

Managing Credit Risk in Rural Financial Institutions in Latin America

Mark Wenner
Sergio Navajas
Carolina Trivelli
Alvaro Tarazona

Inter-American Development Bank

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Mark Wenner is Senior Financial Specialist in the Rural Development Unit. Sergio Navajas is Microenterprise Specialist in the Micro, Small and Medium Enterprise Division. Carolina Trivelli and Álvaro Tarazona are researchers at the Institute for Peruvian Studies (IEP) in Lima, Peru. The authors are grateful for the valuable comments received from Juan Buchenau (consultant), Calvin Miller (FAO), and Dieter Wittkowski (SDS/MSM). The authors express their sincere gratitude to all the institutions and individuals who participated in this study. Special thanks, however, are extended to Fernando Peña, Sergei Walter and Luis Morales from Banrural S.A.; Sammy Calle and Luis Lamela from CMAC Sullana; Elizabeth Ventura and Juan Meza from EDPYME Confianza; and Hugo Vilavicencio and Guillermo Caal from Fundea. In addition, the authors are very appreciative of the efforts of Jorge Luis Godínez who provided invaluable help in designing and implementing the web-based survey utilized for this research, Raquel Trigo who helped us to identify potential financial institutions with rural portfolios and to manage mailing lists, Raphael Saldaña (IEP) for his invaluable programming skills, and Margarita Reyes who provided able production assistance. Lastly, the authors would like to acknowledge the financial support received from the Norwegian Trust Fund administered by the Bank.

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Manager, Sustainable Development Department: Antonio Vives
Deputy Manager, Social Development and Governance Subdepartment: Marco Ferroni
Chief, Rural Development Unit: César Falconi
Chief, Micro, Small and Medium Enterprise Division: Alvaro Ramírez

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Micro, Small and Medium Enterprise Division
Sustainable Development Department
Inter-American Development Bank
1300 New York Avenue, N.W.
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Email: mipyme@iadb.org
Fax: 202-623-2307
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Foreword

Adequately managing credit risk in financial institutions is critical for their survival and growth. In the case of rural lending in general and agricultural lending in particular, the issue of credit risk is of even greater concern because of the higher levels of perceived risks resulting from some of the characteristics of rural dwellers and the conditions that they find themselves in. More extremely poor people tend to live in rural than in urban areas. In addition, fewer people are able to access basic infrastructure services and these tend to be of lesser quality or to be less reliable than in urban areas. Rural residents tend to be less educated, more often than not they have insecure land tenure, and they live farther apart than urban populations. Most importantly, agriculture, the mainstay of most rural economies, tends to be subject to price volatility, weather shocks, and trade restrictions. As a result, financial institutions that are active in rural areas are likely to face an elevated level of credit risk and need to manage it well. The lack of good risk mitigation techniques and high transaction costs can discourage formal financial institutions from entering and serving rural areas.

The purpose of this report is to review common credit risk management techniques used in a sample of Latin American financial institutions with agricultural portfolios, identify the factors that contribute to successful credit risk management as measured by several key financial performance indicators in order to assist donors, governments, and owners of financial institutions to promote and adopt the most efficient and robust techniques. The ultimate aim is to make financial markets more inclusive and sounder.

The report also examines the results of a survey of forty-two rural financial institutions in Latin America and provides a detailed analysis of four intermediaries, two in Peru and two in Guatemala. It ends with a set of recommendations on how to improve credit risk management capabilities.

We are confident that owners and managers of financial institutions with agricultural portfolios, donor agencies, national governments, and other stakeholders will find this report informative and helpful for making decisions and strengthening institutions.

Álvaro R. Ramírez
Chief
Micro, Small and Medium Enterprise Division

César Falconi
Chief
Rural Development Unit

Contents

Executive Summary	i
Introduction	1
Review of Typical Risks Faced by Financial Institutions and Techniques to Address Them	3
Summary and Description of Survey Results	9
Summaries of Case Studies in Guatemala and Peru	17
Conclusions and Recommendations	24
References	27
Annex A: List of Participating Institutions in Survey	29

Executive Summary

Rural areas lack banking services due, in large part, to perceptions of high risks and high costs of delivering financial services. In Latin America, it is estimated that less than five percent of rural households have access to formal credit. Even though agriculture is declining in economic importance and nonfarm activities are becoming more important over time, agriculture remains the main livelihood activity for many. Agriculture, however, is inherently more risky than other sectors due to its vulnerability to climatic shocks, commodity price volatility, and trade restrictions. In the current context of ongoing globalization and the quest to reduce rural poverty, agriculture will have to maintain and improve its competitiveness. Ready access to agricultural finance is one of the main ways of improving agricultural competitiveness. Therefore, it follows that lending technologies and, in particular, rural credit management techniques must improve.

This report examines a sample of forty-two financial institutions in Latin America that have agricultural portfolios, and identifies their principal perceived risks, how they assess and manage credit risk, and how effective they are in the process as measured by key financial performance indicators (such as asset quality, portfolio growth, and profit margins).

We find that these institutions are relying on four techniques to manage risks:

- Expert-based, information-intensive credit technologies wherein repayment incentives for clients and performance incentives for staff play important roles, and information acts as a virtual substitute for real guarantees are being used to reduce risk.
- A number of diversification strategies (geographic, sectoral, commodity) are being used to cope with risk.
- Portfolio exposure limits (requirements that agricultural credit be less than 40 percent of total lending) are being used to reduce risk.

- Excessive provisioning is being used to absorb and internalize risks.

The largest challenge for expanding credit in rural areas is that few institutions are transferring credit risk to third parties. In developed countries, massive expansions of credit have been due in large part to the introduction and wide diffusion of risk transfer techniques (such as insurance, securitization, derivatives, swaps, etc.) and the wider acceptance of different types of collateral (inventories, accounts receivables, warehouse receipts, etc.). In the sample surveyed, the most common risk transfer instrument available and used (albeit only by 25 percent of the respondents) is publicly financed guarantee funds, which have historically been plagued with problems such as high costs, limited additionality, and moral hazard. In order to introduce some of the other risk transfer instruments more commonly found in developed financial markets, investments will be needed to reform and strengthen the insurance industry, capital markets, credit bureaus, commercial codes, secured transaction frameworks, and information disclosure rules.

The implications of using these credit risk management techniques are many. First, credit evaluation technologies are very expensive and tend to increase operating costs and, as a result, the interest rates charged by financial institutions. Second, some minimal economies of scale and scope are necessary. Statistical evidence supports the contention that the larger rural finance institutions in the sample can more easily diversify risks, offer a wider range of products, obtain better efficiency ratios and charge lower lending interest rates. Clearly, agricultural lending cannot be the primary type of lending unless more robust risk transfer techniques become more commonplace. Third, the credit technology used in agricultural microfinance is an adaptation of urban microfinance technology and has limits for more commercially oriented and specialized agricultural borrowers. New technologies will have to be developed or adopted. At

present, a common set of credit evaluation principles seem to be widely applied:

- Employ well-prepared staff that has some background in agronomy.
- Use staff performance incentives to promote a sense of responsibility and to reward results.
- Gather and use copious amounts of information on character, managerial ability, reputation for repayment, and financial viability to identify “good borrowers.”
- Rely principally on cash flow and sensitivity analysis to determine repayment capacity.
- Give preference to households with diversified streams of income and that are somewhat insulated from weather risks (larger homesteads, fragmented plots in different microclimates, and those that use of irrigation).
- Use repayment incentives to avoid strategic defaults.
- Monitor clients closely.

In conclusion, most institutions surveyed saw market opportunities in rural areas, and the most successful institutions were expanding their agricultural portfolios and generating profits. However, much can still be done to improve credit risk management by improving the feasibility of transferring risk to third parties.

The report makes several recommendations for donors and governments. The preferred or best option is to provide support to rural institutions that meet minimum scale requirements that would permit easy diversification of credit risk, and help them to expand and innovate. In countries where these types of rural financial institutions are absent, the second best option would be to assist those institutions that have a clear strategic commitment to the rural sector as well as competent management to upgrade their technologies, diversify, and introduce risk transfer instruments. The third best option would be to promote mergers and acquisitions among smaller institutions so they can reach a larger scale. The fourth best option would be to promote value chain financing, since many of the credit risks are attenuated by participation in a chain.

Introduction

Taking credit risk is part and parcel of financial intermediation. Yet, the effective management of credit risk by financial intermediaries is critical to institutional viability and sustained growth. Failure to control risks, especially credit risk, can lead to insolvency. However, too often, the mere perception of high credit risk can dissuade financial intermediaries from entering a particular market segment when a large contributing factor to that perception may be lack of adequate credit risk evaluation and management techniques. This seems to be the case with rural finance, especially lending to small- and medium-scale agricultural producers. If financial institutions do enter rural areas, they tend to limit exposure to agricultural finance and to favor clients with established credit histories and significant collateral. As a result, a relatively small number of financial intermediaries have a presence in rural markets and an even smaller number have significant agricultural lending portfolios. This limited presence of financial intermediaries in rural areas and the bias against agricultural lending creates access and segmentation problems.

Underdeveloped rural credit markets have serious negative economic and social consequences. Poor access to formal financial services and in particular credit, contributes to persistent poverty, lower economic growth rates, and high income and asset inequality. Rural poverty rates in Latin America have hovered around 54 percent for decades, while rural financial depth has generally declined.¹ Less than five percent of the region's rural population is estimated to have access to formal credit while no widespread problems exist in the United States, for example (USDA, 1997). The problem of poor access constrains many rural entrepreneurs in Latin America and prevents them from diversifying and expanding their businesses.

¹ Using Agricultural Credit/Agricultural Share in Gross Domestic Product as a proxy measure of rural depth, Proenza and Wenner (2003) found that the ratio declined for six of nine countries comparing three data points spanning from 1982-1996.

Segmentation compounds the inequality and growth problems noted above, and also inhibits institutional development, limiting competition, innovation, and efficiency. Institutions tend to identify small niches and do not concern themselves with reducing spreads, providing newer services, or reducing costs because clients have few alternatives and there are few competitors. Well-capitalized rural financial institutions in Latin America tend to serve only large-scale, agricultural and nonagricultural businesses. Since the large farm/agribusiness segment is very small to begin with, there is little impetus to innovate or for others intermediaries to contest this market.

At the other end of the spectrum, microfinance institutions (MFIs) tend to serve a very small segment made up of well-diversified, low-income rural households. MFIs limit loan sizes and term because of their small capital base and the high degree of unmitigated risk associated with agriculture in Latin America. No solid disaggregation exists for rural versus urban microfinance, which is usually defined as loans below US\$3,000. According to the Microfinance Information Exchange (The Mix), there were 762 institutions reaching more than 38 million borrowers in 2005.² A competing database, Microcredit Summit, indicates that there were 92 million active microcredit borrowers in 2004. A Consultative Group to Assist the Poor (CGAP) survey of alternative finance institutions (that is, institutions serving a clientele of lower socioeconomic strata than traditional private commercial banks) found that there were 3,000 such institutions providing services to 152 million low-income borrowers. In Latin America and the Caribbean, Navajas and Tejerina (2006) estimate that there are about 336 MFIs with close to 6 million borrowers. While no clear figure exists on potential demand for microloans, the consensus is that there are several hundred million bankable clients. On the savings deposits side,

² This number combines information from both the Mix database and the MicroBanking Bulletin (www.themix.org). Data for 2004 was utilized when data for 2005 was not available.

