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Soundness and Unsoundness of Banking Sector in Nigeria: A Discriminant Analytical Approach.

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Abstract

This paper set out to determine the factors that discriminate most in the classification of banks into sound and unsound position using method of discriminant analysis. Data used were sourced from the annual report of the Nigerian deposit and insurance corporation. The findings revealed the order of severity of institutional factors that could lead to bank distress. The none performing loans to total loans contributed about 53.4% of the total discriminant scores while capital to risk weighted asset contributed 19 percent to the group separation of the discriminant function. Others, gross loan to deposit ratio (with 14.34%), average liquidity ratio (with 9.25%) and insured deposit to total deposit (with 3.76%) made little discriminating contributions while the rest of the variables made insignificant contributions. Thus, by this reason of contribution, the 25% non scientifically determined (and subjective based judgment) component weight attached to asset quality in the CAMEL rating should be increased to at least 1/3 (30%) of the total weight components since its components are found to dominate the discriminant score.

Keywords : Soundness, Unsoundness, Bank Distress, Non Performing Loan, Capital to Risk Weighted Assets, CAMEL, Discriminant Analysis.

Introduction

In ordinary parlance, the word ‘distress’ connotes unhealthy situation, inability or state of weakness inhibiting the achievement of a set up goal. Distress in the banking industry occurs when a fairly reasonable proportion of banks in the system are unable to meet their obligations to their customers as well as their owners and the economy (CBN/NDIC, 1995). In Nigeria, the case of distress stopped featuring prominently in 2004.

Banks have dual obligations of maximum liquidity to their depositors and maximum profitability to their shareholders. Maximum liquidity can be attained at the cost of no profit since idle cash is barren and does not yield any interest, while profitability can be achieved only at the cost of illiquidity

since hard assets are usually the most illiquid of banks' assets. Hard assets otherwise called the less liquid assets are usually made up of investments, loans and advances (Nwankwo, 1980).

Though banks earn some income through charges, such as, charges on operating the current account, providing safe-deposit boxes, remittance facilities to their customers; the bulk of the commercial banks' profits – more than 75 percent of the profit is however earned from interest on loans and investment which the banks make using the money belonging to their depositors. (Vaish, 1977). It is therefore reasonable to expect banks to carry out in their portfolio, a sizeable proportion of loans and advances since they attract the highest rate of return. However, that a bank has invested too much in interest – bearing assets and/or that some of its investments in loans and advances are not recovered, compel the bank to finding itself incapable of paying back its depositors' money – a situation which could precipitate a run on the bank and consequently lead to banks' failure (Okpara 1997). Since most of the liabilities of the commercial banks are payable on demand, the banks as a precaution against unanticipated withdrawals by customers keep cash reserves equally in a certain fraction or percentage of its total cash deposit liabilities.

According to Okpara (2008) distresses in the banking system as well as outright bank failure are as old as the invention of banking operation itself. For instance, there were catastrophic bank failures in the United States of America in the 1930s and to a lesser extent in the countries of the organization for economic cooperation and development (OECD) in the seventies and eighties. In the light of this, Ogunleye (2006) noted that no country was immune to the wave of financial sector crisis in the 1980s and 1990s and stressed that reports have it, that two – third of member countries

of the international monetary fund (IMF) both developed and developing country members, had significant banking problems. In 1985, over 900 of the nearly 15,000 banks in the U.S. were on regulators problem lists. Two of Canada's 14 banks failed, while Japan's largest mutual bank had to be rescued (NDIC, 1999).

Nigeria is not an exception. In 1899, the Anglo – African Bank was established but on account of hard time, merged with the BBWA in 1912. In 1925 Barclays Bank Dominion Colonial and oversea was formed and it absorbed the colonial bank which sprang up in 1917 into an integrated international bank. The first indigenous bank, the industrial and commercial bank was established in 1929. This bank however could not survive the financial and management challenges and was forced out of the race in 1930. Another indigenous bank, the Nigerian Mercantile Bank came up in March 1931 but liquidated and closed down in 1936 owing to similar problem. Many banks sprang up “between” 1933 – 1952. Between February 1951 and May 1952 alone, seventeen indigenous banks were registered but most of them could not withstand the taste of the days and therefore collapsed. Thus, between 1930 and 1958 over 21 bank failures were recorded. These years however marked the era of free banking in Nigeria (Okpara 2008).

