Journal Pre-proof

Does institution type affect access to finance for cassava actors in Nigeria?

Victor O. Okoruwa, Adebayo B. Abass, Olaide A. Akin-Olagunju, Nurudeen A. Akinola

Please cite this article as: V.O. Okoruwa, A.B. Abass, O.A. Akin-Olagunju, N.A. Akinola, Does institution type affect access to finance for cassava actors in Nigeria?, *Journal of Agriculture and Food Research*, https://doi.org/10.1016/j.jafr.2020.100023.

Does institution type affect access to finance for cassava actors in Nigeria?

Victor O. Okoruwa[1], Adebayo B. Abass[2,3], Olaide A. Akin-Olagunju[1,*] and Nurudeen A. Akinola[3]

[1] Department of Agricultural Economics, University of Ibadan, Nigeria; vokoruwa@gmail.com
[2] International Institute of Tropical Agriculture (IITA), P.O. Box 34441, Dar es Salaam, Tanzania; a.abass@cgiar.org
[3] International Institute of Tropical Agriculture (IITA), PMB 5320, Ibadan, Nigeria; nurudeengona@yahoo.com
[*] Correspondence: hashimakinolag@gmail.com; Tel.: +234-8057445667.

Abstract

The cassava system in Nigeria is developing, with increasing attention to its potential positive outcomes. However, credit access is a major problem in expanding productive activities of the different actors across the value chains of cassava products. This study investigates the extent of access to credit by cassava actors with respect to the different financial institutions in the country using data obtained from a sample of 168 actors, including producers, processors, marketers, fabricators and end users. The study found that commercial banks had the highest disbursement rate (88.0%) despite higher interest rate charged, while government banks had the least (73.6%). Processors (79.5%) and marketers (79.4%) had highest credit access rate while fabricators (67.5%) had the least. Regression results revealed that cassava actors that patronized commercial banks particularly those who are medium scale had access to higher amount of credit. However, female actors and those using cooperative banks secured lower credit amount. In line with the results, Nigeria should champion private-sector-led credit provision through appropriate policies aimed at improving the capacity of the institutions. Financial institutions should be strengthened for better credit access by the cassava actors, and hence improve their productivity.

Keywords: Financial institutions, Value Chain Actors, Cassava, Credit.

1. Introduction

Nigeria is the largest producer of cassava roots in the world with an estimated 36.8 million metric ton (MT), mostly produced by smallholder farmers on fragmented land holdings of about 1-5 ha per farmer and at an average yield of 12 MT/ha [1]. Notwithstanding the leading role of Nigeria in global cassava production, the country can still leverage on some enabling factors for better production and improved welfare of the smallholder producers and other actors along the cassava value chain, especially through value addition. Timely access to sufficient credit has been adjudged as one of the critical factors needed for the success of producers and other actors along agricultural value chains in Africa [2].

Although access to credit is critical to agricultural production and welfare [3], farming households in Nigeria are usually confronted with poor credit access [4]. The trend in agricultural access to credit [5] reveals that between 1991 and 2006, the agricultural sector obtained annual average credit up to the tune of $US500 million, which rose above $US1 billion in 2007. Although there was a rise in credit availability between 2010 and 2014, there has been decline since then. When agricultural credit obtained was viewed as a share of total domestic credit available to all sectors in the economy, the agricultural sector was seen to be lacking. Although highest values of agricultural credit shares occurred in 1994 and 1996, these were less than 20% of total available credit. In addition, there was a dip in 1997 and the shares had been mostly on a downward trend up till recent times [5].

In order to improve the poor nature of agricultural financing in Nigeria, the Federal Government of Nigeria (FGN) instituted intervention policies, projects and program. These programs include the Agricultural Credit Guarantee Scheme Fund (ACGSF), the Agricultural Credit Support Scheme (ACSS), the Commercial Agricultural Credit Scheme (CACS) and the Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL). The ACGSF was instituted in 1977 but started operation in 1978 with the objective of guaranteeing loans disbursed

by commercial banks for agricultural purposes in order to increase credit provision in the sector. The ACSS was established through collaborative efforts of FGN, Central Bank of Nigeria (CBN) and Bankers' Committee with the main intention of giving credit to producers at single-digit interest rate and encouraging repayment through 6.0% rebate on credit facility. In similar vein, the CACS, which was a joint effort of CBN and Federal Ministry of Agriculture and Rural Development (FMARD) was designed to promote commercial agriculture in Nigeria while NIRSAL, had a ₦75 billion [$1 = ₦164.64] take-off grant to address risks in agriculture through credit guarantees in order to make agricultural lending more attractive to financial institutions [6,7]. All the institutional efforts had seen the number of guaranteed loans oscillating with increasing magnitudes though the total amount has been rising considerably up till 2014, when it started declining [8].

Apart from these well-known financing schemes, new schemes have also emerged in recent years. These include the Paddy Aggregation Scheme (PAS) specifically established in 2017 and funded from the CACS fund to boost local rice production and make the staple affordable to the local consumers; the Agri-Business/Small and Medium Enterprises Investment Scheme (AGSMEIS) established by the Bankers' Committee in 2017 to "support FGN's efforts at promoting agricultural businesses as vehicles of employment generation and sustainable economic growth" and the Accelerated Agriculture Development Scheme (AADS) aimed at recruiting youths on annual basis thereby solving manpower problem in the agricultural value chain [8]. However, these have been continually thwarted by inadequate funding and poor coverage, as the number of guaranteed loans is not commensurate with the smallholder population in need of such within the economy.

Many studies conducted in Nigeria have identified salient factors affecting credit access. Adebayo and Adeola [9] focused on credit use in Oyo state, Nigeria and identified age, marital status, household size and amount requested as significant determinants affecting credit access. They, however, observed interest rate as the greatest constraint to credit access. Mbutor et al. [6] studied the relationship between agricultural financing and production in Nigeria using Vector Error Correction (VECM) method and discovered that despite the realization of the importance of financing to the sector, output was largely driven by weather variables and not by credit provision. Ayeomoni and Aladejana [10] applied the Auto-Regressive Distributed Lag (ARDL) econometric approach to time series data spanning 1986-2014. The study found both short and long-run relationships between agricultural credit and economic growth in Nigeria. On the other hand, while examining the effect of credit status on technical efficiency of cassava farmers in Oyo State, [11] found that credit constraint reduced technical efficiency of the cassava producers while age, education, farming experience and membership of farmers' group were the important factors determining farmers' credit status.

Several financial institutions have been involved in agricultural financing in Nigeria. However, the extents of their involvements differ in terms of volume and value of financing. Recent (2017) disbursement figures for the ACGS showed that out of the 58,548 loans totaling ₦8.1 billion, microfinance banks granted 98% of the total volume and 97% of the total value. The remaining percentages were granted by commercial banks [8]. Although, it is widely recognized that the private sector has key role in agricultural value chain financing [12], government-owned financial institutions can also be effective in finance provision. Indications from Madagascar, Tanzania and Zambia showed that credit providers were ready to assist farmers and processors with loans of favorable terms but under the coverage of the government guarantee scheme [13]. This is also evident from success stories from within and outside Africa. Manganhele [14] noted that government intervention in agricultural production and commercialization and offering of protection against vagaries of macroeconomic conditions, particularly inflation is crucial as is the case with Zimbabwe; diversification and risk-sharing as evident from Botswana; technologically-driven need-specific credit provision in Thailand; and good regulatory environment, absence of political interference and high savings mobilization capacity which reduced the need for subsidized loans.

