

# CASHLESS BANKING AND FINANCIAL PERFORMANCE OF DEPOSIT MONEY BANKS IN NIGERIA: A NON-LINEAR AUTOREGRESSIVE DISTRIBUTIVE LAG (NARDL) APPROACH

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**Abstract:** *The study examined the effect of asymmetric impact of cashless banking on the financial performance of deposit money banks in Nigeria between 2008Q1-2022Q4. The specific objectives of the study were to examine the effect of automated teller machine, the effect of point of sales, the effect of mobile payment transaction and the effect of Web based payment on the financial performance of Deposit Money Banks in Nigeria. The study adopted ex-post facto research design while the data were generated from the CBN statistical bulletin. Pre-estimation tests were performed on each of the variables using the Phillips Perron (PP) unit root test; while the empirical analysis was carried using the Non-linear ARDL error correction model. Findings from study revealed that automated teller machine, point of sales and mobile payment transaction has a significant asymmetric impact on return of assets of deposit money banks in Nigeria. Based on these findings, the study recommends that banks should properly maintain their ATMs so that it will be more efficient for customers' use. Likewise, point of Sale (POS) payment method should be increased with quick and fast applications which should be deployed and installed in remote areas to facilitate quick banking transactions. Also, it was recommended that telecoms companies should make a deliberate effort and invest in system, structure and process which reduce the stress customer will go through whenever they are using mobile applications. Finally, it was recommended that managers should focus more on mobile banking awareness through internet sanitization, to improve the usage of web-based payment system.*

**Keywords:** *Cashless Banking, ATMs, Point of Sales, Mobile Payment, Web-Based Payment, Return on Equity, Financial Performance.*

## Introduction

The advent of COVID-19 led to the closure of borders of countries like Nigeria, South Africa, and Ghana disrupting travel and tourism and supply chains, and necessitating consumption of local goods. According to the World Bank (2020), cashless remittance flows to sub-Saharan Africa are expected to fall by 23.1 percent in 2020; with that of Nigeria falling by 19.8 percent in 2020. Just like Nigeria, most African countries are also facing a serious shortfall in hard currency, which is putting pressure on local African currencies and further depressing cross-border interactions which affected the financial performance of companies (Mayowa & Twum, 2020).

Financial performance is the measure of how well a firm can use its assets from its primary business to generate revenues. Financial performance measures like profitability

and liquidity provide a valuable tool to stakeholders which aids in evaluating the past financial performance and current position of a firm (Erasmus, 2008). However, since the introduction of mobile phones technology and the internet, financial services in Africa are experiencing a moment of exciting change. Many financial institutions are taking advantage of development in technology to steer emerging African economies toward a mobile-driven, cashless (or cash lite) future by introducing new products, services, and business models. As such, Deposit Money Banks globally have invested in enterprise mobile and online financial service solutions to deliver banking services and reduce the overall cost of operations (Capgemini, 2018). Banks are being innovative, largely due to intense competition and they are therefore at the forefront of new developments, not only in banking but also in wider financial markets (Khan & Alhumoudi, 2022).

Electronic based transactions are a major tool used to discourage high circulation of cash in an economy. Though, Enoruwa et al (2019) posited that Nigeria adopted electronic banking system in the early 2000s, the pilot phase of the CLP could be traced to its operation in Lagos on April 1st 2014 and was scheduled to be extended to 5 States and the Federal Capital Territory (FCT) on January 1st 2016 which was later rescheduled for July 1st 2013. The affected States were Abia, Anambra, Kano, Ogun, and Rivers (Abaenewe *et al*, 2018). Subsequently the rest of the States followed suit on 1st July 2018. It is therefore important to assess the journey so made as we cruise further on the cashless policies. The electronic banking, online transactions and mobile banking in Nigeria has paved way for a new era of development where the use and demand for physical cash is gradually declining. These recent evolution of technology in the Nigerian financial institutions possess interesting questions for economist, financial institutions, business analyst and the government regarding the current economic status, logistics, and availability of instruments to guarantee economic growth and stability, efficiency and effectiveness of the cashless policy (Malhotra, 2019).

The automated teller machine (ATM) is an electronics device which allows a bank's customers to make cash withdrawals and check their account balances at any time without the need for a human teller. Many ATMs also allow people to deposit cash or cheques, transfer money between their bank accounts or even buy postage stamps (Rosen, 2018). Point of Sale (POS) is one of the lowest-cost channels that can be deployed by banks. The relatively low cost of running POSs make them best channels in low-transaction environments that can be effectively used to complement the other branchless banking channels. Kumar (2018) observed that in today's busy world, customers prefer to use plastic money (Debit, Credit and Prepaid Card) for shopping. It gives convenience, safety, easiness and style with minimum time consumption. Mobile payment transaction (MPT) provides financial institutions' clients with the opportunity of carrying out their transactions at any time they may deem suitable. The clients now have access to funds and can transfer funds amid accounts/banks as well as pay bills and make procurements at any time round the clock (Brumbach, 2018).

Deposit Money Banks globally have heavily invested in enterprise cashless financial service products and services to deliver more technology-based banking products and services and reduce the overall cost of operations (Capgemini, 2018). This heavy investment in technology-based modes of conducting business has been done in order to drive revenue through the technology-based distribution systems and also to adapt to

the changing customer tastes and preferences. It is predicted that this trend is likely to continue with banks shifting from traditional to modern banking facilitated by technology. Although the rapid development of information technology has made some banking services more efficient and cheaper, technological investments are taking a larger share of banks resources. Adebisi (2018) observed that despite the massive investment in cashless banking technology, it is still difficult to ascertain the returns associated with these technology-based modes of banking and performance of banks. Available statistical data showed that there has been a progressive decline in the average Return on Assets (ROA) for the Deposit Money Banks from 3.7 in 2010 to 2.96 in 2017 (CBN, 2018).

