

THE WORLD BANK ECONOMIC REVIEW

Volume 4

September 1990

Number 3

17595

A SYMPOSIUM ISSUE ON IMPERFECT INFORMATION AND RURAL CREDIT MARKETS

**Introduction: Imperfect Information and Rural Credit Markets—
Puzzles and Policy Perspectives**
Karla Hoff and Joseph E. Stiglitz

Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy
Christopher Udry

**The Thai Rural Credit System: Public Subsidies, Private Information,
and Segmented Markets**
Ammar Siamwalla and others

Interactions between Institutional and Informal Credit Agencies in Rural India
Clive Bell

**Imperfect Information, Screening, and the Costs of Informal Lending:
A Study of a Rural Credit Market in Pakistan**
Irfan Aleem

Peer Monitoring and Credit Markets
Joseph E. Stiglitz

THE WORLD BANK

ECONOMIC REVIEW

EDITOR
Ravi Kanbur

ASSISTANT EDITOR
Clara L. Else

EDITORIAL BOARD

Carlos Rodriguez,
Centro de Estudios Macroeconomicos, Buenos Aires
T. N. Srinivasan, Yale University
Joseph Stiglitz, Stanford University
Dennis N. de Tray

John Holsen
Ravi Kanbur
Sarath Rajapatirana
Marcelo Selowsky

The World Bank Economic Review is a professional journal for the dissemination of World Bank-sponsored research which informs policy analyses and choices. It is issued three times a year, with an occasional additional issue devoted to a special area of current research or policy interest.

The *Review* is directed to an international readership among economists and social scientists in government, business, and international agencies, as well as in universities and development research institutions. The *Review* emphasizes policy relevance and operational aspects of economics, rather than primarily theoretical and methodological issues. It is intended for readers familiar with economic theory and analysis but not necessarily proficient in advanced mathematical or econometric techniques. Articles will illustrate how professional research can shed light on policy choices without becoming essays in advocacy. Inconsistency with Bank policy will not be grounds for rejection of an article.

Articles will be drawn primarily from work conducted by World Bank staff and consultants. Before being accepted for publication by the Editorial Board, all articles are reviewed by two referees who are not members of the Bank's staff; articles must also be recommended by two out of the three external members of the Editorial Board.

The *Review* may on occasion publish articles on specified topics by non-Bank contributors. Any reader interested in preparing such an article is invited to submit a proposal of not more than two pages in length to the Editor.

The views and interpretations in articles published are those of the authors and do not necessarily represent the views and policies of the World Bank or of its executive directors or the countries they represent. When maps are used, the designations employed are solely for the convenience of the reader and do not imply the expression of any opinion whatsoever on the part of the World Bank or its affiliates concerning the legal status of any country, territory, city, or area, or concerning the delimitations of its boundaries or national affiliation.

Comments or brief notes responding to *Review* articles are welcome and will be considered for publication to the extent that space permits. The Editorial Office welcomes inquiries and requests to translate or reprint material from the *Review*. Please direct all editorial correspondence to the Editor, *The World Bank Economic Review*, The World Bank, Washington, D.C. 20433, U.S.A.

Subscriptions to *The World Bank Economic Review* are available without charge to readers with mailing addresses in countries that are not members of the Organisation for Economic Co-operation and Development (OECD) but are members of the World Bank. Written request is required every three years for renewal of such subscriptions. See the insert at the back of this issue for subscription charges and additional information.

©1990 The International Bank for Reconstruction and Development / THE WORLD BANK
All rights reserved
Manufactured in the United States of America
ISSN 0258-6770

Material in this journal is copyrighted. Requests for permission to reproduce articles should be addressed to the Director, Publications Department, The World Bank, Washington, D.C. 20433, U.S.A. The World Bank encourages dissemination of its work and will normally give permission promptly and, when the intended reproduction is for noncommercial purposes, without asking a fee. Permission is not required to make photocopies for classroom and similar immediate use.

This journal is indexed regularly in *Current Contents / Social & Behavioral Sciences*, the *Social Sciences Citation Index®*, the *Journal of Economic Literature*, and the *Public Affairs Information Service*.

THE WORLD BANK ECONOMIC REVIEW

Volume 4

September 1990

Number 3

A SYMPOSIUM ISSUE ON IMPERFECT INFORMATION AND RURAL CREDIT MARKETS

THIS SYMPOSIUM ISSUE draws on papers presented at a World Bank conference on agricultural development policies and the economics of rural organization which was held in Annapolis, Maryland, from June 13 to 16, 1989. (The conference was organized by Avishay Braverman, Karla Hoff, and Joseph E. Stiglitz.) The articles in this issue were refereed in the usual way. The Editorial Board invited Karla Hoff to edit the selected papers and asked her and Joseph E. Stiglitz to write the introduction to the symposium.

Introduction: Imperfect Information and Rural Credit Markets—Puzzles and Policy Perspectives <i>Karla Hoff and Joseph E. Stiglitz</i>	235
Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy <i>Christopher Udry</i>	251
The Thai Rural Credit System: Public Subsidies, Private Information, and Segmented Markets <i>Ammar Siamwalla, Chirmsak Pinthong, Nipon Poapongsakorn, Ploenpit Satsanguan, Prayong Nettayarak, Wanrak Mingmaneeakin, and Yuavares Tubpun</i>	271
Interactions between Institutional and Informal Credit Agencies in Rural India <i>Clive Bell</i>	297
Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan <i>Irfan Aleem</i>	329
Peer Monitoring and Credit Markets <i>Joseph E. Stiglitz</i>	351
Index to Volume 4	367

Introduction: Imperfect Information and Rural Credit Markets—Puzzles and Policy Perspectives

Karla Hoff and Joseph E. Stiglitz

Rural credit markets have been at the center of policy intervention in developing countries over the past forty years. Many governments, supported by multilateral and bilateral aid agencies, have devoted considerable resources to supplying cheap credit to farmers in a myriad of institutional settings. The results of many of these interventions have been disappointing, and one explanation for this must be that they were based on an inadequate understanding of the workings of rural credit markets.

The articles in this symposium issue are devoted to empirical and theoretical investigations of rural credit markets, in the framework of the imperfect information paradigm. The authors show how this framework is useful not only in explaining puzzling features of these markets, but also in providing a policy perspective to assess the successes and failures of specific interventions.

I. TRADITIONAL VIEWS AND PUZZLES

Rural credit markets do not seem to work like classical competitive markets are supposed to work. Interest rates charged by moneylenders may exceed 75 percent per year, and in some periods credit is unavailable at any price. The high observed interest rates were attributed by many to the monopoly power of the village moneylender. The policy response arising from this explanation of high interest rates was clear—it was to provide cheap institutional credit as an alternative to the moneylender.

But the past forty years of experience of government intervention in rural credit markets suggests that the creation of institutional alternatives has failed to drive the traditional moneylender out of the market and, whatever competition it has provided, interest rates charged by traditional moneylenders remain high (see table 1). In addition, high default rates have prevented the institutions

Karla Hoff is an assistant professor of economics at the University of Maryland, College Park. Joseph E. Stiglitz is a professor of economics at Stanford University, Stanford, California. The authors acknowledge their debt to Avishay Braverman for initiating and organizing the conference from which the articles in this symposium issue were selected.

© 1990 The International Bank for Reconstruction and Development / THE WORLD BANK.

from being self-financing: recurrent and often large injections of government funds have been required. And despite these subsidies, many of these credit programs have had little success in reaching farmers without collateral or with below-average income.

This apparent failure of policy intervention did not come as a surprise to those who did not believe in the monopoly power explanation of high interest rates, but believed instead that credit markets worked as classical competitive markets should. In this view, observed high interest rates were a reflection of perfect credit markets that took into account the risks of default (see Stigler 1967). The policy conclusion of this line of argument is not to intervene in rural credit markets, at least not on efficiency grounds.

But neither the traditional monopoly nor the perfect markets view can explain other features of rural credit markets which are at least as important and equally puzzling as high interest rates:

- The formal and informal sectors coexist, despite the fact that formal interest rates are substantially below those charged in the informal sector.
- Interest rates may not equilibrate credit supply and demand: there may be credit rationing, and in periods of bad harvests, lending may be unavailable at any price.

Table 1. *Characteristics of Rural Credit Markets Surveyed in this Symposium Issue*

Survey regions and period	Share of formal sector in total credit (value)	Mean interest rate by sector ^a		Average transaction (dollars)	
		Formal	Informal	Formal	Informal
Zaria, Nigeria, 1987-88	8	-3.6	-7.5	266	51
Nakhon Rachasima Province, Thailand, 1984-85	44	12-14	90	254	440
India					
1951	7	3.5-12.5	7-35	400 ^b	200 ^b
1961	17				
1971	30				
1981	61	10-12	22	n.a.	80-345 ^c
Chambar, Pakistan, 1980-81	25	12	79	n.a.	284

n.a. Not available.

a. All interest rates are nominal and annual except Nigeria's which are real realized monthly rates, and Pakistan's which are real annual rates charged. See the articles in this issue for details on the calculation of these rates.

b. Annual borrowings.

c. Low figure for Bihar; high figure for Punjab.

Sources: Nigeria: Udry (this issue). Thailand: Siamwalla and others (this issue). India: Bell (this issue), plus additional data provided by Bell, drawn from the Reserve Bank of India (1954, vol. 1, part 2, chap. 21, "Regional Data" tables); Bell and Srinivasan (1989, table 2), and Bell, Srinivasan, and Udry (1990). Pakistan: Aleem (this issue).

- Credit markets are segmented. Interest rates of lenders in different areas vary by more than plausibly can be accounted for by differences in the likelihood of default; and local events—a failure of a harvest in one area—seem to have significant impacts on the availability of credit in local markets.
- There is a limited number of commercial lenders in the informal sector, despite the high rates charged.
- In the informal sector interlinkages between credit transactions and transactions in other markets are common.
- Formal lenders tend to specialize in areas where farmers have land titles.

Neither the monopoly view nor the perfect markets view can account for these features taken as a whole. An alternative approach is required—one that is better able to help us understand the workings of rural credit markets, and thus help us design appropriate policy interventions.

II. THE IMPERFECT INFORMATION PARADIGM

In the past decade there have been major advances in our theoretical understanding of the workings of credit markets. These advances have evolved from a paradigm that emphasizes the problems of imperfect information and imperfect enforcement. Lenders exchange money today for a promise of money in the future, and take actions to make it more likely that those promises are fulfilled. Lending activity thus entails the exchange of consumption today for consumption in a later period, insurance against default risk, information acquisition regarding the characteristics of loan applicants and the actions of borrowers, and an enforcement element to increase the likelihood of repayment by individuals who are able to do so.

It is this broadening of the perspective of what is entailed by lending activity that provides the background for the new theories of rural credit markets. This framework guides the four empirical studies in this symposium, and is the foundation for Stiglitz's theoretical analysis of peer monitoring that concludes this issue.

The new views of rural credit markets are based on the following three observations:

1. Borrowers differ in the likelihood that they will default, and it is costly to determine the extent of that risk for each borrower. This is conventionally known as the *screening* problem.
2. It is costly to ensure that borrowers take those actions which make repayment most likely. This is the *incentives* problem.
3. It is difficult to compel repayment. This is the *enforcement* problem.

The new view holds that it is the markets' responses to these three problems, singly or in combination, that explain many of the observed features of rural

credit markets, and that they must therefore inform the policy perspective for designing specific interventions.

One can distinguish conceptually between two types of mechanisms for resolving the three problems: direct and indirect. Indirect mechanisms rely on the design of contracts by lenders such that, when a borrower responds to these contracts in his own best interests, the lender obtains information about the riskiness of the borrower and induces him to take actions to reduce the likelihood of default and to repay the loan whenever he has the resources to do so.

These contracts may be in the credit market itself (in loan terms such as the interest rate and loan size), or they may rely on contracts in related markets (in rental agreements, for example) that will influence behavior in credit markets. Because the interest rate serves the dual function of a price and an indirect screening and/or incentive mechanism, the equilibrium interest rate need not clear the market—there may be credit rationing. Notice, however, that these indirect mechanisms are equally applicable whether there is competition or monopoly in the market.

Direct mechanisms rely on lenders expending resources to screen applicants and enforce loans. It follows from this that high interest rates may reflect the high costs of these activities. Perhaps more important, however, these direct mechanisms (through personal relationship, trade-credit linkages, usufruct loans, and so on) lead to a monopolistically competitive structure with interest rate spreads between different segments of the rural credit markets. Moreover, this suggests that the moneylenders' power is unlikely to be broken by the entry of institutional credit, unless the new institutions themselves find substitutes for the direct mechanisms used by moneylenders to overcome the problems of screening, incentives, and enforcement.

III. THE THEORY OF INDIRECT MECHANISMS

A key feature of credit markets is that for any loan there is a possibility that the project for which it is used will perform so badly that the borrower defaults. In these cases, the lender cannot recover his total outlay, and in fact there are legal provisions in many societies which severely limit the amount that he can recover.

The probability of default on a loan thus depends on the probability that the gross return on the project for which the loan is used is less than principal and interest due on the loan. It follows that as projects become riskier, in the sense that the probability of both very high and very low gross returns increases relative to the probability of moderate gross returns, the likelihood of default increases. The lender is hurt by an increase in the riskiness of projects that will be undertaken with his loans. In contrast, the borrower's expected gain from the project will rise. By straightforward extension, the borrower will prefer some projects with lower mean return over those with higher mean return if the former group entails greater risk.

One consequence of default provisions is that changes in the interest rate may change the mix of projects undertaken by borrowers. This can be seen in the case where borrowers care only for expected net return. At any given interest rate, presumably loan applications would only be submitted for projects with a positive expected net return, taking into account default provisions. For a class of projects with the same mean gross return but differing risk, the interest rate will determine a marginal project with an expected net return to the borrower that is just barely positive. By the above argument, all projects in this class that give the borrower a higher expected net return entail a higher probability of default. An increase in the rate of interest will mean that the marginal project now gives a negative expected net return—the new marginal project is now riskier than before, so that the pool of projects coming from this class is on average riskier than at the lower interest rate. The same argument applies for projects with differing risks at any level of mean gross return.

Thus as the interest rate increases, the mix of prospective projects tilts in favor of riskier projects. As Adam Smith put it: “If the legal rate . . . was fixed so high . . . the greater part of the money which was to be lent, would be lent to prodigals and profectors, who alone would be willing to give this higher interest” (*Wealth of Nations*, 1776). Thus the interest rate can act as a screen which regulates the risk composition of the loan portfolio.

A lender cannot ever fully discern the extent of risk of a particular loan, and the pool of applicants for loans at any given interest rate will consist of borrowers with projects in different risk categories. The lender knows, however, that the mix of projects to finance changes with the rate of interest. The interest rate takes on the dual function of a price as well as an instrument for regulating the risk composition of the lender's portfolio (Stigler 1987; Stiglitz and Weiss 1981). This can lead to unexpected outcomes. For example, when there is an excess demand for loans at a given interest rate, classical economic analysis suggests that this price would rise to choke off the excess demand. Higher interest rates would raise the lender's returns if they did not greatly increase his risk by increasing the probability of defaults; but at some higher interest rate the greater risk and thus higher incidence of default will offset the increased interest income from the loan portfolio. In that case the lender will choose to keep the interest rate low enough to obtain a favorable risk composition of projects and to ration available loanable funds by other means. Thus, contrary to the operation of markets as they are supposed to work, credit may be rationed with no tendency for the interest rate to rise.

In fact, the situation would be even more extreme if lenders did not recognize the effect of interest rates on the risk of their portfolios. Then we might get a process whereby at a given rate of interest the default rate is so high that returns to the lender do not cover opportunity costs of funds, putting upward pressure on the rate of interest. But this only worsens the risk mix. The process goes on until the interest rate is so high that only the riskiest projects, those with the highest probability of default, are being undertaken. It has been argued

by some writers that processes such as these account for the thinness of many markets (including some types of credit markets) in which the quality (default risk) of the commodity exchanged depends on the price (interest rate), and there is asymmetric information between buyers and sellers (Akerlof 1970).

This would suggest that lenders, even in situations of limited competition, cannot raise interest rates so high as to extract all the surplus associated with a loan. The observation that interest rates do not seem to vary much and have not been very sensitive to competition from the formal sector is also consistent with this view of the screening and incentive problems.

Reputation Effects and Market Interlinkages

A lender may employ two other indirect mechanisms to enhance the likelihood that borrowers undertake the actions desired by lenders. First, the lender may use the threat of cutting off credit to induce desired borrower behavior (Stiglitz and Weiss 1983). More generally, borrowers want to avoid defaulting on loans because to do so tarnishes their reputation and curtails their access to future loans. For this incentive to be effective, of course, interest rates cannot be too high, and borrowers must enjoy some surplus from obtaining the loans. This provides another way in which markets with imperfect information are fundamentally different from markets with perfect information: competition does not drive rents to zero. Those who are lucky enough to get loans get a consumer surplus, and that consumer surplus, being denied the unlucky, is in effect a rent.

Second, lenders who are landlords or merchants may use the contractual terms in these other exchanges to affect the probability of default. They may interlink the terms of transactions in the credit market with those of transactions in the product or rental markets (Braverman and Stiglitz 1982, 1986). For example, a trader-lender may offer a farmer who borrows from him lower prices on fertilizers and pesticides because the probability of default is reduced when such inputs are used. The use of interlinkages as a direct mechanism for solving information and enforcement problems is considered below.

IV. DIRECT SCREENING MECHANISMS

In addition to using indirect screening mechanisms, most lenders will also use direct screening mechanisms and may monitor borrowers' behavior; they will withdraw credit if the terms of the loan appear to be violated. In developing countries potential lenders vary greatly in their costs of direct screening and monitoring. For some lenders, such costs are low; information is a by-product of living near the borrower or being part of the same kinship group or a party to some other transaction with him. Thus, village lenders often do considerable monitoring, while banks may find it virtually impossible to do so, which partially accounts for the high default rates they face. These differences across

lenders in the costs of screening and monitoring may lead to segmentation of markets.

Geography and Kinship

In the area of northern Nigeria surveyed in the article below by Udry, credit markets are almost completely segmented along geographic lines and kinship groups, and information asymmetries between borrower and lender within these markets appear to be negligible. In Udry's survey the rural credit market was very active, but loans between individuals in the same village or kinship group accounted for 97 percent of the value of those transactions (see Udry, table 3). Collateral was seldom used, and credit terms implicitly provided for direct risk pooling between creditor and debtor. That virtually no loans were observed to cross the boundaries of an extremely small social and geographic space, in an environment characterized by highly correlated risk and seasonal demands for finance, points to the high information costs of such transactions and the reliance on kinship and village sanctions as a mechanism for contract enforcement. (Similar evidence for the informal credit market in rural China was found by Feder and others, 1989.)

Even in areas in which nonresident lenders and institutions provide a large share of total credit, market segmentation by village and kinship group remains pronounced with respect to consumption loans. Thus Siamwalla and others report in their article below on the temporary collapse of local Thai credit markets in the face of a severe regional shortfall of rain. In such periods, resident lenders' own equity is depleted, but nonresident lenders and institutions appear not to be able to form a sufficiently accurate judgment of households' ability to repay to permit them to operate in the consumption loans market.

Interlinkages with Other Markets

For a given lender, loan applicants with the same wealth and productive capacity will differ in their ability to effectively assure potential lenders of their creditworthiness. Similarly, for a given applicant, lenders will differ in their cost of screening and enforcing loan performance. Besides geography and kinship group, a critical source of these differences is the scope of individuals' participation in other markets. Such participation makes possible the interlinking of loans with transactions in those markets. Interlinked credit contracts may provide means to alleviate screening, incentive, and enforcement problems.

The most widespread form of interlinkage is provided by traders. Lenders who are also nonresident traders and commission agents generally require that their clients sell all their crops to, or through them (see Siamwalla and others; Bell; and Aleem; all this issue). This trade-credit linkage "makes information on the size of the borrower's operations . . . available to the creditor and to no

one else. This . . . thus closes the borrower's access to other lenders" (Siamwalla and others, this issue). The trader-lender can easily enforce his claim by deducting it from the value of the crops sold to, or through, him. In towns with well-organized commodity markets, there may sometimes be cooperation among traders in enforcement. Bell reports (this issue): "In Chittoor . . . a commission agent who dealt in *gur* (a sugar product) told me that agents frequently know one another's clients. If a farmer attempted to sell through an agent other than the one with whom he normally dealt, the new agent would deduct principal and interest on the loan, basing his calculations on the usual rule of thumb relating the size of the loan to the quantity to be delivered, and hand over the said sum to the first agent."

Under some circumstances, however, such trader-provided credit turns out to be limited. Cassava, unlike most other crops, has no fixed harvest period. This makes loan enforcement difficult. Generally, cassava growers in Thailand obtain funds only by selling outright the standing crop (Siamwalla and others, this issue). For this crop, a spot sale to a trader serves as a substitute for trader-financed credit.

Bell (this issue) and Siamwalla and others (this issue) argue that trade-credit interlinkages go a long way to resolving the information asymmetry between borrower and lender and the enforcement problem, while they create asymmetries of information across lenders. Lenders who do not serve as traders for a borrower will not know as much about his productivity and will be in a less favorable position to enforce a loan. Although the incentives problem is not entirely resolved by market interlinkages, the severity of the interest rate-risk tradeoff will be less for lenders who have greater access to inside information and to mechanisms to enforce their claims. Interlinkages may also enable the reputation mechanism to work more effectively; what affects behavior is the total benefits (rent) from a relationship. When an economic relationship entails transactions in several markets, there is scope for greater surplus.

Devices that Limit the Consequences of Information Asymmetries and Enforcement Problems

Three devices commonly used in rural credit markets in developing countries—collateral requirements, usufruct loans, and rotating savings and credit associations—may be viewed as methods to limit the consequences of information asymmetries and enforcement problems. Like geography, kinship, and market participation, these devices are available to some borrowers and lenders and not others. Hence, they also have consequences for the sorting of borrowers across lenders and for segmentation in rural credit markets.

Collateral. In developing countries, banks have found it difficult to screen and monitor borrowers directly; banks, but not informal lenders, therefore rely heavily on collateral, generally in the form of land. For this reason, in Thai-

land, “the sphere of operation of commercial banks and cooperatives . . . has been almost exclusively in villages where land titles have been issued” (Siamwalla and others, this issue). Because land wealth is correlated with income in rural areas, this finding helps to explain why borrowers with above average income have been found to have greater access to formal sector sources than those who do not. Average per capita income of Thai households borrowing from the formal sector was more than 30 percent above the mean, whereas those borrowing only from the informal sector had average per capita income close to the survey area’s mean.

Usufruct loans. In one form of usufruct loan, a lender occupies and uses the borrower’s land until the principal is repaid. Such loans are transacted in Thailand to finance migration for work abroad. They are viewed as low-risk loans (Siamwalla and others, this issue). As the saying goes, “Possession is nine-tenths of the law.”

A similar practice, very widespread in Nigeria, is to procure loans by transferring to the lender the right to harvest the borrower’s trees. The harvest provides the interest on the lender’s loan. Such transactions, which are called tree pledging, occur with cocoa, oil palm, and rubber trees. (Adegboye 1983).

Rotating savings and credit associations. Rotating savings and credit associations (ROSCAs) have a long history in developing countries. They predate monetization (Bouman 1983), and they continue to be a major source of credit in African countries (where they are called *tontines*). In the usual case, a small group is formed from a village or family group where enforcement costs are low because of powerful social sanctions. Each member agrees to pay periodically into a common pool a small sum so that each, in rotation, can receive one large sum. Where individuals need to purchase a high-priced item, ROSCAs provide funds with surprisingly small spreads between the return to savings and the cost of borrowing (Edwards 1989). ROSCAs are thus an example of a credit exchange which improves upon opportunities in the market by drawing on preestablished social ties. Highly successful *tontines* in Cameroon were recently described as follows: “Tontines, built on trust, are generally made up of homogeneous groups—people from the same ethnic background, the same workplace or the same neighborhood. [One Cameroonian reported:] . . . ‘If you don’t make your payment to the tontine, you are rejected by the community. If you are banned from one group, you are banned from the others.’ Indeed, several years ago, several Bamileke traders committed suicide because they realized that they could not make their tontine payments” (*New York Times*, November 30, 1987).

But in Latin America, ROSCAs have been adapted to a situation where individuals do not know each other. The initiative for forming the group comes from a retailer of durable goods, for example, cars. Let the group be of size N and the durable have price C . The group members are required to come

together for N monthly meetings to contribute their share of the cost, C/N , into a common pool. At each meeting, the individuals draw lots. The winner takes the pool, buys the car, and becomes ineligible for future drawings, though he must complete his N monthly payments. If he misses a payment, he loses the car. The same would, of course, hold true in a conventional car loan market. But by creating a group of individuals whom the borrower comes to know, and who would be hurt if he defaulted and (at the least) imposed transactions costs on them, the borrower performs more reliably than if the cost were borne only by the lender, with whom the relationship is brief and impersonal.

*Direct Screening and Enforcement Costs as the Basis
for Monopolistic Competition*

The most important way of limiting information asymmetries is buying information. In his remarkable survey of the operations of moneylenders, Aleem (this issue) found that they devote an average of one day to obtaining information per applicant and reject one applicant out of every two screened. In addition to screening costs, lenders face costs of chasing delinquent borrowers, maintaining an office and warehouse, paying hired help, and, finally, covering capital costs. Aleem found that screening and enforcement costs are about 14 percent of marginal costs of lending operations.

The screening process creates relationship-specific capital between lender and creditor. At any one time, a borrower is likely to have built up such capital with only one lender. For example, more than 80 percent of borrowers surveyed by Siamwalla and others reported that they borrowed from only one informal source (Siamwalla and others, this issue; see also Bell, this issue). If a borrower tries to shift to another lender, Aleem found that he needs on average one year to build up creditworthiness with the new lender. In the ten-province household survey of Thailand conducted by Siamwalla and others, 72 percent of informal sector borrowers reported that they had not attempted to borrow from other informal lenders during the past three years; the average period of contact involving credit transactions reported by these 72 percent was close to seven years! (See also Bell.)

Of course, more evidence is needed before we can infer that lenders exercise monopoly power over their borrowers. This evidence can be found in Aleem's study. His first finding is that the total average costs of lenders, as a fraction of the amount recovered, was comparable to the average interest rate charged in the survey area. His second finding is that mean marginal costs as a fraction of the amount recovered were much less than the average interest rate charged.

These findings suggest strongly that the market is characterized by monopolistic competition. Each lender faces a downward-sloping demand curve from borrowers tied to him, so that he can price at above marginal cost, but entry of new moneylenders keeps pure profits close to zero by driving the price down to the average cost. Thus, in the usual way of monopolistically competitive

markets, each lender operates on too small a scale; he spreads his fixed costs over too small a clientele. This view of the market can lead to dramatically different policy conclusions on the effects of cheap institutional credit on rural interest rates, as we shall see in the next section.

To conclude, we emphasize the difference between the screening process in the informal credit market described above and the use of the interest rate as an indirect screening mechanism, as discussed in section III above. The first is active and costs resources; the second is passive and works through a process of self-selection. These two types of screening have entirely different effects on interest rates and on the structure of the market. Passive screening is consistent with perfect competition and, as argued in section III, reduces interest rates below the level that would exist if information were perfect. The evidence of Siamwalla and others and Aleem suggests that active screening through investment in information raises the interest rate above the level that would exist under perfect information by increasing the costs of the lender. More important, active screening makes the credit market imperfectly competitive.

V. POLICY PERSPECTIVES

Economic Development and the Evolution of Rural Credit Markets

We have argued that observed features of rural credit markets in developing countries can be understood as responses to the problems of screening, incentives, and enforcement. Of course, these problems do not only arise in developing countries. It can be argued, however, that underdevelopment increases the severity of these problems because of more extensive asymmetries of information and a more limited scope for legal enforcement, in particular, more limited collateral. Will development, therefore, by itself remove or reduce the imperfections of rural credit markets?

Several studies have argued that as development proceeds and average income levels increase, the imperfections of rural credit markets should diminish. This argument is supported by evidence from India that rural areas with higher average incomes and farmers whose incomes increase seem to face lower interest rates from moneylenders:

A high [interest rate] r is the *effect* of the high-risk premium that the village moneylenders usually charge for lending to the peasants . . . The lack of creditworthiness is really a reflection of the peasants' poor income and meager savings. Hence, the growth of real income and repayment of the farmers should reduce the probability of default and the risk premium, which in turn will reduce r . (Ghatak 1983, pp. 21–22)

In a relatively more prosperous district like Burdwan in West Bengal . . . the average rural interest rate for different classes (such as casual laborers, tenants, and agricultural laborers) varied between 36 and 84 percent per annum, while in a relatively poorer district like Nadia . . . the average

rural interest rates varied between 72 and 120 percent per annum . . . In West Bengal during 1975–1976, moneylenders still remained a major source of agricultural credit. (Ghatak 1983, p. 32)

Agricultural technical change does influence the supply of loans . . . Farmers residing in areas characterized by the use and/or provision of new technology appear to benefit in that they face lower moneylender interest rates. This result provides an additional point of leverage for policy-makers: Interest rates can be lowered indirectly through the provision of technical change and investment opportunities and need not be lowered directly through costly subsidies to some borrowers in the formal credit market. (Iqbal 1988, p. 375)

The argument above relies on the observation that as productivity and incomes increase, the risk of default decreases. But the articles in this issue suggest that the link between development and credit markets is somewhat more complex.

Screening, incentive, and enforcement problems in credit markets are often mitigated through interlinkages between the credit market and other markets, (for example, land and commodity markets). The creation of a dense network of market interactions, which we would expect as development proceeds, lowers screening and enforcement costs. Legal developments such as land titling, in conjunction with the individualization of land rights as commercialization proceeds, allow land to be used as collateral, which in turn expands the scope of credit markets.

As technological change disrupts traditional ties in a developing economy, however, the strength of social sanctions in enforcing credit repayments may decrease. This role of social ties is documented by case studies in this issue and elsewhere. Thus, as social ties break down in the wake of development, but before a dense network of interactions across markets has been built up, the imperfections of rural credit markets may well get worse before they get better.

Because development by itself is unlikely to take care of the imperfections of rural credit markets in the short run and medium run, policy intervention may be called for. In fact the argument has been that the imperfections in rural credit markets, particularly their characteristically high interest rates, may themselves be an impediment to development. We will now discuss and evaluate the policy responses to this problem.

Government Intervention and Credit Subsidies

Because enforcement (or lack of it) is one of the problems in rural credit markets, it might be argued that the government as a lender has advantages the private sector does not: it has the ability to extend or cut off credit subsidies (using general revenue), and it has at least a legal monopoly on the use of force. The experience of many developing countries (and some developed ones) suggests that the government is often politically unable to use the latter advantage.

Thus Bell notes that there is a view, widespread in rural India, that institutional loans are really grants: "politicians regularly vie with one another in promising, if elected, to have such debts forgiven." Harriss (1983) reports that "during the election campaign of 1972 [in North Arcot] farmers were 'promised' that a vote cast in the right direction would write off a loan." In Thailand, farmers' associations, groups of 50–100 farmers formed hurriedly in 1975 by the Department of Agriculture, have the worst repayment record: "Because their formation was politically motivated, their members tend to be rich and influential and, precisely for that reason, their repayment rate was poor" (Siamwalla and others).

In Pakistan, the political cost of foreclosing on debtors with collateral is significant. Aleem reports that while default rates in the formal sector were 30 percent, for the informal lenders the mean delinquency rate was 15 percent and the mean cumulative rate of nonrepayment was only 2.7 percent.

In view of this accumulated evidence, the argument for direct credit supply by the government as a means of relieving enforcement problems must be questioned. What is left, then, is the fact that the government can supply cheap credit. What is likely to be the effect of this on the rural informal credit market? The available evidence, as documented in the case studies in this issue and elsewhere, certainly does not suggest either that cheap credit will drive out informal sector moneylenders, and it may not even drive down interest rates charged by them. The theoretical framework of the imperfect information paradigm allows us to understand this policy failure.

If some borrowers have direct access to cheap funds from government institutions, and can satisfy all their borrowing needs from this source, there will of course be less demand for credit in the informal sector. If rural credit markets behaved like classical markets are supposed to behave, this would exert downward pressure on interest rates. But we know that rural credit markets do not behave in this fashion. If the interest rate plays a screening role in the presence of imperfect information and this leads to credit rationing at a fairly high interest rate, it is unlikely that the interest rate will fall. Conversely, if moneylenders engage in direct screening, those moneylenders with the highest screening costs will drop out of the market and interest rates may be expected to fall.

If borrowers cannot fully satisfy their needs from government institutions, then it matters whether formal sector loans are treated as senior or junior debt relative to informal sector loans. If the formal sector has seniority, the informal sector loans in effect become riskier, which may lead to an increase in the informal sector interest rate. To make matters worse, in monopolistically competitive settings, when there is active screening, the screening costs must be allocated among smaller loan sizes, which raises average costs and interest rates. By contrast, if the formal sector loans are treated as junior debt, the effect on informal sector credit is ambiguous. The greater borrowing that results from access to lower rates increases (at any given level of informal sector loans and interest rates) the default risk, but a disproportionate fraction of the

default risk is borne by the formal sector. Unequal access to formal sector funds may have further implications for the informal sector. If formal sector loans go toward larger borrowers with more collateral, and the evidence suggests that they do, then the mix of applicants among which the informal sector has to screen changes adversely, and this might increase the interest rates charged there.

If formal sector loans do not go directly to borrowers, but instead to moneylenders who act as financial intermediaries, the effects depend on how the costs of informal lenders change and on how the level of competition in the informal sector changes. If privileged access to government funds increases entry, and therefore increases average costs in moneylending because the costs of screening borrowers are now being spread over the smaller clientele, then interest rates will tend to rise for this reason. This is another example of the implications of monopolistic competition in rural credit markets.

More generally, the imperfect information framework alerts us to the difficulty of relying on financial intermediation to resolve the problems in rural credit markets. Although the case studies in this issue present evidence that moneylenders do borrow from each other in the same village and across villages, screening, incentive, and enforcement problems limit the extent of these transactions. Formal sector institutions also face these information and enforcement problems in relation to moneylenders. Aleem, Bell, and Siamwalla and others show the limited extent of financial intermediation between the formal and informal sectors.

Institutional Innovation and the Role of Public Policy

We have seen that the paradigm of imperfect information and costly enforcement stands in contrast to the traditional debate on monopoly versus perfect markets. On the one hand, it argues that rural credit markets do not behave like classical competitive markets are supposed to, so that there is no presumption that they are efficient. On the other hand, both theory and evidence suggest that high interest rates are not necessarily, or even primarily, a reflection of the monopoly power of the village moneylender. Rather, rural credit markets behave the way they do because of the problems of screening, incentives, and enforcement.

These problems may suggest that government intervention is called for, and that it may be successful. But both theory and evidence caution us against any simplistic view of the government's role, because government credit institutions face these same problems in relation to borrowers. In fact, they may be in a worse position in terms of informational asymmetry, monitoring, and enforcement.

Is there, then, any role for public policy? Greenwald and Stiglitz (1986) have recently shown that markets with imperfect information give rise to externality-like effects, for which government intervention may be most successful. In the context of credit markets, one externality is the reduction in information costs brought about by development in other markets. Examples are land titling and

commercialization in goods markets. More generally, government expenditure on rural infrastructure that reduces farmers' risks will likely reduce the importance of information asymmetries, improve the level of competition, and therefore reduce the distortions in rural credit markets.

Another type of externality may reside in institutions which facilitate the overcoming of informational problems in rural credit markets. One such institution is that of small-scale peer monitoring, and the article by Stiglitz in this issue analyzes a model of this activity. Individuals form a small group which is jointly liable for the debts of each member. The group thus has incentives to undertake the burden of selection, monitoring, and enforcement that would otherwise fall on the lender. Of course, this entails an inefficiency because a small group has a lesser ability to bear risk than a lender with a large and diversified portfolio. But Stiglitz shows that under certain circumstances the benefits more than outweigh the costs. There is, however, an externality in this institutional innovation. An individual who bears the initial cost of organizing such an institution is providing a form of social capital from which all members of the group will benefit. As is well known, when this type of externality arises there will be an undersupply of the socially beneficial service, and there is therefore a role for the government to help organize and act as a catalyst in the formation of such institutions. As Huppi and Feder (1990) have noted in a recent review of group lending, there are notable successes when the government has acted in this way.

VI. CONCLUSIONS

Above all, the studies in this issue and the theoretical literature out of which they have grown show that we can look into the black box that was once referred to simply as "imperfect credit markets." We can assess the nature and sources of those imperfections, and we have a framework for assessing the consequences of alternative government policies. A rich research agenda lies ahead of us: to investigate the extent to which the findings of these studies can be generalized to other countries, to explore more deeply the effectiveness of the variety of institutions and mechanisms that can screen and monitor loan applicants which were touched upon in this article, and to evaluate the consequences of a variety of government interventions in credit markets, taking into account the information asymmetries and enforcement problems which are endemic in developing countries.

REFERENCES

- Adegboye, R. O. 1983. "Procuring Loans by Pledging Cocoa Trees." In J. D. Von Pischke, Dale W. Adams, and Gordon Donald, eds., *Rural Financial Markets in Developing Countries*. Baltimore, Md.: Johns Hopkins University Press.
- Akerlof, George. 1970. "The Market for Lemons: Qualitative Uncertainty and the Market Mechanism." *Quarterly Journal of Economics* 84: 488-500.

- Bell, Clive, and T. N. Srinivasan. 1989. "Interlinked Transactions in Rural Markets: An Empirical Study of Andhra Pradesh, Bihar and Punjab." *Oxford Bulletin of Economics and Statistics* 51, no. 1: 73–83.
- Bell, Clive, T. N. Srinivasan, and Christopher Udry. 1990. "Agricultural Credit Markets in Punjab: Segmentation, Rationing and Spillover." Economic Growth Center, Yale University. Processed.
- Bouman, F. J. A. 1983. "Indigenous Savings and Credit Societies in the Developing World." In J. D. Von Pischke, Dale W. Adams, and Gordon Donald, eds., *Rural Financial Markets in Developing Countries*. Baltimore, Md.: Johns Hopkins University Press.
- Braverman, Avishay, and Joseph E. Stiglitz. 1982. "Sharecropping and the Interlinking of Agrarian Markets." *American Economic Review* 72, no. 4 (September): 495–615.
- . 1986. "Landlords, Tenants and Technological Innovations." *Journal of Development Economics* (December).
- Edwards, John H. Y. 1989. "Rotating Credit Associations and Lotteries as Financial Instruments for the Poor." Tulane University. Processed.
- Feder, Gershon, Lawrence J. Lau, Justin Y. Lin, and Xiaopeng Luo. 1989. "The Nascent Credit Market in Rural China." Agricultural Policies Division, Agriculture and Rural Development Department, World Bank. Processed.
- Ghatak, Subrata. 1983. "On Interregional Variations in Rural Interest Rates, *Journal of Developing Areas* 18 (October): 21–34.
- Greenwald, B., and Joseph Stiglitz. 1986. "Externalities in Economies with Imperfect Information and Incomplete Markets." *Quarterly Journal of Economics* (May): 229–64.
- Harriss, Barbara. 1983. "Money and Commodities: Their Interaction in a Rural Indian Setting." In J. D. Von Pischke, Dale W. Adams, and Gordon Donald, eds., *Rural Financial Markets in Developing Countries*. Baltimore, Md.: Johns Hopkins University Press.
- Huppi, Monika, and Gershon Feder. 1990. "The Role of Groups and Credit Cooperatives in Rural Lending." *World Bank Research Observer* 5, no. 2 (July): 187–204.
- Iqbal, Farrukh. 1988. "The Determinants of Moneylender Interest Rates: Evidence from Rural India." *Journal of Development Studies* 24, no. 3 (April): 364–78.
- Reserve Bank of India. 1954. *All-India Rural Credit Survey*. Volume 1, *The Survey Report* (part 1, "Rural Families"; part 2, "Credit Agencies"). Bombay.
- Stigler, George J. 1967. "Imperfections in the Capital Market." *Journal of Political Economy* 75, no. 3: 287–92.
- . 1987. "The Causes and Consequences of the Dependence of Quality on Prices." *Journal of Economic Literature* 25 (March): 1–47.
- Stiglitz, Joseph, and Andrew Weiss. 1981. "Credit Rationing in Markets with Imperfect Information." *American Economic Review* 71, no. 3 (June): 393–410.
- . 1983. "Incentive Effects of Termination: Applications to the Credit and Labor Markets." *American Economic Review* 72: 912–27.
- . Forthcoming. "Banks as Social Accountants and Screening Devices and the General Theory of Credit Rationing." In *Essays in Monetary Economics in Honor of Sir John Hicks*. Oxford, England: Oxford University Press.

Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy

Christopher Udry

This article addresses the issues of incomplete markets and imperfect information in the context of credit markets in rural northern Nigeria. In much recent theoretical literature, the problems of moral hazard and adverse selection are assumed to be decisive for the organization of agrarian institutions. In contrast, it is found that in the four villages surveyed credit transactions take advantage of the free flow of information within rural communities. Information asymmetries between borrower and lender are unimportant, and their institutional consequences—the use of collateral and interlinked contracts—are absent. Credit transactions play a direct role in pooling risk between households through the use of contracts in which the repayment owed by the borrower depends on the realization of random production shocks by both the borrower and the lender.

