Financial Soundness Evaluation of Selected Commercial Banks in Bangladesh: An Application of Bankometer Model

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Abstract
This study examines the financial soundness of twenty four private commercial banks operating in Bangladesh. Rather than using other models like CAMELS framework or CLSA-Stress test, a new effective model has been used in this study named "Bankometer". This model has been developed according to the guidelines of IMF (2000) for measuring soundness of banks and used by many researchers for its simplicity. Using this model, soundness of selected banks has been measured for the year 2015 and again consistency of soundness of these banks has been evaluated for long period covering (2010-2015). The study reveals that all the banks have ensured sound financial status individually and banking industry has always been in favorable position during the period (2010-2015). Finally, this study concludes that "Bankometer" model will definitely help the internal management of any bank in determining insolvency issues and removing the shortcoming generated from inefficiency in banking operations.
Keywords: Financial Soundness, Private Commercial Banks, Bankometer model, S-Score.

1. Introduction
A well-developed banking system is considered as the backbone of financial system of any country. It ensures the sustainable economic development and welfare by forming adequate capital and allocating funds efficiently for investment projects, payment services, healthy and robust financial systems. A stable financial system improves the economic performance and also prevents effects caused by the impact of disruptive disorders (Schinasi, 2004). In fact, an enduring, efficient and financially sound banking sector provides a base for stabilization in financial system to achieve genuine earnings for developing economy.

Over the last two decades, financial institutions around the world have experienced substantial changes in financial systems due to the rapid advancement in globalization, financial integration, technological progress, reduced information costs, demographic changes and competitions among the banking and non-banking financial institutions (Hoque & Rayhan, 2013). These noticeable changes have created new challenges and opportunities for financial institutions. To cope up with this global competitive environment, commercial banks have to be dynamic, responsive and financially sound enough in meeting the challenges and taking advantage of any opportunities. Commercial Banks must be able to maintain the solvency position and ensure soundness because economic development of a country is reflected through the soundness of its banking system (Gaur, A., Sukhija, S., & Julee, M. 2012). In order to ensure a stable, sound, and solid financial system, the commercial banks must have the ability to remove potential vulnerabilities because the sound financial health of a bank is the guarantee not only to its depositors but is equally important for the shareholders, investors, employees and whole economy as well. (Aspal & Malhotra, 2013).

Over a couple of years the structure of the banking system of Bangladesh has been changed significantly. By 2010 the private commercial banks captured 58.8% market share of State owned commercial banks. But recently it has been observed that due to inefficient banking, lack of proper governance, overcrowding of banking sector rather than strengthening existing sector in meeting objectives, people living in Bangladesh have been suffering from indecision that whether they will invest their valuable fund in banks or somewhere else. These problems have created barrier in taking investment decision and forced customer to rethink whether the private commercial banks in Bangladesh are financially sound enough to survive in financial distress. As the financial stability still remains a crucial issue of discussion in developing economies like Bangladesh, this study aims to evaluate financial soundness of selected private commercial banks in Bangladesh. This research has been designed to achieve the following objectives:
- To familiarize Bankometer's framework for effective measurement of financial soundness.
- To compare financial position among selected commercial banks based on solvency rating.
- To provide guidelines to the bank's internal management for eradicating insolvency issues.

The researcher has used Bankometer model for this study in which bank's soundness is measured by a score. He believes that this study will definitely help the potential shareholder, investors, and policymakers by providing reliable results.

2. Literature Review
Ashraf, A., & Tariq, Y. B. (2016) conducted a study on evaluating the financial soundness of listed Pakistani banks in light of Bankometer and Z-score model. Soundness of each bank was computed separately to evaluate

the stability of listed Pakistani banks for the period 2006-2014. Although there existed slight differences, both models reported almost same results classifying Bank of Punjab into grey zone. The study suggested that Bank of Punjab's financial soundness is not that much satisfactory and more improvement is required to secure super sound bank status.

Uddin, M. M., Masud, M., & Kaium, A. (2015) conducted a study to measure the financial soundness of selected private commercial banks of Bangladesh covering the period of 2006-2010. In this study different statistical tools and financial indicators were used to analyze the financial soundness of selected banks. However, the study revealed upward trends during the period of 2006-2010 using different financial indicators and made a rank of the selected commercial banks. It was found from the study that a bank with higher deposits, loans, investments, branches and employees does not always show better profitability. The study also recommended some measures that could be implemented by banks to ensure soundness in their operation.

