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Determinants of Financial Distress: Evidence from the State-owned Commercial Banks in Bangladesh

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Abstract: *Banking sector is now facing a crisis moment due to some recent scams, gradual rise up* of *nonperforming loans, weak corporate governance, mountainous level of corruption, poor regulation and supervision and insignificant legal enforcement against defaulters. Therefore, the survival of the banking sector has become an important issue nowadays. This study investigated the determinants of financial distress in State-Owned Commercial Banks (SCBs) of Bangladesh. Data have been collected from the five SCBs of Bangladesh for the period of 2009-2016 and a panel of 40 observations has been formed. Altman's Z-score is used as a measure of financial distress and Pooled Ordinary Least Square (Pooled OLS) and Panel Corrected Standard Errors (PCSE) methods have been applied to find out the significant determinants of financial distress. The study observed that SCBs in Bangladesh are financially distressed and are characterized by low capital adequacy ratio, high loan loss provision, liquidity problem, poor earning quality and management inefficiency. The regression results of PCSE indicates that management efficiency, earning ability and lending risk are the significant factors to determine financial distress in SCBs of Bangladesh whereas capital adequacy, asset quality and macroeconomic variables have appeared to be insignificant. This study suggests that improvement of governance in the activities of SCBs and their compliance as recommended by the regulatory frameworks will help to address the problems identified and bring a positive change in the banking sector in the years to come.*

Keywords: *Financial distress, SCB, Altman's Z- score, Pooled OLS, PCSE*

1. Introduction

Banking sector is the lifeblood of the economy of a country. The financial crisis of banking sector would lead to generate economic crises (Demiguc and Detraigaialche, 1997) in the country as the banking sector of a country is related with other sectors of the economy. Research of South Asian Network on Economic Modelling (SANEM) claimed that around 1% of GDP is being lost due to present inefficiency of banking sector and this loss was estimated to be almost Tk10,000 crore in the year 2016-17 (Islam, 2018). Therefore, it is important to maintain a sound financial condition in the

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banking industry. Nowadays the banking sector of Bangladesh has been plagued by financial scams, nonperforming loans and weak monitoring, which might cause a macroeconomic risk in the near term through Bangladesh says a UN report (The Independent, 2018). It is also revealed in different studies that the loan scandals of Hallmark, Bismillah group, Basic Bank Ltd, Farmers Bank Ltd, Beximco Group, NRB Bank and a number of other big and small companies make the overall sector risky. Scams one after another involving thousands of crore of taka in the country's financial sector over the years have jeopardized the economic progress and tarnishes the country's image aboard. The turmoil in the banking sector increases due to the increase of bad loan in the last couple of years and the increase of liquidity crisis. The reason of increasing amount of bad loans can be explained by the excessive amount of loan embezzlement in SCBs mainly through political influence occurring, for instance, Sonali Bank loan scandal of TK. 3,500 crore associated with Hallmark Group during 2013, Basic Bank loan scandal of TK. 4500 revealed in 2014, Janata Bank loan scandal of Tk. 5,500 crore associated with AnonTex Group during January 2018 (Hossain, 2018). Some group did not bother to repay even a penny against instalments. Rather the group adjusted the overdue amount only after getting fresh loans. They also got the facility of restructuring and rescheduling overdue loans repeatedly with the blessings from unknown high ups. With this massive amount of NPL, SCBs are struggling to maintain minimum capital adequacy requirement of 10% as per Basel III. Bangladesh Bank quarterly report shows in 2017 average CAR ratio of SCBs stood at 5.04% lowered by 0.82% from the previous period. (Bangladesh Bank, 2017). SCBs namely Sonali, Rupali, Janata and BASIC banks are facing capital deficit of more than Tk. 76.26 billion in total despite the government providing recapitalization facility of Tk. 102.72 billion from FY 2006-2017 (bdnews24.com, 2018). Taking into account the crises in banking sector of Bangladesh it's really necessary to predict financial distress condition of the banks and to find out the factors responsible for the distress.