CGAP estimates that there are 573 million small value deposit accounts, of which 318 million are postal savings accounts (Christen, Rosenberg and Jayadeva, 2005).

Yet these smaller institutions cannot grow and expand services as fast as they would like because they tend to be constrained by capital, technology, and governance structure. Their level of market penetration is increasing but it is still low. To further exacerbate matters, small- and medium-scale agricultural producers that are commercially oriented and specialized, tend to be largely excluded from formal credit even though they have demonstrably profitable investment opportunities. They demand amounts that are larger than what the average microfinance institution can provide (US\$300-US\$3,000), and they lack sufficient collateral, audited financial records, and long credit histories to be deemed creditworthy by large financial institutions that tend to make rural loans greater than US\$50,000. Because of segmentation, few institutions offer a gamut of financial products suited to the demands and capabilities of the various types of clients or even the same client over time. Thus, the tiny top of the market is fairly well served, but the middle and bottom segments are partially served or completely excluded.

In more developed financial markets a host of innovations in credit risk management that have taken place in the last two decades that has facilitated a boom in credit disbursements. U.S. private credit as a ratio of GDP has ballooned from 51 percent in 1950 to over 96 percent in 2005³ (IFM, 2006). The techniques and innovations that permitted this credit expansion are: (i) the greater use of credit scoring models in consumer finance; (ii) the wider use of securitization in mortgage lending; (iii) the greater use of statistical models based on market valuation and accounting information in corporate and small business lending; and (iv) the use of credit derivatives and swaps, which serve to lower transaction costs, improve liquidity, maintain asset quality, and transfer risk to third parties. These techniques may not be fully transferable to rural

Latin America because of the lack of supporting institutions, but certainly hold insights and lessons that may help guide improved practices and innovation in credit risk management.

Policymakers and donor institutions face an efficiency and equity challenge in correcting this suboptimal state of affairs in developing countries. Managers of financial institutions interested in consolidation and growth face the same challenge; namely, how to better manage risks to reduce costs and improve profit margins. Operating in rural areas is particularly challenging because of the spatial dispersion of clients, high transaction costs, poor infrastructure, low levels of education, and low levels of income. However, improvements in risk management techniques would go a long way in offsetting these shortcomings, allowing financial institutions to extend credit services to a hitherto underserved and difficult to reach market segment. Better risk management techniques would help financial institutions penetrate rural markets to a greater extent.

The purpose of this report is to review common credit risk management techniques used in a sample of Latin American financial institutions with agricultural portfolios, and to identify the factors that contribute to successful credit risk management as measured by asset quality maintenance, portfolio growth, and profit margins, in order to assist the donor organizations and national governments in designing better interventions aimed at strengthening rural financial institutions and ultimately deepening rural financial markets.

The next section reviews and explains the types of risks that financial institutions face. It also discusses common approaches used to analyze credit risk, and common portfolio risk management strategies. The third section examines the results of a survey of rural finance institutions in Latin America. The fourth section provides a detailed financial analysis of four intermediaries. The final section presents conclusions and makes recommendations for donors, governments and managers of rural institutions on how to improve credit risk management.

³ In comparison, the average for Latin American countries for this indicator is barely above 30 percent.

Review of Typical Risks Faced by Financial Institutions and Techniques to Address Them

The objective of financial institutions is to maximize shareholder value by mobilizing deposits (liabilities) and lending them (assets) to firms and clients with investment projects. The institution seeks to generate a profit by having interest income, fees, and investment or trading income exceed the interest paid on deposits, borrowings, and all operating costs. Even if the institution is member-owned or has a philanthropic motivation, the principle of earning a profit still applies. Obtaining a positive net income is imperative for permanency and sustainability. What may differ between a for-profit and a not-for-profit institution is the degree of profit accumulation and the use of those profits.

Financial institutions face a number of risks in the pursuit of the aforementioned objective:

- credit risks
- liquidity risks
- interest rate risks
- foreign currency risks
- operational risks (mistakes and fraud committed by staff)
- technological risks (power and equipment failures that lead to data loss)
- product innovation risks (new products failing)
- reputational risks (involvement or linkage to unsavory business practices—racial/ethnic discrimination, money laundering, lending for environmentally unsound projects, excessive related lending)
- competitive risks
- regulatory risks (sanctions for violations of regulatory norms)

The two most important risks, however, are interest rate and credit risks. Problems in these areas often lead to liquidity crises and bank failures. If an institution faces an increase in the interest rates on its liabilities (deposit accounts, commercial borrowings) while it can not easily raise the interest rate charged on loans to clients due to competition, usury laws, and reliance on

fixed interest rate contracts, then the institution can become compromised. Similarly, if an institution makes a series of bad loans that cannot be recovered, its viability can be quickly threatened. Most of the other risks in and of themselves usually do not pose fatal threats. Many of the other risks would have to be combined in order to trigger a liquidity crisis. Since the majority of the financial institutions that provide services to rural areas in Latin America are not deposit-taking, the focus of the rest of paper will be on credit risks.⁴

CREDITWORTHINESS EVALUATION TECHNIQUES

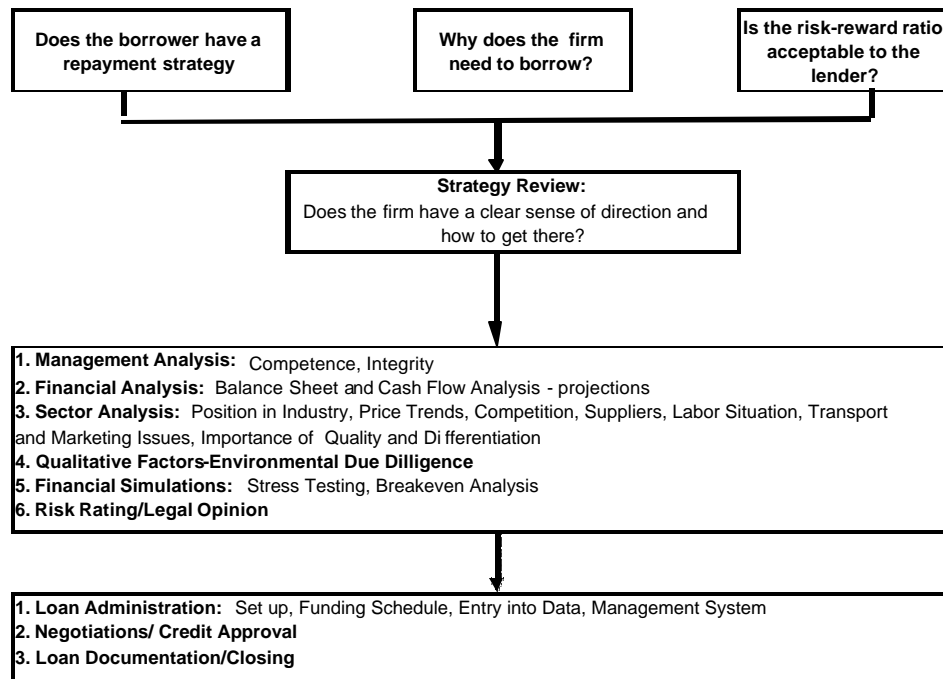
There are two broad means of evaluating creditworthiness: *appraisal of repayment capacity*, and *asset-backed lending*. The former approach focuses on investigating the integrity, moral character, management ability, and debt paying capacity of a potential borrower either through human experts or statistical models, while the latter focuses on the quality and quantity of assets that can be pledged as collateral and quickly liquidated in the event of a default.

Repayment Capacity: Human-based Expert Systems

Within the credit appraisal category the principal means that a financial institution uses to control credit risk is a solid credit evaluation done by a trained professional. The classic credit analysis is a highly labor- and information-intensive process consisting of the steps depicted in Figure 1. Classic credit analysis hinges on the subjective judgments of trained personnel. It is an expert system. Credit officers are turned into experts over time, gaining authority as they acquire experience and demonstrate skill. Developing a

⁴ Many credit unions exist in Latin America and the Caribbean but the largest and best functioning tend to be urban-based and dependent on salaried workers. Our target population is small and micro rural entrepreneurs.

Figure 1: Credit Analysis Process Flow



Source: Adapted from Caoutte et al., 1998

cadre of expert credit officers is an expensive and redundant proposition. Several have to be in constant training to make allowance for analysts who will leave to work for competitors or in other positions, for those who will have to be forced out due to lack of on-the-job success, and for maintaining sufficient numbers of credit experts to handle business volume in a prompt and professional manner at all times.

As business lending has expanded from the acquisition of fixed assets to financing working capital, the focus of analysis has shifted from the static balance sheet to cash flow, a set of financial ratios, and a consideration of the competitiveness of the borrowing firm. The analyst's main concern is how the injection of capital will be used, how competitive the borrower is within the sector or industry in question, how sensible is the business strategy being pursued, how good is the management team in delivering results, and ultimately if the borrower will generate sufficient revenue to service the acquired new debt plus confront likely hiccups and shocks in the

course of conducting business. To aid the analysis, the credit officer usually employs a set of standard and specialized industry-specific ratios that are used to compare the potential borrower to industry benchmarks. Some of the most common ratios are listed in Table 1.

Expert-based credit risk analysis methodologies work, but they can also be problematic and fail from time to time due a number of reasons: poor selection of analysts, poor training, failure to follow agreed upon procedures, overly large and bureaucratic structures wherein the sense of individual responsibility of each analyst is diluted, and natural tendencies to overconcentrate the portfolio. Over time, institutions tend to develop expertise in analyzing creditworthiness in just a few sectors and to expand rapidly in "boom times." When systematic shocks occur in the overexposed sectors, the portion of the portfolio that is nonperforming can worsen unless the lending institution can obtain credit insurance or securitize its portfolio and thereby transfer its risk of overconcentration to another party.

Table 1: Frequently Used Ratios in Credit Analysis

Category	Ratio
Operating Performance	Earnings before Interest, Taxes, Depreciation and Amortization (EBTIDA/Sales) Net Income/Sales Net Income/Net Worth Net income/Total Assets Sales/Fixed Assets
Debt Service Coverage	EBITDA/Interest Payments >1.5 Free cash flow-capital expenditure/interest payments Free cash flow- capital expenditures -dividends/interest
Financial Leverage	Long-term debt/capitalization Long-term debt/tangible net worth Total liabilities/tangible net worth Current liabilities/tangible net worth
Liquidity	Current ratio Quick ratio Inventory to net sales Inventory to net working capital Current debt to inventory Raw material, work in process, and finished goods as percentages of total inventory
Receivables	Aging of receivables: 30, 60, 90, 90+ days Average collection period

Source: Caoutte et al., 1998

* These ratios are commonly used but have to be adapted to specific industries.

