

## Econometric Analysis of the Causal Link between Forensic Accounting Techniques and Fraud Prevention in Nigeria

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### Abstract

### Original Research Article

This study examined the effect of forensic accounting techniques on fraud prevention in Nigeria. The study adopted the ordinary least square technique to assess specifically, the effect of computer assisted audit techniques, Ratio Analysis techniques and Trend Analysis technique on fraud detection/prevention in Nigerian banks. The outcome of the study revealed that there is a causal linkage between application of forensic accounting techniques and fraud detection and prevention in banks operating in Nigeria except trend analysis technique which showed no causal linkage with fraud detection/prevention. We therefore, recommend that frequent utilization of forensic audit services will significantly help in the detection, prevention as well as reduction of incidences of fraud in businesses. Furthermore, Nigeria deposit money banks should encourage the use of forensic accounting techniques to curtail fraudulent malpractices in its operations. Other robust techniques for fraud detection/prevention not considered in this study should be examined and given a chance as the three techniques considered in this study explained less than twenty percent (19.94%) of variation in fraud prevention in Nigerian banks, leaving over eighty percent to other techniques not captured in this study.

**Keywords:** Forensic Accounting, Techniques, Fraud Prevention, Banks.

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## 1. INTRODUCTION

Although the Nigerian Banking sector is one of the most controlled and regulated sectors. In spite of this, fraud has continued to rear its ugly head in the sector. There has been continuous increase in financial crime, mismanagement and misappropriation of funds in the sector. In the year 2017, the Nigerian Deposit Insurance Corporation (NDIC) reported that frauds and forgeries involved in the banking sector amounted to ₦12.01 billion.

The growing level of fraud in the sector makes the need for use of forensic accounting techniques in fraud investigation very apt especially in Nigeria. Globally, the occurrence of fraud in corporate organizations is becoming rampant and this can be shown in the large number of reported cases of bribery, corruption, embezzlement, money laundering, racketing, fraudulent financial reporting, tax evasion, forgery and other means through which both financial and economic dishonesty are being perpetrated (Ofiafoh & Otor, 2013).

Reporting financial irregularities in the firms' accounts has been an increasing phenomenon in the

world and has continuously remained a leading issue at any point in time. Modern organized financial crimes are highly sophisticated while many of management staff are not experts in fraud related problems (Ogutu & Ngahu, 2016).

The spotlight on the accounting profession following the Enron and WorldCom debacles and the fact that the frauds in the banking sector are perpetuated under the watchful eyes of both Internal and External Auditors and the rampant impacts of crime globally prompts the need for credible and high quality forensic accounting services. In fact, many foreign investors in Nigeria have lost several billions of dollars to fraudsters because of corruption thereby leading to reduction or even dis-investment from Nigeria and its attendant negative consequences on economic growth. Forensic accountancy services as expert witness, litigation support and fraud investigation will bridge a large gap in prevention of such financial crimes.

Arising from its importance in ensuring transparency and accountability, various techniques have been put in place to ensure quality service delivery by use of appropriate tools and techniques to detect and

or prevent fraudulent activities. This study examines the application of forensic accounting techniques in fraud detection and prevention among deposit money banks in Nigeria.

### 1.1 Objective of the Study

The study is to examine the casual link between forensic accounting techniques and fraud detection and prevention in the Nigerian Banking Sector with the following specific objectives to test the linkage:

- i. To examine the causal link between computers assisted audit techniques (CAATs) and fraud detection and prevention among money deposit banks in Nigerian.
- ii. To ascertain the causal link between application of ratio analysis technique and fraud detection and prevention in the banks.
- iii. To examine the causal link between application of trend analysis technique and fraud detection and prevention in the banks.

### 1.2 Research Question

The following research questions are thus formulated for the study:

- i. What is the causal link between computers assisted audit techniques (CAATs) and fraud detection and prevention among deposit money banks in Nigeria?
- ii. What causal relationships exist between the application of ratio analysis techniques in fraud detection and prevention among the deposit money banks in Nigeria?
- iii. What causal linkages exist between adoption of trend analysis techniques and fraud detection and prevention among deposit money banks in Nigeria?

### 1.3 Research Hypothesis

**H<sub>01</sub>:** There is no significant linkage between the use of computer assisted audit techniques (CAATs) and fraud detection and prevention among deposit money banks in Nigeria.

**H<sub>02</sub>:** There is no significant linkage between ratio analysis technique and fraud detection and prevention among deposit money banks in Nigeria.

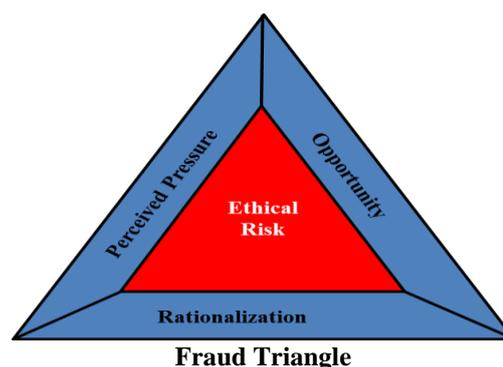
**H<sub>03</sub>:** The application of trend analysis technique has no significant linkage with fraud detection and prevention among deposit money banks in Nigeria.