Kattel, I. K. (2015) evaluated the Financial Solvency of Selected Commercial Banks of Nepal using application of Bankometer covering the period 2007- 2012. The study found that all the private and joint venture banks are in sound financial position and private sector banks are financially sounder in comparison to joint venture banks. The study also concludes that this recent model for financial soundness measurement will help the bank's internal management in mitigating the insolvency issues by proper control and supervision system at the operational level.

Qamruzzaman, M. (2014) tried to predict bankruptcy of selected private commercial Banks in Bangladesh using "Bankometer's S-score and Altman "Z-score" model. For analyzing the financial position of banks the researcher took 20 banks as sample from 30 listed private commercial banks in Dhaka Stock. His study found that both Bankometer's S-score and Altman Z-score show similar results about financial position in year 2008, 2009 and 2010 but exceptions prevail in year 2011 and 2012. Although, Altman Z-score model shows slightly bankruptcy status but S-score model shows as a whole banking industry hold a very healthy financial status according to his study.

Anita Erari, Ubud Salim, SyafieIdrus. M. & Djumahir (2013) used different models namely CAEL, Z-score and Bankometer for assessing financial performance of P.T Bank Papua covering the period 2003-2011. His study shows that both CAEL and Bankometer have revealed same assessment in determining financial position but Altman's Z-score model has reversely put Papua banking industry in to gray zone. This research also suggested that Z-score model is not suitable for evaluation of banking industry having some limitations. However, the study concluded that Z-score model provides early indication about bankruptcy in assessing financial performance and based on the results of above mentioned three models; Bank Papua's profitability is good.

Makkar, A., & Singh, S. (2012) attempted a study with a model named Bankometer to evaluate the solvency of 37 Indian commercial banks covering the period of 2006-07 and 2010-11.The researcher used Bankometer to check whether analyzing the vulnerability of financial distress on the banks is better than the conventional methods like CAMELS and CLSA Stress test. His study found that all the Indian banks are financially solvent and also revealed that private sector banks are financially more sound than public sector banks. This study also indentified some unperformed banks and also concluded that Bankometer model will assist internal management in avoiding insolvency issues.

Arulvel and Balaputhiran (2013) initiated a study of financial performance analysis on banking sector of Sri Lanka. The study covered the period 2006-2010 and assessed financial performance of private and state owned banks by applying different statistical tools like Data Environmental Analysis, CAMELS and Bankometer. The study found that state owned banks are performing better than the commercial banks as per Bankometer approach.

Shar, A. H., Shah, M. A., & Jamali, H. (2010) evaluated the performance of banking sector in Pakistan using a new model named Bankometer model which is recommended by IMF. In this study the model Bankometer has been applied on individual banks covering the period 1999-2002 for evaluating the solvency of each bank in Pakistan. The results have been compared with CAMEL and CLSA-stress test for conducting better comparision. His study concluded that Bankometer's s-score scale can be applied at global level to predict the vulnerability of an individual bank.

Altman (1968) conducted his first study on corporate bankruptcy assessment using financial ratios analysis as tools that showed 90% rate of accuracy in correctly classifying the bankrupted firms and 80% rate of accuracy in predicting the next financial difficulties. Although, Altman's Z-score model was initially developed for predicting bankruptcy of manufacturing organizations attaining 80% accuracy but later the model came with additional modifications for assessing bankruptcy of banking sector and successfully showed 70% accuracy rate of prediction. Altman Z-score model has been used by many researchers to predict financial distress and evaluate soundness of financial institutions over the period.

3. Methodology of the Study

Particularly this study is entirely dependent on secondary data sources. In this study, six year's financial data (2010-2015) have been used only for the analysis purpose and these data are publicly available in the annual reports and financial statements of respective banks. The population under this study is consisted of 30 private commercial banks listed in Dhaka Stock Exchange from which 24 (four Islamic and twenty Conventional) listed private commercial banks have been selected as samples.

