EMPIRICAL ANALYSIS OF FACTORS THAT INFLUENCE CREDIT DEMAND AMONG SMALL SCALE ENTERPRISES IN KANO STATE NIGERIA

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ABSTRACT

This paper investigates the factors that determine credit demand and their influence on the credit accessibility among small scale enterprises operating within three political zones of Kano state; Kano central, Kano north and Kano south. A random sampling of 404 surveyed enterprises for the data collected through a questionnaire was analysed using a logit regression in the first part of the analysis to find whether or not respondents (small business operators) apply for credit. In the second part, the ordered logistic regression was used to identify the influence of these factors on credit application outcome. In the logistic regression analysis, the results show that age, gender and collateral are statistically significant of being apply (versus not apply) while education, enterprise, experience and location show no statistical significance. In the ordered logistic regression, age, location and experience to statistically have influence on access to credit while education, enterprise, gender and collateral show a negative influence. The study recommends policy interventions to design a strategy to improve financial lending with view to improve small business credit accessibility in Nigeria.

Keywords: Credit demand, small scale enterprises, ordered logistic model, logit model.

1. INTRODUCTION

Credit is a scarce resource used in equipping poor households and firms with a promise to pay in a future time. It is a weapon used to combat vicious circle of poverty through an investment to enhance income and consumption leading to welfare improvement (Coleman, 1999; Khandker and Faruqee, 2003).Credit demand among small scale enterprises has increased over years because of the expansion in their activities which results from increase in demand for goods and services they produce and easy accessibility to many people. Yet, the enterprises continue to face financial difficulties due to lack of collateral requirements and financial transaction records which further constrain them to access appropriate financial services especially in developing countries (World Bank, 2008). On the credit supply side, however, commercial banks hesitate to serve these enterprises due to the high costs of transaction, asymmetric information and uncertainty attributable to the business characteristics such as location, initial investment and employment size and that of the owner

such as gender, education level and family size (World Bank, 2008). As a result, a gap is created between credit demand and supply that has attracted attentions of policy makers and researchers especially in developing countries and necessitated the need to device means of matching this gap. In order to remedy this financial gap, a microfinance program was introduced to serve small scale borrowers through bank and nonbank institutions using a specialized character-based approach to ensure that those poor firms and households who are excluded from conventional banking services are adequately equipped with credit to finance their activities (Areetey, 2008).

Small scale enterprises considered in this paper are the small businesses both in rural and urban areas that constitute majority of private sector employment that create jobs and generate income to low-income earners leading to economic growth and social stability in most developing countries. Which despite their contributions to socioeconomic development, have been denied adequate access to credit for the start-up and expansion and the financial services provided by conventional financial institutions. Because formal lending sectors make credit decisions through observed regulatory constraints, which include interest rate and attributes of borrowers and their businesses. So enterprises represent those poor firms and households who are farmers, petty traders, street hawkers and various small services providers that own, manage and employ small number of people, and whose survival of their business relies on self-generated income and they continue to face difficulties in accessing credit (Magboul, 2016). However, they face problems of information asymmetry when trying to identify the riskiness of lending to specific subsets of borrowers. Financial contracts involve default risk because of adverse selection and moral hazard problems associated with the borrower's indeterminate type and unpredictable action (Stiglitzand Weiss, 1981). The paper used ordered logistic regression to identify factors that influence whether or not a small scale enterprise applies for credit particularly in Kano state, Nigeria. After the introduction, section 2 is objective, section 3 literature on credit demand, section 4methodology, section 5 results and discussion and section 6 presents the conclusions of the study.

2. OBJECTIVE

The aim of this paper is to examine the demographic factors (age, education, gender) along with socio economic factors (enterprise, experience, collateral, location) in determining small business enterprises' credit demand and their influence on credit accessibility.

3. LITERATURE REVIEW

Concept of credit access and credit participation was used interchangeably by different studies to examine factors that determine credit demand. Credit access describes an individual's willingness to borrow credit by satisfying all lending conditions irrespective of whether he borrows or not, while credit participation means having access to particular source of credit (Doan et al., 2010).