The analysis of rural markets and institutions in developing countries has been transformed through the application of the theory of economic behavior under conditions of incomplete markets and imperfect information. Nowhere is this more evident than in the literature on rural credit markets.¹ This literature emphasizes that because complete insurance markets are absent, credit transactions take on a special role in allowing individuals to smooth income shocks over time (see, for example, Eswaran and Kotwal 1989). It also emphasizes that because moral hazard and adverse selection are especially prevalent in credit transactions, credit markets are likely to incorporate organizational features that serve to mitigate or accommodate the problems caused by these information asymmetries.

1. See Bell (1988) and Bardhan (1989) for comprehensive bibliographies.

The author is a professor of economics at Northwestern University. He is grateful to Kaushik Basu, Robert Evenson, Karla Hoff, Barbara O'Brien, Dayo Phillip, T. N. Srinivasan, John Strauss, Duncan Thomas, and three anonymous referees for their comments and advice. He received valuable advice from the members and chairman of the Department of Agricultural Economics and Rural Sociology, Ahmadu Bello University, where he was a visiting Research Fellow. This material is based upon work supported by the National Science Foundation (grant SES-8618906), the Social Science Research Council, the Fulbright-Hays Research Abroad program, and the Yale Center for International and Area Studies.

© 1990 The International Bank for Reconstruction and Development / THE WORLD BANK.

Two organizational features have received particular attention in the literature on credit markets. The first is the pledging of collateral.² Collateral pledged in exchange for the receipt of a loan directly reduces the cost to the lender of a default on a loan; it can reduce the moral hazard associated with lending by providing an added incentive for the borrower to repay; and it can alleviate the problem of adverse selection by screening out those borrowers most likely to default.

The second institution is contractual interlinkage between markets. An interlinkage exists if two parties engage in transactions in more than one market and the terms of each transaction are set in a single contract.³ The literature concerning this contractual form has grown to the point at which "the ubiquity of interlocking transactions is now widely acknowledged" (Hart 1986, p. 177). An interlinked transaction may be a disguised form of collateral. For example, the forward sale of standing crops (a product-credit market interlinkage) is often most easily interpreted as the pledging of those crops as collateral. Alternatively, the interlinkage may serve to reduce moral hazard or adverse selection by permitting the use of the contractual terms in one transaction to alter an agent's behavior in another.⁴

This article extends contemporary research on credit markets to rural credit in Africa by reporting findings from a detailed survey of 198 households in northern Nigeria. The survey yields two major findings. First, nearly all loans are transacted within a village or kinship group. I present evidence that information asymmetries within such groups are unimportant. The quantitative unimportance of collateral and contractual interlinkage is evaluated in section III of this article as part of a broader description of the information environment surrounding credit transactions in the survey villages.

Second, I establish (in section IV) that credit contracts play a direct role in pooling risk among households in the survey area: the repayment owed by a borrower depends upon the realization of production and consumption shocks by both borrower and lender.

In preparation for the discussions of information asymmetries and risk management in sections III and IV, section I describes the survey area and survey techniques. Section II outlines the procedure through which credit contracts are made and enforced in the study area and presents summary statistics on credit transactions among the sample households.

2. See Chan and Thakor (1987). For a different approach, see Gangopadhyay and Sengupta (1987).

3. "Interlinked transactions qualitatively differ from the anonymous and systemic interdependence of economic action in competitive general equilibrium theory, and are more in the form of package deals, with the terms of one transaction contingent upon the terms in another" (Bardhan 1989, p. 237). See Bell and Srinivasan (1989) for a recent empirical study.

4. Bardhan (1989, p. 86) describes one mechanism by which this might occur: "An interlinked system of personalized transactions may serve the function of reducing some of the market costs of work monitoring, contract enforcement, and of search by making the possible discovery of dishonesty or shirking by an agent in one transaction too costly for him in terms of spillover effects threatening other transactions."

I. THE GEOGRAPHICAL SETTING

From February 1988 to February 1989, I undertook a survey designed to extend contemporary research on economic behavior in the absence of perfect information and complete markets to the analysis of rural credit in Africa. A two-stage random sampling procedure yielded fifty households in each of four randomly selected villages near the city of Zaria in a semi-arid area of Kaduna State in northern Nigeria.⁵ The size of the sample was kept small in an effort to ensure high-quality data on matters that are notoriously sensitive. The survey consisted of a series of monthly interviews with each of the household heads and (separately) his wives. The questionnaires were designed to yield a complete picture of each household's asset and debt position; an account of its credit, labor, product, asset, and asset-rental transactions over the previous month; and a range of demographic and background data. Consumption and income data were not collected. The demarcation of an appropriate unit of analysis is often difficult; this is particularly true in northern Nigeria.⁶ I adopted the traditional approach of empirical researchers in northern Nigeria and defined the household as "those people eating from one pot" (Norman and others 1976, p. 7). To be a member of the household, an individual had to eat the household food for the six-month period between two demographic questionnaires included in the survey.

The Zaria area is in the heart of one of the most dynamic and promising agricultural regions of Africa. It receives an average of 1,100 millimeters of rain per year during a wet season that lasts approximately 160 days. Rain-fed agriculture predominates, though there is also dry-season irrigated farming on lowlands bordering streams (*fadama*). Over the past decade there have been significant changes in cropping patterns (in particular, a marked shift to the use of hybrid varieties of maize) and inputs (an expansion of the use of chemical fertilizers) (Balcet and Candler 1982). The use of bullock and tractor plowing has become more prevalent, though they are still used by a minority of farmers.⁷

There is a moderate degree of involvement in the market both for the purchase of agricultural inputs and the sale of output. A total of 73 percent of the sample households produce vegetables and nonfood cash crops for the market, and 53 percent of all labor used on the sample household farms was wage

5. Two households had to be dropped during the course of the survey, leaving a final sample size of 198 households.

6. There is a large literature on Hausa family structure in which the fluidity and indefiniteness of household boundaries are documented. See especially Watts (1983), Guyer (1981), Raynaut (1977), Nicolas (1974), Goddard (1973), and Buntjer (1969).

7. Neither animal traction nor tractor plowing was in use during Norman's 1966-67 survey of three villages in the same area (Norman 1972). Currently, 15 percent of cultivated area (7 percent of plots) is plowed at least once by a tractor, and another 14 percent (9 percent) by bullock plow. Longhurst (1985) found heavier use of animal traction (45 percent of cultivated area) in a 1976 survey of one village near this area.

labor. A total of 95 percent of cultivated land was treated with modern chemical fertilizers.

The area has a diverse population, with agricultural systems ranging from farmers who keep no cattle to semisettled herders. Every household in the research villages operates a farm, which is usually composed of multiple plots (an average of five plots per household) interspersed with those of other village residents. Two to five different crops are generally intercropped on each plot. A large variety of nonagricultural occupations also exists. These include trading, the provision of transport services (via vans, motorcycles, bicycles, or donkeys), and small-scale industries such as carpentry, house building, and tailoring. The settlements are nucleated rather than dispersed, and the

Table 1. *Summary Data for the Households Studied (n = 198)*

<i>Characteristic of household</i>	<i>Sample mean</i>	<i>Standard deviation</i>
<i>Size</i>	6.2	3.3
Males aged 10–60	2.5	1.6
Household head	1.0	
All children over 10	.9	1.3
Other males over 10	.6	1.0
Females aged 10–60	1.8	1.2
Wives	1.5	.8
Children over 10	.3	.7
Young children	3.1	2.3
The elderly	.3	.5
<i>Age of head</i>	41	12.6
<i>Land</i>		
Operational holdings (hectares)	3.8	4.3
Uplands	3.3	4.0
Fadama	.5	1.0
Owned (hectares)	3.6	5.1
Uplands	3.2	4.7
Fadama	.4	1.0
<i>Value of livestock (naira)</i>		
July	4,185	22,501
Excluding 2 Fulani households	2,700	7,884
<i>Value of grain holdings (naira)</i>		
August	597	114
January	5,058	978
<i>Daily male agricultural wage (naira)</i>	19	47 ^a
<i>Loan size (naira) (n = 821)</i>	291	719
<i>Household totals, over survey period (naira)</i>		
Gross borrowing	352	1,015
Gross lending	596	2,679

Note: The exchange rate ranged from \$1 = N4 in February 1988 to \$1 = N7 in February 1989.

a. The high variability results from seasonal changes in the wage rate.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

four villages included in the study range in size from 138 to 916 households. See table 1 for summary data concerning land holdings and household demographics.

A large majority of the population of the area is Moslem, as are all but one of the 198 sample households. This fact has particular importance for a study of rural credit because Islamic law prohibits the use of fixed interest charges on loans. Investment income is prohibited if the investor does not share in the risks of the enterprise. Hence an equity investment is legal, whereas lending with a fixed interest rate is not. Fixed repayment periods are also prohibited: "And if the debtor is in difficulty, then [there should be] postponement to a time of ease" (*Koran* 2:280). The vigor with which these prohibitions are enforced is not clear. As documented below, almost no loans between individuals are made with positive explicit fixed interest rates. When asked to explain this pattern, all the respondents referred to Shari'a law. Yet individuals display no reluctance to accept loans from banks at low (but positive) fixed nominal interest rates.

II. CREDIT TRANSACTIONS

The survey data support the conventional wisdom concerning the scarcity of formal sector credit in rural Africa. Only 7.5 percent of all loans (by value) come from banks, companies, or projects. The most numerous of these were in-kind loans from the Nigerian Tobacco Company, which was promoting the cultivation of tobacco in one of the four villages. There is widespread participation, however, in both borrowing and lending in the informal credit market, as can be seen in table 2. On average, loans are held for just under three months (see figure 1). The peak borrowing period occurs near the start of the main growing season, and many loans are repaid after the first crops are harvested. The average amount of credit transacted per household over the survey year 1989-90 was approximately N1,000. This figure is of the same order of magnitude as the mean value of grain holdings when they reach their minimum just before harvest, N652. The loans, therefore, are of a scale and timing associated with short-term consumption and working capital needs. Both borrowing and lending tend to increase with wealth, as can be seen in figure 2.

Table 2. *Participation of Households in Borrowing and Lending*
(percent)

<i>Household</i>	<i>Did not borrow</i>	<i>Did borrow</i>
Did not lend	10	15
Did lend	25	50

Note: Proportion of households in each cell; $n = 198$.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

Figure 1. *Length of Loans*

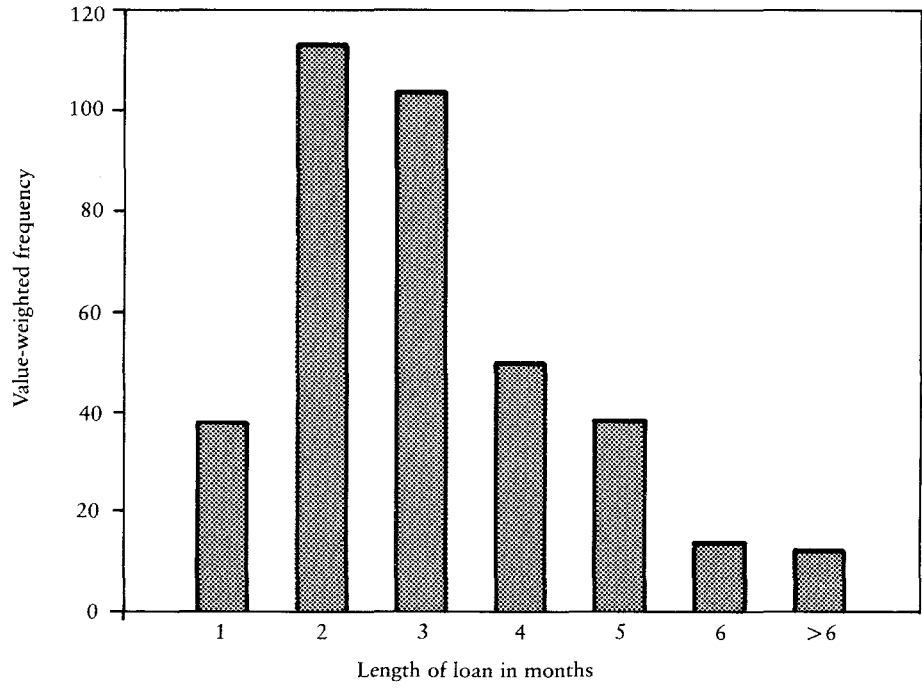
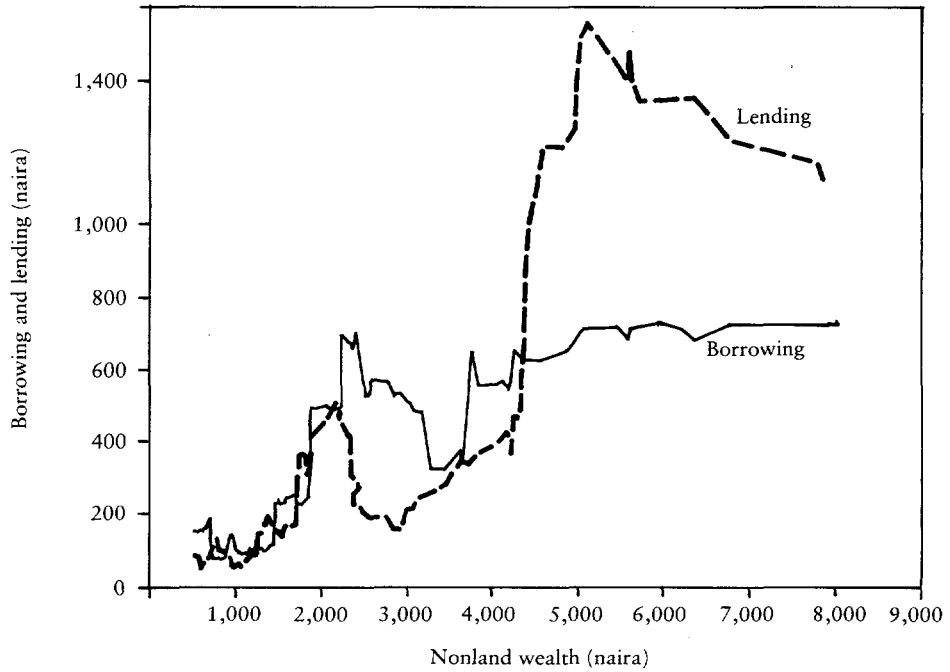


Figure 2. *Credit and Wealth*



The median (nominal) realized monthly rate of return on loans is zero, and the mean nominal monthly return (weighted by value) is -3.8 percent.⁸ After excluding those loans for which there is evidence that a default has occurred, the mean (nominal) rate of return rises to only -3.0 percent. Average monthly inflation in Nigeria over the relevant period was 3.7 percent,⁹ so the average real monthly return on these loans was -7.5 percent.

These figures, however, obscure large variations in realized interest rates. Figure 3 reports the distribution weighted by loan value. It shows that on about one-fifth of the amount lent, realized nominal monthly interest rates exceeded 7.5 percent (or 3.8 percent in real terms). There is no statistically significant difference between the returns realized on loans between relatives and on other loans. There is also no clear relationship between the length of time over which the loan was held and the monthly interest rate (see figure 4).

These loan transactions appear to be extreme in their informality. They generally occur in private, with no witnesses and no written record. They are almost always made and repaid in cash. Although the borrower and lender negotiate over the size of the loan, most (84 percent of transactions) are made without setting an explicit (nominal) interest rate or repayment date. When an explicit interest rate is set, it is almost always set at zero (15 percent of all loans). The realized rate of return on these putatively zero (nominal) interest loans, however, is no more likely to be zero than on other loans and is often quite high.¹⁰ The borrower and lender, therefore, only implicitly agree on the terms of the loan.

The fact that these transactions are loans is explicitly acknowledged, and mechanisms exist which serve to enforce the implicit obligations of both parties. The simplest and most direct penalty for a default is the exclusion of the defaulter from future opportunities to borrow from the lender. This type of mechanism has been analyzed extensively in the literature on repeated games, and it is implemented in the case of defaults on these loan transactions (see Kreps 1990, chap. 14, for an introduction). There is more than one lender available to most borrowers, however, so this particular penalty may have little force. Alternative mechanisms for enforcing credit obligations are available through appeal to community authorities. The respondents reported that the response to a perceived default was negotiation with the borrower's family, a religious leader, or the village head. Recall that the terms of the loan are only

8. The monthly return is calculated only for those loans on which some repayment has been made and for which there is no explicit promise to repay more. Returns are calculated for 71 percent of the 821 recorded loans.

9. Data from the first quarter of 1988 to the first quarter of 1989, from IMF (1989).

10. Respondents who reported an interest rate explicitly set at zero seem to have been victims of an insufficiently flexible questionnaire. Several such respondents explained to me that, as they had told the enumerator, the amount to be repaid would be exactly the amount borrowed. After further questioning, however, they acknowledged that under different future circumstances, repayments would either exceed or fall short of the initial loan value.

Figure 3. *Distribution of Returns*

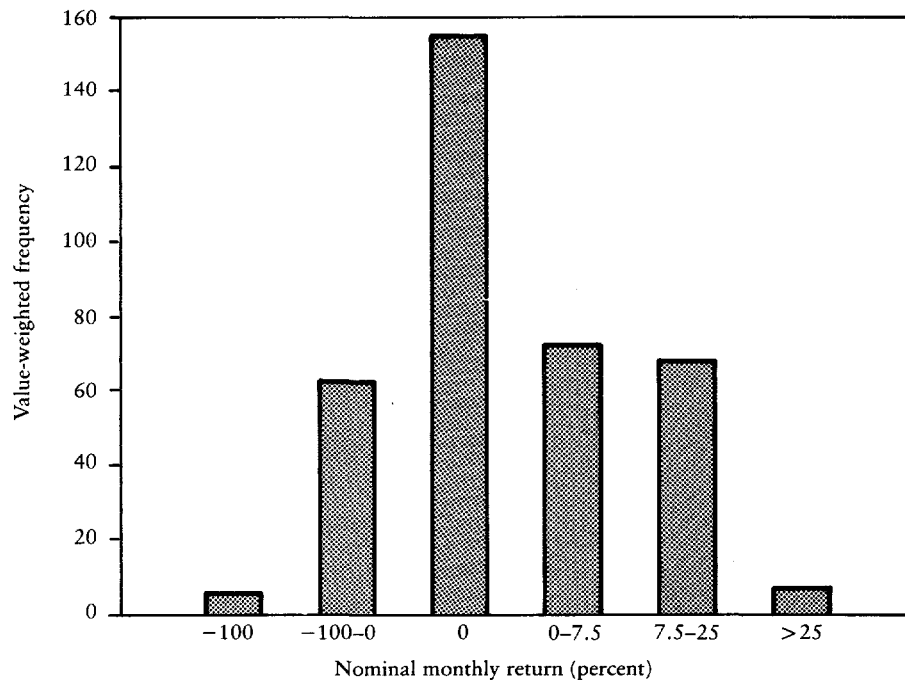
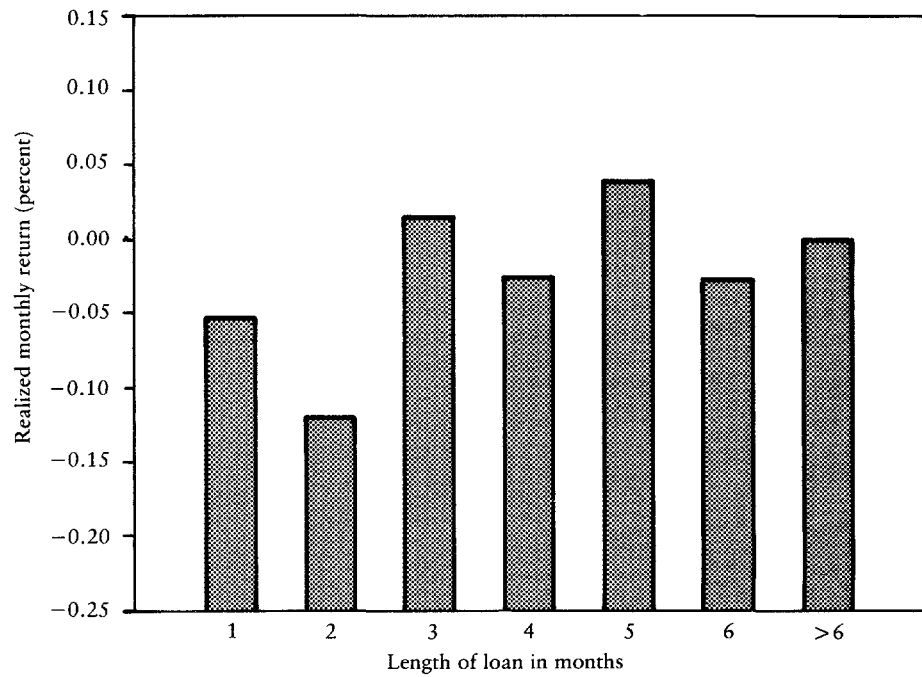


Figure 4. *Term Structure of Returns*



implicit, so the response to a default must consist of at least two stages: first, the lender must convince the authority that the borrower has not met his obligations; and second, the authority must impose a penalty. Both steps depend heavily on the fact that for the vast majority of these loans, borrower and lender are members of the same small community. The authority's decision as to whether a breach of an implicit contract has occurred must rest on the statements of the two parties involved. He must take into account the possibility of deliberate deception as well as of misunderstandings over the terms of the contract.¹¹ As a member of the same community, the authority is able to consider the reputations of both parties for honesty in previous activities in all markets and, more generally, in all types of social activity.

The penalties invoked by the authority also depend on his position as a respected figure in the community. In many cases, the possibility that he might disapprove of one's activities is sufficient to prompt a potential defaulter to meet his obligations. The possibility that he might make his finding public, either to other authority figures or to the community at large (through gossip), is a stronger incentive to meet obligations. Both of these penalties apparently impose a cost on the defaulting party. If his honesty is impugned, the defaulter may be excluded from future credit transactions, and his ability to transact in other markets may be damaged as well. Private negotiation with (and admonishment from) an authority figure was the only penalty imposed on any of the sample households during the survey period; no dispute over loan repayments was made public.

III. THE INFORMATION ENVIRONMENT

Since formal sector lenders are almost completely absent from the study area, the information flows of concern are between individuals who lend to each other. These parties are, with very few exceptions, well known to each other: 97 percent of informal sector loans by value are between residents of the same village or between relatives (see table 3).¹² A total of 65 percent of the remaining informal sector loans occur between individuals who share a long history of exchanging gifts or a long history of previous credit transactions.¹³ The respondents claimed that they knew their transaction partners well. Respondents were asked to give an account of unexpected occurrences on their transaction partners' farms and of nonregular expenditures (such as ceremonies or medical expenses) by their partners. For 82 percent of the 808 private loan transactions, the respondents were able to provide such an accounting.

11. Male pronouns are appropriate in this context because most borrowers and lenders and virtually all authorities to whom disputes are referred are men.

12. Only loans across households are counted as transactions; loans between members of the same household are excluded from the data.

13. A history of previous gift exchanges or credit transactions was defined as "long" when respondents reported more than three transactions extending over more than three years.

Table 3. *Relationship between Borrowers and Lenders*
(percent)

<i>Residency</i>	<i>Related by kinship</i>	<i>Not related by kinship</i>
Residents of the same village	37	55
Residents of different villages	5	3

Note: Proportion of loans, by value, in each cell; $n = 808$. Loans from banks and companies are excluded.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

This direct evidence that information flows freely between borrowers and lenders is complemented by the lack of indirect evidence of information asymmetries. The special contractual forms that are used in other situations to ameliorate the problems of moral hazard and adverse selection are not common in northern Nigeria.

The first question I investigated was the possibility that collateral was used to secure these loans.¹⁴ Almost all households own some land, and although land sales are prohibited by statutory law, each of the sample villages has active land sales markets. A total of 34 percent of all land owned by sample households was acquired through market transactions. These transactions are not limited to within the village; one-fifth of the land purchased by sample households was acquired from individuals who were neither residents of the same village nor relatives. Land, therefore, is available to serve as a collateral asset.¹⁵ However, collateral (usually land) is used in only 3 percent of the loans observed. The distinguishing feature of the few loans for which collateral is used is their size; the average size of a loan involving collateral is N634, as opposed to an average size of N276 for unsecured loans. Loans involving collateral are just as likely to be between members of the same family as are other loans, and respondents are even more likely to be able to provide an accounting of events on their transaction partners' farms when the loans involve collateral (96 percent of the cases) than when they are unsecured.

Contractual interlinkages, discussed above, have also been hypothesized to be common adaptations to the moral hazard implicit in many loan transactions, and empirical studies by Siamwalla and others and Bell in this issue document their high incidence in Asia.¹⁶ In these data, however, there is no evidence of interlinkage of the credit market with the land, labor, or product markets. A necessary condition for the presence of interlinkages between the credit market

14. Hill (1982) documents some use of collateral in other parts of northern Nigeria.

15. See Feder and Feeny (forthcoming) for a discussion of the suitability of land as collateral. See Hill (1982) and Shenton (1985) for details on the history and legal basis of land sales in northern Nigeria.

16. See Clough (1981, 1986) for evidence that market interlinkages are used for credit in some markets of northern Nigeria.

and other markets is the coincidence of transaction partners across pairs of markets.¹⁷ Product market transactions generally occur in markets in nearby, larger villages. Out of 1,150 product market transactions recorded, 96 percent were made with traders in the market with whom the household member had no other connection. Only 0.5 percent of the product market transactions occurred between parties who had engaged in a credit transaction previously.

Land and labor transactions occur mainly within the village, so some overlap with credit transactions is to be expected. The overlap that I found is no more than what would be expected given random assignments of transaction partners within the village. Each household had, on average, 3.65 credit transactions within the village during the sample year, whereas the average size of the four villages is 366 households. Clearly, the proportion of the village with which an average household has ever engaged in a credit transaction is higher than 1 percent; unfortunately, no data are available concerning past loans that had been repaid before the start of the survey. Of 1,920 recorded labor transactions, only 1 percent occurred between individuals who had ever lent to or borrowed from each other. Of 323 land rentals, only 3 percent previously had shared a credit transaction.

The information asymmetries that may drive market interlinkage and collateral use in other contexts do not seem to be present in this set of loans. This does not imply that the pattern of information availability is unimportant for the structure of the credit market. Information flows freely between borrowers and lenders within an extremely small geographic or social space. The fact that almost no loans are observed to cross the boundaries of this space is an indication of the advantages held by family members and village co-residents in the availability of either information or enforcement mechanisms.

IV. RISK POOLING

Wherever insurance markets are incomplete, credit markets are known to play an important role by allowing risks to be pooled over time; households borrow more when they suffer an adverse shock, and they lend more when favored with a positive shock. The free flow of information within the village and among relatives may permit credit contracts to play a more direct role in insuring against risk. A striking finding is that repayments *owed* on a loan appear to depend upon the random production and consumption shocks received by both the borrower and the lender.¹⁸ Such state-contingent contracting would allow households to pool risk more efficiently and would permit credit

17. An anonymous referee points out that the coincidence of transactions is not sufficient to establish the existence of interlinkages because transactions costs might make simultaneous contracting in more than one market optimal, even if the terms of the different contracts are set independently.

18. Actual repayments of loans will generally depend on the random shocks received by the borrower, as long as defaults are possible. Here, *owed* repayments are at issue.

transactions to conform to the Islamic prohibition of fixed interest charges. The easy availability of information implies that a lender need not engage in statistical inference in order to detect a default on a state-contingent contract, because the degree of compliance with the contract is known to both parties.

I hypothesize that these credit contracts are contingent upon random production and consumption shocks that are observable to the borrower, the lender, and to the community authorities who will enforce the obligations of both contracting parties. Examples of such events are flooding, wind damage to crops, or insect infestations on the production side, and medical problems on the consumption side. If these events are common knowledge to the community, then the enforcement of contracts which are contingent upon their realization poses no special difficulty. If the occurrence of these events is exogenous to the agents' actions, or if the actions which affect their probability of occurrence are observable, then no moral hazard issue arises.

The institutional framework within which these contracts are made and enforced is well suited to state-contingent contracting. As noted in section II, contractual terms are set implicitly and are enforced by community leaders. At least two distinct types of state-contingent contracting could be supported in this environment. The first would permit renegotiation of loans after the realization of any random shocks. With rational agents this is equivalent to explicit *ex ante* state-contingent contracting, and can be enforced provided that the realization of the shocks is common knowledge. Second, there may be implicit but commonly known community standards which require adjustments to loan repayments depending upon the realization of the random shocks. This type of contract would limit the flexibility of the borrower and lender in making the loan contract, but would economize on transaction costs and integrate well with the community-based enforcement mechanisms. In this section I will focus on establishing a case for the presence of state-contingent contracting; I will not attempt to distinguish between these alternative mechanisms through which it may be achieved.

Striking preliminary evidence in support of the hypothesis of state-contingent terms is revealed by data on the willingness of the lender to enter into another credit contract with the borrower. If the enforcement mechanism for these contracts includes the exclusion of defaulters from future borrowing, then data on the future availability of loans should provide information on the incidence of default. If contracts are *not* state-contingent, then a judgment that a borrower has defaulted depends upon the realized interest rate (and, of course, on the unobserved promised terms), but *not* on the state of nature conditioned on the realized interest rate. However, as shown in table 4, for a given realized interest rate, a borrower is less likely to be considered in default if he was subject to an adverse production or consumption shock.

The simplest form of this loan contract, in which repayments depend upon the outcome of a particular project, is analogous to sharecropping in the land market. More generally, both parties may understand that if the debtor house-

Table 4. *Defaults by and Shocks to Borrowers*

Loan	Realized monthly nominal return, r			
	$r < 0$	$r = 0$	$0 < r < 0.05$	$r > 0.05$
Total loans (number) ^a	108	194	147	140
Of this total, those in default (number)	16	20	6	2
(percent)	(15)	(11)	(4)	(1)
Loans (number) for which borrower subject to an adverse shock ^b	38	118	19	41
Of this total, those in default (number)	1	2	0	0
(percent)	(2)	(2)	(0)	(0)
Loans (number) for which borrower not subject to an adverse shock	70	76	127	99
Of this total, those in default (number)	15	18	6	2
(percent)	(22)	(24)	(5)	(2)

Note: The difference between the within-interval proportions is significant at the 0.01 level, using the following test: Let p_{ins} , $i = 1, \dots, 4$ be the proportion of borrowers who received no shock who are judged to be in default as indicated by the statement that no further loans will be available. Let p_{is} be the similarly defined proportion of borrowers who received a shock who are judged to be in default. A chi-square test of the hypothesis that $p_{ins} = p_{is}$, for $i = 1, \dots, 4$ against the open alternative yields a test statistic of 30.57. The hypothesis is rejected at the 0.01 level.

a. All loans are weighted by value.

b. A borrower is judged to have received an adverse shock if he reported an unexpected adverse event on any of the fields he farms during the term of the loan. Common events were flooding, wind damage, or infestation by insects. A borrower who is *not* a respondent (that is, the respondent was the lender) is judged to have received an adverse shock if the respondent reported that an unexpected, serious event occurred in the borrower household during the term of the loan. Common events include those just mentioned, as well as medical problems, rain damage to houses, and other "household emergencies."

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

hold's economic fortunes are good, the loan will be repaid with a relatively high interest rate; but if the household suffers an unexpected negative shock, the interest rate will be lower. The survey data show that realized interest rates are lower and repayment periods are longer for debtor households who have experienced adverse shocks (table 5). This observation is consistent with conventional credit contracts because those who experience adverse shocks are more likely to default. The evidence that repayments respond not only to the entire circumstances of the debtor household, but also to those of the creditor household (table 5), however, is not consistent with conventional models. These transactions, therefore, are not analogous to equity investments by the lender in the borrower's activities. They are true risk pooling arrangements between the two households.

It is interesting to note that tables 4 and 5 can be replicated for loans between relatives (see tables 6 and 7). The statistical significance of the results declines as a result of the reduction in sample size, but the pattern remains the same. Loans involving relatives, overall, are just as likely to be considered in default as are other loans, and the terms of loans between relatives seem to be just as responsive to realizations of random shocks.

Table 5. *Realized Terms versus Borrower and Lender Shocks Received*

Adverse shock to: ^a	Sample means		
	Monthly interest rate (percent)	Simple interest rate (percent)	Repayment period (days)
<i>Borrower</i>			
No shock	0.5	20.4	67
Shock	-4.0	-0.6	72
Impact of shock on mean <i>t</i> -statistic ^b	Lower (1.58)	Lower (2.20)	Longer (1.03)
<i>Lender</i>			
No shock	-7.5	-5.0	89
Shock	2.6	11.8	80
Impact of shock on mean <i>t</i> -statistic ^b	Higher (4.56)	Higher (3.06)	Shorter (1.89)

a. The definition of adverse shock is that of table 4, broadened to include lenders.

b. The impact of the shocks is judged by a two-sided *t*-test of equal means ($\mu_{\text{no shock}} - \mu_{\text{shock}}$). The absolute value of the *t*-statistic is in parentheses.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

The flexibility of these contractual forms allows for more efficient risk sharing between the debtor and the creditor than is possible with conventional fixed-interest contracts. Access to conventional loans permits a household to consume its permanent income; the consumption effects of an unexpected shock to income (and therefore to wealth) can be spread over a period of time. In contrast, state-contingent contracting offers a mechanism through which

Table 6. *Defaults by and Shocks to Borrowers, for Loans between Relatives Only*

Loan	Realized monthly nominal return			
	$r < 0$	$r = 0$	$0 < r < 0.05$	$r > 0.05$
Total loans (number) ^a	19	85	66	34
Of this total, those in default (number) (percent)	2 (12)	8 (9)	0 (0)	0 (1)
Loans (number) for which borrower subject to an adverse shock	6	42	7	23
Of this total, those in default (number) (percent)	0 (2)	0 (1)	0 (0)	0 (0)
Loans (number) for which borrower not subject to an adverse shock	14	43	59	12
Of this total, those in default (number) (percent)	2 (16)	8 (18)	0 (0)	0 (1)

Note: The difference between the within-interval proportions is significant at the 0.01 level, using the following test: Let $p_{i_{ms}}$, $i = 1, \dots, 4$ be the proportion of borrowers who received no shock who are judged to be in default as indicated by the statement that no further loans will be available. Let p_{is} be the similarly defined proportion of borrowers who received a shock who are judged to be in default. A chi-square test of the hypothesis that $p_{i_{ms}} = p_{is}$, for $i = 1, \dots, 4$ against the open alternative yields a test statistic of 7.39. The hypothesis can not be rejected at the 0.10 level.

a. All loans are weighted by value.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

Table 7. *Realized Terms versus Borrower and Lender Shocks Received, for Loans between Relatives Only*

<i>Adverse shock to:</i> ^a	<i>Sample means</i>		
	<i>Monthly interest rate (percent)</i>	<i>Simple interest rate (percent)</i>	<i>Repayment period (days)</i>
<i>Borrower</i>			
No shock	-0.7	8.4	69
Shock	-5.6	-1.7	72
Impact of shock on mean <i>t</i> -statistic ^b	Lower (0.89)	Lower (0.69)	Longer (0.32)
<i>Lender</i>			
No shock	-0.7	4.4	84
Shock	0.1	1.6	80
Impact of shock on mean <i>t</i> -statistic ^b	Higher (0.37)	Lower (0.54)	Shorter (0.46)

a. The impact of the shocks is judged by a two-sided *t*-test of equal means ($\mu_{\text{noshock}} - \mu_{\text{shock}}$). The absolute value of the *t*-statistic is in parentheses.

Source: Survey data, available at a nominal reproduction charge upon written request to the author.

both borrowers and lenders can neutralize the unexpected shock itself so that it has no effect on wealth. Only certain shocks, however, can be insured against through this market. In general, the loans described in this article are concentrated within single villages, and thus can serve to pool only the idiosyncratic shocks faced by households within the village. To the extent that these loan transactions do not cross village borders, they can contribute almost nothing to a household's efforts to respond to a shock that affects the village as a whole.¹⁹

To what extent do the shocks affecting these households originate in idiosyncratic as opposed to villagewide events? An analysis of the variation in farm yields across sample households indicates that of that proportion that can be explained by some combination of random shocks and village-level effects, 42 percent result from idiosyncratic shocks, and 58 percent result from a combination of shocks that affects the entire village and other village-level effects.²⁰ In principle, therefore, a significant component of the total risk faced by these households can be insured against through state-contingent loan contracting with other households within the same village. Furthermore, this contractual form provides a mechanism for circumventing legal restrictions on credit transactions.²¹ The existence of these contracts in an information environment in which they are feasible is, therefore, not surprising.

19. Some evidence is presented below that in one of the four sample villages a significant amount of credit is transacted with individuals not resident in the village.

20. The results are derived from a cross-section regression of yields on village dummy variables and the self-reported shock variables used in tables 4 and 5.

21. Shari'a law, strictly interpreted, requires that risk be shared in proportion to the capital contributed to an enterprise (see Schacht 1936). Thus not any state-contingent contract is legal. This amounts to a prohibition on the payment of risk premia (which are implicit in any conventional credit contract, and in many forms of state-contingent contracting).

More puzzling is the almost complete absence of credit transactions which cross community boundaries. This is an environment characterized by seasonal demands for finance that are highly positively correlated over small areas, and the analysis above indicates that there is a large component of yield risk that cannot be insured against within the village. It would seem that there could be high returns available to financial intermediaries able to move finance over wide areas.²² The absence of direct lending from outside the community can be explained by the high information costs of such transactions and by the existence of village-based traders who provide financial intermediation.

The strict information requirements of state-contingent contracts place the outside lender at a severe disadvantage. Because he cannot observe the production shocks, the outside lender is faced with a classic monitoring problem, and the borrower has an incentive to claim a more adverse shock than he actually received. Leaving aside the monitoring problem, unless an outside lender can exclude a borrower from future access to other lenders, he cannot impose a strong penalty on a borrower whom he considers to be in default. These informational disadvantages raise the cost of credit provided by outside lenders.

These costs could be reduced by a contravention of the requirements imposed by Islam or by the development of alternative institutions (such as interlinkages with other markets) within which fixed interest charges can be hidden. A fixed-term contract would reduce the monitoring difficulties faced by outside lenders, and the availability of assets that could serve as collateral could alleviate the problem of contract enforcement. Land is available to serve as collateral for borrowing from outside lenders because, as noted in section IV, both the rental and sales markets in land are active.

An important element in the explanation for the puzzling absence of outside lenders might be found in the role that village merchants play in channeling outside credit to the village. In northern Nigeria, the Hausa tradition of long-distance trading has led to a class of merchants, dispersed through many villages, who have long-term relations with other merchants throughout Nigeria and beyond. These merchants provide market intelligence, advance short-term trading credit, and act as agents for each other. This intensive contact enables them to enter into information-intensive state-contingent credit contracts of the sort described above. Therefore, these village-based traders with wide connections can act as pipelines for outside credit to enter the village, increasing the volume of locally available credit and keeping the cost of credit below the threshold which would induce the entrance of outside lenders.

The fact that village-based traders do at times use their access to credit from other traders to lend to local borrowers is fairly certain. It was confirmed to me in interviews with six such traders in three of the four sample villages, and it corresponds to Clough's (1981, 1986) description of merchant activities in

22. See Binswanger and McIntire (1987, pp. 78–79, 88–89) for a theoretical account of the development of a geographically widespread credit market in such circumstances.

Kaduna State. There is also some indication of its importance in the sample data. Of the 198 household heads in the sample, three are traders who have active relationships with traders in other locations.²³ Each of the three made far more loans than average, accounting for 37, 25, and 17 percent of the total value of loans made by the fifty sample households in their villages.²⁴ One of the three also had large loans from outside traders, accounting for 11 percent of all of the borrowing by sample households in that village. Although too much should not be made of the behavior of one individual, it seems that at least in one village a significant amount of credit flows through this trader across village boundaries.

The degree to which this phenomenon is responsible for the absence of outside lenders in the local credit market is less obvious, because there are other potential explanations. It is possible that contravention or circumvention of the Shari'a prohibition of fixed interest rates is impossible. This would make the information barrier faced by outside lenders almost insurmountable. It is also possible that even peak demand for credit is small enough, relative to local supply, that "pipeline" credit from local traders is not needed to keep rents below the critical value that would induce outside lenders to enter the market. An investigation over several years would be needed to make a definitive statement regarding the importance of local traders' access to external capital as a mechanism for excluding direct lending by external agents. The critical test would be to observe credit transactions during a crisis year in order to see how borrowing by locally resident traders from outside traders and local lending by resident traders respond to peak levels of local demand for credit. No such test is possible with these data; the study year was characterized by generally better than average yields (rainfall was just over the long-run average, and well-distributed).

V. SUMMARY AND IMPLICATIONS

The rural credit market in northern Nigeria appears to be significantly different from its counterparts in other areas of the world and from the idealized markets that appear in theoretical work on the subject. There is only minimal use of collateral and no evidence of contractual interlinkage with other markets. Contractual mechanisms to alleviate the difficulties posed by information asymmetries are not necessary because credit flows through paths that take advantage of the extremely free flow of information within a rural community.

