

CREDIT MARKET ACCESS IN UGANDA: EVIDENCE FROM HOUSEHOLD SURVEY DATA 1999/2000

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Abstract

This study investigated the individual and household characteristics that influenced credit market access in Uganda using household data for 1999/2000. The results suggest that credit market access was significantly influenced by gender, household wealth, age, regional location, and urban/rural location.

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1

Introduction

Uganda's poverty eradication action plan (PEAP) identifies lack of access to credit as one of the major causes of poverty (Ministry of Finance, Planning and Economic Development [MFPED], 2001). Credit can be accessed from either the formal or informal financial sectors. Commercial banks dominate the formal financial sector and are mainly urban-based. Prior to reform, the banking sector was riddled with inefficiencies as shown by high intermediation margins, a significant proportion of non-performing loans, and huge losses by state-owned banks funded by the Treasury. This provided the economic rationale for adopting reforms of the financial sector in Uganda so as to improve the performance of the formal financial sector in the mobilisation and allocation of resources to productive investment, thereby leading to sustainable economic growth. The financial sector reforms included the introduction of new banking laws (the Financial Institutions Statute and Bank of Uganda Act, both of 1993), liberalisation of interest rates, divestiture of public sector banks and liberalisation of foreign exchange markets (Nannyonjo, 2002). Despite the

implementation of these reforms, however, access to formal credit especially for the poor has not improved. Access is restricted to a small proportion of the population who can meet the stringent credit requirements, hence leaving most people dependent on informal credit (Okurut, Schoombee & Van der Berg, 2005). For this reason, a deliberate policy of developing the microfinance sector was developed, geared towards improving access to financial services for economic agents with limited access to the formal financial sector.

Access to credit markets enhances household welfare through the provision of investment credit to boost household income (Adugna & Heidhues, 2000) as well as consumption-smoothing credit (Zeller, Braun, Johm & Puetz, 1994), with the net effect of enabling households to move out of poverty (MFPED, 2001). But some households have constrained access to credit markets due to both institutional and household level factors (Nwanna, 1995). At the institutional level, the lenders in formal credit markets incur high costs in assessing the creditworthiness of small borrowers yet make low returns due to the small loan amounts involved. This motivates formal lenders to adopt strict collateral requirements as a screening mechanism to minimise default risk,

hence keeping small borrowers out of formal credit markets or rationing their credit. At the household level, low levels of income and asset accumulation, widespread poverty and highly skewed income and asset distribution give small households a high risk profile which makes them less attractive to formal lenders (Hoff & Stiglitz, 1990). Even in informal credit markets, lenders have designed non-price mechanisms for screening and rationing borrowers (Zeller, 1994).

This study investigates the factors that constrain household access to credit markets, taken in this case as including both formal and informal credit markets in Uganda. Constrained access to credit can be defined as a state in which borrowers are rationed in credit markets such that they cannot get the amount of credit demanded at the prevailing market interest rates (Stiglitz & Weiss, 1981).

The credit process involves two distinct stages. In the first stage, the borrower who wants credit decides what sum to apply for from a particular lender at the prevailing market price; this constitutes the demand side of the interaction. In the second stage, the lender makes a financing decision on the loan application; this constitutes the supply side of the interaction. The lender undertakes the screening of the potential borrower based on observable characteristics so as to minimise default risk; the results of this screening influence the lender's response to the client's loan demand. Firstly, the lender may fully grant the loan amount/s demanded by the client. Secondly, the lender may partially grant the loan amount/s demanded by the client. Thirdly, the lender may completely reject the loan application. The last two scenarios represent credit constraint, the state in which the borrower is constrained in his/her access to credit markets or credit rationed by the lender (Zeller, 1994).

The rest of the paper is organised as follows: section 2 asks why credit is rationed and provides a survey of the empirical literature on factors that influence lenders' credit rationing behaviour when lending to small borrowers. Section 3 discusses the methodology of the study and its findings, and section 4 presents the conclusion.

2

Credit rationing

2.1 Why credit is rationed

Households may be constrained in their access to credit markets due to market imperfections, institutional factors and household-related factors. Stiglitz and Weiss (1981) argue that market imperfections and information asymmetry problems create an equilibrium in the form of credit rationing in credit markets. At the prevailing market price, lenders will restrict the amount of credit extended to borrowers so as to minimise loan default risk.