Repayment Capacity: Mathematical Models

In the last thirty years, human expert systems have been slowly displaced in developed country financial markets by credit scoring models that use accounting data. For example, econometric techniques (linear and multiple discriminant analysis, logit/probit analysis that are used to calculate probability of default), mathematical programming models (that find the optimal weights for borrower and loan attributes to minimize lender error and maximize lender profits), and hybrid models (that combine direct computation, estimation, and simulation) are gaining currency. In consumer lending in the United States, credit scoring models and well-functioning credit bureaus have become pervasive, allowing loan decisions to be made within minutes. In less developed financial markets, these techniques are less common⁵ and they are

⁵ Lemon Bank, in Brazil, uses statistical scoring models based on payment patterns for utility bills to identify creditworthy low-income clients. Other banks in Latin America are starting to use scoring

rarely used in the case of small business and farm lending. Business scoring models are very dependent on audited financial statements, market capitalization, and volume of traded shares. In countries where most firms do not keep good financial records and few firms are publicly traded, these techniques cannot be readily applied.

Asset-backed Evaluation

Asset-backed lending has been around for centuries, but in the last 50 or 60 years, it has expanded tremendously in developed countries.⁶ Small and mid-sized companies and farmers generally do not own sufficient titled property that can be pledged to obtain large loans. The use of warehouse receipts, inventories, and re-

models to approve charge cards. A few microfinance institutions have also started to use these techniques (Schreiner and Dellien, 2005; Schreiner, 2003).

⁶ Mortgage lending dates back to 17th century England.

receivables as collateral to secure loans emerged as alternatives for the land constrained. Commercial finance companies pioneered the techniques in the 1950s in the United States and commercial banks entered the market soon thereafter. Asset-backed lending places a premium on valuing and understanding assets and their resale markets. Nonetheless, heavy reliance on asset backed financing has three attendant risks: collateral illiquidity, collateral depreciation, and legal risks. The longer it takes to liquidate pledged assets, the worse off the lender will be. Likewise, the lender loses if collateral or pledged inventory suddenly loses market value, deteriorates in storage, or is damaged. Lastly, because asset-based financing results in complex documentation, public findings, strict compliance with commercial codes, and certain borrower impositions, legal errors can prove to be very costly to the lender. Asset-backed lending tends to work where there are well-defined property rights, uniform commercial codes for all jurisdictions and functioning property registries and court systems. In developing countries,

asset-backed credit evaluation approaches tend to be overly reliant on land as surety. To a lesser extent, liens are also placed on standing crops, livestock, and equipment. The use of inventory and receivables is rather underdeveloped and represents a frontier for developing nations.

COMMON PORTFOLIO CREDIT RISK MANAGEMENT TECHNIQUES

Regardless of the credit evaluation techniques used to screen and identify good individual credit risk, a panoply of other strategies exist that are used by lenders to reduce credit risk in the overall loan portfolio. Table 2 provides a list of the techniques used in financial markets. All are common except for credit risk insurance and portfolio securitization. The last two are just beginning to appear in developing countries, but are more commonplace in Europe (credit insurance) and the United States (portfolio securitization, especially in housing and consumer lending).

Table 2: Strategies for Reducing and Coping with Portfolio Credit Risk

Technique	Advantages	Disadvantages	Implication
<i>Geographic Diversification</i>	External shocks (climate, price, natural disasters, etc.) are not likely to affect the entire portfolio if there is spatial diversification.	If the country is small or the institution is capital constrained, it may not be able to apply this principle. It will become vulnerable to covariate risk, which is high in agriculture.	Small financial institutions should not be overly exposed to agriculture.
<i>Sectoral Diversification</i>	Diluting exposure to any one sector provides protection against external shocks that severely affect one sector. Institution lends for consumption, housing, production, etc.	Institutions tend to develop expertise in core sectors then expand. In early stages of institutional development, the typical institution will be more vulnerable.	Small and immature institutions cannot use this technique.
<i>Crop Diversification</i>	Lender finances a variety of different agricultural commodities to avoid downturns in prices and weather-related shocks.		Institution must invest in acquiring agronomic, marketing, and general economic acumen for a variety of crops and livestock.
<i>Loan Size Limits (Rationing)</i>	Prevents the institution from being vulnerable to nonperformance on a few large loans.	Can be carried to the extreme where loan size does not fit the business needs of the client and results in suboptimal use and lower positive impact by client. Client could become dissatisfied	Protects asset quality in the short-run but creates client retention problems in the long run. Inimical to relationship banking.

		and prepay loan or desert after loan cycle ends.	
<i>Business/Farm Size Limits</i>	Lender may establish size thresholds, such as, for example, that eligible farmers must own no less than 2 has to apply for a loan. Serves to protect lender from making loans to unviable clients.	Tends to perpetuate financial exclusion.	Government and policy-makers need to make adjustment in policies to better help the excluded population and make them bankable.
<i>Over Collateralization</i>	Assures the institution that enough liquidation value will exist for foreclosed assets.	Excludes poor, low-income clients who are the vast majority of the market.	Not a recommended technique if goal is to better serve the low- and-moderate income clients.
<i>Joint Liability Loan Contracts</i>	Assortative matching, peer pressure, and local information can serve to reduce default risk.	High transaction costs for borrowers due to regular meetings requirements and policing of neighbors.	Has limited applicability. Good for small loan sizes but as businesses grow the demanded loan size may exceed the mutual insurance capacity of the group.
<i>Graduated Lending and Termination Incentives</i>	In credit-constrained environments, clients are eager to maintain access and will repay promptly as long as reliable promise of a larger loan exists.	Clients may not be served up to their repayment capacity, thus opening the possibility of losing prime clients to other competitors.	Good technique for a microfinance institution to develop a loyal client base, but shortly places high pressure on managers to increase loanable funds. More difficult for a nonregulated, non-deposit taking institution to sustain.
<i>Activity/Product Exclusion Lists</i>	Lender refuses to lend to certain activities/crops that are deemed too risky and unprofitable.	The poor may be excluded because of average returns of activities (perceived or not) rather than calculation based on actual repayment capacity	May maintain high levels of financial exclusion depending on the region or country.
<i>Linkage of Savings to Credit Approval</i>	Classical credit union technique wherein lending limit is a multiple of savings. Helps to build savings-led institution and allows institution to learn a great deal about the discipline and economic capacity of a client by observing frequency of deposits.	Loans may not have a direct relationship with repayment capacity. Also if the deposit rate is low, inflation rate is high, and currency devaluations expectations high, savings will be dampened.	Linkage to savings has severe limitations for rapidly expanding businesses.
<i>Reliance on Guarantee Funds</i>	Reduces significantly default risk for loan originator	Guarantee funds tend to be plagued with limited additionality, high administrative costs and prevent the originating institution from learning how to evaluate risk in the target sector.	Need to be used with great caution and preferably in situations to facilitate innovation.
<i>Reliance on Donor Trust Funds</i>	Targeted clients get access to credit.	Lender does not learn how to evaluate risk in the target population or has such an aversion that no independent lending with	This is a second or third best solution.

		own funds occurs.	
<i>Credit Insurance</i>	Bank makes clients purchase credit insurance. In event of default, bank collects from insurer.	Databases and credit bureaus may not exist to permit insurer to engage in this line of business in cost-effective manner.	
<i>Portfolio Securitization</i>	Lender bundles and sells loans to a third party. Transfers default risk and improves liquidity so that it can continue to lend. Allows lender to develop expertise in analyzing creditworthiness in one sector or niche.	Requires well documented loans and long time series of performance data to permit ratings and reliable construction of financial projections.	Requires a well developed secondary market, standardized underwriting practices, and existence of rating companies.

Summary and Description of Survey Results

The Inter-American Development Bank conducted a web-based survey of Latin American financial institutions with rural portfolios to determine perceptions of risks and techniques used to control, mitigate, and transfer credit risk, as well as to gauge the financial performance of such institutions. Approximately 225 surveys were sent out to institutions believed to have rural portfolios, and 42 institutions responded to the survey in its entirety (see Annex A). The 225 institutions were identified by consulting with trade associations, leading experts, and internal databases. All data is self-reported, the sample cannot be considered representative, and suffers from nonresponse bias.⁷ Nonetheless, the survey provides some insights and patterns of behavior.

As can be seen in Table 3, the vast majority of surveyed institutions are nonregulated and in particular, nonprofits. The two countries with the most responding institutions are Bolivia and Peru. In the case of Peru, specialized microfinance nondeposit-taking entity (*Entidad de Desarrollo para la Pequeña Microempresa, ED-PYME*) has the largest presence in the sample. The agrarian economies of Central America are underreported.

Table 4 shows that there are marked differences between regulated and nonregulated entities. Regulated institutions are more leveraged, maintain better asset quality and generate higher returns on equity (ROE). As can be expected, regulated entities have significantly more capital and assets since they can mobilize deposits from the public.

Table 5, which presents agricultural credit indicators, shows that the agricultural portfolio constitutes less than 40 percent of the total loan portfolio. The only exception is the one commercial bank reporting, which specializes in agricultural and rural lending and can be considered an outlier. This shows an important preference for portfolio diversification between agriculture and nonagriculture activities.

An analysis of the share of agricultural portfolio versus portfolio-at-risk of all sampled institutions yields a positive relationship (Figure 2). As diversification diminishes, rural institutions tend to present higher delinquency rates. Among these institutions, credit unions tended to have higher delinquency rates.

Table 3: Rural Financial Institutions by Country

	Bolivia	Brazil	Colombia	Costa Rica	Ecuador	El Salvador	Guatemala	Honduras	Mexico	Paraguay	Peru	Total
Regulated	1	2	0	0	1	1	0	1	1	1	9	17
Commercial Banks		1				1						2
Nonbank Financial Institution	1							1		1	8	11
Credit Unions		1			1				1		1	4
Nonregulated (NGOs)	7	0	2	2	1	1	3	1	1	0	7	25
Total	8	2	2	2	2	2	3	2	2	1	16	42

Source: IDB Survey to Latin America Rural Financial Institutions, 2006.

⁷ The bias is probably towards the best performing institutions.