23. These traders do little buying or selling within their own villages. They purchase and sell wholesale lots of grain at larger markets, and they have business ties with traders as far away as Sokoto (400 kilometers to the northwest) and Lagos (more than 750 kilometers away).

24. Credit transactions involving these households were no more likely to overlap with transactions in other markets than were those of other sample households. Traders are not sources of interlinked credit.

In this information environment, credit transactions can be viewed as state-contingent contracts that allow direct risk pooling between creditor and debtor and that conform to the prohibition on fixed interest charges by Shari'a law. There is some evidence in one village that these information-intensive contracts are spread over a wide geographical area by a network of village-based long-distance traders.

The flexibility of the state-contingent credit contracts presents an exceptional challenge to potential formal sector lenders. They have neither the access to information nor (generally speaking) the administrative flexibility necessary to make state-contingent loans. Therefore, they cannot compete directly with lenders from within the community. The existence of assets that could serve as collateral for fixed-interest loans may provide an opportunity for institutional change that could be exploited by formal sector lenders. In addition, the conditions which permit state-contingent loan contracting within rural communities, namely the free flow of information within the village and the availability of mechanisms to enforce agreements between village residents, may also allow the design of peer monitoring systems to support lending by formal sector institutions to groups of rural households.

REFERENCES

- Balcet, Jean-Claude, and Wilfred Candler. 1982. "Farm Technology Adoption in Northern Nigeria." World Bank Western Africa Projects Department. Washington, D.C. Processed.
- Bardhan, P., ed. 1989. *The Economic Theory of Agrarian Institutions*. Oxford, England: Clarendon Press.
- Bell, Clive. 1988. "Credit Markets, Contracts, and Interlinked Transactions." In Hollis Chenery and T. N. Srinivasan, eds., *Handbook of Development Economics*. New York: North-Holland.
- Bell, Clive, and T. N. Srinivasan. 1989. "Interlinked Transactions in Rural Markets: An Empirical Study of Andhra Pradesh, Bihar, and Punjab." *Oxford Bulletin of Economics and Statistics* 51: 73-83.
- Binswanger, Hans, and J. McIntire. 1987. "Behavioral and Material Determinants of Production Relations in Land-Abundant Tropical Agriculture." *Economic Development and Cultural Change* 36: 73-99.
- Buntjer, B. 1969. "The Changing Structure of Gandu." Ahmadu Bello University. Zaria, Nigeria. Processed.
- Chan, Y. S., and A. Thakor. 1987. "Collateral and Competitive Equilibria with Moral Hazard and Private Information." *Journal of Finance* 62: 345-63.
- Clough, Paul. 1981. "Farmers and Traders in Hausaland." *Development and Change* 12: 273-92.
- . 1986. "The Social Relations of Grain Marketing in Northern Nigeria." *Review of African Political Economy* 34: 16-34.
- Eswaran, M., and A. Kotwal. 1989. "Credit as Insurance in Agrarian Economies." *Journal of Development Economics* 31: 37-53.

- Feder, G., and D. Feeny. Forthcoming. "Theory of Land Tenure and Property Rights." *World Bank Economic Review*.
- Gangopadhyay, S., and K. Sengupta. 1987. "Usury and Collateral Pricing: Towards an Alternative Explanation." *Cambridge Journal of Economics* 11: 47-54.
- Goddard, A. 1973. "Changing Family Structures among the Hausa." *Africa* 43: 207-18.
- Guyer, J. 1982. "Household and Community in African Studies." *African Studies Review* 24: 87-137.
- Hart, G. 1986. "Interlocking Transactions: Obstacles, Precursors, or Instruments of Agrarian Capitalism?" *Journal of Development Economics* 23: 177-203.
- Hill, P. 1982. *Dry Grain Farming Families*. Cambridge, England: Cambridge University Press.
- IMF (International Monetary Fund). 1989. *International Financial Statistics*. Washington, D.C.
- Kreps, D. 1990. *A Course in Microeconomic Theory*. Princeton, N.J.: Princeton University Press.
- Longhurst, R. 1985. "Farm Level Decision Making in a Northern Nigerian Village." Ahmadu Bello University, Samaru Miscellaneous Paper 106. Zaria, Nigeria. Processed.
- Nicolas, G. 1974. "La Pratique traditionnelle du crédit au sein d'une société subsaharienne (vallée de Maradi, Niger)." *Cultures et Développement* 6, no. 4.
- Norman, D. 1972. "An Economic Survey of Three Villages in Zaria Province: 2. Input-Output Study, Vols. i. text and ii. Basic Data and Survey Forms." Ahmadu Bello University, Samaru Miscellaneous Paper 37. Zaria, Nigeria. Processed.
- Norman, D., J. Fine, A. Goddard, W. Kroeker, and D. Pryor. 1976. "A Socio-Economic Survey of Three Villages in the Sokoto Close-Settled Zone." Ahmadu Bello University, Samaru Miscellaneous Paper 64. Zaria, Nigeria. Processed.
- Raynaut, C. 1977. "Aspects Socio-économiques de la préparation et de la Circulation de la Nourriture dans un Village Hausa (Niger)." *Cahiers d'Etudes Africaines* 68: 569-97.
- Schacht, Joseph. 1936. "Riba." *Encyclopedia of Islam*. London: Luzac and Lo.
- Shenton, R. 1985. *The Development of Capitalism in Northern Nigeria*. Toronto: University of Toronto Press.
- Watts, M. 1983. *Silent Violence: Food, Famine and Peasantry in Northern Nigeria*. Berkeley: University of California Press.

The Thai Rural Credit System: Public Subsidies, Private Information, and Segmented Markets

Ammar Siamwalla, Chirmsak Pinthong, Nipon Poapongsakorn, Ploenpit Satsanguan, Prayong Nettayarak, Wanrak Mingmaneeakin,
and Yuavares Tubpun

Thailand has sought to increase farmers' access to credit by government intervention. In 1966 it created a government agricultural bank to lend solely to farm households, and beginning in the late 1970s it required commercial banks to lend heavily in the rural sector, either directly or by making deposits in the agricultural bank. The result was an enormous expansion of credit in the rural sector. But because formal lenders were either unable or unwilling to solve the information problems involved in the broad range of rural credit transactions, the informal credit sector (which charged interest rates many times higher than the formal sector) continued to thrive. Using household surveys and surveys of moneylenders, this article provides a detailed analysis of the ways in which lenders in the informal sector have solved the information problems of providing credit. The authors argue that the informal sector is competitive, and that high interest rates reflect high information costs, not the scarcity of funds.

This article reports on a set of investigations of the impact of Thai government policies to expand bank lending in the rural sector. Their purpose was to increase farmers' access to capital and reduce their dependence on informal lenders. Fifteen years after the principal government measures were introduced, we hope to be able to answer several questions: How has the expansion of formal sector lending affected the informal sector? Did the increase in the supply of formal credit reduce the business of informal lenders and lower interest rates in the informal market? What has been the performance of the formal credit system in terms of coverage, efficiency, and incidence?

Lacking time-series data on the informal sector, we cannot give a direct answer to these questions. But we can with confidence say that the informal lenders are still very much alive. By examining the behavior of the rural credit market at the present time, we can throw an indirect light on what transpired over the last fifteen years. Our main findings are the following:

- On the basis of our 1984-85 survey of households and moneylenders,

Ammar Siamwalla is president, Thailand Development Research Institute. The other authors are members of the economics faculty at Thammasat University, Bangkok, Thailand.

© 1990 The International Bank for Reconstruction and Development / THE WORLD BANK.

credit from the banking system and cooperatives provided 40 percent of the total credit reported, compared with (very roughly) 10 percent in 1975. But it is impossible to determine whether the absolute volume of informal lending has increased or decreased in the past fifteen years. Almost 75 percent of those active in the credit market still used the informal sector; in many cases, those households also used the formal sector during the survey period. The persistence of the informal sector is the result of the rich variety of contractual relations that enable informal lenders to solve information problems that are currently beyond the ability of the banks and cooperatives.

- The formal sector has evolved a very cost-effective method of channeling credit to the rural sector through its peer monitoring system. But loans provided under this system are only short-term and reach primarily farmers with above average incomes. The credit needs of poor farmers are still served by the informal market or not at all.

- Neither the formal sector nor nonresident informal lenders appear able to provide consumption loans needed in periods of bad harvests or low output prices. Resident lenders also are not able to make these loans because their financial state covaries with their borrowers'.

- Real interest rates in the informal sector have been fairly stable at least for the last two decades despite changes in government credit policies and varying monetary policies.

From our analysis of the Thai rural credit market, we draw the implication that mere injection of funds into the rural areas does not lower informal sector interest rates or drive informal lenders out of business; funds are not the scarce factor. The injection of funds into the Thai rural credit market after 1976 did not achieve its objective of providing low-cost funds for most credit needs, although it was successful in the (very important) market for working capital. Despite repeated attempts, the Bank for Agriculture and Agricultural Cooperatives (BAAC) has been unsuccessful in expanding its scope of activities. A successful formal credit program that can compete with informal lenders over a broad range of their activities requires innovations in institution-building to compete with the information-solving devices in place in the informal rural sector.

This article is in six sections. After describing our data sources (section I), we analyze the structure of the rural credit system (section II) and the rich variety of ways in which different lenders solve their selection, monitoring, and enforcement problems (section III). We present results of a regression analysis of informal interest rates (section IV). In a brief critique of the theoretical literature, we argue that the extant theoretical tools, which focus on contractual relations between anonymous lenders and borrowers, do not fit the highly personal informal market in Thailand (section V). In our concluding section, we comment on the efficiency and distributional consequences of the Thai government policies for rural credit.

I. DATA SOURCES

Available secondary sources provide consistent information only on formal sector credit activities. For our study, we undertook three new surveys—two surveys mostly in Nakhon Ratchasima province (hereafter NR), and one survey in six provinces across Thailand. NR province, although officially a part of the impoverished Northeastern region, is close to the Central Plains and therefore somewhat more prosperous than its Northeastern neighbors. It is also Thailand's largest province and has within its borders a wide variety of physical and socioeconomic environments. The scope of our three studies was as follows:

- *Household survey of fifty-two villages, NR province, 1985.* The survey covered the economic activities of 1,600 rural households, including their borrowing activities but not their lending activities. The latter were excluded as we felt that to raise such sensitive issues in a questionnaire would endanger the quality of the data in other areas, as well.

- *Survey of moneylenders in six villages, NR province, 1984–85.* We sent six researchers to live in six villages for about six to eight weeks, using informal methods to analyze in depth the social relations and borrowing and lending activities within the villages and with people outside. This approach enabled the research team to identify the key lenders inside the villages and to gain their confidence. Two principal researchers then interviewed these lenders in depth to gauge their method of procedure. At no time did we attempt to get a precise measure of the size and turnover of these lenders' activities—the price we gladly paid to get valuable information that would not have been available otherwise.

- *National survey of informal interest rates, fourteen villages in ten provinces of Thailand, 1987.* To obtain information on regional variations in rural interest rates in the informal credit market, enumerators lived for two weeks in each village and administered a survey questionnaire to a total of 293 randomly selected borrowers and 37 lenders in the last five days of their stay.

II. STRUCTURE OF THE THAI RURAL CREDIT MARKET

The main factor separating formal from informal lenders is that the former are generally bureaucratic organizations within which there could be problems of monitoring and control. Informal lenders tend to be individuals or husband-and-wife teams. In our surveys we came across only one category of lender that was difficult to classify—sellers of durable goods on the installment plan. In many but not all instances they are large-scale, bureaucratically run companies. We chose to treat them as informal lenders. This particular choice was convenient in that it grouped together in the informal sector all lenders who receive no subsidies, and into the formal sector all subsidized lenders to rural households.

Historical Overview of the Formal Sector

Beginning in 1916, the government of Thailand has experimented with different institutional frameworks to provide cheap credit to the rural sector. The method usually employed was to encourage farmers to set up credit cooperatives to which the government would provide loans, with the regular government agencies responsible for disbursing to and collecting from the cooperatives. Typically the default rate would be high and the finance would dry up after a few years. In 1966, the government created the Bank for Agriculture and Agricultural Cooperatives (the BAAC), a specialized financial institution to provide loans directly to farm households as well as to the cooperatives.¹ Between 1966 and 1974, the BAAC grew at moderate speed and succeeded in establishing branches in 58 out of Thailand's 71 provinces (Mingmaneeakin 1988, p. 123).

Radical changes took place in 1975. The 1973 departure of a military-dominated regime had ushered in a more democratic government. The countryside was the scene of intense struggles for the proverbial "hearts and minds" between the Bangkok government and the Communist Party of Thailand. The new democratic government was under pressure to transfer resources to the rural areas. In August 1975, in the middle of the planting season for most major agricultural crops, the Bank of Thailand sent a memorandum to all commercial banks, requesting each bank to lend to farm households an amount equal to at least 5 percent of its total stock of loans and advances outstanding at the end of 1974. Should any bank find it impossible to lend the full amount, it was to make a 12-month deposit of the remaining sum with the BAAC.²

At the same time, the BAAC, a public enterprise under the Ministry of Finance, was ordered to expand its loan portfolio to 3.5 billion baht from the level of 2.65 billion baht lent out in 1974 (billion = 1,000 million; Mingmaneeakin 1988, p. 84).³ Thus both the commercial banks and the BAAC found themselves suddenly having to extend a vast amount of new loans to farmers. The commercial banks, particularly the smaller ones, were unable to meet the new lending requirements. The BAAC consequently received substantial deposits from them and had to expand its operations very quickly (see table 1, column 8). The rural credit system was entirely transformed by this policy.

1. The BAAC's mandate is to lend to farm households and for agricultural activities. It is now trying to lend to nonagricultural activities of farm households.

2. In 1975, the Bank of Thailand had no legal authority to impose selective credit control. It could do so only after an amendment to the Commercial Bank Act in 1979. This change, however, did not cause the central bank to impose this requirement as a legally mandated regulation. Its preferred style of regulation in this matter remains what it calls "moral suasion."

3. In 1985, approximately 25 baht equaled one U.S. dollar. Between 1955 and 1981, the baht fluctuated between 20 and 21 baht to the dollar, with the country practicing a relatively open trading regime. The domestic inflation rate therefore corresponds fairly closely to the dollar inflation rate, reaching double digits in the aftermath of the two oil shocks, but staying at fairly low levels after that, including in 1981 and again in 1984 when there were devaluations of 15 percent.

Table 1. *Targets and Performance of Commercial Banks in Agricultural Loans, 1975-85*
(millions of baht)

Year	Commercial banks							
	Target (1)	Percentage of deposits (2)	Direct lending ^a (3)	Deposits with BAAC (4)	Total agricultural loans (5)	Deposits in central bank ^b (6)	Excess (+) or shortfall (-) =(5)+(6)-(1) (7)	BAAC, Total agricultural loans (8)
1975	4,333.3	5	2,233.6	1,670.8	3,904.4	n.a.	-428.9	4,556.1
1976	6,139.0	7	3,810.9	3,160.6	6,971.5	n.a.	+832.5	6,554.6
1977	9,647.0	9	5,891.8	4,528.0	10,419.8	n.a.	+772.8	8,280.2
1978	11,771.0	9	8,099.5	5,511.4	13,610.9	n.a.	+1,839.9	10,207.8
1979	17,322.4	11	9,970.0	6,330.1	16,300.1	n.a.	-1,022.3	11,698.6
1980	19,208.7	11	11,553.1	7,000.3	18,553.4	1,230.0	-655.3	13,448.3
1981	23,649.3	11	14,562.3	7,803.9	22,366.2	1,230.0	-1,283.1	15,208.3
1982	28,293.7	11	20,140.4	8,405.2	28,545.6	1,096.1	+251.9	17,013.7
1983	35,330.0	11	28,613.2	8,806.0	37,419.2	765.0	+2,089.2	18,271.4
1984	44,340.9	11	35,915.4	9,534.5	45,449.9	656.6	+1,109.0	21,078.9
1985	53,819.5	11	37,726.7	10,685.2	48,411.9	n.a.	-5,407.6	23,308.8
1986	60,347.6	11	39,681.7	11,112.8	50,794.5	n.a.	-9,553.1	—

n.a. Not applicable.

—Not available.

a. Excluding loans to agribusinesses.

b. In 1980, commercial banks were unable to lend the required amount to farmers and the BAAC was willing to accept only part of the shortfall for deposit, so the banks were required to deposit at the Bank of Thailand.

Source: Bank of Thailand, cited in Satsanguan (1989, p. 90).

After 1976, the commercial banks' required lending to farm households was gradually increased until it stabilized in 1979 at 11 percent of total deposits. This requirement appears to make the commercial banks the key source of funds for the agricultural sector. The official figures in table 1 show, for example, that at the end of 1984, commercial banks' direct loans to farm households were 70 percent higher than the BAAC's. Of the BAAC lending, 45 percent was financed by the commercial banks.

The official figures, however, exaggerate commercial banks' direct lending to farm households. The central bank's monitoring of the quasi-regulation it imposed on the commercial banks is extremely lax. The central bank follows up on the implementation of its policies not by audits, but only through occasional general studies. The central bank's approach is in line with the position that it has maintained all along, namely, that this measure is enforced through "moral suasion," not regulation. Commercial banks have found it prudent to go along substantially with this pretense, as the central bank has considerable discretionary power in many other areas, for example, in the number of new branches each of them may open.

The consequence is that the commercial banks have tended to include more loans under the agricultural category than would be warranted by a strict definition of the term. The size of the exaggeration may be gleaned from our

statistical survey of NR province, which shows that in April 1985 the outstanding debt of rural households to the BAAC was higher than that owed to the commercial banks in the ratio of 4 to 3. The absolute figures for the BAAC loans to farmers according to the BAAC and according to our sample survey are of the same order to magnitude. The figures submitted by the commercial banks to the Bank of Thailand, however, show the amount owed to them by agricultural households (a narrower category than rural households) of NR province to be more than *twice* that owed to the BAAC, and about twice what our survey indicates (Poapongsakorn 1988, p. 26). In one of its studies, the Bank of Thailand, tracing from the actual transactions classified as agricultural loans by the banks, estimates the degree of exaggeration to be roughly 25 percent (Satsanguan 1988, p. 115).

Aside from the exaggeration of the relative importance of the commercial banks as a result of sheer misreporting, there is also an exaggeration of its impact in terms of the number of farm households affected. In our survey, the average size of the commercial banks' loans was three times as large as the BAAC's (see table 2). The number of rural households with BAAC loans was higher than that with commercial bank loans in the ratio of 4 to 1 (see table 3).

The BAAC also lends to cooperatives. Despite (perhaps because of) considerable efforts put into these institutions by the government and lately by the BAAC, the performance of the credit cooperatives has always been poor. The default rate was high, and therefore the number of farmers reached dwindled rapidly after the initial flush of lending. From our statistical survey of NR province, during 1984–85 cooperatives disbursed 20 percent of the amount borrowed by NR farm households from formal institutions. Almost all the funds for these loans came from the BAAC (Poapongsakorn 1988, p. 33).

Table 2. *Size of Loan per Transaction, Nakhon Ratchasima Province, 1984–85*
(baht)

<i>Sector</i>	<i>Average size of transaction</i>
<i>Formal</i>	11,000
BAAC	8,480
Commercial banks	23,462
Cooperatives	8,348
<i>Informal^a</i>	6,360
Cash loans	6,986
Suppliers' credits	1,246
Installment loans	21,965

a. Excludes loans of less than 100 baht (\$4), which are mostly loans contracted when food and household goods are purchased from a general store on credit, with repayment due at harvest time.

Source: 52-village survey of 1,600 rural households in Nakhon Ratchasima Province, tabulated in Poapongsakorn (1988, p. 35).

Table 3. *Characteristics of Households Borrowing from Formal and Informal Sectors, Nakhon Ratchasima Province, 1984–85*

<i>Sector or source of loan</i>	<i>Number of households (1)</i>	<i>Average assets (baht) (2)</i>	<i>Average gross income^a (baht) (3)</i>	<i>Average net income per capita (baht) (4)</i>
<i>By sector</i>				
Borrowers from formal sector only	43,743	188,697	45,558	4,141
Borrowers from informal sector only	88,145	126,754	30,626	3,171
Borrowers from both sectors	26,671	204,702	47,673	4,413
<i>Nonborrowers</i>				
Unable	4,670	116,927	25,016	2,583
Unwilling	111,976	145,022	32,400	4,094
<i>By source of loan in formal sector</i>				
BAAC	31,272	191,109	45,105	—
Commercial banks	7,902	202,298	82,890	—
Cooperatives	11,521	198,538	34,545	—
Farmers' associations	430	268,945	27,058	—
Others	1,580	109,164	50,367	—

—Not available.

Note: All figures extrapolated to province level.

a. Gross income is income gross of farm production costs. This measure is useful when considering demand for credit.

Source: 52-village survey of 1,600 rural households in Nakhon Ratchasima Province, tabulated in Poapongsakorn (1988, p. 204) and Tubpun (1988, pp. 8, 10).

Informal Lenders

Despite the enormous expansion of formal credit after 1975, informal lenders continue to do a thriving business. Their share of total loans given out has indeed declined from, very roughly, 90 percent to 50 percent, but it is impossible to determine whether the absolute volume of their lending has increased or decreased. The decline in their market share seems to have occurred in every region of the country (Siamwalla 1989, pp. 197–98; Poapongsakorn and Nettayarak 1988, p. 15). Our own survey in NR province indicates that of the households who reported some borrowing or repayment activity during 1984–85, 72.4 percent borrowed from the informal sector, accounting for 56.0 percent of the amount borrowed.

Informal lenders are very thick on the ground. In our fifty-two-village survey, each village headman was asked to give the total number of resident or outside lenders who are known to lend to the villagers. The modal number of lenders resident in the village is three, and the modal number of outside lenders is two (Siamwalla 1989, p. 234).⁴ A question addressed to each resident lender as to

4. A more recent survey conducted in more regions indicated the same (Poapongsakorn and Nettayarak 1988, p. 40). In our survey, the average number of households per village is 112. The average number of people per rural household in Thailand is about 5.

Table 4. *Characteristics of Lenders in the Informal Credit Market, Nakhon Ratchasima Province, 1984-85*

<i>Lender's occupation</i>	<i>Number of contracts (thousands)</i>	<i>Interest-free contracts as percentage of total</i>	<i>Total volume of loans (millions of baht)</i>	<i>Share of total (percent)</i>	<i>Size per transaction (baht)</i>
Resident farmers	66.4	36.4	394.6	32.6	5,945
Resident traders	25.9	22.5	135.7	11.2	5,240
Resident salaried individuals	20.5	23.1	204.1	16.9	9,970
Resident rentiers	3.8	26.6	39.9	3.3	10,425
Temple funds ^a	1.6	45.6	17.4	1.4	11,455
Nonresident farmers	6.3	11.8	55.9	4.6	8,882
Nonresident traders	31.1	1.6	209.5	17.3	6,740
Nonresident salaried individuals	1.7	0.0	19.4	1.6	11,455
Nonresident rentiers	0.9	0.0	1.4	0.1	1,524
Illegal trusts ^b	1.9	0.0	14.6	1.2	7,792
Unknown	13.2	36.3	117.4	9.7	8,870

Note: Figures extrapolated to province level.

a. Temple funds are set up after a collection among villages, and loaned out at low interest rates.

b. These are trader partnerships, some of which accept deposits without requisite registration with the Ministry of Finance.

Source: 52-village survey of 1,600 rural households (borrowers) in Nakhon Ratchasima Province, tabulated in Poapongsakorn (1988, p. 128).

the number of borrowers in his clientele yields numbers that range from one to forty-five borrowers, with the average loan portfolio being 36,000 baht (or \$1,440) per lender (Poapongsakorn and Nettayarak 1988, pp. 41-44). The portfolio of nonresident lenders, particularly the traders, would of course be much larger as they lend to many villages, but we had no way of obtaining this number. The size per transaction in the informal sector is typically much smaller than in the formal sector, although this is not true of installment loans (see table 2).

Table 4 classifies informal lenders by occupation and residence. About one-fourth of informal credit in the sample villages was supplied by nonresidents and, of that, most was supplied by traders. As shown in column 2, over one-fourth of loans were interest-free. Such loans are between relatives and close friends and probably contain an implicit exchange component.

Sorting of Borrowers across Lending Sources

The above account gives the structure of the credit system as it would appear to an outsider. From the borrower's point of view it would look quite different. Whereas the data thus far presented may suggest a high degree of competitiveness among lenders, in fact most borrowers are unable to use multiple sources of informal loans or to switch easily from one lender to another. Of the

households surveyed in NR province who reported some borrowing from the informal sector, about five-sixths reported that they borrowed from only one informal source. Many of these also borrowed from formal sources, but as we shall argue below, formal and informal lenders are noncompeting.

A more telling set of figures comes from our national survey. A total of 72 percent of the informal sector borrowers in that survey reported that they had not attempted to borrow from other informal lenders during the past three years. Creditworthiness vis-à-vis an individual lender takes considerable time to build up; the average period of contact involving credit transactions reported by these 72 percent was close to seven years! Switching of lenders does take place, but it has to be done slowly and may involve some costs and risks to the borrower.

More important, borrowers do not have equal access to all credit sources, particularly to those in the formal sector. Table 3 shows how borrowers appear to be sorted by wealth and income.⁵ A total of 42 percent of households did not report any credit transactions at all during the survey period, and these are the poorest group in the villages. We did ask an admittedly vague question of these households: whether the reason they did not borrow was because they were unable to borrow, or because they did not wish to borrow. Only a small minority, whose mean income is lower than those that were able to borrow, reported that they wished to but were unable to borrow. It is not clear whether the households that reported that they had no wish to borrow (a) knew that a request for credit would be turned down by all lenders; or (b) knew that they would be turned down by the formal sector, whose terms they were willing to accept, but were unwilling to borrow from the informal sector, whose terms they considered too onerous; or (c) really did not need to borrow at all. The mean income figure of this particular group in table 3 indicates that reason (b) is probably the dominant explanation.

Table 3 also shows the mean levels of assets of households who succeeded in obtaining loans from various sources. Well-to-do farmers are more apt to obtain credit from formal sources. Households that borrow from the commercial banks in particular clearly belong to the richest strata.⁶ That different strata sort themselves in this fashion is not a choice of the borrower but the

5. To obtain a sense of these figures, note that average income per capita in the northeast of Thailand is 2,983 baht. Average income for agriculturalists throughout Thailand is slightly greater, at 3,062 baht. These figures are not strictly comparable to those of table 3 because of somewhat different definitions of income.

6. Actually, the wealthiest farmers borrow from farmers' associations, but these are quantitatively unimportant, as can be seen in column 1 of table 3. Farmers' associations are groups of about 50–100 farmers formed hurriedly in 1975 by the Department of Agricultural Extension to obtain loans from the BAAC, in conjunction with the credit program of that year (see historical overview above). Because their formation was politically motivated, their members tend to be rich and influential and, precisely for that reason, their repayment rate was poor. The BAAC has been trying to remove them from its rolls ever since. Those that remained in 1984 to be reported in this paper were presumably those that behaved better than the vast majority of these associations.

result of sorting by lenders, as we shall indicate in the next section when we discuss how lenders solve their information problems.

III. HOW DO LENDERS SOLVE THEIR INFORMATION PROBLEMS?

The size of rural loans in both the formal and informal sectors is typically small, on the order of 10,000 baht (\$400; see table 2 above). Recourse to the state judicial system to enforce contracts would be absurdly uneconomical. The most important consideration facing a lender is therefore to ensure that the borrower will perform according to his contract. One can imagine him trading off among (a) a strict collateral requirement, (b) a stringent vetting of the borrower prior to making a loan, and (c) use of third party guarantees or peer monitoring. Measures (b) and (c) could be supplemented by (d) a strong effort in following up on a debt, sometimes with *ex post* penalties and rewards tailored to repayment performance. Lenders mix the various modes of enforcement in different proportions corresponding to their comparative advantage. Because the ease of implementing modes (a) to (d) also varies across potential borrowers, the result is a sorting of borrowers across lenders. Each of these modes takes on a variety of forms, and we describe the most important ones below.

Collateral

A total of 87 percent of commercial bank loans and 43 percent of cooperatives' loans were backed by collateral (Mingmaneenakin 1988, p. 107). The sphere of operations of commercial banks and cooperatives therefore has been almost exclusively in villages where land titles have been issued (Tubpun 1988, pp. 55, 66–69).

Long-term loans from nearly all sources, including informal lenders, involve the use of land as collateral. The main exception is installment purchases, where the goods purchased are themselves the collateral. In cases where land title exists, farmers generally find little problem obtaining long-term loans, particularly from the commercial banks.⁷

The use of collateral is also central to the *modus operandi* of the illegal trusts. A would-be borrower from one of these trusts obtains his loan by bringing in his land title and signing over the power of attorney to the trust's lawyer, which enables the lawyer to dispose of the land, should the occasion require.⁸ Loans are usually given for about one-quarter of the value of the land

7. Nevertheless many farmers still prefer to borrow long-term from the informal sector at a higher interest rate. The explanation given is that if the creditor forecloses on the loan, the borrowing farmer stands a better chance to lease his land back from the creditor than if he had borrowed from the formal sector.

8. This is not a mortgage. The arrangement allows the lawyer to take over the land any time he wishes.

for a period of six months. Late payment results first in a fine of 100 baht (\$4) a day, followed if need be by forfeiture. The only information required for such transactions is the quality of the land. Most of these trusts require only that the land submitted as collateral be in the same or a neighboring district.

Vetting of the Borrower Before Making a Loan

Resident informal lenders, of course, have a natural comparative advantage in screening loan applicants and ensuring loan performance. Those who live in the same village as their borrowers are aware of the goings-on inside the village and can evaluate the risks of each particular borrower better than could any outside bureaucratic organization. They reinforce these advantages through other means. Many operate a small general goods store, thereby creating a center for village gossip to which they can tune in without much effort.⁹

Peer Monitoring

The BAAC has a peer monitoring system for working capital loans with maturity of less than one year (about 75 percent of its annual loan disbursements). These loans are given to groups of eight to fifteen farmers. The group is jointly liable for each member's loan. Before the first loan is given out and during the growing season of the crop, as well, the bank's officer goes to the borrowers' village to examine their activities.

The most stringent requirement imposed by the BAAC is its refusal to roll over any working-capital loans. All borrowers are required to repay the principal when the loan falls due, even though in the vast majority of cases, both the bank and the borrowers expect the loan to be recontracted within a month after borrowing. There is consequently a secondary credit market, with funds provided by informal lenders at 10 percent a month interest rate to enable farmers with liquidity problems to tide over this particular gap. The BAAC is fully aware of the existence of this secondary market, yet it insists on the ritual repayment. According to its management, this is its way of ensuring performance.

The BAAC has a preference for better-off farmers. This fact, together with the requirement that the group has to be a minimum size, effectively limits who is able to borrow from the BAAC. This is because group members themselves do not wish to have as their colleague anyone who will be a bigger risk than they themselves will pose. The consequence is that a village whose mean income is one standard deviation above the mean of all villages has a 21 percent higher probability of having a BAAC group than a village whose average income is equal to the mean for all villages (Tubpun 1988, p. 53).

9. Because Thai village kinship structure is matrilineal and matrilocal, lines of influence tend to run through the women, and women tend to predominate among resident lenders.

Trade-Credit Interlinkages

The most important enforcement mechanism used by a nonresident trader appears to be the requirement that borrowers sell their output to him. Failure to do so is considered tantamount to default, even if the borrower repays the money on time. The insistence on this trade-credit linkage makes the information on the size of the borrower's operations (and their changes) available to the creditor and to no one else. Trade-credit linkage thus closes the borrower's access to other lenders.¹⁰ Interestingly, most nonresident traders prefer their borrowers to settle accounts at the time of the harvest, and have very little debt carried over from one season to the next.

Nonresident traders solve the problem of screening borrowers by relying on agents. An individual who wishes to borrow from a trader has to be introduced by someone whom the lender knows. If the trader wishes to expand his clientele, he engages an agent from among the villagers to recommend prospects to him. In return, the trader provides the agent an interest-free loan.

Spot Transactions as a Substitute for Credit

One type of farmer who finds it difficult to borrow from nonresident traders is the cassava growers, for the simple reason that cassava, unlike other crops, can be harvested any time between four and fourteen months after planting. Without a fixed harvesting period, the enforcement problem becomes very difficult. Generally, cassava growers faced with liquidity problems can obtain credit only by selling outright the standing crop, subject to some conditions on the harvesting date when the land reverts back to them. An active market in standing crops exists in cassava-growing areas—and only in such areas.

Interlinkage between the Credit and Land Rental Markets

A common reason for borrowing in northeastern Thailand is to finance migration for work in foreign countries, particularly in the Middle East. Because fraudulent practices among labor contractors who arrange such migrations are widespread,¹¹ these investments are quite risky. For those with land,

10. There are other hypotheses to explain the insistence of the nonresident trader-lender that the borrower market his output through him. One hypothesis is that the trader makes a profit by buying at below-market prices. We made thorough inquiries with both lenders and borrowers on this question and are satisfied that, with few exceptions, very little underpaying occurs. It does stand to reason that the trader should not encourage the borrower to default on the loan by underpaying at this stage. Whatever monopoly power the lender may have, he can already exercise through a higher interest rate.

Another hypothesis is that traders operate under conditions of excess capacity on account of Chamberlinian monopolistic competition. Any measure that boosts demand for their services would therefore increase their profits.

11. A study in one northeastern village with a large number of migrants to the Middle East indicates that as many as 50 percent of the households have been cheated by labor contractors during the last seven years (Sangthanapruk 1988, p. 49).

however, usufruct loans¹² sometimes provide a neat solution to their problems. These are loans in which a borrower allows the lender to occupy and make use of his land until the principal is repaid. The borrower may not reoccupy the land until at least a stipulated minimum of two or three years has elapsed; the reason given for the condition is that the yield risk for two or three years' production is less than for one year. This sort of loan is free of default risk. It is used particularly by those who intend to emigrate from the village.

Deposit of Land Title with the Lender

Standard practice when the size of a loan approaches 10,000 baht (\$400) is for the borrower to deposit his land title with the lender. The deposit of title has no legal significance but prevents the debtor from borrowing a substantial sum from another source or from selling the land to a third party.

The topics just discussed—collateral, vetting of the borrower before making a loan, peer monitoring, trade-credit interlinkages, spot transactions as a substitute for credit, interlinkage between the credit and land rental markets, deposit of land title with the lender—are all devices that alleviate the selection, monitoring, and/or enforcement problems arising from a credit transaction. In Thailand we also found evidence of interlinked credit transactions that were intended to solve information problems arising in labor and output markets. In these cases, credit was an instrument for a forward transaction that would otherwise have been highly uncertain.

Credit as an Instrument for Forward Transactions

Credit can be used as an instrument for forward transactions in the labor or output markets. We provide three examples:

(a) The Thai sugar industry, located mostly in the Central Plains, imports an estimated 84,000 workers from the northeast during the harvesting season (Busayawit 1978, pp. 20–21). To obtain this labor, employers advance 5,000–10,000 baht (\$200–\$400) to a village recruiter, who will then contact another 10 to 50 fellow villagers, passing on part of the advance money two months before the harvest. If a group has already been working with the employer, its leader would get the advance as soon as the group completed the previous harvest (Poapongsakorn 1988, p. 77). The laborers would then come to work at the same rate as those who are recruited from the vicinity without any such advance.

(b) Cassava harvesting requires a few days' work in succession but, unlike the case of sugarcane above, the time of the harvest is highly unpredictable because it depends on cassava prices. In recent years cassava prices have fluctuated a great deal over short periods. To ensure that labor is available when needed, large cassava farmers will retain a laborer by giving him access to

12. The NR province has a low incidence of tenancy. Usufruct loans are the only important case of interlinkage between the credit and land rental markets.

credit involving extremely small sums (100–300 baht or \$4–\$12) needed for immediate subsistence purchases. The wages paid are again not affected by whether the laborers have borrowed. The loan is in this sense interest-free.

(c) Early-season custard apple (a local fruit) is highly desired, while the mid- and late-season output is less desired. Middlemen have developed season-long relationships with custard apple farmers. Provided the farmers do not sell their early season output to itinerant spot traders, the middlemen agree to take up the entire mid- and late-season output from the farmers. The prices paid by the middlemen will vary with market prices, except that during the early part of the season, farmers would normally get a better price from the itinerant traders. To put the relationship on a firm footing, middlemen advance money interest-free to the farmers during the pruning season, about five months ahead of the harvest.

IV. INTEREST RATES AND THEIR VARIATIONS

As in many developing countries, in Thailand there is a vast gap between the interest rates charged in the formal and informal credit markets. Commercial banks and the BAAC charge 12–14 percent per year, whereas informal lenders charge much higher rates, 25 percent per year being the minimum mostly to be found in the Central Plains—elsewhere 60 percent or more is usual. Based on regressions that we have run, the variation in interest rates in the informal sector appears to reflect variations in information costs and risks arising, for instance, from differences in collateral used.

Formal Sector

Although the central bank has been regulating the amount of credit that the commercial banks have to provide to the agricultural sector, it did not specify the rate of interest that they should charge. The banks' practice has been to charge 12 percent per year on loans (about the same rate as the BAAC) and 15 percent per year on overdrafts. These rates put the agricultural sector in an even more favored position than the banks' prime borrowers. It appears that the central bank has ignored the role of interest rates in inducing the commercial banks to lend more to the agricultural sector. However, it is uncertain that the commercial banks would respond to such an inducement. Their practice before the 1975 regulations was to ignore the agricultural sector, largely because they never had to face serious competition on the lending side of their operations. Entry into the commercial bank business is subject to approval by the Bank of Thailand, and it has not approved a new domestic bank since 1966. Commercial banks have therefore tended to look at the agricultural loans regulation as a burden to be avoided as much as possible.

The BAAC's policy toward interest-rate setting has been subject to political constraints—its chairman is Thailand's minister of finance. Within these con-

straints, its practice has been to set interest rates according to its average cost of funds. The BAAC obtains soft loans from foreign donors and can rediscount its bills at the central bank at rates between 3.5 to 5 percent per year.¹³ The BAAC charges interest varying between 12 and 14 percent per year and still makes a small profit. Obtaining subsidized funds from the central bank, the commercial banks and foreign sources, the BAAC has never felt it necessary to expand the fund-mobilization side of its business. It must be added that given its smaller branch network, it is doubtful whether it could be as effective as the commercial banks in marshaling deposits.

Informal Sector

In much of Thailand except the commercialized Central Plains, the informal interest rate usually hovers around 5 to 7 percent per month for a loan of 8,000 baht (\$320) for a period of six months, with no collateral but with the land title deposited with the creditor (see figure 1). Some of the more remote provinces report a rate of 10 percent per month, while the rate in the Central Plains is only 2 or 3 percent per month. Despite the significant variations observed in individual contracts from our survey data, there is a sense of a standard rate over quite broad areas, provided one controls for (a) the size of the loan, (b) the length of the loan, and (c) the nature of the security offered by the borrower. Moreover, from our interviews, it appears that the standard rates and their regional differentials appear to have been quite stable for at least the last two decades, despite varying experiences with respect to government credit and monetary policies and inflation rates.

That the key factors determining interest rates in the informal sector are the size, duration, and required collateral of the loan has been confirmed by a number of regressions that were run with interest rates as the dependent variable. Table 5 shows the results of one such regression. It indicates that borrower characteristics do not seem to account for much of the variations. The regression also indicates some anomalous results. Irrigated areas and tree-crop areas which are less risk-prone than upland areas show a much higher interest rate. Since this is a villagewide characteristic, it is likely that there is a sampling bias, as there are only fourteen villages in the survey, among which four are irrigated and two are tree-crop villages.

Lender and contract characteristics account for some variations. For instance, by pledging land as collateral the borrower obtains lower interest than by pledging jewelry. This is probably because many lenders (commercial banks, illegal trusts, as well as other informal lenders) accept land as collateral; the market for such loans is more competitive than for loans obtained by pawning jewelry.

