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Discovery

Effect of electronic banking related fraud on deposit money banks financial performance in Nigeria

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This study empirically ascertained the effect of electronic banking related fraud on deposit money banks financial performance in Nigeria. Empirical studies relating electronic banking and banks performance in Nigeria has been centred on its benefit of improving profitability of deposit money banks while the effect of fraud perpetrated on electronic banking platforms used by banks operating in the economy are often neglected. Specifically, we examined the effect of electronic banking related fraud on automated teller machines, mobile banking, point of sale terminals and web to return on assets, return on equity, interest income and non-interest income of deposit money banks. Comprehensive data on fraud on the various electronic banking channels from the apex regulatory agency of the banking system: Central Bank of Nigeria began in 2013 thus limiting the study to a period of four years. The Ordinary Least Square (OLS) was applied in estimating the regression equation, whereas effect of fraud on various channels of electronic banking and financial performance ascertained with the help of the granger causality analysis. The findings from the study dispelled that fraud on point of sale terminals has significant negative effect on interest income, while fraud on automated teller machines, mobile banking and web had no effect on return on assets, return on equity and non-interest income of banks. we suggested that there is need for deposit money banks to further authenticate transactions on point of sale terminal by sending confirmation code to mobile number linked to the account to affirm that the transaction was initiated the original cardholder.

INTRODUCTION

In the present state of affairs in Nigeria's financial system, the channels of service delivery by deposit money banks have change tremendously owing to the adoption of electronic banking technology. The queues in the banking halls have reduced when compared to those days when banking services were based on analogue status. With electronic banking, customers at the convenience of their homes check account balances; receive credit or debit alerts, pay electricity bills and other utility bills, school fees, medical fees, especially when it involves trip overseas/outside Nigeria, travelling charges/flight tickets, etc. The banking reform of 2005 boosted the availability of electronic banking avenues by deposit money banks on the conviction that Nwakoby and Ananwude (2016) note that immediately after the consolidation exercise of 2005, commercial banks now Deposit Money Banks (DMBs) developed various technology service delivery channels to attract more customers and compete favourably in the industry. Besides, the level of development in the financial service industry globally coupled with the fact that Nigeria is an economy that depends majorly on finance from the banking sector for productive economic activities, the use of electronic banking technology is completely inexorable in other to meet the ever dynamic needs of the customers. Despite the benefits associated with electronic banking, the banks incur some costs as well as face challenges of cyber security which leads to fraud in the use of these electronic banking channels. Although, electronic banking continues to present challenges to financial security and personal privacy but still millions of people have had their checking accounts compromised, mainly as a result of electronic banking related frauds (Aliyu, Tasmin & Takala, 2012; Omotosho, 2017).

Deposit money banks have gone into a massive awareness campaign through posters; jingles, pliers, radio and TV advert on the benefit of online banking and how customers should take the edge off the online banking frauds with First Bank, Guaranty Trust Bank, Zenith Bank, United Bank for Africa and First City Monument Bank as the leading banks with regards to number of transactions carried out through electronic banking services in Nigeria (Aliyu, Tasmin & Takala, 2012). The Central Bank of Nigeria (CBN) annual report of 2016 put the volume and value of transactions done on electronic banking channels in 2016 to ₦278,744,529 and ₦64,186,537,023,217.30 compared to ₦162,598,740 and ₦48,932,506,699,512.20 in 2015, an increase of

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about 71.43 % and 31.035 respectively. The rise in transactions on electronic banking platforms have resulted in increased tendency to committing fraud by individuals working within and outside the financial sector as well as computer gurus usually referred to as hackers. Kanu and Isu (2016) state that studies related to the use of cash and electronic banking aperture in the Nigeria banking system suggest that more than 90% of funds are outside the banking sector as against the developed world where the money in circulation is 4% and 9% in the UK and US respectively. The Nigeria Electronic Fraud Form (NeFF) reports that fraud perpetrated through electronic banking in Nigeria rose by 45% from 10,743 in 2015 to 19,531 in 2016 in terms of fraud volume. Within the same period, the value of attempted fraud declined by 0.14% from ₦4,374,512,776.64 in 2015 to ₦4,368,437,371.64 in 2016, whereas the actual loss was worth ₦2,196,509,038.78 in 2016 compared to ₦2,256,312,660.00 in 2015. Following the Nigeria Electronic Fraud Form (NeFF), Automated Teller Machine (ATM) recorded the highest volume of fraud and this was subsequently followed by mobile banking platform, while the web was the third most used channel of fraud perpetration in the banking system.

