

Detecting Early Warning Bank Distress Signals in Nigeria: A Multi Discriminant Analysis Approach.

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Abstract

The multi discriminant analysis model (MDA) as proposed by Altman in 1968 was applied to a group of failed and healthy banks in Nigeria to ascertain if MDA is a veritable tool to predict business failure in the Nigerian banking industry. Data was gathered for a five year period for ten (three failed and seven healthy) sampled banks. The results show that MDA is a veritable tool for assessing the financial health of banks. As such, it has high predictive power to deduce from a set of these ratios the likelihood of failure or otherwise. The MDA not only predicts business failure but revealed most importantly that the warning signals of impending failure became manifested one to two years before the studied banks actually failed.

Keywords: Bank distress; multi discriminant analysis; predicting business failure; ratios.

1. Introduction

Within a brief period of six years, from 1985 to December 1991, the number of banking institutions in Nigeria surged from 40 to 120. Four years after, from 1994 to 1998, one out of every four of those banking institutions failed. The licenses of the failed banks were revoked by the Central Bank of Nigeria. This distresses and failures are not without colossal consequences on the economy.

While it has been realized that bank failure cannot be totally avoided in any market economy, the preponderance of such failures can be pre-empted and appropriate remedies put in place to restore deteriorating ones to the course of progress. The problem is that until early and the ease to detect warning signals through ratio analysis is developed and diligently followed economies of the world may still be set for a future wave of corporate collapses. The colossal cost implications of such failures are evidenced by loss of jobs, loss of deposits, declines in the gross domestic product and disequilibrium in the macro economy. These are the inevitable consequences of unmitigated collapse of enterprises especially the banking sector given it's intermediation role in the economy.

Through the provision of banking services banks play important roles in the economics life of a country particularly a developing nation like Nigeria. As agents of development, they provide loans and advances including a variety of contingent facilities, which could either be short-term, or long-term (Baye and Jansen, 2006). This explains why credit guidelines contained in government monetary circulars stipulate the aggregate ceiling on credit creation as well as the sectional allocations which banks and other financial institutions must comply with during a fiscal year. The type of bank, (commercial, merchant or development) and its deposit base, coupled with the existing credit guidelines determine its credit creation potential (Baye and Jansen, 2006). In recent times, banks have witnessed a phenomenal growth in term loans in their portfolios as a result of increase in capital base and the need to finance industrial projects in line with the nation's rapid industrialization. The Central Bank of Nigeria through their supervisory role ensures the capital adequacy of commercial, industrial and development banks in Nigeria. This is achieved by way of regulatory continuous recapitalization exercises. However, not given the efforts of the Central Bank of Nigeria, there have been multiple cases of bank distress that culminated into failure in recent times (Alashi, 2002).

The industrial sector made up of manufacturing companies and small scale firms are the major recipient of funds from the financial services sector. Banks play the role of catalysts of industrial development. It follows that a sneeze in the banking sector will send uncomfortable shudders in the industrial sector (Baye and Jenson, 2006). If manufacturing companies that have the capacity for rapid transformation of the macro-economy fail, it is likely that

the downturn commenced with reverses in the banking industry.

This paper therefore seeks to test the reliability of the ratio analysis and the application of the multi discriminant analysis model as a tool for predicting business failure in the Nigerian banking industry. It is the purpose of this work to measure if there is a significant difference between failure/business factor (Z) of Nigerian banking firms and the Multi discriminant model (MDA) of Altman.

The rest of the paper is divided into four sections. Section 2 highlights the empirical review of related literature. Methodological issues are the concern of section 3. Section 4 is devoted to analysis of results and section 5 concludes the paper.

