COLLATERAL SUBSTITUTES: EFFECT ON LOAN ACCESS AND SIZE IN THE PHILIPPINE INFORMAL CREDIT MARKETS

by

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Abstract

Collateral substitutes, such as interlinked contracts and reputation, are econometrically shown to affect loan access and size from informal lenders in the Philippines. Greater access and larger sized loans from farmer lenders were influenced by borrower reputation and land links while from trader lenders by business relations and product links. The specialization of borrowers in farm and non farm activities and specialization of lenders in farming and trading is observed to influence their preferences for interlinked type collateral substitutes. As a result, systematic differences in loan access and size were found for loans received by different types of borrowers from different types of lenders.

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Credit market transactions require mechanisms to ensure the future repayment for loans made in the present. Several threat and incentive mechanisms exist to help guarantee the borrower's promise to repay. These mechanisms are less important in the presence of full information that lenders may obtain about borrowers through personal relations, multiple transactions and credit bureaus, but they are important in an environment characterized by incomplete and asymmetric information.

Loan collateral serves two purposes: it signals information on borrower credit worthiness and is a potential threat useful in securing loans and reducing loan losses (Nagarajan and Meyer). Binswanger et al. defined collateral as physical assets that satisfy three attributes: (i) appropriability leading to ease of liquidation in case of default, (ii) absence of collateral-specific risks, and (iii) accrual of the returns to the borrower during the loan period either through direct economic returns from the use of the asset or indirect returns from the investments made with loans obtained using the asset as collateral. In general, land and real estate are preferred as collateral, especially by formal lenders. The lack of clear land titles or other forms of physical assets that can be used as collateral is expected to contract the supply of credit thereby reducing access to loans for rural borrowers (Binswanger and McIntire). In the absence of tangible collateral, however, lenders use collateral substitutes to screen borrowers and enforce contracts.

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Collateral substitutes are defined as non-physical assets with or without market value, or physical assets that have some qualities similar to collateral that can be used to enforce loan repayments. Collateral substitutes include interlinked contracts, third party guarantees, moral suasion, threat of loss of future borrowing opportunities, reputation, long-term relationships (familial and/or business), group liability, guarantee funds, savings, insurance policies, inventories and accounts receivables (Binswanger et al.,).

Recently, the use of collateral substitutes has been observed to perform the several functions of loan collateral in the Philippine informal credit markets (Esguerra and Meyer; Nagarajan, Meyer and Hushak). Several studies describe the use of collateral substitutes in developing countries but few examine if they affect access to loans and loan sizes from various types of lenders that are active in rural credit markets. This paper argues that differential preferences for collateral substitutes, such as interlinked contracts and reputation, affect access to loans from diverse types of lenders in the first stage, and the size of loans made at the second stage in a predictable pattern leading to market segmentation. It tests these ideas with data from the Philippines. Since farmer and trader lenders are reported to be the primary sources of loans for Filipino farm households, these two types of lenders are included in this analysis. In the next sections, the sample is described and postulates are developed that relate collateral substitutes to loan access and loan size from farmer and trader lenders. The results of our tests of these postulates are then presented, and policy implications conclude the paper.

Description of the Data

The data used in this study were collected from two villages located in the major rice

growing Nueva Ecija province in Central Luzon by the International Rice Research Institute during

the period 1985-86 and 1989-90.[1] The sample includes 127 randomly selected rice farming

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 percent of the land is under land reform

beneficiary status.[2] Before land reform, the farms were large rice haciendas and the majority of

farmers were share tenants.

The households surveyed engaged in both farming and non farm activities. While 69 of the

total 127 households derived more than half of their household income from farming alone, 58 of

the 127 were specializing in non farming activities along with some farming. The average annual

income from farming was reported to be US$ 956, and an additional US$ 615 was earned from non

farm sources.[3] The general characteristics and loan contracts observed with households specializing

in farming and non farming activities are presented in Table 1. Households specializing in non farm

activities tend to be more educated but earn lower income, own fewer assets and operate smaller

farm sizes compared to farming households. The rice cropping intensity among the farm households

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[1] The primary data on farm production, household income and demographic characteristics of
the sample households were collected in 1985-86 and in 1989-90, while the data on the credit market
transactions were collected only in 1989-90.

