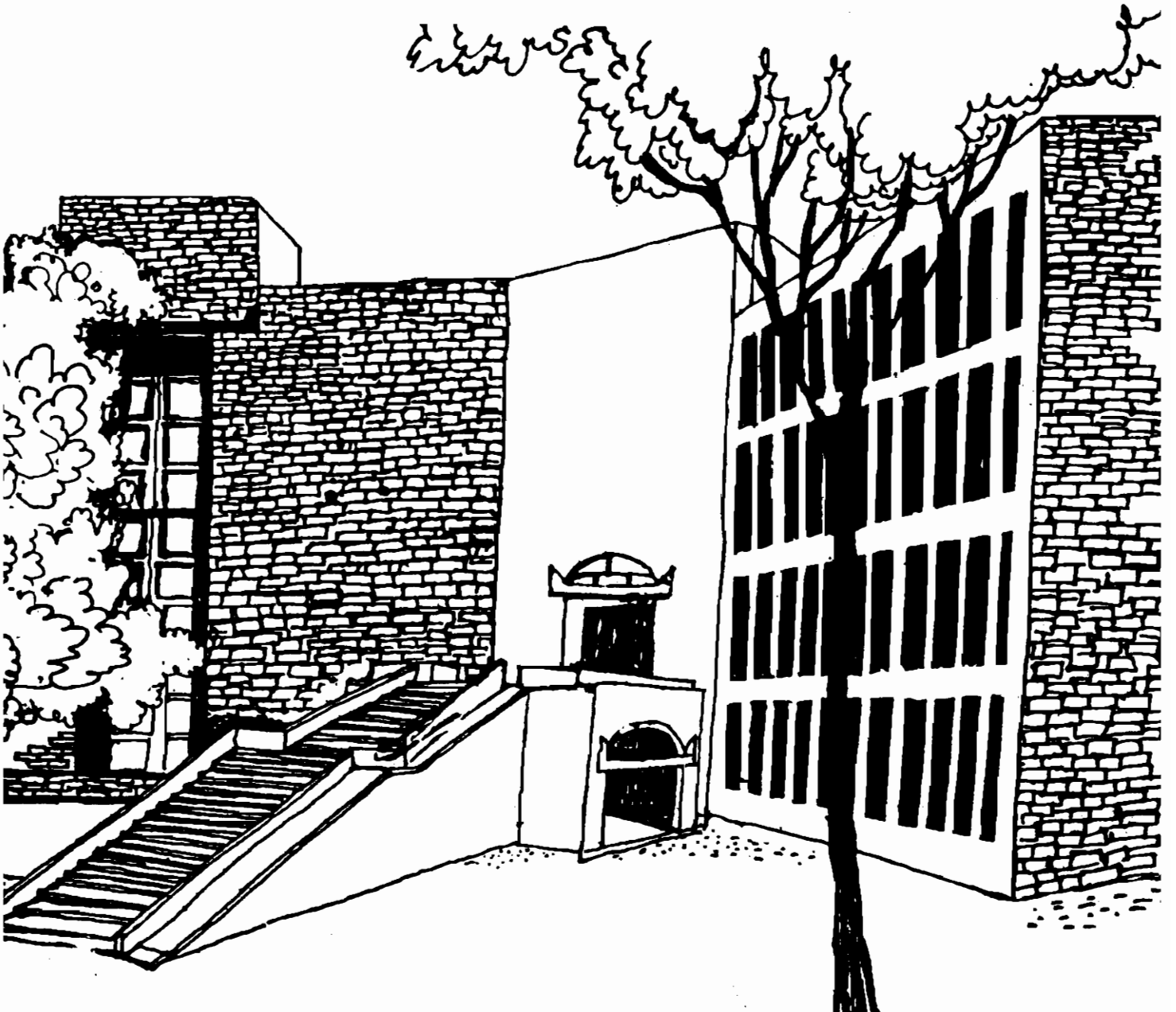




Working Paper



MONITORING COST, TRANSACTION INTERLINKAGE
AND THE SELECTION OF OPTIMAL LOAN CONTRACTS:
EVIDENCE FROM RURAL INDIA

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and the Selection of Optimal Loan Contracts:
Evidence from Rural India

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**Monitoring Cost, Transaction Interlinkage
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Evidence from Rural India**

Abstract

Costly monitoring is an important market imperfection in developed as well as developing economies. In developed countries monitoring costs are usually minimized through intermediation. The intermediation process is hampered, however, by market fragmentation typical of developing agrarian economies. Borrowers may choose to use private moneylenders rather than formal banking sector intermediaries. A theory of loan contract choice is developed which emphasizes the role of monitoring costs and transaction interlinkages. The theory is tested against survey data from rural West Bengal. The results are consistent with the main conclusions of the model.

