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TRADER-LENDERS IN THE RURAL LDC CREDIT MARKET

by

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Abstract

We model the lending behavior of rural traders in a linked credit-output transaction. The likelihood of credit involvement with a trader rises with farmed area, with the combination of enforceability of repayment and demand elasticity and with the likelihood of procurement of marketable surplus by the trader. Data from the Philippines confirm these claims.

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Introduction

The linked contract literature has focused largely on the complex relationship between landlord and tenant encompassing the credit, factor, consumption goods and output markets (e.g., Bardhan, 1980; Braverman and Stiglitz, 1982; Kotwal, 1985; Binswanger and Rosenzweig, 1986; and Otsuka and Hayami, 1988, for an excellent survey) to the relative neglect of other rural players. Bell (1988) has argued for the need to enquire into the relationship between farmers and their other credit sources, most notably, traders which he considers "probably more prevalent and important in practice." Even more interesting, Bell observes, is this relationship's tendency to grow with commercialization while others fade away. The importance of trader-lender credit as a rural economy becomes more commercialized has been documented in several researches [See for example TBAC (1981), Floro (1987) and Geron (1989)]. More recently Esguerra and Meyer (1989), focussing on informal credit arrangements in a rice-growing

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province in Central Luzon, Philippines, traced the widespread use of product-credit interlinkages to the adoption of the high-yielding rice technology in rice-growing areas. Fabella (1989) has shown, among others, that the loan repayment in-kind arrangement between traders and farmers is Pareto superior to straight cash-for-cash arrangement when output price is uncertain and farmers are risk averse.

This paper models the trader's lending behavior in a linked contract framework and presents evidence on the role of marketable surplus, repayment enforceability and the linked nature of the contract. This may then help explain why the trader's role expands in the process of commercialization. In II, we present the model and derive the hypotheses and in III we test these and other hypotheses.

II. The Model

We start with rural traders who also serve as sources of rural credit. While the credit extended insures that a marketable surplus is produced, it also gives the trader a first crack at turning this surplus into trading profit. Following Fabella (op.cit.), at planting time, the farmer procures credit B (in cash or kind) from a trader-lender payable in units of produce at harvest time, the number of units, q, being agreed upon at the time the loan was secured. Let $q = [(1+r'),P']B$ where r' is the interest rate charged on B and P' is the purchase price per unit of produce. After repayment, the farmer is left with (F-q), where F is the farmer's total output, which he disposes at prevailing post-harvest farmgate price. The total output is

$F(B;A)$ where A is the land area cultivated by the farmer assumed fixed. Clearly, $[(1+r')/P'] = R$ is the effective price of the credit. Assuming $F(B;A)$ to be nondecreasing and concave in B, the risk neutral farmer maximizes expected profit $\bar{\pi}_f$ defined as

$$\bar{\pi}_f = P\{F(B;A) - RB\} \qquad (1)$$

where P is the expected post-harvest farmgate price. Maximizing (1) with respect to B gives the loan demand function $B^*(R)$. The case of the risk averse farmer only strengthens the likelihood of this linkage (Fabella, op.cit.).

At harvest time, the trader-lender has access to two types of the same produce: q, the repayment in units of produce and $[F(B^*; A) - q]$, the residual output which the trader-lender is in the best position to purchase at current farmgate price. Let β be the probability that the trader-lender buys $[F(B^*;A) - q]$, $0 \leq \beta \leq 1$. However, q itself is never a certainty. Nonpayment is always a possibility and, for the trader-lender, this is a crucial consideration. Let δ be the probability that q will, in fact, be delivered, $0 \leq \delta \leq 1$. Let Q be the expected market price at harvest time and c be the per unit distribution cost. For providing the farmer B^*, the trader now has to pay his financier (which could be himself) $B^*(1+r)$ where r is the rural market interest rate on loans to which traders have access.