## 2. LITERATURE REVIEW

### 2.1 Theoretical Framework

Studies have employed several theories to explain why corporate bodies apply forensic accounting techniques for fraud and crime management. Among the various theories are the fraud triangle, fraud Diamond, the Pentagon, Fraud Management lifecycle, and fraud scale theories.

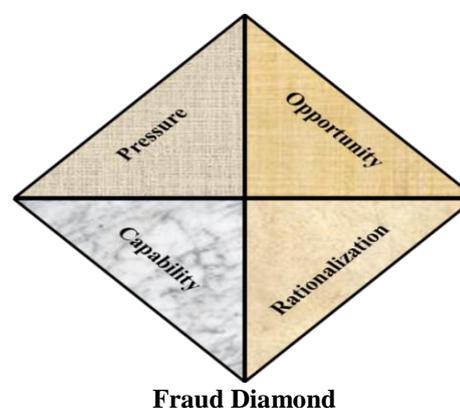
#### 2.1.1 Fraud triangle theory



This theory is credited to American Criminologist Donald Cressey (1950). The fraud triangle is what the forensic accountant relies on to identify suspected fraud, the causes and the weakness in the system that prompted the fraud. Based on the fraud triangle concept, the three factors that cumulate into the triangle are; pressure which may be internal or external, opportunity which is using ones position to commit fraud when internal controls are weak, or where there is poor management oversight on internal control implementation and rationalization by justifying why the action or the fraud is justifiable.

Pressure does not only mean financial pressure. Lister (2007), states that there are three types of motivation or pressure; personal pressure to pay for lifestyle, employment pressure from continuous compensation structures, or management's financial interest, and external pressure such as targets, market expectation, financial covenants etc. Therefore, forensic accountants have to keep in mind that pressure/motive to commit fraud can be either personal pressure, employment pressure, or external pressure and each of these types of pressure can also happen because of financial and non-financial pressure (Gbegi & Adebisi, 2013). Rationalization is the justification for the act to be committed. This is an attempt to justify why a fraudster commit fraud.

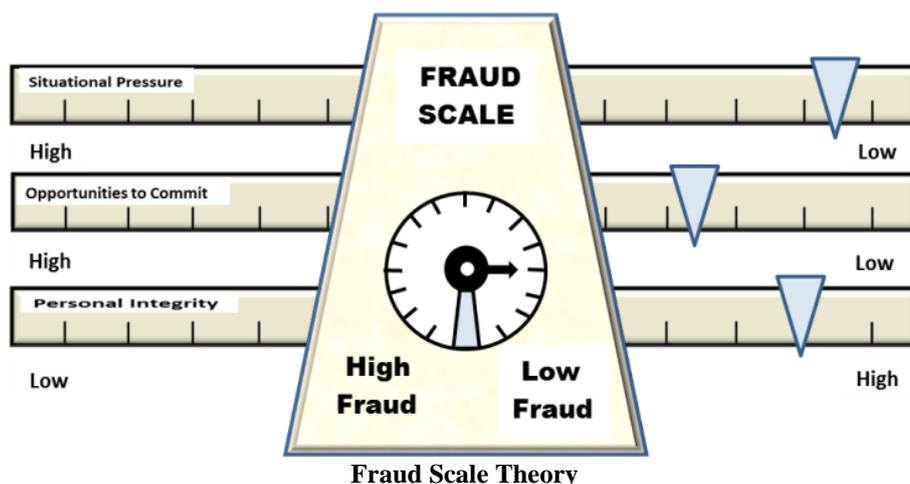
#### 2.1.2 The Fraud Diamond Theory



Wolf and Hermanson (2004) introduced “capability” to the three elements in fraud triangle theory and named it fraud diamond model. Wolfe and Hermanson (2004) opined that although perceived pressure might coexist with an opportunity and rationalization, it is improbable for fraud to occur

unless the fourth element (that is capability) is also present. In other words, the potential perpetrator of crime must have the skills and ability to commit fraud.

### 2.1.3 Fraud Scale Theory



Unlike the fraud triangle, the fraud scale theory which was developed by Albrecht *et al.*, (1984) introduced an element called "personal integrity" instead of rationalization on the postulation that personal integrity can be observed in both an individual's personal decision-making process. This personal integrity element is associated with each individual's personal code of ethical behavior. Experts agree that fraud and other unethical behaviors often occur due to an individual's lack of personal integrity or other moral reasoning.

## 2.2 Conceptual Framework

### 2.2.1 Forensic Accounting

Dhar and Sarkar (2010) define forensic accounting as the application of accounting concepts and techniques to legal problems. Forensic accounting is the integration of accounting, auditing and investigative skills, (Okoye & Egbengi, 2013; Zysman, 2004); Akintoye, 2008; Skousen & Wright, 2008) defined forensic accounting as a discipline that is suitable for legal review, offering the highest level of assurance, and including the new generally accepted connotation of having been arrived at, in a scientific fashion and providing the needed findings in settling disputes. According to Adrian & Lawrence (2009), forensic accountants calculate values draw conclusions and identify irregular patterns or suspicious transactions by critically analyzing given financial data and the service provides an accounting analysis to the court for dispute resolution in certain cases and it also provides the courts with explanation that fraud has been committed.

