FACTORS INFLUENCING INTERNAL AND EXTERNAL CREDIT RATIONING AMONG SMALL-SCALE FARM HOUSEHOLDS IN KWAZULU-NATAL

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The Heckman two-stage procedure is used to identify and rank the determinants of internal and external credit rationing in rural households using data sourced from two districts in the former KwaZulu homeland. The results confirm international findings that high transaction costs faced by rural households limit their access to formal credit markets. Income and savings levels are significant determinants of the level of credit obtained, with savings acting as a substitute for credit. Better access to financial markets will require public investment in rural infrastructure, literacy and vocational training, and legal reform in order to lower transaction costs, improve income levels, and facilitate the efficient use of collateral. Savings lose their value as a source of information when lending institutions are distinct from savings institutions, and moveable assets carry high collateral-specific risk in the absence of an efficient judicial system.

1.   INTRODUCTION

This study seeks to identify and rank factors responsible for both internal (self-imposed) and external (lender-imposed) credit rationing among small-scale farm households in the communal areas of KwaZulu-Natal. The question of extending financial services to small-scale farmers has generated international interest. Recent contributions to the debate (*e.g.* Adams *et al*, 1993; Gonzalez-Vega, 1994; Graham, 1995) focus on the conditions required to sustain competitive financial markets. In South Africa, the recent Strauss Commission of Inquiry has recommended that governmental agencies should play a direct role in extending financial services to rural households (Kraft, 1996). This study takes the view that formal private financial services are already available in rural areas, but that access to these services is constrained by high transaction costs, inadequate collateral and poor debt-servicing capacity. Under these conditions, access to private credit is more likely to be improved by investment in physical and institutional infrastructure than by providing additional Development Finance services.

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Internal credit rationing is the borrower's self-rationing of loan levels requested. It is a function of the borrower's level of risk aversion, levels of business and financial risk, and practices employed in risk management. Perceived levels of risk exposure may change over time with changes in wealth, experience, and household characteristics (Barry *et al*, 1995: 192-195). External credit rationing occurs when lending institutions are not prepared to grant the amount of credit requested by the borrower. Creditworthiness involves the lender's evaluation that the borrower will have sufficient debt-servicing reserves to meet the terms of the loan contract, and that the borrower can furnish sufficient collateral to reduce lending risks to an acceptable level. Consequently, external credit rationing is also influenced by the legal structure and regulatory environment in which the lender operates (Barry *et al,* 1995:194-199).

2.   STUDY AREAS

Data for this study were gathered from 152 small farm households in two communal areas of KwaZulu-Natal. Seventy-six households were sampled in each of two study areas during 1995/96. The first study area - Mpembeni ward - is a remote settlement located in the Hlabisa magisterial district, west of Hluhluwe game reserve. The topography is broken and rainfall unreliable. Crops are grown largely for household consumption, with some local sales. The main cash crops are maize and vegetables. The second area - Mkhwanazi ward - is situated in the Ongoye II magisterial district near Port Durnford just fifteen kilometres from the Empangeni-Richards Bay industrial complex. The topography is flat and rainfall high, but the soil is generally poor, with sugar-cane as the principal cash crop.

The average sample household has nine family members. Education rates are low, with *de facto* heads completing just five years of formal schooling, and households containing on average 1 migrant worker. Farm sizes reported by respondents averaged just two hectares. Crop incomes are low: mean annual cash incomes of R323 and R971 were estimated for Mpembeni and Mkhwanazi respectively. By contrast, annual cash received from off-farm activities (including non-farm enterprises) averaged R16 013 in Mpembeni and R15 825 in Mkhwanazi. Clearly, off-farm income is a more important source of debt-servicing capacity than is farm income.

Almost half of the respondents owned assets - mostly consumer durables, such as refrigerators or freezers, television sets, and some vehicles - and almost half of these were purchased using credit. Moreover, 70 per cent held savings with

commercial Banks, averaging R1658 in Mpembeni and R1 284 at Mkhwanazi. This suggests that rural households do participate in formal financial markets.

