Electronic Banking and Profitability of Deposit Money Banks in Nigeria: New Evidence from Eco Bank

[1]**Michael A. Amaegberi** & [2]**Ebierinyo Ayebaemi Akarara**
[1&2]*Department of Economics, Faculty of Social Sciences*
Niger Delta University, Bayelsa State, Nigeria

Abstract

The study investigated the impact of electronic banking on the profitability of deposit money banks (DMBs) in Nigeria, using Eco bank as a case study. The study used times series monthly data ranging from 2012 to 2021. The data were analysed using the Autoregressive Distributed Lag (ARDL) model. It was found that Point of Sale transactions in monetary value had a positive and significant impact on profit before tax of DMBs in Nigeria. ATM transactions also had a positive and significant impact on profit before tax of Deposit money banks in Nigeria. While electronic mobile banking transactions and internet banking transactions both have positive but insignificant impact on profit before tax of DMBs in Nigeria. The study concludes that point of sale transactions and ATM transactions are important determinants of profit before tax of Eco bank in Nigeria. While internet banking transactions and electronic mobile banking transactions are not important determinants of profitability of Eco bank in Nigeria. Thus, it is recommended amongst others that monetary authorities and DMBs enlighten their customers on the convenience and importance of adopting e-banking channels in completing their transactions.

Keywords: *Electronic Banking, Bank Profitability, Deposit Money Banks, Eco Bank*

Corresponding Author: **Michael A. Amaegberi**

Background to the Study

The globe has experienced an upswing of electronic payment instruments aimed to promote commerce and simplify payments, before the introduction of e-payments into the Nigerian banking system; clients had to walk into the banking hall to perform transactions of any sort. They had to line up and spend extra hours to talk to a teller to conduct their transactions. Most clients are deterred by the inconveniences of these lengthy lines, and occasionally they rebel against them out of frustration. Bankers, IT specialists, business owners, and others have long argued for the replacement of physical currency with more adaptable, effective, and affordable retail payment methods (Siyanbola, 2020). Traditional banking methods have been revolutionised by the rapid growth of electronic banking (Gonzalez, 2019).

The "financial system in Nigeria heavily relies on the money market, which serves as a way to manage liquidity and can also foster economic growth and development. Consequently, how well the payment system works and how smoothly transactions are completed are crucial for its effective operation and profitability. To help the banking system reach the necessary energy, electronic banking has been introduced. With the Nigerian banking sector's acceptance of electronic banking, it is anticipated that the success and profits of deposit money banks will improve. Over time, banks have rolled out various electronic banking options, all aimed at boosting efficiency, effectiveness, and cost savings. However, this does not imply that the Nigerian banking system lacks efficiency; it highlights the critical need to assess its performance and profitability in light of the different ebanking channels that have been added to the system."

In order to fill the research gap, this study focuses on determining how e-banking has been able to improve the performance (profitability) of deposit money banks in Nigeria. Given the above scenario, the system should be deep and broad to be able to absorb large volumes of transactions with attendant cost saving benefits. (Okafor, 2019). Over the years, Nigerian commercial banks have been associated with weak domestic payment systems, which have also hindered efficient liquidity management and have obstructed the development of the banking system. In order to do this, it is necessary to investigate various e-banking channels.

Conceptual Clarification
Electronic Banking
When "services like opening a deposit account, electronic bill payment, online transfers, online withdrawals, and actually any other online banking transaction are delivered via the internet, this is known as electronic banking. The provision of financial services and the market through electronic communication and computation is what Allen et al. (2021) defined as electronic finance, or e-finance. Electronic banking has also been defined by Laford and Li (2018) as the medium of using electronic devices, like internet, wireless connections, networks, ATM, phone and cell phones in banking services. These services are part of providing currency for the economic system of the country. Electronic banking services can be grouped into four major classes, namely:"

a.   **Telephone Banking:**   This kind of electronic banking is seen as a type of virtual or

distance banking. It involves providing branch services through telecommunications tools, allowing customers to carry out banking transactions. Clients can use a phone or mobile device to contact the bank's automated system using Automated Voice Response (AVR) technology (Balachandher et al, 2022). This system enables customers to call their banks to check their account balances, pay specific bills, transfer money between accounts, and update their PIN.

b.   **Internet banking (Online or WEB banking):**   E-commerce is greatly facilitated by internet banking, which uses the electronic card infrastructure to execute payment instructions and for final settlement for goods and services over the internet between the merchant and the customer. As of right now, the most common internet payments are for customer bills and the purchase of air tickets through the merchants' websites. This type of electronic banking model entails conducting banking transactions such as account enquiry, printing account statements, funds transfer, payments for goods and services, etc., on the internet (World Wide Web), using electronic tools like the computer.