### 2.2.2 Forensic Accounting Techniques

These are tools deployed by investigators to assist in examining or discovering abnormal patterns or trends and or relationships in financial systems. Financial analysis is a very useful investigative technique when investigating cases which are more likely to be reflected in the records and financial statements of an organization. Considering the fact that the objective of analytic procedure is to identify unexpected relationship that do not make sense, different tools may be applied to streamline emphasis of investigation on certain sections of the entity's accounts to detect or examine links of financial transactions that do not appear realistic, abnormal or exceptional one-off transactions or events which may likely indicate errors or illegal acts or fraud. These tools include:

#### 2.2.2.1. Data Mining

Data mining is the process of finding anomalies, patterns and correlations within large data sets to predict outcomes. It is the extraction of hidden predictive information from large database. It predicts future trends and behaviors allowing businesses to make proactive knowledge driven decisions. The tool helps get better view of market risks, detect fraud faster, manage regulatory compliance obligations and get optimal returns on marketing investments.

#### 2.2.2.2. Relative Size Factor (RSF)

The purpose of this is to identify anomalies where the largest amount for subsets in a given key is outside the range for those subsets. This test compares the top two amounts for each subset and calculates the Relative size factor (RSF) for each. The test identifies subsets where the large amount is out of line with the

other amounts for that subset. The relative size factor test is an important error detecting test.

### 2.2.2.3. Computer-Assisted Audit Techniques (Caats)

CAATs are a growing field within the IT audit profession. CAATs are the practice of using computers to automate the IT audit processes. CAATs normally includes using basic office productivity software such as spreadsheet, word processors, text editing programs, specialized audit software (e.g. ACL, Arbutus, EAS) and more advanced software packages involving the use of statistical analysis. Computer Assisted Audit Techniques (CAATs) helps auditors to perform various functions like: Data Queries, Data stratification, Sample extraction, Missing sequence identification, Statistical analysis, Duplicate transaction identification, Pivot table creation and Cross tabulation. CAATs can assist the auditor in detecting fraud by performing and creating analytical tests, data analysis reports, continuous monitoring, and curb stoning in surveys.

### 2.2.2.4. Ratio Analysis

Ratio analysis examines the patterns of the data to highlight possible deceitful transactions. Ratio analysis not only highlights irregularities in large groups of records, but also identifies the specific transactions that are unfamiliar. Ratio Analysis uses the accounting information so as to help become aware of prospective problems and also to compare entity's performance with other industry ratios. The ratios are grouped into profitability, leverage, activity and liquidity categories.

### 2.2.2.5. Trend Analysis

Trend Analysis is one of the important techniques to identify frauds. For example if we compare the sales data over the years and also the same with the Bad debts taking place in the organization, then it becomes easy to understand that if sales are increasing and bad debts are also increasing at the same level then, this could be concluded that such bad debts are nothing but the fake sales bill entered in the system. Such fraud could not be identified unless these are compared over the period. It may sound correct for that financial year but may not be the same case over the period of years. This technique is useful even to see the movement of inventories. This also helps top management in decision making.

### 2.2.3 Fraud

Fraud may be defined dishonesty in the form of an intentional deception or manipulation of material facts with clear intension to deceive by convincing people to act against their own best interests but for the material gain of the fraudster. No one description of financial fraud suffices; it has been variously described in literature. Wikipedia dictionary describes Fraud as crimes against property, involving the unlawful

conversion of property belonging to another to one's own.

Fraud is an activity that takes place in a social setting and has severe consequences for the economy, corporations and individuals. It is an opportunistic infection that bursts forth when greed meets the possibility of deception. The incidence of fraud continues to increase across private and public sector organizations across nations. Fraud is a universal problem as no nation is immune although, developing countries and their various states suffer the most pain.

Anyanwu (1993) asserted that fraud is an act of deception, deliberately planned to gain unlawful or unfair advantage; such deception is perpetrated to the detriment of others. Accounting fraud is an act of knowingly falsifying accounting records, such as sales or cost records, in order to boost the net income or sales figures Accounting fraud is illegal and subjects the company and the executives involved to civil lawsuits (Arokiasamy & Cristal, 2009).

Mahdi and Zhila (2008) defined fraud as the intentional misrepresentation, concealment or omission of the truth for the purpose of deception or manipulation to the financial detriment of an individual or an Organization such as a Bank, which also includes embezzlement, theft or any attempt to steal or unlawfully obtain or misuse the asset of the bank. Fraud can increase the operating cost of a Bank because of the added cost of installing the necessary machinery for its prevention, detection and protection of Assets.

Fraud may be classified into two broad ways according to the nature of fraud and method employed in carrying out the fraud. On the basis of the nature of the fraud, fraud may be categorized as Internal fraud which relates to those committed by members of staff and directors of the organizations, external fraud which relates fraud committed by persons not connected with the organization and mixed fraud which involves outsiders colluding with the staff and directors of the organization.

Karwai (2002) reported that the identification of the causes of fraud is very difficult. He stated that modern day organizations frauds usually involve a complex web of conspiracy and deception that often mask the actual cause. Ajie and Ezi (2000) are of the view that studies have shown that on the average out of every 10 staff, 6 would look for ways to steal if given the opportunity and thus only 4 could be normally honest.

