Risks to credit access in a developing economy: Focus on household characteristics and the choice of credit in the Niger Delta Region of Nigeria

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ABSTRACT

Governments in developing economies are continuously seeking ways to increase the number of people that have access to formal financial services. However, literature on why households in developing economies are excluded from the formal credit sector is scarce. Thus, this study examines the link between household characteristics and the choice of credit provider using unique household-level primary data from the Niger Delta region. A binomial logistic regression model based on relevant household characteristics is developed for estimation. The results show that the number of dependents and income of a household, as well as education level and age of household head, is relevant in understanding the choice of the credit provider. Strikingly, the finding that the probability of borrowing from the informal sector increases with household distance from a formal lender at a decreasing rate suggests the significance of cost associated with traveling to the nearest bank on the choice of a lender and the presence of information asymmetry in the credit market of the region. Overall, the study raises important implications to inform credit market policies and practices in the region.

Introduction

The structure of the credit market in developing countries is substantially different from that of developed countries (Beck, et al., 2015). In developing countries, a regulated formal credit sector coexists with an active unregulated informal credit sector and the dissimilarity in lending practices in this segmented credit market have continued to receive attention from researchers, policymakers and financial services providers (Ambrosius and Cuecuecha, 2016). Credit decisions in the segmented credit market are linked to the heterogeneous nature of borrowers (Wydick, 2011). Thus, the understanding of a prospective borrower is crucial in credit access. More so, extant empirical evidence that the dependence of an economy on informal credit sector is inimical to poverty alleviation and constrains economic growth makes the understanding of why some borrowers perpetually stay outside the formal credit market important (Santos & Barrett, 2011). This is particularly important in Nigeria where the persistent high level of poverty has been worsened by challenging access to formal financial services caused by Covid-19 pandemic (Ozili, 2020). Unfortunately, studies in this area of research on Nigeria are limited. Therefore, the current paper examines the link between household characteristics and the choice of credit provider in the Niger delta region of Nigeria. The findings of this study have the potential to influence credit market policies and practices in Nigeria.

To achieve the objective of this study, a survey of households in the Niger Delta region of Nigeria was conducted with households randomly selected within localities that could be defined as urban or rural and with varying proximities to the nearest bank. These data allow for the use a binary choice model to empirically investigate the influence of household distance to a formal lender, household income level, and age of household head on the use of credit. The link between education level of the head of household, number of dependents in a household and credit choice is also examined.
The remainder of the paper is presented thus; section two is the review of relevant literature, section three describes the study area and methodology used, section four presents the socio-economic profiling of respondents and loan characteristics by lending sectors. Presentation of results and discussion of findings is carried out in section five and section six is the conclusion of the study.

**Literature Review**

**Theoretical and Conceptual Background**

**Formal and informal credit sectors in developing economies**

The formal sector comprises financial institutions like the banks whose operations are regulated. Regulated banking institutions provide formal lending capacity that is typically collateralised. Loan tenure frequently exceeds one-year and third party guarantees play a role in access and cost of loans (Menkhoff, et al., 2012; Guirkinger, 2008). Informal lenders, that are typically not regulated, are diverse and include family members and friends, cooperative societies, trusts and moneylenders (Santos & Barrett, 2011). Family members and friends, typically provide small collateral-free, very low cost or interest-free loans on very short-term arrangements (Cecile et al., 2013). Cooperative societies and thrift provide short-term loans for a cost with a requirement of preferably a guarantor or collateral respectively (Cecile et al., 2013). Moneylenders provide collateralized high interest rate loans on short-term basis typically playing the role of emergency lenders (Ruziev & Midmore, 2014).

There are several reasons for the preference of the informal credit market by households. Firstly, problems arising from asymmetric information result in quantity rationing by formal lenders (Ghosh & Ray, 2016). The informal sector has an information advantage that allows them to replace collateral requirement with effective assessment and monitoring. In a study of the rural credit market in India, Kocher (1997) shows that borrowers prefer informal loans from family and friends to formal loans because it is relatively cheaper than the formal loans. In addition, Barham et al. (1996) attributed a cheaper transaction cost of borrowing from the informal sector to the information advantage of the sector over the formal sector. Furthermore, Boucher and Guirkinger (2008) established that the local information advantage of informal lenders makes their approval of loans for projects that are state-contingent more likely, and this reduces borrowing risk for households in the event of a non-performing loan.

In most African countries, banks typically concentrate their operations in the urban areas while the informal sector is more active in the rural areas. The geographical distribution of the population in these countries is heavily rural based constituting a limitation to the choice of formal credit by households, yet favourably disposing the informal credit sector to serve more clients (Mellor, 2014). Consequently, the informal sector may have a comparative advantage arising from geographical proximity (Aryeetey and Udry, 1997).

