Determinants of credit demand and credit constraints among households in Ghana

Theodora A. Asiamah a,*, William F. Steel b, Charles Ackah b,c

a School of Sustainable Development, University of Environment and Sustainable Development, Somanya, Ghana
b Institute of Statistical, Social and Economic Research, University of Ghana, Legon, Ghana
c Centre for Social Policy Studies, University of Ghana, Legon, Ghana

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ABSTRACT

This paper investigates the determinants of and trends in credit demand and credit constraints of households with respect to both formal and informal financial institutions in Ghana. Trends and explanatory factors over 1992–2013 using pooled data from four Ghana Living Standards Surveys are analysed using the Heckman Probit model. Estimates for the full population reveal that tertiary education is a significant determinant of both credit requests (positively) and credit constraints (negatively). In the rural population, household heads that were widowed or separated and those that lived below the poverty line are more likely to request credit and also more likely to experience credit constraints. In the urban population, the aged are less likely to request credit but more likely to experience credit constraints. The policy implication is that financial inclusion measures targeted to people living below the poverty line, the widowed and separated in rural communities are needed to respond to their relatively high demand for credit services and overcome their exclusion from access to credit that could help in generating income to reduce poverty. The sex of a household head is significant for binding credit constraints in the full population and the urban sample, but not significant in the rural sample. Surprisingly, the study finds a decline in the proportion of households requesting credit in the full population as well as rural and urban areas, indicating increasing self-exclusion.

1. Introduction

Broadening access to financial services has been a concern for international development partners, who established the Alliance for Financial Inclusion (AFI) in 2008. This alliance empowers policymakers globally to broaden access of excluded socio-enonomic groups to quality financial services. To this end, financial inclusion has been a key priority on the agenda of most governments, with various policies and practices in place to increase access to financial services by excluded groups (Arun and Kamath, 2015). Furthermore, to broaden access to financial services, the ninth United Nations sustainable development goal (SDG) focuses on promoting inclusive and sustainable industrialisation, with financial inclusion and access to credit by small enterprises as one of its targets. Despite growing efforts to enhance financial inclusion globally, fundamental problems such as high transaction costs, poor infrastructure, high poverty levels and cost of financial services limit access to credit in Sub-Saharan African countries (Demirguc-Kunt et al., 2015; Batuo, 2015; Chikalipah, 2017). In developing countries, low levels of domestic credit also impede financial inclusion efforts as credit for household consumption is limited (Gozgor, 2018).

In Ghana (the focus of this study), as in other Sub-Saharan countries, financial inclusion remains a problem for certain populations, especially when it comes to access to credit. Several reforms in the financial sector of Ghana have revised the legal and regulatory environment and provided room for the entrance of foreign banks and several types of non-bank financial institutions (Biekpe, 2011; Akpandjar et al., 2013). Despite the increase in the number of financial institutions as a result of these reforms, there is a gap in financial inclusion in Ghana. Limitations on access to credit from formal financial institutions affects households generally and some socio-economic groups in particular, such as women, people living below the poverty line and the aged (Akudugu et al., 2009; Akudugu, 2013; Asuming et al., 2018). This limits options for consumption smoothing and opportunities for engagement or growth in economic activities.

A growing body of literature has emphasised the importance of credit (whether from formal or informal sources) for poverty reduction.

* Corresponding author.
E-mail address: tiasmah@uesd.edu.gh (T.A. Asiamah).

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at the household level. Access to credit can enable the growth of existing micro-enterprises managed by households, as well as start-up of new ones. This results in improved incomes, which enables investment in health and education. Access to credit by households also enhances consumption-smoothing (Barslund and Tarp, 2008; Aterido et al., 2013).

Despite the relevance of credit to poverty reduction, the realisation of this benefit will be stifled if credit demand is negligible. The concept of discouraged borrowers, developed by Kon and Storey (2003) offer an insight into the importance of financial inclusion for addressing the linkage between credit demand and credit constraints. They suggest that under a wide range of conditions, some potential consumers of the credit market will not seek credit because of the transaction costs associated with the credit request. Consequently, not all potential consumers enter the credit market; hence the need to examine the factors that drive households to request credit vis-à-vis the factors that determine the approval of their requests. This present study examines concurrently the factors that determine credit demand and credit constraints among households in Ghana and establishes the linkage between demand for credit and credit constraints with respect to the determinants. The study also examines the trends in the drivers of credit demand and credit constraints over time.

Previous studies have explained the factors that drive demand for credit by households and farmers (Akpandjar et al., 2013; Ssonko and Nakayaga, 2014; Tura et al., 2016; Umanath et al., 2018). Other studies reveal the determinants of credit constraints (Aterido et al., 2013; Etonihi et al., 2013; Ali et al., 2014; Banerjee and Duflo, 2014; Sekyti et al., 2017; Chandio and Jiang, 2018). Although these studies reveal interesting determinants such as borrower characteristics, environmental factors and lender attributes, they provide limited information on the linkage between credit demand and credit constraints.