The expected profit of the risk-neutral trader-lender is then

$$\bar{\pi} = (Q-c)\delta q - B^*(1+r) + (Q-P-c)\beta(F(B^*,A) - q) \qquad (2)$$

which simplifies into

$$\bar{\pi} = (n+\beta P)q - B^*(1+r) + m\beta F(B^*;A) \qquad (3)$$

where $n = (Q-c)(\delta-\beta)$, $m = (Q-P-c)$ both of which are assumed nonnegative. Note that B^* is the farmer loan demand function and is a decreasing function of R. In this model, r' and P' are perfect substitutes as instruments of profit maximization (Feibelia, op. cit.) and we only focus on r' given P'. The 1st condition for expected profit maximum is

$$\{\beta[mF' + PR] + nR - (1+r)\}(B^{*\prime}/P') = (B^*/P')[-\beta P-n] \qquad (4)$$

where $F' = \partial F(B^*;A)/\partial B^*$ and $B^{*\prime} = \partial B^*/\partial R$. From (4), we can solve for (dr'/dA), $(dr'/d\beta)$ and $(dr'/d\delta)$. Totally differentiating (4) gives :

$$Mdr' = NdA + Od\beta + Sd\delta \qquad (5)$$

where

$M = [HB^{*\prime\prime}/(P')^2] + [\beta mF'' B^{*\prime} + 2(\beta P+n)][B^{*\prime}/(P')^2]$,

$N = (-B^{*\prime}/P')\beta m(dF'/dA)$,

$O = (B^*/P')m - m(F'-R)(B^{*\prime}/P') - B^*[(Q-c)/P'][\epsilon_{BR} + 1]$

$S = [Q-c)/P']B^*[\epsilon_{BR} - 1]$ where $\epsilon_{BR} = B^{*\prime}R/B^*$,

$H = \{\beta[mF' + PR] + nR + (1+r)\} > 0$ from (4).

If $F'' > 0$, then $B^{*\prime\prime} < 0$ and $M < 0$. If the marginal product of borrowed funds rises with farm area $[(dF'/dA) > 0]$, then $N > 0$. If the farmer's problem is well-defined, then $(F'-R) \geq 0$. Furthermore, if $|\epsilon_{BR}| > 1$, then $O > 0$. Finally, $S \gtreqless 0$ as $\epsilon_{BR} \gtreqless 1$. Thus, from (5), ceteris paribus,

$$(dr'/dA) = (N/M) < 0, \qquad (6)$$

or that the larger is the farm area, the lower the interest charged by the trader-lender. The larger farm area allows larger marketable surplus given $(dF'/dA) > 0$, which is the trader's source of profit. Likewise, ceteris paribus,

$$(dr'/d\beta) = (O/M) < 0. \qquad (7)$$

The larger the likelihood that the residual output is accessed by the trader, the smaller is the interest rate charged. Thus, the more encompassing the linked arrangement, i.e., to include the sale of the residual output, the more interest discount the farmer can hope to enjoy. Finally

$$(dr'/d\delta) = (S/M) \lessgtr 0 \text{ as } \epsilon_{DR} \gtrless 1. \qquad (8)$$

The interest rate falls with the higher likelihood of repayment or the easier is the enforcement of the debt service if the farmer's loan demand is elastic. If inelastic, the trader simply exploits his monopoly position. We associate demand elasticity with access to other credit windows so that large farmers would generally exhibit higher elasticities.

In the case of the trader-lender, the enforcement instrument is a collateral substitute in the form of access to future credit. This collateral substitute fails to bind under certain circumstances: (a) when the farmer is a relative in which case considerations other than business may murky the waters and (b) when the relative operates, in addition, a large farm in which case the farmer's loan demand tends to be price elastic.

Direct tests of (5), (7) and (8) are difficult because in a linked contract arrangement, r' and P' both vary and their measurements tend to be fraught with errors. We, thus, resort to indirect tests involving the re-interpretation of (6), (7) and (8) as likelihoods of loan transactions between farmers and traders. We interpret a decreasing r' as a greater likelihood that a farmer will link with a trader since this means a lower effective loan price R facing the farmer. Thus, (6) would be interpreted as follows: The larger the farm size A (i.e., marketable surplus), the greater the likelihood that the trader links with the farmer. (7) would be interpreted as the linking of the purchase of the residual produce making it more likely that the farmer will be able to source his borrowing from a trader. This likelihood rises if the farmer loan demand is elastic ($|\epsilon_{BR}| > 1$) which is associated with more commercialized farms. (8) would be interpreted as the trader being less likely to provide the production loan to the farmer in the presence of characteristics that make repayment or enforcement of repayment contracts more difficult (such as consanguinity).

In addition, we also test hypotheses connected with type of household (higher likelihood if cultivator and less if landless and this is associated with the importance of marketable surplus), with information about the borrower proxied by duration of stay in the area, with farm household size and other interaction variables.

