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A Time Series Analysis of the Effect of Bank Fraud on the Performance of Deposit Money Banks (DMB) in Nigeria

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Abstract

The main motivation of this study stemmed from the researchers' quest to establish statistically whether the number of fraud cases, actual losses incurred, and the number of ATM frauds that occurred in banks could provide empirical proof as appropriate determinants of bank fraud and also ascertain the extent of influence these variables exerted on the performance of deposit money banks (DMB) in Nigeria. As such, this study ascertained the effect of bank fraud on the performance of deposit money banks (DMB) in Nigeria. Specifically, the study determined the effect of fraud cases, actual loss associated with fraud, and ATM frauds on the return on assets of banks in Nigeria. The study adopted an ex–post facto research design approach, using panel data from the cross-section of three banks for the period of five (5) years from 2017 – 2021, First Bank of Nigeria Plc, Zenith Bank Plc, and United Bank of Africa (UBA) Plc were purposively chosen as the sample size. Secondary data were carefully obtained which included the CBN Statistical Bulletin (2022), CBN and NDIC annual reports from 2017 – 2021, and from which the data were obtained. The data collected were presented and analyzed using tables, descriptive statistics, unit root tests, and inferential statistics. A panel least square Regression analysis was used to test for the statistical significance of the effect of bank fraud on the performance of deposit money banks (DMB) in Nigeria. The results showed that Fraud cases do not significantly affect the return on assets of banks in Nigeria. The findings further revealed that Actual losses associated with fraud do not significantly affect the return on assets of banks in Nigeria. Finally, the result established also that ATM frauds do not significantly affect the return on assets of banks in Nigeria. Consequent upon the findings, this study recommended among others; that organizations should endeavor to put in place a strong internal control system to limit and reduce the amount usually involved in fraud cases. Again, strict disciplinary action should be taken against fraudulent staff to serve as a deterrent for others.

Keywords: *Fraud cases, actual losses incurred. ATM frauds, return on assets, deposit money banks.*

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1. Introduction

1.1. Background

The relevance of the banking sector to the growth of an economy cannot be over-emphasized as banks contribute immensely to a nation's development. Banks maintain a unique position in an economy and that perhaps explains the degree of regulations to which banks are subjected and are probably the most regulated institutions in the whole world.

Healthy banks stabilize the economy of nations; as a result, nations are vested with the task of ensuring the well-being of banks maintained at all times (Nwobia, Adigwe, Ezu & Okoye, 2020). The banking sector in any country performs the crucial role of financial mobilization. This mobilization of fund proceeds from the surplus economic unit to the deficit economic unit enables an efficient and practical payment system, and facilitation the implementation of monetary policies (Taiwo, Agwu, Abiola & Areghan, 2016). In intermediation, banks mobilize savings from the surplus units of the economy and channel these funds to the deficit unit, particularly private business enterprises, to expand their productive capacity. The banking sector has become one of the most critical sectors in the economy with a wide effect on the level and direction of economic growth and transformation and also on some economic variables such as the rate of employment and inflation which directly affect the lives of the people. Globally, the pivotal challenge of banks lies in the inability of banks to advance successfully their role as financial intermediaries, and this in no small measure contributed to numerous financial crises as seen so far. Diamond (1984) cited in Taiwo, Agwu, Abiola & Areghan, (2016) posits that a special feature of banking activities is to act as delegated monitors of borrowers on behalf of the ultimate lenders (depositors). Banks also need to secure the trust and confidence of many of their clients; this remains the bedrock of their lasting relationship with depositors, borrowers, and others. It entails effective banking service delivery which matches with the global best practices. The poor management of different risks that face banks was consequential in the failure of banks which resulted in incessant frauds and accounting scandals. This is one of the major sources of worries severely facing the banking industry. The activities of fraudsters are without doubt frustrating such that even as monetary authorities avail to stipulate minimum standards to banks for effective fraud-free operations, fraudsters continue to destabilize the efforts as they (fraudsters) pose continued threats and decimate their financial base.