2. Review of Related Literature.

The financial services industry in general and the foreign exchange markets in particular were severely affected over the years by the unstable environment created by the high and accelerating inflation, rapidly growing liquidity, sharply rising market interest rates, and the political environment. Under these conditions financially weak institutions proved unable to cope and the ensuing wave of default eroded confidence in the banking sector. Partly as a result, the incidence of distress among commercial and merchant bank, prior to consolidation, became noticeable on a substantial scale. Access to the inter-bank funds markets became highly restricted as defaults in the market escalated; and in the resulting flight to safety in government securities in the well-funded institutions, the liquidity problems in the bank intensified. A number of such banks faced occasional runs on their deposits. The central bank took direct and forceful action to eliminate excess reserves from the banking system and achieved a measure of success in its use of Open Market Operation (OMO). There was considerable increase in the number of problem commercial and merchant's banks whose resuscitation had been the focus of efforts by the supervisory authorities since 1989.

Banking system distress can be traced on the prevailing economic recession, policy induced shocks, poor and deteriorating assets quality arising from large portfolios of non-performing creditors, mismatching of assets and liabilities, over trading, bad management and insider abuses among others. Afolabi (1999) and Itsede (1998) submit that bank distress impacts negatively on the economy in the following ways:

- i. Loss of confidence in the banking system.
- ii. Poor investment arising from distribution-saving attitude on the part of potential depositors
- iii. Increasing rate of employment
- iv. Inflation
- v. Delayed and slow national economic growth etc.

To avoid business failure especially in the banking industry, there is the dire need to detect early warning signals to predict ailing banks so that corrective measures can be applied to avert its failure and dire consequences.

The empirical literature of bankruptcy prediction gained further momentum and attention from financial institutions after academicians and practitioners realized that the problem of asymmetric information between banks and firms lies at the heart of an important market failure such as credit rationing and that the improvement in monitoring technologies represents a valuable alternative to any incomplete contractual arrangement aimed at reducing borrowers' moral hazard (Stiglitz-Weiss, 1981, 1986 and 1992).

Technical insolvency denotes lack of liquidity (Afolabi, 1999). Insolvency in bankruptcy on the other hand means that the liabilities of a company exceed its assets, in other words the net-worth of the company is in negative. Bank failure includes the entire range of possibilities between these extremes. The remedies available to save a failing bank vary in harshness according to the degree of financial difficulty (Afolabi, 1999). If the outlook is sufficiently hopeless, liquidation may be the only feasible alternative. Technical insolvency is quick at pushing a bank out of business, if swift action is not expeditiously taken to redress the situation. The unwary management of some banks that fail to read the signs on the wall commit serious mistakes that usually quicken their demise. It is therefore obligatory for firm's management to be dynamic and flexible by adjusting to economic change and conditions prevalent in the environment in which it operates. Various economic problems of the nation make it

obligatory for bank management to adjust particularly to measures adopted to solve distress problems. This is more so because the sign of potential distress are usually evident prior to actual failure. A good management can take correction action before failure occurs. Many reasons have been adduced as the cause of bank failure, Afolabi (1999) The causes range from inadequate working capital, bad management over trading/expansion/technological changes and government polities others.

Unegbu and Tasi (2011) tested the efficacy of 'CPT' 'Cash flow Statement and Percentage Trend Analyses' model for identifying false financial statements and examined further some relevant literatures in an attempt to develop analytical tool for detecting false financial statements. Three null hypotheses were formulated and tested with samples of fifty-one companies' financial statements. The decision outcomes of CPT analyses model were validated with T-test and Chi square statistical tools. Out of the fifty one financial statements tested, 37% were found to be falsified. 57% of the predicted Companies that falsified their financial statements had been liquidated as at 2010. It was found that CPT analyses model can significantly discriminate between falsified and non-falsified financial statements. The proposed 'CPT' analyses, showed that investment decisions and applications of corporate insolvency predictive models are useful only when financial statements are not falsified. It also showed that users of financial statements are at risk of forming opinions based on distorted and inaccurate information. The paper demonstrates that conducting and implementing the proposed 'CPT' analyses for detection of false financial statements will, undoubtedly be helpful to professionals such as auditors, forensic accountants, insolvency practitioners, tax authorities, investors, consultants, banks and other users of financial statements.

