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Segmentation in the informal credit markets: the case of the Philippines

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Abstract

This paper explains market segmentation that occurs in the Philippine informal credit markets through the matching of borrowers and lenders by their occupational specializations to internalize transaction costs and facilitate economic activity. The regression results support a predictable pattern of matching farmer lenders with borrowers specialized in non-farm activities and trader lenders with borrowers specialized in farming.

1. Introduction

The informal credit market has always been active in servicing the rural population in the Philippines (see Floro and Yotopoulos (1991) for a history of the role of informal credit markets in the Philippines). The formal credit market, however, was active during the seventies but there was a severe contraction in formal loans due to the insolvency of many rural banks in the eighties (Blanco and Meyer, 1989). (The formal credit market was persuaded to participate in rural credit markets through various government pro-

grams that aimed to curtail peasant unrest and increase adoption of modern rice technology to increase food production. The inability of formal credit markets to screen borrowers and enforce contracts, because of information problems and lack of incentives for officials, led to high transaction costs and default problems (Sacay et al., 1985).) Consequently, the informal market re-emerged in the 1980s as an important source of rural credit. The reemergence of informal credit has been accompanied by a change in the composition of the informal lenders. The traditional moneylenders and landlords have been replaced by specialized farmer and trader lenders (see Nagarajan (1992) for details. The traditional moneylenders and landlords still exist but are insignificant compared with trader and farmer lenders). Currently, trader and farmer lenders are the primary sources of credit in rice growing areas in the country (Bautista, 1991). These spe-

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cialized lenders offer differentiated credit contracts usually involving linkages of credit with labor, land and product markets (Geron, 1988; Floro and Yotopoulos, 1991; Nagarajan, 1992; Adams and Sandoval, 1992; Esguerra and Meyer, 1992).

The presence of many different credit contracts from various types of lenders would seem to imply a competitive credit market. It has been observed, however, that trader lenders who specialize in trading tend to offer loan contracts to large and asset rich farmers, while farmer lenders who specialize in farming tend to lend to small and asset poor farmers and landless laborers (Floro and Yotopoulos, 1991; Esguerra and Meyer, 1992). This paper argues that the observed lending patterns indicate a segmented credit market in which specialized borrowers and lenders are matched through differentiated loan contracts designed to internalize transaction costs based on the occupational specializations of the contracting parties. Indeed, the two-way matching of borrowers and lenders by their occupational specialization has two effects: (i) it reduces information problems inherent in credit markets and enhances borrower screening and contract enforcement mechanisms for lenders, and (ii) it increases the quality of services received by specialized borrowers compared with borrowing from non-specialized lenders. On the one hand, the risk and transaction costs associated with the contracts that suit the occupational specialization of profit maximizing lenders influence the type of borrowers preferred by them and hence the type of contracts that are accessible to borrowers. On the other hand, contract choice by utility maximizing borrowers is determined by the qualitative attributes of the contracts and the costs and risks involved in negotiating the contracts that suit the borrowers' occupational specialization. Consequently, a one-to-one matching often occurs between specialized borrowers and lenders. This matching results in a segmented credit market. A conflict in interests among the contracting parties could result in a no matching situation. While there is a possibility of some borrower households having a singleton or an empty set of accessible contracts for contract choice, there is usu-

ally more than one contract and lender available to any borrower.

This paper rationalizes the observed segmentation based on occupational specialization of the participants, and presents an empirical test of the determinants that match informal lenders and borrowers in informal credit markets in a major rice growing area in the Philippines. These determinants will: (i) help predict contract access and choice given lender and borrower characteristics, and (ii) provide evidence of market segmentation that may occur due to the occupational specializations of borrowers and lenders. This paper concentrates on rice traders and farmer lenders because they are the primary sources of credit in rice growing villages.