Statistics on the activities of fraudsters and hackers in the industry have been both amazing and confounding. In 2016, 943 fraud cases involving 11.2 billion were recorded. Recently, a report from Nigeria Inter-Bank Settlement System Plc recorded that banks in Nigeria lost N12.3bn to fraudsters in four years (Punch, Nov.18, 2023). NDIC report (2019), showed the actual loss to have exceeded the expected provisions for only N13.4 billion. Such an amount would have been enough to set up at least one hundred and forty-three (143) microfinance banks in the current period. Forgeries currently constitute the greatest challenge facing the industry coupled with high rate of insider dealings with outsiders which promotes bank forgeries. Equally worrisome is the rise in the number of top management staff who have either been indicted or accused of engaging in bank fraud. Again, the banking business has become more complex with the development in the field of Information and Communication Technology (ICT) which has changed the nature of bank fraud and fraudulent practices. With ICT, it has been observed that customers rely heavily on Automated teller machines (ATM) and web for their banking business which leads to an increase in the number of online transactions. Additionally, the growing rate of fraud and unethical practices in banks is distressing, despite all the banking regulations and supervisions by bodies like the Central Bank of Nigeria (CBN), Deposit Insurance Corporation (NDIC), and The Chartered Institute of Bankers of Nigeria (CIBN). Evidence from the NDIC Report (2008) cited in Araga, and Jelili, (2018) reveals that the report of the examinations and special investigations showed that some banks were still bedeviled with problems of fraud which include, inter alia, poor financial reporting, skimpy book-keeping practices, oversight weaknesses by the board and management, poor debt recovery, devaluation of asset quality, lack of compliance with banking laws, rules and regulations. Empirically, past studies on fraud were heavily carried out using a survey research design approach with little room left for ex-post research studies. This study, thus, examines the effect of bank fraud on the performance of deposit money banks (DMB) in Nigeria. with a focus on First Bank of Nigeria Plc, Zenith Bank Plc, and United Bank of Africa (UBA) Plc.

1.2. Objectives of the Study

The broad objective of this study is to ascertain the effect of bank fraud on the performance of deposit money banks (DMB) in Nigeria.

The specific objectives are:

a. To ascertain the effect of fraud cases on the return on assets of banks in Nigeria.
b. To determine the effect of Actual loss associated with fraud on the return on assets of banks in Nigeria
c. To evaluate the effect of ATM fraud on the return on assets of banks in Nigeria

1.3. Research Questions

These research questions guided this study:

a. What is the effect of fraud cases on the return on assets of banks in Nigeria?
b. To what extent does Actual loss associated with fraud affect the return on assets of banks in Nigeria?
c. What is the effect of ATM fraud on the return on assets of banks in Nigeria?

1.4. Research Hypotheses

To achieve the above objectives, the following hypotheses were tested in the study:

H0:1 Fraud cases do not significantly affect the return on assets of banks in Nigeria.

H0:2 Actual losses associated with fraud do not significantly affect the return on assets of banks in Nigeria.

H0:3 ATM frauds do not significantly affect the return on assets of banks in Nigeria.