Henebry (1997) used both cash flow and non-cash flow proportional hazards models to test for stability of the models over time. Several different time horizons and start dates were used to test stability over the 1985-1989 time periods. The results indicate that none of the specific formulations were stable across different starting dates nor across different horizons for the same starting date. Forecast models further tested stability and only three variables were found to be consistently useful in predicting bank failure: Primary Capital to Total Assets (PCTA), Non-performing Loans to Total Loans (NPLTL) and Total Loans to Total Assets (TLTA).

A firm must remember that insolvency and liquidation are the end points of the process of failure. Management must continually review how the company is operating to prevent any slide towards corporate failure. The ugly effects of bank or business failure are detected through the following initial signals, Afolabi (1999) viz:

- i. Inability to pay workers' salaries and fringe benefits regularly.
- ii. Withdrawal of fringe benefits
- iii. Retrenchment of workers (or a policy of non-retrenchment or recruitment)
- iv. Low productivity (or inability to utilize excess capacity continuously).
- v. Inability to contribute to social welfare of their host community.
- vi. Low profit margin or losses
- vii. Inability to service debts.

Discriminant analysis characterizes an individual, or a phenomenon, by a vector of variables which constitute a multivariate density function. The discriminant function maps the multidimensional characteristics of the density function of the population's variables into a one-dimensional measure, by forming a linear combination (Zavgren, 1983). The linear discriminant function as modeled by Chung, Tan and Holdsworth (2008) is as follows: $Z_i = XA = a_0 + a_1X_1 + a_2X_2 + \dots + a_nX_n$

Where; Z = discriminant score for the company i

X = vector of n independent variables or characteristics

A = vector of discriminant coefficients. Multi Discriminant Analysis computes the discriminant coefficients and selects the appropriate weights (cut-off score) which will separate categories. The average values of each group, while minimizing the statistical distance of each observation and its own group means (Altman, 1966). By using the Z score and cut-off score, a company is classified into failed or non-failed. The pioneers of the empirical approach are Beaver (1966), Altman (1968), and Ohlson (1980). Beaver (1966) was one of the first researchers to study the prediction of bankruptcy using financial statement data. However, his analysis is very simple in that it is based on

studying one financial ratio at a time and on developing a cutoff threshold for each ratio. The approaches by Altman (1968) and Ohlson (1980) are essentially linear models that classify between healthy/bankrupt firms using financial ratios as inputs. Altman uses the classical multivariate discriminant analysis technique (MDA). It is based on applying the Bayes classification procedure, under the assumption that the two classes have Gaussian distributions with equal covariance matrices. The covariance matrix and the class means are estimated from the training set. Altman (1968) used the following financial ratios as inputs:

- 1) working capital/total assets;
- 2) retained earnings/total assets;
- 3) earnings before interest and taxes/total assets;
- 4) market capitalization/total debt;
- 5) sales/total assets.

3. Methodology.

This study geared towards proving the validity or otherwise of Multi Discriminant Analysis (MDA) approach in detecting business distress in the Nigerian banking industry. The information (data) vital for the ratio analysis were obtained from the financial statements of the sampled banks quoted on the Nigerian Stock exchange. The financial statements exist in the form of Annual reports and accounts. The sample size was influenced majorly by the availability data for the various sampled banks and includes failed and un-failed banks in Nigeria as at the end of 2004. The sample consists of three failed banks African Continental Bank (ACB) Plc, Co-operative and Commerce Bank (CCB) Plc and Orient Bank Plc (African Express Bank Ltd.) as well as two healthy banks Oceanic Bank Plc now subsumed in ECOBANK Plc and Intercontinental now subsumed in ACCESS Bank Plc. This sample is considered valid. The sample ensures that there is a comparison between the failed and the healthy banks as at 2004 so as to reach a valid conclusion on the topic for the banking industry.