Financial distress occurs when a firm becomes unable to generate adequate operating cash flows to fulfil existing liabilities and the firm is compelled to make remedial measures (Ross, Westerfield, and Jaffe, 2005). Altman and Hotchkiss (2006) defined financial distress of a firm by four types of terms such as failure, default, insolvency and bankruptcy. It is an early indication of bankruptcy. In case of banking industry whenever the capital adequacy ratio shortfalls, non-performing loan and lending risks increases, profitability falls down and inefficiency in management occurs, banks are likely to encounter financial distress. SCBs previously considered as the safest place to keep deposits are now being doubted as looting of public money. Concern is raised among people because government is supporting those poor performing banks and mountainous loan scams are happening in these banks. The situation gets worse due to excessive administrative expense over income of banks. An international financial affairs

publication revealed that cost to income ratio of banks in Bangladesh is the highest in the world. The report documented that in 2017 the ratio was 87.9% for SCBs (Bangladesh Bank, 2017).

Considering the above circumstances, this study made an attempt to find out the determinants that are responsible for financial distress of SCBs in Bangladesh. The section 2 of the paper presents review of literature. Section 3 presents the research methodology, section 4 presents results and discussion, section 5 presents additional analysis and finally section 6 presents' conclusions of the study.

2. Review of Literature

Financial distress which ultimately causes an entity bankruptcy is a major concern both for the entity itself and the broader stakeholders. Hamid et al., (2016) quoted Telmoudi, Ghourabi, and Limam (2011) that managers can avoid the probable future losses by not making investment in the failing firms identified by the early financial distress signal. Realizing the consequences of bankruptcy risks, researchers and academicians have attempted to develop different types of models namely Altman Z-score (1968), Bankometer s-score, Ohlson (1980) O-score, Zmijewski (1984) X-score, Grover (2003) G- score, neural network model and so on to predict the bankruptcy risk.

Though no model can ensure hundred percent accuracy of prediction, a reasonable prediction can be made about the financial distress of an entity before the ultimate bankruptcy takes place. So far Altman Z-score model is proved to be best predictor of bankruptcy among all the models (Pradhan, 2014) and is widely used by previous empirical literatures. For example, Altaee (2013), Qamruzzaman (2014), Hamid et al., (2016), Hossain et al., (2017), Elbadri and Bektaş (2017) etc. used Z-score as an indicator of financial distress.

Financial distress of corporations doesn't come up suddenly but grows up along with the gradual fall to financial standards (Hilman, 2014). Applying different quantitative methods, some earlier literatures (Demirgüç-Kunt and Detragiache, 1997; Molina, 2002; Konstandina, 2006; Sahut and Mili, 2011; Yauri et al., 2012; Altaee, 2013; Hilman, 2014; Zhen-Jia-Liu, 2015; Baklouti et al., 2016; Hossain et al., 2017; Elbadri and Bektaş, 2017) identified a number of bank specific financial factors as well as macroeconomic factors to be responsible for financial distress in banking industry. The articles that are reviewed to conduct the study are summarized in the following Table 1.

Table 1: Summary of Reviewed Literature

Author(s)	Sample countries	Period	Method/ Indicator	Findings
Demirgüç-Kunt and Detragiache (1997)	63 countries including developed and developing countries	1981-1994	Multivariate logit model	-Low growth in weak macroeconomic environment, high inflation, high real interest rates, and vulnerability to balance-of-payments increase possibility of bank crisis -Countries having weak law enforcement and explicit deposit insurance scheme were prone to risk
Molina (2002)	Venezuelan Banks	1994–1995	Proportional-hazard model with time-varying covariates	-Banks with less Earning capability and less investment in liquid and sound assets like government bonds were likely to face failure.
Konstandia (2006)	Russian Banks (including functioning and failed banks)	1999–2003	Logit model and proportional hazard model	-Significant effect of efficiency measures as well as size and regional belonging -Insignificant effect of macroeconomic variables
Sahut and Mili (2011)	55 distressed and 275 non-distressed banks in Middle East and Northern Africa countries	2000-2007	Logit regression	-Significant impact of capitalization ratio, management quality and bank size and loan loss reserves. -Insignificant impact of loan growth rate, earning ability and macroeconomic variables
Yauri et al., (2012)	25 commercial banks in Nigeria	1997-2006	Correlation analysis	-Improving the liquidity and asset quality only help in short term not in the long term to combat financial distress.
Altaee et al., (2013)	-GCC Countries -55 conventional banks and 42 Shariah-compliant banks	2003-2010	Z-score indicator OLS method	-No statistically difference between Shariah-compliant banks and conventional banks during pre and post financial crisis