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2. Literature Review

2.1. Conceptual framework

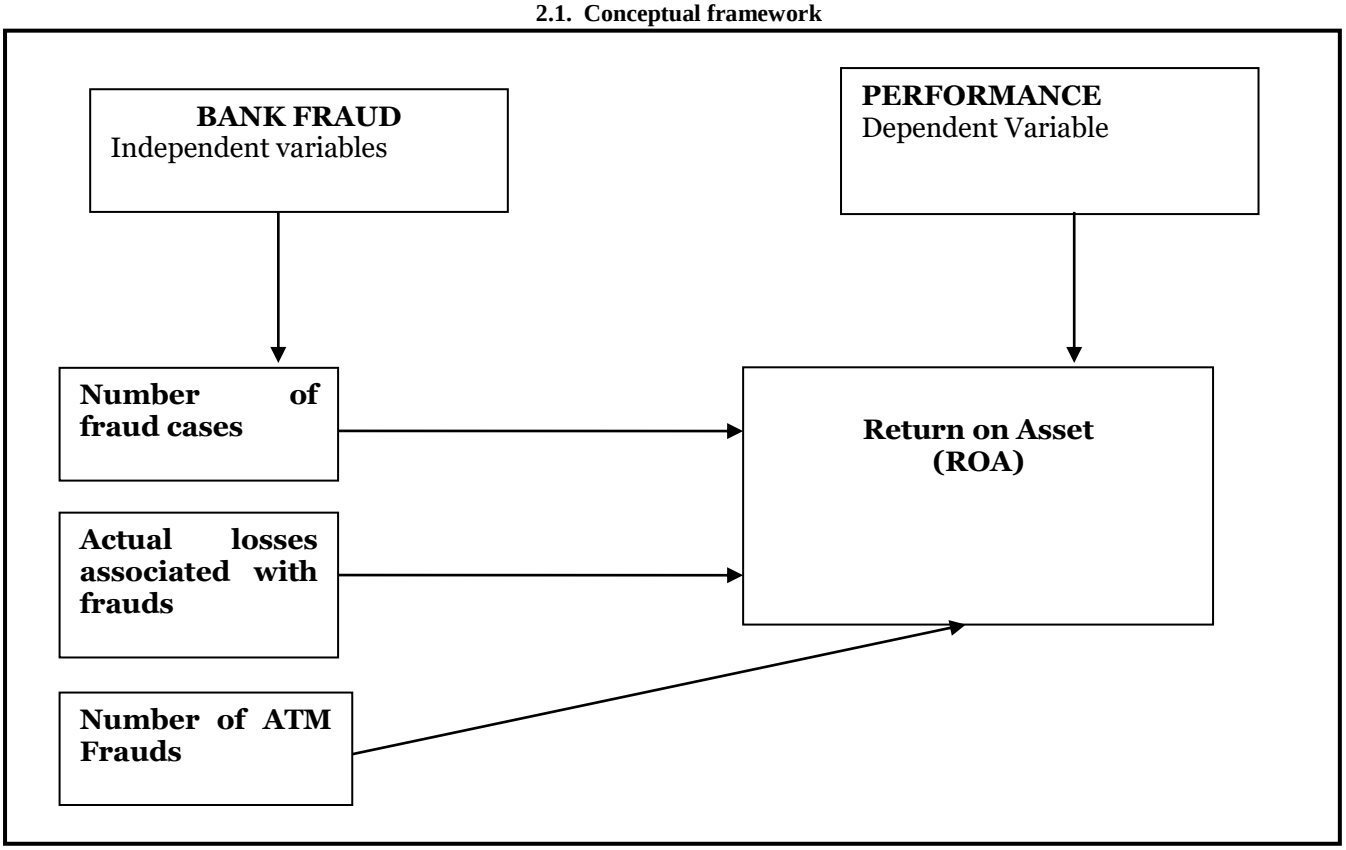

Fig.1: Schematic representation of the conceptual framework of the study

Source: Researchers' innovation (2023)

2.2. Theoretical Framework

Several theories exist in the area of fraud, Job dissatisfaction theory, The Fraud Scale, the Theory of Concealment, the Theory of Fraud Diamond, and the Theory of Work Place Deviance. This study is built on the Theory of Work Place Deviance.

Theory of Work Place Deviance

This theory was pioneered by Comer (1985). He believes that fraud is deviant behaviour. Deviance theory postulates that employees steal primarily as a result of the conditions of the workplace. It adds that a lower rate of employee theft is a by-product of management responsiveness to the employee's affairs. Workplace conditions bring to force the issue of corporate governance. Banks being institutions where the object of trade is money require good management, internal control, updated equipment, adequate remuneration, and high security. Good management is essential good and bad conduct within a corporate organization is infectious. This implies that bad attitudes (like fraud) as well as good conduct by supervisors and top management in corporate organizations could be easily emulated. The nature of the banking business where the object of trade is money itself makes it special as much effort is made on fraud prevention. This is because fraud in banks affects the transactions directly, and has psychological effects on the depositors as regards the safety of their deposits. The ripple effect of reporting fraud in banks is the cause of underreporting of frauds in the industry. Good corporate governance becomes the key to locking the elements in fraud diamond such that they might be like a thought inside the box (Okoye, 2016).

