculation of the payment periods did not match the given field. A slight degree of imprecision also was identified in a few paid-off loans which carried very small negative balances, indicating overpayment.

After initial data review, IMON data was segmented into vintages by calendar year of loan origination. The stratification of those vintages revealed positive general trends of geographic expansion, increased loan size, stable loan tenor, and a narrowing of interest rate dispersion.

IMON was rigorous in its classification of restructured loans as well as its pursuit of collections. Although some borrowers had borrowed more than 30 times in the period examined, we found clear evidence that loans were repaid according to schedule before new loans were funded. IMON removed defaults from its Kredits system after 360 days, but continued to collect past due balances for years after that.

IMON historical defaults were 55, or 1 in 415 loans made. 664 loans showed a late repayment but not a default. When those loans were included as defaults, the count increased to 729, or 1 in 31 loans.

Cumulative synthetic gross defaults were 6.4%. This default rate is consistent with the typical non-prime borrower rate in the U.S. capital markets. The shape of the curve indicates that defaults occur more randomly than in the United States. A U.S. curve typically shows much curvature in the middle of the range (18-24 months post-closing). The shape of the IMON synthetic curve also lends further credence to the hypothesis that their defaults are largely random and most likely occur early in the borrower relationship as the borrower either succeeds or fails in launching his or her enterprise.

CONCLUSIONS AND RECOMMENDATIONS

This study sought to determine whether selected microfinance institutions operating within developing regions collect operations data in a format that could be adapted easily to global financial markets practices. In particular, the study considered whether subject MFI data could be analyzed by static pool analysis.

CDSF relied on two MFIs operating in very different markets to serve as test cases to gain insights to the workings of the microlending sector. The two participating MFIs were motivated participants that recognized the value of bringing capital markets tools to their operations, and both understood that their operations could benefit from an infusion of capital market investor dollars in their operations. They were self-selected participants.

Based on the data collected here, CDSF affirms that the MFIs studied here do operate according to the standards of global lending entities and that their activities could be integrated into the global markets. The threshold for entry into the capital markets is high; static pool analysis is only one tool that could be applied to advancing this entry. This study affirms, however, that the study participants have within their existing systems data that can be analyzed to provide useful default predictions.

This study provides valuable information to investors, philanthropic organizations, and the microfinance sector. Investors and philanthropic organizations should now understand that they can add a useful quantitative tool, static pool analysis, to their MFI evaluation criteria. The microlending sector itself can call for the introduction of this analytical tool to their practices as a means of attracting a more vigorous pool of capital market investors.

CDSF recommends that MFIs worldwide begin to embed static pool analysis in their public reporting, and that they bring static pool analytical training to microfinance training programs. We also recommend that investors and philanthropic organizations who support microlending consider that static pool analysis can enhance their efforts. Among the more than 3,000 microlenders worldwide, many are appropriately funded by charity; however, many may be poised to expand their operations through funding from investors who demand the information provided by static pool analysis.

CDSF is continuing in this work and welcomes comments from the philanthropic, investor, and microlending communities.

