Collateral, Guaranties and Rural Credit in Developing Countries: Evidence from Asia

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Abstract

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The paper reviews the theory of the impact of loan collateral, and in particular land collateral, in institutional and non-institutional rural credit markets. Evidence from three Asian developing countries is presented, showing extensive use of land collateral among institutional lenders in countries where such collateral is legal. The use of land collateral is more common than other forms of security, except in places where legal inhibitions on mortgaging agricultural land exist. Non-institutional lenders are less inclined to use land collateral. However, lenders who do not have links to borrowers in matters other than finance are more likely to use loan securities. Estimates of instutional credit supply and demand in rural Thailand confirm that the pledging of land collateral affects the supply of credit more than group guaranty. It is also shown that larger farmers are more likely to utilize land collateral. The conclusion is that land collateral is preferred by instutional lenders as it reduces creditworthiness assessment costs. Attempts to ban or limit collateral use by decree are motivated by equity considerations, but they will cause loss of efficiency. Simplification of ownership verification and other policies reducing the transaction cost of collateral pledging will mitigate the negative equity implications of collateral.

Introduction

Loan transactions typically involve the risk of borrower default, and lenders therefore pursue various procedures to reduce default risk and to minimize the losses which may be incurred in the case of default. Screening potential borrowers according to creditworthiness criteria and credit rationing are two common policies adopted by lenders facing default risk (Stiglitz and Weiss, 1981). The utilization of collateral and guaranties is another universal procedure de-

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signed to increase the lender's expected profitability from a loan transaction. Several works developed rigorous models demonstrating that collateral increases (ceteris paribus) the amount of credit offered to a given borrower, or reduce the rate of interest charged (Barro, 1976; Benjamin, 1978; Plaut, 1985). The prevalence of collateral arrangements or guaranties in many economies throughout history would seem to indicate that they perform a useful role for lenders, otherwise such arrangements would not persist.

In the context of rural financial markets in developing countries, however, doubts have been raised whether collateral and guaranties are useful and effective:

> "Even when collateral is taken, it may be extremely dificult — for political, social, legal and institutional reasons — for lenders to foreclose on agricultural land or on other assets, such as cattle and machinery." (Von Pischke, 1986, p. 95)

If collaterals are not practically enforceable in rural economies of LDCs, one would expect the practice to vanish, or, if collaterals are used because of bureacratic inertia, they would actually not affect lending decisions. The purpose of the present paper is to present evidence from several less developed countries on the use of collateral and guaranty procedures in rural financial markets, and on their impact on lending.

The structure of the paper is as follows: the next section provides a conceptual framework on the role of collaterals and other guaranties, followed by evidence on the use of such procedures. The subsequent section estimates a supply–demand model using Thai data on credit transactions, to identify the impact of collateral on credit supply. The last section discusses equity issues and policy implications.

1. Role of loan securities

For the purposes of our discussion, it is useful to distinguish two broad sources of farm credit, namely, institutional (formal) and non-institutional (informal) lenders. Institutional lenders include banks, cooperatives and specialized government agencies. Non-institutional lenders include friends, relatives, moneylenders, traders and rich farmers. The literature on rural credit markets suggests several important distinctions between these two sources of finance. In particular, the role of collateral may differ for these two types of lenders.

The lending decision involves determination of loan amount, the direct and indirect price, loan duration, and collateral (or other security) requirements. Some of these decisions may be simultaneous and others may be recursive (e.g., the duration or the amount of the loan may depend on the type of collateral provided). Lenders face the risk of borrower default and thus they require information which is borrower-specific. The acquisition of information is costly, and this aspect defines one of the main distinctions between institutional and non-institutional lenders. The latter are frequently part of the farmers' envi-

ronment. They have established a close acquaintance with the farmer and his social group and may, in fact, be part of it. They thus have detailed and reliable information about the farmer (Timberg and Aiyar, 1984; Miracle, 1983). Institutional lenders, on the other hand, do not usually have detailed personal familiarity with farmers. With less information, a borrower is more risky from an institutional lender's point of view, as compared to a non-institutional lender.