2

The importance of financing the agricultural sector in general and cassava value chain in particular is not limited to Nigeria. Cassava root is a staple that cut across several other African countries and the governments and private sectors of these countries are making remarkable efforts to increase its production through financing. Coulibaly et al. [15] gave insights into cassava value chain financing situation in several West African countries. Most of the (informal) finance providers in Ghana were mostly well-educated males, in contrast to Cote d'Ivoire where there is sex balance. Almost all the providers in Ghana give out credit to actors unlike in Cote d'Ivoire where approximately 50% do so. Thus, coupled with the prohibitive interest rate, high transaction cost and not taking the peculiar characteristics of agricultural production into consideration, demands of the cassava actors could not be adequately met. In Liberia, the cassava sector begs for financing bail-out as only a quarter of cassava traders (who are the most prominent in the sector) were able to access credit from formal financial institutions and the other actors too had to rely on informal sources. Elsewhere in Africa, Rwanda's Economic Development and Poverty Reduction Strategy (EDPRS) is specific about the role of agriculture (of which cassava production feature prominently) since it accounts for almost a third of the national GDP and employs 75% of the total workforce. Thus, financing such a sector is critical for agricultural transformation and financial inclusiveness for overall growth and development [16].

There is great potential for the development of cassava value chain in Nigeria both from supply and demand sides, but it is wrought with many challenges. Generally, there are (limited or) no formal financing from financial institutions and available micro-credit schemes are neither widely-spread nor cover all sector needs. Furthermore, fund provision for small processing equipment is virtually non-existent while large processors access funds that are tied to product supply to end-users. In all, the financing scheme is not integrated to take care of all actors, simultaneously [17]. With respect to Sierra Leone, ease of access to credit has been identified as a way of developing the cassava value chain [15]. In Mozambique, the effort at providing credit for agricultural financing has been slowed down by lack of institutional capacity to ensure timely loan repayment, rural market failures, shortage of funds, inexperienced management personnel, lack of government support for private sector finance providers, political interference and high interest rate [14][18]. In the case of Uganda, more than three-fifths of the financial service providers charge interest rates in the range of 23-30% in a year, making it difficult for the cassava value chain actors to access credit [19]. In addition, there is no co-ordination among the various actors involved in the cassava value chain in contrast to the institutions (governmental, non-governmental, local and foreign organizations) which together influence the workings of the actors through capacity building, input supply, machineries provision, value addition services, financial and market linkage supports, among others [20]. Although there are formal lenders in Rwanda, people still use informal credit providers mostly. Notwithstanding the challenges, Rwanda has the key institutional foundation to scale up agricultural financing [16].

In view of the important role of cassava in the African and West African sub-regional agricultural systems, there is need to assess specific roles of the financial institutions with respect to cassava value chain financing. This is particularly salient for Nigeria, being the largest producer of cassava in the world. Thus, the pertinent questions in this respect are: Does institution type really affect access to credit for cassava actors? What other factors dictate actors' access to credit? To address these questions, the study employed Ordinary Least Square (OLS) regression technique and the Instrumental Variable (IV) regression estimation using Generalized Methods of Moment (GMM). The rest of the paper is organized as follows: Section 2 dwells on some theoretical and conceptual issues surrounding credit markets, Section 3 addresses different aspects of the research methodology, Section 4 presents the results while Section 5 caps the paper with conclusion and policy recommendations.

2. Theoretical and Conceptual Issues in Credit Markets

A growing body of literature has emerged to provide theoretical perspectives to the operationalization of financial markets. Specifically, the works tried to emphasize the role of imperfect information and incomplete markets on the running of financial markets particularly in developing nations. The crucial focus on these factors is as a result of the connection between financial markets imperfections and income inequality [21]. Financial market imperfections are usually considered to be core mechanisms through which inequality adversely affect growth because inequality persists as a result of these imperfections [22].

Stiglitz and Weiss [23] pioneered the attempts to explain the role of credit rationing in credit market. According to [23], a loan market in equilibrium may be characterized by credit rationing. For instance, banks giving out loans are basically concerned about how risky a loan is and the possible interest that can be received from it. It is however good to note that the interest rate charged by a bank contributes significantly to the degree of riskiness of the loans. This can take the form of sorting potential borrowers or affecting the actions of borrowers. Sorting potential borrowers, otherwise referred to as adverse selection effect, can be used to screen borrowers into "good borrowers" or "bad debtors" based on the assumption that customers who are ready to pay high interest rate may do so because they know that their probability of paying back is low. By implication, the higher the interest rates charged by banks, the higher will be the riskiness of loan repayment, with a possible downward effect on the bank's profits. Interest rate can also affect the actions of the borrowers and this is termed the incentive effect. Charging high interest rates affects the behavior of the borrowers as the return obtained from successful projects decreases with high interest rate.

In line with the stated assumptions, [24] analyzed the conditions of rural financial markets in developing countries. The study showed that a wide variety of rural settings exists and as such financial markets are highly fragmented and imperfect. While lenders might have a good idea about the average characteristics of the pool of potential borrowers, they may not have complete information concerning the characteristics of any particular borrower [25]. As a result, potential borrowers are categorized across different financial contracts based on their personal characteristics and financial activities. This explains why firms within the same market environment can have their loans processed and designed using financial instruments that vary in terms of the loan conditions [24]. The financial instruments include interest rate, size and type of collateral, contract forms, resources expended on monitoring and implementation of contract terms and conditions among others. Similarly, in his review of empirical literatures on rural financial markets, [26] argued that there exists extreme variability in the interest rates charged by lenders for superficially similar loan transactions within the same economy. However, to limit the consequences of information asymmetry in rural areas, three devices which are collateral requirements, usufruct loans and rotating savings and credit association are commonly used [27].

Empirically, research on the use of credit by rural households tends to imply that although it is not obvious that demand for credit far outweighs the supply, there are significant obstacles to the transformation of potential demand into revealed demand [28]. According to [23], both demand for loans and the supply of funds depends on interest rate which in turn is determined by the financial institution's expected return at r^*. The study further explained that, in the case of unmet loan requests, unsatisfied borrowers may offer higher interest rate to the bank until supply of funds equals demand. However, this situation is only obtainable under traditional analysis, as banks will not give out loans beyond r^*, even if borrowers are willing to offer interest rate beyond this point. Consequently, market failure in credit markets prompts household to switch profits between activities in order to finance their working capital and this therefore explains the complementarity of formal and informal financial institutions [29].

3. Materials and Methods
3.1. Study Area

4

The study was conducted in six states located in four out of the six geopolitical zones of Nigeria. These zones include South West, South East, South South and the North Central. These zones were selected based on the fact that several cassava programmes and research including root and tuber expansion programs have long been put in place and on-going in these areas. One such program is the "Cassava multiplication program" supported by the International Fund for Agricultural Development (IFAD), which is subsumed under the "Root and Tuber Expansion Program (RTEP)". This programme was implemented in 26 states of the Federation majority of which were located in these four geopolitical zones. Apart from the fact this programme was meant to contribute to the food security efforts of the FGN, it was also meant to improve cassava yields and increase the output of smallholder farmers. Thus, two states each from the South West (Oyo and Ogun) and South East (Abia and Enugu); one state from the South South (Rivers) and the FCT from North Central were selected for study. Target groups that were investigated in the study include different formal credit institutions, cooperatives and individuals who are cassava actors-cum-customers of the different financial institutions.

3.2. *Data type and Source*

The study relied mostly on primary data, which were collected with three well-structured questionnaires designed to elicit information from the three target groups – formal financial institutions, cooperatives and individuals engaged with the financial institutions (i.e the cassava value chain actors consisting of producers, processors, marketers, fabricators and end users). Information were collected as follows:

i. Financial institutions- Information on institutional characteristics, financial services rendered, type of client such services were rendered to along the cassava value chain, terms and condition of services, difficulties encountered and way to overcome such difficulties while rendering financial services;

ii. Individuals users – Type of financial institution associated with, types of financial service(s) obtained from credit institution, adequacy of such services, difficulties encountered while accessing financial services and ways of reducing such difficulties.