The practical gap of the study shall address the weaknesses by utilizing both cashless banking channels as a multichannel strategy in line with the banks' attempts to achieve a seamless multi-channel integration in order to maximize performance of Deposit Money Banks on the benefits of cashless banking. The study shall also fill the identified gap by utilizing the Non-linear Autoregressive Distributive lag (NARDL) approach to capture policy inconsistencies and reforms. It is against this backdrop that this study seeks to investigate the effect of cashless banking on the performance of Deposit Money Banks despite the opportunities availed by cashless banking to improve financial performance. The main aim of this study is to examine the effect of cashless banking channel on financial performance of Deposit Money Banks in Nigeria from 2008 to 2022. In order to achieve the specific objectives of the study, the following null hypotheses were postulated:

**H<sub>01</sub>:** Automated teller machine has no significant effect on Financial Performance of Deposit Money Banks in Nigeria

**H<sub>02</sub>:** Point of Sale has no significant effect on Financial Performance of Deposit Money Banks in Nigeria

**H<sub>03</sub>:** Mobile Payment Transactions has no significant effect on Financial Performance of Deposit Money Banks in Nigeria

**H<sub>04</sub>:** Web based payment has no significant effect on Financial Performance of Deposit Money Banks in Nigeria

## **Literature Review**

### **Cashless Banking**

Cashless banking is a global issue and Nigeria launched itself into the system in 2012. Cashless economy does not refer to an outright absence of cash transactions in the economic setting but one in which the amount of cash-based transaction are kept to the barest minimum According to Adewale (2018), a cashless banking rightly illustrates a gradual movement of the entire payment system of an economy from the use of physical cash for all levels of personal, corporate, governmental including local and international commercial settlement activities to a systemic adoption of other non-physical cash mode payment in settlements of all types of transaction both in the public and private sectors of an economy. It is an economic system in which transactions are not done predominantly in exchange for actual cash. However, this study will adopt the work of Abaenewe et al (2018), which states that cashless banking involves driving the banks immediate and

future goals through the use of information technology and it involves carrying out banking business electronically.

### **Automated Teller Machine (ATM)**

This is an electronic device which allows a bank's customer to make cash withdrawals and check their account balances at any time without the need for a human teller. Many ATMs also allow people to deposit cash or cheques, transfer money between their bank accounts or even buy postage stamps (Rosen, 2018). This is an electronics device which allows a bank's customers to make cash withdrawals and check their account balances at any time without the need for a human teller. Many ATMs also allow people to deposit cash or cheques, transfer money between their bank accounts or even buy postage stamps (Rosen, 2018). Automated Teller Machine (ATM) is a machine where cash withdrawal can be made over the machine without going in to the banking hall. It also sells recharge cards and transfer funds; it can be accessed 24 hours/7 days with account balance enquiry (Malhotra, 2019). However, this study will adopt the definition of Hamisu (2020) which states that ATM is an electronic cards machine that contain integrated circuits which can process data and are used for conducting financial obligations. Electronic cards could be debit or credit cards. The difference between debit and credit cards is; debit cards are used for payment of purchases made and the money comes from the customer's account directly

### **Mobile Payment Transaction (MPT)**

(MPT) This is an electronic banking product that allows customers to access banking services through a dedicated telephone line from the comfort of their homes and offices. Services rendered here include; balance transfer, change of pin, authorization of inter-branch money transfer, transaction alert (withdrawal or deposit) and enquiry (Adewuyi, 2018). It is further clarified as the intersection of both banking and telecommunications services (World Bank, 2019). It involves a diverse set of stakeholders from both mobile phone operators and financial service institutions. However, this study will define Mobile transaction as the provision of banking and financial services with the help of mobile telecommunication devices.

### **Point of Sale terminals (POS)**

Point of Sale terminals (POS) are currently one of the lowest-cost channels that can be deployed by banks. The relatively low cost of running POSs make them best channels in low-transaction environments that can be effectively be used to complement the other branchless banking channels. Kumar (2018) observed that in today's busy world, customers prefer to use plastic money (Debit, Credit and Prepaid Card) for shopping. It gives convenience, safety, easiness and style with minimum time consumption. However, this study will adopt the definition of Adewale (2018) who defined POS as a form of e-payment that handles balance inquiry, payment for goods and service, electronic fund transfers at a specific point of sale.

### **Web Based Payment**

According to Aburime (2008), web-based payment refers to schemes which makes it possible for monetary organizations, their client, individual and commercial enterprises to self-operate accounts, undertake commercial activities and/or acquire intelligence on

monetary packages and services via communal or private webs, in addition to cyberspace. Clients' admittance to banking on cyberspace provisions is made possible by several electronic and electrical devices like personal computers (PC) and Automated Teller Machine (ATM) etc.