2.3. Empirical Review

Numerous research works have been conducted on the nexus between bank fraud and its effects on the performance of organizations. Despite all these empirical research works reviewed, to the best of the researchers' knowledge, not even a single robust study has been carried out to provide empirical evidence on the effect of bank fraud on performance with a particular focus on the number of fraud cases occurred, actual losses incurred associated with fraud and number of ATM frauds occurred as determinants of bank fraud in Nigerian Deposit Money Banks. Most related studies reviewed adopted descriptive survey as research design with little interest in ex-post facto research design, however propelled researchers' interest to conduct this study on the effect of bank frauds on performance in Nigeria.

For instance, Adekunle (2024) investigated on the nexus between fraud prevention and internal control mechanisms in selected banks in Nigeria. Being a survey research study, data was gathered from employees of the chosen banks' internal control units using a purposive sample technique. The study adopted Thematic analysis to examine the gathered data and it was found that the internal control methods that banks used to identify fraud were centered on setting up a control environment and identifying, analyzing, and managing risks from both internal and external sources. The study further revealed that Nigerian banks' use of a number of internal control mechanisms such as authorization, asset security, reviews of

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operational performance, a regular assessment of the internal oversight structures already in place and others to curtail alarming rate of fraud in Banks.

In a related study, Akinyomi (2012) also employed survey research design approach on his study on fraud in Nigerian banking sector and its prevention, administered two hundred (200) copies of questionnaire to two hundred (200) staff member in ten (10) deposit money banks in Lagos. The study revealed that implementation of internal control mechanism is not sufficient, hence lack of training, overburdened staff, competition and low compliance level was reported as the main reasons for bank frauds.

Wanjohi (2014) studied fraud in the banking industry in Kenya using the Commercial Bank of Africa as a case study. By employing descriptive statistics with the use of an online questionnaire to access a population of 68 employees representing 33% of the population, the study revealed that fraud in Commercial Bank of Africa was given a very high priority and employee fraud was the most prominent fraud in the bank, while third party fraud was second. It was recommended that banks should implement systems and structures that will reduce the opportunities for fraud within the banking environment. In another related study, Abdul-Rahman and Khair-Anwar (2014) investigated the effectiveness of fraud prevention and detection techniques in Malaysian Islamic banks. The study adopted a survey research designed approach, and administered 146 questionnaires to the managers of Islamic banks in Malaysia, the study reviewed that the protection software is an exceptionally convincing component/ technique of fraud protection

Rabiu, Abbah and Lawan (2021) investigated on the impact of Bank fraud on the financial performance of Banks in Nigeria is a related research work to this study, but the study was not robust in surrogating bank fraud, it only captured bank fraud with the total actual loss on fraud used as independent variable. Whereas, earning per share was used as a proxy of Bank financial performance. The regression output showed that the total actual loss on fraud has significant impact on the earnings per share.

Ojianwuna, (2024) determined the extent of influence fraud exerts on performance Deposit Money Bank in Nigeria. The study used correlational and expo facto research design, utilizing secondary data pooled out from the Nigerian Deposit Insurance Commission (NDIC) and published financial reporting of the DMBs. By the aid of Multiple regression showed that fraud triangle and diamond theories have negative and significant effect on of DMBs in Nigeria. Consequent to the mixed research reports reviewed, this study examined the effect of bank fraud (surrogated by number of fraud cases, actual loss associated with fraud and number of ATM fraud) on performance (captured as return on assets) of deposit money banks (DMB) in Nigeria.

3. Methodology

This study adopts an ex-post facto design because the data used here is a secondary source, a series of data carefully drawn from the cross-section of three (3) selected banks for a period of five (5) years from 2017 – 2021. The population of the study consists of fourteen (14) listed banks in Nigeria but by purposive sampling, three banks were selected based on their liquidity position as put forward by the equity research report (2022). They are First Bank of Nigeria Plc, Zenith Bank Plc, and United Bank of Africa (UBA) Plc. Panel regression analysis was adopted showing fixed effect regression result as supported by the Hausman Specification Test with the aid of Eview V.10 statistical package to ascertain the effect of bank fraud on the performance of deposit money banks (DMB) in Nigeria. The dependent variable in this study is performance measured by using Return on Asset as used by Nwobia, Adigwe, Ezu & Okoye (2020). The independent variable for the study (bank fraud) surrogated by the number of Fraud cases (FC), Actual losses (AL) associated with fraud, and number of ATM frauds in Nigerian banks. These were sourced from the annual reports of CBN, NDIC, and NIBSS publication 2020.