There is limited information on borrower characteristics that drive demand for credit and concurrently enhance or deter access to credit. The few studies that address this have limitations of not revealing the dynamics between rural and urban populations (Barslund and Tarp, 2008; Chen and Chivaku, 2008). For policy interventions to promote financial inclusion across the context of Africa, considering the differences in the dynamics of financial inclusion across continents, especially regarding developing countries in Sub-Saharan Africa. The present study differs from previous studies by examining the factors that concurrently determine credit demand and credit constraints using a large national data set which is segregated into rural and urban populations in order to investigate the dynamics in the rural and urban populations, considering the differences in their economic contexts. In addition, this study includes year dummies to assess the changes in credit demand and credit constraints over time.

Employing a large secondary national data set, the authors assessed concurrently the determinants of credit demand and credit constraints. The authors conclude that, for the entire population, the linkage between credit demand and credit constraints is strongly explained by the education variable. In the rural population, poverty status and marital status of household heads are more significant, while in the urban population, the age of household heads is more important. This has policy implications for financial inclusion of people living below the poverty line and those widow or divorced in rural areas as well as the aged in the urban areas. This paper adds to the knowledge on the literature of financial inclusion and access to credit and credit constraints at the household level by highlighting the distinctions between rural and urban populations.

The paper is structured as follows: Section 2 offers an overview of relevant literature, while section 3 presents the details of the data and methodology. The empirical results are presented in section 4, and the conclusions and policy implications follow in section 5.

2. Literature review

Access to credit by households from either formal or informal institutions has been presented as playing an important role in enhancing their welfare. Short-term benefits of consumption-smoothing, investment in economic activities, and income growth which eventually improves the welfare of households are found by several studies (Nader, 2008; Kaboski and Townsend, 2012; Li et al., 2011; Luan and Bauer, 2016). Several other studies on smallholder farmers present the benefits of credit for agricultural productivity (Tura et al., 2016; Sekyti et al., 2017; Nordjo and Adjast, 2020).

Notwithstanding these benefits of credit, not all households demand credit (Kochar, 1997; Kon and Storey, 2003). Earlier studies have assumed that credit demand is positive for all households, and households that did not obtain credit were considered as credit-constrained (Stiglitz and Weiss, 1981; Hoff and Stiglitz, 1990). Since the seminal work of Kochar (1997), who found that this assumption was too restrictive, several studies have considered active credit demand in examining access to credit (Barslund and Tarp, 2008; Kim et al., 2016). Studies reveal factors such as perceived transaction costs (Kon and Storey, 2003) and perceived risk of default (Kochar, 1997) as reasons for the lack of demand for credit.

Studies show that not all households that demand credit have access; thus, some households are credit-constrained. This is explained by the systemic nature of the credit market. A common feature of credit markets is the presence of imperfect (asymmetric) information by both borrowers and lenders concerning the intentions of each other in the credit transaction. To circumvent this market friction, it has been theoretically explained that lending is made under heavy collateral contracts (Hoff and Stiglitz, 1990; Barham et al., 1996; Boucher et al., 2008; Getachew, 2016). As a result, households that do not have collateral, for instance the poor, have limited access to credit either in quantity or by denial entirely. Furthermore, collateral requirements made by lenders result in self-exclusion, as potential borrowers are discouraged from borrowing, following the perception of high transaction costs and risks of default (Guirkinger and Boucher, 2008). Credit constraints impede the growth of micro-enterprises and have implications for deepening poverty among the poor, reinforcing income inequality. Denial of credit results in an imbalance in credit allocation, as this impedes the transfer of capital to the poor, resulting in income inequality and a deepening of poverty (Beck et al., 2007; Dong et al., 2012; Aterido et al., 2013).

The notion of credit constraints requires measurement of both credit demand and credit access. Consequently, several definitions of credit constraints have been established in the development finance literature. Entities (firms or households) that apply for credit and are outrightly denied, as well as those that do not receive the full amount of credit requested, are considered credit-constrained (Araujo and Rodrigues, 2016). Following the conceptual framework of Cole (2008), such borrowers are known as denied borrowers. Entities that need credit but do not make requests as a result of reasons such as complex credit application procedures or high cost of credit are also credit-constrained and referred to as discouraged borrowers (Kon and Storey, 2003; Cole, 2008). The concept of credit constraint also depends on the perception of the consumer. Consumers that hold the perception that the lack of access to credit is an obstacle to their growth also perceive themselves as credit-constrained (Hansen and Rand, 2014).

The literature on the determinants of credit demand and constraints is varied. Some studies focus on demand for credit generally among households, irrespective of the purpose of the credit (Akpandjar et al., 2013). Other studies focus on the determinants of demand for credit among smallholder farmers in rural areas (Ssonko and Nakayaga, 2014; Tura et al., 2016; Umanath et al., 2018). Some studies focus solely on the determinants of credit constraints (Ali et al., 2014; Chandio and Jiang, 2018). Studies that focus on both the factors that determine credit demand and credit constraints among households, and consequently provide a linkage between the drivers of credit demand and credit constraints are very few.
Barslund and Tarp (2008), Chen and Chivaku (2008) and Tang and Guo (2017) provide insights on the linkage in the determinants of credit demand and credit constraints. However, these studies provide limited knowledge on the nuances in rural and urban populations, considering the differences in the dynamics of rural and urban populations. In a survey of 932 rural households, Barslund and Tarp (2008) examined the determinants of demand for formal and informal credit. A Heckman two-stage selection model revealed that the significant determinant that linked credit demand and credit constraints among rural households was education. Education increased the likelihood of credit demand and decreased the chances of credit rationing. Other significant personal attributes include the age of a household head, asset ownership and credit history. The age of the household head (measured linearly) was negatively related to credit demand from both formal and informal institutions. The study did not provide information on the age in squared terms; hence the status of credit demand and rationing at old age cannot be ascertained. Asset ownership also increased the likelihood of credit demand but was not a significant determinant of credit rationing. Households that had not paid earlier credits were at a greater chance of experiencing credit rationing. External factors such as regional location and connectedness with credit institutions also determined credit demand.