**Socio-economic characteristics and credit access in developing economies**

The Socio-economic characteristics of household is imperative in household lending since lenders adopt the strategy of relationship lending to reduce exposure to high default risk associated with information asymmetry (Fiordelisi et al. 2014). Relationship lending is a function of the credit worthiness of a borrower determined by relevant information gathering over a considerable period of continuous contact with a lender and subjective to the distance between a lender and a prospective borrower (Elyasiani and Goldberg, 2004; Petersen and Rajan, 2002). Existing research focusing on formal lending to small businesses shows that distance affects loan transaction cost (Petersen and Rajan, 2002), collateral requirement (Jiménez et al, 2009), interest rate on loan (Agarwal and Aliero, 2012) and credit quality (DeYoung et al, 2008). Microfinance institutions in Niger adapt their credit policy through a more intensive screening of household loan applications, offering of restrictive loan conditions and higher interest rate to cope with the effect of proximity to borrowing households (Pedrosaand Do, 2011). Distance is also relevant in informal sector as lenders know the credit status of prospective borrowers that live in the same community (Okten and Osili, 2004, Barslundand Tarp, 2008). The availability of a loan is thus dependent on the characteristics of the borrower and lender and the relationship between them.

Similar studies have focused on identifying the determinants of credit rationing. Zeller (1994) identifies loan applicant’s debt and income as the determinant of credit rationing by formal and informal lenders in rural Madagascar. Duong and Izumida (2002) examined the significant impact of formal credit on rural households involved in agricultural production in Vietnam. Formal lenders thus consider reputation, number of household dependents and the amount of credit applied for by the household as the main criteria for credit rationing.

Ibrahim and Aliero (2012) used a cross-sectional survey data to examine factors that influence rural farmer’s accessibility to formal credit in Katsina State, Northern Nigeria. They reported that the probability of accessing formal credit increases with income level of a farmer, being educated and being married. An eastern Nigerian study by Agbo et al. (2015) used cross-sectional data of vegetable farmers in Imo state, to examine the influence of socio-economic characteristics on access to credit. The estimates of the logistic regression model used in the study indicated that education, household size, income and farming experience had significant relationship with farmers’ access to formal credit. A study of peasant farmers in Benue state, North-central Nigeria, indicates age, household size, and education as the socio-economic characteristics that had significant effect on access to credit in the cohort of study (Asogwa et al., 2014). The existence of literature that provides a comparative analysis of these rural communities alongside the credit decisions of individuals with a more stable income from the formal sector whose households are located closer to the banks in the urban areas, remains a gap which the current study seek to fill. Therefore, the current paper identifies the borrowing options
available to households in the formal and the informal credit markets of the Niger delta region of Nigeria and further explores the link between household characteristics and the choice of lender.

**Stylised facts on the formal and informal credit markets in Nigeria**

In Nigeria, the formal financial sector comprises commercial banks, mortgage institutions, and microfinance banks. The informal sector consist of community based organisations, cooperative societies, professional moneylenders, Rotatory Savings and Credit Associations (ROSCAS), self-help groups and other similar associations (Adeleke, 2014).

The formal financial sector in Nigeria is dominated by the commercial banks that hold about 90% of the total financial asset in the economy of which 50% is in government debt (Abubakar and Gani, 2013). These banks channel the largest share of their credit towards oil and gas investments to the disadvantage of sectors like agriculture, manufacturing and others (Ehikioya and Mohammed, 2013). In 2016, there were 24 commercial banks in Nigeria with 3570 branches concentrated in the urban areas of the 36 states of the country (CBN, 2017). However, about 64% of Nigerian adults live in the rural areas of the country and only 25% of them have access to banking services (EFInA, 2016). The effect of this situation may be twofold: (a) it may engender the problem of information asymmetry between the rural households and the urban banks and (b) it can equally provide an enabling environment for a complementary financial market, the informal sector, to thrive in the rural areas.

Practically, the regulated banking institutions typically demand for documents that constitute sources of hard information for loan applications from households (Olokoyo, 2011). These documents which also serve as the security for the loan include a guarantor’s letter from the loan applicant’s employer, preferably from the public service or organised private sector, copies of applicant’s most current monthly pay advice or job retirement entitlements statement from the applicant’s pension fund manager. In addition, the account which the applicant receives monthly salaries or pension must be domiciled in the bank that offers the loan to facilitate loan repayment using the automatic monthly debit system. These stringent conditions may have major disincentive effect on households’ decisions to approach a bank for a credit facility. Also, the highly demanding and time-consuming loan processing approaches adopted by some formal financial institutions create high transaction cost in household lending (Le, 2003). All these serve as disincentives to households in seeking formal credit resulting in dependent on the informal credit sources.