### 2.3 Empirical Review

There are many studies on forensic accounting application and fraud detection both globally and in Nigeria. Ewa (2022) study on forensic accounting and fraud management in the public sector in Nigeria used

commercial data mining software, ratio analysis techniques and trend analysis techniques as proxies to measure forensic accounting techniques. The result of the study revealed all the three forensic accounting techniques significantly enhanced ability to detect and or prevent fraudulent practices in Ministries, Departments and Agencies (MDAs). The study also revealed knowledge gap among the work force in the application of these preventive control techniques in the public sector and thus recommended a robust IT facilities in each MDA, development of the human capital of the staff members in the MDAs and mandatorily make possession of professional qualification and knowledge of information technology a requisite to be engaged in the accounts and audit departments of MDAs in Nigeria. This collaborated the work of Okoye and Egbengi (2013).

Ewa *et al.*, (2020) evaluated forensic accounting techniques in fraud prevention in the banking sector in Nigeria using descriptive and ordinary least square multiple regression model. They used as their proxy to measure forensic accounting techniques, commercial data mining software, ratio analysis techniques and trend analysis techniques. The analysis of their results revealed the significance of all the three forensic accounting techniques. They recommended among others, that commercial banks should mandatorily be required to acquire robust data mining softwares facilities as well as enhanced training on the application of data mining and its usefulness in the banking sector.

Izedonmi and Ibadin (2012), examined forensic accounting and financial Crimes; looking at some basic and common financial crimes in corporate organizations, resting the focus on Nigeria, and by extension, the developing world. They revealed that the motivations for financial crimes are built around some risk factors, such as incentive (or pressure), opportunity and rationalization surrounding the financial criminals.

Efiong, (2012), investigated the awareness of Forensic accounting among the Nigerian undergraduates. The study found that there is a very low level of awareness of forensic accounting among undergraduate students. The study recommended increased awareness can be achieved via adoption of forensic accounting education into the universities accounting curriculum to enhance students' skills and competencies.

Eiyal, Otor and Awili, (2013) explored how forensic accounting can be employed in fighting financial crime in Nigeria and concluded that forensic accounting assignment is more comprehensive in nature than financial audit. This is because forensic accounting looks beyond the transactions and audit trail instead focus on substances of the transactions.

Davis, Farrel and Ogil (2010), in their work titled "Characteristics and skills of the Forensic Accountant. With the use of online, a total of seven hundred and seventy-nine (779) respondents were drawn as sample. The major instrument for data collection was questionnaire and the instrument used in analyzing the data was ranking method. It was discovered that analytical characteristics remain the foremost trait that forensic accountants are expected to possess. The study revealed that communication skills, the ability to simplify the complex and the ability to present opinions in a logical setting are critical to the effectiveness of the forensic accountant.

Zachariah, Masoyi, Ernest and Gabriel (2014), worked on the topic titled "application of forensic auditing in reducing fraud cases in Nigeria money deposit Banks". The study analyzed the trend in fraud cases from 2001-2012, included are the amounts involved in fraud, the most frequent types of fraud, and the losses sustained by Banks. The descriptive analysis revealed that there are up and down movements in fraud cases. Since Banks continually loose huge sums of money as a result of the inability of the auditors and the supervisory regulators to curtail the trend, there is therefore the need to devise different means of tackling frauds in the Banks. According to the authors, Nigerian Banks over the past decades had suffered from the menace of fraud which resulted to distresses and liquidation which hamper the roles of Banks in the economy. The study therefore suggested employment of forensic auditing in Nigerian Banks by amending the existing statutes, in such a way that forensic auditors are included in the audit team.

Onodi, Okafor and Onyali (2015), examined the effect of forensic investigation methods in corporate fraud deterrence in Nigerian Banks. This study adopted a survey research design and data from primary source were collected through interviews and administration of questionnaires, while secondary source consists of reports on fraud and forgery in the banking sector. Statistical tools used to analyze the data included percentages, mean score, frequency tables, regression analysis and Z-test. The result revealed that there is a significant relationship between the forensic investigative methods and corporate fraud deterrence. The finding revealed that expert services of forensic investigators are normally required in the prosecution of fraud, but majority of the audit and accounting personnel in Nigeria are suffering from poor perception and knowledge of forensic investigative methods.

Akhidime and Uagbala-Ekatah (2014), in their exploration of the growing relevance of forensic accounting in Nigeria, found that though forensic accounting in Nigeria have helped fraud detection, it is lacking statutory back up. Hence, it has no significant impact in tackling corruption in Nigeria. Pamuke and Ozkul (2010), in their investigation into fraud detection

and forensic accounting concluded that forensic accounting will be one of the best careers in the future and urge Companies and government around the world to make material and moral investment for this profession, in order to ensure better world economy free of fraud.

Enofe, Okpako and Atube (2013) conducted a study on the impact of Forensic Accounting on fraud detection. In their research work, they adopted ordinary least square method. The choice of this technique arises as a result of the fact that it is subject to some crucial assumption of the error term and this provides the best of the parameter estimates of a single equation model. Based on the finding, their study reveals that forensic accounting services provide firms with the necessary tools to determine fraudulent activities but does not curb fraudulent activities. Adegbe and Fakile (2012) carried out study on forensic accounting as an antidote to economic and financial crime in Nigeria. The paper tested four hypotheses. Chi-Square was applied to achieve the objectives. The results revealed that forensic accounting is a financial strategy to curb and resolve economic and financial crimes in the Nigerian economy.