FIGURES AND TABLES

Figure 1. SKS Growth Rate: November 2002-October 2006

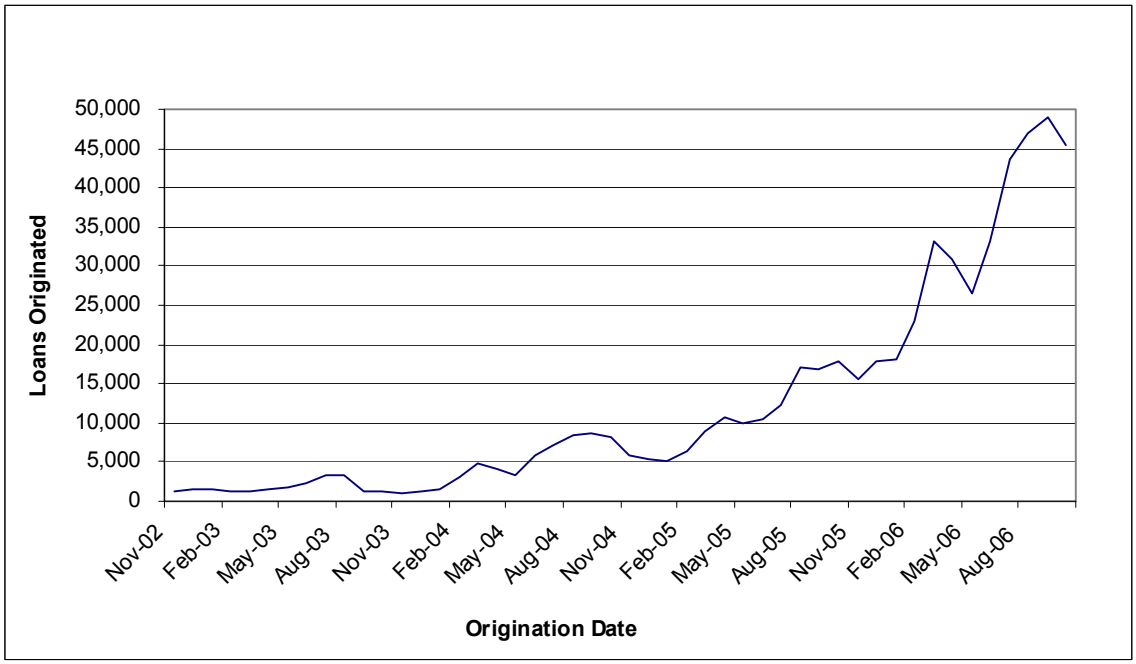


Figure 2. SKS Synthetic Cumulative Defaults by Branch

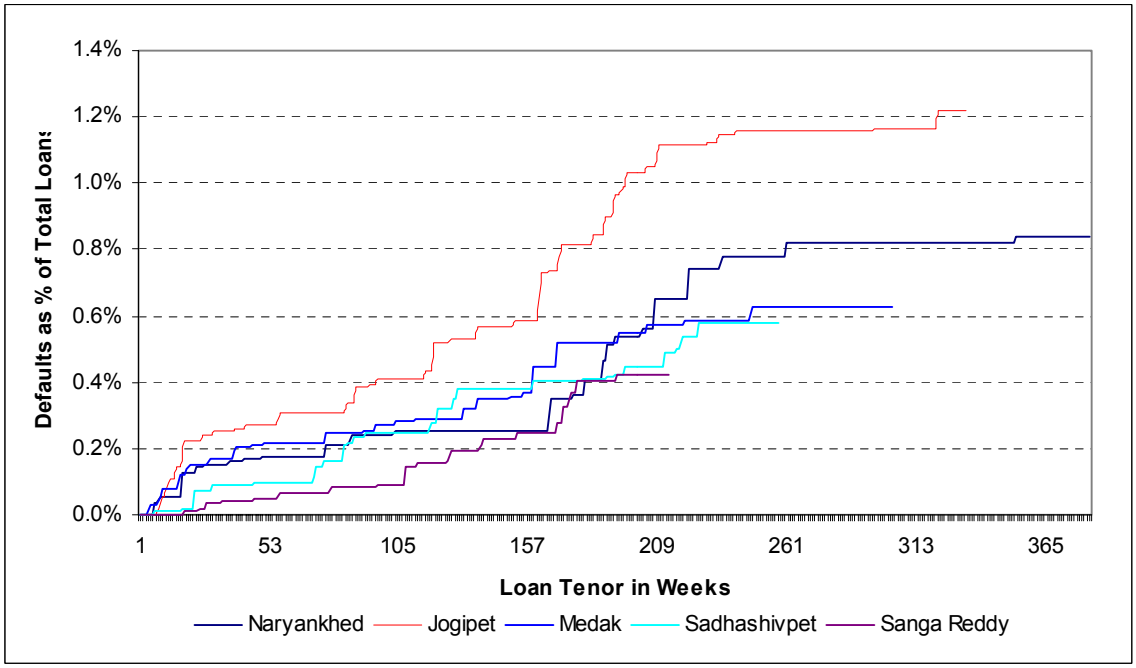


Figure 3. SKS Cumulative Defaults: Monthly Vintage versus Historical Total

The dotted line represents the default rate for the entire history of the portfolio.