In line with Altman (1968) this study computed univariate ratios based on the information available in the financial statements for a five year period (2000-2004). The critical variables/ratios computed for the banking Industry are Capital Adequacy Ratio, Asset Composition measured by Ratio of Short-term Asset to Total Asset and Ratio of Loan and Advances to Total Asset, Loan quality measured by Ratio of Provisions for Doubtful Debt to Loans/Advances, and Profitability measured by Return on Assets.

In applying the multi discriminant analysis model, statistical weights were then assigned to the various multivariate ratios in the order of importance as follows: 1.2, 1.4, 3.3, 0.6, and 1.0 for numbers 1,2,3,4 and 5 above respectively in consonance with Altman (1968). The study then computed an average Zeta (Z) score for each company using information from the annual reports and accounts of the various bank to represent the composite MDA value for each bank concerned. Expected Z scores were assigned to each bank being investigated using a ranking approach as prescribed by (Gupta, 1979). Then the computed values were ranked and discriminated as to likelihood of failure/ bankruptcy using the model postulated by Altman(1968).

The parametric t test was used to test the hypothesis. The formula is stated thus:

$$t = \frac{D - O}{SE}$$

Where : t = t test

D = Mean of difference in scores

SE = Standard Error

Decision Rule: Accept Ho if computed value of $t_c < t_i$ otherwise reject Ho.

Variables.

Capital adequacy is a key element in the CAMEL acronym for investigating a bank's financial health and well-being. The ultimate strength of a bank lies in its capital funds. Capital adequacy is an index of a bank's ability to meet its liabilities. It is the confidence a bank must enjoy to continue to make progress. The Bassel Committee is in

1988 prescribed a capital adequacy framework, including the general requirement for banks to hold total capital equivalent to at least 8% of their risk-weighted assets.

Asset Composition is a very important ratio since it determines a bank's profitability. Three major ratios could be utilized to measure asset composition. These include:

- i. The ratio of short-term assets to total assets
- ii. The ratio of fixed assets to total assets
- iii. The ratio of loans and advances to total assets.

However, this paper employed the ratio of short-term assets to total assets and the ratio of loans and advances to total assets

Liability Composition. The efficiency of liability composition is the ratio of short-term deposit to total deposits. This is a useful yardstick because the uses of which a bank can put its deposit liabilities depend on their maturity structure. The more long-term these deposits are the more profitable and socially desirable loans and advances. Thus, the higher the ratio, the greater, the risk-taking ability of the bank.

Loan Quality ratio can be used to gauge the effectiveness of the lending policies, procedures and practices. Generally, this ratio would have best been measured by the ratio of net loan losses-to-loan and advances, but because of the sensitiveness of these figures, they are hardly published. So, an approximate ratio is the ratio of provision for bad and doubtful debts to loans and advances

Profitability ratios measure a bank's viability and overall performance. It shows, among other things, its ability to lend confidently and sufficiently, as well as the ability to undertake risky but economically beneficial development-oriented investments. The ratio employed for this measure is return on asset measured as the ratio of Profit after Tax to Total Asset, which shows the proportion of profit, the assets of the banks are able to generate. The higher this ratio, the more efficient and effective use is apparently made of the bank assets.

4. Findings

Among all the sectors of the Nigerian economy the banking sector appears to be most bedevilled by distress and failure. This is shown by the fact within a short period of 5 years (1993-1998) not less than 32 merchant and commercial banks were closed and under liquidation by NDIC and by 2006, the number rose to 45.