**Monitoring Cost, Transaction Interlinkage
and the Selection of Optimal Loan Contracts:
Evidence from Rural India**

1. Introduction

A common feature of many rural agrarian financial markets is the simultaneous operation of both a formal and an informal sector. In the formal sector, loans are made through banking intermediaries which pool the assets of investors and lend to many different borrowers. The officials of these bank intermediaries have little social or economic interaction with borrowers other than through their agents. Often the officials are not even members of the same community as their clients. In the informal sector, loans are made by moneylenders. The moneylenders and borrowers are almost inevitably members of the same community and have extensive social and economic interactions with one another.

The contracts available in the formal and informal sectors are very different. Formal sector intermediaries are specialized institutions which offer only financial contracts. In the informal sector, however, numerous investigators have found that factor markets are characterized by transaction interlinkages (Bardhan, 1980). The moneylender, in addition to being the supplier of credit, may be the borrower's landlord; he may be the borrower's employer; he may sell raw materials such as fertilizer or seed to the borrower; he may buy the borrower's output and then resell it in outside markets; or, the moneylender may perform several of these functions simultaneously for the borrower.

Despite the differences between formal and informal sector contracts, not only do both institutions continue to operate in parallel but also many borrowers raise funds simultaneously in both sectors.

We argue that this seeming paradox can be explained by the existence of monitoring costs coupled with risk averse moneylenders with limited wealth. A monitoring cost is defined to be a cost that must be incurred by an outsider¹ in order to observe the outcome from an investment project. Monitoring costs lead to information asymmetries which are difficult to deal with directly through markets (Harris and Townsend, 1981). When borrowers have an incentive to misrepresent the true outcome of investment projects, lenders cannot rely on information provided by them. Thus, when monitoring costs are present, financial markets are subject to moral hazard.

Costly monitoring is an important market imperfection in developed as well as developing economies. In developed countries monitoring costs are typically minimized through intermediation (Diamond, 1984; Ramakrishnan and Thakor, 1984; and Williamson, 1986a and 1986b). Intermediation alone is likely to be inadequate for dealing with monitoring costs in LDCs. This is because, while markets in developed economies are often highly integrated, the poor agrarian markets which characterize developing countries are usually fragmented (Bardhan, 1983). This fragmentation has caused LDCs to evolve institutions different from developed countries for dealing with monitoring costs and moral hazard.

We argue, in particular, that transaction interlinkage is an important means by which monitoring costs can be minimized in agrarian markets. In effect, through interlinked transactions in factor markets, the moneylender is transformed from an outsider into an insider. For many borrowers, contract interlinkage may reduce monitoring costs sufficiently such that they will prefer contracts offered by moneylenders. This is true even though formal sector intermediaries have access to lower cost funds.

The main contribution of this paper is to integrate recent theories from the intermediation literature with theories from the development literature.² Specifically, we emphasize the role of intermediaries as delegated monitors. We argue that the intermediation process is hampered by market fragmentation typical of agrarian economies. As a result, farmers and other borrowers end up being customers of local moneylenders for funding of their projects. The model developed here is tested against survey data from rural West Bengal. We find that the data is generally consistent with the main conclusions from our model.

The plan of the paper is as follows. The next section discusses the structure of financial institutions in agrarian societies and compares these to financial institutions in developed countries. In Section 3, we develop the empirical implications of our theory. Section 4 tests the model against data from rural India. The final section concludes the paper.