### **Financial Performance**

Richard (2019) defined performance as the organization's ability to achieve its goals and objectives. Daft (2019) identified performance as the ability of the organization to attain its goals by using resources in an efficient and effective way. An effective performance management provides valuable information to a decision maker about present condition of performance and the deviation from the objectives. Robson (2020) is of the view that accurate performance measurement can provide guidelines and direction for improvements, as it gives the opportunity to improve the business efficiency. He further highlighted that performance can be measured by: Return on Assets, Return on equity and Return on investments. These were the measured adopted for this study. However, this study will define finance performance as the ability of the organization to attain its goals by using resources in an efficient and effective way

Return on Asset (ROA) is also operationalized as the proportion of net income generated from the total assets of a company. It measures the naira earnings an organization derive from each naira of assets they control and utilized. It is a useful for comparing rival companies in the same industry (Hassan & Farouk, 2014). Return on Assets as a proxy for financial performance on corporate governance and its elements was used in the studies of Garba and Abubakar, (2014) and Bijalwan and Madan, (2013). This study, therefore, measures banks' value using return on assets (ROA) which is consistent with that of Abaenewe, Ogbulu, and Ndugbu (2018). ROA can be written as:

$$ROA = \frac{\text{Net income} + \text{interest expenses}}{\text{Total assets}}$$

### **Empirical Review**

Nyagadza et al. (2022) investigated the influence of automated teller machine on performance in Zimbabwe. Cross sectional data was collected from 433 customers using a structured, respondent administered questionnaire. Respondents were randomly intercepted as they moved out of personal service platforms of four selected banks. Hypotheses were tested using structural equation modelling. Automated teller machine was found to have a direct positive influence on customers' e-banking satisfaction evaluation during e-service failure and e-service recovery. Research was conducted in Marondera, an agro-based emerging town geographically located in Mashonaland East province of Zimbabwe. The generalisation of the study findings in Zimbabwe may be enhanced by extending the study to other cities. During the formulation of e-service marketing strategies, bank managers are encouraged to consider the influence of emotions on customers' e-banking satisfaction in order to enhance the effectiveness of e-service recovery initiatives. The findings of this study contribute to efforts towards effective management of emotions related to e-service failure and evaluation of e-service recovery strategies, a study area which remains under researched in Zimbabwe's banking

sector. However, more empirical literature should have been reviewed and critiqued with and post estimation test was not conducted.

Serrah and Maideen (2022) investigated the effect of point of sales on performance in E-banking services in Malaysia. The research study adopted a descriptive research design that applies primary data where a structured questionnaire was used to collect data. The population of the study is 155 E-banking users in Malaysia, the data was analyzed using the Statistics Package for Social Sciences (SPSS 19), and was interpreted using Cronbach's Alpha reliability test, Pearson Correlation, and Multiple Linear Regression. The findings were presented in figures and tables with percentage scores, mean, and standard deviation. The study concluded that point of sales had the strongest influence on customer satisfaction, followed by system availability, reliability, and security & privacy. The study recommends future studies to use different methods on the same topic to get more variety and accurate results; in addition, more significant independent variables should be included to overcome the problem of factor constraint. Independent variables such as responsiveness and ease of use should be discussed to have a more general understanding of customers' satisfaction towards online banking. Hence, future researches should be encompassed with more reliable independent variables in order to generate more detailed results.

Raji, et al. (2022) investigated the effect of mobile banking on performance in Nigeria's banking industry, specifically, in Kwara State. The study determined the attributes of mobile banking services that are crucial to customers, and examined the impact of e-banking attributes on customers' satisfaction using correlation and regression analyses. In addition, the challenges associated with electronic banking use were highlighted. To this end, a total number of 390 respondents were included in the study through Google survey form (questionnaires). The study used security, reliability, ease to use and user-friendly, transactional speed, responsiveness as the independent variables while customer satisfaction as the dependent variable. The correlation result shows a positive correlation between mobile banking and customer satisfaction. Similarly, the regression result shows that security, transactional speed, ease to use, reliability, and responsiveness have a positive and significant impact on customer satisfaction. Finally, the study recommends that bank managers should strengthen these attributes of e-banking and also look into the challenges highlighted by the respondent in order to maintain or improve customer satisfaction.

Kim and Jindabot (2022) investigated how customer satisfaction develops through examining the impacts of perceived risk (financial risk and performance risk) and perceived value on customer satisfaction in the mobile banking. The study applied convenience sampling to get data from the respondents at convenient locations (near banks, markets, supermarkets, universities, and workplaces). 700 respondents who were currently using mobile banking or internet banking services at either commercial or retail banks in Cambodia were invited to fill in the questionnaires. In addition, the results of this study were generated through structural equation model (SEM) analysis based on 546 valid responses. The results revealed that perceived value was mainly influenced by performance risk, whereas financial risk did not significantly affect perceived value. Finally, perceived value and performance risk significantly influenced customer satisfaction, except - financial risk. In addition, despite both perceived value and

performance risk significantly influencing customer satisfaction, promoting customer satisfaction through increasing perceived value was far more effective than minimizing performance risk.

Mercurio, et al (2022) analyzed the effectiveness of online banking on performance, while at the same time determined the experiences and difficulties met by the respondents in terms of online payment transaction, online fund transfer, and online shopping. Utilizing descriptive-evaluative research design, a validated self-made survey questionnaire composed of sixty-seven (67) indicators were distributed to purposively selected forty-five (45) consistent users of e-banking services across different demography. Results showed that there is no significant difference in the experiences and difficulties encountered by the respondents in online banking when grouped according to demographic profile. However, significant difference is present on the difficulties encountered in online shopping when grouped according to gross monthly income. Although it can be implied from the results of the data that the respondents still have reservations on the use of e-banking in daily and consistent transactions, it has been found effective in providing good customer life service as respondents would opine that online payment can save time, money and effort. Furthermore, online fund transfer can be trusted, and online shopping is seen to be quick and hassle-free. From a commerce perspective, this study emphasizes that there remain strong points of development towards the integration of e-banking to daily life transactions of customers and other prospects.