The level of fraud staunched through the various channels of electronic banking affect financial performance because deposit money banks reserve substantial part of their profit to purchase, install, maintain and service these technology machines/outlets of electronic banking. Fraud in the banking industry shakes the foundation and credibility of most deposit money banks in Nigeria resulting to some of the bank being distressed, and has been believed to have influenced at both micro and macro levels of the economy, the financial performances of banks (Inaya & Isito, 2016). Besides, the availability of these electronic banking services are also influenced by internet/communication infrastructures interconnected with the issue of epileptic power supply in the country. Ekwueme, Egbunike and Okoye (2012) assert that many bank customers believe that banking transaction via the internet are not secure and often congested thus interruption is usually experienced in banking operations due to network failures, and this hinder customers from carrying out transactions at that point in time. Deposit money banks have complained about the rising costs in realization of convenience, effectiveness and efficiency in the use of these electronic banking platforms. This is attributed to the fact that banks' electricity supply depend on generators coupled with the high price of diesel and solar power installation and operationally. Melancholy on the repulsive influence of fraud on confidence of the bank customers' and the financial system in general, Kanu and Isu (2016) alleged that the increasing incidence of insecurity and frauds affect the already survival and viability of the banking sector on the argument that fraud is not unique to the banking sector but due to the product which the banks deal on - cash and allied by predominant use of cash in virtually all transactions in Nigeria, no area of banking system is immune to fraudsters, not even the operational security.

At the moment, fraud in the banking industry as well as its social effect has been a topical issue not only to the shareholders, and regulatory authorities but also those that have interest in the industry's performance (Inaya & Isito, 2016). Generally, there are empirical studies regarding the effect or nexus between electronic banking and bank performance, especially in developed countries but few in emerging economies with particular reference to Nigeria. Bulk of the studies focused on the effect, and the linkage between electronic banking and bank performance, hence researches on electronic banking fraud and performance are relatively scarce in the Nigeria context. In addition, return on assets, return on equity, profit before tax and earnings per share were the measures of bank performance utilized my researchers but neglected variables like interest income and non-interest income of the deposit money banks. That notwithstanding, the empirical findings emanating from these studies dispel mixed and inconclusive results. The conflicting results by some researchers have been attributed to the level of literacy in the countries studied, the degree of electronic banking adoption, and the proxies used to measure financial performance of the banks. Kanu and Isu (2016), Inaya and Isito (2016), Gitau and Samson (2016), Ikhu-Omorege and Enimola (2014), Muritala, Ijaiya and Adeniran (2017), Abdulrasheed, Babaita and Yinusa (2012), Taiwo, Agwu, Babajide, Okafor and Isibor (2016), Nwankwo (2013), Chelangat (2014), Olongo (2013) and Kolapo and Olaniyan (2018) have shown that fraud through electronic and non-electronic banking avenues have significant negative effect on performance of banks. However, this assertion did not go well with Mawutor (2014) who establish empirically that fraud has no effect on performance of Agricultural Development Bank of Ghana. With regard to the inconsistency in empirical findings coupled with the indicators used to reflect banks performance in prior researches, this study examine the effect of electronic banking related fraud on financial performance of deposit money banks in Nigeria from 2013 to 2016. We introduced two new financial performance variables: interest income and non-interest income which to the best of our knowledge have not been used in a study of this nature in the Nigerian environment based on internet search as at the time this research work was undertaken.

We structured the other part of this study as follows: section two takes care of the literature review; methodological approach dispelled in section three; results from analysis of data and material divulged in section four, while section five concluded the study.

LITERATURE REVIEW

Bank Fraud is the use of deliberate misrepresentation (which usually requires some technical expertise) in order to fraudulently obtain money or other assets from a bank (WiseGeek, 2013). Fraud according to Kanu and Isu (2016) is defined as a deception deliberately practiced in order to secure unfair or unlawful gain, that is, it is a deceit, trickery, sharp practice, or breach of confidence, perpetrated for profit or to gain some unfair or dishonest advantage. fraud is an act or omission which is intended to cause wrongful gain to one person and wrongful loss to the other, either by way of concealment of facts or otherwise which its effect has always been negative to both banks and society at large (Kanu & Isu, 2016). The fear that always strikes the banking industry is if customers choose a particular bank over another base on the bank pass track record on security, or lack thereof, it could impact securing a new banking customer (Aliyu, Tasmin & Takala, 2012). The high occurrence of fraud within the banking industry has become a problem to which solution must be provided in view of the large sums of money involved and its adverse implications on the economy (Fadipe-Joseph & Titiloye, 2012). With regard to electronic banking, frauds in the Nigerian banking system are perpetrated through four channels: automated teller machine, mobile banking, point of sale terminals and web. Financial performance helps to tell how far and well a bank has improved in terms of its profitability as a result of its services delivery and can be identified using different proxies such return on assets, return on equity, profit before or after tax, net income margin, etc. (Gitau & Samson, 2016).

