

## Determinants of Credit Accessibility to Small and Medium Enterprises (SMEs) in Bangladesh

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### Abstract

SMEs have been contributing a vital and vibrant role in promoting economic development, structural change, reducing hunger and poverty, and attaining sustainable Development Goals in Bangladesh. Their contribution to GDP is decreasing day by day in percentage. The major problem limiting the SME sector from contributing fully to the mainstream economy is the shortage of finance. The purpose of the study is to establish the determinant of factors influencing credit accessibility of SMEs based on the Trade-off Theory, Information Asymmetry Theory, and Pecking Order Theory. A deductive methodological approach has been used in this research. A conceptual model was developed, and a random sample survey of 350 SME owners or managers was conducted from the entire SME population. Only 25.97 percent of SME firms use commercial bank loans in Bangladesh. Quantitative data were analyzed using descriptive statistics, and multiple regression analysis was used to determine the relationship between dependent and independent variables. Determinant factors of debt accessibility of SME firms are the internal fund; financial information of the firm; firm age and firm size; profitability; and the sector. The research will help fill the research gap and will significantly contribute to the policy makers finding out the limited access to bank loans by the SME firm. The research paper uses a detached approach from the previous studies with Ramsey's Tests for Model Specification Error to rummage through different ways.

**Keywords:** SME, financial leverage, accounting statement, financing difficulties, adverse selection.

### Introduction

Small and Medium Enterprises (SMEs) have a significant role in economic development, eradicating scarcity and potential influence to the overall industry by generating new employment, achieving sustainable development goals (SDG) and empowering the women (Balogun *et al.*, 2016; Brighi & Venturelli, 2017; Catherine, 2016; Khalid & Kalsom, 2014). This sector offers 80 percent of industry jobs, which need lower power, unutilized local resources and simple infrastructure facilities (Bongini *et al.*, 2021; Wellalage & Reddy, 2020; Yildirim *et al.*, 2013). About 96 percent of construction and manufacturing industry in developed countries originates from SMEs (Abel, 2018; Ahmeti & Fetai, 2021; Badi & Ishengoma, 2021; Oshora *et al.*, 2021).

The agriculture sector contributes to GDP around 22.4 percent in 2021-2022 (Bangladesh Bureau of Statistics) whereas it was 50 percent in 1972-73 (Regional

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Institute of Central Asia *et al.*, 2021). SMEs, the potential engine of economic growth, contribute about 20.25 percent to GDP in Bangladesh whereas their contribution to GDP is 39.1 percent in Malaysia, 46 percent in India, 60 percent in China (Chatterjee & Kumar Kar, 2020; Khalid & Kalsom, 2014; Rafiki, 2020; Rahman, Belas, *et al.*, 2017). In spite of its noteworthy contribution to GDP, SMEs' progress and expansion is hindered by difficulty in having limited access to financial resources (Dias Duarte *et al.*, 2017; Guci *et al.*, 2021; Oluseye, 2013; Waweru, 2017).

A good number of studies (Badi & Ishengoma, 2021a; Dias Duarte *et al.*, 2017; Erdogan, 2019; Gveroski & Jankuloska, 2017; Rafiki, 2020; Sabki *et al.*, 2019) divulged shortage of capital, political instability and lack of good governance to have a straight influence on growth of firms whereas capital is the supreme robust one among them. So in this circumstances the researcher has clearly identified the limited access of SMEs to credit as a problem.

Additionally, many studies elucidate that firm size and age are the determining factors in SMEs' financing constraints. The studies also indicate that older and large firms have less difficulty obtaining bank loans because they have fewer information asymmetry problems (Balogun *et al.*, 2016; Osano & Languitane, 2016). Several studies argue that firm growth is a determinant of financing constraints. While some literature suggests that the growth of the firms negatively influences access to bank finance, other literature advocates that high growth positively influences access to bank finance (Erdin & Ozkaya, 2020; Gveroski & Jankuloska, 2017).

Bank-borrower relationships and their duration are the determinants that are argued to affect getting access to bank credits. Some studies argued that SME firms' credit relationship with a particular bank has superior credit accessibility due to easier data gathering about the characteristics of the firms and loan processing procedures compared to relationships with multiple banks (Beltrame *et al.*, 2023; Bongini *et al.*, 2021).

The sector or industry in which the SME firms function is similarly estimated to influence financing restrictions. However, some literature argues that industrial or manufacturing firms look for greater financing restrictions compared to service or trade sector firms due to huge amount requirements (Opoku-Mensah & Agbekporu, 2015; Palazuelos *et al.*, 2018). Other literature shows different arguments because of the large number of physical assets that can be pledged as collateral (Osano & Languitane, 2016; Waweru, 2017).

Likewise, the ownership style is assumed to influence financing constraints. The multiple owners positively affect access to bank credits due to firms' lower information asymmetry (Erdin & Ozkaya, 2020; Guci *et al.*, 2021) and have a negative influence due to higher agency problems (Waweru, 2017; Wu & Xu, 2020).

