

World Bank Reprint Series: Number 410

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Lessons for Policy Analysis from Practice and Modern Theory

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Rural Credit Markets and Institutions in Developing Countries: Lessons for Policy Analysis from Practice and Modern Theory

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Summary. — We present the evidence of government intervention in rural credit markets of LDCs in the past three decades and confront it with modern theory. That evidence shows a significant failure of subsidized credit programs either to achieve an increase of agricultural output cost-effectively or to improve rural income distribution and alleviate poverty. In addition, many of the financial institutions that were created to channel rural credit have been shown to be inept and lacking accountability.

Modern theory has focused mostly on two areas, credit rationing in competitive markets and interlinking of credit contracts with labor and land contracts. We outline the policy implications of these theories and find them insufficient to account for the empirical evidence. We contend that a more systematic and rigorous analysis of institutions and institutional environments is essential for understanding and implementing effective policy reforms of rural credit markets. We present suggestions for undertaking such an analysis.

1. INTRODUCTION

It is currently a mark of sophistication in presenting economic models not to mention institutions. But for all that, it is a significant trait of contemporary economics that, despite this omission, it manages somehow to find support for institutional change. It is a neat trick, but it cannot hide the fact that in thinking about institutions, the analytical cupboard is bare. (Schultz, 1968)¹

During the 1960s and 1970s subsidized rural credit was seen as one answer to low productivity and poverty in the agricultural sectors of developing countries. There is now an emerging consensus among the development community that rural credit subsidies do not work. Increases in agricultural output have not been achieved cost-effectively, and rural income distribution and rural savings rates have deteriorated. Faced with these disappointing results, careful students of rural credit markets such as Dale Adams, Claudio Gonzalez-Vega, and John von Pischke have concluded that rural credit should not be subsidized.

The failures of subsidized rural credit are frequently laid at the feet of the institutions that were created to manage it. Their performance raises serious doubts about the efficacy of government-funded financial institutions in the rural sector. There are some success stories, however, which demonstrate the possibilities of appropriate environments and effective policies and shed light on the ingredients necessary for successful institutional reforms.

Policy choices should be based on clear descriptions of the policy objectives and on analysis of the expected effect of each policy considered, given specific socio-political and economic con-

*The World Bank does not accept responsibility for the views expressed herein which are those of the authors and should not be attributed to the World Bank or to its affiliated organizations. We are thankful to Ed Schuh, Joe Stiglitz, Judith Tendler and Jonathan Morduch for helpful comments and to Colleen Roberts for editorial assistance. In addition, Guasch gratefully acknowledges partial support from the National Science Foundation under Grant #SES-840219.

straints. The main objectives of rural development are wide-ranging. They include increasing agricultural output and productivity, inducing the optimal rate of new technology adoption and input and output mix, improving income distribution, reducing rural poverty, and increasing rural employment. Though subsidizing rural credit is commonly discussed as a means of reaching many of these sometimes conflicting objectives, it is clearly only one of the policy instruments used to achieve them. Therefore any methodology for policy analysis in rural credit markets should integrate the whole set of the other policy instruments. More often than not, however, each policy instrument is analyzed separately without the appropriate framework for comparison with other policy instruments.

The relevant policy choices open for examination fall into these broad categories:

- (1) Abolish credit subsidies but maintain the existing institutions under the assumption that abolishing subsidies will remedy major inefficiencies and disorders mainly due to excess demand for underpriced funds; or
- (2) dismantle government-funded financial institutions and abolish credit subsidies, letting the informal markets and commercial banks fill the gap. In other words, retreat to the position prior to government intervention, or
- (3) do not rule out the possibilities for rural credit subsidies or public financial institutions. On a case-by-case basis, analyze the institutional structure and then, if possible, design and implement institutional reforms with appropriate incentive schemes in order to produce sound management. Then compare the costs and benefits of credit subsidies with feasible price or non-price policy instruments, including the non-intervention state.²

Though so far institutional reforms have not had great success, efforts to achieve them cannot be completely abandoned. Depending solely on indigenous market forces to emerge and achieve the desired results is unrealistic, and since many LDCs initially exclude the role of private banks, there is no other way than to continue struggling with the challenge of institutional reforms. This may be attempted through movements to increase privatization and decentralization of financial institutions, and through properly designed incentive mechanisms which mimic competitive forces in reducing incentives for corruption and lack of accountability.

This paper's purpose is to explore potentially

sound methodologies for formulating effective policies in light of practical experience and new developments in theory. It is structured as follows: The following section summarizes the conclusions regarding the impact of rural credit subsidization and the funding of rural financial institutions in LDCs from case studies over the last two decades. The third section compares this evidence with the insights provided by the modern theory of incentives and credit markets. Finally, the fourth section suggests conceptual frameworks for: (i) a methodology for credit policy analysis which allows comparison with other policy instruments and (ii) a methodology for analyzing reforms of rural financial institutions. Specifics of these frameworks will be presented in a companion piece.

2. RURAL CREDIT MARKETS: EVIDENCE

Until recently conventional wisdom held that imposing low ceilings on interest rates and allocating massive amounts of credit to rural financial markets would speed rural development and improve income distribution. But by and large policies directed along these lines have failed. Indeed, most often they have made matters worse. Low interest rate ceilings provide income transfers to loan recipients, distorting the real price ratio of investment opportunities by undervaluing the real cost of capital in different sectors. To the standard cost of distorted resource allocation, add the specific costs and consequences of implementing credit programs in rural financial markets for the full measure of impact. The record overwhelmingly shows credit programs' objectives have not been met.