On the theoretical exposition, Fraud Triangle Theory, Differential Association Theory and Fraud Diamond Theory are the three major theories documented in literature regarding the nexus between electronic banking fraud and banks performance. From the preposition of the Fraud

Triangle Theory, Perceived Pressure, Perceived Opportunity and Perceived Rationalization are the three motivating factors to committing fraud. Firstly, Donald Cressey who propounded the Fraud Triangle Theory in 1971 is of the firm believe that pressure from family, friend, peer group, community and even work related may influence an individual to perpetrate a fraud in the bank. Secondly, the bank staff may utilize the loopholes in the internal control system to commit such fraud which become the opportunity to committing fraud. Thirdly, when an individual is convinced or finds a reason to support fraud he/she committed then the issue of rationalization is realized. Taking a look at the Differential Association Theory by Edwin Sutherland, individual would commit fraud if he/she associates with people that commit crime. This points to the adage that "birds of the same feather flock together". Following the Fraud Diamond Theory, fraud occurrence is determined by four factors: incentive, opportunity, rationalization and individual's capability. This is to say that the intellectual attributes and capacity of an individual with respect to workplace determines whether fraud occur or not, and in the event that it occur, it must have been influenced by pressure, opportunity and rationalization.

Empirical studies on bank fraud and banks' financial performance are relatively few in the case of emerging economies like Nigeria. However, the available studies are hereby reviewed. Kanu and Isu (2016) evaluated the insecure situation, bank fraud and their impact on bank performance. Multiple regression analysis was applied to determine if there is any significant relationship between the indicators of bank insecurity, fraud and the earnings before tax (the indicator of bank performance) of the Commercial banks in Nigeria. Data were obtained through secondary sources on the indicators of bank insecurity and fraud and the earnings before tax of Commercial banks in Nigeria for the period 1991 -2013 from Nigeria Deposit and Insurance Corporation's annual report. The results of the study demonstrated an inverse relationship between Expected Losses on insecurity and Fraud (ELF), Number of Fraud Cases (NFC) and Number of Staff involved in Fraud Cases and earnings before tax of commercial banks in Nigeria. The results of the Granger causality test show a unidirectional causality from bank insecurity and fraud to commercial bank performance.

Inaya and Isito (2016) investigated the social impact of fraud on the Nigerian banking industry. Secondary data of Fraud, Actual/Expected Loss and Return on Equity were obtained from Annual Reports and Accounts of Nigeria Deposit Insurance Corporation (NDIC) and the commercial banks during the period 1990-2014. The Ordinary Least Square (OLS) with its Best Linear Unbiased Estimate (BLUE) Property was used in analysing the data. The findings showed that banks in Nigeria are significantly thriving from, and may also be complicit in, the high rate of fraud in the country. They also discovered a negative social impact of fraud on the Nigerian banking industry.

Gitau and Samson (2016) assessed the effect of financial fraud on the financial performance of Commercial Banks in Kenya, a case of Nakuru Town. Specifically the study identified the effect of cheque fraud, the effect of fraudulent invoice and payments, examined the extent of money laundering and to identify the effect of fraudulent loans on the financial performance of Commercial Banks in Nakuru town. The study was grounded on Cressey's Fraud Triangle Theory, Wolfe & Hermanson's Fraud Diamond Theory, and Hollinger Clerk Study. This study adopted a descriptive research design. The population of interest in this study is Tier I banks in Nakuru County. A survey of 11, Tier 1 Banks was sufficient, and specifically targeted; management, tellers, Loans department, and Accounts opening section. Primary data for the study was collected using self-administered questionnaires, while secondary data was collected from annual reports at Central Bank of Kenya, Bank fraud investigation unit and audited financial reports of the banks. The result showed that banks' financial performance variable Return on Assets (ROA) has significantly affected by liquidity ratios and fraud loss with positive correlation.

Ikhu-Omorege and Enimola (2014) examined the implications of financial crime on bank performance in Nigeria. The study adopted a survey design and data analysed by Pearson correlation. It was found out in this research work that, the volume and frequency of financial crime in Nigerian banks have been on the increase with obvious negative effects on their performance. This is also linked to the connivance, corrupt and fraudulent nature of the operators and the society.

Muritala, Ijaiya and Adeniran (2017) ascertained the impact of fraud on bank performance in Nigerian banking industry using quarterly data spanning from 2000 to 2013.The study found out that the number of staff involved in fraud has a significantly positive impact on the return on asset while the fraud perpetrated and the amount involved in fraud perpetration both have negative impact on bank performance. The expected coefficient of the (VECM) result showed that there is a short run dynamic effect of the changes on the return on asset meaning that the variables adjusted to correct the imbalances in the fraudulent banking environment.