Again, firms' profitability is suggested to positively affect entrance to bank credits due to frequent cash flows that lower the possibility of nonpayment of loans (Balogun *et al.*, 2016; Catherine, 2016; Sanchez-Torres & Juarez-Acosta, 2019).

Although the reviewed literature that evaluates the factors of bank financing accessibility is diverse, some gaps exist. Several previous research that take up existing survey datasets has not taken into account all the factors that can influence getting

access to bank credits in research. In fact, several determinants (e.g., Tax payment, size of the firm, trade sector of the firm, gender of the owner, interest rate, educational background of the owner) were not examined by the researchers. Although, considering the significance of finance for the development of SMEs, a good number of literature reviews expose that research on the financial structure of SME firms is very few compared to big firms (Buchdadi *et al.*, 2020; Catherine, 2016; Dias Duarte *et al.*, 2017; Palazuelos *et al.*, 2018). Whereas, in large firms, financial constraints is almost half the effect on the development and growth annually in compared to SMEs (AlBar & Hoque, 2019; Buchdadi *et al.*, 2020; Cowling *et al.*, 2020; Fufa, 2016).

Furthermore, studies on this issue have been done in developed countries such as the U.S. and UK. The upstairs situation is the main motivation for leading this study.

### **Objectives of the Study**

To find out the reason for financing constraints in Bangladeshi SMEs considering theoretical structure based on the literature of Information Asymmetry, Agency Theory, Trade of theory and Pecking Order Theory.

### **Review of Theories**

#### **Trade-off theory**

The trade-off theory of capital structure is the optimal concoction and priority arrangement of financial institutions and market debt using this model in which financial institutions have the inimitable capability to renegotiate external formal liquidation. Elastic bank debt suggests a superior trade-off between tax shields and bankruptcy costs (Jarallah *et al.*, 2019; Martinez *et al.* 2019). In this approach, leverage is assumed beneficial (definite situations), and management desires to use bank loans despite available internal funds (Abel, 2018)

**Agency theory:** explicates the connection between agents and principals. SMEs are very much related to agency problems that arise between proprietors and debt suppliers because SMEs record rapid progress and limited assets and a shortage of informational or information asymmetry.

**Information Asymmetry theory:** SMEs repeatedly encounters in finding outward operational capital due to shortage of information called information asymmetry for that a numerous studies has been done considering a signaling perspective (Khan *et al.*, 2024; Waweru, 2017).

**Pecking Order theory:** suggests that organizations select to finance their investments from their internal sources, using retained earnings, before outer sources of funding such as bank loans or share capital. Management of the firms favors investing firstly from undistributed profit or retained earnings, then with bank loans (Guizani, 2020; Jarallah *et al.*, 2019; Waweru, 2017). Management also favors lastly finance externally issued equity considering bankruptcy costs, agency costs, and information asymmetries that play a slight influence in affecting the capital structure policy.

### **Owner's Capital**

Internal finance i.e. undistributed profits of the firm refers as the main capital for the small firm because of its less expensiveness in compared to securities (Badi & Ishengoma, 2021; Ogeta, 2016; Yuan *et al.*, 2020). In contrast, an organization highly depended on internal capital may be in a risky position and may fall short of working capital position. Nevertheless, a firm with high internal capital has more capability to repay the bank loan in compared to a firm with low internal capital (Adair & Adaskou, 2015; Li *et al.*, 2018).

H<sub>1</sub>-It can be hypothesized that internal capital has no positive impact on access to bank finance.

### **Financial Information**

Based on the above-mentioned theories, information asymmetries are one of the key arguments in determining SME financial structure (Mpofu & Sibindi, 2022; Pham, 2017). Information asymmetry is more severe in the SME context than the large organizations due to a shortage of available accounting information. Besides these account keeping procedures are different from firm to firm and the quality of financial statements is very poor since the financial statements are mostly unaudited (Cotei & Farhat, 2009). The number and quality of financial statements have a positive influence on access to bank credit and asymmetric information creates limited access to bank credit (Serrasqueiro & Caetano, 2014; Singh & Kaur, 2021). As the asymmetric information reduces, the credit accessibility of SME firms' increases.

H<sub>2</sub>- There is no positive relationship between debt accessibility and financial information.

### **Firms' features**

#### **Age**

The longer age of an organization survives and the larger it is, the more it signs that it can endure harsh financial circumstances. Fresher firms (not more than 4 years) depend less on bank debt but mostly on internal capital (Fatoki & Asah, 2011; Khan *et al.*, 2024; Kira & He, 2012; Ogeta, n.d.). It is very difficult and expensive for fresher firms to access bank financing because of their information asymmetry and ability to repay the loan (Badi & Ishengoma, 2021b; Chandrayanti *et al.*, 2020). Badi & Ishengoma, 2021; Mc Namara *et al.*, 2017 express that younger organization have more possibility to fail in compared to older ones.