Many studies on credit demand used different empirical and analytical approaches. Studies that used empirical approaches to study credit demand and based their empirical models on behavioral assumptions from economic theory include (Magri, 2002; Fabbi & Padula, 2004Mpuga; 2004) and their empirical specifications were based on pragmatic assumptions.

Fabbri and Padula (2004) applied constrained utility maximization as their theoretical framework to introduce minimum repayment requirements by testing for the influence of judicial system efficiency on the credit demand.

Beck and Torre (2006) used access frontier framework and evaluated the outreach of financial system of a country and also designed policies to ensure the outreach of lending services increase. However, number of studies that adopted simple descriptive statistical approaches like cross-tabulation, test of differences between means and analyses of variance (ANOVA) to study credit market participation include (Atieno, 2001; Guangwen, 2008; Shah et al., 2008). Others that used Randomized Controlled Trials (RCT) for price and maturity elasticity of consumer credit demand as well as evaluating the impact of microfinance program or effect of new product and policy (Karlan, 2008; Karlan & Zinman, 2009; Gine & Karlan, 2009).

Moreover, common models used for credit demand analysis are choice models. Different versions of choice models have been used based on the dependent variable under study e.g. binary and multinomial logit/probit models, etc. for example, when the response variable is measured as continuous amount credit borrowed, version of truncated distribution models are used. Studies that have used combinations of the models mentioned above to analyse determinants of credit demand and amount of credit borrowed e.g. Shah et al. (2008) used logit model (binary and multinomial) to analyse determinants of credit participation in Pakistan. Li (2010) used the models to study microcredit in rural household in China. Duman (2009) applied it to study small enterprises in turkey. Messah and Wangi (2011) studied determinants of choice between sources of finance in Kenya. Others include Sekyi et al. (2014) in Ghana, Okurut (2006) in South Africa and Mpuga (2004) in Uganda.

For probit models, the studies include Umoh (2006) in Nigeria, who studied small business owner's access to microcredit. Zeller (1994) in Madagascar and Aga and Reilly (2011) in Ethiopia. Okurut (2006) used Heckman probit model to correct for bias of sample selection in his study of microcredit participation among poor blacks in South Africa. Similarly, two-stage choice selection model was employed to study credit participation in rural Vietnam by Nguyan (2007). The same model was used by Mpuga (2004) in Uganda, Diagne and Zelller (2001) in Malawi, Duta and Magableh (2006) in Jordan, Daniel et al (2013) in Kenya and Bendig et al (2009) in Ghana. The studies above identified different number of geographic, demographic and socio-economic factors that influence small scale business owner to whether apply for credit or not.

From the review of above literatures on small business credit demand, further study need to be carried out using different method. Therefore this study employed ordered logistic model to investigate factors that influence credit demand among small business enterprises in Nigeria.

4. METHODOLOGY

The data used in this study were obtained from a survey of small-scale enterprises conducted in Kano state, Nigeria. It involved the survey of 404farmers, petty traders, street hawkers and various small services providers and only selected from three political zones in Kano state.

Logit regression was used in the first part to model the response on whether or not an individual applies for credit. Similarly, an ordered logistic regression was used in the second part to investigate the determinants of credit demand. Outcome response (is categorical) has some order and coded 0, 1, 2 and 3 indicating the credit groups. Model specification in this study follows that of Sofia, et al (2015) in their study of citizens' preferences on healthcare expenditure allocation: Evidence from Greece. The likelihood of being in either of the credit groups was described by ordered logit model as follows:

$$\text{Pr}\,(Y = c/X_i) = F(X_i\beta) \,\text{-------------------------------}\, \text{I}$$

Where; Y is the outcome response for dependent variable (coded as 0, 1, 2, 3); F is the standard logistic cumulative link function; X is the set of predictor variables. The empirical specification of equation I above is presented below:

$$Y_i = a_0 + a_i X_i + \varepsilon_i \,\text{-----------------------------------}\, \text{II}$$

Note that; inclusion of variables in X_i set is justified by various studies as presented in Table 4.1 and $\varepsilon_i \sim$ the Logistic (0, 1).

