AN ANALYSIS OF FRAUD IN NIGERIAN BANKS

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ABSTRACT
The risk of fraud in banks is high. It could damage the reputation of a bank and exacerbate legal risks. In Nigeria, it is generally believed that bank’s junior staff (usually with low level of qualifications), particularly, the ‘non-permanent’ staff, are more prone to committing fraud than other categories of staff. To one’s knowledge, this has not been empirically tested. This study, therefore, estimates the probability of an individual bank employee, below the rank of ‘officer’, committing fraud based on whether he is a ‘permanent staff’ or a ‘contract staff’ and on whether he has a qualification of a first degree and above or below. It also finds the relationship between a staff in this category committing fraud and his level of education. The logistic probability model and data on frauds, obtained from all the banks, operating in Nigeria, for the period January 2005 to December 2010, were used in the study. The study showed that a contract staff is more prone to committing fraud than a permanent staff and the higher the level of education, the less probable that the staff will commit fraud. The probability that a contract bank staff with low and high levels of education, would be fraudulent were 0.71, and 0.66 respectively, while the probability that a permanent staff with a low level of education would commit fraud was 0.61 and the probability that a permanent staff with a high level of education would commit fraud was 0.42.

The probability of bank staff below the officer grade committing fraud should be a guide in calculating the level of fidelity insurance a bank should take against insider fraud relating to staff of that category. Banks should employ staff with high levels of education and pay them well. They should also, employ more permanent staff and supervise contract staff more closely.

JEL Classifications: C3, GO, G21.
Key Words: Fraud; Contract Staff; Non-Permanent Staff; Fidelity; Corruption

1.0 INTRODUCTION AND BACKGROUND TO THE STUDY
Globally, fraudulent acts by banks’ staff have led to enormous losses to national economies and to the failure of banks. In contemporary Nigeria, fraud appears to have become the norm more than the exception. More worrisome is, the volume of fraud in banks and the calibre of bank staff involved in the frauds. Tables 1 and 2 show the total number and total amount involved in bank fraud and bank staff involved in fraud for the given years, respectively.
Table 1. Total Number and Total Amount of Fraud

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Number of Fraud and Forgeries</th>
<th>Total Amount Involved (₦ Million)</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>1,229</td>
<td>10,606.18</td>
</tr>
<tr>
<td>2006</td>
<td>1,193</td>
<td>4,832.17</td>
</tr>
<tr>
<td>2007</td>
<td>1,553</td>
<td>10,005.81</td>
</tr>
<tr>
<td>2008</td>
<td>1,553</td>
<td>10,005.81</td>
</tr>
<tr>
<td>2009</td>
<td>1,764</td>
<td>41,265.50</td>
</tr>
<tr>
<td>2010</td>
<td>1,532</td>
<td>21,291.41</td>
</tr>
</tbody>
</table>

Source: Nigeria Deposit Insurance Corporation (NDIC) Annual Reports, 2005 to 2010

Table 2. Banks’ Staff Involved in Fraud and Forgeries

<table>
<thead>
<tr>
<th>Status</th>
<th>2005</th>
<th>2006</th>
<th>2007</th>
<th>2008</th>
<th>2009</th>
<th>2010</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
<td>No.</td>
<td>%</td>
</tr>
<tr>
<td>Senior Supervisors &amp; Managers</td>
<td>169</td>
<td>44.7</td>
<td>118</td>
<td>35.6</td>
<td>84</td>
<td>15.3</td>
</tr>
<tr>
<td>Officers, Accountants &amp; Executive Assistants</td>
<td>124</td>
<td>32.8</td>
<td>90</td>
<td>27.2</td>
<td>89</td>
<td>32.6</td>
</tr>
<tr>
<td>Staff Below the Levels of Officers, Accountants &amp; Executive Assistants</td>
<td>85</td>
<td>24.5</td>
<td>123</td>
<td>37.2</td>
<td>100</td>
<td>36.6</td>
</tr>
<tr>
<td>Total</td>
<td>378</td>
<td>100</td>
<td>331</td>
<td>100</td>
<td>313</td>
<td>100</td>
</tr>
</tbody>
</table>