Model Specification

In line with the previous research, the researchers adapted and modified the Models of Nwobia, Adigwe , Ezu & Okoye (2020) on the effect of fraud on the performance of banks in Nigeria.

This is shown below as thus:

ROA = a0 +a1POS + u

Where

$\mu = Error\ term$

$ao = Intercept$

$a\text{ঀ} = parameter/\ coefficient$

Where ROA = Return on Assets

POS = Point of Sale Terminal fraud

a0, a1, a2 and a3 - are parameters

U t = Error term

The model was therefore modified to suit and guide the purpose of this study. The model specified below estimates the functional correlation between the dependent and independent variables in this study as follows:

The model specified below estimates the relationship:

Perf.=f(Bk.frauds)…… (1)

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ROA= β0 + β1FCs+ β2 AL+ ATMf + ε ---------- (2)

Where:

i. Perf. = Performance proxied by Return on Asset (ROA) (Dependent variable).

ii. Bk.frauds= bank frauds surrogated by FCs, AL & ATMf (Independent variables)

iii. FCs= fraud cases obtained as number of fraud cases attributable to the selected banks as published in annual reports of NDIC & CBN.

iv. AL = Actual loss associated with fraud attributable to the selected banks as published in annual reports of NDIC& CBN.

v. ATMf = ATM frauds attributable to the selected banks as published in NIBSS Publication 2020 and NDIC Annual report

vi. β0 is the intercept of the population regression line.

vii. ε is the error term

Decision Rule: accept Ho if P-value > 5% significant level otherwise reject Ho

4. Results and Analysis

4.1. Descriptive statistics

Table 1: Descriptive Statistics

	ROA	FC	AL	ATMF
Mean	0.128110	93.80000	0.162067	62.33333
Median	0.111711	81.00000	0.146000	54.00000
Maximum	0.265165	198.0000	0.295000	132.0000
Minimum	0.010917	66.00000	0.118000	42.00000
Std. Dev.	0.085381	33.05234	0.045764	22.22183
Skewness	0.380880	2.231209	1.659921	2.184707
Kurtosis	1.860479	7.715656	5.708806	7.562651
Jarque-Bera	1.174242	26.34412	11.47437	24.94348
Probability	0.555926	0.000002	0.003224	0.000004
Sum	1.921647	1407.000	2.431000	935.0000
Sum Sq. Dev.	0.102059	15294.40	0.029321	6913.333
Observations	15	15	15	15

Source: Researchers' review output, 2023.

The summary of the statistical properties of the variables used in this empirical study as shown above in Table 1 presented the average value of the Return on Asset (ROA), a performance proxy of the selected banks as 0.128110, this implies sampled selected banks on average earned a net income of 13% of the total asset with a maximum and minimum value of 0.265165 and 0.010917. The standard deviation is 0.085381. On the other hand, the average value of the sampled banks 'fraud is 94 percent (93.80000) which was measured by the number of fraud cases with the maximum and minimum occurrence of 198.0000 and 66.00000 respectively. It deviates by 33.05234 from the mean value of the sampled selected banks. The fraud of the sampled banks has on average 0.162067 as measured by Actual loss associated with fraud (AL). The maximum value of Actual loss associated with fraud (AL) incurred in banks is 0.295000 and the minimum value is 0.118000. It shows a standard deviation of 0.045764 from the mean value. Finally, the fraud of the sampled banks surrogated by the number of ATM frauds (ATMf) has on average occurred 62 times with a maximum and minimum occurrence of 132.0000 and 42.00000. The standard deviation is 22.22183. In this case, the Skewness coefficient shows that all the variables under study have values less than 1 except the number of fraud cases (FCs) and number of ATM frauds (ATMf) and this indicates that their frequency distribution is normal.

The kurtosis coefficient supports the result of Skewness in all the variables as their coefficient is less than 3, which indicates normally` distributed. Jarque – Bera statistics show that - Return on Asset (ROA), Banks' fraud cases (FCs), Actual loss associated with fraud (AL), and the number of ATM frauds (ATMf) have p-values greater than 0.05 which show that they are not significant and it implies that they are normally distributed supporting the result of Kurtosis.