Table 4.1: Definition and Measurement of Variables

Variables	Definition	Measurement	Source
C_{Dij}	Credit Demand	(j = 0, 1, 2, 3) not apply, fully access, partially access, fully rejected.	Aga & Reilly (2011), Essien & Arene (2014), Akudugu (2016), Denkyirah, et al. (2016)
Ag_i	Age	Measured as number of years for firm owner	Bonnet, Cieply & Dejardin (2016); Chen & Ahmed (2014); Aga & Reilly (2011); Akudugu (2016)
Ed_i	Education level	1= primary, 2 = secondary, 3= diploma/NCE, 4 = BSC/HND, 5 = postgraduate, 6 = religious education	Akudugu (2016); Hoque, et al. (2016);); Essien&Arene (2014)
Gd_i	Gender	Binary; 1 if male, 0 female	Hoque, et al, (2016); Denkyirah, et al. (2016); Maso (2014)
En_i	Enterprise	(j =1-4) Agricultural Industry, Manufacturing Industry, Servicing Industry, Trading Industry	Bonnet, Cieply & Dejardin (2016); Mkandawire & Duan (2016)
Ex_i	Experience	Measured as number of years a firm spent in the business	El-Said et al. (2013); Hoque, et al. (2016);
Lc_i	Location	(j =1, 3) if firm is located in Kano central, north and or south	Akudugu (2016); Denkyirah, et al. (2016); Akudugu, et al, (2009); Aga & Reilly (2011)
Cl_i	Collateral	Binary; 1 if firm gets loan with collateral, 2 if otherwise	Aga & Reilly (2011); El-Said et al., (2013); Denkyirah, et al. (2016)

Author's compilation, 2017

Regarding standard deviation in all samples in Table 4.2, gender, enterprise, location and collateral variables have smaller standard deviations, which indicate that they cluster around their mean value. While age, experience and education variables have large standard deviation, indicating that they are more disperse to the mean.

Table 4.2: Summary Statistics

Variable	Obs.	Mean	Std. Dev.	Min	Max
Outcome	404	0.47772	0.86967	0	3
Age	404	34.8713	12.0881	18	80
Education	404	2.87376	1.25878	1	6
Gender	404	0.80941	0.39326	0	1
Enterprise	404	2.48762	0.96198	1	4
Collateral	404	1.29455	0.45641	1	2
Experience	404	5.93564	5.71974	1	40
location	404	1.38119	0.69256	1	3

Author's computation using STATA 13Software

Table 4.3 presents correlation analysis that shows the direction and strength of the linear association between predictor variables in this study. The lowest correlation is 0.0065 between outcome and education while the highest is 0.5668, between experience and age. However, none of the correlations is equal to or above 0.60 and crucial issue of multi colinearity order occurs when correlation is 0.90 (Tabachnik & Fidell, 2007).

Table 4.3: Correlation Analysis

	outcome	age	education	gender	enterprise	collateral	experience	location
outcome	1							
age	0.265	1						
education	-0.0065	0.0884	1					
gender	0.0637	-0.0772	-0.037	1				
enterprise	0.1391	0.5124	0.136	-0.1866	1			
collateral	-0.1866	-0.222	-0.079	-0.0182	-0.1301	1		
experience	0.1593	0.5668	0.0898	0.0519	0.164	-0.1524	1	
location	-0.0353	0.0118	0.1274	0.0852	-0.0972	0.0207	0.0895	1

Author's generation using STATA 13 Software

5. RESULTS AND DISCUSSION

5.1 Logistic Estimates and Marginal Effects of the Determinants of Credit Application

Of the 404 respondents surveyed in the study area, 292 did not apply (non-applicants), 21 are rejected and 39 received partial amount while 52 received full amount (applicants).So total number of non-applicants is 292 and that of the applicants put together is 112. Column (1) of Table 5.1 presents estimates of logit model while column (2) presents the marginal effects results of the seven predictor variables.