The era of supervision, examination and control of banks in Nigeria which started with the bank ordinance of 1952 and its subsequent amendments, was not without bank crisis. The radical changes in financial developments in 1987 brought about by the Structural Adjustment Programme of 1986 did not prevent bank crisis. The said innovations of the CBN in 1986 has not been able to provide enough backbone for the financial industry as reflected by the down turn in the events of late 1980s which were characterized by the unprecedented level of distress as reflected in large

volume of non-performing loans, insolvency, liquidity problem and default in meeting depositors and inter-bank obligations. This poor state of the banking system was exposed in 1989 with the government directive to withdraw the deposits of governments and other public sector institutions from banks to CBN. Thus, bank distress became obvious and increased from 7 in 1989 to a peak of 60 in 1995 while the amount required for recapitalization of distressed banks increased from N1.1 billion in 1989 to N30.5 billion in 1995, N43.9 billion in 1996 while peaking at N98.1 billion in 2004. Non-performing loans for the distress banks increased from N2.9 billion to N29.5 billion in 1994 and 1995, and increased further to N40.7 billion in 1997 while peaking at N149.6 billion in 2004.

Precisely, the Nigerian banking industry in 1994 operated in an environment that was not very conducive. On the economic front, the nation continued to witness high rate of inflation, balance of payments problems, high debt burden, low productivity, industrial unrest and general economic decline. In addition, the socio – political uncertainties in 1994 compounded the economic situation. As would be expected, these led to a decline in the general performance of banks during the year under review (NDIC, 1994).

Recorded also in that year was the high number of commercial banks involving in frauds and forgeries. All these put together led to a decline in the general performance of banks during the year under review.

With government's resolve to address the political, economic as well as distress problem in the industry, the banking system showed some positive responses in the late 1998 till the year 2000 (NDIC 1998, table 1). However, in 2001 the CBN tightened monetary policy to stem the liquidity surge arising from expansionary fiscal operations of the 3 tiers of government due to renewed emphasis of fiscal federalism. The CBN

progressively raised its minimum rediscount rate (MRR) by 650 basis points from 14.0 percent to 20.5 percent, yet inflation rate still rose sharply from 6.9% in 2000 to 18.9% in 2001. (See NDIC 2001; ix, 7). This singular measure has negative spillover effect on the banking system whose total loans and advances increased from N519 billion in 2000 to N803 billion in 2001. The distressed bank's loans and advances increased from N26.4 billion in 2000 to N123.1 billion in 2001 and by 2004 rose to N191.24 billion. While the non performing loans of the distressed banks rose increasingly from N29 billion in 2000 to N149.6 billion in 2004 (see table 1 and 2). The reason for not extending the data to the recent years is for the sake of capturing the severe bank distress periods that stopped in the year 2004.

Table 1 Loans and Non-performing Loans Indices in the Banking Industry (1989-2004)

Year	Loans and Advances (N billion)		Non-Performing Loans and Advances (N billion)		Proportion of Non-Performing Loans and Advances to Total Loans (N billion)	
	Industry	Distressed	Industry	Distressed	Industry	Distressed
1989	23.1	4.3	9.4	2.9	40.8	76.1
1990	27.0	6.4	11.9	4.7	44.1	72.8
1991	32.9	5.4	12.8	4.1	39.0	76.5
1992	41.4	15.7	18.8	6.8	45.5	43.0
1993	80.4	25.3	32.9	14.7	41.0	58.0
1994	109.0	54.6	46.9	29.5	43.0	64.6
1995	175.9	48.9	57.8	29.5	32.9	68.9
1996	213.6	51.7	72.4	33.9	33.9	75.5
1997	290.4	49.6	74.9	40.7	25.81	81.92
1998	327.2	24.2	63.3	18.7	19.3	77.3
1999	370.2	29.1	24.8	21.0	25.6	72.2
2000	519.0	26.4	111.6	29.0	21.5	75.8
2001	803.0	123.1	135.7	35.4	16.9	28.9

2002	938.63	102.4	199.6	40.0	21.27	39.06
2003	1205.03	129.9	260.19	98.4	21.59	76.7
2004	1519.76	191.24	350.82	149.6	23.08	79.2