Loan default risk (defined as the risk of the borrower being unable to pay back the principal loan amount plus accrued interest) may be influenced by factors such as the expected returns of the project, the terms of the loan (interest rate, loan period), market imperfections and borrower characteristics. The expected returns on the proposed project have a significant influence on the lenders' decision to ration credit or not (Kochar, 1997). Should the expected returns of the project (defined as net income after subtraction of operational costs) be less than the principal loan amount plus accrued interest, then the probability of default will be high. The optimal decision would then be to ration the borrower's credit.

The strength of the previous business relationship between borrower and lender plus the borrower's reputation in the market also determine the lender's credit-rationing behaviour (Aleem, 1990; Bell, 1990, Siamwalla *et al.*, 1990). Hoff and Stiglitz (1990) term this the relationship-specific social capital built between the lender and the borrower and used as a non-price-related mechanism for credit rationing. The stronger and more long-standing the relationship, the lower the probability of the borrower's credit being rationed.

The lender's assessment of the borrower's debt service capacity (measured as outstanding debt as a proportion of total household income and household wealth) also affects the likelihood of the borrower's credit being rationed (Zeller, 1994). The larger this ratio, the greater the prospect of the credit being rationed.

Interlinked credit, defined as credit contracts linked to either product markets (where borrowers have to market their agricultural output at agreed prices through the lenders) or labour markets (where the borrowers undertake to provide labour to the lender at predetermined wage rates) also provides alternative forms of collateral. The borrower's acceptance of an interlinked credit contract decreases the odds of his/her credit being rationed because this contract lowers the probability of loan default (Udry, 1990). This is because such a contract is a non-conventional form of collateral that removes some of the difficulties associated with adverse selection and moral hazard. The interlinked credit contract moreover presents the borrower with a further incentive to repay the loan (Bell, 1990).

Other socio-economic variables that influence the probability of a borrower's credit being rationed include the borrower's gender, household wealth and/or asset values (Zeller, 1994), education level and access to network information (Vaessen, 2001). Men mainly control household resources and are perceived by lenders to be more credit-worthy than women. Household wealth and/or asset values are important as collateral, hence control of these reduces the man's probability of credit rationing. Education level enhances human capital in the form of skills, which is associated with effective utilisation of credit and minimisation of default risk. Access to network information enables the screening of potential clients and reduces default risk as only those with good reputations are likely to be recommended for credit.

2.2 Determinants of credit rationing

A survey of the empirical literature suggests that household characteristics such as age, gender, education level and income influence lenders' credit-rationing behaviour.

Age

Empirical evidence provided by Zeller (1994) suggests that age has a positive and significant effect (at the 5 per cent level) on the probability of households being rationed in credit markets in Madagascar. A possible explanation for this

result is that older individuals are more likely to apply for bigger loan amounts, which increases the probability of their credit being rationed. Zeller *et al.* (1994) however observe a positive and significant effect of age (with a t-value of 2.91) on the probability of credit access in Gambia, as older persons who control household resources may be rated as more credit-worthy, thus reducing the probability of their credit being rationed.

Gender

The gender variable is captured as a binary variable in the empirical literature. Evidence from Zeller *et al.* (1994) indicates that being female has a significant negative effect (with a t-value of -5.98) on credit access. This particular result reflects discrimination against women in the credit market. Possible reasons for this result are firstly that the membership of the credit union is male-dominated. Secondly, in the cultures of the particular communities investigated, men are regarded as the representatives of the households, thus it is argued that there is no discrimination against women since the men in the credit market effectively represent the women. This argument is supported by Baydas, Meyer and Aguilera-Alfred (1994) who report that being male does not have any significant effect on access to credit in Ecuador.

Education level

Vaessen (2001) shows that credit access in northern Nicaragua is positively and significantly influenced by education level (at the 1 per cent significance level), possibly on account of increasing returns to investment as a result of education. Similar results are reported by Baydas *et al.* (1994), who show that in Ecuador the amount of credit supplied is positively and significantly influenced by level of education (at the 5 per cent significance level). The rationale for this result is that the educated are more likely to get loans because they demand larger loans. In addition, lending institutions often prefer to give larger loans in order to minimise transaction costs. In contrast, Zeller (1994) reports that education level has a positive and significant effect (at the 10 per cent significance level) on the probability of credit rationing,

which contradicts Vaessen (2001) and Baydas *et al.* (1994). A possible explanation for Zeller's results is that the character of the borrower in terms of trustworthiness in servicing debts is critical to the lender, which may not necessarily be correlated with education level.

