



## CAMEL RATING MODEL: AN EFFECTIVE PARAMETER FOR PREDICTING BANK DISTRESS IN NIGERIA

John Ugah<sup>1</sup>, Bassey Ina Ibor<sup>1</sup>, and Fidelis Anake Atseye<sup>1</sup>

<sup>1</sup>Department of Banking and Finance  
University of Calabar  
Nigeria

**Corresponding Author:** ugahson@gmail.com or johnugah@unical.edu.ng

### ABSTRACT

The paper tested the efficacy of the use of the CAMEL Rating Model to predict bank distress in Nigeria during the period 2009-2018. Data for the study were collated from published annual reports and accounts of a sample of 10 deposit money banks. The study employed the techniques of Multiple Discriminant (MDA) and Multiple Regression Analyses on the data. The MDA results revealed that 5 out of the 10 sampled banks obtained Z-score values within the region of distress. Using the CAMEL Rating Model, banks were categorized as distressed and non-distressed banks. The result further revealed that all distressed banks fell under the marginal category, indicating symptoms of financial deterioration in their asset quality ratios. Again, the CAMEL Rating values were regressed against the Z-score values to provide further impetus to distress prediction. The regressed estimates showed the quality of assets, efficiency of management and the state of liquidity impact significantly on bank distress. On the other hand, capital adequacy and earning strength had an insignificant effect on bank distress. Therefore, CAMEL variables were effective in predicting bank distress in Nigeria in the period of study. Based on these results, it was recommended, among other things that the Central Bank of Nigeria should ensure strict compliance with prudential guidelines by banks in granting loans and advances to customers to enhance liquidity strength, asset quality, earning strength and management efficiency among deposit money banks, hence a sound and safe banking industry in Nigeria.

**Keywords:** asset quality, bank distress, camel rating, capital adequacy, management quality, liquidity, earnings strength, multiple discriminant analysis and multiple regression analysis.

**JEL:** G33, G28, E58

### INTRODUCTION

Globally, the intermediation activities of banks confer on them the unique roles as the engine of growth in any economy; which role comes from both internally (within the bank and non-bank financial intermediaries themselves) and externally (from the regulatory framework). This is the role of financial intermediation and is widely acknowledged, especially in developmental economics, as aimed at stimulating economic growth. Because this financial intermediation role places the banks as key economic players, it would be right to say that the failure of the banking sector could ignite the failure of an entire economy. This explains why the sector takes regulatory centre stage, globally.

However, the various regulations, rules and principles placed, since the 1930s, to enhance sound banking practices, have helped bank failures to show signs of abating. The spate of failures in the banking sector, although not entirely unexpected, became so alarming that it was the subject of intense regulatory searchlight. To address the issues of distress in Nigeria, CBN introduced a Four



(4) Pillar Reform Program in 2010, namely: achieving quality banks, financial stability, and a healthy financial sector that contributes to the real economy. In this direction and based on the Framework of the Basel Accord, the CBN had undertaken a review of extant prudential guidelines, to resolve the issues of risk management, corporate governance/management quality, liquidity, loan loss provisioning and other variables, in the operations of banks. Regulators have, since 1979, used the CAMEL modelling of the five indicators to gauge the operational performance and soundness of banks, as required under the US Federal Reserve and the Uniform Financial Institutions Rating System (UFIRS). These are adequacy of capital, quality of assets, efficiency of management, earnings/ profitability and liquidity. This framework, which is a methodology used to measure the soundness of banking institutions, mirrors these indicators on the bank's income statement and the statement of financial position to measure the position of the banks. Despite the effort by the regulatory authorities to arrest this ugly situation, the outcome has not been completely satisfactory as the problem persisted, despite the introduction of early warning signals, such as CAMEL and other regulatory frames on bank failure, prediction and resolution. This has raised the question as to whether the CAMEL methodology is effective in predicting bank failure through illiquidity and ultimately insolvency. Hence, it is, therefore, necessary to undertake a critical study of how effective the CAMEL rating parameter is when used by the regulatory authorities in predicting bank distress in Nigeria.