Table 5.1: Logit Regression and A/ Marginal effects

VARIABLES	(1) Logit estimate	(2) M/effects of Logit
age	0.0417***	0.00710***
	(0.0145)	(0.00238)
2.education	0.515	0.0786
	(0.533)	(0.0756)
3.education	0.879*	0.143*
	(0.510)	(0.0739)
4.education	0.884	0.144
	(0.591)	(0.0911)
5.education	-0.208	-0.0269
	(1.049)	(0.131)
6.education	-0.398	-0.0490
	(0.638)	(0.0795)
gender	0.807**	0.137**
	(0.342)	(0.0568)
2.enterprise	-0.0507	-0.00826
	(0.428)	(0.0701)
3.enterprise	0.679	0.125
	(0.494)	(0.0888)
4.enterprise	0.209	0.0357
	(0.500)	(0.0847)
collateral	-0.999***	-0.170***
	(0.315)	(0.0517)
experience	0.0225	0.00384
	(0.0238)	(0.00404)
2.location	-0.120	-0.0200
	(0.370)	(0.0607)
3.location	0.138	0.0240
	(0.372)	(0.0657)
Constant	-2.798***	
	(0.924)	
Observations	404	404

Standard errors in parentheses, *** $p<0.01$, ** $p<0.05$, * $p<0.1$

From column (1) in Table 5.1, the age is found to be statistically significant at 90% level meaning that one year increase in the age of small entrepreneur increases the probability to apply for credit. In the column (2), marginal effect shows that age has a significant positive effect in credit application by 0.71%. Regarding the beta coefficient of education, those who have 2.education, 3.education and 4.education are more likely to apply for credit while those who have 5.education and 6.education are less likely to apply, compared to those who primary school certificate (reference category). However, in column (2) of Table 5.1, the marginal effects show that having a secondary school certificate (2.education) increases by 7.9% more probability to apply for credit and having a Diploma/NCE (3.education) increases by 14.3% and having a BSC/HND (4.education) increases by 14.4% probability to apply for credit respectively. But having a postgraduate (5.education) and religious education (6.education) decreases the probability to by 2.7 and 4.9% respectively.

Gender is another important factor which is found to be positive and statistically significant at 95% level. This means that being a male-owned small enterprise increases the probability to apply for credit. According to the column (2) result, the gender has 13.7% more likelihood of a male being applied than a female. The bets coefficient for sector enterprise is negative for manufacturing (2.enterprise) and positive for services (3.enterprise) and trade (4.enterprise) respectively. This means that being an enterprise from manufacturing sector decreases the probability to apply for credit compared to the agriculture (reference category) while being in services and trade sectors increases the probability to apply. The marginal effect result shows that being an enterprise from manufacturing sector decreases the probability to apply by 0.83% and increases the probability to apply by 12.5 and 3.6% for being in services and trade enterprises respectively.

Collateral coefficient is negative but statistically significant at 99% level. It means that those who have collateral are more likely to apply that compared to those who do not have (reference category). According to the marginal effect in column (2), one unit increase in the collateral holding decreases the likelihood to apply by 17%.This is in line with existing literatures confirming that collateral reduces risk of default and lender exposure to loss of repayment default (Zander, 1992; Fatoki & Smit, 2001; Dutta & Magableh, 2006; Pham & Lensink, 2008; Mira & Kennedy, 2013; Essien & Arene, 2015; Tadesse, 2014).

The coefficient of business experience is positive and insignificant meaning that increases in experience by one year increases the probability to apply for credit by 0.38%. However, the location of an enterprise in this study is found to have negative and positive coefficients. This implies that business enterprises which are located in Kano north (2.location) are less likely to apply for credit while those located in Kano south (3.location) are more likely to apply in comparison to those in the Kano central (reference category). Business enterprises which are in 2.location are 2.0% less likely to apply while those in 3.location are 2.4% more likely to apply.

5.2 Ordered Logistic Estimates and Marginal Effects of the Effects of Factors on Credit Outcome

To identify the influence of factor attributes on credit demand, age, education level, gender, experience, enterprise, location and collateral are considered in the analysis which involved only non-zero observations 112(applicants). One of the assumptions of ordered logistic regression is that relationship between outcomes in each group is the same. It is assumed that coefficients that describe relationship between first, second and third categories of the response variable are the same and also between one category and the next. This is referred to as proportional odds assumption or parallel regression assumption indicating the relationship between all groups is the same as in Table 5.2.