The actual size of the informal financial market comparative to the formal financial market, in both the rural and urban areas of Nigeria, is unknown. However, around 85% of savings and credits needs in the rural areas of the country are provided by the informal financial market (Adeleke, 2014). The informal financial sector typically provides unregulated, unsecured, unorganised, small, short-term savings and lending services largely to households or small entrepreneurial ventures. The persistence of the informal financial sector can be seen as a response to the underdeveloped nature of the formal financial sector (Pham and Lensink, 2007).

Among the informal credit providers, moneylenders typically offer non-collateralized, short-term, high interest rate loans to households on mutual trust (Soyibo, 1997). ROSCAS, which operate in the form of cooperative savings and loans associations, is another source of informal credit to households and are popular in Nigeria with the name “Esusu” (Adeleke, 2014; Soyibo, 1997). “Esusu” involves the coming together of individuals who know and trust one another for the sole purpose of pooling funds to facilitate savings and borrowing process. Even though few members typically constitute a unit of “Esusu”, it remains one of the most dependable sources of credit to Nigerian households as credit access amongst members is on rotational basis, a decision reached by lots, and the cost of loan is minimal (Adeleke, 2014).

The thrift collectors are another source of informal credit to households in Nigeria. The modus operandi of thrift collectors is very similar to that of the banks. Thrift collectors are sole-proprietors who offer rural entrepreneurs savings services for a charge. The funds mobilised through savings is then offered as loans to others for a cost. The unique feature of thrift collectors is that they move from door to door to take the daily savings of their clients. Clients are issued savings and withdrawals card and can make withdrawals at any time but on due notification of the thrift collector. Thrift collectors have very close relationship with their clients. Their operation thrives on reputation and mutual trust (Oloyede, 2008). Households in Nigeria also rely on family members and friends for credit. Interest free loans are offered to relatives and friends who are in financial difficulties because of a natural disaster or fulfilment of a cultural right. The repayment terms and schedule is always flexible to suit the borrower (Oni et al., 2006).

**Research and Methodology**

**Study area**

The Niger Delta region is situated in the south of Nigeria. All of Nigeria’s oil production takes place on the land or waters of the nine oil producing states in the Niger Delta comprising Akwa Ibom, Bayelsa, Cross River, Delta, Edo, Rivers, Abia, Imo and Ondo. The nine Niger Delta states collectively have 185 LGAs. The estimated population of the area is 32 million (22% of total Nigerian population). Over half of the population of Niger Delta resides in network of creeks and small islands constituting the rural population. This rural population lives in small, scattered hamlets of 50 to 500 persons and maintains links with larger towns in the region. By infrastructural standard, the headquarters of the nine states that make up the Niger delta may be regarded as urban areas in the region. The population of the Niger Delta region is heterogeneous with approximately forty different ethnic groups speaking 120 languages and dialects. Historically, agriculture has been the major occupation of the people of the Niger delta region. However, there has been a significant level of job migration due to emergence of new job opportunities in the organised private sector and public sector in the
region. To this end, people have left agriculture in the rural area to take up employment opportunity in the urban areas where the organised private sector and the public service typically operate. By observation, banks concentrate in the cities while the informal financial market operators are more active in the rural areas in the region. The rich socio-economic characteristics and a clearly segmented financial market in the Niger delta region informed the choice of the area for the study.

**Sampling technique**

A multi-stage sampling design was used in selecting households in the region for the study (Menkhoff et al, 2012). At the first stage four out of the nine states in the Niger delta region were purposively selected. The state are; Akwa-Ibom, Rivers, Bayelsa and Delta. At the second stage, purposive sampling was used again to select the capital of the selected states that is Uyo, Portharcourt, Yenagoa and Asaba for Akwalbom, Rivers, Bayelsa and Delta states. In addition, 4 rural settlements located in local government areas near each of the selected cities were again purposively selected resulting in a total of 20 settlements (4 urban and 16 rural settlements). At the third stage, 25 households per settlement were randomly selected by the enumerators. This produced a sample size of 500 households. Two major criteria guided the purposive sampling of a rural settlement for the survey. These criteria were; accessibility by road or water and identification of a contact person in the settlement who equally acted as a translator. The use of a translator was to ensure the participation of all the randomly selected households when a participant was fluent in the local dialect.

**Data collection**

A structured questionnaire was used in collecting cross-sectional primary data from the randomly sampled households. Ten enumerators were trained at the Centre for Rural Development and Skill Acquisition (CRDSA), University of Uyo, Akwa-Ibom State on how to administer the structured questionnaire effectively. Each of the enumerators was assigned and dispatched to two settlements with the instruction to administer the survey on heads of household who are public servants, organised private sector employees or self-employed on a face-to-face basis. This method was used with the expectation that the face-to-face interaction will improve the quality and rate of response. Here, the head of household is defined as an income-earning member who obtained the most recent loan on behalf of the family.