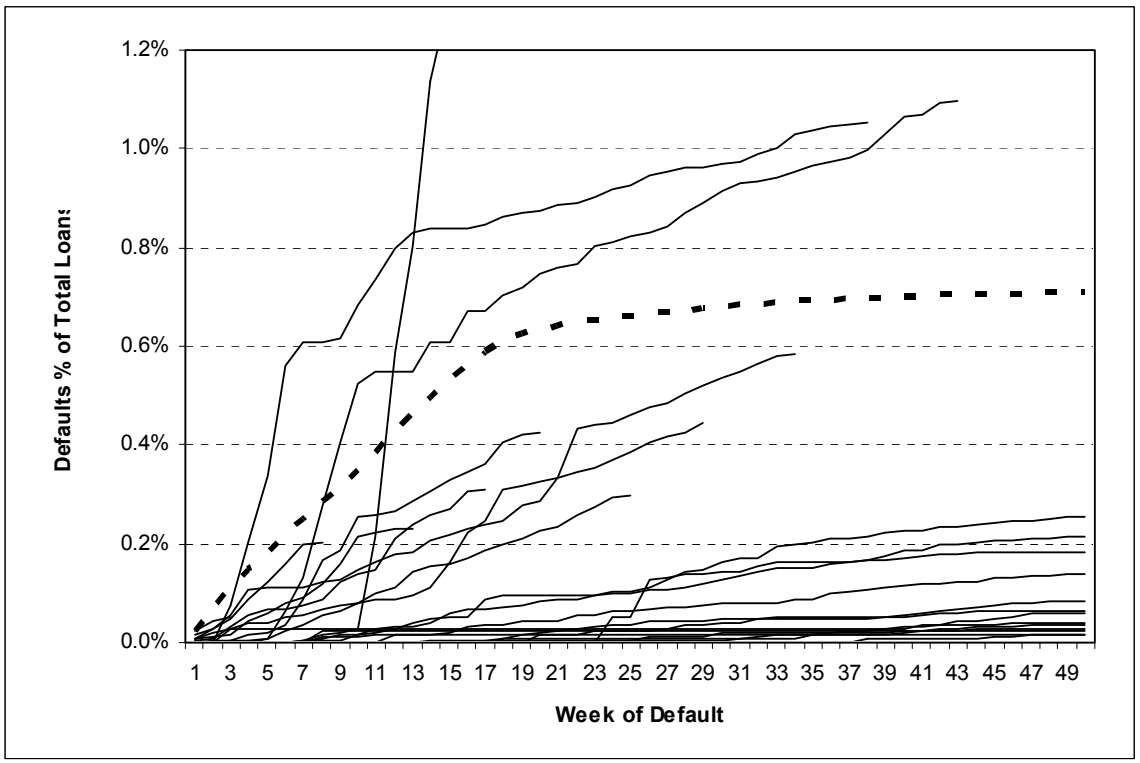


Figure 4. SKS Mean Loan Amount versus Weighted Average Yields

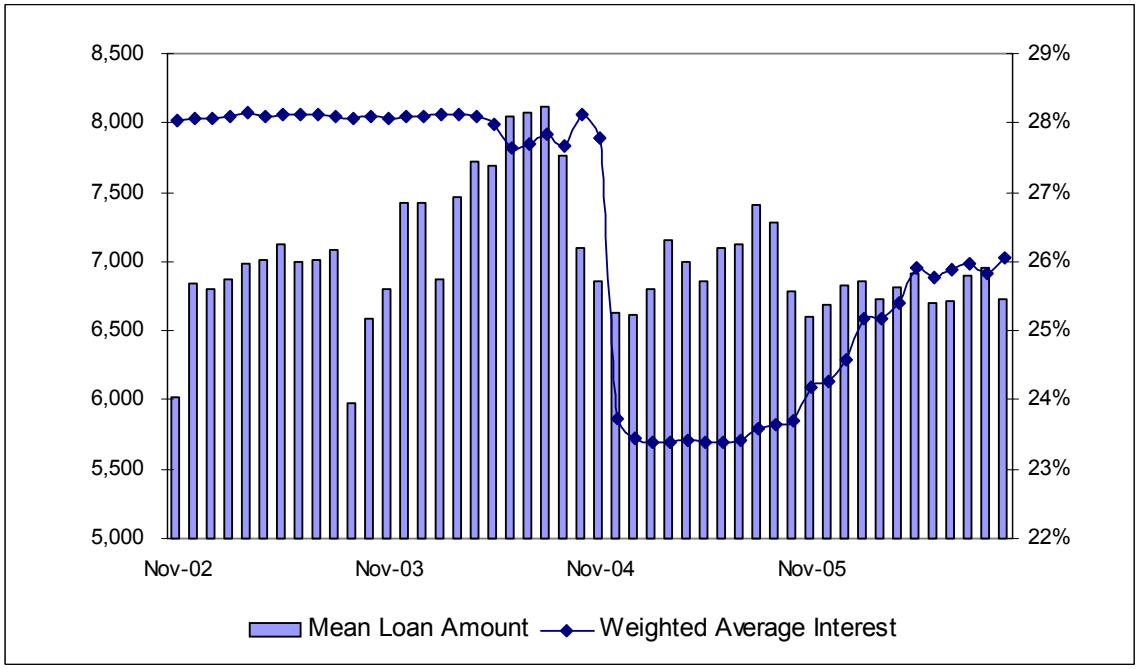


Table 1. SKS Example Loan Amount Stratification: October 2006 and 4-Year History

Period	Amount	Number of Loans	%	Total	Min Loan	Max Loan	Mean Loan	Minimum Effective	Maximum Effective	Weighted Average Effective
				Amount in INR				% Rate		
Oct-06	0	4,680	10%	9,984,000	500	3,000	2,133	0.00	28.13	25.86
Oct-06	3,001	16,900	37%	83,720,000	4,000	6,000	4,954	23.60	28.13	26.02
Oct-06	6,001	15,914	35%	125,634,000	7,000	9,000	7,895	23.60	174.13	26.95
Oct-06	9,001	7,145	16%	74,786,000	10,000	12,000	10,467	23.60	28.13	25.00
Oct-06	12,001	579	1%	8,113,000	13,000	15,000	14,012	23.60	28.13	23.87
Oct-06	15,001	193	0%	3,152,000	16,000	18,000	16,332	23.60	28.13	23.63
Oct-06	18,001	21	0%	420,000	20,000	20,000	20,000	23.60	23.60	23.60
Oct-06	21,001	0	0%	0	0	0	0	0.00	0.00	0.00
Oct-06	24,001	0	0%	0	0	0	0	0.00	0.00	0.00
Historical	0	72,118	12%	156,539,500	250	3,000	2,171	0.00	28.13	24.83
Historical	3,001	193,143	33%	973,647,000	4,000	6,000	5,041	22.69	28.13	25.28
Historical	6,001	188,714	32%	1,492,906,200	7,000	9,000	7,911	22.95	174.13	25.99
Historical	9,001	115,340	20%	1,183,914,000	10,000	12,000	10,265	23.19	28.13	25.36
Historical	12,001	15,027	3%	201,515,000	13,000	15,000	13,410	23.25	28.13	24.83
Historical	15,001	4,191	1%	68,266,000	16,000	18,000	16,289	23.33	28.13	24.15
Historical	18,001	481	0%	9,473,000	19,000	20,000	19,694	23.36	28.13	24.11
Historical	21,001	29	0%	644,000	22,000	24,000	22,207	23.60	28.13	23.76
Historical	24,001	5	0%	129,000	25,000	26,000	25,800	23.42	23.60	23.57

Figure 5. SKS Loan Amount: Historical 4-Year versus 6 Months Ending October 2005 (in INR)

