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BENCHMARKING INCIDENCE OF DISTRESS IN THE NIGERIAN BANKING INDUSTRY ON ALTMAN SCALE

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Abstract

This paper applied the Altman's model in the prediction of distress in the Nigerian banking industry. Three banks (Union bank, Bank PHB and Intercontinental Bank) declared distress during the period of the study were used as case studies. Four years financial statistics prior to distress was used to compute the most discriminating financial ratios that were substituted into the Altman's model. The result of the analysis shows that Altman's model significantly predicted the distress state of each of the bank at 0.001level. The implication being that Altman's model can be validly applied in the prediction of the health state of banks in Nigeria. The paper recommends for further research on the domestication and adaptation of the model in order to improve its predictive ability.

Keywords: Benchmarking, Capital adequacy, Liquidity, Solvency, Distress, Financial ratio, Early warning signal

1. INTRODUCTION

Banks play important roles in the economic development of any country. As an important component of the financial system, they channel scare resources from surplus economic units to deficit units. In Nigeria, the banking sector has passed through various evolutions starting from the advent of banking dated back to 1892 to the present day of consolidation. Distress in the history of the Nigerian banking industry is not an entirely new phenomenon and this has had far reaching consequences on the economy. Among which includes loss of confidence by depositors in the industry with corresponding retardation in the tempo of capital formation for investment. Bank

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distress is not an accident and does not occur in a day. It is rather organic as well as systemic. It can therefore be predicted ahead of time bases on the identification of the early warning signals; thereby providing a sustainable framework for bank management and regulatory authorities to take decisive actions to nip the problem in the bud. Early signals of distress may include increasing portfolio of nonperforming loans, sustained drop in earnings per asset, high turnover of staff, consistent sourcing of funds from the interbank market, turnover of depositors, growing incidence of fraud, inability to meet statutory requirements, instability in corporate management (Donli, 2003; Kostyuk, 2011).

The importance of management quality in a bank cannot be over emphasized. Quality of management is the essential ingredient of success of corporations. In fact it is the very element that makes all the difference. A management decision in response to changes in the business environment determines performance and survival. It is therefore the prime responsibility of bank management to provide adequate shock absorbers (sustainable internal environment) that helps the bank to face the challenges of unstable external environment (Ogunleye, 2002; Oghojafor et al., 2010). This paper applies the Altman's model in the examination of health of banks in Nigeria as well as assessing the extent to which distress can be predicated based on early warning signals.

The problem of distress in the banking sector including outright failure of banks has been observed in Nigeria as far back as 1930. Indeed, between 1930 and 1958 over 21 banks failed. Also between 1994 and 1998, about 31 banks' licenses were revoked for failure to meet the statutory minimum capital requirement for banking operations, (Michael et al., 2009). In 2009, the CBN hinged the removal of five banks chief executive officers on distress occasioned by high concentration of non-performing loans on the board. The distress syndrome has caused a down turn in the economy and made negative impact on virtually every segment of the Nigerian economy among which according to Adehla (2002) are:

- Loss of public confidence in financial system.
- Loss of savings.
- Loss of investment.
- Increased unemployment and loss of jobs.
- Loss of national productivity and output.

The central objective of this paper is to assess the extent to which Altman's model which has found wide applicability can be used to predict the health state of banks in Nigeria. This paper is significant as it advocates a systemic strategy for distress prevention through early warning signals for banks in Nigeria. To this extent finding answers to questions "*to what extent is the predictive ability of Altman's model constrained by geographical boundaries?*" is of interest in this paper.

2. LITERATURE EVIDENCES

The regulatory authority CBN and Nigerian deposit insurance corporation (NDIC) uses off-site bank analysis in identifying distressed banking institution. This is usually based on statutory monthly return and the statement of audited annual account submitted by the banks. On-site examination however involves the physical examination of the books, records and affairs of licensed banks with a view to ensuring the

safety and their operations and compliance with the various banking laws and regulations.