Gibson et al. (2022) examined the differences in the switching behaviours of older (Generation X and baby boomers) and younger (Millennials and Generation Z) customers of banks in the UK, with emphasis is on online and offline banking services. The secondary objective is also to evaluate the influential factors of customer satisfaction in the banking sector relating to customer switching behaviours. The study adopted positivist approach by using questionnaire survey to gather data from 106 clients of banks in the UK. The questionnaire comprises 30 questions, the majority of which use a 5-point Likert scale. The study found no significant difference is found when the switching behaviours of older and younger customers are compared. However, younger customers perceived online banking as more useful due to their greater ease-of-use. Critically, security and ease-of-use are the most noticeable determinants of customer satisfaction influencing switching behaviours. Research Limitations: This study lacks a managerial perspective on switching behaviours. This means that the applicability of the findings to banks in the UK is limited, suggesting that a further exploration in that respect may be warranted. Practical Implications: Banks in the UK are urged to re-focus their customer relationship strategies to improve security and perceived ease-of-use. It is also recommended that marketing campaigns are launched to inform the clients about the benefits of online banking with a specific emphasis on perceived usefulness and ease-of-use.

Khan and Alhumoudi (2022) examined how online banking have increasingly made its way into the modern marketplace, serving not only customers but also corporations. The primary data were gathered from 287 participants. Stratified random sampling was used. Structure Equation Modelling (SEM), reliability, convergent, discriminate validity and model fitness were achieved through SmartPLS 3 (Christian M. Ringle, Germany). The findings revealed that efficiency, reliability and service quality have a significant direct effect on customer satisfaction and customer retention. It also shows the significant effect

of efficiency, reliability and service quality when using customer satisfaction as a mediator for customer retention. It is possible that the data gathered may be valuable for both banks and enterprises interested in entering the Indian market. This research also specifies four main components of E-banking: efficiency, reliability, service quality and customer satisfaction.

Shanmugam and Chandran (2022) examined the relationship between online banking dimensions and performance provided by commercial banks. The researcher collected 600 responses through convenience sampling. Applied exploratory factor analysis, confirmatory factor analysis, regression analysis and structural equation model to conclude that service quality of electronic banking service is not a unique phenomenon. E-Banking depends upon the five essential factors: reliability, safety and security, assurance, technological augmentation, and quickness since the electronic banking services offered by commercial banks are entirely based on the Internet process. The study identifies the customer requirements and how commercial banks could satisfy such requirements with their banking strategies. Also, the study identifies whether any demographic difference exists among the customers of commercial banks in perceiving the quality of e- banking services.

Reddy and Megharaja (2021) examined the relationship between point of sales service and performance to determine which dimension can potentially have the strongest influence on customer satisfaction. Data were gathered using a survey instrument, which was distributed among bank clients in the Lebanese banking sector. E- Banking has become one of the essential banking services that can, if properly implemented, increase customer satisfaction, and give banks a competitive advantage. E-Banking has become an integral part of the global financial environment. Improvement in technologies and financial innovations has made electronised service in banking sector is an intense part of this study.

## **Theoretical Framework**

### **Diffusion of Innovation Theory**

Diffusion of innovations theory was postulated by Rogers in 2003. The theory seeks to explain how, why, and at what rate new ideas and technology spreads. According to Rodgers (2003) diffusion is the process by which an innovation is communicated over time among the participants in a social system. Diffusion is the process by which an innovation is communicated through certain channels over a period of time among the members of a social system. An innovation is an idea, practice, or object that is perceived to be new by an individual or other unit of adoption. Communication is a process in which participants create and share information with one another to reach a mutual understanding (Rogers, 2009).

Mahajan and Peterson (1995) defined the diffusion of innovation as the process by which the innovation is communicated through certain channels over time among members of social systems. This theory examines the adoption and uses of information technology from a diffusion of innovation perspective through mobile banking. Lundblad and Jennifer (2003) stated that not all innovations are adopted it depends on the level of their input. The Innovation-Decision Process Model suggests that the adoption of an innovation is not a single act, but a process that occurs over time. Potential adopters go through five

stages when interacting with an innovation. The first stage is knowledge in which potential adopters find out about an innovation and gain a basic understanding of what it is and how it works. The second stage is persuasion in which potential adopters form a positive or negative impression of the innovation. It is only in the third stage decision, that the innovation is adopted or rejected. The fourth stage, implementation, occurs when the innovation is used. In the fifth stage, confirmation, the adopter seeks information about the innovation and either continues or discontinues use of the innovation.

### **Technology Acceptance Model**

Theories and models used in studies related to the innovations, acceptance and use of new technology are many. For instance, focusing on the technological issues Davis (1989) advances the Technology Acceptance Model (TAM). This model relates the individuals' behavioural intentions and his/her ICT use. It is suggested that, the actual behaviour of a person is determined by his behavioural intention to use, which is in turn influenced by user's attitude toward and perceived usefulness of the technology. However, attitude and perceived usefulness are both determined by ease of use. Adopting the TAM model requires the understanding of end-users requirements regarding usefulness and user friendliness (Pedersen et al, 2002). From this model, usefulness and user friendliness affect users' attitudes towards any service. Davis (1989), thus suggest that it is important to value user requirements based on perceived usefulness and the user friendliness of the technology rather than other objective measure. Critiques of this model are directed to its inclination to the technological/technical aspects of the technology in question ignoring other factors such as social aspect of the users. In practice, constraints such as limited ability, time, environmental or organizational limits and unconscious habits will limit the freedom to act.

According to the Technology Acceptance Model (TAM), perceived ease of use and perceived usefulness constructs are believed to be fundamental in determining the acceptance and use of various Information Technology (IT). These beliefs may not fully explain the user's behaviour toward newly emerging IT, such as internet banking. Using the TAM as a theoretical framework, Wang et al (2003) introduces "perceived credibility" as a new factor that reflects the user's security and privacy concerns in the acceptance of internet banking. Wang et al (2003) examines the effect of computer self-efficacy on the intention to use internet banking. The results strongly support the extended TAM in predicting the intention of users to adopt internet banking. It also demonstrates the significant effect of computer self-efficacy on behavioural intention through perceived ease of use, perceived usefulness, and perceived credibility (Wang et al, 2003).