[2] Under the land reform of rice and corn lands 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. See Hayami, Quisumbing and Adriano for details.

[3] US $1 = 18.2 Philippine Pesos during 1989-90.

was significantly higher than for non farm households. It is important to note that non farm households reported more loan contracts with farmer lenders than trader lenders, while the opposite was found for farming households. Furthermore, farming households tend to link their contracts more with farm products than with land in contrast to non farm households. These observations indicate a preference by household specialization for different types of lenders, and for different types of collateral substitutes offered in terms of linkages.

For the 127 households interviewed, there were 17, 29 and 10 non borrowers in each of the three 1989-90 cropping seasons. But only five households reported never borrowing in any of the three seasons. A total of 688 loan contracts were reported in all three seasons indicating nearly 5.4 loans on average per sample household. These loans were made by 180 different lenders; 111 different trader and farmer lenders accounted for 480 of the loans (70 percent of the total loans). In general, trader lenders specialized in agricultural trading while farmer lenders tended to be large, rich farmers specialized in farming. Table 2 shows that trader lenders provided a larger number of and larger sized loans than did farmer lenders. The average seasonal interest rates were similar across the lender types.

Collateral in the form of buildings, livestock and jewels was seldom used to secure loans but a variety of collateral substitutes were used, especially linked contracts. The majority of the loan contracts were linked to farm products. However, the frequency of linking credit with product markets was higher with trader than with farmer lender loans. Although the majority of loans received from farmer lenders were also linked with farm products, land and labor links were also frequently used to secure them. A typical loan contract from a trader lender required borrowers to repay with farm products, and a stipulation tampa additionally required them to sell their entire

marketable surplus to the lender so that economies of scale can be realized.[4] The trader lenders

usually specialized in rice so their loan contracts specified repayment in terms of rice. On the other

hand, since farmer lenders were directly involved in farming that requires land and labor, loan

repayment was accepted in kind or linked to land and labor markets. Land linked contracts involved

the pawning of cultivation rights in which the borrower (pawner) temporarily transferred cultivation

rights to the lender (pawnee) for a loan and redeems the rights upon loan repayment. 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. This phenomena is explained by the large percentage of loans made

to friends, relatives and neighbors. On the other hand, the majority of trader loans were made to

business partners and borrowers with no familial ties. In the absence of formalized contracts, long

term familial and business relations assure a well established informational base that enhances the

lender's operational efficiency in loan screening and contract enforcement.

Collateral Substitutes: Effect on Loan Access and Loan Size

Collateral substitutes perform three functions. They (i) promote a lender's primary economic

activity, (ii) provide a lender with a relatively low cost technology to evaluate information on

borrower creditworthiness, and (iii) assist a lender to effectively enforce contracts. The use of

collateral substitutes reveals the borrowers' ability to offer them and the lenders' preferences to

accept them. The technology that the lenders use to assimilate information that a collateral

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[4] While the 'tampa' condition is not explicitly stated in most of the product linked contracts from trader lenders, it is implicitly assumed by lenders and borrowers.

substitute reveals about a borrower and to enforce contracts using collateral substitutes varies with their occupational specialization. Consequently, differences in preferences among lender types for various types of collateral substitutes lead to differential levels of loan access and to loan sizes. This contributes to segmentation in informal credit markets.