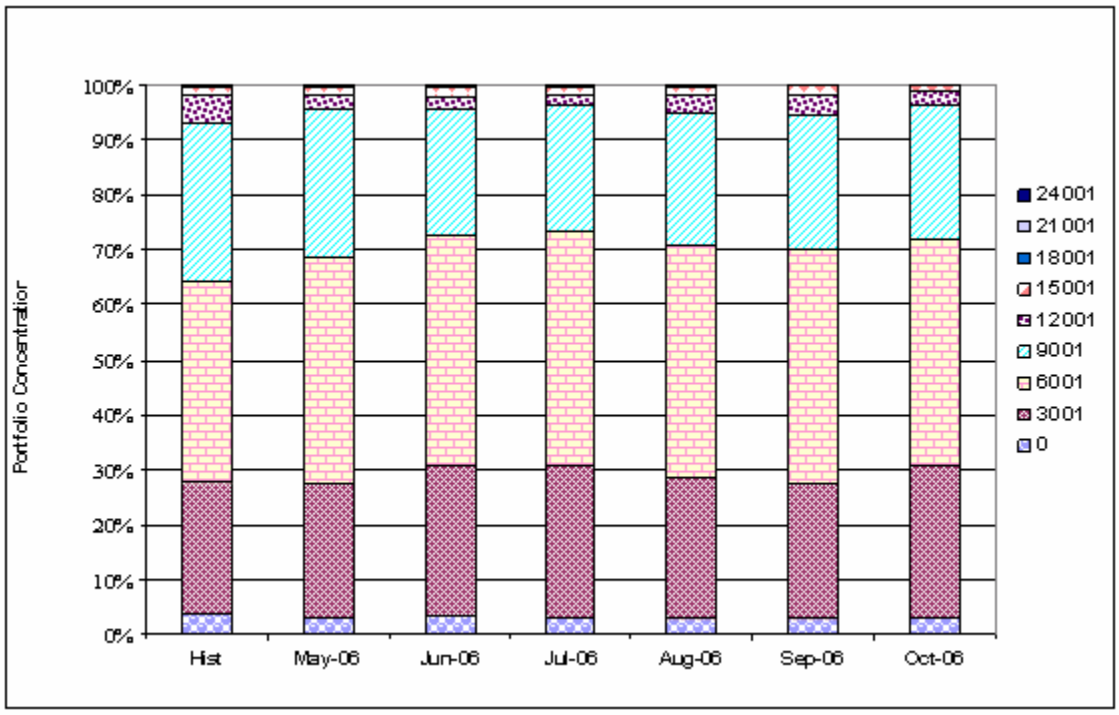


Figure 6. SKS Distribution of Loan Purpose May-October 2006

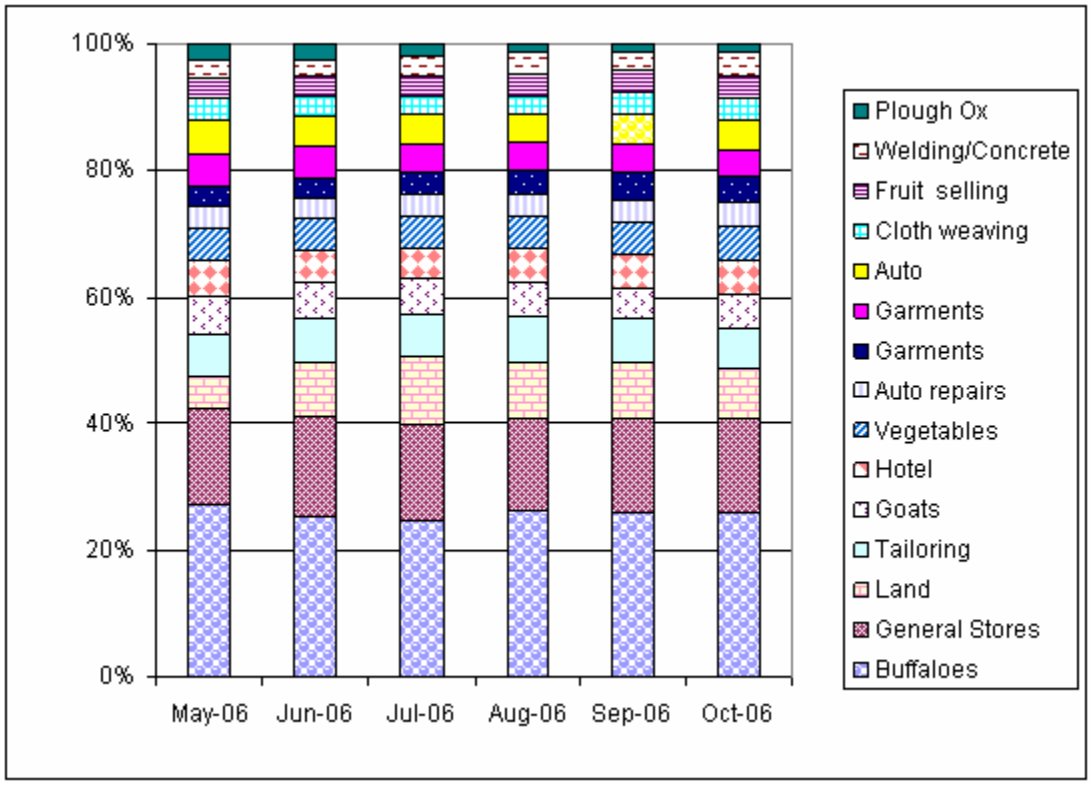


Table 2. SKS Top 20 Geographic Regions for Loans as % of Portfolio May-October 2006

	May	June	July	Aug	Sep	Oct
Bellary	1.8	1.1	1.1	1.4	1.4	1.9
Bhadrachalam	2.3	2.0	2.3	1.0	1.0	1.8
Bodhan	1.6	1.4	0.9	1.2	2.0	1.7
Khammam-B	1.2	1.3	1.2	0.3	1.3	1.6
Kodada	1.8	1.4	1.1	0.6	1.0	1.6
Hospet	2.0	1.2	1.1	0.7	1.2	1.6
Armoor	1.2	1.5	1.0	0.2	1.2	1.5
Nizamabad	0.9	0.9	0.9	0.1	1.5	1.5
Jammikunta	0.7	0.8	0.7	0.9	1.2	1.5
Berhampur	1.2	1.0	1.1	1.1	1.1	1.5
Gagawathi	0.0	0.0	2.7	1.8	3.3	1.5
Karimnagar	1.3	1.2	1.0	1.4	1.6	1.4
Sadashivpet	2.1	1.7	1.5	0.2	1.4	1.4
Narayankhed	1.5	1.4	1.1	0.7	1.3	1.4
Chityal	1.2	0.8	1.4	0.1	2.1	1.4
Thallada	1.7	1.4	1.6	0.8	1.1	1.4
Korutla	1.2	1.2	0.8	1.5	1.3	1.4
Pedapally	0.7	0.8	0.7	0.7	1.8	1.4