2. Description of the sample

The data used in this study were cross-sectional and were collected from a survey conducted by the International Rice Research Institute during the period 1985–1986 and 1989. (The primary data on farm production, household income and demographic characteristics of the sample households were collected in 1985–1986 and in 1988–1989, while the data on the credit market transactions were collected in 1989. The data were collected as part of a study on the Differential Impact of Modern Rice Technology on rural credit markets. The International Rice Research Institute (IRRI) provided assistance in data collection and processing.) The sample includes 127 randomly selected rice farm households and 29 lower income landless households that operated no farms. These households resided in two villages, Maragol and Gabaldon, located in the major rice growing province of Nueva Ecija in Central Luzon. Table 1 presents a profile of the sample households. The majority of farms are irrigated by gravity irrigation systems and grow two rice crops a year. Furthermore, the farms are small and 83% of the land is under land reform beneficiary status. (The land under beneficiary status refers to land under Certificate of Land Transfer (CLT) and Leasehold (LH) tenurial status. Under the land reform of rice and corn lands

Table 1
Socio-economic characteristics of the sample households

Items	FHH ^a	LHH ^a
Sample farm households (number)	127	29
Area irrigated (%)	72	–
Rice cropping intensity (%)	179	–
Average farm size (ha)	2.1	–
Area under beneficiary status (%) ^b	83.0	–
Area under non-beneficiary status (%) ^c	15.0	–
Area under share tenancy (%)	2.0	–
Average farm income ('000 P year ⁻¹)	17.4	–
No. of off and non-farm employment sources per season	1.6	2.8
Average non and off farm income ('000 P year ⁻¹)	8.20	3.28
Number of years of stay in the village by the HH head	22.6	15.2

^a FHH, farm households; LHH, landless households.

^b Refers to land with certificate of land transfer (CLT) or leasehold (LH) tenurial status.

^c Refers to land with owner cultivator (OC) tenurial status.

in 1972, share tenants were supposed to be converted to Leaseholders (LH) by Operation Leasehold when the landlord owned less than 7 ha of land, or to Certificate of Land Transfer (CLT) holders under Operation Land Transfer when the

landlord owned more than 7 ha of land (Hayami et al., 1990).) Before land reform, the farms were large rice haciendas and the majority of farmers were share tenants. While land use and the importance of farm income indicate that the occu-

Table 2
Loan contacts of the sample farm and landless households, by lender type

Item	Trader		Farmer	
	FHH ^a	LHH ^b	FHH ^a	LHH ^b
No. of different lenders	26	8	85	19
No. of loan contracts	247	16	233	33
No. loans per lender	9.5	2.0	2.7	1.7
Average loan size ('000 P per contract)	6.01	1.03	2.11	0.72
Average seasonal interest rate (% per season) ^c	25.6	26.2	24.3	20.1
% of contracts with collateral	2	2	4	5
Contract linkages (% of contracts)				
Product link	84	47	58	14
Labor link	4	22	9	43
Land link	2	0	8	2
Land + labor + product links	0	11	1	14
No links	10	20	24	27
Information base for lenders (% of contracts)				
Friends and relatives	16	23	79	59
Business partners	55	28	3	17
Neighbors	29	2	16	14
None	0	47	2	10
Purpose for loans (% of contracts)				
Farm production	65	0	49	0
Consumption	35	100	51	100

^a FHH, farm households.

^b LHH, landless households.

^c Season is 5 months.

pational specialization of farm households is farming, the observation of more than three non-farm employment sources per landless household suggests that their specialization is non-farm activities.

