ASSESSING THE PROBABILITY OF FINANCIAL DISTRESS IN COMMERCIAL BANKS OF INDIA

Shveta Singh[1] and Anita Makkar[2]

The present paper attempts to assess the probability of financial distress in 46 Indian commercial banks covering 26 public sector banks and 20 private sector banks for the period of 2005-06 to 2011-12. Using Z-score test for four different ratios namely, working capital to total assets, retained earnings to total assets, earnings before interest and taxes to total assets and equity to total asset, the study finds that all commercial banks in India are distress free except three banks. There is a significant difference in the value of Z-score of public and private sector banks. The study also concludes that there is consistency in the performance of public sector banks while there is much variation in the performance of private sector banks.

Keywords: *Distress, Crisis, Bankruptcy, Commercial Banks*

JEL classification: G01, G21, G33, Q01

1. Introduction

One of the most dramatic reflections of recent financial crisis is the failure of ancient banks not only in US but all over the world. Several banks lost their existence in different parts of the globe. Banks are still falling in the global economy; almost half of the banks have one form of distress or the other. Therefore, it is necessary to grind the monitoring of performance in banks incessantly (Okezie, 2011). One of the ways of doing this is by being able to notice problem in banks at the early stage before the bank slides into distress (Doguwa, 1996).

Several studies have been carried out to assess the distress in banks, which has been defined differently in the literature. For example, Chan and Chen (1991) described distressed firms as the firms that had lost market value because of poor performance, these are inefficient producers and are likely to have high financial leverage and cash flow problems. As per Elebute (1999), distress in banking sector is observed when a quite reasonable proportion of banks are unable to meet their obligations to customers, owners and

[1]Assistant Professor, Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar, India

[2]Junior Research Fellow (UGC), Haryana School of Business, Guru Jambheshwar University of Science and Technology, Hisar, India

the economy, due to weakness in financial, operational and managerial capabilities which made them either illiquid or insolvent. Bank is defined as distressed if the ratio of its non-performing loans to total loans is in the two highest deciles of the industry using a three year moving average (Carapeto *et al.*, 2010). According to Betz *et al.* (2013), a bank is defined to be in distress if it receives a capital injection by the state or participates in assets relief programmes (assets protection or assets guarantees). The assistance given in the form of assets and liabilities is not included in it. Hence, it does not include liquidity support or guarantee of bank liabilities.

The main causes of distress during crisis are the extent to which the wave of bank(s) break down and deposit contraction affects the bank survival. It is also reflected in serious weakening in banks' health that may enforce viable banks to fail (Calomiris and Mason, 2000). There is no doubt that poor fundamental shocks pertinent to bank solvency are core donors to bank distress. The argument is over the size of these fundamental shocks - that is whether banks experiencing distress are truly insolvent or simply illiquid.

Although Indian banks are not directly exposed to this great depression but due to interconnectivity with the world market, Indian banking system has faced some difficulties in its smooth functioning. Consequently, the assessment of bank's financial distress also becomes an essential footstep for regulators to ensure the viability of Indian commercial banks. All this paved way to endeavor the present study.

The main *objective* of the study is to estimate the probability of financial distress in Indian commercial banks. It also compares public and private sector commercial banks of India using the Z-score (Probability of Financial Distress).

The study is divided into six sections. Section I gives a brief introduction of the paper. Section II scans the relevant literature. Section III elaborates the objectives and Section IV describes the methodology adopted to analyze the issue at hand. Section V analyzes the data and discusses results and inferences. Lastly, Section VI concludes the paper.

2. Survey of Literature

Numerous studies have been conducted for assessing the financial distress of banks across the world. Some of the relevant studies are mentioned as follows:

Alam *et al.* (2000) used the fuzzy clustering and self-organizing neural networks for identifying the potentially failing banks. They found that these two were very useful

classification tools for identifying potentially failing banks. Muranda (2006) examined the relationship between financial distress and corporate governance. The study found that adequate board monitoring, senior management oversight helped to remove the financial distress. The study concluded that failure of bank in corporate governance discarded the survival of banks. Cipollini and Fiordelisi (2009) examined the impact of bank concentration on the financial distress of 180 European commercial banks over the period of five years (2003 to 2007).The financial distress was proxied by shareholder value ratio .This indicator is obtained as the ratio of bank's economic value added(EVA), to the shareholders' invested capital. The study found positive effect of bank concentration on the financial distress of banks. It concluded that change in banking business model had increased the moral hazard in business operations and also encouraged the carelessness in risk taking.