These credit policy failures can be attributed to basic flaws intrinsic to formal rural credit markets out of which arise persistent problems as described in Table 1. We elaborate further on some of these points below.³

(a) Allocation of credit

If indeed one of the objectives of a credit program is to reach a large number of targeted small rural farmers, then by and large most programs can be deemed failures. Despite the remarkable expansion of credit throughout rural areas in developing countries over the last three decades, only a small fraction of the farmers in low income countries seem to have received or

Table 1. *Characteristics of rural financial markets*

<i>Basic flaws</i>	
Weakness of competitive forces.	
Weak legal enforcement of contracts.	
Corruption and lack of accountability in institutions, patronage and income transfer practices, which are partly due to poorly designed or non-existent incentive mechanisms to induce accountability on both sides of the market.	
Significant information problems and uncertainty regarding the ability of borrowers to meet future loan obligations.	
Inability to monitor the use of funds.	
Lack of collateral often due to land tenure arrangements or ill-defined property rights (e.g. parts of Africa).	
Lack of coherent financial savings mobilization program.	
Higher opportunity cost of capital in other sectors because of interest rate ceilings.	
<i>Persistent problems</i>	
Credit loans to wealthy farmers, small farmers rationed out of the credit market.	
Loans for agricultural programs diverted to non-agricultural uses.	
Credit policies that encourage consumption and discourage savings.	
The term structure of agricultural loans contracts or fails to expand.	
Low adoption rates of cost-saving technologies in agriculture and in financial services.	
Low recovery rate.	
Significant distortions in the optimal allocation of resources across markets.	
Extensive use of interlinking credit contracts with labor and land contracts.	

benefited from such credit. It has been estimated that only 5% of farms in Africa and about 15% in Asia and Latin America have had access to formal credit. Rather than equalizing income inequality, low interest rate credit programs have increased it; 5% of borrowers have received 80% of the credit. Policies that allocate credit to farmers indiscriminately provide larger loans to larger landholders when all credit demands are fulfilled. This is because larger landholders require larger loans even if there are decreasing returns to credit per hectare and per farm size. This is also true if excess demand gives rise to rationing.

If credit program interest rates are not market rates — this is so for most programs implemented in rural financial markets (RFM) — they do not reflect the true cost of capital. This results in a subsidy or income transfer to loan recipients. The larger the size of the loan, the larger will be the subsidy or income transfer. Thus larger landholders receive larger income transfers and income inequality increases. The problem is exacerbated because rationing is not equiproportional to demands. Since commercial banks and specialized farm credit organizations tend not to be located in rural settings, they possess limited

information about rural customers. Their credit allocation policies tend to be based on observable wealth or ability to provide collateral. Therefore they do not ration the large landholders. But the intermediate or medium-size landholders are rationed, and the small farmers are screened out.⁴ Substantial costs in processing and administering loans, with returns increasing as a function of loan size, strengthen the incentives to maintain such policies;⁵ because of those scale effects, targeting small farmers is a problem whether or not interest rates are subsidized. However, subsidized credit worsens the problem, since it increases the demand for loans at all levels. Thus, given a fixed supply of capital the rationing to small farmers will be even more severe.

Formal credit has not often reached the small farmers; just as often this credit has been shifted out of the agriculture sector altogether. Estimates of the percentage of rural credit channeled for non-agricultural purposes have ranged from 20% to 40% of total funds. Fungibility of loans and distortions in the opportunity cost of capital across sectors are the explanations. The obvious consequence is a further slowdown of the rural development process.

(b) *Improper credit practices at the expense of the poor*

Loans at fixed nominal interest rates are predictably generators of poor investments, misallocations, borrowing for arbitrage and become even more attractive to the well-to-do in the presence of high inflation rates (e.g., in Latin America). Under these circumstances, it is not surprising that credit is allocated in return for political benefits or as compensation for favors, rather than according to need or efficiency. Examples abound (see Landman and Tinnermeir, 1981 in Bolivia and Robert, 1979 in India for a sampling). This phenomenon is reinforced by the specialized farm credit institutions that operate without active competition or accountability. Monopoly power from nonprofit institutions fosters patronage, corruption, and other forms of inefficiency and inequality wherever markets lack the forces of competition.

Widely used schemes by countries searching for revenue-generating mechanisms tax agricultural output — often to the detriment of poor farmers. Brazil, for example, has among other things, a value-added or export tax on agricultural output. A subsidized credit policy is often the consequence of such taxes; subsidized credit is provided as a means of offsetting the export taxes, both implicit and explicit. In these cases, those who do not receive credit bear most of the burden of the tax. This makes possible the perverse situation whereby small farmers — the nonrecipients — subsidize large farmers — the recipients of credit.

(c) *Loan term structure*

Public institutions' main operations are short-term loans to organized groups or single farmers. Only a small part is long-term. For example, in Mexico, Banrural does not have more than 15% of its portfolio in long-term loans. Commercial banks there also tend to finance largely short-term loans to large farmers and agrobusiness.

The rationale for this emphasis on short-term loans in the rural sector varies. Perhaps the most common is the belief that cheap loans should be collected quickly, especially in regimes of high inflation, since inflation often decapitalizes banks when interest rates are set by decree. Clearly, lack of collateral due to land tenure arrangements or lack of well-defined property rights (e.g., in parts of Africa) are contributing factors. The consequences are further inefficiencies in the use of capital, increases in noncompliance, and

an increasing likelihood that small farmers are screened out of the loan market.

(d) *Savings mobilization*

Interest rate ceilings have detrimental effects not only on the viability of financial institutions but for the economy as a whole. Ceilings create disincentives for savings or accumulation of capital; limitations on external borrowing make internal generation of capital vital for a proper functioning of the rural sector.