Of the 156 households interviewed, 529 loan contracts were reported in three seasons from 131 different traders and farmer lenders. (The data collected from three seasons during 1989–1990 showed that there were a total of 191 different lenders (179 for farm households (FHH) and 22 for landless households (LHH)) under seven different lender types with 774 total loan contracts (688 for FHH and 86 for LHH) during the reference period (double counting of lenders due to multiple seasons was avoided). However, this analysis is restricted to the two main lender types of traders and farmers which represented 68% of the total loans reported.) This large number of contracts and lenders suggests that a large amount of credit is used by rural populations in these rice growing areas. (Floro and Yotopoulos (1991) and Geron (1988) observed that the number of lenders and contracts per corn and coconut farmer was lower than for rice farmers.) In general, trader lenders specialized their economic activities in agricultural trading while farmer lenders tend to be large, rich farmers who specialized in farming. (It is illogical to expect large farms in areas where land reform has been successfully implemented. The land reform laws allow the farmers to own up to 7 ha of land, and average farm size in these rice growing areas is reported to be around 2–25 ha. Therefore, farmers who operate above the average are considered to be large farmers.) Table 2 shows that a higher proportion of farm households than landless households borrow from trader lenders. Although the number of loan contracts made per farmer lender to farm households tends to be higher than the number made to landless households, the differences are not statistically significant. Also, the trader lenders provided larger sized loans to farm households than did farmer lenders. While the average seasonal interest rates were similar across both lender types for farm household loans, they were higher for trader than for farmer lender loans made to landless households. The above observa-

tions indicate a tendency to match lenders and borrowers by their occupational specializations.

Collateral such as land, buildings, livestock, and jewels, was seldom used to secure loans but a variety of collateral substitutes such as tied contracts and guarantors were used. The majority of the loans reported by the households were tied with product, labor and land markets. The frequency of linking credit with product markets for farm households was higher for traders than for farmer lender loans. Although the majority of loans made to farm households by farmer lenders were also linked with farm products, land and labor links were sometimes used to secure these loans. The majority of loans made to landless households by traders involved product links while labor and land links were used by farmer lenders. (The majority of trader lenders also owned and operated farms. Therefore, they provided loans to landless laborers employed on the farms. The loans were linked to either labor services or to earnings that were paid in kind in rice.) A typical loan contract from a trader lender required borrowers to repay with farm products, and a tampa stipulation additionally required them to sell their entire marketable surplus to the lender so that economies of scale can be realized. Local economies of scale are realized by traders due in part to the cost reduction involved in transporting and storing large volumes of rice (Esguerra et al., 1993).

While the tampa condition is not explicitly stated in the majority of the product linked contracts from trader lenders, it is implicitly assumed by lenders and borrowers. The trader lenders usually specialized in rice so the contracts were specified in terms of rice. On the other hand, since farmer lenders were directly involved in farming that requires land and labor, they accepted loan repayment in kind but also linked their lending to land and labor markets. Therefore, they did not insist on tampa but supplied loans to landless households by linking them to labor and land markets. (The landless households in our sample refer to those households that did not operate any land during the study period. Some sampled landless households, however, previously owned land but pawned their land rights

to the lender during the study period. Therefore, we find landless households securing loans from farmer lenders using land links.) Land linked contracts involved the pawning of cultivation rights in which the borrower (pawner) temporarily transfers cultivation rights to the lender (pawnee) for a loan and redeems the rights upon loan repayment (Nagarajan et al., 1992). In labor linked contracts, borrowers were required to provide lenders with permanent or temporary labor services.

There were many farmer loans, however, with no explicit factor market links, but with an implicit promise of reciprocity. (Anthropologists classify reciprocity into three different groups: generalized reciprocity where the timing and exact content for reciprocation are diffused, balanced reciprocity where reciprocation is based on *quid pro quo* within a well defined time framework, and negative reciprocity where transactions are considered as exploitative (see Van den Brink and Chavas, 1991). Let us further classify balanced reciprocity into conditional reciprocity where reciprocation within a time frame is dependent on the state of outcome and unconditional reciprocity where contracts are usually unconditional on the state of outcome of the project and the terms of exchange are made certain, either implicitly or explicitly, at the time of the transaction. The reciprocity mentioned in this paper refers more to the unconditional balanced reciprocity type.) This phenomena is explained by the large percentage of farmer lender loans with friends, relatives and neighbors. The majority of trader loans were made to business partners and borrowers with no familial ties. In the absence of a formalized contract, long-term familial and business relations provide a well established informational base that enhances the lender's operational efficiency through effective loan screening and contract enforcement. While the fungibility of loan funds cannot be denied, the frequency of loans reportedly obtained for production purposes was higher from traders than from farmer lenders. The majority of trader lenders rolled over defaulted loans with a penalty interest, while farmer lenders pawned in land from delinquent borrowers.