Modugu and Anyaduba (2013) carried out study on forensic accounting and financial fraud in Nigeria. Specifically, the study examined the agreement amongst stakeholders on the effectiveness of forensic accounting in financial fraud control, financial reporting and internal control quality. The survey design was used in the study with a sample size of 143 consisting of accountants, management staff, practicing auditors and shareholders. The simple random technique was utilized in selecting the sample size, while the binomial test was employed in the data analysis. The findings of the study revealed that there is significant agreement amongst stakeholders on the effectiveness of forensic accounting in fraud control, financial reporting and internal control quality.

### 3. RESEARCH METHODOLOGY

#### 3.1 Research Design

This study adopted an ex-post facto research design. The study used questionnaires to solicit responses from respondents believing to have the desired information. The population of this research comprises of auditors, accountants and IT staff of Deposit Money Banks in Calabar, Cross River State of Nigeria. The Deposit Money Banks and the population of audit, accounts and IT staff are tabulated below:

**Table 3.1: Population of Studied Banks**

S/N	BANKS	POPULATION IN PERSON (Relevant Staff Only)
1	Access Bank Plc	20
2	First Bank of Nigeria Limited	10
3	Union Bank of Nigeria Plc	10
4	United Bank for Africa Plc	20
5	Zenith Bank Plc	20
6	Fidelity Bank Plc	10
7	First City Monument Bank Plc	10
8	Guaranty Trust Bank Plc	10
9	Ecobank Nigeria Limited	20
10	Sterling Bank Plc	20
11	Heritage Bank Plc	10
12	Wema Bank Plc	10
	<b>Total</b>	<b>170</b>

Source: Field Study 2019

A total of 150 questionnaires were administered and 140 were returned which informed the use of 140 observations. Our analysis is based on the returned question which was framed using five point likert scale.

#### 3.2 Model Specification

The model specification used to examine forensic accounting techniques as the determinants of fraud prevention is specified as:

$$FRP = f(CAAT, RAS, TRD)$$

It is stated econometrically as:

$$FRP = \beta_0 + \beta_1 CAAT + \beta_2 RAS + \beta_3 TRD + \mu$$

Where:

$\beta_0$  = Unknown Constant term to be estimated

FRP = Fraud Prevention

CAAT = Computer Assisted Audit Techniques

RAS = Ratio Analysis

TRD = Trend Analysis

$\mu$  = Stochastic error term

$\beta_1 - \beta_3$  = Unknown coefficients to be estimated

$\beta_0, \beta_1, \beta_2, \beta_3 > 0$

The log transformation used for analysis is stated as :

$$\ln FRP = \beta_0 + \beta_1 \ln CAAT + \beta_2 \ln RAS + \beta_3 \ln TRD + \mu$$

### 4. RESULTS AND DISCUSSIONS

#### 4.1 Descriptive Statistics

Presented below is the descriptive statistics of the dataset collected for this study. These data were

keyed into the Eview statistical package which generated the result as presented in table 1 below.

**Table 1: Descriptive Statistics**

	CAAT	RAS	TRD	FRP
Mean	31.75714	36.40000	27.49286	52.33571
Median	32.00000	38.00000	28.00000	55.00000
Maximum	37.00000	42.00000	30.00000	55.00000
Minimum	20.00000	22.00000	19.00000	39.00000
Std. Dev.	2.687224	4.142776	2.528959	3.963159
Skewness	-1.461025	-0.765430	-1.008043	-1.643463
Kurtosis	6.269474	2.749343	3.450621	4.918857
Jarque-Bera	112.1624	14.03709	24.89469	84.50108
Probability	0.000000	0.000895	0.000004	0.000000
Sum	4446.000	5096.000	3849.000	7327.000
Sum Sq. Dev.	1003.743	2385.600	888.9929	2183.221
Observations	140	140	140	140

**Source:** Researchers' computation (2018) from E-view 9.5

From table 1, the mean value of our raw data is 31.75714, 36.4, 27.4926 and 52.33571 for CAT, RAS, TRD and FRP series respectively. The median is 32.0, 38.0, 28.0 and 55.0 for CAAT, RAS, TRD and FRP variables respectively. The values of the variables range from 20.0 to 37.0 for CAAT, 22.0 to 42.0 for RAS, 19 to 30 for TRD and 39 to 55 for FRP. The standard deviation for each of the variables is 2.667224 for CAAT, 4.142776 for RAS, 2.528959 for TRD and 3.963159 for FRP. The skewness result which measure the degree of symmetry of our raw data shows value of -1.461025 for CAAT, -0.765430 for RAS, -1.008043 for TRD, -1.643463 for FRP which means all our variables/series has negative skewness, long left tail and this means that all our variables has more values than the mean values. Kurtosis in our data show a value of 6.269474 for CAAT, 3.450621 for TRD and 4.918857 for FRP respectively shows that these three variables are leptokurtic, positive kurtosis which means their curve are peaked and that they have more higher values than the mean. RAS series has a kurtosis value of 2.749343 which indicate that it is platykurtic i.e negative kurtosis, flatter curve and therefore means that it has lower values than the mean. The Jarque Bera statistics value of 112.1624 for CAAT, 14.03709 for RAS, 24.8949 for TRD and 84.50108 for FRP and each

has probability of less than 5percent. This means that we cannot accept the null hypothesis that the residuals of all our series are normally distributed.