Table 4: General Financial Indicators as of December 2005

	Measure	No.	Assets (US\$)	Equity (US\$)	Outstanding Loans (US\$)	Delinquency (PAR >30 days)	Assets/Equity	ROA (%)	ROE (%)
Regulated	Mean	17	112,326,999	8,355,762	59,876,281	2.4	13.4	1.3	15.5
	Median	17	17,956,254	3,787,223	13,393,088	5.0	5.8	2.5	11.8
Commercial Banks	Mean	2	673,800,000	27,212,252	289,950,000	0.3	24.8	0.5	9.0
	Median	2	673,800,000	27,212,252	289,950,000	0.9	20.2	1.0	9.7
Nonbank Financial Institutions	Mean	11	35,847,882	5,265,965	28,136,743	3.6	6.8	3.9	26.6
	Median	11	14,540,379	3,787,223	11,648,147	4.0	4.7	4.0	22.8
Credit Unions	Mean	4	41,908,070	7,424,457	32,123,150	8.6	5.6	2.1	5.8
	Median	4	17,731,786	2,995,952	13,730,540	10.2	7.1	1.4	4.9
Nonregulated	Mean	25	6,291,322	2,783,957	5,314,395	6.1	2.3	3.4	8.0
	Median	25	3,281,506	1,780,963	3,043,258	5.0	2.0	4.3	8.3
TOTAL	Mean	42	49,210,525	5,039,211	27,398,968	2.8	9.8	1.5	13.0
	Median	42	6,874,702	2,266,180	5,725,090	5.0	3.9	4.0	10.4

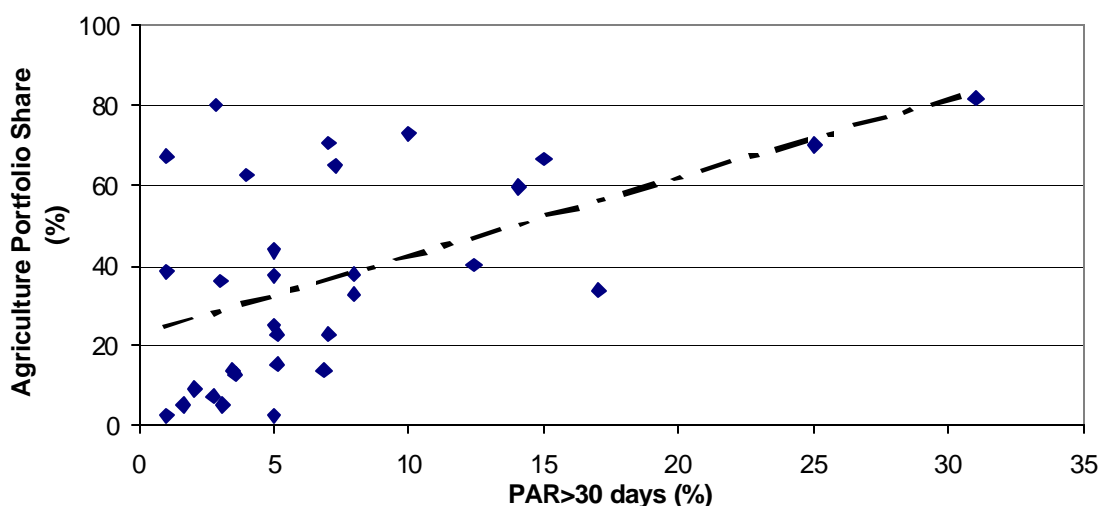
Source: IDB Survey to Rural Financial Institutions, 2006.

Table 5: Agricultural Credit Indicators as of December 2005

	Measure	No.	Agricultural Portfolio (US\$)	Number of Loans	Avg. Loan Size (US\$)	Share in Total Portfolio (%)	Agricultural Delinquency – PAR>30 days (%)
Regulated	Mean	13	41,329,498	7,251	5,700	63.2%	0.8
	Median	13	3,128,282	3,501	1,487	32.7%	4.3
Commercial Banks	Mean	1	461,558,016	33,130	13,932	96.7%	0.0
	Median	1	461,558,016	33,130	13,932	96.7%	0.0
Nonbank Financial Institution	Mean	9	3,812,452	3,469	1,099	13.7%	3.3
	Median	9	1,430,000	2,600	894	14.2%	3.0
Credit Unions	Mean	3	13,804,464	9,967	1,385	34.0%	7.3
	Median	3	8,351,117	5,617	1,487	40.4%	8.0
Nonregulated	Mean	19	2,084,294	1,621	1,286	35.7%	6.2
	Median	19	1,541,081	968	815	37.2%	2.0
TOTAL	Mean	32	18,027,658	3,908	4,613	60.0%	1.1
	Median	32	1,602,557	1,236	1,063	36.6%	3.0

Source: IDB Survey to Rural Financial Institutions, 2006.

Figure 2: Agricultural Portfolio Share vs. PAR (>30 days)



Source: IDB Survey to Rural Financial Institutions, 2006.

The nature of agricultural lending is quite different from microenterprise credit, which is geared primarily to retail trade (Table 6). In general, agricultural loans tend to be larger, have few scheduled payments due to sharp seasonal variations in farm-dependent household income streams, and interest rates tend to be lower due to suspected higher interest rate elasticities of demand. Agricultural returns tend to be more volatile than nonagricultural projects; as a result, the debt servicing capacity of farm-dependent

households is more constrained. This means that risk-adverse farm household heads would be less prone to accept higher interest rate contracts, thereby lowering demand for agricultural credit. Again, due to differences in the capital base, regulated entities are more able to grant larger loans than nonregulated entities.

The institutions in the sample reported offering different financial services to their clients but the gamut tended to be restricted and to favor short-

Table 6: Type of Loan Contracts

	Measure	Regulated		Nonregulated		Total	
		Agricultural Credit	Microenterprise Credit	Agricultural Credit	Microenterprise Credit	Agricultural Credit	Microenterprise Credit
Loan Amount (US\$)	Median	2,219	1,500	850	800	1,226	842
Maturity (months)	Mean	11.5	12.9	21	18	17	16
	Median	11	12	22	18	12	14
Number of Payments	Median	2	12	7	12	6	12
Annual Interest Rate (%) of US\$ Denominated Loans	Mean	26.1	31.3	22.4	27.3	23.9	29.3
	Median	25.4	25.4	21.0	24.0	22.0	24.0
Annual Interest Rate (%) of Local Currency Denominated Loans	Mean	27.9	34.9	31.7	32.4	30.1	33.5
	Median	24.5	35.0	29.8	29.5	28.0	30.0
Number of Institutions		10	10	17	23	27	33

Source: IDB Survey to Rural Financial Institutions, 2006.

term working capital loans. For example, all regulated and nonregulated entities offered working capital loans, but only 6.3 percent of the regulated entities offered leasing compared to 3.8 percent of the nonregulated; 75 percent of the regulated institutions offered fixed investment medium- and long-term loans versus 62 percent of the nonregulated ones. Payment services, transfers, and passbook savings accounts were offered by less than half of the regulated entities.

As Table 7 shows, the most common type of loan contract offered was individual loans. Group loans (including associative lending as a variant) were a distant second and village banking was third.

Table 8 indicates that, contrary to conventional wisdom, financial institutions active in rural areas are more concerned about risks stemming from political interference such as government debt forgiveness programs, passage of usury laws, and mandatory refinancing of debt than they are of weather-related risks. Reduction in prices of agricultural products ranks third in the list of concerns of rural institutions. It is also interesting to note that very few institutions believe that their clients had few investment opportunities.

Good clients are not scarce. Both nonregulated and regulated institutions were more or less equally concerned (no statistical significant dif-

ference) about stiff competition, foreign exchange risks, downturns in the macroeconomic situation, weak contract enforcement framework, lack of liquidity or internal control deficiencies. However, there were statistically significant differences between the two types of institutions. Regulated entities were more concerned about the high cost of funds and operational risk than nonregulated institutions.

Nonregulated institutions were more worried about the regulatory and legal risks, lack of guarantees and scarcity of information on repayment capacity. Regulated, deposit-taking institutions were more concerned about interest rate risks due to the need to attract and maintain deposit accounts.

With regards to credit evaluation methodologies, all respondents used human expert systems. Scoring or mathematical models were rarely used (1 respondent out of 42). The two key elements to good credit analysis are well-trained and motivated staff and access to reliable information.

The majority of the credit officers ranged in age from 26 to 35 years old and was male. A little over 52 percent had both university training and specialized knowledge of agronomy and agricultural sciences and 50 percent had previously worked in another financial institution. Sixty-percent of the respondents (17) used performance incentives that weighted volume of loans

Table 7: Types of Loan Contracts - Percent Reporting Use

	Regulated		Nonregulated		Total	
	Frequency	Percent	Frequency	Percent	Frequency	Percent
Individual	12	92	17	90	29	91
Group	5	38	10	53	15	47
Village Banking	2	15	9	47	11	34
Associative*	6	46	7	37	13	41
Other	1	8	0	0	1	3
Total	13		19		32	

Source: IDB Survey to Rural Financial Institutions, 2006.

Note: The percent column does not sum to 100 because several institutions offer more than one loan contract.

* Type of group lending that was commonplace in Bolivia but becoming less so. The association had to be legally incorporated. The main difference with group lending is that no legal incorporation is necessary. Each of the members of the group signs the joint and several liability contract.

Table 8: Index of Risk Perceptions

Categories and Subheadings	Regulated	Nonregulated	Total	
<i>General External Threats (Average)</i>	0.25	0.25	0.25	
High Cost of Funding	0.37	0.26	0.31	*
Stiff Competition	0.23	0.31	0.28	
Interest Rate Risk (for deposit takers)	0.17	0.05	0.10	*
Foreign Exchange Risk	0.28	0.15	0.20	
Regulatory and Legal Risk (difficulties in legalizing guarantees, biased regulations)	0.14	0.52	0.36	*
Unfavorable Macroeconomic Situation	0.32	0.24	0.28	
<i>External Threats Peculiar to the Agricultural Sector (Average)</i>	0.64	0.71	0.68	
Reduction in prices for agricultural products	0.49	0.66	0.59	
External Risks (bad weather, natural disasters, civil unrest)	0.74	0.69	0.71	
Political Interference (usury laws, debt forgiveness programs, etc.)	0.68	0.78	0.74	
<i>Problems with Clients (Average)</i>	0.27	0.42	0.36	*
Majority of clients lack guarantees	0.42	0.65	0.56	*
Majority of clients do not have profitable investment opportunities	0.18	0.20	0.19	
Weak Contract Enforcement	0.29	0.40	0.36	
Lack of information on repayment capacity	0.20	0.41	0.33	*
<i>Internal Management (Average)</i>	0.29	0.28	0.28	
Lack of Liquidity	0.23	0.29	0.27	
Operational Risk (fraud committed by personnel, equipment failure)	0.42	0.27	0.33	*
Deficient internal controls and weak accounting systems	0.22	0.27	0.25	

Source: IDB Survey to Rural Financial Institutions, 2006.

Note: Scale is 0-1 with 0 being unimportant or nonexistent, 1 being very important.

* Significant difference at least at the 10 percent level.