3.3. *Sampling Procedure*

A multi-stage sampling approach was used to sample both the financial institutions and clients resident in the six states studied. In the first stage, financial institutions were stratified into four strata namely: government owned, commercial, microfinance and cooperatives. Stage two involved the identification of the various financial institutions before the random or purposive selection (in some cases) of each of them in each of the three stratums. For example, for the stratum consisting of government owned financial institutions, both the Bank of Industry and Bank of Agriculture were purposively selected for study. This was because they were known to be the government-owned institutions used mostly by government to disburse agricultural credit. In the other three strata, the financial institutions were randomly selected. For the stratum consisting of commercial institution only five banks consisting of both the old and new generation banks (First Bank, Unity bank, Union Bank, United Bank of Africa (UBA) and Enterprise Bank) were selected, while for the microfinance banks ten banks were sampled. Higher number were sampled for the cooperatives owing to their proliferation. All these sections were replicated across the six states. The last stage entailed the random sampling of clients from each of the financial institutions sampled. The sampled clients were made of individuals who were selected at almost equitable proportion across the various financial institutions within each stratum. The respondents were drawn from the list of agricultural clients engaged in the cassava industry provided by the various financial institutions.

In order to obtain the number of banks and respondents to be sampled in each state, we applied an equitable distribution principle over selection proportionate to the size of either the LGAs or the EAs in each state (see Table C.1 in the appendix). The percentages for states with larger

distribution were however prorated slightly downwards to accommodate more samples for states with smaller distribution so that each zone may be sufficiently represented. The last column of Table C.1 shows the final percentages used for obtaining the number of enumeration areas sampled in each of the states and zones for financial institutions and individual users of financial institutions. In all a total of 912 respondents consisting of 108 formal financial institutions, 288 cooperatives and 516 individual users of financial institutions were sampled (see Table C.2 in the appendix for the distribution across zones). However, from the total number sampled only 317 (about one third) retrieved and properly filled questionnaires consisting of 52 formal financial institutions, 65 cooperatives and 200 individual users of financial institutions were used for analysis. Finally, 168 individuals were used in this paper because complete information could only be extracted for this number across the different financial institutions.

3.4. Model Specification

Two models were utilized for this study: the Ordinary Least Square-OLS regression technique and the Instrumental Variable (IV) regression, which was introduced at a point to correct for endogeneity. The Generalized Methods of Moment (GMM) option was used for the IV because it is the 'mainstay of econometric procedure' [30]. These models were used to assess the determinants of the amount of credit accessed by the value chain actors with differences in the underlying assumptions which is with and without consideration for bi-causality. The OLS regression is specified thus:

$$lnY_i = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \cdots + \beta_n X_n + \varepsilon_i \qquad \dots (1)$$

where

lnY_i = log of the amount of loan received from financial institution in Naira by the i-th actor. The explanatory variables for the OLS: X_1 = Age (years); X_2 = Sex (female=1, male=0); X_3 = Years of education; X_4 = Marital status (single=1, married=0); X_5 = Household size; X_6 = Primary occupation (agriculture=1, non-agriculture=0); X_7 = Years of specialization; X_8 = Monthly income (₦); X_9 = Association membership; X_{10} = Interest rate (%); Financial institution variable dummies [X_{11} = Cooperative, X_{12} = Commercial, X_{13} = Microfinance]; Specialization dummies [X_{14} = Processor, X_{15} = Marketer, X_{16} = Fabricator, X_{17} = End-user]; Scale of operation dummies [X_{18} = Medium scale, X_{19} = Large scale].

Each of the categories of financial institution type, specialization and scale of operation are dummy variables specified thus: D=1 if Yes; 0 otherwise. Estimations were made for different elements of the categorical variables using one of the elements as the base. In this wise, the government bank, producers and small-scale operation where base variables for the financial institution, specialization and scale of operation dummies respectively. Post-analysis tests were carried out to ensure correctness of the variables chosen and the models specified.

The possibility of bi-causality between financial institution type and amount of loan granted was further assessed. For instance, the case for bi-causality may arise when the amount disbursed to a cassava value chain actor is a function of the financial institution approached for loan. On the other hand, the amount of finance at hand or being used to run an enterprise could dictate the type of institution an actor domiciles his business fund to be able to access available credit facilities. This two-way relationship was tested through instrumental variable (IV) approach. The specification of the relationship between amount of loan granted and institution is expressed by

$$lnL_i = f(I_i) \qquad \dots (2)$$

where

6

lnL$_i$ is the log of amount of loan received by actor *i*, and *I* is the financial institution used by actor *i*. The linear representation of this model in Generalized Methods of Moment (GMM) specification can be given by

$$Y_i = X_i' \beta + \varepsilon_i \qquad \qquad \dots (3)$$

Y$_i$ = Dependent variable; *X$_i$* = Vector of explanatory variables; *β* = vector of coefficients; *ε$_i$* = stochastic error term. Borrowing from the works of [31], [32], [30] and [33], the linear empirical moment equation is given as

$$\left[\frac{1}{N} \sum_{i=1}^{N} Z_i (Y_i - X_i' \hat{\beta}) \right] = \left[\frac{1}{N} \sum_{i=1}^{N} m_i(\hat{\beta}) \right] = \bar{m}(\hat{\beta}) = 0 \qquad \dots (4)$$

where

$\bar{m}(\hat{\beta})$ = empirical moment equation; *m$_i$* = i-th moment condition; ℓ = number of moment conditions; *K* = number of parameters; *Z$_i$* = vector of instruments; N = number of observations; $\hat{\beta}$ = parameters vector. *Y$_i$* represents *lnL$_i$* which is the log of amount received as credit by i-th cassava actor in Naira. The $\bar{m}$ is the ℓ-vector and each ℓ-moment equation is a sample moment which is averaged over N. The GMM estimator for $\hat{\beta}$ is thus the parameter value that solves $\bar{m}(\hat{\beta})$ for zero. If $\ell = K$, there is exact solution to the empirical moment equation. However, there is over-identification *if* $\ell > K$ and under-identification *if* $\ell < K$; in which case it will be impossible to find solution and there will not be a unique solution, respectively.

Distance to source of credit was used as an instrumental variable in the model and post-estimation analysis results affirmed its appropriateness. In essence, commercial banks might have fewer branches than microfinance banks since they are mostly found in urban centers. Smaller size and less bureaucracy in microfinance banks make them to be better tailored towards the needs of the clients. Thus, there is possibility of such mini-banks to be more proliferated and thus closer to cassava actors than the mega-banks. On the other hand, the amount of loan granted an actor is a function of individual and institutional factors.

4. Results and Discussion

4.1. *Characteristics of the Cassava Value Chain Actors*

The general overview of the characteristics of the cassava value chain actors are presented in Tables 1 and 2. Table 1 shows that most of the actors were males and were married, with agriculture as their main source of income. Porter [34] had earlier shown that less women were usually found outside microcredit financing settings. Approximately two-third of the actors were members of associations and patronized microfinance banks, while one-fourth were farmers. Among the financial institutions patronised by actors, commercial banks were the least-used. In addition, actors were fairly-distributed with respect to the scale of operation. For instance, two (2) out of every five (5) actors were operating on medium scale while one (1) out of every five (5) operated large-scale businesses, suggesting the medium scale as the most preferred scale of operation among the actors.