Commercial banks and state-funded institutions have not mobilized much rural savings. The estimate of the percentage of loanable funds from rural sources has ranged from 5% to 40%, with the median much closer to the former than the latter figure. Most of the high estimates came from farmers' cooperative efforts like rotating savings and credit associations, chit funds, and other forms of forced savings or insurance programs. Taiwan and Korea have been among the most successful examples of savings mobilization, due to the bottom-up formation of an extensive network of cooperatives, coupled with a government policy of positive real interest rates (see Lipton, 1981, for an illuminating analysis of the problem).

(e) *Recovery rates and bankruptcy*

Successful credit programs have high recovery rates. Subsidized credit programs also fail in this regard. Most studies report low recovery rates. Defining default as a loan overdue for repayment, those studies have indicated default rates ranging, with a few exceptions, from 40% to 95% for credit programs in Africa, the Middle East, and Latin America. Similar results have been reported in South and Southeast Asia. East Asia is the exception: the high recovery rates for Korea, Taiwan, and Japan are frequently attributed to strong village cooperative systems which have provided a strong incentive and enforcement system.

Looking at the timing of default over the life of a credit program illuminates some of the issues behind default rates. The history of programs not requiring any collateral — making all farmers eligible — shows that the recovery rate is unusually high at the beginning, but declines gradually over a program's life. The reasons are declining screening quality over time, lax supervision, and stronger incentives to default as the prospect of future loans diminishes. For example, the BIMAS credit program in

Indonesia, implemented in 1970, reports recovery rates of 95% for the first two years. After five years, however, recovery rates dropped to 60%.

While there is no conclusive evidence regarding the relative compliance of small farmers versus large farmers, studies in Bangladesh, Bolivia, Colombia, Costa Rica and Ethiopia show that on average poorer farmers have better records than the well-to-do farmers. They also indicate that larger farmers have a poorer compliance record regarding credit from organized markets, while small farmers have a poorer record regarding credit from informal credit markets. But it should be noted that most larger farmers obtain credit from organized credit markets while the smaller ones get it from the informal credit market, so these findings are predictable. Furthermore, the level of aggregation in most of the studies is too high to allow sensible inferences.

(f) *Informal lending and interlinking of credit contracts with labor and land contracts*

Informal lending was once the only form credit took in rural settings. Evidence suggests that as farm size increases, private credit sources, village moneylenders and pawnbrokers, chit funds with an array of implicit interest rates, and friends or relatives grow less important than banks. With the implementation of development plans, official lending complements but clearly does not supersede informal sources.

Sample surveys supply the information on the extent of informal lending practices. They indicate that its volume is far greater than that of organized institutions. It is characterized by a much shorter processing time, better screening techniques or enforcement devices (noted in the lower default rate), and higher interest rates, with a median around 50% and a variance much higher than institutionalized credit rate (see Singh, 1968; Harris, 1982; Bottomley, 1975 and Desai, 1983).

The lower delinquency rates reported in informal credit sources are to a large extent due to better assessment of creditworthiness ability to exert social pressure for repayment, and the frequent practice of tying (interlinking) credit contracts with other input or output contracts. Documentation of the use and characteristics of the latter practice is quite extensive. Sharecropping contracts are quite often interlinked with credit contracts (e.g. see Bharadwaj, 1974; Bardhan, 1984; Binswanger *et al.*, 1984; Bell and Srinivasan, 1985). Credit contracts between

landlords and tenants are often in the form of production loans and tied to the purchase of fertilizer, seeds, and other forms of capital (see Singh, 1984, Chap. 10; Braverman and Stiglitz, 1985) with different tenants paying different interest rates on their loans (see Bardhan and Rudra, 1978). These interlinkage practices have been viewed as a way to address the adverse selection problem (Braverman and Guasch, 1984) and the moral hazard problem indigenous to these markets⁶ (see e.g., Braverman and Srinivasan, 1981; Braverman and Stiglitz, 1982; Mitra, 1982; and Bell and Zusman 1980).

(g) *Success stories: Ingredients for reform*

Not every single rural credit program implemented has failed. Some successes are reported here in order to examine which components work best.

The INVIERNO Development Bank program, implemented in Nicaragua in 1975, served the region containing the largest number of small producers and the lowest rural family incomes. Its results were extraordinary: the participation rate of small farms was more than 80%; the maize yield per hectare doubled that of traditional methods; the rate of adoption of modern technology was significantly high; and the delinquency rate was only about 10%. Internal auditing of local office operations, cost monitoring, technical help for operational procedures and new methods were combined in a policy that supported these successes. Expeditious loan application and credit disbursement was also a major factor, together with a long-term credit policy suggested by efficiency arguments. Line of credit was devised for a five-year period with flexible schedules for loan repayment built into the contracts.

A different success story emphasizing savings is found in the Republic of Korea (Lee, Kim and Adams, 1977). It is fairly representative of most East Asian countries. In the 1960s, Korea implemented an extensive network of rural cooperatives. They were organized in three levels: primary cooperatives at the township level; county cooperatives; and the National Agriculture Cooperative Federation at the national level. Participation levels were about 80%. The cooperatives provided farm inputs, farm product marketing, credit and savings deposit services, mutual insurance, and technical education. The stress on mobilizing rural financial savings was perhaps the most distinguishing feature: while deposits contributed only 20% of loanable funds in 1961, and government funds nearly 60%, by

1975 the figures reversed to 51% and 19%, respectively. A strong government policy of positive real interest throughout most of the period was crucial. Equally important may have been the bottom-up design of the cooperative system which was quite effective in providing secure and dependable savings opportunities for small farmers.

