Microfinance and Credit Rationing:

Does the Microfinance Type Matter?

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ABSTRACT

This study sets out to examine the extent to which access to credit and credit rationing are influenced by the microfinance type based on the major factors determining micro, small and medium enterprises' access to credit from microfinance institutions in the era of financial liberalization. The data or the study were gleaned from the microfinance companies' credit and loan records consisting of the various pieces of information provided by the borrowers in the application process. Our results are puzzling and show that credit rationing is not influenced by the microfinance types but by the individual microfinance companies. Our results also show that the Government microfinance company is the least severe in the rationing behavior.

Keywords: Microfinance; credit rationing; financial liberalization; Probit; Ghana

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1. Introduction

Ghana's micro and small enterprises (MSEs) employ about 80% of the working population in the private sector. This sector is characterized by the difficulty in accessing the credit required to expand, boost production and increase employment and incomes. The main reason for this difficulty is that the microfinance institutions that are set up to provide the necessary credit engage in credit rationing. A major problem that remains a puzzle in trying to overcome this difficulty is determining the extent and nature of this credit rationing across the microfinance types. The research aims to test the extent and degree of rationing across the microfinance types in Ghana. It will therefore test for the significance of the firm, loan and borrower characteristics in determining credit rationing and the extent to which the rationing behavior of the microfinance companies is influenced by their institutional types. This is necessary because of the likelihood of that credit-rationing problem may differ across microfinance types and therefore there is the need to not only view the problem holistically but also to consider it based on the institutional type so that it can be resolved effectively. We are doing this because microfinance types have different sources of funding, different in terms of ownership, corporate responsibility, capital requirements, outreach, mission and other goals which may influence their operations that are likely into influencing their rationing behavior differently from each other.

The introduction of the financial reforms in 1989 in Ghana triggered massive growth in the financial sector, as witnessed by the increase in the number of commercial banks, which has led to competition and market efficiency. However, these commercial banks charge high interest rates (between 24% and 30% per annum) and consider the amount of the loans required by these micro and small businesses too small in relation to the cost of lending. Another problem faced by these micro and small businesses is that the requirements for accessing loans from the commercial banks are too cumbersome (Economic Reforms in Ghana: Miracles and Mirage, 2000).

Murdoc (2000) asserts that microfinance institutions' principles of good banking as a way of alleviating poverty are supported neither by logic nor by the available empirical evidence. According to him an important step should be towards reaching a more constructive dialogue between microfinance advocates that supports financial development and those that support social impacts. Going by the principles of good banking means adopting the practices of commercial banking of which credit rationing is inevitable. If microfinance institutions (MFIs) charge too high interest rates,

they may hinder their ability to assist the poor and the vulnerable to pull themselves out of poverty and this will also price them out of the loan markets. Excessive interest rates could also lead to MFI losses as borrowers cannot pay the loan with such high interest rates thereby defaulting. On the other hand, with a small interest on the principal amounts inherent in microcredit, a little economies of scale exists in the lending process to defray fixed costs (Brau and Woller, 2004). With high operation and administrative costs per dollar lent relative to formal financial institutions, charging high interest rates is inevitable if they are to achieve self-sufficiency and be sustainable

The study will test the hypothesis that credit rationing is influenced by the microfinance type. It will determine the extent to which, once we control for firm, loan and borrower characteristics, the microfinance type still plays a role in determining credit rationing. The outcome of this research will therefore offer policy recommendations to the various microfinance institutions for addressing the problem of credit rationing effectively.

2.1 Literature Review

Credit rationing is a situation in which borrowers are given just some or none of the amount they requested from lenders even though they are willing to pay the market rates of the cost of borrowing (interest rates). This basically occurs as a result of the existence of information asymmetry. It is therefore a situation in which the equilibrium price (interest rate) does not ensure efficient allocation of credit; hence, rationing is performed instead of allocation using a non-price mechanism. The studies by Jaffee and Russell (1976) and Stiglitz and Weiss (1981) demonstrated that the difficulty in gaining access to credit might persist even in equilibrium markets using information-based models. To them interest rates cannot function as an allocator of credit in so far as information asymmetries exist and therefore credit rationing may persist even in the face of interest rate liberalization. Using models of imperfect markets, they explain that lenders seek to maximize profits through their choices of interest rates whilst borrowers seek to maximize profits through their choices of projects. The probability of success in the choice of the project may be known to the borrowers but unknown to the lenders due to asymmetry information. Borrowers may choose to substitute projects that yield normal returns but less risky to projects that may yield high returns but riskier with low probability of success, such actions, lenders have no control. Lenders therefore use interest rates as a screening device for distinguishing less risky borrowers from more risky borrowers. This phenomenon leads to adverse

selection as this result from a change in the behavior of borrowers to shift from safe to high risk projects. In dealing with this situation therefore, lenders adopt the strategy of credit rationing using non-price mechanism so as to maximize their expected profits. This non-price mechanism consists of the information of the borrower comprising of the borrower's individual, firm and loan characteristics.