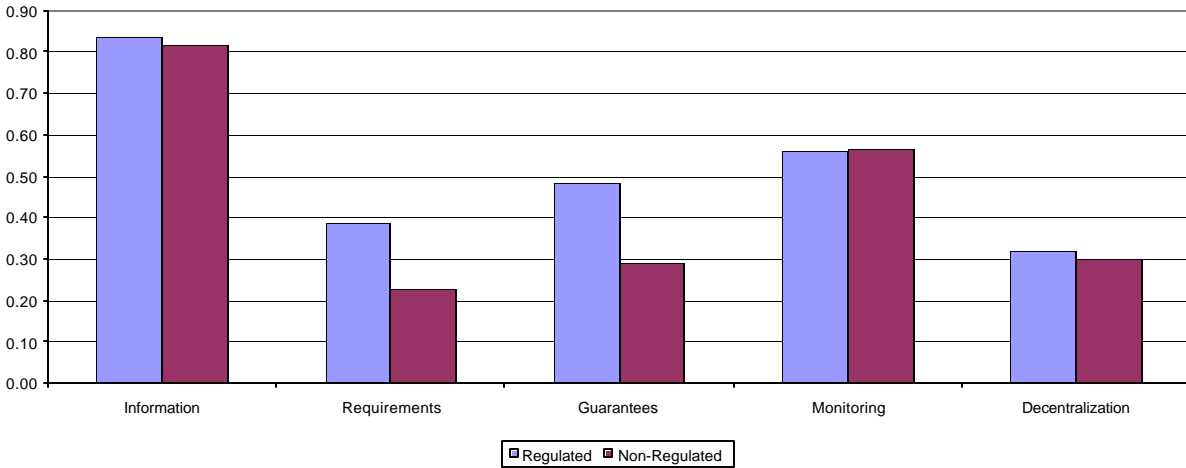
approved and on-time repayment rates. For 12 of the 17 respondents using incentives, the commissions and bonuses amounted to 50 percent of base salary. No information was gathered on in-house training.

The respondents tended to rely to a greater extent on gathering and processing creditworthiness information than on real guarantees. Because the majority of the clients lacked real assets to pledge and many of the assets they did possess are not legally recognized as guarantees, asset-backed lending was not widely found.

When asked, the majority of the respondents identified important common elements that were used in their credit evaluation and approval processes. The most important category was information gathering followed by direct monitoring. Institutions that invested more in information gathering and monitoring experienced lower delinquency and higher profitability.

As part of their credit technology, regulated institutions tend to have more requirements related to the commercial risk of the agricultural activity of their clients. Near half of the sampled regulated institutions required clients to have a formal sales contract (compared to only 11 percent of the nonregulated institutions in the sample) and 39 percent requested that clients be part of a value chain. Regulated institutions find that these types of requirements are quite important, as can be seen in Figure 3. There were many responses to the question of what specific methods or techniques were used to control credit risk. The leading six techniques that respondents reported using in rank order were: (1) loan size limits (94 percent); (2) additional information requirements and guarantees for loans above a certain threshold (91 percent); (3) loan exposure limits per individual borrower (88 percent); (4) provisioning and risk client classification (88

Figure 3: Index of Rural Credit Technology (by components)



Source: IDB Survey to Rural Financial Institutions, 2006.

Note: Value for each component of the index goes from 0 to 1, with 0 representing “does not use” and 1 representing “very important” and “used all the time.”

percent)⁸; (5) repayment incentives to clients (automatic approval for graduated loan, interest rate rebates, etc.) (84 percent); and (6) use of credit bureaus (81 percent).⁹

⁸ All regulated institutions reported use of provisioning and risk client classification as part of the techniques used to control credit risk.

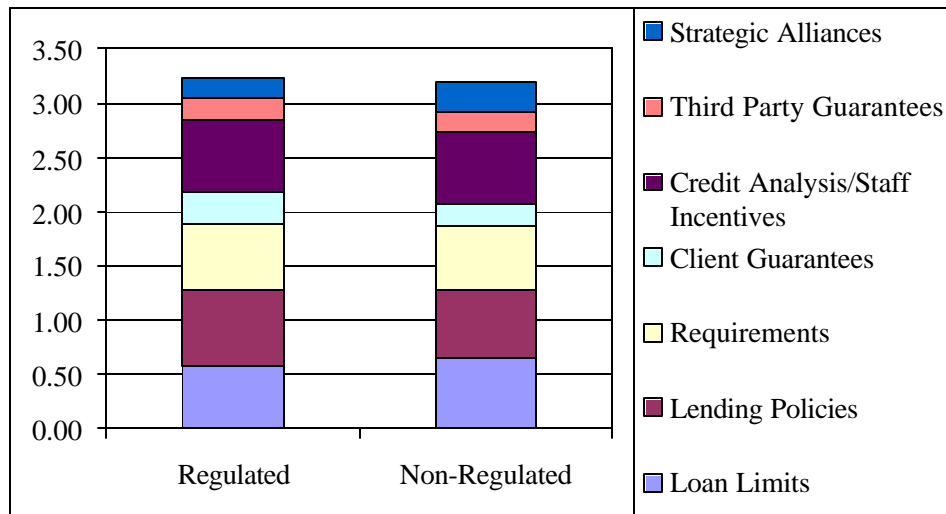
⁹ The full list includes: (1) portfolio concentration limits for the agricultural sector; (2) exposure limit for individual crops; (3) portfolio limits on geographic concentration; (4) limits on interrelated lending; (5) limits on total loan exposures to a single borrower lesser than the usual Superintendent requirement of no more that 5 percent of capital; (6) loan size limit; (7) strict loan risk classification and provisioning; (8) faster loan loss write-offs for nonperforming agricultural loans than for other sectors; (9) require additional documentation, guarantees, etc. for loan above a certain threshold; (10) loan exclusion list; (11) reliance on credit bureaus for creditworthiness information; (12) lending tied to savings balance; (13) loan value fully backed by pledged assets; (14) excess collateralization to compensate for lack of dynamism in agricultural sector and illiquidity for typical rural assets pledged; (15) repayment incentives; (16) credit analyst performance incentives; (17) require crop insurance or reduce loan interest rate charged if crop insurance policy presented; (18) use of government and donor financed guarantee funds; (19) reliance on joint liability loan contracts; (20) use

The information on 22 possible techniques to control credit risk was converted to an index with scale 0-7 (0 being no technique used and 7 being all techniques used). It became clear that institutions with lower indices of portfolio at risk relied more on staff incentives than institutions with higher delinquency indices.

They also did not use all the possible measures; but they used selected techniques more effectively. However, regulated entities seem to require more formal proof that the potential borrower belongs to a value chain in order to reduce market risk. Over 46 percent of regulated institutions expect the borrower to have a sales contract versus only about 10 percent of nonregulated institutions. Nonetheless, regulated entities by law have to comply with significantly more loan documentation requirements and tend to use a higher number of different credit risk control techniques. These factors translate into higher costs and pushes up minimum loan amounts.

only trust funds to lend to agricultural sector; (21) use strategic alliances; and (22) transfer risk to third parties via portfolio securitization, sale of portfolio, guarantee funds, insurance.

Figure 4: Index of Risk Control Techniques Used: Regulated versus Nonregulated



Source: IDB Survey to Rural Financial Institutions, 2006.

Figure 5: Index of Credit Risk Control – Measures Used: Low v. High PAR

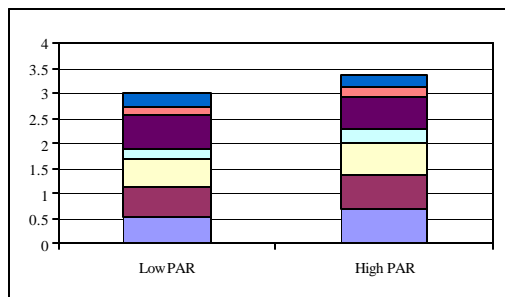
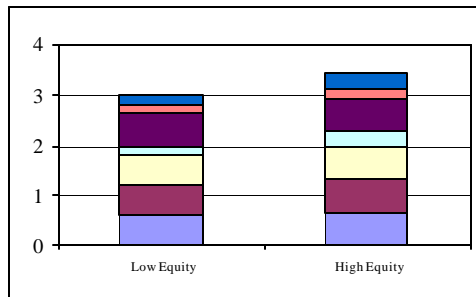


Figure 6: Index of Credit Risk Control Measures Used: Low v. High Equity



Note. High/low is defined according to the indicator being above/below the median of the indicator.
Source: IDB Survey to Rural Financial Institutions, 2006.

For the analysis of possible scale effects, the sample was divided into quartiles based on total loan size. Pearson correlation tests were conducted on a number of key performance indicators: delinquency, ROA, ROE, and share of agricultural portfolio. Two significant statistical relationships were found. The first one was between loan portfolio size and share of agricultural lending. Larger institutions tend to have a lower and less variable percentage of agricultural lending (about 25 percent). The second relationship was between ROE and loan portfolio size. Larger institutions had significantly differ-

ent and higher ROEs indicating both the direct effect that leverage due to regulation bestows and also capturing the effect that successful diversification strategies can be readily applied on a larger scale and that translates into higher profitability.

In conclusion, few risk transfer mechanisms exist (guarantee funds, credit insurance, etc.). Only 23 percent of regulated and 5 percent of nonregulated institutions reported use of insurance. Similarly, 31 percent of regulated and 21 percent of nonregulated institutions reported use of

guarantee funds. Since the majority of potential rural clients are collateral constrained, the principal means of controlling credit is through appropriate and effective credit analysis processes.

Within the credit appraisal process, the most important elements are information and direct monitoring.

Table 9: Scale Effects – Ranked by Total Portfolio Size

		Share of Agricultural Credit (%)	Agricultural Delinquency – PAR>30 days (%)	Total Portfolio Delinquency - PAR>30 days (%)	ROA (%)	ROE (%)
Quartile 1	Mean	0.53	4.11	10.60	1.72	0.08
	Median	0.61	2.50	3.50	5.0	7.75
Quartile 4	Mean	0.25	4.56	5.87	2.57	14.65
	Median	0.25	0.25	5.00	2.00	7.00
<i>Total Portfolio - Correlation Coefficient</i>		<i>-0.308*</i>	<i>-0.009</i>	<i>-0.152</i>	<i>0.0238</i>	<i>0.296*</i>

Source: IDB Survey to Rural Financial Institutions, 2006.

Note: Due to its significant different size, data from Banco Cooperativo SICREDI was not included in this calculation.

(*) Significant of at least 10 percent level (cut-off corresponds to 0.296).

Summaries of Case Studies in Guatemala and Peru

To complement and deepen the understanding of how successful rural financial institutions perceive, measure, and control credit risk, four in-depth case studies were conducted in Guatemala and Peru: Banrural S.A., Fundación para el Desarrollo Empresarial y Agrícola (FUNDEA), Caja Municipal de Ahorro y Crédito Sullana (CMAC Sullana), and Entidad de Desarrollo para la Pequeña y Micro Empresa Confianza (EDPYME Confianza). The information for these studies was gathered in the second semester of 2006 principally through field interviews and review of annual reports, published documents, consultant reports, and information from banking superintendencies.¹⁰

Banrural S.A. is the most profitable commercial bank in Guatemala and the third largest in terms of assets. It has over 300 agencies and conducts the majority of its operations outside the capital. It grew out of the reform of a failed state agricultural bank, maintained a mission to serve rural entrepreneurs and has a mixed capital structure where NGOs, civil associations, and former employees dominate the board of directors and control the majority of the capital while the government is a minority shareholder. FUNDEA is a nonregulated Guatemalan NGO born of the fusion of donor-sponsored credit programs that operated in three highland regions. The stated mission is to provide financial services to rural producers and entrepreneurs. CMAC Sullana is a regulated deposit-taking, nonbank financial institution that has a long history of promoting urban and rural microfinance in the northern coastal area of Peru. It is owned wholly by the municipal government of the province of Sullana. It has a long tradition of innovation and is currently participating in the development of an index insurance scheme. The last group studied is EDPYME Confianza, another regulated non-deposit-taking, nonbank financial institution that operates in central Peru with a mission to serve

¹⁰ See comprehensive consultant report by Carolina Trivelli and Alvaro Tarazona (2007) for detailed information.

agricultural producers. Confianza is owned by a group of local investors and international donors.¹¹

As can be seen in Tables 10 and 11, successful rural financial institutions tended to be well diversified, profitable, and enjoy high asset quality both at the level of the general portfolio and at the level of the agricultural portfolio. Key characteristics in explaining their success are the pursuit of diversification strategies, achievement of scale, a well-proven credit evaluation technology, and the retention of skilled and motivated staff. Figures 7 through 10 demonstrate that agricultural loans are trending upward for in all the studied cases for the last available years of data, indicating that agricultural lending can be viable activity.

