

Micro determinants of the extent of credit rationing amongst SMEs in Ghana

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Received 11 March 2016
Revised 24 May 2016
4 August 2016
Accepted 27 October 2016

Abstract

Purpose – The purpose of this paper is to investigate the micro determinants of the extent of credit rationing experienced by small and medium-sized enterprises (SMEs) in Ghana.

Design/methodology/approach – The study adopted the direct approach to investigating the presence of credit rationing. This involves the use of surveys permitting loan applicants to report on their credit market experiences. The multinomial logistic regression model was then applied to the survey data to arrive at the findings reported.

Findings – The study amongst other things confirms the existence of credit rationing in the SME sector. It also revealed that the extent to which SMEs are rationed varies and these variations are determined by the characteristic of the SME owner and the characteristics of the business.

Research limitations/implications – The use of the survey method in investigating credit rationing could introduce some biases in the responses obtained. However, the lack of publicly available data did not permit the use of the indirect method which is based on the testing for possible violation of the permanent income hypothesis. Despite its weakness, the survey method remains the more realistic approach to investigating credit constraints especially in the data-constrained developing countries. The design and piloting of the questionnaire as well as the use a large sample size all went a long way to reduce any possible biases in the responses.

Originality/value – Despite the fact that a number of studies exist on SME financing problem in Ghana, available studies present the problem as if it were the same for all SMEs. Even though there is evidence to suggest that SMEs may be rationed in the credit market to different extents, currently, there are no known studies that have empirically investigated the various degrees of rationing and factors that determine the extent to which SMEs may be credit rationed. This paper thus attempts to contribute to the literature by unearthing these factors.

Keywords Ghana, SMEs, Credit rationing, Micro determinants

Paper type Research paper

1. Introduction

Small and medium-sized enterprises (SMEs) are important agents of economic growth across the world (Kongolo, 2010; Ayyagari *et al.*, 2011). These enterprises promote innovation and entrepreneurship. They are found to be labor intensive and have no huge capital requirements and can therefore be established easily. For this reason, they are a great source of employment in several economies (Beck *et al.*, 2008; Wehinger, 2013) and strategic poverty alleviators. Available evidence indicates that SMEs account for over 60 percent of GDP and 70 percent of total employment in low-income countries, and in middle-income countries, they account for over 95 percent of total employment and 70 percent of GDP (Ayyagari *et al.*, 2003).

In Ghana, the contribution of SMEs to economic development is conspicuously documented; of all registered businesses at the Registrar General's Department, SMEs constitute about 90 percent, it is also believed that they contribute 70 percent to GDP (Villars, 2004; Abor and Quartey, 2010). Despite their important role, SMEs in Ghana like those around the world are still confronted with several challenges that stifle their growth. The limited access to credit or the lack of it is the dominant of all the challenges facing SMEs (Lader, 1996; Abor and Biekpe, 2006; Ayyagari *et al.*, 2006; IFC, 2013; Domeher *et al.*, 2014).



Access to credit facilitates business growth. SMEs usually require smaller loan amounts than larger firms; however, it is surprising that the rationing behavior of banks affects SMEs the most. In a study of manufacturing firms in some selected countries in Africa including Ghana, Bigsten *et al.* (2000) observe that about 64 percent of microenterprises, 42 percent of small enterprises and 21 percent of medium enterprises that apply for credit from the banks have their applications rejected compared to 10 percent of large businesses. These findings though most applicable to manufacturing SMEs and banks in Ghana, nonetheless provide a fair picture of credit constraints in the SME sector. The effect of the above constraint is the considerable reduction in the growth rate of SMEs compared to larger businesses (Beck *et al.*, 2006).

Admittedly, a number of studies exist on SMEs financing in Ghana. For instance, Mensah (2004) reviewed the SME financing schemes in Ghana, Abor and Biekpe (2006) examined how to address the SME financing gap through policy, Abor (2007) focused on the differences in financing preference across SMEs in Ghana, Ahiawodji and Sackey (2013) examined the determinants of credit rationing to the private sector and Domeher *et al.* (2014) examined the nature of the SME credit access problem. Most of the studies currently available on the SME financing problem in Ghana present the problem as if it were the same for all SMEs. Indeed, some evidence in Ghana shows that though most SMEs are credit constrained, the extent of the constraint varies. For instance, it was found in a study amongst SMEs that apply for credit that about 11 percent are fully rationed as their applications are wholly rejected; however, another 62 percent of these credit applicants are said to have been rationed to various degrees (Domeher *et al.*, 2014). A critical question that has remained unanswered in the empirical literature is what determines the extent or degree to which an SME may be credit constrained? The aim of this paper is therefore to contribute to the literature by exploring the determinants of the level of credit rationing experienced by SMEs in Ghana. The rest of the paper is organized as follows: Section 2 provides a review of theoretical and empirical literature. Section 3 outlines the methodology. The analyses and discussion of results are presented in Section 4. Section 5 concludes and gives policy recommendation.

2. Literature review

Credit rationing – market imperfections, transaction cost and the discouragement arguments

Credit markets are characterized by imperfections such as information asymmetries which refer to information imbalance between the parties involved in a given economic transaction that allows the party with more information to have an undue advantage in the transaction (Stiglitz and Weiss, 1981). Such information imbalances tend to have negative implications on the transaction since the disadvantaged party in the transaction may withdraw from the transaction for fear of losses arising from the unknown. For instance, a borrower may have more information regarding the purpose of taking a loan and the possibility of default than the lender; this makes it difficult for lenders to identify “good borrowers” from “bad borrowers.” Therefore, banks use interest rate as a screening device. It must be stated that increasing interest rate has the potential of adverse selection. The degree of risk aversion for riskier candidates is low and so they are likely to invest in projects with perceived higher pay offs but low probability of success causing the return to the bank to decrease (Stiglitz and Weiss, 1981).

The concept of market equilibrium, information asymmetry and credit rationing has been discussed in detail by Stiglitz and Weiss (1981). Excerpts from their work are presented below: the credit market is at equilibrium when demand for credit equals supply of credit. An increase in demand for credit above supply will cause some borrowers to offer to pay higher interest rates in order to obtain the needed credit bidding up interest rate and consequently causing supply to increase returning the credit market to equilibrium at

higher interest rate (Stiglitz and Weiss, 1981; Domeher *et al.*, 2014). At this point the return to the bank is increased. It can therefore be said that any time there is high demand for credit, banks' expected return increases as a result of an upward adjustment in interest rates. However, Stiglitz and Weiss (1981) show that there is an optimal interest rate beyond which the expected return to the bank will decrease. Thus, in the midst of increasing demand for credit, lenders cannot increase interest rate beyond the optimal. The resulting effect is that any excess demand at the optimal interest rate level leaves the banks with no option than to ration credit.