Kenya's Cooperative Saving Scheme initiated in 1970 is also noteworthy (von Pischke, 1983). It is based on a system of weak forced savings. Cooperative members are mostly small coffee farmers. The scheme arranged payment to growers for coffee sales by crediting it to their accounts with the cooperative, rather than paying cash. Along with positive real interest rates, this generated a viable lending organization — a kind of implicit insurance or collateral scheme which was very successful in achieving high participation rates and relatively low delinquency rates.

More recent success stories are the UNO program in Brazil and FUNDE in Nicaragua.⁷ The critical features in those programs were (i) that no new loans were to be given until old loans were repaid, indicating that intertemporal linking of loans is an effective way to induce compliance, and (ii) that strict auditing and accounting procedures were to be followed, suggesting the value of monitoring technologies in inducing the desired behavior.⁸

3. CREDIT MARKET THEORY — BRIEF LITERATURE REVIEW

This section surveys recent developments in the theory of credit markets and their usefulness for policy analysis. Modern economic theory has focused on two areas: credit rationing in competitive equilibria and interlinking of credit contracts with labor and land contracts in rural developing economies.⁹ Some of the main contributions to these two branches of the literature are discussed below.¹⁰ This brief review demonstrates the limitations of current theory as an adequate base for policy analysis and reform of rural credit in LDCs.

(a) *Credit rationing*

Traditional economic theory viewed financial markets as no different from other markets and interest rates no different from other commodity prices. Allocation induced by non-price rationing was perceived as a temporary phenomenon or away from the equilibrium path (Samuelson, 1952). The persistence of credit-rationing alloca-

tions, however, began to raise doubts. Hodgman (1960; 1962) was one of the first to present an equilibrium theory of credit rationing based on profit-maximizing lenders operating under the assumption that the default risk was a function of loan size. He postulated that if the borrowers' liabilities are bound by an amount no greater than their wealth, lenders find it optimal to set credit limits. No increase in interest rate could compensate lenders for the increased default risk associated with a loan over the critical size. This asymmetry, or truncation, in the distribution of returns is what makes credit limits the most profitable strategy for lenders. His formulation had a few limitations though. First, it could not explain the fact that some borrowers obtained loans while others, seemingly identical, did not; this was so-called loan-quantity rationing as opposed to loan-size rationing. Second, the interaction between lender behavior and borrower demand was not built into the model. And finally, it did not take account of competition for making loans.

Jaffe and Modigliani (1969; 1976) extended Hodgman's work by explicitly introducing the interaction between lender behavior and borrower demand but two basic problems tainted their results. Their analysis was constrained within a pure monopoly framework, and the monopolist's strategies were limited by exogenous ceilings on interest rates. From a formal theoretical standpoint, both of these limitations should have been explained. But for the purpose of explaining the past activity in RFM, they may be appropriate because usually one institution is given control of the supply of funds and operates under an imposed policy of a nominal interest rate ceiling. From the policy standpoint, however, the implications of disposing of these restrictions should be considered.

Most of the early literature ignored the effects of *information asymmetries* prevalent in credit markets. So-called adverse selection and moral hazard incentive problems are the most common types in these settings and have been studied mostly under the principal/agent arrangement wherein the agent contracts with the principal to perform a service for a fee. In principle, the fee can be anything — a pure income transfer, a share of the proceeds, or any nonlinear form of a payment function. The contracting process is modeled by allowing the principal to present the agent with an all-or-nothing choice between the principal's contract and severing the relationship.

With the advent of the economics of information, a flourishing literature on defaulting and rationing in credit markets has developed. Jaffee and Russell (1976), Keeton (1979), Stiglitz and

Weiss (1981), Bester (1985), O'Connell (1984) and Gale and Hellwig (1983), have all analyzed short-run loan models where the incentive problem that arises in asymmetrical information frameworks gives rise to equilibrium with credit rationing. Several aspects of this phenomenon are described below.

Jaffee and Russell (1976) in a two-period Fisherian consumption framework with two types of borrowers — "honest" and "dishonest" — developed a model of credit rationing in which the former repay their loans even when there is a financial incentive to default, while the latter default whenever financially advantageous. Since lenders cannot distinguish among borrowers, it might be best to ration credit in order that dishonest borrowers will not default even though doing so reduces the profitability of lending to honest borrowers. Thus the optimal credit-rationing policy depends on the proportion of honest borrowers because of the adverse selection problem. In the absence of competition among lenders, the most profitable contract does not involve credit rationing; it pools all types of borrowers together. That type of contract might not function in the face of competition — unsustainability of pooling contracts in asymmetrical information frameworks is standard, i.e., a new firm can design a new contract and make positive profits attracting *only* the honest borrowers away from the pooling contract. The only equilibrium possible then entails separation, and in most cases, credit rationing at the offered interest rate.

Keeton (1979) analyzes credit rationing as a result of incentive problems. He devised conditions for equilibrium loan-size and loan-quantity rationing. The Stiglitz and Weiss (1981) model is similar. But while Keeton analyzes the problem in terms of borrowers who change project risks when the terms of the contract change, Stiglitz and Weiss discuss changes in the underlying risk of the borrowing population in connection with variations in the interest rate and a fixed loan size.