2. Financial Intermediation in Developed and Backward Agrarian Economies

Farmers and other borrowers who need to finance investment projects will seek funds from low cost lenders. Diamond (1984), in a seminal article, has argued that one way of minimizing monitoring costs is through intermediation. If each investor were to lend directly through financial markets, each would have to generate information about the borrower separately and each would have to incur monitoring costs. By pooling resources through a single intermediary, information need only be generated once and monitoring costs are minimized.³

While intermediation eliminates the need to monitor each separate borrower, individual investors must still monitor the intermediary. Diamond (1984) argues that this problem can be overcome through diversification. A fully diversified intermediary has a certain return and thus investors need never monitor such an intermediary. Since well diversified intermediaries can be monitored by investors at low cost, they can raise funds at a lower cost than other lenders (e.g., money-lenders). Diversification, however, requires that intermediaries have a large portfolio. Thus, intermediaries must raise funds from as large a number of individual investors as possible. In the limit, one intermediary will service all borrowers and investors.

Two important assumptions in the Diamond model are that intermediaries have homogeneous information costs and that each

intermediary has access to the same enforcement technology. This being so, no intermediary has a cost advantage in generating information on a given borrower and diversification unambiguously lowers total cost by reducing the need for investors to monitor the intermediary. Since markets in developed countries are highly integrated, the assumption of homogeneous information costs, as a first approximation, is plausible for these economies. Markets in poor agrarian economies, however, are much less integrated.

Because agrarian markets are fragmented, it is costly to learn idiosyncratic information about borrowers. This is particularly true if the inquirer is not a member of the borrower's community. High information costs coupled with difficulty in enforcing contracts increase the scope for moral hazard on the part of borrowers and serve as barriers to entry for intermediaries into local markets. Even though large well diversified formal sector intermediaries are able to raise funds at low cost, moneylenders, who can gather information efficiently in local villages, have an advantage in many agrarian markets.⁴

Transaction interlinkage plays an important role in the ability of moneylenders to compete with formal sector intermediaries. Those moneylenders who have repeated transactions with specific borrowers are able to take advantage of economies in information gathering and processing. Moreover, through interlinked transactions, the moneylender can generate a competitive advantage over not only formal sector intermediaries but also over other potential informal sector lenders. That is,

transaction interlinkage allows the moneylender to operate at a lower cost than other lenders (including other potential moneylenders). Thus, transaction interlinkage is an effective means of minimizing overall information costs in agrarian societies.

3. Lender Choice

In this section, we develop in more detail the empirical implications of the theory outlined in the previous section. In particular, we investigate the implications of our theory for the observed preference of borrowers and lenders for each other in backward agrarian economies.

The main thrust of our argument is that differences in monitoring costs can explain the choice of one group by another. We argued above that, when markets are fragmented, transaction interlinkage allows moneylenders to take advantage of economies of scale. The greater the number of interlinked transactions, the better able to take advantage of economies in information gathering and processing is the moneylender. Our first prediction then is that an increase in the number of contract interlinkages between agricultural producers and potential moneylenders will increase the probability of borrowing from the informal sector.

The type of interlinkage also influences the probability of a credit contract with an informal moneylender. This is because the form of the contract interlinkages will influence the ability of the moneylender to enforce the loan contract. When loans are not repaid on time, moneylenders are often able to enforce

contracts by confiscating land or through bonded labor (Basu, 1983). Also, a moneylender who is the borrower's employer can enforce a contract simply by withholding wages.⁵

The impact of the type of transaction interlinkage on the choice of contract is likely to be complicated. For example, often contracts which tie the sale of final product to the extension of credit, also guarantee -- implicitly or explicitly -- a minimum price for the final product. That is, such a contract may be a put option, a loan contract and a sales contract, all at the same time. To the extent that tying sales to credit provision reduces monitoring cost, these contracts should find favour with the moneylenders. At the same time, to the extent that the put option increases the risk exposure of the moneylender to the borrower, the willingness of the moneylender to provide credit should be reduced. Other types of contract interlinkage have similar complicated effects on contract choice.

Monitoring costs are most likely to be incurred when a borrower defaults. Accordingly, anything that increases the probability of default of loans, in general, also increases the advantage of lower monitoring costs to informal sector moneylenders. An increase in the loan amount, all else constant, increases the probability that a borrower will be unable to repay due to binding budget constraints. Also, an increase in the loan amount increases the benefit to opportunistic borrowers from default (Bell, 1988).⁶ Accordingly, we predict that the greater the loan balance, the more likely a moneylender will be utilized.

The greater the expected income of the borrower, the more likely the borrower will be able to repay.⁷ For agricultural producers, the most important component of expected income is the one generated through crop sales. Thus, we predict that the greater is the expected crop yield, the greater is the probability of repayment and the less is the likelihood that a moneylender will be utilized.

