ABSTRACT
The study examined electronic banking in order to ascertain its effect on profitability of deposit money banks (DMB) in Nigeria between 2010 and 2018. The study relied on the secondary source of data collection. Data for the study were obtained from Central Bank of Nigeria's (CBN) Statistical Bulletin and CBN Financial Stability Reports. Data were analyzed by conducting unit root test and co-integration bound test. Estimation was done by employing Autoregressive Distributed Lags using E-view 9.0 version. In the specified model for this study, four variables, namely, automatic teller machine transaction value (ATMTV), point of sale transaction value (POSTV), mobile banking transaction value (MBTV) and internet banking transaction value (IBTV) while commercial banks performance was proxied by returns on assets (ROA). The study revealed that two independent variables namely ATMTV and POSTV individually have positive relationship ROA, while both MBTV and IBTV defied apriori expectations as they individually have negative relationship with ROA. However, a combined test for all the four variables revealed a no significant relationship with ROA. The study therefore, concludes that digital banking channels have no significant effect on the performance of banks in Nigeria in the short run for the period covered by the study. Therefore, the study recommended that monetary authorities and commercial banks should enlighten their customer on the benefits and importance of using mobile and internet banking just as they seem to
have embraced the use of point of sale POS and automatic teller machines ATM for their transactions.

**Keywords:** Electronic, Transactions, Deposit Money Banks. Profitability.

**INTRODUCTION**

The revolution and development in information communication and technology (ICT) has greatly transformed the procedures and processes in the banking sector in the recent time. Through ICT, electronic banking (E-banking, online banking) has brought different perspective in assessing bank’s profitability and service delivery in the banking sector (Abubakar & Rasmaini, 2012). Electronic banking is an electronic payment system that enables customers of a bank or other financial institution to conduct a wide range of financial transactions through electronic gadgets without visiting the physical banking hall. The electronic banking system will typically connect to or be part of the core banking system operated by a bank and is in contrast to branch banking which was the traditional way customers accessed banking services (Daramola, Okolie, & Ogunlowore, 2014).

E-banking has changed manual and traditional ways of operating business in the banking sector and is being replaced by the highly appealing technology which is based on automation and interconnection of computers and other electronic gadgets in such a way that paper invoice, ledger books, printed materials and business trips have all been replaced with online billings and payments, elaborate website with product notification and real-time teleconferencing across continents and time zones (Wali, Wright & Reynolds, 2014; Daramola, Okolie, & Ogunlowore, 2014 and Oladejo, 2016). The e-banking is changing the banking and financial sector in terms of the nature of core products or services and the way these are packaged, suggested, delivered and consumed. E-banking is a powerful and invaluable weapon pivoting development, supporting growth, elevating innovation and improving competitiveness (Kamel, 2005; Gupta 2008).
It is important to state that the evolution of banking technology are being driven through distribution channels like the automated teller machine (ATM), mobile banking, tele-banking, PC-banking point of sale (POS) and internet banking (Daramola, Okolie, & Ogunlowore, 2014 and Oladejo, 2016). E-banking has witnessed explosive growth and transformed traditional practices, this has led to a paradigm shift in marketing practices proceeding to great performances in the banking industry (Asidok & Micheal, 2018). E-banking became essential means to sell the products and services as perceived to be necessary so as to remain profitable in the competitive environment as asserted by Oginni, Mohammed, El-maude, and Arikpo (2013).

In Nigeria today, it would be very difficult if not impossible to come across any bank in the country that is not rendering one form of e-banking services or the other, even in the most inaccessible part of the country. Even though the adoption of electronic banking in Nigeria came with its own challenges, it is expected to improve banking operations, enhance banking service delivery and generally improve banks performance. This study will however proxied performance with profitability which will be measured by returns on assets (ROA).

**Statement of Problem**
Most of the reviewed studies’ scopes do not cover 2018, as the data for 2018 was just released by the CBN Statistical Bulletin. Such studies include: Oginni, Mohammed, El-maude, and Arikpo (2013); Wali, Wright and Reynolds (2014) and Oladejo (2016) ; Asidok and Micheal (2018). The scope of this study shall cover 2010 to 2018 which is the period of time for which data were available in CBN Statistical Bulletin. Therefore, because of the above identified gap in literature, the study intends to examine electronic banking and profitability of deposit money banks in Nigeria.