PERCEPTIONS OF RISK

Consistent with the general findings of the other surveyed institutions, the four organizations included in the case study reported price risk faced by actual and potential clients as a more serious concern than climatic risks. In Table 12, price risk was mentioned more times in the very important and important risk categories than climatic risks. The likely explanation for this finding is that price hedging (futures, options) and price insurance are not widely available in Latin America.¹² Similarly, crop yield insurance products are not generally available but the institutions seem to believe that non-catastrophic climatic risks can be managed through a combination of portfolio diversification and limits on the

¹¹ See background paper by Trivelli and Tarazona (2007) for more details.

¹² Only in Brazil, Mexico, and Argentina are hedging instruments used to a modest degree and normally by larger farmers for a select number of commodities (cocoa, sugar, coffee, wheat, corn, soybeans). In other countries, such as El Salvador, some incipient use of coffee futures, for example, is occurring.

Table 10: General Characteristics of the Four Case Studies as of December 2005

Category/ Institution	Banrural S.A.	CMAC Sullana	EPDYME Confianza	FUNDEA
Type of Organization	Bank	Nonbank	Nonbank	NGO
Regulated by Banking Superintendent	Yes	Yes	Yes	No
Ownership	Mixed (Private-Public)	Public	Private	Private
Country	Guatemala	Peru	Peru	Guatemala
Sphere of Operations	Nationwide	Northern and Central Coast area: Piura, Tumbes, Lambayeque, and capital Lima	Central Highlands and capital city: Junin, Ucayali, Huancayo, Huancavelica, and capital Lima	Central zone, Western Highlands, and Northern zone.
No. of Agencies	323	20	10	19
Sectors Served and Products Offered	Multisectoral (Credit, Savings, Transfers, Payments)	Multisectoral (Credit, Savings)	Multisectoral (Credit)	Predominately rural (Credit)
Outstanding Loans	US\$673.8 million	US\$69.5 million	US\$21.0 million	US\$6.2 million
Number of Active Clients	195,822	58,301	26,258	12,213
Share of Agricultural Portfolio in Total	11.4%	15.2%	14%	39%
Equity	US\$81.3 million	US\$15.2 million	US\$4.9 million	US\$7.4 million
Portfolio at Risk (>30 days)	0.9%	5.1%	3.5%	0.9%
ROA	2.1%	5.7%	3.7%	12%
ROE	38.7%	38.2%	21.3%	14.8%
Efficiency (Operating Costs/ Average Gross Loan Portfolio)	11.4%	11.4%	15.2%	23.5%

Source: Trivelli and Tarazona (2007)

Table 11: Agricultural Portfolio as of December 2005

	Banrural S.A.	CMAC Sullana	EDYPME Confianza	FUNDEA
Agricultural Portfolio	US\$81.7 million	US\$11.6 million	US\$3.1 million	US\$3.0 million
Number of Loans	28,810	5,850	3,501	4,275
Average Loan Size	US\$2,839	US\$1,982	US\$894	US\$694
Annual Interest Rate	16%	51.1%	57%	29%
Delinquency (PAR>30 days)	1%	2.3%	9.6%	1%
Guarantees Normally Requested and/or Accepted	Trust Funds Liens	Title in Custody (no mortgage)	Liens Group Joint Liability Co-signers	Trust Funds Co-signers, Liens
Typical Client Profile	Diversified Farmer cultivating 2-3 different crops in the year. No minimum farm size.	Specialized Farms with high margin crops or livestock. Minimum farm size 1 ha	Rural Households with diversified income stream. Minimum farm size 1 ha.	Diversified Farmer cultivating 2-3 different crops in the year. Minimum .4 ha.

Source: Trivelli and Tarazona (2007).

Figure 7: Banrural S.A., Guatemala, Growth in Agricultural Portfolio

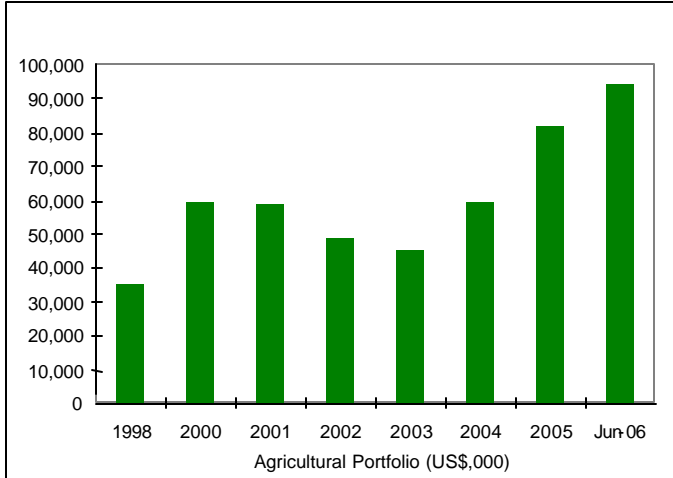


Figure 8: CMAC Sullana, Peru, Growth in Agricultural Portfolio

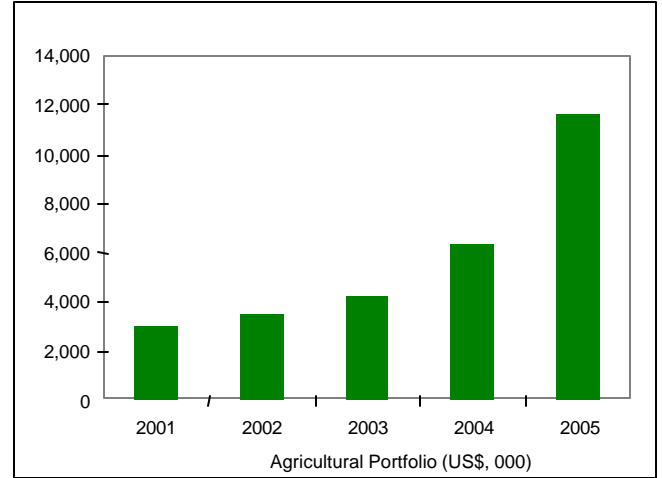


Figure 9: EDPYME Confianza, Peru, Growth in Agricultural Portfolio

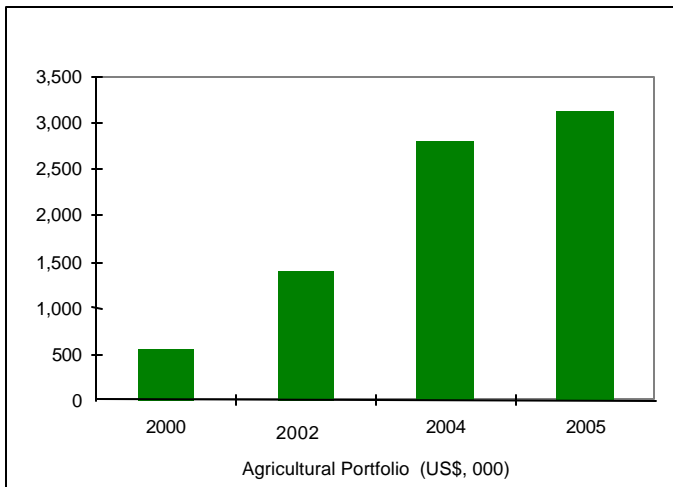
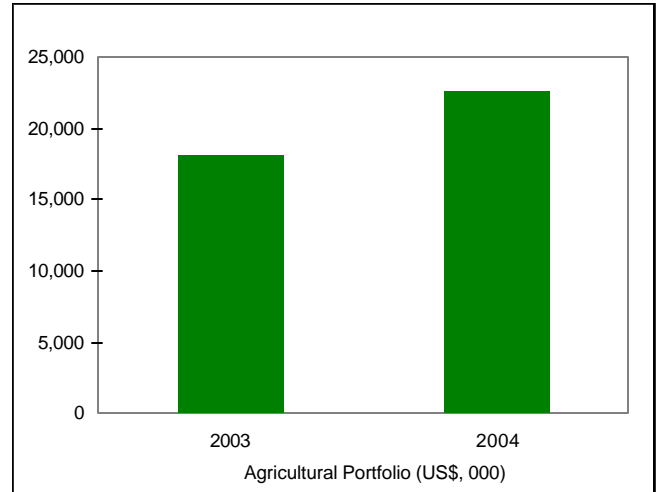


Figure 10: Fundea, Guatemala, Growth in Agricultural Portfolio



Source: Trivelli and Tarazona (2007).

Table 12: Perceived Risks

Ranking of Perceived Risk	Banrural S.A.	CMAC Sullana	EDPYME Confianza	FUNDEA
Very Important			Reduction in Price of Main Ag. Output	Climatic Risk
Important	Reduction in Price of Main Ag. Output	Lack of Guarantees	Political Interference Climatic Risks	Contract Enforcement Reduction in Price of Main Output
Somewhat Important	Climatic Risks	Reduction in Price of Main Ag. Output Climatic Risks		Political Interference

Source: Trivelli and Tarazona (2007).

size of the agricultural portfolio.¹³ All of the institutions, however, are quite aware of systemic weather shocks and have developed many of the currently used techniques as a result. CMAC Sullana changed many policies because of the 1997/98 El Niño and EDPYME Confianza also introduced changes in its technology due to a drought in the central areas of Peru in 2004. In the case of Guatemala, both institutions reacted to Hurricane Mitch in 1998 and Tropical Storm Stan in 2005.

KEYS TO MANAGING AGRICULTURAL CREDIT RISKS

The four institutions all apply a set of common principles to manage and absorb credit risks. The common elements are: (i) an appropriate credit evaluation technology given the operating environment and constraints; (ii) reliance on portfolio diversification; (iii) limits on agricultural lending; and (iv) adequate provisioning. Risk transfer instruments (insurance, third party guarantee funds, securitization, trust funds, derivatives) were not widely available or prominent. One Peruvian institution, Confianza, relied on third party guarantees, but for a miniscule 5.8 percent of loans approved. Banrural S.A. used

trust funds but it accounted for 10 percent of funding. In short, all the institutions have made a strategic commitment to the sector and have learned how to identify, measure, and manage risks in the sector using largely their own resources and applying home-grown solutions.