Another aspect differentiating between the two types of lenders is related to the borrower's incentive to default and the lender's ability to enforce repayment. Given that the non-institutional creditor is a member of the farmer's social environment, there are social norms and pressures that militate against default. An informal lender can also apply violent enforcement procedures or threats. These aspects are absent in the case of institutional lenders (Bottomley, 1983, p. 284; Von Pischke et al., 1983, p. 228). As a result they will be *more* inclined to utilize risk-reducing measures such as loan secirity. The term loan security usually refers to the pledging of collateral or the provision of collateral substitute.

The role of collateral in lending is discussed extensively by Barro (1976), Benjamin (1978), Binswanger et al. (1985), Plaut (1985) and Binswanger and Rosenzweig (1986). A collateral increases the expected return of the lender and creates an incentive for borrowers to avoid intentional default. It is expected therefore that the amount of loan will increase with the value of the collateral, ceteris paribus. A collateral is not a risk free asset: it can be damaged or moved before the creditor seizes it. It is expected that land will be the most common collateral in rural areas (Binswanger and Rosenzweig, 1986). Typically, in order for land to be used as collateral, evidence of legal ownership is required (e.g. title).

The utility of *land* collateral in rural areas depends on the extent to which the legal system as well as the socio-political environment enable actual foreclosure of agricultural land. Fore-closure usually entails a considerable transaction cost (legal fees, auctioner fees; etc.), but these may in fact reinforce repayment discipline and enhance the utility of collaterals if the cost is borne by the borrower. The risk of incurring a high transaction cost in the case of an unintended default may imply that farmers will forgo the use of collateral even though this limits their access to credit. An additional risk-reducing element, implicit in a collateral, is the fact that it restricts the borrower's ability to incur additional institutional debt (Von Pischke, 1986).

Farmers operating in areas where suitable collaterals are not available (e.g. squatters) resort to alternative arrangements which are referred to as collateral substitutes, such as third party guaranty (Binswanger et al., 1985). A common collateral substitute in some LDCs is a 'group guaranty'. Farmers form groups such that while they borrow individually, the group as a whole is responsible for each of its members' loans. It is expected that social pressures will minimize defaults. However, repayment discipline on loans obtained

through group guaranty may be hampered if actual enforcement of collective responsibility is difficult. In many cases the repayment performance of such loans was poor (Adams and Ladman, 1979; Onchan and Techavatananan, 1982; Desai, 1983).

For obvious reasons, borrowers who own substantial assets are perferable to those who have few assets even if no formal collateral is pledged. Similarly, borrowers with a record of good repayment performance, are preferred to those who do not have such a record.

Institutional lenders are usually heavily regulated, and in most cases have to abide by usury laws which dictate a relatively low rate of interest. Non-institutional lenders are not regulated, and in cases where regulation is attempted it is difficult to enforce. As a result, interest rates charged by such lenders are typically higher. The ability of non-institutional lenders to charge higher interest rates to compensate for risk reduces their need to utilize collateral.

2. Evidence on utilization of loan security

The discussion in the preceding section suggested that institutional lenders will be more inclined to use collateral or guaranties as compared to non-institutional lenders. It is also expected that land will be a major type of collateral as it is the most suitable collateral asset. However, if land cannot be foreclosed for social or political reasons, the merits of land collaterals are much diminished and their utilization will be less common. These propositions are tested below using Data from three less developed countries: Thailand (1985/86). India (1979/80) and Korea (1968).

The data from Thailand pertain to samples of borrowing farmers from eight provinces. The farmers are separated into two groups, namely farmers who have titles to their land, and untitled farmers, who are essentially squatters encroaching on state land. Squatters, who are not legal owners, cannot provide land as a collateral. The data from Thailand show that titled farmers provide land as collateral in 63% of the institutional loans sampled (Table 1). Group guaranty, which is officially sanctioned by the government bank, is used in only 29% of the institutional loans of titled farmers. A very small proportion of the institutional loans to titled farmers is not backed by any security. The situation is different in the case of untitled farmers. As they cannot offer a land collateral, a vast majority of their loans (71%) is covered by a group guaranty, and the remaining loans are either backed by a guarantor or are granted with no security at all. Non-institutional loans are mostly granted with no collateral or other security. However, for the few non-institutional loans which involve any security, the most common security is land collateral.