Source: NDIC Annual Report and Bank Returns

Table 2 Performance indices in the Banking Subsector (1990-2004)

Year	Total Number of Banks	Number of banks in distress	Deposits of Distressed banks to total deposits in banking industry (%)	Assets of Distressed banks to total assets in banking industry (%)	Amount required for recapitalization of Distressed banks (N' billion)
1990	107	9	14.6	23.7	2.0
1991	119	8	4.4	16.4	2.4
1992	120	16	18.1	20.9	2.4
1993	120	33	19.2	18.6	23.6
1994	116	55	29.4	18.6	23.4
1995	115	60	14.1	19.8	30.5
1996	115	50	14.7	11.0	43.9
1997	115	47	9.0	7.6	42.8
1998	89	15	3.5	3.9	15.5
1999	90	13	1.6	1.5	15.3
2000	89	12	2.5	20.0	10.3
2001	90	9	2.0	3.0	12.1
2002	94	NA	7.2	5.74	20.6
2003	89	NA	4.9	4.7	79.7
2004	89	NA	6.0	5.4	98.1

Source: NDIC Annual Report and Bank Returns

The CBN asserted that many of the banks were still in distress and if allowed to fail woefully, the ensuing confidence crisis might lead to disintermediation, demonetization, a collapse of the payment system and a serious depression of the economy (Soludo, 2004). Thus, CBN came up in July 2004 with recapitalization policy of raising the mandatory minimum capital base of N2 billion to a new mandatory minimum of N25 billion

before or on December 2005. Okpara (2009) in his research paper however, figured out that the raising of capital base to N25 billion could be necessary but not a sufficient measure to averting a run on banks. According to him, the factored out critical factors namely, undue interference from board members, political crisis, undercapitalization and fraudulent practices must be dealt with if bank failures must be brought to control in Nigeria.

This paper however will set out to determine the institutional factors that discriminate most in the classification of banks into sound and unsound (distress) position.

Review of Literature

So many authors, regulatory and supervisory institutions have identified similar factors leading to unsoundness of banks in Nigeria.

Odejimi, (1992) contended that the major factors responsible for the precarious financial condition of the banks were huge uncollectible loans and advances, the financing of long-term assets with short-term funds; overtrading, unsound management practices and reliance on volatile deposits. Okpara (1997) saw loan default as one of the major causes of distress and identified factors such as wrong appraisal techniques, interference by owners or banks top officials who may even obtain loans without collaterals, delay in the approval and disbursement of loans which most often help to fuel loan defaults; mischanneling of loan funds and dubious character of the borrowers as catalyzing loan default. The collaborative study of distress by CBN and NDIC identified and weighted factors such as

- * bad loans and advances
- * fraudulent practices

- * undercapitalization
- * rapid changes in government policies
- * bad management
- * lack of adequate supervision and
- * undue reliance on forex

While brandishing factors like economic depression, political crisis, bad debt and undue interference from board members as been responsible for banks being severely distressed (CBN/NDIC 1995).

Okpara (2009) noted that the general institutional factors that led to the identified factors on the banking system could be discussed as insiders abuse, weak corporate governance, weak risk asset management and inadequacy of capital. In his empirical analysis, however, four critical endogenous and exogeneous factors were identified. These factors are

- * undue interference from board members
- * political crisis
- * undercapitalization and
- * fraudulent practices

Adeyemi (2007) in his practical observation noted that twenty four out of the eighty-nine deposit money banks that existed then exhibited one form of weakness or the other. Prominently, undercapitalization and/or insolvency, illiquidity, poor asset quality, weak corporate governance, boardroom squabbles, dwindling earnings and in some cases loss making were asserted by him as being commonly associated with the distressed banks. In the face of this difficulty, some of the banks went into rent-seeking and non banking businesses that were not related to core banking functions.