One empirical regularity which must be explained by any theory dealing with agrarian markets is the simultaneous borrowing from both formal and informal sector lenders. In our sample, 41 percent of borrowers took out new loans simultaneously from both types of lenders. It appears that this phenomena is not unique to our sample. Bell and Srinivasan (1989) also found borrowing simultaneously in both sectors a common practice among agricultural producers in Andhra Pradesh, Bihar and Punjab.

There are a number of possible explanations for this practice. First, institutional arrangements may encourage borrowing from more than one source. For example, a distinction is often made between production and consumption loans in Indian financial markets. Specifically, most formal sector loans are restricted to be used for production. Given that funds are fungible, however, such a distinction is not particularly relevant. That is, an agricultural producer could claim to be borrowing for productive purposes and yet use the funds acquired for consumption. We do not have direct evidence on fungibility; we do, however, know that most of the respondents in our sample

who exclusively borrowed from the formal sector also reported using at least a part of such loans to finance consumption. This indicates that contract clauses restricting the use of funds are not consistently enforced.

Another explanation for borrowing from multiple sources is risk aversion on the part of lenders. Most moneylenders have limited portfolios with large exposure to borrowers from the local economy. As a result, they are likely to be not well diversified. Assuming risk aversion, poorly diversified moneylenders will be reluctant to commit large amounts to any one project. As the moneylender's exposure to a particular borrower increases, the moneylender will require a higher return to compensate for his increased risk, even though the moneylender has substantially lower monitoring costs. At some point, the moneylender will no longer be willing to offer attractive terms compared to formal sector intermediaries. Thus, above a certain loan balance, any additional financing will be met by borrowing from a formal sector intermediary rather than from the moneylender.

The argument made above also applies to formal sector intermediaries. In India, lending is controlled by local banks (Morris, 1985). These banks are evaluated on a number of criteria at least one of which is return on investment portfolio. Like moneylenders, the portfolio controlled by local banks are relatively small and geographically concentrated. Thus, formal

sector intermediaries are also likely to behave as if they are risk-averse.

Based on the above analysis, we expect to find that the larger is the loan balance, the greater the probability agricultural producers will use multiple lenders. This tendency will to a certain extent offset the tendency to use informal sector moneylenders as loan size increases due to the increased default risk argument as described previously.

4. Results

4.1 The Data

We test our model using cross sectional survey data on 56 agricultural producers in the Indian state of West Bengal (see, Datta, 1990 for details). The subjects are primarily paddy producing farmers, although they typically also produce other crops. The sample is fairly representative of the agricultural practices in West Bengal but not necessarily representative of the entire subcontinent nor of the agricultural practices in the LDCs, in general. The survey was conducted during 1986 and elicited information on current and past transactions. The survey was primarily designed for extracting information on rural credit. Respondents were asked to answer questions about financial, agricultural and social variables.

In addition, information on four different types of transaction interlinkages are included in the data set. The four types of transaction interlinkages are 1) the practice of tying the sale of the final product to the lender (via a forward

transaction); 2) purchase of inputs by the borrower from the lender; 3) share tenancy by the borrower with the lender as landlord; and 4) employment of the borrower by the lender (via a forward transaction).

4.2 Estimation

Our basic strategy is to use trinomial logit to estimate the probability that a particular loan contract is chosen. This probability is hypothesized to be a function of the variables discussed in Section 3. Accordingly we estimate

$$\text{Prob}(\Gamma^j = \Gamma^*) = h(\beta X) \quad (1)$$

where

Γ^* is the observed contract

Γ^j is either a contract calling for borrowing from moneylender only, banking intermediary only or both

$h(\)$ is the logit function

β is a row vector of coefficients to be estimated

X is a vector of explanatory variables which includes:

NUMTRAN: Number of transactions between the borrower and the informal sector lender in the past,

OUTPUT: Dummy variable; one if the borrower and the moneylender are interlinked through sale of output, and zero otherwise,

INPUT: Dummy variable; one if the borrower and the moneylender are interlinked through purchase of inputs, and zero otherwise,

SHARETEN: Dummy variable; one if the borrower is a share tenant of the moneylender, and zero otherwise,

LABSERV: Dummy variable; one if the borrower supplies labor services to moneylender, and zero otherwise,

LOAN: Total amount of loan outstanding,

PADDY: Expected paddy production estimated using ordinary least squares method of linear regression,

MULTICROP: Dummy variable; one if the borrower cultivated at least one other cash crop in addition to paddy, and zero otherwise.

