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THE DEMAND FOR FUNDS FROM RURAL CREDIT UNIONS IN TOGO

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THE DEMAND FOR FUNDS FROM RURAL CREDIT UNIONS IN TOGO

Abstract

The paper shows that credit rationing is not exercised through transaction costs in Togo rural credit unions, as is the case in other financial institutions. Rules of proportionality between deposit holdings and loan amounts determine loan size, while risk-related factors influence the level of borrower transaction costs.

THE DEMAND FOR FUNDS FROM RURAL CREDIT UNIONS IN TOGO

1. Introduction

This paper analyzes the demand for funds by rural borrowers in the semi-formal institutional framework of a credit union movement. In this framework, loans supplied by the financial institution are allocated among borrowers according to a rationing mechanism which involves several instruments. The objective of the study is to analyze the extent to which price components influence credit allocation in credit unions and to highlight the factors that help resolve asymmetric information problems.

Transaction costs, as a part of the total price of funds, have been identified as a primary factor in borrowing decisions (Adams and Nehman). They represent the additional costs imposed on borrowers by lenders beyond interest charges which play the role of a rationing instrument, particularly in the presence of interest-rate restrictions. However, it is not clear whether under the credit union non-profit and democratic operational mechanisms transactions costs are used as a rationing instrument in the credit allocation process. This paper addresses this question using a simultaneous equations system involving a price equation and a demand for funds equation. In this model, transaction costs and loan amounts are tested for the validity of their classification as endogenous variables. Moreover, the explanatory

variables in the system will shed some light on the significant factors and principles by which credit unions operate.

A baseline study of the Togo credit union movement in 1987, which involved 395 rural household interviews, provided the data used to test the model (Cuevas, 1987). A total of 137 observations representing farmer-borrowers who had access to credit union loans, are used as the data base for analysis.

The next section provides a review of the factors explaining the demand for and cost of funds and specifies the simultaneous-equations model. The specification test is discussed in section 3. The last section presents the empirical results, implications, and conclusions of the study.

2. The Model

Farmer-borrowers' attitude and specifically rural credit union members' behavior are described using a cost minimization approach. Borrowers seek to minimize the cost of a loan subject to the constraints of investment and consumption opportunities. The total loan price (W) can be defined in an identity relating transaction costs (TC) and the explicit-interest rate charged on the loan (i) as:

$$W=TC+i \qquad (1)$$

Farm production (Q) is a function of three factors. First is the aggregate measure of assets (AST) that represents the borrower's resource endowment available to generate output; this includes farm area, animal stock and machinery.

Second is family size (F) which is used as a proxy for labor needed to generate output, and third is depository holdings (D), a proxy for working capital needed in production. This is represented as follows:

$$Q=f(AST,F,D) \tag{2}$$

Consumption preferences are determined by family size (F) and income level (Y) which reflects potential consumption patterns. Defining (C) as the level of consumption, a functional form can be written as:

$$C=g(F,Y) \tag{3}$$

Both production and consumption constraints, (2) and (3), can be relaxed through borrowed funds (L). For credit union members, two determinant factors explaining variations in loan demand directly are depository holdings (D) and years of membership in the credit union (N). First, consideration of depository holdings can be regarded as a competitive source of liquidty, or as a complementary factor when considered as initial capital, and a positive element for getting access to credit. Second, increased credibility can be associated with the number of years of membership in the Coopec (N). Hence, (L) can be written as a function of (D, N) and is added to (2) and (3) as an additional factor input. A cost minimization problem is set up as:

$$\text{Min} \quad WL = [i + TC]*L(D,N) \tag{4}$$

st $\quad Q = f(AST, F, D, L(D,N))$ (5)

$C = g(F, Y, L(D,N))$ (6)

Specifing a lagrangian function and taking first order derivative with respect to the decision variable (L), the demand for loans can be derived as a function of:

$$L=L(TC,i,AST,F,Y,D,N) \quad (7)$$

Total borrowing costs have been defined to include the nominal interest payments charged by the lender, non-interest transaction costs incurred by the borrower, and changes in the purchasing power of money over the loan period (Adams and Nehman). Interest rate ceilings and other restrictive policies lead lenders to use the alternative of exercising credit rationing through transaction costs which becomes a primary factor in the borrowing decision. Transaction costs can be identified as all the non-interest expenses incurred in association with obtaining and repaying the loan. These costs include explicit costs such as travel and other cash expenses, and the opportunity cost of time involved in securing and repaying the loan.