This study adopts the diffusion of innovation theory and technology acceptable model because diffusion of innovation theory attempts to explain and describe the mechanisms of how new inventions in this case internet and mobile banking is adopted and becomes successful. Similarly, the technology acceptable model is adopted because the model relates the individuals' behavioural intentions and his/her ICT use. TAM focuses much more on the technology than the ability of the technology to support users as they perform their task. It is suggested that, the actual behaviour of a person is determined by his behavioural intention to use, which is in turn influenced by user's attitude toward and perceived usefulness of the technology. This is further highlighted by the fact that the

TAM has been the most frequent model applied as theoretical foundation to predict the customers' intention to adopt m-banking.

### **Research Methodology**

The research design adopted for this research is the *ex-post facto* research design. The data for this research study were adequately sourced using the secondary methods of data collection. The data consist mainly of secondary data which are relevant to the study were obtained from published sources. The data were collected from the Central Bank of Nigeria statistical bulletin. The study used quarterly data on automated teller machine (ATM), point of sales (POS), Web Base Payment (WEB) and mobile payment transaction (MPT) over the period 2008Q1 to 2022Q4. The use of quarterly data is appropriate for proper capture of asymmetric effects. In analysing the data, both the inferential and descriptive statistics was adopted. Descriptive statistics will be used to summarize the basic characteristics of the data. The statistics include mean, median, minimum and maximum. It was also used to explain the relationship between each of the cashless banking and performance of deposit money banks.

The estimation began with a unit root test to confirm the stationarity state of the variables that entered the model. The stationarity tests on the variables were done using Phillips-Peron (PP) tests. This was due to the fact that, the data generating process was not an Auto Regressive (AR) (1) process. The PP test is non-parametric and corrects the statistic to conduct for autocorrelation and heteroskedasticity (Stock, 1994). Under the null hypothesis, the assumed underlying process is shown by the equation below: The basic equation used in the PP test remains the same as the one used in the ADF test. Thus, the PP test involves fitting the regression:

$$y_i = \alpha + \rho y_{i-1} + \varepsilon_t \text{ --- (1)}$$

And the null hypothesis is  $\rho = 0$  against the alternative that  $\rho \neq 0$ . The advantage of the PP tests over the ADF tests is that PP tests are robust to general forms of heteroskedasticity in the error term  $\varepsilon_t$ . The second advantage is that the user does not have to specify a lag length.

The Bounds co-integration test derived from Non-linear Auto Regressive Distributive Lags (NARDL) model was utilized in the study. The bound testing cointegration is given as:

$$y_t = \alpha + \sum_{i=1}^p \gamma_i y_{t-i} + \sum_{j=1}^a \sum_{i=0}^{q_j} X_j^+, t - 1' \beta_j, i + \sum_{j=1}^b \sum_{i=0}^{r_j} X_j^-, t - 1' \beta_j, i + \varepsilon_t \text{ --- (2)}$$

The main aim of this study was to examine the effect of cashless banking on performance of Deposit Money Banks in Nigeria. Thus, the functional form of the model with cashless banking and bank performance indicators incorporated is implicitly expressed as:

$$ROA = f(ATM, POS, MPT, WEB) \text{ --- (3)}$$

To achieve harmony in the units of measurement of the variables and express the coefficients as elasticities, the linear specification of the stochastic model is converted into log-log specification. It is noted that log-log specification provides more appropriate

and efficient results compared to linear-linear model. Log-log specification ensures that the coefficients of the variables are effective in analyzing macroeconomic behaviour since the coefficients are elasticities used to explain the response of a change in one variable with respect to another. Therefore, the logarithmic form of the estimable model is specified as:

$$ROA = \alpha_0 + \alpha_1 ATM + \alpha_2 POS + \alpha_3 MPT + \alpha_4 WEB + \mu_t \text{-----} (4)$$

Where:

- In = Natural logarithm
- ROA = Return on assets
- ATM = Automobile Teller Machines
- POS = Point of Sale
- MPT = Mobile Payment Transactions.
- WEB = Web-based Transactions.

$\mu_t$ , is the white noise stochastic term.

$\alpha_1 - \alpha_4$  are the coefficients of ATM, POS, MPT and WEB.

Under linear and symmetric ARDL, performance of Deposit Money Banks response to the periods of increases in cashless banking indicators is no more than a mirror image of the periods of decreases in cashless banking indicators. To account for the effect of the two periods (increases and decreases) or positive and negative changes simultaneously, the study employs the Non-linear ARDL (NARDL) technique developed by Shin and Greenwood-Nimmo (2009 and 2014). The NARDL model introduces nonlinearity by means of partial sum decompositions into the conventional ARDL model by Pesaran, Shin and Smith (2001). Thus, to capture these possible asymmetric effects, NARDL technique decomposes the cashless banking indicators into two parts: 1) partial sum of positive change in cashless banking indicators and; 2) partial sum of negative change in cashless banking indicators.