**Objectives of the study**
The main objective of this study is to examine the effect of electronic banking on the profitability of deposit money banks in Nigeria. Specifically, the study seeks to:
1. examine the effect of automated teller machine (ATM) transactions on the profitability of deposit money banks in Nigeria.
2. investigate the effect of point of sales (POS) terminal transactions on the profitability of deposit money banks in Nigeria.
3. examine the effect of electronic mobile banking (EMB) transactions on the profitability of deposit money banks in Nigeria.
4. investigate the effect of internet (WEB) banking transactions on the profitability of deposit money banks in Nigeria.

Research Hypotheses
This study shall be guided by the following null hypotheses:

1. ATM transactions have no significant effect on the profitability of deposit money banks in Nigeria
2. Point-of-sales transactions have no significant effect on the profitability of deposit money banks in Nigeria
3. Electronic mobile banking has no significant effect on the profitability of deposit money banks in Nigeria
4. There is no significant effect of internet (WEB) on banking services and the profitability of deposit money banks in Nigeria

REVIEW OF RELATED LITERATURE
Conceptual Review
Conceptualizing Electronic Banking
Electronic banking (also known as e-banking) as a concept has attracted different interpretations and definitions. The versatility of e-banking as delivery multichannel increases the intricacy of being precisely defined in the literature. It is therefore understandable that many writers have offered succinct and all-inclusive meanings of electronic banking (Oginni, Mohammed, El-maude, & Arikpo 2013, Asidok & Micheal 2018, Auta, 2010; Ugwueze & Nwezeaku, 2016). For example Oladejo (2016) viewed e-banking or internet banking as the employment of a remote delivery channel in performing banking services. Saleh and Alipour, 2010 termed e-banking as automated delivery of new and conventional banking products and services directly to customers through electronic, interactive channels. Simpson (2002) explained that the emergence of e-banking has not relinquished traditional banking products and services but rather
transformed traditional models to enhance quality service delivery, real
time access, reduce operational cost and ultimately achieve maximum
efficiency in banking operations. Asidok and Micheal (2018) defined
electronic banking as rapid spread of services that enables customers to
access and use computer to access account specific information and also
conduct transactions from any location.

When compared to the traditional system of banking, banks provide fast
information delivery from customer to customer making it obvious that
variations exist between services offered by electronic enable banks and
banks which do not embrace e-banking (Singhal & Padhmanabhanm,
2008). It is noted that in 2005, electronic banking transactions was
considered fastest growing commercial activity on the internet and this has
improved banking transactions for global competitiveness in the 21st
century (Oginni, Mohammed, El-maude, & Arikpo 2013 and Udeze,
Okafor, Nwafor & Abarikwu, 2013). Quite impressively, electronic
banking transactions have eased and fastened banking transactions,
lowered cost of banks operations, improved profits maximization (Saleh
&Alipour, 2010 and Oginni, Mohammed, El-maude, and Arikpo, 2013).

Electronic-banking serves as automated, interactive channels by which
customers conveniently satisfy their demands for bank transactions. It is
viewed as process by which a customer carries out banking transactions
electronically without going to any physical structure or banking hall
(Simpson, 2002). In this case, e-banking is defined from the state of
branchless or virtual banking indicating that geographical location in
banking sphere seems to be less important as banks continue to adopt e-
banking. In this study, e-banking is defined as electronic payment system
that enables customers of a bank or other financial institution to conduct a
wide range of financial transactions through the electronic gadgets such as
automated teller machines (ATM), point of sales terminals (POS), mobile
phones and computer without the need of physical presence in any
banking hall or building.
Abae newe, Ogbulu, and Ndugbu, (2013) classified electronic banking into three basic types. These are; internet banking, smart card banking and mobile/telephone banking.

**Internet banking:** This is a type of e-banking service where customers’ instructions are taken and attended to through the internet. Internet banking offers customers the possibility of enjoying banking services from the comfort of their homes and offices. What this means is that customers can make payments for goods and services by placing orders from the net, instruct their banks to pay the vendor the invoice amount involved, and the products are delivered to the destination.

**Smartcard banking:** This is the conduct of banking transactions through the use of electronic cards (Value Card, ATM Card, Debit Card, Credit Card etc.). The smart card system makes it easy for bank customers to have access to cash, carry out transfers, make payments and make enquiries about their accounts without visiting the banking hall. Smart card facility is usually mounted at strategic places in the cities such as supermarkets, hotels, transport terminals, shopping malls etc.

**Mobile/telephone banking:** This involves the conduct of banking business through the use of mobile phones or fixed wireless phones. Instructions are passed via voice or short messages (SMS) to the computer; the computer decrypts the message and executes the instructions through a highly coded device. Then, the response is given back to the customer electronically.