Abdulrasheed, Babaita and Yinusa (2012) determined the problem of fraud and its implications for bank performance in Nigeria through empirical analysis. The sources of data used for the paper were extracted from the Nigerian Deposit Insurance Corporation (NDIC) Annual Report from 2004 to 2009. Statistical methods such as parametric table and Pearson correlation were employed in the evaluation of the data. The study revealed that Nigerian banks recorded the highest fraud cases in 2008. The result of the hypothesis shows that, there is a significant relationship between total amount involved in fraud cases and bank's profit.

Taiwo, Agwu, Babajide, Okafor and Isibor (2016) evaluated the growth of bank frauds and the impact on the Nigerian banking industry. The study used time series annual data for the period covering 2002 to 2014 gathered from the Central Bank of Nigeria statistical bulletin, various financial website, Journals and Newspapers. The multiple regression technique and the Augmented Dickey-Fuller (ADF) Unit Root test were used for the study while the study hypothesized that fraud does not have a significant effect on bank profitability in Nigeria. The result showed that there exists a negative significant relationship between Bank Profitability as proxied by return on asset and the total amount involved in frauds committed in the banking sector.

Mawutor (2014) assessed the impact of electronic banking on the profitability of a Bank in Ghana. How the Bank finds itself before a new fact imposed by technology revolution that has changed their work mechanisms from traditional means to electronic means. Furthermore, this study investigated how the electronic banking services through internet and ATM has impacted on banking services in general and the banks' profitability in particular. The methodology was quantitative in nature. In all, 150 questionnaires were administered to the interviewee from the selected branches of the Agricultural Development Bank who are customers, to solicit information concerning the E-banking. All data from the structured self-administered questionnaires were correctly organized. The software that was used for this is, Statistical Package for Social Sciences (SPSS). The study was also more descriptive in nature. After testing the hypothesis by using inferential statistics, it was discovered that E-banking does have an impact on the profitability of the Agricultural Development bank.

Nwankwo (2013) evaluated the impact of fraud on the performance of commercial banks in Nigeria. It also sought to ascertain the relationship between bank ATM Fraud, Forged Cheque, Clearing Cheque Fraud and bank performance. The methodology adopted in testing objective of this study was regression analysis. The outcome of the research revealed that there is significant impact of fraud on the performance of commercial banks in Nigeria. The implication of this is that if the level of fraud in commercial bank did not reduced to the barest minimum, it may not allow commercial banks to perform well and as well contribute to the growth of Nigeria economy.

Chelangat (2014) determined the effects of the various types of fraud on the financial performance of deposit taking SACCOs in Kenya. The study used a descriptive design. The population of interest in this study was the deposit taking SACCOs that are operating in Kenya between the years 2009 to 2013. The study sampled 10 deposit taking SACCOs in each sector of the Sacco Industry. The type of data collected for this study was both Primary and secondary data for the purpose of analysing the effect of financial fraud on financial performance of deposit taking SACCOs in Kenya. From the regression model, the study found out that there were factors influencing the financial performance of deposit taking SACCOs in Kenya, which are fraud due to behavioural causes, fraud due to technological causes, fraud due to management causes and fraud due to legal causes.

Olongo (2013) ascertained the effects of financial fraud and liquidity on the financial performance of the commercial banks in Kenya. This research study adopted a descriptive research design. Regression analysis model was used in which the dependent variable was the ROA. The independent variables were the annual liquidity ratios and the annual fraud loss. The multiple regression analysis was used to determine how each of the dependent variable relates to ROA. The result showed that banks' financial performance variable Return on Assets (ROA) has significantly affected by liquidity ratios and fraud loss with positive correlation. The strong and positive Pearson correlation coefficients imply that financial fraud loss and liquidity ratios had a strong and significant influence of financial performance of commercial banks in Kenya for the period considered.

METHODOLOGICAL DIMENSION

Covering a short period of four years that is, from 2013 to 2016, we adopted an ex-post facto research design based on availability of data from the Central Bank of Nigeria. We disaggregated fraud on electronic banking channels into automated teller machine, mobile banking, point of sale terminals and web which is the independent or explanatory variables. Deposit money banks financial performance in Nigeria was categorized into return on assets; return on equity, interest income and non-interest income thus the dependent variables. We adopted and modified the model of Kanu and Isu (2016) which expressed financial performance of banks as a function of expected losses from insecurity and fraud cases, number of fraud cases, number of staff involved in fraud cases and volume (amount) involved in fraud cases. The original model is stated as:

$$LogPBT = \beta_0 + \beta_1 logELF + \beta_2 logNFC + \beta_3 logNSF + \beta_4 logVCF + \varepsilon_t \qquad Equ.1$$

Where: β_0 is the intercept; β_1 - β_4 are the slope coefficients of the model; ELF expected losses from insecurity and fraud cases; NFC is number of fraud cases; NSF is number of staff involved in fraud cases; VCF is volume (amount) involved in fraud cases; and ε_t is the error term.

