# Collateral and SME financing in Bangladesh: an analysis across bank size and bank ownership types

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**Abstract.** We examine the issue of pledging collateral and its effect on access to credit, interest rates and credit risk of SMEs financing in Bangladesh with respect to bank size. We also examine the collateral classification (fixed assets collateral, personal guarantee and third-party guarantee) by bank ownership types to find what types of collateral are preferred by public, private and foreign banks in Bangladesh for lending to firms. In addition to that, we examine whether collateral requirements are different between large and small banks as they have different incentives for collateral based lending. Our empirical results suggest that small banks have no additional incentives to provide loans based on the collateral security than  large banks. Hence, we did not find any evidence that collateral can increase  access to credit for SMEs from  small banks. Similarly, we also did not find any effect of collateral on interest rates or collateral security can lower the default rates of the SME loans and the results are similar regardless  bank size. With regards to  collateral segmentation across  bank ownership types and bank size, our regression's results suggest that each type of banks has its  own preferences about collateral requirements while lending to  firms. Therefore, we conclude that depending on  bank internal policy commercial banks ask for different collateral, which comply with the best interests of  banks.

**Keywords:** Bank Financing, Collateral, Small and Medium Enterprises, Bank Size, Bank Ownership, Credit Risk, Bangladesh.

**JEL classification:** G21, G32, L26, O16

## 1. INTRODUCTION

Difficulties in getting easy access to finance are treated as one of the foremost barriers to the development of Small and Medium Enterprises (SMEs) not only in developing countries but also in developed countries due to information asymmetry between borrowers and lenders. Pledging collateral is often treated as an effective mechanism to easing the access to finance due to personal commitments with pledged assets. Collateral requirements for lending to SMEs are even more serious in underdeveloped countries due to strong information asymmetry and also weak legal enforcement (Hainz, 2003; Menkhoff et al., 2006). Menkhoff et al. (2012) find that SME borrowers in less developed economies have lower level of collateralizable assets to pledge as a security by banks and thus, the probability of credit rationing is higher for SMEs in the less developed economies. Beck et al. (2006) use the World Business Environment Survey (WBES) and find that collateral requirements are the third most important difficulty in financing for SMEs while high interest rates and lack of long-term loans are the first and second ones. In the context of Bangladesh, Hoque et al. (2016) found that 44.5% of their respondents did not apply for bank loans due to being unable to pledge collateral and therefore, they had a fear to get rejection on a loan application. Berger et al. (2011) stated that the main reason why banks ask for collateral while lending to SMEs is mainly due to the ex-ante information gap between lenders and borrowers and if the information gap can be shortened it will also reduce the collateral requirement for SMEs.

Several studies show that lending for SMEs is more difficult than for large firms due to information asymmetry and therefore, it requires a relationship to be developed between a bank and a firm to know more about them (Berger and Udell, 2002, 2005; Petersen and Rajan, 2002; Berger and Black, 2011). The research based on the "small bank advantage" hypothesis suggests that small banks are more efficient in lending to SMEs than large banks due to their advantage in processing soft information, because of their simple organizational structure (Carter et al., 2004; Canales and Nanda, 2012; Berger et al., 2005; Kano et al., 2006; Shen et al., 2009). In contrast to small banks' relationship-based loans, large banks prefer to provide loans based on hard financial information because it is difficult for large banks to make frequent contact with SMEs (Cole et al., 2004). Moreover, relationship-based lending is not the most economical way of lending for large banks due to agency issues within large banking structures, namely, delegating more authority to loan officers (Berger and Udell, 2002).

In this paper, we argue that as small banks have lower asset base than large ones , hence, small banks will provide more loans based on collateral than large banks due to the potential loss if borrowers are default. Therefore, there are incentives for small banks to provide credits based on pledged collateral. However, as large banks do not have capital constraint, they will prefer to provide loans based on strict loan screening process. Thus, collateral will not have any significant impact on access to credit from large banks. Similarly, we assume that as small banks keep a close contact with SMEs than large banks, it will enable small banks know more about their potential SME borrowers and it could help reducing the default rates. On the other hand, we also assume that collateral will signal positive information about borrowers' quality and it may reduce the interest rates on loans . Nevertheless, the literature does not provide enough evidence on whether the availability of collateral can play any incentives' roles for small or large banks while providing loans as a result of their organizational diseconomies.