Source: Nigeria Deposit Insurance Corporation (NDIC) Annual Reports, 2005 to 2010

Section 33 of the Nigerian Deposit Insurance Corporation (NDIC) Act, 2006 requires banks to purchase fidelity insurance to reduce the adverse impact of frauds and forgeries committed by banks’ staff. The level of the insurance is prescribed by the NDIC from time to time, with the minimum set at 15% of its paid-up capital as at 31st December of the preceding year, thus, applying a uniform level of risk to all banks. In line with the recent shift to ‘Risk Based Bank Supervision’, it will be more efficient to tie the level of fidelity insurance a bank should take to its specific level of exposure to the risk of insider fraud.
In addition, some of the banks do not hold the adequate fidelity bond insurance. In 2010, 12 (50 %) of the banks had fidelity bond insurance cover lower than 15 % of its paid-up capital. The figures for 2009, 2008 and 2007 are, 80.92 %, 79.17 % and 92 %, respectively. One of the reasons why banks do not meet the regulatory level of fidelity insurance, is that they do not feel that the level of risk they are exposed to is up to 15 % of the paid-up capital. Hence, the need to have a good estimation of the level of the risk a bank is exposed to as a result of fraud and forgeries and to know the probability of bank staff committing fraud, which this paper would provide.

This paper, therefore, determines the relationship between the committing of fraud by bank staff below the levels of officers, accountants and executive assistants with their educational level and their nature of employment (contract or permanent). Specifically, it finds answers to the following questions:

1. What is the probability of a contract staff with low educational level, committing fraud?
2. What is the probability of contract staff with a high level of education, committing fraud?
3. What is the probability of permanent staff with low level of education committing fraud?
4. What is the probability of permanent staff with high level of education committing fraud?

The study covers the period 2005 to 2010, based on the availability of published data in the NDIC Annual Reports and covers the entire banks in Nigeria during the period. Its findings would be useful to the NDIC and banks in the administration of Fidelity Insurance on banks’ staff. It will also enhance human resources practices and the bank supervisors’ knowledge of fraud and the capacity to monitor and control fraud.

This paper is divided into five main sections. Section 1 is this introduction, containing elements like objectives, justification and scope of the paper. Section 2 discusses the theoretical framework and literature review, while Section 3 is the methodology. Section 4 gives the result of data analysis and discussion, and the last section of the paper is the summary, conclusions and recommendations.
2.0 THEORETICAL FRAMEWORK AND LITERATURE REVIEW

2.1 Theoretical Framework

2.1.1 Theories of Fraud:

Fraud is different from other crimes because of the level of concealment involved in it. A bank robber may shoot his way into the bank's vault, but a fraudulent bank teller may use the 'stamp' of another teller in committing fraud to conceal the act and divert attention (away) from him/herself.

Several theories have been put in place in attempts to understand and explain the occurrence of fraud. Such theories include:

i. The Fraud Triangle Theory

ii. The Constructive Fraud Theory

iii. Fraud Equal Success Theory

iv. Trans-Systemic Fraud Theory

v. The Revisionist Fraud Theory

Of all the fraud theories, the Fraud Triangle Theory best explains fraud committed by employees of an organisation. The fraud triangle and similar arguments on fraud are therefore discussed.

a. The Fraud Triangle Theory

According to Rosefield (1988), employees who commit fraud generally are able to do so because of the interaction between pressure (usually financial), perceived opportunity and rationalisation. These three elements that have been identified to be often present when fraud occurs, form the 'fraud triangle'

This is explained in the diagram below:
b. Other Arguments Similar to the Fraud Triangle

Similar to the above thought is the argument in Ovuakporie (1994), that fraud is caused by the presence of three elements – will, opportunity and exit, which he tagged ‘WOE’, meaning:

- the Will to commit the fraud
- the Opportunity to execute the fraud and
- the Exit, which is the escape route from being caught or sanctioned.

Krauss and Maccahan, (1976) also state that there are three elements which may lead to fraud when they are all present. They are; the Dishonesty factor, the Opportunity factor and the Motive factor; (DOM). He further stated that the probability of being a fraud, \( F_p \) is given by:

\[
F_p = \frac{D \times O \times M}{1000} \quad \text{(1)}
\]

Where \( D, O, \) and \( M \) can take values ranging from 0 to 10 and \( F_p \) takes values between 0 and 1.