13. The rediscount facility provided 12 percent of the total liabilities of the BAAC in 1984 (Siamwalla 1989, p. 40).

Figure 1. *Map of Thailand Showing Monthly Interest Rates for the 8,000 Baht Loan Contract, with the Borrower Surrenduring Land Documents*

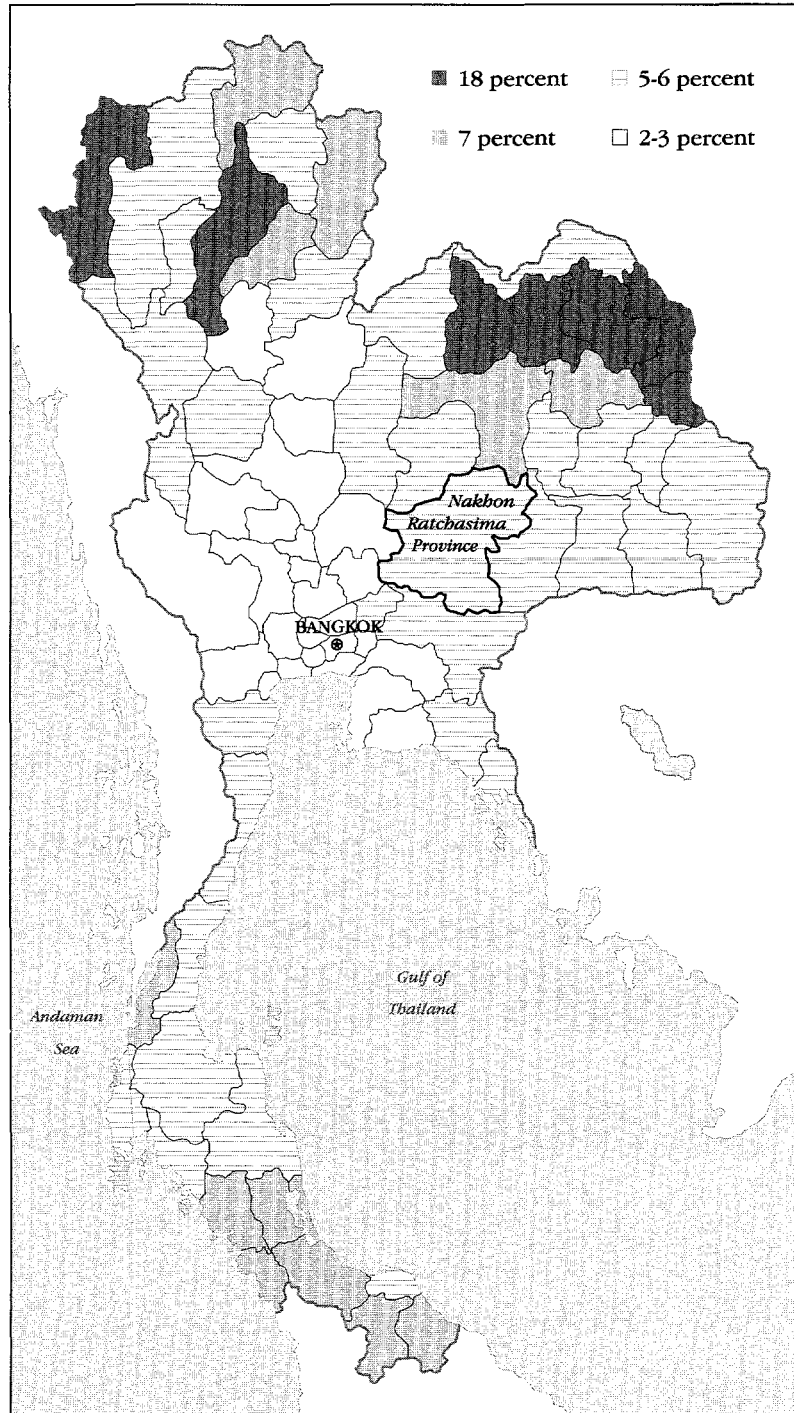


Table 5. Results of "Hedonic" Regression of Interest Rates in the Informal Sector, Thailand, 1987

<i>Variable^a</i>	<i>Regression coefficient</i>	<i>t-statistic</i>
<i>Contract terms</i>		
Logarithm of loan size	-0.072	-2.83
Logarithm of loan duration	-0.177	-6.29
Usufruct loan (dummy)	0.390	0.16
Surrender of title to lender (dummy)	0.160	1.80
Land mortgage (dummy)	-0.217	-1.31
Pawning of jewelry (dummy)	0.324	0.75
Written contract (dummy)	-0.165	-1.82
In-kind loans	-0.140	-2.40
Payment of interest in kind	0.094	0.16
<i>Purpose of loan</i>		
Consumption (dummy)	0.032	0.51
Repayment of other debts (dummy)	-0.201	-1.10
<i>Borrowers' characteristics</i>		
Logarithm of landholdings	-0.032	-0.83
Ownership of titled lands (dummy)	-0.064	-0.93
Logarithm of borrowers' income	-0.028	-0.96
Borrower also a formal sector loanee (dummy)	0.123	2.09
<i>Lenders' characteristics</i>		
Nonresidency (dummy)	-0.155	-2.48
Farmers (dummy)	-0.145	-1.73
Traders (dummy)	0.058	0.51
Rice-mill owners (dummy)	-0.513	-4.59
Professional lenders of landlords (dummy)	-0.150	-1.13
Salaried workers (dummy)	-0.198	-1.12
<i>Relationship and interlinkages</i>		
Requirement to sell crops to creditor (dummy)	0.010	0.13
Logarithm of number of years of acquaintance	-0.010	-0.39
Direct kinship (parents, offspring of siblings)	0.097	0.70
<i>Socioeconomic environment^b</i>		
Irrigated (dummy)	0.601	3.56
Upland-crop growing (dummy)	-0.019	-0.24
Tree-crop growing (dummy)	0.407	2.43
<i>Region^c</i>		
Eastern	-0.688	-2.85
Central	-0.120	-1.12
Lower north	0.170	1.75
Upper north	-0.120	-1.17

a. The dependent variable is the natural logarithm of the monthly compounded interest rate.

b. Rainfed village has all dummy values equaling zero.

c. Northeast has all dummy values equaling zero.

Source: Based on survey of borrowers in the ten-province survey of Thailand in 1987, reported in Poapongsakorn and Nettayarak (1988, p. 119).

V. CRITIQUE OF THE THEORETICAL LITERATURE

Three major sets of views have dominated the rural credit literature. According to the traditional view, rural financial markets were shot through with monopolies, with inordinately high interest rates as the consequence. This view led to many heavily subsidized credit schemes in developing countries.

This traditional view of rural financial markets was strongly criticized in a series of papers, later collected in the volume by Von Pischke, Adams, and Donald (1983). The critique was enlivened by observations of credit policies in developing countries. Even a cursory look revealed a rich crop of disasters induced by poorly designed policies. This critical literature stressed the distortions introduced by government policies and, in doing so, tended to idealize the informal credit markets that did exist or that might have existed in the absence of the massive government intervention in the credit market. There was a presumption that an intervention-free rural financial market would approximate the perfect competition model.

A third view emphasizes the informational problems that make credit markets inherently imperfect, even in the presence of competition among a large number of lenders. Inspired by the earlier model of Stiglitz and Weiss (1981), this view stresses the contractual aspects of the market under imperfect information but maintains the notion of a "credit market" as an arena where strangers meet to borrow and lend. Lenders cannot observe or monitor the behavior of borrowers in certain respects, which leads to moral hazard and adverse selection. The lenders' solution to these problems may give rise to credit rationing in competitive equilibrium, as in Stiglitz's article in this issue.

We accept the view that the information problem in the credit market is a serious one in Thailand. We have argued that lenders' attempt to solve it effectively sorts borrowers into different parts of a highly segmented credit market. We would argue, however, that many informal rural lenders (at least in Thailand) incur costs to acquire nearly complete information regarding their borrowers. For those lenders that reside in the same village as their borrowers, this cost is not particularly great. As a consequence, nearer the mark would be a model that portrays the lender to have complete information about her borrower's resource endowment, tastes, and investment opportunities, so that she can conduct a Fisherian analysis of the borrower's credit requirements as efficiently as he can. What therefore appears as a borrower's decision on intertemporal consumption and production is, in reality, a joint decision of lender and borrower. After lending out the money, the lender can also completely monitor and regulate the borrower's behavior that may affect his intertemporal resource allocation. In particular, she can prevent him from acquiring credit from other lenders. Because of these advantages, resident lenders can provide "consumption" loans more readily than can any other type of lender.

For nonresident lenders and formal lenders, the problem is more complex. Here, the Stiglitz-Weiss model in which information is asymmetric may be

appropriate. What has not yet been explained in the theoretical literature is the coexistence of the various forms of informal lending and how these interact to determine interest rates.

From table 4, it is clear that resident lenders are a very important part of the credit scene, accounting for close to two-thirds of all the loans obtained from the informal sector. Quantitatively, therefore, it appears that models of symmetric information would repay closer investigation than models of asymmetric information in vogue in the literature.

Some of the answers given in the literature to the central question of why interest rates in rural areas are inordinately high appear unsatisfactory. Also, much of the criticism of government policies that limit informal financial intermediation (for example, Von Pischke, Adams, and Donald 1983, pp. 108–89) is misplaced (at least in the Thai context) in that it emphasizes the generation of new funds whose increased supply is then expected to lower interest rates. In our extensive interviews with informal lenders in Thailand, there is very little evidence that the volume of their business is constrained by the availability of funds. Besides, many informal lenders are engaged in other activities that could not possibly yield the 4–5 percent per month return that they obtain from moneylending (if we ignore the transaction costs). The cash flows from these other activities are siphoned to the moneylending business when the need arises. Indeed, if a particularly valued prospect wishes to borrow and the lender is short of cash, the lender will borrow from the formal sector or even from another informal lender to relend to the prospect.¹⁴

We are inclined to accept the view that interest rates are high because transaction costs are high, particularly at the margin. For the borrowers who are already among the clientele of a particular lender, the transaction costs may not be very high, but if a borrower among this clientele were to shift to another lender, the marginal transaction cost that that lender would have to cover may be quite high. Knowing this, the present lender can then obtain an economic rent equal to the difference between his closest competitor's transaction cost and his own.

Our view is based on the hypothesis that rural credit supply requires two factors: namely, loanable funds themselves and something that we will call "lending effort." Lending effort entails transaction costs. In our view, the supply of loanable funds is almost perfectly elastic at the formal sector interest rates, as the rural sector is now a relatively small part of the Thai economy (agriculture currently contributes only about 16 percent of the gross domestic product). But the lender's supply price of enlarging his clientele is high (much higher than the interest rate), because it is a fixed cost incurred to make a (typically) small loan. Moreover, the lender's supply curve may be inelastic

14. There is one important exception here. Loans to maintain consumption in the face of poor harvests or low output prices may not be available because of the shortage of equity among resident lenders arising from the covariance of risks.

with respect to clientele size. As he expands his clientele, he faces borrowers with whom he has had fewer contacts or who intrinsically have greater risk of default.

If we push these arguments to their logical limits, then the following observations would be relevant to our evaluation of the Thai government's credit policies during the last two decades. First, mere injection of funds into the rural areas will not necessarily reduce informal interest rates, because for that sector funds are not the constraining factor. Second, a successful credit program would require the building up of formal institutions that can supply the additional lending effort to compete effectively with informal lenders in a wide range of segments of the rural credit market. In this view, if government credit subsidies crowd out informal financial intermediation, a cost arises not from the displacement of local efforts to mobilize deposits, but from the possible displacement of the information services provided by the informal lender. The key to successful government intervention in rural credit is institution-building that is innovative and efficient in tackling the information problems entailed in lending.

VI. PERFORMANCE OF THE THAI RURAL CREDIT SYSTEM

Given the arguments above, what has been the performance of the Thai rural credit system? And what is the place of a policy that has as its objective injecting a huge amount of funds into the countryside? We will briefly consider the Thai rural credit system's performance in terms of coverage, efficiency, and redistribution effects.

Coverage

It is useful to distinguish loans for purposes of consumption, working capital, and long-term investment. The first two types of loans generally have repayment periods of less than one year and have been aptly termed "flow credit." Long-term loans have been called "stock credit." For flow credit, the information required by the creditor is the income flow of the borrower. By contrast, with stock credit it is the borrower's asset-and-liability situation that is of interest to the creditor.

A total of 75 percent of loans dispensed countrywide by the BAAC (Mingmaneeakin 1988, p. 177) and about 40 percent of the informal sector loans in NR province (Poapongsakorn 1988, pp. 110-11) are flow credit to finance working capital. For this category of loan, and also for long-term loans with collateral, the credit market appears to function smoothly. In both cases the formal-sector lenders are active participants, although they have not succeeded in driving out the informal lenders. The rise of the BAAC in the last two decades probably undercut the position of the nonresident lender more than that of any other lender. However, in our interviews these lenders do not report any falloff in the absolute size of their businesses. The increasing use of agricultural

chemicals in NR province may have more than compensated for the inroads the BAAC made in the nonresident traders' market share.

Rural households that have transitory income shortfalls or unexpected consumption needs still seek credit primarily from the resident lenders. Resident lenders are particularly suited for the task. Time and again in our interviews, both borrowers and lenders described the scenario of illness in a family that triggers an urgent need for cash. It is very difficult to design a bureaucratic credit system that would provide the household with that cash. Lenders resident in the village are perfectly suited to the task, even though the interest rate charged may be high.

However, when a region suffers a collective shock, such as low rainfall, the consumption loans market ceases to function (Pinthong and Nettayarak 1988, p. 38).¹⁵ In theory, nonresident lenders and even bureaucratic organizations such as the BAAC could form a judgment not only of the credit needs but, more important, of the households' ability to repay, in order to provide consumption-smoothing opportunities to households. In practice, both the formal and nonresident informal lenders in Thailand appear not to be able to perform this function satisfactorily. Resident lenders, however, are not adequate to the task because their equity is least when demand for credit is greatest.¹⁶

Efficiency: The BAAC's Achievements through Group Lending

The fund injection that resulted from compelling commercial banks to lend to the agricultural sector is workable only because they can satisfy the requirement by making deposits with the BAAC, which then on-lends the money to the farmers. It is the ability of the BAAC to perform its task that lies at the heart of the sustained impact that the government has had on rural credit.

The major achievement of the BAAC lies in its approach to administering credit, which is totally different from that of the informal sector. In its group-lending method, it discovered the means to achieve an initially high rate of loan repayment, which was increased further as the BAAC came to appear in farmers' eyes as a permanent institution.¹⁷ The BAAC penalizes default in two ways: (a) the amount overdue is subject to a higher (by about 3 percent per year) interest rate (which is as assiduously followed up on as the repayment of principal), and (b) no new loan is given to the delinquent borrower until the old debt is repaid, and even then the individual cannot be sure of getting a new loan. The

15. The main recourse of farmers in this situation is to seek dry-season employment. If the sale proceeds from the poor year's harvest carry the affected farmers through part of the following year, and if that year is not also a bad year, then some loans would be forthcoming during the planting season from nonresident lenders.

16. The influence of covariant risk on the functioning of credit markets is emphasized in Binswanger and Rosenzweig (1986).

17. Actually, the idea of group responsibility and peer monitoring is not new. The cooperatives in a sense embody this approach. What is new is the very small size of the BAAC groups (between eight and fifteen people).

Table 6. *Collection Records of Overdue Short-Term Working Capital Loans from the BAAC*
(millions of baht)

<i>Loan cohort (loan falling due during)</i>	<i>Amount due during year</i>	<i>Overdue at end of year</i>	<i>Overdue at end of year + 1</i>	<i>Overdue at end of year + 2</i>	<i>Overdue at end of year + 3</i>	<i>Overdue at end of year + 4</i>	<i>Overdue at end of year + 5</i>
1981-82	7,444	1,765	1,141	545	361	258	193
1982-83	8,451	1,883	760	346	251	180	
1983-84	10,493	2,298	1,169	637	413		
1984-85	12,056	2,865	1,374	623			
1985-86	12,782	2,593	925				

Note: The accounting year for the BAAC ends on March 31.

Source: BAAC, *Annual Reports*, various issues.

group as a whole becomes ineligible for new loans when the BAAC decides that the debt will never be repaid.

Moreover, the BAAC has achieved this high repayment rate at a small cost. The BAAC reports its administrative costs to be around 5 percent of the loans administered. Reckoning the costs of bad debts is problematic, but we may assume from table 6 that of the working capital loans that fall due each year, only about 3 percent eventually will be written off. If we further suppose that the *marginal* cost of its funds in 1984 was 12 percent, then the BAAC could comfortably lend without any subsidies to the rural sector at 20 percent per year, well below the 90 percent per year that was being lent in the northeast or the 36 percent or more in the Central Plains.

True, from the point of view of borrowers, BAAC credit has a number of disadvantages, most notably a higher transaction cost imposed on them. We estimate this transaction cost to be about 9 percent.¹⁸ With this cost included, the resulting effective social interest cost would be 29 percent, still well below the rates in the informal markets, at least for areas outside the Central Plains. Thus, for the loans that the BAAC made, the informal lenders would not be competitive even if the subsidies to the BAAC were removed. This is different from saying that the informal sector is altogether inefficient. The BAAC has been successful in one segment of the credit market, albeit a very important one, namely for short-term working capital loans. It has found a technology to "mass-produce" this kind of loan and in that way has overcome the problems that normally beset a bureaucratic organization engaged in giving small loans.

But despite repeated attempts, the BAAC remains unsuccessful in expanding its scope of activities. Even in its traditional working capital loans, it has been reluctant to expand its clientele to poor farmers or those in riskier areas. That the informal sector appears still to thrive, either by lending to those left out by

18. This leaves out the cost of risk, discussed by Stiglitz in an article in this issue.

the formal sector or for activities that the BAAC does not finance, indicates that the informal sector also has a role to play within its sphere.

Whether the interest rate that the BAAC charges the farmers should remain subsidized is questionable.¹⁹ A somewhat convoluted excuse that may be given, at least as far as one component of the subsidy (the implicit subsidy from the compulsory lending requirement) is concerned, is as follows: because the ban on new entrants has made commercial banks financially more sound, they have become a very efficient gatherer of deposits, including from the rural areas. As a quid pro quo for the economic rent that they can thus earn, they should be asked to engage in this cross-subsidization scheme.

It is possible that if subsidies to the BAAC were removed and the BAAC forced to obtain its funds in the money markets—from the commercial banks or from any source willing to lend to it—it could still survive. New kinds of private institutions would probably enter the scene, obtain funds from the commercial banks (which would likely remain the most efficient deposit-taking machines), and lend to the farmers using the BAAC technology. At the moment, this possibility will have to remain a matter of speculation.

Redistribution

What are the redistributive effects of the expansion of the role of the formal credit system into the countryside? In Thailand as elsewhere, most formal credit goes to the better-off rural households. Subsidies to rural credit would ipso facto seem to be a regressive policy within the rural sector. But the average urban per capita income is 2.5–3 times higher than the average rural income in Thailand. Thus, the impact of rural credit subsidies on the overall Thai income distribution remains unclear.

Rural credit also affects income distribution through its impact on the product market. By lowering the cost of working capital, it lowers the production cost of agricultural goods for farmers lucky enough to get the credit. For poor farmers there is now the added insult of lower product prices to add to the injury of having no access to the subsidized credit. This effect is not very large, however. Our computable general equilibrium exercise found that a policy of allocating 10 percent of bank deposits to the rural sector would lower agricultural product prices by 1.04 percent, increase per capita real income in rural

19. There are two major subsidy elements in the Thai government's credit policies. First is the requirement that the commercial banks lend 11 percent of their deposits to agricultural households or to the BAAC. This imposes an implicit tax on nonagricultural borrowers. Second, the BAAC uses an average-cost pricing rule in setting interest rates. In doing so it includes in its average the rates on many soft loans it receives from foreign donors (the BAAC is a favorite of many donors). A recent calculation indicates that the major portion of the subsidy arises from the average-cost pricing rule, because the elasticity of demand for bank loans is quite high. Nonetheless, the total size of the implicit subsidy turns out to be only about 1 billion baht (\$40 million; Siamwalla and Nettayarak 1988), surprisingly small compared with the total BAAC loan portfolio of 25 billion baht in 1987, or to the stated agricultural portfolio of the commercial banks of 46 billion baht.

areas by only 0.3 percent (per capita real urban income increased by 1.3 percent), and increase the Gini coefficient of rural incomes from 0.575 very marginally to 0.578 (Nijathaworn 1988, table 4-1).

The effect is small because Thai agricultural output is mostly traded (hence the small impact on prices), because working capital for agricultural production is mostly self-financed (hence the small impact on all variables), and because poorer farmers have lower marketable surplus (hence the small impact on the Gini coefficient).

REFERENCES

- An asterisk preceding an item indicates that it is part of the project being summarized.
- Binswanger, Hans P., and Mark R. Rosenzweig. 1986. "Behavioral and Material Determinants of Production Relations in Agriculture." *Journal of Development Studies* 22: 503-39.
- Busayawit, Sunee. 1978. "A Comparison of the Costs of Cutting Sugarcane by Labor versus by Machines in the Western Region of Thailand." Master's thesis, Faculty of Economics, Thammasat University, Bangkok. In Thai.
- Chalamwong, Yongyuth, and Gershon Feder. 1988. "The Impact of Landownership Security: Theory and Evidence from Thailand." *World Bank Economic Review* 2, no. 2 (May): 187-204.
- Kirakul, Krisada. 1975. "Sugarcane Procurement in the Eastern and Western Regions of Thailand." Master's thesis, Faculty of Economics, Thammasat University, Bangkok. In Thai.
- Lapanun, Patchara. 1986. "Credit Market for Sugarcane Planting: Udonthani." Master's thesis, Faculty of Economics, Thammasat University, Bangkok. In Thai.
- *Mingmaneeakin, Wanrak. 1988. *The Role of the BAAC in Agricultural Credit Operations*. Thailand Development Research Institute Discussion Paper ARD 2. Bangkok. In Thai.
- *Nijathaworn, Bandid. 1988. *The Macroeconomic Impact of Credit Policies*. Thailand Development Research Institute Discussion Paper ARD 3. Bangkok. In Thai.
- *Pinthong, Chirmsak, and Prayong Nettayarak. 1988. *Portraits of Thai Rural Capitalists*. Thailand Development Research Institute Discussion Paper ARD 5. Bangkok. In Thai.
- *Poapongsakorn, Nipon. 1988. *Informal Credit Markets in Thailand: Case Studies of Contracts, Market Structure, Behavior, and Interest Rates*. Thailand Development Research Institute Discussion Paper ARD 7. Bangkok. In Thai.
- *Poapongsakorn, Nipon, and Prayong Nettayarak. 1988. "Regional Interest Rates in Rural Thailand: Report Prepared for the Informal Credit Markets Project." Manila: Asian Development Bank. Processed.
- Sangthanapark, Hongpha. 1988. "The Consequences of Overseas Migration on a Rural Labour Market: Udonthani." Master's thesis, Faculty of Economics, Thammasat University, Bangkok. In Thai.
- *Satsanguan, Ploenpit. 1988. *The Role of the Commercial Banks in the Provision of Agricultural Credit*. Thailand Development Research Institute Discussion Paper ARD 4. Bangkok. In Thai.

- *Siamwalla, Ammar, ed. 1989. *Rural Credit in Thailand*. Thailand Development Research Institute Discussion Paper ARD 12. Bangkok. In Thai.
- Siamwalla, Ammar, and Prayong Nettayarak. 1989. "Estimating the Cost of Subsidies for Agricultural Credit." Paper prepared for the World Bank Thai financial sector study. Bangkok: Thailand Development Research Institute. Processed.
- Siamwalla, Ammar, and Suthad Setboonsarng. 1987. "Agricultural Pricing Policies in Thailand, 1960-85." Report prepared for the Political Economy of Agricultural Pricing Policies Project. Washington, D.C. World Bank Development Research Department. Processed.
- Stiglitz, Joseph E., and Andrew Weiss. 1981. "Credit Rationing with Imperfect Information." *American Economic Review* 71, no. 3 (June): 393-410.
- *Tubpun, Yuavares. 1988. *Factors Determining the Source and Level of Loans of Rural Households*. Thailand Development Research Institute Discussion Paper ARD 6. Bangkok. In Thai.
- Von Pischke, J. D., Dale Adams, and Gordon Donald. 1983. *Rural Financial Markets in Developing Countries: Their Use and Abuse*. Baltimore, Md.: Johns Hopkins University Press.

Interactions between Institutional and Informal Credit Agencies in Rural India

Clive Bell

In an attempt to expand rural credit and displace the village moneylender, India created a system of rural cooperatives in the 1950s and expanded branch banking into rural areas in the 1970s. This article examines how these measures affected the rural market. It begins with the question of how large the expansion of institutional credit has been and the extent to which it has dislodged the village and nonresident moneylenders. A detailed comparison of three major surveys of the Indian rural credit market suggests that in various guises, the moneylender is still a major source of loans. The article also examines the (weak) evidence on intermediation between the formal and informal sectors. A formal model of the interaction between the informal moneylender and institutional lender is constructed under a variety of assumptions about the exclusivity of loan contracts and the competitive structure of the informal sector. The conclusions are drawn together in the form of five proposals for public policy.

In a landmark study of the system of credit and household indebtedness published by the Reserve Bank of India (RBI) in the early 1950s, the authors of the *All-India Rural Credit Survey* subjected the role and operations of the moneylender, who then enjoyed a dominant position as a source of finance, to critical scrutiny. They did so on the premise that, in India, agricultural credit presented a “twofold problem of inadequacy and unsuitability” (RBI 1954, vol. 2, p. 151). They envisaged only a minor place for him in their proposed solution, which took the form of a system of cooperatives covering all villages: “The moneylender can be allotted no part in the scheme [of cooperatives]. . . . It would be a complete reversal of the policies we have been advocating . . . when the whole object of . . . that structure is to provide a positive institutional alternative to the moneylender himself, something which will compete with him, remove him from the forefront and *put him in his place*” (RBI 1954, vol. 2, pp. 481–82; emphasis added).

The author is a professor of economics at Vanderbilt University. This article was originally prepared for a World Bank Conference on Agricultural Development Policies and the Theory of Rural Organization, Annapolis, Maryland, June 14–16, 1989. This revised version has benefited from the valuable comments of Kaushik Basu, Karla Hoff, and three anonymous referees.

© 1990 The International Bank for Reconstruction and Development / THE WORLD BANK.

The authors of the *Survey* did not, of course, lay out a formal model of India's rural credit system as it then existed, nor did they provide a formal analysis of the effects of introducing a system of cooperatives upon its workings. The above quotations and the whole tenor of their argument do suggest, however, that they were strongly convinced that the moneylender possessed considerable market power, the exercise of which was made very profitable by the peasants' pressing needs for credit. This power was to be curbed by competition from cooperatives, despite the fact that the record of this particular form of state agency had been rather patchy, as the authors themselves recognized (RBI 1954, vol. 2, p. 229 *passim*). Thus their commitment to cooperatives was both ideological and something of an act of faith.

In the contemporary literature, the thesis that the moneylender remains powerful and that his dealings are an obstacle to progressive changes in rural economic life has been developed forcefully and at length by Bhaduri (1973) and his school. Although their analysis has not gone unchallenged, both theoretically (Srinivasan 1979) and empirically (Bardhan and Rudra 1978), it seems fair to say that they have provided the clearest formal statement of what appears to have been the position of the authors of the *Survey*.

Be that as it may, how have matters turned out? The decennial surveys that followed revealed a steady growth of lending by cooperatives and banks to rural households and a great erosion of the moneylender's position, as can be seen from table 1. In his various guises of professional lender, farmer, trader, and landlord, 80 percent of all rural debt was owed to him in 1951, but a mere 24 percent in 1981. Meanwhile, the proportion owed to institutions—cooperatives, banks, and government—rose from 7 percent to 61 percent, the residual being owed to friends and relatives. Thus public policy—first in the form of the cooperative movement, and in more recent years in the extension of commercial branch banking in rural areas—appears to have “put him in his place.” Indeed, table 1 suggests that the next decennial survey will reveal the moneylender to be on the fringe of things, his grip on rural life broken by a competing supply of institutional credit.

On the official evidence, therefore, it is unnecessary to go any further, which would make for a commendably brief article. I shall begin, therefore, by arguing that this evidence is open to very serious reservations, both on a priori grounds and in light of the evidence from independent surveys of various areas of India. This critical evaluation in section I suggests that official reports of the moneylender's impending demise are much exaggerated.

This conclusion opens the door to several questions. First, if the moneylender is still very much in business, what is his main guise? The evidence for his continued existence is evaluated in section I. It is argued in section II that the growing commercialization of Indian agriculture has encouraged the rise of the trader-moneylender, so that policies toward credit and commodity markets must be considered together. Second, to what extent has the expansion of credit from state agencies created opportunities for financial intermediation by

Table 1. *The Share of Debt of Rural Households Held by Different Creditors: The Official Evidence*
(percent)

Year and kind of debtor	Creditor									Total debt (millions of rupees) ^b
	Government ^a	Cooperatives	Banks	Relatives and friends	Landlords	Agriculturist moneylenders	Professional moneylenders	Traders and commission agents	Others	
1951										
Cultivators	3.9		3.7 ^c	11.4	3.2	25.2	46.8	4.7	1.1	—
All families	3.7		3.5 ^c	11.5	3.5	25.2	46.4	5.1	1.1	—
1961										
Cultivators	6.7	11.4	0.3	5.2	0.9	48.1	13.8	7.1	6.5	31,257
All families	6.6	10.4	0.3	5.8	1.1	47.0	13.8	7.5	7.5	36,100
1971										
Cultivators	7.1	22.0	2.6 ^d	13.1	8.1	23.0	13.1	8.4	2.6	32,917
All families	6.7	20.1	2.4 ^d	13.8	8.6	23.1	13.8	8.7	2.8	37,541
1981										
Cultivators	3.9	29.8	29.5 ^d	8.7	3.7	8.3	7.8	3.1	5.2	21,641
All families	4.0	28.6	28.6 ^d	9.0	4.0	8.6	8.3	3.4	5.5	23,361

—Not available.

a. Some government departments, especially those connected with the Ministry of Agriculture, make loans to households, often in kind, such as seeds and fertilizers.

b. At 1970–71 (wholesale) prices. One 1970–71 rupee is worth about 40 current U.S. cents at the official exchange rate in 1970–71.

c. Percentage is debt held by cooperatives and banks jointly.

d. Including insurance and provident funds.

Sources: RBI (1954, vol. 1, part 2, p. 3; 1977, p. 40; 1988, p. 38).

informal lenders? This is taken up in section III. Third, what is an appropriate model of competition between institutions, that is, formal credit agencies, and informal lenders, and what are the main conclusions to be drawn from it about the borrower's welfare and the allocation of resources? This is taken up in section IV. In section V, I make five proposals for public policy.

I. INDEBTEDNESS AND CREDIT AGENCIES: AN EVALUATION OF THE EVIDENCE

The fall from dominance of the moneylender, as revealed in table 1, invites critical scrutiny. The first reservation stems from the implausible behavior of certain key variables derived from the official surveys. Aggregate real debt fell by one-third from 1971 to 1981. More strikingly, the debt-asset ratio declined from 5.9 percent in 1951 to 1.8 percent in 1981. In view of the growth in incomes and the intensification of agriculture during this period, such a decline seems most unlikely. In examining the various components of this decline, attention will be focused on cultivating households, which the surveys define as those cultivating in excess of 0.05 acres. Such households accounted for 85, 88, and 92 percent of the total rural debt in 1961, 1971, and 1981, respectively, and 76 percent of all rural households in 1981 (RBI 1977, p. 6; RBI 1988, p. 31). This focus will also facilitate comparisons with the estimates derived from two independent surveys.

The key magnitudes are set out in table 2. First, the proportion of cultivating households reporting any debt declined from 69.2 percent in 1951 to 46.1 percent in 1971, and then to 22.3 percent in 1981 (line 1). This last figure and the steep decline from the proportion in 1971 clearly perplexed the authors of the first published report on the 1981 survey: "the present round estimate appears to be inexplicably low . . ." (NSSO 1986, p. 16).

Panikar and others (1988) have examined in considerable detail the purported decline in the proportion of cultivating households reporting any debt over the period 1961-81. They focus on the shift in sampling strategy, from relatively few villages (about 2,000) and many households per village (forty) in 1961, to more villages (about 8,000) and fewer households per village in 1971

Table 2. *The Indebtedness and Assets of Cultivators: The Official Evidence*

<i>Indebtedness or assets</i>	1951	1961	1971	1981
1. Proportion of indebted households (percent)	69.2	50.0	46.1	22.3
2. Debt per indebted household (rupees) ^a	1,114	1,314	1,281	1,324
3. Debt per household (rupees) ^a	771	657	590	296
4. Proportion of total debt owed to institutions (percent)	7.6	18.4	31.7	63.2
5. Assets per household (rupees) ^a	13,068	9,125	14,183	16,393
6. Debt-asset ratio (percent)	5.9	7.2	4.1	1.8

a. Rupees in 1970-71 wholesale prices.

Sources: RBI (1954, vol. 1, part 2, p. 3; 1977, p. 40; 1988, p. 38).

(twelve) and 1981 (eight). In doing so they make a persuasive case that this shift has resulted in less reliable estimates of the incidence of indebtedness for 1981 in relation to 1971, with an unclear result for 1971 in relation to 1961.

The possibility of large nonsampling errors must also be considered. The authors of the National Sample Survey Organization (NSSO) report in *Sarvekshana* (NSSO 1986) do so implicitly by drawing attention to the large differences between the estimates obtained from the central samples, which are canvassed by the NSSO's own investigators, and the estimates obtained from the state samples, which are canvassed by investigators of the state cadres. Because the central and state samples are both large, differences in the magnitude of their nonsampling errors seem likely culprits. In this connection, it should be noted that the quality and training of the NSSO's own investigators were superior to those of the state cadres. The share of NSSO observations in the total sample declined from more than 90 percent in 1961 to slightly less than 50 percent in 1981. Thus part of the decline in the incidence of indebtedness over that period may simply reflect a progressive systematic bias as the weight of the state estimates in forming the pooled estimates grew.

Second, the estimated level of (real) debt per indebted household has changed little since 1961, and increased by just under one-fifth between 1951 and 1981 (row 2 of table 2). In view of the technical changes in agriculture since the mid-1960s, the former finding strains belief. At least one component of the official estimates of cultivators' total debt supports this skepticism. The extent of underreporting of debt to cooperatives, according to the RBI's financial statistics for those institutions, increased from 17 percent in 1961 to 39 percent in 1971 (RBI 1977, p. viii). It seems unlikely that this increase stemmed wholly or even mainly from the shift in sampling strategy discussed above, for the estimated proportion of indebted households fell only a little and the efficiency of these estimates did not differ much for the years in question (Panikar and others 1988).

Taken together, the official estimates of the incidence and amount of indebtedness yield a level of real debt per cultivating household of about Rs300 in 1981, which is barely one-half of the level in 1971 and less than 40 percent of the 1951 level (see row 3 of table 2). Because holdings of real assets increased over the whole period (row 4), the decline in the debt-asset ratio (in row 6) is arithmetically "explained."

Whether the estimates on which the debt-asset ratio is based command credence or not is another matter. Slightly facetiously, one is tempted to conclude from table 2 that public policies are well on the way to banishing from rural economic life not only the private lender, but also indebtedness itself. Certainly this conclusion is consistent with the widespread view in rural India that institutional loans are really grants, because politicians regularly vie with one another in promising, if elected, to have such debts forgiven.

By calling into question the reliability of the official estimates of the extent of indebtedness, especially those for 1981, the above discussion also serves to

cast doubt, indirectly, on the changes in the composition of the aggregate debt owed to various agencies set out in table 1. Although no evidence has been adduced that the various components are subject to different rates of underreporting, the claim that informal lenders as a group enjoyed an utterly dominant position in 1951 is surely beyond dispute. In order to clinch the argument that the table underestimates the size of the informal sector, some direct evidence is needed.

Such a challenge to the official estimates, and hence any claims based on them, is provided by two independent surveys of particular areas of India. These surveys were mounted under the auspices of World Bank research project RPO 671-89, "Impact of Agricultural Development on Employment and Poverty in India" (hereafter WBRPO), and the village studies program of the International Crop Research Institute for the Semi-Arid Tropics (ICRISAT). The former covered forty households in each of thirty-four villages spread over the states of Andhra Pradesh, Bihar, and Punjab, and the latter covered forty households in each of six villages in semi-arid tracts of the states of Andhra Pradesh, Madhya Pradesh, and Maharashtra.¹ While neither can claim to be "representative" of the states in question, they are not especially atypical in any obvious way. Both surveys relied on enumerators who resided for long periods in the villages assigned to them. As noted above, the NSSO's design for 1981 involved far more villages, but only eight households per village, which were canvassed by a nonresident enumerator. Keeping the official estimates for 1951 as a benchmark, I shall now compare the estimates from the two unofficial surveys with the RBI's estimates for 1981.²

The RBI's and WBRPO's estimates for 1981 are compared in table 3. Unfortunately, whereas the former do not include borrowings, complete tabulations in the latter case are available only for borrowings. Nevertheless, one central comparison can be made directly, namely, the proportion of households reporting indebtedness (rows 1). In all three states, the WBRPO's estimates for 1981 are far higher than the RBI's, although they are close to the estimated incidence of indebtedness in the RBI's survey in 1951 (see column 2, row 1). In the case of Bihar, the WBRPO's estimate is more than four times the RBI's, to which one might add that most of those who have conducted fieldwork in Bihar will surely regard the RBI's estimate that only one-seventh of that state's cultivators were indebted as little short of preposterous.

The remaining comparisons between the RBI's and WBRPO's estimates are necessarily indirect. Real borrowings per borrowing household (rows 3) changed

1. The relevant sources for present purposes are, respectively, Bell and Srinivasan (1985, 1989), Binswanger and Rosenzweig (1984), and Binswanger and others (1985).

2. From 1961 on, the sampling design and execution of the decennial surveys have been the responsibility of the NSSO, whereas the results of those surveys have been reported in a series of monographs published by the RBI. Because the latter sources are well-known and widely accessible, the estimates reported therein will be referred to henceforth as those of the RBI.

Table 3. *The Debts and Borrowings of Cultivators: A Critical Comparison of Surveys*

State and variable	1951		1981		
	Debt (RBI)	Borrowings (RBI)	Debt		Borrowings (WBRPO)
			RBI	WBRPO	
<i>Andhra Pradesh</i>					
1. Proportion of households reporting	81.4	71.3	32.0	60.5	43.0
2. Amount per household	1,327	834	478	—	519
3. Amount per reporting household	1,630	1,170	1,493	—	1,210
4. Proportion transacted with institutions	3.9	4.7	43.6	—	35.4
<i>Bihar</i>					
1. Proportion of households reporting	79.2	68.7	13.8	61.7	37.6
2. Amount per household	593	322	88	—	167
3. Amount per reporting household	749	469	642	—	444
4. Proportion transacted with institutions	5.1	4.8	48.8	—	38.0
<i>Punjab</i>					
1. Proportion of households reporting	56.1	45.8	23.4	48.2	83.9
2. Amount per household	882	440	825	—	2,961
3. Amount per reporting household	1,573	961	3,527	—	3,529
4. Proportion transacted with institutions	9.0	18.8	76.9	—	53.7

—Not available.

Note: Rupees are in 1970–71 prices.

Sources: RBI (1954, vol. 1, parts 1 and 2; 1988, pp. 31, 45); Bell and Srinivasan (1985, 1989).

little between 1951 and 1981 in Andhra Pradesh and Bihar but increased almost fourfold in Punjab. Moreover, this is a conservative assessment, because RBI's borrowings refer to a complete year, whereas the WBRPO's borrowings refer to a single agricultural season.³ Now consider the ratio of debt to current borrowings averaged over all households (rows 2). In 1951 the values for Andhra Pradesh, Bihar, and Punjab were 1.59, 1.84, and 2.00, respectively. Because the average time to maturity of loans has probably lengthened over the period in question, one would expect the corresponding values for 1981 to be somewhat higher. Combining the RBI's estimates for debt in 1981 with the WBRPO's for borrowing, however, yields much lower ratios of 0.94, 0.53, and 0.28, respectively. Taken together, the RBI's estimates of indebtedness and borrowing for 1951 and the WBRPO's estimates of borrowing for 1981, which are broadly consistent with earlier beliefs based on the growth of agricultural incomes and the intensification of agricultural techniques, indicate that the RBI's estimates of indebtedness in 1981 are implausibly low. Allowing for the fact that the WBRPO's estimates are based on a single season of 1980–81, it seems fairly safe to conclude that real debt per household in Andhra Pradesh

3. The season of Rabi (November 1, 1980, to May 31, 1981) in Bihar and Punjab, and the season of Kharif (May 1, 1980, to December 31, 1980) in Andhra Pradesh.

and Bihar fell little, if at all, from its level in 1951, and it may have grown five- or even tenfold in Punjab. In contrast, according to the estimates in table 1, aggregate real debt grew little, if at all, between 1961 and 1971 and then fell by more than one-third in the following decade.

Doubts concerning the reliability of the RBI's estimates of indebtedness in 1981 are strengthened by an examination of ICRISAT's estimates for June 30, 1980. The last column of table 4 shows that ICRISAT's estimates of debt per household in Andhra Pradesh, Madhya Pradesh, and Maharashtra are roughly four, seven, and five times larger, respectively, than those of the RBI.⁴ The conclusion that the RBI's estimates of indebtedness in 1981 are implausibly low is surely irresistible.

The independent surveys suggest that the aggregate real debt of cultivators in 1981 was at least twice, and quite possibly five times, greater than the RBI's estimate (table 1, last column), which implies an aggregate debt of Rs43 to Rs108 billion (at 1970-71 wholesale prices; billion = 1,000 million) for cultivating households in 1981. In turn, this implies that the debt-asset ratio in 1981 lay in the range 3.8 to 9.5 percent, as opposed to the RBI's estimate of 1.8 percent. By way of direct comparison, ICRISAT's estimates of the debt-asset ratios in the villages surveyed were about 11 percent.