Zhen-Jia-Liu (2015)	772 cross country banks	2002-2015	Logit regression	-Significant negative association of capital ratios, interest income to interest expenses, non-interest income to non-interest expenses, return on equity and provisions for loan losses on bank failure -Positive effect of loan ratios, non-performing loans and fixed assets on bank failure
Baklouti et al., (2016)	147 banks from 18 countries	2005-2011	Logistic regression	-Significant impact of investor protection, a proxy of governance variable -Insignificant impact of CAMEL variables and bank size -Negative impact of economic growth
Elbadri and Bektaş (2017)	24 Islamic and Conventional banks	2006-2013	z-score indicator Panel regression	-Less financial stability of large Islamic bank than the large commercial banks -Large Islamic bank and commercial banks are financially stronger than their small counterparts.
Hossain et al., (2017)	29 listed PCBs in Dhaka Stock Exchange	2005-2015	Altman Z-score System GMM and Difference GMM	-Significant Positive effect of CAR and efficiency and negative effect of NPL on Z- score.

A lot of researches have been conducted on financial distress in global context and in Bangladesh most of the researches on financial distress are based on private commercial banks. But there is a lack of research on SCBs in context of Bangladesh. So this study will be the first one which is carried out on SCBs in Bangladesh. Moreover this study considers a broad range of firm specific especially CAMEL type characteristics and macroeconomic variables. Prediction of financial distress in banks is really necessary as performance of banking sector in Bangladesh is deteriorating day by day. So the outcome of this study will keep a significant contribution in literature and help the regulators to formulate policy and its implementation.

3. Research Methodology

3.1. Data and Sample

The study is based on the six SCBs in Bangladesh. Data for bank specific factors and for the computation of Z-score have been collected for the five SCBs (Janata, Agrani, Sonali, Rupali, and Basic Bank Limited) from the period 2009-2016. Thus a panel data set of 40 bank-year observations has been formed. The study excluded Bangladesh Development Bank Ltd (BDBL) from the sample due to lack of availability of the data. All the data has been collected manually from the respective annual reports of the banks, available in the websites except macroeconomic data. Macroeconomic data has been collected from the data bank provided by World Bank.

3.2. Variables of the study

3.2.1. Dependent Variable

Altman Z-score has been used here as a measure of financial distress in banks. Altman developed Z-score model to predict bankruptcy for manufacturing firms, non-manufacturing firms as well as financial institutions. Altaee (2013), Qamruzzaman (2014), Hamid et al., (2016), Hossain et al., (2017), Elbadri and Bektaş (2017) etc. used Z-score as an indicator of financial distress in banks. For financial institutions, the cut off points to predict bankruptcy are respectively - > 2.6 indicating Safe zone, 1.1 < - < 2.6 indicating Grey Zone, -< 1.1 indicating Distress Zone (Altman, 1993).

The model is given below:

$Z = 6.56X_1 + 3.26X_2 + 6.72X_3 + 1.05X_4$

Here, X_1 = Net Working Capital/ Total Assets

X_2 = Retained Earnings/ Total Assets

X_3 = EBIT/ Total Assets

X_4 = Book Value of Equity/ Total Debt

3.2.2 Independent Variables

In line with the empirical studies (Molina,2002; Konstandina, 2006; Sahut and Mili, 2011; Altaee, 2013; Hilman, 2014; Zhen-Jia-Liu, 2015; Baklouti et al., 2016; Hossain et al., 2017; Elbadri and Bektaş, 2017) this study will examine the determinants of financial distress in SCBs using bank specific CAMEL type characteristics along with macroeconomic factors. Also, logarithmic form of bank size measured by total asset is considered as control variable.

Table 2 : Summary of Independent Variables

Descriptions of variable	Variable	Measurement	Expected sign	
			Z-score	Financial Distress
Capital Adequacy Ratio	CAR	(Tier 1 + Tier 2) Capital / Total Risk Weighted Assets	+	-
Asset Quality	AQ	Loan loss Provisions / Total Loan and Advances	-	+
Management Efficiency	ME	Non Interest Income / Non Interest Expenses	+	-
Earning Ability	EA	Non Interest Income / Total Income	+	-
Lending Risk	LR	Total Loan and Advances / Total Deposits	-	+
Gross Domestic Product Growth	GDP	GDP growth rate collected	+	-
Inflation Rate	INF	Inflation rate collected	-	+
Bank Size	SIZE	Natural log of total assets	+	-

3.3 Model Specification and Analysis Methods

The following model has been used to see whether CAMEL type bank specific characteristics and macroeconomic variables can determine financial distress in SCBs.