The type of collateral substitute can be expected to influence the access to loan and to loans of different sizes from the trader and farmer lenders. Related transactions in factor and product markets function as a collateral substitute, and they provide information that specialized lenders can use to evaluate borrower creditworthiness and repayment type. Trader lenders are primarily specialized in agricultural trading and farmer lenders are primarily specialized in farming. Trading is enhanced by marketing a large quantity of product at a low cost, while farming is facilitated by using enough land and labor to operate an economically viable farm. Therefore, trader lenders would prefer farmer borrowers with the capacity to produce a marketable surplus large enough to help them maximize their returns through economies of scale. Borrowers who have the ability to link loans with farm products should have greater access to trader loans. Farmer lenders, on the other hand, would prefer borrowers that can offer family labor in labor linked contracts or borrowers with secure land tenure status because cultivation rights can be pawned for a loan and be transferred in the event of loan default. As a result, borrowers able to provide land and/or labor as collateral substitutes should have greater access to farmer lenders.

Borrowers, based on their specialization, vary in their ability to offer various types of collateral substitutes. This affects their preference for various types of lenders. On the one hand, while households that specialize in farming can produce a large marketable surplus that can be offered as collateral, they are limited in their ability to provide land/farm labor, that is directly used

in production, as loan collateral. As a result, these households would prefer trader lenders who accept farm products rather than farmer lenders who may require land/labor as collateral. On the other hand, households that specialize in non farm activities are unable to produce a large marketable surplus attractive to trader lenders, but they can offer land as collateral since they do not rely on it as much to derive a major portion of income [5]. Therefore, these households would more likely prefer to borrow from farmer lenders than from trader lenders.

The ability of the borrowers to offer collateral and therefore their preferences for lenders, and the ability of lenders to use the collateral and therefore their preferences for borrowers result in a matching of interests of the contracting parties in a predictable pattern. It can be postulated that borrowers who specialize in farming by operating larger farms producing a larger marketable surplus that can be linked to loans will have greater access to and will receive larger sized loans from trader lenders. Borrowers who specialize in non farm activities and therefore can provide more labor and secure land ownership rights to the lender to enter into land and labor linked contracts will have greater access to and will receive larger sized loans from farmer lenders. While reputation and long term business and familial relationships function as collateral substitutes and affect loan access and loan sizes from various types of lenders, the direction of causality is to be empirically determined. These propositions are tested below.

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[5] The data show that the households specializing in non farm activities crop less intensively compared to households that specialize in farming although all households have the same access to irrigation facilities. Therefore, the households that specialize in non farming activities can afford to lend or pawn their land for the season that they are not farming. Indeed, they can also pawn out part of their land for a longer period.

Econometric Analysis and Results

The borrowers in the sample report having access to more than one type of lender, and the difference in access to various types of lenders seems to affect loan size. In other words, access to various lender types in the first stage affects loan sizes at the second stage of the loan allocation process. When multiple lender types are involved, the factors that influence loan access by borrower type need to be explained, then that information has to be suitably incorporated into the estimation of loan size. A multinomial logit is appropriate to examine loan access from multiple type lenders. However, a single equation tobit is not adequate to explain loan sizes from various types of lenders under the conceptual framework presented earlier. Therefore, an econometric model proposed by Greene and Lee is used in this paper to adequately consider the truncation in the loan access variable, the censoring in loan size variable, and the joint relationship between access and loan size from various types of lenders. The model is based on Heckman's two stage procedure [6]. The model can be written as:

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\begin{aligned}
Z_{ij} &= \beta' X + \epsilon_i & (i) \\
Y_{ij} &= \gamma' W + u_i & (ii) \\
Z_{ij} &= Z_{ij} \ \text{ if } Z_{ij} > 0 \ \ ; \ \text{else } Z_{ij} = 0 & (iii) \\
Y_{ij} &= Y_{ij} \ \text{ if } Z_{ij} > 0 \ \ ; \ \text{else } Y_{ij} = 0 & (iv)
\end{aligned}
\tag{1}
$$

Where Z is a discrete variable reflecting loan access that takes values of 0, 1, 2, ... j for j+1 outcomes, and i indexes the observations. The j+1 outcomes in our sample include no access (0),