Ebong (2004) observed that most banks in the country had a capital base of less than US\$ 10 million. According to him, the capital base of the

largest bank before the reforms, was about US\$526 million compared to Malaysia where the smallest bank had a capital base of US\$526 million. The small size of most Nigerian banks coupled with their high overheads and operating expenses, had serious repercussions for the cost of intermediation. As a result of this, many of them could not meet clients' request for funding. Other problems that called for consolidation programme include:

- * Heavy reliance on government patronage as the public sector accounted for over 20% of aggregate deposits in the industry. For some banks, the dependent ratio was as high as 50%.
- * Weak corporate governance; as number of Board members and management staff of banks were more interested in pursuing their private or narrowly defined interests even at the detriment of the corporate goals and objectives of the banks they serve.
- * The relative ease of entry owing to low capital requirement resulted to unhealthy competition that led the banks to unethical and non-core banking business like trading in foreign exchange and sometimes indirect importation of goods. These practices boomeranged on banks (Soludo, 2004).

Soyibo, Alashi and Ahmed (2004) contended that among the number of potential causes of distress in banks are poor management, inadequate capital base, fraud, and insider abuse by management and board members. Others are poor asset and liability management, macroeconomic instability, political instability/interference, inadequate legal frameworks and structures, and poor regulation and supervision. Competition, overly aggressive pursuit of growth, and excessive risk-taking can also contribute to bank distress (CBN/NDIC, 1995; Comptroller of the Currency, 1988; Short et al., 1985). These factors have occasioned the weighted average of the scores on the

various components of CAMEL parameters currently in use for identifying distress. The different factors and scoring weights attached to them are shown in table 3 as follows.

Table 3. Weight of CAMEL Factors in use in Nigeria

Factor	Component	Component Weight (%)	Factor weight (%)
1.Capital	a. Capital to risk assets ratio	15	25
	b. adjusted capital ratio	5	
	c. Capital growth rate	5	
2. Asset quality	a. Non-performing risk assets to Total risk assets	15	25
	b. Reserve for losses to non-performing risk assets	5	
	c. Non-performing risk assets to capital and reserves	5	
3. Management	a. CAEL/85 *	5	15
	b. Compliance with laws/regulations	10	
4. Earnings	a. Profit sector tax to total assets	5	20
	b. Total expenses to total income	5	
	c. Net interest income to total earning assets	5	
	d. Interest expenses to total earning assets	5	
5. Liquidity	a. liquidity ratio	5	15
	b. Net loans and advances to total deposits	5	
	c. Volatile dependence ratio	5	
Total		100	

Notes:

*CAEL/85 is composite scores for capital, Assets, Earnings and Liquidity divided by 85,

* Net of interest in suspense.

Source: Central Bank of Nigeria

Capital to risk asset ratio as well as non-performing risk assets to total risk assets have the highest weights of 15% each. This is followed by compliance with laws/regulations that is assigned the component weight of 10%, the rest has 5 component weight each. However, these weights are not scientifically determined but are based on subjective judgment yet they form the bedrock rating system for the supervisory and regulating authorities.

By the total score of the composite rating, banks are classified very sound, sound, satisfactory, marginal and unsound. The classification is shown in table 4 below. Banks rated A and B are said to be very sound and sound respectively. The classification is presented in table 4 below.

Table 4: Bank Classification Based on the Composite Scheme

Class	Composite score (%)	Rating	Alphabetical rating
A	86-100	Very sound	A
B	71-85	Sound	B
C	56-70	Satisfactory	C
D	41-55	Marginal	D
E	0-40	Unsound	E

Source: Soyibo, Alashi and Ahmad 2004.

A bank with a “C” rating is one whose financial condition is fundamentally sound and stable and which should be able to withstand business fluctuations. Its adverse findings are minor and can simply be corrected through supervision. A bank rated “D” is classified as marginal

and may have some serious financial weaknesses that may not be satisfactorily addressed. Such ailing bank is placed under prudential management and close supervisory attention to correct its deficiencies and return it to normalcy.

Lastly, banks rated “E” are classified as “unsound”. Such banks are in coma and have immediate probability of failure; as they are bedecked with severe weaknesses, critical and precarious conditions. To avert the banks from total failure, urgent assistance from the owners or other financial institutions becomes necessary.

Poor management is perhaps the greatest cause of bank failure. The comptroller of the Currency (1988) ascribed over 90% of bank failures since deregulation in the United State to poor management and other internal problems. Managerial decisions to accept risk also play an important role in the determination of bank failures. Poor management resulting from wrong appraisal technique can lead to high non performing loans and advances, high ratio of non performing loans to total loans. It can also lead to reduction in asset value, (owing to non performing hard assets), chop into the capital base (owing to frauds) and cause a drop in the volume of deposits resulting from depositors’ loss of confidence. The deteriorated assets and capital will now call for recapitalization. Any amount of capital if not under proper management can be eroded to inadequacy.