CRITICAL COMMON ELEMENTS OF THE CREDIT TECHNOLOGY

Good credit analysis depends essentially on capable staff and on accurate and timely information. Other factors such as management information systems, the application of sophisticated mathematical techniques, and the availability of efficient and low-cost communication technology can facilitate credit analysis but cannot replace the need for capable staff and quality information.

The first critical element is that all the institutions rely on *well-prepared staff*. Two of the institutions used credit analysts who had a background in agronomy. All preferred staff with post-secondary levels of education and strong skills in accounting, financial analysis, and economics. The knowledge of agricultural production and marketing combined with numeracy skills are vital in making sound judgments about the viability of farm and food enterprises. In areas where indigenous populations are commonly found, bilingual staff is specifically recruited.

Second, all the institutions use *performance incentives* to promote a sense of responsibility and

¹³ The level of crop insurance penetration (area insured/area cultivated) is quite low in Latin America. Most countries have less than 1 percent and only two exceed 10 percent in comparison with 45 percent for Spain and more than 70 percent for the United States (Wenner, 2005).

to reward results. In two cases, performance bonuses can sum to 100 percent of base salary. As can be seen in Table 13, productivity per loan officer is extremely high.

Third, copious amounts of *information on character, managerial ability, reputation for repayment, and financial viability* are gathered and processed by the credit analysts.

The analysts rely on credit bureaus, interviews, and personal references. Information is more important than guarantees. Guarantees are more formalities and there is no intent to foreclose on them in the event of a default. Since the legal costs can be prohibitive to execute land guarantees, liens on moveable property and co-signers are preferred.

Fourth, *cash flow and sensitivity analysis* are used that view the household as the unit of analysis and not a single line of business or investment project.

Fifth, there is a distinct *preference to finance households with diversified streams of income and that are somewhat insulated from climatic risks*. The key concern is that the household has

sufficient debt service capacity. There are variations in details from institution to institution. For example, CMAC Sullana lends primarily to specialized rice farmers. It believes that there is low price variability due to government protection and that reliance on irrigated water reduces yield risk significantly. However, the minimum size of farms tends to be 4 has. This size and multi-cropping assure the lender that the household is viable. In the case of Confianza, there is preference for households with fragmented plots and a variety of crops.

Sixth, *repayment incentives* are widely used. The promise of access to a graduated loan and lower transaction costs for repeat loans serves to motivate clients to avoid strategic defaults.

Seventh, *direct monitoring of clients* is essential. All four institutions visit clients randomly to reduce moral hazard and to alert upper management if the client is likely to default due to observed problems.

Because of these critical elements, rural lending and agricultural lending in particular are extremely labor-intensive and costly.

Table 13: Characteristics of Loan Officers

	Banrural S.A.	CMAC Sullana	EDPYME Confianza	Fundea
Number of Loan Officers Specialized in Agriculture	572*	10	12	45*
Number of Clients per Loan Officer	500	585	292	280-290
Education	Majority secondary education. Some technical degrees	100% university trained agronomists	50% university trained agronomists. 50% university trained economists	Majority technical and university level in accounting, agronomy, and business.
Incentive Pay	Yes	Yes	Yes	Yes
Amount of Incentive Pay	Up to 100% of base salary	Not available	Up to 100% of base salary. Average is 50%	10-20% of base salary

Source: Trivelli and Tarazona (2007).

(*) In Banrural and Fundea all analysts are multisectoral but those with agricultural backgrounds tend to have larger agricultural portfolios than those without.

Table 14: Diversification Strategies

	Banrural S.A.	CMAC Sullana	EDPYME Confianza	Fundea
Geographic Diversification	Operates in the whole country.	Operates in four regions that cover two distinct agro climatic zones	Operates in three regions, all in one agro climatic zone. Seeking to expand to Amazon.	Operates in three distinct agro climatic zones
Sectoral Diversification	Engages in nonfarm microenterprise housing, and consumer lending	Engages in nonfarm microcredit and consumer lending	Engages in nonfarm microcredit and consumer lending	Engages in nonfarm microcredit and rural housing lending
Client Income Diversification	Prefers clients with nonfarm sources of income	Prefers clients with nonfarm sources of income		Prefers clients with nonfarm sources of income
Agricultural Commodity Diversification	Principally livestock financed.	Variety of crops financed	Clients must grow more than one crop and ideally must do so in separated plots at different elevations or in different microclimates	Variety of crops financed
Index*	Not available	.66	.60	.62

Source: Trivelli and Tarazona (2007).

(*) Index weights equally the share of agricultural portfolio in total loan portfolio, the concentration of top three principal crops in total agricultural portfolio, and the agricultural lending volume of the largest agency as a share of the total agricultural portfolio.

PORTFOLIO AND LOAN SIZE LIMITS

As a further means to reduce risk, the four institutions tended to limit exposure to agriculture (Table 15). None surpassed a 40 percent share in practice. Three had explicit limits and Banrural's agricultural portfolio constitutes 11 percent of the total portfolio. Two avoided low-return subsistence crops, one had a loan size limit of US\$2,800, and two forbade branches from lending more than a certain amount. The excluded commodities were basic grains and it was presumed that they do generate a return of at least 22 to 24 percent, which is the average rate of interest charged.

PROVISIONING

The last line of defense is loan loss provisioning. Adequate provisioning due to a risk classification scheme helps protect the institution from liquidity and capital adequacy crises and represents absorption of the inherent credit risk. Mar-

ginal and substandard loans have a higher probability of deteriorating into a "loss situation" and adequate provisioning protects the institution. All four institutions present significantly high provisions in relation to their portfolio at risk (Banrural S.A., 251 percent; CMAC Sullana, 148 percent; EDPYME Confianza, 121 percent; FUNDEA, 260 percent). There are no specific provisioning rules for agriculture in the two countries. CMAC Sullana provisions to cover risks related to El Niño. Write-offs are also used as an ex-post credit risk management measure. For example, after the climatic shock in the central highlands in 2004, EDPYME Confianza made a write-off of 8.12 percent of its agricultural portfolio while the total portfolio write-off amounted to only 1.52 percent in 2005. However, if agricultural loans tend to be classified regularly as higher risks it becomes is a disincentive to lend to the sector and makes agricultural lending more expensive. All institutions engaged in provisioning and three out of four reported it as a very important element in their

overall credit technology. CMAC Sullana automatically increases provisioning when there are indications that weather-related shocks may

have an adverse impact on the repayment capacity of its clients.

Table 15: Portfolio Limits and Loan Size Limits

	Banrural S.A.	CMAC Sullana	EDPYME Confianza	FUNDEA
Explicit Limit on Agricultural Portfolio	No	Yes, maximum 20%	Yes, maximum 20%	Yes, 40-45%
Limit on a Particular Crop	No, however does not lend for subsistence crops or basic grains	No	Yes, maximum 40%	No, however limits financing of basic grains.
Maximum Amount for Agricultural Loan*	No	No	No	Yes, US\$2,800
Limits by Agency	No	Yes, maximum 30% of total portfolio	No	Yes, 50-60% of total portfolio

Source: Trivelli and Tarazona (2007).

* Note: Regulated institutions normally cannot lend more than 5 percent of capital to any one party.

Conclusions and Recommendations

Credit risk management in Latin American rural financial institutions is improving and evolving, but much still needs to be done. Many of the institutions surveyed demonstrated success as measured by high overall rates of profitability, low delinquency rates in both general and agricultural portfolios, and sustained growth rates in agricultural portfolios over time. Nonetheless, the paucity of institutions active in rural areas and expressed desires for better risk management systems, the relatively small loan sizes, and restricted terms indicate that the situation is less than optimal.

There are four ways to deal with credit risk—reduce it, cope with it, transfer it, or retain it. Based on survey results and the four case studies, the following techniques were identified as the most important and widely used:

- Expert-based, information-intensive credit technologies (wherein repayment incentives for clients and performance incentives for staff play important roles and information acts as a virtual substitute for real guarantees) are being used to reduce risk.
- A number of diversification strategies (geographic, sectoral, commodity) are being used to cope with risk.
- Portfolio exposure limits (wherein agricultural credit is less than 40 percent of total lending) are being used to reduce risk.
- Excessive provisioning is being used to absorb and internalize risks.

Few, however, are transferring the credit risk to third parties and this represents the next challenge. Massive credit expansion in developed countries has been due in large part to the introduction and wide diffusion of risk transfer techniques (insurance, securitization, derivatives, etc.) and the wider acceptance of different types of collateral (inventories, accounts receivables, warehouse receipts, etc.). In Latin America, the most common risk transfer instruments available

are publicly-financed loan guarantee funds; however, they are used only modestly (25 percent). Historically, guarantee funds have been plagued with problems of high costs, limited additionality, and moral hazard.¹⁴ Recent work has shown that the most successful guarantee funds in Latin America (in terms of additionality) are those in Chile, and that much of the positive impact is due to adequate regulation (Llisterri et al., 2006). In order to introduce some of the other risk transfer instruments more commonly found in developed financial markets, investments will be needed to reform and strengthen the insurance industry, capital markets, credit bureaus, commercial codes, secured transaction frameworks, and information disclosure rules.

The implications of using the aforementioned credit risk management techniques commonly found in Latin America are manifold. *First*, the credit evaluation technologies commonly used are very expensive and tend to increase operating costs and interest rates charged because they are time and labor intensive. Steps need to be taken to dramatically reduce the cost of gathering and analyzing data; of securing, perfecting, and executing guarantees; of classifying and modeling risks; and of monitoring clients. With cost reductions, innovations in delivery mechanisms, and greater competition, interest rate spreads should decline over time, making financial systems more inclusive.

Second, some minimal economies of scale and scope are necessary. The larger rural finance institutions in the sample showed that they could more easily diversify risks, offer a wider range of products, obtain better efficiency ratios, and charge lower lending interest rates. Agricultural lending probably cannot be the primary type of lending unless more robust risk transfer techniques become more commonplace. If more sophisticated risk transfer instruments can be introduced, smaller and more agriculturally ori-

¹⁴ A distinction should be made between individual loan guarantee funds to which this statement applies and intermediary guarantees to which it does not.

ented institutions can be more readily helped and supported. Otherwise, the challenge for donors/governments and owners of financial institutions is how to rapidly grow and diversify financial institutions that started out small with a rural vocation and how to attract to rural areas larger institutions that hitherto were primarily urban. The majority of rural financial institutions tend to be very small, exhibit many institutional needs (access to more low-cost source of funds, inadequate credit technology, better internal controls) and are possibly overexposed to agriculture. The larger financial institutions that social planners would like to see more active in rural areas are not interested because they perceive high risks and can exploit other more profitable market segments such as consumer lending to salaried workers.