3.1 Method of Analysis: Bankometer Model

There are many models available for analyzing bank's soundness, among them Bankometer is recently developed and simple approach that uses financial ratios which are derived from both CAMELS framework and CLSA-stress test parameters with slight modifications in percentages to synthesize bank's soundness. In this model, soundness of bank is measured by a score which is called solvency score(S-Score). In determining insolvency issues and eradicating the shortcomings pointed out by Bankometer approach, this procedure may be helpful to the bank's internal management. It can be used not only by individuals but also by supervisory bodies to have an instant look over any bank's soundness or solvency position. Following IMF (2000) recommendations, the researcher has undertaken the initiative and used a comprehensive procedure called Bankometer which has the quality of providing maximum accurate results with minimum number of parameters. However, the expression of the "Bankometer" model is:

$$S = 1.5X1 + 1.2X2 + 3.5X3 + 0.6X4 + 0.3X5 + 0.4X6$$

Where,

"S" stands for solvency which is dependent variable.

Independent variables under this model are:

- X1= Capital to Assets Ratio (CA)   :$\geq$04%
- X2= Equity to Assets Ratio (EA)   :$\geq$02%
- X3= Capital Adequacy Ratio (CAR)   : 40 %$\leq$CAR$\geq$08%
- X4= Non-performing Loans to Loans Ratio (NPL)   :$\leq$15%
- X5= Cost to Income Ratio (CI)   :$\leq$40%
- X6= Loans to Assets Ratio (LA)   :$\leq$65%

However, above mentioned percentages explain a bank that has

- CAR ratio between 8% to 40%;
- CA ratio higher than 4%;
- EA ratio greater than 2%;
- controlled NPL ratio below 15%;
- maintained CI ratio less than 40%;
- maintained liquidity by controlling LA ratio below 65%

may be classified as "Super Sound Bank" under the Bankometer procedure. Predicting bank's vulnerability to financial distress is a crucial consideration to banks, creditors and investors. When a bank goes insolvent, creditors become deprived by losing portion of principal and interest payments, while equity investors can potentially lose all of their investment. Even if, the bank survives after a financial distress, the future growth of the bank will be hampered significantly due to huge survival costs incurred by the bank. However, the researcher of this study believes that being simple procedure Bankometer's s-score model will definite help any bank to identify insolvency issues and to maintain a favorable position by protecting itself from being insolvent in financial distress.

Criteria: The banks having 'S' value greater than 70 are solvent and termed as "Super Sound Banks" (holding favorable financial status) while the banks having 'S' value less than 50 are termed as "Insolvent" (experiencing high risk of financial distress). And, the banks having 'S' value between 50 and 70 are in moderate position and can be classified into "Gray Zone" (the area between 50 < S < 70) because of the susceptibility to error classification. (Altman, 1968)

3.2 Test of Hypothesis

The research's hypothesis has been formulated on the basis of research's problem and objectives outlined above as follows:

- H1: There is significant difference in the solvency among the selected banks during the period 2010-2015.

4. Analysis, Results and Interpretation

Table-1 exhibits the calculation of solvency score (s-score) of selected private commercial banks of Bangladesh for the year 2015 and the outcomes from the calculations have revealed that in the year 2015 all the banks have attained solvency scores (s-score) above the acceptance limit of at least 70 percent (i.e., Bankometer procedure).

Therefore, it can be interpreted that all the banks have ensured healthy financial positions classifying themselves as "Super Sound Banks" and have not experienced any financial distress during 2015. On the basis of the calculation, Al-Arafa Islami Bank Limited has stood at the first position with highest s-score (125.78%) followed by City Bank Limited (124.57%) and NCC Bank Limited (123.38%). Trust Bank Limited has stood last with lowest s-score of (100.79%) among all banks. However, it has been found from the results that average s-score of banking industry is 100.97% which is strongly above the safety limit (minimum 70 percent) indicating the great contribution of private banking sector in overall financial system.