Incorporating this study's specific objective variables, the following multivariate models were estimated:

$$ROA = (FATM) \qquad Equ.2$$
$$ROE = f(FMB) \qquad Equ.3$$
$$INTI = f(FPOS) \qquad Equ.4$$
$$NINTI = f(FWEB) \qquad Equ.5$$

The variables in the models were transformed to log linear econometric format. This is to maintain a balance on the numerical base of the dependent and independent variables and to allow for easy interpretation of coefficients thus:

Model 1

$$LogROA_t = a_0 + a_1 logFATM_t + \varepsilon_t \qquad Equ.6$$

Model 2

$$LogROE_t = a_0 + a_1 logFMB_t + \varepsilon_t \qquad Equ.7$$

Model 3

$$LogINTI_t = a_0 + a_1 logFPOS_t + \varepsilon_t \qquad Equ.8$$

Model 4

$$LogNINTI_t = a_0 + a_1 logFWEB_t + \varepsilon_t \qquad Equ.9$$

Where:

ROA is return on assets, ROE is return on equity, $INTI$ is interest income, $NINTI$ is non- interest income, $FATM$ is fraud on automated teller machine, FMB is fraud on mobile banking, $FPOS$ is fraud on point of sale terminal, $FWEB$ is fraud on web, and ε is the error term.

RESULT AND DISCUSSION

First, we begin by presenting the descriptive properties of the data as disclose in Table 1. The mean of the variables were observed to be 1.915, 14.99, 1944895, 953120.5, 8.91, 1.26, 1.18 and 3.49 respectively for ROA, ROE, INTI NINTI, FATM, FMB, FPOS and FWEB, whereas the median are 1.90, 14.22, 188163, 748415, 4.10, 1.24, 1.11 and 1.41. The maximum and minimum of the series are 3.39 and 0.47 for ROA, 18.9 and 12.56 for ROE, 2800000 and 1216330 for INTI, 1700000 and 615652 for NINTI, 2,688,669,200 and 549,998,290 for FATM, 248,144,130 and 6,787,544 for FMB, 5,851,443 and 243,321,812.67 for FPOS and 83,776,994 and 1,031,239,200 for FWEB. The series standard deviation are 1.24 for ROA, 2.79 for ROE, 807006.3 for INTI, 512071 for NINTI, 1.21 for FATM, 1.34 for FMB, 1.05 for FPOS and 4.56 for FWEB. All the variables are positively skewed towards normality as shown by the positive sign of the skewness. The variables are not leptokurtic in nature as the kurtosis for all the variable are less than three (3). The Jarque-Bera statistic p-values for all the variables disclose the non-normality of the data hence, the study applied another econometric test of normality – Shapiro-Wilk. The result of the Shapiro-Wilk normality test (at 5% significance level) in Table 2 entails that the data were normally distributed and allows for statistical inferences to be made.

After determining the descriptive attributes of the data, we proceeded to diagnosing the models visa viz: serial correlation LM test, heteroskedasticity and Ramsey rest specification to ensure there are in line with classical linear regression assumptions. Table 3 reveals that the variables are not serially correlated; no heteroskedasticity issue and the models were well-specified owing to insignificant p-values of the f-statistics.

Table 1 Descriptive Properties of the Data

	Mean	Median	Maximum	Minimum	Std. Dev.	Skewness	Kurtosis	Jarque-Bera	P-value	Obs
ROA	1.915000	1.90000	3.390000	0.470000	1.240551	0.035476	1.718147	0.274697	0.87167	4
ROE	14.99250	14.2200	18.97000	12.56000	2.792363	0.822785	2.103647	0.585225	0.74631	4
INTI	1944895.	188163	2800000.	1216330.	807006.3	0.079268	1.117701	0.594697	0.74279	4
NINTI	953120.5	748415	1700000.	615652.0	512071.0	0.980144	2.171658	0.754814	0.68564	4
FATM	8.91E+08	4.1000	2699999	54999829	1.21E+09	1.082654	2.283637	0.866956	0.64825	4
FMB	1.26E+08	1.24E+0	2.48E+08	6787544.	1.34E+08	0.003500	1.007842	0.661457	0.71840	4
FPOS	1.18E+08	1.11E+0	2.43E+08	5851443.	1.05E+08	0.168104	1.548446	0.370008	0.83110	4
FWEB	3.49E+08	1.41E+0	1.03E+09	83776994	4.56E+08	1.131359	2.314479	0.931639	0.62762	4

Source: Output Data from E-views 9.0

Table 2 Shapiro-Wilk Test of Normality

Variables	Shapiro-Wilk Test Statistic	P-value
ROA	0.997988	0.003604
ROE	0.890893	0.007245
INTI	0.842405	0.002506
NINTI	0.786822	0.050611
FATM	0.759748	0.047452
FMB	0.765078	0.050020
FPOS	0.974732	0.040529
FWEB	0.701889	0.012211