3. Matching of borrowers and lenders: a conceptual model

A comprehensive framework is required to examine the complex and multifaceted transactions that take place between borrowers and lenders in the rural informal credit markets. A useful framework is provided by the Neo-Institutional Economics (NEOIE) proposed by Eggertsson (1990). In NEOIE, the rational choice model with its emphasis on constrained utility (profit) maximizing individuals is modified by introducing information and transaction costs and the constraints of property rights induced by institutional settings. The NEOIE relaxes the full information assumption of neo-classical economics in order to focus on the multiple quantitative and qualitative dimensions of credit contracts. The concept of a contract is central to the NEOIE. Therefore, it focuses on the economic logic of contractual arrangements and the competition among contracts. This framework, therefore, facilitates modelling the matching of heterogeneous agents who are constrained by technologies, endowments, agency and information costs, and uncertainty, and provides an explanation for the observed empirical regularities found in rural financial markets.

The informal credit market is characterized by several specialized lenders matched with specific sets of specialized borrowers. We now present a conceptual model that explains the matching of borrowers and lenders based on their occupational specializations, and propositions are derived for empirical testing.

In the absence of complete information, good contract enforcement techniques and tangible assets owned by borrowers, the lenders resort to several mechanisms such as collateral substitutes to screen their borrowers and enforce contracts. However, a lender's technology to assimilate the information that a collateral substitute reveals about the borrower and his ability to enforce contracts using it varies with his occupational specialization. An occupation specific collateral substitute performs three functions: (i) it promotes a specialized lender's primary economic activity, (ii) it provides a specialized lender with a

relatively low cost technology to decipher information on borrower creditworthiness, and (iii) it assists specialized lenders to more effectively enforce contracts and foreclose collateral than can non-specialized lenders.

Let us assume two specialized lenders: trader lenders primarily specialized in agricultural trading and farmer lenders primarily specialized in farming. Trading is enhanced by marketing a large quantity at a low cost, while farming is facilitated by using enough land and labor to operate economically viable farms.

The behavior of a profit maximizing trader lender, $E[\pi_{TL}]$, from trading and lending under production uncertainty can be specified as:

$$\begin{aligned} \text{Max}_L E[\pi_{TL}] \\ = q_1\{P[Q_a + Q_b] - C_1(Q) - C_2(I)\} \\ + q_2\{P[Q_a] - L(1+r) - C_1(Q) - C_2(I)\} \end{aligned} \quad (1)$$

where q_1 and q_2 are probabilities for the occurrence of the states of nature, with $q_1 + q_2 = 1$, with Q_a being the farm output sold as a tampa requirement, and Q_b the quantity of farm output used to repay the loan obligation, $L_s(I+r)$. The total quantity of product traded is $Q = Q_a + Q_b$. The borrower's farm output $Q = f[X(L), N, A]$; $f' > 0$; $f'' < 0$. N is land size and A represents the ability of the borrower to produce the output using inputs X that are financed entirely through loans, L . Let the exogenous unit price of the farm product be P and r be the implied interest rate charged. Let the costs of trading be C_1 , $C_1 = f(Q)$; $f' \geq 0$; $f'' \leq 0$, and the costs of lending be C_2 (monitoring, screening and default costs), which is a function of the quality of information, I , available to lenders on borrower creditworthiness and credit transactions with other lenders; $C_2 = f(I)$, $f'_I \leq 0$; $f''_I \geq 0$. Solving the maximization problem, the implicit loan offer function, L^*_{TL} can be written as:

$$L^*_{TL} = f\{Q, I, r, P\} \quad (2)$$

where f'_Q and $f'_I > 0$, f'_r and $f'_P \leq 0$. The above analysis implies that trader lenders tend to prefer farmer borrowers with the capacity to pro-

duce a marketable surplus large enough to help the trader lenders maximize their returns through economies of scale.