$$Z\text{-}score_{it} = \alpha_0 + \alpha_1 CAR_{it} + \alpha_2 AQ_{it} + \alpha_3 ME_{it} + \alpha_4 EA_{it} + \alpha_5 LR_{it} + \alpha_6 GDP_{it} + \alpha_7 INF_{it} + \alpha_8 LN(SIZE)_{it} + \varepsilon_{it}$$

Where, Subscript $_{it}$ denotes bank year observations, $\alpha_1, \alpha_2, \alpha_3, \alpha_4, \alpha_5, \alpha_6, \alpha_7, \alpha_8$ are the coefficients for the independent variables and ε_{it} represents error term. To find out the determinants of financial distress in SCBs, at first Pooled Ordinary Least Square regression has been run. An important assumption of OLS is heteroscedasticity test that has been done using white's (1980) test to see whether the variance of the error term is constant. The study found no heteroscedasticity problem. Yet another problem with the pooled OLS method is that it doesn't account the serial correlation and firm specific heterogeneity or inborn fixed effect problem in case of panel data set. The sample data of this study consists of five cross section units and eight years time period forming a small panel data of 40 bank-year observations. Here, the number of cross section unit is less than the number of time period. So the study cannot apply Panel analysis like fixed effect model or random effect model. Because when T>N, it is wise to use Feasible Generalized Least Squares (FGLS) or panel Corrected standard error (PCSE). But FGLS is likely to

produce imprecise lower standard error estimates which can be mitigated by using PCSE (Hoechle, 2007 and Moundigbaye, Rea and Reed, 2018). Finally, this study applied PCSE along with Pooled OLS methods.

3.3 Research Hypotheses

A. Capital Adequacy Ratio (CAR) and Financial Distress

CAR is a cushion against banks excessive risk taking and capital losses. According to Basel III guidelines of Bangladesh Bank minimum capital requirement is 10% of risk weighted assets. An increase of CAR can decrease the possibility of financial distress. The hypothesis is-

H_1: CAR negatively influences financial distress probability in SCBs.

B. Asset Quality (AQ) and Financial Distress

Loan loss provisions a proxy of Asset quality (AQ) indicates the amount of loss coverage against loan default and to account for the financial distress. Loan loss provision increases in case of decreasing asset quality. If asset quality becomes poor it will lower Z- score indicating possibility of financial distress.

H_2: AQ positively influences financial distress probability in SCBs.

C. Management Efficiency (ME) and Financial Distress

Management Efficiency (ME) is measured by non- interest income to non-interest expense. Increase of non-interest income over non-interest expenses (administrative expenses) will increase the profitability of banks.

H_3: ME negatively influences financial distress probability in SCBs.

D. Earning Ability (EA) and Financial Distress

Net interest income to total revenue is considered as a proxy of Earning Ability (EA) is the major source of profitability for banks. Increase of net interest income will increase the Z--score and a negative link can be assumed between EA and distress possibility.

H_4: EA negatively influences financial distress probability in SCBs.

E. Lending Risk (LR) and Financial Distress

If amount of loan increases substantially and banks become unable to maintain short term liabilities, it will have adverse effect on the working capital of banks and performance. Moreover, disbursing loan beyond the standard limit increases the liquidity problem. Thus LR will have a positive link with financial distress.

H_5: LR positively influences financial distress probability in SCBs.

F. Macroeconomic Factors (GDP and INF) and Financial Distress

GDP growth may negatively influence financial distress as in boom economy financial risk tends to be lower. On the other hand, Inflation may increase the possibility of distress as then investors will not be interested to borrow money from banks at high interest rate that reduces banks sufficient income generation.

H_6: GDP negatively influences financial distress probability in SCBs.

H_7: INF positively influences financial distress probability in SCBs.

4. Results and Discussion

4.1 Descriptive Statistics

Table 4 represents summary statistics of dependent and independent variables used in the study. Table shows the mean value of Z-score is -0.1683, which indicates that SCBs of Bangladesh are in financial distress. Minimum and median values of Z-score also indicate the banks are in distressed position.