Table 1. Bankometer model assessments and results for the year 2015

$S = 1.5X1 + 1.2X2 + 3.5X3 + 0.6X4 + 0.3X5 + 0.4X6$								
Variables	X1	X2	X3	X4	X5	X6	S-Score Max 70% & Min 50%	RANK
	CA	EA	CAR	NPL	CI	LA		
Criteria Commercial Banks	CA≥4%	EA≥2%	40%≤CAR≥8%	NPL≤15%	CI≤ 40%	LA≤ 65%		
BRAC Bank	9.1	8.4	12.2	6.0	48.5	65.7	110.86	13
Dutch-Bangla Bank	8.7	6.9	13.7	3.7	58.9	62.4	114.13	09
Dhaka Bank	8.5	7.6	10.5	4.7	47.8	66.8	102.50	21
Bank Asia	10.2	8.5	12.5	4.3	41.8	60.8	108.69	16
Jamuna Bank	10.2	11.0	12.8	6.7	48.2	61.1	116.22	06
United Commercial Bank	11.3	8.7	12.2	5.2	46.0	67.2	113.89	10
Trust Bank	7.7	5.3	10.8	2.7	48.2	72.5	100.79	24
Pubali Bank	8.7	8.7	11.9	5.3	47.5	60.6	106.81	18
Prime Bank	11.6	10.5	12.7	7.8	51.1	60.2	118.54	05
One Bank	9.6	7.5	10.9	3.6	45.7	69.2	105.10	19
Mercantile Bank	9.8	8.5	11.9	5.0	50.5	69.1	112.34	12
NCC Bank	11.3	10.7	13.5	7.2	44.6	71.6	123.38	03
Standard Bank	10.8	8.7	12.5	3.2	44.1	69.1	113.18	11
Premier Bank	6.8	7.8	9.1	6.6	63.9	69.5	102.34	23
Southeast Bank	10.9	10.4	11.5	4.3	30.8	64.8	106.82	17
City Bank	10.5	11.9	14.0	7.6	47.8	66.6	124.57	02
IFIC Bank	6.6	6.5	10.5	6.5	54.6	69.1	102.37	22
AB Bank	9.9	8.0	11.1	3.2	53.0	73.6	110.56	14
Eastern Bank	10.8	10.8	14.2	3.3	48.4	68.7	122.84	04
National Bank	11.1	11.9	12.1	7.0	36.8	66.1	114.96	07
Islami Bank	6.6	6.5	11.7	4.2	48.4	73.1	104.93	20
EXIM Bank	10.7	9.6	12.0	4.7	41.5	74.2	114.52	08
Social Islami Bank	9.4	7.2	12.3	3.8	41.2	74.5	110.23	15
Al-Arafah Islami Bank	10.1	8.4	16.7	4.7	36.4	70.9	125.78	01
Industry Average							111.93	
Classification							Super Sound	

Source: Author's Calculation

Capital to Asset Ratio (CA) is the ratio which reveals the proportion of total assets used in total capital. The capital to asset ratio measures whether the bank has sufficient capital to support its assets. The higher the ratio indicates that the more of the internal and external sources of funds have been used for investment in assets. According to the IMF hint, the minimum limit for this ratio is 4%. The Based on the results, the selected banks have fulfilled the requirement of CA successfully in 2015. Prime Bank Limited has achieved highest CA ratio of 11.6% and the lowest CA ratio has been obtained by IBBL of 6.6%.

Equity to Asset ratio (EA) determines that percentage of a company's assets which are financed by equity capital and not leveraged. The higher the EA ratio, the less leveraged the company is, meaning that a larger percentage of its assets are owned by the bank and its investors and bank is less dependent on external financing. According to IMF recommendation, the EA ratio must be higher than 2% and based on calculations it has been found that all the banks have covered the minimum limit of 2%. City Bank Limited and National Bank Limited both have highest EA ratio of 11.9% and lowest EA have been obtained by Trust Bank limited as 5.3% in 2015.

Capital Adequacy Ratio (CAR) is the ratio that implies a bank's capital in relation to its risk weighted assets which determines the bank's capacity to meet the time liabilities and other risks such as credit risk, operational risk etc. The high s-score is mainly influenced by the high Capital Adequacy Ratio or CAR (variable X3). Based on the calculations, it has been found that all the banks have higher CAR values than the CAR limit of 8% recommended by IMF. Al-Arafah Islami Bank limited has highest CAR value of 16.7% indicating more capability of the bank to ensure the efficiency and financial stability by lowering the risk of becoming insolvent. Premier Bank Limited has lowest CAR value of 9.1% among all banks. The result has shown that in case of capital requirement, all the banks have ensured the safety position in 2015.

Non-performing loan to loan ratio (NPL) shows the percentage of the loan which is classified as non-performing loans. The higher the ratio indicates the higher non-productive loans given by the bank. NPL limit must be less than 15% suggested by IMF, where all the banks have NPL ratio less than 15% in 2015 indicating that all the banks have ensured good credit quality. Trust Bank Limited has obtained lowest NPL ratio of 2.7% and City Bank Limited has obtained highest NPL ratio of 7.6% but still far below than the limit of 15%.