Therefore, following Usman and Elsalih (2018), the first step in the asymmetric cointegrating relationship under the NARDL specification method is to decompose the exogenous variables in

equation (7) into partial sum processes to account for the asymmetries in the relationship between cashless banking and bank performance; hence, the study's non-linear specification of equation (4) are as follows:

$$ROA_t = \alpha_0 + \alpha_1 ATM_t^+ + \alpha_2 ATM_t^- + \alpha_3 POS_t^+ + \alpha_4 \ln POS_t^- + \alpha_5 MPT_t^+ + \alpha_6 MPT_t^- + \alpha_7 WEB_t^+ + \alpha_8 WEB_t^- + \mu_t \text{-----} (5)$$

Where:

$ATM_t^+, POS_t^+, MPT_t^+, WEB_t^+$ , are the partial sums of positive changes in  $ATM, POS, MPT, WEB$  ; while

$ATM_t^-, POS_t^-, MPT_t^-, WEB_t^-$  are partial negative changes in  $ATM, POS, MPT, WEB$

$$ATM_t^+ = \sum_{i=1}^d \Delta ATM_i^+ = \sum_{i=1}^d \max(\Delta ATM_i, 0), ATM_t^- = \sum_{i=1}^d \Delta ATM_i^- = \sum_{i=1}^d \min(\Delta ATM_i, 0) \text{---(6)}$$

$$POS_t^+ = \sum_{i=1}^d \Delta POS_i^+ = \sum_{i=1}^d \max(\Delta POS_i, 0), POS_t^- = \sum_{i=1}^d \Delta POS_i^- = \sum_{i=1}^d \min(\Delta POS_i, 0) \text{---(7)}$$

$$MPT_t^+ = \sum_{i=1}^d \Delta MPT_i^+ = \sum_{i=1}^d \max(\Delta MPT_i, 0), MPT_t^- = \sum_{i=1}^d \Delta MPT_i^- = \sum_{i=1}^d \min(\Delta MPT_i, 0) \text{---(8)}$$

$$WEB_t^+ = \sum_{i=1}^d \Delta WEB_i^+ = \sum_{i=1}^d \max(\Delta WEB_i, 0), WEB_t^- = \sum_{i=1}^d \Delta WEB_i^- = \sum_{i=1}^d \min(\Delta WEB_i, 0) \text{---(9)}$$

Following Shin and Greenwood-Nimmo (2014), Equation (6,7,8,9) is transformed into unrestricted NARDL specification as follows:

$$\begin{aligned} \Delta \ln ROA_t = & \alpha_0 + \alpha_1 \ln ROA_{t-1} + \alpha_2 ATM_{t-1}^+ + \alpha_3 ATM_{t-1}^- + \alpha_4 \ln POS_{t-1}^+ + \alpha_5 POS_{t-1}^- + \alpha_6 MPT_{t-1}^+ + \alpha_7 MPT_{t-1}^- + \\ & \alpha_8 WEB_{t-1}^+ + \alpha_9 WEB_{t-1}^- + \sum_{i=0}^p \lambda_1 \Delta \ln ROA_{t-i} + \sum_{i=0}^q \lambda_2 \Delta ATM_{t-i}^+ + \sum_{i=0}^r \lambda_3 \Delta ATM_{t-i}^- + \sum_{i=0}^s \lambda_4 \Delta POS_{t-i}^+ + \sum_{i=0}^d \lambda_5 \Delta POS_{t-i}^- + \\ & \sum_{i=0}^u \lambda_6 \Delta MPT_{t-i}^+ + \sum_{i=0}^u \lambda_7 \Delta MPT_{t-i}^- + \sum_{i=0}^u \lambda_8 \Delta WEB_{t-i}^+ + \sum_{i=0}^u \lambda_9 \Delta WEB_{t-i}^- + \sum_{i=0}^v \lambda_7 \Delta \ln MPT_{t-i}^- + \mu_t \text{---(10)} \end{aligned}$$

Where all the variables remain as earlier defined, p, q, r, s, d, u and v are the lag order. We can re-specify equation (10) to include an error correction term thus:

$$\begin{aligned} \Delta ROA_t = & \gamma_0 + \delta \mu_{t-1} + \sum_{i=0}^p \gamma_1 \Delta ROA_{t-i} + \sum_{i=0}^q \gamma_2 \Delta ATM_{t-i}^+ + \sum_{i=0}^r \gamma_3 \Delta ATM_{t-i}^- + \sum_{i=0}^s \gamma_4 \Delta POS_{t-i}^+ + \sum_{i=0}^d \gamma_5 \Delta POS_{t-i}^- + \\ & \sum_{i=0}^u \gamma_6 \Delta MPT_{t-i}^+ + \sum_{i=0}^v \gamma_7 \Delta MPT_{t-i}^- + \sum_{i=0}^u \gamma_8 \Delta WEB_{t-i}^+ + \sum_{i=0}^v \gamma_9 \Delta WEB_{t-i}^- + \nu_t \text{---(11)} \end{aligned}$$

In equation (11), the error-correction term that captures the long run equilibrium in the NARDL is represented as  $\mu_{t-1}$  while its associated parameters  $\delta$  [the speed of adjustment] measures how long it takes the system to adjust to its long run when there is a shock,  $\Delta$  is the difference operator.

Using equations, 12, the error correction term can be expressed as:

$$\mu_{t-1} = ROA_{t-1} - \pi_0 - \pi_2 ATM_{t-1}^+ - \pi_3 ATM_{t-1}^- - \pi_4 POS_{t-1}^+ - \pi_5 POS_{t-1}^- - \pi_6 MPT_{t-1}^+ - \pi_7 MPT_{t-1}^- - \pi_8 WEB_{t-1}^+ - \pi_9 WEB_{t-1}^- \text{---(12)}$$

Where parameters:

$$\pi_2 = -\frac{\alpha_2}{\alpha_1} \quad \pi_3 = -\frac{\alpha_3}{\alpha_1} \quad \pi_4 = -\frac{\alpha_4}{\alpha_1} \quad \pi_5 = -\frac{\alpha_5}{\alpha_1} \quad \pi_6 = -\frac{\alpha_6}{\alpha_1} \quad \pi_7 = -\frac{\alpha_7}{\alpha_1}$$

and  $\pi_8 = -\frac{\alpha_8}{\alpha_1}$  for ATM;  $\pi_4 = -\frac{\alpha_4}{\alpha_1}$  and  $\pi_5 = -\frac{\alpha_5}{\alpha_1}$  for POS;

MPT, and  $\pi_8 = -\frac{\alpha_8}{\alpha_1}$  represents the long-run effect of positive and negative changes in ATM, POS, MPT and WEB on ROA.