Farmer lenders may require the borrowers to repay in farm output but do not insist on tampa. However, these contracts may additionally require the borrowers to offer land cultivation rights, or labor services as implicit collateral. The expected profit maximization function for a farmer lender, $E[\pi_{FL}]$, offering linked contracts can be written as:

$$\begin{aligned} \text{Max}_L E[\pi_{FL}] = q_1[PY_1 + PQ_b - C(L, I)] \\ + q_2[PY_2 - C(L, I) + c] \end{aligned} \quad (3)$$

where Y denotes farm output of the lender in two states of nature, Q_b is the loan obligation repaid in terms of farm produce, and c is net value of collateral, including land and labor, collected for non-repayment of loans. The costs of lending are represented by C , with $C(L, I)$, $f'_L \geq 0$, $f''_L \leq 0$, $f'_I < 0$, $f''_I \geq 0$. Solving the maximization problem, the loan offer function can be implicitly written as:

$$L^*_{FL} = f(Q, I, c, r, P) \quad (4)$$

where f'_Q , f'_c , f'_r and $f'_P \leq 0$; $f'_I > 0$. Although the mathematical signs explaining farmer lender behavior are ambiguous, propositions can be drawn by suitably qualifying the assumptions. Farmer lenders require land and labor for farming. Therefore, they prefer to lend to farmers with a secure land tenure status so cultivation rights can be transferred in the event of loan default. (The transfer of land rights through land pawning is the only option to acquire land in land reform areas that restricts the maximum amount of land owned by a farmer to 7 ha, and to obtain large loans for consumption purposes (Nagarajan et al., 1992).) Also these households can offer family labor as collateral in labor linked contracts. This proposition can be demonstrated by an example. Let total collateral involved in a contract be c , and let collateral (or collateral substitutes) offered be farm output (Q), land (N), and labor (I). Then, ceteris paribus, the ratio of farm output, Q , used as collateral to total

explicit and implicit collateral (c) based on lender specialization can be simply stated as:

$$\text{Traders: } (Q_a + Q_b)/c = 1 \quad (5)$$

$$\text{Farmers: } Q_b/c < 1, \text{ if } N/c \text{ and } l/c \text{ are } > 0 \quad (6)$$

Since the quantity of product linked collateral is larger in trader ($Q_a + Q_b$) than in farmer lender contracts, the above proposition also implies that trader lender loans are accessible only to borrowers who are able to produce a large marketable surplus. Farmer lender contracts, on the other hand, are accessible to both large and small farmers who are able to offer land and labor as implicit collateral. The land tenure status and efficiency of family labor (quality of collateral) are more important to farmer lenders than to traders because cultivation rights or labor services may be transferred in the event of non-repayment.

The supply of loans provided by trader and farmer lenders depends upon the information the lenders have about borrowers that is obtained through long-term business and familial relationships. Although this information may be incomplete, the cost of obtaining it in the informal credit market is low compared with the formal credit market due to the physical proximity of the participants (Stiglitz, 1990). This information is important in screening borrowers. Lenders have different technological abilities to acquire and utilize information. Related and repeated transactions in factor and/or product markets in which the lender specializes provide information at a low cost that lenders can use to evaluate the borrower's creditworthiness and repayment type. These long-term business relationships help a lender to form expectations about a borrower's ability to manage exogenous risks due to random shocks. Also, familial relationships and proximity reduce the endogenous risk of default due to borrower character. Consequently, the risk costs of lending are reduced through established relationships involving business or familial connections.