The survey obtained quantitative data on household characteristics and credit related activities including household location, distance to the nearest bank, education level of head of household, occupation of head of household, household income level, number of earners and dependents in a household. Financial information including loan amount, purpose of borrowing, cost and duration of loan, average monthly income, and monthly savings were gathered. The survey focused on the most recent credit that a household obtained to enhance the quality of the data. Missing information in 13 out of the 500 questionnaires returned reduced the number of useful questionnaires to 487.

**Empirical model specification**

The empirical model used for analysis in the current study is formulated thus:

\[ Pr(LENDER_i = 1) = F(\beta_0 + \beta_1 \log(DISTANCE_i) + \beta_2 \log(INCOME_i) + \beta_3 (EDU - LEVEL_i) + \beta_4 (DEPENDENTS_i) + \beta_5 (AGE_i)) \]

Where the variables;

- **Lender** = 0 when a household borrow from the formal sector and 1 when a household borrows from the informal sector and
- **Distance** = physical distance of household to the nearest bank in kilometres;
- **Income** = average monthly income of household;
- **Edu-level** = education level of head of household;
- **Dependents** = number of dependents in a household;
- **Age** = age of the head of household.

Index \( i \) indicates household.

Considering the dichotomous nature of the dependent variable equation above, a binary choice model, can be expressed as a binomial logistic regression function indicating household choice of formal or informal credit source thus:

\[ Pr(LENDER_i = 1) = F(x_i) = \frac{1}{1 + \exp(-\beta x_i)} \]

The implication of using the model stated as equation \( F(x_i) \) for the analysis is that, households’ choice of a credit source at any given time is assumed to be influenced by the combined effect of the factors that determine households’ decision exceeding the reaction threshold. These factors which are household characteristics constitute the dependent variables, the covariates, and are captured in equation \( (Pr(LENDER_i)) \) as distance, income, education level, dependents and age. The use of logit model in this study is consistence with Agbo et al. (2015) and Oloolade and Olagunju (2013).

For a clearer understanding of the household choice of a credit source, two estimations are undertaken. The first estimation employs a logistic regression model to determine household choice of the formal or informal sector credit. In the first estimation, the response
variable takes the value 0 if a household obtained credit from the formal sector or 1 if the household obtained credit from the informal sector. The second estimation involves the use of a multinomial logistic regression model to establish the relationship between the household characteristics and the choice of individual credit sources in the formal and the informal credit markets. Distance and income are used as discrete variables in the logistic regression and as continuous variables in the multinomial logistic regression.

The choice of variables for the empirical model of this study was informed by a thorough review of related literature.

**Description of variables**

Table 1 presents a detailed description of the variables used in the estimations. Distance and income are used as discrete variables. Distance is categorised into quartiles in accordance with Yang (2008). Households in the sample are categorised into upper, middle and lower income classes based on average monthly income in line with Deku, et al., (2016). Considering the binary nature of the response variable, distance and income are transformed into logarithm form to eliminate the effect of heteroscedasticity in the estimation (see; Berg, Shahe and Shilpi, 2015). Dependents and age are continuous variables while edu-level is a dummy variable.

In the estimation, households in the first quartile of distance are used as the base as they are less likely to face distance constrain to the nearest bank. Hence, an increasing positive parameter over the quartiles is expected as increasing distance from the bank should encourage engagement with the informal sector. The lower income class is used as the base for the estimation because the financial capacity of the lower income household may reduce the likelihood of approval of loan applications for this income class by the banks, (Deku, et al., 2016). Thus, increasing income level is expected to be associated with borrowing from the formal sector.

Heads of households are placed in two categories according to their level of education – first, those who did not obtain secondary education and second, those that completed secondary education at the least similar to Barslund and Tarp (2008). It is expected that households whose heads did not obtain secondary education will less likely borrow from the bank. Also, age of the head of household serves as a proxy for relationship between the household and the credit market (Barslund and Tarp, 2008; Deku, et al., 2016). Age as a demand side variable, will likely have an ambiguous influence on the outcome variable. Similar to Deku, et al., (2016), number of dependents is the explanatory variable used as a measure of household credit risk and it is anticipated to have a negative effect on borrowing from the formal credit sector.