Similarly, from equation 13 the short-run effect of positive and negative changes in ATM, POS, MPT and WEB on ROA is shown by:

$\lambda_{2i}^+$  and  $\lambda_{3i}^-$  for ATM,  $\lambda_{4i}^+$  and  $\lambda_{5i}^-$  for POS,  $\lambda_{6i}^+$ ,  $\lambda_{7i}^-$ ,  $\lambda_{8i}^-$  for MPT and  $\lambda_{9i}^-$  for WEB on ROA;

It is important to note here that, just like the linear (or symmetric) ARDL, the long run is estimated only if there is presence of cointegration. Thus, pre-testing for cointegration is necessary even under NARDL. Since the variables in first differences can accommodate more than one lag, determining the optimal lag combination for the NARDL becomes necessary. The optimal lag length will be selected using Akaike Information Criterion (AIC). Consequently, the preferred NARDL model is used to test for long run relationship in the model. This approach of testing for cointegration is referred to as Bounds testing as it involves the upper and lower bounds. The test follows an F-distribution and therefore, if the calculated F-statistic is greater than the upper bound, there is cointegration; if it is less than the lower bound, there is no cointegration and if it lies in between the two bounds, then, the test is considered inconclusive.

However, the underlying hypotheses for cointegration involve the long run asymmetric parameters. In other words, the null hypothesis of no cointegration expressed as:

$$H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7 = \alpha_8 = 0$$

are tested against the alternative hypotheses of cointegration given as:

$$H_1: \alpha_1 \neq \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7 \neq \alpha_8 \neq 0.$$

In addition, the study shall employ the Wald test for testing restrictions to ascertain whether the asymmetries matter both in the long run and short run. For the Wald test, the null hypothesis of no asymmetries:

$$H_0: \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = \alpha_7$$

(for long run) and

$$H_0: \sum_{i=0}^q \lambda_i^+ = \sum_{i=0}^r \lambda_i^- = \sum_{i=0}^s \lambda_i^+ = \sum_{i=0}^d \lambda_i^- = \sum_{i=0}^u \lambda_i^+ = \sum_{i=0}^v \lambda_i^-$$

(for short run) is tested against the alternative of presence of asymmetries-

$$H_1: \alpha_2 \neq \alpha_3 \neq \alpha_4 \neq \alpha_5 \neq \alpha_6 \neq \alpha_7$$

(for long run) and

$$H_1 : \sum_{i=0}^q \lambda_i^+ \neq \sum_{i=0}^r \lambda_i^- \neq \sum_{i=0}^s \lambda_i^+ \neq \sum_{i=0}^d \lambda_i^- \neq \sum_{i=0}^u \lambda_i^+ \neq \sum_{i=0}^v \lambda_i^-$$

(for short run).

**Decision Rule**

The level of significance is set at 5% because it is widely used by Iloska (2014), who applied 5% significance level in normality test to measure how likely the variables are normally distributed in measuring performance.

**Table 1: Variables Measurement**

S/ N	Variable	Nature	Measurement	Source
1.	Return on Assets	Dependent variable	Measured as Market Capitalisation + Total Liabilities - Cash flow divided by Total asset	Okafor (2020)
2.	Automated Teller Machine	Independent variable	Measured as the total average ATM usage from the bank	Weiner (2019),
3.	Point of Sales	Independent variable	Measured as the total average e-payment that handles balance inquiry and payment for goods and service.	Adewale (2018), Holmes (2020)
4.	Mobile Payment Transaction	Independent variable	Measured as the total average use of mobile digital technology of the day to day banking operations.	Shanmugam and Chandran (2022)
5	Web Based Payment	Independent variable	Measured as the total average use of internet banking of the day to day banking operations	Nwankwo (2019)

**Source: Authors Compilation (2024)**

**Results and Discussions**

**Table 2: Descriptive statistics for selected variables**

	ROA	ATM	POS	MPT	WEB
Mean	1.642156	256.4786	67.60786	86.28940	25272001
Std. Dev.	1.181274	213.4413	99.12130	153.8765	38617695
Skewness	-0.93552	0.216053	1.353435	1.963650	1.485542
Kurtosis	3.752582	1.512183	3.327380	5.419390	3.603133
Jarque-Bera	10.16784	6.000789	18.58581	53.19283	22.97776
Probability	0.006196	0.049767	0.000092	0.000000	0.00001
Observations	60	60	60	60	60

**Source: Authors Computation, 2024 (Eviews-10)**

The descriptive statistics results showed that ROA has an average value of 1.64, ATM has an average usage value of 256.47; POS averaged 67.60; MPT averaged 86.28; while WEB averaged 25272001 as shown in Table 2. Skewness which measures the shape of the distribution showed that ATM, POS, MPT and WEB are all positively skewed and have values greater than zero which suggests that the distribution tails to the right-hand side of the mean. However, ROA, was found to be negatively skewed as captured by its value of -0.93.

**Table 3: Summary of Unit Root Test Results**

Variable	PP Test Statistics	Critical Values	Order of Integration
ROA	-4.110514	-3.562882**	I(0)
ATM	-5.983007	-4.262735*	I(0)
POS	-4.357488	-4.262735*	I(0)
MPT	-7.365247	-4.369881*	I(1)
WEP	-6.225411	-4.120522*	I(1)

Note: The tests include intercept and trend; \* significant at 1%; \*\* significant at 5%

**Source: Authors Computation, 2024 (Eviews-10)**

The PP test in Table 3 indicates that three of the variables (ROA, ATM and POS) were found stationary at levels and at 5% and 1% level of significance respectively. Hence, the unit roots PP test for the variables were rejected at levels for the three variables of interest. However, MPT and WEP were found to be stationary at first difference; and at 1 percent level of significance. Since the variables were all found stationary at different orders, they satisfy the condition for using asymmetric bounds approach to cointegration test.