Table 2 on the other hand, indicates that on average, an actor was about 44 years of age, spent about 12 years in formal education setting, had family size of 7 persons and 13 years of experience in his/her enterprise. This shows that on a general note, the actors were educated young adults with fairly large family and were well-experienced in their occupational activities. With respect to the finances, the actors got an average of ₦63,624.00 ($386.44) as monthly income while they requested for less than ₦0.5 million ($3,036.93) as loan, out of which approximately half was granted. This was repaid over a period of about a year at a very low average interest rate (0.13%). The results

7

revealed very high variations among actors in the monthly income, amount of loan requested and granted, as reflected by the standard deviation, minimum and maximum values.

Table 1. Distribution of actors by socioeconomic, enterprise and financial institution characteristics.

Variable	Description	Frequency	Percentage
Sex	Male	115	68.45
	Female	53	31.55
Marital status	Married	151	89.88
	Single	17	10.12
Primary occupation	Agriculture	134	79.76
	Non-Agriculture	34	20.24
Association membership	Yes	110	65.48
	No	58	34.52
Specialization	Producer	132	78.57
	Processor	21	12.50
	Marketer	12	7.14
	Fabricator	2	1.19
	End-User	1	0.60
Scale of operation	Small	61	36.31
	Medium	72	42.86
	Large	35	20.83
Institution type	Government Bank	26	15.48
	Cooperative Bank	19	11.31
	Commercial Bank	15	8.93
	Microfinance Bank	108	64.29
Number of observations		168	100.0

Table 2. Summary statistics of continuous socioeconomic and loan variables.

Variables	Mean	Std. deviation	Minimum	Maximum
Age (yrs)	44.03	9.26	25	80
Years of education	11.52	4.82	0	32
Household size	6.70	2.95	1	19
Years of specialisation	13.15	10.65	1	60
Experience with financial institutions (yrs)	4.80	4.43	1	21
Monthly income (₦)	63, 623.80	74, 879.38	4, 000.00	530, 000.00
Loan requested (₦)	418, 184.50	808, 800.30	15, 000.00	6, 000 000.00
Loan granted (₦)	274, 565.50	511, 322.30	10, 000.00	5, 000 000.00
Loan duration (months)	11.53	6.13	1.00	36.00
Interest rate (%)	0.13	0.10	0	0.36

Exchange rate: $1 = ₦164.64 [28]

Figure 1 shows further characteristics of cassava value chain actors with respect to loan acquisition. About 97% of the actors paid interest on their loans. Interest rates are mostly required in loans because it is considered as earning on capital. However, what is quite interesting in Figure 1 is that a relatively small number of actors (2.98%) did not pay interest on loans accessed. A further examination of the data revealed that these set of actors got loans only from agricultural banks which were government-owned. Apart from the interest rate, actors were asked to pay service charges and present collaterals. Credits given to approximately three (3) out of every five (5) actors were conditioned upon their presentation of collateral. Disaggregating on financial institution basis shows that about 73% of the actors that got credit from commercial banks were asked to supply collateral. This contrasts with cooperative bank where about 16% of the respondents were required to give collateral. This situation similarly played out in microfinance and agricultural banks where about 41% and 35% respectively were asked for collateral. Furthermore, about 97% of the actors got

8

their credit in cash while about 77% got it on time. Securing credit in cash gives opportunity of liquidity to be able to pay for various business activities [35] while timely access is crucial to procuring input at the right time. Adebayo and Adeola [9] noted that credit obtained by most of the small-scale farmers in Oyo state were used to pay for labour wages suggesting that loans secured as cash were very critical to the production processes. Perhaps, as a way of ensuring that the credit was used for the intended purpose, it was not disbursed to the actors at once but staggered over a period.
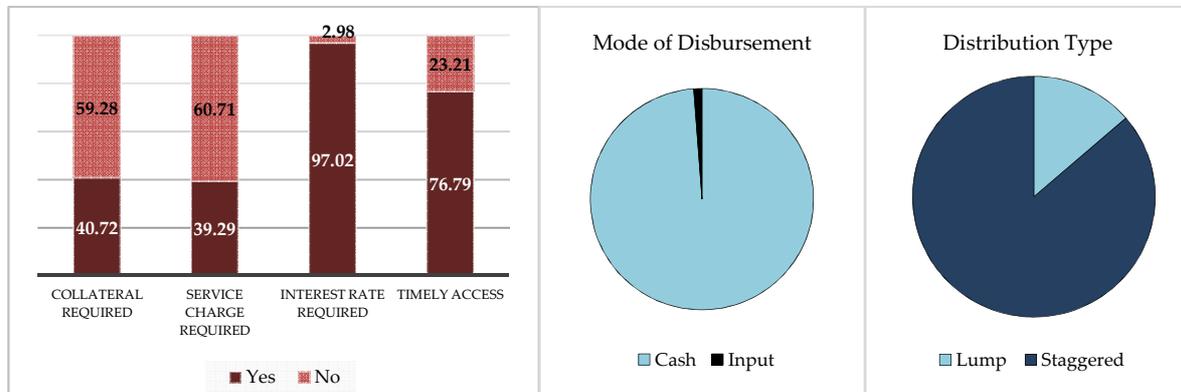

Figure 1. Additional loan characteristics of cassava value chain actors.

4.2. *Loan Request and Financial Institution Characteristics*

The results in Table 3 presents the average values of loan variables (amounts requested and granted, loan ratio, loan duration, interest rate) broken down by specialization, scale of operation and financial institution. From the table, fabricators put up highest average amount of loan request perhaps as a result of huge capital requirement for machine/equipment manufacture. Processors, producers and marketers however had relatively low amount of loan request in decreasing order. Processors were observed to be close to fabricators in terms of loan request, probably due to similar high cost requirement for machine procurement. Producers, processors and marketers however, had high credit access rate ranging from 77.1% to about 80.0% while their interest rates were about half of that of fabricators (25.0%). Low capital requirement and the possibility of higher frequency of loan turnover conferred advantage on them, unlike the case of fabricators. However, the fabricators had highest loan duration (21 months). These findings may suggest that higher loan disbursement and the incentive of longer repayment period are possibly influenced by readiness to pay higher interest rate since the financial institutions were mostly profit-oriented and therefore want to make the best use of the available fund. The low repayment period observed for most of the actors in the result has actually been identified as the bane of agricultural financing [36].

Large scale of operation conferred advantage of high loan access (81.0%) and better loan terms (i.e. low interest rate with reasonable loan duration) to the actors. The amount of loans requested from commercial banks was the highest despite their high interest rate. This was followed by government banks while cooperative banks had the least requested amount of loan. In addition, commercial banks had the highest disbursement rate (88.0%) while the government bank was the least in disbursement rate (73.6%). It was observed that most of the requests made to government banks were not met probably as a result of credit rationing. Low interest rates charged by government banks might have served as incentive for requests but these could not be attended to as a result of inadequate fund. On the other hand, high interest rate was charged by both commercial and cooperative banks probably as a result of high transaction cost and the fact that privately-owned initiatives are usually profit-oriented [35]. With the exception of government banks which are publicly owned and welfare-driven, microfinance banks were the only banks with low interest rate charges. There is the possibility that the low interest rate charged by this bank could have encouraged repayment which provided the bank much liquidity to be able to grant most of the

9

loans (76.3%) requests for. More so, the amount of loans requested by the clients are often micro (microloans) in nature and could easily be repaid, thereby reducing default rate to the minimum.

Table 3. Average values of loan variables by enterprise and financial institution characteristics.