Third, the agricultural microfinance credit technology reviewed here is essentially an adaptation of urban microcredit technology, but it has limits. The better-performing institutions seem to adhere to a common set of principles, but there are slight differences from institution to institution as they adapt the principles to suit local conditions. For example, the general rule is to give preference to highly diversified households, but if price and yield risk can be controlled, institutions will lend to highly specialized farm households. The noteworthy differences of the rural adaptation of the urban microcredit technology are the use of specialized staff with a knowledge of agronomy, fewer repayments, larger loan sizes, charging of relatively lower interest rates compared to microenterprise rates to avoid adverse selection, and projection of a strong corporate responsibility image. All of the four case study institutions, for example, finance works of charity and have a visible presence in the communities where they operate. The emerging model of agricultural microfinance, however, will have to evolve and possibly coexist with other credit technologies more suited for small business and fixed investment lending. The leading institutions are constantly tweaking and improving their technologies. However, the tweaking is being done by trial and error and not in a systematic way. To fully understand what works and does not work, cost accounting (activity-based accounting), randomized evaluations, and frequent client satisfaction

surveys would have to be institutionalized. These changes can be costly and would require a new mindset and way of doing business.

Based on the survey and case study findings, we have formulated six recommendations for donors, governments, and managers of financial institutions interested in designing interventions to improve how rural financial institutions manage credit risk.

First, donors and governments should identify and support rural institutions with a minimum scale that would permit easy diversification of credit risk and help them to expand and innovate as the preferred or first best option. The second best option would be assist those with a clear strategic commitment to the rural sector and competent management to do the following: (i) upgrade credit technologies; (ii) help them develop diversification strategies within their reach (i.e. introduce new credit products, finance a wider number of sectors, finance only highly diversified households); and (iii) use agricultural portfolio limits by agency and total portfolio as an early warning system to take corrective actions. As the third best option, and in the absence of minimal scale institutions, donors and governments should strive to assist smaller institutions to merge or associate. An effective association of smaller institutions can derive benefits from collective action such as fundraising, common training, purchase and installation of modern information management systems, and lobbying for regulatory changes. A movement to merge smaller institutions would permit the emerging entity to have scale and scope. A fourth option would be to promote value chain financing wherein credit risk is managed and transferred among various actors in a supply chain. A fifth possible option, that donors and governments may pursue, would be linkages between regulated financial institutions (such as commercial banks) with NGOs active in rural areas. NGOs, for example, could serve as delegates of banks in remote areas.

Second, donors, governments, and managers/owners of rural financial institutions need to collaborate in the introduction and improvement of a variety of risk transfer instruments. The risk transfer instruments in rank order of easiest to

most difficult to introduce are (i) recognition and valuing of inventories and accounts receivables as forms of assets that can be pledged as collateral or sold to third parties for cash; (ii) guarantee funds; (iii) credit insurance (death, disability, portfolio); (iv) parametric crop insurance; (v) portfolio securitization; and (vi) derivatives and swaps. Each of the above has preconditions and country-by-country assessments would have to be made. In general, recognition of inventories and accounts receivables require reforms in banking supervision and regulatory frameworks, commercial codes, and taxes affecting financial transactions. To improve guarantee fund operations, political interference needs to be minimized or eliminated and adequate regulation introduced. To introduce credit insurance, credit bureaus have to be strengthened, and massive databases and probabilistic risk models built. To introduce crop insurance, large investments in information, training, and modeling are needed. To introduce portfolio securitization, long data series on loan type performance, standard underwriting procedures, a sufficient number of homogenous loans for bundling, and rating companies are needed. For derivatives and swaps, well-developed legal/regulatory frameworks and capital markets need to be developed.

Third, donors and governments should promote and support regulated nonbank financial institutions. Nonbanks are forced to be more disciplined (adhere to loan documentation, risk classification, and provisioning rules) and have better chances of diversifying liabilities (access to government lines of credit, issuing bonds, cap-

ture savings (where permitted) besides obtaining commercial loans), but allowances have to be made for flexibility and innovation.

Fourth, the role of the state is fundamental in helping to develop rural financial markets, but direct political interference at the retail level can retard progress. The preferred role would be for state-owned second-tier institutions to extend lines of credit and to train staff of rural finance institutions. Many of the institutions expressed a need for more liquidity and access to low-cost funds. It was also clear that term finance is very scarce. Most institutions do not offer term finance with the stated reason being fear of mismatches. Second-tier institutions and international donors can assist in extending terms through a combination of lines of credit and promotion of savings mobilization.

Fifth, donors and governments should focus on improving the legal and regulatory framework, especially with regards to improving contract enforcement, an expressed concern of many surveyed.

Sixth, donors and governments can assist in the capture and dissemination of relevant information that would serve to reduce asymmetries that contribute to market failures. High quality and functioning databases would help to facilitate better agricultural marketing, better risk measurement, better risk modeling, and the design of credit, savings, and insurance products.

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Annex A: List of Participant Institutions in Survey

Institution	Country	Equity (US\$ ' 000)	Total Portfolio (US\$ ' 000)	No. of Loans	Average Loan (US\$)	Agricultural Portfolio Share	PAR>30 days (%)	PAR>30 days (%) - Ag. Portfolio	ROA (%)	ROE (%)
Regulated		8,356	59,876	31,672	1,771	52.8%	5.0	4.3	2.5	11.8
FFP Prodem	Bolivia	12,164	108,900	68,356	1,593	9%	2.1	2.3	1.9	23.9
Banco Cooperativo Sicredi	Brazil	36,902	477,500	33,617	14,204	97%	0.0	0.0	0.4	7.6
Cresol Baser	Brazil	23,700	100,900	75,800	1,331	33%	8.0	8.0	2.4	5.4
Codesarrollo	Ecuador	3,025	20,691	12,472	1,659	40%	12.4	4.5	0.5	4.5
Banco Procredit El Salvador	El Salvador	17,523	102,400	66,617	1,537		1.7		1.6	11.8
Fundacion Microfinanciera Covelo	Honduras	3,983	9,975	17,500	570	5%	3.1	4.3	4.0	10.0
Capaz, scl	Mexico	6	132	67	1,963	70%	25.0	18.0	-2.2	-36.0
Financiera El Comercio S.A.E.C.A.	Paraguay	3,787	13,393	38,518	348	44%	5.0	3.0	6.0	42.0
CMAC Sullana	Peru	15,215	76,285	74,836	1,019	15%	5.1	2.4	5.3	36.0
EDPYME Edyficar	Peru	10,961	54,789	65,202	840		3.7		4.8	24.3
EDPYME Confianza	Peru	4,916	22,063	26,256	840	14%	3.5	9.7	4.0	22.8
EDPYME Proempresa S.A.	Peru	3,130	11,648	14,536	801	3%	5.0	5.0	4.0	17.0
Cooperativa de ahorro y credito "Santo Cristo de Bagazan"	Peru	2,967	6,770	13,067	518		5.0		2.5	10.7
EDPYME Nueva Vision S.A.	Peru	1,663	5,400	6,848	789	13%	3.6	0.2	4.5	15.3
EDPYME Efectiva S.A.	Peru	1,100	4,000	20,000	200		4.0		15.0	40.0
EDPYME Crear Trujillo	Peru	470	2,200	4,100	537	65%	7.3	6.0	0.5	3.4
EDPYME Solidaridad S.A.C.	Peru	536	850	630	1,349	60%	14.0	3.0	2.5	5.2

Note: Medians have been used to summarize Portfolio-at-Risks (PAR), Returns on Assets (ROA) and Returns on Equity (ROE).

Annex A: List of Participant Institutions in Survey (continued)

Institution	Country	Equity	Total Portfolio	No. of Loans	Average Loan (US\$)	Agricultural Portfolio Share	PAR>30 days (%)	PAR>30 days (%) - Ag. Portfolio	ROA (%)	ROE (%)
Not Regulated		2,784	5,314	7,882	1,079	29.8%	5.0	2.0	4.3	8.3
Fundacion para alternativas de desarrollo - Fades	Bolivia	5,584	18,846			37%	5.0	2.0	2.0	7.0
Agrocapital	Bolivia	10,336	16,334	6,451	2,532	25%	5.0	3.0	2.0	3.0
Asociacion Nacional Ecuménica de Desarrollo	Bolivia	1,043	12,868	9,996	1,287	67%	15.0	16.0	-0.5	-7.3
Fundacion Diaconía FRIF	Bolivia	13,079	12,504	26,838	466	2%	1.0	1.0	10.0	11.0
Fondo de Desarrollo Comunal - Fondecó	Bolivia	2,303	6,050	2,599	2,328	71%	7.0	6.0	1.0	3.0
Servicio Financiero Rural Sartawi - Focades	Bolivia	277	3,043	2,002	1,520	34%	17.0	14.0	1.3	-0.2
Foncresol	Bolivia	1,510	2,029	1,176	1,726	82%	31.0	0.0	12.0	14.0
Corporacion Microempresas de Antioquia	Colombia	729	8,750	10,489	834	23%	7.0	1.0	5.0	21.0
Corporacion Nariño Empresa y Futuro Contactar	Colombia	2,229	3,302	3,641	907	14%	6.8	0.1	13.0	18.0
Asociacion ADRI	Costa Rica	3,552	14,000	2,500	5,600		5.2	0.0	4.3	20.8
Fundacion Mujer	Costa Rica	607	684				13.9		1.0	1.3
Fondo Ecuatoriano Populorun Progression - FEPP	Ecuador	7,476	2,561	1,465	1,748	73%	10.0	12.0	0.1	0.2
Fundacion Campo	El Salvador	2,198	2,142	3,237	662	62%	4.0	3.0	5.0	6.0
FUNDEA	Guatemala	6,670	6,191	8,185	756	39%	1.0	1.0	7.1	8.3
Asociacion Cooperacion para el Desarrollo Rural del Occidente	Guatemala	679	1,697	1,287	1,319	8%	2.8	4.5	10.5	30.9
Asociacion de Desarrollo Integral Cuenca del Lago Atitlan - A	Guatemala	344	600	1,131	531	36%	3.0	2.0	5.0	15.0
Fundacion Adelante	Honduras	40	2,134	7,516	284	80%	2.9	0.4	-21.0	-33.0
Alternativa Solidaria Chiapas, A.C.	Mexico	317	890	5,926	150	67%	1.0	0.0	-2.0	-5.0
Caritas del Perú	Peru	1,611	6,668	24,883	268	6%	1.7	0.0	4.0	24.0
Asociacion Benéfica Prisma	Peru	2,560	4,053	15,222	266	38%	8.0	5.0	-7.0	-9.0
Promujer Peru	Peru	2,406	3,416				0.0		10.1	18.0
Movimiento Manuela Ramos	Peru	1,781	1,817	25,474	71		1.5		2.9	3.5
Finca Perú	Peru	1,849	1,431	7,279	197		0.5		10.6	11.5
Microcrédito para el Desarrollo "La Ch'uspa" - Mide	Peru	150	614	4,543	135		4.8		10.2	47.0
Instituto para el Desarrollo, Educacion, Salud, y Pacificacion	Peru	270	233	1,563	149	23%	5.1	5.0	8.9	9.5

Note: Medians have been used to summarize Portfolio-at-Risks (PAR), Returns on Assets (ROA) and Returns on Equity (ROE).