In this study we also try to understand the collateral requirements in terms of fixed assets, personal guarantee and third party guarantee across bank ownership types (private, public and foreign banks) as well as from the bank size perspective for the credit market in Bangladesh during the year 2014. Studies show that lending practices are different across banks' organizational structures due to different organizational incentives (Liberti and Mian, 2009). Mian (2003) argued that not all types of banks have similar credit expertise

thus, collateral requirements are also different across banks' types. Therefore, it is important to shed light on whether collateral requirements vary due to banks' ownership structure as well as due to differences in bank size in the case of Bangladesh.

Our empirical results suggest there is no significant difference between small and large banks in terms of demanding for collateral and giving SMEs access to loans. Hence, with regards to bank size, we did not find any evidence on the ability of pledging collateral by the SMEs and access to loans. Furthermore, we did not find any plausible evidence that collateral can reduce interest rates on SME loans from the bank size perspective. Similarly, our results do not support the view that collateralized loans are less riskier than non-collateralized ones and also any bank size idiosyncratic difference in credit risk of SMEs. Regarding the collateral segmentation across banks' sizes and bank ownership types, our regression results suggest that foreign banks demand lower fixed asset's collateral than public and private banks. On the other hand, the large banks demand for higher fixed assets as collateral than the small banks. Moreover, private banks accept lower level of third party guarantee as collateral. However, our results for personal guarantee as collateral is not significant across bank size and also across ownership structure.

Our paper is different from the existing literature at least in two ways. First of all, we examine the issue of pledging collateral and access to credit from the bank size perspective since small and large banks have different lending techniques. Secondly, we examine the collateral requirements and credit risk of SMEs in the context of low-income country like Bangladesh. The rest of the paper is structured as follows: section 2 provides theoretical and empirical literature on collateral requirements and our hypotheses. In Section 3 we present our data and the methodology. Section 4 documents our empirical results and discussions. Finally, in section 5 we provide concluding remarks.

## 2. LITERATURE REVIEW

The use of collateral on loan contract is a widespread phenomenon by banks while lending to SMEs. Davydenko and Franks (2008) found that 75.7% loans are secured in France and while they observed that 88.5% loans are secured in Germany. Similarly, Degryse and Cayseele (2000) show that 26% of loans are secured in Belgium. In the case of the USA, Steijvers et al. (2010) find that about 87% loans are secured with various types of collateral and with some covenants. Menkhoff et al. (2012) find that around 15% of loans are secured in Thailand.

In 2007, the World Bank conducted an enterprise survey among 560 small and medium enterprises in Bangladesh to understand the collateral requirements by the commercial banks. The survey results show that 67.14 per cent of SMEs provided land and buildings as collateral to get access to the bank loans. On the other hand, about 43 per cent SMEs provided personal assets and about 29 per cent firms provided equipment and machinery as collateral. However, only 3.39 per cent firms pledged accounts receivables as collateral (World Bank Enterprise Survey, 2007). Hence, the results suggest that commercial banks in Bangladesh are comfortable to provide SME loans when they are secured with the fixed assets as collateral.

With regards to the less developed economies, Feder et al. (1988) analyses the use of collateral and access to credit in three developing countries (India, Thailand and Korea) and it is found that political, social and legal issues may influence the use of collateral in Korea. On the other hand, pledging collateral is legal in Thailand and India. However, excessive use of land collateral certainly reduce bank creditworthiness assessment cost for the banks. In Thailand, the use of collateral can increase the access to credit by 40% in compared to loans those without any collateral. In examining the potential substitutes for collateral requirements in Thialand, Menkhoff et al. (2012) find that about 11% of the borrowers are credit constraints and

rest of the borrowers borrow without any collateral. La Porta et al. (2003) show that the relationship banking can reduce the use of collateral and similarly loans provided based on the relationship lending are more risky in the Mexican loan market. Godlewski and Weill (2011) examine the effect of information asymmetry on loan spread and collateral in 31 countries where about half of them are developed countries. The result show that there is a positive relationship exists between the use of collateral and loan spread and hence, validating the observed risk hypothesis.

There is a wide array of research shows that collateral is acting as a disciplinary role for the borrowers, and it can solve the moral hazard problem of the loans (Chakraborty and Hu, 2006; Menkhoff et al., 2006; 2012; Brick and Palia, 2007). On the other hand, research based on ex-ante information shows that the collateral can reduce the adverse selection problem of the loans (Godlewski and Weill, 2011; Jimenez and Saurina, 2009; Hainz et al., 2013; Jimenez et al., 2006; Lehmann and Neuberger, 2001). However, Blazy and Weill (2013) did not find any evidence that the collateral can reduce the ex-ante and ex-post information asymmetry, and hence asking for collateral is not due to information asymmetry, but it may be due to bank internal policy while lending to firms. Jimenez and Saurina (2004) find that the loans given based on collateral security are more ex-post riskier than the loans given without any collateral. They infer that due to the collateral, banks are less restrictive to evaluate the quality of the loans and as a result, their default rates are higher than the non-collateralized loans.