		Loan requested (₦)	Loan granted (₦)	Loan ratio	Loan duration (months)	Interest rate (%)
Specialization	Producer	427 840.90	293 083.30	0.7711	11.5	0.14
	Processor	479 523.80	221 428.60	0.7946	11.4	0.12
	Marketer	200 833.30	168 333.30	0.7944	11.5	0.11
	Fabricator	600 000.00	335 000.00	0.6750	21.0	0.25
	End-user	100 000.00	100 000.00	1.0000	6.0	0.03
Scale of operation	Small	256 311.50	187 409.80	0.7539	10.4	0.18
	Medium	541 250.00	309 375.00	0.7776	12.6	0.12
	Large	447 142.90	354 857.10	0.8104	11.3	0.07
Financial institutions	Government	607 307.70	244 807.70	0.7361	15.8	0.10
	Cooperatives	160 526.30	97 894.00	0.8195	6.6	0.26
	Commercial	950 000.00	756 666.70	0.8796	16.7	0.21
	Microfinance	344 120.40	245 851.90	0.7633	10.7	0.11

Exchange rate: $1 = ₦164.64 [28]

Furthermore, the general credit access situation was highly positive as shown by the average loan ratio value of 0.78 for all the actors in Table 4.

Table 4. Summary statistics of loan ratio of cassava value chain actors.

Statistic	Value
Mean	0.78
Median	0.95
Standard deviation	0.27
Observation	168
Range	0.94
Minimum	0.06
Maximum	1

4.3 Determinants of Credit Accessed by Cassava Value Chain Actors

Results of Ordinary Least Square (OLS) regression parameter estimates on determinants of credit access are presented in Table 5. Robust variant of the regression was run to control for heteroscedasticity and the mean Variance Inflation Factor (VIF) of 1.61 indicates the absence of multicollinearity. Diagnostic statistics indicate non-significance of F-statistics for the Ramsey RESET Test (acceptance of the null of no omitted variables) thus confirming the suitability of the model, including right choice of variables. This was confirmed by the link test result. About ten (10) variables were significant between 5 and 10% levels. These include household size, years of education, monthly income, scale of operation (medium) and interest rate charged on loan which all had positive relationship with amount of loan received while sex (female) and specialization (marketer & fabricator) had negative relationship with the loan variable. On the other hand, coefficients of financial institution variables showed mixed result relationships.

The results in Table 5 further indicates that a unit (100%) increase in the number of females accessing credit relative to males reduced the amount of credit obtained by 49.8%, depicting the sex dimension to credit access. In contrast, a unit increase in years of formal education improved credit amount by 3.7%. Higher education level indicates higher human capacity which is rewarded with increased awareness of the type of loan and loan processing and hence better access. Moreover,

10

credit access increased with monthly income of the actors though the effect was minimal. One of the requirements for accessing loans from financial institutions is the income flow of the applicant, hence a good income flow as shown by monthly income increases the possibility of a successful loan request. Moreover, income might be indirectly linked to credit through savings. Actors with high income have tendency of setting some amount aside as savings with formal or informal institutions and this might be used as a pivot to get credit from such institutions. These savings might be generally low, but they have profound effect on agricultural credit [2]. Amount of credit is elastic to interest rate. A unit increase in interest rate increased the amount of credit by 188.5%. The association of high interest rate with better credit access might not be intuitive because ordinarily, high interest rate should discourage access. For instance, [2] noted that interest rates charged by financial institutions, with special reference to commercial banks, had negative effect on credit available to the agricultural sector. However, actors might need to overlook the higher interest rate in a bid to get needed fund to run their enterprises. In addition, they may feel more comfortable accessing loans from financial institutions that charge high interest rate if they are sure of getting the fund. To buttress this point, results from Table 3 showed that cassava actors accessed large credit from commercial banks that were charging high interest rates (comparatively), laying credence to the explanation. A similar case of non-intuitive credit-interest rate relationship is repayment rate that was found to relate positively with interest rate [38]. However, it would be better for the loan recipient to pay in time in order to reduce the interest accrued to the loan which would make repayment prohibitive.

   Moreover, a unit (100%) increase in the usage of commercial and cooperative banks by actors increased the amount of credit obtained from commercial bank by 98.2% points but reduced amount of credit got from cooperative bank by 77.1% points, relative to government banks (Table 5). The advantageous position of commercial banks may be because of high capacity to fund business concerns from their capital base. On enterprise characteristics, a unit increase in the number of medium-scale entrepreneurs relative to small-scale business owners improved the amount of credit by 51.7% points. Financial institutions will feel secure transacting with business entities where there is ease of monitoring, as a way of preventing default. More so, banks get considerably higher profit on loans given to big farms than to small farms even under the same loan terms [39]. Among the actors, marketers and the fabricators were the ones having significant influence on credit. A unit increase in the number of marketers and fabricators willing to access credit relative to producers reduced the amount of credit to be obtained by these two groups of actors by 45.1% and 100.9% points, respectively. The worse credit access situation of the fabricators might be a result of huge capital requirement for machineries which financial institutions might not want to buy-into as a result of risk involved or fund being tied down. The case of marketer was fair since the enterprise is variable-cost-dominated and the fund could be turned around severally.

Table 5. Parameter estimates of the determinants of credit access by actors from financial institutions.

Variable	Coefficient	Robust standard error	t-statistics	P >	t	
Age	-0.0008	0.0081	-0.09	0.927
Sex: Female	-0.4979***	0.1379	-3.61	0.000
Marital status: Single	-0.1451	0.2992	-0.48	0.629
Years of education	0.0369**	0.0154	2.39	0.018
Household size	0.0468*	0.0262	1.78	0.076
Primary occupation: Agric.	-0.3032	0.1894	-1.60	0.112
Years of specialization	0.0025	0.0074	0.33	0.739
Monthly income	4.63E-06***	1.49E-07	3.11	0.002
Association membership	-0.0119	0.1281	-0.09	0.926
Interest rate	1.8852*	1.0341	1.82	0.070
Financial institution type				
Cooperative	-0.7705**	0.3214	-2.40	0.018

11

Commercial	0.9823***	0.3207	3.06	0.003
Microfinance	0.0359	0.2066	0.17	0.862
Scale of operation				
Medium	0.5174***	0.1913	2.70	0.008
Large	0.1046	0.2692	0.39	0.698
Specialisation (VCA)				
Processor	0.1825	0.2968	0.61	0.540
Marketer	-0.4509*	0.2315	-1.95	0.053
Fabricator	-1.0089*	0.6082	-1.66	0.099
End User	-0.5005	0.3605	-1.39	0.167
Constant	10.8198***	0.4792	22.58	0.000
Post-estimation Results				
Ramsey RESET Test	F (3,145) = 1.98	Prob > F=0.1196		
Multicollinearity test	Mean VIF = 1.61	Min VIF=1.15	Max VIF=2.72	
Linktest	_hatsq: t = 0.99	P >	t |=0.324		
	F (2,165) = 83.74	Prob > F=0.000		

VCA – Value Chain Action; Observations: 168; R-squared= 0.5008; Level of Sig.: ***1%, **5%, *1%.

5. Conclusion

The study assessed the effect of financial institution type on the amount of credit received by cassava value chain actors in Nigeria. Some key points manifested in the data as well as the results of the analyses carried out. Commercial bank had the least number of patronages, but the amount of credit involved in the limited number of transactions was enormous as reflected in the average credit disbursement. Government bank took the second position while cooperative bank was in the rear. Amount of credit was highly elastic to change in interest rate. In addition, the study showed that higher loan disbursement and the incentive of longer repayment period were possibly influenced by readiness to pay higher interest rate. This is actually true for large amounts; otherwise, low interest rate will encourage access. Endogenous relationship was also established between amount of credit and the financial institution type. This finding is particularly important in agricultural value chain financing research which will should prompt wider testing across cassava-producing African countries.