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[6] This is also called as an extension of type 3 Tobit (Amemiya)

and access to farmer (1), trader (2) and other lenders (3)[7]. Y_{ij} is a continuous variable representing

the size of loan received from the jth lender by the ith borrower. X and W are vectors of independent

variables that affect loan access and loan size. These equations can be estimated by the following

procedure: First, since there is more than one type of lender in the sample, estimate equation 1(i) by

a multinomial logit model using maximum likelihood methods. Retain the coefficients, the

estimated asymptotic covariance, the variance matrix and the full set of predicted probabilities for

which Z takes the value in question and use them to compute the mills ratio, λ_j. Then obtain

consistent estimates of γ in equation 1(ii) by OLS by regressing Y_{ij} on W and λ_j.

The sample for the analysis includes nonborrowers and borrowers. The marginal contract

of the borrowing household in a given season is analyzed to ensure mutual exclusivity among the

outcomes in this sample characterized by households reporting multiple borrowings from several

types of lenders. The marginal contract for a borrower is defined as the loan obtained at the highest

implicit interest rate [8]. The dependent variables are loan access and loan size from several types of

lenders. Independent variables are represented by variables that affect the ability of a household to

enter into product, labor and land linked contracts with various types of lenders, and that reflect the

borrower's credit worthiness and reputation. Farm size in hectares (FSIZE), value of physical capital

measured by the market value of nonland assets (ASSETS) owned by the household, and annual

gross returns per hectare from rice farming (RETURNS) primarily affect product linkages. The

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[7] The no access category refers to applicants who were rejected by the lenders and non applicants.

[8] The implicit interest rate were calculated to include explicit interest rate, transactions costs, imputed value for over pricing of inputs in input loans and under pricing of output in product linked loans.

labor linked contracts are essentially affected by annual non farm income (NONFARM), human capital denoted by the years of schooling of the household head (EDUHH), and the number of eligible laborers in the family (LABOR). The land linked contracts are predominantly affected by the security of tenure for land operated that can be used as collateral. This can be proxied by the proportion of total land operated by the household to land area under land reform beneficiary status (CLTLH) and under ownership status (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 1989-90, while all other variables refer to the year 1985 to avoid endogeneity problems.[9]

In general, the regression results presented in Table 3 confirm the earlier inferences regarding a pattern in the observed access to loans and loan size from farmer and trader lenders. The multinomial logit results presented in column 2 indicate a matching phenomena in loan access. First, the households specializing in non farm activities are observed to be matched with farmer lenders. The significant and negative coefficients for ASSET, MSURP and FSIZE indicate that poorer borrowers with fewer physical assets, smaller farm size and producing a smaller marketable surplus tend to obtain loans from farmer lenders. Positive coefficients for EDUHH and NONFARM indicate that households with higher levels of education and higher non farm income link their loans with

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[9] 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. These business customer relationships are essentially formed through farm product linked contracts.

land to get access to farmer lenders [10]. These results are consistent with the observations reported in Table 1 that shows households specializing in non farm activities tend to operate smaller farm sizes, possess fewer assets and borrow from farmer lenders. These households rely less on their land for generating income while the farmer lenders demand land for their operations. The information variable, DCUST, negatively and significantly influences access to loans from farmer lenders, while REPUTE positively influences it. These results demonstrate that farmer lenders provide loans to borrowers with better reputations rather than with long term customer relationships established through product linked contracts.

The converse is true for loan access from trader lenders. The results indicate that trader loans are most accessible to households with larger assets and farm sizes that enable them to produce a large marketable surplus, and with longer customer relationships established through product linked contracts. The loans from traders are less accessible to households specializing in non farm activities. Since households specializing in non farm activities farm relatively less as indicated by their lower farm income and cropping intensity compared to households specializing in farming, they are unable to offer rice that is preferred as collateral by trader lenders. Therefore, they are less able to link their loans with farm products, they have less access to trader lenders.