Stiglitz and Weiss (1981) argument was in disagreement of the interest rates liberalization proponents of McKinnon (1973) and Shaw's (1973) that when interest rates are liberalized financial markets will allocate credit based on the interest rates that reflects scarcities. Despite these theoretical efforts, there remains little consensus about whether this difficulty with regard to access to credit is an economically significant phenomenon. Whereas Riley (1987) argued that this difficulty in the Stiglitz–Weiss environment is limited to the marginal class of distinct risk pools, Stiglitz and Weiss (1987) counter argued that Riley's result is model-specific rather than general. Others have argued that contractual mechanisms, such as loan commitments (Boot and Thakor, 1989; Sofianos et al, 1990) and collateral (Bester, 1985; Chan and Kanatas, 1985) may mitigate the problem of access to credit. The significant effect of information asymmetry on credit access is largely accepted in the literature; however, given the arguments on all sides of this issue, it is clear that there are competing theories on the persistence of the difficulty in gaining access to credit and these render the explanations for access to credit inconclusive.

Access to credit and credit rationing may differ according to the MFI type since the MFIs may be differentiated by their lending policies, mission drift, organizational form and institutional transformation as well as by their disclosure and transparency (Akoten et al, 2006; Von Pischke, 2008). According to Atieno (2001), the problem of access to credit is one created by the institutions mainly through their lending policies. Schmidt et al (1987) observed that lending policies affecting access to credit are often displayed in the form of minimum loan amounts, complicated application procedures and restrictions on credit for specific purposes. Schmidt et al (1987) argued that the type of financial institution and its policy determine access to credit. Atieno (2001) further observed that the lending terms and conditions imposed by lenders, such as the application fee, collateral value, application period, repayment period and purpose, influence the enterprise's decision on whether to apply for credit or not as well as to which type of MFI to apply to. Aquire et al (2011) found that MFIs may adopt different policies, such as solidarity group lending which includes the Grameen Bank model and the Latin American model, individual lending, the village banking model and the credit union model, and all of these tend to affect access to credit. Aquire et al (2011) further observed that MFIs' policy

often hinges on areas of operation, borrowers' eligibility, eligible projects, loan maturity periods, business operations, interest rates, collateral, loan limits, credit contracts and secrecy of information, which tend to affect access to credit. According to Hardy et al (2002), a microfinance institution's commitment may be replaced or supplement other private or public objectives, such as maximizing share value, the direction of investment in priority sectors or the mobilizing of savings to finance government operations, and this may greatly affect credit access. Since microfinance operations are influenced by their institutions and policies, source of funding and objectives, it is possible that their rationing behavior may differ based on the microfinance institutional type. It is for these reasons that we find it pertinent to determine the extent to which credit rationing is determined by the microfinance institution type.

Again, these are issues that have not been empirically studied to a large extent and warrant further investigation. It is clear that access to credit by micro and small enterprises is difficult but the extent and severity of this phenomenon are unknown. This situation therefore calls for an empirical estimation to determine the extent to which loan, firm and borrower characteristics and microfinance type determine the access and rationing of credit in microfinancing. Various researchers have reached the conclusion that credit rationing exists in most developing countries even in the face of interest rate liberalization (Okerenta et al, 2005; Rahji et al, 2009; Zeller, 1994; Zeller et al, 2002). The results, however, show strong and significant relationships with the loan, firm and borrower characteristics as well as mixed results for some of them. It is relevant and imperative, however, to distinguish between studies conducted in developed countries and those conducted in developing countries, since the institutional, legal and development nature of the financial sectors as well as the business environments differ among these countries.

In their study determining the factors affecting credit rationing, Armstrong et al (2013) observed that firm characteristics were the major determinants of credit rationing, with firms with a higher credit risk rating, previous financial delinquency and lower sales more likely to be rejected whilst older and more established businesses were less likely to face rejection. Using credit information on 56,752 firms between 1993 and 2008 from the Spanish Banking Association (AEB) and the Spanish Confederation of Savings and Banks (CECA), Carbo-Valverde et al (2011) found that firms with more intense lending relationships, as measured by the lower number of banks that they dealt with, enjoyed a greater supply and a lower degree of credit rationing. Becheti et al (2009) noticed that the borrower's past record was significant in determining credit rationing, whilst the number of pre-existing loans

with other banks and the loan duration were also significant but negatively correlated with the supply of credit. Steijvers (2008) found that applicants for long-term bank credit were rationed more than those applying for short-term bank credit. He also noticed that the firms that applied for credit and were rationed were smaller firms in terms of size and had a low return on assets. Blumberg and Latterie (2008) observed that credit denial largely depended on entrepreneurs' commitment and signals regarding the repayment of the loan and the success chances of the proposed business. In a similar study on 3,144 firms in Italy, Atzeni and Piga (2007) concluded that the probability of being denied credit was high for firms with no or low research development intensity. When determining access to credit for corporate farmers in the 2003 BASIS Survey in Russia, Subbotin (2005) observed that farm specialization and profitability were significant and positive. Using a sample of more than 3 million loan applicants between 1998 and 2000 from the Spanish Credit Register (Central de information de Riesdos or CIR), Jimenez and Saurina (2003) observed that the bank–borrower relationship was an important factor in determining access to credit. Chakravarty (2002) also found that relationship variables were very important determinants of credit rationing. In a study on the evidence concerning the empirical significance of credit rationing. Berger et al (1999) discovered that commitment borrowers were not rationed whilst non-commitment borrowers were rationed.