Repayment capacity

The repayment capacity of the household may be captured by wealth (asset values), debt-income ratio, engagement in off-farm activities and expected business profits. Zeller (1994) uses the debt-income ratio, also referred to as the leverage ratio, as a measure of a household's debt-repayment capacity. Empirical results suggest a positive and significant relationship between the probability of credit rationing and the debt-income ratio (at the 10 per cent significance level). The rationale for this result is that the higher the debt-income ratio, the higher the exposure to default risk which raises the household's probability of credit rationing. Zeller *et al.* (1994) also observe that household per capita income (which is an indicator of repayment capacity) has a positive and significant effect (with t-value of 2.00) on the probability of credit access.

In Vaessen's study (2001), dummies for off-farm activities and work as an agricultural wage labourer are used as proxies for the repayment capacity of households. Off-farm activities have a positive and significant effect (at the 10 per cent significance level) on the probability of credit access. A possible explanation for this result is that credit institutions prefer to finance off-farm activities (as compared to agricultural activities), which have a high turnover, so as to service short-term loans. Also, clients who engage in off-farm activities are perceived by credit institutions to have a higher repayment capacity compared to agricultural households with high income variability due to exogenous production and price shocks. The agricultural wage labourer dummy has a negative and significant effect on household credit access (at the 5 per cent significance level). The argument here is that being an agricultural labourer is a reflection of a lower repayment capacity, as it is the poor who mainly work as agricultural wage labourers.

The value of visible assets is also used as a measure of a borrower's repayment capacity. Evidence in Zeller (1994) suggests that the total value of assets owned by a household has a negative and significant effect (at the 5 per cent significance level) on the probability of credit rationing. The rationale for this result is that lenders view the borrower's visible assets as the last resort to liquidate to recover the loans in case of default.

Bell, Srinivasan and Udry (1997) also find a positive and significant relationship between visible assets and the amount of credit supplied by lenders in rural Punjab, India. Intuitively these results are consistent with those reported by Zeller (1994), as the household factors that positively influence the quantity of credit supplied by lenders implicitly reduce the probability of such households' credit being rationed.

Evidence by Baydas *et al.* (1994) suggests that business profits have a positive and significant effect (at the 5 per cent significance level) on informal credit supply, which implies that the more profitable businesses are less likely to be credit rationed. A possible explanation for this result is that the expected profits from the investments are closely associated with repayment capacity. The higher the expected profit, the lower the default risk and the lower the probability of the household's credit being rationed.

Social capital

We can define social capital to include personal guarantees and/or recommendations of potential clients which act as social collateral. In effect, the guarantors sign an undertaking with lenders to make good in case of default by the client(s) whom they guarantee or recommend. This motivates the guarantors to monitor and put pressure on the borrowers to ensure full repayment of the loans. For this reason clients who have access to this form of social capital are less likely to be credit rationed. The findings by Vaessen (2001) suggest that access to a network of information and recommendation has a significant positive effect (at the 1 per cent significance level) on credit access. Further evidence by Kochar (1997) in rural India also

suggests that the probability of credit access is positively and significantly influenced (at the 5 per cent level) by a social security dummy (=1 if personal guarantees are given for a loan).

Interlinked credit contracts

An interlinked credit contract involves the linking of the amount of credit supplied in the credit market to either the product market (in terms of borrowers undertaking to market their agricultural output through the lenders at pre-determined prices) or to the labour market (in terms of borrowers undertaking to work for the lenders at pre-determined wages for specified periods). The economic rationale of interlinked credit contracts is to enable the lenders to overcome the information asymmetry problems inherent in credit markets and to minimise default risk. Bell *et al.* (1997) find that this kind of linked credit positively and significantly influences the amount of credit supplied (t-value 2.76). These results imply that a borrower's acceptance of an interlinked credit contract reduces the probability of his/her credit being rationed.