Source: Output Data from Gretl

Table 3 Diagnostic Test

Estimated Models	Serial Correlation LM		Heteroskedasticity		Ramsey RESET Test	
	F-statistic	Prob.	F-statistic	Prob.	F-statistic	Prob.
Model 1	0.006395	0.9492	1.448429	0.3519	1.514290	0.4344
Model 2	6.910797	0.2314	0.348506	0.6605	4.883645	0.2705
Model 3	0.015308	0.9216	0.002784	0.9627	0.028946	0.8927
Model 4	0.012355	0.9295	0.657223	0.5027	1.373914	0.4497

Source: Output Data from E-views 9.0

Table 4 Result of ADF Test at First Difference

Variables	Intercept	None	Remark
ROA	-5.501588 (0.04)**	-2.867862 (0.02)**	Stationary
ROE	-5.772159 (0.04)**	-2.952436 (0.03)**	Stationary
INTI	-2.936964 (0.02)**	-5.482326 (0.03)**	Stationary
NINTI	-61.35519 (0.00)*	-2.652473 (0.02)**	Stationary
FATM	-5.782116 (0.02)**	-2.500802 (0.03)**	Stationary
FMB	-5.801783 (0.02)**	-2.451027 (0.03)**	Stationary
FPOS	-6.021082 (0.02)**	-2.705741 (0.02)**	Stationary
FWEB	-5.607806 (0.04)**	-2.274873 (0.04)**	Stationary

Source: Data output via E-views 9.0

Note: The optimal lag for ADF test is selected based on the Akaike Info Criteria (AIC), p-values are in parentheses where (*) and (**) denote significance at 1% and 5% respectively.

Table 5 Result of PP Test at First Difference

Variables	Intercept	None	Remark
ROA	-5.734793 (0.03)**	-2.867862 (0.02)**	Stationary
ROE	-5.399703 (0.03)**	-2.141802 (0.02)**	Stationary
INTI	-5.686076 (0.04)**	-2.936964 (0.03)**	Stationary
NINTI	-70.29947 (0.00)*	-2.889547 (0.02)**	Stationary
FATM	-5.782116 (0.02)**	-2.602752 (0.02)**	Stationary
FMB	-7.268936 (0.01)*	-2.451027 (0.02)**	Stationary
FPOS	-6.021082 (0.02)**	-2.705741 (0.02)**	Stationary
FWEB	-7.607806 (0.01)*	-2.274873 (0.04)**	Stationary

Source: Data output via E-views 9.0

Note: In determining the truncation lag for PP test, the spectral estimation method selected is Bartlett kernel and Newey-West method for Bandwidth, p-values are in parentheses where (*) and (**) denote significance at 1% and 5% respectively.

In the third place, the stationarity properties of the data were checked to prevent spurious result. The Augmented Dickey-Fuller (ADF) and Phillips Perron (PP) unit root test at first difference were applied in this regard and results in Tables 4-5 unveil that the data are not affected by stationarity problem linked with lost time series data.

Fourthly, due to the short period of the study, the short run relationship between the variables were ascertained as the number of observation would not allow for assessment of a long run relationship. This was achieved using the OLS technique and results summarized in Tables 6-9. The regression result in Table 6 reveals that there is a negative relationship between electronic banking fraud on ATM and return on assets of deposit money banks in Nigeria. The coefficient of the constant 1.252269, indicates that when electronic banking fraud on ATM is held constant, return on assets would be 1.25%. A unit increase in electronic banking fraud on ATM causes 7.44% depreciation in return on assets. The Adjusted R-squared value of 0.290621 indicates that the independent variable explained 29.06% variation in return on assets within the period studied. The F-statistic of 2.229050 and p-value of 0.273997 show that when electronic banking fraud on ATM did not significantly influenced variations in return on assets. The Durbin Watson statistic value of 1.40 is not that bad as the serial correlation LM test in 6 depicts that the variables in the models are not serially correlated.

Table 7 shows that there is a negative and insignificant relationship between electronic banking fraud on mobile banking and return on equity of deposit money banks in Nigeria. The coefficient of the constant 2.941788 is an indication that electronic banking fraud on mobile banking is held constant, return on equity would be valued at 2.94%. The electronic banking fraud on mobile banking coefficient of -8.16E-09 reveals a percent increase in electronic banking fraud on mobile banking leads to 8.16% reduction in return on equity. From the Adjusted R-squared, 66.22% changes in return on equity was attributed to fraud perpetrated through mobile banking. The F-statistic (6.880211) with p-value (0.119784) suggests that fraud perpetrated through mobile banking insignificantly explained the variation in return on equity of deposit money banks. The Durbin Watson value suggests no autocorrelation.