Distinguin *et al.* (2009) carried out study to understand how the credit rating agencies determine the bank's financial health in 13 emerging economies of MENA countries. The study found that capital adequacy, asset quality, earnings and liquidity ratios were important factors in predicting financial distress in banks. It concluded that the influence of these factors varies across the size of the banks.

Cole and Wu (2009) compared the hazard or probit model for predicting financial distress in US banks for 1985 to 1992. The study found that hazard model was more accurate in predicting bank failure as compared to probit model. It concluded that the firm-specific characteristics were the major determinants of bankruptcy or failure as compared to the macroeconomic variables.

Segoviano and Goodhart (2010) analyzed the financial stability indicators of the financial system from three complementary perspectives: common distress in the system, distress between specific banks, and cascade effects associated with a specific bank. The study concluded that this new approach was helpful in improving the density of financial distress for developed as well as developing countries.

Hua and Liu (2010) investigated the consistency between banks rating and risk-return profile of 1024 banks from 2000 to 2004. The study found that Moody and Fitch credit rating agency assigns higher rating to banks with high risk-return stocks. It concluded that Fitch was more risk averse as it paid extra attention to bank's financial distress risk.

Okezie (2011) assessed the relationship between the capital ratios, leverage ratios, gross revenue ratios and financial distress in Nigerian banks from 1991 to 2004. The study found that there was no significant difference in the efficiency of three different ratios in

distress prediction.

Zaki *et al.* (2011) assessed the probability of financial distress in UAE banks during 2000 to 2008. The study found that cost to income, equity to total assets, assets growth, loan loss reserve ratio had positive impact on the probability of financial distress. It concluded that macroeconomic information had no significant impact on the probability of financial distress of banks in UAE.

Hunsa and Rahman (2012) compared the Islamic banks and Conventional banks to select the financial distress detection model for Islamic banks. The study found that Islamic banks were more liquid and less risky as compared to Conventional banks. It concluded that good performance of Islamic banks did not guarantee for Islamic banks an escape from financial distress situation.

Obamuyi (2012) analyzed the nature and extent of banking distress in Nigeria. The study concluded that recent consolidation of central bank on heavy capital did not ensure the financial stability. This was mainly due to implementation problem. The study recommended strict enforcement of management, liquidity and corporate governance to ensure sound financial health of the banks.

Tamini (2012) investigated the impact of corporate governance on the financial performance and distress of UAE national banks. The study found that UAE banks were aware of disclosure, transparency, executive compensation and role of the board of directors. The study found no significant difference in the disclosure practices of conventional banks and its Islamic banks.

Jim and Simone (2013) used the consistent information multivariate density optimization (CIMDO) methodology to predict bank defaults among 32 European banking systems. The study measured the credit risk common to all banks, credit risk in the banking system conditional on distress. It concluded that this credit risk model was a rich set of indicators for a macro prudential operational framework based on banks' default dependence. Aneja and Makkar (2013) compared the book value insolvency of 47 Indian commercial banks for the period of 2006-07 to 2010-11. The study found that there existed significant difference in the insolvency risk faced by public and private sector commercial banks.

In the light of reviewed literature, we find that several attempts have been made to analyze the bank's financial distress in the different parts of the world. But not much attempt has been made to measure the financial distress of commercial banks operating exclusively

in India. The present study intends to fulfill this comprehensive gap and contribute to the literature.

3. Database and Methodology

The study is based on secondary source of information as the data is collected from RBI publications, annual reports, journals and from different websites. The sample of 46 commercial banks is selected including 26 public sector banks and 20 private sector banks. The study covers a period of 6 financial years i.e. 2005-06 to 2011-12.

The study attempts to assess the probability of financial distress in Indian commercial banks. It also compares public and private sector commercial banks of India using the Z-score (Probability of Financial Distress).

On the basis of above objectives, the following hypotheses are outlined:

H_{01}: There is no financial distress in Indian commercial banks.

H_{02}: There is no significant difference in the Z-score (Probability of Financial Distress) of public and private sector banks of India.