Cost to Income ratio (CI) is another key parameter of Bankometer model that determines the profitability of a bank. The lower the ratio, the more profitable the bank is. IMF has suggested that the CI should be lower than 40%. According to calculations, most of the banks have CI ratios above the limit, meaning that these banks have not ensured adequate efficiency in carrying out their operations. However, Al-Arafah Islami Bank, City Bank and Southeast Bank limited have maintained CI ratio less than 40% in 2015.

Loans to Assets ratio (LA) measures the proportion of total assets used in advancing the loans. The higher LA ratio indicates more loans provided by the bank, more expected earnings and also indicates higher risk due to low liquidity maintained by bank whereas, the smaller ratio indicates fewer loans provided by the bank maintaining high liquidity and also indicates lower earnings possibility. However, based on calculations, most of the banks have not maintained LA ratio below 65% imposed by IMF and it can be concluded that these banks have loaned excess maintaining low liquidity. Social Islami Bank has maintained highest loan to asset ratio (74.5%) followed by EXIM Bank (72.2%) and AB Bank (73.6%). Prime Bank (60.2%) has maintained the lowest LA ratio among all banks in 2015.

Table 2. Bankometer model assessments and results for the period (2010-2015)

S = 1.5X1 + 1.2X2 + 3.5X3 + 0.6X4+ 0.3X5 + 0.4X6								
Commercial Banks	2015	2014	2013	2012	2011	2010	Mean	Classification
BRAC Bank	110.9	118.7	105.0	102.9	109.3	113.3	110.0	Super Sound
Dutch-Bangla Bank	114.1	113.1	113.0	103.7	102.5	96.0	107.1	Super Sound
Dhaka Bank	102.5	106.1	110.7	103.6	106.1	100.1	105.0	Super Sound
Bank Asia	108.7	106.2	103.6	112.0	121.5	90.2	107.0	Super Sound
Jamuna Bank	116.2	101.2	102.4	101.3	102.8	98.0	104.0	Super Sound
United Commercial Bank	114.0	103.5	107.6	101.8	103.7	81.2	102.0	Super Sound
Trust Bank	100.8	106.9	108.6	117.1	110.3	97.0	106.8	Super Sound
Pubali Bank	106.8	101.6	99.3	105.7	107.0	107.7	104.7	Super Sound
Prime Bank	118.5	114.3	110.6	111.4	112.6	116.9	114.1	Super Sound
One Bank	105.1	121.3	119.2	108.1	110.2	99.7	109.4	Super Sound
Mercantile Bank	112.3	116.3	107.0	99.1	102.3	100.5	106.3	Super Sound
NCC Bank	123.4	121.1	115.7	106.2	108.2	109.6	108.9	Super Sound
Standard Bank	113.2	102.6	102.0	101.7	106.1	100.1	104.3	Super Sound
Premier Bank	102.3	121.4	111.9	115.4	116.0	103.2	107.9	Super Sound
Southeast Bank	106.8	108.9	100.9	104.0	109.8	111.8	107.0	Super Sound
City Bank	124.6	134.7	117.9	119.6	125.0	116.8	107.8	Super Sound
IFIC Bank	102.4	101.2	99.7	99.1	102.9	100.8	101.0	Super Sound
AB Bank	110.6	101.2	103.9	107.8	106.8	101.2	107.1	Super Sound
Eastern Bank	122.8	119.1	111.7	111.4	106.6	115.4	114.5	Super Sound
National Bank	115.0	108.1	110.2	114.6	118.1	146.7	107.7	Super Sound
Islami Bank	104.9	109.2	116.9	114.5	113.2	106.5	110.9	Super Sound
EXIM Bank	114.5	113.6	119.0	107.7	113.3	107.9	108.0	Super Sound
Social Islami Bank	110.2	105.1	105.8	104.2	114.3	95.4	105.8	Super Sound
Al-Arafah Islami Bank	125.8	113.7	118.1	106.4	116.5	126.3	107.8	Super Sound
Industry Average	111.9	111.2	109.2	107.5	110.2	105.9		Super Sound