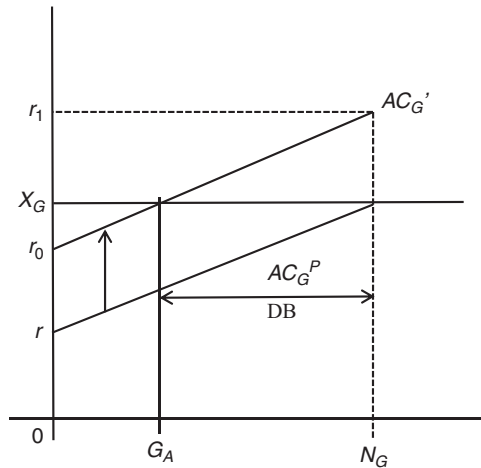
The SME financing gap can also be explained by the high transaction cost involved in SME lending relative to the loan amounts required by such enterprises. There are fixed costs arising from credit assessments, processing, monitoring of loan clients and maintaining good relationships which banks will normally want to pass on to borrowers through an increase in interest rates. However as Williamson (1987) argues, increasing interest rate above the market clearing rate increases the likelihood that borrowers cannot repay their loans. Hence, the expected return to the bank reduces. Beck (2007) explains that transaction cost makes SMEs more credit constrained than other borrowers. Transaction costs therefore induce banks to ration credit rather than increasing interest rates.

Discouragement on the part of the borrower is also crucial in explaining the existence of credit constraints. Some firms (discouraged borrowers) will not apply for a bank loan (even though they need it) for the fear that they will be rejected (Jappelli, 1990). Various reasons have been noted in the literature as causes for borrower discouragement. According to Deakins *et al.* (2005), borrower discouragement is caused by bureaucracy, stringent financial requirements by banks and the experience from previous rejections. From another perspective, the theoretical model of Kon and Storey (2003) asserts that discouragement arises when effective cost of borrowing exceeds the returns to be accrued from investing the borrowed funds. Thus, borrowers usually compare the return for investing borrowed funds into a project to the cost of borrowing which comprises interest rate charged on loans, opportunity cost and application cost. When the cost of borrowing exceeds the returns to be accrued to the borrower, the borrower is discouraged from applying and therefore becomes credit constrained. Figure 1 gives details.

The AC_G^P line represents the effective borrowing cost for the i th firm. Under perfect information, the number of borrowers (N_G) who apply is successful because the return (X_G) is greater than the effective borrowing cost (thus line X_G is above the AC_G^P line). However under imperfect information, applicants are screened with error and incur positive application costs. The inaccuracy in screening in addition to positive application costs causes the AC_G^P line to shift upward to AC_G . G_A is the point where the expected return to the firm is just equal to the effective borrowing cost when the firm decides to borrow. So at G_A no firm will apply for a loan. The left of G_A represents firms who will apply for a loan because the expected return is greater than the cost of applying for the loan (i.e. the X_G line is above r). However to the right of G_A no applicant will apply because it is not profitable to apply since the cost of borrowing far exceeds the returns to be accrued from the borrowed funds. Therefore, the applicants beyond G_A are credit constrained as a result of discouragement and thus described as discouraged borrowers.

Meaning of SMEs and sources of SMEs finance in Ghana

The concept of SMEs is best understood in Ghana using the employment-based definition because of the data difficulties involved in using other definitions based on assets. SMEs have been variously defined in the Ghanaian literature using the employment criterion. The Ghana Statistical Services in its industrial statistics classified firms with ten employees or less as small-scale enterprises and those with more than ten employees as medium- and



Notes: r_i is the effective borrowing cost for the i th firm (the sum of interest rate, opportunity cost and application cost), G_A the point where effective borrowing cost equals returns for investing borrowed funds, X_G the return to the borrower and N_G the number of borrowers
Source: Kon and Storey (2003)

Figure 1.
Model of discouraged
borrowers

large-scale enterprises. Steel and Webster (1991) and Osei *et al.* (1993) specify a cut-off point of 30 employees for small-scale enterprises. SMEs are also classified according to the report of the Regional Project on Enterprise Development Ghana manufacturing survey (Teal, 2002) as microenterprise (less than five employees), small enterprise (5-29 employees) and medium enterprise (30-99 employees). The study adopted the definition of Teal (2002) for its clear-cut distinction between micro, small and medium enterprises.

Generally, SMEs can access credit from two main credit market sources. These are formal and informal credit markets. Informal credit markets are unofficial sources usually not under government regulation from which credit transactions take place (Hanedar *et al.*, 2014). Formal credit markets on the other hand are official sources such as banks, savings and loans companies and microfinance institutions (MFIs) amongst others under the regulation of the central bank or any such other agencies that may be responsible for their regulations. In Ghana, a wide range of formal and informal credit sources exist. Informal sources of credit in Ghana include but not limited to family/friends, moneylenders and rotating savings and credit associations (Jones *et al.*, 2000). It must be pointed out that the cost of credit could be relatively higher in informal markets compared to formal sources. In this regard, Akudugu (2014) argues that informal credit has always been a disincentive to borrowers in Ghana due to high borrowing cost.

In terms of formal credit sources, quite a number are available in Ghana. The banking industry of Ghana is one of such sources. SME banking is becoming a popular concept amongst banks in Ghana. Nonetheless, their stringent requirements which are often cited as one of the barriers of SMEs access to credit (Atieno, 2001; Kwaning *et al.*, 2015) are prevalent in Ghana. MFIs have also been an important source of finance for SMEs. The Government of Ghana has also played a significant role in financing SMEs through various support programs such as direct lending schemes and credit guarantee programs amongst others. Support programs from external bodies such as Austrian Import Program (1990),

Micro determinants of the SME credit constraint

There are a number of studies that have explored the factors explaining the presence of the financing gap experienced by SMEs. The determinants of the SME financing gap can be classified broadly into two: the macro factors (various macroeconomic variables, e.g. inflation, interest rates, etc.) and micro factors (the SME owner characteristics and business characteristics). This paper focuses on the micro determinants of the financing gap. The literature on the micro determinants of the SME financing gap has been examined below.