Most models from the information school of credit markets depict the failure of interest rates to clear the market as a result of incentive problems indigenous to monitoring costs and imperfect information. This is because the possibility of default and limited liabilities place a floor on the distribution of net returns to borrowers. In a sense this creates incentives to choose riskier projects since the down risk is limited. Borrowers' investment choices to some extent determine default risk. These cannot be observed by lenders and thus cannot be specified in loan agreements. Lending institutions realize

that high interest rates and large principals are relatively more attractive to risky borrowers; this is the adverse selection effect. Interest is paid only when the borrower does not default. This is one of Stiglitz and Weiss' (1981) arguments and their lender equilibrium handles the adverse selection problem. They also point out a moral hazard problem. Increases in the interest rate, while raising the return to successful loans, may lead to adverse shifts in the risk composition of lenders' portfolios, increasing the probability of default. It follows that increases in the interest rate may lead to a decrease in the expected returns to lenders. Then the moral hazard and adverse selection effects may render a market-clearing interest rate non-optimal, leading to credit rationing. In the context of RFMs, the moral hazard aspects concerning choice of projects involve choice of production technology, use of loans (production vs. consumption) and input mix. The adverse selection issue is the same, making their results applicable.

Recently, Bester (1985) modified those results by showing that credit rationing might not be necessary in equilibrium if banks can compete by offering contracts with different collateral requirements and interest rates, an option not considered by Stiglitz and Weiss. Perfect self-selection is obtained when high-risk borrowers choose contracts with higher interest rates and lower collateral. This result assumes that borrowers (in particular, those with low-risk) are not constrained by the amount of collateral they can provide. In rural markets, however, there is a real constraint. The collected evidence indicates that securing loans through collateral is not often feasible. In fact, a fair amount of loans are supplied without any collateral to small farmers lacking title to their property and producing under tenancy arrangements. In addition, some states in India legally prohibit agricultural lenders from using collateral such as land as security. That clearly hampers the self-selection equilibrium, throwing it back to credit-rationing as described by Stiglitz and Weiss.¹¹

Because the inability of borrowers to relinquish control over bankruptcy is one of the main factors leading to inefficient allocation in the credit market, implementing indirect controls to raise the cost of default should be considered. These include interlinking current credit transactions with future access to credit and with transactions in other markets. These interlinkage practices have been put forward as a way to address the adverse selection and the moral hazard problems indigenous to the rural credit markets. In using them, the lender attempts to induce borrowers to behave in a desired fashion,

presumably, decreasing the likelihood of default and thus raising profits.

The present lack of effective enforcement mechanisms raises doubts about the ability of intertemporal disincentives to provide implicit insurance against default. It is assumed that defaulting will be punished by a credit embargo, thus imposing costs on the defaulter in terms of future ability to obtain working capital or to smooth consumption. However, there is not a convincing story for the sustainability of the embargo when lenders do not cooperate.

Long-term relationships can be quite effective in overcoming incentive problems; any mechanisms that promote cooperation ought to be strongly considered since it is through cooperation that most inefficiencies can be eliminated given proper accountability. The successful cases of UNO in Brazil and FUNDE in Nicaragua exemplify the benefits from long-term relationships.

Hellwig (1977) developed a fairly complete model capturing the essence of long-term credit relationships. The incentives for that type of contract are the gains derived from temporal consumption-smoothing and risk-sharing. At each point in time, the lender has to make two decisions: (1) whether to renew the loan or extend additional credit and (2) which interest rate to charge. The model shows that credit limits are useful instruments to control the likelihood of bankruptcy. Several criteria for evaluating enforceability of credit limits are then proposed.¹²

In summary, allocation of credit under competition in the form of rationing seems to be induced by a variety of factors: (1) finiteness of borrowers' wealth; (2) adverse selection problems; (3) moral hazard problems; and (4) insufficient number of instruments.

Let us note that this theory assumes that no restrictions are imposed ex-ante on any of the instruments available to the lenders and that firms behave (as expected) as profit-maximizers under a viability constraint of positive profits. While the former assumption can be easily relaxed, the latter one is crucial and significantly affects results.

The adverse selection and moral hazard problems seem less severe for the *informal* or village money lenders than for the organized commercial lending institutions, indicated by the fact that the default rate for the latter is much higher than for the former. Information available to the local money lender is more extensive, more accurate, and easier to obtain than for the formal institution. Indeed, as experience has demonstrated, this is a major problem for organized lending,

especially for government-backed institutions where screening borrower creditworthiness is not carried out very thoroughly.

(b) *Interlinking of credit with other agrarian contracts*

Two approaches have been put forward in the past to explain why landlords (employers) transact with their tenants (workers) in credit. They are: (1) reduction of transaction costs and (2) exploitation of weaker agents by more powerful ones (e.g., Bhaduri, 1973). Though both have merits under certain circumstances, they fail to explain such interlinkages under a wider range of circumstances.¹³ In particular, they do not pay attention to the particular information structure. Even though information costs are part of the transaction cost, it is essential to specify them in order to explain the details of the contractual equilibrium, e.g., why some landlords may subsidize tenants' credit while others charge their tenants higher interest rates. The exploitation theory fails to explain why monopolist landlords choosing tenants (workers) from a pool of the "reserve army of the unemployed" need any extra instrument (credit) for exploitation beyond the rental (tenant) or wage (worker) contract.¹⁴

As mentioned before, the modern theory of contractual equilibrium under imperfect information focuses on the moral hazard and adverse selection features commonly found in rural developing economies. The "moral hazard" features as pertaining to the interlinking credit with labor and land contracts are:

- (a) Individuals are not paid on the basis of their input (effort) in general since this is not observable and they often do not rent land for a fixed sum since that imposes too much risk on them. Hence the contractual arrangements involve at least some form of sharecropping; as a result, tenants do not obtain the full marginal product of their efforts.
- (b) The landlord cannot completely specify the actions to be taken by the tenant: the tenant has considerable discretion both with respect to the allocation and level of effort, and the choice of production technique. Some of these decisions may be easily monitored by the landlord, but there are others, perhaps equally important, for which the cost of monitoring would be very high.