In all, Nigerian financial institutions are on the right track of cassava value chain commercialization through provision of credit for industrialization and value chain up scaling with the commercial banks playing leading role. However, the importance of the pseudo-formal and self-help institutions is pertinent as is the case in several African countries. The financial institutions should therefore be encouraged in these efforts through policies that allow private-sector initiatives to flourish and complement public-sector responsibility. Decision makers should focus on how financial institutions can be strengthened for better credit access by the cassava actors, and hence improve their productivity. The study suggests that further research should be conducted on how public-private partnership can improve loan size and guarantee in Nigeria and by extension other African countries since primary production (agriculture) is still a mainstay on the continent.

Conflicts of Interest: The authors declare no conflict of interest in this study.

Appendix A
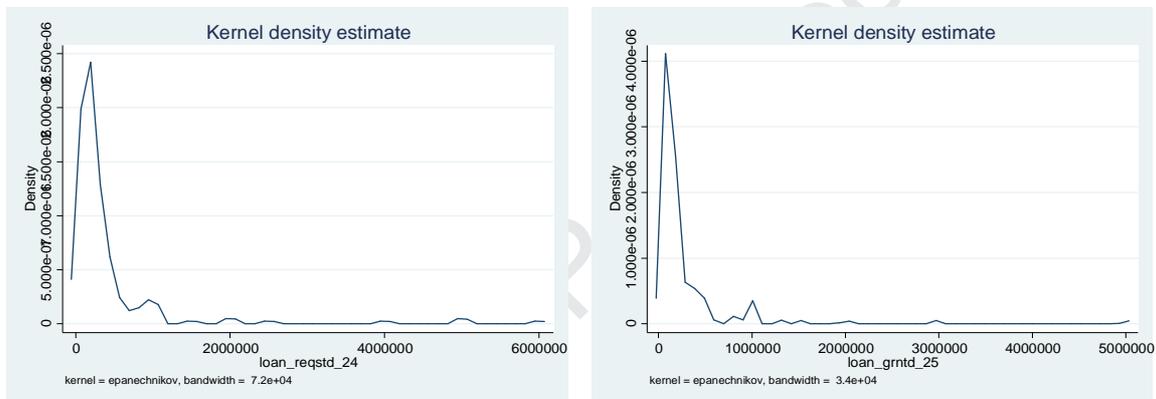
Figure A.1 Distributions of the amounts of loan requested and loan granted
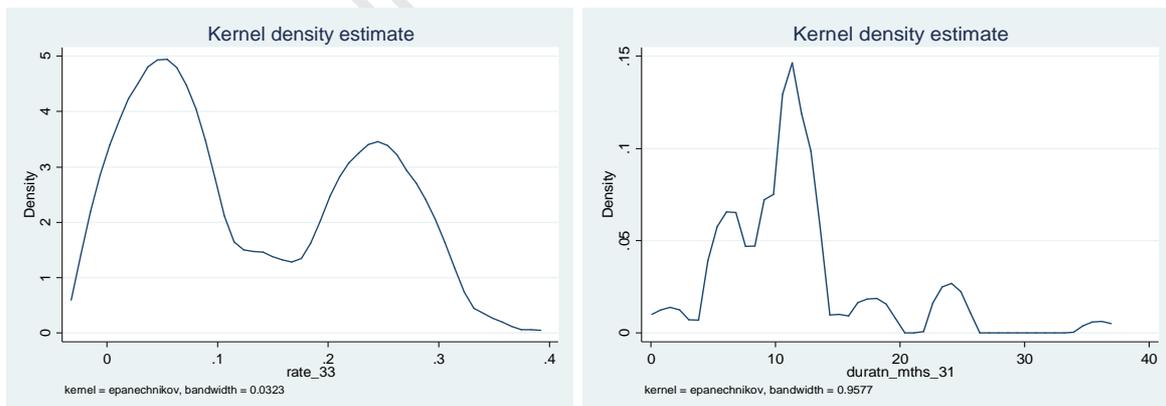
Figure A.2 Distributions of the interest rate and loan duration

Table A.1 Summary statistics of loan variables by financial institutions.

Variable	Financial Institution	Mean	Median	Std. dev.	Min.	Max.
Loan requested (N)	Government	607 307.70	202 500.00	1 236 227.00	100 000.00	6 000 000.00
	Cooperative	160 526.30	50 000.00	205 682.40	40 000.00	800 000.00
	Commercial	950 000.00	500 000.00	1 224 307.00	100 000.00	5 000 000.00
	Microfinance	344 120.40	200 000.00	628 492.40	15 000.00	5 000 000.00
Loan granted (N)	Government	244 807.70	150 000.00	283 776.30	100 000.00	1 300 000.00
	Cooperative	97 894.74	50 000.00	177 625.70	40 000.00	800 000.00

	Commercial	756 666.70	400 000.00	791 749.10	100 000.00	3 000 000.00
	Microfinance	245 851.90	125 000.00	512 584.90	10 000.00	5 000 000.00
Loan ratio	Government	0.736	0.750	0.280	0.060	1.000
	Cooperative	0.819	1.000	0.361	0.060	1.000
	Commercial	0.880	1.000	0.162	0.500	1.000
	Microfinance	0.763	0.817	0.262	0.100	1.000
Loan duration (months)	Government	15.77	12.00	7.62	1.00	36.00
	Cooperative	6.63	6.00	1.89	6.00	12.00
	Commercial	16.67	18.00	6.75	4.00	24.00
	Microfinance	10.66	10.00	5.04	1.00	36.00
Interest rate (%)	Government	0.10	0.09	0.07	0.00	0.30
	Cooperative	0.26	0.26	0.00	0.25	0.26
	Commercial	0.21	0.23	0.08	0.02	0.28
	Microfinance	0.11	0.04	0.10	0.02	0.36

Exchange rate: $1 = ₦164.64 [28]

Table A.2 Summary statistics of loan variables by specialization

Variable	Specialty	Mean	Median	Std. dev.	Min.	Max.
Loan requested (N)	Producer	427 840.90	200 000.00	756 832.30	30 000.00	5 000 000.00
	Processor	479 523.80	200 000.00	1 276 995.00	15 000.00	6 000 000.00
	Marketer	200 833.00	150 000.00	201 875.70	30 000.00	800 000.00
	Fabricator	600 000.00	600 000.00	565 685.40	200 000.00	1 000 000.00
	End-user	100 000.00	100 000.00	.	100 000.00	100 000.00
Loan granted (N)	Producer	293 083.30	150 000.00	561 063.60	22 000.00	5 000 000.00
	Processor	221 428.60	150 000.00	285 206.70	10 000.00	1 300 000.00
	Marketer	168 333.30	100 000.00	205 684.40	10 000.00	800 000.00
	Fabricator	335 000.00	335 000.00	233 345.20	170 000.00	500 000.00
	End-user	100 000.00	100 000.00	.	100 000.00	100 000.00
Loan ratio	Producer	0.771	1.000	0.281	0.060	1.000
	Processor	0.794	0.750	0.240	0.217	1.000
	Marketer	0.794	0.900	0.248	0.333	1.000
	Fabricator	0.675	0.675	0.247	0.500	0.850
	End-user	1	1	.	1	1
Loan duration (months)	Producer	11.45	11.0	5.69	1	36
	Processor	11.38	10.00	8.81	1	36
	Marketer	11.50	12.00	4.68	4	24
	Fabricator	21.00	21.00	4.24	18	24
	End-User	6.00	6.00	.	6	6
Interest rate (%)	Producer	0.14	0.10	0.10	0	0.36
	Processor	0.12	0.08	0.10	0.03	0.30
	Marketer	0.11	0.08	0.09	0.03	0.25
	Fabricator	0.26	0.26	0.04	0.23	0.28
	End-User	0.03	0.03	.	0.03	0.03