Z-score model suggested by Altman (1968) is used to measure the probability of financial distress in commercial banks. It is a hybrid model which calculates a score for corporate houses and financial institutions on the basis of different variables namely, working capital, retained earnings, earnings before interest and taxes (EBIT), book value of equity, total liabilities and total assets (Sharma and Myanka, 2013). The following equation is used for Z-score:

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

where,

X_1= Working Capital to Total Assets

X_2= Retained Earnings to Total Assets

X_3= Earnings before Interest and Tax to Total Assets

X_4= Book Value of Equity to Total Assets

As per this model, if a financial institution secures more than 2.6 score, then it would be in *safe zone*. But if it is unable to secure even 1.1 score, then it is assumed in *distress zone* and it is more prone towards insolvency. If the value of Z-score is in between 1.1 and 2.6, it is treated in *grey zone*. Further, t-test is applied to compare the Z-score of public and private

sector banks.

4. Findings and Discussion

The results of Z-score are shown in Table 1 and Table 2. Perusal of these tables reveals that on an average, working capital to total assets ratio (X_1) is high in private sector banks (0.335) as compared to the public sector banks (0.271). There is a fluctuating trend in working capital of public sector banks while there is a decreasing trend in working capital of private sector banks during the study period. This clearly depicts the impact of crisis on the private sector banks. Foreign funds have been squeezed and cross-border lending is also affected due to disturbance in the global market. Numbers of foreign investors have withdrawn their money from private sector banks.

Table 1: Z-score of Public Sector Banks

Ratios	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
X_1	0.261	0.251	0.261	0.283	0.280	0.276	0.288	0.271
X_2	0.047	0.047	0.047	0.047	0.047	0.050	0.051	0.048
X_3	0.058	0.060	0.067	0.071	0.067	0.064	0.075	0.066
X_4	0.057	0.055	0.053	0.053	0.052	0.055	0.057	0.054
Z	2.318	2.264	2.370	2.548	2.493	2.463	2.616	2.439

The public sector banks have low retained earnings ratio (X_2) as compared to private sector banks as shown in Table 1 and Table 2. Public sector banks are backed by Reserve bank of India for their smooth survival while private sector banks have to maintain the reserves at their own level. That's why the retained earnings ratio is low in public sector banks as compared to the private sector banks.

EBIT ratio to total assets ratio (X_3) is high in public sector banks (0.066) as compared to the private sector banks (0.064). Earnings of private sector banks have been affected because of the adverse events of US. People have more confidence about their funds in the public sector banks as compared to the private sector banks. Due to failure of large number of private banks across the world, the public faith has dwindled and this has reduced their investment in private sector banks. It has ultimately resulted into reduction in the earnings of private sector banks.

Table 2: Z-score of Private Sector Banks

Ratios	2005-06	2006-07	2007-08	2008-09	2009-10	2010-11	2011-12	Average
X_1	0.334	0.329	0.353	0.369	0.345	0.327	0.289	0.335
X_2	0.055	0.056	0.073	0.074	0.076	0.084	0.072	0.070
X_3	0.055	0.056	0.067	0.073	0.064	0.061	0.073	0.064
X_4	0.076	0.077	0.090	0.090	0.123	0.100	0.078	0.091
Z	2.822	2.800	3.102	3.250	3.070	2.927	2.704	2.954

Equity to total assets ratio (X_4) indicates how much assets are financed through equity capital and how much debt is used by bank in financing its assets. Equity to assets ratio is low in case of public sector banks (0.054) as compared to private sector banks (0.091). Public sector banks are using more external funds as compared to the private sector banks. Private sector banks are more lean on the internal funds i.e. shareholders' funds. There may be some problems in getting money from market that's why private sector banks focused more on using internal funds.

Z-score of private sector banks is above 2.6 (cut-off point given by Altman for sound position) for the last seven years but in public sector banks Z-score is below 2.6 in the years 2005-06, 2009-10 and 2010-11. The working capital management, internal funding i.e. retained earnings or reserve management and equity to total assets ratio is good in private sector banks. Due to this, Z-score is high in case of private sector banks as compared to the public sector banks. The probability of distress is low in private sector banks. For a broader picture, working capital to total assets ratio (X_1), retained earnings to total assets ratio (X_2), EBIT to total assets ratio (X_3), equity to total assets ratio (X_4) and Z-score of 46 Indian commercial banks have been calculated and presented in Table 3.