| Variable       | Type        | Description                                                                 |
|----------------|-------------|-----------------------------------------------------------------------------|
| Lender         | Binary      | The sector that household obtained credit                                    |
|                |             | (y=0) if household borrowed from the formal sector                           |
|                |             | (y=1) if household borrowed from the informal sector                        |
| Distance       | Discrete    | Physical distance of household to the nearest bank in KM.                    |
|                |             | $Q_1 = $ household is located at the 25th percentile ($0 < Q_1 \leq 17.25$)   |
|                |             | $Q_2 = $ household is located at the 50th Percentile ($17.25 < Q_2 \leq 34.5$)|
|                |             | $Q_3 = $ household is located at the 75th Percentile ($34.5 < Q_3 \leq 51.75$) |
|                |             | $Q_4 = $ household is located at the 100th Percentile ($51.75 < Q_4 \leq 69$) |
| Income class   | Discrete    | Household income class based on average monthly income.                     |
|                |             | $Lower =$ less than 55,000 naira monthly income                               |
|                |             | $Middle = $ between 55,000 naira and 100,000 naira monthly income             |
|                |             | $High =$ greater than 100,000 naira monthly income                           |
| Edu. Level     | Categorical | Highest academic institution completed by head of household disaggregated into two groups. |
|                |             | 1 = head of household did not complete secondary school                       |
|                |             | 2 = head of household completed secondary school and (or) tertiary institution |
| Age            | Continuous  | Age of household head as at the time the loan was approved                   |
| Dependents     | Continuous  | Number of dependents in a household as at the time the loan was approved      |

**Socio-economic profiling of respondents and loan characteristics by lending sector**

**Socio-economic profiling of respondents by lending sector**

Table 2 shows the socio-economic profiling of respondents by lending sector. In considering their most recent loan, 302 households noted loans were provided by the informal sector with 185 households borrowing from the formal sector. For households that obtained credit from the informal market, the options available included: family members, cooperative society, thrift and moneylender (see Figure 1 for distribution of loan by individual lenders).
The average distance of households that borrowed from the bank is 17.94km while the average distance of households that borrowed from the informal credit market is 22.36km. The mean age of heads of households that obtained credit from the formal and the informal markets were 44 years and 41 years respectively. Notably, 97% of households whose head had at least completed secondary education accessed formal loan while only 3% of households whose head had no secondary education borrowed from the formal market. The average income of households that borrowed from the formal credit market seems to almost double that of informal sector borrowers – 130,000 Naira against 74,000 Naira. There is no significant variation in the average number of dependents that borrowed from both credit markets but a higher standard deviation for informal market borrowers may suggest that borrowing from the informal sector is associated with larger household size.

Table 2: Socio-economic profiling of respondents by lending sector

| Variable                                      | Formal | Informal |
|-----------------------------------------------|--------|----------|
| **Education level of household head (%)**     |        |          |
| No secondary education                        | 2.70   | 37.42    | 24.23   |
| Had at least secondary education              | 97.30  | 62.58    | 75.77   |
| **Household Distance from nearest bank (KM)** |        |          |
| Mean                                          | 17.94  | 22.36    |
| Std. dev.                                     | 14.93  | 17.48    |
| Min.                                          | 0.4    | 0.5      |
| Max.                                          | 56     | 69       |
| **No. of household dependents**               |        |          |
| Mean                                          | 2.98   | 3.25     |
| Std. dev.                                     | 1.27   | 1.57     |
| Min.                                          | 1      | 1        |
| Max.                                          | 8      | 8        |
| **Average monthly household income**          |        |          |
| Mean                                          | 130    | 74       |
| Std. dev.                                     | 83     | 76       |
| Min.                                          | 11     | 12.5     |
| Max.                                          | 657    | 935      |
| **Age of household head**                     |        |          |
| Mean                                          | 43.64  | 40.69    |
| Std. dev.                                     | 8.18   | 8.30     |
| Min.                                          | 27     | 23       |
| Max.                                          | 60     | 64       |
| **Number of borrowers**                       |        |          |
| N = Total population size. Average monthly household income is reported in 1000 Naira.
Loan characteristics by lending sectors.

Table 3 reports the summary of loan characteristics by lending sectors. As shown, the formal sector provides households larger loan amounts and on a longer duration compared to the informal sector. On the average, the formal loan term exceeds two years while the informal loan term is less than a year. Household surveyed reported that the banks charged a uniform interest rate of 3% on loans as at the time of this study. Among informal lenders, households reported an average interest rate of 2.68% per month with a high degree of variability (Standard deviation = 2.95) in the cost of lending across the sector. The variation in the cost of lending within the informal sector ranges from family members providing interest free loans to moneylenders charging as high as 10% per month on loans.

Formal loans are typically secured with collateral as well as the provision of a guarantor. The mean value of collateral required by the informal sector is small with significant variations in the values as indicated by a large standard deviation. Interestingly 85.83% of loans obtained from the informal sector are approved with at least one form of security suggesting that the credit market in the region is responsive to ex-ante concerns of adverse selection and ex post problems of moral hazard with collateralization and other securities (Berger et al., 2011).