This revision of the estimated level of debt in 1981 also carries an implicit conclusion concerning the level of informal lending in rural areas. Except for the moment the RBI's estimates of the combined share of landlords, moneylenders, and traders as creditors in total debt, which are 69.9, 52.6, and 22.9 percent in 1961, 1971, and 1981, respectively. Then this erosion in their share over the period in question was probably not accompanied by a substantial contraction in the volume of real debt owed to them. Thus, even if the moneylender is now "in his place," as the authors of RBI (1954, vol. 2, p. 482) would see it, he is also still very much in business.

There remains the possibility that the RBI's estimates of the combined *shares* of informal lenders in rural debt are also too low. A comparison of the estimates of debt and annual borrowings in table 3 reveals that the average maturity of loans exceeded one year in all three states in 1951. If institutions had made heavy inroads at the expense of informal lenders in the decades that followed, and the average maturity of institutional loans was at least as great as that of informal loans, which is plausible, then in later surveys one would expect the share of borrowings from institutions to exceed the share of total debt owed to them. Yet a comparison of the RBI's estimates of the latter share for 1981 with the WBRPO's estimates of the former (see table 3, rows 4), reveals that the contrary holds. The differences are, moreover, substantial, especially in the Punjab, where agriculture is most commercialized. Strictly speaking, the presence of sampling and nonsampling errors precludes any logical inferences

4. ICRISAT's sample comprises thirty cultivating and ten agricultural labor households in each village. Thus the RBI's estimates for *all* rural households are employed in the comparison.

Table 4. *Household Indebtedness to Credit Agencies in 1980–81: A Critical Comparison of Surveys*
(rupees per household)

State and survey	Government	Cooperatives	Relatives and			Agriculturist moneylenders	Professional moneylenders	Traders	Others	Total
			Banks	friends	Landlords					
<i>Andhra Pradesh</i>										
RBI	32 (2.5)	278 (21.5)	254 (19.6)	96 (7.5)	125 (9.7)	191 (14.8)	117 (9.0)	57 (4.4)	142 (11.0)	1,293 (100.0)
ICRISAT ^a	— (—)	1,380 (26.6)	498 (9.6)	5 (0.1)	— (—)		2,330 ^b (45.0) ^b	56 (1.1)	914 (17.6)	5,183 (100.0)
<i>Madhya Pradesh</i>										
RBI	15 (2.2)	228 (33.8)	209 (31.0)	24 (3.6)	15 (2.2)	40 (5.9)	110 (16.3)	28 (4.3)	5 (0.7)	674 (100.0)
ICRISAT ^a	1,048 (21.6)	2,947 (60.7)	98 (2.0)	186 (3.7)	— (—)		190 ^b (3.9) ^b	226 (4.7)	162 (3.4)	4,857 (100.0)
<i>Maharashtra</i>										
RBI	46 (3.9)	664 (56.0)	331 (27.9)	78 (6.6)	9 (0.8)	14 (1.2)	15 (1.3)	9 (0.8)	18 (1.5)	1,186 (100.0)
ICRISAT ^a	815 (13.6)	3,320 (54.6)	58 (1.0)	1,450 (23.8)	— (—)		409 ^b (6.7) ^b	— (—)	35 (0.5)	6,086 (100.0)

—Not available.

Note: The figures in parentheses are percentages.

a. Two villages in a semi-arid district.

b. Debt to both agricultural and professional moneylenders.

Sources: RBI (1988, p. 45); Binswanger and others (1985) for ICRISAT.

to be drawn from comparisons of two different surveys. Nevertheless, it can be claimed with some confidence that in Andhra Pradesh, Bihar, and Punjab, the erosion of the informal lender's *relative* position has been probably much less marked than table 1 would suggest. ICRISAT's estimates provide strong support for this conclusion for a semi-arid tract of Andhra Pradesh, although they broadly agree with the RBI's estimates for Madhya Pradesh and Maharashtra. Taken together, the independent surveys support the contention that in a diverse and important set of states, the relative share of informal lenders has declined less markedly over the past two decades than the RBI's estimates would indicate.

To sum up, although the moneylender did lose ground relative to institutions over the period from 1951 to 1981, he remained a very important source of finance to rural households, and the expansion of aggregate debt was almost surely so great as to imply that his volume of business grew. With this important preliminary matter largely settled, I turn now to how he responded to the competition—and opportunities—offered by the advance of cooperatives and, more recently, the commercial banks.

II. INFORMAL LENDERS AND PUBLIC POLICY

The lender has several guises, which reflect what anthropologists call the multiplex nature of rural life. The same individual may lend to cultivators and laborers. If he has land and cultivates part of it, those of his tenants and laborers who borrow from him will think of him as a landlord, while other owner-cultivators will think of him as a cultivator who pursues moneylending on the side. In certain areas of India, some of the borrowers (though almost certainly not those who are laborers) may be his relatives and regard themselves as such in their dealings with him. Similarly, the village shopkeeper often lends to his customers in the lean season and may engage in commodity trading on a small scale at harvest time. As we shall see, traders and commission agents (who operate as brokers between farmers and both private traders and state purchasing agencies) are often heavily involved in financing cultivation, with the provision that their clients sell their crops to, or through them, respectively. Thus the lender's guise is very much in the eye of his clients, and though the categories in table 1 look tidy and mutually exclusive, they must have seemed elastic and slippery to the respondents whose replies are reported therein.

The authors of the *All-India Rural Credit Survey* (RBI 1954) and their successors were aware of these difficulties of interpretation. Only interest-free loans between relatives or friends qualified for the category "relatives and friends"; only loans to tenants qualified for "landlords"; and the remainder were categorized by the principal business of the lender (RBI 1954, vol. 1, part 2, p. 1). Even so, this scheme is not watertight and the quality of its execution by individual enumerators was surely variable. For these reasons, the changes in the composition of the debt owed to individual lenders reported in table 1

must be viewed with considerable caution. Nevertheless, such a comparison is called for if the influences of public policies on informal lending are to be identified and understood.

Between 1951 and 1961, according to table 1, the inroads made by institutional agencies into rural lending were fairly limited. Regarding the sources of credit, the striking change that occurred in this period was the overwhelming displacement of the professional by the agriculturist moneylender. It will now be argued that this displacement was more apparent than real.

There were two policy interventions that are especially relevant here. First, the state attempted to register professional moneylenders and regulate their practices. Although some may have gone out of business altogether as a result, most probably assumed another guise and continued moneylending as a sideline. Second, during the 1950s the zamindars⁵ interests in land were abolished in favor of their registered tenants, and other land legislation that made own-cultivation more attractive was also enacted. In all likelihood, therefore, many rural, and some urban, professional moneylenders responded by taking up cultivation in a substantial way. Certainly it would have been easy for them to do so. In 1951, before the abolition of zamindari, 68 and 29 percent, respectively, of rural and urban professional moneylenders reported cultivation as an additional activity, and a further 10 and 14 percent, respectively, reported that they were noncultivating landlords (RBI 1954, vol. 2, p. 170). Trading and related activities, which are not mutually exclusive with owning or cultivating land, were pursued by 38 and 78 percent, respectively. Only 2 and 6 percent of village and urban moneylenders, respectively, reported no other profession but moneylending in 1951 (RBI 1954, vol. 2, p. 170). There is thus no reason to believe that departures from this line of business were large. In all probability, most of the professional moneylenders who were active in 1951 had assumed the guise of agriculturalist moneylenders, who were extremely active in 1961.

In the next two decades, according to table 1, the agriculturist moneylender suffered a fall from dominance at the hands of, first, the cooperatives and, second, the commercial banks, which were nationalized in 1969. In contrast, the combined share of landlords, professional moneylenders, and traders decreased quite modestly.

The findings of the independent surveys by ICRISAT and the WBRPO cast considerable doubt on some aspects of this "official" account. In ICRISAT's areas, the traditional moneylender was still (just) holding his own in Mahbubnagar district, Andhra Pradesh; institutions were utterly dominant in Akola district, Madhya Pradesh; and relatives and friends were important sources in

5. Zamindars were essentially tax-farmers, who held title to land on condition of payment of a fixed sum to the government and leased their land to tenants. There were often several layers of subtenancy, and in such cases those who actually cultivated the land did so under oral contracts. The zamindari system was established under the terms of the Permanent Settlement of 1793.

Table 5. *The Numbers of Lending Households in the WBRPO's Villages, Rabi Season, 1980-81*

Household type	Andhra Pradesh		Bihar		Punjab	
	Lenders	Total	Lenders	Total	Lenders	Total
Landlords	9	84	4	29	0	78
Owner-cultivators	270	2,165	79	719	56	779
Owner-tenants	13	151	11	173	7	177
Pure tenants	4	79	1	60	0	131
Attached laborers	32	137	1	200	0	129
Landless laborers	2	489	0	384	0	816
Landed laborers	27	646	0	470	0	94
Other laborers	0	147	0	178	3	188
Traders and moneylenders	6	110	8	68	39	125
Others	38	649	18	214	3	477
Total	400	4,657	122	2,494	108	2,998

Source: Bell and Srinivasan (1985).

Sholapur district, Maharashtra (see table 4). In Akola and Sholapur the traditional moneylender had departed the scene some time before (Binswanger and others 1985). In the WBRPO's villages, a small proportion (3-9 percent) of all households reported making loans in the single season canvassed in 1980-81 (see table 5, last row). These are, of course, almost certainly underestimates, because respondents are usually more reluctant to reveal what they have lent than what they have borrowed, especially in the earlier stages of an enumerator's stay. Even taking the data in table 5 at face value, owner-cultivators and owner-tenants were relatively active as lenders in all three states, as were village traders, one-third of whom were lending in Punjab. Thus the agriculturist moneylender and resident trader (usually shopkeeper) are still in business in these villages, from undeveloped Bihar to commercialized Punjab.

The really intriguing feature of the WBRPO's data, however, is the importance of *nonresident* traders and commission agents as sources of finance in the most commercialized areas. Table 6 sets out the borrowings of cultivating households by source, with private loans classified according to whether they were interlinked with tenancy (land) or marketing (output) contracts, the residual category "other" being almost entirely made up of untied loans. Cross-sectionally, it is clear that commercialization is associated with heavier borrowings, not only from institutions, but also from traders and commission agents. Indeed, the average amount borrowed with output interlinking in Punjab greatly exceeded the average amount borrowed from all sources in Andhra Pradesh and Bihar. The same pattern was also evident *within* the latter states: traders and commission agents were making substantial loans to farmers cultivating potatoes near Patna in Bihar, paddy in the command area of the Nagarjunasagar irrigation system, cotton in Kurnool district, and paddy and sugarcane in Chittoor district, all in Andhra Pradesh. Thus trade and (interlinked) money-

Table 6. *The Borrowings of Cultivating Households in the WBRPO's Villages by Source and by Interlinkages, Rabi Season, 1980-81* (rupees per household)

State	Loans from institutions	Loans from informal lenders interlinked with:			Total
		Land	Output	Other ^a	
Andhra Pradesh	486 (35.4)	1 (—)	149 (10.9)	738 (53.7)	1,374 (100.0)
Bihar	168 (38.0)	11 (2.4)	16 (3.6)	247 (56.0)	442 (100.0)
Punjab	4,213 (53.7)	50 (0.6)	2,258 (28.8)	1,328 (16.9)	7,849 (100.0)

—Not available.

Note: The figures in parentheses are percentages.

a. All but a very small part is not interlinked.

Source: Bell and Srinivasan (1985).

lending flourish with advancing commercialization, as simple intuition would suggest.

Stated in a somewhat different form, this thesis has been pursued with considerable vigor by Harriss (1982, 1983), on the basis of her detailed field studies in Tamil Nadu. Harriss reports that in the early 1970s in North Arcot district, about half of the traders' clients also borrowed from them. She argues that moneylending was a relatively competitive activity, with numerous lenders and fairly easy entry. In support of this position, she points first to the fact that interest rates barely exceeded legal ceilings. Second, in regard to ease of entry, a fall in the volume of finance available from traders at one juncture appeared to induce a great expansion in pawnbroking, which catered heavily to poorer households (Harriss 1982).

It may be claimed with some confidence, therefore, that public policies that have promoted the growth of agriculture and its commercialization have also encouraged the rise of the trader and his associated lending activities. Indeed, Harriss goes so far as to assert that Tamil Nadu is a "Merchant State" (1983, p. 81).

III. INSTITUTIONAL FUNDS FOR INFORMAL LENDERS

One potentially important form of interaction between institutional and informal credit agencies is financial intermediation, the extent of which ought to have been influenced by the great expansion of institutional credit over the past forty years. I first summarize for 1950-51 some features of the pattern of intermediation (see table 7). Fewer than 4 percent of village moneylenders borrowed from commercial banks, but 35 percent of traders did. One-fourth of urban moneylenders borrowed from commercial banks and some of them

Table 7. *Moneylenders' Dependence on Borrowed Funds, 1951-52*

Creditors	Number responding	Number borrowing	Number borrowing from:				Total ^a
			Commercial banks	Indigenous bankers	Other moneylenders	Others	
Village moneylenders	622	174	7 (3.5)	11 (5.5)	136 (68.0)	45 (22.5)	199 (100.0)
Urban moneylenders	2,854	966	320 (25.5)	84 (6.7)	673 (53.6)	178 (14.2)	1,255 (100.0)
Traders	5,047	3,246	1,567 (34.6)	214 (4.7)	1,447 (32.0)	1,299 (28.7)	4,527 (100.0)
Indigenous bankers	152	83	34 (29.1)	13 (11.1)	42 (35.9)	28 (23.9)	117 (100.0)

Note: The numbers in parentheses are percentages of the "Total" column.

a. This will exceed the number borrowing if some lenders themselves borrowed from more than one source.

Source: RBI (1954, vol. 1, part 2, pp. 670-79).

re-lent funds to other private lenders. It is also clear that a significant proportion of those who depended on borrowed funds borrowed from more than one source.

Unfortunately, it is very difficult to arrive at quantitative estimates of the extent of such intermediation. Cultivating families borrowed, on average, Rs2.0 and Rs11.5 from commercial banks and traders, respectively, in the year 1951-52 (RBI 1954, vol. 1, part 2, p. 3). Loans to cultivating households accounted for 2.9 percent of all commercial bank advances (RBI 1954, vol. 2, p. 181), and advances for wholesale trade in agricultural commodities accounted for 16.8 percent (RBI 1954, vol. 2, p. 183). Directly and indirectly (through traders and urban moneylenders) commercial bank lending enlarged the finance available to rural households even in 1951-52, though both were certainly small relative to the total borrowings of cultivating households.

The picture after 1951 is much less clear, in part because the RBI in concert with the NSSO has ceased its inquiries of lending agencies. It is therefore necessary to rely on independent studies, which inevitably deal with limited geographical areas. Harriss (1982) constructs a convincing case that with the ending of the cooperative monopoly in fertilizer marketing, intermediation became extensive in North Arcot in the early 1970s. Dealers in agro-inputs were able to obtain bank credit both for the purchase of goods for resale and for crop production on their own farms and those of their clients. The interest rates charged by dealers were higher than those charged by cooperatives, but the dealers still accounted for about half of all fertilizer sales. In contrast, bank loans to paddy and rice traders were prohibited, but enforcement was rather feeble, and such loans were certainly made, perhaps on a large scale. Harriss

Table 8. *Total Borrowings by Resident Traders and Moneylenders in the WBRPO's Villages, Rabi Season, 1980–81*
(rupees)

<i>Andhra Pradesh</i>		<i>Bihar</i>		<i>Punjab</i>	
<i>Informal</i>	<i>Institutional</i>	<i>Informal</i>	<i>Institutional</i>	<i>Informal</i>	<i>Institutional</i>
4,100	0	42,900	79,400	170,300	10,300
(0.2)	(0)	(5.9)	(20.1)	(3.2)	(0.2)

Note: The figures in parentheses are proportions of the total amount borrowed by all households from the source in question.

Source: Bell and Srinivasan (1985).

also notes that larger farmers were themselves very active as lenders, drawing upon the commercial banks, cooperatives, and dealers as sources of funds.

The WBRPO's survey was confined to households resident in the sampled villages, so that direct information on the financial dealings of nonresident traders and commission agents, who are a very important source of rural credit in commercial areas, is not available. Table 8 reports borrowings by resident traders and moneylenders from informal and institutional sources in 1980–81. It suggests that intermediation involving institutional agencies and resident trader-moneylenders was probably very small in Andhra Pradesh and Punjab. Intermediation may have been significant in Bihar, however, where institutional borrowings of resident traders and moneylenders represented 20 percent of the total amount borrowed by all Bihar households in that season.

IV. COMPETITION BETWEEN INFORMAL LENDERS AND STATE AGENCIES

All lenders face three problems arising from asymmetric information and the fact that disbursement and repayment are necessarily separated in time. First, the terms of the loan contract may influence the characteristics of those who present themselves for loans and, hence, the distribution of the lender's returns. If the lender cannot at reasonable cost distinguish good borrowers from bad, he faces a potential problem of "hidden information," to use Arrow's (1985) terminology—or, as it is usually called, adverse selection. Second, even if the characteristics of the borrower are fully known to the lender, the terms of the loan may influence the borrower's activities and performance in ways that affect the lender's returns. In an uncertain environment, where poor returns from the borrower's activities may result from bad luck rather than indolence, prohibitively costly monitoring of the borrower's actions will confront the lender with the problem of "hidden action"—or, as it is usually called, moral hazard. Third, when the loan falls due, the lender must recover principal and interest, either out of the borrower's returns or, if these are insufficient, out of any collateral specified in the loan contract. Thus he faces a potential problem of enforcement.

Before attempting to analyze competition between informal lenders and institutional agencies, therefore, some comments on the former's system of operation are needed.

Moneylenders' Modus Operandi

Many of those who have firsthand experience in rural credit markets emphasize the moneylender's intimate knowledge of the borrower's character and circumstances. Writers as diverse as Darling (1925), the authors of RBI (1954), and Harriss (1982) put such knowledge at the center of the moneylender's system of operation. For example: "There is little that escapes his eye in the circumstances of his debtors or of those who may one day be his debtors. What cooperatives merely postulate, he actually possesses, namely, a local knowledge of the 'character and repaying capacity' of those he has to deal with" (RBI 1954 vol. 2, p. 171).

This passage makes it clear that moneylenders take the problem of adverse selection very seriously. It suggests that they solve it by confining their lending to a group of known clients, such as they might build up by operating in a particular village or set of villages over a period of years. Of course, they must still make the relevant investment in building up a clientele and adding to it when the occasion looks promising. Once they have done so, however, what was hidden information about their clients' characteristics becomes inside knowledge, which other potential lenders must acquire if they are to compete. This arrangement is a far cry from the pooling and separating equilibriums that feature so prominently in the literature on adverse selection in insurance markets, in which the characteristics of agents are not ascertained *ex ante*.

The fact that lenders prefer to deal only with longstanding clients and take on new ones reluctantly (and only then after extensive inquiries) makes it costly for borrowers to switch to other lenders. Because the game between a lender and his clients is likely to be repeated over a succession of seasons, the lender should find it less difficult to distinguish between bad luck and poor performance, especially when his clients reside in the same village and the risks each faces from variations in the state of nature should be quite strongly correlated. These considerations will influence the borrower's actions in ways that mitigate the problem of moral hazard for the lender. They do not, however, eliminate it entirely. Of the 622 village moneylenders and 2,854 urban moneylenders who responded to the RBI's inquiries in 1951, 344 and 1,497 replied to the question concerning the proportion of their loans to agriculturists which they considered doubtful. Of those with doubtful loans, 104 village and 529 urban moneylenders said that such loans were 10 percent or more of their total lending (RBI 1954, vol. 1, part 2, pp. 477, 501). In regard to litigation for recovery, the numbers answering the question were 187 and 1,162, respectively, of whom 46 and 383, respectively, put the proportion of loans thus affected at 10 percent or more (pp. 477, 503). This suggests that moneylenders had not fully overcome the problems of moral hazard and enforcement. More-

over, changes in India's legal and political climate since 1951 have surely exacerbated them, as politicians regularly vie with one another in promising, if elected, to impose a moratorium on the repayment of informal and institutional debts alike. If this were done, informal lenders could no longer resort to litigation to recover their loans—though other methods would remain open.

Relative to other lenders, the trader-moneylender is especially well placed to enforce his claims. When the crop is sold to or through him, he is in a position to exercise first claim on the proceeds, to the detriment of the borrower's other creditors. There is also sometimes cooperation among traders in this regard, especially in towns with well-organized commodity markets. In Chittoor, for example, a commission agent who dealt in *gur* (a sugar product) told me that agents frequently know one another's clients. If a farmer attempted to sell through an agent other than the one with whom he normally dealt, the new agent would deduct principal and interest on the loan, basing his calculations on the usual rule of thumb relating the size of the loan to the quantity to be delivered, and hand over the said sum to the first agent. Others doing field research have reported similar practices elsewhere in India.

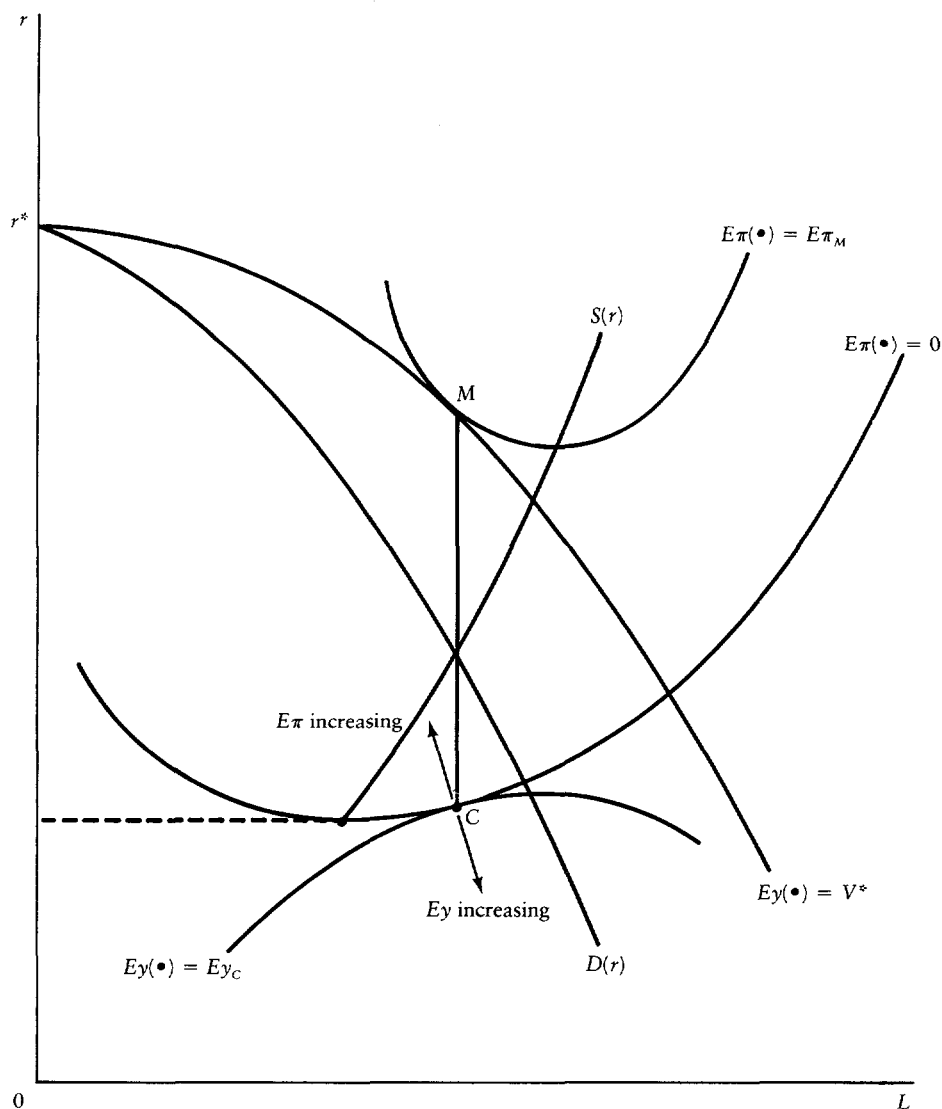
The Terms of the Credit Contract in the Absence of State Agencies

In order to analyze the determination of the terms of an informal loan and how those terms will be affected by the presence of a state agency in the setting just described above, a model of some kind is needed. The one underpinning the graphic analysis that follows is analyzed in detail in Bell (1990) and has something in common with that of Milde and Riley (1988).

The moneylender is assumed to be risk-neutral, so that he will maximize expected profits, $E\pi$. In general, the iso-expected profit curves will be U-shaped in the space of the size of the loan, L , and the rate of interest, r , as drawn in figure 1. This follows from the usual influence of fixed costs, which include the lender's investments in acquiring inside knowledge about his clients, and the fact that in the presence of moral hazard, the probability of default will at some point increase with the size of the loan. In order to keep the exposition simple and to avoid an excursion into certain technicalities, the contours of the expected-profit map have been drawn as smooth and strictly convex everywhere; but it should be noted that these properties may fail to hold, even with quite "nice" underlying assumptions.

There are two polar cases of particular interest. First, if there is free entry into moneylending, lenders will make zero expected profits. Thus, on the basis of his knowledge of the borrower's characteristics, the technology, and the distribution of the states of nature, each lender will offer the borrower the entire menu of contracts defined by the contour $E\pi(L, r) = 0$. Faced with this opportunity set, the borrower, who is also assumed to be risk-neutral, will select that contract which maximizes his expected net income, Ey . In figure 1, this is depicted as point C , where an iso-expected net-income contour is tangent to the zero-expected-profit contour $E\pi(L, r) = 0$. Observe that C lies to the

Figure 1. *The Loan Contract and Preference Maps in the Absence of an Institutional Lender*



left of the borrower's notional demand schedule $D(r)$, so that the borrower is rationed in the sense that at the interest rate in his optimum contract, he desires a larger loan than the one specified in that contract. Such a loan is not offered, however, because it entails negative expected profits for the lender.

At the other extreme, suppose the lender is a monopolist. In the absence of any competition, the lender is constrained only by the requirement that the contract he offers be at least as attractive as the borrower's reservation alternative of self-financing his activities, an option which yields the borrower an expected net income of V^* . Hence, the boundary of the lender's opportunity

set is the contour $Ey(L, r) = V^*$. In figure 1 the contract that will maximize his expected profit is at point M , where an iso-expected-profit contour is tangent to $Ey(L, r) = V^*$. The lender will make the borrower (something slightly better than) this all-or-nothing offer. Observe that it lies to the left of the notional supply schedule, $S(r)$, and to the right of $D(r)$. At the rate of interest at point M , the borrower would prefer to have a smaller loan, whereas the lender would prefer to extend a larger loan.

Between these two extremes, both parties will have some bargaining power and the final outcome will depend on their relative bargaining strengths. It is plausible that the outcome will be Pareto-efficient, so that it will lie somewhere on the contract locus CM .⁶

Exclusive Loans from Institutional Lenders

I now examine how the arrival on the scene of state agencies affects the welfare of borrowers and informal lenders and the terms of their loan contracts. In order to do this, I must begin by describing the terms offered by state agencies.

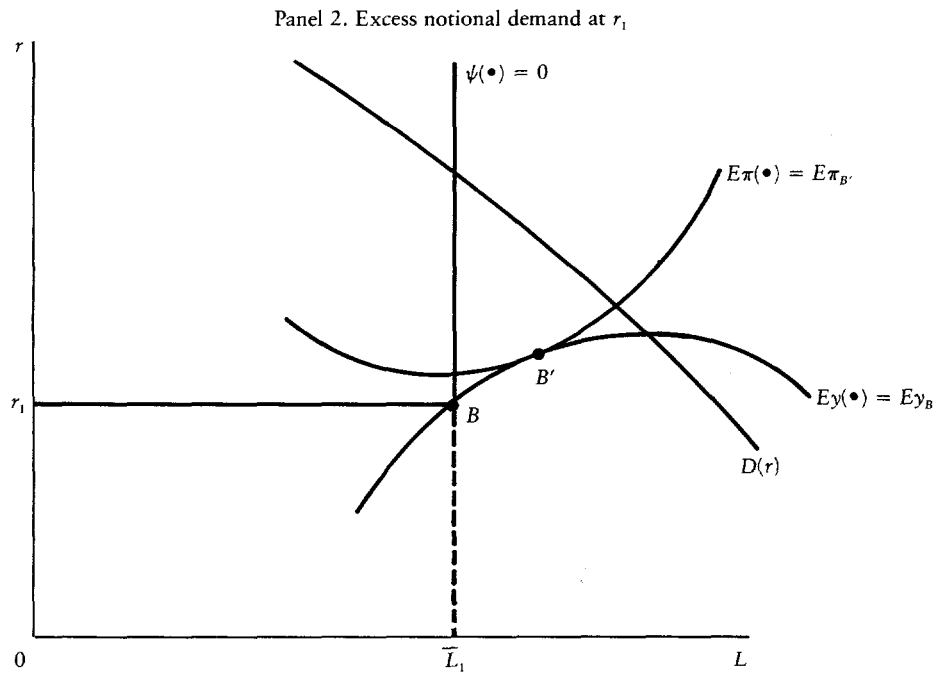
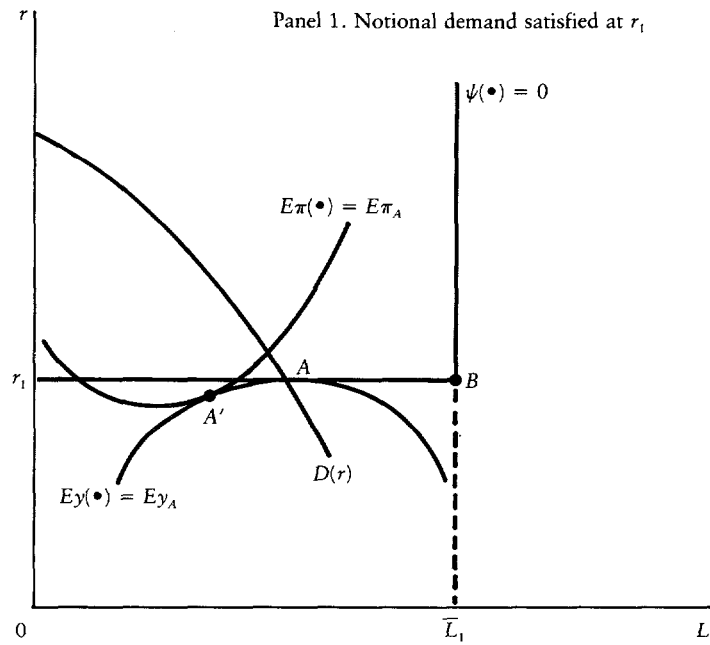
Assume that the rules of a cooperative or bank stipulate that a member or client in good standing qualifies for a loan up to a certain ceiling (or ration) L_1 at a given, regulated rate of interest r_1 . The ceiling depends on the purpose of the loan, the extent of the borrower's activity (say, the area to be devoted to certain crops), and the form of any associated collateral, which may be just the crop itself. An influential individual might be able to get the rules bent to his advantage, particularly in regard to the ceiling, but that will not detain us here. For the moment, it will simplify the exposition if informal lenders are ignored. Then the boundary of the borrower's opportunity set in the space of (L, r) in dealing with a bank or cooperative is represented by $\psi(\bullet) = 0$, as depicted in figure 2. When an individual's *notional* demand for credit, $D(r)$, is less than \bar{L}_1 , the loan chosen, L_1^0 , will also be less; when greater than or equal to the ceiling, $L_1^0 = \bar{L}_1$. These two qualitative outcomes are depicted in figure 2. In panel 1, the borrower's notional demand for credit at the rate r_1 , $D(r_1)$, is less than his ration L_1 . Thus he chooses point A , where his notional demand schedule, $D(r)$, intersects the horizontal section of $\psi(\bullet) = 0$. By the definition of $D(r)$, the iso-expected net-income contour that passes through A , $Ey(\bullet) = Ey_A$, is tangential to $\psi(\bullet) = 0$ at that point. In panel 2, $D(r_1)$ exceeds L_1 so that the borrower must make do with his ration, which puts him at point B , the "elbow" of $\psi(\bullet) = 0$. Because the borrower is rationed, the iso-expected net-income contour passing through B , $Ey(\bullet) = Ey_B$, must be upward-sloping at B .

Equilibrium in the Credit Market with Exclusive Contracts

I now reintroduce the informal lender and begin with the case in which he was a monopolist before the establishment of a cooperative or a branch of a

6. In this particular model, it turns out that CM is a vertical line, a result obtained by Milde and Riley (1988) for a similar model.

Figure 2. Competition between an Institutional and an Informal Lender: Exclusive Contracts



state bank. This would approximate the situation in many developing areas, where low productivity and limited commercialization limit the size of the market for loans. If both the moneylender and the state agency can enforce exclusive contracts, then he must offer the farmer a contract that is at least as attractive as (L_1^0, r_1) . Because the borrower's iso-expected net-income contours are inverted U shapes in the space of (L, r) , the moneylender's optimum will be the point of tangency between the map of iso-expected-profit contours and the borrower's iso-expected net-income contour corresponding to the reservation alternative of borrowing from the institutional lender. In panel 1 of figure 2, the point of mutual tangency, A' , is depicted as lying to the left of A ; but A' will lie to the right of A if A lies to the left of the supply curve. In both cases the rate of interest in the contract offered by the informal lender is less than r_1 , but it is packaged with a particular size of loan in an all-or-nothing deal. In panel 2, the moneylender's optimum is the all-or-nothing offer depicted as point B' , a contract in which both the rate of interest and the size of the loan exceed their institutional counterparts at B .

Now recall the benchmark case of the monopolist moneylender in which the borrower does not enjoy the alternative opportunities described by $\psi(\cdot) = 0$, (because either there is no institutional lender or he is unable to obtain a loan; $L_1 = 0$). In that case, he will obtain V^* from his loan from the moneylender. In light of past and current interest rate policies, it can be assumed that for most would-be borrowers, r^* exceeds r_1 by a substantial margin. Hence, the moneylender's expected profits will be lower and the borrower's expected net income will be higher, following the arrival of the institutional credit agency—provided the borrower can obtain an institutional loan. Figure 2 is just a formal representation of how, if the moneylender had monopoly power in the informal credit market, the institutional lender has “put him in his place”—but not out of business, unless his expected profits at A' and B' are negative.

The analysis of the polar case in which there is free entry into moneylending is similar. I begin with the case in which the borrower is unrationed in the market for institutional loans. If Ey_A in panel 1 of figure 2 exceeds Ey_C in figure 1, informal lenders will go out of business. Conversely, if Ey_C exceeds Ey_A , institutional lenders will find no clients. In the case in which the borrower is rationed in the institutional segment of the market, everything hinges on whether $E\pi_B$ is positive or negative. If it is positive, institutional lenders will find no clients; if it is negative, informal lenders will go out of business.

Empirical Evidence: Nonexclusive Contracts by Institutional Lenders

The above analysis affords some useful insights, but we must now examine whether the key assumption that exclusive contracts are enforceable is empirically relevant. Table 9 indicates that in the WBRPO's villages, a substantial proportion of borrowers obtained credit from both informal and institutional sources in Punjab, which is perhaps the most interesting case in this connection. In Andhra Pradesh and Bihar the proportions are much smaller, but they are

Table 9. *Borrowing Households in the WBRPO's Villages, Rabi Season, 1980-81, by Source*

<i>State and borrower</i>	<i>Percentage of households borrowing from:</i>			<i>Total</i>
	<i>Informal lenders only</i>	<i>Institutions only</i>	<i>Both</i>	
<i>Andhra Pradesh</i>				
Cultivators	70.9	21.6	7.5	100.0
All households	79.6	14.2	6.2	100.0
<i>Bihar</i>				
Cultivators	72.7	18.1	9.2	100.0
All households	84.4	11.9	3.7	100.0
<i>Punjab</i>				
Cultivators	27.2	27.7	45.1	100.0
All households	47.2	20.4	32.4	100.0

Source: Bell and Srinivasan (1985).

still significant among cultivators. In commercialized areas, therefore, it seems that the working assumption of contractual exclusivity by institutions needs to be scrapped.

At the time of the survey in Punjab, the rate of interest on loans from traders was typically 18-24 percent a year, whereas institutions were charging about 11 percent. Thus if the lower rate on institutional loans was not eroded by higher transactions costs, one would expect borrowers to seek institutional finance first. Only if they failed to obtain as much as they desired would they then consider seeking private finance. That is, rationing by institutional agencies might result in a spillover of demand into the informal segment of the credit market.

Support for this hypothesis is provided by table 10, which summarizes the transactions of the sample of Punjabi cultivating households which were members of cooperatives. First, if the real cost of credit from both sources were the same and there were no rationing, borrowers would tend to go to one source alone, thereby avoiding the transactions cost of separate deals. In fact, 40 percent of the sample obtained credit from both sources. Second, those who borrowed from both sources borrowed, on average, almost exactly as much from cooperatives as those who borrowed from cooperatives alone, which suggests that cooperative credit was rationed. Third, those borrowing from cooperatives alone greatly outnumbered those borrowing solely from informal sources, which is also consistent with cooperative credit being cheaper than informal credit. Fourth, in regard to the timing of borrowing, of the eighty households which borrowed from both sources, forty-six transacted with those sources in different months (the smallest unit of time in the WBRPO survey). Of those forty-six, thirty-one borrowed from the cooperatives before turning to private sources, a result which falls well inside the critical region of a test of size 0.05 of the null hypothesis that the probability of that event is one-half (Bell, Srinivasan, and Udry 1990).

Table 10. *Credit Transactions of Punjabi Households Belonging to Cooperatives, 1980–81*

<i>Source</i>	<i>Households (number)</i>	<i>Average loan (rupees)</i>
None	37	0
Cooperative only	58	3,674
Informal only	21	2,622
Both	80	8,716
cooperative	—	3,347
informal	—	5,279
Total	196	

—Not available.

Source: Bell, Srinivasan, and Udry (1990).

This last result suggests that cooperatives were not well placed to enforce exclusive contracts. In that case it must be ascertained whether the moneylender would have any interest in preventing the borrower from taking an institutional loan. Because the institutional finance will permit an expansion of the borrower's activities, if the moneylender is in a position to exercise first claim on the returns produced by the borrower's activities, the institutional loan will, in general, improve the moneylender's expected returns from his loan. This question is pursued below.

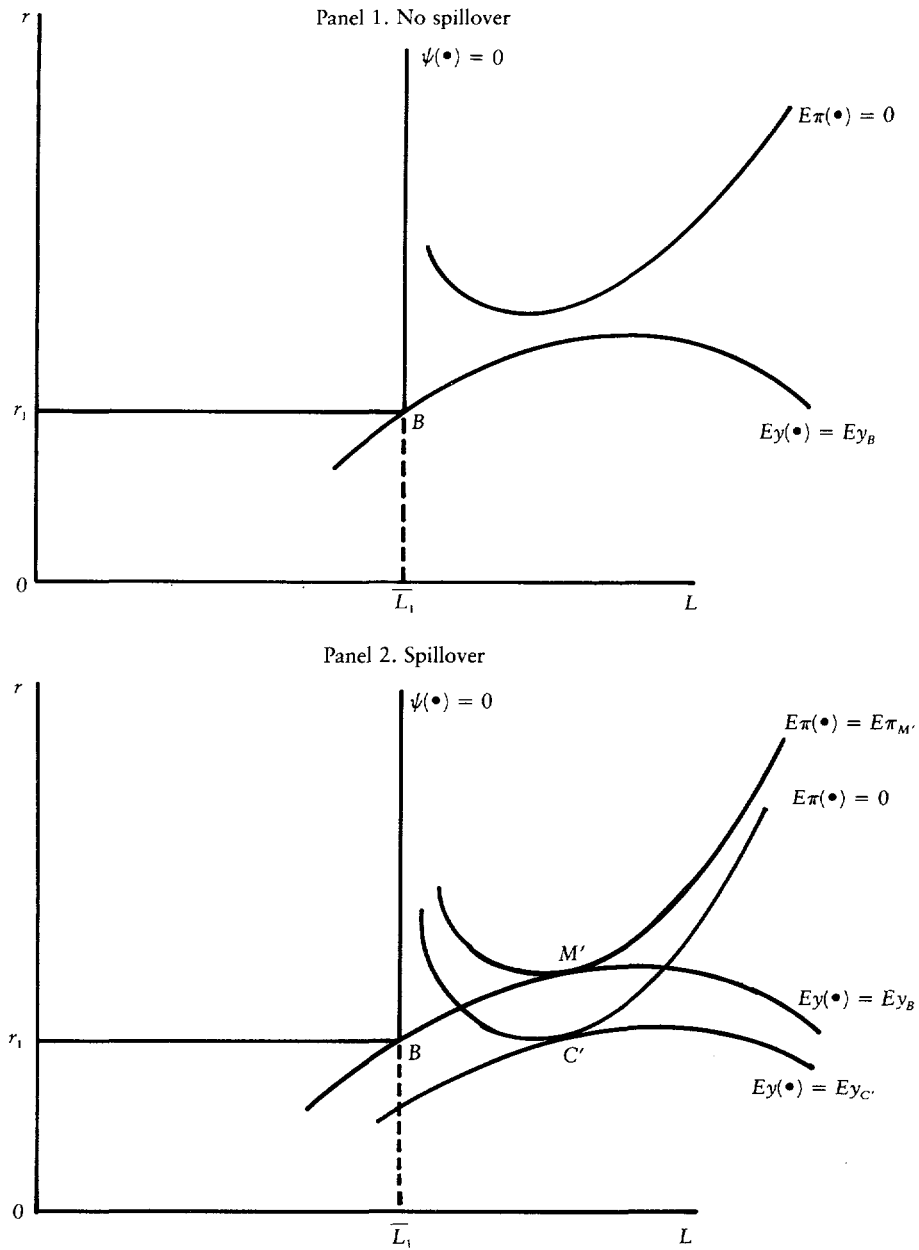
Equilibrium with Nonexclusive Institutional Contracts

With nonexclusive institutional contracts, the borrower's opportunity set takes the form depicted by the heavy curves in figure 3, in which it has been assumed that the lowest rate the moneylender could charge and still make nonnegative expected profits, namely, i , exceeds r_1 . The boundary of that opportunity set is made up of $\psi(\bullet) = 0$ and an iso-expected-profit contour, which is a member of the lender's map drawn with the point $(L_1, 0)$ as origin to reflect the fact that the borrower seeks institutional finance first. The location and shape of that contour will depend on the private lender's knowledge of what dealings his client had with the cooperative or bank and the ease of entry into lending activities. In Bell (1990) it is established that the contours of the borrower's preference map become steeper in this setting, while those of the informal lender are unchanged or become less steep, depending on the information available to the lender on the borrower's dealings with the institutional credit agency.