Entrepreneur characteristics. Educational level. Empirical evidence on the effect of SME owner educational level on access to credit has been mixed. Zarook *et al.* (2013) in a survey of 600 SMEs in Libya had evidence to conclude that the educational level has significant positive effects on access to finance. Similarly, Pandula (2011) provided evidence from Sri Lanka that there is a positive and significant relationship between education of SME owners and access to bank loan. Irwin and Scott (2010) found that in the UK, highly educated SME owners had less difficulty in accessing credit from banks. This has been attributed to the fact that educated SME owners are in a better position to meet the requirements of formal lenders. For instance, they can easily provide convincing business plans, they possess good managerial capability and as Irwin and Scott (2010) put it, they can maintain good relationship with lenders which is vital ingredients to obtaining finance. It is thus expected that SME owners with formal education will be less rationed relative to SME owners with no formal education.

Age. The age of the SME owner to a large extent determines the SME's ability to access credit. Ajagbe (2012) identified age among other features of small-scale entrepreneurs in Nigeria to have influence on access to credit. From a supply-side perspective, it is believed that information asymmetries (which can be a barrier to credit access) tend to decrease with increase in age (Abdulsaleh and Worthington, 2013). A study by Kristiansen *et al.* (2003) also showed that there is a significant positive relationship between age and the success of a business due to the wealth of business experience acquired by the entrepreneur over the years. For this reason older entrepreneurs are better positioned to access credit easily than younger ones. Hence, the level of credit rationing experienced by SMEs is expected to reduce with the age of the owner.

Level of experience. SME owners/managers who have been in business for long have rich experience regarding the very line of business they are into. As a result, Dobbs and Hamilton (2007) argued that such SME owners have greater likelihood to avoid serious mistakes that could be detrimental to the growth of the business than owners with little or no prior experience. Consequently, experienced owners may be preferred candidates for bank loans than inexperienced owners. In South Africa, Fatoki and Asah (2011) recorded a positive and significant relationship between experience of SME owners and access to credit. Similarly, Zarook *et al.* (2013) found management experience of owners to be an important determinant of SMEs access to credit. The level of credit rationing experienced by SMEs is expected to reduce with experience; the more experienced the owner, the lesser their level of constraint is likely to be.

Gender. There is extant empirical literature on the gender gap and access to credit. Muravyev *et al.* (2007) in a cross-country study provide evidence that women are less likely to get credit from formal financial institutions and even if they do, they do so at a very high interest rate. In analyzing loan denial rates, Calcagnini and Lenti (2008) confirm the presence of gender discrimination. Bellucci *et al.* (2010) show that female entrepreneurs in Italy

encounter greater difficulties in accessing credit than male when they borrow at the same rate of interest. Asiedu *et al.* (2013) have evidence to show that female-owned firms in Sub-Saharan Africa are more likely to be financially constrained than male-owned firms whilst there is no evidence of a gender gap in the other developing regions. Ongena and Popov (2013) investigate the gender disparity in access to credit by considering a sample of 17 European countries. Results of their study show that women-led businesses face greater constraints than male-led businesses in obtaining bank loans. In Ghana, where lending is often collateral based, female business owners who very often do not own property could encounter greater difficulty accessing credit. Hence, one would expect the level of credit rationing experienced by SMEs to be higher for female-owned SMEs.

Firm characteristics. Age of firm. In general, the age of a firm refers to how long the firm has been in existence. This could range from days, weeks to years. Haltiwanger *et al.* (2012) use five years as a benchmark and describe younger firms as those that are five years or less in business whilst those above five years in business are described as old or mature firms. A firm's age speaks well of its reputation, managerial competence and its ability to remain in business (Diamond, 1991). Martinelli (1997) argues that the lack of reputation for younger firms makes it more constraining for them to access credit. Pandula (2011) argues that new and young firms often fail to meet collateral requirements of banks and this affects their ability to access credit. Thus, their operation within a small span of time does not offer them the opportunity to accumulate assets to pledge as collateral. Makoni and Ngcobo (2014) show that mature firms in Zimbabwe have access to bank credit easily than younger firms because contrary to younger firms, mature firms have capacity, collateral and performance track record to support their applications. From the above, the level of credit rationing experienced by SMEs is expected to reduce as the business matures.

Size of the firm. The size of a firm seems to have some association with the firm's ability to access credit. Bigsten *et al.* (2003) report that small firms are less likely to have access to credit than large firms. Levenson and Willard (2000) assert that constrained firms are smaller, younger and more likely to be owned by their founders. Similarly Levy (1993) observes that credit access is a major constraint for smaller and less established firms. Several reasons have been advanced for the small firm effect. First, greater constraints may be faced by small firms due to market imperfections, in the form of greater informational opacity. Though not unique to small firms, this may be considerably more relevant because of relatively poor quality and provision of financial information by small firms. This leads to greater difficulties in credibly conveying their quality or the quality of their projects (Binks and Ennew, 1996). Also small firms do not have publicly known contracts (supplier, customer or labor related), and do not trade securities that are continuously priced in public markets. Moreover, unlike large firms, their performance is not regularly assessed by independent market analysts, and they may be unable to provide audited financial statements (Saito and Villanueva, 1981; Berger and Udell, 1998). Kumar and Francisco (2005) use investment climate data to assess SME credit constraints in Brazil. They had evidence to conclude that medium and larger firms are less credit constrained than smaller firms. It is expected that the degree of credit rationing will be higher for smaller SMEs.

Industry sector. The sector in which a firm operates is another determining factor of the ease with which a firm could access credit. Byiers *et al.* (2010) assert that firms' sector is very crucial to their access to credit; using data from Mozambican manufacturing firms, their results indicated that the metal-mechanic and wood-furniture sectors have significantly lower credit access than the food processing sector. Similarly, Chakraborty and Mallick (2012) investigate the credit gap in small businesses in the USA; they have evidence to conclude that the magnitude of the finance gap varied considerably across industries with manufacturing firms facing higher credit constraints. Firms in sectors with more capital

requirements may most likely face greater credit constraints (Kumar and Francisco, 2005). In the service sector, Silva and Carreira (2010) argue that the service sector usually lack physical assets to pledge as collateral since they deal in intangibles (service rather than physical products) and therefore are more likely to be credit constrained. There is also evidence that survival rates differ among firm sectors (Storey and Wyncarczyk, 1996; Gimeno *et al.*, 1997). The crux of the matter is that banks prefer to lend to firms in sectors with high profitability and growth potential. On the basis of this, the level of credit rationing experienced by SME is expected to vary across sectors. Indeed, the agricultural sector is expected to be more highly rationed relative to other sectors.