Household size

Evidence by Vaessen (2001) suggests that family size has a positive and significant effect (at the 5 per cent significance level) on credit access. By implication, larger households are less likely to have their credit rationed. Vaessen gives no explanation for this result, but it could be

argued that a rational lender will perceive large households as having lower repayment capacity, which will increase the probability of these households having their credit rationed.

In conclusion, the empirical evidence indicates that lenders' credit-rationing behaviour is negatively and significantly influenced by repayment capacity, social capital (guarantee arrangements) and interlinked credit contracts. Though household size is reported to have a negative and significant effect on lenders' credit rationing behaviour, there appears to be no rational basis for this result. Age, gender and education level have inconclusive effects on a household's credit access (as their coefficients are positive and significant in some studies but negative and significant in others).

3

Credit rationing in Uganda

Credit rationing in the broader financial sector, comprising both the formal and informal financial sectors, is included in this study. The data comes from the Uganda National Household Survey (UNHS) data set for 1999/2000 from the Uganda Bureau of Statistics (UBOS) with a sample size of 10 692 households. In this survey, the formal financial sector is taken to include banks and the informal (unregulated) financial sector all other lenders. The variables used in the analysis are presented in Table 1.

Table 1
Variables used in this study

Definition and unit of measurement
Lessmo = credit rationing status (=1 if credit rationed in credit market, otherwise zero)
Level1 = credit demand status (=1 if applied for credit from credit markets)
Ln(recivo) = natural log of amount of credit received in US dollars
Ln(age) = natural log of age of borrower
Dummy: Male = gender of borrower (=1 if male, otherwise zero)
Ln(depr) = natural log of dependency ratio, measured as the proportion of economically inactive persons (children aged below 15 years and older persons aged over 65 years) to economically active persons (those aged 15–65 years)
Ln(educ) = natural log of highest education level, measured in completed years of schooling

Dummy: Migration = migration status of household head (=1 if household head migrated to current location, otherwise zero)
Ln(hhexp) = natural log of household expenditure (measured in US dollars) per adult equivalent household member
Ln(astva) = natural log of value of household assets (measured in US dollars) per adult equivalent household member
Ln(lan) = natural log of household land holding, measured in acres per adult equivalent household member
Ln(hhsize) = natural log of household size
Dummy: Urban = dummy variable for urban area (=1 if household resides in urban area)
Dummy: Central = dummy variable for central region
Dummy: Eastern = dummy variable for eastern region
Dummy: Western = dummy variable for western region
Dummy: Northern = dummy variable for northern region (reference category)

3.1 Modelling credit rationing

The Heckman probit model with sample selection (Greene, 2000; Heckman, 1976; Heckman, 1990) is used to estimate the determinants of constrained access or credit rationing in the credit markets (equation (1)). The dependent variable for the model of interest is *lessmo* (=1 if credit rationed in the credit market,

otherwise zero). For the selection model, the dependent variable is the probability of applying for a loan from the credit market *leve1* (=1 if applied for a loan in the credit market, *otherwise zero*). This specification aims to avoid modelling those who have not applied for any credit, as such persons' credit is not rationed by financial institutions but rather by themselves.

$$\text{Prob}(\text{lessmo}) = \beta_0 + \sum \beta_i X_i + \varepsilon_i, \text{ select } (\text{leve1} = \Omega_0 + \sum \Omega_i K_i + \varepsilon_i) \dots (1)$$

where:

$\text{Prob}(\text{lessmo}) = \beta_0 + \sum \beta_i X_i + \varepsilon_i$, which is the model of interest

$\text{Prob}(\text{leve1}) = \Omega_0 + \sum \Omega_i K_i + \mu_i$, which is the selection model

lessmo = the probability of being credit rationed (*lessmo* = 1 if borrower's credit was rationed in market, otherwise zero)

leve1 = the probability of applying for credit (*leve1* = 1 if borrower applied for credit, otherwise zero)

β_0, Ω_0 = constant terms

β_i, Ω_i = vector of coefficients

X_i = vector of household socio-economic characteristics

K_i = sub-set of the socio-economic characteristics vector, X_i .

ε_i, μ_i = error terms

The results are presented in Table 2.