Table 3: Summary of loan characteristics by lending sector

| Variable                              | Lending sector | N = 487 |
|---------------------------------------|----------------|---------|
|                                       | Formal         | Informal|
| Loan amount (monthly)                 |                |         |
| Mean                                  | 1197           | 140     |
| Std. dev.                             | 524            | 121     |
| Loan duration (monthly)               |                |         |
| Mean                                  | 24.62          | 7.47    |
| Std. dev.                             | 7.48           | 4.79    |
| Loan cost (monthly)                   |                |         |
| Mean                                  | 3.00           | 2.68    |
| Std. dev.                             | 0.00           | 2.95    |
| Min.                                  | 3              | 0\(^a\) |
| Max.                                  | 3              | 10\(^b\) |
| Value of collateral                   |                |         |
| Mean                                  | 5210           | 332     |
| Std. dev.                             | 1643           | 688     |
| Willingness to increase loan amount (%)|                |         |
| Yes                                   | 28.65          | 45.39   | 39.01 |
| No                                    | 71.35          | 54.64   | 60.99 |
| Willingness to increase loan term (%) |                |         |
| Yes                                   | 23.24          | 48.34   | 38.81 |
| No                                    | 76.76          | 51.66   | 61.19 |
| Purpose of borrowing (%)              |                |         |
| Health                                | 10.27          | 21.19   | 17.04 |
| Education                             | 20.00          | 18.87   | 19.30 |
| Family event                          | 6.49           | 22.19   | 16.22 |
| Regular expenses                      | 22.16          | 11.92   | 15.81 |
| Entrepreneurship                      | 41.08          | 25.83   | 31.62 |
| Collateral/guarantee required (%)     |                |         |
| No collateral/guarantee required      | 0.00           | 13.58   | 8.42  |
| Only collateral required              | 1.62           | 51.66   | 32.65 |
| Only guarantee required               | 0.00           | 24.17   | 14.99 |
| Collateral and guarantee required     | 98.38          | 10.00   | 43.99 |
| Population                            | 185            | 302     |

N = Total population size. Loan amount and value of collateral are reported in 1000 naira. \(^a\)Family members offer interest free loan. \(^b\)Moneylenders charge a flat interest rate which is also the highest in the credit market of the region.

Table 3 also shows that 39% of households in the entire sample were credit constrained with households that borrowed from the informal sector being more affected. This is indicative of a high elasticity of loan supply to household credit risk profile. Responses to the purpose of borrowed funds revealed 31% of households directed funds towards entrepreneurial activities. The formal sector
provides a higher proportion of loan for entrepreneurship which indicates the economic growth potentials of the region (Naudé, 2011).

Loans to finance medical bills are typically obtained from the informal sector supporting the finding that informal sector lends more for consumption (Menkhoff et.al, 2012). This makes a strong case for an expansion of the National Health Insurance Scheme (NHIS) coverage in the region, as it has the potential to reduce payment of punitive interest rates on loans obtained from informal lenders, such as the moneylenders, for medical care by households (Wagstaff, 2010).

**Findings and Discussion**

*Choice of formal or informal loan*

Table 4 presents the marginal effects of the choice of formal or informal loan by households. The results show a significant positive relationship between household proximity to a formal lender (as specified in quartiles) and informal lending when compared with households in close proximity to the banks. Households in Q2, Q3 and Q4 are 16.9%, 13.1% and 12.1% more likely to obtain credit from the informal credit sector than households who are in Q1. The predicted probabilities of distance, in quartiles, reduce with increase in household distance to a formal lender. Fundamentally, this is suggestive of a significant effect of transport cost on the use of informal loan. Also, this result suggests the responsiveness of the credit behaviour in the region to information asymmetry. The possible explanation for this finding is that households that are in the rural areas, where the informal sector concentrate their operations, are less likely to borrow from the informal sector due to the local information advantage of informal lenders, which might result in unfavourable loan conditions and this is consistent with the finding of Agarwal and Hauswald, (2010).

Middle-income households and high-income households are 17.9% and 42.9% less likely to borrow from the informal sector than low-income households, providing evidence that low-income households remain mostly outside the formal lending system and this corroborates the findings of Reardon et al., (2002). The result indicates the existence of the inherent risk of income level trap in the region. Obviously, low income households do not have the incentive to access formal loans which support income level transition and poverty alleviation making them to perpetually vulnerable. This suggests the need for expanded access to formal credit through the design of loan facilities targeted at the low-income but credit worthy households. This will increase the number of low-income households that borrow from the formal sector and equally improve overall borrower’s outcome (Karlan and Zinman, 2009).

The result also shows that Completion of secondary education by a household head reduces the likelihood of borrowing from the informal sector by 29.5%. The findings of Foltz (2004), and Barslund and Tarp (2008) in Vietnam are in support of this result. Additionally, this is indicative of the effect of expected utility of education (increase income and literacy) on the choice of credit.

Increase in age decreases the likelihood of deciding for an informal loan by 0.7%. Since age is used as a proxy for relationship, this ascertains that formal lending in the region thrives on relationship (Jiménez et al., 2009; Berger and Udell, 1995).