The values of \( D, O \) and \( M \) are however, assigned subjectively and not empirically. The study on hand is similar to that of Krauss and Maccahan, (1976), because it also estimates the probability that some bank employee would be fraudulent. Empirical data is however, used in this study as against the use of assigned values by, Krauss and Maccahan, (1976).
2.1.2 Binary-Choice Models

The logit and probit regressions are used in situations where the outcome of a dependent variable is binary. When dependent variables have a mix of discrete and continuous outcomes, (i.e. limited responses), the tobit model is used. The logistic regression is used for prediction of the probability of occurrence of an event by fitting data to a logistic function, while a probit model is a popular specification for an ordinal or a binary response model that employs a probit link function. The logit and probit methods of analysis are similar, differing essentially in the underlying distributional assumptions. While the probit technique is based on the cumulative normal distribution, the logit technique is based on the cumulative logistic probability function. The general form of the methods is:

\[
P(y=1 \mid x) = G(\beta_0 + \beta_1 x_1 + \ldots + \beta_k x_k) = G(\beta x) = G(\beta_0 + \beta x) \quad . \quad (2)
\]

where \(0 < G(z) < 1\), \(y\) takes binary values 0 or 1, \(x\) denotes the full set of explanatory variables, \(x_1, \ldots, x_k\) and \(\beta\), a vector of the coefficients, \(\beta_1, \ldots, \beta_k\).

In the logit model, \(G\) is the logistic function:

\[
G(Z) = \frac{\exp(z)}{1 + \exp(z)} \quad . \quad . \quad (3)
\]

while in the probit model \(G\) is the standard normal cumulative distribution function (CDF), which is expressed as an integral from minus infinity \((-\infty)\) to \(z\):

\[
G(Z) = (z) \int_{-\infty}^{z} \Phi(v) dv \quad . \quad . \quad . \quad (4)
\]

Where \(\Phi(v)\), is the standard normal density function.

For these models, ordinary linear regression analysis yields biased estimates of the coefficients; therefore, the maximum likelihood estimation method is used to yield estimates with desired asymptotic properties. Since the dependent variable, committing fraud, is a binary variable from a qualitative point of view, (a bank staff either commits fraud or does not), the logistic regression model is used in this study, (Shih, 2003, Nyong, 1994 and Doguwa, 1996).

Relying on Pindyck and Rubinfeld (1991) and Norusis (1992), the probability of an event \(P_p\) is given by:
\[ P_p = F(Z) = F(\sigma + \beta_i X_i) = \frac{1}{1 + e^{-Z}} \] \hspace{1cm} (5)

where, \( \sigma \) is a constant, \( e \) is the base of natural logarithms, which is approximately 2.718, \( Z \), a linear combination of factors that influence the probability of occurrence of the event, \( X_i \) the \( i \)th explanatory variable and \( \beta_i \) is the \( i \)th coefficient estimate. Equation (5) is extended to:
\[ Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n \] \hspace{1cm} (6)

and since by definition, \( e^{-Z} = \frac{1}{e^Z} \), then from equation (5),
\[ e^Z = \frac{P_p}{1 - P_p} \] \hspace{1cm} (7)

Taking the natural logarithm of both sides, yields:
\[ \log\left(\frac{P_p}{1 - P_p}\right) = Z = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_n X_n \] \hspace{1cm} (8)

The dependent variable in equation (8), is defined as the logarithm of the odds that the event would occur.

2.2 Literature Review

2.2.1 Prevalence of Fraud

In the opinion of Adewumi (1986), ‘fraudulent acts are prevalent in all societies of the world, including the socialist societies. This view is supported by Umoh (2003) who stated that ‘corruption (including fraud), is a social malaise and is as old as time. It is the quantum that causes dislocation and despair in the society. The ultimate test of whether individuals pursue or restrain from this trait depends on whether the enabling environment encourages it or imposes sanctions against it. Adewumi (1986) further stated that ‘of all the problems confronting the Nigerian economy, fraud is easily the most intractable. Judging by the facts available in respect of major frauds perpetrated in the past and considering their astounding successes, apparent careful planning and the boldness with which they were executed, one cannot but agree with Famodimu (1986), that fraud is an upcoming sector of the invisible yet forceful industry called crime.

