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GROUP CREDIT IN COSTA RICA: AN ECONOMETRIC ANALYSIS OF INFORMATION TRANSFER, REPAYMENT PERFORMANCE, AND COST-EFFECTIVENESS

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ABSTRACT

Group lending with joint liability is a promising innovation in financial intermediation involving smallholders. Signaling theory is used to examine the effect of improved information regarding borrower creditworthiness on loan repayment rates. Internal rates of return determine cost-effectiveness. Data for the analysis came from a Costa Rican case study.

P8466

GROUP CREDIT IN COSTA RICA: AN ECONOMETRIC ANALYSIS OF INFORMATION TRANSFER, REPAYMENT PERFORMANCE, AND COST-EFFECTIVENESS

In contrast to individual lending, group credit makes everyone in a pre-formed group responsible for total loan repayment to an outside party. Group lending is a promising innovation in financial intermediation for developing economies given the general failure over three decades of traditional finance programs to deliver credit to smallholders. Only 5% of all farm households in Africa and about 15% in Latin America and Asia have received credit despite of billions allocated by international and public agencies and a rapid increase in the number of rural lending institutions(1, p. 1255). This novel form of lending promises to reduce transaction costs, improve repayment rates, and overcome colleralaterization problems that haunt individual liability, small farm credit programs.

This paper explores (1) how group lending with joint liability can improve information transmission regarding both observable and latent borrower creditworthiness, (2) whether the additional information is used by the group to lower delinquency rates with a distant lender, and (3) whether group lending is cost-effective. It presents a case study using 1988 data from a group credit program administrated by the Fundacíon Integral Campesina (FINCA) in Costa Rica.

The paper first highlights basic issues in rural finance. Then it presents a brief literature review, focusing on the applicability theory of information economics (agency theory) to imperfect credit markets. Then it describes, the nature and scope of the studied credit program, FINCA. The econometric model used for program evaluation and the cost-benefit methodology follow, and empirical results are reported. Lastly, conclusions and policy implications are derived.

Basic Issues in Rural Finance

Delivering productive credit to small-scaled agricultural producers in developing nations has been hotly pursued but plagued with problems. Credit is widely accepted as a fundamental component of any rural

development strategy; a means of hastening technological adaption, commercialization, and productivity increases in the lagging, small farm sector. Consequently, the volume of agricultural credit directed to small farmers has increased, the number of rural financial institutions have mushroomed, and several government interventions in the market place, such as mandatory, low-fixed interest rates, sectoral quotas, and supervised, in-kind disbursements, have become commonplace. The policymakers aim to either increase agricultural output and farm incomes or to compensate and appease farmers for adverse pricing polices and overvalued exchange rates.

Despite significant investments, traditional rural finance programs have not generally lived up to expectations. First, loan recovery rates tend to be low. Second, administrative costs have been high. Financial institutions do not generally enjoy access to credit bureaus and databases, or to advanced data management/communication technology which are important shortcomings when dealing with small, geographically disbursed, borrowers. Third, large proportions of subsidized credit have gone to non-target groups, namely, large farmers, thus aggravating rural income inequality and class stratification. Preferential interest rates, often negative in real terms, create excess demand for credit and contribute to non-price rationing. Small borrowers are the likely victims of non-price rationing because they can not bear the increased non-interest costs of borrowing associated with rationing, i.e. the opportunity cost of waiting in lines, transportation costs of numerous visits to a distant bank in order to complete a loan application, bribes, legal fees, and the greater risk of reduced yields due to untimely disbursements. Fourth, adverse agricultural pricing, high inflation rates, and negative externalities such as the lack of extension services, all weather roads, and secure marketing outlets, lead many credit recipients to divert funds to non-agricultural investments. Lastly, low interest rate policies dampen savings mobilization. As a result, financial intermediaries tend to remain dependent on periodic infusions of capital from external donors.

The economic literature on rural credit markets contains two strands. One focuses on policy reform and advocates interest rate liberalization, the lowering of total borrowing costs, and mobilization of saving deposits

as the cure. The chief proponents of this viewpoint are economists associated with Ohio State University (Adams, Graham, Gonzalez-Vega, Meyer, Cuevas, et al).