Against this backdrop, the study's objective was majorly the determination of the effectiveness of CAMEL rating as a predictive model for bank distress in Nigeria. Specifically, this study, therefore seeks to: i) determine the impact of capital adequacy on bank distress in Nigeria; ii) determine the impact of asset quality on bank distress in Nigeria; iii) determine the impact of management competency on bank distress in Nigeria; iv) determine the impact of earnings strength and bank distress in Nigeria; and v) determine the impact of liquidity on bank distress in Nigeria.

## LITERATURE REVIEW

Earlier studies by Olaniyi, (2007), Amachukwu (2011), David and Hanno (2014), Unuafé and Afolabi (2014) and Egbunike and Ibeanuka (2015)-bank distress prediction captured information on capital adequacy (C), asset quality (A), management quality (M), earnings (E), and liquidity (L) which make up the CAMEL rating prototypical factors, representative of major elements in a bank's financial statement. Accordingly, these studies adopt more or less the same variables, based on the five categories of CAMEL and showed that a weakness in any of these variables may indicate a threat to the bank's continuing existence. One of these threats represented in CAMEL assists in covering loan repayment defaults and offsets the threat of losses or large withdrawals that might occur. Capital adequacy (C) represents the availability of past income to cushion future losses, while earnings (E) refer to present value income. Both variables assist in covering loan repayment defaults and offset the threat of losses or large withdrawals that might occur. Management (M) actions and decisions, related to capital and earnings, control the door to risk, or at least moderate the swing. The CAMEL model, originally developed by the FDIC, was to purposively determine when an on-site examination of a bank should be scheduled (Thomson, 1991).

This is related to the probability of bank distress resulting when one of these factors does not avail. In Nigeria for instance, the failure of a bank to meet the minimum capital adequacy and



liquidity ratios imply evidence of some distress phenomenon without providing a good measure

of the intensity of distress. To derive an efficient measure of distress through the establishment of thresholds, attempts have been made at developing a composite measure based on these CAMEL parameters for supervisors to determine on a uniform platform, the extent of distress in each of the banks and, by extension, in the financial system as a whole. Most of the empirical work excluded management in the consideration of the CAMEL elements, perhaps because management proves to be the most difficult to measure. Accordingly, a composite measure used is simply the weighted average of the CAMEL parameters summed up to unity. According to Sahut and Mili (2003), before any bank can be passed for fit, it must have been CAMEL-examined and rated accordingly.

#### Capital adequacy

A financial institution must maintain the appropriate tier of capital matching the type and severity of risks it is exposed to and the competency of management to identify, measure, monitor, and control these risks. When Capital is adequate, it is a veritable signal of the operational fitness of a bank, buoys stakeholder confidence and prevents bankruptcy. To assure against bank failure, maintaining satisfactory capital adequacy levels is inevitable because it represents the capacity of the bank to absorb losses when they arise in the future and supports bank leverage (Chen, 2003, Eyo & Offiong, 2015). Basel Accord for the Capital requirements classify capital into two parts, namely: Tier I, and Tier II capital (Chen, 2003), requiring that it must be above eight per cent of its risk-weighted assets, using the formula;  $CAR = (Tier\ I + Tier\ II) / Risk\text{-}weighted\ assets$ .

#### Assets quality

This is one of the most important components of the CAMEL framework for bank rating (Jerome, 2008) and majorly a poor quality of assets remains a set cause of most bank failures (Grier, 2007). Loans are the most important asset category and delinquent loan losses constitute the greatest risk facing bank assets quality. According to Frost (2004), for-asset quality indicators nonperforming loan ratios (NPLs) could be used as a proxy, with the allowance or provision to loan losses reserve.

#### Management quality

The competency of the board of directors and management to efficiently and effectively recognize, quantify and manage risks associated with an institution's activities, as well as comply with relevant laws and regulations to ensure the safety and soundness of their operation is a key indicator of management quality (Uyen, 2011). In the view of Grier (2007), management is considered the most critical component in the CAMEL rating system as it plays a vital role in determining the bank's overall soundness and stability. It measures bank management efficiency indicated by earnings per employee, cost per loan, cost per unit of money lent, average loan size and expense ratio (Baral, 2005).

#### Earnings strength

To maintain market share, in the long term, banks need to produce sufficient earnings through profit-building, as losses work to reduce capital and liquidity (Couto & Brasil, 2002). Insufficient ability to maintain earnings leads to negative feedback on capital and asset quality, which impinges on the efficiency of the bank (Gasbarro, Sadguna & Zumwal, 2002, Eyo & Offiong, 2015).