The dividend (or retention) policy in the managerial finance function requires that a proportion of earnings be apportioned to shareholders as remuneration for their capital and the rest retained to plough into the business to enhance the capital base. The proper implementation of this requires managerial acumen. Also investment decision, financing decision and current asset management are exclusive finance functions that require

expertise and honesty in discharge. Thus, management is vital to the performance of the banks.

Materials and Methods

Discriminant analysis technique which classifies an observation into failed or non-failed dummy variables will be employed to evaluate the model. the estimated centriod for sound and unsound banks will be compared while the contributions of the variables of the total discriminant scores will be estimated in percentage form. To ascertain the reliability of the discriminant function, the Eigenvalue, the canonical correlation, the Wilk's Lambda and the Chi statistic of the discriminant function will all be evaluated.

Grouping of the banks into two is based on classification of the banks into sound and unsound. Industry's data are used as proxy for the sound banks. The data are sourced from the Nigeria Deposit Insurance Corporation (NDIC) Annual Report and Statement of Accounts. The sound banks are assigned to group 1 while the unsound banks are assigned to group 0. the function of the variables X_1, \dots, X_n that discriminates the variables into the two mutually exclusive and exhaustive categories, the sound and unsound will be a linear combination of the X_i explanatory variables such that the explicit presentation of the model takes the form

$$Z = b_1 x_1 + b_2 x_2 + b_3 x_3 + \dots + b_n x_n$$

Where Z = the discriminant variables-sound and unsound banks

X_i =the explanatory variables namely, insiders credit to total credit (InsCTC), Recapitalization requirement to total assets (RecapRTA), Capital to Risk weighted Asset ratio (CRWARatio), Nonperforming Loans to total Loans (NonPLTL), Average Liquidity Ratio (AVliqratio), Gross Loans to

Deposit Ratio (GLoans DR) and ratio of insured deposit to total deposits (RIDPTotal).

B_i = the parameters to be estimated.

Result and Discussions

The predictive model for the standardized canonical discriminant function is estimated and stated thus,

$$Z = -0.055 \text{ InsCTC} + 0.002 \text{ RecapRTA} + 0.189 \text{ CRWARatio} + 1.117 \text{ NopLTL} + 0.404 \text{ AvLiqratio} + 0.193 \text{ GLoansDR} + 0.158 \text{ RIDeptotal}.$$

With this result in view, the percentage contribution of individual variables to the total discriminant score is calculated in table 6, having determined the mean difference of the variables as presented in table 5.

Table 5 Group Means and Mean Difference for Discriminating Variables

Variables	Sound Banks	Unsound Banks	Mean Difference
InsCTC	6.9222	9.5889	2.6667
RECAPRTA	1.3333	41.3778	40.0445
CRWARatio	12.8000	-91.2433	-104.0445
NonPLTL	23.2233	72.5989	49.3747
AvLiqratio	22.0078	-1.63900	-23.6468
GLoansDR	78.1956	1.462900	-76.7327
RIDPTotal	21.0278	45.6067	24.5789

Source: Author's Computation

Table 6 Percentage Contribution of Individual Variables Total Discriminant Scores

Variables	Coefficients	Mean Differences	Product	Percentage Contribution
InsCTC	-0.055	2.667	-0.1467	0.14

RecapRTA	0.002	40.0445	0.0801	0.08
CRWARatio	0.189	-104.0433	-19.6642	19.00
NonPLTL	1.117	49.3747	55.1515	53.40
AVLiqratio	0.404	-23.6468	-9.5533	9.25
GLoansDR	0.193	-76.7327	14.8094	14.34
RIDPTotal	0.158	24.5789	3.8835	3.76
			103.2887	100

Source: Author's Computation

The above table shows that variables such as nonperforming loans to total loans, capital to risk weighted asset ratio, gross loans to deposit ratio and average liquidity ratio made remarkable contributions to the total discriminant scores. Nonperforming loans contributed about 53.40% of the total discriminant scores for the function while capital to risk weighted asset follows, with 19% to group separation of the discriminant function. Gross loans to deposit ratio and average liquidity ratio made poor contributions of 14.34% and 9.25% respectively. Insured credit to total credits and recapitalization requirement to total asset made insignificant contribution while ratio of insured deposits to total deposits made a minimal contribution of 3.76% to group separation of the discriminant function. In the light of the findings (see the product signs), the chance of belonging to the group of unsound banks increases as its nonperforming loans and/or gross loans to deposit ratio increases. While it decreases with the increase in capital to risk weighted asset ratio and average liquidity ratio.