In a similar study in Bosnia and Herzegovina, Chen and Chivaku (2008) used a panel data set and ran two separate probit models using a Heckman selection model. Their findings indicate that age, income, education, and wealth determine credit market participation, while the experience of credit constraints is determined by factors such as wealth and income. In addition, the aged were less likely to participate in the credit market but were more likely to experience credit constraints. Similarly, Tang and Guo (2017) ran separate regression models to examine credit demand and credit constraints among rural households. They also observed that land size determines both credit demand and credit constraints. Larger land sizes increased the probability to borrow as well as the probability to experience credit constraints by quantity among rural households in China. The determinants of credit demand were household size and education qualification of household head. External factors such as transaction costs had a significant negative effect on the demand for credit from formal institutions. Age was also significant for credit demand, as older farmers were found to be more likely to borrow. Other factors that influenced credit constraints by quantity included off-farm employment and the cost of credit. Households that were engaged in non-agricultural activities were more likely to experience credit constraints, while an increase in the interest rate of loans decreased households’ ability to borrow larger amounts of loans.

Factors that influence access to credit, credit constraints and productivity of farmers have been examined in Ghana. Age, financial literacy, and group membership positively influenced farmers’ access to credit, while factors that positively influenced credit constraints included household size, membership in a group, and household durable assets. Farmers’ productivity depended on marital status, household size, farm size, and group membership (Sekyi et al., 2017). Using the GLSS 5 Data, Akpandjar et al. (2013) found that the income of the household head impacts significantly on the demand for credit among urban households. Furthermore, demand for credit facilities by rural households was positively induced by shocks. It was also found that remittances had no significant effect on demand for credit among urban households, but in rural households, remittances had a positive significant effect on demand for credit. Education was also significant in both urban and rural areas in driving demand for credit.

Tura et al. (2016) assessed determinants of demand for credit by teff and wheat farmers in Central Ethiopia. They found out that among the teff farmers, credit demand was spurred by interest rate, education, dependency ratio, repayment duration and farm size. In addition, the source of the loan of a business partner affected the amount of credit demanded by teff farmers. On the other hand, among wheat farmers, the amount of credit requested was negatively influenced by the sex of farmer and source of loan; while education, access to training facilities, size of farm, duration of repayment and interest rate positively influenced the loan amount demanded. Male wheat farmers were more likely to demand credit than female wheat farmers, though it is not clear from the study if they actually had greater access to credit.

Sonoko and Nakayaga (2014) used binary logit model estimation to examine the determinants of demand for credit among farmers in Uganda. Farmers that lived close to financial institutions and those that were members of farmers’ associations had greater probability of demanding credit. In addition, farmers that had rights to ownership of land by customary land tenure system were more likely to request credit. On the supply side, a simplified credit application process also facilitated request for credit. Contrarily, the probability of credit demand decreased as farm size increased. In a similar study on farmers, Ali et al. (2014) examined credit constraints and agricultural productivity in rural Rwanda. The number of years of schooling, asset ownership, access to information through the media, and connectedness with political persons appeared as determinants of credit constraints. Personal attributes such as listening to the news at least once a week and holding a political office reduced the likelihood of credit constraints. Households that had relatives holding political offices were also less likely to experience credit constraints. This suggests that political connectedness and listening to the news increase access to information and reduce information asymmetry. Another related study by Chandio and Jiang (2018) showed that institutional factors such as time lag, lending procedures, distance to credit sources and interest rates contributed significantly to credit constraints. However, socio-economic factors such as the age and education of household head were not significant.

Menkhoff and Rungruxrivorn (2011), employed the Heckman two-step selection model and found that access to village funds helped to reduce credit constraints. Also, the household size, represented by the number of children, negatively influenced credit constraints. Finally, similar to the case of the household, individual characteristics of business owners serve as important determinants of credit constraints. Hansen and Rand (2014a) noted that female business owners and those highly educated were less likely to experience credit constraints from formal institutions.