#### 4.2 The Unit Root Test

The test for stationarity was conducted to examine whether there is presence of unit root in the data set collected for this study. This test was done using Augmented Dickey Fuller approach. The results of the unit root test are reported in table 2 and 3 below.

**Table 2: Augmented Dickey Fuller (ADF) Unit Root Test**

Variables	ADF Test Statistics	Order of integration
<b>Level</b>		
LNFRP	-4.427171	I (0)
LNCAAT	-9.280990	I(0)
LNRAS	-10.07542	I (0)
LNTRD	-7.656989	I(0)

Test critical values at level: 1% = -3.477835, 5% = -2.882279, 10% = -2.577908

**Source:** Researchers' E-views 9.1 Computation, 2019

The result of the unit root test using the augmented dickey- fuller (ADF) test as presented in tables 2 above showed that all our variables are stationary at levels. Therefore, the null hypothesis, variable has unit root can be rejected at levels for all.

**Table 3: Regression result of our model after log transformation**

<b>Dependent Variable: LNFRP</b>				
<b>Method: Least Squares</b>				
<b>Date: 10/22/19 Time: 01:31</b>				
<b>Sample: 1 140</b>				
<b>Included observations: 140</b>				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.933490	0.232070	8.331513	0.0000
LNCAAT	0.305106	0.083660	3.646961	0.0004
LNRAS	0.068152	0.059946	1.136880	0.2576
LNTRD	0.218369	0.068205	3.201671	0.0017
R-squared	0.358171	Mean dependent var		3.954549
Adjusted R-squared	0.344013	S.D. dependent var		0.081352
S.E. of regression	0.065890	Akaike info criterion		-2.573516
Sum squared resid	0.590436	Schwarz criterion		-2.489469
Log likelihood	184.1461	Hannan-Quinn criter.		-2.539362
F-statistic	25.29813	Durbin-Watson stat		0.971598

Prob(F-statistic)	0.000000
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### 4.2.1 Test for Reliability and Stability of the Estimates

To test whether or not the estimates of the results are reliable and stable, the study applied the

Breuch-Godfrey serial correlation LM test, the normality test, heteroskedasticity test and the CUSUM test. The results of this test are presented below.

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	29.40494	Prob. F(2,134)	0.0000
Obs*R-squared	42.70208	Prob. Chi-Square(2)	0.0000

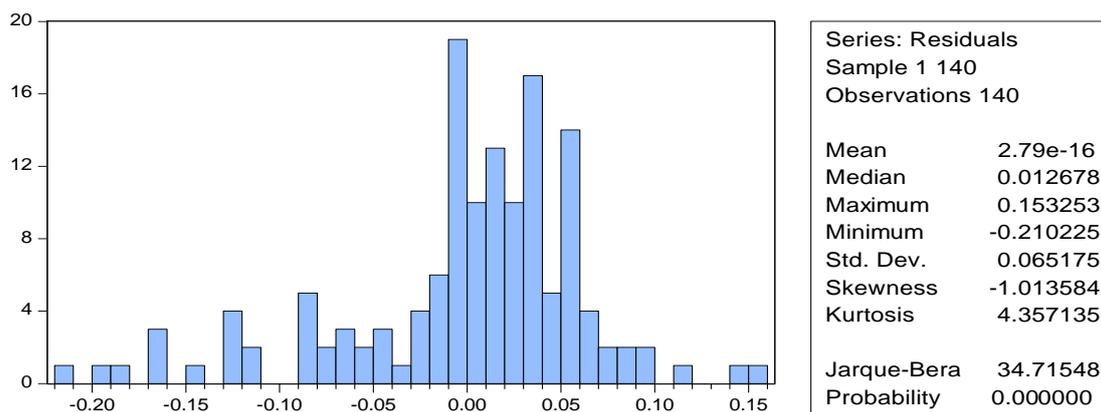
Model has serial correlation. Prob. Chi-Square is less than 5%. We reject the Null hypothesis of No serial Correlation.

### 4.2.2 Heteroskedasticity Test

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	9.189189	Prob. F(3,136)	0.0000
Obs*R-squared	23.59550	Prob. Chi-Square(3)	0.0000
Scaled explained SS	37.37574	Prob. Chi-Square(3)	0.0000

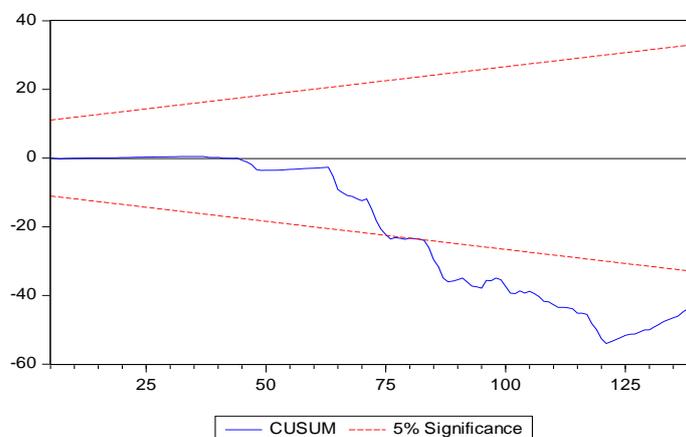
Model is heteroskedastic. Prob. Chi-Square is less than 5%. We reject the Null hypothesis of heteroskedasticity.