c.   **Mobile banking (m-banking)**:   In this type of electronic banking, financial transactions are settled using a mobile device. It facilitates person-to-person transactions and makes money instantly available to the recipient. Mobile payments employ secure short message service (SMS) transmission to confirm receipt to the recipient and the card infrastructure to carry out payment instructions. Mobile banking is designed for small-value transactions when transaction speed is crucial. Account enquiries, money transfers, phone recharges, password changes, and bill payments are among the services covered by this product and are provided by a select few institutions (Sathye, 2020).

d.   **Electronic Card:** A tangible plastic card that can be used for online financial transactions and provides a unique identifier for the bearer is this type of electronic banking. For example, payments to the seller or merchant are authorized by Point-of-sale (POS) terminals and Automatic Teller Machines (ATM) (James, 2022). Debit cards, credit cards, and releaseable cards are among the several kinds of electronic cards that need to be refilled at banks (James, 2022).

Development of Electronic Banking
Electronic banking is an attempt to combine a number of distinct technologies, each of which is developing in its own unique way (Onodugo, 2015). Mainframes and minicomputers are the first examples of the computer era in usage in banks. Data including bank inventory, accounting packages, personnel information, and client accounts were processed using them. The concept of direct client service was less defined at the time, and technology was utilized to help banking operations. Technology was then used to assist staff in doing their work faster, more conveniently, and with less human errors. The Automated Teller Machine (ATM), the first outward manifestation of computerized banking, entered commercial usage in 1968, according to Kondabagil (2007). Later, the ATM changed from being a simple money dispenser to a multipurpose tool that allowed users to do anything from bill payment to fund transfers to account management.

Customers were able to bank from the comfort of their homes in the latter part of the 1990s thanks to the development of the Internet and the World Wide Web (WWW) (Salehi & Alipour, 2010). Since then, the banking industry has been changing due to the development of electronic commerce and creative use of information technology, as confirmed by Offei and Nuamah-Gyambrah (2016). Since businesses need to perform simple, fast, and accurate financial activities, the rise of e-banking may be considered one of the benefits of e-commerce (Hoseini & Dangoliani, 2015). The e-banking system speeds up national and international transaction settlement, which helps to close the gap between the bank and its customers. With activities including balance enquiries, cash withdrawals, bill payments, money transfers, electronic payments, and loan applications, among others, the majority of the services are provided through several distribution e-channels (Agwu & Carter, 2014).

Evolution of E-banking in Nigeria
From the days of ledger cards and other manual filling systems to the computer age, banking has advanced significantly. Society General Bank (Nigeria) Limited was the first bank in Nigeria to undertake computerization in the 1970s. Few computerized banks implemented Local Area Networks (LANs) in their branches until the middle of the 1990s. One or two banks used leased lines to provide interstate connection, while the more advanced ones connected their branches inside cities to establish WAN (Salawu & Salawu, 2007).

Later, the situation changed; banks not only embraced computerization but also progressed from the very basic retail operations of cash withdrawal, deposits, and check processing to the delivery of sophisticated products. This was due to intense competition brought on by the previously unheard-of increase in the number of banks and branches as well as advancements in information technology. In response to growing market pressure and consumer demands for better service and more convenience, banks have to innovate and modernize their operations. As a result, using the internet and electronic banking becomes essential (Salawu and Salawu, 2007).

According to Dogarawa (2018), who quoted Sanusi (2021). The CBN authorized All States Trust Bank to launch the ESCA, a closed system electronic purse, in 1996, marking the beginning of the introduction of e-banking (e-payment) goods in Nigeria. This was followed in February 1997 by Diamond Bank launching a comparable product named "Paycard." With the approval of Smartcard Nigeria PLC, a firm established by a group of 19 banks to create and oversee value cards issued by the member banks, card-based e-money solutions took on an open platform in February 1998. In November 2020, Gemcard Nigeria Limited, a group of over 20 banks, received clearance from the CBN to launch the "Smartpay" scheme (Dogarawa, 2018). The number of participating banks in each of the two schemes had been rising since then.

Additionally, while on a restricted basis, the CBN authorized many banks to launch telephone banking, online banking, and international money transfer programmes (Dogarawa 2018). It's also important to note how certain banks have implemented Automated Teller Machines (ATMs) to streamline card usage and improve service quality. Nowadays,

almost every bank in Nigeria has a website. The service or ordering bank drafts or certified cheque made payable to third parties has also been increasingly automated (Irechukwu, 2000).