In determining the factors influencing the access to credit in Croatia, Ana et al (2011) observed that enterprise size was significant in determining credit rationing and that having a relatively larger enterprise size reduced the likelihood of being rationed. Investigating credit rationing by commercial banks in Ghana Ahiawodzi and Sackey (2010) noticed that higher interest rates, lower maturity of loan repayment, a higher value of assets, experience and higher profits reduced the probability of being rationed. Doan et al (2010) found that wealthier households, in terms of asset holding and mobile phone possession, and the distance to the nearest banks were the significant factors determining credit rationing. Using a sample of 1,076 respondents from 34 randomly selected villages in Bangladesh, Chakravarty et al (2010) observed that respondents who built a longer membership with a micro credit provider and had non-mandatory savings accounts and a track record of payments of previous loans were more likely to apply and be approved. On credit risk assessment in the microfinance industry, Ayayi (2012) observed that the depth and breadth of outreach and write-offs are by some margin the two most important determinant indicators of a microfinance institutions' credit risk control. He also found no significant statistical difference in terms of risk management among the different types of MFIs.

With the aim of determining the access to credit and borrowing behavior of rural households in a transition economy, Nguyen (2007) observed that the age of the household head and the working adult rate had a positive and significant relationship with access to credit, whilst the distance to the bank was negative and significant in determining access to credit. In a similar research Lawal et al (2009) observed that requests for collateral and the gender of the household head increased the constraints to access to credit, whilst the educational status, years of experience and presence of savings reduced the constraints to access to credit. Nuryartono et al (2005) also conducted similar research using 63 households in rural areas of Central Sulawesi in Indonesia. They observed that human capital (education and age) as well as wealth and risk-bearing indicators (distance from the house to the road) were significant in determining credit constraints. Using a sample of 290 borrowers from 20 formal and informal financial institutions operating in the Niger Delta of Nigeria, Okerenta and Orebiyi (2005) found that access to credit was determined by the profitability level, value of assets and interest rates and that the higher these were, the less likelihood there was of being denied access to credit. Similarly, Kedir (2000) observed that the geographical location, value of assets, value of collateral, number of dependents and marital status as well as outstanding debts were significant factors determining credit rationing. Using two rounds survey to examine the relative returns to micro-credit for small-scale businesses in two regions of Ghana, Peprah and Ayayi (2016) observe that micro credit impact on scales, stock, expenses and profits for clients as compared to non-clients. They also observe that women entrepreneurs produce higher returns from micro credit than male entrepreneurs and that individual enterprise characteristics influence access to credit.

2.2 The Microfinance Sector in Ghana

To understand fully the credit-rationing problem and the factors influencing the credit-rationing behavior of the microfinance institutions in Ghana, it is pertinent to discuss the nature, characteristics, policy guidelines and mode of operations of these microfinance institutions so that the credit-rationing problem can be addressed holistically.

Over the past decade and since the United Nations declared 2005 as the International Year of Micro Credit, much recognition has been given to microfinancing as a means of bridging the credit gap created by commercial banks. Microfinance institutions (MFIs) have undergone various phases and currently four major types exist in Ghana. These are non-governmental organization microfinance, rural and community banks, savings and loans companies and government-sponsored

microfinance. The microfinance sector in Ghana has witnessed growth in outreach as well as in the number of registered and non-registered microfinance institutions. The sector served over 5.4 million clients as of December 2010 (GHAMFIN, 2011). The Bank of Ghana (BOG), by the end of October 2012, had registered a total of 161 MFIs and granted them a provisional license (BOG, 2012). The challenge, however, is that the growth of the industry is yet to reflect the scope of microfinance products available for microfinance clients (Ayeh, 2012). A major problem faced by these micro and small entrepreneurs is that they are unsure which of these microfinance institutions would give them the credit needed for their operations since they perceive these MFIs as not different from commercial banks. Microfinance institutions provide similar products and services to their customers as formal sector financial istututions (Brau and Woller, 2004). It must be emphasized that though these microfinance institutions' operations are guided by the Ghana Microfinance Policy (GHAMP), their individual policies and modes of operation often deviate from it as they frequently request various pieces of information from borrowers as the basis for granting loans. The applicants are therefore not certain which part of the information required by these institutions in the loan processing will ensure that the credit needed will be granted. Another problem that is of great concern is that these microfinance institutions charge interest rates that are even higher than those charged by commercial banks. It was the intention that these MFIs would charge interest rates that are lower and affordable by micro and small businesses, but whereas commercial banks charge annual interest rates ranging from 21% to 30%, microfinance institutions charge annual rates ranging from 24% to 60%. Though MSEs are seen as risky, high interest rates are used to make up for the defaults; this nonetheless has not reduced the number of desperate applicants who are considered to be risky demanding credit from this credit market. Understanding microfinance as a financial transaction with MSEs and as a tool for development is the key to ensuring sustainable private sector growth and the growth of the economy as a whole.