Collateral. The willingness of borrowers to pledge collateral could be a signaling tool for borrower's ability and willingness to repay loans. Bester (1987) saw collateral as a screening device for lenders; borrowers with low probability of default will reveal themselves by accepting collateral requirements which would be unattractive for high risk borrowers. Atanasova and Wilson (2004) in their study in the UK found collateral to be an important determinant of loan supply as it alleviated credit rationing in the UK formal credit market. Voordeckers and Steijvers (2008) showed that in Belgium, firms with insufficient financial strength and lack of collateral were more credit rationed for short-term debt. In a study in Nigeria, Azende (2012) showed that SMEs had difficulty in accessing funds from formal sources because of stringent collateral security requirements and inadequate risk-mitigating schemes for formal sources of finance. Zambaldi *et al.* (2011) analyzed credit granting decisions in Brazil, with probability of loan approval as dependent variable and concluded that there is limited supply of credit to SMEs mainly because of transaction cost, collateral dependency and constraints due to asymmetric information. Most banks in Africa appear to be collateral dependent in the lending process; hence, it is expected to facilitate credit access. Therefore, SMEs with more assets to use as collateral are more likely to experience lower degree of rationing.

3. Methodology

Following the approach of Love and Sánchez (2009), the study adopted the survey-based (direct) approach to study the determinants of the extent of credit rationing amongst SMEs. The indirect approach involves the test for possible violations of the assumptions of the permanent income hypothesis that consumption expenditure should not be affected by temporary shocks in income if there are no credit constraints (Diagne *et al.*, 2000). The difficulty in obtaining data for the indirect approach necessitated the adoption of the direct approach often used in the literature. The structured questionnaire used in the survey was designed based on an extensive review of literature on credit rationing and its determinants. The questionnaire was designed to capture data on the entrepreneur and firm-specific characteristics identified in the literature as the main micro determinants of credit rationing as well as the credit market experiences of participants in 2015. The sample of SMEs was selected from Kumasi – the capital of the Ashanti Region (the second largest commercial center in the country with several active financial institutions and SMEs). The Ashanti Region is also the most populated region in the country according to the 2010 census (Ghana Statistical Services, 2012). The researchers' knowledge of the region and the fact that this kind of study has not been conducted in the region before partly influenced its selection. Since the SMEs are scattered across different sectors in the economy, there was the need to ensure fair representation of all sectors in the chosen sample. As a result, the study adopted the stratified sampling technique to sample 200 respondents each across the six main SME subsectors, namely, agriculture, transport, hospitality, retail, manufacturing and construction. Thus, a total of 1,200 SMEs were sampled. Each of the six SME subsectors was considered as a stratum in the

sampling process. Saunders *et al.* (2007) assert that dividing the population into various strata leads to selection of samples that are more likely to be representative of the population. Participants in the agriculture sector were mainly crop and animal farmers. Owners of commercial vehicles constituted the transport sector. In the hospitality sector, however, hotel owners, owners of guest houses and restaurants were sampled. Players in the retail sector were mostly retail businesses and petty traders. Participants in the manufacturing sector comprised steel benders, carpenters and artisans as well as mechanics engaged in the production of various vehicular spare parts. Finally, building contractors, dealers in stone quarrying as well as architectural firms constituted the construction sector. Four research assistants were trained to assist in the data collection process. The research assistants who were allocated to areas across the municipality approached various SMEs and after explaining to them owners the purpose of the study and assuring them of confidentiality, those who were available and willing to participate were conveniently chosen and given the questionnaire to complete. For most of these participants, the questionnaires were administered immediately either with or without the assistance of the research assistants. In a few instances, however, questionnaires had to be left with the participants to complete at their own convenience whilst an arrangement was made for the research assistants to return on a later date for the completed questionnaire.

The econometric model

Traditionally, OLS is used to model relationships. However, its underlying assumptions make it inappropriate to deal with dependent variables having more than one outcome (Cox and Snell, 1989; Peng *et al.*, 2002). Logistic regression is well suited for studies whose dependent variables have more than one outcome (Cabrera, 1994; Kira and He, 2012; Alhassan *et al.*, 2016). Binary logistic regression is used when the dependent variable has two outcomes (dichotomous) whilst multinomial logistic regression is used when the dependent variable has more than two outcomes (polytomous). The multinomial logistic regression model was adopted in examining the determinants of the extent of credit rationing amongst the participants as a result of the dependent variable being polytomous. The dependent variable (extent of credit rationing) is made up of various credit rationing categories (see Table I). The polytomous dependent variable was regressed on SME owner and business characteristics as independent variables. In multinomial logistic regression, one of the categories is used as a reference (base) category and the log odds is the probability of being in a particular category relative to the reference category.

For $j = 1, 2, \dots, k$ categories, let $k =$ the reference category.

Thus:

$$\ln \left[\frac{\Pr(Y = 1)}{\Pr(Y = k)} \right] = \beta_1 X_i, \Rightarrow \Pr(Y = 1) = \Pr(Y = k) e^{\beta_1 X_i}$$

$$\ln \left[\frac{\Pr(Y = 2)}{\Pr(Y = k)} \right] = \beta_2 X_i, \Rightarrow \Pr(Y = 2) = \Pr(Y = k) e^{\beta_2 X_i}$$

...

$$\ln \left[\frac{\Pr(Y = k-1)}{\Pr(Y = k)} \right] = \beta_{k-1} X_i, \Rightarrow \Pr(Y = k-1) = \Pr(Y = k) e^{\beta_{k-1} X_i}$$

The normalization condition holds that parameters in the reference category must be set to 0 (Kimhi, 1994). Therefore, given the fact that sum of probabilities must be unity, the