A second strand focuses on agency theory or informational asymmetries and resulting contractual difficulties. This second school of thought concludes that laissez-faire interest rate policies may be insufficient and allow equilibrium credit rationing to persist due to adverse selection and incentive problems (2, 3). Their basic argument asserts that if loan clients are free to choose between investment projects with varying degrees of risk or to divert credit, then as interest rates rise, the "safer risk" clients will leave the market. The increased interest payments may eliminate expected positive net returns on their low-yielding but low-risk projects. Their withdrawal leaves a pool of generally undesirable clients who can adversely affect the lender's expected profit levels. This school acknowledges that subsidized or even negative real interest rates undermine lender viability. Yet this contractual restriction, along with other heavy-handed government interventions, are not at the center of observed credit market disorders. Instead, the lack of information and secure collateral are the main culprits. In brief, supply-side interventions compound rather than cause the observed market failure.

Proponents of this school urge consideration of comprehensive contracting that accounts for both opportunistic behavior and bounded rationality. This agency theory approach underlines the importance of acquiring low-cost, reliable information on characteristics and intentions, or forcing parties to reveal latent characteristics through the selection of alternative contracts. Accordingly, cooperative behavior can be induced and private information overcome.

Group-based lending with joint liability has emerged in the last twenty years as an alternative to individual, small farmer lending. Practically, it promises to reduce transaction costs for all parties involved, improve repayment rates due to the use of peer pressure within the group, and to substitute mutual insurance for lack of secure collateral and a small resource base.

Theoretically, group lending is appealing because it directly addresses the asymmetric distribution of information regarding default risk between contracting parties. In essence, the lender faces a hidden characteristic, namely, borrower's risk type, that directly affects two outcome variables, loan repayment and expected lender profit. The lender therefore uses incentive schemes that induce natural selection processes thereby separating the pool of borrowers who are thus encouraged to act in the lender's interest. The "better risks" signal their creditworthiness by forming a jointly liable credit group. The "poorer risks" find it too costly to "signal" and are thus excluded from the incentive scheme. They are either forced to do without credit or to seek loan contracts in the more costly informal sector.

Description of the FINCA Group Credit Program

The FINCA program evaluated here began operations in 1985 and seeks to establish self-managed revolving loan funds in poor, isolated, rural communities in the Southern Pacific and Atlantic zones of Costa Rica. Since its inception, FINCA has grown rapidly, from 16 groups with 495 members in 1985 to 128 groups with 3,768 members in November 1988. Likewise, loan assets have increased from $29,433 to $280,830 in the same three year span. Loan recovery rates have been excellent (92% in 1986 and 90% in 1987) and substantial formal savings have been mobilized.

FINCA extends microloans for productive purposes in a graduated scale, beginning at $64 per individual and terminating at $384 to groups of small farmers and rural women without collateral, for a term of one year, and at a modest interest rate (15-18%). The loan is made to the group who in turn distributes the amount to members in equal allotments in the first loan period then uses a 1:1 match for forced savings in subsequent loan periods.

In addition to joint liability, each loan recipient has to save at least 20% of his/her loan amount in order to qualify for another loan. These forced savings remain in the possession of the group and can be safeguarded, used for secondary lending, or as a buffer against defaults. Four to five officers are responsible for group loan

administration, inspections, and record-keeping.

The main attraction of the FINCA program from the perspective of the borrower is the agility of loan procurement and economization of transaction costs. Once accepted into a group, loans are usually processed within three weeks compared to an average of four months for State bank loans. Since the interest rates for both State banks and FINCA are comparable, total borrowing costs are greatly reduced.

From the perspective of the sponsoring non-governmental organization, FINCA, the main benefits are educational: the development of a savings discipline, the transfer of organizational and bookkeeping skills, and the sense of empowerment stemming from self-management of a loan fund. The biggest complaint of program participants is the small loan size which places a premium on project selection and choice of technique. Only those beneficiaries with good skills and quick-gestating projects or high-value crops consistently made profits. FINCA hopes to increase the portfolio size and to eventually grant more substantial loans to fully matured groups.

Analytical Framework

In order to determine the viability and cost-effectiveness of the FINCA group credit program, several econometric tests are specified based on an underlying signaling model. This model holds that a formal lender seeks to minimize default exposure by acquiring additional information on borrower creditworthiness. Collateral is ruled out as a screening/loan enforcement mechanism because the clientele is asset-poor and generally without land title. Creditworthiness is composed of two components, observable indicators such as farm-size, income, and value of improvements and latent indicators such as managerial/technical ability, reputation for hard work and integrity. The latter indicators can substitute imperfectly for the former. Through group credit the formal lender gains access to both kinds of creditworthiness information indirectly. By using graduated loan sizes and contract termination incentives, the lender induces the autonomously formed groups to screen out uncreditworthy individuals. Therefore, ideal groups tend to be either quite homogeneous

with all members commanding sufficient economic resources to cover loan obligations in the event of project failure or mixed where a number of better-off peasants complement others with lower asset worth but high skill levels and good reputations. Group credit, thus, serves to separate previously undistinguishable borrowers, to pool risk, and to mutually insure selected borrowers.