Microfinance in Ghana has passed through four distinct phases. The first phase, which started in the 1950s, involved the provision of subsidized credit by the Government. The second phase was the provision of microcredit to the poor through NGOs in the 1960s and 1970s. During this phase, sustainability and financial self-sufficiency were not considered important. The third phase saw the formalization of microfinance institutions, which began in the 1990s. The fourth phase, the current phase, involves the commercialization of microfinance institutions. This started in the mid-1990s and gained much importance with the mainstreaming of microfinance and its institutions in the financial

sector. According to Aryeetey et al (2000), the microfinance institutions in Ghana belong to the informal financial markets, which are basically fragmented, faced with information asymmetries and often grant small, short-term loans to risky borrowers who are already rationed out of credit from the formal financial sector.

The term microfinance institution in Ghana is understood as a sub-sector of the financial sector, comprising most different financial institutions that use a particular financial method to reach the poor. The microfinance sector in Ghana comprises four tiered ranges: formal suppliers, which include the savings and loan companies and rural and community banks; semi-formal suppliers, including credit unions, financial non-governmental organizations (FNGOs) and cooperatives; informal suppliers, including *susu* collectors, clubs and rotating and accumulating savings and credit associations (ROSCAs and ASCAs); and government-sponsored microfinance schemes and programs, which have also been instigated, the current scheme being the Micro and Small Loans Centre (MASLOC). As at October 2014, the Bank of Ghana had provided licences to various microfinance companies categorized as microfinance, money lenders and financial Non-Governmental Organisations depending on their line of operations and service. In all, four hundred and nine (409) microfinance companies had received lincenses with seven (7) of them being the Financial Non-Governmental Organisations.

The four major types of microfinance institutions in Ghana are rural and community banks, savings and loans companies, NGO-based institutions and government-sponsored institutions.

Rural and community banks (RCBs) are the type of MFIs that operate as quasi-commercial banks under the Banking Act, 783 of 2007. Their minimum requirement is GH¢300,000.00 (US$144,000.00), which is, however, lower than that of commercial banks and they are not permitted to undertake foreign exchange transactions. They are owned by members of the rural community through equity participation and are licensed.

Savings and loans companies (SLCs) are the type of MFIs that are licensed and regulated by the Bank of Ghana. Their minimum capital requirement is far higher than that of the RCBs and is pegged at GH¢15,000,000.00 (US$7,200,000.00). They serve clients who normally hold either a current or a savings account and are in a productive business or a start-up. They provide loans to their clients with a monthly or biweekly pay-up period, depending on the nature of the business. *NGO-based MFIs* are incorporated as companies limited by guarantee (not for profit) under the Company Code

1973 (Act 179). Their poverty focus enables most of them to provide multiple services to their clients, especially micro-credit and skill training. The minimum requirement set by the Bank of Ghana is GH¢500,000.00 (US$240,000.00). Their operations are normally financed by donor agencies as well as managed funds from the Government and development partners, equity capital and loans from commercial banks (Adjei, 2010).

The government-sponsored MFI currently in operation is the Microfinance and Small Loan Centre (MASLOC). It is the apex body responsible for implementing the Government of Ghana's microfinance program targeted at reducing poverty and creating jobs and wealth.

3.0 Methods

Here we discuss the methodology used for the estimation of our data as well as the data collection

3.1 Econometric Estimation

We assume that the microfinance type influencing the credit rationing and the factors influencing the credit-rationing behavior of the microfinance institutions are determined by the following linear relationships:

$$y_i = \beta' X_i + \varepsilon_i \qquad (1)$$

In equation (1), we consider two outcomes. In one regression, the outcome y_i is a dummy variable that takes the value one if the loan amount requested is not fully granted and zero otherwise. That is, with the binary outcome variable in model (1), we estimate the probability of being credit rationed. In this case, we resort to the probit model. The second regression considers the outcome y_i to be the share of the total amount requested that has been granted. In this case, we estimate equation (1) using the OLS estimation method. The matrix X contains a set of individual characteristics and variables picking up the creditworthiness of the loan, that is, the microfinance type and the borrower's individual characteristics. These variables concern the borrower's economic and financial characteristics, the trust variables and the loan characteristic variables. β is a vector of parameters to be estimated and ε is random error term with the standard distributional properties in each case.

The use of multinomial probit estimation with marginal effects was appropriate since the outcome variable is categorical. Also the use of multinomial probit estimation in determining credit rationing has been largely adopted by researchers including, (Zeller, 1994; Normito et al., 2006; Petrick, 2005; Atzeni et al., 2005; Chakravarty, 2010; Nuryartono et al., 2005, Kedir, 2000). The choice of

multinomial probit over the logit is the fact that mulitnomila probit errors are assumed to follow the standard normal distribution and hence ideal for hypothesis testing. We use the OLS to test the factors determining access to credit since the outcome variable is not categorical but measured as the amount of loan granted per the amount requested.

3.2 Data

The rationing processes that are followed by all four types of MFIs involve three stages, as observed by Lapar and Graham (1988). These involve having interactions with prospective loan applicants and assessing their business plan or visiting the business premises of applicants who are already in business to ascertain their creditworthiness. Applicants who are perceived to be very risky are turned down before the loan application process begins through the issuance of the loan application forms. The decision on whether to grant an applicant the full or part of the amount requested depends on the information given by the applicant via the application forms.