Collateral is seen as a signalling device for the banks to know about the borrowers' quality and hence, pledging collateral can reduce the credit risk of the loans by increasing access to the credits. On the other hand, it is also possible that poor borrowers will provide more collateral because of their capital constraints and also for credit rationing from other sources (Gama and Duarte, 2015). Information asymmetry is even acuter in the segment of SMEs and hence, pledging collateral is higher for the small and medium firms than the large firms due to inability to show their credit worthiness (Chakraborty and Hu, 2006; Grunert and Norden, 2012). Gama and Duarte (2015) find that as there is an incentive for collateralized borrowers to act in the best interest of the banks and therefore, pledging collateral can increase access to finance for small businesses. Menkhoff et al. (2012) examined the issue of collateral in the context of less-developed country (Thailand) and show that there is a positive relationship exists between pledging collateral and access to credit. Neuberger and Rathke-Doppner (2015) also found similar results in the German market and conclude that when firms pledge collateral, it increases access to credits from banks. On the other hand, there is empirical research those do not find any relationship between pledging collateral, and access to credits (Kundin and Erecgovac, 2011; Ono and Usegi, 2009).

The literature also shows evidence that by pledging collateral borrowers will show their ability of repayment, and they can ask for bank loans with lower interest rates. Gama and Duarte (2015) and Comeig et al. (2015) proposed that when borrowers are pledging collateral they can access loans with lower interest rates and hence; they argue that quality borrowers pledge more collateral to avail loans with lower interest rates. Blazy and Weill (2013) find that high collateral measures the poor quality of the borrowers and hence, interest rate increases with the amount of collateral. Theory based on the observed risk hypothesis is also suggesting similar results. It is found that when information asymmetry is lower, in that case, banks can measure the riskiness of the borrowers more accurately and therefore, banks will ask for higher collateral and also higher interest rates from the risky borrowers. Therefore, a positive relationship exists between collateral, interest rates and credit risk of the loan (Godlewski and Weill, 2011; Brick and Palia, 2007; Jimenez et al., 2006). Brick and Palia (2007) observed that loans with higher levels of collateral charged with 200-400 basis points more interest rates than the loans with lower or no collateral. Therefore, it shows that when the information gap is lower banks can evaluate the riskiness of the firm with more accuracy and if firms are riskier, they are charged with more interest rates.

Beck et al. (2011) find that foreign banks and the large public banks tend to provide the loans with collateral and giving less importance to the soft and relationship based information. Beck et al. conclude that regardless of the bank ownership type, large banks use more arms-length lending, and so they ask for more collateral from the SMEs. In contrast, Jimenez et al. (2009) show that technology based credit scoring of large banks reduces collateral requirements for SMEs due to a strict screening process by the credit scoring models. Mian (2003) stated that government-owned banks have less screening and monitoring processes for loans, and therefore, they require higher collateral. Likewise, government-owned banks have more default rates on the loan contract which are higher than the private or foreign banks. Conversely, it is possible to get loans with lower interest rates from the public banks as a result of political and hidden motives for lending to firms (Berger et al., 2008; Cole, 2009; Sapienza, 2004). With respect to foreign banks, it is stated that they are situated far from the local community, and it is difficult for them to monitor the loans by keeping a close contract with the borrowers and as a result; foreign banks ask for more collateral while lending to SMEs (Mian 2009). Thus, depending on the bank ownership structure and bank size, collateral requirements are also different based on banks internal policy, and it exerts different outcomes in terms of access to credit and interest rates for SMEs.

A large number of studies show that the effect of market competition on collateral requirements for SMEs in connection with access to credit and interest rates. In examining the effect of competition, Voordeckers and Steijvers (2006) find that when several banks are competing for the same borrowers, it reduces the collateral requirements for the borrowers. Since, to attract the borrowers to be with their banks, banks need to provide their best offers, and it will ultimately reduce the collateral requirements. Menkhoff et al. (2006) find that when a borrower has the opportunity to borrow from different banks, it increases the bargaining power of the borrower and it results with a lower interest rate on the loan contract. Jimenez et al. (2009) find that in a competitive market, banks ask for more collateral than it is in the concentrated market. The reason is that in a competitive market banks want to develop their holding power in the loan contract due to excessive switching behaviour of the borrowers. Hainz et al. (2013) argue that as the competition increases, banks prefers to use their best screening process due to a large number of lenders and as a result, strict screening process reduces the collateral incidence. They also find that the market competition reduces the interest rates on the loan contract due to a tighter process of the loan. Jimenez et al. (2009), Chakraborty & Hu (2006), Kozubíková et al. (2015) also document a positive relationship between market competition and collateral requirements for small business lending.