An increase in the number of dependents in a household increases the likelihood to borrow from the informal sector by a significant 4.4%. One of the main purposes for household borrowing is to smoothing consumption at economically critical times. Logically, a household with large number of dependents will barely feed at critical times let alone be able to borrow from the formal sector at such times for consumption. Such households will simply turn to the informal sector for a small loan amount with a very short duration to smoothing consumption. Duong and Izumida (2002), and Barslund and Tarp (2008) verify this finding.

| Variable            | dy/dx  | Std. Error |
|---------------------|--------|------------|
| Log (Distance)      |        |            |
| Q2                  | 0.169  | 0.052***   |
| Q3                  | 0.131  | 0.052***   |
| Q4                  | 0.121  | 0.051***   |
| Log (Income)        |        |            |
| Middle class        | -0.179 | 0.051***   |
| High class          | -0.429 | 0.610***   |
| Education level     | -0.295 | 0.078***   |
| Age                 | -0.007 | 0.003***   |
| Dependents          | 0.044  | 0.014***   |
| Observation         | 487    | -          |
| Pseudo R2           | 0.290  | -          |
| Log likelihood      | 229.763| -          |
| Prob. > chi2        | 0.000  | -          |

*, ** and *** mean statistically significant at 10%, 5% and 1%. See table 4.0 for description of variables.
The choice of credit source by household.

Table 5 shows the determinants of the choice of a credit source by households. This section provides empirical evidence on the influence household characteristics on the choice of a credit provider. The credit providers are bank, family, cooperative society, thrift and moneylender and this informs the use of multinomial logistic regression in the analysis. The only source of formal lending, the bank, serves as the reference group in the analysis. The implication of this is that a borrower choice of a credit provider is in comparison to the option of borrowing from the bank. The coefficients and the corresponding standard errors are presented in Table 5.

**Table 5: Determinant of the choice of a credit source.**

| Variables                  | Family (Coefficient Error) | Coop (Coefficient Error) | Thrift (Coefficient Error) | Money lender (Coefficient Error) |
|----------------------------|----------------------------|---------------------------|-----------------------------|----------------------------------|
| Log(distance)              | 0.6867*** (0.3245)         | 0.7193*** (0.2567)        | 0.5178 (0.2959)             | 1.3130*** (0.4470)              |
| Education level            | -1.5930*** (0.5746)        | -1.7806*** (0.5308)       | -2.3307*** (0.5429)         | -2.8894*** (0.5883)             |
| Log(average income)        | -5.1250*** (0.8729)        | -1.7158*** (0.6192)       | -4.8871*** (0.8132)         | -4.9828*** (1.0888)             |
| Age                        | -0.0313 (0.0235)           | -0.0583*** (0.0189)       | -0.0279 (0.0217)            | -0.0474 (0.0276)                |
| Dependents                 | 0.1694 (0.1220)            | 0.2552*** (0.1006)        | 0.2822*** (0.1132)          | 0.1680*** (0.1462)              |
| Constant                   | 27.0954*** (3.9332)        | 12.2611*** (3.0461)       | 27.1888*** (3.7287)         | 27.8102*** (4.8887)             |
| No. of obs.                | 487                        | 487                       | 487                         | 487                              |
| Prob> F                    | 0.0000                     | 0.0000                    | 0.0000                      | 0.0000                           |

*, **, *** mean statistically significant at 10%, 5% and 1%. Bank, the only formal source of credit, serves as the reference group.

The choice of family, cooperative and moneylender credit sources is significantly influenced by distance. The result indicates that a percentage increase in household distance from a formal lender leads to a significant increase in the likelihood to borrow from a family member, a cooperative society or a moneylender versus the bank. The result for thrift is different showing that distance has no significant effect on the choice of thrift in relation to bank. The thrift provides deposits, savings and credit services to a targeted market segment who find it difficult to access formal banking services due to socio-economic deprivation (Oloyede, 2008). Consequently, this result concurs that the thrift fulfils the function of the bank to its customers becoming a near perfect replacement of the bank wherever it operates.

Borrowing from cooperative society, thrift or moneylender versus the bank is significantly influenced by increase in the number of dependents in a household. However, increase in the number of dependents does not have significant influence on the use of family credit source. Notwithstanding intrinsic credit risk, this reflects the influence of family relationship on household consumption smoothening (Barslund and Tarp, 2008). The result also shows that household heads who have completed secondary education will less likely borrow from family, cooperative society, thrift and moneylender in relation to bank. This result shows the knock-on effect of formal education on the use of formal financial services through financial literacy (Chen and Volpe, 2002). The finding of Wydick et al., (2011) that higher levels of education were significant for accessing bank credit but insignificant for informal credit in Guatemala also supports this finding.