Table 5.2 Ordered Logit Regression and Marginal Effects

VARIABLES	(1) Ologit estimates	(2) Fully accessed	(3) Partially accessed	(4) Fully rejected
age	0.0532**	-0.0120**	0.00448*	0.00756**
	(0.0254)	(0.00546)	(0.00232)	(0.00362)
2.education	0.440	-0.0975	0.0296	0.0678
	(0.905)	(0.203)	(0.0758)	(0.129)
3.education	-0.239	0.0539	-0.0235	-0.0304
	(0.880)	(0.198)	(0.0805)	(0.118)
4.education	0.433	-0.0960	0.0293	0.0667
	(0.968)	(0.215)	(0.0762)	(0.143)
5.education	-0.344	0.0776	-0.0352	-0.0424
	(1.583)	(0.355)	(0.170)	(0.186)
6.education	-0.0591	0.0133	-0.00541	-0.00794
	(1.069)	(0.241)	(0.0975)	(0.144)
gender	0.182	-0.0412	0.0153	0.0259
	(0.618)	(0.140)	(0.0525)	(0.0874)
2.enterprise	-0.707	0.150	-0.0291	-0.121
	(0.682)	(0.136)	(0.0288)	(0.128)
3.enterprise	-0.902	0.194	-0.0464	-0.148
	(0.778)	(0.156)	(0.0368)	(0.139)
4.enterprise	-0.830	0.178	-0.0396	-0.138
	(0.790)	(0.159)	(0.0354)	(0.142)
collateral	0.318	-0.0720	0.0268	0.0452
	(0.577)	(0.130)	(0.0490)	(0.0820)
experience	-0.0624*	0.0141*	-0.00526	-0.00886*
	(0.0377)	(0.00820)	(0.00328)	(0.00538)
2.location	-1.141*	0.263**	-0.129	-0.134**
	(0.616)	(0.132)	(0.0829)	(0.0573)
3.location	-0.931	0.217*	-0.100	-0.117*
	(0.572)	(0.128)	(0.0732)	(0.0602)
Constant cut1	1.103			
	(1.565)			
Constant cut2	2.852*			
	(1.589)			
Observations	112	112	112	112

Standard errors in parentheses, *** p<0.01, ** p<0.05, * p<0.1

Interpretation of this result is in similar way to that from a binary logistic regression, except that, under logit regression we are interesting in knowing whether or not a credit is applied while under ordered logistic regression we are interesting in investigating the influence/effect of these factors on credit outcome. From column (2) of Table 5.2 increase in age by one year decreases the likelihood to fully access credit by 1.2% and increases the likelihood to partially access by 0.5 and to be fully rejected by 0.8% respectively. This perhaps is due to the fact that banks perceive borrower with more age to be economically less active. This result contradicts the findings of Tonin et al (1998); Alhassan & Sakara (2014) who found old people to fully accessed credit.

Having 2.education (Secondary) decreases the probability to fully access credit by 9.8% and increases the probability to partially access by 2.9 and to be fully rejected by 6.8%

respectively. Similarly, having 3.education (Diploma/NCE) increases 5.4% more likelihood to fully access credit and decreases the likelihood by 2.4 and 3.1% to partially access credit and to be fully rejected respectively. This is because applicants with 3.education level are perceived to acquire more skill and be more responsible compared to the 1.education (reference category). Conversely, applicants who hold 4.education certificate (BSC/HND) are 9.6% less likely to fully access credit and 2.9 and 6.7% more likely to partially access credit and to be fully rejected respectively. Likewise, holding 5.education (postgraduate) and 6.education (religious education) influences the likelihood to fully access credit by 7.8 and 1.3% respectively and decreases the likelihood to partially access credit by 3.5 and 0.5% and to also be fully rejected by 4.2 and 0.8% respectively. The result of education corroborates with Mkandawire and Duan (2016) who also found a similar result.

Gender negatively affects the probability of female borrower to fully access credit by 4.1% and positively influences the probability to partially access by 1.5% and to be fully rejected by 2.6%. This is because female borrower are deemed not have economically viable enterprise and they patronize bank services compared to their male counterparts. This finding corroborates with (Zeller, 1994; Aga & Reilly, 2011; Sebu, 2013). Being in a sector enterprise 2.enterprise (manufacturing), increases the probability to fully access credit by 15.0% and decreases the probability to partially access credit by 2.9% and to be fully rejected by 12.1% respectively. Similarly, being in 3.enterprise (services), increases the probability to fully access credit by 19.4% and decreases the probability to partially access credit by 4.6% and to be fully rejected by 14.8% respectively. Again, being in 4.enterprise (trade), increases the probability to fully access credit by 17.8% and decreases the probability to partially access credit by 3.9% and to be fully rejected by 13.8% respectively. Having collateral decreases the likelihood to fully access credit by 7.2% and increases the likelihood to partially access credit by 2.7% and to be rejected by 4.5% respectively. This result agrees with (Fatoki & Smith, 2011; Mira & Kennedy, 2013; Tadesse, 2014; Essien & Arene, 2015).