### 4.2.3 Nomality Test



Residual is not normally distributed. Probability is less than 5% for Jarque-Berra Statistics.

### 4.2.4 Stability Test



Our model is not stable because the BLUE line is outside one of the boundary RED line.

- ii. Remove constant(c) from our model and
- iii. Auto regress the dependent variable lnFRP.

In our model results as presented in table 3, we found that the residual has serial correlation, is heteroskedastic, it is not normally distributed and has stability problem. We need to correct our model especially for serial correlation problem. To do this we:

- i. Turn all variables to their first difference

We therefore formulate our new model as:

**D(lnFRP) D(lnFRP(-1)) D(lnCAT) D(lnRAS) D(lnTRD)**

The regression results after correcting our model is as presented in table 4 below:

**Table 4: Dependent Variable: D (LNFRP)**

<b>Method: Least Squares</b>				
<b>Date: 10/22/19 Time: 01:52</b>				
<b>Sample (adjusted): 3 140</b>				
<b>Included observations: 138 after adjustments</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
D(LNFRP(-1))	-0.084733	0.079662	-1.063667	0.2894
D(LNCAAT)	0.121188	0.057836	2.095366	0.0380
D(LNRAS)	0.071421	0.039686	1.799662	0.0742
D(LNTRD)	0.080475	0.055231	1.457060	0.1474
R-squared	0.217007	Mean dependent var		-0.001454
Adjusted R-squared	0.199477	S.D. dependent var		0.062108
S.E. of regression	0.055570	Akaike info criterion		-2.913802
Sum squared resid	0.413790	Schwarz criterion		-2.828954
Log likelihood	205.0523	Hannan-Quinn criter.		-2.879322
Durbin-Watson stat	1.929314			

We therefore, perform diagnostic check after correcting the model before interpreting our results.

### 4.3 Serial Correlation

<b>Breusch-Godfrey Serial Correlation LM Test:</b>			
F-statistic	0.768517	Prob. F(2,132)	0.4658
Obs*R-squared	1.588404	Prob. Chi-Square(2)	0.4519

There is no serial correlation in our model. We cannot reject Null hypothesis that there is no serial or

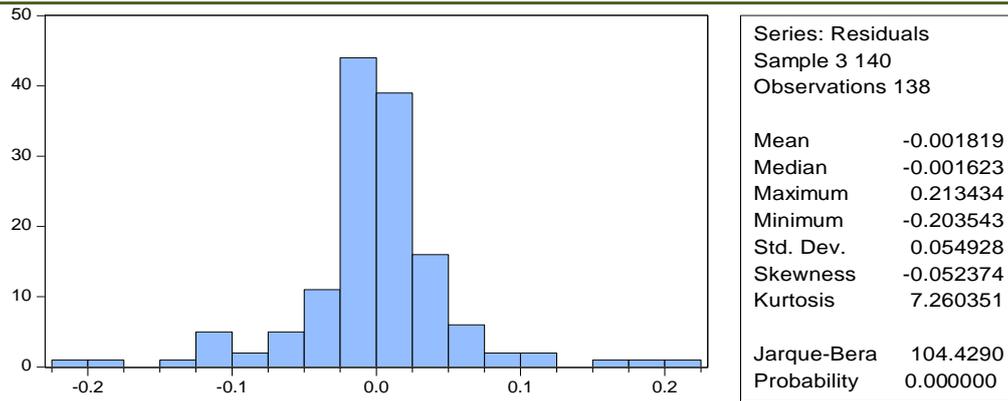
autocorrelation in our model since our prob. Chi-Square is not less than 5 percent. It is 45.19percent.

#### 4.3.1 Heteroskedasticity Test

<b>Heteroskedasticity Test: Breusch-Pagan-Godfrey</b>			
F-statistic	5.323825	Prob. F(4,133)	0.0005
Obs*R-squared	19.04628	Prob. Chi-Square(4)	0.0008
Scaled explained SS	56.19017	Prob. Chi-Square(4)	0.0000

There is heteroscedasticity in our model. Our Prob. Chi-Square is less than 5percent. We reject the Null hypothesis.

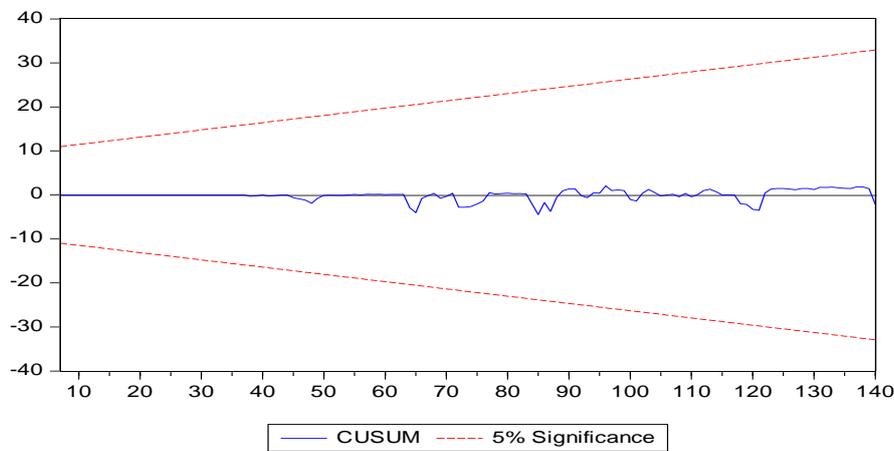
#### 4.3.2 Normality Test



Our model is not normally distributed. We reject the Null hypothesis that our residual is normally

distributed. The probability value of the Jarque-Bera statistics is less than 5percent.