<Insert Table 1, List of Closed Financial Institutions under Liquidation >

<Insert Table 2. Capital Adequacy Ratio for the failed banks.>

The Capital adequacy results show that more or less the ratio was low and nose-dived continually for the five years studied for CCB (Co-operative and Commerce Bank) Plc and the other failed banks African Continental Bank Plc, and African Express Bank Ltd. However, the deterioration in African Express Bank Ltd and ACB became manifest even before year 1994. The capital adequacy ratio of 0.01% in 1994 and 1995 speaks volumes of the financial dislocation of the banks and its imminent bankruptcy position. The banks has since ceased to function as a full commercial bank. From 1996 to 1998, ACB plc and African Express Bank Ltd recorded negative capital adequacy ratios.

<Insert Table 3. Asset Composition Ratio of Loan and Advances to Total Asset>

Asset Composition a very important ratio determines a bank's profitability. The ratio of short-term assets to total assets indicates a poor performance for some banks. CCB and Orient Bank Plc recorded very poor outcomes within the period under review. A similar interpretation is also applicable with the ratio of fixed assets to total assets. This is because fixed assets are almost non-income earning. It is undesirable that the ratios of fixed assets to total assets be high. CCB Plc posted a relatively low figure of 5%, a lower figure of 2% for ACB and 5% for African Express Bank Ltd. The same trend applies for Oceanic Bank Plc (3%) and Intercontinental Bank Plc (4%).

<Insert Table 4. Return on Asset>

All the studied banks except the distressed and failed banks posted positive profitability ratios during the period under review. CCB Plc, ACB Plc and African Express Bank Ltd recorded negative profitability ratios. This suggests that these companies ought to have taken some radical policies to turn around profitability but they did not and thus failed. In the ratio of Gross Earnings to Total Assets, CCB Plc generated an average of 13%, ACB Plc posted an average of 14%, and African Express Bank Ltd had a negative ratio of (4%) during the period under review. It is pertinent to note that the Revenue generating mix of the banks that failed were rather too small to affect Profit for the relevant period.

< Table 5: Differences between the Z scores>

Multivariate ratios involve a condensing of the various useful ratios into a single discriminant function. This is often termed Multi-Discriminant Analysis (MDA). MDA carried out on the concerned banks disclosed remarkable results as portrayed. The healthy z scores for company's ranges between 2.99 to 2.675. Therefore, a firm is healthy if it records z scores > 2.99 or 2.675 (Pandey, 2001). Given the above, CCB Plc recorded z scores of 0.50 < 2.99 or 2.675 for each of the years under consideration. Hence, the z score portrayed the bank's distressed condition many years before its eventual collapse and liquidation. Had the bank heeded the various warning signals, which MDA would have further crystallized, they might long have come out from the woods. ACB Plc calculated z score fell within the range of 1.94 and 2.25 during the period of review. When placed against the MDA postulated z score of 2.99 to classify a business as financially sound it becomes very clear that as early as ten years before the ACB Plc failed, many indices had indicated its poor state. The Multi-Discriminant Analysis function (Z score) for Orient Bank Plc = 0.22 in 1990 and < 0 up to 1994. This speaks volume of the terrible state of Orient Bank PLC. The z score for Oceanic Bank Plc in 2004 was 3.89; and 3.10, 2.81, 2.30, 1.78 for 2003, 2002, 2001 and 2000 respectively. These suggest that the company was healthy as at the end of 2004 as it's calculated z score for the period under review was > 2.99. The MDA function for this Intercontinental Bank Plc stood at 1.54, 1.93, 1.18, 1.16, and 1.76 for the years 2003 through 1999 respectively < 2.99. The poor Z scores appear to arise from the low-debt carrying portfolio of the bank.

Test of hypothesis.

The hypothesis as earlier stated is as follows:

Ho: There is no significant difference between the failure/success factor (Z) of Nigerian banking firms and the Model advanced by Altman.

H₁: There is significant difference the failure/success factor (Z) Of Nigerian banking firms and the model postulated by Altman.