Table 2
Heckman probit model with sample selection for credit rationing
in the credit market, national and regional, of Uganda

Equation of interest: dependent variable lessmo (=1 if credit rationed in credit market)					
Explanatory variable	National	Region			
		Central	Eastern	Northern	Western
Ln(age)	-0.163 (1.83)*	0.361 (1.31)	-0.163 (1.81)*	0.310 (1.86)*	-0.178 (0.78)
Gender (Male=1)	-0.251 (2.80)***	0.098 (0.26)	-0.455 (2.50)***	0.405 (3.05)***	0.075 (0.29)
Ln(educ)	0.004 (1.06)	0.020 (1.28)		0.005 (0.69)	
Ln(depr)	-0.204 (3.20)***	0.387 (1.56)	-0.349 (2.99)***	0.263 (1.22)	-0.134 (0.77)
Ln(hhexp)	0.093 (2.03)**	0.228 (1.28)	0.026 (1.09)	0.176 (4.21)***	0.145 (1.24)
Dummy: Migration	0.028 (0.72)	0.230 (1.36)	-0.001 (0.01)	-0.033 (0.40)	0.062 (0.55)
Ln(astva)	-0.099 (3.89)***	-0.006 (0.06)	-0.044 (0.57)	0.073 (1.06)	-0.020 (0.21)
Ln(lan)	0.001 (0.06)		0.007 (0.93)	0.026 (0.74)	-0.024 (0.52)
Dummy: Urban	-0.130 (1.69)*	-0.128 (0.57)	-0.067 (1.74)*	-0.257 (1.28)	-0.157 (0.82)
Dummy: Central Region	-0.360 (2.63)***				
Dummy: Eastern Region	-0.538 (2.70)***				
Dummy: Western Region	-0.522 (2.78)***				
Constant	2.193 (3.52)***	-3.621 (1.62)	2.084 (5.98)***	-4.271 (6.23)***	-0.001 (0.00)
Dependent variable for selection equation: leve1 (=1 if applied for a loan in credit markets)					
Ln(age)	0.289 (10.43)***	0.286 (4.80)***	0.175 (2.32)**	0.223 (2.32)**	0.493 (9.00)***
Gender (Male=1)	0.418 (15.37)***	0.382 (6.53)***	0.524 (2.94)***	0.358 (3.68)***	0.331 (7.02)***

Ln(depr)	0.253 (6.98)***	0.063 (0.81)	0.300 (3.25)***	0.336 (2.18)**	0.271 (4.47)***
Ln(lan)		-0.037 (1.95)**			
Ln(astva)	0.131 (13.94)***		0.067 (0.92)	0.219 (4.13)***	0.145 (7.97)***
Ln(educ)					0.014 (3.98)***
Constant	-2.945 (25.85)***	-2.585 (10.87)***	-2.289 (7.46)***	-3.159 (6.33)***	-3.477 (16.55)***
/anthro	-1.603 (2.76)***	0.395 (0.31)	-8.965 (0.10)**	10.512 (0.07)	-0.658 (0.98)
Rho	-0.922	0.376	-1.000	1.000	-0.577
Number of observations	20 034	4 038	5 404	3 426	5 873
Censored observations	18 505	3 707	4 941	3 309	5 252
Uncensored observations	1 529	331	463	117	621
Wald chi2	164.6	12.82	76.19	56.42	5.15
Prob>chi2	0.000	0.118	0.000	0.000	0.741

Absolute value of z-statistics in parentheses

* significant at 10%, ** significant at 5%, *** significant at 1%

The results suggest that in Uganda, at the national level, lenders' credit rationing behaviour is negatively and significantly influenced by the borrower's being male. Since males arguably control household resources in Uganda, this makes them more creditworthy and reduces their probability of being rationed in credit markets. These results suggest that there is gender discrimination against women in Ugandan credit markets. These results are consistent with those of Zeller *et al.* (1994), who observe that being female has a significant negative effect on credit access in rural Gambia.

Asset values have a negative and significant effect on the probability of credit rationing. This result is consistent with various studies such as Zeller (1994) and Bell *et al.* (1997). Since assets are a measure of creditworthiness, households with more assets are less likely to have their credit rationed. The coefficient for dependency ratio, negative and significant, is quite surprising.