The tenant's considerable discretion over his own actions combined with their significant impact on the landlord's expected profits — have some

further implications. In particular, the landlord has an incentive to *induce* tenants to behave as he wishes. This is attempted through influencing the amount and terms of credit the tenant borrows and by the goods he can purchase and the prices he pays.

The behavior affected includes the effort supplied by the tenant and the choice of technique (risk distribution) applied by him. For instance, if the landlord makes credit less expensive, under reasonable conditions the tenant will be induced to borrow more. If there are severe penalties associated with default (e.g., bonded labor), the tenant will then need to work harder to avoid this contingency.

Similarly the landlord may observe that his tenants are employing techniques of production which are too safe; the landlord's income might be increased if his tenants were willing to employ techniques with higher means and higher variances. He may note that his tenants are acting in a particularly risk-averse manner because of the consequences of defaulting on outstanding loans. To change their behavior, the landlord may require that his tenants only borrow from him. He may charge them interest above the market rate in order to induce them to limit their borrowing, and at the same time he may offer a tenancy contract which is much more attractive in some other dimensions. Such a phenomenon (e.g., Braverman and Stiglitz, 1982) prevails both in competitive and non-competitive environments and shifts the utilities possibilities frontier. Since interlinking is really the internalization of the externality from the credit to the labor/land markets in the absence of a complete set of markets, the utilities possibilities frontier moves outward while the distribution effects of interlinkage are ambiguous. The rationale for interlinkage becomes ever stronger where law or custom restricts certain contractual arrangements, for example usury laws or floors on tenants' crop shares (see Braverman and Srinivasan, 1981).

Another rationale for interlinking is the "adverse selection" effect, where interlinking credit and tenancy contracts may screen the high-ability from the low-ability types (see Braverman and Guasch, 1984).¹⁵

The phenomenon of interlinking credit and tenancy contracts was stated by Bhaduri (1973) to be an obstacle to technological innovation. His argument was that innovations which make tenants better off reduce their demand for credit and thus make landlords (cum-creditors) worse off. Srinivasan (1979) using Bhaduri's model, has argued against Bhaduri's contention that innovations lead to lower demand for credit. Braverman

and Stiglitz (1986) have shown that there is no presumption that innovation results either in a reduction or in an increase in tenants' demand for credit. Whether the demand for credit itself is increased or decreased depends critically on both how the technical change affects the probability distribution of yields and on tenants' utility functions. The presence of interlinkage between credit and land markets does not preclude either resistance to or encouragement of the adoption of technological innovations. Either is possible. In some cases, it might actually encourage the adoption of some technologies which otherwise would not be adopted, even though the innovation itself reduces tenants' demand for credit.

As explained before, the amount borrowed affects the landlord's return (through its effect both on the tenants' effort and on his decisions concerning choices of technique), and conversely, the terms of the landlord's contract affect returns to the lender (through its effect on the likelihood of default). Interlinkage was a method by which these "externalities" could be internalized. What then concerns the landlord-cum-lender is the total impact of the innovation on his income; the decomposition of his income into a return as a lender, or return as a landlord, has no particular significance. So it becomes clear that the impact of an innovation on a landlord-cum-lender may be quite different from the impact of the same innovation on a landlord who does not control the borrowing activities of his tenants.

(c) Policy relevance

The credit rationing theory implies that under a policy of no restrictions on interest rates and in a competitive environment, credit will be rationed. Any intervention in that market other than to alleviate informational constraints will do more harm than good. This theory assumes that institutions behave "appropriately." However, it has little to say about rampant corruption or mishandling of funds by individuals in lending institutions. It is only by correcting or allowing for that behavior in organizations that sensible predictions about rural credit in LDCs can be generated. A new theory of incentives and monitoring embedded within the actual operational framework of the LDC's lending institutions might be a more appropriate assistant for analyzing and designing corrective mechanisms.

The main conclusion of the interlinking theory for policy is that partial reforms in the credit market alone, such as ceilings of interest rate in the informal market or disallowing credit linking may decrease efficiency, often without gains in

improving the distribution of income. Sound policy reforms, then, need to take account of the institutional structure of the particular rural economy. Reforms in several markets simultaneously are required as well as recognition of the importance of existing informal credit markets.

Neither the theory of credit rationing nor the theory of interlinking has much to say about the accountability issues of the institutions themselves in the face of weak or semi-corrupt legal environments. Given such environments, any of the past or present subsidized interest rate policies is easily questioned. The most prevalent argument in their favor is that, without them, adoption of technological innovations would be delayed and costly inputs like fertilizer would be underutilized, with the result that the growth of output and the development of the agricultural sector would be slowed. However, it is not clear that either one of these objectives has been attained cost effectively. It has also been claimed that high-priced capital would foster poverty by screening out small farmers from the credit markets. The institutional failure to channel credit to poor small farmers under subsidized interest rate programs ought to silence the latter argument once and for all. Given the overall adverse effects of cheap credit programs, continuation of rural credit subsidies should be seriously questioned. Only when the institutional structure has proven that it can channel funds appropriately should they again be considered and then only after comparison with alternative policy instruments.

It should be remembered, though, that given the prevailing "urban bias" in most LDCs,¹⁶ these arguments cannot be taken as advocating the increase of overall subsidization of the urban sector. Similar arguments concerning accountability and misuse of funds should be applied to the urban sector as well. In addition, the evaluation of a set of particular subsidies to agriculture should be conducted in the overall economic context. If there are sustained and successful political pressures to subsidize the activities in the urban sector, which are often non-economic and regressive, utilization of countervailing subsidies to the agricultural sector as "second best" instruments, are legitimate options to consider.¹⁷ The "first best" alternative is clearly to remove the urban bias directly.