<Inset Table 6. Calculated Standard Deviation >

$$\text{Computed Standard Deviation, SD} = \text{Square Root of } \frac{76514.81}{13-1} = 79.9.$$

$$\text{Computed Standard Error; SE} = \text{SD} / \text{Square Root of N} = 79.9 / \text{Square Root of } 13 = 2.13.$$

$$\text{Calculated t Value } t_c = \frac{D - 0}{\text{SE}} = \frac{6.343 - 0}{2.13} = 0.287$$

The Critical value of t_t at degree of Freedom of 13-1 = 12 at 5% level of significance = 2.170.

Given the decision rule to Accept Ho if t_c < t_t otherwise reject Ho, therefore, since t_c = 0.287 < t_t = 2.170, we accept Ho. Thus, there is no significant difference between the failure/success factor (Z) of Nigerian banking firms and the Model advanced by Altman. This implies that multi discriminant analysis model as proposed by Altman in 1968 can predict corporate bankruptcy even in the banking industry.

5. Conclusion

This study empirically tested the applicability of using ratios as a tool for predicting business failure in Nigeria. The summary of the Multi Discriminant Analysis (MDA) indices emphatically disclose that financial ratios are veritable sine qua non for assessing the financial health of banks and as such high predictive power to deduce from a set of these ratios the likelihood of failure or otherwise; that the failed banks examined had poor CAMEL ratios; that the MDA of about 70% of the banks examined fell within the adjudged healthy range; the MDA of the failed banks (ACB, CCB, ORIENT) proved the Altman 1968 model correct.; some of the companies, though few in number posted Z scores that conflict with the Altman 1968 model. This can be accounted for by the fact that most of the banks did not disclose their debt profile. The result is that the debt/equity complement of the Z score, for such companies = 0. This impacted very negatively on the Z score aggregate and the consequent interpretation.

Applying the Multi Discriminant Analysis as proposed by Altman in 1968, the major finding is that the model not only predicts business failure but revealed most importantly that the warning signals of impending failure became manifested one to two years before the studied banks actually failed.

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List of Tables.

Table 1. List of Closed Financial Institutions under Liquidation

S/No	Name of Bank Under Liquidation	Date of Closure
1	Abacus Merchant Bank Ltd	Jan. 16, 1998
2	ABC Merchant Bank Ltd	Jan. 16, 1998
3	African Express Bank Ltd	Jan. 16, 2006
4	Allied Bank of Nigeria Plc	Jan. 16, 1998
5	Allstates Trust Bank Plc	Jan. 16, 1998
6	Alpha Merchant Bank Plc	Sept. 08, 1994
7	Amicable Bank of Nigeria Plc.	Jan. 16, 1998
8	Assurance Bank of Nigeria Plc	Jan. 16, 2006
9	Century Merchant Bank Ltd.	Jan. 16, 1998
10	City Express Bank Plc	Jan. 16, 2006
11	Commerce Bank Plc	Jan. 16, 1998
12	Commercial Trust Bank Ltd	Jan. 16, 1998
13	Continental Merchant Bank Plc	Jan. 16, 1998
14	Coop. & Commerce Bank Plc	Jan. 16, 1998
15	Credite Bank Nig. Ltd	Jan. 16, 1998
16	Crown Merchant Bank Ltd.	Jan. 16, 1998
17	Financial Merchant Bank Ltd.	Jan. 21, 1994
18	Great Merchant Bank Ltd.	Jan. 16, 1998
19	Group Merchant Bank Ltd.	Jan. 16, 1998
20	Gulf Bank Ltd	Jan. 16, 2006
21	Hallmark Bank Plc	Jan. 16, 2006
22	Highland Bank of Nig Plc	Jan. 16, 1998
23	ICON Ltd. (Merchant Bankers)	Jan. 16, 1998
24	Ivory Merchant Bank Ltd .	Dec. 22, 2000
25	Kapital Merchant Bank Ltd.	Jan. 21, 1994
26	Lead Bank Plc	Jan. 16, 2006
27	Lobi Bank of Nig. Ltd.	Jan. 16, 1998
28	Mercantile Bank of Nig. Plc.	Jan. 16, 1998
29	Merchant Bank of Africa Ltd.	Jan. 16, 1998
30	Metropolitan Bank Ltd.	Jan. 16, 2006
31	Nigeria Merchant Bank Ltd.	Jan. 16, 1998
32	North-South Bank Nig. Plc.	Jan. 16, 1998
33	Pan African Bank Ltd.	Jan. 16, 1998
34	Pinacle Commercial Bank Ltd.	Jan. 16, 1998
35	Premier Commercial Bank Ltd	Dec. 22, 2000
36	Prime Merchant Bank Ltd.	Jan. 16, 1998
37	Progress Bank Ltd.	Jan. 16, 1998