This is because dependency ratio was expected to have an inverse relationship with the income earning capacity of the household. Typically households that have high dependency ratios are also characterised by low education levels with less employment opportunities in high paying jobs. By implication, households with high dependency ratios would be judged by lenders to be less creditworthy, thus increasing the probability of their credit being rationed.

Age has a negative and significant effect on the probability of credit rationing, which is consistent with Zeller *et al.* (1994). A possible explanation is that older persons are more likely to control household resources, hence to be rated as more creditworthy by lenders.

Being an urban resident also has a significant negative effect (at the 5 per cent significance level) on the probability of credit rationing. The rationale for this result may be that urban households have a more diversified income base

compared to that of rural households which are dependent on highly variable agricultural income vulnerable to exogenous production and price shocks. This makes lenders rate households who base their income on agriculture as less creditworthy than non-agricultural households (Vaessen, 2001).

Household expenditure has a significant positive effect on lenders' credit-rationing behaviour. This is an unexpected result, since household expenditure is arguably a measure of wealth and high repayment capacity, hence should reduce the probability of credit rationing.

Regional location, relative to the reference category (northern) negatively and significantly influences the probability of credit rationing. This result may be explained by the fact that the northern region is the poorest in Uganda, having been affected by civil war for almost two decades, which makes the region less creditworthy.

At regional level, lenders' credit-rationing behaviour in the central and western regions is not significantly influenced by any of the variables tested. In the eastern region, the probability of credit rationing is negatively and

significantly influenced by age, urban dwelling, the male gender and dependency ratio, which corresponds to the results at national level. In the northern region, credit rationing is positively and significantly influenced by the male gender, household expenditure and age, which is in direct contrast to the results at national level.

The results of the rural/urban disaggregation (see Table 3) suggest that lenders' credit-rationing behaviour for borrowers located in the rural sector is positively and significantly influenced by household expenditure and education level, and negatively and significantly influenced by asset value. For the urban sector probit model, the probability of credit rationing is negatively and significantly influenced by age, dependency ratio, asset value and migration. The only variable that positively and significantly influences the probability of credit rationing in the urban sector is land size, which result is unexpected. This is because land in urban areas in Uganda has a higher value compared to land in rural areas and so acts as good collateral. For this reason land size in the urban sector was expected to improve creditworthiness and reduce the probability of credit rationing.

Table 3
Heckman probit model with sample selection for credit rationing in credit markets (rural/urban) in Uganda

Equation of interest: dependent variable lessmo (=1 if credit rationed in the credit market)		
Explanatory variables	Rural	Urban
Ln(age)	-0.003 (0.02)	-0.622 (6.96)***
Gender (Male=1)	-0.184 (0.94)	-0.061 (1.37)
Ln(educ)	0.011 (1.65)*	-0.0008 (0.2)
Ln(depr)	-0.121 (1.10)	-0.334 (3.57)***
Ln(hhexp)	0.175 (2.30)**	0.016 (0.65)
Dummy: Migration	0.055 (0.84)	-0.068 (1.94)**

Ln(astva)	-0.151 (3.31)***	-0.130 (4.04)***
Ln(lan)	0.041 (0.96)	0.007 (2.64)***
Constant	0.301 (0.18)	4.124 (11.03)***
Selection equation: dependent variable leve1 (=1 if applied for a loan in the credit markets)		
Ln(age)	0.226 (7.49)***	0.604 (10.2)***
Gender (Male=1)	0.459 (15.40)***	0.169 (5.07)***
Ln(depr)	0.197 (4.83)***	0.386 (5.11)***
Ln(astva)	0.138 (11.80)***	0.183 (9.96)***
Constant	-2.759 (22.11)***	-4.207 (16.73)***
/athrho	-0.827 (1.24)	-11.2 (8.14)***
Rho	-0.679	-1.000
Number of observations	16 215	3 677
Censored observations	14 892	3 471
Uncensored observations	1 323	206
Wald chi2	29.56	7 186
Prob>chi2	0.000	0.000