### Liquidity sufficiency

The degree to which a bank is capable of satisfying its maturing obligations is an expression of its liquidity (Rudolf, 2009). This is because there should be sufficient liquidity due to settling maturing financial obligations, and quickly liquidating assets without significant loss in the asset's

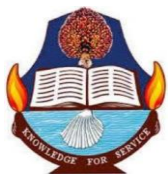
price (Uyen 2011). Keter, Jared and Geoffrey (2018) stress that the liquidity of banks has a significant positive effect on bank distress. In a typical CAMEL rating system, liquidity is impacted by the volatility of a bank's deposits, reliance on a bank interest sensitive funds, and proficiency in the management of a bank's structure of liabilities and assets, as well as access to inter-bank markets and availability of emergency cash resources such as Lender of Last Resort (LLR) services provided by the country's Central Bank (Sundararajan & Errico, 2002). The CAMEL Model measures liquidity by liquid assets to total assets and liquid assets to total deposits.

### Studies and models in predicting bank distress.

Many studies and models have predicted with some degree of accuracy, the likelihood of success or failure of banks in particular and firms in general. A literature survey revealed six (6) statistical models employed as early warning models in the prediction of financial distress, failure or weakness. These models are the univariate analysis model; the multiple discriminant analysis model; the linear probability model; LOGIT analysis model; PROBIT analysis model; nonparametric analysis model. This review of past studies begins with Altman multiple discriminant analysis (MDA) model. The technique of Multiple Discriminant Analysis (MDA) helps to combine different ratios into a single measure of the probability of failure (bankruptcy). MDA can be used to classify companies (banks inclusive), based on their characteristics as measured by financial ratios, into two groups: distress or non-distress, failure or non-failure, etc. (Altman, 1968).

The LOGIT model transforms into a LOGIT function by assuming a logistic distribution. Jagtiani, Kao and Lemieux (2000) observed that, although there is widespread popularity of the LOGIT model as an effective Early Warning System (EWS) approach, it has some limitations in terms of the information that it provides. One of such limitations is that it is difficult to determine from the model result provided by LOGIT, which variables are most crucial in predicting which banks are likely to be capital-inadequate banks or capital-adequate. According to them, the results only indicate the efficacy of each variable's ability to distinguish between the two groups of banks, without providing sufficient information as to their relative importance.

Another model mentioned above is the PROBIT analysis model which assumes a cumulative standard normal function transformed into a standardized normal distribution. This model avoids the problem of non-normality of the error term which the LOGIT model accepts. The reason is behind the PROBIT model is akin to the LOGIT model. However, PROBIT takes a different approach arguing that if failure is the result of many independent and individually inconsequential factors that add up to a certain benchmark, it is reasonable to assume the benchmark level to be normally distributed (Ako, 1999). Ako (1999), quoting Alam, Booth, Lee and Thordarson (2000), applied the univariate analysis test on four decomposition measures to discriminate between companies that failed and those that did not fail based on their attributes, size and stability. According to Ako's conclusion, the attributes of most of the measures were successful in discriminating between failed and non-failed companies. Thus, the study suggests



that univariate analysis can be a useful tool in predicting company failures.

Another model is the non-parametric analysis model (NM), which is a relatively new approach to classification problems, which promises to resolve observed shortcomings and weaknesses of conventional MDA and LP models. The most popular variants of this model are the artificial neural network (ANN) and data envelopment analysis (DEA). The non-linear approach of artificial neural

networks-used to model banking failures since the 1990s is better able to capture non-linear effects such as the saturation effects than traditional statistical approaches. However, the ANN model has a major drawback, which is the need to perform optimally and problems with extreme observations. In contrast, the data envelopment analysis (DEA) is a linear programming technique which helps to determine production efficiency by transforming model input factors into desired output factors. While DEA is used often for banking benchmarking purposes, it is only rarely deployed to predict banking failures except in the study by Avkiran and Cai (2012), where they found that, less 'efficient' banks are likely to fail in a multi-dimensional environment.