Table 3: Average Z-score of Indian Commercial Banks (2005-06 to 2011-12)

S. No.	Name of Bank	X_1	X_2	X_3	X_4	Z
1	State Bank of India	0.163	0.059	0.063	0.060	1.75
2	State Bank of Bikaner & Jaipur	0.210	0.048	0.069	0.049	2.05
3	State Bank of Hyderabad	0.275	0.049	0.070	0.049	2.48
4	State Bank of Mysore	0.223	0.054	0.069	0.055	2.16
5	State Bank of Patiala	0.303	0.046	0.070	0.049	2.66
6	State Bank of Travancore	0.292	0.043	0.069	0.044	2.57
7	Allahabad Bank	0.298	0.056	0.068	0.061	2.66
8	Andhra Bank	0.376	0.052	0.068	0.060	3.15
9	Bank of Baroda	0.374	0.058	0.058	0.060	3.10
10	Bank of India	0.391	0.049	0.061	0.052	3.19
11	Bank of Maharashtra	0.167	0.035	0.062	0.046	1.67
12	Canara Bank	0.357	0.048	0.068	0.058	3.02
13	Central Bank of India	0.204	0.034	0.061	0.047	1.91
14	Corporation Bank	0.328	0.059	0.066	0.061	2.85
15	Dena Bank	0.284	0.041	0.064	0.048	2.48
16	IDBI Bank	0.007	0.058	0.069	0.063	0.76
17	Indian Bank	0.302	0.063	0.070	0.074	2.74
18	Indian Overseas Bank	0.292	0.048	0.067	0.053	2.58
19	Oriental Bank of Commerce	0.338	0.067	0.071	0.070	2.99
20	Punjab and Sind Bank	0.236	0.040	0.065	0.058	2.18
21	Punjab National Bank	0.232	0.060	0.065	0.061	2.22
22	Syndicate Bank	0.202	0.038	0.064	0.043	1.92
23	UCO Bank	0.308	0.027	0.065	0.039	2.59
24	Union Bank of India	0.351	0.050	0.066	0.054	2.97
25	United Bank of India	0.186	0.028	0.062	0.053	1.79
26	Vijaya Bank	0.360	0.037	0.067	0.051	2.99
27	Axis Bank	0.132	0.069	0.065	0.074	1.60
28	Catholic Syrian Bank	0.453	0.047	0.062	0.050	3.59
29	City Union Bank	0.509	0.067	0.079	0.071	4.16
30	Development Credit Bank	0.253	0.054	0.061	0.080	2.33
31	Dhan Laxmi Bank	0.359	0.045	0.059	0.053	2.95
32	Federal Bank	0.438	0.089	0.057	0.093	3.64
33	HDFC Bank	0.053	0.081	0.017	0.084	0.81
34	ICICI Bank	0.068	0.113	0.011	0.116	1.01
35	Indusind Bank	0.310	0.053	0.032	0.065	2.49
36	ING Vysya Bank	0.233	0.061	0.021	0.065	1.93
37	J & K Bank	0.227	0.068	0.071	0.163	2.36
38	Karnataka Bank	0.509	0.066	0.074	0.072	4.13
39	Karur Vysya Bank	0.512	0.079	0.138	0.082	4.63
40	Kotak Mahindra Bank	0.045	0.102	0.068	0.116	1.20
41	Laxmi Vilas Bank	0.508	0.056	0.142	0.063	4.54
42	Nanital Bank	0.350	0.065	0.065	0.082	3.03
43	Ratnakar Bank	0.397	0.129	0.054	0.187	3.58
44	South Indian Bank	0.480	0.054	0.068	0.059	3.85
45	Tamilnad Mercantile Bank	0.480	0.093	0.081	0.093	4.10
46	Yes Bank	0.299	0.061	0.070	0.081	2.71

Table 4: List of Top Five & Bottom Five Banks with Z-Score (2005-06 to 2011-12)

Top 5 Banks with Highest Z-Score			Bottom 5 Banks with Lowest Z-Score		
S. No.	**Name of Bank**	**Z-Score**	**Sr. No.**	**Name of Bank**	**Z-Score**
1	Karur Vysya Bank	4.63	42	AXIS Bank	1.60
2	Laxmi Vilas Bank	4.54	43	Kotak Mahindra Bank	1.20
3	City Union Bank	4.16	44	ICICI Bank	1.01
4	Karnataka Bank	4.13	45	HDFC Bank	0.81
5	Tamilnad Mercantile Bank	4.10	46	IDBI Bank	0.76

Table 4 reveals that Karur Vysya Bank (4.63) stood first with highest Z-score among the 46 Indian commercial banks. Top 5 banks are the private sector banks. No public sector bank stood in top 5 positions of all the banks. In the bottom 5, four banks are new private sector banks and one is public sector bank. ICICI bank, HDFC bank and IDBI bank have very poor performance. They fall in the distress zone as their score is below 1.1 (cut-off point given by Altman for distress area).