The outcome of off-site bank examination programme assists the monetary authorities to distinguish between the above five levels of bank distress. According to Sahut and Mili (2003), before any bank can be given any of the above nomenclature, it must have been examined and rated using the variants of the CAMEL rating an acronym for:

- Capital adequacy.
- Assets quality.
- Management competency.
- Earnings strength.
- Liquidity sufficiency.

A bank is said to be in distress where evaluation by the supervisory authorities depicts the institutions as deficient in the following performance criteria.

- Under-capitalization in relation to the level of operation.
- High level of classified loans and advances.
- Illiquidity reflected in the inability to meet customers cash withdrawals.
- Low earnings resulting from huge operational cost and.
- Weak management reflected in poor credit quality, inadequate internal control, high rates of fraud and foreign.

The nature of distress can then be determined depending on the severity of the rating. For example, a bank may rate low on capital adequacy but high in management competency. However, it is most likely that if the asset quality is low then earnings strength and probably liquidity sufficiency will also be low. It will be pertinent at this juncture to examine briefly the CAMEL criteria.

Capital Adequacy: It determines how well banks can cope with shocks on their balance sheets. It measures the bank's solvency. Capital adequacy a bank is measured in relation to the relative risk weights assigned to the different category of assets held both on and off balance sheet items. Three ratios are often used to evaluate capital adequacy:

- Equity /total assets,
- Equity /total loans,
- Equity + loan loss reserve /loans.

Assets Quality: The solvency of a bank is at risk when its assets become impaired. The quality of an assets needed to be evaluated to know the ability of the assets to perform or carry out the objectives for which they are acquired is normal to ascertain whether they are in good working condition and this can be done by checking the age as well as ensuring that appropriate provision has been made for depreciation to determine the assets real book value. So it is important to monitor indicators of the quality of the assets in terms of over exposure to specific risks trends in nonperforming loans and the health and profitability of banks as a corporate entity. Credit risk is inherent in lending, which is the major banking business. It arises where a borrower defaults on the loan repayment agreement, which causes the bank to loss trends of cash inflow projected, which will eventually affect the profitability as well as shareholders funds through extra loan loss provisions. Two indicators used for the evaluation of assets as King (2006) asserts includes:

Managerial Quality: The competence of the staff and management of a bank can be deduced from the performance indices. However, it is necessary to check qualifications (Academic and Professional) as well as experience of the top management. It is expected banks with quality staff will be more efficient and be less likely to drift towards distress. The two indicators for

managerial quality are:

Total operating expenses/ total revenue ratio: A higher ratio indicates inefficiency of bank management and increase the probability of banking distress (Jimoh, 1993).

Earning Strength: The continued viability of a bank depends on its ability to earn an adequate return on assets and capital employed. This enables a bank to fund its expansion, remain competitive in the market and replenish and/or increase its capital. Some ratios that measures banks earning strength of a bank according to Ebhodaghe (1995) include:

- Return on Equity (ROE),
- Return on Assets (ROA),
- Net Interest Income /Total Revenue,
- Loan loss provision and
- Personal expenses.

Liquidity Sufficiency: Banks may be driven toward insolvency due to poor management of short-term liquidity. Indication liquidity insufficiency for a bank includes large maturity mismatches. An unmatched fund flow position potentially exposes the bank to the risk of illiquidity. The ratio used includes

Deposit/Total assets as an indicator of bank liquidity. Perfect liquidity implies that liabilities ranked by maturity be matched by corresponding assets. The size of deposits (short-term liabilities) over total assets gives a rough estimate of liquidity risk associated with deposit withdrawal (Olaniyi, 2006). The above criteria CAMEL rating is used in assessing the health state of banks as well as their classifications.

Early Warning Signals: Certain warning signals are however common to most financial institutions and these include:

- Persistent illiquidity: The inability to meet current obligations on a persistent basis.
- Persistent levy of penalties by regulatory authorities for failure to meet certain laid down regulatory requirements.
- Negative net worth: This may not be disclosed in the books if covered with paper profits especially where inadequate or no provisions have been made for bad and doubtful debts.
- Alarming high operating cost: This may result in overstating, in anticipation of future expansion and/or rapid expansion by opening too many branches within a relatively short period of time, accompanied by payment of higher salaries more than the industry's average in order to discourage staff from leaving.
- Charging of excessive interest on loans and advances. This is brought about by the necessity to cover the high cost of deposit, accommodation of high risk in a bid to increase profit rapidly.
- Accelerated deterioration of portfolio: This is as result of an increase in advances to risky customers with a resultant development of hard core overdraft accounts (Babalola, 2005).