After a thorough review of the nature of the problem and the objectives of this study, the MDA statistical technique, utilized across disciplines since its first application in the 1930s was considered most appropriate for this study. When data are collected for groups (distressed and non-distressed). MDA applies to derive a linear combination of these characteristics which "best" discriminated between the groups. Another reason for using MDA is that, when accessing a bank's distress potential utilizing a comprehensive list of financial ratios, there is an indication of a high degree of correlation between the measurements (Altman, 1968). This reason supports the need for care in the selection of predictive variables and the advantage of modelling with a comparatively small number of study variables with the potential to convey a lot of information. Probably, a major advantage of using this technique to deal with problems of classification is the possibility of analyzing the entire profile of the bank variable concomitantly rather than studying the individual characteristics sequentially.

## **METHODOLOGY**

The study employed the multiple discriminant analysis models for predicting bank distress in Nigeria, from 2009 to 2018, using the CAMEL rating model testing. The population of this study consists of twenty-two licensed commercial banks in Nigeria quoted in the Nigeria Stock Exchange at the time of this study. Ten of these banks were selected randomly from the entire population. The sample size selection was motivated majorly by the accessibility of data for the selected banks and their strong presence in the Nigerian economy overtime. The banks include Access Bank, Ecobank, Fidelity Bank, First Bank, First City Monument Bank (FCMB), Guaranty Trust Bank (GTB), Unity Bank for Africa (UBA), Union Bank, Wema Bank and Zenith Bank.

Only data collected from the financial reports and statements of accounts of the Banks under study were used to achieve the set objectives of the study.

Theoretical model for data analysis

In predicting bank distress, the Multiple Discriminant Analysis (MDA) framework introduced in 1968, by Edward Altman, to predict corporate bankruptcy was used. This framework developed and presented the Z-score formula as a prominent financial evaluation tool to guide analysts and



creditors in their assessments of institutional vulnerabilities to distress. In this work, the model captured the CAMEL variables which are the indices used in the assessment of the distress and non-distress banks studied.

#### Model specification and techniques of data analysis

In carrying out the analysis of the study, the paper employed the Multiple Discriminant Analysis (MDA) and Multiple Regression analysis. The MDA here is used to discriminate between distressed and non-distressed banks and is given by the equation below:

$$Z = aX_1 + bX_2 + cX_3 + dX_4 + eX_5 \dots\dots\dots(1)$$

Where Z= Discriminant Score (discriminating between distress and non-distress banks).

- X<sub>1</sub> = Capital Adequacy (CAR)
- X<sub>2</sub> = Asset Quality (AQR)
- X<sub>3</sub> = Management Competency (MQR)
- X<sub>4</sub> = Earnings Strength (ERNR)
- X<sub>5</sub> = Liquidity (LQR) and a, b, c, d and e = Coefficient.

This technique was supplemented with Multiple Regression Analysis. The Multiple Regression Equation is given by the following:

$$Y_i = \beta_0 + \beta_1X_1 + \beta_2X_2 + \beta_3X_3 + \dots\dots\dots \beta_nX_n + E_i \dots\dots\dots(3)$$

In this analysis, CAMEL was regressed against the z-score (the dependent variable or predicting factor) to determine its usefulness in predicting distress. The dependent variable, Y, is the Z-score, which is the predicting factor, X<sub>1</sub>, X<sub>2</sub>, X<sub>3</sub>..... X<sub>n</sub> represents the CAMEL variables (the independent variables). Regression was performed on the "E-Views 11.0" statistical package.

### RESULTS AND DISCUSSION OF FINDINGS

#### Descriptive test

The study employed (capital adequacy, assets quality, management quality, earnings strength and liquidity strength (CAMEL) variables and z-scores as predictive variables to ascertain the “distressed” or “non-distressed” position of selected banks in Nigeria. The data set is made up of the ten-year cumulative value of the CAMEL variables in banks in Nigeria, and their trend behaviour is depicted in the descriptive statistics analysis below:

Table 1: Result of descriptive statistics

	CQR	AQR	MQR	ERNR	LQR
Mean	0.212991	0.071497	0.607825	0.022116	0.518926
Median	0.201000	0.062500	0.606500	0.020800	0.509000
Maximum	0.440000	0.244000	0.871000	0.230100	0.766100
Minimum	0.110700	0.010700	0.310000	-0.123000	0.328000
Std. Dev.	0.057853	0.044475	0.122288	0.029555	0.111259
Skewness	1.428987	1.739563	-0.033641	2.511948	0.244063
Kurtosis	6.383648	6.609227	2.616370	31.48341	2.103092
Jarque-Bera	81.73788	104.7118	0.632080	3485.600	4.344633
Probability	0.000000	0.000000	0.729030	0.000000	0.113913
Observations	100	100	100	100	100