Experience is statistically significant at 90% level for fully credit access and fully rejected. Having one year increase in the business experience increases the probability to fully access credit by 1.4% and decreases the probability to partially access credit by 0.5% and to be fully rejected by 0.9% respectively. This contradicts the findings of Mkandawire and Duan (2016) who found experience to have a negative on the credit access. Location of business enterprises in Kano north (2.location) increases more likely to fully access credit by 26.3% and less likely to partially access credit by 12.9% and also decreases less likely to be fully rejected by 13.4% respectively. While if the location is in the Kano south (3.location)probability to fully access credit is increased by 21.7% and to partially access credit is decreased by 10.0% and to be fully rejected by 11.7% respectively. The result concurs with Okurut (2006) who found provisional location to have a positive impact on the access to formal credit.

The cut-points shown at the bottom of the output indicate where the latent variable is cut to make the three credit groups that are observed in our data, excluding the zero group. It is important to note that this latent variable is continuous and are generally not used in the

interpretation of the results. Due to assumption of proportional odds, the same increase is found between 1 and 2category of apply and the combined categories of 2 and 3apply.

Table 5.3: Post Estimation Diagnostic Tests

Model Specification Test, Goodness of FIT-Test and Multicollinearity Test of Ordered Logistic Estimates

Test	Measure
Model Specification	
Linktest	p-value
_hat	0.000
Multicollinearity Test	
Variable	**Tolerance**
age	0.49
educ	0.91
gndr	0.95
entpr	0.68
cotrl	0.94
expr	0.64
lctn	0.97
Variable	**Variance Inflation Factor (VIF)**
age	2.06
educ	1.09
gndr	1.06
entpr	1.46
cotrl	1.06
expr	1.56
lctn	1.03
Brant Test	**Chi-Square**
Parallel Regression Assumption	51.44
Likelihood Ratio Test	
lrtest	= 10.44
m1 nested in m2	= 0.0012

Source: Author's generated using STATA software version 13.0

The table 5.3 presents different results conducted for the post estimation diagnostic tests. First, the link test for model specification error with p-value (0.439) meaning hat square is not statistically significant, indicating that the model is corrected specified. However, multicollinearity test was carried out using VIF and TOL values. All the values of variables under VIF are less than 10.0 and that of TOL are greater than 0.1, showing that there is no presence of multicollinearity among the predictor variables in the model (Pregibon, 1981). Similarly, lrtest was conducted where model one was nested into model 2 and likelihood ratio (10.44) and the pro>chi2 (0.0012). Finally, a brant test is chi2 (51.44) and p>chi2 (0.000) implying that the parallel regression has been violated and meaning the current model is relevant in explaining the relationship between the dependent variable and explanatory variables.

6. CONCLUSION

The aim of this paper was to find the determinant factors of credit demand and their influence on the credit application outcome using demographic and socioeconomic factor attributes of the borrowers. Two regression models; logit model and ordered logistics model were used. Both models found some of these factors to be statistically significant while others are not. Logit model found age, gender and collateral to be statistically significant in determining credit application while the ordered logistic model found age, location and experience to significantly influence credit accessibility. The application of ordered logistic model in this study is in conformity with previous study conducted on the healthcare expenditure allocation. It is recommended that the model will be extended for further study to include both formal and informal money lenders especially in developing economies with a view to resolve issues and challenges facing the credit markets.

However, future study can be carried out in different ways. Firstly, the dependent variable in this study is defined on the basis of demand-side response only which reflects the view of borrowers, therefore next study can add the supply-side to hear the view of lenders. Secondly, more explanatory variables can be used to replicate this study in different country or region.

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