**Deposits money banks’ Performance**
Deposits money banks’ performance generally means how deposits money banks have fared in its trading activities for a specified period of time (usually a year) to realize its objectives. One of the most important documents that explain this is the published financial statements of such banks. One of the indicators of performance for these banks is profitability and commercial banks in Nigeria have reported a sustained increase in profit over the decade though in some years the profit have been increasing in a decreasing rate which positioned the Nigeria banks as the
second most profitable banking system in Africa (Omotunde, Sunday & John-Dewole, 2013).

According to Joseph (2017), a fair evaluation of any bank’s performance should start by evaluating whether it has been able to achieve the objectives set by management and stockholders. Certainly, many banks have their own unique objectives. Some wish to grow faster and achieve some long-range growth objective, others seem to prefer quiet life, minimizing risk and conveying the image of a sound bank, but with modest rewards to their shareholders (Abaenewe, Ogbulu, & Ndugbu, 2013). Ordinarily, stock prices and its behavior are deemed to reflect the performance of a firm. This is a market indicator and may not be reliable always. However, the size of the bank, the volume of deposit and its profitability could be deemed as more reliable performance indicators. For the purpose of this study, profitability indicators, precisely the returns on assets (ROA) are used to assess bank performance (Abaenewe, Ogbulu, & Ndugbu, 2013 and Joseph, 2017).

According to Joseph (2017), these ratios are indicators of management efficiency, and rate of returns. These profitability measures vary substantially over time and from one banking market to another. The ROE and ROA are popular in use today. Saheed (2108) posit that the amount of net income earned in relation to total assets is an indicator of how efficiently a company uses its economic resources. They further stressed that when the ROE is higher than the ROA, the company has favourable financial leverage.

**Theoretical Review**

This section reviewed the theoretical foundations that discuss and explain the effect of digital banking on the performance of commercial banks in Nigeria. The theories discussed are the technology acceptance model, the innovation diffusion theory and the theory of planned behavior.

**Technology Acceptance Model (TAM)**

The technology Acceptance Model developed in 1989 by Fred Davis. The model was originally designed to predict user's acceptance of Information
Technology and usage in an organizational context. The model posits that that user acceptance is determined by two key beliefs, namely perceived usefulness and perceived ease of use. Perceived usefulness (U) is defined as the extent to which a person believes that using a particular technology will enhance her/his job performance, while perceived ease of use (EOU) is defined as the degree to which a person believes that using a technology will be free from effort (Asidok & Micheal, 2018). The theory argues that the consumers’ attitude towards using new technology is influenced by perceived usefulness and perceived ease of use.

The theory uses psychometric scales to measure usefulness and ease of use. Perceived usefulness is measured on scales of whether work is done more quickly, job performance, increased productivity, effectiveness and usefulness. Perceived ease of use scales included whether the technology is easy to learn, clear and understandable, easy to become skillful easy to use, controllable and easy to remember. TAM also proposes that external factors affect intention and actual use through mediated effects on perceived usefulness and perceived ease of use. TAM has been criticized for its failure to take into account the costs involved in acquiring a new technology. The organization may be willing to adopt a new technology but may not have the necessary resources (financial or human) to do so. Despite this shortcoming, TAM is still one of the most useful models in explaining the adoption of technology in the organizational context. This theory informed on the process and motivation of e banking amongst commercial bank (Asidok & Micheal, 2018).

**Theory of Planned Behavior**
The theory of planned behavior (TPB) was developed by Ajzen in 1988. The theory posits that individual behavior is driven by behavior intentions, where behavior intentions are a function of three determinants: an individual’s attitude toward behavior, subjective norms and perceived behavioral control. Attitude refers to the degree to which a person has positive or negative feelings of the behavior of interest. Behavioral intention represents a person's motivation in the sense of her or his conscious plan or decision to perform certain behavior (Asidok & Micheal, 2018). Subjective norms perceived are a person’s own estimate
of the social pressure to perform the target behavior. Subjective norms are assumed to have two components which work in interaction: beliefs about how other people, who may be in some way important to the person, would like them to behave (normative beliefs).

Perceived behavioral control is the extent to which a person feels able to enact the behavior. It has two aspects: how much a person has control over the behavior and how confident a person feels about being able to perform or not perform the behavior. The theory of planned behavior predicts behavior, because behavior is planned. This theory has been widely applied and extended to studies on individual behavior, especially in the prediction of individual’s intention to behave and the actual behavior. It is generally expected that the more favorable the attitude and subjective norm with respect to a behavior, and the greater the perceived behavioral control, the stronger should be an individual’s intention to perform the behavior (Asidok & Micheal, 2018)

Empirical Review of Related Studies
Oginni, Mohammed, El-maude, and Arikpo (2013) examined the impact of electronic banking on banks’ performance in Nigeria. Panel data comprised annual audited financial statements of eight banks that have adopted e-) and retained their brand name banking between 2000 and 2010 as well as macroeconomic control variables were employed to investigate the impact of e-banking on return on asset (ROA), return on equity (ROE) and net interest margin (NIM). Result from pooled OLS estimations indicate that e-banking begins to contribute positively to bank performance in terms of ROA and NIM with a time lag of two years while a negative impact was observed in the first year of adoption.