Exchange rate: $1 = ₦164.64 [28]

Table A.3 Summary statistics of loan variables by scale of operation

Variable	Scale	Mean	Median	Std. dev.	Min.	Max.
Loan requested (₦)	Small	256 311.50	180 000.00	270 733.40	15 000.00	1 000 000.00
	Medium	541 250.00	200 000.00	1 040 490.00	50 000.00	6 000 000.00
	High	447 142.90	200 000.00	861 982.40	30 000.00	5 000 000.00
Loan granted (₦)	Small	187 409.80	100 000.00	244 080.40	10 000.00	1 000 000.00
	Medium	309 375.00	150 000.00	473 455.90	40 000.00	3 000 000.00
	High	354 857.10	150 000.00	829 529.90	30 000.00	5 000 000.00

14

Loan ratio	Small	0.754	0.800	0.286	0.089	1.000
	Medium	0.778	0.842	0.264	0.060	1.000
	High	0.810	1.000	0.265	0.200	1.000
Loan duration (months)	Small	10.36	10.00	5.92	1	24
	Medium	12.64	12.00	6.47	1	36
	High	11.29	10.00	5.47	1	36
Interest rate (%)	Small	0.18	0.24	0.10	0.02	0.30
	Medium	0.12	0.08	0.10	0	0.36
	High	0.07	0.04	0.07	0	0.30

Exchange rate: $1 = ₦164.64 [28]

Appendix B: Supplementary Materials

Kernel Distribution of loan ratios

Figure B1 which shows the kernel distribution of loan ratios for all actors, indicates the existence of a left-skewed distribution for the loan ratio among actors which suggests that there were more low loan ratio values than high values.
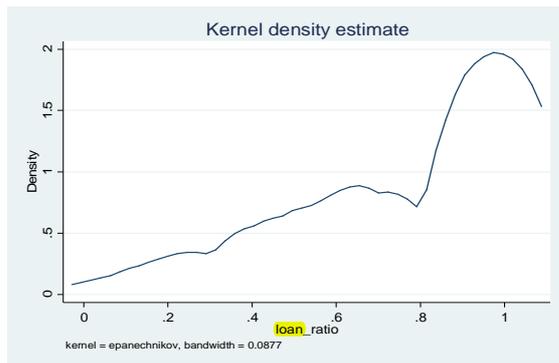

Figure B.1 Kernel distribution of loan ratio for all actors

Treatment of Endogenous Relationship

Possible endogenous relationship between the amount of loan and institution type was tested with instrumental variable (IV) regression. The results presented in Tables S1&2 revealed that institution type was truly endogenous to the amount of loan going by the output of the endogeneity test. Furthermore, the null hypotheses of under-identification (Anderson LM test) and weak identification (Cragg-Donald Wald test) were rejected and Sargan statistic result showed exact identification of the IV regression equation. These imply that the excluded instrument, distance to credit source, is relevant. Credit amount showed increase with education and household size. More education years gives better human capacity leverage through improved earnings that could assist in getting loans. Positive effect of household size could be viewed from different angles: if all members of the household are involved in the enterprise, the high capacity of the business mean more needs for credit. Secondly, responsibility of taking care of many members could drive the owner of enterprise to strive more to secure loan for enterprise expansion.

15

Table B.1 Parameter estimates of the determinants of the amount of loan granted cassava actors.

Variable	Coefficient	Standard Error	z-statistics	P > |z|
Age	-0.0096	0.0107	-0.89	0.153
Sex	-0.2972	0.2332	-1.27	0.203
Marital status	0.1882	0.3251	0.58	0.563
Years of education	0.0537***	0.0205	2.62	0.009
Household size	0.0589*	0.0337	1.75	0.080
Primary occupation	-0.0445	0.2477	-0.18	0.857
Years of specialisation	0.0112	0.0103	1.09	0.274
Monthly income	2.07e-06	1.47e-06	1.40	0.160
Association membership	-0.2878	0.2116	-1.36	0.174
Interest rate	0.9674	1.4180	0.68	0.496
Financial institution type	-0.4071	0.2848	-1.43	0.153
Scale of operation	0.1307	0.1686	0.77	0.438
Specialization	0.1425	0.1354	1.05	0.293
Constant	11.7297***	1.0030	11.69	0.000
No. of observations:	143			
Centered R-squared:	-0.0283			
Uncentered R-squared:	0.9932			
F-value:	F (13, 129) = 2.73; Prob>F=0.0019			

Table B.2 Postestimation results of 2-step IV GMM regression.

Test	Statistics
Under-identification test (Anderson canon. Corr. LM statistics):	10.568; chi-sq (1) P-value=0.0012
Weak identification test (Cragg-Donald Wald F statistics):	10.294
Stock-Yogo weak ID test critical values: 10% maximal IV size=16.38; 15% maximal IV size= 8.96	
20% maximal IV size= 6.66; 25% maximal IV size=5.53	
Source: Stock-Yogo (2005). Reproduced by permission.	
Sargan statistics (over-identification tests of all instruments):	0.000
	(equation exactly identified)
Endogeneity test of endogenous regressors:	4.893
	chi-sq (1) P-value=0.0270
Regressors tested	
Instrumented: Financial institution type	
Included instruments: Age, Sex, Marital status, Years of education, Household size, Primary occupation, Years of specialization, Monthly income, Association membership, Interest rate, Scale of operation, Specialization.	
Excluded instrument: Distance to credit source	

Appendix C

Table C.1 Sample selection by LGAs, and EAs (Villages/Communities) for states and zones.

Zones	States	LGAs		EAs		% Used for selection
		Num.	%	Num	%	
South West	Oyo	33	29	35,534	31	26
	Ogun	20	17	18,518	17	14
South East	Enugu	16	14	13,997	12	14
	Abia	18	15	11570	11	14
South South	Rivers	22	19	24,871	23	18

North Central	FCT	06	06	3787	06	14

Table C.2 Distribution and retrieval of questionnaires by zone and actor type.

Actor type	Zones									
	SW		SE		SS		NC		All	
	Proposed	Retrieved	Proposed	Retrieved	Proposed	Retrieved	Proposed	Retrieved	Proposed	Retrieved
Formal fin. institutions	36	11	36	22	18	15	18	4	108	52
Cooperatives	96	16	96	21	48	16	48	7	288	65
Individuals	172	68	172	68	86	13	86	38	516	200

References

1. United Nations Development Program, UNDP. Nigerian Agribusiness Supplier Development Program. Road Map, 2013.

2. Salami A., D.F. Arawomo, Empirical Analysis of Agricultural Credit in Africa: Any Role for Institutional Factors? Working Paper Series No. 192, African Development Bank, Tunis, Tunisia, 2013

3. Adepoju A.O., K. Oluoha, Rural Households' Access to Microcredit and Poverty Status in Obafemi-Owode Local Government Area of Ogun State, Nigeria. Journal of Rural Economics and Development, 2008, 17, 75-87.

4. Odu O.O., V.O. Okoruwa, K.O. Adenegan, A.O. Olajide, Determinants of Rice Farmers' Access to Credit in Niger State, Nigeria. Journal of Rural Economics and Development, 2011, 20, 8-20.

5. FAOSTAT. FAO Statistics. www.faostat.org Accessed on 14 September 2018.

6. Mbutor O.M., R.E. Ochu, I.I. Okafor, The Contribution of Finance to Agricultural Production in Nigeria. CBN Economic and Financial Review, 2013, 31, 1-20.

7. Central Bank of Nigeria, CBN. Guidelines for Commercial Agriculture Credit Scheme (CACS). CBN/FGN, Development Finance Department, Central Bank of Nigeria, Abuja. 2014a.