III. Empirical Evidence

The results of the econometric test to determine which factors affect the probability of obtaining a loan from a trader-lender are shown in Table 1. The econometric model is specified as a single-equation conditional logit model with a dichotomous dependent variable, i.e.

$$\text{Prob}[y_i = j] = F_{ij}(X, \beta), \qquad (9)$$

where j=1 if the ith borrower obtained a loan from a trader, and 0 otherwise. X and β are vectors of borrower characteristics and unknown parameters, respectively. Data on informal loan transactions of farmer and landless households in four rice-producing Philippine villages for two cropping seasons during 1987/88 are used for the empirical test. The Philippine data set is described in Esguerra and Meyer (op.cit.).

The logit model which is estimated using the maximum likelihood method includes both continuous and binary-valued explanatory variables. The likelihood of obtaining a loan from a trader-lender is expected to be positively influenced by hectarage farmed, AREA, which indicates potentially available marketable surplus. Likewise we expect farm households to have a higher probability of obtaining loans from trader-lenders than do landless workers, not only because of the higher income potential of farm households which translates into better repayment ability, but also because of the trader's interest in the farm output. Moreover, if the borrower already sells paddy regularly to the trader, there is a greater likelihood that the trader is also the credit source of the farm household.

The econometric results generally support our hypotheses. The sign as well as the significance level of the TYPE dummy indicates trader-lender's preference for farmer-borrowers. A larger farm area increases the likelihood of dealing with a trader in the credit market. Regularity of transactions in the product market (PADIDUM) also significantly and strongly determines the probability of dealing with a trader-lender. Years of residence in the village (DSTAY) which proxies for borrower information and number of dependents (NODEP) which is demand-related did not turn out to be significant. For trader-lenders, existing relations in the product market as well as area farmed probably reveal better information about the credit-worthiness of borrowers. LABORDUM also had an insignificant effect as we expected since trader-lenders generally do not relate with their borrowers in the labor market.

The more commercial nature of trader-lender loans is confirmed by the inclusion of TYPEDUM*REL and AREA*REL. The interaction of household type and farm area with the relation dummy weakens the effect of being a cultivator and increasing farm size on the probability of transacting with a trader-lender. The negative and significant signs of the coefficients of these two interaction terms suggest that trader-creditors prefer to deal less with persons with whom they have close personal relations. Especially when combined with a larger farm area, which is associated with having more borrowing options, close personal relations with borrowers tend to weaken repayment incentives. The nature of his buy-sell business requires that

the trader be sufficiently liquid. Thus, he can ill-afford to tie up his working capital in outstanding loans. Enforceability of the credit contract requires that the trader choose those borrowers with characteristics that facilitate contract enforcement. Impersonal, businesslike dealings are therefore preferred over open-ended transactions with friends and relatives.

Conclusion

The tendency of the output-credit linkage between trader and farmer to expand with growing commercialization motivates interest in the behavior of traders in rural LDCs. The model, constructed in the linked contract framework, points to the importance of marketable surplus (proxied by farm area), enforceability of repayment and the extension of the linked contract to include residual output purchase as important determinants. The econometric evidence seems to confirm these hypotheses. Moreover, influences considered important in the behavior of other rural lenders (say, farmer-lenders) such as borrower information (proxied by duration of stay) and labor linkage prove insignificant. A study that further contrasts the behavior of trader-lenders and farmer-lenders would greatly complement the rural credit picture presented in this paper.

Table 1

Probability of Obtaining a Loan from Trader-Lenders

Single-Equation Maximum Likelihood Logit Estimates
N = 354

Effect	Estimate	Standard Error
Intercept	0.0573	0.5438
TYPEDUM[a/]	0.5121*	0.2539
PADIDUM[a/]	1.0700**	0.2647
LABORDUM[a/]	0.0039	0.2836
DSTAY	0.0060	0.0089
NODEP	0.0870	0.0677
AREA	0.5353*	0.2142
TYPEDUM*REL[b/]	-0.7344*	0.2950
AREA*REL[b/]	-1.0098**	0.3421
Chi-Square	263.16	

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a/ Dummy variables, TYPEDUM = 1 if the borrower is a farm household, 0 if landless. PADIDUM = 1 if debtor and creditor deal regularly in the product market, 0 otherwise. LABORDUM = 1 if wage relations exist between borrower and lender, 0 otherwise.

b/ Interaction of two variables where REL is a dummy variable and is equal to 1 if borrower and lender are friends or relatives, and 0 otherwise.

**Significant at 1% level

*Significant at 5% level

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