Oyewole, El-Mauda, Abba and Arikpo (2013) carried out a study on e-banking and bank performance in Nigeria. Panel data comprised annual audited financial statements of eight banks that have adopted e-banking and retained their brand name banking between 2000 and 2010 as well as macroeconomic control variables were employed to investigate the impact of e-banking on return on asset (ROA), return on equity (ROE) and net interest margin (NIM). Result from pooled OLS estimations indicate that
e-banking begins to contribute positively to bank performance in terms of ROA and NIM with a time lag of two years while a negative impact was observed in the first year of adoption.

Abaenewe, Ogbulu, and Ndugbu (2013) investigated the profitability performance of Nigerian banks following the full adoption of electronic banking system. Judgmental sampling method was adopted by utilizing data collected from four Nigerian banks. These four banks are the only banks in Nigeria that have consistently retained their brand names and remain quoted in the Nigerian Stock Exchange since 1997. The profitability performance of these banks was measured in terms of returns on equity (ROE) and returns on assets (ROA). With the data collected, we tested the pre- and post-adoption of e-banking performance difference between means using a standard statistical technique for independent sample at 5 percent level of significance for performance factors such as ROE and ROA. The study revealed that the adoption of electronic banking has positively and significantly improved the returns on equity (ROE) of Nigerian banks. On the other hand and on the contrary, it also revealed that e-banking has not significantly improved the returns on assets (ROA) of Nigerian banks.

Edwin and Adele-Louise (2014) investigated the extent of the adoption and usage of the mobile phone banking services among banking customers in Nigeria and the associated problems. In the course of the research, ten out of twenty one banks were selected in Nigeria. The stakeholders interviewed included bank staff, customers and students from higher education institutions. Study data was gathered over a two month period using an unstructured set of interview questions and data analysis was through thematic evidences arising from the data analyzed. The findings of this study however, discovered that phone banking was more established than internet banking and ATM services, but ATM services had a wider reach. In summary, the overriding factors affecting this situation included the cost and maintenance involved, education of customers, poverty and infrastructure availability.
Wali, Wright and Reynolds (2014) examined the impact of the cashless system on user’s perception and retail marketing performance in Nigeria retail sector, using survey instrument (questionnaire) and randomly selected 550 samples as to generate data on the impact of cashless systems on user’s perception and retail marketing performance in Nigeria. The study revealed that the adoption of cashless policy impacted on marketing performance of retail outlets in Nigeria. Specifically, the study revealed that the use of point of sale terminal (POS) as an instrument of cashless policy has strong and positive relationship with profitability and sales volume of retail outlet. The study further found that the use of E-cash wallet influences customers purchase intention as well as impact on customers repeat purchase behaviour.

Osazevbaru, Sakpaide, and Ibiubune (2014) examined the impact of cashless policy on the profitability of Nigerian banks, against the backdrop that these banks in a cash based economy are known for their huge profits even in the face of associated high cost of operations. Basically, will banks in the cashless regime still make as much profits as they use to make? To address this, secondary data were collected and analyzed using content analysis comparing profits under cash based policy with a cashless regime. The results revealed that cashless economic policy positively impact on banks’ profit through reduction in cost of operations and banking the unbanked populace.

Eze, and Egoro, (2016) investigated the impact of electronic banking on the profitability of commercial banks in Nigeria. The study sought to examine the relationship between different e-banking channels and the profitability of commercial banks in Nigeria. Four e-banking channels (automatic teller machines, electronic mobile banking, internet banking transactions, and point of sales services) were identified and regress against the profit before tax of commercial banks operating in Nigeria between 2006 and 2014. The study used the confirmed ECM model (via residual diagnosis) to test the formulated hypotheses. The results revealed that the over impact of electronic banking on the profitability of commercial banks was significant; whereas, the impact of the individual channels was varied.
Oladejo (2016) examined the impact of four (ATM, POS, web/Internet and mobile) e-payments adoption and banks specific variables on profitability of the Nigerian Deposits Money Banks (DMBs). Secondary data were obtained from annual report and accounts of ten quoted (DMBs) between 2005 and 2012. Data were analysed using panel logistic regression. The overall result from data analysis shows that when bank adopt e-payment systems, their performance level, such as gross margin, profits after tax, return on assets and return on equity changes. This is reflected in the positive association between adoption and gross earning of banks. Further, adoption of the four e-payment instruments like ATM, WEB, POS and Mobile banking influenced performance indices measured by return on assets (ROAE), gross margin and profits after tax (PAT) of the sampled banks.