Mean value of 6.36% CAR indicates violation of Basel III requirements of maintaining minimum 10.00% capital of total risk weighted assets. Moreover, negative minimum value of CAR indicates the existence of capital shortage in SCBs. AQ measured by loan loss provision to total loan is 8.74% with standard deviation 4.85%. Higher loan loss provision indicates lower asset quality of SCBs. Mean value of ME measured by non-interest income to non-interest expense ratio is 164.98% and the median value is also similar to the mean value, which specify better management efficiency. But the 51.78% dispersion of this ratio from mean value indicates that the industry average does not represent the other banks. The range of ME is between 16.51% to 269.85%. Average EA measured by net interest income to total revenue is 7.15% specifying poor earning ability of SCBs. Net interest spread is a primary determinant of bank profitability but unfortunately some SCBs are running with negative profitability evidenced by the minimum EA value of -27.28%. Loan to deposit ratio, a measure of LR has an average rate of 67.31% with standard deviation 13. 87% and the range is minimum 37.28% to maximum 98.02%. Mean value specifies that the sample SCBs don't have liquidity risks but the range of LR indicates a highly deviated loan to deposit ratio of SCBs.

The Average GDP growth rate of Bangladesh economy during the study period was 6.19% reflecting the rapid economic expansion and consequently the gradual increase of growth rate over the years. On the other hand, average inflation rate was 7.56% ranging from 5.90% -10.90% indicates a fluctuated inflation rate over the study period. Average size of SCBs measured by total assets is Tk. 423952.80 million.

Table 3: Descriptive statistics

Variables	Observation	Mean	Min	Median	Max	Std. Dev.
Z- score	40	-0.1683	-4.1676	0.2852	1.8396	1.2093
CAR	40	0.0636	-0.2908	0.1004	0.1381	0.0870
AQ	40	0.0874	0.0100	0.0732	0.2147	0.0485
ME	40	1.6498	0.1651	1.6989	2.6985	0.5178
EA	40	0.0715	-0.2728	0.0756	0.4361	0.1830
LR	40	0.6731	0.3728	0.6438	0.9802	0.1387
GDP	40	0.0619	0.051	0.0630	0.0710	0.0060
INF	40	0.0756	0.0590	0.0710	0.1090	0.0151
SIZE (in millions)	40	423952.80	45308.00	347027.00	45308.00	289975.20

4.2 Graphical presentation of Variables

The following graphs showed the trend of all the study variables over the sample periods. Figure 1 show Z-score of all SCBs is below (1.1) and is financially distressed. Only Agrani bank Limited was in grey position in the year 2009 and 2010 and later it also becomes distressed. Figure 2 shows CAR of all SCBs are similar except Basic Bank Limited having negative CAR.

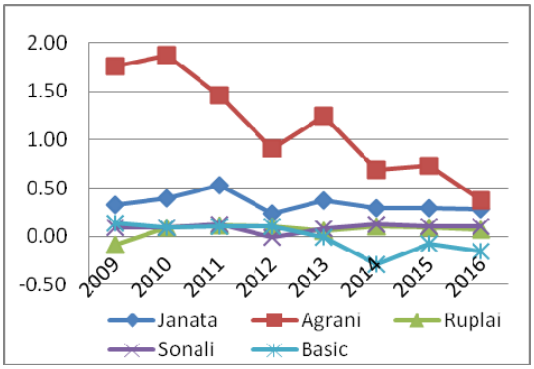

Figure 1: Z-Score

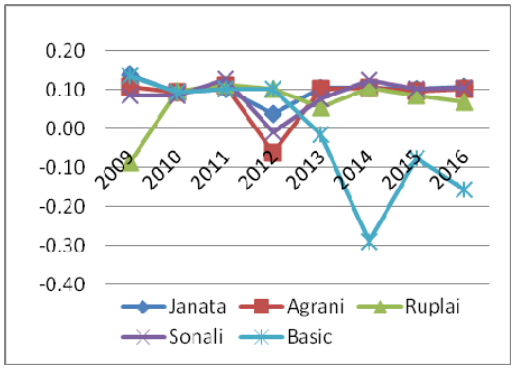

Figure 2: Capital Adequacy Ratio

Loan loss provision ratio presented in Figure 3 shows Sonali Bank Limited maintains higher provision than other SCBs and the lowest provision are held by Basic Bank limited. Figure 4 shows all SCBs are somewhat close to each other in generating non-interest income and all except one are going downwards after 2013.