A total of 14 microfinance institutions were able to provide us with data on their borrowers. Of these, 3 were savings and loan companies, 1 was government-sponsored, 5 were from non-governmental organizations and 5 were community and rural banks. A total of 1,429 observations, being the number of granted loans (both partially and fully granted) from the microfinance institutions, were used for the study. The data collected on these 1,429 borrowers consist of information about the individual, firm and loan characteristics as well as their status with regard to being rationed or otherwise. This information was gleaned from the microfinance clients' database for the 2012/2013 financial year. Of these observations, 372 (26.03%) correspond to the number of borrowers of the savings and loan companies, 127 (8.89%) relate to the government-sponsored MFI, 512 (35.83%) are from the NGO type and 418 (29.25) correspond to the rural and community banks.

It was not possible to collect data from the microfinance institutions on applicants who were turned down completely in the loan application process, as this took place through the interaction process and therefore no application forms were completed and no records were taken. It was also difficult to have a very large sample as some of the microfinance institutions were unwilling to provide information on their borrowers even though they had indicated their willingness to provide such information during the preliminary and feasibility study stages. The non-availability of credit bureaus in Ghana also made it difficult to obtain more MFIs' data and hence a larger sample. According to

Ayeh (2013), the fiercely competitive nature of these microfinance institutions makes them unwilling to provide data and information on their clients and operations to their APEX body, the Ghana Microfinance Institutions Network (GHAMFIN), to enable it create a credit bureau for fear that a competitor may use such information for its counter benefit. The difficulty in accessing data from the government-sponsored microfinance scheme (MASLOC) was also due to the perception that successful applicants are members of the political party in power and therefore a change of the party in power would lead to the persecution of these applicants, as happened in 2009 during the change of government from the National Patriotic Party (NPP) to the National Democratic Congress (NDC). It is hoped that when the Right to Information Bill, which is currently before the Parliament of Ghana, is passed, it will make it easier to access such information and also contribute to the research growth and development of the country.

The table below presents the descriptive analysis of the total number of applicants used for the study. The table shows that of the 1,429 applicants, 517 were rationed, whilst 912 applicants received the entire amount that they requested. Of the 1429 borrowers, 966 were youths aged between 18 and 35 based on the GYEEDA module. Female borrowers constituted 807 and this number also confirms that the clients of microfinance and microcredit are mostly women (MIX, 2012). The classification of borrowers based on economic sectors shows that 535 were in the commerce sector, 83 were in the transport sector, 191 were in the manufacturing, 223 were in the service sector and 397 were from the agricultural sector. The large number of clients representing the commerce and agricultural sectors also supports the claim that the microfinance sector has a large number of female clients who are basically petty traders and a large number of clients from the agricultural sector, who normally need small loans for their operations. Borrowers in the manufacturing and transport sectors normally demand large sums of money and therefore turn to the formal financial sector, normally commercial banks, for loans. With regard to the educational background of the borrowers, 714 were clients who had attained some tertiary education, 299 had attained secondary education, 367 had attained primary education and 49 had not attained any formal education. The statistics on the educational background are slightly surprising since it was expected that a large number would be borrowers who had attained secondary and primary education. The microfinance sector is supposed to serve the vulnerable, who are often termed semi-literate people who are frequently turned down by formal commercial banks as they basically serve clients who have tertiary qualifications who are capable of preparing and keeping good financial records. The large number of borrowers who have

attained tertiary education indicates the extent of rationing in the formal financial sector as well as the progress with which Ghana is making tertiary education accessible, as witnessed by the large number of private universities being established in the country. With regard to the closeness of borrowers to the microfinance institutions to which they applied for loans, 914 were borrowers who were located within the district in which the microfinance institution operates, whilst 515 were borrowers who were located outside the district within which the microfinance institution operates.

Table 1. Descriptive analysis of data.

Variable	Description	Mode of measurement		Mean	Standard Deviation
Amount requested	Amount of money requested	Ghana Cedis		4425.36	5389.37
Amount granted	Amount of money granted	Ghana Cedis		3652.09	4318.83
Education	Borrower's educational level	education	percentage	1.82	0.93
		tertiary	50		
		Secondary	21		
		elementary	26		
		illiterate	3		
Sector	The business sector of the borrower	sector	percentage	2.78	1.55
		commerce	37		
		transport	6		
		manufacturing	13		
		agric	28		
		service	16		
Sex	Sex of the borrower	1 = female 0 = male	0.56	0.49	
Profits	Profits after tax,	Ghana Cedis	899.44	1643.74	
Assets	Borrower's Assets	Ghana Cedis	7020.34	12932.87	
Age	Borrower's Age	Years	38.75	8.43	

4.0 Findings and Discussion

In this section we report our econometric results and discuss the findings

4.1. The Probability of Being Credit Rationed

In table 2, we show the estimated effects of the determinants of the probability of being credit rationed. To allow for interpretation and comparison across alternative models, we report the marginal effects instead of the estimated coefficients. The degree/percentage of the rationing and the direction will be determined by the marginal effects and their signs, whilst the significance or otherwise will be determined by their corresponding p-values. Our estimation strategy consists of introducing each set of variables sequentially. We start with the most parsimonious model, which only includes a set of dummy variables identifying the type of microfinance institution (column 1). In column 2, we add the individual and credit characteristics. Finally, in column 3, we include the monthly interest rate associated with each loan, which varies not only across borrowers but only across microfinance institutions. In columns 4, 5 and 6, we repeat the same sequential procedure, but now we include dummies for each microfinance company (lender) instead of the type of microfinance institution to test whether within each institution type we can observe some heterogeneity across microfinance institutions regarding the amount of borrowers who are credit rationed.