4. SUGGESTED METHODOLOGIES FOR CREDIT POLICY ANALYSIS IN LDCs

There are two analytical steps to support more credible policy work. They are complementary.

One is to construct a suitable framework for comparing credit subsidies with other policy instruments. The other is to analyze institutions and institutional environments based on individual and organizational incentives and monitoring schemes.

As stated in Section 3, the contribution of current theory to policy analysis in this area is limited in several ways. First, the methods for assessing the impact of credit allocation have most often been carried out in an operational vacuum. The effects of credit policy instruments have been examined neither in comparison with other fiscal instruments (taxes or subsidies) nor in the context of policy mixes. Second, the theory is still weak on the internal organization of the institutions and the legal/institutional environment through which credit is channeled. Third, predictions made using credit theory are mainly based on profit-maximizing objectives for private credit institutions facing positive profit as a viability constraint. This contrasts with the reality of rural credit markets which operate in environments where objectives are not often so well-defined and corruption is rampant. Even when legitimate objectives are defined, there is no system of incentives to accomplish them.

In order to contribute to the formulation of sound economic policy, credit theory needs to incorporate all these factors. Otherwise, the current gap between theory and practice will continue to widen.

(a) *A framework for evaluating mixes of policy instruments*

A suitable framework for policy analysis should include definitions of: (1) policy objectives; (2) policy control variables; and (3) the institutional environment. Credit programs usually aim at a set of objectives including increased agricultural output and agricultural productivity, reduction of the urban bias, improved rural income distribution, alleviation of rural poverty, and inducement of the optimal rate of adoption of technological innovations and optimal input and output mix. Given the institutional structure of many developing countries, some of these objectives are bound to conflict. And some can be achieved with other policy instruments such as taxes, subsidies, and public investments. In the past, the relationship between the chosen objectives has not often been clearly stated. Hence the clear need for a framework to compare alternative policy instruments, especially in the context of their impact on the government budget.

Two methods to do this have been recently

developed. They compare alternative agricultural price policies (taxes and subsidies) in developing countries. One is theoretical (Sah and Stiglitz, 1984). It utilizes the optimal commodity taxation framework (i.e., it maximizes a social welfare function, subject to a revenue constraint) in order to analyze alternative agricultural price policies. The other approach developed by Braverman and Hammer is an operational one. It incorporates insights from both the new public economics and the literature on agricultural household models, capturing key substitutions among agricultural commodities in production and consumption in a multi-market framework. This method has been used for policy analysis in various countries.¹⁸ It compares the impact of alternative price policies for both inputs and outputs on government revenue, foreign exchange, and the real incomes of different groups in the rural and urban sector. There is no explicit optimality framework. The welfare impact on different groups is aggregated into welfare indices after the analyses.

In order to modify either of these approaches so that credit subsidies can be compared with other price (tax) instruments, the fungibility of credit, the information failures and other imperfections peculiar to rural credit markets have to be properly incorporated. First-best analysis is of no use in most socioeconomic environments of LDCs. To resort only to first-best Pareto conditions as guidance for policy is often inappropriate and the "constrained Pareto efficiency" criteria differ according to the particular constraints. It is the details of the second-best solutions that are relevant for welfare comparisons of alternative policies in developing country circumstances. Our view is that a positive analysis is called for before resorting to either cumbersome welfare criteria or irrelevant ones.

(b) *Institutional analysis and design*

The other major task is to develop a methodology for analyzing institutions and institutional environments, and for comparing institutional reforms in rural financial organizations. To some extent, failure of credit subsidy policies can be attributed to the lack of incentive devices within the institutions and to the inefficiencies and corruption intrinsic to rural financial institutions facing minimum accountability and not confronting a *bona fide* profit constraint. Thus the success of future credit programs will depend on increased emphasis on institutions and the implementation of schemes to eradicate corruption. Following the decline in attention to the

"institutional school," modern economic literature has largely overlooked the analysis of institutions, institutional change, and reform mechanisms in general, treating them as exogenous elements seldom analyzed with any rigor.¹⁹

The need for serious analysis of institutions cannot be overstated. Without a rigorous study of institutions, their internal organization, and motivation, policy recommendations are of questionable value. More attention must be focused on social norms, historical patterns, legal systems, and management procedures. Competitive market forces should be mimicked to the extent they serve the goals sought through rural credit policies.

We suggest here an approach for such analyses. It emphasizes the role of the credit-dispensing institutions as intermediaries between several parties. The government or lending agency (principal) establishes a contract or reward structure with the financial institution (intermediary). That party generates another contract or subcontract with the farmers (agents) or with a subset of them. All parties receive information, some of it common to all parties, some exclusive to one. The system can be viewed as a three-or-more-tiered structure or as a sequence of nested principal/agent relationships. Also the institution itself is a collection of overlapping principal(s)/agent(s) relations. Each layer in the hierarchy of an organization can be thought of as the agent for the level just above it and the principal for the layer below it.²⁰ Various constraints should be incorporated to assess alternative corruption possibilities.

The principal/agent literature has contributed substantially to the type of contracts that should be used given informational constraints. However, the literature has been mostly concerned with two-tiered structures: principal(s) and agent(s), ignoring nested relationships of the sort exposed above and the incentives they generate. Nested relationships have appeared mostly in the context of the theory of the firm and its internal organization (Calvo and Wellisz, 1979; Stiglitz, 1975; Rosen, 1982; Milgrom and Genakopoulos, 1984; and Guasch, 1985, among others). These agents in the multi-layered structure of firms, however, were severely limited in the range of strategies they could implement. Their behavior was rather passive.