The estimation outcomes indicate that an increase in household income significantly reduces the likelihood to borrow from a family member, cooperative society, thrift or moneylender in relation to the bank. This demonstrates the effect of income on credit decisions (Thorbekke and Charumilind, 2002; Kiplimo et al., 2015). Borrowing from the cooperative society versus the bank is significantly influenced by age of household head. The relationship is negative indicating that the probability of borrowing from the cooperative society against the bank decreases as the age of the head of household increases. Since age is a proxy for relationship in the current study, the result suggests that a relationship with the bank offers a household better credit outcome in relation to cooperative societies. As for the choice of family member, thrift and moneylender, age is not significant.
The results reveal that the choice of family, cooperative society, thrift and moneylender is associated with borrower’s proximity to a formal lender and number of dependents in a borrowing household. Households whose heads have obtained formal education, households whose heads are older in age and households living above the poverty line are more likely to borrow from the bank.

A robustness check using the Variance Inflation Factor (VIF) was conducted to ensure that multi-collinearity did not influence the estimates from the model (for detail on VIF see; Senaviratna and Cooray, 2019). The result indicated no significant collinearity supporting the consistency of the logit model parameters (see Table 6).

| Variables     | VIF |
|---------------|-----|
| Log-average-income | 1.86 |
| Education level       | 1.62 |
| Age               | 1.35 |
| Dependents        | 1.21 |
| Distance          | 1.03 |

### Conclusion

This paper attempts to establish the link between household characteristics and the choice of credit provider in the Niger delta region of Nigeria. The study identifies the sources of credit available to households in the region and proceeds to estimate the association between household characteristics and the choice of credit provider. This study builds from existing literature in this area by using a novel data that incorporates households whose heads are public and private sector employees as well as self-employed. It also fills the gap created by limited studies in this area in sub-Saharan Africa. The current study differs from existing works as it thoroughly explores the association between household physical distance from a formal lender, household characteristics and the choice of lender. The nature of loans provided by the regulated formal credit sector and the unregulated informal credit sector is also explored.

The results suggest that a household that is not in close proximity to the bank is more likely to borrow from an informal credit source but at a decreasing likelihood with increase in distance. This finding suggests the effect of transport cost on the use of formal credit by households in the region. Increased number of dependents in a household is also associated with the choice of informal credit. On the other hand, the choice of formal credit is related to household income level, education level and age of the heads of household. According to the result, high income households less likely borrow from the informal sector income level of a household, the higher the probability of borrowing from the formal credit sector. In addition, households whose heads have obtained formal education avail themselves of formal credit. Interestingly, age of the head of household, used as a proxy for relationship between the household and the credit market, indicates a negative relationship with informal lending. This suggests that gaining more knowledge on the operations of the credit market of the region, increases the likelihood to borrow from formal credit provider. The study also reveals that the formal sector predominantly provided loans for entrepreneurial purposes whereas the informal sector mainly offered loans for consumption purposes.

The analysis to determine household choice of the individual sources shows that increase in household income and formal education of household heads drive borrowing from the bank. Obtaining credit from a family member is significantly associated with increase in distance of household from a formal lender. Increased distance of household to a bank and increased number of dependents in a household is linked to borrowing from cooperative society. Borrowing from thrift is found to be significantly related to increase in the number of dependents in a household only. A household with large number of dependents that is not in close proximity to the bank is more likely to obtain credit from the moneylender. Meanwhile, moneylenders charged the highest interest of 10% per month on loans as emergency lenders while the interest rate on loans offered by the bank was 3% per month.

The results motivate some practice implications to boost formal credit in the region. The finding of the study suggests that distance to a formal lender is crucial to the use of formal loan. Thus, there is need for formal financial services to be taken closer to the people to reduce the negative effect of transport cost on borrowing from the bank. To achieve this, the extension of banks branch network to the rural areas and the adoption of smart banking technologies like mobile banking in service delivery is imminent. Formal lenders need to develop lending strategies that advance credit worthiness of a borrower with large number of dependents since having a large size family is cultural in many parts of sub-Saharan Africa. It is evident from the analysis that formally educated heads are more likely to use formal credit, which is partly due to financial literacy. Banks can therefore encourage those who are not educated formally but are credit worthy to use formal credit by carrying out financial literacy programmes in vernacular. In addition, credit officers of banks must be individuals who are fluent in the local dialect of the community that they serve.

A study that involves a panel of countries will make a rewarding extension of this work as it will support a more casual approach in examining the association between household characteristic and the choice of a credit provider. However such an extension of the current study will require an extensive data set on household borrowing from different developing countries, which appears to be unavailable for now. Caution is advised in the generalisation of the findings of this study to other developing economies since the main results of the empirical analysis are specific to the Niger delta region of Nigeria.
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