Variables	Type	Description	Notation
<i>Dependent variable</i>			
Extent of rationing	Categorical	100% (fully rationed: application completely rejected) < 40% (obtained < 40% of amount wanted) 40-59% (obtained 40-59% of amount wanted) 60-79% (obtained 60-79% of amount wanted) 80-99% (obtained 80-99% of amount wanted) 0% (not rationed: obtained all amount required)	E
<i>Independent variables</i>			
SME owner characteristic			
Age of SME owner	Dummy	0 ≤ 18 years and > 60 years 1 = 18-60 years	Age (X_1)
Gender	Dummy	0 = female 1 = male	Gender (X_2)
Education	Dummy	0 = no formal education 1 = educated	Educ (X_3)
Experience	Categorical	0 ≤ 5 years' experience 1 = 5-10 years' experience 2 ≥ 10 years' experience	Exp (X_4)
Marital status	Dummy	0 = not married 1 = married	Marsta (X_5)
Number of dependents	Dummy	0 = no dependents 1 = have dependents	Dep (X_7)
Formal sector employment	Dummy	0 = no 1 = yes	Femp (X_8)
<i>Business characteristic</i>			
Capital requirements	Dummy	0 = not capital intensive 1 = capital intensive	Capreq (X_9)
Ownership	Dummy	0 = foreign owned 1 = Ghanaian owned	Owshp (X_{10})
Sector	Categorical	1 = retail 2 = manufacturing 3 = transport 4 = construction 5 = hospitality 6 = agriculture (reference category)	Sector (X_{11})
Age of business	Continuous	Age of the business measured in years	Busage (X_{12})
Size of business	Categorical	1 = micro 2 = small 3 = medium	Busize (X_{13})
Number of assets	Continuous	Assets that can be used as collateral	Nassets (X_{14})
Relationship with bank	Continuous	Length of relationship with bank (in yrs)	Relship (X_{15})

Table I.
Description
of variables

probability of being in the reference category is:

$$\Pr(Y_i = k) = \frac{1}{1 + \sum_{j=1}^{k-1} e^{\beta_j X_i}}$$

where β_j s are coefficients and X_i s are variables. Hence, the probability of being in any of the $k-1$ categories is:

$$\Pr(Y_i = j) = \frac{e^{\beta_j X_i}}{1 + \sum_{j=1}^{k-1} e^{\beta_j X_i}}$$

In this study, we have four categories, namely, fully rationed, obtained < 50 percent of amount wanted, obtained 50-99 percent of amount wanted and the reference category which is labeled as no rationing category (SMEs obtained all credit amounts required).

Thus, the model for the study is:

$$E = \Pr(Y_i = j) = \frac{e^{\beta_j X_i}}{1 + \sum_{j=1}^{k-1} e^{\beta_j X_i}}$$

where E is the extent of credit rationing.

X_i s are SME owner and business characteristic variables described in Table I. However, the level of experience is not included in the model as a result of its high correlation with age of business. β_j s are coefficients to be determined.

4. Results and discussion

Demographic characteristics

To study the extent of credit rationing, the study focused on only loan applicants. Table II presents a summary of the demographic characteristics of these respondents involved in the survey. Though a total of 1,200 SME owners participated in the entire study, the analysis to determine the degree of credit rationing was based on only 301 SMEs that reported to have participated in the credit market activities in the three-year period prior to the survey. In terms of age, 90.7 percent of respondents were aged between 18 and 60 years whilst the remaining 9.3 percent were either less than 18 years or above 60 years. The latter category is considered in the formal sector to be below the legal working age or retired from active work in Ghana. The informal sector where most SMEs are found, however, has no age barrier. The sample of respondents was dominated by males accounting for about 75 percent of total respondents. Furthermore, a larger proportion of the sample (90.4 percent) had some form of formal education. This is a positive development as this can facilitate the successful running of such businesses. This result thus does not reflect the general notion that the informal sector in Ghana is dominated by illiterates. A total of 78.1 percent of the respondents had at least a dependent whilst the remaining 21.9 percent had no dependents. Whilst nearly 43 percent of the businesses in the sample were small, about 30 percent were micro-scale enterprises. Majority of the sample (20.3 percent) were from the retail sector and only 12 percent from the hospitality sector.

Descriptive statistics of the continuous variables is presented in Table III. The businesses surveyed had on the average been in existence for about 11 years. This indicates that the average SME in this sample was fairly matured and experienced to contribute to an understanding of the key issues facing the sector. In terms of a mix of assets the business could use to pledge as collateral, the businesses reported an average of two different assets that could be used as collateral. The respondents have had a relationship with their current lenders for an average period of three years.

Before proceeding to test for the determinants of the extent of credit rationing, it is important that a test is conducted to confirm whether or not there is evidence of credit rationing amongst the present sample and whether there are variations in the levels of rationing. The Wilcoxon's signed ranked test shown in Table IV indicates that there is statistically a significant difference between the amount of credit respondents applied for and the amount of they received. Since the loan amounts received is significantly lower than the amount respondents wanted, this is enough evidence that there is credit rationing (Atieno, 2001).

Having established from Table IV that SMEs in this sample are credit rationed, evidence from Table V indicates that they are rationed to different degrees. About 26 percent of all the 301 loan applicants in the study showed no evidence of credit rationing. The remaining

IJSE 44,12	Categories	Sample = 301	Valid %
1806	<i>Age</i>		
	< 18 years and > 60 years	28	9.3
	18-60 years	273	90.7
	<i>Gender</i>		
	Female	76	25.2
	Male	225	74.8
	<i>Qualification</i>		
	No formal qualification	29	9.6
	Educated	272	90.4
	<i>Experience</i>		
	< 5 years' experience	48	15.9
	5-10 years' experience	125	41.5
	> 10 years' experience	128	42.5
	<i>Marital status</i>		
	Not married	107	35.5
	Married	194	64.5
	<i>Dependents</i>		
	No dependents	66	21.9
	Have dependents	235	78.1
	<i>Formal sector employment</i>		
	No formal employment	252	83.7
	Have formal employment	49	16.3
	<i>Capital requirements</i>		
	Not capital intensive	190	63.1
	Capital intensive	111	36.9
	<i>Ownership</i>		
	Foreign owned	20	6.6
	Ghanaian owned	281	93.4
<i>Sector</i>			
Retail	61	20.3	
Manufacturing	49	16.3	
Transport	50	16.6	
Construction	57	18.9	
Hospitality	37	12.3	
Agriculture	47	15.6	
<i>Size of business</i>			
Micro	99	32.9	
Small	138	45.8	
Medium	64	21.3	

Table II.
Summary of
demographic and
business
characteristics
of respondents

74 percent exhibited evidence of varying degrees of rationing in the credit market. For instance, about 28 percent of the entire loan applicants were fully rationed, that is to say that their applications were completely rejected; 20.6 percent of the SME loan applicants received less than 50 percent of the loan amounts they applied for, whilst 25.2 percent had between 50 and 99 percent of amounts they applied for. This confirms the finding of Domeher *et al.* (2014) that about 72 percent of SME loan applicants sampled in Ghana are rationed. In Romania, however, Chavez *et al.* (2001) established that the proportion of application completely rejected is 29 percent. Having established that loan applicants

experience different degrees of rationing, the next section provides evidence of the micro factors that determine the likelihood of SMEs being rationed to the various categories shown in Table V.