Source: E-views 11.0 Statistical Software

The displayed result in Table 1 is the summarized descriptive output which revealed that the mean capital adequacy ratio (CAR) value is 0.212, the deviation from the mean value is 0.057, the minimum value is 0.110 and the maximum value is 0.440. Assets quality (AQR) has its minimum value standing at 0.010 and a maximum of 0.244, with a mean value of 0.071 and a standard deviation of 0.044. Management quality (MQR) posts the lowest value of 0.310 and the highest value of 0.871, with a mean value of 0.607 and a standard deviation of 0.122. Earnings strength (ERNR) has a minimum of -0.123 and a maximum of 0.230, posting a mean and standard deviation of 0.022 and 0.029, respectively. Liquidity strength (LQR) revealed its mean value as 0.518 and a standard deviation of 0.111, with a minimum value of 0.328 and a maximum value of 0.766.

The analysis also indicated that the variables CAR, AQR and ERNR are skewed positively to the right (leptokurtic), while MQR and LQR were negatively skewed to the left (platykurtic). The coefficient of kurtosis for CAR, AQR and ERNR peaked at 3.00 and above, while MQR and LQR were less than 3.00. Moreover, the Jarque-Bera (JB) test result showed the values of 81.73, 104.71 and 3485.60 for CAQ, AQR and ERNR respectively, as confirmation that the series is distributed normally with their relative probabilities of less than or equal to 0.05 percent.

#### Distressed and non-distressed bank categories

Given the respective average values of the variables for each bank and the Central Bank of Nigeria Component Weight values, "z-value" was computed using the discriminant function as represented below:

$$Z = aX_1 + bX_2 + cX_3 + dX_4 + eX_5$$

where the Central Bank of Nigeria Component Weight Allocated to CAMEL variables are:

- CAR = 0.25 (a)
- AQR = 0.25 (b)
- MQR = 0.15 (c)
- ERNR = 0.20 (d)
- LQR = 0.15 (e)

$x_1 - x_5$  = average components of the CAMEL variables. Thus;

$$Z = 0.25CAR + 0.25AQR + 0.15MQR + 0.20ERNR + 0.15LQR$$

$$Z = 0.2500 (0.2130) + 0.2500(0.0715) + 0.1500(0.6078) + 0.2000(0.0221) + 0.1500(0.5189)$$

Determination of Z-score = **0.244558**

Table 2: Distressed and non-distressed bank categories

S/N	BANK	SCORE	CRITICAL Z-SCORE	REMARK
1	ACCESS	0.265629	0.244558	NON-DISTRESSED
2	FIDELITY	0.239627	0.244558	DISTRESSED
3	FIRST	0.269341	0.244558	NON-DISTRESSED
4	GTB	0.251829	0.244558	NON-DISTRESSED
5	UBA	0.230787	0.244558	DISTRESSED
6	UNION	0.219946	0.244558	DISTRESSED
7	WEMA	0.238955	0.244558	DISTRESSED
8	ZENITH	0.249679	0.244558	NON-DISTRESSED
9	ECOBANK	0.232265	0.244558	DISTRESSED
10	FCMB	0.247523	0.244558	NON-DISTRESSED

Source: Researchers' computation

The computed z-score (0.244558) would serve as the critical score to predict the “distressed” or “non-distressed” position of the selected banks. Accordingly, any bank having a z-score greater than the computed z-score would be assumed a non-distressed bank. On the other hand, banks having a z-score of less than the critical z-score computed would be categorized as distressed banks. The distribution of the “distressed” and “non-distressed” banks is represented in Table 2. The computation of the z-score shows the average value of the CAMEL variables which further differentiates distressed from non-distressed banks. Based on this presentation, a "cut-off point" was obtained to determine the fate of the bank. That is whether the bank will go into distress or not. The critical value obtained was 0.244558. This critical value is known as the z-score. A bank with a z-score above 0.244558 falls into the category of non-distressed banks, and banks with a z-score below 0.244558 conveniently fall into the distressed group. The classification of banks into distressed and non-distressed groups, problem and non-problem banks, and failed and non-failed banks justifies the use of the Multiple Discriminant Analysis (MDA). Table 2 shows the respective