H<sub>3</sub>- It can be hypothesized that the age of the firm has no positive impact on access to bank finance.

#### **Size**

The size (Small or Medium) of an organization has a significant influence on accessibility to bank loans because of their more net assets. Medium firms are assumed to be more expanded and less likely to fail, so the size of the firm can be a contrary substitution for the possibility of insolvency (Chandrayanti *et al.*, 2020; Kira & He, 2012; Mc Namara *et al.*, 2017). The problem of information asymmetries with debt providers is relatively more costly to solve for smaller firms (Chandrayanti *et al.*, 2020; Kergroach, 2020; Khan *et al.*, 2024). Subsequently, firms with small capital can be proposed less debt capital.

H<sub>4</sub>- It can be hypothesized that size has no positive impact on access to bank finance.

### **Industry / Sector**

The capital structure of the firm is not related to the industry in which it operates but it may do so indirectly through the nature and composition of the firm's assets (Waweru, 2017; Yuan *et al.*, 2020). The nexus between different industries such as trade, manufacturing, and service and debt accessibility are established on the statement that the nature of industry is a substitution for business risk. The basis for this statement can be that organizations in the same industry experience similar environmental and financial conditions.

H<sub>5</sub>- It can be hypothesized that industry has no positive impacts on access to bank finance.

### **Collateral**

SMEs have limited access to loan facilities despite high resistance from commercial investors (Sabki *et al.*, 2019; Wu & Xu, 2020). Personal loans and credit cards give the facilities to grant in favor of them. Without Collateral, financing for SMEs is quite impossible. Collateral or mortgage lessens the riskiness of a loan for the financial institutions if the firm is unable to repay the loan (Chandrayanti *et al.*, 2020; Regional Institute of Central Asia *et al.*, 2021). So collateral is called the creditor's subsequent line of security. H<sub>6</sub>- It can be hypothesized that collateral has no positive impact on access to bank finance.

### **Managerial ownership**

Managerial ownership indicates the ownership style (Proprietorship, partnership) of the firm. Debt finance and equity finance have a positive effect and significant influence on the ownership style and managerial style of SMEs (Benedict *et al.*, 2021; Nizaeva & Coskun, 2018). There is a relationship between financial leverage and managerial ownership. The solo- proprietorship managerial style firm is more acceptable in comparison to the partnership managerial style (Rahman, Rahman, *et al.*, 2017).

H<sub>7</sub> – The access to get bank loan is not positively interconnected to managerial ownership.

### **Profitability of the firm**

The SME firms that earn more profit have a better conception of access to bank finance because of their ability to generate higher cash flows that enhance the chance to pay the loan with interest (Ferrando and Mulier 2013). The researcher confirms that firms with lower profitability can face financial obstacles. Profitability, one of the key factors of financial performance, influences accessing bank credit (Benedict *et al.*, 2021; Palazuelos *et al.*, 2018). However, due to the debt finance, firms get tax benefits from the Government.

H<sub>8</sub> – The access to bank loans is not positively interconnected to the profitability of the firm.

### **Age of the owner**

The owners' age influences the firm's future growth and it has a significant influence on determining SMEs' accessibility to bank loans. The age of the owner affects positively the SMEs' accessibility to bank loans. Young owners or professional managers face difficulties in getting debt financing. As a result, policymakers and banks encourage young owners (Ogubazghi and Muturi 2014; Chowdhury & Alam 2017; Nguyen 2014).

H<sub>9</sub> – The access to bank loans is not positively interconnected to the age of the owner.

### **The education level of the owners of the SME firms**

The education level of the owner affects significantly getting accessibility to bank loans. Most of the SME firms managed by professional managers encounter problems with

accessibility to debt financing. The banks promote professional managers (Ogubazghi and Muturi 2014). Among the owners' characteristics, the trained, skilled, and educated entrepreneurs with the capacity to create relationships with banks get access to bank credit. The trained entrepreneurs are capable of managing the borrowed money for the actual purposes of the business (Chowdhury & Alam 2017).

H<sub>10</sub> – The access to get bank loan is not positively interconnected to the education level of the owner.

#### **The interest rate of the loan**

The relationship between banks' lending terms and SMEs' accessibility to bank credit is positive and significant. Among the lending terms, interest rate is the most important (Korutaro et al. 2014). High interest rates and collateral problems are some of the major problems faced by SMEs in accessing bank credit (Chowdhury & Alam 2017). For the new SME project in the manufacturing or construction sector the rate of interest is high (Nguyen 2014).

H<sub>11</sub> – The access to bank loans is not positively interconnected to the interest rate of the loan.