Source: Author's Calculation

Table-2 shows the solvency scores (s-score) of selected private commercial banks for the period (2010-2015). However, the Bankometer's s-score calculations have been conducted again by the researcher to see whether the selected banks have been consistently doing good and whether they have been financially sound for

last couple of years. According to calculations, the results have shown that during the period the private commercial banks of Bangladesh have always been in the category of super sound, no matter what economic or financial crisis has prevailed around the world. The results have also revealed that during the period the banking industry has always sustained the healthy financial position as the solvency value has never been below than 70% rather it has increased from 105.9% in 2010 to 111.9% in 2015 indicating great financial stability. Averaging all the s-scores, it has been found that Eastern Bank has highest s-score (114.5%) followed by Prime Bank (114.1%) and Islami Bank (110.9%). The lowest average s-score has been obtained by IFIC Bank (101.0%). It can be concluded that although minimum fluctuations has been existed in solvency values over years, these banks have always attained the financially healthy status according to Bankometer analysis.

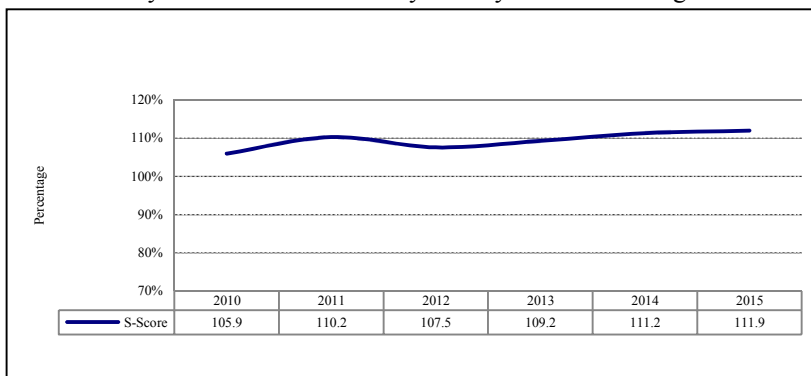|	2010	2011	2012	2013	2014	2015
S-Score	105.9	110.2	107.5	109.2	111.2	111.9

Figure 1. The Trend of S-Score of Banking Industry over the period (2010-2015)

Figure-1 exhibits that from the year 2010 to 2011 the s-score has increased by 4 percent then solvency of banking industry has decreased by 2 percent in 2012 after that the trend has increased gradually. The chart shows that financial solvency status of banking industry has been very satisfactory and can be categorized as super sound.

Table 3. Hypothesis Test (Anova Table)

Solvency						
	Sum of Squares	df	Mean Square	F	Sig.	(From F Table for α = 0.05)
Between Groups	4357.703	23	189.465	3.988	.000	F (23,143) 1.8128
Within Groups	5701.052	120	47.509			
Total	10058.755	143				

To depict clearly whether there exists significant difference in the solvency of selected private commercial banks of Bangladesh, 'F-test' has been applied at 5% level of significance. Table-3 indicates that the calculated value of F=3.99 which is more than the table value of 1.8128 at 5% level of significance. Hence, it can be concluded that H1 is accepted as there is a significant difference in the solvency among the selected banks during the period 2010-2015. Therefore, the null hypothesis has been rejected.

5. Conclusion

In this fast-evolving global competitive environment, competition among banks is getting intense and customer's expectation has become the most concerning issue to the banks. Hence, soundness of bank has become the most crucial issue for building sustainable financial system which leads to economic development. This study aims to examine the financial soundness of selected private commercial banks of Bangladesh listed in Dhaka stock exchange. However, the results retrieved from Bankometer model exhibits that all the banks have consistently maintained the soundness as the solvency scores of all the banks have been much higher than the limit of 70% over the period of 2010-2015. According to Bankometer assessment for the year 2015, all the banks have fulfilled the requirement of individual parameter of this model although most of the banks have not able to minimize their cost to income ratio below 40 percent and loan to assets ratio below 65 percent as prescribed by IMF guidelines. Although, this model has not been widely familiar and not yet been recognized as a valid analysis for financial distress of banks but because of its simplicity this model has been tested by many researchers around the world for predicting the financial soundness of banks and comparing the results between insolvent and bankrupt banks. The study concludes that this newly established Bankometer model will definitely help the bank's internal management to avoid insolvency issues by controlling their operations properly and remove the shortcoming generated from inefficiency in dealing banking activities. This study also suggests all the banks to maintain the consistent solvency to ensure sound financial system which is the pre-requisite for the economic growth of the country.

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