3. METHODOLOGY

The five (5) banks among the banks operating in Nigeria at the time of the investigation have been declared distress by the regulatory authority, the Central Bank of Nigeria. This paper concentrated on three (3) of the above distress banks (Intercontinental Bank, Bank PHB and Union Bank). Financial aggregates (working capital, retained earnings, earnings before interest tax, equity as well as total assets and total assets and total book debts) from audited accounts of the banks under assessment for the period 2004-2008 were used to generate

the financial ratios that discriminated the most in predicting the health of a bank as reported by Altman (1968). The ratios include:

X1 = working capital to total assets

X2 = Returned earnings to total assets

X3 = Earnings before interest and taxes to total assets

X4 = Value of equity to total book debt

X5 = Gross earnings to total assets.

The Altman's model adopted by this paper is given as Zeta "Z".

$$Z = 1.02X1 + 0.014X2 + 0.033X3 + 0.006X4 + 0.999X5 \quad (1)$$

The decision rule from Altman is Z < 1.80 = financially distress.

The paired sample t-test is used in testing the hypotheses earlier stated. Here the statistic is the difference between the paired observations, which is symbolized by d (for difference).

$\bar{d}$ is average difference. $\bar{d}$ has the same value as the difference between the means of the two samples (Altman Z-score for each bank and Altman's standard Z score of 1.80).

The mean of the differences is the same as the difference between the means

$$(\bar{d} = \mu_1 - \mu_2) \quad (2)$$

$$d = \sum x / n \quad (3)$$

The test asks the question: Is there a difference between the sizes of the paired observations?

H0 : = 0

Ha : ∫ 0 (non directional)

Standard Error = SEdiff = sdiff /sqrt(n)

The t-value calculated is the ratio of a statistic divided by the standard error.

$$t_s = \frac{\bar{d}}{SE_{\bar{d}}} \quad (4)$$

4. RESULTS AND DISCUSSIONS

Table 4. shows that Intercontinental Bank

Table 1. Financial Statistics of Intercontinental Bank

	2008 ₦m	**2007** ₦m	**2006** ₦m	**2005** ₦m	**2004** ₦m
(1) Total assets	1392210	704784	369234	203647	96786
(2) EBIT	45,633	22567	10263	8149	4346
(3) Working capital	162536	135152	43070	29142	5646
(4) Returned Earnings	339994	15120	7215	5703	3040
(5) Equity	200413	156889	54567	34678	10110
(6) Book debt	1098469	480133	254507	134383	66378
(7) Gross earning	174615	37866	41516	32795	21410

Sources: Audited Account 2008

Table 2. Altman's Ratios for Intercontinental Bank

	Year	**2008**	**2007**	**2006**	**2005**	**2004**
X_1	Working capital / total assets	0.1166	0.1911	0.1165	0.1430	0.0583
X_2	Returned earnings / total assets	0.0243	0.0214	0.0192	0.0278	0.0314
X_3	Earnings before interest and taxes / total assets	0.0303	0.0303	0.0272	0.0093	0.0107
X_4	Equity / total bank debts	0.1500	0.3166	0.2500	0.2500	0.1500
X_5	Gross earnings / total assets	0.1253	0.1246	0.1124	0.1601	0.2212

Source: Computed based on Table 1. values

for the period 2004 - 2008 exhibited a health index of -1.52 when benchmarked on the Altman minimum standard of 1.80. The above incidence of distress is highly significant as the tcal value of 89.6 is significant at 0.01 level.