Our general results support the existing theory and other empirical studies, since all our control variables behave according to expectations. Having a relatively high number of years of experience, some relationship with the lender, being in the manufacturing sector and mandatory savings reduce the likelihood of being credit rationed and increase access to credit. On the contrary, having no formal education in relation to tertiary education, providing a guarantor and being in the Agriculture sector increases the likelihood of being credit rationed. Obviously, the need for a guarantor indicates that the loan might be risky. We find striking that being a female and a young entrepreneur rather reduce the likelihood of being credit rationed which do not support theory and other empirical studies in different countries. We think that this result might be due to the Ghana government's efforts at making access to credit to the marginalized and the vulnerable a priority through its Ghana Microfinance Policy.

We start commenting on the results of the models considering dummies for the type of microfinance institution. The government-sponsored microfinance institution type is set as the base category. The results in column (1) of table 2 indicate that the savings and loans microfinance type reduces rationing by 20%, whilst the NGO type reduces rationing by 21%, according to their marginal effects, with the rural and community bank type not showing any significance. In column (2), we

observe that some individual and loan characteristics are significant in determining rationing but the degree of rationing by the microfinance types does not change significantly, as indicated by their corresponding marginal effects. It is interesting and pertinent to perform a simulation; combining the interest rate as an explanatory variable with the microfinance type and individual and loan characteristics as in column (3), we observe that the marginal effects for all the microfinance types change sign from negative to positive and have much higher rates (marginal effects), as the savings and loans type increases rationing by 43%, the NGO type increases it by 58% and the rural and community bank type increases it by 66% in the same way as the base category, being the government-sponsored type. The results in column (3) therefore indicate that the interest rate as a risk minimizing factor is very important in determining credit rationing and that all the microfinance types use interest rates to ration credit.

The results in column (4) indicate the rationing behavior of the various microfinance companies under the four microfinance types with the government- sponsored type as the base category. Their marginal effects show that the various microfinance companies reduce rationing but at varied degrees even within each type and in relation to the base category, which rather increases rationing. It is interesting to note that the variations in the rationing behavior of these microfinance companies are not influenced their microfinance types. In column (5), we introduce individual and loan characteristics into the model with the microfinance companies using the government-sponsored type as the base category. Just like the results obtained in column (2), we do not find any significant change in the rationing behaviors of the microfinance companies as indicated by their marginal effects; however, we find some individual and loan characteristics are significant in determining rationing. An interesting simulation, again, is performed in column (6); after introducing interest rates into the model, some of the microfinance companies increase rationing as the signs of the marginal effects change from negative to positive. This observation lends support to Stiglitz and Weiss's (1981) assertion that credit rationing may persist even in the face of interest rate liberalization credit as lender will raise interest rates and ration credit and that it is the information provided by the borrowers that will determine credit rationing and access to credit. Our observation is that interest rates have rather worsen the rationing behavior of the microfinance companies and using the government type as the base category shows that the government type is the least sever in the rationing behavior.

It is imperative to note that the rationing behaviors of the microfinance institutions differ even within the same type as there are some that behave differently as indicated by their coefficients.

Table 2. Credit rationing and microfinance type: probit estimation with marginal effects.