The only interesting case is that in which the borrower is rationed in the institutional segment of the market. Because he deals with two lenders, the question of debt seniority must be settled first. As already argued, the moneylender is in a much better position to exercise first claim on the returns from the borrower's activities.

In panel 1 of figure 3, the contour $E\gamma(\bullet) = E\gamma_B$ lies completely below the zero-expected-profit contour $E\pi(\bullet) = 0$, which is the most favorable menu of contracts that any moneylender would offer. Hence, although the borrower has

Figure 3. *Competition between an Institutional and an Informal Lender: Nonexclusive Contracts*



unsatisfied demand for finance at the parametric rate r_1 , no selection from the menu of contracts offered by the lender affords an improvement over B , and there is no spillover of demand into the unregulated segment of the market.

Two further cases are depicted in panel 2, where it is assumed that the

contour $E\gamma(\bullet) = E\gamma_B$ intersects the contour $E\pi(\bullet) = 0$. First, if there is free entry into moneylending for those willing to invest in acquiring inside knowledge about potential clients, then lenders will earn zero expected profits and each borrower will face a menu of loan contracts described by the contour $E\pi(\bullet) = 0$. In that case, the borrower will choose point C' , where an iso-expected net-income contour is tangent to $E\pi(\bullet) = 0$. Second, private lenders may have sufficient market power to keep would-be borrowers at their reservation levels of expected net income, given the opportunities defined by $\psi(\bullet) = 0$. In that case, the moneylender will choose point M' , where an iso-expected-profit contour is tangent to $E\gamma(\bullet) = E\gamma_B$. This involves making the borrower an all-or-nothing offer of $(L_{M'} - \bar{L}_1, r_{M'})$.

Intermediation between Institutional Lenders and Moneylenders

I turn now to the effects of intermediation between institutional lenders and informal lenders on the terms and conditions of loans to rural households. To start with, suppose there is no uncertainty, natural or strategic. Then a fall in the moneylender's cost of funds will result in a fall in the rate of interest he charges, whether the market is perfectly competitive or he is a monopolist. Moreover, unless he exercises perfectly discriminating monopoly, his clients will also be better off. Indeed, if there is perfect competition and marginal costs are (locally) constant, they will capture the entire gain.

In the presence of uncertainty, these conclusions continue to hold when suitably restated. With free entry into lending, expected profits will be zero. The associated iso-expected-profit contour in figure 2 will shift downward (and perhaps rotate) as the lender's cost of funds declines, and all gains will be captured by his clients. In the case of a monopoly with exclusive contracts, all gains will accrue to the lender unless the terms of the contract are constrained by an active threat of strategic default by the borrower, in which case the gains will be shared to some degree.

There remains the closely related matter of arbitrage between the formal and informal segments of the credit market. Anyone who obtains a loan from an institutional lender has the option of relending the money to another individual, usually at a higher rate. Three factors impose a limit on such arbitrage: individuals' access to loanable funds from institutions is limited; relending requires inside knowledge of the client (the costs of acquiring this knowledge are partly reflected in the spread between interest rates in the two segments of the market); and other activities, such as cultivation, may be more attractive at the margin than moneylending.

If there is free entry into moneylending for anyone willing to acquire inside knowledge on a group of clients, and if enough would-be lenders do have access to unlimited funds at the rate of, say, r_1 , then expected profits from lending will be zero in the long run. If, further, some would-be borrowers have excess demand for loans at the rate r_1 and institutions cannot enforce exclusivity, then equilibrium will be at point C' in panel 2 of figure 3, as argued above.

V. FIVE PROPOSALS FOR PUBLIC POLICY

The main object of Indian public policy toward rural credit has been to ensure cheap and plentiful credit to all rural households. The chosen instruments for this purpose have been, first, the promotion of cooperatives, and then, following the nationalization of the commercial banks two decades ago, a concentrated push to establish branch banking in rural areas. These policies have certainly enjoyed some success in attaining the objective, but much less completely than the official estimates might suggest. The moneylender's grip has been loosened in commercialized areas but remains tight in backward ones, where credit is dear and inadequate. Access to institutional credit is much easier, and credit limits far more generous, for the well-to-do than the rural poor, though intermediation probably produces some benefits indirectly for the latter.

For some time, however, institutions have been plagued with defaults, and the cooperative sector is in a sorry condition in many states. In the period 1973-74 to 1985-86, overdue agricultural loans expressed as a proportion of scheduled repayments rose from 23 percent to 45 percent in the case of the land development banks, hovered around 40 percent in the case of primary cooperatives, and fell slightly from 49 percent in the case of the commercial banks (RBI 1988).

It is in this context that public policy needs reexamination. Each of the following proposals draws on a different feature of the foregoing discussion.

Proposal 1: Improve the Decennial Surveys

On the principle that description should precede prescription, the evaluation of the official evidence in section I suggests that the design and execution of the most recent decennial surveys were not fully satisfactory. To that end, serious consideration should be given to a return to the sampling design employed in 1961-62, which involved just over 2,000 villages and forty households per village. As Panikar and others (1988) have argued, this would lead to more efficient estimates of the proportion of households that are indebted and of total indebtedness.

In regard to nonsampling errors, with forty households per village this design lends itself to the use of a resident enumerator in each village, along the lines of the WBRPO's and ICRISAT's surveys. Given the sensitivity of the questions to be posed, long-term residence seems strongly desirable to reduce nonsampling errors. Two other measures suggest themselves. First, there should be a drastic reduction in the size of, and hence resources devoted to, the state samples in favor of those canvassed by the NSSO, which is one of the most experienced and capable survey organizations in the developing world. Second, particular attention should be paid both in the questionnaires and in the training of the enumerators to credit transactions arising in connection with trade, especially forward sales. In the WBRPO's survey, many loans came to light in the course of posing questions on households' purchases and sales.

A return to the design of earlier surveys would also improve survey coverage. There has been no investigation of the supply side of the market after 1951–52. Thus, absent systematic evidence on the activities of private lenders and institutions alike, it is very hard to arrive at an informed view of, for example, the nature and extent of intermediation and the competitive structure of the market. This investigation should be resumed.

Proposal 2: Use the Knowledge of Informal Lenders in the Formal Sector

It should be recalled that the moneylender was to have no role in the comprehensive scheme of cooperatives advocated by the authors of the *All-India Rural Credit Survey* (RBI 1954). Yet they also pointed to his vital knowledge of clients' "character and repaying capacity," which knowledge, they asserted, cooperatives did not fully possess (RBI 1954, p. 171). The desire to put the moneylender "in his place" was understandable, as was the fear that, once admitted to the cooperative, he would dominate it. But by keeping him out, the cooperatives were also denied direct access to his knowledge. Moreover, the way was then left open for the agriculturist moneylender, whose membership in the cooperative as a cultivator was to be eagerly sought. Leaving aside the merits of this policy in the 1950s, do current conditions and circumstances warrant its revision?

Although both cooperatives and the banks have had serious problems with overdue loans, the sources of their problems probably were not the same. Despite the concerns about the moneylender's vital knowledge of his clients' character, it should be noted that the members of a cooperative belong to the same community and know a good deal of one another's affairs. Thus the main difficulty would seem to be not so much one of information but of enforcement (Wade 1988). For the banks, however, inadequate information about their clients' characteristics and activities surely poses a severe problem, because banks have expanded their lending very rapidly from a small base and have been under constant political pressure to continue this expansion.

One way of alleviating the banks' difficulties would be to permit them to employ private lenders as their agents. In the commercialized areas of India the importance of traders and commission agents as sources of rural credit indicates that there are numerous private lenders who are well placed to grant and recover loans on behalf of institutions. In the 1970s such arrangements were adopted in North Arcot by banks and private fertilizer companies for dealers in fertilizer. The dealers in question were selected from a group of farmers who were not dealers in grain, and their lending and recovery activities were monitored by both the companies and the banks. The formal exclusion of dealers in paddy and rice, however, showed that the old reservations concerning their social usefulness as lenders lingered on. Be that as it may, the substantial intermediation that undoubtedly exists implies that many private lenders are already, in effect, acting as agents of cooperatives and commercial banks. Thus the proposal made here would regularize their status and perhaps encourage further entry by other private agents and greater activity by all lenders. It

would also enable the banks to concentrate more heavily on mobilizing rural deposits, a task in which they have enjoyed considerable success.

In support of this proposal, there is at least one other well-documented instance in which private lenders have been engaged by institutional lenders to act as their agents in granting and recovering loans. Wells (1978) reports on a fairly successful scheme organized by the Agricultural Bank of Malaysia, in which cooperatives, farmers' organizations, and private traders were appointed, after screening, as local credit agents of the bank. The bank set the rate of interest the agents could charge clients and the commission they received. In the early 1970s, these interest rates were 9 percent and 6 percent per season on unsecured and secured loans, respectively, with a 3 percent commission rate. These arrangements gave farmers some measure of choice and gave agents an incentive to compete for borrowers. Wells notes that the decision to admit informal lenders into the scheme was controversial, but that their superior performance in utilizing lines of credit from the bank and recovering loans vindicated the decision to include them.

Two questions remain. First, how should the terms and conditions of loans to households be regulated? Second, what is the appropriate design of a system of incentives? The scheme devised by the Agricultural Bank of Malaysia stipulated both the rate of interest and the commission that private agents could charge. As described by Wells, it lacked specific incentives for agents to compete for good borrowers and to take other steps to ensure recovery, because the commission rate was apparently linked to the volume of funds disbursed. One way of overcoming this potential defect would be to base commission payments on agents' success in securing repayment of the loans they advance, with a small salary to make the burden of lender's risk tolerable (Miracle 1973). Such a (linear) scheme would, of course, still leave the institution with the option of setting the rate of interest on loans.

Proposal 3: Interlink Institutional Credit with Marketing and Supply

The authors of the *All-India Rural Credit Survey* (RBI 1954, vol. 2) argued persuasively that cooperatives would be more profitable if they also engaged in business related to lending, such as the supply of inputs and marketing of outputs, which—if credit, input supply, and marketing transactions are bundled—is interlinking by any other name. This form of interlinking is clearly valuable to traders and commission agents, not least because it mitigates the problem of enforcement. The RBI's recommendation was taken up only recently, as part of the Integrated Rural Development Programme. Whether it will reduce cooperatives' overdue loans remains to be seen. In any event, such vertical integration is a potentially useful step toward the often-stated objective of curbing the power of private traders in commodity markets, should it exist.

Proposal 4: Do Not Restrict the Trader-Moneylender

It was argued in section IV that the effect of introducing institutional lenders into a rural credit system depends heavily on the ease with which private agents

can enter into moneylending activities. If entry is fairly easy, the threat of entry will keep informal lenders' expected profits close to zero. Thus the institutions' costs of supervision under proposal 2 will be modest, and there is no cause to worry about moneylender-traders capturing integrated credit-cum-marketing cooperatives because the associated rents will be small. It is important to note that this conclusion also holds if private loans are interlinked with the marketing of output, as is commonly the case in commercialized areas, where traders and commission agents are numerous.

In these circumstances the activities of the trader-moneylender should not be restricted. It has been argued that commercialization and the growth of a marketed surplus have fostered competition in credit markets, both among trader-moneylenders and between informal and institutional lenders. Hence, the avowed intention of the government to drive the private trader out of commodity markets and to supplant him with state trading organizations with exclusive purchasing rights would—whatever be its other merits—have highly adverse effects on rural credit markets. In more commercialized areas there would be adverse consequences also for agricultural output and incomes. Promoting credit-cum-marketing cooperative societies would be far preferable to banning private trade in commodities.

If informal lenders are few and entry is difficult, however, the above proposals will require closer (and more costly) supervision of these lenders' activities. The opportunity to borrow from an institution also imposes a limit on the terms an informal lender can exact, and thus provides a form of indirect regulation of his activities. Whether such arrangements will bring about a substantial improvement in the borrower's lot depends on how the institutions actually function. It is often remarked that the behavior of the institutions' officials is influenced by the profitability of private moneylending. Thus a borrower might face the unappetizing choice between a usurious loan from the local moneylender and a hefty side payment to the official who sanctions institutional loans. In that case, calls for strict regulation of the informal lender's activities and an expansion of cheap institutional credit will, if heeded, create substantial opportunities for rent-seeking within the institutions. The question of what should be done in backward areas is not, therefore, by any means fully resolved by the preceding discussion.

Proposal 5: Use Direct Measures to Raise Incomes in Undeveloped Areas

The claim that credit is comparatively plentiful and cheap in commercialized areas is hardly new and should not be especially controversial. For example, Harriss (1982) has persuasively argued as much in the case of North Arcot. In undeveloped areas, however, credit is scarce and dear, and the moneylender, often in the guise of the big cultivator, has a firm grip on village economic life. Casual observation of such areas suggests that their cooperatives are enfeebled or dormant and that those who staff the few branches of commercial banks settle for a quiet, or even venal, life, thus leaving the private lender's power unchallenged.

It is probable that interventions in the credit market will do little to remedy the miserable conditions of life for the people of such areas. As argued in section IV, only those borrowers with fair access to some institutional credit will be able to drive a more favorable bargain with the moneylender. If, moreover, the latter gets his hands on some institutional credit—as he usually will—he will also capture most or all of the gains from the resulting reduction in his cost of funds when making loans of his own. Most experience also suggests that in the circumstances considered here, the infusion of loanable funds through institutional lenders is too limited to make such credit widely available—except at a very heavy cost to the government treasury. Attention should be focused, instead, on raising agricultural productivity and incomes directly. This will certainly require an initial increase in cultivators' working capital. But the amount in question should not be exaggerated, and there is ample evidence that even quite poor households are able to muster some savings. Thus an infusion of institutional credit is not necessary to get the process started. If the experience of commercialized areas of India is any guide, informal lenders and institutional credit agencies will then follow, so that discussion of appropriate intervention in credit and related markets will then become relevant.

REFERENCES

- Arrow, K. J. 1985. "The Economics of Agency." Discussion Paper 451, Stanford University Department of Economics. Stanford, Calif.
- Bardhan, P. K., and A. Rudra. 1978. "Interlinkage of Land, Labour, and Credit Relations: An Analysis of Village Survey Data in East India." *Economic and Political Weekly* 13: 367–84.
- Bell, Clive. 1990. "Credit Contracts When There Are Regulated and Unregulated Lenders." Vanderbilt University Department of Economics. Nashville, Tenn. Processed.
- Bell, Clive, and T. N. Srinivasan. 1985. "An Anatomy of Transactions in Rural Credit Markets in Andhra Pradesh, Bihar, and Punjab." Working Paper No. 8. World Bank Agriculture and Rural Development Department. Washington, D.C. Processed.
- . 1989. "Interlinked Transactions in Rural Markets: An Empirical Study of Andhra Pradesh, Bihar, and Punjab." *Oxford Bulletin of Economics and Statistics* 51: 73–84.
- Bell, Clive, T. N. Srinivasan, and Christopher Udry. 1990. "Agricultural Credit Markets in Punjab: Segmentation, Rationing, and Spill-over." Yale University, Economic Growth Center. New Haven, Conn. Processed.
- Bhaduri, A. 1973. "Agricultural Backwardness under Semi-Feudalism." *Economic Journal* 83: 120–37.
- Binswanger, Hans, and M. Rosenzweig. 1984. *Contractual Arrangements, Employment and Wages in Rural Labour Markets in Asia*. New Haven, Conn.: Yale University Press.
- Binswanger, Hans, and others. 1985. "Credit Markets in Rural South India: Theoretic-

- cal Issues and Empirical Analysis." World Bank Agriculture and Rural Development Department. Washington, D.C. Processed.
- Darling, M. L. 1925. *The Punjab Peasant in Prosperity and Debt*. London: Oxford University Press.
- Harriss, Barbara. 1982. "Money and Commodities: Their Interaction in a Rural Indian Setting." *Development Digest* 20: 16-23.
- . 1983. "Agrarian Change and the Merchant State in Tamil Nadu." In T. P. Bayliss-Smith and S. Wanwani, eds., *Understanding Green Revolutions*. Cambridge, England: Cambridge University Press.
- Milde, H. and J. G. Riley. 1988. "Signaling in Credit Markets." *Quarterly Journal of Economics* 72: 101-29.
- Miracle, M. 1973. "Economic Incentives for Loan Agents." *AID Spring Review of Small Farmer Credit* 19: 223-33.
- NSSO (National Sample Survey Organization). 1986. *Sarvekshana* 10 (July).
- Panikar, P. G. K., and others. 1988. "The Informal Credit Markets in India." Centre for Development Studies. Trivandrum, India. Processed.
- RBI (Reserve Bank of India). 1954. *All-India Rural Credit Survey*. Volume 1, *The Survey Report* (part 1, "Rural Families"; part 2, "Credit Agencies"). Volume 2, *The General Report*. Volume 3, *The Technical Report*. Bombay.
- . 1977. *Indebtedness of Rural Households and Availability of Institutional Finance*. Bombay.
- . 1988. "Tabulations of Recovery Performance of Scheduled Commercial Banks and Cooperatives." Bombay. Processed.
- Srinivasan, T. N. 1979. "Bonded Labor Contracts and Incentives to Adopt Yield-Raising Innovations in Semi-Feudal Agriculture." *Economic Journal* 89: 416-19.
- Wade, Robert. 1988. *Village Republics*. Cambridge, England: Cambridge University Press.
- Wells, R. J. D. 1978. "An Input Credit Programme for Small Farmers in West Malaysia." *Journal of Administration Overseas* 17: 4-16.

Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan

Irfan Aleem

Many governments have perceived the rural moneylender as usurious. This article takes a first step toward directly testing the validity of this view. In a study of services, costs, and charges of fourteen informal market moneylenders and their clients in Chambar, Pakistan, the article examines whether the high implicit interest rates charged reflect the actual costs of operating in that market. Estimates of the resource costs incurred by informal lenders for screening, pursuing delinquent loans, overhead, and cost of capital (including unrecoverable loans) suggest that lenders' charges are equal to their average cost of lending but exceed their marginal cost. This finding is consistent with the view that the informal credit market is characterized by excess capacity and monopolistic competition in the presence of imperfect information.

Credit surveys in developing countries have generally noted that noninstitutional lenders—moneylenders, traders, landlords, and so forth—charge interest rates far in excess of those charged on similar loans by institutional lenders such as banks.¹ The observed gap in interest rates raises a number of basic questions: Why is it not possible to arbitrage between the low-interest-rate institutional market and the informal money markets charging “usurious” rates of interest? More fundamentally, what determines interest rates in the unregulated market, and why are they so high? One explanation for high interest rates is the problem of asymmetric information (that is, the lender has less information than the borrower about the latter’s ability and willingness to repay a loan), with lenders expending resources to screen applicants and passing on the costs to borrowers. Yet it is rare to find evidence about the costs associated with screening and, more generally, about the effect of imperfect information on the behavior of credit market participants.

The objective of this article is to assess the costs incurred by noninstitutional lenders. The assessment is based on the author’s survey of a rural money

1. For references and a review of recent surveys, consult Aleem (1985, chap. 1).

The author is an economist in the Industry and Energy Division, Africa Technical Department, the World Bank.

market in Pakistan which serves a market town and surrounding villages with a total population of approximately 2,400 farmers. I compare these costs with interest rates charged and advance the hypothesis that the evidence presented is consistent with Chamberlinian monopolistic competition as it applies to informal credit markets.

Imperfect information affects both the supply and demand sides of the informal credit market: first in its impact on the cost of lending, and second in enhancing product differentiation in cases where each lender has a relatively small number of customers.

When a potential borrower approaches a bank or a moneylender for a loan, it is impossible from casual observation to determine the risk involved in offering him a loan contract. Unlike sellers in other markets, the lender cannot sell loan contracts to every buyer that comes along because this could easily lead to an increase in the riskiness of the loan portfolio, which the lender would find unacceptable. The contract that the lender will offer, if he does make an offer, depends crucially on his assessment of the risk of default. The risk of default is dependent, among other things, on the borrower's credit history and the characteristics of the project he wishes to invest in. To overcome this informational problem, the lender expends significant time and resources on screening the loan applicant in an environment in which credit histories are not documented and pooled. The screening costs involved are further enhanced by moral hazard—any source of information has itself to be screened for reliability.

On the demand side, borrowers are not well informed about the terms under which loan contracts are available from individual lenders, because of such characteristics of informal credit markets as lack of advertising and a time-consuming and imperfect screening process. This enhances product differentiation in an environment in which the lender typically packages lending services with trading and marketing services.

Section I of this article describes the survey from which the data have been obtained. Section II outlines the difficulties faced by lenders in ascertaining the quality of loan applicants and the actions they have taken to overcome the asymmetry in information. Besides providing information on screening and its costs, this section estimates the total costs of the lending operation for informal lenders. Section III compares interest rates in the informal market surveyed with the costs of lending. Section IV interprets the results and the extent to which they conform with the Chamberlinian model of monopolistic competition. Finally, section V brings together the main conclusions of the analysis, including policy implications.

I. BACKGROUND: SURVEY PROFILE AND CONTEXT

The evidence presented in this article is drawn from a broader theoretical and empirical investigation of the workings of credit markets in developing

countries carried out by the author, which included a detailed survey of the literature and of the established facts about money markets in developing countries.² The empirical aspect of this investigation included an intensive micro-level survey covering the supply of and demand for credit in villages served by the market town of Chambar in Sind, Pakistan, during 1980–81. The focus of the Chambar survey was the imperfections in the flow of information in credit markets.

Survey Profile

The often-imagined picture of a single village moneylender with monopoly power over clients in the village does not hold true in the Chambar context.³ There are in fact a large number of informal lenders serving farmers in the Chambar area. Every village in the area does not have an informal lender. Instead, informal lenders tend to gravitate toward and concentrate in the market town, Chambar, and in some of the larger of the sixteen villages in the area served by Chambar and lying within a five-mile radius of the market town.

Of the sixty informal lenders estimated to be operating in the area, fifteen were based in Chambar, another fifteen were spread among the three largest villages, and the remaining thirty were based outside the market area, including twenty lenders based in urban centers located twenty to fifty miles from Chambar. The survey covered sixty borrowers (farmers) and fourteen noninstitutional lenders operating in the area under study. Borrowers were randomly selected for interviews using multistage stratified sampling.

Interviews with informal lenders were more difficult largely because of concerns that information so obtained may end up with the government. Out of the sixty sources, fourteen were selected for the individual interviews, which lasted approximately three hours each. The selection was not entirely random because it depended on the availability of personal introductions to these lenders. More lenders were prepared to give interviews but were excluded because of time constraints. Interviews were carried out with the understanding that the interviewees would not have to provide information on interest rates charged; information on the costs of borrowing was obtained from the demand side.

A number of institutional sources of credit, primarily banks, were also present in the Chambar area, accounting for approximately 25 percent of the loans transacted in the 1980–81 period. Their operations were also reviewed, but the focus of the study was on the noninstitutional market.

Chambar lies on the east bank of the river Indus, approximately 180 miles north of Karachi. It lies in an irrigated area where multiple cropping is practiced (with cash and subsistence crops being grown in alternate seasons), and

2. See Aleem (1985) for a detailed literature survey. A flavor of the literature can be obtained also from Bottomley (1975), Ghatak (1975, 1983), Iqbal (1987), and Bliss and Stern (1983).

3. See, for example, the evidence on monopoly presented in Chandavarkar (1965, pp. 322–25); see also evidence presented in Bliss and Stern (1983).

high-yielding varieties of crops have been successfully introduced. A striking feature of the rural economy is the seasonal (and uncertain) nature of the farmers' cash flow. The seasons exert a strong influence on the demand for credit because there is a considerable time lag between the time that expenditures are incurred on farm inputs, such as fertilizers, and the crop is harvested and sold. This is reflected in market transactions: not only farm inputs but also food, clothing, and sometimes even medicines and doctors' services are purchased on credit to be paid off at harvest. Seasonal demands have an important bearing on the farmer's credit needs in the area and account for almost 50 percent of his total demand for credit.

Comparing Chambar with Other Credit Markets

The market environment and structure in Chambar share key characteristics widely observed in credit markets in other developing countries. These include:

- *Duality or segmentation in market structure.* As has been observed in other countries, a highly regulated and nationally integrated institutional market with uniform and relatively low rates of interest coexists with an informal market that charges a widely dispersed set of relatively high rates.

- *Lack of specialization by informal market intermediaries.* Although the players and nature of the loan contract in the institutional market are well defined, informal commercial lenders come in various guises (traders, money-lenders, shopkeepers, landlords, and so forth) and are characterized by nonspecialization, with the typical informal lender combining credit with trading in crops and selling general merchandise.

- *Interlinking of loan and commodity contracts in informal markets.* Associated with the nonspecialized nature of the informal lender is the interlinking of loan and commodity contracts: only a limited number of loans were given in the conventional form of outright loans to be repaid in cash with interest. In general, at least one end of the loan transaction involved the delivery of commodities, with the loan either extended or repaid in kind. The cost of borrowing was the rate of interest when this was explicitly agreed upon. In the majority of cases, however, the cost of borrowing had to be estimated from the terms of commodity transactions reported by farmers in the demand component of the survey. For example, if the farmer paid 15 percent extra for purchasing pesticides on a three-month credit, the implicit annual interest rate after compounding was 75 percent. A similar calculation was carried out to estimate the charge and the implied interest rate on loans against which the farmer had agreed to a specific discount on his cotton crop which he sold to the lender.⁴ (For details of calculations in more complex transactions see Aleem 1985).

4. It should be noted that, although interlinking of loan and commodity contracts has been observed in many developing countries, its dominance in Chambar may in part also be because of the conformity of this type of traditional contract with local social values. Islam, the main religion practiced in

- *Dominance of noninstitutional or unorganized money markets.* As in many other developing countries, noninstitutional sources of credit still dominate the market for credit. They account for approximately three-quarters of the loans extended in the area, as indicated above.

- *Limited access of smaller borrowers to institutional credit.* Although the evidence is not unambiguous, the results of the survey suggest that, as in most developing countries, larger borrowers have greater access to institutional credit than their smaller counterparts.

- *Absence of security in loan contracts given by informal lenders and the relatively low risk of default.* Informal lenders generally give unsecured loans but face far lower risks of default than institutional sources, who normally lend against collateral but rarely foreclose.

II. SCREENING AND LENDING COSTS IN A MARKET WITH IMPERFECT INFORMATION

Screening of Loan Applicants: Significance and Procedures

Informal lenders operating in the Chambar area expend considerable effort to obtain information about loan applicants to reduce the risk of default. Because of the legal problems and associated high costs involved in selling land—the most common asset that farmers can put up as collateral—there were no practical alternatives open to lenders other than a careful screening process. One indication of the consequences of providing loans without adequate screening is the default rates in excess of 30 percent experienced by some of the institutional lenders operating in the area, although other factors, such as corruption and political pressure, also contributed to the problems.

Tables 1 and 2 give the salient features of the long process used by the fourteen noninstitutional lenders to screen loan applicants, including resources employed and average rejection rates. Although there is considerable variation in the methods used by individual lenders, there are some important common features. First, the lender generally does not entertain loan requests from farmers who have not had previous dealings with him, for example, in the sale of harvested crops or the purchase of farm inputs. These dealings, over at least one season, provide important information about the farmer, including his likely marketable surplus and the way he conducts business. Second, most lenders make further inquiries—both in the market and of farmers in the applicant's village who are known to the lender—about the applicant's indebtedness as well as his reputation in the market. Third, if the farmer satisfies the

Chambar, does not prohibit return on risk-bearing, or profit on a commercial contract. But the conventional loan involving a prearranged fixed rate of interest was considered un-Islamic. There was a clear preference to avoid interest payments, although the prohibition did not deter farmers from seeking low-cost bank loans, which at the time of the survey carried an explicit rate of interest.

Table 1. *Sequence of Steps Used by Noninstitutional Lenders to Obtain Information about Loan Applicants (steps used in the process)*

Lender	Assessment through dealings in other activities (A)	Asking the applicant to provide references or sureties from persons known to lender (B)	Making inquiries of other farmers in applicant's village and in the market (C)	Visiting the applicant's farm (D)	Testing him by giving a small initial loan (E)	Was lender prepared to consider applicants who had not gone through stage A?	Location of customers within the Chambar market ^a	
							All over the market area	Concentrated in specific villages
1	1 (1)		2	3	4	Usually not	X	
2	1 (1)		2		3	Never	X	
3	1 (1)		2	3	4	Never		X
4	1 (2)	2		3	4	Yes	X	
5	1 (2)			2	3	Yes	X	
6	1 (2)	2 ^b	3		4	Usually not		X
7	1 (1)		2		3	Usually not ^c		X
8	1 (1)	2 ^b	3		4	Usually not ^c		X
9	1 (2)	2 ^b	3			Usually not		X
10			1	2	3	Yes		X
11	1 (1)		2		3	Usually not ^c		X
12	1 (1)				2	Usually not ^c		X
13	1 (2)	2 ^b	3		4	Yes		X
14	1 (1)		2	3	4	Usually not	X	

Note: The numbers in this table correspond to the sequence of steps undertaken by the lender in screening a loan applicant. The numbers in parentheses in step A are the number of seasons over which step A takes place.

a. Lenders located outside the market area (defined as a five-mile radius around Chambar) had customers both inside and outside the market.

b. Only for applicants who had not gone through stage A. (In one instance the lender also wanted gold as collateral.)

c. The exception in these cases were farmers who were living in the same village where the lender operated and whom he knew well.

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

Table 2. *Costs of Obtaining Information about Loan Applicants and Some Screening Statistics*

Lender	Resources allocated to obtaining information on average loan applicant		Lenders experiencing a decrease in the cost of screening over time?	Average rate of rejection of loan applicants (percent)	Lenders prepared to give loans to farmers borrowing from other lenders as well?	Percentage of repeat borrowers in 1980 summer season
	Time (days)	Expense (rupees)				
1	3.0	20	Yes	75	No	82
2	0.5	0	Yes	50	No	78
3	2.0	50	Yes	80	No	83
4	1.0	30	Yes	50	No	67
5	0.5	0	Yes	75	No	60
6	1.0	50	Yes	20	No	91
7	0.0	0	Yes	10	Yes	80
8	0.0	0	Yes	20	No	67
9	0.5	0	Yes	90	No	83
10	2.0	100	Yes	70	No	100
11	2.0	30	Yes	25	Yes	85
12	0.0	0	Yes	20	Yes	52
13	0.5	20	No	60	Yes	85
14	1.0	20	Yes	70	No	75

Note: The rupees-to-dollar exchange rate was 9.9 (1981).

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

lender's requirements in the first two stages, he gets a small initial loan for one season for a further assessment before he can count on the lender to satisfy all his legitimate credit needs. The average successful applicant takes, on average, two seasons (approximately one year) to get to this stage.

Table 2 shows that the costs of screening are substantial—on average, screening costs one day of the lender's time and Rs20 (\$2.02) in transportation expenditures—despite the fact that many of the lenders had been operating in the area for periods in excess of five years and virtually all had experienced a learning curve effect. Variations in the average cost of screening can be attributed to the length of time that the lender has been operating, his market strategy—for example, he could concentrate on borrowers from a specific village or villages, as did some of the lenders who had the lowest rejection rates (10–25 percent), or he could have a diversified clientele from both Chambar and the adjoining areas—and the tradeoff the lender accepted between spending resources on screening and accepting a higher risk of default. The cost of screening, which ultimately has to be borne by the successful applicants, is magnified by the high proportion (on average, more than 50 percent) of applicants who were rejected by the lenders interviewed.

It should be noted that rejection of applicants was not significantly linked to the nonavailability of loanable funds; eleven of the fourteen lenders interviewed

indicated that they could cope with an increased demand for funds by drawing from other lenders from outside the Chambar area for funds (see the discussion below on the marginal cost of funds).

The high rejection rate has important implications for a farmer thinking about changing his source of informal credit and moving to a new lender: if the long screening process was not a sufficient deterrent, then the relatively small chance of success should certainly make him think twice.

Screening and the Risks Facing Noninstitutional Lenders

Table 3 outlines the risks facing the informal lenders operating in the Chambar area. It is clear from the table that the main risk facing the noninstitutional lender, whether he is urban or rural-based, does not arise from nonrecovery. On average the cumulative rate of default (defined as the percentage of loans due that had not been recovered since the lender's inception of lending operations) was 2.7 percent, with twelve out of fourteen lenders experiencing a default rate of 5 percent or less. The cumulative rate of default is a good first approximation of the incidence of bad debt. Given the possibility that some of the more recent overdue loans may eventually be recovered, the cumulative rate of default is, if anything, an overestimate of nonrecoverable debt. It is therefore fair to conclude that the screening actions of the informal lenders are successful in limiting bad debts, especially taking account of the experience of institutional lenders and the fact that virtually all informal loans are unsecured (see table 3).

However, the screening process is not perfect. Delinquent loans, involving late payment, were a constant source of concern to the informal lender. As shown in table 3, lenders face a significant risk of loss from delinquent loans: on average 15 percent of all loans were delinquent with a delay of approximately six months, and over this period interest was waived on 70 percent of these.

Screening and Other Components of Loan Administration Costs

Because there is little paperwork involved and no collateral, informal lenders' main costs in administering a loan are in screening loan applicants and chasing delinquent borrowers. Costs hereafter are cited per Rs100 (the average rupee-to-dollar exchange rate for 1981 was 9.9) either lent (tables 5 and 6 below) or recovered (tables 7 and 8 below). The cost of handling commodities exchanged as part of a loan contract is assumed to be covered in the price of the commodity (these costs would have to be covered in a cash sale as well). Estimates of the costs of administering loans are made on the basis of a valuation of the time and resources allocated to managing a loan from application through recovery. The marginal and average costs of screening, in particular, and of loan administration, in general, are considered separately below.

Marginal costs of screening and loan administration. Table 4 shows the make-up of the marginal costs of loan administration for the fourteen lenders

Table 3. *Risks Facing the Noninstitutional Lender: The Possibility of Nonrecovery and Delinquency (Delay in Repayment)*

Lender	Percentage of due loans that had not been recovered since the inception of lending operations	Percentage of loans against which collateral is taken, and type of collateral	Percentage of loans repaid after due date	Average delay (months)	Percentage of delinquent loans on which no interest is charged for period of delay	Conditions under which additional interest is waived ^a	Was lender prepared to give extra loans to farmers facing crop failure?	Average time spent chasing each overdue loan (days) ^b
1	1	5 (gold)	25	3	50	(A)	Yes	2-3
2	10	0	20	6	50	(B)	Yes	2-3
3	1	0	25	4-6	40	(A)	No	2
4	0	0	15	6	100	(D)	Yes	3-4
5	3	0	15	6	100	(D)	Yes	2
6	1	0	5	6	60	(B)	Yes	5
7	2	0	20	6	100	(D)	Yes	2-3
8	5	0	20	6	100	(D)	Yes	0
9	1.5	2 (land lease or gold)	8	6	50	(C)	Yes	5
10	1	0	12	6	33	(C)	Yes	5
11	0	0	5	3	100	(D)	Yes	0
12	7	10 (gold)	10	6	100	(C)	Yes	5
13	3	0	20	12	50	(C)	No	2
14	2	0	15	3	50	(C)	No	2

a. (A) "Farmer in financial difficulty—for example, through crop failure." (B) "Exceptional or unavoidable circumstances." (New lender.) (C) "Return of principal is itself at risk" (that is, something is better than nothing). (D) "Always waived" (lenders explained that while no charge was levied on late payment, those who did not have a genuine reason were excluded from future loans).

b. This does not apply to the small credits extended to sharecroppers which were, according to the lenders, not worth running after.

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

interviewed in the survey. The key assumptions used in the analysis include the time period and loan size over which screening and other administrative costs are spread, and the valuation of the lender's time. First, it is assumed here that the lender wishes to recover his screening costs from the marginal loan of six months' duration (one season). Screening costs should really be spread over all the loans that the borrower is expected to take; as revealed by table 1, on average 78 percent of customers are repeat customers, implying that on average a borrower remains a repeat customer for approximately four periods, beyond which the farmer generally moved to another lender or left the market until he again needed to borrow funds. Hence the assumption that the lender wishes to recover all screening costs from the marginal loan assumes that the lender heavily discounts the future and makes the figure for marginal screening costs per Rs100 lent to the farmer, if anything, an overestimate.

Second, the relative amount of the charge for screening and other administrative costs depends on the size of the loan over which costs are spread. In calculating the cost of the marginal loan (table 4) it is assumed that on the margin the size of loan given by a lender is the same as he has been giving on average. There was considerable diversity in the average size of loans and it appears that different lenders were catering to the needs of different-size farmers.

Finally, an important assumption implicit in the calculations relates to the valuation of the lenders' time. If lending was the only business activity and the lender had excess capacity (in the sense of time available for administering more loans), then the marginal cost of his time would be zero (neglecting any disutility of work). If he is carrying out other activities as a means of reducing business risk through diversification (the most frequently given reason for non-specialization), then there is an opportunity cost to his time depending on his gain from these activities. The survey established that lenders are carrying out other activities, but that their profitability was less than that of the lending operation. No measures of the profitability of these other activities were available, however. In fact, it could be argued that providing loans may actually increase the incentive for borrowers to purchase (or sell) commodities from (or to) the lender, thereby increasing his other activities and the gain from them. In the latter situation, the opportunity cost of the lender's time devoted to the marginal loan could be negative. Absent other information, it has been assumed that there is a displacement of other activities and the opportunity cost of his time is estimated according to what the lender expected to earn in paid employment.

To the screening costs in table 4 is added the time cost of chasing delinquent loans. The costs are then compounded to give an effective annual charge. The final column in the table gives the expected cost of administering the marginal loan as a percentage of the loan's value. The mean for the group is 6.54 percent with a standard error of 6.83 percent. The main reasons for dispersion in the estimated costs are variations in the intensity of screening and in the forgone wage.

Table 4. *The Marginal Cost of Administering a Loan per Rs100 Lent*

Lender	Resources allocated to obtaining information about loan applicants		Expected time to chase overdue loans (days) ^a	Opportunity cost of the lender's time (rupees) ^b	Expected cost for lender of administering marginal loan	
	Time (days)	Expense (rupees)			Time and resources (rupees) ^c	Percent ^d
1	3.0	20	0.63	18,000	229.42	19.01
2	0.5	0	0.50	13,200	42.31	4.51
3	2.0	50	0.50	24,000	242.31	20.32
4	1.0	30	0.53	15,000	103.56	6.01
5	0.5	0	0.30	18,000	46.15	7.85
6	1.0	50	0.25	18,000	122.12	2.45
7	0.0	0	0.50	7,800	12.50	0.50
8	0.0	0	0.00	10,800	0.00	0.00
9	0.5	0	0.40	36,000	103.85	4.20
10	2.0	100	0.60	18,000	250.00	1.67
11	2.0	30	0.00	7,200	76.15	15.82
12	0.0	0	0.50	9,600	15.38	2.07
13	0.5	20	0.40	10,000	48.85	1.63
14	1.0	20	0.30	18,000	95.00	5.49
Mean						6.54
Standard deviation						6.83

Note: The rupees-to-dollar exchange rate was 9.9 (1981).

a. The expected time cost of chasing overdue loans estimated as the average time spent on each overdue loan times the percentage of loans that is expected to be repaid after the due date (table 3).

b. Expected annual wage in employment. Average in the case of a number of partners.

c. Value of the lender's time and resources allocated to administering an average-size loan from application through to recovery. Value of time based on opportunity costs and 312 working days per annum.

d. Costs estimated in previous column expressed as a percentage of marginal loan and compounded to give effective annual rate, because the marginal loan is assumed to be given for six months.