Borrowers in rural areas tend to specialize in farming or in non-farm activities. The borrower

derives his total loan demand based on the terms and conditions of his accessible set of loan contracts, and chooses the contract(s) that best satisfies his total loan demand. Borrower behavior can be outlined as follows. Let ω be the set of contracts that is offered to a borrower or are accessible to a borrower, given the borrower's characteristics. The borrower maximizes his expected utility subject to cash flow constraints and his accessible credit contracts to derive his loan demand by choosing appropriate contract(s). The model of borrower maximization can be written as:

$$\text{Max}_L E\{U[C]\}$$

st.,

$$R = \begin{cases} PQ[X(L), N, A] + WL - L(1 + r) & \text{with prob. } q_1 \\ PQ[X(L), N, A] + WL - c - \rho & \text{with prob. } q_2 \end{cases} \quad (7)$$

$$C = R$$

$$L = f(\omega)$$

where C is consumption, R is the income net of loan obligation derived from farming and non-farming activities (selling l units of labor at W exogenous labor market wages). ρ is the implicit and explicit penalty such as loss of reputation attached to non-repayment of loans. The solution requires that:

$$E\{U[L_D^+]\} | \bar{\psi} > E\{U[L_D^+]\} |_{(\omega - \bar{\psi})} \quad (8)$$

where, L_D^+ is the observed loan demand and $\bar{\psi}$ is the observed set of contracts and lenders from the accessible set, ω , that satisfy loan demand.

The observed set of contracts and lenders that satisfies the borrower's total loan demand, $\bar{\psi}$, depends on his preferences and specialization. Utility maximizing borrowers with access to multiple contracts will choose contracts perceived to be most advantageous. A borrower's occupational specialization provides resources that can be used as a collateral substitute with specialized lenders. For instance, assume that a borrower has access to non-exclusive product linked contracts from both a trader lender and a farmer lender, and that there is no loan size rationing. The borrower

can choose either contract to satisfy his loan demand. The majority of farmer lenders offer an advantage to the borrower by charging lower interest rates than trader lenders, but trader lenders offer marketing services in addition to credit. These marketing services are especially important for farmers who specialize in farming and produce a large marketable surplus. They have an incentive to link up with a trader who has better means to store and transport their output to their markets (Esguerra et al., 1993). Therefore, a farmer who is specialized in intensive farming and faces an imperfect product market will prefer to borrow from a trader lender rather than a farmer lender if product market access can be guaranteed.

Furthermore, in the absence of contingent markets, a risk averse borrower in an uncertain production environment will prefer a risk sharing loan contract. Trader lenders more often than farmer lenders offer loans with a built-in risk sharing mechanism in terms of loan rollover to the next season. A farmer lender would more likely request the borrower's cultivation rights in the event of loan default. (While borrowers generally do not actually lose their cultivation rights to farmer lenders, they frequently suffer a loss in reputation and access to future loans which serves as a disincentive to default.) In other words, there is a demand for risk-sharing contractual arrangements that act as insurance in the absence of contingent markets. Therefore, borrowers specialized in farming would prefer trader lenders while borrowers primarily specialized in non-farm activities would prefer a farmer lender because of their comparative advantage in offering labor and land cultivation rights as collateral in exchange for loans. (However, the possibility cannot be ruled out that a borrower prefers a combination of services provided by traders and farmers so that he borrows from both to satisfy the demand for loans and insurance. This happens when farmer lenders offer flexible emergency credit and maintain an open credit line for their clientele which tends to serve as an insurance substitute.)

The lender's flexibility in providing loans for borrower-specific purposes also influences con-

tract choice. While the product linked loans through tampa stipulation from trader lenders allow little flexibility to divert loans to consumption purposes, farmer lender loans can be used for consumption provided the borrowers implicitly tie loans to land or labor services. Whereas loans are often fungible, the close monitoring by lenders or peers and penalties for default reduce fungibility in informal credit markets (Stiglitz, 1990; Feder et al., 1990).