Accordingly, the empirical analysis tries to determine the interrelationship between group delinquency rates and active and passive screening processes controlling for several factors. The main hypothesis to be tested is that credit groups screening members prior to loan disbursement are more likely to have a better repayment record, both internally as a group and externally with the central lender, FINCA, all else equal. A further test is the comparison of individual observable creditworthiness scores across groups that screened and groups that did not. If the default rates for "screened" individuals is lower, then latent information on reputation is being used effectively. Lastly, internal rates of return are calculated for observed and imputed resource flows in order to determine cost-effectiveness.

The models to be estimated follow:

CASE A. STRICT DEFINITION OF GROUP DELINQUENCY

$$Y1$$
$$Y2 = \beta X + \epsilon_1 S + \epsilon_2 C + \mu$$

CASE B. LAX DEFINITION OF GROUP DELINQUENCY

$$Y3$$
$$Y4 = \beta X + \epsilon_1 S + \epsilon_2 C + \mu$$

CASE C. INDIVIDUAL CREDIT ASSESSMENT

$$Y5 = \beta D + \epsilon_1 S + \epsilon_2 C + \mu$$

where Y1= 0 no incidence of internal loan delinquency
= 1 at least one case of loan delinquency in the group
Y2= 0 no incidence of external loan delinquency
= 1 at least one case of loan delinquency
Y3= Percentage of internal delinquency
Y4= Percentage of external delinquency
Y5= 0 if individual member repaid loan on-time
= 1 if individual member repaid late
X = vector of control variables
X1= Intercept
X2= VISITS, number of FINCA extension visits
X3= NUMINSP, number of monitoring inspections
X4= INFRINDX, infrastructure index (0-5)

X5= ORGSC, factor score for organizational effectiveness
X6= AGYEAR, type of agricultural year with a value of 0 if bad and 1 if normal
X7= SAVMOB, average savings per group
D= Discriminant score for observable creditworthiness
S= Informal or passive screening indicator with a value of 1 if the group screened membership according to reputation. (In formulation C, if individual belonged to a group that screened, S=1).
C= Formal or active screening indicator with a value of 1 if the group had an internal written code of regulations (In CASE C, if individual belonged to a group that had a code, C=1).
u= error term

Delinquency is defined as a loan not canceled in full by its due date on the loan contract.

The hypotheses to be tested consist of whether ϵ_i's are significantly different from zero and negative in sign. The two screening variables are expected to have a negative effect on group delinquency, but one is seen as a weaker form. With informal screening (SCREEN), social norms, kinship, and friendship ties may or may not result in a group of truly creditworthy individuals. In contrast, the existence of a written code (CODE) sets a uniform membership standard and is more likely to induce self-selection. If the coefficients are significant in CASES A and B, one or both forms of screening induces a separate credit risk types and improve repayment performance. If the cofficients are significant in CASE C, latent information on borrower creditworthiness is being effectively utilized to the group's advantage.

Empirical Results

The only significant coefficients are CODE and VISITS in Table 1. The CODE result supports the hypothesis. The positive sign on VISITS, however, is ambiguous. It may indicate that FINCA attempts to resuscitate faltering groups by investing more resources or that is valiantly attempting to recover funds. In looking at external incidences of delinquency, only CODE was significant, again supporting the hypothesis.

TABLE 1--REGRESSION MODEL RESULTS: STRICT CASE

Dependent Variable:	(Probit) 0=No Internal Delinq. 1=Some		(Probit) 0=No External Delinq. 1=Some	
Obs	36.0		36.0	
Mean	.75		.30	
	Param	t	Param	t
Intercept	4.18	.013	-6.47-	.02
Screen	1.60	1.35	- .01	- .01
Code	-2.25	-2.06*	-2.58	-1.82*
Visits	.32	2.74*	.12	1.05
Inspections	- .15	-1.39	- .01	- .73
Agric. Year	-5.00	- .02	6.62	.02
Infrastr.	.49	.23	.33	1.43
Saving Mobil.			- .00	-1.55
Organ. Effect.			.43	1.20

* Statisitically Significant (either at 5% or 10% level).