#### **Gender of the owner**

The gender of the owner/ entrepreneur affects the SMEs' financial performance, cost of bank loans and accessibility to bank loans (SimoKengne, 2016; Hsiao, Yu-Jen, and Chou, N 2015). Male owners alleviate financial risks of the firm by the bank's support whereas female owners accentuate the role of society (Kozubíková, Homolka, Kristalas, 2017). In Australian SMEs, females are not discouraged from taking SME loans from commercial banks (Guci *et al.*, 2021).

H<sub>12</sub> – The access to get bank loan is not positively interconnected to the gender of the owner.

#### **Taxation status of the firm**

The capital structure of SME firms is the combination of debt and equity to continue its operation. The advantage of using debt in an SME firm's capital structure is interest on debt is tax-deductible (Olufemi Adeyeye *et al.*, 2016, 2016). As a result, it reduces the cost of capital and exploits shareholders' wealth by using debt. Tax saving benefit creates debt finance cheaper than equity finance (Nizaeva & Coskun, 2018). A lower cost of capital makes the firm profitable and banks are also interested in providing loans to successful businesses. So taxation and debt accessibility to bank loans are positively related.

H<sub>13</sub> – The access to get bank loan is not positively interconnected to the taxation status of the firm.

#### **Methodology of the Study**

The study is empirical and the approach is quantitative. Concerning the enterprise's financial position of being financially reserved, the researcher used the answer to the question about the difficulties in accessing bank loans for business enterprises. The owners or managers of the SME firms have been chosen indiscriminately to represent a portion of the population so that each owner or manager of the SME firms can be selected. Cochran's (1963 & 75) formula has been used to calculate the sample size. The questionnaire was definite as an investigation tool through a pilot study covering 20 construction SME firms. The pilot study was done to recognize the common difficulties in

the deliberated questionnaire and to integrate the respondent's comments that enriched the excellence of the questionnaire. This study scrutinizes the determinants predicting credit accessibility by SMEs in Bangladeshi SMEs. A deductive methodological approach has been used to study this problem. This paper utilizes primary data emanating from structured survey questionnaires. The structured survey questionnaire was administered to 395 trade, manufacturing and service organizations to produce pertinent data about their credit accessibility. A simple regression model was applied to decide the impact of demographic variables on credit accessibility. The equation specified access to credit as the dependent variable while firm and personnel characteristics as the independent variable. The statistical package for social science version 26 along with Amos was used.

#### Nature of research

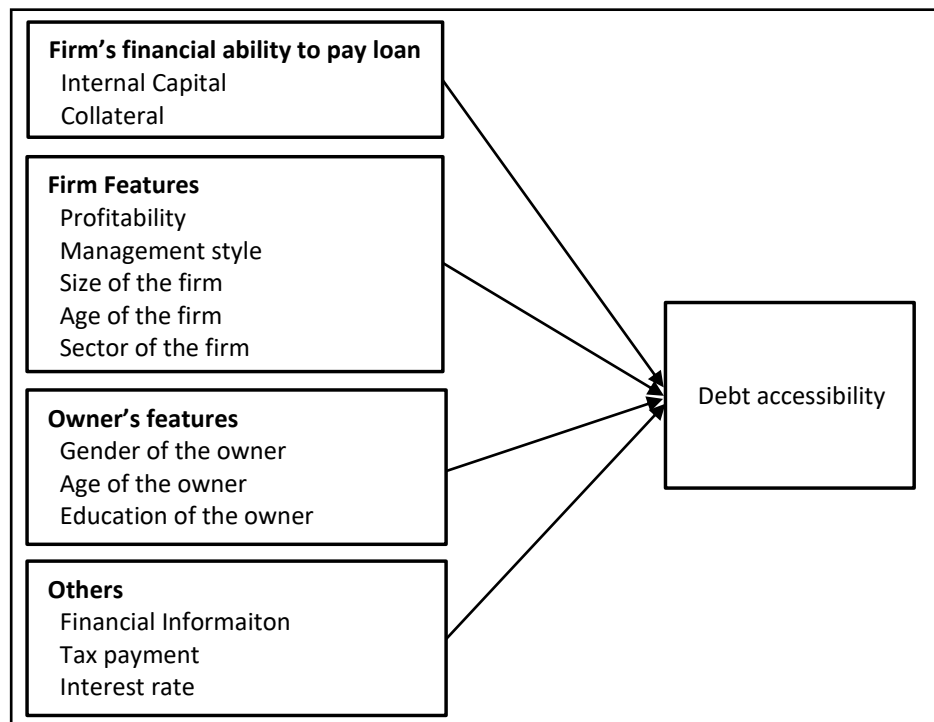
A four-year period from 2018 to 2022 and this period has been selected considering the pandemic situation, the financial calamity period of private and government commercial banks and the period of regular economy. To conduct the study, the investigator has collected essential data by interview methods from both primary and secondary sources.