Macro-level variables also play a role in the discussion on the determinants of access to credit and credit constraints. Gozgor (2018) indicates that in developing countries, access to credit by households is determined by the levels of domestic credit. Consequently, knowledge on the determinants of domestic credit is important to understand the determinants of credit demand and credit constraints. Gozgor (2018) illustrates the negative effect of the overall political risk on domestic credit for both emerging and developing countries. In his paper, overall political risk has subcomponents such as government stability, investment profile, socioeconomic conditions, internal and external conflicts, corruption and other geo-political variables. In a similar paper, Gozgor et al. (2019), demonstrates that a high level of economic uncertainty decreases the level of domestic credit, measured as both domestic credit to the private sector and domestic credit by banks. Domestic credit to private sector includes credit level in non-banking financial institutions and insurance companies. In developing countries, the non-banking financial institutions are vibrant and contribute to domestic credit. Furthermore, the level of geopolitical risks in a economy also influences the level of domestic credits. Lu et al. (2020) show that geopolitical factors such as military-related tensions, nuclear tensions, war threats, terrorist threats and war intentions all negatively affect the level of domestic credit. The above studies contribute to knowledge on the determinants of credit demand and credit constraints, but there is little attention to the linkages between the determinants of credit demand and credit constraints.

3. Data and methodology

The data for the study was obtained from the Ghana Living Standards Surveys (GLSS) data sets, which are cross-sectional surveys carried out...
nationwide. Seven rounds of the surveys have been conducted since their inception in 1987. The methodology of the first two rounds was similar, but subsequent rounds differed. The first two rounds were carried out in 1987/88 and 1988/89, respectively. Since the third to the seventh rounds were conducted with a methodology that was different from that of the first two rounds, this study excluded the first two rounds of the GLSS data, as it would not support data combination to achieve a large data set. The third round was conducted in 1991/92 while the fourth, fifth and sixth rounds were conducted in 1998/99; 2005/06; and 2012/13, respectively. In the seventh round, conducted in 2017, credit requests and credit constraints were measured differently from the previous rounds. As a result, the seventh round was also excluded from the study, as it would distort the measure of credit constraints. In this study, the third to sixth rounds of the data were combined to obtain a larger data set for statistical analysis. These are respectively known as GLSS 3, GLSS 4, GLSS 5, and GLSS 6 with sample sizes in terms of number of households of 4,508; 5,998; 8,687; and 16,772, respectively. After merging the various segments of the data and pooling the various data sets, a pooled data of 35,489 households was obtained for the study.

The multi-stage sampling technique was used in collecting the data for all the rounds. The Enumeration Areas (EAs), which consisted of clusters of households demarcated by the then ten administrative regions, as well as rural and urban locations and ecological zones, were defined as the primary sampling units. The households within each EA constituted the secondary sampling unit. The surveys, which provide important information on the living conditions of Ghanaians at a point in time, focused on the household as the key socio-economic unit and provided detailed information on demographic characteristics and various aspects of living conditions such as employment, education, health, housing, consumption, expenditure, household income, credit, assets, savings and prices.

The determinants of credit demand and credit constraints from both formal and informal financial institutions were analysed using the STATA 13 software and Heckman Probit model. The standard errors were clustered at the household level during the data analysis stage by including clustering in the STATA syntax.

### 3.1. The estimation model

The model employed in the estimation is the Heckman Probit model. The structural equation is given as:

\[
y^*_i = X_i \beta + \varepsilon_i
\]  

where \(y^*_i\) denotes the unobserved credit constraints of the \(i\)th household head, \(X_i\) denotes the full set of independent variables, \(\beta\) represents the vector of parameters to be estimated, and \(\varepsilon\) is the random error term.

From the theory of credit rationing, the credit market is characterised by imperfect information, which results in credit rationing and use of collateral to mitigate the information problem (Stiglitz and Weiss 1981). Consequently, a household with collateral should have greater access to credit. Household characteristics that correlate with access to collateral and also facilitate lender information are considered as independent variables in the credit constraint model. Demographic and household head personal characteristics are considered in this case.

Since \(y^*_i\) is unobserved, the observed variable, \(y_i\) is as follows:

\[
y_i = (y^*_i > 0)
\]

The data on the observation of credit constraints is available only for households that made credit requests. Thus, the sample is incidentally truncated, which leads to sample selectivity bias. This is resolved by including a selection equation which has an additional variable that is exogenous to the outcome equation. It is also possible that unobserved factors that affect the incidence of credit constraints may influence the decision to request credit. This may result in endogenous selection bias, which is addressed by using the Heckman Probit model, which allows a simultaneous estimation of two equations, a selection equation and an outcome equation (Wooldridge, 2009). Consequently, we include a selection equation as follows:

\[
y^*_i = (Z_i \lambda + \varepsilon_i < 0)
\]

where \(y^*_i\) represents demand for credit by the \(i\)th household. This takes the value of 1 if a credit request is made and 0 otherwise. \(Z\) denotes the full set of independent variables addressed in this study, namely sex, age, household size, marital status, education level, poverty level, employment status and survey year. \(\lambda\) represents the vector of parameters to be estimated, and \(\varepsilon\) is the normally distributed error term.

A dummy variable, hospitalization, which represents shocks, was added in the selection model. The admission of any member of the household at the hospital for at least a night is an experience of shock to the household. Consequently, hospitalization was included in the model as a proxy for shocks experienced by the household head. This is expected to correlate highly with demand for credit, considering the limitations of the National Health Insurance Scheme in Ghana. Similar studies have likewise used hospitalization as a proxy for the experience of shocks (Barslund and Tarp 2008; Menkhoff and Rungruxsirivorn 2011; Akpandjar et al., 2013).