The regression results presented in columns 3 and 4 in Table 3 for loan sizes from farmer and trader lenders logically follow the results obtained for loan access. The results indicate that poorer households with smaller farm sizes and marketable surplus obtain larger loans from farmer lenders,

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[10] The correlation between education and non farm income of a household is positive and highly significant indicating that households with higher education tend to specialize more in non farm activities.

while the results are opposite for the trader lenders. Furthermore, whereas borrowers with better reputations rather than long-term customer relationships are observed to receive larger loans from farmer lenders, the converse holds for trader lenders. The variable NONFARM is positive but insignificant for farmer lenders but it is negative and significant for trader lenders indicating that borrowers engaged in non and off farm activities get larger loans from farmer lenders than from trader lenders. Education (EDUHH) positively and significantly affects loan size from both types of lenders. Whereas a significant and negative coefficient for CLTLH indicates that land reform beneficiaries have lower loan sizes from farmer lenders due to eviction risk, a negative sign for OC negates that inference. In the presence of eviction risk, one would expect a positive coefficient for OC and a negative sign for CLTLH. Therefore, it can be concluded that there is little evidence of collateral specific risk due to tenurial status in the sample [11].

The above results indicate that households that have a greater ability to link loans with farm products get better access and larger loans from trader lenders. Land owning households that specialize in non farm activities have greater access to farmer lender loans because of their ability to provide land as collateral.

Conclusions and Implications

Informal lenders employ factor and product market linkages and social relations to secure their loans with borrower households. Interlinked contracts serve as substitutes for the collateral normally required in formal financial markets. Our study indicates that access to loans and to larger loans from farmer lenders was greater for asset poor small farmers with good reputations engaged

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[11] While a well implemented land reform program in the sample area could have led to the insignificance of OC, it is hard to conclude that collateral specific risk exists in practice.

in non and off farm activities. Access to loans from trader lenders was greater for asset rich large farmers with long business relations and a large marketable surplus so that loans can be linked to production. These patters in the use of collateral substitutes suggests that market segmentation occurs in rural informal credit markets based on borrower and lender types. This segmentation may result in limited competition because these two types of lenders may be able to serve only a small subset of possible borrowers who can provide their preferred form of collateral substitute in a given geographical area. Informal finance has found a way to alleviate collateral problems found in this land reform regime, but it does not completely substitute for the attributes of a well functioning formal financial system. Therefore, the present informal credit market represents only an important stop-gap solution to the immediate working capital needs of rice farmers. The formal rural finance system needs to be rebuilt so it can provide those financial services for which it has a comparative advantage over the informal credit markets.

Another aspect that needs to be addressed in research of this kind pertains to the lack of data about potential borrowers who self-select themselves out of the credit market due to their perceptions that they lack the collateral or collateral substitute that lenders require for loans. Furthermore, it is generally presumed that lenders reject applicants because of insufficient collateral, but there is a lack of information about the actual reasons used by lenders to reject applicants. The paucity of such information may seriously bias the analysis and lead to underestimating or overestimating the effect of collateral on access to loans and loan size.

Table 1: Characteristics of the Sample and Loan Contracts, By Household Specialization

Items	Household specialization[a]		All households
	Farming	Non farming	
No. of households	69	58	127
Average farm size (ha.)	2.1	1.9	2.1
Average assets held ('000 Pesos)	46.6	33.8	38.6
Average rice cropping intensity (%)	194.6	149.8	191.6
Average farm income ('000 Pesos/year)	20.9	8.8	17.4
Average non farm income ('000 Pesos/year)	10.5	12.6	11.2
Average household income ('000 Pesos/year)	31.5	21.5	23.4
Average educational level (years of schooling)	6.7	8.9	7.1
Loan contracts with farmer lenders (%)	30	38	33
Loan contracts with trader lenders (%)	44	29	36
Loan contracts with product linkages (%)	68	52	63
Loan contracts with land linkages (%)	2	8	4

a   Household specialization is based on the proportion of total household income derived from farm and non farm income. Households with more than 51% of their total income derived from non farm sources are classified as specializing in non farm activities. Others are classified as households specializing in farming activities.