### 4.3.3 Stability Check



Our model is stable. Has no stability problem

The results in table 4 shows Rsquare of 21.7 percent which indicate that only 21.7percent of variation in fraud prevention is explained by our three independent variables CAAT, RAS and TRD. 78.3percent are explained by variable not captured in our model.

CAAT and RAS are significant and positively related to fraud prevention in Nigeria for period under observation. CAAT is significant at 3.8 percent while RAS is significant at 7.42 percent. Every one percent increase in CAAT will lead to 12.11 percent increase in fraud prevention while a one percent increase in the use of RAS will lead to a 7.14 percent increase in fraud prevention

### 4.4 Test of Hypotheses

#### Hypothesis 1

**H<sub>0</sub>:** There is no significant linkage between the use of Computer Assisted Audit Techniques (CAATs) and fraud detection and prevention among deposit money banks in Nigeria.

**H<sub>1</sub>:** There is significant linkage between the use of Computer Assisted Audit Techniques (CAATs) and

fraud detection and prevention among deposit money banks in Nigeria.

**Decision Rule:** Accept  $H_0$  if probability of t-stats is greater than 5percent else reject  $H_0$ . From our model we can see that CAAT has a probability of 0.0380 which is 3.8percent, therefore we cannot accept  $H_0$ , rather we accept  $H_1$ . It therefore means that Computer Assisted Audit Techniques has a significant linkage with fraud detection/prevention in Nigerian Banks.

#### Hypothesis 2

**H<sub>0</sub>:** There is no significant linkage between Ratio Analysis Techniques (RAS) and fraud detection and prevention among deposit money banks in Nigeria.

**H<sub>1</sub>:** There is significant linkage between Ratio Analysis Techniques (RAS) and fraud detection and prevention among deposit money banks in Nigeria.

**Decision Rule:** Accept  $H_0$  if probability of t-stats is greater than 5percent else reject  $H_0$ . From our model we can see that RAS has a probability of 0.0742 which is 7.4percent, therefore we cannot reject  $H_0$ , rather we accept  $H_0$ . It therefore means that Ratio Analysis Techniques has no significant linkage with fraud detection/prevention in Nigerian Banks.

### Hypothesis 3

**H<sub>0</sub>:** The application of Trend Analysis Techniques (TRD) has no significant linkage with fraud detection and prevention among deposit money banks in Nigeria.

**H<sub>1</sub>:** The application of Trend Analysis Techniques (TRD) has significant linkage with fraud detection and prevention among deposit money banks in Nigeria.

**Decision Rule:** Accept H<sub>01</sub> if probability of t-stats is greater than 5percent else reject H<sub>0</sub>. From our model we can see that TRD has a probability of 0.1474 which is 14.74percent, therefore we cannot reject the null hypothesis H<sub>0</sub>. It therefore means that Trend Analysis Techniques has no significant linkage on fraud detection/prevention in Nigerian Banks.

## 5. CONCLUSION/RECOMMENDATIONS

The study which examined the linkages between application of forensic accounting techniques and fraud detection/prevention in Nigerian banks adopting Computer Assisted Audit Technique, Ratio Analysis Techniques and Trending Analysis Techniques as proxies on fraud detection and prevention in Nigerian banks revealed:

- i. There is a significant linkage between application of Computer Assisted Audit Techniques and fraud detection/prevention among Nigerian banks. This is consistent with the findings by Enofe, Omagbon and Ehigiator (2015) where they recommended frequent utilization of forensic audit services will significantly help in the detection, prevention as well as reduction of incidences of fraud in businesses.
- ii. There is no significant linkage between application of Ratio Analysis and Trend Analysis Techniques on fraud prevention among Nigerian banks. This is inconsistent with the findings by Ewa *et al.*, (2020) where these two techniques were significant in fraud control. These may be attributed to the perception of the individual respondents enlisted in the separate studies occasioned by their ranks and work schedule in the respective banks or the rigorous econometric model used for analysis in this study.

In view of the findings we recommend as follows:

- i. Nigerian deposit money banks should encourage the use of Computer assisted audit technique as a template for carrying out fraud detection/prevention in their institutions.
- ii. Other robust techniques for fraud detection/prevention not considered in this study should be examined and given a chance as the three techniques considered in this study explained less than twenty percent (19.94%) of variation in fraud detection/prevention in Nigeria banks, leaving over eighty percent to other techniques not captured in this study.

- iii. Further studies with respondents drawn from the head offices with only accounting background of the Nigerian deposit money banks is carried out to test the significance of the application of Ratio and Trend analysis techniques on fraud prevention and detection since this study shows that the techniques have no significant effect on fraud prevention.

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