## Hypotheses

In line with the research objectives, we also expect that there can be a significant difference exists between bank size and its impact on collateral requirements and ultimately the effect of collateral requirements on the credit availability, interest rates and credit risk of SMEs. Hence, according to the expectation, our hypotheses are as follows:

**H1:** There is a relationship between bank size and collateral on approval of credits to SMEs.

**H2:** There is a relationship between bank size and collateral on lending interest rates to SMEs.

**H3:** There is a relationship between bank size and collateral requirements on reducing SME credit risk.

**H4:** There is a relationship between bank size and collateral on ex-post credit default rates on SMEs.

## 3. DATA AND METHODOLOGY

This study uses the data collected by a self-administered questionnaire survey during the month of June-August in 2015 targeted to the banks credit officers who are only dealing with SME finance. Purposively, we interviewed only SME credit officers so that we can tease out the most essential information from them, what they consider while dealing with a loan proposal. The initial target of the survey was to collect data at least from one credit officer from all scheduled commercial banks those are operating in Bangladesh, which covers public (government-owned), private and foreign banks (total 56 scheduled commercial banks in Bangladesh). Finally, we have collected data from 110 credit officers from 44 commercial banks, mainly from their different branches operating in Dhaka city.

We have classified the size of the banks on the basis of the banks total assets. Bank total assets are also used in different papers to differentiate between small and large banks (Berger et al., 2005; Uchida et al., 2008; Shen et al., 2009). Bank total assets, total advance, collateral types and all other secondary data that we used for our analyses are collected from the audited financial statements of the banks that are published in 2014. We did not use any financial statements, which are not audited, as a result; we did not include any 2015 interim financial statements information in this paper.

The study uses descriptive statistics such as mean to gain understanding about the bank's size. In addition, this study applied Chi-square test in order to examine the hypotheses. Moreover, we adopted regression models to understand the overall collateral classification (fixed assets, personal guarantee and third-party guarantee) according to the bank size and bank ownership structure in the year of 2014.

Regression Models:
(1) $\ln(Y_{(\text{Fixed Assets})}) = \beta_0 + \beta_1 Private\ Banks + \beta_2 Foreign\ Banks + \beta_3 Small\ Banks + \mu$
(2) $\ln(Y_{(\text{Personal Guarantee})}) = \beta_0 + \beta_1 Private\ Banks + \beta_2 Foreign\ Banks + \beta_3 Small\ Banks + \mu$
(3) $\ln(Y_{(\text{Third Party Guarantee})}) = \beta_0 + \beta_1 Private\ Banks + \beta_2 Foreign\ Banks + \beta_3 Small\ Banks + \mu$

### Summary Statistics by Bank Sizes and Collateral

Table 1 presents the summary statistics of our full sample data of 44 banks as well as segmented analysis across the bank size from the total number of banks. There is a significant difference exists between banks fixed assets collateral, which is comprised of land, equipment/machinery, and buildings from the personal guarantee (family assets) or third party guarantee to total advance ratio. Hence, it reflects that banks in Bangladesh ask for more fixed assets as a security than any other forms of collateral. The results are similar to the case of Thailand as found by Menkhoff et al. (2012). Since these fixed assets are mainly connected with the businesses and banks are more secured with the fixed assets than the personal or third party guarantee. Moreover, Bangladesh is a growing emerging economy as a result, values of lands and buildings are increasing to a great extent each year. Therefore, it is also convenient for banks to ask for fixed assets as collateral because they can recover the defaulted loans by selling the collateralized assets easily.

With regards to measuring the bank size, first we calculate the mean value of total assets for our full sample, and then if the banks total asset is equal to or more than the mean of the full sample are considered as a large bank and otherwise, the banks are classified as small banks. In table 1 we see that the small banks required about (9%) more fixed assets to their total extended loans as compared to the large banks. As discussed elsewhere that small banks are more capital constraint than the large banks, thus to safeguard their capital against bad loans small banks require higher collateral. Similarly, we also find that there is a signifi-

cant difference exists between personal (20%) and third-party guarantee (10%) between the small and large banks. This result suggests that the small banks require higher collateral with respect to all types of collateral.