On the other hand, the chances of refusal or approval of requests will be less correlated with the experience of shocks. An additional variable, a dummy variable which indicates whether or not the household head was working, was also included in the outcome equation. This variable is likely to affect borrowers’ repayment ability and is observable to lenders.

### 3.2. Description and conceptualisation of variables

Table 1 presents the variables used in the estimation. As illustrated in the literature, the concept of credit constraints is measured by the experience of credit denial from either formal or informal institutions upon credit request. In measuring credit requests, we assign a value of 1 when a household head made a loan request from either a formal or informal institution. Furthermore, in measuring credit constraints, we assign a value of 1 when the loan request was denied. From the literature, factors that explain credit demand and credit constraints at the household level include household head characteristics such as education qualification, sex, marital status, and poverty status (Barslund and Tarp, 2008; Menkhoff and Rungruxsirivorn, 2011; Akpandjar et al., 2013; Tang and Guo, 2017). Household characteristics such as household size and location are also important.

As explained above, we include hospitalization as an exclusion restriction variable. We also include an observable variable that is likely to influence repayment ability and also is observable to lenders, which is whether or not the household head has worked for the last seven days.

### 3.3. Sample characteristics

Table 2 presents the summary statistics of the variables used in the estimation. The pooled data show that a lower proportion of households in the population (25%) requested credit from either formal or informal institutions. Out of this, a greater proportion (87.6%) had access to credit while a lesser proportion (12.4%) had their loan requests denied. We find the average age of a household head in the pooled data as 45 years, while the average household size was 4. A majority of households reside in rural areas (an average of 59%), and a majority of households (71%) were headed by males. We find that 39% of household heads had primary education; a greater proportion had no formal education (45%); while relatively few household heads had tertiary education (7%).

### 4. Empirical results

This section presents the empirical results. Tables 3 and 4 present the Heckman Probit results of the determinants of credit demand and credit...
Table 1. Description of variables.

| Variables          | Description/Categories                                                                 |
|--------------------|----------------------------------------------------------------------------------------|
| Dependent variable: Credit request | Dummy variable. This indicates whether or not a household head made a loan request from either a formal or informal institution. |
| Dependent variable: Credit constrained | Dummy variable representing the refusal of a household’s loan request. |
| Explanatory variables: Gender Age | Dummy variable capturing the sex of household head. Continuous variable capturing the age of a household head above 15 years. |
| hhsize | Continuous variable capturing the total number of individuals within the household. |
| Loc 2 | Dummy variable capturing the setting of the household. 1-Urban 2-Rural Base category is 1 |
| Marital status | Categorical variable representing marital status of household head 1-Married 2-Never married 3-Ever married Base category is 2 |
| Education level | Categorical variable capturing the highest education qualification of household head 1-No education 2-Primary/Basic education 3-Secondary education 4-Tertiary education Base category is 1 |
| Work | Dummy variable capturing whether or not the household head did some work within seven days before the survey 1-Yes 0-No |
| Hospitalization | Dummy variable capturing the experience of shocks. This indicates whether a member of the household has been admitted to the hospital for at least a night. 1-Yes 0-No |
| pov | Dummy variable indicating whether or not the household was poor with reference to the poverty line. 1-Poor 0-Non-poor |

Source: Author's computation based on GLSS 3, GLSS 4, GLSS 5, and GLSS 6 data.

Table 2. Summary statistics of sample.

| Variable | Measures | Response/ | Pooled |
|----------|----------|-----------|--------|
| Observations | Households | 35,489 |
| Dependent Variable: Credit request | Whether or not a household head made a loan request | Yes (%) | 25.0 |
| Dependent Variable: Credit constrained | Whether or not a household head was refused a loan request | Yes (%) | 12.4 |
| Independent Variables: Age (Average in years) | Age of household head | 45.4 |
| Household size (Average) | Number of individuals in a household | 4.3 |
| Location | Location of household head | Urban (%) 41.0 Rural (%) 59.0 |
| Sex | Sex of household head | Female 29.4 Male 70.6 |
| Marital status | Marital status of household head | Married 68.2 Never Married 22.5 Ever Married 9.3 |
| Education level | Highest education attained by household head | No formal educ. 45.1 Primary educ. 39.2 Secondary educ. 9.0 Tertiary educ. 6.7 |
| Work | Whether or not the household head did some work within seven days before the survey | Yes 85.3 No 14.7 |
| Hospitalization | A household member being admitted to the hospital for at least a night. | Yes 3.6 No 96.4 |
| Poverty status | Whether or not the household head was poor with reference to the poverty line | Poor 27.2 Not poor 72.8 |

Source: GLSS 3, GLSS 4, GLSS 5, and GLSS 6.

Constraints for the full sample and sub-samples respectively. The full sample consists of the total number of households in the pooled GLSS data, and the sub-samples consist of households in either rural or urban locations. Trends over time and differences between urban and rural households are also discussed.