2.2.2. Tools for Detecting Fraud:

Different authors have proposed different tools for fraud detection and control. Some authors like Ogunlewe (2003), Sanusi (1986) and Ovuakporie (1994), in their approach suggest that the best
method is to address the causes of fraud. The difficulty in this approach, is that sometimes, what is looked at as a cause of fraud may in fact, be a symptom. This was the case in the position held by the revisionist theory on fraud, (Obasi; 1988). Okezie (2007) lists tools for fraud detection to include: Data Verification, Regression Analysis, Parallel Simulation, Ratio Analysis and Digital Analysis.

Recently, ‘intelligent’ systems like the neural networks and sentinel solutions which ‘learn’ the ways frauds are committed and provide ways of detecting them are used, (NuroDimension; 2008).

Umoh (2003), posits that, ‘economic analysis is well-equipped to study the complexities of the problem of corruption (and fraud), since it can theorise about it, test some of the interesting hypotheses empirically, as well as generate operational policy proposals for dealing with its problems’. This study shares the view expressed in Umoh (2003) and applies economic analysis in this study.

3.0 METHODOLOGY

3.1 Data

The data used in this study are obtained from the returns on fraud and forgeries of all banks operating in Nigeria, the Annual Reports of the NDIC and information supplied by the banks on the affected staff, for the period January 2005 to December, 2010. Stratified simple random sampling is used to select a sample of size 480. The employees of each bank are divided into 5 classes – Top Management, Middle Management, Low Management, Officers, and Others. The top management class include staff of the status of General Manager and above, middle management – senior manager to below GM, low management – Assistant Manager to below senior manager, officers – banking officers, accountants/equivalents and others – all other staff below the rank of banking officer and equivalents - including, executive assistants, office assistants, drivers, security men and temporary staff. A sample of 20, (10, who have been involved in fraud and 10 who have not) staff is selected from each bank in the ratio of, 1:1:2:4:2, for the five classes of employees, respectively. The ratio is based on two factors; the numerical strength of each class and their level of involvement in the banks’ day-to-day operations. For instance, officers may be lower in number than the ‘others’, but officers in banks are like the ‘non-commissioned’ officers in the military and are heavily involved in the
nitty-gritty of the operations of banks. That is why the officers’ class has a ratio of 4 and others 2.

The different levels of education of the employees (E_i) and the values assigned them, are as follows:

<table>
<thead>
<tr>
<th>Qualification</th>
<th>West African School Certificate and below</th>
<th>National Diploma and Equivalent</th>
<th>First Degree And Equivalent</th>
<th>Masters’ Degree And Equivalent</th>
<th>Higher than Masters’ Degree</th>
</tr>
</thead>
<tbody>
<tr>
<td>Score</td>
<td>1</td>
<td>2</td>
<td>3</td>
<td>4</td>
<td>5</td>
</tr>
</tbody>
</table>

Selected staff belonging to the ‘Others’ category are then, classified according to their employment status: {'permanent staff' or ‘contract staff’} and also according to their level of education: {'high level', (a minimum of a first degree or equivalent) and ‘low level’ (lower than first degree or equivalent}).

3.2 Model Specification

Adopting the postulation of Pindyck and Rubinfield (1991), if V_1 represents the employment status of a staff in the ‘others’ category that have committed fraud and V_2, the educational level, such that V_{1a} represents fraudulent ‘contract staff’, while V_{1b} represents fraudulent ‘permanent staff’ and V_{2c} represents ‘low level of education’ and V_{2d} represents ‘high level of education’ and if: X_2 and X_3 are two dummy variables defining the category to which each of the staff belongs; such that:

\[
X_2 = \begin{cases} 
1 & \text{for } V_{1b} \\
0 & \text{otherwise}
\end{cases} \quad (9)
\]

\[
X_3 = \begin{cases} 
1 & \text{for } V_{2d} \\
0 & \text{otherwise}
\end{cases} \quad (10)
\]

then, the logit probability model (see equation (8)), will be estimated as:
\[ \log \left( \frac{P}{1-P} \right) = Z_i = \beta_1 + \beta_2 X_2 + \beta_3 X_3 + \epsilon_i \]  