Ugwueze and Nwezeaku (2016) studied the relationship between electronic banking and the performance of Nigerian commercial banks. Electronic banking was proxied by value of Point-of-Sale transactions while commercial banking performance was proxied by customers’ deposits. Engle-Granger co-integration model was used to analyze data for the sample period January 2009 to December 2013. The results show that POS is not co-integrated with both the savings and time deposits but are co-integrated with demand deposits.

Asidok and Micheal (2018) investigated the impact of mobile banking transactions on bank profitability in Nigeria using selected banks data from Electronic payment system office, Central Bank of Nigeria statistical bulletin from 2007-2016. The study adopts Panel unit root and SURE model estimation technique to conduct quantitative analysis for four selected old and new generation banks. The results of this study were analyzed using economic a priori criteria, statistical criteria and econometric criteria. The positive and statistically significant relationship between automated teller machine of old and new generation banks in Nigeria indicates that automated teller machine is a major factor that contributes to old and new banks performance in Nigeria.
Gap of the study
Most of the reviewed studies’ scopes do not cover 2018, as the data for 2018 was just released by the CBN Statistical Bulletin. Such studies include: Oginni, Mohammed, El-maade, and Arikpo (2013); Wali, Wright and Reynolds (2014) and Oladejo (2016); Asidok and Micheal (2018). The scope of this study shall cover 2010 to 2018 which is the period of time for which data were available in CBN Statistical Bulletin. Therefore, because of the above identified gap in literature, the study intends to examine electronic banking and profitability of deposit money banks in Nigeria.

METHODOLOGY
Research Design, Nature and Source of Data
The research design for this work is ex-post factor research design. The study employed annual time series data covering the period 2010 -2018. Data for the study was obtained from Central Bank of Nigeria’s (CBN) Statistical Bulletin and CBN Financial Stability Report.

Model Specifications
This study adapts the model used by Udoka and Mbat (2016) when they examined the relationship between banks credits and agricultural production in Nigeria and specified the following model:

\[ \ln\text{AGOUT} = a_0 + a_1 \ln\text{CBCR} + a_2 \ln\text{GEXPA} + a_3 \ln\text{ACGSF} + a_4 \text{INT} + \]
\[ u_t \] 

\[ \text{Eq. (1)} \]

The mathematical specification for this study is as follows:

\[ \text{ROA} = f(\text{ATMTV}, \text{POSTV}, \text{MBTV}, \text{IBTV}) \]

\[ \text{Eq. (2)} \]

Where:
- ROA = Return on Assets of banks in Nigeria
- ATM = Automated Teller Machine transactions
- MB = Mobil Banking Transactions value
- POS = Point on Sales services transaction value
- IBTV = Internet Banking transactions value

The econometric form of equation 2 is:

\[ \text{ROA} = \beta_0 + \beta_1 \text{ATMTV} + \beta_2 \text{MBTV} + \beta_3 \text{POSTV} + \beta_4 \text{IBTV} + e_t \]

\[ \text{Eq. (3)} \]

Where \( e = \) Error term

Transforming equation 3 to the natural logarithm, we have:
LogROA = $\beta_0 + \beta_1 \log\text{ATM} + \beta_2 \log\text{POS} + \beta_3 \log\text{EMB} + \beta_4 \log\text{IBT} + e$

The formed natural logarithm in equations 4 is adopted because most time series data have an unequal variance (heteroskedastic in nature), thus the natural logarithm helps to stabilize the variance within the sample, which helps to improve our analysis. The Autoregressive Distributed Lags form of equation 4 is stated thus:

$$\Delta \log\text{ROA} = \beta_0 + \beta_1 \log\text{ROA}_{t-1} + \beta_2 \log\text{ATM}_{t-1} + \beta_3 \log\text{MBTV}_{t-1} + \beta_4 \log\text{IBTV}_{t-1} + \Sigma \pi \Delta \log\text{ROA}_{t-1} + \Sigma \theta \Delta \log\text{ATMTV}_{t-1} + \Sigma \gamma \Delta \log\text{MBTV}_{t-1} + \Sigma \mu \Delta \text{POSTV}_{t-1} + \Sigma \lambda \Delta \text{IBTV}_{t-1} + \Sigma \lambda \Delta \text{IBTV}_{t-1} + U_t$$

The variables, ROA, ATM, MB, POS and IBTV are as earlier defined in equation 4. $\beta_1, \beta_2, \beta_3$ and $\beta_4$, refer to the long run coefficients while $\pi$, $\theta$, $\gamma$, $\mu$, and $\lambda$ are the short run coefficients.