3.   THE MODEL

In the ideal situation where all households participate in the credit market, the level of current debt of the ith household could be regressed upon attributes affecting loan size, such as debt-servicing capacity and collateral. Transaction costs and risk preferences are excluded from this 'ideal' model because they are *ex-post* costs incurred when participants entered the market. In reality not all households participate in the credit market. When non-participants are excluded from the analysis, sample selectivity bias is introduced into a model estimated using ordinary least squares (OLS) regression. Heckman (1979) suggested a two-stage procedure to overcome this problem. A probit model, establishing the probability of participation, is employed in the first stage. Explanatory variables would include household risk preferences and transaction costs, as well as debt-servicing and collateral indicators. The estimated probit model is then used to calculate the inverse of Mill's ratio, λ_i (a monotone decreasing function of the probability that a household is selected into the sample of credit users). The second step includes this ratio as a regressor in the ordinary least squares regression. The OLS regression coefficient for λ_i will be statistically significant if sample selectivity bias occurs, while the remaining explanatory variables will be consistent (Heckman, 1979).

Sample households were classified as credit market participants only if they had borrowed during 1995. This ensured that the explanatory variables, also recorded in 1995, were relevant at the time of borrowing. The dummy dependent variable of the probit model scored one for all participants (n = 25), and did not distinguish between credit used for durable and consumable goods. The vast majority of credit transactions observed - and the largest amounts of credit – were used to finance durable goods. Households that had not utilised credit in 1995 scored a zero on the dependent variable (n = 69). The second stage of the analysis seeks to identify and rank factors affecting the **level** of credit observed in the subset of borrower-households (n=25) during 1995. This OLS regression model includes as regressors all variables used in the probit model except for the transaction costs and risk preferences, which affect a household's decision to participate in the credit market. In addition, λ_i, computed from the estimated probit model, is included as a regressor to absorb any sample selectivity bias. The independent variables, and their expected signs, are presented in Table 1.

Table 1:   Independent variables included in the probit and regression models

Variable	Probit expected sign	Regression expected sign	Description of variable
Capacity	+		Indicator of debt serving capacity calculated as the sum of off-farm and non-farm income[a] plus the monetary value of livestock owned (Rand/annum)
Fsavings	-	-	Formal savings level (Rand)
Trade	+	+	Dummy variable scoring one if household has a micro-enterprise, zero otherwise
Risk	-		Dummy variable scoring one if credit was not used because the household did not like incurring debt or felt that it could not be serviced, zero otherwise
Tcost	+		Transactions cost index calculated as the **standardised values**[b] of each variable in the index, namely {[(gender[c] of *de facto* head) * (education of *de facto* head)] + (length of residency in the area) + (log[1+number of migrant workers])} / {(district dummy[d]) * (car ownership[e])}
Income		+/-	Liquidity indicator calculated as the sum of off-farm and non-farm income[a] (Rand/annum)
Livestock		+/-	The monetary value of livestock owned (Rand/annum)
Assets	+	+	Dummy variable scoring one if household owns a refrigerator or television, zero otherwise
λ_i		-	Monotone decreasing function of the probability that a household will be selected into the sample of credit users[f]
Dependency	-	-	Ratio of infants and school children to wage earners and pensioners

Notes:

a   Off-farm income includes wage incomes, remittances and pensions while non-farm income includes income from micro-enterprise activities in the Wards

b   A constant of 100 was added to each standardised value to eliminate negative values

c   Gender is a dummy variable scoring one for males and zero for females

d   A district dummy scoring one for Mpembeni ward and zero for Mkwanazi ward

e   Car ownership is a dummy variable scoring one for non-owners and zero for owners

f   Calculated from the probit model to account for sample selectivity bias

Farm income is not included as part of debt-servicing capacity due to its irregular

nature and the unreliability of the reported cash flows. Debt-servicing capacity (Capacity) in the probit model is therefore proxied by off-farm income (including wage incomes, remittances and pensions), non-farm income (from micro-enterprise activities), and the monetary values of livestock, which are often liquidated to smooth consumption (Low, 1986: 111-115). A positive relationship is expected between participation in the credit market and repayment capacity, even though higher levels of earnings imply greater capacity for own financing (Stanton, 1997), as most of the observed credit transactions were financing consumer durables and these require large capital outlays.