The Entry of Nigerian Banks into Electronic Banking

With more and more banks joining the competition, electronic banking is rapidly catching up to Nigeria. It has acquired widespread acceptability abroad as a means of delivering financial services as well as a strategic instrument for corporate growth. With the introduction of net banking, Nigeria can be considered on the cusp of a significant banking revolution (Ovia, 2022). Despite the fact that Nigeria's economy is "not too good," the banking industry shines out among all other industries. High Nett Worth Individuals with several bank accounts and non-resident Nigerians find electronic banking especially exciting since it allows them to access their customer accounts from any location in the globe using a home computer with an Internet connection. Thus, the potential for expansion is enormous. Customers would become "hooked" to the ease of armchair banking if banks offered additional incentives to discourage them from going to real branches.

The situation does not appear to have significantly improved as of yet. However, additional electronic banking services, such as telephone banking, are provided by around 90% of the nation's banks. Internet banking, ATMs, and electronic financial transfers have not yet taken central stage. Even though Internet banking has been extensively praised for its advantages over traditional branch banking, this area of banking is still in its infancy (Ovia, 2022). Lack of proper operational infrastructure, such as electricity and telecommunication, which electronic banking often depends on, is one of the factors cited for Nigerian banks' incapacity to fully utilize this banking method. One may argue that Internet banking has less of a place in the nation's current financial system since banks are unable to incorporate their operations into the Internet development process.

The lack of a clearly defined legal framework for internet banking, which leaves banks with insufficient legal cover to provide the services, the poor telecommunications infrastructure throughout the nation, and the fact that Nigerian bank customers are not typically trained for teller jobs and the operation of internet banking, which makes transaction processing via internet banking prone to error, are some of the previously stated reasons why internet banking was having a moderate economic impact in the nation. Furthermore, the country's internet infrastructure has been misused by cybercriminals, which makes it unappealing for both legal foreign and domestic financial activities. The mounting proof that suspicious Nigerians utilized phoney websites to steal money from unwary victims is further reinforcing the natural apprehension that comes with using online banking services in Nigeria. These crimes are occasionally perpetrated through the use of pre-existing bank websites.

Theoretical Literature

The nature of the implication of electronic banking has for some time been a subject of debate amongst different schools of thought. There is a huge survey of literature, which investigated theoretical and empirical aspects of evaluating the efficiency electronic banking. This section presents theories on electronic banking.

The Decomposed theory of Planned Behaviour

Taylor and Todd (1995) created this notion. According to the hypothesis, attitude, perceived behavioural control, and subjective norm all have an impact on a person's desire to use a certain technology. The study by MdNor and Pearson (2019) and Karahanna, Straub, and Chervany (2020) served as the basis for the selection of two influencing factors: the perceived behavioural control and the attitude towards behaviour.

Innovation Diffusion Theory

People's intention to use technology as a modality to carry out a conventional task is explained by the Innovation Diffusion Theory (IDT). Rogers (1983) created the hypothesis. Relative advantage, compatibility, complexity, trial ability, and observability are the key elements that influence an innovation's broad acceptance. Rogers (1995). The notion about the adoption of e-banking has been examined by researchers including Tan and Teo (2000), Gerrard and Cunningham (2003), and MdNor and Pearson (2019). Complexity, triability, and observability are the factors that have been nominalized.

Technology Acceptance Theory (TAT)

The Technology Acceptance Theory (TAT) was proposed by Davis, Bagozzi, and Warshaw (1989) to explain the conceptual model that explains users' intention or level of acceptance towards new technology or information systems. Perceived utility and perceived simplicity of use serve as the cornerstones around which TAT is built. The term "perceived usefulness" describes a person's conviction that utilizing a specific new technology or information system would enhance their level of work performance. According to Davis et al. (1989) and Gefen et al. (2003), perceived ease of use measures how simple it is for someone to operate or use new technology or information systems. The model focuses more on how perceived usefulness might be positively impacted by perceived ease of use. Exogenous variables such as environment are also the antecedent that induces perceived usefulness and perceived ease of use. TAT is therefore predicated on two crucial perceptual elements: perceived utility and perceived ease of use. TAT is frequently used in information technology research.

Based on TAT theory, Liu and Arnett (2000) looked at the important factors to create a successful website. Gefen et al. (2003) proposed an integrated model for understanding online customer behaviour by combining TAT and Rust. Pavlou (2003) separates and applies survey and experiment designs to develop an e-commerce acceptability model of online customers. The study incorporates perceived danger, faith, public encounters, and TAT variables. The empirical findings demonstrate that the fundamental tenet of e-government is that citizens strongly identify with information technology and have complete faith in the government. Because of the empirical study, researchers have determined that TAT is appropriate for explaining problems with online user behaviour in addition to examining new information technology accept intention or behaviour (Liu and Arnett, 2000; Gefen et al., 2003; Pavlou, 2003; Horst et al., 2007).