Table 8. shows that Bank PHB for the period 2004 - 2008 exhibited health index of -1.56 (distress) when benchmarked on the Altman minimum standard of 1.80. The above incidence of distress is highly significant as the tcal value of 52.89 is

Table 3. Z-Score of Intercontinental Bank

Year	2008	2007	2006	2005	2004
Working capital to total assets	0.1190	0.1950	0.1189	0.1459	0.0595
Returned earnings to total assets	0.0034	0.0030	0.0027	0.0039	0.0044
Earnings before interest and taxes to total assets	0.0010	0.0010	0.0009	0.0013	0.0015
Equity to total bank debts	0.0009	0.0019	0.0015	0.0015	0.0009
Gross earnings to total assets	0.1252	0.1245	0.1123	0.1609	0.2210
Zeta Score (₹)	0.25	0.32	0.24	0.32	0.29
Altman Standard	1.80	1.80	1.80	1.80	1.80

Source: Computed based on substitution of Table 2. values into Equation 1

Table 4. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 Zintercon - Altmanstd	-1.52	.03782	.01691	-1.563	-1.469	-89.6	4	.000

Table 5. Financial Statistics of Bank PHB

	2008 ₦m	2007 ₦m	2006 ₦m	2005 ₦m	2004 ₦m
(1) Total assets	1036586	378949	156001	51670	25026
(2) EBIT	25808	10159	3483	1055	885
(3) Working capital	133233	17837	20076	9293	2004
(4) Returned Earning	19437	7637	1180	702	512
(5) Equity	7577	3217	9652	4311	1838
(6) Book debt	739441	307887	109829	2189	2005
(7) Gross earning	86443	35589	12973	6642	5258

Sources: Audited Account 2008

Table 6. Altman's Ratios for Bank PHB

Year	2008	2007	2006	2005	2004
Working capital to total assets	0.1285	0.0471	0.1343	0.1798	0.0800
Returned earnings to total assets	0.0185	0.0207	0.0071	0.0135	0.0207
Earnings before interest and taxes to total assets	0.2424	0.2424	0.2112	0. 2112	0.3636
Equity to total bank debts	0.0166	0.0166	0.0833	0.200	0.100
Gross earnings to total assets	0.0831	0.094	0.0831	0.1285	0.2102

Source: Computed based on Table 5. values

Table 7. "Z" scores for Bank PHB

Year	2008	2007	2006	2005	2004
Working capital to total assets	0.1311	0.0480	0.1370	0.1834	0.0817
Returned earnings to total assets	0.0026	0.0029	0.0010	0.0019	0.0029
Earnings before interest and taxes to total assets	0.008	0.0008	0.0007	0.0007	0.0012
Equity to total bank debts	0.0001	0.001	0.0005	0.0012	0.006
Gross earnings to total assets	0.0830	0.0940	0.0830	0.1284	0.2100
Zeta value (Ƶ)	0.22	0.15	0.22	0.31	0.30
Altman Standard	1.80	1.80	1.80	1.80	1.80

Source: Computed based on substitution of Table 6. values into Equation 1

Table 8. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 ZPHB - Altmanstd	-1.560	.06595	.02950	-1.642	-1.478	-52.89	4	.000

significant at 0.01 level.

Table 12. shows that Union Bank for the period 2004 - 2008 exhibited health index of -1.60 when benchmarked on the Altman minimum standard of 1.80. The above incidence of distress is highly significant as the tcal value of 71.3 is significant at 0.01 level.

Table 9. Financial Statistics of Union Bank

	2008 ₦m	2007 ₦m	2006 ₦m	2005 ₦m	2004 ₦m
(1) Total assets	1106779	807074	619800	517564	398271
(2) EBIT	48493	29746	1532	12350	11953
(3) Working capital	(123)	85151	71488	74333	24640
(4) Returned Earning	(71052)	24737	2474	3766	3111
(5) Equity	53145	111271	96630	95685	39129
(6) Book debt	758390	649334	417406	252418	200511
(7) Gross earning	130187	92935	71090	50736	44791