Absolute z-statistics in parentheses

* significant at 10%, ** significant at 5%, *** significant at 1%

3.2 Modelling the value of credit supplied

To eliminate possible sample selection bias, the Heckman two-step selection model is used to

estimate the factors that influence the amount of credit supplied in the credit markets (Heckman, 1976; Heckman, 1990). The specification of the model is given in equation (2):

$$Q_s = \delta_0 + \sum \delta_i X_i + \varepsilon_i, \text{ select } (Q_s = \Phi_0 + \sum \Phi_i K_i + \mu_i) \dots \dots \dots (2)$$

where

$Q_s = \delta_0 + \sum \delta_i X_i + \varepsilon_i$, which is the model of interest

$Q_s = \Phi_0 + \sum \Phi_i K_i + \mu_i$, which is the selection model

Q_s = total value of credit supplied

X_i = vector of socio-economic characteristics

K_i = sub-set of vector of socio-economic characteristics, X_i .

δ_0, Φ_0 = constants

δ_i, Φ_i = coefficients

e_i, μ_i = error terms

The results of the analysis of factors that influence the amount of credit supplied in credit markets are presented in Table 4.

Table 4
Heckman two-step selection model for amount of credit supplied in the Ugandan national credit market

Equation of interest: dependent variable lnrecivo (amount of loan received)	
Explanatory variables	Coefficients
Ln(age)	0.185 (1.42)
Ln(hhexp)	1.251 (16.64)***
Ln(astva)	0.201 (4.04)***
Ln(lan)	0.040 (1.26)
Ln(hhsize)	0.918 (10.26)***
Constant	-6.047 (9.35)***
Selection equation: dependent variable leve1 (=1 if applied for a loan in credit market)	
Gender (Male=1)	0.396 (13.67)***
Dummy: Urban	-0.087 (2.20)**
Ln(depr)	0.200 (5.02)***
Dummy: Central region	0.438 (7.37)***
Dummy: Eastern region	0.636 (11.08)***
Dummy: Western region	0.765 (13.60)***
Constant	-2.146 (35.73)***
Lambda	-0.394 (2.40)**

rho	-0.272
sigma	1.445
Number of observations	20 003
Censored observations	18 730
Uncensored observations	1 273
Wald chi2(5)	618.6
Prob>chi2	0.000

Absolute value of z-statistics in parentheses

* significant at 10%, ** significant at 5%, *** significant at 1%

The results suggest that the amount of credit supplied is positively and significantly influenced by household expenditure, household size and asset value. The positive and significant coefficient for household size agrees with Vaessen (2001) but, as argued earlier, is surprising, as such households are arguable less creditworthy. The results for household expenditure and asset value are as expected. Both factors suggest creditworthiness and reduce the likelihood of borrowers' credit being rationed.

4

Conclusion

Lenders' credit rationing behaviour in the credit markets in Uganda, as would be expected, is linked to borrowers' repayment capacity (or creditworthiness). Various factors influence repayment capacity, including individual and household characteristics. These factors were the focus of this study.

This research has found, in support of empirical work done in other developing countries, that household asset value has a significant negative effect on credit rationing. This is so at national level, in both rural and urban sectors, and when modelling the amount of credit supplied.

Age is shown to have a significant negative effect on lenders' credit rationing behaviour at national level in the eastern region of Uganda and in the urban sector. However, in the empirical studies of countries of a similar level of development, age is shown in some instances to have a significant positive and in others a significant negative impact on credit rationing.

Dependency ratio has a significant negative effect on the rationing of credit at national level in the eastern region and the urban sector. This is surprising, as a higher dependency ratio would suggest a lower repayment capacity and thus less access to credit.

Household expenditure indicates an unexpected significant positive impact nationally, in the northern region and in the rural sector. However, when modelling the amount of credit supplied, the results indicate that household expenditure has a positive effect on credit supplied, implying a negative (and expected) impact on credit rationing.

Notes

1. The study by Okurut *et al.* (2005) explores credit rationing only in informal credit markets in Uganda.
2. Network information refers to a system in which potential borrowers have to be recommended to the lender by existing clients. The rationale is to screen the potential borrower so as to minimise default risk. This practice is most prevalent among microfinance institutions which give collateral-free loans. Those who give recommendations are obliged to act as guarantors in case of default.
3. Explanatory variables for the selection equations are chosen to yield the most significant effects, hence the variation of variables across the national, regional, and rural/urban models.

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