- 38 Republic Bank Ltd June 29, 1995
- 39 Rims Merchant Bank Ltd. Dec. 22, 2000
- 40 Royal Merchant Bank Ltd. Jan. 16, 1998
- 41 Trade Bank Plc Jan. 16, 2006
- 42 United Commercial Bank Ltd. Sept. 8, 1994
- 43 Victory Merchant Bank Ltd. Jan. 16, 1998
- 44 Eagle Bank Plc. Jan. 16, 2006
- 45 Liberty Bank Plc. Jan. 16, 2006

Source; NDIC, 2012.

Table 2. Capital Adequacy Ratio for the failed banks.

Year	CCB	ACB	Afex Bank
1998	NA	-27	-0.01
1997	3	-23	-3
1996	3.8	-15	-1
1995	5	0.01	0.01
1994	3	0.01	0.01

Source, Author's computation from Annual Reports of the Banks.

Table 3. Ratio of Loan and Advances to Total Asset>

Year	CCB	ACB	Orient
1998	NA	12	49
1997	41	48	35
1996	50	53	35
1995	52	52	31
1994	61	66	44

Source, Author's computation from Annual Reports of the Banks.

Table 4. Return on Asset.

Year	CCB	ACB	Afex
1998	NA	13	-4
1997	0.01	10	-5
1996	0.01	17	-3
1995	0.01	--	-1
1994	0.01	--	0.01

Source, Author's computation from Annual Reports of the Banks.

Table 5: Differences between the Z scores

Firm name	Computed z	Expected Z	Difference
ACB	2.103	1.80	0.303
Afribank	9.396	2.70	6.696
CCB	0.258	1.80	-1.515
First bank	26.598	2.70	23.898
Afex Bank	0.01	1.80	-1.79
Fidelity	0.528	2.70	-2.172
Guaranty	11.592	2.70	8.892
Intercontinental	1.698	2.70	-1.002
IBTC	3.158	2.70	0.458
Oceanic	2.766	2.70	0.076
UBA	28.36	2.70	25.66
Union	6.997	2.70	40.297
Zenith	21.352	2.70	18.652
Total			82.452

Source: Computed from handpicked data of sampled banks.

Table 6: Calculated Standard Deviation.

Firm	Computed z	Expected Z	Difference		
ACB	2.103	1.80	0.303	82.15	6748.62
Afribank	9.396	2.70	6.696	75.757	5739.12
CCB	0.258	1.80	-1.515	83.968	7050.63
First bank	26.598	2.70	23.898	58.555	3428.69
Orient Bank	0.01	1.80	-1.79	84.243	7096.88
Fidelity	0.528	2.70	-2.172	84.625	7161.39
Guaranty	11.592	2.70	8.892	73.561	5411.22
Intercontinental	1.698	2.70	-1.002	83.455	6964.74
IBTC	3.158	2.70	0.458	81.995	6723.18
Oceanic	2.766	2.70	0.076	82.377	6785.97
UBA	28.36	2.70	25.66	56.793	3225.44
Union	6.997	2.70	40.297	78.156	6108.36
Zenith	21.352	2.70	18.652	63.801	4070.57
Total					76514.81

Source: Computed from handpicked data of sampled banks.

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