In all the samples (Tables 3 and 4), the study finds age in the linear form as having a positive relationship with credit demand and a negative relationship with credit constraints. This finding is consistent with the studies of Tang and Guo (2017) and Sekyi et al. (2017). Other studies, however, found a negative relationship between age and credit demand (Barslund and Tarp 2008; Menkhoff and Rungruxsiririvorn, 2011). In addition, this study examines the relationship between age in the squared form and credit demand and credit constraints. In all the samples, age squared had a negative relationship with credit demand and a positive relationship with credit constraints. As household heads age, they are initially more likely to request credit, but as they become old and retire, the chances of credit demand decrease. This finding indicates that young adults are less likely to demand credit while middle-aged household heads have a greater probability to demand credit, and at old age they have a lower probability of demanding credit from either formal or informal institutions. Young household heads have fewer dependants and have less credit demand, while middle-aged household heads have many dependants and have a greater need for credit. The finding on the relationship between age and credit demand is similar to that of Chen and Chivaku (2008), who found that demand for credit increased with age and decreased at old age. However, the finding differed concerning credit constraints, as Chen and Chivaku (2008) identified that the supply of credit increased with age. In the present study, access to credit (supply) decreased at old age. The finding of the present study on age and demand for credit is contradictory to the findings of Tang and Guo (2017), who found out that the aged in rural households were more likely to request credit. Other studies, such as Chandio and Jiang (2018), do not find the age of household heads significant.

In both rural and urban populations, household heads with tertiary education were more likely to request credit and less likely to experience credit constraints from either formal or informal financial institutions. This indicates that higher education places household heads in a position both to demand credit and also gain access to credit. These results are consistent with the findings of Barslund and Tarp (2008), Ali et al. (2014), Chen and Chivaku (2008), Akpandjar et al. (2013), and Tang and Guo (2017). Highly educated household heads are likely to have permanent incomes and are better able to access credit from formal as well as informal institutions. They are also likely to form ties with wealthy individuals in their social networks who can offer informal loans.

Interestingly, in all the samples, we find a decline in credit requests over the years when compared to the reference year, 1991/92. Although household heads did not face greater credit constraints over the years when compared to the reference year, there was a consistent decline in credit demand. This suggests a growing disininterest or discouragement with respect to borrowing, whether from formal or informal institutions. The financial climate in Ghana is very complex, and the decisions of households concerning the use of financial services, especially credit, is dictated by many unobserved factors. Results from the GLSS 6 data
Observations 35,489
Uncensored observations p-value 0.0001

Table 3. Heckman probit estimates of determinants of credit demand and constraints (full sample).

| Variables                        | Credit request (AME) | Credit constraints (AME) |
|----------------------------------|----------------------|--------------------------|
| Female                           | 0.0198               | -0.1973***               |
|                                  | (0.0497)             | (0.0696)                 |
| Age                              | 0.0179***            | -0.0076                  |
|                                  | (0.0035)             | (0.0063)                 |
| Age squared/100                  | -0.0245***           | 0.0095                   |
|                                  | (0.0034)             | (0.0070)                 |
| Household size                   | 0.0527***            | -0.0183*                 |
|                                  | (0.0038)             | (0.0103)                 |
| Marital status (Reference Never married) |                      |                          |
| Married                          | 0.0195               | -0.0371                  |
|                                  | (0.0251)             | (0.0407)                 |
| Ever married (Widowed/Divorced)  | -0.2446***           | 0.1854***                |
|                                  | (0.0396)             | (0.0688)                 |
| Location (Ref. Urban)            | 0.1973***            | -0.0629                  |
|                                  | (0.0311)             | (0.0420)                 |
| Highest Education (Reference no education) |                |                          |
| Primary education                | 0.1023***            | -0.0416                  |
|                                  | (0.0230)             | (0.0357)                 |
| Secondary education              | 0.0136               | -0.0535                  |
|                                  | (0.0351)             | (0.0541)                 |
| Tertiary education               | 0.2642***            | -0.3444***               |
|                                  | (0.0397)             | (0.0607)                 |
| Survey year (Reference Round 3–1991/92) |                  |                          |
| Round 4 (1998/99)                | -0.2769***           | -0.2073                  |
|                                  | (0.0102)             | (0.1599)                 |
| Round 5 (2005/06)                | -0.4392***           | -0.0680                  |
|                                  | (0.0938)             | (0.1597)                 |
| Round 6 (2012/13)                | -1.1427***           | 0.2196                   |
|                                  | (0.0904)             | (0.2494)                 |
| Female x Round 4 (1998/99)       | 0.1233*              | 0.0003                   |
|                                  | (0.0650)             | (0.0901)                 |
| Female x Round 5 (2005/06)       | 0.0569               | 0.1134                   |
|                                  | (0.0614)             | (0.0901)                 |
| Female x Round 6 (2012/13)       | 0.0306               | 0.2209**                 |
|                                  | (0.0588)             | (0.0989)                 |
| Poor (Reference Non-poor)        | -0.3442***           | 0.1726***                |
|                                  | (0.0261)             | (0.0574)                 |
| Worked (Reference Not working)   | 0.5914**             | -0.9012**                |
|                                  | (0.0453)             |                          |
| Hospitalization                  | 0.2448***            |                          |
|                                  | (0.0372)             |                          |
| Constant                         | -0.6503***           | 0.2964                   |
|                                  | (0.1007)             | (0.2748)                 |
| Test: Independence of equations  | Wald test P = 0      |                          |
| Uncensored observations p-value  | 0.0001               |                          |
| observations                     | 8,866                |                          |
| Observations                     | 35,489               | 35,489                   |

Clustered standard errors in parentheses.
***p < 0.01, **p < 0.05, *p < 0.1.
Note: AME represents Average Marginal Effects. This provides the average change in credit demand and credit constraints as a result of a unit change in any of the independent variables.