**A priori expectations**

The a priori expectation is that all the coefficients of the explanatory variables in this study should be positive. That is, $\beta_1, \beta_2, \beta_3, \beta_4 > 0$; meaning that there should be a positive relationship between electronic banking and commercial banks profitability.

**Method of Data Analysis**

Data that were collected for this study were analyzed using inferential statistics. Thus, the study commenced data analysis by conducting stationary test on the data to determine the number of unit root in the data series. Estimation was done by employing Autoregressive Distributed Lags, (using OLS approach). Thereafter, co-integration test was conducted to determine both the short-run and long-run dynamic relationships among the variable of interest. Then Error Correction Model (ECM) was estimated thereafter. This was done by employing E-view 9.0 version.
Result and Discussion of Findings

Table 1: Augmented Dickney-Fuller Unit Root Test Results

Unit root test at logarithmic levels

\[ H_0: b = 0; \ Ha: b > 0 \]

<table>
<thead>
<tr>
<th>Variables</th>
<th>Critical value @5%</th>
<th>Philips Perron test statistics</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LROA</td>
<td>-3.259808</td>
<td>-2.416145</td>
<td>-</td>
</tr>
<tr>
<td>LATMTV</td>
<td>-3.320969</td>
<td>8.520741*</td>
<td>I(0)</td>
</tr>
<tr>
<td>LMBTV</td>
<td>-3.259808</td>
<td>-2.282077*</td>
<td>I(0)</td>
</tr>
<tr>
<td>LPOSTV</td>
<td>-3.259808</td>
<td>-0.213526</td>
<td>-</td>
</tr>
<tr>
<td>LIBTV</td>
<td>-3.320969</td>
<td>-2.214791</td>
<td>-</td>
</tr>
</tbody>
</table>

Unit root test at first differences

<table>
<thead>
<tr>
<th>Variables</th>
<th>Critical value @5%</th>
<th>Philips Perron test statistics</th>
<th>Order of Integration</th>
</tr>
</thead>
<tbody>
<tr>
<td>LROA</td>
<td>-3.320969</td>
<td>-3.341648*</td>
<td>I(1)</td>
</tr>
<tr>
<td>LATMTV</td>
<td>-</td>
<td>-</td>
<td>I(0)</td>
</tr>
<tr>
<td>LMBTV</td>
<td>-</td>
<td>-</td>
<td>I(0)</td>
</tr>
<tr>
<td>LPOSTV</td>
<td>-3.320969</td>
<td>-4.198198*</td>
<td>I(1)</td>
</tr>
<tr>
<td>LIBTV</td>
<td>-3.320969</td>
<td>-6.810908*</td>
<td>I(1)</td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019 using E-view 9.0 version.

Notes:*Denotes significance at the 5% level and the rejection of the null hypothesis of non-stationarity.

From Table 1.0, only the ATMTV and MBTV were stationary when the unit root test was conducted at logarithm level I(0) while POSTV, ROA and IBTV were not stationary at levels. However, by subjecting the variables to first differencing, all the unit roots in POSTV, ROA and IBTV were and they all became stationary at order one I(1). Thus, in this study, the stationarity of the variables of interest is a mixture of I(0) and I(1) series. The foregoing then necessitates the use of Autoregressive Distributed Lags Model for estimation and analysis in this study.
Table 2: Co-integration Bound Test Result

ARDL Bounds Test
Date: 07/23/19   Time: 13:35
Sample: 2010 2018
Included observations: 9
Null Hypothesis: No long-run relationships exist

<table>
<thead>
<tr>
<th>Test Statistic</th>
<th>Value</th>
<th>K</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.548465</td>
<td>4</td>
</tr>
</tbody>
</table>

Critical Value Bounds

<table>
<thead>
<tr>
<th>Significance</th>
<th>I0 Bound</th>
<th>I1 Bound</th>
</tr>
</thead>
<tbody>
<tr>
<td>10%</td>
<td>2.45</td>
<td>3.52</td>
</tr>
<tr>
<td>5%</td>
<td>2.86</td>
<td>4.01</td>
</tr>
<tr>
<td>2.5%</td>
<td>3.25</td>
<td>4.49</td>
</tr>
<tr>
<td>1%</td>
<td>3.74</td>
<td>5.06</td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019 using E-view 9.0 version