But when there are more than two layers or nested principal/agent relationships, and each element in the structure can take an active role in issuing commands, designing reward structures, and conveying information, the possibility of collusion among two or more adjacent parties in the structure should not be ruled out. An analysis

of the factors likely to induce that sort of collusion should help design built-in disincentive mechanisms when that behavior is considered inappropriate. This would provide the base for control of and compensation for corruption that is absent from the current theory. The incentive-compatible mechanism most conducive for information transmission across layers is the one which should be preferred.²¹

Moreover, when there is more than one agent associated with a given principal (number is endogenous), or when the latter has access to performance data on other agents, new incentives schemes based solely on observed performance rank and called "contests" or "tournaments" become feasible. The theoretical advantages of contests over more general schemes are that there are fewer information requirements and that they have the ability to compensate automatically for changes in conditions or risks common to all agents.²²

In reorganizing institutions into several parallel divisions, forcing them to compete among each other, and basing the rewards on relative

performance of the disbursement of funds, some efficiency from scale effects may be lost. But at the same time the incentives for corruption and patronage may be reduced. Likewise, a rotation policy of key employers may shorten the benefits those individuals might derive from undesirable policies since benefits of collusive behavior will be short-lived. In addition, there will be a distinction between the incentive effects of short-term and long-term relationships of farmers with lending institutions. Long-term relationships are advantageous in incentive design to the extent that they can escape the inefficiencies usually associated with the short-term equilibria of "one shot deals."²³

We contend that a more systematic and rigorous analysis of institutions and institutional environments is essential groundwork for effective policy reform in rural credit markets and hope the evidence has been convincing. In a companion piece, the principles outlined above are used for detailed institutional analysis of financial environments in LDCs.

NOTES

1. This particular quote has been also used by Adelman and Head (1983) who, like us, advocate the urgent need for studying institutional structures in developing economies to provide effective guidance for policy reforms.

2. Clearly, analysis of the impact of credit subsidies has to address the terms of credit (e.g., subsidies) of the industrial sector as well.

3. A major source for the evidence and conclusions covered in this section is von Pischke, Adams and Donald (1983).

4. The reality, though, is that recovery rates are often as bad or worse among larger farmers than small farmers. See below.

5. The productivity effects of subsidized credit have not been clearly established. For example, the conventional wisdom has it that operating expenses and investment per hectare were often higher per borrower, but that production differences and net farm income per hectare were not very notable.

6. For elaboration of these points see Section 3 below.

7. For a comprehensive evaluation of the FUNDE program see Tendler *et al.* (1985).

8. For a related analysis of the evidence in this section and lessons learnt, see Adams and Vogel (1986).

9. For example, the case of landlords/employers who are also money lenders to their tenants and/or workers.

10. This survey is by no means, and does not intend to be, inclusive of all contributions to these subjects.

11. See also Virmani (1982), Allen (1983), O'Connell (1984) and Krahnhen (1984) for further insights on credit rationing.

12. Other studies that analyze the benefits of long-term relationships are Eaton and Gersovitz (1981), Sachs and Cohen (1984), Stiglitz and Weiss (1983) and O'Connell (1984). The emphasis there is on the implementation of credit limits to induce compliance, emphasizing optimal ways to penalize default.

13. See Stiglitz (1986) for comparison of these two approaches to the one of imperfect information.

14. See Newbery (1975).

15. One of the results obtained there is that under a heterogeneous population a monopolist landlord will increase his ability to extract surplus out of his tenants through the interlinking of credit and tenancy markets. This case supports Bhaduri's (1973) conclusion.

16. See Lipton (1977).

17. See Braverman and Kanbur (1986) for an analysis of agricultural price reform in the face of sustained urban bias.

18. See Braverman, Hammer and Ahn (1983), Braverman and Hammer (1984) and Braverman, Hammer and Gron (forthcoming) for methodological discussions and references to other studies.

19. Noted exceptions are Arrow's (1974) eloquent exposition of the benefits and limits of organizations, followers of the Simon school and Williamson (1975). Institutional aspects are also strongly emphasized in the works of North and Thomas (1973), Ruttan (1982) and Schultz (1968). This latter work is lucidly summarized in Schuh's (1981) presidential address to the AAEA.

20. For a comprehensive analysis of hierarchies see Williamson (1975).

21. A word of caution is warranted here. Our suggested methodology is to derive the right set of incentives, along the lines described here, to induce compliance with the desired set of objectives. Thus it does not necessarily imply privatization of public institutions, but an incentive compatible technology to achieve intended objectives. For example, if targeting

the small farmer is part of the objective, the reward structure would be designed appropriately to induce that behavior, rather than just measuring overall profitability of the outstanding loan portfolio. A pure private sector approach would only be concerned with the latter measure.

22. These commonly observed schemes have been studied by Lazear and Rosen (1981), Holstrom (1982), Nalebuff and Stiglitz (1983), Green and Stokey (1983) and Bhattacharya (1984).

23. We should note that we are not implying that short-term credit ought to be eliminated. In fact, a fair percentage of small borrowers seem to prefer that form of credit with low transactions costs (i.e., credit for working capital rather than for investment). We also are not ruling out the use of discretionary power of the lending institutions to use short-term credit as a screening or information gathering device. Our argument, based on efficiency grounds, is that long-term credit ought to be an option available to sound borrowers.

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