TABLE 1

Borrowing transactions in rural Thailand (1985/86)

Type of security	Lender/Borrower type			
	Institutional		Non-institutional	
	Titled farmers (%)	Untitled farmers (%)	Titled farmers (%)	Untitled farmers (%)
No collateral	8	24	79	95
Land collateral	63	n/a	19	n/a
Group guaranty	29	71	0	0
Third party	0	4	1	0
Other	0	1	1	5
Sample size	316	178	179	153

Sources: Surveys sponsored by World Bank (1985) and Kasetsart University (1986).

TABLE 2

Collateral types in rural India (1979/80)

Collateral type	Institutional lenders (N=226) (%)	Non-institutional lenders (N=258) (%)
Land collateral	65	3
Third-party guaranty	30	1
Other	0	13
No collateral	5	83

Source: Binswanger et al. (1985, appendix 4).

The evidence from India is similar (Table 2)[1]. The institutional loans are backed by a land collateral in almost two thirds of the cases. The remainder of the institutional loans are granted with a third-party guaranty[2]. Non-institutional loans were mostly without a security, as in Thailand. Land was rarely used as a collateral by informal lenders in India.

The study of Korea took place at a time when the government banned the use of land as a loan collateral, presumably in an attempt to protect farmers against land loss and pauperization. Institutional lenders had to abide by this regulation, and resorted mainly to requiring a third party guaranty. Informal lenders, however, could arrange an effective land collateral through disguished conditional sale contracts. (Kim, 1971, p. 179). It is thus observed in Table 3

[1]The data on credit transactions in the Indian sample do not distinguish between landowners and renters or between titled and untitled farmers.
[2]Group guaranty was apparently not feasible in India at the time of the study.

TABLE 3

Distribution of loans by lender and collateral type, Korea 1968[a]

Collateral type	Institutional lenders	Non-institutional lenders					
		Money-lenders	Traders	Manufacturers	Other farmers	Informal credit association	Relatives and friends
Land collateral	4.4	25.8	12.0	10.1	7.4	2.0	3.8
Movable property	9.9	29.6	20.4	19.7	12.7	15.3	12.0
Third party guaranty	66.9	36.2	28.9	28.1	11.8	26.5	7.6
No collateral	18.8	8.4	38.7	42.1	68.1	56.2	76.9

[a]Numbers in the table are percentages of total volume of loans given by each source of credit.
Source: Kim (1971).

that most types of non-institutional lenders had a higher frequency of land collateral than institutional lenders, ranging from 26% among moneylenders to 7% among farmers-lenders. It is notable that those informal lenders who have some social bond with the borrowers (friends, relatives, informal credit associations, other farmers) are more inclined to forgo a collateral (about 60% of their loans were not backed by any security). Lenders who have some business transactions with the borrowers (e.g. traders, manufacturers) require somewhat more frequently a loan security (only 40% of their loans were granted without security). Moneylenders, whose only dealings with farmers are in the context of credit transactions, required some form of loan security for more than 90% of the loans extended. This pattern is compatible with the discussion of the preceding section. Lenders who are socially related to the borrower have a better enforcement capability through social pressure. Lenders with other business dealings with borrowers can use the threat of disrupting other business to increase their enforcement capacity. Moneylenders, who deal with farmers only in credit transactions, require more security.

If the pledging of a land collateral increases the supply of credit to farmers, utilization of collateral in rural lending can have adverse implications for equity. Suppose, for simplicity, that a certain amount of credit per hectare of land owned is available to farmers when they offer no security, and a larger amount per hectare is avialable if a land collateral is pledged. The same opportunities are thus available *theoretically* to larger and smaller farmers, provided that they own land. Tenants and renters, who do not own land, do not have the option of obtaining the larger amount of credit per hectare and herein lies one inequity implication of land collaterals. This problem, however, is often resolved by the landlords obtaining credit from institutional lenders and relending funds to their tenants.

The actual provision of a land collateral frequently requires certain *fixed* transaction costs on the part of farmers, such as ownership certification, legal

fees and the farmer's time. Fixed costs imply a higher effective borrowing cost per hectare to smaller farmers. In addition, the risk of loosing land if the harvest fails is likely to be a stronger deterrent to less wealthy farmers. Smaller farmers may therefore refrain from pledging collateral either due to cost considerations or due to risk aversion (Aku, 1986, p. 27). This proposition is tested using data from four provinces in Thailand. A logit equation was estimated, relating the probability that a titled farmer pledges his land as collateral to the size of his holding (adjusted for quality differences). The equation is of the form:

$$P = e^{a+bS} / (1 + e^{a+bS}) \tag{1}$$

where P is the probability of collateral use, S is farm size, and a, b are parameters.