	(1) Ration	(2) Ration	(3) Ration	(4) Ration	(5) Ration	(6) Ration
Savings & loans	−0.202***	-0.237***	0.432***			
	(0.041)	(0.043)	(0.147)			
NGO type	−0.213***	−0.226***	0.585***			
Rural & Comm.	−0.035	−0.054	0.658***			
	(0.047)	(0.052)	(0.118)			
Maturity		0.018***	0.019***		0.021***	0.021***
		(0.003)	(0.003)		(0.003)	(0.003)
Assets value		−0.000	−0.000		−0.000	−0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Profits		0.000	0.000		0.000	0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Experience		−0.014***	−0.014***		−0.013***	−0.013***
		(0.003)	(0.003)		(0.004)	(0.004)
Second Cycle		0.025	0.030		0.086*	0.086*
		(0.041)	(0.042)		(0.046)	(0.046)
Primary		−0.054	−0.051		−0.035	−0.035
		(0.037)	(0.037)		(0.039)	(0.039)
No Education		0.434***	0.456***		0.463***	0.463***
		(0.085)	(0.082)		(0.109)	(0.109)
Female		−0.106***	−0.100***		−0.088***	−0.088***
		(0.029)	(0.029)		(0.030)	(0.030)
Youth		−0.122***	−0.107***		−0.122***	−0.122***
Collateral		0.000	0.000		0.000	0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Location		0.029	0.046		0.044	0.044
		(0.029)	(0.030)		(0.030)	(0.030)
Guarantor		0.318***	0.281***		0.266***	0.266***
		(0.035)	(0.036)		(0.043)	(0.043)
Relationship		−0.108***	−0.102***		−0.121***	−0.121***
Purpose		−0.031	−0.021		−0.026	−0.026
		(0.031)	(0.032)		(0.032)	(0.032)
Transport		−0.015	−0.014		−0.030	−0.030
Manufacturing		−0.062	−0.080*		−0.104**	−0.104**
		(0.047)	(0.047)		(0.047)	(0.047)
Agric		0.171***	0.168***		0.163***	0.163***
		(0.044)	(0.044)		(0.046)	(0.046)
Service		0.036	0.025		0.037	0.037
		(0.048)	(0.048)		(0.050)	(0.050)
Savings		−0.233***	−0.264***		−0.228***	−0.228***
Int. rate			−0.374***			−0.188***
			(0.080)			(0.033)
MFI1				−0.183***	−0.186***	0.172**
MFI 2				−0.284***	−0.276***	0.015
				(0.033)	(0.036)	(0.082)
MFI 3				−0.099*	−0.179***	0.081
MFI 5				−0.335***	−0.319***	
				(0.025)	(0.030)	
MFI 6				−0.164***	−0.164	0.203
				(0.049)	(0.112)	(0.168)
MFI 7				−0.210***	−0.086	0.303***
				(0.043)	(0.065)	(0.080)
MFI 8				−0.243***	−0.257***	0.150
				(0.039)	(0.038)	(0.095)

MFI 9				0.015	−0.082	0.309***
				(0.062)	(0.066)	(0.084)
MFI 10				−0.231***	−0.243***	0.068
				(0.044)	(0.046)	(0.093)
MFI 11				0.008	−0.059	0.334***
				(0.068)	(0.078)	(0.087)
MFI 12				0.040	0.149	0.510***
				(0.073)	(0.091)	(0.065)
MFI 13				−0.046	0.007	0.400***
				(0.055)	(0.063)	(0.068)
MFI 14				0.083	−0.067	0.325***
Sample size	1429.00	1429.00	1429.00	1429.00	1429.00	1429.00

***p < .01, **p < .05, *p < .1.

4.2 The Size of the Credit Rationing

Table 3 is a linear (OLS) estimation of the data to determine the percentage of the loan requested by borrowers that are conceded, that is, the size of the rationing. The degree/percentage of the credit access and the direction will be determined by the coefficients and their signs, whilst the significance or otherwise will be determined by their corresponding p-values. The results of this model are qualitatively the same as those for the probability of being rationed as the control variables behave in the same way as in our probit estimation and therefore lend support to theory and other empirical studies except for being female and young entrepreneur that goes contrary to theory and other empirical studies and the reasons, perhaps, may be attributed to the Ghana Microfinance Policy 2006, which encourages the MFIs to increase credit access to the vulnerable who are mainly women and youth. Column (1) of table 3 shows the results of the dummies for the microfinance types. Setting the government-sponsored type as the base category, we observe that the access to credit increases by 13% for the savings and loan type, 14% for the NGO type and 8% for the rural and community type, as indicated by their corresponding coefficients. In column (2), we observe that the increases in the access to credit by the various microfinance types do not show much difference when compared with those in column (1) when the individual, firm and loan characteristics are introduced into the model, as indicated by their corresponding coefficients, though we observe some significant variables with regard to the individual, firm and loan characteristics in determining the access to credit. It is important to note that in column (3), we do not observe any significance in the access to credit by all the microfinance types as we introduce the monthly interest rate into the model, though the various individual, firm and loan characteristics are still significant in determining it, as indicated by their significant p-values.

Table 3. Credit rationing and microfinance type: linear regression.