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4.2. Unit Root Tests

Table 2 Result of Unit Root Tests (Augmented Dickey Fuller (ADF)

Variable	ADF P-value @ level	Decision	ADF P-value @ 1st Difference	Decision	ADF P-value @ 2nd Difference	Decision	Order of Integration
ROA	0.0010	reject Null hypothesis			-	-	1(0)
FC_s	0.9966	Do not reject Null hypothesis	0.2963	Do not reject Null hypothesis	0.0026	reject Null hypothesis	1(2)
AL	0.9940	Do not reject Null hypothesis	0.0765	Do not reject Null hypothesis	0.0000	reject Null hypothesis	1(2)
ATM_f	0.9970	Do not reject Null hypothesis	0.2976	Do not reject Null hypothesis	0.0016	reject Null hypothesis	1(2)

Source: Researchers' Eview output, 2023.

From Table 2 above, one can see that Banks 'fraud cases (FCs), Actual loss associated with fraud (AL), and ATM frauds (ATMf) are stationary at the second difference I(2) stochastic process. This means that at level and first difference of the order of integration, these data were not stationary and by that null hypothesis at that level and first difference cannot be rejected, but; the porosity of the data was ceased at the second difference order of integration which informed that null hypothesis is rejected at this order. In general, they were differenced twice to become stationary, it is said to be integrated of order two and is denoted by I (2) stochastic process. Table 2 also made it clear that Return on Asset (ROA) becomes stationary at level, it is said to be integrated at level of the order of integration, these data were stationary at level, which suggests that the porosity of the data ceased at level, as such, the null hypothesis at this order (at level) can be rejected.

4.3. Panel regression result

Table 3: Panel regression result showing the effect of Bank Frauds on Return on Assets

Dependent Variable: ROA

Method: Panel EGLS (Period random effects)

Date: 12/03/23 Time: 16:49

Sample: 2017 2021

Periods included: 5

Cross-sections included: 3

Total panel (balanced) observations: 15

Swamy and Arora estimator of component variances

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FC	-0.003264	0.018672	-0.174794	0.8644
AL	3.587355	1.830363	1.959915	0.0758
ATMF	-0.000456	0.027842	-0.016374	0.9872
C	-0.118718	0.089378	-1.328263	0.2110

Effects Specification		
	S.D.	Rho

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Period random		0.000000	0.0000
Idiosyncratic random		0.070224	1.0000
Weighted Statistics			
R-squared	0.428274	Mean dependent var	0.128110
Adjusted R-squared	0.272349	S.D. dependent var	0.085381
S.E. of regression	0.072832	Sum squared resid	0.058350
F-statistic	2.746663	Durbin-Watson stat	1.225881
Prob(F-statistic)	0.093421		
Unweighted Statistics			
R-squared	0.428274	Mean dependent var	0.128110
Sum squared resid	0.058350	Durbin-Watson stat	1.225881

Hausman Specification Test

Test Summary	Chi-Sq. Statistic	Chi-Sq. d.f.	Prob.
Period random	4.301208	3	0.2307

Source: Computer output data using E-views 10.0 output, 2023.

Hypothesis One

H0: Fraud cases do not significantly affect the return on assets of banks in Nigeria.

H1: Fraud cases significantly affect the return on assets of banks in Nigeria

From the regression analysis, Table 3 indicates that there is a negative (t-statistics, -0.174794) and insignificant (p-value, 0.8644) effect of Fraud cases on the return on assets of banks in Nigeria. This negative effect implies that a 1% increase in fraud cases will tend to decrease return on assets by -0.003264. Since, the p-value, 0.8644 is greater than the a-value (0.005), therefore null hypothesis (H0) is accepted, thus; Fraud cases do not significantly impact on return on assets of banks in Nigeria.

Hypothesis Two

H0: Actual losses associated with fraud do not significantly affect the return on assets of banks in Nigeria.

H1: Actual losses associated with fraud significantly affect the return on assets of banks in Nigeria.