Empirical Literature

The impact of online banking on First Bank Nigeria Plc's non-financial performance in

Abuja was investigated by Akyuz and Opusunju (2022). The staff of 41 First Bank Plc branches in Abuja were given a structured questionnaire as part of the study's survey research design. Using the Taro Yamane formula, a sample size of 337 was determined from a target population of 2231 workers. Ordinary Least Squares was used to analyse the point-in-time data that was gathered from primary sources. The results show that First Bank Nigeria plc Abuja's success was greatly influenced by online banking proxies including low internet charges, round-the-clock internet services, and client ICT proficiency. Thus, the study concludes that online banking has a major impact on First Bank Nigeria Plc's performance in Abuja. It advised clients to use internet services around-the-clock.

Using Diamond Bank Plc's Bauchi branch as a case study, Rabiu, Ladan, Usman, and Garba (2022) investigated how e-banking affected Nigerian banks' operational effectiveness. The study collected data from original sources. Regression analysis was used to examine the data gathered from the 138 questionnaires that were given to Bank clients. Results show that banks' use of e-banking (Internet and mobile banking) has increased their efficiency in terms of offering customers efficient services electronically, cutting down on customer service time, enabling new customers to open accounts online, and giving customers easy access to their accounts around-the-clock. Additionally, E-banking eliminates the need for checks and postage and gives access to client information from the database. Additionally, the report suggests that internet services be made available around-the-clock.

Using data from the Central Bank of Nigeria (CBN) bulletin for the years 2022–2017, Enoruwa, Ezuem, and Nwani (2021) investigated the connection between electronic banking and bank performance in Nigeria. The type and degree of the link between the independent and dependent variables were examined using regression analysis. The performance of the Nigerian banking sector was proxied by Total Bank Deposit while transaction values of Automated Teller Machine (ATM Debit Cards), Mobile Banking, Point of Sales (POS) and Web Pay was used as proxy for electronic banking. This study became necessary considering the increasing popularity of e-channel products in Nigerian banks and world over. The correlation results demonstrate a positive and substantial relationship between bank performance and electronic channel products (ATM, POS, Web pay, and Mobile Pay). All of the factors have a strong correlation with one another, according to the regression findings. It concludes that there is a significant relationship between bank performance and electronic banking channels, and as a result, it suggests that these channels be maintained.

Hussein and Elyjoy (2020) investigated how internet banking affected the way commercial banks in Kenya's Nakuru County operated. Regression analysis and correlation were used to examine the primary data. The study found that online banking significantly and favourably affects commercial banks' operational performance. It suggests that internet service in Kenya's Nakuru County be suspended. Using a case study of Nigerian commercial banks, Taiwo and Agwu (2020) examined the effects of e-banking adoption on organisational performance. The findings were analysed using the Statistical Package for Social Sciences (SPSS) and the Pearson correlation. Since the more engaged clients are with their electronic transactions, the more lucrative it is for the banks, it was determined that adding new channels to their e-

banking operations significantly improved bank performance. According to the report, all Nigerian banks should implement new e-banking systems. Amu and Nwezeaku (2021) investigated the connection between Nigerian commercial banks' performance and electronic banking. Data for the sample period from January 2019 to December 2020 were analysed using the Engle-Granger cointegration model. According to the report, POS is cointegrated with demand deposits but not with savings or time deposits. In order to deter POS withdrawals, the study suggests that greater interest rates be applied to deposits over the long term.

Babatunde and Salawudeen (2017) investigated how e-banking affected Nigerian financial institutions and the banking sector. Both descriptive and inferential statistics are used in the study's data analysis. According to the findings, 22 credit officers, or 63.9% of the respondents, agreed that the e-banking system has made banking transactions easier. Of these, 11 credit officers, or 31.45%, strongly agreed with this statement, while 2 credit officers, or 5.7%, were unsure. They also did not disagree or strongly disagree. As a result, it was determined that e-banking systems should be promoted as they have simplified banking transactions.

Methodology
Research Design
The ex post facto research design was used in this investigation. Because the circumstance for the study already exists or has occurred, the researcher does not control or influence the independent variables in ex post facto research, which is a methodical empirical study (Asika, 2017). The research compiles historical data from 2017 to 2022. By implication, the study is a time series analysis. Most works along this line use time-series analysis of annual observations and even quarterly data to maximize the information included in their analyses. Time series analysis adjusts the standard errors accordingly and conduct an array of sensitivity checks and this procedure formally deal with simultaneity bias.