#### Development of the Research Model

$$DA = \alpha + \beta_1 INTFIN + \beta_2 COLL + \beta_3 PROFIT + \beta_4 FININFO + \beta_5 INT + \beta_6 TAXATION + \beta_7 AGEF + \beta_8 SI ZEF + \beta_9 SECF + \beta_{10} AGE0 + \beta_{11} GENO + \beta_{12} EDUO + \beta_{13} TYPE + \varepsilon$$

Where:  $DA = FL = TD/TA$

$DA$  = Debt Accessibility,  $FL$  = Financial Leverage,  $TD$  = Total Debt,  $TA$  = Total Asset



As a survey instrument, a semi-structured typed questionnaire survey was done through the interview method targeting the information from the owner or manager of the SME firms established in different divisional cities of Bangladesh considering the three main business sectors namely; trade, services, and manufacturing. A total of number of 395 survey instruments were sent but 350 survey instruments were reimbursed perfectly. The remaining 40 questionnaires were incomplete and unacceptable. Thus, the returned 40 questionnaires were considered imperfect and were not perfect to achieve the objectives of the research.

**Table: Sorting of the collected questionnaire**

Questionnaire Category	Frequency	Percent
Loan Borrower	132	37.71
Loan Non-Borrower	224	64.00
Rejected Loan Proposal	4	00.01
Total	350	100

Source: Survey data

The collected questionnaires were divided into three heads: loan borrower, loan non-borrower and loan rejected proposal. Among the collected questionnaires, SME loans approved from different financial institutions were 132. On other hand 64 percent (224) of respondents have not taken any SME loans from any financial institution. About .01 percent of the questionnaire respondents have proposed for the SME loans, but the loan proposal has been rejected for various reasons.

	N	Minimum	Maxi	Mean	Std. Dev	Variance	Skewness	Kurtosis
Internal fund	132	5.75	1305.00	94.86	232.89	5440.45	3.731	13.360
Ln-int.finan	132	1.78	17.17	3.30	1.25	1.55	1.298	1.394
profit 22	132	5.40	1002.00	38.58	86.24	748.009	9.275	99.829
Ln_profit of firm	132	1.71	6.95	3.01	.99	.972	.674	.671
tax for firm	132	.04	10.09	.41	1.18	1.262	7.104	54.990
Ln_tax for firm	132	-3.66	2.35	-1.41	.95	.846	1.182	2.496
Age of the firm	132	2.20	3190	11.96	5.34	28.53	.711	1.505
Ln_Age of firm	132	.67	3.48	2.36	.56	.28	-1.162	1.899

Source: Survey data

The above Table shows a huge deviation in the internal fund, Tax, age of the firm, and profit. Therefore, the logarithm function has been used to elucidate the extreme positive skewness of these variables.

#### **Data Reliability and Validity**

Data reliability and validity refer to the completeness, accuracy, structure, and integrity of data as a way of measuring how well it can be calculated to be stable and free from mistakes across time and sources.

In our study, Cronbach's alpha test was used to confirm the reliability and validity of the data. In this study, internal uniformity reliability for the 13 items is mediated by the average inter-item correlation and Cronbach's alpha. The average inter-item correlation is 0.18, and Cronbach's Alpha is 0.577. So, the result of this study is reliable and valid.



### Creating Dummy Variables for Categorical Variables

The dummy variable takes the value 0 or 1 to designate the nonexistence or presence of some categorical influence that may be estimated to change the result. In regression analysis, the response variable may be affected not only by measurement variables (age, price, income, etc.) but also by qualitative variables (education level, region, gender, etc.).

### Checking for Missing Data

Missing data is a general incidence and may have a substantial influence on the outcomes or results that are concluded from the information. The problem of missing data may be deciphered in numerous ways: firstly, by crossing out all information relating to missing values, after getting in touch with the participants to complete the missing values, tertiary, by inserting the missing information with a substitute value (Abbasi *et al.*, 2021; Ali Qalati *et al.*, 2020; Rafiki, 2020; Rahman, Rahman, *et al.*, 2017). In our research cancelling is difficult because of the small sample size. Thus, the inserting method was used using the mean value.

### Model Specification Error

In a model, the number of regressor variables that may have much or fewer can cause model specification errors (Erdogan, 2019; Nizaeva & Coskun, 2018). For the perfect correctness of the model, the number of regressor variables can be increased but this may create the problem of multicollinearity (Guci *et al.*, 2021; Gveroski & Jankuloska, 2017; Haritone & Mirie, 2016). When the quantity of variables is plentiful, they impede the suitable calculation of variable coefficients generating incorrect variance. A model specification error is associated with the statement that there is no correlation between the error term and the explanatory variables ( $E(e/X)=0$ ) (Olufemi Adeyeye *et al.*, 2016; Pham, 2017).