	(1) Acces	(2) Acces	(3) Acces	(4) Acces	(5) Acces	(6) Acces
Savings & loans	0.136***	0.145***	−0.039			
	(0.019)	(0.019)	(0.054)			
NGO type	0.142***	0.148***	−0.079			
Rural & Comm.	0.085***	0.100***	−0.102*			
	(0.019)	(0.019)	(0.058)			
Maturity		−0.004***	−0.005***		−0.006***	−0.006***
Assets value		0.000	0.000		0.000	0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Profits		−0.000	−0.000		−0.000	−0.000
Experience		0.003***	0.003**		0.003**	0.003**
		(0.001)	(0.001)		(0.001)	(0.001)
Second Cycle		−0.020	−0.022		−0.039***	−0.039***
Primary		0.014	0.013		0.004	0.004
		(0.013)	(0.013)		(0.013)	(0.013)
No Education		−0.121***	−0.126***		−0.119***	−0.119***
Female		0.031***	0.029***		0.026**	0.026**
		(0.010)	(0.010)		(0.010)	(0.010)
Youth		0.020**	0.016		0.023**	0.023**
		(0.010)	(0.010)		(0.010)	(0.010)
Collateral		−0.000	−0.000		−0.000	−0.000
		(0.000)	(0.000)		(0.000)	(0.000)
Location		0.002	−0.003		−0.003	−0.003
		(0.010)	(0.010)		(0.010)	(0.010)
Guarantor		−0.096***	−0.085***		−0.079***	−0.079***
		(0.012)	(0.012)		(0.014)	
Relationship		0.028***	0.026***		0.033***	0.033***
		(0.010)	(0.010)		(0.009)	(0.009)
Purpose		0.017	0.014		0.015	0.015
		(0.011)	(0.011)		(0.011)	(0.011)
Transport		−0.004	−0.003		0.005	0.005
		(0.022)	(0.022)		(0.022)	(0.022)
Manufacturing		0.036**	0.043**		0.050***	0.050***
		(0.017)	(0.017)		(0.018)	(0.018)
Agric		−0.036**	−0.035**		−0.028*	−0.028*
Service		−0.013	−0.009		−0.009	−0.009
		(0.016)	(0.016)		(0.016)	(0.016)
Savings		0.074***	0.087***		0.055	0.055
		(0.022)	(0.022)		(0.034)	(0.034)
Int. rate			0.100***			0.077***
			(0.027)			(0.010)
MFI1				0.129***	0.135***	−0.020
MFI 2				0.162***	0.146***	−0.009
				(0.023)	(0.023)	(0.023)
MFI 3				0.119***	0.147***	0.030
				(0.023)	(0.023)	(0.021)
MFI 5				0.197***	0.193***	
				(0.024)	(0.025)	
MFI 6				0.144***	0.155***	0.000
				(0.024)	(0.048)	(0.050)
MFI 7				0.146***	0.108***	−0.047*
				(0.024)	(0.025)	(0.024)
MFI 8				0.190***	0.194***	0.001
				(0.024)	(0.024)	(0.026)
MFI 9				0.036	0.076***	−0.078***
				(0.024)	(0.026)	(0.026)
MFI 10				0.157***	0.162***	0.008

				(0.027)	(0.027)	(0.026)
MFI 11				0.087***	0.122***	−0.033
				(0.026)	(0.029)	(0.027)
MFI 12				0.026	0.004	−0.151**
				(0.027)	(0.029)	(0.029)
MFI 13				0.093***	0.082***	−0.073**
				(0.022)	(0.022)	(0.022)
MFI 14				0.057**	0.109***	−0.046 *
Constant	0.778***	0.773***	0.581***	0.778***	0.791***	0.636**
	(0.016)	(0.023)	(0.057)	(0.016)	(0.023)	(0.037)
R-squared	0.051	0.143	0.151	0.101	0.179	0.179
Sample size	1429.00	1429.00	1429.00	1429.00	1429.00	1429.0 0

***p < .01, **p < .05, *p < .1.

In columns (4), (5) and (6), we repeat the same procedure but we now include dummies for each microfinance company instead of the dummies for the microfinance type, using the government-sponsored microfinance company (MASLOC) as the base category, to test whether within each institution type we can observe some heterogeneity across the microfinance companies regarding access to credit. A very important simulation is performed here; in column (6), we observe that some of the microfinance companies reduce the access to credit at varied rates, as indicated by their corresponding coefficients across and within each type of institution as we introduce the monthly interest rate into the model, whilst we do not observe any significance with regard to access to credit for some of the microfinance companies even within the same institution type, as indicated by their insignificant p-values. Our observation is that interest rates have rather reduced access to credit by the microfinance companies and access to credit is determined by the borrower and firm characteristics as well as the loan characteristics. The final result is that access to credit is not influenced by the microfinance types but by the individual microfinance companies. This results supports the findings of Peprah and Ayayi (2016).

5. Conclusions

In this paper, we investigated the various microfinance types and the rationing behavior in the microfinance markets in Ghana. We conclude that there is credit rationing in the microfinance market and that the rationing behavior is not influenced by the microfinance type but by the individual microfinance companies. Our results also confirm what prevails in the microfinance markets in developing countries, where the rationing is influenced by the individual, firm and loan characteristics.

Our primary data show that MFIs charge very high interest rates between 24% and 60% per annum, which is a very disturbing development in the quest to make credit easily accessible to entrepreneurs who are desperate for loans because they are not served by commercial banks. The higher interest rates may defeat the policy intentions of the microfinance program, which mainly targets the poor and the marginalized. There is the need for government intervention in this sector until such time that the microfinance sector is fully developed. Regulations through interest rate ceilings are necessary if more credit is to be extended to more micro and small businesses at affordable rates. Our results show that the Government microfinance type was the least severe with regards to the rationing behavior and therefore if they could expand their outreach and increase access other microfinance companies would be compelled to also reduce their rationing behavior. The Bank of Ghana's capital requirement policy, which sets different minimum capital requirements for each type of microfinance institution, is also not in the right direction, as our results show that the rationing behavior is not determined by the microfinance type but by the individual microfinance companies. Setting a minimal and a fixed amount as capital requirements for all microfinance types will make more funds available, which will increase microfinance institutions' outreach and allow them to serve more clients who are vulnerable, desperate and unable to access loans from commercial banks. This will also promote the growth of the microfinance sector and enable it to become more competitive. Microfinance institutions should also consider economic factors rather than using individual characteristics and other discriminating factors that are non-business-related as well as improving their monitoring systems as a way of minimizing and eliminating credit default.

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