Determinants of the extent of credit rationing

The study used multinomial logistic regression to examine the micro determinants of the extent of credit rationing amongst SMEs. Before carrying out the multinomial logistic regression analysis, the independent variables were examined to check for the presence of multicollinearity. According to Pallant (2010), variables are said to be highly correlated when the correlation value is 0.6 or above. The correlation matrix shows that the level of experience and age of business denoted by Exp (X_4) and Busage (X_{12}) are highly correlated (see Table VI for details). For this reason, one of them had to be dropped. The level of experience was therefore not included in the regression.

Determinants of being fully (100 percent) credit rationed. Results of the multinomial regression as shown in Table VII indicate that gender is a significant determinant of being completely rationed. The result suggests that male SME owners compared to female are less likely to have their loan applications completely rejected. The odds ratio of 0.240 indicates that male SME owners are 0.240 times less likely than female to be completely rationed. In other words, male applicants are more likely to obtain the full loan amount wanted rather than being completely rationed relative to female applicants. The result supports the findings of Ongena and Popov (2013) and Asiedu *et al.* (2013) that there is a gender gap in access to credit. The gender gap in credit access is attributed to the difference in ownership

	Age of business	Number of assets	Length of relationship with bank
Minimum	2.00	1.00	1.00
Maximum	35.00	6.00	15.00
Mean	11.3488	2.7043	3.4884
SD	7.58340	1.25523	2.95590

Note: Based on 301 observations

Table III.
Descriptive statistics
of continuous
variables

Z-statistic	Asymp. Sig. (two-tailed)
-10.152 ^a	0.000

Note: ^aBased on positive ranks

Table IV.
Wilcoxon's signed
rank test for
difference between
amount applied for
and amount received

Extent of rationing	Frequency	Valid percent	Cumulative percent
<i>Valid</i>			
Received nothing (rejected)	69	22.9	22.9
< 40%	15	5.0	27.9
40-59%	18	6.0	33.9
60-79%	14	4.7	38.5
80-99%	39	13.0	51.5
100%	146	48.5	100.0
Total	301	100.0	

Table V.
Extent of credit
rationing reported
by respondents

Table VI.
Correlation matrix

Variables	Age (X ₁)	Gender (X ₂)	Educ (X ₃)	Exp (X ₄)	Marsta (X ₅)	Reli (X ₆)	Dep (X ₇)	Femp (X ₈)	Capreq (X ₉)	Owshp (X ₁₀)	Sector (X ₁₁)	Busage (X ₁₂)	Busize (X ₁₃)	Nassets (X ₁₄)	Relship (X ₁₅)	
Age (X ₁)	1.000															
Gender (X ₂)	0.024	1.000														
Educ (X ₃)	-0.066	-0.008	1.000													
Exp (X ₄)	0.103	0.087	-0.020	1.000												
Marsta (X ₅)	0.068	0.167**	-0.035	0.164**	1.000											
Reli (X ₆)	0.036	0.079	0.077	0.115*	0.040	1.000										
Dep (X ₇)	0.051	0.099	-0.091	-0.039	0.119*	-0.020	1.000									
Femp (X ₈)	0.048	0.091	0.022	-0.013	0.070	-0.020	0.081	1.000								
Capreq (X ₉)	-0.063	0.032	-0.007	-0.024	-0.055	0.044	-0.028	0.111	1.000							
Owshp (X ₁₀)	0.052	-0.002	-0.087	0.062	0.049	0.055	-0.012	-0.027	-0.073	1.000						
Sector (X ₁₁)	0.109	0.136*	0.018	0.098	0.030	0.104	-0.069	0.139*	-0.057	-0.057	1.000					
Busage (X ₁₂)	0.133*	0.139*	-0.043	0.769**	0.114*	0.072	0.006	-0.007	-0.071*	0.047	0.102	1.000				
Busize (X ₁₃)	0.057	0.155**	-0.084	0.179*	0.035	0.046	0.076	0.180**	-0.137*	-0.076	0.244**	0.236**	1.000			
Nassets (X ₁₄)	0.081	0.097	-0.004	0.165**	0.006	0.059	0.088	0.053	0.002	-0.031	0.292**	0.192**	0.256**	1.000		
Relship (X ₁₅)	0.177**	-0.072	-0.018	0.124*	0.017	0.078	-0.176**	-0.030	-0.061	0.085	0.597**	0.122**	0.078	0.147**	1.000	

Notes: **Significant at 5 and 1 percent levels, respectively

Variable	Rejected		< 50%		50-99%	
	Coefficient	Odds ratio	Coefficient	Odds ratio	Coefficient	Odds ratio
Age (X_1)	-0.071 (0.913)	0.931	-0.183 (0.771)	0.832	0.201 (0.767)	1.223
Gender (X_2)	-1.428** (0.010)	0.240	-1.492*** (0.007)	0.225	-1.905*** (0.001)	0.149
Educ (X_3)	0.170 (0.795)	1.185	0.235 (0.748)	1.265	-0.318 (0.615)	0.728
Marsta (X_4)	-0.643 (0.114)	0.525	-0.557 (0.187)	0.573	-0.393 (0.342)	0.675
Reli (X_5)	-0.416 (0.321)	0.660	0.256 (0.557)	1.292	-0.331 (0.422)	0.718
Dep (X_6)	0.526 (0.285)	1.692	0.273 (0.585)	1.314	-0.339 (0.461)	0.713
Femp (X_7)	0.063 (0.918)	1.065	0.811 (0.155)	2.251	0.828 (0.123)	2.290
Capreq (X_8)	-0.003 (0.993)	0.997	0.206 (0.605)	1.229	0.200 (0.609)	1.221
Owshp (X_9)	-1.000 (0.232)	0.368	-0.708 (0.431)	0.493	0.528 (0.590)	1.695
<i>Sector (X_{10})</i>						
Retail	-1.579* (0.091)	0.206	0.590 (0.600)	1.804	-1.591 (0.135)	0.204
Manufacturing	-1.808* (0.058)	0.164	1.212 (0.256)	3.359	0.724 (0.440)	2.062
Transport	-1.029 (0.242)	0.357	0.875 (0.404)	2.398	-0.468 (0.622)	0.626
Construction	2.297** (0.022)	9.946	1.131 (0.453)	3.100	3.166*** (0.003)	23.722
Hospitality	-2.547** (0.015)	0.078	0.825 (0.452)	2.282	-0.595 (0.555)	0.551
Busage (X_{11})	-0.129*** (0.000)	0.879	-0.124*** (0.001)	0.883	-0.024 (0.412)	0.977
<i>Busize (X_{12})</i>						
Micro	1.557 (0.118)	4.743	17.897*** (0.000)	5.92 × 107	1.973** (0.044)	7.193
Small	0.954 (0.313)	2.597	17.803*** (0.000)	5.39 × 107	1.827* (0.051)	6.216
Nassets (X_{13})	-0.627*** (0.000)	0.534	-0.338* (0.061)	0.713	-0.266 (0.120)	0.767
Relship (X_{14})	0.101 (0.341)	1.107	0.197 (0.111)	1.217	0.034 (0.765)	1.035
Constant	4.727*** (0.009)	()	-15.505*** (0.000)	()	0.774 (0.685)	()
Observations	301					
Pseudo R^2	0.459					