The regression result in Table 8 reveals that fraud perpetrated through point of sale terminals distributed to customers by deposit money banks in Nigeria has negative insignificant relationship with interest income. The coefficient of the constant 1.781738 means that holding electronic banking fraud on point of sale terminals constant, interest income would be ₦1.78 million. A unit rise in electronic banking fraud on point of sale terminals would decrease interest income by ₦1.13 million. The Adjusted R-squared infers that -48.63% change in interest income was as a result of electronic banking fraud on point of sale terminal which statistically in significant owing to the f-statistic (0.018430) and p-value (0.904445). The Durbin Watson statistic met the bench mark of 2.0 evidencing no problem of autocorrelation in the model.

The model relative statistic in Table 9 reveals that electronic banking fraud on web has negative and insignificant (5% level of significance) relationship with non-interest income of deposit money banks in Nigeria. The coefficient of the constant 1.199243 suggests that holding electronic banking fraud on web constant, non-interest income would stand at ₦1.199 million. Non-interest income of deposit money banks would be lowered by ₦2.05 million following a unit rise on electronic banking fraud on web. The Adjusted R-squared value of 0.350619 indicates that electronic banking fraud on web explained 35.06% variation in non-interest income within the period studied. The F-statistic of 2.619785 and p-value of 0.246953 reflect that electronic banking fraud on web did not significantly influenced variations in non-interest income. The Durbin Watson statistic of 1.72 is within the acceptable range of no autocorrelation.

Finally, in the methodological analysis, we employed the granger causality test to ascertain the effect of electronic banking related fraud on deposit money banks financial performance indicators, and this was detailed in Table 10. The granger causality test provide evidence that there is a unidirectional causal relationship between electronic banking fraud on point of sale terminals and interest income of deposit money banks in Nigeria within the time frame that Nigeria Electronic Fraud Forum (NeFF) started its mandate of publishing fraud perpetrated on electronic banking channels. This is to say that electronic banking fraud on point of sale terminals has significant effect on interest income of deposit money banks in Nigeria. On other hand, there was no evidence on the significant effect of electronic banking fraud on ATM, mobile banking and web on return on assets, return on equity and non- interest income of deposit money banks in Nigeria. This is on the argument that there is no causal or bidirectional relationship between the variables concerned.

In this discussion our findings, we found a negative relationship between fraud on ATM and return on assets of deposit money banks as dispelled in Table 6. This is indication that when electronic banking fraud on ATM increases, return on assets of deposit money banks reduces in a similar manner. This would be that ATM been a service delivery channel of banks is also part of the banks' assets thus rising cases of fraud through its usage may make customers shy away from using it as a transaction which might affect the bank performance owing to rise in operating cost as the case in the analogue banking system (Md. Mijanur Rahman et al. 2016). This result in line with Kanu and Isu (2016) on the inverse relationship between amount loss to fraud on financial performance of deposit money banks in Nigeria. It also accord credence to Nwankwo (2013) who established that the level of ATM bank fraud over the years have indeed negatively affected insignificantly on performance of commercial banks in Nigeria. There is a negative relationship between return on equity of deposit money banks and electronic banking fraud on mobile banking as shown in Table 7. This portray that increase in fraud on mobile banking lowers shareholders' wealth owing to the value of money that would be loss following rising cases of fraud on mobile banking. This result is similar to Inaya and Isito (2016) that volume of fraud has social negative impact on the Nigerian banking industry.

Electronic banking fraud on point of sale terminals has negative relationship with interest income of deposit money banks. Again, as shown in Table 8, fraud on point of sale terminals has significant effect on interest income of banks. This suggests that if fraud cases on increases the actual amount lost by deposit money banks would in turn lead to depreciation in interest income of the banks. This result relates to the empirical finding of Muitala, Ijaiya and Adeniran (2017), Taiwo, Agwu, Babajide, Okafor and Isibor (2016) and Abdulrasheed, Babaita and Yinusa (2012). Non-interest income of deposit money banks is no affected or influenced by fraud perpetrated on web despite the existence of a negative relationship between fraud on web and non-interest income which is an affirmation of a priori expectation. The inverse relationship between fraud on web and non-interest income implies that non-interest income of deposit money banks would reduce when fraud on web continue to rise which is similar to the result of Chelangat (2014) and Olongo (2013).