Sources of Data
Secondary data is used for the study. profit after tax of Eco bank, volumes of ATM transactions, electronic mobile banking, point of sale services and internet banking transactions were obtained from the Central Bank of Nigeria Statistical Bulletin and NDIC Annual Reports and Account. The study makes use of time series data.

Model Specification
In order to achieve the objectives of the study, the functional form of the relationship between the dependent variable and the list of independent variables is stated as follows:

$$PBT = f(ATM, POS, EMB, IBT) \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (1)$$

Where:
PBT = Profit before tax
ATM = Automated Teller Machine transactions
EMB = Electronic Mobil Banking

POS = Point of Sales services
IBT = Internet Banking transactions

The mathematical form of the model is specified in a functional relationship as follows;

$$PBT_t = b_o + b_1ATM_t + b_2POS_t + b_3EMB_t + b_4IBT_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (2)$$

The OLS linear regression equation based on the above functional relation for models 1 is econometrically stated as:

$$PBT_t = b_o + b_1ATM_t + b_2POS_t + b_3EMB_t + b_4IBT_t + e_t \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots (3)$$

Where e = Error term
Transforming equation 2 to the natural logarithm, we have:
$$LogPBT_t = b_o + b_1logATM_t + b_2logPOS_t + b_3logEMB_t + b_4logIBT_t + e_t \dots\dots\dots\dots\dots\dots\dots (4)$$

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.

Theoretical (apriori) Expectations
The apriori expectation is that all the coefficients of the explanatory variables in this study should be positive. That is, b1, b2, b3, b4 > 0. In other words, there should be a positive relationship between e-banking and commercial bank profitability.

Method of Data Analysis
The Autoregressive Distributed Lag (ARDL) estimate approach is employed to do the study's econometric analysis because, in contrast to other estimating strategies, it has the special quality of being the Best Linear Unbiased Estimator (BLUE). The variables underwent an initial diagnostic test to make sure that false regression results would not be generated. The model's variables' stationary status was determined using the Augmented Dickey Fuller test (ADF). In order to provide thorough explanations of the results obtained in relation to the previously stated assumptions, additional parametric tests (such as the T-test, F-test, Durbin-Watson, and others) were used as research instruments.

Results and Discussions
Unit Root Test Result
Table 1: Unit root test result (ADF test)

Series	Augment Dickey-Fuller Test				
	Levels	First Diff.	5% C.V	Ord. of Int.	Decision
PBT	-3.942	-	-2.948	I(0)	Accept
ATM	-1.468	-7.955	-2.954	I(1)	Accept
POS	-0.279	-6.249	-2.951	I(1)	Accept
EMB	-1.867	-6.098	-2.951	I(1)	Accept
IBT	-4.989	-	-2.964	I(0)	Accept

Source: Author's computation from Eviews 10

The study's variables exhibit a mixed order of stationarity, as Table 1 demonstrates. The variables PBT and IBT are stationary at level, as seen in Table 1. This indicates that in all of their level forms, these series have a unit root. Nevertheless, after differencing once, the variables ATM, POS, and EMB all became stationary despite initially not being at level. The mixed order of stationarity, as shown in Table 1, is a sufficient condition to test for the long-run properties of the variables used in the study using the Autoregressive Distributed Lag (ARDL) bounds testing approach proposed by Peseran and Shin (2022), since all of the variables are not stationary of I(1), which is a prerequisite for determining the long-run properties of the series using the Johansen co-integration test. The results of the Autoregressive Distributed Lag (ARDL) bounds test are shown in Table 2 below.

Table 2: ARDL Bounds Test

Dependent Variable: D(PBT)
Selected Model: ARDL(3, 0, 2, 0, 0, 4)
Case 2: Restricted Constant and No Trend

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
		Asymptotic: n=1000		
F-statistic	5.412710	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
		Finite Sample: n=35		
Actual Sample Size	120	10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
		Finite Sample: n=30		
		10%	2.407	3.517
		5%	2.91	4.193
		1%	4.134	5.761