Note: *, **, ***Significant at 10, 5 and 1 percent levels, respectively

Table VII.
Results of multinomial
logistic regression

of assets between men and women – particularly in Africa where laws on inheritance and property rights favor men most (Buvinic *et al.*, 1979; Powers and Magnoni, 2010). Women are also perceived not to network effectively as men and so are unable to take advantage of opportunities that arise out of networking in relation to credit access.

Using the agricultural sector as the reference category, the results further show that operating in the retail, manufacturing and hospitality sectors is significantly negative determinant of an SME being completely rationed. Hence, SMEs in the above sectors are less likely to have their loan applications completely rejected. The retail sector had an odds ratio (0.206) and hence the least likely to have a loan application completely rejected closely followed by manufacturing and hospitality sectors, respectively. With a positive coefficient and an odds ratio of 9.946, the construction sector is the most likely of the four sectors to be completely rationed. This is not surprising because of the nature of the cash flow of such businesses which is often not regular and is characterized by delays in payments for work done. This is particularly true for firms undertaking contracts awarded by government which is probably the biggest source of contracts for such firms. Therefore, lenders tend to regard such businesses as posing a significantly higher risk of default relative to others. This is in tandem with the findings of Byiers *et al.* (2010) and Chakraborty and Mallick (2012) that the SME financing gap varies across sectors.

The study revealed that age of the business is a significant determinant of the likelihood of being fully rationed. The result suggests that as SMEs advance in age, they are less likely to be fully rationed. The odds ratio of 0.879 indicates that a unit increase in the age of the SME makes it 0.879 times less likely to be fully rationed. This result substantiates the argument of

Makoni and Ngcobo (2014) that firms with advancement in age have better access to credit as they may have attributes that are appealing to lenders than younger firms.

The number of assets SMEs had to pledge as collateral was found to be a significant determinant of being in the completely rejected/rationing category. The result shows that a unit increase in the number of assets that can be used to pledge as collateral makes an SME 0.534 times less likely to be completely rationed. This was to be expected because banks working in an environment where borrower information is difficult to verify will rely heavily on collateral to overcome the twin problems of information asymmetry (adverse selection and moral hazard). Hence, borrowers without sufficient collateral are regarded more risky and as such are more rationed. The result corroborates the findings of Atanasova and Wilson (2004) in the UK that collateral contributed to alleviating rationing in the UK formal credit market. Voordeckers and Steijvers (2008) also found lack of collateral to partly account for the rationing of Belgian SMEs by lenders. Many SMEs will be unable to access formal credit without the requisite collateral.

Determinants of being rationed to less than 50 percent of loan amount. In the case of SMEs which received less than 50 percent of the loan amounts they applied for, the result in Table VII show that there were three main determinants, namely, gender of the SME owner, age of the business and size of the business. Similar to the completely rationed category, gender of the SME owner is negatively related to the likelihood of being rationed to less than 50 percent of loan amount applied for. Thus, male-owned SMEs are 0.225 times less likely to be rationed to less than 50 percent relative to female-owned SMEs. This re-emphasizes the gender gap in credit access particularly in Sub-Sahara Africa.

It was again established that there is a significant but negative relationship between business age and the likelihood of been rationed to less than 50 percent of amounts applied for. This result was anticipated since business age communicates good attribute of the business such as managerial competence and good track record amongst others (Diamond, 1991). Regarding business size, medium businesses were used as a reference and the results revealed that micro and small businesses are more likely to have their loan amounts rationed to less than 50 percent. The results as shown in Table VII indicate that compared to medium businesses, micro and small businesses are, respectively, 5.92×10^7 and 5.39×10^7 times more likely to have their loan amounts rationed to this category. Thus the smaller the business, the more likely it is to be rationed to this category.

It is not surprising that micro businesses are the most likely to have less than 50 percent of amounts applied for. By virtue of their size, they often lack the needed assets to pledge as collaterals in their bid to access loan facilities. The degree of information asymmetry is also believed to be higher amongst micro and small firms. This result is consistent with most previous studies (Aryeetey *et al.*, 1994; Boocock and Woods, 1997; Jensen and McGuckin, 1997; Makoni and Ngcobo, 2014).

Determinants of being rationed to between 50 and 99 percent of loan amount. The results depict that the probability of an SME being rationed to receive 50-99 percent of the loan applied for depends on the owner's gender, sector and size of the business. Male SME owners were found to be 0.149 times less likely compared to female to be rationed to this category. A worrying situation as it suggests greater credit constraints for female-owned SMEs. The results so far show that for all rationing categories in this study, male-owned SME are less likely to be rationed relative to female-owned SMEs. On a per sector basis, the results suggest that SMEs in the construction sector are more likely to be rationed to 50-99 percent compared to the agriculture sector which is the reference sector. The odds ratio of 23.722 suggests that SMEs in the construction sector are 23.722 times more likely to be rationed to 50-99 percent of loan amounts applied for. Even though SMEs in this sector may have physical assets to pledge as collaterals, the seasonal nature of this business is a

possible reason for their being rationed. Majority of businesses in the construction sector have irregular cash inflows and this has the potential to affect their loan repayment schedules that may be outlined by lenders. Business size exhibited a positive significant relationship with the likelihood of being rationed to the 50-99 percent category. Micro and small businesses were, respectively, found to be 7.193 and 6.216 times more likely to be rationed to this category compared to medium businesses. The “small firm effect” is clearly manifested in this study as the result suggests that credit access is major constraint for micro and small firms.