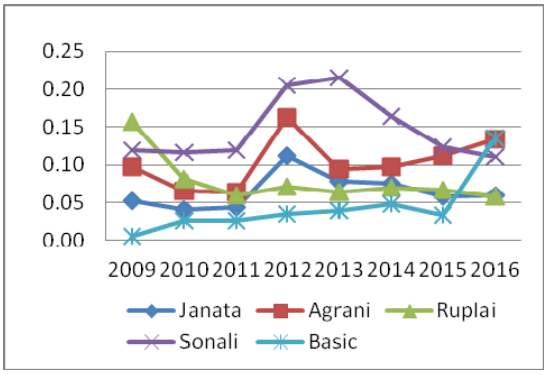

Figure 3: Loan Loss provision to Total Loa

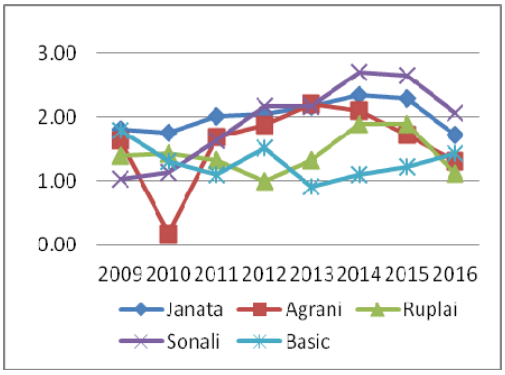

Figure 4: Non-interest Income to Non-interest Expense

Figure 5 shows net interest spread to total income ratio of all SCBs drastically fell after 2011 and yet it's in declining stage. Loan to deposit ratio presented in Figure 6 shows Basic Bank Limited has the highest loan-deposit ratio and other SCBs share the similar ratio.

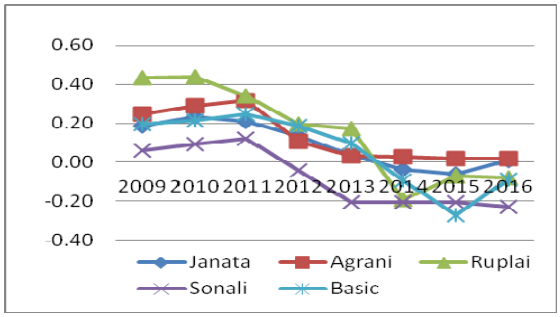

Figure 5: Net Interest Income to Total Income

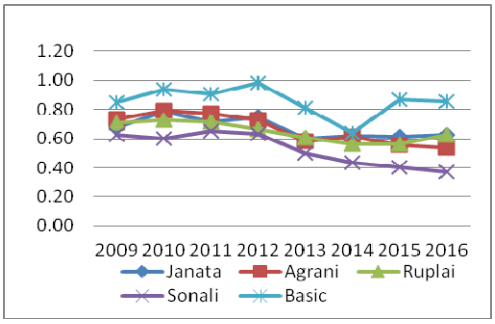

Figure 6: Loan to Deposit Ratio

Figure 7 shows Sonali Bank Limited has the highest assets base whereas Basic and Rupali Bank Limited have the lowest. However, asset base is growing for all SCBs over the sample years. Figure 8 shows GDP growth rate of Bangladesh has an increasing trend whereas Inflation rate is decreasing gradually.

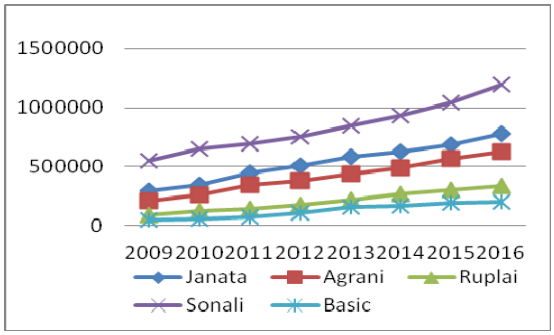

Figure 7: Total Assets (in million)

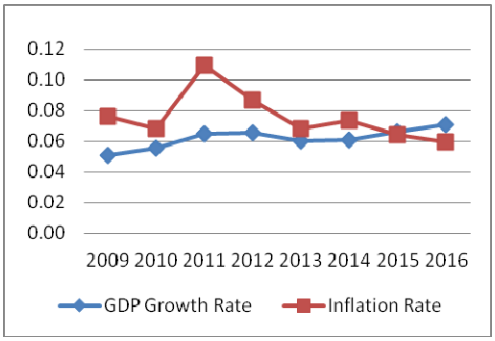

Figure 8: Macroeconomic Variables

4.3 Correlation Analysis

A correlation analysis has been done which found that no explanatory variable is highly correlated with other explanatory variables considered in the model. Maximum correlation was found -0.7701 between Lending Risk (LR) and logarithmic form of SIZE. However, this point is not larger than 0.80 that can cause multicollinearity problem in the regression analysis (LewisBeck, 1993; Gujarati, 2004). Additionally VIF test has also been conducted to test the multicollinearity problem and the mean VIF is within the acceptable limit. The result of correlation matrix has been included in the appendix section.