(Appendix I) indicate that a majority of household heads (62%) did not request credit because they did not need credit (reasons for not trying to obtain credit were provided only in GLSS 6, but not in previous surveys). While these reasons offer some explanation for the decline in demand for credit over the years, further empirical studies are needed to investigate this interesting phenomenon.

While these reasons offer some explanation for the decline in demand for credit over the years, further empirical studies are needed to investigate this interesting phenomenon.

The sub-sample results (Table 4) reveal some differences in the determinants of credit constraints between rural and urban households. First, the results reflect that female household heads in urban areas had greater access to credit than male household heads, whereas in rural areas the sex of the borrower does not significantly matter in credit

| Variables                        | Urban                  | Rural                  |
|----------------------------------|------------------------|------------------------|
|                                  | Credit Request (AME)   | Credit Constraint (AME) |
| Female (Reference male)          | -0.0451                | -0.2849*               |
|                                  | (0.0790)               | (0.1542)               |
| Age                              | 0.0277***              | 0.0124***              |
|                                  | (0.0060)               | (0.0109)               |
| Age squared/100                  | -0.0346***             | -0.0188***             |
|                                  | (0.0060)               | (0.0127)               |
| Household size                   | 0.0490***              | 0.0546***              |
|                                  | (0.0069)               | (0.0255)               |
| Marital status (Reference Never married) |                  |                          |
| Married                          | -0.0028                | 0.0363                 |
|                                  | (0.0379)               | (0.0892)               |
| Ever Married (Widowed/Divorced)  | -0.2541***             | -0.1977***             |
|                                  | (0.0567)               | (0.1544)               |
| Highest Education (Reference no education) |                  |                          |
| Primary Education                | -0.0672*               | 0.1962***              |
|                                  | (0.0383)               | (0.0612)               |
| Secondary Education              | -0.1641***             | 0.2900***              |
|                                  | (0.0488)               | (0.1252)               |
| Tertiary Education               | 0.1145**               | -0.3147***             |
|                                  | (0.0532)               | (0.1123)               |
| Survey Year (Reference Round 3–1991/92) |                  |                          |
| Round 4 (1998/99)                | -0.5346***             | -0.1397                |
|                                  | (0.1645)               | (0.3632)               |
| Round 5 (2005/06)                | -0.6504***             | -0.1912                |
|                                  | (0.1566)               | (0.4161)               |
| Round 6 (2012/13)                | -1.2037***             | -0.2038                |
|                                  | (0.1487)               | (0.5435)               |
| Female x Round 4 (1998/99)       | 0.2169**               | 0.0120                 |
|                                  | (0.1024)               | (0.1761)               |
| Female x Round 5 (2005/06)       | 0.0609                 | 0.2625                 |
|                                  | (0.0947)               | (0.1774)               |
| Female x Round 6 (2012/13)       | 0.0278                 | 0.2603                 |
|                                  | (0.0990)               | (0.1730)               |
| Poor (Reference Non-poor)        | -0.2321***             | -0.1147                |
|                                  | (0.0496)               | (0.1075)               |
| Worked (Reference Not working)   | 0.0598                 | 0.1086*                |
|                                  | (0.0679)               | (0.0632)               |
| Hospitalization                  | 0.2183***              | 0.2580***              |
|                                  | (0.0558)               | (0.0515)               |
| Constant                         | -0.5957***             | 0.6737*                |
|                                  | (0.1669)               | (0.4056)               |
| Test: Independence of equations  | Wald test P = 0        | Wald test P = 0        |
|                                  | p-value 0.0892         | p-value 0.0006          |
| Uncensored observations          | 3,395                  | 5471                   |
| Observations                     | 14,560                 | 20,929                 |

Clustered standard errors in parentheses.
***p < 0.01, **p < 0.05, *p < 0.1.
request or constraints. Other studies that focused on rural households did not also find the sex of the household head significant for the experience of credit constraints (Ali et al., 2014; Barslund and Tarp, 2008; Tang and Guo, 2017). Further, the importance of the age of household head in determining credit constraints differs between urban and rural households. Age squared was significant for credit constraints in urban locations with a positive sign, but was not significant for rural locations. This indicates that the elderly in urban areas had a greater chance of experiencing credit constraints. On the other hand, the elderly in rural areas do not have a significant likelihood of experiencing credit constraints. This is explained by the kinship ties in rural communities in developing countries, which is not experienced in more cosmopolitan urban communities. This has social protection and economic security implications for the elderly in urban areas, as they may not have access to funds to engage in economic activities and kinship ties are weak to support material transfers.