Formal savings (Fsavings) aid in consumption smoothing (Yaron *et al,* 1997) and are thus expected to substitute for credit, especially when they are deposited with institutions distinct from those providing the credit (Gurgand *et al,* 1994:18, 95; Gonzalez-Vega, 1994). In the study areas, observed loans were provided largely by suppliers and not by formal savings institutions. Consequently, savings accounts had little value to lenders as sources of information and collateral. The dummy variable indicating involvement in a non-farm micro-enterprise (Trade) was expected to have a positive impact on both the use and the level of debt observed. Micro-enterprises can supplement and smooth irregular cash flows received from farming (Devereux *et al,* 1989).

Households that were averse to incurring debt or uncertain as to whether they could service debt were expected to impose stricter internal credit rationing. Borrowers are exposed to the risk of not being able to service debt and of having those assets, which were pledged as collateral, repossessed. A negative relationship was therefore anticipated between the Risk dummy and credit use.

Tcost is an index of exogenous variables measuring transaction costs faced by rural households. Each variable was standardised to give it equal weighting in the index. Households with high index scores face low transaction costs. To ensure that this condition held true, a constant of 100 was added to each standardised variable to eliminate negative values.

The transaction cost index postulates that a better educated male migrant faces lower transaction costs than a married woman who has limited access to communal resources, lower education, and who faces great distances to formal markets (Delgado, 1996 and Lyne, 1992). The homelands of South Africa are characterised by a dual legal system. Contract disputes and property right conflicts are often settled in tribal, rather than national, courts. Berry (1993)

makes frequent references to the influence of gender and social standing on the outcomes of these disputes in tribal courts. A longer length of residency in the area suggests higher social standing and lower transaction costs. Women face greater legal uncertainty - especially if separated from their husbands through migration, abandonment, divorce or death (Bruce, 1989). The denominator of Tcost reflects interaction between the distance households must travel to participate in formal markets, as captured by the district dummy, and ownership of a car. The impact of distance on transaction costs is most relevant when a household does not own a motor vehicle. Households that owned a serviceable motor vehicle scored a zero on the dummy variable whereas those that did not scored one.

The monetary value of livestock (Livestock) was separated from the income variable (Income) in the regression model as the latter is a flow variable and is expected to be a less ambiguous determinant of the level of credit obtained from lenders. Livestock may serve as collateral or as savings. Ownership of assets would ordinarily serve as a measure of collateral, but in this case may only indicate relative wealth as the variable is dichotomous. Since greater wealth decreases risk perceptions, this variable may be viewed as an inverse measure of internal credit rationing. Households that own depreciable assets (refrigerators and television sets) are therefore expected to use more credit than non-owners.

4.   RESULTS

Except for Risk and Dependency, collinearity diagnostics revealed high multicollinearity between the other explanatory variables included in the probit model. Remedial measures were taken because the probit model yields useful information about variates affecting participation in the credit market. A principal component analysis (PCA) was applied to the explanatory variables, excluding Risk and Dependency. The principal component technique is a method of economising on variables by creating uncorrelated (orthogonal) indexes. Four significant principal component factors were extracted and included as regressors in the probit model, along with the Risk and Dependency variables. These latter two variables were standardised to make them consistent with the principal component factors.