4.4 Regression Analysis

The regression results of both Pooled OLS and PCSE are presented in separate column in the Table 6. Overall R^2 value represents a good fit of the model and first method shows the model can explain 47.52% variability in financial distress and later one shows variability of 38.11% can be explained by the model. F-test and model Chi square results have also significance level at 0.01 indicating the independent variables are jointly significant.

According to the Pooled OLS and PCSE regression results, CAR has positive but insignificant impact on Z-score. The result is not consistent with Hilman (2014), Zhen-Jia-Liu (2015) and Hossain et al., (2017) who found significant effect of CAR on bank financial distress. Minimum CAR requirement limits the bank's lending amount and acts as a cushion against capital run out. But this type of insurance against the deposit may encourages managers to take excessive risky lending decisions and moral hazard can occur specially in SCBs as these are subsidized by government in case of insolvency (Demirgüç-Kunt and Detragiache, 1997). Minimum CAR only improves short run liquidity situation (Yauri et al., 2012) and so maintaining minimum CAR doesn't guarantee financial solvency in SCBs in Bangladesh.

AQ measured by loan loss provision to total loan has also negative but insignificant effect on Z-score. If loan loss provision increases, AQ gets deteriorated which in turn increases the possibility of financial distress. Sahut and Mili (2011) and Baklouti et al., (2016) also found insignificant effect of AQ.

ME and EA are found to be the significant determinants of financial distress in both analysis methods. ME measured by non-interest income to non-interest expense ratio positively influences Z-score. If managers are efficient enough, they can generate more non-interest income over the administrative expenses and in turn increases profitability which reduces the risk of financial distress. Similarly, an increase in net interest income to total income ratio, a proxy of EA, will cause an increase in Z-score and thus will have

a negative impact on financial distress. Konstandina (2006), Hilman (2014) and Zhen-Jia-Liu (2015) also found similar results.

LR is negatively related with financial distress and comes out significant in PCSE method. If loan to deposit ratio increases, it will cause Z-score to decrease and thus increase the probability of financial distress. Hilman (2014) found loan to deposit ratio as a significant explanatory variable of bank bankruptcy before 12 months period and for large bank group bankruptcy prediction.

Table 6: Regression Results of Determinants of Financial Distress

	Pooled OLS			PCSE		
	Coefficients	**Std. Error**	**t- statistic**	**Coefficients**	**Std. Error**	**Z-statistic**
Constant	-1.9732	5.0567	-0.39 (0.699)	0.1414	4.0008	0.04 (0.972)
CAR	1.0936	2.3195	0.47 (0.641)	1.7334	1.6242	1.07 (0.286)
AQ	-4.5351	4.5097	-1.01 (0.322)	-3.9910	3.9518	-1.01 (0.313)
ME	1.0070**	0.4022	2.50 (0.018)	0.8955**	0.3810	2.35 (0.019)
EA	5.6839***	1.4587	3.90 (0.000)	4.4889***	1.1723	3.83 (0.000)
LR	-2.9360	1.9836	-1.48 (0.149)	-2.6517*	1.3896	-1.91 (0.056)
GDP	33.0018	32.5295	1.01 (0.318)	23.2180	26.7153	0.87 (0.385)
INF	-13.3011	13.0377	-1.02 (0.316)	-11.0055	9.0347	-1.22 (0.223)
LN(SIZE)	0.0792	0.3686	0.21 (0.831)	-0.0583	0.3240	-0.18 (0.857)
R^2	0.4752			0.3811		
Adjusted R^2	0.3397			-		
F- test	3.51***			-		
Model Chi^2	-			29.26***		

*(Probability is presented in the parentheses (***significance at 1% level, **significance at 5% level, *significance at 10% level). F-test and Model chi^2 are the statistical significance test of the model.)*

Macroeconomic variable GDP is positively related with financial distress whereas Inflation is negatively related with financial distress. But no variable comes out as significant in both Pooled OLS and PCSE regression method. So, GDP and Inflation might not be the significant determinants of financial distress in SCBs. This result is analogous to Molina (2002), Konstandina (2006) and Sahut and Mili (2011). Control variable size is found to be negatively related with financial distress in Pooled OLS method whereas PCSE method shows positive relation with financial distress. However, both the regression method found insignificant impact of size on financial distress of SCBs.