The results are reported in Table 4, and indicate that the parameter of farm size is significantly greater than zero at a 99% confidence level. This confirms that the incidence of land collateral use among borrowing farmers increases with farm size. Thus, even when all land owners face theoretically similar credit supply schedules per hectare irrespective of size, the *actual* borrowing per hectare is larger for wealthier farmers.

A distinction can be drawn between commercial banks and other institutional lenders. While commercial banks are profit-oriented, other institutional lenders such as government-owned banks and cooperatives may have broader objectives, and in particular they may be inclined to pursue a wider dispersion of funds among all classes of farmers. This may translate into different positions with respect to use of collateral. As argued above, a requirement for collateral, and in particular land collateral, may exclude or discourage less wealthy farmers. For this reason, more socially-oriented lenders adopt more lenient collateral policies. This hypothesis is compatible with the data from Thailand and India: of the loans granted by commercial banks, 85% and 89%, respec-

TABLE 4

Logit analysis of the effect of farm size on the probability of using collateral

Variable	Parameter
Constant	−0.4010
	(1.519)[a]
Farm size (adjusted for quality)	0.0160
	(2.903)
Likelihood ratio statistic	9.955
No. of observations[b]	201

[a]Numbers in parentheses are t-values.
[b]The data pertain to 201 titled borrowers from four Thai provinces surveyed in 1985/1986 under World Bank and Kasetsart University sponsorship.

tively, were backed by land collateral[3]. This is a significantly higher frequency than that observed in the overall sample of the loans from institutional lenders (about 66%). Recent evidence from Nigeria, while not providing detailed data, indicates that commercial banks frequently require land collateral in their transactions with farmers (Aku, 1986, p. 27). Similarly, Collier (1983, p. 163) points out the significance of land collateral in the operations of commercial banks in rural Kenya. Since commercial banks are profit-oriented, and assuming that their information and lending costs are similar to those of other institutional lenders, this observed pattern of their lending is compatible with the hypothesis that the utilization of collateral (and specifically land collateral) increases the profitability of their lending.

3. Econometric analysis of supply and demand for institutional credit

The evidence in the preceding section is generally consistent with the propositions formulated in Section 1. However, if collateral is used only for bureaucratic purposes, the data do not necessarily imply that the utilization of collateral increases the availability of credit. In order to clarify this issue, an analysis of credit supply is required. The standard appraoch in analyzing market-observed quantities and prices is to assume equilibrium and estimate supply and demand equations where price (or quantity) is the dependent variable. However, the credit market may not be in equilibrium due to the prevalence of rationing (Stiglitz and Weiss, 1981). This phenomenon is particularly likely in the case of institutional credit, where information asymmetry increases the need for supply rationing and where a ceiling on the rate of interest may prevail. The econometric approach suitable for dealing with data generated by market disequilibrium is popularly known as 'switching regression', and it utilizes a maximum likelihood procedure to obtain simultaneous estimate of supply and demand equations' coefficients which are efficient, consistent, and asymptotically normal. The data utilized in the analysis were obtained in a farmers' survey conducted in Lop-Buri province of Thailand in March 1985. The estimated system is defined formally as:

$$L_1 = \alpha' X + \epsilon_1 \quad \text{(supply of institutional credit)} \tag{2}$$

$$L_2 = \beta' Z + \epsilon_2 \quad \text{(demand for institutional credit)} \tag{3}$$

$$L = \min(L_1, L_2) \quad \text{(observed borrowing from institutional lenders)} \tag{4}$$

where L_1 is the amount of institutional credit lenders are willing to provide, X is a vector of farmer characteristics which influence lender perceptions, α a corresponding vector of parameters, L_2 the amount of credit the farmer would

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[3]The data from Korea do not distinguish between different types of institutional lenders.

like to have, Z a vector of factors determining the farmer's credit requirements, β a corresponding set of parameters, and ϵ_1 and ϵ_2 are random error terms which are assumed to be normally distributed wich mean zero. Farmers are expected to attempt to satisfy their overall credit needs from (cheap) institutional sources first, and only if there is some unsatisfied demand will they approach non-institutional lenders. This implies that information on farmers' transactions in the non-institutional credit market does not affect the estimates of the parameter vectors α and β of equations (2) and (3).