Sathupally	1.1	1.5	2.0	0.2	1.8	1.3
Sanga Reddy	2.1	1.7	1.1	2.3	1.5	1.3

Figure 7. SKS Borrower Loan Cycles May-October 2006

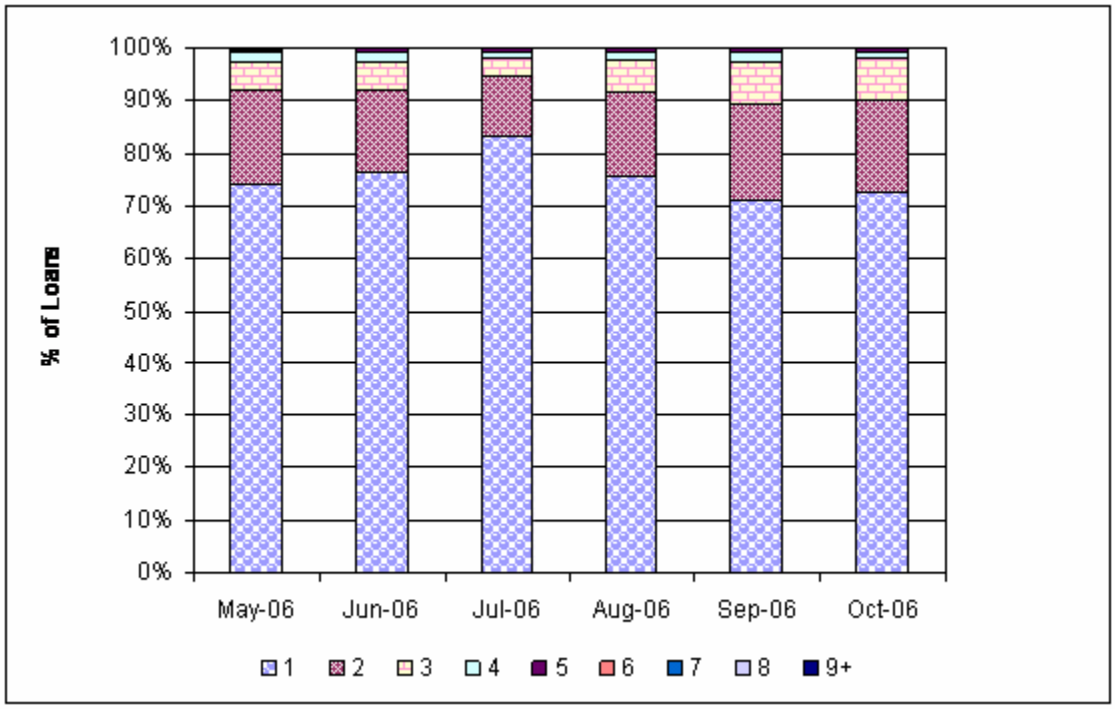


Table 3. SKS Default Rate by Branch

Branch Name	Number of Defaults	Disbursed Amount of Loans (INR)	Default %	First Date of Loan Origination	% Default Per Day
Nizamabad-B	2,210	20,460,000	87.8728	5/24/04	0.0987
Sambalpur	26	183,000	4.3624	8/10/06	0.0532
Madhira	699	4,707,000	12.3804	7/26/05	0.0268
Bhubaneswar	37	270,000	2.2169	7/6/06	0.0189
Nanded	226	1,650,000	3.1371	11/16/05	0.0090
Berhampur-B	76	552,000	2.3990	1/2/06	0.0079
Bhokar	30	204,000	1.0225	3/14/06	0.0044
Kurdhar	25	156,000	0.7379	3/6/06	0.0031
Bidar-A	89	566,000	0.9025	7/27/05	0.0020
Sathupally	56	425,000	0.5580	5/9/05	0.0010
Huzur Nagar	92	689,000	0.7935	6/8/04	0.0009
Miryalguda	116	775,000	0.7095	5/24/04	0.0008