5. Conclusion and policy implications

Credit rationing has been one of the fundamental reasons explaining the inability of SMEs to meaningfully contribute to the economic development process in the developing world. This study has revealed evidence to support not just the existence of rationing among loan applicants seeking formal credit but more importantly, evidence which indicate variations in the level of rationing experienced by loan applicants and the factors that determine these variations. Various SME owner characteristics as well as business-specific characteristics have been found to significantly determine the degree to which an SME may be credit rationed. Gender of SME owner, sector of the business, collateral requirements, age of the business and size of the business significantly explained the various degree of rationing. However, age of the SME owner, educational level, marital status, number of dependents, formal sector employment, capital requirements, ownership and length of relationship the SME owner has had with the bank did not significantly explain the various degrees of rationing. Majority of loan applicants experiencing rationing were found to be fully rationed and therefore had their applications completely rejected. This indeed has serious consequences for SME growth in Ghana given the fact that raising funds internally to support business growth is made almost impossible by the high levels of poverty prevalent in the country. Hence, external funding becomes critical if any significant amount of investment is to take place in the sector. If majority of rationed applicants are fully rationed then it calls for urgent policy interventions to reduce the extent of the rationing and/or reduce the number of people and business that are being highly rationed.

Gender was found to be a highly significant determinant across the rationing categories. Thus, female-owned SMEs (compared to male-owned SMEs) were found more likely to be rationed to the various categories rather than having full loan amounts they applied for. This is clear evidence that female-owned SME are more highly rationed than male-owned counterparts. Any interventions by stakeholders to enhance access to credit should give more attention to females to generate greater impact on society. Gender-sensitive programs which were echoed few years back need to be revisited in the country to bridge the gender gap and promote equal opportunities for all. Indeed Amu (2005) argues that the role of women in the Ghanaian economy spans across all sectors with their impact being felt more in the agricultural and services (wholesale and retail) sector; evidence also show that women’s involvement in economic activities contributes immensely to household incomes, health and education of children. Microfinance schemes which have sought in the past to facilitate women’s access to credit by organizing them into groups or cooperatives should be intensified in the face of this evidence.

Since the possession of collateral assets influenced the level of rationing, key stakeholders could consider instituting credit guarantee schemes that will either reduce or eliminate completely the reliance on collateral in the lending decision-making process to reduce the level of rationing experienced by loan applicants in the sector. Also policies that can facilitate the growth of the microfinance industry will to a large extent reduce the extent of rationing experienced by SME loan applicants since MFIs have less stringent collateral requirements.

The current turbulence in the microfinance sector in Ghana where a number of such institutions are collapsing will not auger well for SME finance.

Age of the business was also found to be a significant determinant of an SME to be fully rationed. Businesses with advancement in age were less likely to be fully rationed. To this end, key institutions like the National Board for Small Scale Industries amongst others must be well resourced in order to step up their efforts of providing training programs and advisory services for SMEs at the very early stages in their development. This will particularly boost the chances of survival for SMEs at the startup and infant stages of operation and hence their credit access. Lenders' perception of a doubtful future of such SMEs will be minimized. Business size which was found to be a significant determinant of being rationed also requires some policy attention. Compared to medium enterprises, micro and small enterprises were more likely to be rationed. Since micro and small enterprises usually do not have enough assets to pledge as collateral, credit guarantee programs are necessary to improve their credit access. The study further revealed that whilst most sectors are credit rationed, compared to other sectors such as retail, manufacturing, transport and hospitality, applicants from the agricultural sector are more highly rationed. This is bad news for policy makers given the contribution of agriculture to national output. Hence, any government supported lending schemes should be skewed toward the agricultural sector since they are the ones in greatest need of financing support. Alternatively, instituting policies such as the warehouse receipt system could enhance credit worthiness of agricultural-based loan applicants and attract private sector funding.

This study highlights key issues that require policy attention as suggested above. Admittedly, the Government of Ghana appears to be working on promoting SME growth as part of the overall economic development agenda. Government's policies for SMEs in this country are scattered in different documents. Some can be found in the Ghana Industrial Policy Document, the rural enterprise project II, the Ghana Exim Bank document, etc. The Ghana Industrial Policy Document which is set within the context of Ghana's long-term strategic vision of achieving middle-income status by 2020, through transformation into an industry-driven economy capable of delivering decent jobs, provides some detailed strategic action plans for SMEs (Government of Ghana (GOG), 2016). In this policy, government acknowledges the strategic role of SMEs in economic development as well as their challenges (including but not limited to credit access). To overcome this challenge, government's policy is to support the banking sector to reduce transaction cost and risks through measures such as strengthening credit reference bureaus, expanding credit guarantee schemes, strengthening commercial courts and contract enforcement and promoting capacity building for SME lending. Subsequently, the Ghana EXIM Bank has been established to among other things to provide guarantee to SMEs seeking credit from financial institutions for export purposes (Terkper, 2015). Furthermore, government seeks to support the removal of Secondary Reserve Requirements of Banks to ensure adequacy of funds for lending to SMEs; in addition, government further seeks to streamline existing public-funded financing schemes to enable SMEs access them (GOG, 2016).

As part of the strategy of government to ease credit access to the agricultural sector (which is the most credit constraint according to the findings of this paper), the government launched the Ghana Commodity market in 2015 to reduce losses of farm produce and allow farmers to leverage the accompanying warehousing system to access funding (GNA, 2015). Also, the establishment of the microfinance and small loans center by government in 2006 sought to promote SMEs by implementing government microfinance programs that will provide small loans and business advisory and training services to SMEs. Given the various policies of government outlined above, the findings of this study provide a compelling case for government to move beyond merely drafting policy documents to actually implementing these policies. Whilst applauding government for these policies, conscious attempts must be

made to eliminate unnecessary political interferences; this will ensure that funds are not diverted into unintended ventures or channeled into the hands of political party faithfuls. Politicizing these policy interventions will spell doom for their survival. Going forward, policy should be looking more at the option of public-private partnerships in the implementation of SME financing programs in this country. It may be impossible to completely eradicate rationing in the credit market; however, it is within our reach to reduce it to a level that will not seriously constrain SME investment activity and growth. This can be done through a combination of several policy initiatives and commitment to the implementation of such initiatives.

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