The dependent variable in our model is the type of loan contract observed during the production cycle. The three contract types are those in which producers borrow new funds only from moneylenders, those in which producers borrow only from the banking intermediaries, and those in which producers borrow from both sources. The estimations are normalized by setting all coefficients equal to zero in the equation for contracts calling for borrowing from both sectors (which is, therefore, omitted from Table 1).

As argued in the previous section, the number of past transactions between the same borrower and the same moneylender is included to capture economies of scale in information production. Increasing the number of transactions between moneylenders and borrowers will reduce marginal monitoring costs

and thus increases the probability that a moneylender will be utilized.

The four types of interlinkage are incorporated into the estimation by including dummy variables. These dummy variables indicate the relationship between the borrower and the moneylender. For example, if the borrower is a sharecropper but the moneylender is not the landlord, SHARETEN would be zero. Only if the moneylender is also the landlord, SHARETEN is one.

Two variables are included to account for expected yield -- expected rice production and a dummy for multiple crops. To determine expected paddy production, we have estimated a simple Cobb-Douglas production function using ordinary least squares. The details of this regression are given in the appendix. Unfortunately, the data set does not contain information sufficient to estimate a production function for any other crop. Nevertheless, other cash crops are an important source of income for producers. In fact, 34 of the 56 farmers in our sample cultivated at least one crop other than paddy. To account for expected output from sources other than paddy, we include a dummy variable indicating whether the producer grows more than one crop during the survey period.

4.3 Estimation

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The results of our estimation are presented in Table 1. In general, the data supports our predictions. The Wald test for the overall significance of the model is significant at 1 percent level. Table 2 gives the classification matrix which indicates

that 68 percent of the observations are classified correctly.⁶ The results for 'moneylenders only' are especially encouraging. The estimated coefficients are significant except for those for INPUT, SHARETEN and PADDY. All variables have signs consistent with our a priori expectations. In particular, as predicted, our proxy for economies of scale in monitoring, the number of informal sector transactions in the past, is significant and positive.

The equation for 'banking intermediaries only', however, does not perform as well. Wald tests indicate that this equation is not significantly different from either of the other two equations. One reason why the 'banking intermediary only' equation may not perform well is that the formal sector intermediaries may not maximize profits. In particular, the banking intermediaries in our sample are operated by the government. It is likely that loans are allocated by these intermediaries based on political factors not accounted for in the present model. If political factors are important in allocating funds in the formal sector, the predictions of our theoretical model may not be valid.⁹

LOAN has a positive coefficient in the 'moneylender only' equation. This sign is consistent with the hypothesis that increased default risk increases the likelihood of using moneylenders exclusively for transaction cost reasons. The coefficient of LOAN is also positive in the 'intermediary only' equation, although it is insignificant.

5. Conclusion

Traditional theories of development stress the importance of the size and allocation of the capital stock in the development process. But, as Stiglitz (1989) has argued, if just a lack of physical capital were the cause of underdevelopment, the return to capital in LDCs would be greater than that in developed countries and market forces would result in capital transfers from rich to poor countries. There are, however, many examples of financial market imperfections in developing countries which hinder these transfers. Perhaps and even more important, market imperfections prevent the effective allocation of capital within the LDCs themselves. Financial market failures are an important explanation of why income level differentials continue to persist between rich and poor economies and between urban and agrarian sectors within LDCs. Understanding of these market failures is necessary if successful development strategies are to be implemented.

In this paper we have sought to study one such market failure -- the existence of costly monitoring of ex-post output from investment projects. We have argued that in highly integrated developed economies, these costs are dealt with primarily through intermediation. However, the poor agrarian markets typical of LDCs are highly fragmented. This fragmentation makes it difficult for banking sector intermediaries to operate directly in agrarian markets. Moneylenders who are members of the same community as borrowers, however, can generate information on

borrowers at low cost through transaction interlinking. In general, our empirical work supports the main conclusion of the model. Monitoring costs do appear to be important in choosing optimal loan contracts.