Table 5: Classification of Banks on the Basis of Z-Score

S. No.	Type of Bank	Sound Bank	Banks Under Grey Area	Distressed Banks	Total
1	Public Sector Banks	12	13	1	26
2	Private Sector Banks	12	6	2	20
	Total	24	19	3	46

It is also observed that among 46 Indian commercial banks, 24 banks (12 public sector banks and 12 private sector banks) are in sound area, 19 banks (13 public sector banks and 6 private sector banks) fall into grey area and 3 banks (1 public sector bank and 2 private sector banks) are in distress zone as presented in Table 5. On an overall basis, the major Indian banks are in safe zone in terms of their probability of distress. So, the null hypothesis that there is no financial distress in Indian commercial banks is accepted for 24 banks as these stand in the safe zone. While the null hypothesis for other banks which stand in grey area and distress zone are rejected.

Comparison of Z-score for Public and Private Sector Banks

To know whether there is any significant difference in the Z-score of public and private sector banks of India, t-test has been applied for different years separately. The

significance is checked at 5 percent and 10 percent level of significance. The results of Table 6 reveal that there is a significant difference in the Z-score of public and private sector banks of India for five different financial years i.e. 2005-06 to 2009-10. So, the null hypothesis is rejected that there is no significant difference in the Z-score of public and private sector banks of India.

Table 6: Comparison of Public and Private Sector Banks on the basis of Z-Score (2005-06 to 2011-12)

Year	Group of Banks	Number	Mean	Standard Deviation	df	t-value	Significance
2005-06	Public Private	26 20	2.31 2.82	0.79 1.09	45	-1.82	0.075**
2006-07	Public Private	26 20	2.26 2.79	0.68 1.16	45	-1.95	0.056**
2007-08	Public Private	26 20	2.37 3.10	0.60 1.14	45	-2.81	0.007*
2008-09	Public Private	26 20	2.54 3.24	0.54 1.28	45	-2.53	0.015*
2009-10	Public Private	26 20	2.49 3.07	0.57 1.27	45	-2.07	0.044*
2010-11	Public Private	26 20	2.46 2.92	0.64 1.33	45	-1.56	0.125
2011-12	Public Private	26 20	2.61 2.70	0.58 1.43	45	-0.82	0.780

*Note: ** Significant at 10 per cent, * Significant at 5 per cent*

There is no significant difference in the Z-score of public and private sector banks of India for the years 2010-11 and 2011-12. So, the null hypothesis is accepted for these two years. The mean value of Z-score indicates that private sector banks have high mean score as compared to the public sector banks during this period. The private sector banks are safer from the probability of distress as compared to the public sector banks. The standard deviation is also high in private sector banks which indicates the variation in the performance of private sector banks. Even though the Z-score is low in case of public sector banks as compared to the private sector banks, but there is a consistency in the performance of public sector banks.

5. Conclusion

The study concludes that almost all major banks of India whether public or private

banks are financially viable and away from distress area. Only three banks, ICICI bank, HDFC bank and IDBI bank are in distress zone. This is mainly due to negative working capital ratio. These banks are required to manage the current assets and current liabilities for effective working capital management. Public sector banks are required to manage working capital ratio, reserve ratio and equity to assets ratio, while private sector banks are required to improve the earning capacity to successfully survive in the market.

Assessment of financial distress through this study will help the banks to timely monitor and control the performance of the banks. It will be an effective tool for estimating the risk of economic failure and also helpful in selecting the best possible alternative for operating the banks successfully. Bank regulators are suggested to take the timely care of different aspects in the performance of the banks to escape them from any sort of financial distress. Further, it will also help the policy makers in designing their investment outlay.

References

Alam, P., D. Booth, K. Lee and T. Thordarson (2000), "The Use of Fuzzy Clustering Algorithm and Self Organizing Neural Networks for Identifying Potentially Failing Banks: An Experimental Study", *Expert Systems with Applications*, Vol. 18, pp. 185-199.

Altman, E. (1968), "Financial Ratios, Discriminant Analysis and the Prediction of Corporate Bankruptcy", *Journal of Finance*, Vol. 23, No. 4, pp. 589-609.