Other variables such as poverty status and marital status proved to be significant in the rural sample. However, in the urban sample, these variables were not significant. In the rural sample (Table 4), the poor are less likely to request credit, but are rather more likely to experience credit constraints. This finding resonates with the findings of Ali et al. (2014), who found that household heads with larger land sizes were less likely to experience credit constraints. This finding is consistent with other findings such as Tang and Guo (2017), who observed that land size, which is an indicator of wealth, positively determines credit demand. Akpandjar et al. (2013) also observed that income is a positive determinant of credit demand. The capital resources of the poor are limited and hence insufficient to serve as collateral to secure loans from the formal sector. Consequently, they are more likely to be denied credit. It is also likely that their associations and networks are persons who belong to low-income socio-economic groups and who cannot offer informal loans. Consequently, their chances of receiving credit from informal sources (friends) are low. This result has implications for deepening the vulnerability of poor household heads as they are unable to access funds for engagement in economic activities and consumption-smoothing.

The results show that in urban areas, household heads that were married were less likely to face credit constraints. This result is consistent with the findings of Duy et al. (2012), who noted that household heads that were married had greater access to credit relative to household heads that were not married. Contrarily, in rural areas, those who had married before, but were either divorced or separated were more likely to request credit and face credit constraints. This indicates that, although there is a high need for credit among this group, the chances of gaining access to credit is low. This tends to deepen poverty in this socio-economic group and requires policy attention.

Finally, the results indicate that larger households are more likely to request credit and, at least in the rural areas, are less likely to experience credit constraints (Table 4). Larger households have a greater demand for credit in all areas. This finding is similar to that of Barslund and Tarp (2008); Menkhoff and Rungruksirivorn (2011); Sekyi et al. (2017), and Tang and Guo (2017).

5. Conclusion and policy implications

The purpose of this study is to investigate the determinants of credit demand and credit constraints in both formal and informal institutions. Using secondary data which does not disaggregate formal credit from informal credit poses a limitation to this study. It would have been more informative to know the drivers of credit demand and credit constraints in formal versus informal credit markets. Nevertheless, the study provides policy guidance for intervention in rural versus urban populations. Using a Heckman Probit model, the study finds in both urban and rural populations that education is a significant factor that determines both credit demand and credit constraints: having tertiary education increases the demand for credit and reduces the incidence of credit constraints. This implies that sound educational policies to promote tertiary education would enhance financial inclusion. In urban areas, the aged have a lesser probability to request credit and a greater probability to be denied credit. This has economic and social security implications. In the urban areas, family support for older people is weaker than in the rural areas, and this tends to expose the aged to poverty. Most especially, those who do not have any pension or retirement benefits may be caught in a poverty trap when they are denied access to credit to engage in economic activities. A conscious intervention to cater for the financial needs of the aged in urban areas would facilitate financial inclusion to help alleviate poverty among the aged.

In rural areas, household heads that are divorced or widowed and those living below the poverty line were less likely to request credit but more likely to be denied credit. This finding implies some degree of self-exclusion. It also implies institutional exclusion of the needy that request credit from either formal or informal institutions. Widows, widowers and household heads living below the poverty line are generally less resourced and do not have collateral to support their credit requests; hence any form of exclusion of this socio-economic group from the financial system has implications for deepening poverty. Consequently, policies that deliberately seek to meet the financial needs of this socio-economic group are commendable in the quest to promote financial inclusion. Financial policies should encourage financial institutions to incorporate these groups into their portfolios and design products that will suit their needs and at the same time remain profitable. With the inception of mobile money services, credit transfers to such socio-economic groups tend to attract lesser transaction costs.

The study also reveals a general decline in the proportion of household demands credit over the years, relative to 1991. While it is difficult to establish if the decline is skewed towards borrowing from formal or informal institutions, this implies a general loss of interest (or increasing self-exclusion) by households in borrowing from either formal or informal financial institutions. Policies and processes that facilitate easy and flexible requests for credit are needed to enhance financial inclusion. Similarly, flexible and convenient credit approval procedures and processing would help avoid self-exclusion.

Declarations

Author contribution statement

Theodora A. Asiamah: Conceived and designed the experiments; Performed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

William F. Steel and Charles Ackah: Conceived and designed the experiments; Analyzed and interpreted the data; Contributed reagents, materials, analysis tools or data; Wrote the paper.

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Data availability statement

Data associated with this study can be downloaded from the Ghana Statistical Service (https://statsghana.gov.gh/gsddatadownloads.php).

Declaration of interests statement

The authors declare no conflict of interest.

Additional information

No additional information is available for this paper.
Appendix I. Reasons for not obtaining credit.

| Reasons                                | Frequency | Percentage |
|----------------------------------------|-----------|------------|
| No need for credit                     | 9,396     | 61.66      |
| Interest rate too high                 | 2,826     | 18.55      |
| Demand for collateral                  | 1,416     | 9.29       |
| Cannot obtain the amount needed        | 795       | 5.22       |
| Already has too much debt              | 253       | 1.66       |
| Other reasons                          | 552       | 3.62       |
| Total                                  | 15,238    | 100.00     |

Source: GLSS 6.

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