Consequently, the matching of lenders and borrowers is given by the tangency between the iso-expected profit curve of a lender and the borrower's iso-expected utility curve. For these reasons, the matching of lenders and borrowers can be explained by: (i) the borrower's ability to offer collateral that is valued by lenders resulting in differential access to specialized lenders, and (ii) the lender's ability to provide borrower specific services leading to the borrower's contract choice from among the accessible set of contracts. As a result, a predictable pattern of loan contracts emerges that matches heterogeneous borrowers and lenders. It can be posited that trader lenders are matched with borrowers who specialize in farming by operating larger farm sizes that produce a larger marketable surplus. Farmer lenders, however, tend to be matched with borrowers who specialize in non-farm activities, who operate smaller farm sizes and possess fewer total assets, but can provide more labor and secure land ownership rights to the lender. In the following section, these propositions are tested using the cross-sectional data described above.

4. Econometric analysis and results

A single equation logit model was estimated for each lender type using the maximum likelihood method to examine the factors that affect the matching of informal lenders with borrowers. The dependent variable is dichotomous, taking a value of 1 if the contract is from farmer (trader) lenders during 1988–1989, and 0 otherwise.

The independent variables are represented by the borrowing household's occupational specialization indicated by farm size in hectares (FSIZE),

annual gross returns per hectare from rice farming (RETURNS), and annual non-farm income (NONFARM). Human capital is denoted by the years of schooling of the household head (EDUHH) and the number of eligible laborers in the family (LABOR). The value of physical capital is measured by the market value of non-land assets (ASSETS) owned by the household. Security of tenure for land operated that can be used as a collateral is captured by the proportion of total land operated by the household to area under land reform beneficiary status (CLTLH) and under ownership status (owner cultivator; OC). The ratio of number of years of residence in the village of the household head to his age (REPUTATION) and a dummy variable that captures the business customer relationship with the lender (DCUST) are proxies for the information available to the lenders. The variable DCUST refers to 1988–1989, while all other variables refer to the year 1985 to avoid endogeneity problems. (The variable DCUST is 1 if the borrower had a business customer relationship with the lender sometime during the previous 4 years, and 0 otherwise.)

The regression results are presented in Table 3. (About 18% of the FHH and 2% of the LHH reported multiple loans from multiple types of lenders. Therefore, there is a possibility of some households borrowing from both trader and farmer lenders contaminating the sample used for the econometric analysis. However, a model run on a subsample that excluded those households that borrowed from both trader and farmer lenders did not produce significantly different results.) The results for the trader and farmer lender equations generally show opposite signs and confirm the arguments proposed above. The significant positive results for ASSET, RETURNS, and FSIZE and the negative coefficients for NONFARM, LABOR and EDUHH in the trader lender equation indicate that borrowers specializing in farming with the capacity to produce a large marketable surplus are matched with trader lenders. Negative coefficients for FSIZE, RETURNS and ASSET, and a significant and positive sign for NONFARM in the farmer lender equation show that borrowers who

Table 3

Single equation logit estimates for the determinants that match borrowers with trader and farmer lenders

Variable	Trader	Farmer
Constant	−0.130 (0.57)	−0.495 (0.48)
FSIZE	0.801 (0.95)	−0.312 ^c (0.11)
RETURNS	0.102 ^c (0.02)	−0.159 ^c (0.03)
EDUHH	−0.116 ^c (0.04)	0.164 ^c (0.04)
ASSET	0.965 ^c (0.29)	−0.121 ^a (0.05)
NONFARM	−0.133 (0.48)	0.248 ^c (0.11)
LABOR	−0.532 (0.59)	0.434 (0.62)
CLTLH	−0.699 ^a (0.41)	−0.233 (0.30)
OC	−1.603 ^c (0.59)	0.583 (0.40)
REPUTATION	−0.197 (0.34)	0.379 (0.34)
DCUST	1.652 ^c (0.28)	−0.517 ^c (0.19)
Log-likelihood	−290.8	−326.68
Chi-square	143.8	167.68

^{c,b,a} Represent significance at 1%, 5% and 10% levels, respectively. Asymptotic standard errors given in parentheses.

specialize in non-farm activities tend to be matched with farmer rather than with trader lenders. If a significant and positive coefficient for education can be taken as an indication of capacity of a borrower to engage in education specific non-farm activities, there is further support for the specialization hypothesis.