We also run ANOVA (Analysis of Variance) tests to look at whether the mean difference is statistically significant or not. In particular, the results of F-tests indicate that bank mean assets, mean advance is statistically significantly different from the bank size. However, mean fixed assets collateral, personal guarantee and third party guarantee on SMEs are not statistically significantly different across the bank size.

Table 1

Characteristics of Banks on Collateral Requirements

|  |  |  | Bank Size | |
| --- | --- | --- | --- | --- |
|  | All banks | | Small | Large |
| Variable | Mean | F-Tests | Mean | Mean |
| Total Assets (BDT Million) | 193140(180981) | 31.2[0.000] | 115350(124384) | 305502(193584) |
| Total Advance (BDT Million) | 103310(74522) | 17.5[0.000] | 57114(39273) | 167470(63677) |
| Fixed Assets Collateral (BDT Million) | 75829(62909) | 1.22(0.27) | 45275(36089) | 118265(67438) |
| Personal Guarantee (BDT Million) | 14991(19170) | 2.51(0.12) | 7830(10462) | 24140(23409) |
| Third party Guarantee (BDT Million) | 6483(7373) | 1.76(0.19) | 4802(7686) | 8444(6459) |
| Fixed Assets to Total Advance Ratio (%) | 73 | | 77 | 68 |
| Personal Guarantee to Total Advance Ratio (%) | 29 | | 37 | 17 |
| Third party Guarantee to Total Advance Ratio (%) | 11 | | 15 | 5 |

All banks N= 44; Small banks N= 26; Large banks N=18. Standard deviations are in parentheses.

Source: Banks annual statements 2014. Authors' calculations.

In table 2, we present our survey results according to the bank size to understand whether the size of the bank matters for financing SMEs. This is very important for our research because by this way, we can find out some obvious reasons for banks to ask for more collateral from the SMEs. The survey result suggests that about 62% of respondents from the small banks think that SMEs are unstable and difficult to evaluate their future business prospects. Similarly, about 59% credit officers reported that SMEs have poor management, and that is why they ask for more collateral. However, from the large bank perspective, 77.23% respondent approved that management structure is poor in the case of SMEs than the large firms. Except, the poor management structure of SMEs all other results of the large banks are very similar to the result of the small banks. Overall, the results signals that the large banks are more concerned about the management structure of the SMEs while, small banks are more apprehensive about the stability and evaluation of the business. Therefore, we argue that a strong management board may reduce the collateral requirements for SMEs from the large banks while increasing the stability of SMEs through better performance may lessen the collateral burden from the small banks. Hence, both types of banks have different evaluation criteria for SMEs and for setting collateral requirements.

Table 2

Why banks ask for more collateral from SMEs than the large firms (indicate maximum three options)

|  | Small Banks in % | Large banks in % |
|---|---|---|
| SMEs are more unstable | 62.26 | 52.25 |
| SMEs are more informal so difficult to collect hard information | 52.15 | 57.89 |
| Evaluation of SMEs is difficult | 62.64 | 56.14 |
| Management of SMEs is poor | 58.85 | 77.23 |
| Calculation of default probability rate merely based on soft information, so it is difficult to measure for SMEs | 58.50 | 56.14 |

Small banks N=26; Large banks N=18.

Source: Authors own survey results.

Table 3 presents the descriptions of the survey questions used to constructing the association between bank size and collateral for SMEs from 110 SME credit officers, representatives from 44 banks in Bangladesh. Respondents were given five points Likert scale questions to disclose their opinion about relationship lending that is ranging from 'strongly disagree' (1 point) to 'Strongly agree' (5 points).

We have constructed four questions to measure four hypotheses. At first, we see that 50 per cent of our total respondent agree and 24.5 per cent respondent strongly agree that "Borrowers with collateral have much more chances to get loans from the bank". Hence, the survey result suggests that having collateral while applying for loans do value by the credit officers for extending loans. With regards to "Borrowers with collateral receive loans with lower interest rates" about 43 per cent respondent considers that collateral does have an impact on lowering interest rates, however, 31 per cent of them denied that collateral can reduce the interest rates. Furthermore, about 51 per cent respondents are agreed with the view that "My bank value collateral security as a significant factor for SME credit risk". Hence, it suggests that collateral security can be a significant factor for banks to reduce the credit risk of the firms. Finally, the survey result shows that about 56 per cent credit officers approved that "SMEs with a higher level of collateral have defaulted less than the SMEs with lower/no collateral". Therefore, the survey result suggests that collateral can reduce the default rates of the SME loan due to personal commitments with the collateralized assets. Moreover, when SMEs pledges higher levels of collateral, it shows that they are more aligned with the interest of the banks than the firms those are having lower levels of collateral.