z-score obtained by individual banks. The following banks that fell into the non-distressed group include First Bank, GTB, Zenith Bank, FCMB, and Access Bank. Their corresponding z-scores were as follows: 0.269341, 0.251829, 0.249679, 0.247523 and 0.265629. The distressed banks and their respective scores are UBA 0.230787, Union Bank 0.219946, Wema Bank 0.238955, Ecobank 0.232265, and Fidelity 0.239627. Analysis, using the CAMEL ratios, shows that the nature of distress depends on the severity of these indicators. For instance, in the distressed group, the value of capital adequacy for all the banks is above the minimum capital requirement set by the regulatory authority but the value of asset quality is high and earnings ratios are deteriorating. However, the values of liquidity, though above the CBN-prescribed minimum of 30% compared to the non-distressed banks, are still insufficient. Thus, if the asset quality ratio is low, the earnings strength ratio will also be low. From the foregoing, there is a causal effect in the value of the variables (Altman, 1968). In the context of the analysis, a distressed bank does not imply that the implicated bank has failed, but that the bank should be on the regulatory “watch list” as the institution could flounder. Conversely, for the ones classified as non-distressed. It does not permit regulatory low privatization as it could suddenly weaken. These results must be understood against the backdrop of the drawbacks of historical data used for the analysis.

Table 3: Central Bank of Nigeria CAMEL rating Categorization

Component	Weight	1	2	3	4	5
Capital Adequacy	25	>15%	14%-11%	11%- 8%	8%-4%	<4%
Asset Quality	25	<1.5%	3.5%- 1.5%	7%-3.5%	9.5% -7%	>9.5%
Management Quality	15	<25%	30%-26%	38%-31%	45%-39%	>46%
Earning strength	20	>1.5%	1.25 -1.5%	1.01%-1.24%	1%-0.75%	<0.75%
Liquidity	15	>80%	70%-80%	61%-70%	60%-30%	<30%

Source: Central Bank of Nigeria CAMEL rating, 1995

Table 4: CAMEL rating applied to sample banks

Bank	CAR	Rating	AQR	Rating	MQR	Rating	EAR	Rating	LQR	Rating
ACCESS	22%	I	3.5%	2	61%	5	4.1%	I	69%	3
FIDELITY	26%	I	9.9%	5	63%	5	1.2%	3	40%	4
FIRST	17%	I	1.4%	1	71%	5	1.0%	4	73%	2
GTB	22%	I	5%	3	68%	5	4.3%	I	67%	3
UBA	20%	I	8.1%	4	57%	5	1.0%	4	49%	4
UNION	17%	I	7.4%	4	58%	5	-0.27	5	46%	4
WEMA	12%	I	7.3%	4	58%	5	0.5%	5	60%	4
ZENITH	26%	I	3.0%	2	41%	4	2.9%	I	61%	2
ECOBANK	14%	I	7.5%	4	57%	5	1.23	3	48%	4
FCMB	23%	I	6.3%	3	60%	5	3.1%	I	51%	I
<b>AVERAGE</b>		<b>I</b>		<b>3.2</b>		<b>4.9</b>		<b>2.8</b>		<b>3.I</b>