The results of the probit and OLS regression models are presented in Table 2. The probit model highlights important differences between households that participate in credit markets and those that do not. The estimated model predicts 60 per cent of the sample cases correctly, with Factors 1 and 2 significant at the one per cent level of probability, and Factor 3 significant at the five per cent level

of probability. Since the factors are standardised, the sizes of their estimated coefficients indicate their relative importance in the model. The signs of the estimated coefficients comply with *a priori* expectations. Factor 1, the most important explanatory variable, indicates that households facing high transaction costs and who perceive borrowing to be risky (as they have little wealth and poor debt-servicing capacity) are unlikely to borrow. Factor 2 suggests that formal savings are more of a substitute for credit than a source of information and collateral to lenders. Factor 3 suggests that wealthier households (i.e. those that had accumulated assets) are more likely to participate in credit markets. Households with positive scores on Factor 3 were not expected to enter the credit market because few of the sample households engaged in micro-enterprises (Trade).

Table 2: **Results of the probit (n=94) and OLS regression (n=25) analyses, Mpembeni and Mkwananzi wards, 1995**

SIGNIFICANT VARIABLES	PROBIT[a] REGRESSION				
	Factor 1	Factor 2	Factor 3	Income	Fsavings
Percentage contributions	46.50	19.00	16.20		
Original variable					
Capacity	**0.74**	0.22	**0.29**		
Fsavings	0.45	**0.84**	-0.11		
Trade	**0.66**	-0.23	**0.59**		
Asset	**0.70**	-0.19	**-0.58**		
Tcost	**0.80**	-0.32	-0.18		
Standardised Coefficient	0.72	-0.44	-0.34	0.91	-0.41
t-value	3.43	-2.64	-0.34	6.35	-2.95
significance t-value	0.00	0.01	0.05	0.00	0.01
R^2	0.65				
F	20.13**				

Note:
a. 88% of households not using credit and 52% of households using credit were classified correctly when the same sample was used in classifying.
** Significant at the one per cent level of probability.

The estimated regression model has an R^2 value of 65 per cent, with a highly

significant overall fit. The only two variables contributing significantly to the regression model are income and formal savings, with income being the more important determinant of the observed level of credit. The non-significance of λ_i suggests little or no sample selectivity bias in the model. Levels of credit use rise with increases in income and decline with the level of formal savings. Again, the results suggest that savings are a substitute for credit rather than a source of collateral or information to lenders. It is interesting that the livestock variable is not statistically significant. This seems to confirm the limited availability of good collateral sources for lenders, therefore increasing the importance attached to borrowers' cash flows. In addition, the non-significance of the asset variable (an inverse proxy of internal credit rationing) in the regression model, contrasting with its significance in the decision to enter the credit market, may indicate that observed levels of debt are subject to external rather than internal credit rationing.

5.   CONCLUSIONS

The empirical results in the probit model suggest that transaction costs are important primary constraints limiting entry to the market. Considering the way in which the transaction cost index was constructed, the implication is that government can decrease borrowers' transaction costs and risk perceptions by focusing on physical and institutional infrastructure. This includes improving education, and developing roads, telecommunications, electricity, and postal services in rural areas. In addition, government should take steps to ensure that tribal courts uphold commercial contracts, particularly those conducted with women married under customary law.

Savings play an important role in both the decisions to enter the financial market and the extent to which credit is required. The propensity to save in the study areas is high, with most households in the sample possessing formal savings accounts. While a successful savings record can serve to reduce information asymmetries, this study has shown that savings are used more as a substitute for credit than as a source of information or collateral. This is not surprising since the savings institutions (Banks) were distinct from the lender (Retail suppliers). This reinforces the importance of combining savings and lending services within Development Finance Institutions (DFI's).

The second part of this study indicated that once access to the credit market has

been achieved, the level of credit used is determined primarily by lenders who emphasise household income when appraising loan applications. Lenders attach little importance to collateral when evaluating creditworthiness. This may be attributed to the fact that tribal land cannot be repossessed and sold, and that moveable assets carry high collateral-specific risk, particularly when contracts are difficult to enforce. The implications are clear. Capacity building, in the form of literacy and language skills, vocational training, and business and financial management skills, is required to improve the income opportunities of rural people. In addition, reform of the legal, regulatory and institutional frameworks, of which property rights are a fundamental element, is crucial to facilitating the efficient use of collateral.

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