Transaction costs which are implicit price variations, can be explained to a large extent by the borrowers' different risk characteristics. A group of proxy variables for risks includes area of the farm, deposit holdings, and loan amount. Again the number of years of membership can be a determinant of transaction costs. A framework including all of the various dimensions of transaction costs discussed

above can now be specified in a supply price equation.

It has been argued that under a price-setting framework, the specification of the loan amount as an exogenous variable in the transaction costs equation is questionable (Cuevas and Graham). Considering this loan amount as a point on the borrower's demand for funds and assuming that borrowers consider transaction costs as a part of the loan price, a model is specified as a simultaneous equation system in which transaction costs and loan amounts are endogenous variables. Although this endogenous justification might hold for some financial institutions, it might be less likely in the case of credit unions, since in these institutions the loan amount appears to be determined primarily by the borrower's deposit holdings at the credit unions. The elements that determine transaction costs are captured by the explicit-interest rate (i), a group of proxy variables for risk such as loan amount (L), farm area (A), deposit holdings (D), and (N) denoting number of years of membership. Hence, the model can be written, in log form, as follows:

$$lnTC=a_1lni+a_2lnL+a_3lnA+a_4lnD+a_5lnN \qquad (8)$$

$$lnL=b_1lni+b_2lnTC+b_3lnAST+b_4lnD+b_5lnY+b_6lnF+b_7lnN \qquad (9)$$

Under the simultaneity assumption, with over identified equations, Three Stage Least Squares should give the most efficient estimates. However, to test the appropriateness of the simultaneous-equation specification an exogeneity test is carried out to verify if transaction costs and loan amount are indeed endogenous

variables.

3. Specification Test

Hausman's specification error test is implemented as an exogeneity test and is carried out as follows (Maddala). First, the endogenous variables in the simultaneous equations system are each repressed on all the instruments in the system, i.e., estimating :

lnTC = f(lni, lnA, lnAST, lnD, lnF, lnY, lnN)

lnL = f(lni, lnA, lnAST, lnD, lnF, lnY, lnN)

Second, each of the regression equations is expanded by adding the corresponding predicted value of the endogenous variables ($\widehat{lnTC}$) and ($\widehat{lnL}$) as additional explanatory variables, and Ordinary Least Squares (OLS) is used to estimate the modified equations:

$$lnTC=f(lni,lnL,\widehat{lnL},lnA,lnD,lnN)$$

$$lnL=f(lni,lnTC,\widehat{lnTC},lnAST,lnD,lnY,lnF,lnN)$$

The third step is to test the significance of the coefficient of the predicted variables on the right-hand side of the equations, i.e. the null hypothesis that the coefficient of the predicted endogenous variable equals zero in each of the regression equations. This test indicates the endogeneity or exogeneity of these variables.

The test presented in table 1 rejects the hypothesis of significant endogenous variables in the system. This implies that the reduced forms do not have explanatory power beyond that contributed by the explanatory variables of the structural

equations and, therefore, a simultaneous equations technique is not justified. Thus, the OLS estimation is sufficient to generate consistent and most efficient estimates. This result is not surprising in a credit union where transaction costs are not necessarily a rationing mechanism imposed by the lender but instead they are largely due to the borrower's value of time spent in obtaining the loan. Another plausible explanation is the fact that borrowers are credit union members, i.e. they have a vote in the loan decision making process and access to revealed information concerning borrowers' creditworthiness.

4. Results and Implications

The results presented in Table 2 corresponding to the OLS estimation show acceptable levels of R-square for samples of cross-sectional data. Individual variables are likely to be correlated among themselves; therefore, statistical tests were carried out to check the significance of the group of variables for risk, total prices, and consumption effects. Analysing the determinants of transaction costs in Table 2, it is estimated that the loan amount is significant in increasing the price of the loan. Farm area, which is one of the proxies for risk, is also significant and has the expected negative relationship with transaction costs; costs decrease the less risky the prospective borrower appears to be. Depository holdings as a proxy for risk does have the expected sign but is not significant. The group of variables representing risk proves to be a significant source explaining variations in transaction costs; this finding implies that the length of time required to obtain a loan increases as the

perceived risk associated with the prospective borrower increases. The number of years of membership does not contribute as a significant explanatory source of variations in transaction costs. The implication is that information is revealed upon joining the group during the same period of time, and that new members are not at a disadvantage or subject to more difficult processing of loans. Although interest rate has the expected sign, it is statistically insignificant. This is not surprising considering the very low rates charged on loans in the credit unions and the lack of variation among them as recognized from the data. With a zero profit objective, the credit union is presumably breaking even by earning enough on loans to pay the returns on deposits and maintaining a flow of circulating liquidity in the community.