Source: Authors' computation

#### CAMEL rating applied to sample banks

To further strengthen the result of Table 2, this study uses the evaluation of CAMEL rating to satisfy the analysis of the result. Table 3 shows the grade of sample banks using the CAMEL rating of 1-5. Rating 1 means that the bank is very strong, 2 strong, 3 satisfactory, 4 marginal and 5 unsatisfactory. The interpretation of each CAMEL rating indicates that for capital adequacy rating; Table 4 revealed that the sample banks used all have a capital adequacy ratio above the minimum as set by the regulatory authority. This indicates the banks' ability to meet maturing obligations on time and other risks such as operational, credit and market risks, thus, having strong and sufficient capital to absorb losses and maintain daily business operations, even under higher financial distress conditions. Table 4 also shows that First Bank has a rating of 1 with 1.4% which is very strong and can combat the challenge that comes with illiquidity and insolvency in the bank. UBA, Union Bank, Wema Bank and Ecobank have a rating of 4 which under the composite range of camel rating falls under the marginal category. This rating of 4 implies that serious financial weaknesses and unsafe conditions may exist, which are yet to be satisfactorily redressed. Fidelity Bank with the highest value of asset quality ratio is considered weak and unsafe. However, Zenith Bank, GTB, FCMB and Access Bank are satisfactory and strong which is an indication that the banks are financially sound in cushioning against the risk of increasing non-performing loans and avoiding potential distress compared to other banks. Further, in Table 4 the management quality rating shows that all banks reflect a rating of 5 except for Zenith Bank with a rating of 4. This shows the efficiency with which management is converting available deposits to generate profit through the efficient disposal of idle resources. This is done by granting loans and advances on short to medium term in line with the bank's risk exposure as well as its-ability to meet withdrawal of customers' deposits timeously. The rating indicates management efficiency and the quality of board performance and risk management practices. The earnings strength rating for the banks in Table 4 reflects that Union Bank and Wema Bank have ratings of 5 a piece, which implies earnings are critically deficient. A bank with earnings rated 5 indicates the bank is experiencing losses, and eroding capital is a clear threat to its viability.

While Access Bank, GTB, Zenith and FCMB have ratings of 1; a signal that earnings are strong and adequate to support operations with adequate capital and allowance levels that guarantee asset quality, growth, and other factors affecting the quality, quantity, and trend of earnings. With ratings of 3 and 4, Fidelity Bank, Ecobank, First Bank and UBA have earnings that need to be improved. Such earnings are under stress to fully support operations and accretion of capital, making such banks vulnerable to erratic fluctuations in ROA or net interest margin. Table 4 shows FCMB, First Bank and Zenith Bank have a score of 1 and 2, implying strong liquidity levels and funds management practices, with acceptable liquidity needs profiles. With a rating score of 3, GTB and Access Bank demonstrate a modest and satisfactory liquidity level to meet anticipated needs and combat prevailing liquidity pressures. Also, Wema Bank, UBA, Union Bank, Ecobank, and Fidelity Bank, with a rating of 4 apiece, have below-par liquidity levels.

Table 5: Result of CAMEL rating analysis

Bank	CAMEL RATING	DESCRIPTION
ACCESS	2.4	Strong
FIDELITY	3.6	Marginal
FIRST	2.6	Satisfactory
GTB	2.6	Satisfactory
UBA	3.6	Marginal
UNION	3.8	Marginal
WEMA	3.8	Marginal
ZENITH	2.0	Strong
ECOBANK	3.6	Marginal
FCMB	2.2	Strong

Source: Researchers' computation from Table 4

To verify the correctness of the result in line with the discriminant analysis Table 5 shows an average analysis of camel rating for the 10 sampled banks. Fidelity Bank, UBA, Union Bank, Wema Bank and Ecobank are within the marginal description proposed by the regulatory authority and these banks fall under the distressed category. This indicates that the banks are experiencing a fall-out in two or more of the CAMEL model predictors, while the others are non-distressed,

implying that they are fundamentally sound, stable and can withstand business pressures from maturing obligations well. However, First Bank and GTB fall under the fair category which from all indications is within the ambit of CBN guidelines and Access Bank, FCMB and Zenith are satisfactory making them better, stronger and even above the risk of falling into a distressed state. At this juncture, it is pertinent to mention that the research was designed to determine the impact of CAMEL ratios against the predicting variables (z-score) and not a definitive verdict on the state of the banks studied.

#### Hypotheses testing and discussion of findings

This section of the study will use the panel fixed effect result to test the hypotheses in the study. For clarity, the t-statistics and their corresponding probability values will be used for testing the

individual significance of the CAMEL variables as effective parameters in predicting bank distress in Nigeria in the regression model. That is, it will be used for the testing of the individual effect of each independent variable (CAR, AQR, MQR, ERNR, LQR) on the dependent variable (z-scores).