Sources: Audited Account 2008

Table 10. Altman's Ratios for Union Bank

Year	2008	2007	2006	2005	2004
Working capital to total assets	(0.0009)	0.0941	0.1157	0.1436	0.0618
Returned earnings to total assets	(0.0071)	0.0271	0.0043	0.0071	0.0078
Earnings before interest and taxes to total assets	0.0424	0.0303	0.0030	0.0242	0.0303
Equity to total bank debts	0.0701	0.1713	2.2315	0.3790	0.1951
Gross earnings to total assets	0.1177	0.1024	0.1147	0.0981	0.1125

Source: Computed based on Table 9. values

5. CONCLUSIONS

- Based on the results of the analysis carried out the following conclusions are made;

Table 11. Z Score for Union Bank

Year	2008	2007	2006	2005	2004
Working capital to total assets	(0.0001)	0.0960	0.1180	0.1465	0.0631
Returned earnings to total assets	(0.0010)	0.0038	0.0006	0.0010	0.0011
Earnings before interest and taxes to total assets	0.0014	0.0010	0.0001	0.0008	0.0010
Equity to total bank debts	0.0004	0.0010	0.0014	0.0023	0.0012
Gross earnings to total assets	0.1176	0.1023	0.1146	0.0980	0.1124
Zeta Score (Ƶ)	0.12	0.20	0.23	0.25	0.18
Altman Standard	1.80	1.80	1.80	1.80	1.80

Source: Computed based on substitution of Table 10. values into Equation 1

Table 12. Paired Samples Test

	Paired Differences					t	df	Sig. (2-tailed)
	Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference Lower	Upper			
Pair 1 ZUnion - Altmanstd	-1.60	.05030	.02249	-1.666	-1.542	-71.3	4	.000

• The three banks sampled were actually in distress when benchmarked on the Altman's scale. This is consistent with the position of the Central bank of Nigeria;

• The application of the Altman's failure prediction model in not constrained by geographical boundaries;

• The Altman's model which has been applied in other economies has can be validly applied to the Nigerian banking industry;

• Financial ratios remain a valid index for assessing the financial health of banks as posits by Altman;

• Sustained decrease in the following ratios: working capital to total assets; Retained earnings to total assets; Earnings before interest and taxes to total assets; Value of equity to total book debt; Gross earnings to total assets are signals of distress in banks as earlier reported by Altman.

It therefore follows that levels of Capital adequacy; Assets quality; Earnings strength; Liquidity sufficiency and Management competency are critical indices for measuring the health state of banks in Nigeria as earlier suggested by Altman.

6. RECOMMENDATION

• Based on the results and conclusions made the following recommendations are made as a way of averting the problem of distress in the Nigerian banking industry;

• Effort should be made by the CBN and other regulatory agencies in the industry to domesticate the Altman's model for a result oriented monitoring of the health of banks.

The domestication of the model can be achieved through the development of interactive systems built around financial ratios as used by Altman with some adjustment index based on character of management of banks be used for on-site and off-site supervision of banks.

БЕНЧМАРКИНГ ПОЈАВЕ ПРОБЛЕМА У НИГЕРИЈСКОМ БАНКОВНОМ СЕКТОРУ ПОМОЋУ АЛМАНОВЕ СКАЛЕ

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Извод

У овом раду је примењен алтманов модел у предвиђању проблема у нигерисјком банковном сектору. Три банке (Унион банка, ПХБ банка и Интерконтинентална банка) пријавиле су поремећаје током периода проучавања и употребљене су као студије случаја. Употрбљена је четворогодишнња финансијска статистичка база, пре појаве поремећаја, како би се израчунали најзначајнији финансијски односи, који су потом унети у Алман-ов модел. Резултати анализе показују да Алтман-ов модел може значајно да предвиди појаву пореćћаја у свакој од банака на нивоу тачности 0.001. На тај начин, овај модел се може користити у анализи стања било које банке у Нигерији и превенцији појаве проблема. У раду се предлажи и даља истраживања на овом пољу како би се побољшала тачност предвиђања разматраног модела.

Кључне речи: Бенчмаркинг., адекватност капитала, ликвидност, солвентност, поремећај, финансијски однос, сигнал раног упозорења

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