Co-integration bound test hypotheses is stated as follows:

H₀: β₁ = β₂ = β₃ = β₄ = β₅ = 0
H₁: β₁ ≠ β₂ ≠ β₃ ≠ β₄ ≠ β₅ ≠ 0

From Table 2.0, the F-statistic value of 0.5484 is less than the upper bound I(1) and the lower bound I(0) critical values of 4.01 and 2.86 respectively at 5% significant level. Therefore, null hypothesis of no co-integration cannot be rejected. Hence, there is no co-integration and long run relationship among the variables of this study. In this case only ARDL short run coefficients can be estimated as depicted on Table 3.0.
### Table 3: ARDL Short run Estimates
Dependent Variable: ROA  
Method: ARDL  
Date: 07/23/19  Time: 13:32  
Sample (adjusted): 2010-2018  
Included observations: 9 after adjustments  
Maximum dependent lags: 1 (Automatic selection)  
Model selection method: Akaike info criterion (AIC)  
Dynamic regressors (0 lag, automatic): LATMTV LMBTV LPOSTV LIBTV  
Fixed regressors: C

<table>
<thead>
<tr>
<th>Variable</th>
<th>Coefficient</th>
<th>Std. Error</th>
<th>t-Statistic</th>
<th>Prob.*</th>
</tr>
</thead>
<tbody>
<tr>
<td>ROA(-1)</td>
<td>0.574705</td>
<td>0.754117</td>
<td>0.762091</td>
<td>0.5014</td>
</tr>
<tr>
<td>LATMTV</td>
<td>0.710137</td>
<td>1.014212</td>
<td>0.700186</td>
<td>0.5342</td>
</tr>
<tr>
<td>LMBTV</td>
<td>-2.319325</td>
<td>2.313322</td>
<td>-1.002595</td>
<td>0.3899</td>
</tr>
<tr>
<td>LPOSTV</td>
<td>2.447564</td>
<td>2.702507</td>
<td>0.905664</td>
<td>0.4319</td>
</tr>
<tr>
<td>LIBTV</td>
<td>-0.345013</td>
<td>0.999762</td>
<td>-0.345095</td>
<td>0.7528</td>
</tr>
<tr>
<td>C</td>
<td>-4.305707</td>
<td>7.682599</td>
<td>-0.560449</td>
<td>0.6143</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th></th>
<th>R-squared</th>
<th>Mean dependent var</th>
<th>2.433333</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adjusted R-squared</td>
<td>-0.866180</td>
<td>S.D. dependent var</td>
<td>0.492443</td>
</tr>
<tr>
<td>S.E. of regression</td>
<td>0.672717</td>
<td>Akaike info criterion</td>
<td>2.279738</td>
</tr>
<tr>
<td>Sum squared resid</td>
<td>1.357646</td>
<td>Schwarz criterion</td>
<td>2.411221</td>
</tr>
<tr>
<td>Log likelihood</td>
<td>-4.258821</td>
<td>Hannan-Quinn criter.</td>
<td>1.995998</td>
</tr>
<tr>
<td>F-statistic</td>
<td>0.257367</td>
<td>Durbin-Watson stat</td>
<td>2.290397</td>
</tr>
<tr>
<td>Prob(F-statistic)</td>
<td>0.910928</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019 using E-view 9.0 version

Table 3 shows that the return on assets (ROA) is positively but insignificantly induced by its first lag; hence 1% increase in the first lag of ROA will propel 57% increase in the mean value of ROA and vice versa. In addition, conducting banking transaction through Automated Teller Machine (ATMTV) channel yield a positive effect on the profitability of the banks, such 1% increase in the value of transaction conducted via ATM is associated with about 71% increase in the profitability level of the banks and vice versa. Thus, ATMTV is a positive but weak propeller of banks profitability in the short run. The relationship shows by ATMTV is nevertheless in line with *apriori* expectation that increase in the conduct
of banking business via ATM should yield positive effect on the banks profitability because of the accruing charges on those transactions which come to banks as additional incomes.