To verify the reliability of the function, we employ the Eigenvalues, Wilk's Lambda that transforms into Chi square statistic and the canonical correlation measures summarized in table 7 as follows.

Table 7 Wilk's Lambda

Discriminan	Eigenvalues	Canonical	Wilk's	Chi-	DF	Significance
-------------	-------------	-----------	--------	------	----	--------------

t function		correlation	Lambda	square		level
1	5.540	0.920	-0.153	23.475	7	0.001

Source: Author's Computation

The Eigenvalue of the function is high, the function is canonically highly correlated (92%), indicating high association between the discriminant variables and the set of defined dummy variables. While the chi-square is significant, and hence establishing a prima facie evidence that differences exist between the group. The F statistic is also significant. Thus, the hypothesis that all the discriminant coefficients are equal to zero is rejected; the estimated function therefore, can be reliably used to discriminate between sound and unsound banks.

To show how well the banks are classified as sound and unsound, the classification performance of the estimated discriminant function is presented in the table 8 below.

Table 8 Classification Result

Z		Predicted group membership		Total
		0	1	
Original	Count 0	8	1	9
	1	0	9	9
	Ungrouped cases	0	2	2
	% 0	88.9	11.1	100.0
	1	0	100.0	100.0
	Ungrouped cases	0	100.0	100.0
Cross-validated _a	Count 0	7	2	9
	1	0	9	9
	% 0	77.8	22.2	100.0
	1	0	100.0	100.0

a. Cross validation is done only for those cases in the analysis. In cross validation, each case is classified by the functions derived from all cases other than that case.

b. 94.4 % of original grouped cases correctly classified

c. 88.9% of cross-validated grouped cases correctly classified.

From the above table, the sound banks are 100% correctly classified, but the proportion of unsound banks erroneously classified as sound constitute about 11%. This kind of error constitutes a risk in banking sector. The 11% unsound banks misclassified for sound banks may default in their performance due to misspecification error.

Conclusion

The banking system categorized as sound or unsound was evaluated to determine the extent of discriminating power of the independent variables. The explanatory variables used are the insiders credit to total credit, recapitalization requirement to total assets, capital to risk weighted asset ratio, nonperforming loans to total loans, average liquidity ratio, gross loans to deposit ratio and insured deposit to total deposits.

The finding reveals that nonperforming loans to total loans contributed about 53.4% of the total discriminant scores for the function, while capital to risk weighted asset contributed 19% to the group separation of the discriminant function. Others are gross loans to deposit ratio which made little contribution of 14.34%, the average liquidity ratio that contributed 9.25% and the insured deposits to total deposit that made 3.76% contribution. The rest of the variables made insignificant contributions. By this analysis, order of severity of the institutional factors that could lead to bank distress has been identified.

The policy implication of this is that the chance of belonging to the group of unsound banks increases profoundly as its nonperforming loans and/or gross loans to deposit ratio increases.

The 25 percent non scientifically determined component weight attached to asset quality in CAMEL rating should be increased to at least 1/3

(30%) of the total weight components since its components are found to dominate the discriminant score. While the weights attached to other factors in CAMEL rating with the exception of capital should be adjusted downwards to accommodate the 100 percent score point. The rightful and more scientific attachment of weights to CAMEL components will prevent the banking sector from misclassification error which constitutes a threat to the performance of the affected banks and the economy at large. The nonperforming loans to total loans which play a dominant role in leading to unsoundness of the banking system should be given priority regulatory and supervisory control. Surveillance should however not be neglected on all others, especially the capital risk weighted asset ratio, the gross loans to deposit ratio and the average liquidity ratio.

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