8. CBN. CBN Annual Report 2017, Abuja, Nigeria. 2017.

9. Adebayo O.O., R.G. Adeola, Sources and Uses of Agricultural Credit by Small scale Farmers in Surulere LGA of Oyo State. Anthropologist, 2008, 10, 313-314.

10. Ayeomoni O., S.A. Aladejana, Agricultural Credit and Economic Growth Nexus: Evidence from Nigeria. International Journal of Academic Research in Accounting, Finance and Management Sciences, 2016, 6, 146-158.

11. Yusuf W.A., O.A. Hamzat, O.A. Akin-Olagunju, S.A. Yusuf, Effects of Credit Constraint on Technical Efficiency of Cassava Farming Households in Oyo State, Nigeria. Ibadan Journal of Agricultural Research, 2018, 14 (forthcoming), Faculty of Agriculture, University of Ibadan, Nigeria.

12. Ruete, M., Financing for Agriculture: How to Boost Opportunities in Developing Countries. Investment in Agriculture Policy Brief No. 3, International Institute for Sustainable Development (IISD), September 2015.

13. Abass, A.B., Mlingi, N., Ranaivoson, R., Zulu, Mukuka, M.I., Abele, S., Bachwenkizi, B. and Cromme, N., Potential for Commercial Production and Marketing of Cassava: Experiences from the Small-scale Cassava Processing Project in East and Southern Africa. IITA, Ibadan, Nigeria, 2013, 74pp.

14. Manganhele, A.T., Improving access to credit for smallholder farmers in Mozambique: Lessons from government efforts in developing countries of Africa and Asia. Unpublished M.Sc dissertation, Department of Agricultural Economics, Extension and Rural Development, Faculty of Natural and Agricultural Sciences, University of Pretoria, South Africa, 2010, 218pp.

15. Coulibaly, O., Arinloye, A.D., Faye, M. and Abdoulaye, T., Regional Cassava Value Chains Analysis in West Africa: Regional Summary, CORAF/WECARD, 2014, 49pp.

16. The World Bank, Agriculture Finance Diagnostic: Rwanda, 2018, 44pp.

17. UNIDO, CBN, BOI, Unleashing Agricultural Development in Nigeria through Value Chain Financing. Working Paper. United Nations Industrial Development Organization (UNIDO), Vienna, Austria, November 2010.

18. Costa, C. and Delgado, C., The Cassava Value Chain in Mozambique. World Bank, Washington, DC. License: Creative Commons Attribution CC BY 3.0 IGO, 2019, 74pp.

19. Kilimo Trust, Development of Inclusive Markets in Agriculture and Trade (DIMAT): The Nature and Markets of Cassava Value Chains in Uganda, November 2012, 51pp.

20. Mutyaba, C., Lubinga, M.H., Ogwal, R.O. and Tumwesigye, S., The Role of Institutions as Actors Influencing Uganda's Cassava Sector. Journal of Agriculture and Rural Development in the Tropics and Subtropics, 2016, 117(1), 113-123.

21. Loury, G. C., Intergenerational Transfers and the Distribution of Earnings, Econometrica, 1981, 49 (4), 843-867.

22. Demirguc-Kunt A., T.H.L. Beck, P. Honohan, Finance for All? Policies and Pitfalls in Expanding Access. Tilburg University, School of Economics and Management. 2008.

23. Stiglitz J.E., A. Weiss, Credit Rationing in Markets with Imperfect Information. The American Economic Review, 1981, 71 (3), 393-410.

24. Connning J., C. Udry, Agricultural Development: Farmers, Farm Production and Farm Market. In R.E. Evenson, P. Pingali and T.P. Schultz (eds.), *The Handbook of Agricultural Economics*, Vol 3., 2005.

25. Aryeetey E., C. Udry, The Characteristics of Informal Financial Markets in Africa. Paper prepared for presentation at the plenary session of the bi-annual research conference of the African Economic Research Consortium, Nairobi, Kenya, December 1994.

26. Banerjee A.V., Contracting Constraints, Credit Markets, and Economic Development, *in* Mathias Dewatripont, Lars Peter Hansen and Stephen Turnovsky (eds.), *Advances in Economics and Econometrics: Theory and Applications, Eighth World Congress, Volume III*, Cambridge, U.K.: Cambridge University Press. 2003.

27. Hoff K., J.E. Stiglitz, Introduction: Imperfect Information and Rural Credit Markets-Puzzles and Policy Perspectives. The World Bank Economic Review, 1990, 4(3), 235-250.

28. Aryeetey E., Rural Finance in Africa: Institutional Developments and Access for the Poor. The World Bank Annual Conference on Development Economics, 25–26 April, Washington, D.C., 1996.

29. Atieno R., Formal and Informal Institutions' Lending Policies and Access to Credit by Small-scale Enterprises in Kenya: An Empirical Assessment. AERC Research Paper 111, African Economic Research Consortium, Nairobi. November 2001.

30. Baum C.F., M.E. Schaffer, S. Stillman, Enhanced Routines for Instrumental Variables/Generalized Method of Moments Estimation and Testing. The Stata Journal, 2007, 7, 465-506.

31. Greene W.H., Econometric Analysis, Fifth Edition, Pearson Education, Inc., USA. 2003.

32. Baum C.F., Instrumental Variables Estimation in Stata. Faculty Micro Resource Center, Boston College. 2007.

33. Hansen B.E., Econometrics, Department of Economics, University of Wisconsin. 2015.

34. Porter M., Effects of Microcredit and Other Loans on Female Empowerment in Bangladesh: The Borrower's Gender Influences Intra-Household Resource Allocation. Agricultural Economics, 2016, 47, 235-245.

35. Global Partnership for Financial Inclusion, GPFI. New Trends in Agricultural Finance. G20 GPFI SME Finance Sub-group Synthesis Report. October 2015.

36. Asian Development Bank, ADB. PRC: Study on Modern Agriculture Demonstration Area Planning and Financial Support Mobilization – International Lessons on Financing Agricultural Modernization. ADB TA No. 8126. September 2015.

37. Central Bank of Nigeria, CBN. Monthly Average Exchange Rate of the Naira, Data & Statistics. Abuja, Nigeria. 2014b.

38. Raghunathan U.K., C.L. Escalente, J.H. Dorfman, G.C.W. Ames, J.E. Houston, The Effect of Agriculture on Repayment Efficiency: A Look at MFI Borrowing Groups. Agricultural Economics, 2011, 42, 465-474.

39. Rodrigues de Castro E., E.C. Teixeira, Rural Credit and Agricultural Supply in Brazil. Agricultural Economics, 2012, 43, 293-301.

Highlights

- Commercial banks least-patronized but had high disbursement level because of huge amount involved.
- Amount of credit was highly elastic to interest rate.
- Role of pseudo-formal and self-help institutions pertinent.
- Endogenous relationship exists between loan amount and institution type.

Author Declaration

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

We confirm that the manuscript has been read and approved by all named authors and that there are no other persons who satisfied the criteria for authorship but are not listed. We further confirm that the order of authors listed in the manuscript has been approved by all of us.

We understand that the Corresponding Author is the sole contact for the Editorial process (including Editorial Manager and direct communications with the office). He is responsible for communicating with the other authors about progress, submissions of revisions and final approval of proofs. We confirm that we have provided a current, correct email address which is accessible by the Corresponding Author.

Signed by all authors as follows:

Victor O. Okoruwa_____V.O.O (27th Oct. 2019)

Adebayo B. Abass_____A.B.A (27th Oct. 2019)

Olaide A. Akin-Olagunju _____ O.A.A. (27th Oct. 2019)

Nurudeen A. Akinola_____ N.A.A. (27th Oct. 2019)