From the regression analysis, Table 3 indicates that there is a positive (t-statistics, 1.959915) but insignificant (p-value, 0.0758) effect of the Actual losses associated with fraud on the return on assets of banks in Nigeria. This positive correlation implies that a 1% increase in Actual losses associated with fraud will tend to increase the return on assets by 3.587355. Since, the p-value, 0.0758 is greater than the a-value (0.005), therefore null hypothesis (H0) is accepted, thus; Actual losses associated with fraud do not significantly affect the return on assets of banks in Nigeria.

Hypothesis Three

H0: ATM frauds do not significantly affect the return on assets of banks in Nigeria.

H1: ATM frauds significantly affect the return on assets of banks in Nigeria.

From the regression analysis, Table 3 shows that there is a negative (t-statistics-0.016374) and insignificant (p-value, 0.9872) effect of the number of ATM frauds on the return on assets of banks. This negative effect implies that a 1% increase in control of ATM frauds will tend to increase the return on assets by -0.000456. Since, the p-value, 0.9872 is greater than the a-value (0.005), therefore null hypothesis (H0) is accepted, thus; ATM frauds do not significantly affect the return on assets of banks in Nigeria.

In general, R2 measures the percentage of return on asset that could be explained by changes in independent variables, Banks' fraud cases (FCs), Actual loss associated with fraud (AL), and ATM frauds (ATMf). In this case, the R2 adjusted as seen in table Table 3 is 0.272349 (27%). This implies that about 27% of the variation in return on assets could be explained by the effect of independent variables, Banks' fraud cases (FCs), Actual loss associated with fraud (AL), and ATM frauds (ATMf) while about 73% could be attributed to other factors capable of affecting

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changes on return on asset of banks in Nigeria. In this case, the Durbin-Watson statistic is 1.225881. This indicates the absence of autocorrelation in the data series.

5. Summary of Findings, Conclusion and Recommendations

5.1. Summary of Findings

The following findings were made concerning the effect of bank fraud on performance of Deposit Money Banks in Nigeria:

a) Fraud cases do not significantly affect the return on assets of banks in Nigeria.
b) Actual losses associated with fraud do not significantly affect the return on assets of banks in Nigeria..
c) ATM frauds do not significantly affect the return on assets of banks in Nigeria.

6. Conclusion

This study was conducted to ascertain the effect of bank fraud on performance of Deposit Money Banks in Nigeria. By this, the study determined the extent of influence bank fraud surrogated by Banks' fraud cases (FCs), Actual loss associated with fraud (AL), and ATM frauds (ATMf) on performance proxied by return on assets of banks in Nigeria. In this research, three hypotheses were considered. Using panel Least Square Regression analysis with random effect panel option, the first hypothesis established that there is a negative and insignificant effect of the number of fraud cases on the return on assets of banks in Nigeria. The implication is that an increase in the number of fraud cases will not exert increase on the return on assets of banks in Nigeria. Again from the research output, it is not arguable that Actual losses associated with fraud exerted a positive but insignificant effect on the return on assets of banks in Nigeria. It implies that an increase in Actual losses associated with fraud is highly probable to increase the return on assets of banks in Nigeria.

Finally, the panel regression analysis result also presented a negative and insignificant effect of the number of ATM frauds on the return on assets of banks in Nigeria. It implies that a unit rise in the number of ATM frauds results in a decline on the return on assets of banks in Nigeria.

In conclusion, it can be deduced that fraud is capable of exerting influence on banks' performance in Nigeria.

6.1. Recommendations

Based on the findings of this study, the researchers recommend that:

a) Organizations should endeavor to put in place a strong internal control system to limit and reduce the amount usually involved in fraud cases.
b) Strict disciplinary action should be taken against fraudulent staff to serve as a deterrent for others.
c) The regulatory and supervisory bodies of banks in Nigeria should improve their supervision using all tools at their disposal to appropriately check and curtain the incidence of fraud and fraudulent practices in the banking industry in Nigeria.
d) The service of forensic auditors should be sought in our banks to complement that of the traditional audit as various studies have shown that forensic auditing is capable of reducing the level of fraud in organizations.
e) Top-level management and bankers should try to achieve a high ethical standard when carrying out their responsibilities as this will help them reduce fraud.

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