Aneja, R. and A. Makkar (2013), "A Comparative Study of Book Value Insolvency of India Commercial Banks: An Application of Z-Score Model", *The IUP Journal of Financial Risk Management*, Vol. 10, No. 2, pp. 19-27.

Betz, F., S. Oprica, T. A. Peltonen and P. Sarlin, "Predicting Distress in European Banks", Paper retrieved from http://www.ecb.europa.eu/pub/pdf/scpwps/ecbwp1597.pdf on December 29, 2013.

Calomiris, C.W. and J. R. Mason (2000), "Causes of US Bank Distress during the Depression", *NBER Working Paper*, No. 7919, Paper retrieved from http://www.nber.org/paper/w7919 on September 16, 2013.

Carapeto, M., S. Moeller, A. Faelten, V. Vitkova and L. Bortolotto (2010), "Distress Classification Measures in the Banking Sector", Paper retrieved from http://citeseerx.ist.psu.edu/viewdoc/summary?doi=10.1.1.175.7259 on December 20, 2013.

Chan, K. C. and N. F. Chen (1991), "Structural and Return Characteristics of Small and Large Firms", *Journal of Finance*, Vol. 46, No. 4, pp. 1467-1484.

Cipollini, A. and F. Fiordelisi (2009), "The Impact of Bank Concentration on Financial Distress: The Case of the European Banking System", *EMFI Working Paper*, No. 2, pp. 1-25.

Cole, R. A. and Q. Wu (2009), "Is Hazard or Probit More Accurate in Predicting Financial Distress? Evidence from US Bank Failures", Paper retrieved from http://mrpa.ub.in-muench.de/29182 on September 17, 2013.

Distinguin, I., I. Hasan and A. Tarazi (2009), "The Use of Accounting Data to Predict Bank Financial Distress in MENA Countries", Paper Presented at ERF 16th Annual Conference of Shock, Vulnerability and Therapy, Egypt, November 7-9, pp. 1-34.

Doguwa, S. I. (1996), "On the Early Warning Models for the Identification of Problem Banks in Nigeria", *CBN Economic and Financial Review*, Vol. 34, No. 3, pp. 462-487.

Elebute, K. (1999), "The Role of External Auditors in Resolving Distress", Retrieved from http://freewebs.com/bizadmin/publication4.html on December 30, 2013.

Hua, C. and L.G. Liu (2010), "Risk Return Efficiency, Financial Distress Risk and Bank Financial Strength Ratings", *Asian Development Bank Institute Working Paper*, No. 240, pp. 1-37.

Hunsa, H. N. and R. A. Rahman (2012), "Financial Distress-Detection Model for Islamic Banks", *International Journal of Trade*, *Economics and Finance*, Vol. 3, No. 3, pp. 158-163.

Jim, X. and F. N. Simone (2013), "Banking Systematic Vulnerabilities: A Tail Risk Dynamic CIMDO Approach", *Cahier D' Etudes Working Paper*, No. 82, Central Bank of Luxembourg, pp. 1-63.

Muranda, Z. (2006), "Financial Distress and Corporate Governance in Zimbabwean Banks", *Corporate Governance*, Vol. 6, No. 5, pp. 643-654.

Obamuyi, T. M. (2012), "Incessant Bank Distress and the Policies of Central Bank of Nigeria", *International Management Journal*, Vol. 1, No. 1 and 2, pp. 17-24.

Okezie, A. C. (2011), "Capital Ratios as Predictors of Distress: A Case Study of the Nigerian Banking System", *Global Journal of Human Social Science*, Vol. 11, No. 3, pp. 1-10.

Segoviano, M. A. and C. Goodhart (2010), "Distress Dependence and Financial Stability", *Central Bank of Chile Working Paper*, No. 569, pp. 1-36.

Sharma, N. and Mayanka (2013), "Altman Model and Financial Soundness of Indian Banks", *International Journal of Accounting and Financial Management Research*, Vol. 3, No. 2, pp. 55-60.

Tamini, H. A. H. A. (2012), "The Effects of Corporate Governance on Performance and Financial Distress: The Experience of UAE National Banks", *Journal of Financial Regulation and Compliance*, Vol. 20, No. 2, pp. 169-181.

Zaki, E., R. Bah and A. Rao (2011), "Assessing Probabilities of Financial Distress of Banks in UAE", *International Journal of Managerial Finance*, Vol. 7, No. 3, pp. 304-320.