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

Average costs of screening and loan administration. The major problem in estimating average administration costs is the treatment of joint costs—overhead and variable costs—between lending and other activities carried out by the informal lenders. The allocation of administration costs to the lending operation depends on the assumption regarding the lender's main activity and on the dependence of the activities on each other. In table 5, loan administration costs have been estimated using two alternative assumptions. If lending is considered the primary activity and other activities considered either relatively minor or complementary to it, then it may be reasonable to allocate all administrative costs to the lending operation. This is the assumption made in columns 2–4 of table 5. In column 5, however, it is assumed that lending is a joint activity carried out in parallel with other trading activities, such as buying and selling crops and the sale of farm inputs and provisions. Trying to allocate overhead and operational costs in these circumstances is difficult. In the table these costs have been allocated according to the time allocated to various activities by the lender.⁵ The average cost for the group is Rs49.52 (with a standard deviation of 50.2), using the assumption that lending is a primary activity. This estimate declines to Rs38.72 (with a standard deviation of 41.4) when it is assumed instead that it is a joint activity.

It should be noted that both estimates of average costs are closely associated with the scale of the lending operation and decline sharply as the latter increases. As a corollary, there is a large variation in average costs reflecting in large part the considerable variance in the size of the average annual amount loaned by individual lenders, as shown in column 1 of table 5. The variation in the size of the loan portfolio is in large part a reflection of variation among lenders in the size of clientele: the number of borrowers per lender varied from 10 to 180, with an average of about 40 for the group of lenders interviewed. Thus the high and widely dispersed level of average costs results from the relatively small number of borrowers per lender and the significant variation in the number of borrowers per lender. Estimates of the average costs of administration also depend on the opportunity-cost assessment of the lenders' time, which is the dominant component of overhead costs. An evaluation of the original survey results suggests that the assessment of their own opportunity wage by the lenders in the survey, although subjective, was realistic within the context of prevailing labor market opportunities available to them.⁶

Other Costs of Lending

The remaining costs of the lending operation are captured in the estimated charge on capital. This is made up of the following components: the opportu-

5. For information on time allocation by the lender between credit and other activities, see Aleem (1985, table 20-A). Trying to allocate overhead in the described circumstances is difficult. Using time as a basis for allocating costs is the only reasonable approach within the constraints imposed by available information.

6. See Aleem (1985, p. 249).

Table 5. *The Average Annual Costs of Administering Loans, Estimated per Rs100 lent to Farmers*

Lender	Average amount outstanding over the year (thousands of rupees) (1)	Assuming lending is the primary activity			Assuming lending is a joint activity, administration costs ^d (5)
		Variable costs ^a (2)	Overhead ^b (3)	Administration costs ^c (4)	
1	89.5	7.92	23.15	31.07	15.54
2	42.0	13.33	74.29	87.62	61.33
3	132.0	7.65	23.64	31.29	25.03
4	226.4	12.19	14.31	26.50	23.85
5	14.5	46.90	157.24	204.14	163.31
6	293.5	8.18	8.79	16.97	11.03
7	197.5	8.51	8.51	17.02	9.36
8	72.5	21.52	16.55	38.07	28.55
9	180.0	10.67	20.00	30.67	26.07
10	6,000.0	6.40	6.60	13.00	7.80
11	19.0	11.58	56.84	68.42	61.58
12	22.0	27.27	48.18	75.45	71.65
13	172.5	18.09	18.09	36.18	21.70
14	195.0	5.64	11.28	16.92	15.23
Mean				49.52	38.72
Standard deviation				50.20	41.40

Note: The rupees-to-dollar exchange rate was 9.9 (1981).

a. Wages to employees, business travel, stationery, and entertainment.

b. Opportunity cost to the lender (and any active partners) and rent of shop and warehouse.

c. Sum of variable and overhead costs.

d. Costs allocated to lending according to the proportion of the lender's time spent on this activity.

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

nity cost of funds, a premium for bad or unrecoverable debt, and interest lost on delinquent loans. Table 6 shows the build-up of the capital charge on the margin and on average. This table shows that for the marginal loan, the mean capital charge for the fourteen lenders was 38.8 percent (with a standard deviation of 10.64 percent), whereas on the average loan the corresponding figure is 27 percent (with a standard deviation of 9.5 percent).

The cost of funds. The main reason for the high capital charge is the high (opportunity) cost of funds facing the informal lender. The marginal cost of funds, according to data obtained directly from the fourteen informal lenders, is quite high. It ranges from 20 to 50 percent with an average for the group of 32 percent. The figures for marginal cost of funds were obtained in response to a specific question in the primary survey.⁷ In most cases these figures reflect the cost of getting marginal funds from other informal lenders. The survey revealed that on average approximately half of the funds used by the informal

7. See Aleem (1985, table 19).

Table 6. *Other Costs of the Lending Operation: The Capital Charge per Rs100 Lent to Farmers*
(rupees)

Lender	Marginal cost of capital			Marginal capital charge (1)+(2)+(3)	Average cost of capital ^a
	Marginal cost of funds (1)	Bad debt (2)	Interest lost on delinquent loans (3)		
1	36	3.0	1.13	40.13	30.08
2	20	10.0	1.00	31.00	20.92
3	40	3.0	2.01	45.01	23.16
4	36	0.0	2.70	38.70	34.83
5	24	9.0	1.81	34.81	20.85
6	40	3.0	0.60	43.60	39.57
7	20	2.0	2.00	24.00	19.60
8	50	15.0	5.00	70.00	51.75
9	30	4.5	0.60	35.10	25.98
10	30	3.0	0.60	33.60	24.05
11	40	0.0	0.50	40.50	16.20
12	25	7.0	1.25	33.25	22.75
13	30	9.0	3.0	42.00	26.87
14	25	6.0	0.48	31.48	20.75
Mean				38.80	26.95
Standard deviation				10.64	9.48

Note: The rupees-to-dollar exchange rate was 9.9 (1981).

a. Sum of bad debt, delinquency costs, and cost of funds—all on an average basis.

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

lender come from his own savings, 30 percent from institutional sources, either directly or indirectly (from cotton mills, wholesalers, and so forth who have direct access to such funds), and the remainder from other informal lenders as well as from clients who use him as a safe deposit (at zero interest) for surplus cash. The use of institutional funds by informal lenders reveals that they are actively involved in arbitrage between the two segmented markets.

If own funds are priced at the marginal opportunity cost of funds (as is the case in table 6), then the average cost of funds ranges from 10.4 to 42.5 percent, with a mean value for the group as a whole of 23 percent. (If own funds were priced at the prevailing bank rate of 10 percent, then the average cost of funds would be significantly lower. The marginal cost of funds, however, is probably a better measure of the opportunity cost of own funds to the informal lender in the conditions existing in Chambar at the time of the survey.)

Premium for bad debt. The premium for bad debt on the marginal loan has been derived from data presented in table 3. As argued above, the cumulative rate of default is a good first approximation of the cost of unrecoverable loans, and these are included in table 6 in the estimation of the average capital charge. The cumulative rate of default ranges from 0 to 10 percent, with a mean value for the group of 2.7 percent. The cumulative rate of default is a reasonable

approximation of the cost of default on an average loan, but it does not, however, provide an assessment of the risk facing the lender at the margin—from new borrowers—which is likely to be higher. An assessment has been made by considering the risks facing those lenders that have recently entered the market. The default rate they faced was two to three times the average for the group. The marginal risk for the more experienced lenders (those that had been in the market more than two years) has been estimated at three times their average risk; the estimates on the expected marginal rate of default range from 0 to 15 percent, with a mean value for the group of 5.3 percent). If anything, this is likely to be an overestimate, as is the case with the screening component of marginal costs discussed above.

Interest lost on delinquent loans. Estimates have also been made of the interest lost on delinquent loans. This is the additional interest accrued (but not recovered) beyond the original due date of the loans (see table 3). The marginal charge for expected loss on interest payments has been estimated in table 6 as the lenders' marginal cost of funds and ranges from 0.48 to 5 percent, with a mean of 1.62 percent. The cost of this component in an average loan is included in the estimation of the average capital charge. It ranges from 0.2 to 4.25 percent, with a mean of 1.2 percent.

Total Costs of Lending

The structure of total costs for the loan operation of the group of informal lenders surveyed is summarized in table 7. The first column gives the total marginal cost per Rs100 of loans recovered. It is the sum of the expected cost of administering the marginal loan (see table 4) and the marginal capital charge (see table 6), with the total adjusted for the fact that losses from bad debt have to be recovered from loans that are repaid. The mean is 48.1 percent with a relatively high dispersion (standard deviation of 14.6 percent). The last two columns give two estimates of the average total cost of the lending operation per Rs100 of loans recovered. These latter estimates have been derived from tables 5 and 6. The first of these two columns assumes that lending is the primary activity and this reveals estimates of average costs with a group mean of 79.20 percent and a standard deviation of 40.8 percent. The second assumes lending to be a joint activity, at par with other business operations being carried out by the informal lenders, and this leads to lower estimates of average total costs, with a group mean of 67.9 percent and a standard deviation of 40.5 percent.

III. INTEREST RATES AND THE COST OF INTERMEDIATION: A COMPARISON

Average and marginal costs are compared in table 8 with each other and with observed interest rates. Interest rates shown in the table represent the cost of borrowing, at an annual rate, on loans given during the year before the survey

Table 7. *Structure of Total Costs for the Lending Operation per Rs100 Recovered from Farmers*
(rupees)

<i>Lender</i>	<i>Total marginal cost</i>	<i>Total average costs</i>	
		<i>Lending the primary activity</i>	<i>Lending a joint activity</i>
1	60.97	61.77	46.08
2	39.46	120.60	91.36
3	67.34	55.00	48.68
4	44.71	61.33	58.68
5	46.88	231.95	189.86
6	47.47	57.11	51.11
7	25.00	37.37	29.55
8	82.35	94.35	84.53
9	41.15	57.51	52.84
10	36.36	37.42	32.17
11	56.32	84.42	78.05
12	37.98	105.59	101.51
13	47.95	65.00	50.07
14	39.33	38.44	36.71
Mean	48.09	79.20	67.94
Standard deviation	14.58	40.78	40.52

Note: Because the costs are allocated per Rs100 recovered rather than lent, they will exceed the sum of administration and capital costs shown in tables 5 and 6. The rupees-to-dollar exchange rate was 9.9 (1981).

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

by informal commercial sources, and are based on the terms agreed between the farmer and the informal lender at the time of the loan. These rates were derived from demand-side data in which are included both loan contracts with the rate of interest explicitly agreed upon, as well as credit transactions involving sale and purchase of commodities with an implicit cost of borrowing (that is, implicit interest rates) built into the transaction. On an annual basis the average cost of borrowing from commercial sources in the informal market was 78.7 percent. There was a large dispersion in the cost of borrowing from these sources, as reflected in the standard deviation of 38.1 percent, with rates ranging from a low of approximately 18 percent (still well above the 12 percent rate charged by banks) to a maximum of 200 percent.

It is clear from the tables that estimates of average costs (whether one considers lending to be the main or a joint activity) are higher than estimates for marginal costs. If lending is considered to be the primary activity, then average costs exceed marginal costs for thirteen out of the fourteen lenders in the survey. Alternatively, if lending is perceived as a joint activity, then estimates of average costs exceed corresponding figures for marginal costs in ten cases out of fourteen. In either circumstance, marginal cost pricing would lead to losses for the large majority of lenders. In comparing marginal and average costs, it should be noted that for reasons discussed in the previous section, it is

Table 8. *Comparing Costs and Observed Interest Rates per Rs100 Recovered*

Item	Average costs			Interest rate
	Marginal costs	Lending the primary activity	Lending a joint activity	
Mean	48.09	79.20	67.94	78.65
Standard deviation	14.58	40.75	40.52	38.14

Note: The table gives the costs facing the informal lenders and the interest rates they charged. The rupees-to-dollar exchange rate was 9.9 (1981).

Source: Author's survey data, available for a nominal reproduction charge upon written request to the author.

likely that marginal costs have been overestimated. This implies that the divergence between marginal and average costs could be greater than indicated in table 8.

As far as the comparison between average costs and interest rates is concerned, the results support the view that interest rates are equal to average costs, but not unambiguously. If lending is considered the primary activity, then the mean average cost for the group is virtually identical to the interest rates observed in the market. If lending is assumed to be a joint activity, however, then a gap does emerge between costs and rates. The statistical significance of the gap between the mean values of the observed market rates of interest and the estimated average cost cannot be estimated because of the nonrandom nature of the supply-side information; absence of random sampling on the supply side raises the possibility that many of the smaller, higher-cost suppliers may have been left out. (Table 8 reports unweighted means. Using weighted as opposed to unweighted means increases the gap between interest rates and average costs, but does not alter the qualitative conclusion that average costs of lending exceed marginal costs.⁸)

IV. INTERPRETATION OF RESULTS

The evidence presented above appears to be consistent with the classic Chamberlinian model of monopolistic competition as applied to informal credit markets. Each lender, because he does not specialize, offers a wide range of lending services which vary in terms of the types of loan contract, accessibility to the lender, marketing services provided with the loan, and so forth. As confirmed by demand-side interviews, borrowers perceive each lender to be offering a different product; thus each lender faces a downward-sloping demand curve, which gives him some flexibility to price according to his own circumstances.

Equilibrium in this model involves a distortion in the market: there are too many lenders in relation to the size of the informal credit market. With overhead spread over a relatively small amount of loans, interest rates are forced

8. See Aleem (1985, table 7).

up, above marginal cost, to cover average costs. Further, equilibrium is characterized by a dispersion in prices (interest rates); if interest rates are to cover average costs, then in the circumstances described above not only will the level of rates be raised but they will be spread over a range. The key characteristics of the model are that prices are close to the average costs of lending and above marginal costs, there is relatively free entry into the market, and there is product differentiation.

Interest Rates, Costs, and Market Distortions

Although the evidence is not unambiguous, it is tempting to accept the hypothesis that interest rates are close to the average costs of lending and above marginal cost in the circumstances existing in the Chambar market. Indeed, a number of empirical questions which have been raised can only be answered by more (empirical) research regarding, in particular, the opportunity cost of lenders' time and the extent to which lenders' activities are complementary or competitive. If one accepts the lenders' reported levels of opportunity costs as realistic, however, then even the relatively weak assumption that lending is a joint activity leads to the tentative conclusion that average costs are higher than those at the margin. This implies that, in the long run, the desire to at least cover costs will lead to distortions in the market with prices above marginal costs. In the study, the author was surprised at the large number of lenders operating in the small market area. If this is a long-run norm, then lenders have no choice but to charge relatively high rates in order to cover costs from a small clientele. This observation of "too many lenders" is not unique to the Chambar market. Similar observations have been made in studies of credit markets in other countries.⁹

There is a link between pricing distortions in informal credit markets and the government's policy regarding interest rates on institutional loans. As noted above, on average, approximately 30 percent of the informal lender's funds came directly or indirectly from low-cost institutional sources. Indeed, a major benefit to the lender from nonspecialization was the access trading activities gave him to low-cost and subsidized institutional credit. To the extent that the availability of such subsidized credit allows the marginal lender to remain in the market he otherwise could not because of the small size of his clientele, the policy of subsidizing institutional credit helps to support the distortion in the informal market.

Market Entry

One of the key assumptions behind the Chamberlinian model is that of free entry. Conditions in the Chambar market are broadly consistent with this

9. See Harriss (1983). In this article the author asks the rhetorical question: "Why are there so many small traders?" (p. 240). The author's explanation of the "relative crowding" is, however, different from the reasons given in this article and is based on broader socioeconomic factors.

assumption. The relative ease with which a large number of lenders (some of whom were urban-based), were operating successfully in the market supports this assertion. Indeed two of the lenders interviewed had moved into the area within the past eighteen months to two years. Information about the credit-worthiness of clients is a barrier to entry. The ease with which new lenders were able to enter the market and the number of lenders operating in the area, however, suggest that the problem can be surmounted in part by incurring higher screening costs in initial years.

Product Differentiation and the Role of Information Flows

Although the environment (as described above) is supportive of product differentiation, it is unlikely on its own, without accompanying informational problems, to cause the large variations in interest rates that were observed in the survey. Further, analysis carried out on this data in Aleem (1985) indicates that the dispersion in interest rates cannot be explained on the basis of variations in the following key factors: loan size, risk of default, and duration of loan. Imperfections in the flow of information (or more specifically the technology of information flows, including the screening process) contribute to and strengthen product differentiation.

There are two key imperfections in the flow of information in the market that enhance product differentiation. First, on the supply side the screening process carried out by lenders is imperfect. Second, on the demand side, although farmers have a good idea about the location of various sources of credit, they are not well aware of the terms of the loan contracts offered by individual informal lenders. Because of these imperfections the lender does not have an incentive to cut interest rates in order to increase his market share, even when rates are well above his marginal cost of lending. Imperfect information available to farmers about the terms on which loan contracts are being sold in the market implies that a lowering of interest rates is a signal which filters through to only a limited section of the market. Part of the reason farmers are poorly informed is the wide dispersion in noninstitutional rates, unlike the uniform rates charged by banks, which are well known. At the same time information on the demand side appears to flow less readily than in other markets. Lack of advertising, the farmer's reluctance to reveal his indebtedness to others, and the presence of loan contracts with the rate of interest not explicitly defined (and hence difficult to estimate and compare) are all contributing factors.

Even when borrowers become aware of a cut in rates by an informal lender, they think twice before moving from their existing sources of credit. The problem is again one of information. Farmers are discouraged from applying by the long screening process to which they would be subjected, especially as they are uncertain about its outcome and the terms that they would eventually be offered, and they do not wish to jeopardize their relationship with their existing lender. Given the uncertainty about eventual terms, farmers said that

they could end up being worse off than with their existing lender; borrowing from multiple sources was usually precluded by the lender's requirement that the farmer market all his harvested crop through the lender. As a reflection of similar concerns and the extent of the monopoly power enjoyed by lenders, nearly two-thirds of the farmers interviewed said that they would have problems in obtaining credit if their current lender were to refuse to give them a loan.

On the supply side, information problems can prevent the lender from benefiting from any increased demand that follows a cut in interest rates. As indicated above, unlike in other markets, the lender cannot sell contracts to anyone that comes along, for this could easily raise losses from bad debt. But if he tries to separate out the high risks, the lengthy nature of the screening process means that he risks losing to his competitors the advantage gained from the initial cut in interest rates.

V. CONCLUSIONS

This article has presented information derived from a survey on the costs of screening loan applicants in a particular setting—a rural money market in Pakistan—together with other costs and the modes of operation of noninstitutional lenders active in the area. It is rare to get such detailed information on the costs and performance of informal lenders, and more specifically on the flow of information in the market, including the process of screening. This information has been used to derive the structure of costs facing informal lenders, including both the marginal and average costs of lending. These costs were then compared with the high and widely dispersed interest rates that were observed in the market. The evidence, although not unambiguous, provides tentative support to the hypothesis that interest rates in the market reflect the average costs of lending and are above marginal costs.

That interest rates are close to average costs and above marginal costs, that entry is relatively free, and that lenders are seen to offer differentiated products are all characteristics of a market that is consistent with the Chamberlinian model. Equilibrium in this model involves a distortion: there is an excess of lenders, and fixed costs must be spread over a relatively small amount of lending. Thus interest rates rise above marginal costs to cover average costs. Such an environment is also consistent with the high and widely dispersed interest rates that were observed in the market. Informational imperfections—the imperfect nature of the screening process on the supply side, and borrowers' lack of awareness of loan terms available from specific lenders—give rise to product differentiation.

In the short term it will be difficult to reduce the problem of imperfect information through, for example, such actions as enforcing laws to advertise the terms of loan contracts offered in the informal money markets. An area in which policy can have an effect is through the structure of institutional interest

rates. The above analysis suggests at least two effects of reducing the subsidy on these loans. First, given that a significant proportion (30 percent) of the funds available to the informal lender came from institutional sources, raising interest rates would raise the opportunity costs of funds for informal lenders, and some of the higher costs will be passed on to borrowers, thus dampening the demand for credit in informal markets. Second, it would discourage further entry into the informal money market (on the margin of lenders who would otherwise not be able to lend), and this could ameliorate the problem of "too many lenders" with its inherent inefficiency.¹⁰

REFERENCES

- Aleem, Irfan. 1985. "Information, Uncertainty, and Rural Credit Markets in Pakistan." Ph.D. thesis, Oxford University.
- Bliss, C. J., and Nicholas Stern. 1983. *Palanpur: The Economy of an Indian Village*. Oxford, England: Clarendon Press.
- Bottomley, Anthony. 1975. "Interest Rate Determination in Underdeveloped Rural Areas." *American Journal of Agricultural Economics* 57, no. 2 (May): 279-91.
- Chandavarkar, A. G. 1965. "The Premium for Risk as a Determinant of Interest Rates in Underdeveloped Areas." *Quarterly Journal of Economics* 79 (May): 322-25.
- Ghatak, Subrata. 1975. "Rural Interest Rates in the Indian Economy." *Journal of Development Studies* 11, no. 3 (April): 190-201.
- . 1983. "On Interregional Variations in Rural Interest Rates in India." *Journal of Developing Areas* 18 (October): 21-34.
- Harriss, Barbara. 1983. "Money Commodities: Their Interaction in a Rural Setting." In J. D. Von Pischke, D. W. Adams, and G. Donald, eds., *Rural Financial Markets in Developing Countries*. Baltimore, Md.: Johns Hopkins University Press.
- Iqbal, Farrukh. 1988. "The Determinants of Moneylender Interest Rates: Evidence from Rural India." *Journal of Development Studies* 24, no. 3 (April): 364-78.
- Salop, Steven, and Joseph E. Stiglitz. 1977. "Bargains and Ripoffs: A Model of Monopolistically Competitive Price Dispersion." *Review of Economic Studies* 44, no. 3 (October): 493-510.

10. For a discussion of inefficiency, see Salop and Stiglitz (1977).

Peer Monitoring and Credit Markets

Joseph E. Stiglitz

A major problem for institutional lenders is ensuring that borrowers exercise prudence in the use of the funds so that the likelihood of repayment is enhanced. One partial solution is peer monitoring: having neighbors who are in a good position to monitor the borrower be required to pay a penalty if the borrower goes bankrupt. Peer monitoring is largely responsible for the successful financial performance of the Grameen Bank of Bangladesh and of similar group lending programs elsewhere. But peer monitoring has a cost. It transfers risk from the bank, which is in a better position to bear risk, to the cosigner. In a simple model of peer monitoring in a competitive credit market, this article demonstrates that the transfer of risk leads to an improvement in borrowers' welfare.

Difficulties in obtaining capital, and the high cost of capital when it can be obtained, may act as important impediments to improvements in productivity. Capital markets in the rural sector often appear to be underdeveloped. There are traditional moneylenders, but they are often reviled for charging usurious rates. The reason for these high rates remains a subject of controversy. There are widespread popular views that the rates are exploitative. These views implicitly assume that competition is limited. Local moneylenders make use of local knowledge, and this local knowledge may explain why competition is so limited. More recent views have questioned the extent of exploitation, suggesting that the high rates are a result of three factors: the high rates of default, the high correlations among defaults, and the high cost of screening loan applicants and pursuing delinquent borrowers.¹ Because of the importance of local information, moneylenders' loans are generally concentrated within a single geo-

1. See, for instance, Aleem, this issue.

Joseph E. Stiglitz is a professor of economics at Stanford University, Stanford, California.

This article is based on earlier work on the general theory of moral hazard (Arnott and Stiglitz 1985, 1986, 1988) and on joint work with Richard Arnott on the general theory of peer monitoring (Arnott and Stiglitz 1990). It also draws heavily upon earlier joint work with A. Weiss on the theory of credit markets (Stiglitz and Weiss 1981, 1983, 1986, 1987a, 1987b). Financial support from the National Science Foundation, the Olin Foundation, and the Hoover Institution is gratefully acknowledged. I am greatly indebted to Richard Arnott and K. Hoff for helpful comments.

© 1990 The International Bank for Reconstruction and Development / THE WORLD BANK.

graphical area; the inability to diversify means that the risks they must bear are large.

Both in the rates charged and the institutional arrangements by which loans are extended, traditional moneylending appears markedly different from modern banking institutions of the form found in more developed economies. As a result, many governments have encouraged formal banking institutions to go into the rural sector (see Siamwalla and others, and Bell, this issue.) These institutions would serve to increase both economic efficiency—by making credit more widely available—and equality, by lowering the interest rates which poor farmers have to pay. This, it was believed, would be true whether the high interest rates reflected exploitation as a result of limited competition, or whether they reflected compensation for the undiversified risks which local moneylenders had to bear. Presumably, these more efficient modern institutions would drive out the less efficient local moneylenders.

As it has turned out—as shown in the articles by Bell, Siamwalla and others, and Aleem in this issue—the two groups have not only managed to coexist, but the local moneylenders seem able to continue to lend at high interest rates. Although the formal lending institutions often have suffered large losses, the local moneylenders have not only survived, in some cases they have actually thrived. Part of the reason for this is that the formal institutions have not made loans available to all farmers who would like them (or have not provided them with as much credit as they would like). But another part of the reason may be that the local moneylenders have one important advantage over the formal institutions: they have more detailed knowledge of the borrowers. They therefore can separate out high-risk and low-risk borrowers and charge them appropriate interest rates; and they can monitor the borrowers more effectively, making sure that the funds are used productively and thus lowering the default rate.² (See Aleem for the dramatic contrast in default rates.)

Of the banking institutions which have been set up to provide credit in the rural sector of developing countries, one institution, the Grameen Bank in Bangladesh, appears to be a model of success. It makes small loans—the average size is approximately seventy dollars. It makes about 475,000 loans a month. Its default rate is approximately 2 percent, in contrast to some other lenders, which have default rates of between 60 and 70 percent (Lurie 1988). There are a number of distinctive characteristics to the Grameen Bank, but the one I wish to focus on here is that the loans are made to self-formed groups of approximately five farmers, who are mutually responsible for repaying the loans. Moreover, other members of the group cannot obtain credit until existing loans are repaid.³

2. The incentive (moral hazard) and selection problems are two of the central problems facing any credit market.

3. Peer monitoring through group loans also appears to be used in some African loan markets and in Thailand. (See Migot-Adholla and others, forthcoming and Siamwalla and others, this issue.)

Thus, the Grameen Bank is able to exploit the local knowledge of the members of the group. It has devised an incentive structure whereby others within the village do the monitoring for it. I call this *peer monitoring*. Elsewhere, Arnott and I (1990) have argued that peer monitoring may be an effective way of designing an incentive-monitoring system in the presence of costly information.⁴

Peer monitoring is not without its cost. The members of the borrowing groups in the Grameen Bank bear risks that, in the absence of the monitoring problem, could much better be absorbed by the bank. Indeed, in the case of borrowing groups, the interdependence among the members of the group is artificially created. They have been induced to bear more risks than they otherwise would.

This poses an analytical problem: are the gains from improved monitoring worth the costs of increased interdependence? This is the problem that this article sets out to model and answer. The article should be viewed as a first attempt at developing a general theory of peer monitoring. Thus the borrowing group consists of only two individuals. Moreover, the interdependence is limited—they have to pay only a limited amount in the event of default. But even this limited amount raises the risk that they must bear. I assume, moreover, that the information each member of the group has about each other is essentially costless; it is a by-product of living near each other. (In more general cases, the amount of monitoring will depend on the extent of interdependence, so that with only a little interdependence, one may obtain only limited monitoring.) Finally, I assume that the risks of default are independent. In practice, they are correlated. The existence of correlation would only strengthen the results of this analysis.

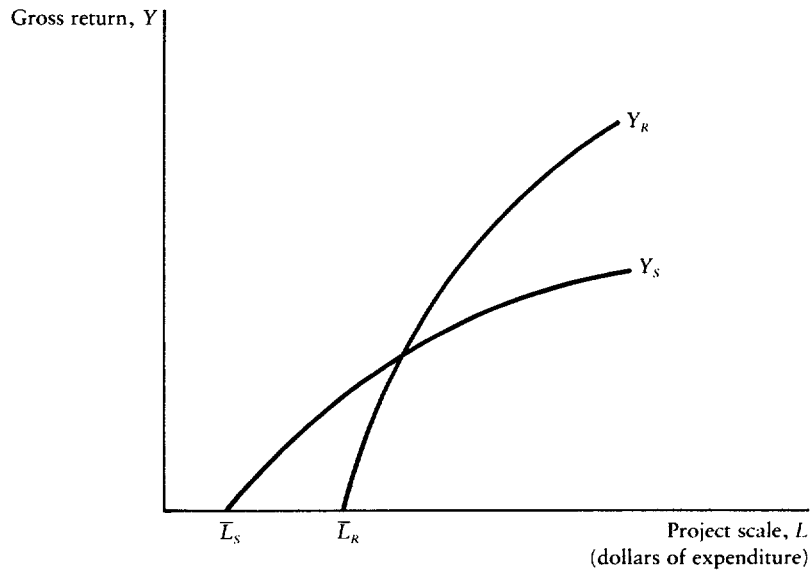
The article is divided into three sections. Section I presents the basic model, describing the equilibrium which would emerge in the absence of peer monitoring. Section II shows how peer monitoring works and explains why it will be adopted. Section III provides some concluding remarks.

I. THE BASIC MODEL

I assume all individuals have two projects which they can undertake, a relatively safe project yielding, if successful, a return of $Y_S(L)$ when undertaken at scale L (measured in dollars of expenditure), and a relatively risky project yielding, if successful, a return of $Y_R(L)$. If a project fails, returns are zero. The probability of success for each project is p_S and p_R , with $p_S > p_R$. I assume that the return is an increasing function of scale, but that the fixed costs, \bar{L} , associ-

4. In labor markets workers frequently have much better information about whether peers are shirking than do managers. In insurance markets, family members have a much better idea about what precautions each is taking against some insured event than does the insurance firm. The principles of peer monitoring that are developed here thus have important implications and applications in a variety of settings.

Figure 1. Relationship between Gross Returns and Investment (Assuming Success) for Safe and Risky Projects



Note: \bar{L} = fixed costs; R = risky project; S = safe project.

ated with the risky project are larger: $\bar{L}_R > \bar{L}_S$. Accordingly, in the relevant region, $Y'_R > Y'_S$, as depicted in figure 1.

Assume that, taking into account the probability of success, the safe project always yields a higher return than the risky project:

$$Y_S(L)p_S - (1+r)L > Y_R(L)p_R - (1+r)L \quad \forall L$$

where r is the rate of interest. An individual who invests his own funds, therefore, will always choose the safe project. An individual who invests borrowed funds and declares bankruptcy if the project fails, however, will discount the cost of funds to reflect the probability of bankruptcy.

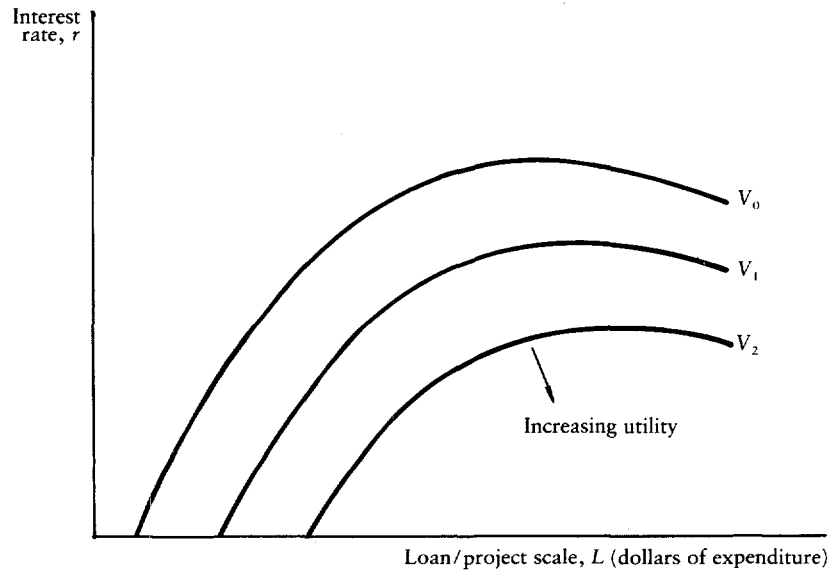
In order to focus on the incentive problem, I assume all individuals are identical⁵ and, for simplicity, that the level of effort required by the two projects at any given size is identical. Expected utility from undertaking project i is⁶

$$(1) \quad V_i(L, r) = U[Y_i(L) - (1+r)L]p_i - v(e(L))$$

5. If villagers know each other's characteristics, then, in forming peer monitoring groups, there will be "assortative mating"; that is, the least likely to default will group together, the next most likely to default will group together, and so on, leaving the most likely to default to form a group. Thus the assumption that all members of the peer monitoring group are identical can really be viewed as one of the equilibrium conditions, which can be derived in a more general setting.

6. I assume that either the individual has no source of income other than that from the project, or that whatever the income is, it is constant and cannot be garnished by the bank if the project fails.

Figure 2. Indifference Curves between Loan Size and Interest Rate Charged for a Single Project



Note: V_i = expected utility from project i , where $V_0 < V_1 < V_2$.

where $U(Y)$ is the utility of income, $U' > 0$, $U'' < 0$, and the utility function is normalized so that $U(0) = 0$.^{7,8} The term $v(e(L))$ is the disutility of effort e ; $v' > 0$, $v'' > 0$. It is assumed that the level of effort required goes up as project size increases: $e'(L) > 0$. The individual's indifference curve for a given project (risky or safe) is given in figure 2. This curve gives all the contracts (L, r) that yield the borrower the same utility.⁹

7. This normalization is a convenient one for the exposition of this article but is in no way essential and encounters difficulties, for instance, with constant absolute risk aversion utility functions.

8. Implicit in this formulation is that the individual's investment in the project is equal to the amount that he can borrow, L . The results can be generalized to the case where the amount of his own funds that the individual is willing to invest depends on the amount that he can borrow.

9. I assume that the lender can monitor the borrowing activity of the borrower, ensuring that he does not obtain funds elsewhere, though the lender cannot monitor other actions of the borrower. This assumption is not entirely satisfactory. While the lender can limit the size of the loan he extends, formal lenders often have difficulty enforcing restrictions on loans taken out with other lenders. Thus several of the case studies in this issue suggest that while information and other transaction costs imply that the borrower has a credit relationship with only one (or at the most, very few) informal lenders, borrowers frequently borrow from both formal and informal credit institutions.

A full analysis of market equilibrium in which formal institutions could not restrict the amount of outside loans would take us beyond the scope of this paper. (See Arnott and Stiglitz 1990 for an analysis of the analogous problem in the context of insurance markets with moral hazard). Doing so, however, would strengthen the case for peer monitoring, because the inability to restrict outside loans will lower the level of expected utility attained by the borrower in formal credit markets without peer monitoring.

The slope of the indifference curve if the individual undertakes project i is¹⁰

$$(2) \quad \frac{dr}{dL} = \frac{Y'_i - (1+r) - v'e'/U'p_i}{L}$$

The “switch line” can be defined as those combinations of (L, r) for which the individual is indifferent between the two projects; that is:

$$(3) \quad V_S(L, r) = V_R(L, r).$$

The switch line is negatively sloped under the plausible condition that, because returns to scale are more important for the risky project than for the safe, an increase in L , keeping r fixed, makes the risky project more attractive. In the relevant region ($L > \bar{L}_R$),

$$(4) \quad \frac{\partial V_S}{\partial L} < \frac{\partial V_R}{\partial L}.$$

Note that the indifference curve, letting the choice of project vary with the terms of the loan contract, is the escalloped shape shown in figure 3A. Above the switch line (at high levels of L) the individual undertakes the risky project.

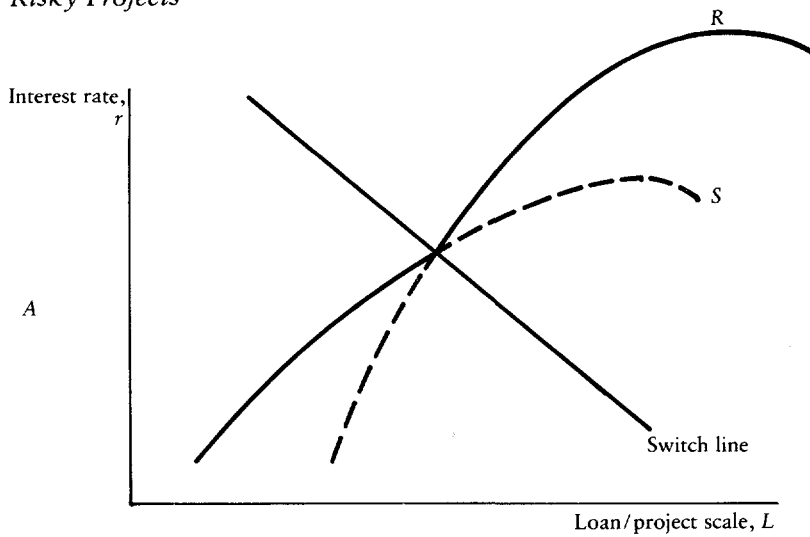
To see that the switch line is downward-sloping, fix the loan size and note that utility decreases with increases in r by the amount $LU'p_i$. Since for the risky project U' is lower and p_i is lower, the decrease in utility for each increase in r is smaller for the risky project. Hence, starting from a value of (L, r) at which the borrower is indifferent between undertaking the safe or risky project, such as point E in figure 4, an increase in r causes the risky project to dominate the safe project. But it was assumed in equation 4 that an increase in L at a fixed r increases the expected utility from the risky project more than that from the safe project. Therefore, an increase in L must be accompanied by a fall in r to leave the borrower indifferent between the two projects, which proves that the switch line is negatively sloped.

The borrower is compensated for the extra risk associated with the risky project by a higher return when the project is successful, but the bank is not. The risky project has a lower probability of success and, hence, the bank has a lower chance of being repaid. Clearly, if the bank could directly control the actions of the borrower, it would specify that the borrower undertake the safe project. It cannot, and this is the basic problem with incentives in credit markets. By controlling the terms of the loan contract, the bank can induce the borrower to undertake the safe project. That is, the bank must offer a contract which lies on or below the switch line.

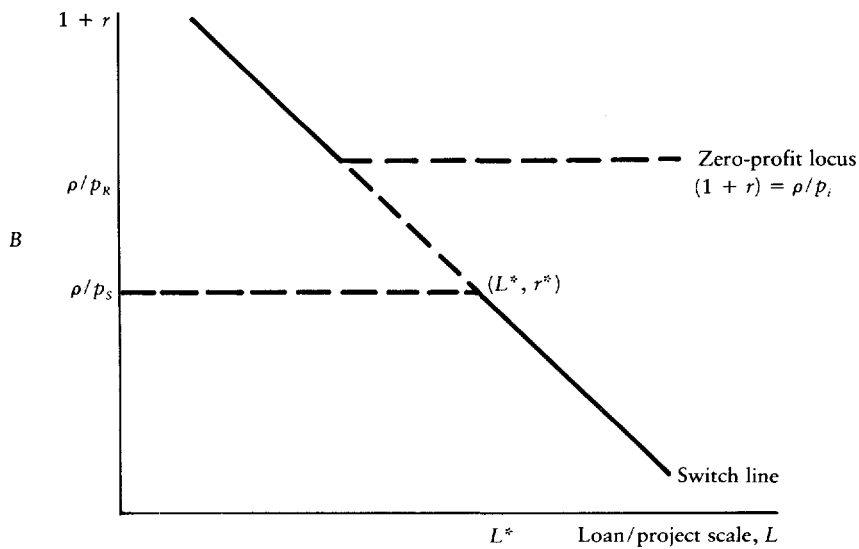
To analyze the market equilibrium one additional set of curves is needed—the zero-profit locus. The zero-profit locus can be constructed simply as follows. If the borrower undertakes the safe project, the expected return to the

10. The indifference curve for a given project is “well-behaved” in the relevant region where $Y'_i > (1+r)$ provided $Y''_i < 0$ and $d^2(v'e')/dL^2 > 0$.

Figure 3. Influence of Loan Size and Interest Rate in Selection of Safe and Risky Projects

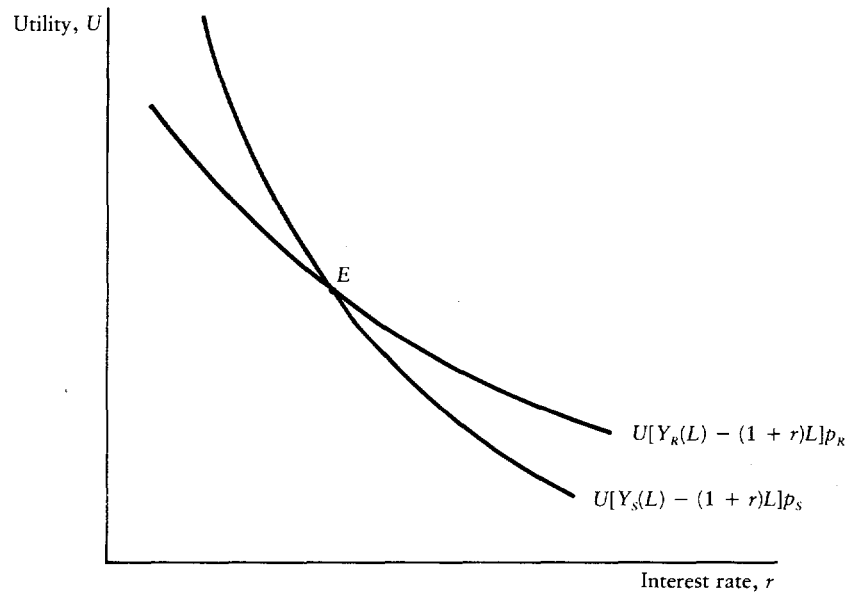


Note: Because at larger loan sizes individuals undertake the risky project, the indifference curve—letting the technique employed vary with the contract—has an escalated shape. R = risky project; S = safe project.