The loan demand equation shows a positive relation between loan amounts and total prices (w). This is not a rational demand behavior as it implies a positive own-price elasticity. Nevertheless, under the prevailing conditions in rural areas, it is likely that higher costs imply simply more time involved in obtaining larger loans; with low interest rates, the transaction costs component of the price dominates and yields an overall positive relation. Moreover, this rationale is supported by noting that the transaction costs part of the total price is a significant variable, and has a positive relationship with the loan amount. The variable for investment opportunities (AST) performs poorly and is insignificant although it has the expected sign. Family size (F) has a significant coefficient and reflects the expected substitution of family labor for hired labor which implies reduced cash expenses and hence reduced

demand for borrowed funds. Deposit holdings (D) is highly significant and has a positive relationship with loan amounts which is the typical behavior observed in credit unions; the loan to deposit ratio or multiplier is approximately two. Consumption preferences proxied by family size and income level are a significant category. Income as a measure of future consumption is a significant factor and reflects the expected relationship, it is increased with an increase in loans. The number of years of membership does not contribute significantly in explaining variations in loans demanded, implying no effective rationing of new members.

The findings reported above indicate that in credit unions rationing cannot be assumed to be exercised through transaction costs, nor that this instrument is an endogenous factor in the borrower's loan demand function. Risk related factors do have a significant role in determining transaction costs. This result suggests that although there exists trust among members, they still do consider the riskiness of the borrowers as an important factor in determining loan procedures. Specifically, deposit holdings are considered as a collateral substitute and an indication of repayment ability. Furthermore, the results suggest that in credit unions transaction costs and loan price do not play the rationing role they play in other lending institutions.

The close relationships in rural communities provide direct access to information indicating an individual's creditworthiness which is a natural resolution for credit allocation problems. On the other hand, the credit union established rules

of proportionality between deposit holding and loan amounts appear to dominate the factors determining loan size.

Table 1. Estimated Parameters of the Exogeneity Test (OLS)

Explanatory Variables	Transaction Costs (lnTC) Estimate	t-ratio	Loan Amount (lnL) Estimate	t-ratio
Loan Amount (lnL)	0.211	2.272*	----	----
- predicted (lnL)	-0.247	-0.979	----	----
Transaction Costs (lnTC)	----	----	0.456	2.252*
- predicted (lnTC)	----	----	-0.040	-0.049
Interest Rate (lni)	0.064	-0.567	0.021	0.115
Area of the Farm (lnA)	-0.156	-1.828⁰	----	----
Deposit Holdings (lnD)	0.046	0.318	0.504	4.769*
Assets (lnAST)	----	----	0.024	0.422
Family Size (lnF)	----	----	-0.171	-0.736
Income Level (lnY)	----	----	0.245	2.666*
Years of Membership (N)	-0.019	-0.150	-0.256	-1.514+
Intercept	7.518	5.889*	-0.714	-0.123
R^2	0.174		0.555	
Test F-value				
HO: predicted = 0	1.753		7.472*	

N = 56;
Significance levels: * = 1 percent
+ = 5 percent
0 = 10 percent

Table 2. Estimated Parameters of the Transaction-Costs and the Loan-Demand Equations (OLS)

Explanatory Variables	Transaction Costs (lnTC)		Loan Amount (lnL)	
	Estimate	t-ratio	Estimate	t-ratio
Loan Amount (lnL)	0.148	1.838+	-	-
Transaction Costs (lnTC)	-	-	0.594	3.741*
Interest Rate (lni)	0.054	0.485	-0.044	-0.282
Area of the Farm (lnA)	-0.186	-2.301*	-	-
Deposit Holdings (lnD)	-0.075	-0.943	0.537	5.759*
Assets (lnAST)	-	-	0.017	0.313
Family Size (lnF)	-	-	-0.293	-1.639+
Income Level (lnY)	-	-	0.192	2.592*
Years of Membership (N)	0.037	0.329	-0.168	1.166
Intercept	6.865	8.724*	-1.310	-0.775
R^2	0.139		0.503	
F-Value	1.776		10.254	

N = 60;
Significance levels : * = 1 percent
+ = 5 percent
0 = 10 percent

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