Figure 8. IMON Monthly Growth Rate: 2001-2006

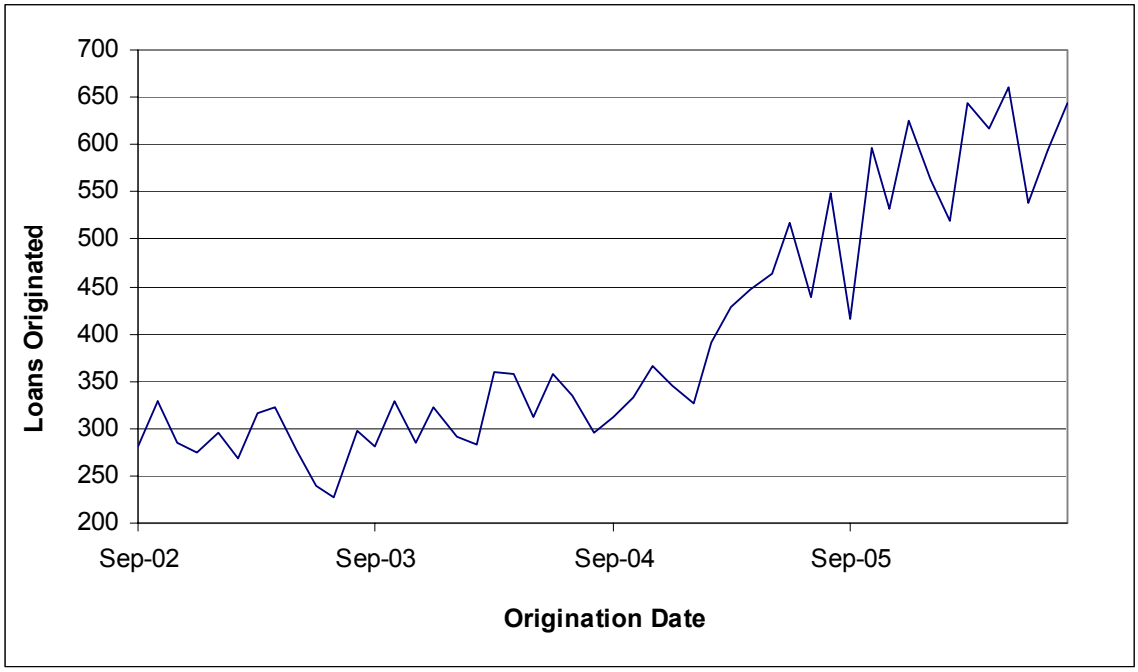


Figure 9. IMON Synthetic Cumulative Defaults

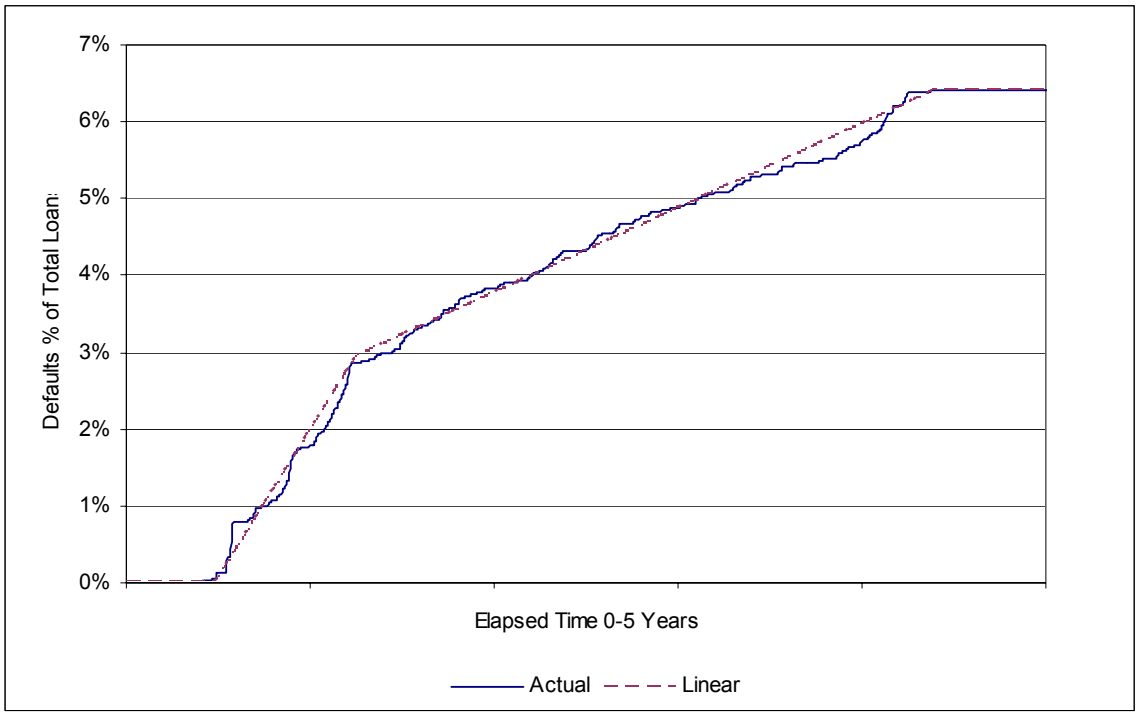


Figure 10. IMON Mean Loan Amount (in TJS) versus Weighted Average Rates

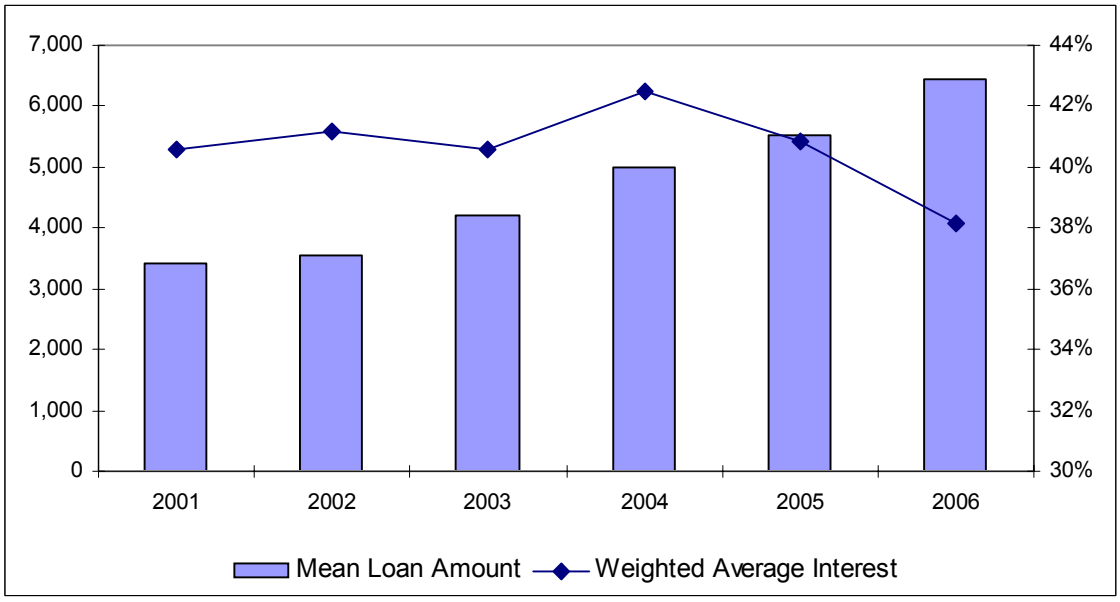


Table 4. IMON Example Loan Amount Stratification 2005 Vintage

Range	Number of Loans	Total	Mean Loan	Min. Loan	Max. Loan	Wt Avg	Min	Max	Wt Ave	Min	Max
		Amount in TJS				Days			% Rate		
0-3000	1,725	3,976,125	2,305	380	3,000	162	56	730	42.3	22.0	50.4
3001-6000	2,249	10,016,219	4,454	3,020	6,000	148	56	730	41.7	22.0	50.4
6001-9000	1,005	7,411,420	7,375	6,050	9,000	145	56	730	41.1	22.0	50.4
9001-12000	399	4,147,920	10,396	9,090	12,000	193	56	730	39.9	22.0	50.4
12001-15000	218	3,100,800	14,224	12,100	15,000	307	84	504	39.0	22.0	50.4
15001-18000	32	528,600	16,519	15,200	18,000	244	56	504	39.4	39.2	44.8
18001-21000	22	437,800	19,900	18,500	21,000	333	56	504	39.7	39.2	50.4
21001-24000	42	956,857	22,782	21,150	24,000	449	140	672	38.6	34.0	39.2
24001-27000	6	152,200	25,367	24,600	27,000	364	168	504	39.2	39.2	39.2
27001-30000	32	958,125	29,941	28,125	30,000	493	168	1,008	38.8	34.0	39.2
Total	5,730	31,686,067	5,530	380	30,000	195	56	1,008	40.9	22.0	50.4

Figure 11. IMON Loan Amount by Year: 2001-2006 (in TJS)