Table 3

Descriptions of the Survey Questions

| Descriptions | Measurements/Categories | | | | |
|---|---|---|---|---|---|
|  | Strongly disagree | Disagree | Neither agree nor disagree | Agree | Strongly agree |
| 1 | 2 | 3 | 4 | 5 | 6 |
| Borrowers with collateral have much more chances to get loans from the bank. | 3 (2.8) | 13(11.8) | 12(10.9) | 55(50.0) | 27(24.5) |
| Borrowers with collateral receive loans with lower interest rates. | 7 (6.4) | 34(30.9) | 18(16.4) | 47(42.7) | 4(3.6) |

| 1 | 2 | 3 | 4 | 5 | 6 |
|---|---|---|---|---|---|
| My bank value collateral security as a significant factor for SME credit risk. | 2 (1.8) | 12(10.9) | 14(12.7) | 56(50.9) | 26(23.6) |
| SMEs with higher level of collateral have defaulted less than the SMEs with lower/no collateral. | 2(1.8) | 15(13.6) | 18(16.4) | 61(55.5) | 14(12.7) |

Note: 5 = Strongly Agree, 4 = Agree, 3 = Neither Agree nor Disagree, 2 = Disagree, 1 = Strongly Disagree. Percentage values are in parentheses; N = 110.

Source: Authors' survey.

## 4. EMPIRICAL RESULTS AND DISCUSSIONS

Table 5

Test of Hypotheses

|  | Bank Size | |
|---|---|---|
|  | Chi-Square Value | P-Value |
| **H1:** Borrowers with collateral have more access to credit from the bank | 5.674 | 0.23 |
| **H2:** Borrowers with collateral receive loans with lower interest rates | 1.108 | 0.89 |
| **H3:** Collateral is considered as a significant factor for SME credit risk | 2.971 | 0.56 |
| **H4:** SMEs with collateral defaulted less than the SMEs without/lower levels of collateral | 1.224 | 0.87 |

Source: Authors' results.

We test whether the availability of collateral can make any difference across the bank size while providing credits to SMEs because of small banks incentives to collateral based lending. Our empirical results suggest that there is no significant difference exists between the small and large banks while lending to SMEs with collateral and therefore, we reject this hypothesis (H1). Hence, this result is suggesting that small and large banks are giving similar importance to collateral while lending to the SMEs. It can be that fact that small banks takes collateral from the borrowers to reduce the loan loss; however, collateral incentives does not insist the small banks to provide loans in a risky projects. As it is found that banks use collateral not only to reduce the asymmetric information problem but minimizing loan loss is one of the major concerns for banks to use collateral (Blazy and Weill, 2013; Menkhoff et al., 2006). On the other hand, in our case; it is also possible that small banks have the similar credit expertise as like as the large banks and thus, they provide loans by a strict credit screening process than only to depend on the collateral security. Nevertheless, our inference is opposite to Jimenez et al. (2006, 2009) where they stated that small banks have limited credit expertise than the large banks and for that reason the small banks relay on collateral security to provide credits to the SMEs. Additionally, as Bangladesh is a developing country and therefore, information asymmetry is comparatively higher than the developed countries due to lack of monitoring and enforcement. Hence, regardless of the bank size, commercial banks may ask for collateral to reduce the adverse selection and moral hazard. Moreover, small banks are specialized in relationship banking and they can evaluate the credit risk of the SMEs better than the large banks (Berger et al., 2001, 2005; Berger and Udell, 2002; Uchida et al., 2012). Therefore, in that case having collateral from the SMEs may not have any significant incentives for the small banks to provide loans because they have already information advantage and which may allow

them to extend credits. Finally, we argue that large banks may have the similar incentives as like as the small banks to deliver loans based on collateral security due to inefficiency in credit evaluation processes which arises from their organizational diseconomies (Canales and Nanda, 2012; Carter et al., 2004).

We test H2 in order to measure the effect of collateral on interest rates. Our result is not significant across the bank size, and consequently, we reject the hypothesis (H2). This is suggesting that collateral cannot reduce the interest rates and it is indifferent regardless of the bank size. This result is not according to our expectation because we expected that having collateral will reduce the interest rates from the small banks because it will signal a positive information about the borrower's credit quality since small banks have the information advantage. Jimenez et al. (2006) found a negative relationship between collateral and interest rates because collateral signals a positive information about the credit quality. Blazy and Weill (2013), Godlewski and Weill (2011) find a positive relationship between collateral and credit risk of the borrower and hence having collateral increases interest rates. On the other hand, Hanedar et al. (2014) do not find any relationship between having collateral and interest rates. However, in our case, it can be the fact that banks in Bangladesh are too much profit oriented and therefore, regardless of the credit quality they do not charge lower interest rates. In contrast, it is also possible that only pledging collateral is not enough to show better credit quality, and therefore, small banks are not lowering the interest rates on the SME loans. Moreover, due to small bank's information advantage in SME lending they can charge the appropriate interest rates with collateral and which is consistent with the theory of observed risk hypothesis (Goldewski and Weill, 2011; Brick and Palia, 2007).