### Ramsey's regression specification error Tests for checking Model Specification Error

Ramsey's regression specification error Tests for omitted variables

$H_0$ : The model suffers from no omitted variable

T value	0.184
Beta	2.802
Prob>F =	0.874

By the values of the Debt Accessibility, the regression specification error (RESET) test is done to confirm that the model does not bear any of the variable omission bias. Here the result of the t value is 0.184. At the same time, the result of the p-value (Prob > F) is 0.874. Therefore, the alternative hypothesis is rejected, and the null hypothesis is accepted. The hypothesis confirms that the model has no missing variables.

### No presence of Multi-Collinearity

If there is a high correlation among the regressor variables in the regression variable, Multi-collinearity exists. The presence of Multi-collinearity can lead to wrong results when the investigator tries to see how well every regressor variable may be utilized most efficiently to forecast or realize the regressand variable in a statistical model (Rafiki, 2020; Waweru, 2017). To prove the presence of multi-collinearity in the model, the Pearson correlation matrix and VIF were run in Table.

**Table: Pearson Correlation Matrix**

	Coll	Ln_Age of Firm	Gen of owner	Sector of firm	Education	Fin info	Int	Ln_tax for firm	Sizeof F	Ln_profit of firm	Ln_age of owner	Ln_intfinan	Debt acces	Own.
Coll	<b>1.00</b>	<b>.016</b>	<b>-.037</b>	<b>-.046</b>	<b>-.066</b>	<b>.122</b>	<b>.101</b>	<b>.232</b>	<b>.213</b>	<b>.329</b>	<b>.057</b>	<b>.449</b>	<b>.160</b>	<b>.375</b>
Ln_Age of firm		<b>1.00</b>	<b>.049</b>	<b>.081</b>	<b>.032</b>	<b>.123</b>	<b>.233</b>	<b>.212</b>	<b>.223</b>	<b>.243</b>	<b>.546</b>	<b>.245</b>	<b>.099</b>	<b>.056</b>
GenO			<b>1.00</b>	<b>.026</b>	<b>.127</b>	<b>-.055</b>	<b>.033</b>	<b>-.056</b>	<b>-.067</b>	<b>-.070</b>	<b>.033</b>	<b>-.125</b>	<b>.052</b>	<b>-.053</b>
Sector of firm				<b>1.00</b>	<b>-.134</b>	<b>.243</b>	<b>.343</b>	<b>.333</b>	<b>.268</b>	<b>.365</b>	<b>.105</b>	<b>.176</b>	<b>.016</b>	<b>.143</b>
Education					<b>1.00</b>	<b>.211</b>	<b>.155</b>	<b>.133</b>	<b>.065</b>	<b>.034</b>	<b>-.067</b>	<b>.133</b>	<b>.025</b>	<b>.066</b>
fininfo						<b>1.00</b>	<b>.344</b>	<b>.133</b>	<b>.146</b>	<b>.199</b>	<b>.044</b>	<b>.234</b>	<b>.064</b>	<b>-.061</b>
Int							<b>1.00</b>	<b>.344</b>	<b>.255</b>	<b>.422</b>	<b>.156</b>	<b>.319</b>	<b>.345</b>	<b>.034</b>
Ln_tax for firm								<b>1.00</b>	<b>.767</b>	<b>.765</b>	<b>.255</b>	<b>.766</b>	<b>.356</b>	<b>.041</b>
Size f									<b>1.00</b>	<b>.633</b>	<b>.266</b>	<b>.765</b>	<b>.675</b>	<b>.208</b>
Ln_profit of the firm										<b>1.00</b>	<b>.267</b>	<b>.834</b>	<b>.454</b>	<b>.276</b>
Ln_age of owner											<b>1.00</b>	<b>.266</b>	<b>.323</b>	<b>.053</b>
Ln_intfinan												<b>1.00</b>	<b>.462</b>	<b>.265</b>
Debt Acc.													<b>1.00</b>	<b>.165</b>
Own.														<b>1.00</b>

The degree of correlation among variables is appraised by the Pearson correlation matrix and coefficient (Palazuelos *et al.*, 2018; Rafiki, 2020). The existence of multi-collinearity draw breath when the result of correlation exceeding 0.9 (Denbelo, 2020; Olufemi Adeyeye *et al.*, 2016). The result shown in the above Table presents that the output of all matrix is below 0.9 confirming the existence of no multi-collinearity in the model.

#### Variance Inflation Factor (VIF)

VIF and tolerance are the extensively used measures that evaluate how much the variance of an estimated regression coefficient increases when predictors are correlated. If the VIF value lies between below 1 or above 10, then there is a possibility of presence of multicollinearity (Ahmeti & Fetai, 2021). When VIF is high there is high multicollinearity and instability of the beta coefficients. Here all the value of VIF lies between 10, it can be said that there is no multicollinearity.