Source: Author's computation

Table 2 shows the long-run properties of the variables in the model specified in equation 2 in the third section of this work. The result shows that the variable exhibits joint convergence in the long-run. In other words, there is a long-run relationship among the variables in the model. This is because the ARDL F-statistic value of 5.412710 is greater than the 5% upper bound (I1 Bound) value of 3.38. Thus, the null hypothesis of "no level relationship" or "no long-run relationship exists" is rejected and its alternate hypothesis is accepted. By implication, the result shows that there exists a long-run relationship between the e-banking variables and profitability of Eco bank in Nigeria. This is a sufficient condition to estimate the conventional ARDL error correction model (ECM). The result of the ARDL ECM is presented in Table 3 below. However, it is only wise to select the best ARDL model in the midst of various competing model. To achieve this, the Akaike information criteria was used to select the best ARDL model from the top twenty (20) models. The selection criterion is presented in Figure 1 below.
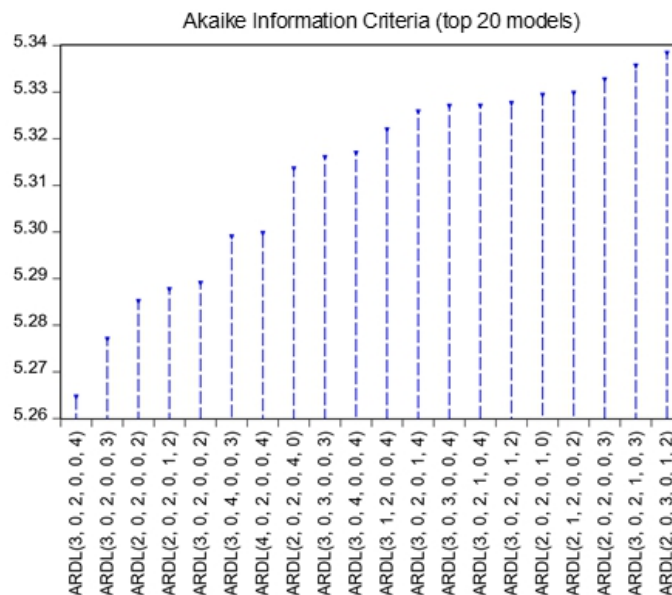

Figure 1: Akaike information criteria for ARDL model selection

The decision criterion for the Akaike information criteria for model selection is that, the ARDL model with the smallest or least Akaike value is the best. Thus, the ARDL(3, 0, 2, 0, 0, 4) is the best and selected for the estimation process as it records Akaike value of about 5.2605. The result of the estimated ARDL(3, 0, 2, 0, 0, 4) is presented in Table 3 below.

Table 3: ARDL Error Correction Regression

Dependent Variable: D(PBT)
Selected Model: ARDL(3, 0, 2, 0, 0, 4)
Included observations: 120

ECM Regression
Case 2: Restricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-28.17622	7.269356	-3.876027	0.0012
PBT(-1)*	-0.343878	0.208497	-1.649316	0.1174
POS	10.50717	1.929980	5.444189	0.0000
EMB**	0.140777	0.145134	0.969976	0.3457
IBT**	0.786483	0.557853	1.409840	0.1766
D(IBT(-1))	-0.699164	0.246624	-2.834942	0.0114
D(IBT(-2))	-0.361564	0.218567	-1.654249	0.1164
D(ATM)	3.473022	0.860960	4.033894	0.0009
D(ATM(-1))	3.139380	0.979710	3.204396	0.0052
D(EMB)	1.067312	1.337961	0.797715	0.4360
D(EMB(-1))	37.19035	16.50707	2.252995	0.0378
D(EMB(-2))	-45.12991	28.28494	-1.595546	0.1290
D(EMB(-3))	20.82480	18.11114	1.149834	0.2661
CointEq(-1)*	-0.343878	0.048030	-7.159717	0.0000

R-squared	0.758295	Mean dependent var		0.900000
Adjusted R-squared	0.674223	S.D. dependent var		4.351492
S.E. of regression	2.483694	Akaike info criterion		4.889629
Sum squared resid	141.8809	Schwarz criterion		5.301868
Log likelihood	-69.23407	Hannan-Quinn criter.		5.026275
Durbin-Watson stat	2.081799			
F-statistic	21.01312			
Prob(F-statistic)	0.000000			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test			Null Hypothesis: No levels relationship	
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	5.412710	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15

Source: Authors' computation

The ARDL error correction model result presented in Table 3 shows that the value of ATM transactions has a positive impact on profit before tax of Deposit money banks as the coefficient of ATM has a positive value of 3.473022. This is in tandem with apriori theoretical expectation as increase in ATM transactions means that more person utilizing the ATM facilities of the bank, which further implies greater transactions, which may also imply more ATM charges and this would add to the profitability of the bank. Thus, it is expected that as ATM transactions increases, profit before tax of the bank would also increase. The positive value of 3.473022 for ATM transactions indicates that a one percent increase ATM transactions would result to about 3.47 percent increase in profit before tax of Eco bank, all

things being equal. The absolute student t-statistic value for ATM transaction (in monetary terms) of 4.033894 and its corresponding probability value of 0.0009 showed that the monetary value of ATM transactions has a significant impact on profit before tax of the understudied bank (ECO bank) over the period of the study. This is assertion is made because the absolute student t-statistic value for ATM of 4.033894 is greater than 2 and its corresponding probability value of 0.0009 is less than the 5 percent (0.05) level of significance.