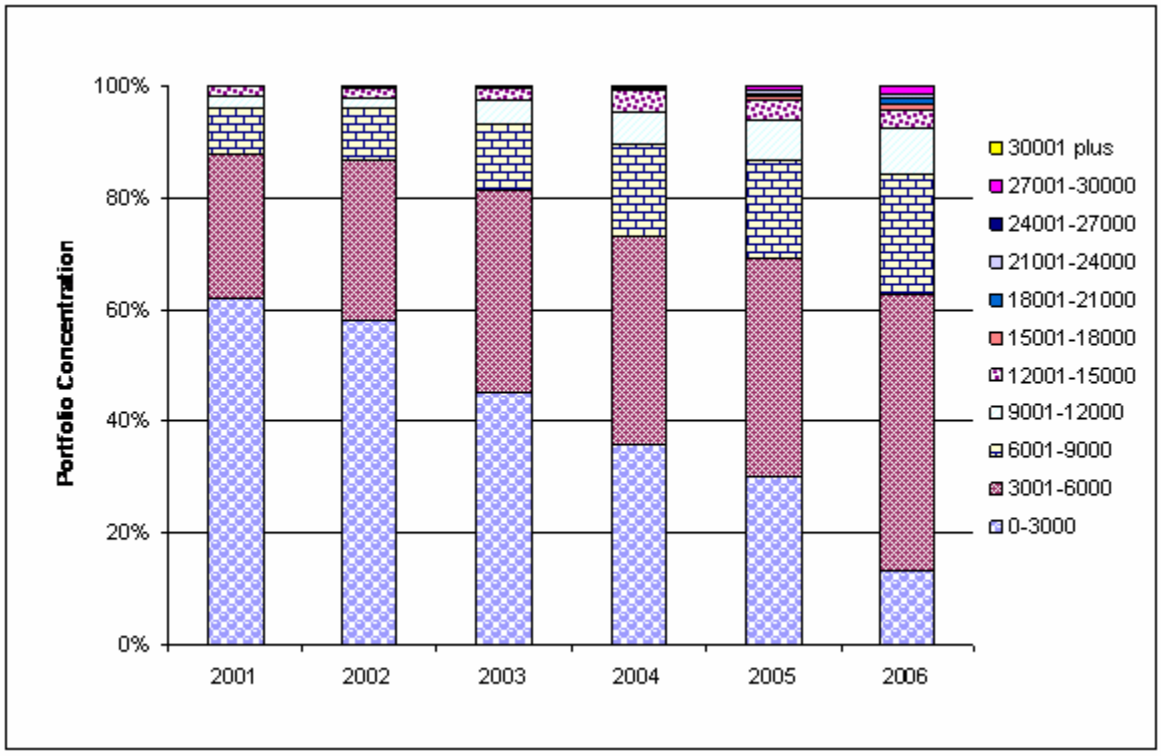


Figure 12. IMON Loan Interest Rate by Year: 2001 to 2006

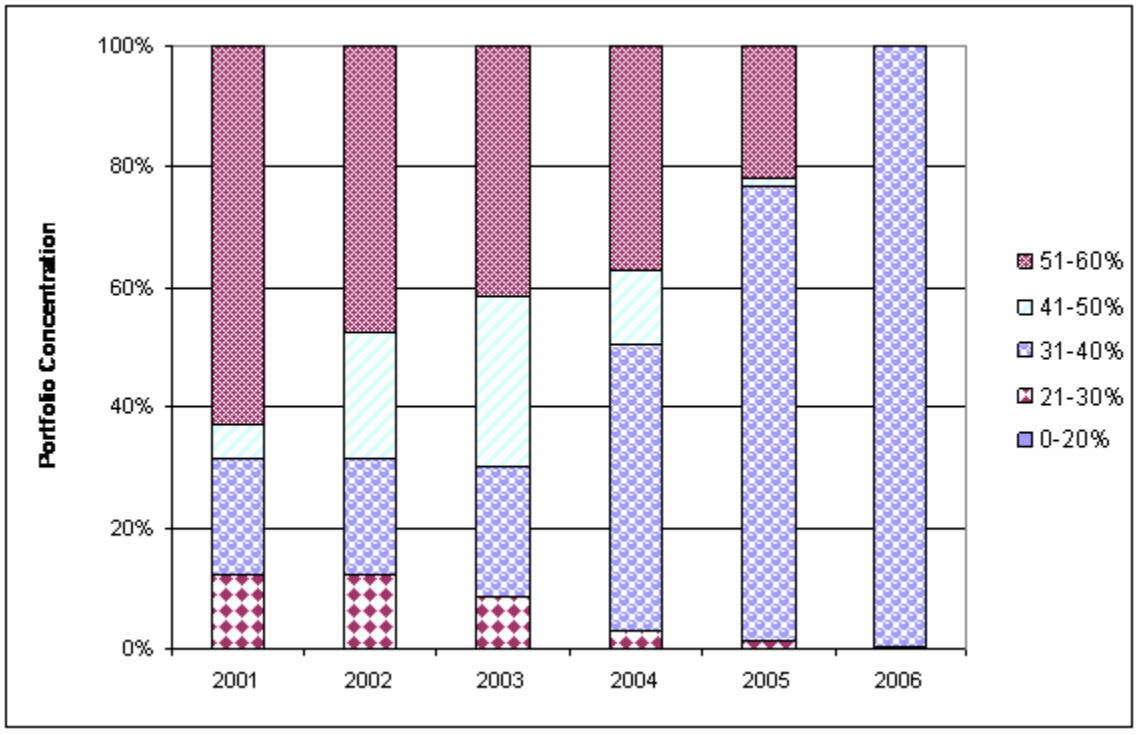


Figure 13. IMON Loan Tenor in Weeks: 2001 to 2006

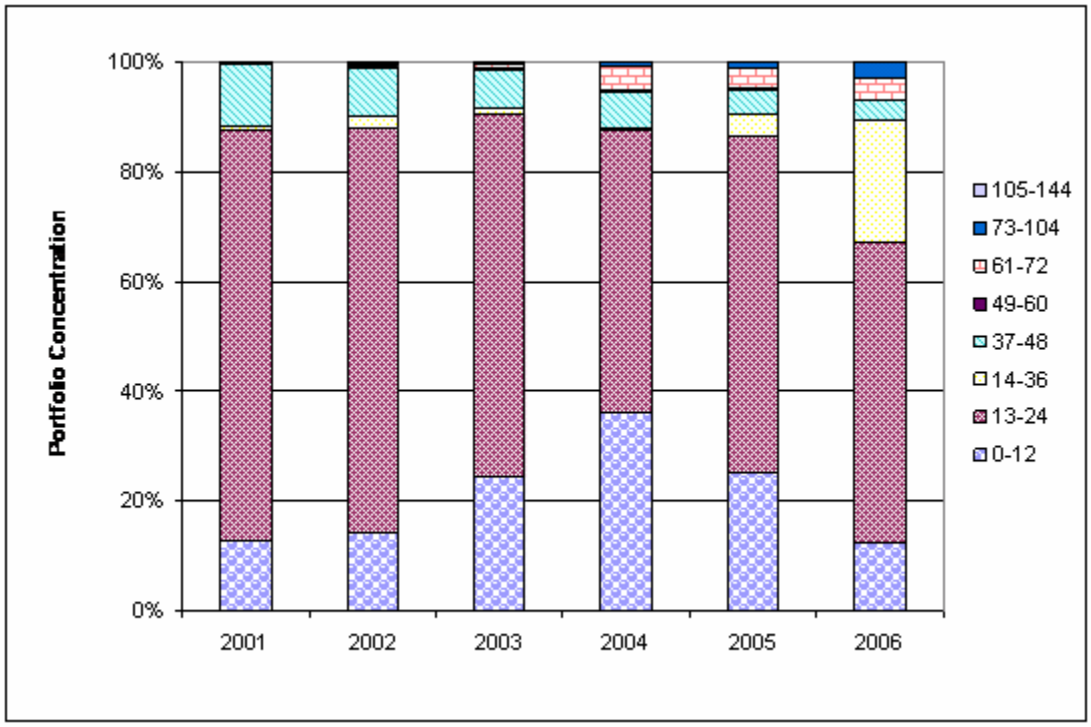


Figure 14. IMON Loan Products

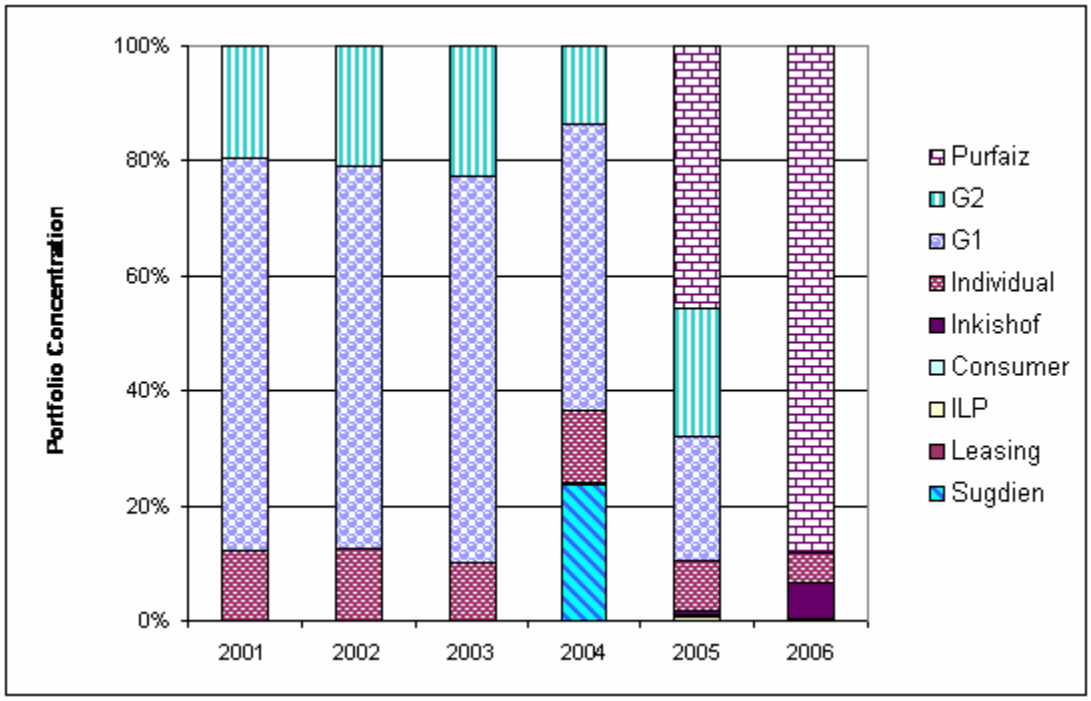
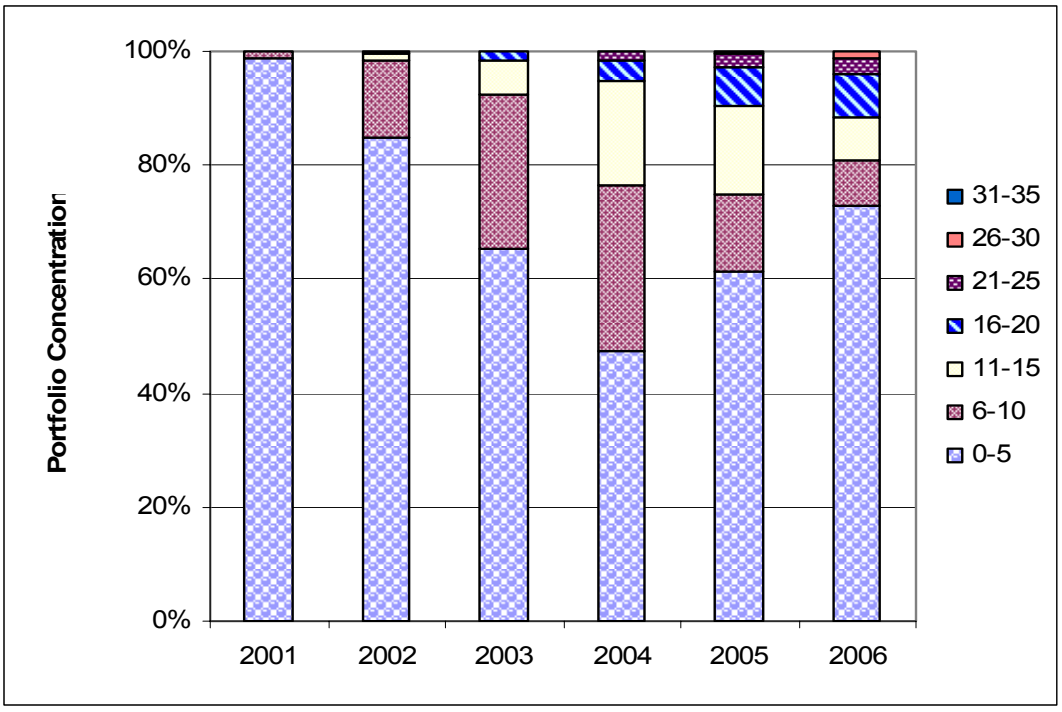


Table 5. IMON Top 20 Geographic Regions for Loans as % of Portfolio

Region	2001	2002	2003	2004	2005	2006
Истаравшан	19.3	15.4	18.4	19.1	16.1	15.3
Исфара	2.4	9.6	10.1	11.6	13.1	10.2
Худжанд	38.2	22.3	17.5	14.1	12.5	9.6
Канибадам	13.6	10.2	7.8	7.9	8.6	8.0
Турсунзаде	0.1	4.3	6.0	7.0	6.2	6.2
Пенджекент	0.0	0.0	0.0	0.2	3.8	6.2
Шаартуз	0.3	5.3	7.4	8.5	5.7	5.1
Душанбе	8.8	12.2	7.2	6.1	4.2	5.0
Гиссар	3.8	5.2	4.6	4.5	4.4	4.4
Спитамен	0.0	0.0	0.0	0.3	3.6	3.8
Дж.Расулов	0.0	0.0	0.0	0.0	1.6	3.6
Кабодиён	0.4	4.6	5.7	5.8	3.9	3.1
Колхозобад	1.4	1.7	3.1	3.7	2.9	2.4
Курган-Тюбе	0.0	0.0	0.0	0.0	1.4	2.3
Гафуров	8.8	3.8	2.6	2.5	2.1	2.3
Носир Хусрав	0.0	0.8	2.1	3.1	2.0	2.0
Джиликуль	0.0	2.2	5.6	3.1	2.5	1.9
Кумсангир	0.0	0.0	0.0	0.0	0.5	1.9
Рудаки	1.1	1.4	1.1	1.3	1.1	1.8
Вахдат	0.0	0.0	0.0	0.5	1.0	1.4

Figure 15. IMON Borrower Loan Cycles



GLOSSARY

Asset-backed securities	An investment security whose return to investors is based on the payments of, and is collateralized by, a pool of loans
Capital	The money used to fund loans, i.e., debt, equity, or donations
Capital markets	The system and organization by which money moves from investor to investor or borrower and vice versa
Characteristic	Amount, tenor, rate, product, cycle, purpose, geographic location or other quantifiable or identifiable outcome of a loan
Cumulative default	The sum of current defaults plus all prior defaults
Cycle	The number of times a borrower has borrowed