**Table: Variance of inflation factor**

Variable	Tolerance	VIF
Ln_intfinan	.109	7.453
Ln_profit of the firm	.177	4.768
Ln_tax for the firm	.256	3.896
Collateral		
Equal	.543	2.879
Double	.345	3.876
Fininfo		
Profit and loss account	.212	6.756
Profit and loss account+ Balance sheet	.231	5.353
Profit and loss account+ Balance sheet+ cash flow statement	.430	7.020
SizeF		
Dummy small	.242	4.949
SECF		
Dummy trade	.322	3.218
Dummy manu	.232	4.584
ProF		
Dummy sole	.453	2.277
Dummy part	.356	2.655
EDUO		
Dummy Secondary School Level	.154	7.451
Dummy Higher Secondary Level	.123	4.434

Dummy Hon's	.166	7.665
AGEO		
Dummy be35	.168	5.632
Dummy 36-45	.282	4.963
Dummy 46-55	.394	5.547
Interest rate of loan	.689	2.465
Gender		
Male	.863	1.164
Age of the firm	.727	1.378

### Homoscedasticity

Homoscedasticity or homogeneity of variances is a statement of alike or parallel variances in various groups being compared. Heteroscedasticity means the nonconformity of homoscedasticity. Breusch-Pagan and Koenker test statistics is one of the statistical tests to identify heteroscedasticity (Ali Qalati *et al.*, 2020; Denbelo, 2020; Guci *et al.*, 2021; Haritone & Mirie, 2016).

### Breusch-Pagan and Koenker test for checking Homoscedasticity

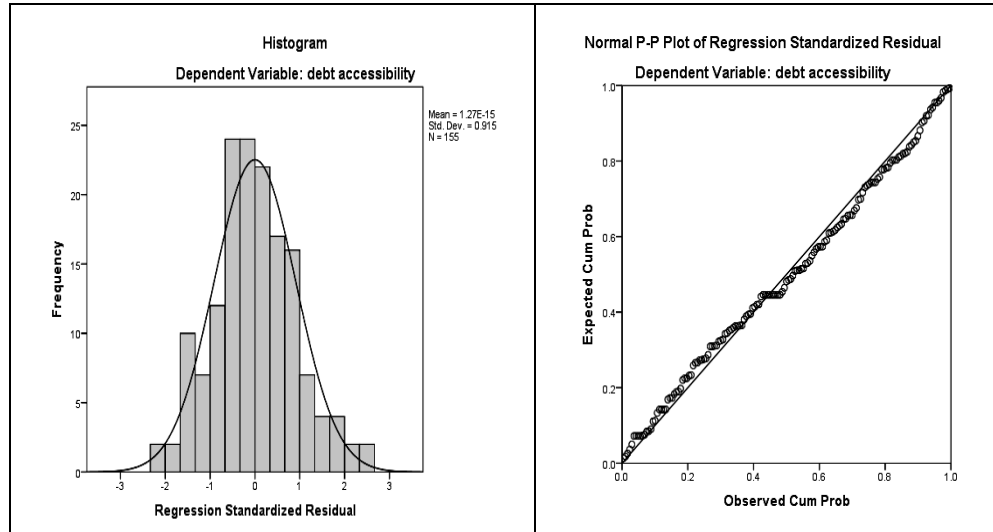
$H_0$ : There is no Heteroscedasticity (homoscedasticity).

	LM	Sig
BP	39.388	0.079
Koenker	35.505	.133

The result of Breusch-Pagan and Koenker test for checking homoscedasticity shows that the residuals are normally distributed. So the model is free from heteroscedasticity.

### Normality of Residuals

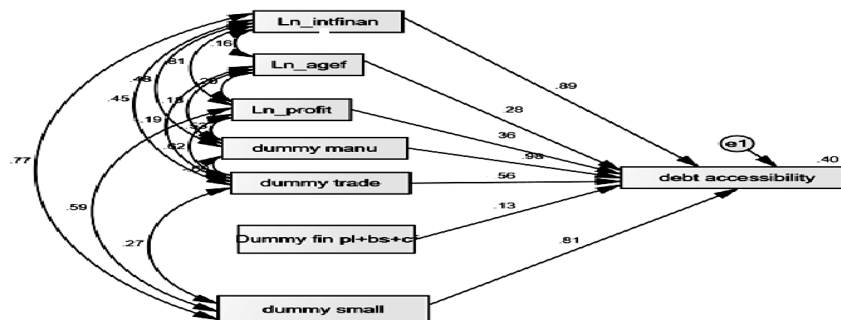
Portion of a dependent variable is not explained by a multivariate technique. Associated with dependent methods that attempt to predict the dependent variable, the residual represents the unexplained portion of the dependent variable. Residuals can be used in diagnostic procedures to identify problems in the estimation technique or to identify unspecified relationships (Dias Duarte *et al.*, 2017; Guci *et al.*, 2021). The variation between the observed (Y) and the forecasted (Yhat) dependent variable value is to be normally distributed. This is the residual score 'e' (Ali Qalati *et al.*, 2020; Erdin & Ozkaya, 2020). The residual value ( $e = Y - \hat{Y}$ ) is graphically symbolized in a straight line with homogeneous variance for all forecasted scores. If this concept fails, there is an influence in validity and reliability of regression analysis results. Previous research (Serrasqueiro & Caetano, 2014; Singh & Kaur, 2021) favored to use graphical examination. Thus, the normality of residual 'e' is ensured by probability plots namely Histogram, and pnorm (p-p plot).