In our model, moneylenders and transaction interlinking are a symptom and not a cause of underdevelopment. Thus, government policies, such as usury laws which aim to control or eliminate moneylending may under certain circumstances be counter-productive. Similarly, the Indian government's policy of discouraging relending of funds borrowed from state operated banks, when it is effective, introduces transaction cost inefficiencies by forcing borrowers to seek funds from high cost banking intermediaries. While policies aimed at curbing moneylending are likely to be counter-productive, policies which seek to regulate the activities of moneylenders are also likely to fail. The same market fragmentation which makes it difficult to monitor direct borrowers also makes it difficult to monitor moneylenders. Government policies which channel funds through moneylenders, for example, invite the same type of moral hazard problems as lending directly to borrowers.

Successful development strategies should not, therefore, focus on moneylending per se but on reforms of financial and legal institutions so as to promote greater integration of agrarian markets. Such reforms, which would enable intermediaries to operate directly in agrarian markets through interlinking of direct and indirect loans would allow developing economies to

take full advantage of increased efficiency achievable through delegated monitoring.

The present study highlights the need for policy changes of the formal banking intermediaries at least on three major fronts. First, the banking sector intermediaries must explicitly recognise the fact that the consumption loans provided by informal lenders are no less important inputs than the traditional and physical inputs of production. Second, credit must be viewed as essentially a package of services which ought to be judged in a broader perspective of credit-complimentary activities. This does not, however, mean that the banking sector intermediaries should merely restrict their credit-complementary activities to traditional ones like providing access to input markets (e.g., seed, fertilizer and irrigation) or to the market for product. Under the service area approach, the institutional sources of credit should actively come forward to undertake modern varieties of credit-complementary activities through provision of loans for employment generation and diversification of rural activities so as to produce the maximum regional linkage effect. While the traditional moneylenders have gone so far as to providing 'paternalistic' credit-complementary goods and services, the formal sector intermediaries ought to find out ways and means not only to replicate such activities but also to put them on even stronger footing either by providing them (e.g., health services) through tie-up arrangements with the existing organisations or by promoting such activities through

multipurpose Primary Agricultural Cooperative Societies (PACS). Third, a point seems to have been reached when certain institutional innovations have become necessary to streamline the incentive-disincentive structure of the banks' own employees, and also to build up bridges with NGOs in a spirit of partnership and cooperation so as to attract neglected groups of customers and people from regions with low yield, and high variances.

Appendix: Determination of Expected Rice Production

To determine expected rice production, we estimate a simple Cobb-Douglas production function using ordinary least squares. The results from this estimation are given in Table 1A. The dependent variable in this regression is paddy output. The explanatory variables are LOAN which we use as a proxy for capital;²⁰ LABOR which includes both family labor and hired labor; human capital which is measured by the highest education level attained by any member of the household (ED); MULTICROP, a dummy variable indicating whether the farmer cultivates multiple crops; and four dummy variables which indicate the types of contract interlinkages entered into by the borrower. Paddy production, capital and labor are measured on a per acre basis and converted to logarithmic form.

Unfortunately, the data set does not include information on factors used directly in paddy production, but only on aggregate resources available to the producer. The dummy variable for multiple crops is included as an indication that not all resources are devoted to paddy production. The four dummy variables for contract type are included based on the assumption that each contract type influences how inputs are applied in the production process. The dummy variables included in the production function indicate if the producer is a party to such a contract. For example, if the producer is a sharecropper, the sharecropper dummy variable is one. This is true whether or not the landlord is also the moneylender or not. Thus the dummies

used in the production function differ from those used in the logit estimation.