Default	Failure to make a loan payment as agreed, resulting in acceleration or restructuring of the loan and possible loss to the lender
Diversification	The range of possible outcomes for each loan characteristic
Effective yield	The imputed rate of interested earned on the repayment of a loan
Geographic location	The general vicinity of the borrower or the branch where the loan was originated
Gross default	The unpaid loan principle on the of default regardless of future loan payments
Homogeneity	Similarity of diversification of characteristics from one vintage to another
Interest rate	The interest payment divided by the outstanding loan principle
Level yield	The fixed rate of interest earned on an amortizing loan where each payment is a fixed amount
Loan origination	The underwriting and disbursement, or funding, of a loan
MFI	Microfinance intermediary or institution
Microloan	A loan smaller than the status quo for a lending business
Product	A lender's standard offering of loan amount, rate, tenor and other characteristics
Purpose	The use of the loan proceeds cited by the borrower
Securitization	The act of pooling loans and issuing asset-backed securities
Static pool	The data from a discrete pool of loans typically originated within a given time period
Stratification	The tabular representation of pool characteristics stratified by logical increments of all possible outcomes
Tenor	The elapsed time between loan funding and loan maturity
Vintage	The time period during which loans in a pool were originated
Volume	The number of loans, or total amount of loans, originated in a period
Weighted average	Each observation is weighted by the loan amount, summed, and divided by the total of the loan amounts

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