**Figure: Histogram normality and probability normality plot**

The histogram normality plot discloses that the residual 'e' is normal in shape. The histogram plot also reveals the normal distribution with a mean closer to zero.

The probability plot (p-p) is just off the normal line but very much closer to the normal line. Thus graphical position proves the normality of residual.

#### Model fit



Model fit indices	Suggested value	Obtained value
The ratio of chi-square to the degree of freedom	<3	1.622
The goodness of fit index	>=.90	.911
Comparative fit index	>=.90	.963
Normalized fit index	>=.90	.950
Incremental fit index	>=.90	.965
Tucker Lewis fit index	>=.90	.972
Root mean square error of approximation	<=.05	.03

Source: Survey data

### Interpretation of the Regression Analysis Output

R-squared ( $R^2$ ) and adjusted R-squared work as intended in a simple linear regression model with one explanatory variable and with a multiple regression made up of several independent variables respectively (Israeli, 2006). In this study, the result of the regression analysis is interpreted by the multiple coefficient of determination ( $R^2$  and adjusted  $R^2$ ); standard error of estimate (F-test); significance tests (t-test and p-value statistics) and the standard regression coefficients ( $\beta$ ) (Palazuelos *et al.*, 2018).

Multiple Linear Regression Analysis Output						
Number of Obs =		132				
F( 25, 133)		=		4.721		
Prob > F		=		0.000		
R-squared		=		0.570		
Model	Un. Co. B	Std. Error	St. Co. Beta	t.	Sig.	
Ln_intfinan	.017	.018	.182	.966	.000**	
Ln_profit of the firm	.006	.021	.052	.311	.007**	
Ln_tax for the firm	.004	.016	.034	.272	.102	
Collateral						
Dummy equal	.029	.033	.079	.861	.405	
Dummy double	.018	.052	.035	.337	.600	
Fininfo						
Dummy fin PL	.001	.038	.002	.013	.206	
Dummy fin pl+bs	.044	.048	.122	.927	.204	
Dummy fin pl+bs+cf	.114	.059	.212	1.934	.050**	
SizeF						
Dummy Small	.094	.037	.357	2.547	.012**	
Sector F						
Dummy Trade	.070	.027	.295	2.608	.040**	
Dummy Manu	.126	.036	.476	3.524	.001**	
Typeo						
Dummy Sole	.044	.034	.122	1.284	.201	
Dummy Part	.005	.049	.011	.108	.914	
EduO						
Dummy SSC	-.104	.045	-.380	-2.305	.063	
Dummy HSC	-.142	.045	-.573	-2.128	.062	
Dummy Hon's	-.120	.044	-.503	-2.707	.068	
AgeO						
Dummy below 35	.016	.035	.067	.448	.655	
Dummy 36-45	.026	.035	.094	.750	.469	
Dummy 46-55	.018	.033	.055	.548	.585	
Interest rate of loan	.040	.010	.313	.092	.700	
Gender						
Male	.021	.042	.034	.498	.169	
Age of the firm	.000	.002	.022	.300	.050**	

The analysis identifies that there is a statistically significant relationship among tax accessibility and internal finance (ln\_intfinan), profitability (ln\_profit), Financial information (Dummy fin pl+bs+cf), size of the firm (Dummy small), sector of the firm (Dummy Trade, Dummy Manu) and Age of the firm. So hypothesis 1, 2, 3, 4, 5, and 8 are rejected which means there is a significant relationship among them.

### Conclusion

Different variables related to SME organization's characteristics, owner's characteristics, loan characteristics and financial information are scrutinized about SME's accessibility to bank loans. The  $R^2$ , t-test and corresponding p-values are considered to conclude the confirmation of the model. To appraise the power of their association with the dependent variable the  $\beta$  coefficients of the independent variables are employed.

About the part of the preliminary assessment of data, the average value of that variable is used in case of missing data. Appropriate diagnostic tests related to heteroscedasticity, multicollinearity, normality and model misspecification are passed to determine a suitable multiple regression model. The  $R^2$  value of 57.0 percent indicates the regression model to be a good fit.

The regression equation provides a positive influence on the SME firms' accessibility to bank credit and the variables: internal fund; financial information of the firm; firm age and firm size; profitability; and the sector as predicted. A limitation of the research is that it is conducted only on the demand side.

Therefore, we suggest future research considering the demand and supply side of bank loans and the implications of different phases of an enterprise's life cycle. The influencing factors identified here apply to the emerging market is another suggestion for future research.

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