Rigorous models of credit supply and demand have already been developed in the literature (e.g., Barro, 1976; Bell and Srinivasan, 1985). We, therefore, provide only a discursive outline of the theory underlying the variables utilized in the empirical analysis and their expected effects. In general, variables that were incorporated in the supply equation are indicators which are relatively easy to observe for an instituional lender. Demand variables, on the other hand, reflect variables known to the borrower, but not necessarily to the lender. The determinants of institutional credit supply are:

(1) *Land collateral dummy*. The provision of land as a formal collateral greatly reduces the risk to the lender and thus is hypothesized to increase the amount of credit offered, relative to a case where no collateral is provided.

(2) *Group collateral dummy*. The practice of group guaranty theoretically reduces default risk. It is hypothesized, however, that the amount of credit offered with a group collateral will be less than that which is offered with a land collateral. Moreover, in areas where repayment performance on group-responsibility loans is poor, the amount of credit which is offered with such a collateral is not expected to be higher than that which is offered in the absence of any collateral.

(3) *Land value*. Land is usually the most valuable asset owned by the farmer, and as such it can serve to generate cash by sale if cultivation revenues are not sufficient. In addition, land is a productive factor which generates cash income. Land value summarizes information pertaining to the land's productive potential (Chalamwong and Feder, 1987). It is thus expected that farmers who have higher land value will be offered more institutional credit.

(4) *Capital*. Farm capital is both an indicator of the farm's productive capacity and an asset with cash value which can serve as an implicit collateral. Farmers with more capital (measured in current value) are expected to be offered more credit.

(5) *Debt to institutional lenders*. Farmers' outstanding debt to institutional lenders is a drain on their cash resources and is therefore expected to negatively affect the amount of credit they are offered. Debt to informal lenders is not included because it is not observable to formal lenders.

(6) *Past default dummy*. If the farmer has defaulted in the past on payments to institutional lenders, his creditworthiness is expected to be negatively affected, and hence also the supply of institutional credit available to him.

(7) *Formal liquidity.* Farmers with more liquid assets are less likely to default since they can use their liquid resources in order to generate the cash required to repay a loan, rather than incur the costs of default. The present study defines outstanding deposits in financial institutions as indicators of liquidity observable to institutional lenders, and these are expected to increase the supply of credit.

(8) *Experience/age.* The number of years a farmer has acted as farm manager is expected to increase his productivity and thus to exert positive influence on a lender's assessment. However, this variable is highly correlated with age. If younger farmers are perceived as being more productive and innovative, the effect on credit supply will be negative.

Demand variables

(1) *Number of adults.* The number of working age adults (ages 14–65) in the household represents a fixed endowment (in the short run), which reduces the need for cash for hired labor. However, this variable is also an important determinant of consumption requirements, and could thus affect positively the demand for credit. The final effect on demand is thus undetermined.

(2) *Education.* The number of years of formal schooling is an indicator of human capital, which affects positively efficiency. For this reason, education would also be an indicator of creditworthiness, and would affect the supply of institutional credit. However, sample farmers have had only a few years of elementary schooling, and it is difficult for the lender to verify that the reported number of school years is indeed accurate. It should also be pointed out that there is very little variation in the sample with respect to reported formal schooling. Higher human capital increases the marginal productivity of variable inputs, and thus increases the demand for inputs and the derived demand for cash.

(3) *Experience.* The number of years of practice as farm decision maker is an indicator of human capital, and would thus be expected to have an effect quantitatively similar to that of education. However, given the high correlation between this indicator and age, and the possibility that higher age is related to lesser innovativeness, the ultimate effect on credit demand may be positive or negative.

(4) *Title dummy.* Possession of a legal title increases ownership security, and thereby it increases the incentive to invest (Feder and Onchan, 1987). The higher demand for investment translates into higher demand for credit, and it is thus expected that the possession of title will positively affect credit demand.