Table 2: Loan Contracts of the Sample Farm Households, by Lender Type.

Item	Trader	Farmer	All lenders[a]
	(Three seasons: 1989-90)		
No. of Different Lenders	26	85	180
No. of Loan Contracts	247	233	688
No. of Loans per Lender Type	9.5	2.7	3.8
No. of Loans per Sample Household	1.9	1.8	5.4
Ave. Loan Size ('000 P/contract)	6.1	2.1	4.5
Ave. Seasonal Interest Rate (%/season) [b]	25.6	24.3	26.8
Contracts with Physical Collateral (%)	2	4	4
Contract Linkages (% of contracts)			
Product Link	84	58	63
Labor Link	4	9	6
Land Link	2	8	4
Land+Labor+Product Links	0	1	0.4
No Links	10	24	26
Information Base for Lenders (% of Contracts)			
Friends and Relatives	16	79	45
Business Partners	55	3	27
Neighbors	29	16	27
None	0	2	0.8

a. Includes farmer and trader lenders, money lenders, banks, and friends and relatives. Number of loans from banks accounted for less than 2% of the total.

b. Season = 5 months.

Table 3. Joint Estimation of Loan Access and Loan Sizes from
Farmer and Trader Lenders: Heckman's Two Stage Procedure.

Variables (1)	Loan Access (Multinomial Logit)	Loan Size (Selection Equation: OLS)	
	Farmer/Trader (2)	Farmer (3)	Trader (4)
CONSTANT	-0.495	0.19	-1.73 ***
	(0.48)	(0.28)	(0.36)
ASSET	-0.421***	-0.70 ***	0.10 ***
	(0.05)	(0.32)	(0.02)
EDUHH	0.164***	0.22 *	0.46 *
	(0.04)	(0.14)	(0.28)
CLTLH	-0.533*	-0.51 ***	-0.01
	(0.30)	(0.21)	(0.20)
OC	-0.58	-0.30	0.11
	(0.40)	(0.27)	(0.31)
DCUST	-0.517***	-1.09 ***	1.07 ***
	(0.19)	(0.22)	(0.14)
REPUTE	0.679*	0.14 *	-0.59
	(0.34)	(0.08)	(0.41)
FSIZE	-0.312*	-0.12 *	0.24 ***
	(0.11)	(0.07)	(0.07)
MSURP	-0.159***	-0.13 **	0.47 *
	(0.03)	(0.04)	(0.32)
LABOR	-0.434	-0.18	0.68 **
	(0.62)	(0.29)	(0.36)
NONFARM	0.248	0.45	-0.13 *
	(0.39)	(0.99)	(0.07)
Chi-Square	192.68		
Log-likelihood	-326.68		
Lambda		1345.49	1636.45
		(904.2)	(1145.5)
R-square		0.42	0.54

Asymptotic standard errors are reported in parentheses.
***, **, * represent significance at 1, 5 and 10% levels, respectively.

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Appendix: Correlation matrix.

	NONFARM (for all households)	NONFARM (for hh. specialized in nonfarm)
DFAR	0.02	0.02
	(0.59)	(0.70)
DTRA	-0.089	-0.10
	(0.02)	(0.04) .
DPROD	-0.04	-0.002
	(0.31)	(0.96)
DLAND	0.013	0.03
	(0.74)	(0.58)
EDUHH	0.14	0.21
	(0.0005)	(0.0001)
ASSET	0.017	0.054
	(0.66)	(0.27)
REPUTE	0.30	0.404
	(0.0001)	(0.0001)
FSIZE	-0.05	-0.03
	(0.17)	(0.48)
CROPINT	0.033	-0.03
	(0.399)	(0.59)

Significance given in parenthesis.