Table 3 also shows that electronic mobile banking (EMB) had a positive impact on profit before tax (PBT) of Eco bank in Nigeria over the period covered by the study, as the coefficient of EMB had a positive value of 0.140777. This also is in tandem with apriori theoretical expectation as increase in electronic mobile banking (EMB) transactions means that more person utilizing the electronic mobile banking platform of the bank, which further implies greater transactions, and this would add to the profitability of the bank. Thus, it is expected that as EMB transactions increases, profit before tax of the bank would also increase. The positive value of EMB indicates that a one percent increase in EMB would result to about 0.14 percent increase in profit before tax of Deposit money banks in Nigeria, all things being equal. The absolute student t-statistic value for EMB of 0.969976 and its corresponding probability value of 0.3457 showed that EMB had no significant impact on profit before tax of Eco bank over the period of the study. This assertion is also made because absolute student t-statistic value for electronic mobile banking (EMB) of 0.969976 less than 2 and its corresponding probability value of 0.3475 is greater than the 5 percent (0.05) level of significance.

Point of Sales transactions (POS) as shown in Table 3 is seen to have a positive impact on profit before tax of the understudied bank (Eco bank) in Nigeria over the period of the study as the coefficient of POS has a positive value of 10.50717. This corroborates apriori theoretical expectation. This is because, increase in Point of Sale (POS) transactions means that more person utilizing the POS terminals of the bank, which further implies greater transactions, and this would add to the profitability of the bank. Thus, it is expected that as POS transactions increases, profit before tax of the bank would also increase. The positive value of 10.50717for POS transactions implies that a one percent increase in POS transactions would result to about 10.5 percent increase in profit before tax of Eco bank, holding every other variable constant. The absolute student t-statistic value for POS of 5.444189 and its corresponding probability value of 0.0000 showed that POS transactions also have a significant impact on the profit before tax of Deposit money banks over the period of the study. This is assertion is also made because the absolute student t-statistic value for POS of 5.444189 is greater than 2 and its corresponding probability value of 0.0000 is less than the 5 percent (0.05) level of significance.

On the impact of internet bank transactions (IBT) on profit before tax of Deposit money banks in Nigeria, it could be seen from Table 3 that IBT also has a positive impact on profit before tax of the understudied bank (Eco bank) in Nigeria over the period of the study as the coefficient of IBT has a positive value of 0.786483. This corroborates apriori theoretical expectation. This is because, increase in internet banking (IBT) transactions means that more

person utilizing the internet banking platforms of the bank, which further implies greater transactions, and this would also add to the profitability of the bank. Thus, it is expected that as IBT transactions increase, profit before tax of the bank would also increase. The positive value of 0.786483 for IBT transactions implies that a one percent increase in IBT transactions would result to about 0.78 percent increase in profit before tax of Eco bank, holding every other variable constant. The absolute student t-statistic value for POS of 1.409840 and its corresponding probability value of 0.1766 showed that IBT transactions do not have a significant impact on the profit before tax of Deposit money banks over the period of the study. This is assertion is also made because the absolute student t-statistic value for IBT of 1.409840 is less than 2 and its corresponding probability value of 0.1766 is greater than the 5 percent (0.05) level of significance.

The variable (cointEq(-1)) in Table 4 is the error correction term or variable in the estimated ARDL ECM result and it accounts for the speed of adjustment in the model. The result shows that any short-run disequilibria among the variables in the model will be corrected at the speed of 34 percent. In other words, if there a short-term disturbance in the system that makes the variables in the model of oscillate or drift away from their equilibrium path, in the long-run, they would return at the speed of just 34 percent. The is because the coefficient of the error correction term (CointEq(-1)) is negative as expected (i.e, -0.343878) accounts for the speed of adjustment in the model and its corresponding probability value of 0.0000 is also significant at the 0.05 level.

The adjusted R^2 value of 0.674223 showed that the estimated model has a good fit. It also shows that the explanatory variables, point of sales (POS) transactions, Electronic Mobile Banking (EMB), ATM transactions and internet banking transactions (IBT) jointly explained about 67 percent of the variations in profit before tax of Deposit money banks in Nigeria, while the remaining 33 percent is being accounted for by the stochastic variable in the model. The Durbin-Watson statistic value of 2.081799 indicates that the estimated model is free from serial or autocorrelation. This is further validated by the serial correlation test result in table 4 below.