(5) *Capital.* The effect of the farmer's stock of capital on credit demand is complex, and there are several counterveiling aspects. A higher stock of capital increases the marginal productivities of variable inputs (when production

complementarity exists), and would thus induce a higher derived demand for credit. But the availability of more family-owned machinery and animals reduces the need to hire machine and animal services, and thus reduces cash need. The net effect on credit demand is thus ambiguous.

(6) *Owned land, adjusted for quality.* Land is a major determinant of the farmer's productive potential and of his scale of operation. With larger amounts of land owned, the farmer's total demand for variable inputs will be higher, and hence the demand for credit. The amount of land owned is adjusted for quality differences using a land quality index derived from a hedonic price analysis of land values (Chalamwong and Feder, 1987).

(7) *Net liquidity.* The farmer's liquidity, including certain liquid assets not easily observable to formal lenders, such as a output not yet sold, will have a negative effect on the farmer's demand for cash.

Variables pertaining to cropping decisions (i.e., area cultivated, types of crops grown) are not included in the analysis since they are being determined simultaneously with the demand for credit, or even after the farmer knows what amount of liquidity he can obtain. The interest rate on institutional credit is practically identical for all farmers within the area studied because of a legal interest rate ceiling. It is therefore excluded from the analysis.

If the institutional credit market were in equilibrium (i.e., demand and supply are equal at the prevailing interest rate), then a single-equation reduced form could be estimated, involving all the variables in vectors X and Z. The two models (equilibrium and disequilibrium) cannot be tested formally for superiority as they are not nested. However, the main interest is in the impact of the collateral variables, which can be identified even in the reduced form equilibrium model (they appear in the supply equation only). Therefore, both specifications can be compared with respect to the conclusions they generate for the collateral variables. The estimation results are reported in Table 5

The results for both models are quite similar. The estimates indicate that the coefficient of the land collateral dummy variable in the supply equation is significantly greater than zero at the 95% confidence level. This confirms that the pledging of land collateral significantly increases the amount of credit offered by institutional lenders as compared to the case of no collateral. The coefficient of the group collateral dummy variable is small in magnitude, and it is not significantly different from zero (it is negative in the disequilibrium model). The difference between the coefficient of the land collateral and the group guaranty is statistically significant at a 95% confidence level for both models. The results imply that farmers providing land collateral obtain more institutional credit than farmers providing group guaranty or no security at all. In the area studied, group guaranty apparently does not imporve access to credit.

The parameters of land value and capital in the supply equation of the disequilibrium model are significantly greater than zero, as expected. It is note-

TABLE 5

Econometric analysis of institutional credit supply and demand (Lop-Buri Province, Thailand, 1985)

Disequilibrium model				Equilibrium model	
Supply equation		Demand Equation		Reduced Form	
Constant	8.8431	Constant	11.1641	Constant	8.7213
	(17.524)[a]		(2.292)		(15.356)
Land collateral	0.3643	No. of adults	2.2356	land collateral	0.4386
	(2.091)		(1.402)		(2.126)
Group guaranty	−0.0666	Education	−0.4084	Group guaranty	0.0738
	(0.421)		(1.211)		(0.414)
Land value	0.1694	Land (adjusted for quality)	0.3958	Land value[b]	0.1854
	(2.547)		(0.384)		(2.760)
Capital	0.0508	Capital	0.1063	Capital	0.0541
	(2.368)		(0.777)		(2.395)
Liquidity (in institutions)	0.0004	Liquidity (total)	−0.0626	Liquidity in (institutions)	0.0123
	(0.028)		(0.260)		(0.827)
Experience (age)	0.2193	Experience (age)	−0.9145	Experience (age)	−0.2916
	(1.884)		(0.955)		(2.222)
Debt to institutions	0.0404	Title (dummy)	8.0803	Debt to institutions	−0.0355
	(2.491)		(0.407)		(1.909)
Past default (dummy)	−0.0205			Past default (dummy)	0.0280
	(0.182)				(0.223)
				No. of adults	0.1277
					(0.844)
				Education	−0.0015
					(0.030)
				Liquidity (total)	−0.0249
					(0.975)
				Title (dummy)	0.0970
					(0.617)
R^2	n.a.	n.a.			0.34
Likelihood ratio statistic		55.5			n.a.
No. of observations		116			116

[a]Numbers in parentheses are asymptotic t-values in the disequilibrium model, and t-values in the equilibrium model.
[b]Because land value and area adjusted for quality are highly correlated, only land value was used in the reduced form.

worthy that the coefficient of land is significantly larger than that of capital, implying that land is perceived as a better implicit collateral. In the disequilibrium model, liabilities to institutions have a significant negative effect on supply as expected. Experience, or rather, age, seems to have a negative effect

on institutional credit supply. The default dummy variable and the liquidity variable are not statistically significant although they have the expected sign.