1. By outsider, we mean an agent who is not directly involved in the operations of the investment project.
2. Others who have argued that interlinkages can be explained by information asymmetries include Braverman and Srinivasan 1981; Braverman and Stiglitz 1982; Bardhan 1983; Mitra 1983; Gangopadhyay and Sengupta 1987; and Datta, et al. 1988.
3. An alternative to intermediation would be to trade information in the market. The large positive externalities associated with information generation, however, often make such market allocations inefficient. In particular, once information is sold, there is no means by which the original generator of the information can prevent a buyer from reselling. Further, to the extent that the generator of the information has an incentive to misrepresent information, say because he is bribed, moral hazard may cause the information market to fail. Intermediation, in effect, allows individuals to capture the positive externalities inherent in generating information while avoiding moral hazard problems.
4. A deeper question is why poor agrarian economies do not have the institutions which allow them to take full advantage of intermediation. One reason may be that the lower level of capital accumulation means that the capital that does exist is utilized in ways other than the provision of infra-structure for financial markets. Also human capital, which is an input to both legal and information technologies, is lacking in less developed economies.
5. While the borrower could seek work with another employer in order to avoid repayment, such an action would be costly (Eswaran and Kotwal 1985).
6. Sarap (1990) argues opportunistic default is particularly a problem among large landholders who could repay but choose not.
7. Expected income is relevant since loan contracts are entered into ex ante.
8. The results presented in this table should be interpreted with caution since it is constructed using only small sample data.
9. Institutional constraints on interest rates may result in credit rationing in the formal sector (Nabi 1989). Thus borrowers who would have preferred to obtain financing only through the formal sector may be forced to borrow from both sectors. However, ceilings do not qualitatively affect our analysis. Furthermore, all but three of the producers in our sample either currently borrow from intermediaries or have in the recent past. While interest ceilings may limit the size of formal sector loans, it does not appear that access to the formal sector is denied.

10. Financial capital is required not only to support the consumption and or purchases of traditional inputs like labor, but also for the purchase of modern agricultural inputs including seeds, fertilizer, irrigation, pesticides, the services of agricultural tools and marketing services.

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Table 1
Optimal Contract Choice
Maximum Likelihood Estimates^a

Variable	Contract Type	
	Moneylender Only ^b	Intermediary Only ^b
CONSTANT	-1.2293 (-.873)	-18.2687 (-.012)
NUMTRAN ^c	.2634 [*] (1.874)	.2400 (1.243)
OUTPUT ^d	-2.1027 ^{**} (-2.076)	-2.8887 ^{**} (-2.048)
INPUT ^d	-.5929 (-.474)	-1.6141 (-1.018)
SHARETEN ^d	.2890 (.165)	.0439 (.024)
LABSERV ^d	2.2359 ^{**} (2.139)	18.4664 (.012)
LOAN	.0012 [*] (1.730)	.0009 (1.028)
PADDY ^e	-.0552 (-.593)	.0134 (.094)
MULTICROP ^f	-2.4189 ^{**} (-2.420)	-1.1063 (-.889)

n = 56

t-values indicated in parenthesis

Log Likelihood: -38.456

Notes:

a: Dependent variable: Type of loan contract currently undertaken.

b: Estimates were normalized by setting the coefficients for Contract Type: Both to zero.

c: Number of transactions with informal sector lenders.

d: Dummy variables, one if the borrower and the moneylender are *both* parties in contract.

e: Estimated using equation given in Table 1A.

f: Dummy variable, one if borrower cultivated at least one other cash crop in addition to rice.

*: Coefficient is significantly different from zero at 10 percent (2-tailed test).

** : Coefficient is significantly different from zero at 5 percent (2-tailed test).

Table 2
Frequencies
of actual &
predicted
outcomes

A C T U A L CONTRACT	P R E D I C T E D C O N T R A C T			
	Total	Both	Moneylender Only	Intermediary Only
Total	56	23	21	12
Both	23	17	3	3
Moneylender Only	22	4	15	3
Intermediary Only	11	2	3	6

Correctly classified observations: 68 percent.

Table 1A
Paddy
Production
Function
Ordinary
Least
Squares^a

Variable	Coefficient
CONSTANT	6.6578*** (3.481)
OUTPUT ^b	-.4547 (-.349)
INPUT ^b	2.0443 (1.254)
SHARETEN ^b	4.8271** (2.598)
LABSERV ^b	-1.4976 (-1.008)
LOAN ^c	.0025*** (3.737)
ED ^d	-.5556 (-.888)
LABOR ^e	.0198 [*] (1.824)
MULTICROP ^e	-1.8705 (-1.364)

n = 56

t-values indicated in parenthesis

Adjusted R²: .57

Notes:

a: Dependent variable: log of rice paddy output per acre.

b: Dummy variables, one if borrower is a party in *any* such contract.

c: Log of per acre value.

d: Log of highest education level of any member of the producers household.

e: Dummy variable, one if borrower cultivated at least one other cash crop in addition to rice.

*: Coefficient is significantly different from zero at 10 percent (2-tailed test).

** : Coefficient is significantly different from zero at 5 percent (2-tailed test).

***: Coefficient is significantly different from zero at 1 percent (2-tailed test).

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