We examine the importance of collateral in credit risk management of the SMEs across the bank size. We predicted that there will be a considerable difference exists in between the large and small banks in giving the priority of collateral in credit risk assessment of the SMEs due to small bank's capital constraint or due to the small banks limited credit expertise. However, according to the result's collateral is valued by both sizes of banks similarly for credit risk and no association is found for the bank size, and we reject this hypothesis (H3). Nonetheless, from the evidence, it may be the fact that collateral act as an incentive for both types of banks to secure their investment from bad loans (Menkhoff et al., 2006; Blazy and Weill 2013). Moreover, as Jimenez et al. (2006, 2009) argue that large banks are more efficient in processing SME loans due to their advanced credit expertise. Therefore, it is possible that large banks can evaluate the riskiness of the SMEs better than the small banks and due to that reason they are charging similar level of collateral as like as the small banks to compensate any credit default risk.

In H4, we examined the association between SME default rates across the bank size with collateral. We expected that small banks SME loan default rates will be lower than the large banks due to the small banks close relationships with the firm when loan guaranteed with collateral. However, our results do not suggest any difference to the bank size and therefore, we reject the hypothesis (H4). Our results may signal that the collateral does not have any effect on reducing the adverse selection and moral hazard problem in the Bangladeshi banking sector and which is similar to the result of some other markets (Hanedar et al., 2014; Jimenez and Saurina, 2004; Brick and Palia, 2007; Hainz et al., 2013). In our case, it is also possible that banks are not willing to screen the loans which have a substantial amount of collateral and thus small and large banks have similar default rates, because of less screening process (Jimenez and Saurina, 2004). Moreover, as small banks provide loans mostly based on relationship banking and, as a result, they may overestimate the quality of the loans due to the relationship (Jimenez and Saurina, 2004). From this point of view, it can be possible to say that relationship-based loans are naturally risky and collateral cannot reduce the default rates which may arise from the poor performance at the company. Finally, it can be the fact that due to our small sample size, we cannot capture the true situation regarding collateral and credit risk of the SMEs.

In table 6 we present our regressions results about the collateral classification according to bank size and bank ownership structure to understand which types of collateral are mostly preferred by the banks for lending.

Table 6

Regressions results

| VARIABLES | (1)<br>ln(Fixed assets) | (2)<br>ln(Personal Guarantee) | (3)<br>ln(Third Party Guarantee) |
|---|---|---|---|
| Ref: Public Banks | | | |
| Private Banks | -1.049 | -0.347 | -1.699* |
| | (0.684) | (1.026) | (0.936) |
| Foreign Banks | -2.088** | -0.0883 | -2.405 |
| | (0.846) | (1.430) | (1.482) |
| Large Banks (Ref: Small Banks) | 0.752* | 0.556 | 0.216 |
| | (0.393) | (0.604) | (0.568) |
| Constant | 11.37*** | 8.671*** | 9.462*** |
| | (0.734) | (1.106) | (1.014) |
| | | | |
| Observations | 44 | 42 | 39 |
| R-squared | 0.23 | 0.034 | 0.12 |

Robust Standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

With regards to the amount of fixed asset's collateral, the private banks require less collateral comparing with the public banks, but this is not statistically significant. However, the result shows that foreign bank is statistically significant at 5 per cent level indicating that the amount of collateral received by the foreign banks is 88.0 per cent less comparing with public banks. Our result is different from the result of Beck et al. (2011) where they have shown that foreign banks provide more collateralized loans, and their collateral requirement is higher than the public and private banks. In our case, it can be the fact that foreign banks use more advanced credit scoring models, and they provide credits based on strict screening process and as a result; they require lower collateral. Moreover, most of the foreign banks in Bangladesh are big and hence, it is convenient for them to use technology-based lending and consequently, they will charge lower collateral, which is consistent with Jimenez et al. (2006). With respect to the size of the banks, the result of this study shows that large banks received a larger amount of fixed assets as collateral, which is about 75 per cent higher than the small size banks and the result is statistically significant at 10 per cent level. This result is according to our expectation. Since small banks have an information advantage in lending, therefore, small banks can ask for lower collateral (Berger et al., 2005; Kano et al., 2006; Uchida et al., 2012; Gama and Duarte, 2015).