Table 6: Summarized t-test result from the panel fixed effect

The t-test as summarized: {t-cal.}		t-tab	Corresponding probability	Remark
Capital adequacy	{1.653}	$\pm 1.984$	0.1016	Insignificant
Asset quality	{2.221}	$\pm 1.984$	0.0288	Significant
Management quality	{3.025}	$\pm 1.984$	0.0032	Significant
Earnings strength	{1.878}	$\pm 1.984$	0.0635	Insignificant
Liquidity	{3.485}	$\pm 1.984$	0.0008	Significant

\*\*\* Level of significance: at 5 per cent

Source: E-Views 11.0 Statistical Software

From the analysis of the summarized t-test result in Table 6, asset quality, management quality and liquidity strength have significant impact in predicting bank distress while capital adequacy and earning strength had insignificant impact in bank distress prediction. Based on the investigations carried out in this study, the CAMEL Rating model used was based on financial ratios computed from the financial statements of selected banks in Nigeria, from 2009 to 2018. The five elements of CAMEL rating model are rated on the scale of 1 to 5 in Table 4. Components having rating 1 shows strong position, while rating 5 indicates worst position of a bank in the particular component. Each component’s scale of rating based on the prevailing financial and economic conditions (Demyanyk and Hassan, 2010).

The findings that capital adequacy has strong and satisfactory effect on banks’ position evidences the ability of the bank to satisfy due obligations on time and cover operational, credit and other risks (Christopoulos, Mylonakis and Diktapanidis, 2011). Quality of banks assets on its statement of financial position (or balance sheet), was found to be marginal on the average, implying that unsafe conditions exist in the system. Usually top managements of banks are routinely eye marking the quality of loans granted, as it is a veritable source of earnings to the bank.

This finding that assets with low quality affect the earnings of the bank is in line with the assertion of Chauhan, Ravi and Chandra (2009) that asset quality affects both cost to the banks and economies of scale for the bank. Accordingly, low-quality assets have a higher possibility of becoming non-performing assets, which are debts that are in default or that are near default and a low asset quality ratio signifies a lower performance of banks. Furthermore, the management quality of banks was found to be satisfactory and signals that a moderate weakness is present with the capabilities of the bank management, although determining the quality of bank management performance could be difficult. This finding agrees with Fethi and Pasiouras (2010) who recommend a lower ratio as better for a bank as it shows management is well able to handle the bank operations.



The earnings strength of banks rating was found to be fair revealing moderate to severe weaknesses. Banks must generate sufficient earnings to remain in the market for a longer time, enhance shareholder satisfaction, as well as to protect and improve their capital. This finding accords with that of Christopoulos, Mylonakis and Diktapanidis (2011) that unusually volatile earnings would hinder the manner and level of the bank's profitability. Lastly, the liquidity management rating of the banks was fair, implying that these banks have reduced withstanding business fluctuations and could become vulnerable to sudden external shocks. The management of liquidity of any bank is the primary objective of its management and regulators. This finding is in line with Fethi and Pasiouras (2010) who concluded that the fund management level of banks failed to ensure that banks were sufficiently liquid to discharge their maturing financial obligation on time.

### CONCLUSION AND RECOMMENDATION

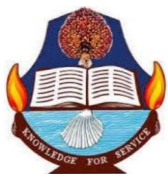
Based on the research findings in this study, it was concluded that Capital Adequacy, Assets Quality, Management Competence, Earnings Strength and Liquidity, as components of CAMEL, are satisfactory indicators of the financial condition of a bank. The study concludes that all the observed CAMEL variables were effective in predicting bank distress. However, a deficiency in one of the CAMEL variables will not affect the health of the bank as observed in Table 4 but where there are two or three fall-outs in the variables a bank may be distressed. The study concluded that the asset quality of banks in Nigeria is the most critical variable or the major root cause of bank distress in Nigeria. A bank's earning capacity reduces once its asset quality base is weak. Also, the study discovered that banks successfully maintained CAR at levels higher than the prescribed level of 15% in the period under review.

On the strength of the foregoing research findings, recommendations were made as follows:

1. Bank regulations on the maintenance and improvement of capital adequacy levels should be sustained and implementation enforced.
2. The apex should ensure that banks adhere strictly to the canon of lending and loan provisioning to prevent weak asset quality, which could negatively affect the stability of the banks and ultimately the sector.
3. Banks, particularly those indicated as distressed, should be closely supervised to maintain and continually ensure management quality to ensure their stability at all times.
4. The CBN should strengthen supervisory controls to improve banks' operational returns and maintain a satisfactory level of profitability as a cushion for their earnings strength.
5. The CBN should strictly enforce liquidity ratio stipulations to ensure at all times that the banks maintain satisfactory liquidity levels to checkmate the likelihood of illiquidity-induced distress.

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