5. Additional Analysis

In the correlation analysis, Size is appeared to be correlated with LR by -0.7701 which is a greater degree of correlation than others. That's why additional analysis has been done omitting this variable from the regression analysis to see the change if any. Even in the absence of LN (Size) the regression results by both methods are found to be consistent with the previous one. The only difference with the previous results is LR was insignificant in Pooled OLS but now shows significance at the 0.10 level in this method and in PCSE method LR had significance at the 0.10 level previously whereas this time significance level increases to the 0.05 level. The results have been given in the Appendix.

6. Summary and Conclusions

This study measured Financial distress of SCBs by Altman's Z-score (Altman, 1993) and the study assessed that all the SCBs in Bangladesh are in financial distress condition. The study adopted pooled OLS and PCSE regression approaches to assess the significant determinants of financial distress in SCBs of Bangladesh. The regression results indicate ME, EA and LR are the significant determinants of financial distress whereas CAR and AQ have appeared to be insignificant. The signs of regression coefficients have matched with the hypotheses. Increase of ME and EA and decrease of LR will contribute to reduce financial distress. CAR has positive impact and poor AQ has negative impact on financial distress though the impacts are not significant. SCBs are supported by government and explicit deposit insurance scheme in case of capital shortfall. That's why in spite of maintaining minimum CAR through recapitalization, SCBs are undergoing financial distress. Again, SCBs frequently restructure defaulted loans which sometimes ultimately turned to be bad loans despite restructuring. So, enough provision against these loans isn't maintained timely. The above causes might be the reason of insignificant impact of CAR and AQ. Macroeconomic variables are also not significant determinants of financial distress in SCBs.

However, the result of the investigation indicates that if jointly all the determinants are taken into account management efficiency, earning ability and lending risks are the core determinants of financial distress.

The findings of the study are really important for the policy makers and regulators to focus on improving corporate governance, efficiency of managers, net interest spread and lowering lending risks to tackle the ongoing financial distress in SCBs. Only recapitalization and bail out of poor performing SCBs don't guarantee the survivability of SCBs in the long run. If the scenario goes on like this other well performing banks have to bear the consequences. Further research can be done incorporating governance variables and using other financial distress measures or applying advanced econometric tools. However, other good proxy of asset qualities such as non-performing loan to total assets ratio, net non-performing loan to net advances ratio, total investment to total assets ratio can reveal significant impact on financial distress that will be an interesting future scope to find out.

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Appendix

Table 5: Correlation Matrixs

	CAR	AQ	ME	EA	LR	GDP	INF	LN(SIZE)
CAR	1.0000							
AQ	-0.1486	1.0000						
ME	0.2577	0.3590	1.0000					
EA	0.1744	-0.2911	-0.4309	1.0000				
LR	-0.1908	-0.5262	-0.5134	0.5532	1.0000			
GDP	-0.0985	0.0857	0.1559	-0.4591	-0.2047	1.0000		
INF	0.1375	-0.0913	-0.0291	0.4778	0.3253	-0.0048	1.0000	
LN(SIZE)	0.2139	0.5576	0.5385	-0.5680	-0.7701	0.3722	-0.1967	1.0000

Table 7: Regression Results of Determinants of Financial Distress

	Pooled OLS	PCSE
Constant	-1.0204 (0.673)	-0.6295 (0.708)
CAR	1.2492 (0.569)	1.6066 (0.304)
AQ	-4.1642 (0.318)	-4.2173 (0.280)
ME	1.0140** (0.015)	0.9133** (0.016)
EA	5.6129*** (0.000)	4.6701*** (0.000)
LR	-3.1309* (0.081)	-2.5720** (0.032)
GDP	34.9868 (0.263)	23.0232 (0.317)
INF	-13.1544 (0.313)	-11.2367 (0.212)
LN(SIZE)	-	-
R^2	0.4744	0.3922
Adjusted R^2	0.3594	-
F- test	4.13***	-
Model Chi^2	-	31.46***

*Probability is presented in the parentheses (***significance at 1% level, **significance at 5% level, *significance at 10% level).F- test and Model Chi^2 are the statistical significance test. Probability of less than 0.05 indicates significant model.*