This implies that if \( X_2 = 0 \) (ie. 'no fraudulent permanent staff') and \( X_3 = 0 \) (ie. 'no fraudulent staff with high educational level'), then we are left with only 'contract staff with low educational level' and :

\[ \beta_1 = \log \left( \frac{P_1}{1-P_1} \right) = \text{the logarithm of the predicted odds of a contract staff with low level of education committing fraud; where } P_1 \text{ is the probability that s/he will commit fraud.} \]

By similar arguments;

\[ \beta_1 + \beta_3 = \log \left( \frac{P_2}{1-P_2} \right) = \text{the logarithm of the predicted odds of a contract staff with a high level of education committing fraud.} \]

\[ \beta_1 + \beta_2 = \log \left( \frac{P_3}{1-P_3} \right) = \text{the logarithm of the predicted odds of a permanent staff with low level of education committing fraud, while} \]

\[ \beta_1 + \beta_2 + \beta_3 = \log \left( \frac{P_4}{1-P_4} \right) = \text{the logarithm of the predicted odds of a permanent staff with high level of education committing fraud.} \]

Where \( P_2, P_3 \) and \( P_4 \) are the probabilities for the respective classes.

therefore:

\[ P_1 = e^{\beta_1} / (1 + e^{\beta_1}) \]  

\[ P_2 = e^{\beta_1 + \beta_3} / (1 + e^{\beta_1 + \beta_3}) \]  

\[ P_3 = e^{\beta_1 + \beta_2} / (1 + e^{\beta_1 + \beta_2}) \]  

\[ P_4 = e^{\beta_1 + \beta_2 + \beta_3} / (1 + e^{\beta_1 + \beta_2 + \beta_3}) \]

According to Pindyck and Rubinfeld (1991), however, the approximation leading to the specification of equation (11), is reasonable, only when sufficient repetitions occur. Also, when only one choice is associated with each set of the explanatory variables, the left-hand side of equation (11) is undefined. For accurate results, the number of choices associated
with each value of X, should be at least 5 and the data should not be continuous. In this study, each of the variables, therefore has 5, different (non-continuous) levels.

4.0 DATA ANALYSIS AND DISCUSSION

4.1 Data Analysis Techniques

Equation (11) is then run and the $\beta$s used to calculate the probabilities stated earlier.

4.2 Results and Discussion

\[
\log Z_i = 0.915157 - 0.45026 X_2 - 0.25075 X_3. \dot{\dot{}} (11)
\]

From the above, the odds are 3:1 in favour of a contract staff with low level of education committing fraud, while the odds are 2:1 in favour of a contract staff with high level of education committing fraud. The odds are 2:1 and 1:1, for permanent staff with low level of education and for permanent staff with high level of education committing fraud, respectively.

Therefore, the probability that a contract bank staff with low level of education would be fraudulent is 0.71, while the probability that a contract staff with a high level of education will commit fraud is 0.66. Similarly, the probability that a permanent staff with low level of education would commit fraud is 0.61 and the probability that a permanent staff with a high level of education would commit fraud is 0.42.

The analysis also shows that, banks’ contract staff are more likely to commit fraud than their permanent counterparts. This supports the stand of the Central Bank of Nigeria, (CBN) and NDIC.

5.0 SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

A contract staff, is more prone to committing fraud than a permanent staff. In the same vein, the level of education is inversely related to the propensity to commit fraud. The probability that a contract bank staff with low level of education would be fraudulent was 0.71, while the probability that a contract staff with a high level of education will commit fraud was 0.66. Similarly, the probability that a permanent staff with low level of education and a permanent staff with a high level of education would commit fraud were, 0.61 and 0.42 respectively.
Banks should as much as is possible employ staff with high level of education and pay them well. They should also employ more permanent staff and supervise contract staff more closely. The level of fidelity insurance a bank should take against insider fraud relating to staff below the officer grade can be derived based on the banks’ specific level of exposure to such risk, using the probabilities obtained in this study as a guide.

Further studies can be done by deriving the probability of bank staff in other grades committing fraud.

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