When a percentage definition of delinquency is used, screening variables do not help explain internal delinquency. Number of extension visits and degree of infrastructural development are more important. At the external level, however, CODE is one of three significant determinants.

TABLE 2. REGRESSION MODEL RESULTS: LAX CASE

Dependent Variable:	(OLS) Percentage Rate of Internal Delinquency		(OLS) Percentage Rate of External Delinquency	
Obs	36.0		36.0	
Mean	.21		.15	
Std. Dev.	.30		.32	
R^2	.29		.35	
F	2.03		1.82	
	Param	t	Param	t
Intercept	-.18	- .92	-.06	-.23
Screen	.11	.87	-.08	-.50
Code	-.19	-1.57	-.28	-1.66*
Visits	.03	1.91*	.02	1.31
Inspections	- .00	- .25	-.00	-.37
Agr. Year	.15	1.13	.19	1.21
Infrastructure	.06	1.94*	.06	1.73*
Saving Mobil.			-.00	-.47
Organiz. Effect			.08	1.84*

* Statistically Significant (10% level).

These tests indicate that information does make a difference. In the latent test, creditworthiness is decomposed into two components, the universally observable and locally observable. A credit score derived from using discriminant analysis controls for the readily observable component while the screening variables account for the component unobserveable to outsiders. The significant coefficient on SCREEN indicates that group lending does give a distant lender access to unique character information, hitherto unavailable. Its negative sign further indicates that the groups use the information judiciously to eliminate poor risks and improve overall group repayment rates.

TABLE 3. TEST FOR INDIVIDUAL LATENT CREDITWORTHINESS

Dependent Variable:	Individual Delinquency Status 0=On-time payment 1=Late Payment		Mean .17	Obs. 118
Independent Variables	Mean	Parameter		t
Intercept	1.00	-1.21		-3.28*
DSCORE	-.03	.91		3.65*
Code	.53	-.24		-.39
Screen	.42	-1.72		-2.32*

* Statistically Significant (5% level).

To address the practical question of whether group credit is economically worthwhile, internal rates of return were calculated under two assumptions and summarized in Table 4. One assumes full privatization or full recovery of cost. The other assumed only variable cost recovery and considers the value of members' time spent in group activities as a revealed minimum nonpecuniary benefit. The derived rate can be interpreted as the discount measure of project worth or the maximum rate of interest the individual group could pay and still break-even.

TABLE 4. ECONOMIC RATES OF RETURN FOR SAMPLED CREDIT GROUPS

	FULL COST RECOVERY IRR	VARIABLE COST RECOVERY IRR
Number of Groups Recording:		
Positive Rates	11 (30%)	19 (52%)
Negative Rates	25	17
TOTAL	36	36

Only eleven, or 30%, of the sampled groups are viable under the strict assumption of full cost recovery. Under the relaxed standard, nineteen, or 52%, of the groups are deemed worthwhile. In sensitivity analysis where several policy instruments (interest rate charged, reductions in administrative overhead, and increased loan sizes) were either singularly or simultaneously varied, upwards of 77% of the groups became viable. This suggests that the FINCA program has great leeway for improvement. In the final

analysis, the program may be justifiable only in a social sense if private rates of return exceed the needed break-even, theoretical interest rates. This would imply that FINCA participants are receiving a subsidy or transfer from other members in society but were nonetheless putting the funds to good use.

Summary and Conclusions

In conclusion, group lending can elicit additional information, especially on latent creditworthiness, which can be used to reduce delinquency rates.[1] The policy significance is that a clientele hitherto excluded from institutional credit due to insufficient or unsecured collateral, poor scores on traditional credit evaluation techniques that rely heavily on readily observable characteristics, or high non-interest borrowing costs, can be served through group lending with joint liability. The main shortcoming of poverty-focused, group lending, is that in cases where the lender bears group formation costs, it is not immediately viable and a period of amortization may be needed before a final verdict is rendered on total lending costs.

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[1] Whereas the percent of agricultural and livestock loans in arrears in the nationalized Costa Rican banking system ranges from 55 to 70% per year between 1984 and June 1988, FINCA boasts an overall repyament rate of near 90% for two years of officically reported data and 85% in sample data.