Mobile banking transaction value (MBTV) however, defies *apriori* expectation because of its negative relationship with ROA. It thus means that conducting banking business via mobile channel during the period of this study negatively affects the return on assets of the banks and hence, unprofitable to the banks; to this end, 1% increase or decrease in MBTV is associated with about 230% decrease or increase in the return on assets of the banks in the short run. In case of point of sale transaction value (POSTV), it aligns with theoretical expectation of positive causal relationship with ROA of the banks. For every 1% change in the value of transaction conducted via point of sale in the short run, the profit level of the banks is boosted in the same direction by about 244% during the period of this study. Consequently, POSTV like ATMTV is a positive but weak predictor of the profitability of banks. IBTV against *apriori* expectation is negatively and insignificantly related to profitability level of the banks in the short run, such that 1% increase in IBTV will yield about 35% decrease in ROA and by extension, the profit level of the banks. Hence, in the short run, IBTV is a negative and weak inducer of the profit level of the banks.

Furthermore, the low F-statistics value is low and this indicates a weak overall performance of the model variables. The foregoing is further confirmed by the insignificance of p-value of the F-statistics and secondly that the electronic banking is only accountable for only 30% of the changes in profitability of banks while the remaining 70% is accounted for by other factors not captured in the estimated model. The overall standard error of the model is however low at 0.6727 which means the estimation procedure is reliable and accuracy is assured. The Durbin-Watson statistic is approximately equealed to the benchmark of 2 which is a testament to the autocorrelation result displayed on Table 4.0.
Diagnostic Tests

Autocorrelation Test

Table 4: Breusch-Godfrey Serial Correlation Test Result

Breusch-Godfrey Serial Correlation LM Test:

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Prob.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.410971</td>
<td>Prob. F(2,1)</td>
<td>0.7409</td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>4.060217</td>
<td>Prob. Chi-Square(2)</td>
<td>0.1313</td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019 using E-view 9.0 version

The hypotheses for LM correlation test is stated below:

H₀: The model residuals are serially uncorrelated;
H₁: The model residuals are serially correlated;

From Table 3.0, the P-value 0.4109 is above the critical values at 5%, hence, H₀ cannot be rejected. And this means the residuals the estimated model are not suffering from autocorrelation.

Homoskedasticity Test

Table 5: Breusch-Pagan-Godfrey Homoskedasticity Test Result

Heteroskedasticity Test: Breusch-Pagan-Godfrey

<table>
<thead>
<tr>
<th></th>
<th>Value</th>
<th>Prob.</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>0.161329</td>
<td>Prob. F(5,3)</td>
<td>0.9612</td>
</tr>
<tr>
<td>Obs*R-squared</td>
<td>1.907140</td>
<td>Prob. Chi-Square(5)</td>
<td>0.8618</td>
</tr>
<tr>
<td>Scaled explained SS</td>
<td>0.319529</td>
<td>Prob. Chi-Square(5)</td>
<td>0.9973</td>
</tr>
</tbody>
</table>

Source: Author’s computation 2019 using E-view 9.0 version

Also, Table 4.0 contains the homoskedasticity test using the following hypotheses:

H₀: The model residuals are homoskedastic;
H₁: The model residuals are not homoskedastic;

Looking at Table 4.0, the P-value of 0.9612 is over and above the critical value at 5% significance level which indicates acceptance of H₀; consequently, the residuals of the estimated model are homoskedastic and the estimator is efficient.
Test of Hypotheses
This test was conducted using the F-statistic test of significance. To carry out any meaningful test, the following decision rule was followed:

**Decision Rule:** If the calculated P-value of F-statistic value is less than the critical value at 5% significance levels, the alternative hypothesis (H1) of the study is accepted while the null hypothesis (H0) is rejected and vice versa.

- **H0:** Electronic banking has no significant effect on the profitability of money deposits banks in Nigeria;
- **H1:** Electronic banking has significant effect on the profitability of money deposits banks in Nigeria;

From the Table 4.0, the p-value of F-statistic is 0.9109 which is greater than the critical value at 5% significance level, hence, H0 cannot be rejected. This translates that digital banking channels have no significant effect on the performance of banks in Nigeria.

**Conclusion**
Co-integration bound test revealed there is no existence of co-integration and long run relationship among the variables of interest, therefore, only ARDL short run estimates was estimated. The results of data analysis revealed that two independent variables namely ATMTV and POSTV individually have positive but insignificant relationship ROA. Both MBTV and IBTV defied *apriori* expectations as they have negative relationship with ROA. However, a combined test for all the four variables revealed a no significant relationship with ROA. The study therefore, concludes that digital banking channels have no significant effect on the performance of banks in Nigeria in the short run for the period covered by the study.

**Recommendations**
Based on the findings above, the study therefore recommends that monetary authorities and commercial banks should enlighten their customer on the benefits and importance of using mobile and internet banking just as they seem to have embraced the use of point of sale POS and automatic teller machines ATM for their transactions.
REFERENCES