As predicted, the probability of matching borrowers with trader lenders is positive and significant for those borrowers with previous business relationships, while it is the opposite with farmer lenders. Furthermore, the variable REPUTATION is negative but DCUST is positive for trader lenders. These variables have opposite signs for farmer lenders. These results reveal that a better reputation is more important than a long-term customer relationship in matching borrowers with farmer lenders than with trader lenders. This indicates that for poorer borrowers (negative FSIZE and ASSET), farmer lenders use

reputation as a collateral substitute. This is not surprising because farmer lenders by their physical proximity can accumulate information about borrower creditworthiness through means other than previous customer relationships. (It has been noted that the majority of trader lenders resided in neighboring towns and provided loans to business customers while the farmer lenders resided in the same village and provided loans to several new customers in their village. This indicates that access to technology to assimilate qualitative information such as reputation should be higher for farmers than for trader lenders.) The coefficients for CLTLH and OC are negative in the trader lender equation and the variable OC is positive in the farmer lender equation suggesting riskiness of lending for the two types of lenders. However, there is little risk of lending to beneficiaries for there are few incentives for reporting illegal pawning transactions. (Otsuka (1989) argued that in practice there exists a very low risk of eviction in the study villages due to the lack of incentives for reporting the illegal pawning transactions of land reform beneficiaries.)

5. Conclusions and policy implications

The informal credit market is dominated by rice traders and farmer lenders in Philippine rice growing villages. They employ factor and product market ties and social relations to secure their loans with borrower households. We tested the argument that the matching of informal lenders with borrowers is based on their occupational specializations using primary data collected from rice growing villages. The regression results supported the argument. Trader lenders tend to be matched with borrowers who have a large capacity to produce rice, while farmer lenders tend to be matched with those borrowers using land, labor and product links, and who are engaged in non-farming activities.

This observed pattern in the matching of lenders with borrowers suggests that market segmentation occurs in rural informal credit markets based on occupational specialization. This seg-

mentation limits the effective functioning of a particular type of lender to his/her specialized field where there exist adequate borrower screening technologies and contract enforcement mechanisms. (Siamwalla et al. (1990) observed in Thailand that loans from rice traders were limited for crops with fixed harvest time. This was attributed in part to the specialized lenders' inability to evaluate the borrower and enforce contracts.) Furthermore, access to loans from rice traders is limited to large farms specializing in rice production. A rice trader is better equipped to evaluate the creditworthiness of rice farmers than corn farmers at a lower cost due to his occupational specialization. However, with the growing need for crop diversification because of environmental and risk concerns, it may become difficult for such specialized informal lenders to adequately service diversified farms. In addition to a loss in economies of scale, they have to incur high transaction costs to evaluate the creditworthiness of diversified farmers with whom they have not had other business transactions. Consequently, the core of eligible borrowers for specialized lenders and the set of accessible lenders for diversified borrowers might decline unless the current specialized lenders develop information substitutes to service these new potential borrowers.

It would also be difficult to introduce a formal credit institution into this type of segmented market to improve borrower access to formal loans. Formal institutions would have to solve these borrower screening and contract enforcement problems in order to effectively compete with specialized lenders in the provision of borrower specific services. Since formal credit institutions cannot compete with informal lenders that specialize in, for example, trading and farming, they must develop other mechanisms to provide borrower specific services at a lower screening and contract enforcement costs. The well documented failure of the Philippines rural banking system in the early eighties was due in part to its inability to develop appropriate financial technologies to meet this challenge. The experiments now under way in linking formal institutions with various types of informal financial arrangements may prove to be a more promising method to increase

access to financial markets than the targeted credit approach of the seventies and eighties.

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