Note: Market equilibrium occurs at the contract (L^*, r^*) , where profits are zero. It is the largest loan size along the zero-profit locus for which individuals are willing to undertake the safe project. The variable ρ = cost of capital; p_i = probability of success of project i ($i = R, S$).

Figure 4. *Effect of Interest Rates on Utility in Selection of Risky or Safe Projects at a Given Loan Size*



Note: L = loan/project size; p_i = probability of project success; R = risky project; S = safe project; Y = gross return.

bank is $p_S(1+r)$. If the cost of capital is ρ , then profits are zero provided $1+r = \rho/p_S$. Similarly, if the borrower undertakes the risky project, expected profits are zero provided $1+r = \rho/p_R$. The zero-profit locus is thus the peculiarly shaped dashed line in figure 3B.

The market equilibrium is that point on the zero-profit locus which maximizes the borrower's expected utility. (It is assumed that the borrower does not have alternative sources of credit or, equivalently, that the lender can monitor the total amount borrowed by any single individual.) In figure 3B, the equilibrium loan contract is (L^*, r^*) . Clearly, the borrower would like to borrow more at the market rate of interest; and if the borrower could credibly commit himself to not undertaking the risky project, the lender would be willing to lend him a larger amount at that rate. But given that the borrower cannot commit himself, and that the lender cannot enforce such a promise, even were it made (and the borrower and lender both know that), the lender must limit his loan size to L^* .

This is only one of the two forms that credit rationing may take. It also may take the form that of a group of identical borrowers, some get loans and some don't. The usual argument for why this kind of credit rationing cannot occur is that those who have been rationed out of the market offer to pay higher interest rates. As they do so, the interest rate gets bid up, until demand for funds equals supply. But this argument does not work here, because lenders

know that at any interest rate above the switch line, borrowers will undertake the risky project. Though the amount borrowers promise to pay is higher, the amount they actually pay (on average) is lower.¹¹

II. PEER MONITORING

Now assume that every borrower has one (and only one) neighbor who is also a borrower. The success of their projects is independent. The two borrowers can monitor each other. The lender would like each to report if his neighbor is using the risky technique. He wants to create an environment in which it is in the interests of each to monitor the other and to report any cheating.

The following is a simple way of doing so. The lender offers a contract in which if his neighbor agrees to cosign—in a specific sense to be described below—the borrower can obtain a lower interest rate and additional funds. The cosigner agrees to pay qL dollars to the lender in the event that the loan he has cosigned goes into default—provided, of course, that he himself does not go into default.

Now, the cosigner's expected utility depends on whether his neighbor undertakes the risky or the safe project. Given their interdependence and the symmetry we have imposed on the problem, it is reasonable to assume that they cooperate; that is, they decide jointly on whether to undertake the safe or the risky project, and if they undertake the risky project, they agree not to report it.¹²

11. This argument is set forth in greater detail in Stiglitz and Weiss (1981). In the simple model presented here, lenders are indifferent to lending any size loan below the switch line, at a given interest rate. But if the model is modified slightly to allow p_i to increase slightly with loan size, then below the switch line the zero-profit locus is negatively sloped, and lowering the loan size below L^* actually lowers the expected return to the lender.

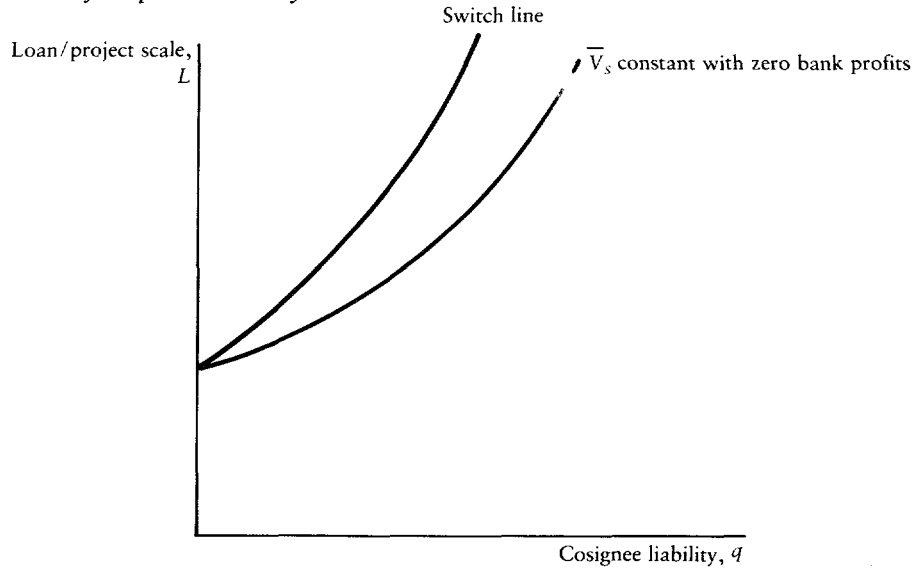
Other modifications to the model, to make it more realistic, provide further reasons why lenders will not wish to make small loans, to "underfund" projects. For instance, borrowers often have the discretion to take actions which put the lender in a position of choosing to ante up more money or risk the loss of everything previously lent. Borrowers thus can "force" lenders to lend them more. See Stiglitz and Weiss (1981) and Hellwig (1977).

12. The interactions among the individuals which result in this being an equilibrium are not modeled in detail. It is easy to construct a game for which this is an equilibrium. For instance, assume that at any date at which one side reports that his neighbor has undertaken the risky project, the other side has time to report the same information. Then it would not pay either party to renege on the agreement not to report.

More generally, it is reasonable to assume that social sanctions would ensure that they behave cooperatively, when each's income depends not only on his own actions but also on those of his neighbor. There are natural information assumptions which assure that they cannot cheat on each other.

Throughout, it is assumed that if the borrower cheats on the contract by undertaking the risky project, the cosignee can "force" the reversal of the action; for example, the loan contract provides that in the event of such cheating, the loan is in default and the lender assumes control and gets all the returns.

Figure 5. Relationship between Loan Size and Cosignee's Liability at a Fixed Level of Expected Utility



Note: \bar{V}_s = fixed level of utility from safe project (S). The switch line is the maximum loan size, for each q , which induces individuals to undertake the safe project.

Making the individual cosign his neighbor's loan imposes on him an additional risk. Since the zero profit condition ensures that the interest rate will adjust to leave the expected return to the bank unchanged—taking into account the payment from the cosignee, the effect of the cosignatory provision is to induce a mean-preserving spread on the borrower's income at any given level of his loan L : if both borrowers are successful, utility is higher; but if one is successful and the other is not, the first borrower's utility is lower. To compensate him for undertaking this additional risk, the lender must provide a larger loan. The relationship between the minimum-size loan required to attain a given level of expected utility and the magnitude of the cosignee's payment rate, q , is depicted in figure 5. Equation A-5 in the appendix shows that at $q = 0$, and given the bank's zero-profit condition

$$(5) \quad \left. \frac{dL}{dq} \right|_{\bar{V}_s} = 0$$

This means that (at low levels of q) the risk burden imposed on the borrower by cosigning is exactly compensated by the reduction in the competitive interest rate charged.

The only remaining question is to ascertain what happens to the switch line.

If the two parties act cooperatively, the switch line is now given by the equation

$$(6) \quad U[Y_S(L) - (1+r)L]p_S^2 + U[Y_S(L) - (1+r-q)L]p_S(1-p_S) \\ = U[Y_R(L) - (1+r)L]p_R^2 + U[Y_R(L) - (1+r-q)L]p_R(1-p_R)$$

Equation A-7 in the appendix shows that so long as the condition of equation 4 is satisfied and the interest rate adjusts as q increases to maintain zero profits for the lender, the maximum L at which the individual undertakes the safe project increases with q . That is,

$$(7) \quad \left. \frac{dL}{dq} \right|_{\text{switch line at } q=0} > 0.$$

As shown in figure 5, peer monitoring will be welfare-enhancing: for low levels of q , the increase in L which it allows (with borrowers undertaking the safe project) is greater than that required to compensate the individual for the increase in risk-bearing.

III. CONCLUSIONS

This analysis of the value of peer monitoring suggests some of the ingredients in the design of successful peer monitoring systems. First, the members of the peer group must be provided with incentives to monitor the actions of their peers. In the Grameen Bank this is provided by the fact that members of the peer group are jointly liable for repayment of loans, and by the fact that they cannot gain access to credit until the debts of the group are discharged. The denial of access to further credit can be an effective incentive device, as the earlier study of Stiglitz and Weiss (1983) emphasized.

The Grameen Bank employed small groups. The small size increased the risk from a single member's default but increased the incentives for peer monitoring. The gains from the latter exceeded the losses from the former. With large groups there is a free rider problem—each would prefer that others expend the energy required to monitor and incur the ill will that would result from reporting offenders who have misused the funds lent to them. Moreover, the costs to each as a result of a default by any member are sufficiently small that incentives to monitor—even apart from the free rider problem—would be minimal.

There are strong incentives for groups with similar risk characteristics to form. Because the group acts as a cooperative, if some individual is more prone to default than others, he is being subsidized. When groups are identical, there is no subsidy (at least in an ex ante sense). Of course, those with high risks of default would like to join groups with a low risk of default. The assortative grouping comes about as those with the lowest risk of default recognize their mutual interest in grouping together; then those with the lowest risk among the ones remaining group together; and the process continues until the individuals with the highest risk are forced to group together. Villagers have an informa-

tional advantage over formal credit institutions not only in monitoring but also in selection. By eliminating some of the cross-subsidization that occurs in credit markets with imperfect screening, peer selection with substantial cross-guarantees may enhance the effectiveness of rural credit markets, although, like peer monitoring, it increases the risks that borrowers have to bear. Having groups which are self-formed may thus be an important ingredient in the success of the Grameen Bank.¹³

Provisions for cosigning have traditionally been viewed as a way of increasing the effective collateral behind a loan. This article has provided an alternative interpretation. Cosigning provides an incentive for the cosigner to monitor the actions of the person for whom he has cosigned the loan. Cosigning also increases risk. But in the kind of symmetric competitive equilibrium analyzed here, interest rates adjust to reflect the improved monitoring. It has been proven that at low levels of q , the gains from peer monitoring more than offset the loss in expected utility from the increased risk-bearing.

In developing countries the inability of those outside a village to monitor loans has posed a major impediment to the development of effective capital markets. Within the village, risks are sufficiently highly correlated and there are sufficiently few individuals with wealth that the lending market is both imperfectly competitive and carries with it high risk premia.

Although governments have recognized the existence of a problem, they have paid insufficient attention to its root causes. If informational problems are the barrier to the development of an effective capital market, then there is no reason to presume that governmental lending agencies will be in a superior position to address these problems. Indeed, the lack of incentives for government bureaucrats to monitor loans may exacerbate the problem. The experience of government losses in such programs (see, for instance, Sanderatne 1978, and Bell, this issue) suggests that it may be foolish for government to go where the market has feared to tread.

But government may be able to use peer monitoring to offset its informational disadvantage. This article has illustrated a simple way by which such peer monitoring can be implemented, but there are alternative institutional arrangements that could work as well or better. For instance, government could lend to small lending cooperatives within a village, making each member of the cooperative collectively liable for the whole.

A question naturally arises at this juncture: if peer monitoring is so effective, why isn't it employed by private markets? In capital markets in developed countries, it may be extensively employed. As noted above, provisions for cosigning may be important not only for the increased effective collateral but also for the induced peer monitoring.

13. There still may be some cross-subsidization across groups if interest rates charged to different groups do not correspond to differences in group default rates. Successful peer monitoring, however, lowers group default rates to the point where this cross-subsidization may be relatively unimportant.

In developing countries a major impediment to the development of peer monitoring—as well as to the development of other institutions—comes from inadequate legal systems to enforce contracts. Government has one advantage over private lenders, a difference which is particularly important in developing countries, where the judicial system is at best slow, at worst ineffective. Government may have powers of enforcing contracts that private lenders might not have.

This suggests an alternative policy reform to more extensive government provision of credit: legal reforms giving lenders more security for the recovery of their loans. It may, however, be difficult to isolate legal reforms directed at making the credit markets more effective from a broader range of legal reforms. And there may be serious impediments to undertaking this broader range of legal reforms. Although legal reforms can facilitate the use of peer monitoring in private markets, even short of such fundamental reforms, well-designed government lending programs, taking advantage of the opportunities provided by peer monitoring, may, in these circumstances, be an effective second-best policy.

APPENDIX

No Peer Monitoring

To simplify the notation, let $\bar{r} \equiv 1 + r$, the principal and interest charged by the bank; $U_i \equiv U[Y_i(L) - \bar{r}L]$, the utility of a borrower who succeeds at project i ; and $i = R, S$.¹⁴

Recall that $V_i(r, L) = U_i p_i$, the expected utility of a borrower who undertakes project i , and the switch line is the set of contractual terms (L, r) for a rationed borrower where

$$(A-1) \quad V_R = V_S$$

We assume in equation 4 in the text that in the relevant region ($L > \bar{L}_R$), the benefit of an extra dollar of credit is greater for the risky than for the safe project:

$$(A-2) \quad U'_R(Y'_R - \bar{r})p_R = \frac{\partial V_R}{\partial L} > \frac{\partial V_S}{\partial L} = U'_S(Y'_S - \bar{r})p_S$$

Differentiating the switch line (A-1) completely yields

$$\left. \frac{dr}{dL} \right|_{\text{switch line}} = \frac{\left(\frac{\partial V_R}{\partial L} - \frac{\partial V_S}{\partial L} \right)}{L(U'_R p_R - U'_S p_S)} < 0$$

where the sign condition follows from equation A-2 and the fact that $p_R < p_S$

14. Throughout the appendix, the effort required to manage the project is ignored. Incorporating the effects of changes in effort induced by changes in loan size is straightforward.

and $U'_R < U'_S$. Thus the switch line is downward-sloping, as illustrated in figure 3.

Peer Monitoring

With peer monitoring, the borrower faces in effect three states of the world: (1) both his own and his neighbor's projects succeed; (2) his own succeeds but his neighbor's fails; and (3) his own fails. Utility in the three states is

$$U_i \equiv U[Y_i(L) - \bar{r}L]$$

$$U_{iq} \equiv U[Y_i(L) - \bar{r}L - qL]$$

$$U(0) = 0$$

Expected utility in a symmetric equilibrium—where both the borrower and his neighbor choose the same project, R or S—is

$$(A-3) \quad \bar{V} = U_i p_i^2 + U_{iq} p_i (1 - p_i) = V_i(r, L, q)$$

Assuming that equilibrium is characterized by credit rationing, the bank chooses a contract (r, L, q) that ensures the individual will choose the safe project. The bank's zero-profit condition is

$$p_s (1 + r) + p_s (1 - p_s) q = \rho$$

so

$$(A-4) \quad \frac{dr}{dq} = -(1 - p_s).$$

For any r equations A-3 and A-4 define a relationship between the borrower's loan limit and the copayment which keeps the borrower's expected utility unchanged and is consistent with the bank's zero-profit conditions. That relationship is characterized by

$$(A-5) \quad \left. \frac{1}{L} \frac{dL}{dq} \right|_{\bar{v} \text{ and the bank's zero-profit condition}} = \frac{-U'_i p_i^2 (1 - p_s) + U'_{iq} p_i p_s (1 - p_i)}{U'_i (R'_i - \bar{r}) p_i^2 + U'_{iq} (Y'_i - \bar{r} - q) p_i (1 - p_i)}$$

$$= \frac{-M_i}{\partial V_i / \partial L}$$

$$(A-5') \quad = 0 \text{ if } q = 0 \text{ and } p_i = p_s$$

$$(A-5'') \quad > 0 \text{ if } q = 0 \text{ and } p_i = p_R$$

where

$$M_i \equiv \frac{\partial V_i}{\partial q} + \frac{\partial V_i}{\partial r} \frac{dr}{dq}$$

Equation A-5' yields the result that in an equilibrium in which the borrower undertakes the safe project and banks earn zero profits, imposition of a low cosigner liability rate q at a fixed loan limit L leaves borrower utility unchanged. See the lower curve in figure 5.

It is useful to write the switch line (equation A-1 or equation 6 above) explicitly:

$$(A-6) \quad p_R^2 U_R + p_R(1 - p_R)U_{Rq} = p_S^2 U_S + p_S(1 - p_S)U_{Sq}$$

Differentiating A-6 totally yields

$$\left. \frac{dL}{dq} \right|_{\text{switch line}} = - \frac{M_R - M_S}{\partial V_R / \partial L - \partial V_S / \partial L}$$

From the assumption stated as equation A-2, the denominator is positive. Using A-5' and A-5'', respectively, we have that at $q = 0$,

$$M_S = 0$$

$$M_R < 0$$

so

$$(A-7) \quad \left. \frac{dL}{dq} \right|_{\text{switch line at } q=0} = \frac{-M_R}{\partial V_R / \partial L - \partial V_S / \partial L} > 0.$$

Equation A-7 shows that peer monitoring shifts up the switch line. It relaxes the constraint on (L, r) required to ensure that the borrower undertakes the safe project. Comparing A-5' and A-7 indicates that at low levels of q , the shift up in the switch line *exceeds* the shift needed to maintain the borrower at constant expected utility, as illustrated in figure 5. Peer monitoring will thus increase the borrower's welfare.

REFERENCES

- Arnott, R., and J. E. Stiglitz. Forthcoming. "Dysfunctional Non-Market Institutions." *American Economic Review*.
- . 1985. "Labor Turnover, Wage Structure and Moral Hazard: The Inefficiency of Competitive Markets." *Journal of Labor Economics* 3, no. 4 (October): 434–62.
- . 1986. "Moral Hazard and Optimal Commodity Taxation." *Journal of Public Economics* 29: 1–24.

- . 1988. "The Basic Analytics of Moral Hazard." *Scandinavian Journal of Economics* 90, no. 3: 383–413.
- . 1990. "Equilibrium in Competitive Insurance Markets with Moral Hazard." Stanford University. Processed.
- Hellwig, Martin F. 1977. "A Model of Borrowing and Lending with Bankruptcy." *Econometrica* 45, no. 8 (November): 1876–1906.
- Lurie, T. 1988. "Increasing Income and Employment in Bangladesh." *Ford Foundation Letter* 19, no. 4: 1–5.
- Migot-Adholla, Shem, Peter Hazell, Frank Place, and Benoit Blarel. Forthcoming. "Customary Land Rights in Sub-Saharan Africa: A Constraint on Productivity?" *World Bank Economic Review*.
- Sanderatne, N. 1978. "An Analytical Approach to Loan Defaults by Small Farmers." *Savings and Development* 2.
- Stiglitz, Joseph E., and A. Weiss. 1981. "Credit Rationing in Markets with Imperfect Information." *American Economic Review* 71, no. 3 (June): 393–410.
- . 1983. "Incentive Effects of Termination: Applications to the Credit and Labor Markets." *American Economic Review* 72 (December): 912–27.
- . 1986. "Credit Rationing and Collateral." In Jeremy Edwards, Julian Franks, Colin Mayer, and Stephen Schaefer, eds., *Recent Developments in Corporate Finance*. New York: Cambridge University Press.
- . 1987a. "Credit Rationing with Many Borrowers." *American Economic Review* (March): 228–31.
- . 1987b. "Macro-economic Equilibrium and Credit Rationing." National Bureau of Economic Research Working Paper 2164. Cambridge, Mass.

Index to Volume 4

AUTHOR INDEX

- Akiyama, Takamasa, and Panayotis N. Varangis, "The Impact of the International Coffee Agreement on Producing Countries," 2: 157-73
- Alem, Irfan, "Imperfect Information, Screening, and the Costs of Informal Lending: A Study of Rural Credit Markets in Pakistan," 3: 329-49
- Bell, Clive, "Interactions between Institutional and Informal Credit Agencies in Rural India," 3: 295-327
- Briscoe, John, Paulo Furtado de Castro, Charles Griffin, James North, and Orjan Olsen, "Toward Equitable and Sustainable Rural Water Supplies: A Contingent Valuation Study in Brazil," 2: 115-34
- Castro, Paulo Furtado de (see John Briscoe), 2: 115-34
- Cavallo, Domingo (see Yair Mundlak), 1: 55-79
- Claessens, Stijn, and Ishac Diwan, "Investment Incentives: New Money, Debt Relief, and the Critical Role of Conditionality in the Debt Crisis," 1: 21-41
- Cohen, Daniel, "Debt Relief: Implications of Secondary Market Discounts and Debt Overhangs," 1: 43-53
- de Melo, Jaime, and L. Alan Winters, "Voluntary Export Restraints and Resource Allocation in Exporting Countries," 2: 209-33
- Diwan, Ishac (see Stijn Claessens), 1: 21-41
- Domenech, Roberto (see Yair Mundlak), 1: 55-79
- Griffin, Charles (see John Briscoe), 2: 115-34
- Hoff, Karla, and Joseph E. Stiglitz, "Introduction: Imperfect Information and Rural Credit Markets—Puzzles and Policy Perspectives," 3: 235-50
- López, Ramón E., and Vinod Thomas, "Import Dependency and Structural Adjustment in Sub-Saharan Africa," 2: 195-207
- Mingmaneeakin, Wanrak (see Ammar Siamwalla), 3: 271-95
- Mintz, Jack M., "Corporate Tax Holidays and Investment," 1: 81-102
- Mundlak, Yair, Domingo Cavallo, and Roberto Domenech, "Effects of Macroeconomic Policies on Sectoral Prices," 1: 55-79
- Nettayarak, Prayong (see Ammar Siamwalla), 3: 271-95
- North, James (see John Briscoe), 2: 115-34
- Olsen, Orjan (see John Briscoe), 2: 115-34
- Pinthong, Chirmsak (see Ammar Siamwalla), 3: 271-95
- Poapongsakorn, Nipon (see Ammar Siamwalla), 3: 271-95
- Pursell, Garry, "Industrial Sickness, Primary and Secondary: The Effects of Exit Constraints on Industrial Performance," 1: 103-14
- Satsanguan, Ploenpit (see Ammar Siamwalla), 3: 271-95
- Siamwalla, Ammar, Chirmsak Pinthong, Nipon Poapongsakorn, Ploenpit Satsanguan,

- Prayong Nettayarak, Wanrak Mingmaneeakin, and Yuavares Tubpun, "The Thai Rural Credit System: Public Subsidies, Private Information, and Segmented Markets," 3: 271–95
- Stiglitz, Joseph E., "Peer Monitoring and Credit Markets," 3: 351–66
 ——— (see Karla Hoff), 3: 235–50
- Tarr, David, "Second-Best Foreign Exchange Policy in the Presence of Domestic Price Controls and Export Subsidies," 2: 175–93
- Thomas, Vinod (see Ramón López), 2: 195–207
- Tubpun, Yuavares (see Ammar Siamwalla), 3: 271–95
- Udry, Christopher, "Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy," 3: 251–69
- Varangis, Panayotis N. (see Takamasa Akiyama), 2: 157–73
- Winters, L. Alan (see Jaime de Melo), 2: 209–33
- Yeats, Alexander J., "Do African Countries Pay More for Imports? Yes," 1: 1–20
 ———, "On the Accuracy of Economic Observations: Do Sub-Saharan Trade Statistics Mean Anything?" 2: 135–56

TITLE INDEX

- "Corporate Tax Holidays and Investment," Jack M. Mintz, 1: 81–102
- "Credit Markets in Northern Nigeria: Credit as Insurance in a Rural Economy," Christopher Udry, 3: 251–69
- "Debt Relief: Implications of Secondary Market Discounts and Debt Overhangs," Daniel Cohen, 1: 43–53
- "Do African Countries Pay More for Imports? Yes," Alexander J. Yeats, 1: 1–20
- "Effects of Macroeconomic Policies on Sectoral Prices," Yair Mundlak, Domingo Cavallo, and Roberto Domenech, 1: 55–79
- "The Impact of the International Coffee Agreement on Producing Countries," Takamasa Akiyama and Panayotis N. Varangis, 2: 157–73
- "Imperfect Information, Screening, and the Costs of Informal Lending: A Study of a Rural Credit Market in Pakistan," Irfan Aleem, 3: 329–49
- "Import Dependency and Structural Adjustment in Sub-Saharan Africa," by Ramón E. López and Vinod Thomas, 2: 195–207
- "Industrial Sickness, Primary and Secondary: The Effects of Exit Constraints on Industrial Performance," Garry Pursell, 1: 103–14
- "Interactions between Institutional and Informal Credit Agencies in Rural India," Clive Bell, 3: 295–327
- "Introduction: Imperfect Information and Rural Credit Markets—Puzzles and Policy Perspectives," Karla Hoff and Joseph E. Stiglitz, 3: 235–50
- "Investment Incentives: New Money, Debt Relief, and the Critical Role of Conditionality in the Debt Crisis," Stijn Claessens and Ishac Diwan, 1: 21–41
- "On the Accuracy of Economic Observations: Do Sub-Saharan Trade Statistics Mean Anything?," Alexander J. Yeats, 2: 135–56

- “Peer Monitoring and Credit Markets,” Joseph E. Stiglitz, 3: 351–66
- “Second-Best Foreign Exchange Policy in the Presence of Domestic Price Controls and Export Subsidies,” David Tarr, 2: 175–93
- “The Thai Rural Credit System: Public Subsidies, Private Information, and Segmented Markets,” Ammar Siamwalla, Chirmsak Pinthong, Nipon Poapongsakorn, Ploenpit Satsanguan, Prayong Nettayarak, Wanrak Mingmaneeenakin, and Yuavares Tubpun, 3: 271–95
- “Toward Equitable and Sustainable Rural Water Supplies: A Contingent Valuation Study in Brazil,” John Briscoe, Paulo Furtado de Castro, Charles Griffin, James North, and Orjan Olsen, 2: 115–34
- “Voluntary Export Restraints and Resource Allocation in Exporting Countries,” Jaime de Melo and L. Alan Winters, 2: 209–33

Subscription Coupon

If you are not already a subscriber to **The World Bank Economic Review**, you may begin a subscription by completing and returning this coupon to World Bank Publications.

You may also use this coupon to subscribe to **The World Bank Research Observer**. Written for noneconomists and students, the **Observer** provides overviews of key issues in development economics research and assumes no economics training on the part of the reader. It is also helpful to economists seeking concise surveys of work outside their own specialties.

Subscriptions to both **The Economic Review** and **The Research Observer** are available on a complimentary basis to readers with mailing addresses in non-OECD countries. For readers with mailing addresses in OECD countries, discounts are available for three-year subscriptions and subscriptions to both journals.

Indicate below the type of subscription desired. Please complete both sides of this subscription coupon.

For Readers with Mailing Addresses in Non-OECD Countries:

Please begin my complimentary subscription to **The World Bank Economic Review** **The World Bank Research Observer** (check either or both boxes).

For Readers with Mailing Addresses in OECD Countries:

(Check appropriate box).

	One Year		Three Years	
	Individuals	Institutions	Individuals	Institutions
The World Bank Economic Review (three issues per year)	\$25 <input type="checkbox"/>	\$45 <input type="checkbox"/>	\$ 65 <input type="checkbox"/>	\$125 <input type="checkbox"/>
The World Bank Research Observer (two issues per year)	\$20 <input type="checkbox"/>	\$35 <input type="checkbox"/>	\$ 50 <input type="checkbox"/>	\$ 95 <input type="checkbox"/>
Both Journals	\$40 <input type="checkbox"/>	\$70 <input type="checkbox"/>	\$100 <input type="checkbox"/>	\$175 <input type="checkbox"/>

Check method of payment

Enclosed is my check for US\$ _____ payable to World Bank Publications.

Charge my VISA MasterCard American Express

Credit Card Number _____

Signature _____

Expiration Date _____

Please bill me. (Institutional orders only.)

Purchase order number _____

Please complete both sides of this subscription coupon.

Subscription Coupon

Send to: World Bank Publications
Box 7247-8619
Philadelphia, PA 19170-8619, U.S.A.

Please print clearly:

Name _____

Title _____

Organization name _____

Organization address _____

County _____ Postal code _____

OCCUPATION CODES

Please check only one.

- 01 International, regional organization (including field offices), that is, WHO, UNDP
- 02 Central banks, finance and planning ministries
- 03 Other government agencies (including embassies)
- 04 Nongovernmental organizations (NGOs) and other associations
- 05 Research institutions
- 06 University faculty
- 07 Libraries
- 08 Bookstores
- 09 Commercial banks and other financial institutions (including savings and loan associations, security dealers, and so forth)
- 10 Business – manufacturing (goods) Where both apply, check “goods”
- 11 Business – consulting (services)
- 12 Student
- 13 News media

SUBJECT INTEREST CODES

- R0 General economics: theory, history, systems
- R1 Economic growth: development, planning, fluctuations
- R2 Economic statistics
- R3 Monetary and fiscal theory and institutions
- R4 International economics
- R5 Administration, business finance, marketing, accounting
- R6 Industrial organization; technological change; industry studies
- R7 Agriculture, natural resources, rural development
- R8 Labor, population and human resources
- R9 Welfare programs; consumer economics; urban and regional economics

Please complete both sides of this subscription coupon.

*The most convenient and
user-friendly software ever released
by the World Bank*

World Bank Data on Diskette

An increasing number of data collections published by the Bank are now available on diskette for use in personal computers. Using the Bank's newly developed Socioeconomic Time-series Access and Retrieval System (STARS), the data can be easily exported to spreadsheet and word processing programs.

Each diskette package includes double-density 5 1/4" diskettes and 3 1/2" diskettes for use in PCs with a hard disk and MS-DOS versions 2.0 or higher. Also included is a User's Guide to the software and an English paperback edition of the corresponding book.

World Tables 1989-90 Data on Diskette

ISBN 0-8213-1531-5 / US\$70.00 / Stock #11531

The most detailed collection of economic data published by the Bank.

Social Indicators of Development 1989 Data on Diskette

ISBN 0-8213-1530-7 / US\$95.00 / Stock #11530

Reorganized and expanded to provide a clearer picture of the social effects of economic development.

World Debt Tables 1989-90 Data on Diskette

ISBN 0-8213-1533-1 / US\$95.00 / Stock #11533

Compiled from information gathered through the World Bank's exclusive Debtor Reporting System.

World Development Indicators 1990 Data on Diskette

ISBN 0-8213-1532-3 / US\$95.00 / Stock #11532

Drawn from the **World Development Report**, the Bank's most widely circulated statistical tables on economic and social development.

African Economic and Financial Data on Diskette

ISBN 0-8213-1529-3 / US\$95.00 / Stock #11529

Designed to track the performance of development programs and aid flows in the region.

**To order any of these data collections on diskette,
list title, stock number, and price on the coupon that
follows.**

By exploring the effectiveness of rapid small-farm growth in reducing poverty -- and the scope of social action to improve that effectiveness -- this splendid book should capture the attention of policymakers and researchers.

--Michael Lipton, Institute of Development Studies, University of Sussex

The Great Ascent

The Rural Poor in South Asia

Inderjit Singh

This new book challenges the widely held view that the rapid growth of small farms in South Asia has done the poor more harm than good. By critically reviewing recent academic literature and the World Bank's operational experience in Bangladesh, India, and Pakistan, Inderjit Singh shows that agricultural growth has benefited all classes of the poor. He concludes that the "great ascent" from poverty to a more materially rewarding life has begun.

The report examines in detail a variety of programs intended to help the poor. It evaluates agricultural research, extension, and training activities, as well as programs in dairying, poultry farming, commercial fishing, and forestry. Mr. Singh also examines the failure of land reforms to reduce poverty.

*Published for the World Bank by The Johns Hopkins University Press
472 pages / ISBN 0-8018-3954-8 / US\$39.95 / Order Stock #43954*

Of Related Interest by Inderjit Singh

Land and Labor in South Asia

244 pages / ISBN 0-8213-1129-8 / US\$12.95 / Order Stock #20033

Small Farmers in South Asia

Their Characteristics, Productivity, and Efficiency

82 pages / ISBN 0-8213-1090-9 / US\$6.95 / Order Stock #20031

Tenancy in South Asia

128 pages / ISBN 0-8213-1091-7 / US\$10.95 / Order Stock #20032

To order *The Great Ascent* or other publications by Inderjit Singh, list title, stock number, and price on the coupon that follows.

*Now available in
eight languages*

World Development Report 1990

Featuring . . .

- The World Bank's first in-depth analysis of global poverty in 10 years.
- World Development Indicators -- the most comprehensive and current data available on social and economic development in more than 120 countries.
- A concise review of recent trends in the world economy.

English hardback edition / 282 pages / ISBN 0-19-520850-1 / US\$29.95 /
Order Stock #60850

Paperback editions -- all US\$14.95:

English / ISBN 0-19-520851-X / Order Stock #60851
Arabic / ISBN 0-8213-1506-4 / Order Stock #11506
Chinese / ISBN 0-8213-1507-2 / Order Stock #11507
French / ISBN 0-8213-1504-8 / Order Stock #11504
German / ISBN 0-8213-1508-0 / Order Stock #11508
Japanese / ISBN 0-8213-1509-9 / Order Stock #11509
Portuguese / ISBN 0-8213-1510-2 / Order Stock #11510
Spanish / ISBN 0-8213-1505-6 / Order Stock #11506

Also available . . .

- *World Development Indicators 1990* on machine-readable diskettes for use in your personal computer. Files are easily transferable to other programs.

Includes an English paperback edition of *World Development Report 1990*.
ISBN 0-8213-1532-3 / US\$95.00 / Order Stock #11532

To order any of the language editions of *World Development Report 1990* or the diskettes, list title, stock number, and price on the coupon that follows.

New Studies on the Implementation of Educational Policies in Africa

This series of reports examines how eight countries of eastern and southern Africa are working to improve their educational systems. A central theme emerging from all the reports is the crucial role of national strategies and policies in education. Also stressed throughout the series is the need for each country to develop its own educational strategy based on its unique political and social situation, resource base, and national cultural heritage.

The eight case studies are complemented by two additional reports assessing the implementation of educational policy from a broader, regional perspective.

Why Educational Policies Can Fail: An Overview of Selected African Experiences

George Psacharopoulos

Discussion Paper 82 / 34 pages / ISBN 0-8213-1549-8 / US\$5.95 / Order Stock #11549

Comparative African Experiences in Implementing Educational Policies

John Craig

Discussion Paper 83 / 102 pages / ISBN 0-8213-1578-1 / US\$7.95 / Order Stock #11578

Implementing Educational Policies in . . .

. . . Ethiopia

Fassil R. Kiros

Discussion Paper 84 / 132 pages / ISBN 0-8213-1581-1 / US\$9.95 / Order Stock #11581

. . . Kenya

G. S. Eshiwani

Discussion Paper 85 / 44 pages / ISBN 0-8213-1582-X / US\$5.95 / Order Stock #11582

. . . Tanzania

C. J. Galabawa

Discussion Paper 86 / 44 pages / ISBN 0-8213-1583-8 / US\$5.95 / Order Stock #11583

. . . Lesotho

T. Sohl Thelejani

Discussion Paper 87 / 34 pages / ISBN 0-8213-1584-6 / US\$5.95 / Order Stock #11584

. . . Swaziland

Cisco Magalula

Discussion Paper 88 / 84 pages / ISBN 0-8213-1585-4 / US\$6.95 / Order Stock #11585

. . . Uganda

Cooper F. Odaet

Discussion Paper 89 / 40 pages / ISBN 0-8213-1586-2 / US\$5.95 / Order Stock #11586

. . . Zambia

Paul P. W. Achola

Discussion Paper 90 / 66 pages / ISBN 0-8213-1587-0 / US\$6.95 / Order Stock #11587

. . . Zimbabwe

O. E. Maravanyika

Discussion Paper 91 / 44 pages / ISBN 0-8213-1588-9 / US\$5.95 / Order Stock #11588

To order any of these publications, list title, stock number, and price on the coupon that follows.

*New Edition
Now Available*

Trends in Developing Economies 1990

The recent economic performance of some 90 developing economies -- arranged alphabetically for easy reference -- is assessed in the second edition of the World Bank's newest annual • statistical series.

Including . . .

- A comprehensive table of economic and social indicators for 1965-89
- Descriptive analyses for the majority of countries
- Highlights of the problems and prospects for each country's economy and the main elements of its development strategy.

The series complements the *World Development Report*, which looks at global and regional economic trends and their implication for future prospects of the developing countries.

The profiles of each country are drawn from the Bank's data base and economic analyses of its member countries.

632 pages / ISBN 0-8018-1648-6 / US\$19.95 / Order Stock #11648

To order *Trends in Developing Countries 1990*, list title, stock number, and price on the coupon that follows.

The World Bank and the Environment

First Annual Report, Fiscal 1990

This report reviews the Bank's progress in combating environmental degradation during July 1989 - June 1990. The main goal of the Bank's effort has been the *integration* of environmental concerns into its development work.

The Bank emphasizes five problem areas in its operations . . .

- Destruction of natural habitats
- Land degradation
- Degradation and depletion of fresh water resources
- Urban, industrial, and agricultural pollution
- Degradation of "the global commons" such as atmospheric and marine pollution

Describes not only the Bank's successes in its environment work, but also the problems it has encountered.

112 pages / ISBN 0-8213-1641-9 / US\$7.95 / Order Stock #11641

Also Available from the World Bank

Environmental Health Components for Water Supply, Sanitation, and Urban Projects

James A. Listorti

Technical Paper 121 / 156 pages / ISBN 0-8213-1537-4 / US\$9.95 / Order Stock #11537

The Greenhouse Effect *Implications for Economic Development*

Erik Arrhenius and Thomas W. Waltz

Discussion Paper 78 / 26 pages / ISBN 0-8213-1520-X / US\$4.95 / Order Stock #11520

Conserving the World's Biological Diversity

Jeffrey A. McNeely, Kenton R. Miller, Walter V. Reid, Russell A. Mittermeier, and Timothy B. Werner

204 pages / ISBN 0-8213-1384-3 / US\$14.95 / Order Stock #11384

To order any of these publications, list title, stock number, and price on the coupon that follows.

**Use this coupon to order
any of the titles listed on the previous pages.**

Title	Stock Number	Price

Subtotal US\$ _____
 Shipping and handling US\$ 3.50
 Airmail surcharge outside USA (US\$6.00 per copy) US\$ _____
 Total US\$ _____

Check your method of payment. **Orders from individuals must be accompanied by payment or credit card information. Ask local distributors about forms of payment acceptable to them.**

Enclosed is my check payable to World Bank Publications in U.S. dollars.

Charge my VISA MasterCard American Express
These credit cards are accepted for orders addressed to Philadelphia. (Check with your local distributor about acceptance of credit cards in your country.)

_____ Credit card account number _____ Expiration date _____

_____ Signature _____

Institutional customers only:
 Send invoice and reference purchase order no. _____

Please print clearly

Name _____

Title _____

Firm _____

Address _____

City _____ State _____ Postal Code _____

Country _____ Telephone _____

Customers in the United States: Detach this form and mail to World Bank Publications, P.O. Box 7247-8619, Philadelphia, PA 19170-8619, U.S.A.

Customers outside the United States: Contact World Bank Publications, 1818 H Street, NW, Washington, DC 20433, U.S.A. for a list of World Bank publications distributors. Write to the local distributor in your area for information on prices and terms of payment. Coupons received in Washington from countries with authorized distributors will be returned to the customer. Customers in countries with no authorized distributor, return your coupon to World Bank Publications, P.O. Box 7247-8619, Philadelphia, PA 19170-8619, U.S.A.

Coming in the next issue of

THE WORLD BANK ECONOMIC REVIEW

January 1991
Volume 5, Number 1

Analyses of the measurement of poverty, including articles on . . .

- **International comparisons**, based on recent studies in developed countries, *by A. B. Atkinson*
- **Correlates of poverty**, identified by comparing statistical data and personal observations in an Indian village, *by Peter Lanjouw and Nicholas Stern*
- **Methodological approaches**, applied to Indonesian household survey data, *by Martin Ravallion and Monika Huppi*

Topics in land rights and land taxation, including articles on . . .

- **The efficiency of land versus output taxes** *by Karla Hoff*
- **Targeting efficiency versus administrative costs in land taxation** *by Jonathan Skinner*
- **The effect of indigenous land rights systems in Sub-Saharan Africa** *by Shem Migot-Adholla, Peter B. Hazell, Benoit Blarel, and Frank Place*
- **The effects of land rights on incentives, uncertainty, and credit**, with empirical evidence from Thailand, *by Gershon Feder and David Feeny*