Table 6 OLS Regression Result for ROA and Electronic Banking Fraud on ATM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.252269	0.685542	1.826685	0.2093
FATM	-7.44E-10	4.98E-10	-1.493000	0.2740
R-squared	0.527081	Mean dependent var		1.915000
Adjusted R-squared	0.290621	S.D. dependent var		1.240551
S.E. of regression	1.044850	Akaike info criterion		3.232476
Sum squared resid	2.183422	Schwarz criterion		2.925623
Log likelihood	-4.464952	Hannan-Quinn criter.		2.559110
F-statistic	2.229050	Durbin-Watson stat		1.400351
Prob (F-statistic)	0.273997			

Source: Data output via E-views 9.0

Table 7 OLS Regression Result for ROE and Electronic Banking Fraud on Mobile Banking

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.941788	0.532178	5.527832	0.0312
FMB	-8.16E-09	3.11E-09	-2.623016	0.1198
R-squared	0.774780	Mean dependent var		1.915000
Adjusted R-squared	0.662170	S.D. dependent var		1.240551
S.E. of regression	0.721047	Akaike info criterion		2.490628
Sum squared resid	1.039818	Schwarz criterion		2.183775
Log likelihood	-2.981256	Hannan-Quinn criter.		1.817262
F-statistic	6.880211	Durbin-Watson stat		2.969830
Prob (F-statistic)	0.119784			

Source: Data output via E-views 9.0

Table 8 OLS Regression Result for INTI and Electronic Banking Fraud on POS

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.781738	1.239124	1.437901	0.2870
FPOS	-1.13E-09	8.35E-09	-0.135757	0.9044
R-squared	0.009131	Mean dependent var		1.915000
Adjusted R-squared	-0.486304	S.D. dependent var		1.240551
S.E. of regression	1.512406	Akaike info criterion		3.972133
Sum squared resid	4.574744	Schwarz criterion		3.665281
Log likelihood	-5.944267	Hannan-Quinn criter.		3.298768
F-statistic	0.018430	Durbin-Watson stat		2.048528
Prob (F-statistic)	0.904445			

Source: Data output via E-views 9.0

Table 9 OLS Regression Result for NINTI and Electronic Banking Fraud on Web

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.199243	0.667381	1.796940	0.2142
FWEB	-2.05E-09	1.27E-09	-1.618575	0.2470
R-squared	0.567079	Mean dependent var		1.915000
Adjusted R-squared	0.350619	S.D. dependent var		1.240551
S.E. of regression	0.999688	Akaike info criterion		3.144105
Sum squared resid	1.998751	Schwarz criterion		2.837252
Log likelihood	-4.288210	Hannan-Quinn criter.		2.470739
F-statistic	2.619785	Durbin-Watson stat		1.724795
Prob (F-statistic)	0.246953			

Source: Data output via E-views 9.0

Table 10 Granger Causality Output for E-Banking Fraud and Financial Performance of DMBs

Null Hypothesis:	Obs	F-Statistic	Prob.	Remarks
FATM does not Granger Cause ROA		5.06324	0.2662	No Causality
ROA does not Granger Cause FATM	4	0.05188	0.8574	No Causality
FMB does not Granger Cause ROE		0.00074	0.9827	No Causality
ROE does not Granger Cause FMB	4	4.77280	0.2733	No Causality
FPOS does not Granger Cause INTI		4166.45	0.0099	Causality
INTI does not Granger Cause FPOS	4	2.49147	0.3595	No Causality
FWEB does not Granger Cause NINTI		0.02650	0.8973	No Causality
NINTI does not Granger Cause FWEB	4	5.10273	0.2653	No Causality

Source: Data output via E-views 9.0

The a priori expectation was anchored on the triangular theory of fraud which upheld the negative effect of fraud on bank performance. Our results in Tables 6-9 show that electronic banking fraud on automated teller machine, mobile banking, point of sale terminal and web confirmed to a priori expectation of a negative relationship.

CONCLUSION

In this study, the effect of electronic banking related fraud on financial performance of deposit money banks in Nigeria from 2013 to 2016 was determined. The finding reveals that fraud on point of sale terminals has significant negative effect on interest income, while fraud on automated teller machines, mobile banking and web had no effect on return on assets, return on equity and non-interest income of banks. We found also that electronic banking via the various platforms: automated teller machine, mobile banking, point of sale terminals and web have negative relationship with deposit money banks financial performance in Nigeria. Electronic banking frauds are becoming a global phenomenon in nature, while its consequences are becoming a great concern for the banks worldwide. This research work empirical studied the effect of electronic banking related fraud on financial performance of deposit money banks in Nigeria. From the result of the analysis, financial performance of deposit money banks is negatively related with electronic banking related, hence this study concludes electronic banking fraud has negative and devastative effect on financial performance of deposit money banks in Nigeria. Considering the findings from this study, we recommend that there is need for deposit money banks to further authenticate transactions on point of sale terminal by sending confirmation code to mobile number linked to the account to affirm that the transaction was initiated the original cardholder. Fraud detection mechanisms should be put in place by installing biometric scan such as finger print on ATMs to confirm that transaction originated from the real cardholder, and not a third party.

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