Table 4: Breusch-Godfrey Serial Correlation LM Test

F-statistic	0.470905	Prob. F(2, 15)	0.6334
Obs*R-squared	1.890497	Prob. Chi-Square(2)	0.3886

Source: Authors' computation

The result in table 4 shows that the model estimated does not have the problem of serial or auto-correlation as observed R-squared (Obs*R-squared) value of 1.890497 and its corresponding probability Chi-Squared (Prob. Chi-Square (2)) of 0.3886 are not statistically significant at 0.05 level. Thus, the null hypothesis of the residuals of the model being serially correlated is rejected and its alternate hypothesis of no serial correlation is accepted. This also makes the estimates of the model valid for making predictions and also for policy options.

Stability Test on Model/Equation 2 estimated in Table 3
Table 5: Stability Test Result

Ramsey RESET Test
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.890968	16	0.3861
F-statistic	0.793825	(1, 16)	0.3861

F-test summary :

	Sum of Sq.	df	Mean Squares
Test SSR	6.706548	1	6.706548
Restricted SSR	141.8809	17	8.345937
Unrestricted SSR	135.1744	16	8.448399

Source: Author's computation

The result in table 5 confirms that the model is stable and is fit for making prediction and policy. This is because, the F-statistic value of 0.793825 and its corresponding probability value 0.3861 are not statistically significant at 0.05 level of significance. To further verify the stability of the ARDL result, ARDL CUSUM squared test was conducted and the result is presented in figure 2 below. This also serves as structural break test for the estimated model.

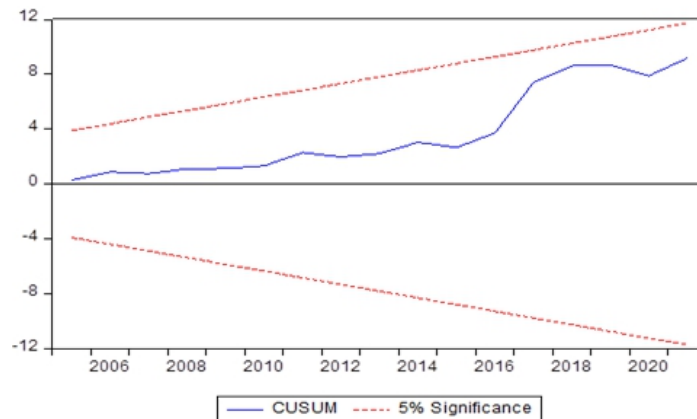**Test for Structural Break**

Figure 2: CUSUM of Squares test for break points

Figure 2 shows that there are not structural breaks in the estimated model or the series associated with it. This is because, as seen in the plot, the blue line lies perfectly between the upper- and lower-5 percent critical bounds denoted by the two red lines. This also confirms that there are no outliers in the estimated ARDL model, thereby further supporting its stability status and making it fit for policy recommendations and predictions.

Table 6: Multicollinearity Test

Variance Inflation Factors
Included observations: 32

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
POS	0.408251	6.322225	2.177672
EMB	0.741253	3.200129	2.127355
IBT	0.021064	6.279898	2.871593
ATM	0.311200	20.04580	6.414173

Source: Author's computation

A test for multicollinearity was also conducted to ascertain whether the independent variables in equation 2 in the third chapter of this work are correlated among themselves and the result is presented in Table 6 above. The Variance Inflation Factor (VIF) method was adopted for the test. The rule of thumb for the test is that, any variable with VIF greater than 10 has a problem of multicollinearity with other variables, therefore, could pose a problem in the regression equation, which may also affect the forecasting power of the estimates in the model estimated. Thus, such variable may be dropped from the equation. From Table 4.6, all the VIF values for the variable are very low (lower than 10), meaning that the variables in equation 3.2 do not have multicollinearity problem, which also implies that the estimates of the ARDL model in Table 4 above are good enough for making predictions and also for policy options.

Conclusion and Recommendations

Drawing from the conclusions above, the study concludes that Point of sale transactions and ATM transactions are important determinants of profit before tax of Eco bank in Nigeria. While internet banking transactions and electronic mobile banking transactions are not important determinants of profitability of Eco bank in Nigeria. Thus, the following recommendations are made;

1. Monetary authorities and DMBs should enlighten their customer on the convenience and importance of adopting e-banking channels in completing their transactions.
2. It was observed that ATM has a positive effect on the profitability of deposit money banks in Nigeria. The banks should provide more ATM facilities; these should be placed at vantage locations within the city to reduce distance and time use in access to the facility.
3. Marketing and education of E-banking services and products should be intensified to attract more customers.
4. The bank should conduct further research to find new E-banking products to attract and to retain their current customers.

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