With regards to the amount of personal guarantees as collateral, surprisingly this study found that both the type of bank and the size of the bank are statistically insignificant. Thus, the result suggests that personal guarantee does not differ according to the bank size and also with bank ownership types. It can be the fact that personal guarantee does not have any significance on the credit risk of the loan and therefore, banks ask for personal guarantee just to include more private property in the loan contract for safety. Steijvers et al. (2010) found that personal guarantee cannot reduce the credit risk of the loan as like as the business collateral. Therefore, it may be possible that banks in Bangladesh ask for a personal guarantee to reduce

information asymmetry or to create superiority over the loan contract. Since, personal asset pledged to the bank can reduce agency seeking behaviour of the borrowers.

Finally, with regards to the amount of third party guarantees as collateral, the results reveal that the private bank variable is found to be statistically significant at 10 per cent level. This indicates that the private banks require less amount of third party guarantee as collateral comparing with public banks in Bangladesh. However, the co-efficient of foreign banks shows that they also require less amount of third party guarantee as collateral comparing with the public banks but this is not statistically significant. The result from the private bank perspective suggests that third party guarantee is not commonly accepted as collateral as like as the public or foreign banks. The private banks receive a significantly lower amount of third party guarantee may be due to lack of monitoring of the guarantor or may be due to lack of enforcement (Hainz, 2003; Menkhoff et al., 2006). However, more acceptance of third party guarantee by the public banks may be due to the political connection with their clients (Cole, 2009; Sapienza, 2004).

Moreover, the large banks require higher amount of third party collateral comparing with the small size banks but again this is not statistically significant. Hence, the firms capable of providing third party guarantees might get access to the loans from the large banks but third party guarantee may not provide any extra benefit with access to credits from the small banks. It can be the fact that small banks do not prefer to provide loans on the guarantee which is not personally attached with the borrowers. Since, it may insist the borrowers to take more risk as they do not have any personal commitment with the loans and as a result, it will increase the moral hazard problem. Similarly, due to lack of physical presence of the collateral, it will be difficult for the small banks to recover the loan if the loan defaults, and that will increase the capital risk to the bank.

## CONCLUSION

In this paper, we empirically test the effect of bank size and bank ownership structure on the collateral requirements in the context of Bangladesh. Especially we test the hypotheses about pledging collateral and its effect on access to the credit, interest rates and credit risk of SMEs from the small and large bank perspective. Our results suggest that having collateral is not beneficial for SMEs to have access to the credits from the small banks. Therefore, it suggests that small banks have no additional incentives in collateral based lending. Similarly, we did not find any effect of collateral on interest rates and credit risk of SMEs according to the bank size. Hence, pledging collateral is not going to be helpful to have loans with reduced interest rates for SMEs. Moreover, we did not find any evidence on whether collateral helps to reduce the default rates of the SME loans. Thus, the collateral is more likely to be considered as a safety net for the banks rather than to prevent ex-post default rates of the loans.

While examining the collateral classification according to bank size and ownership structure of the banks our result suggests that in some cases collateral requirements are different according to the bank size and bank ownership structure. It can be the fact that, due to bank internal policy these collateral requirements are different for lending to the firms. Because incentives for collateral are different according to the collateral classification and therefore, each bank has their own policy to treat the collateral which suites their best interest.

From a policy perspective, our results are significant to understand the effect of collateral on SME finance within the bank size perspective and also from different banking organizational structure. Moreover, if the collateral does not provide any additional benefits to have access to finance or reduction in interest rates then it would be helpful for the firms should know about the requirements of the SME finance. However,

the regulatory bank in Bangladesh may advise the commercial banks to consider the loan applications more carefully and prevent them from higher collateral requirement. Consequently, it may lead to increase in accessing to the credit for the SMEs, and that it would have a positive impact on removing the financing constraint for the start-up businesses and contributing to develop the economy of Bangladesh.

Nevertheless, this paper has some limitations due to a small number of samples. More importantly, our sample does not cover all scheduled commercial banks available in Bangladesh. Therefore, we may leave out some interesting findings from the other banks. Moreover, this study uses only one year (2014) financial data of banks and therefore, we are unable to make any comments on how collateral requirements are changing over the years. For example whether collateral requirements have changed from the pre-crisis period to the post financial crisis. Furthermore, we did not examine the effect of banking competition on the access to credit and credit risk of the SMEs and thus, we are leaving it for the potential future research.

## ACKNOWLEDGMENT

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