In the demand equation of the disequilibrium model most of the parameters are not statistically significant. The number of adults increases significantly (at a 95% one-tailed confidence level) the demand for credit. The inconclusiveness of the demand estimates is apparently due to the fact that the disequilibrium model almost all borrowers (97%) had a high probability (of 50% or more) of being credit supply-constrained.

The numerical results imply that in the area studied, the pledging of land collateral increases the amount of institutional credit offered by 43% (disequilibrium model) or 55% (equilibrium model), as compared to a loan without a security (calculated using the logarithmic coefficient in Table 5). This is compatible with a situation where lenders perceive a significant improvement in loan profitability when land collateral is pledged. The Thai legal system does indeed allow land foreclosure (Feeny, 1982, pp. 96, 189–190). While foreclosures are not frequent, the threat of land loss is apparently perceived as viable by farmers, and land collateral is therefore useful for lenders.

4. Policy implications

The possible negative equity implications of collateral requirements underly the frequent attempts by development officials and policy makers to reduce or eliminate the need for land collaterals. Alternative arrangements such as group guaranties and partial government guaranties are typically proposed. In several countries, the utilization of land collateral is banned or is made ineffective by political interventions rescinding foreclosures.

The evidence shows that institutional lenders prefer land collaterals to other loan securities, where land collaterals are legal. Moreover, group guaranties are frequently ineffective, as is apparent from a review of experience in several LDCs (Desai, 1983). Government guaranties for farmers' loans can lead to moral hazard problems: lenders will be inclined to adopt a lax creditworthiness assessment procedure, and borrowers will have less incentive to repay. Moral hazard problems thus lead to welfare losses. Efficiency loss is also likely to result from a ban on land collateral as this forces lenders to spend more resources (at the margin) on creditworthiness assessment, and less lending to farmers may take place as lenders shift funds to other borrowers who are less risky (but have lower return) at the margin. As demonstrated in the case of Korea, the prohibition on land collateral, while adhered to by institutional lenders, did not prevent informal lenders from utilizing collateral in a disguised form, and thus did not prevent land loss.

The costs of creditworthiness assessments are a consideration overlooked by many development officers and scholars who call for abandonment of 'old fashioned' lending procedures based on collateral in favor of procedures based

on projections of farm budgets and detailed assessments of farmers' capabilities. Such assessments put a heavier demand on lending institutions' staff time, and thus the more equitable distribution of credit is obtained at a real cost.

One policy which is typically pursued for other purposes, but which has a direct bearing on the transaction cost of pledging land collaterals (and hence on the equity issue) is land titling and registration. When land registers are kept up to date and ownership documents are provided on a large scale with simple procedures, it is easy (and cheap) for farmers to confirm ownership and to pledge collateral. Simplification of legal procedures for land transactions is also a policy with a similar effect, namely, it reduces the inequity in access to credit without incurring an efficiency loss.

Another policy addressing smaller farmers' aversion to the pledging of collateral is the implementation of procedures whereby rescheduling of loans is possible (with a small interest penalty to cover processing costs) if the inability to repay on schedule is a result of natural calamities or a temporary weak market. This procedure alleviates somewhat the farmer's fear of land loss in the case of adverse developments beyond their control, but maintains a lien on the land, thus providing an incentive to repay.

The relaxation of interest rate ceilings, or elimination of subsidies on agricultural credit, aside from a direct efficiency gain, will reduce (at the margin) the role of land collaterals and other securities. However, the evidence in the paper demonstrates that even in the unregulated informal credit markets, collaterals are being used, albeit at a lesser frequency. Since information asymmetries are bound to persist in most lending transactions by institutional lenders, it is unlikely that the usefulness of collaterals will be eliminated once interest rate restrictions are removed.

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