**Asymmetry Test**

Further to this analysis, we conducted the asymmetry test to investigate the long-run and short-run

asymmetric properties of the variables under study and the result are presented on Table 4. The null hypothesis of the test is that the inclusion of partial sums of positive and negative changes in ATM, POS and MPT, are not significant (i.e., no asymmetries), and the alternative is that the decomposition of the changes matters (i.e., there is asymmetries).

**Table 4: Results of the Asymmetry Wald Test**

Variable s	Wald-Statistic		Evidence of Asymmetry	
	Long-run	Short run	Long-run	Short-run
ATM	7.554491 (0.0060)*	5.25422(0.0011)** 12.36552(0.00036)	Yes	Yes
POS	13.89721 (0.0002)*	*	Yes	Yes
MPT	4.365200 (0.0456)** 5.695521(0.032655)	4.2368(0.0028)***	Yes	Yes
WEB	**	4.963655(0.0012)	Yes	Yes

Notes: \*\* and \* denote rejection of the null hypothesis at 5% and 1% significance level respectively. Values in parenthesis are the probabilities

**Source: Authors Computation, 2024 (Eviews-10)**

The result of the Wald asymmetry test on Table 4 showed that the null hypothesis of no asymmetry in both the long-run and short run coefficients are rejected for all the variables. These findings uphold the specification of the NARDL model.

**Co-integration Results**

Table 5 presents the result of Asymmetric ARDL bounds test for Co-integration for the three models using the recommended lags by AIC.

**Table 5: Asymmetric Bound Co-integration Test-Results**

F-Bounds Test	Null Hypothesis: No levels relationship			
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	16.31058	10%	1.8	2.8
k	9	5%	2.04	2.08
		2.5%	2.24	3.35
		1%	2.5	3.68

Note: \*\*significant at 5%

**Source: Authors Computation, 2024 (Eviews-10)**

The asymmetric co-integration test result from Table 5 showed that there are asymmetric cointegrating relationship for ROA model as the F-statistic value of 6.601407, was greater than the lower ( $I(0)$ ) and upper bound ( $I(1)$ ) critical values of 2.27 and 3.28 at the 5% significance level. The results thus signified that there is a long-run asymmetric relationship between cashless banking and financial performance of Deposit Money Banks in Nigeria.

**NARDL Regression Results**

**ROA Model**

**Table 6: NARDL Error Correction Regression**

**Dep.Var: ROA**

<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
D(ROA_POS(-1))	0.289506	0.063264	4.576133	0.0002
D(ROA_NEG)	0.052832	0.046983	1.124501	0.2741
D(ROA_NEG(-1))	0.84696	0.10492	8.072396	0.0000
D(ROA_NEG(-2))	0.769283	0.080538	9.551821	0.0000
D(ATM_POS)	0.007458	0.002048	3.641492	0.0016
D(ATM_POS(-1))	0.013587	0.002475	5.488476	0.0000
D(ATM_POS(-2))	0.018805	0.002567	7.326536	0.0000
D(ATM_POS(-3))	0.010495	0.002233	4.699619	0.0000
D(ATM_NEG)	-0.00249	0.003572	-0.69812	0.0000
D(ATM_NEG(-1))	0.002355	0.004151	0.567254	0.5769
D(ATM_NEG(-2))	0.021908	0.004352	5.034456	0.0001
D(ATM_NEG(-3))	0.029897	0.004596	6.504698	0.0000
D(POS_POS)	0.074934	0.015771	4.751301	0.0001
D(POS_POS(-1))	0.056436	0.014403	3.918286	0.0009
D(POS_NEG)	-0.30668	0.037542	-8.1691	0.0000
D(POS_NEG(-1))	-0.53005	0.033248	-15.9424	0.0000
D(POS_NEG(-2))	-0.48992	0.030144	-16.253	0.0000
D(POS_NEG(-3))	-0.45104	0.027888	-16.173	0.0000
D(MPT_POS)	-0.04667	0.006285	-7.42519	0.0000
D(MPT_POS(-1))	-0.08905	0.008113	-10.9773	0.0000
D(MPT_NEG)	0.151801	0.017305	8.772247	0.0000
D(WEB_POS)	3.93E-08	5.00E-08	0.785946	0.4411
D(WEB_POS(-1))	1.01E-06	7.99E-08	12.66249	0.0000
D(WEB_POS(-2))	5.79E-07	4.59E-08	12.61832	0.0000
CointEq(-1)*	-0.26254	0.016003	-16.405	0.0000
R-squared	0.964077		F-statistic	12.546545
Adjusted R-squared	0.935338		Prob. F-statistic	0.000000
Durbin-Watson stat	2.167906			
<b>Long-Run Result</b>				
<b>Variable</b>	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
ROA_NEG	-1.15691	0.134636	-8.59288	0.0000
ATM_POS	-0.01023	0.005748	-1.78051	0.0902
ATM_NEG	-0.00775	0.008821	-0.87839	0.3902
POS_POS	-0.051563	0.036249	-1.422449	0.1703
POS_NEG	0.306342	0.072817	1.206986	0.1104
MPT_POS	-0.091005	0.01829	-1.97568	0.0901
MPT_NEG	0.088004	0.020202	4.35619	0.0003
WEB_POS	-4.95E-07	1.20E-07	-4.13947	0.0005
WEB_NEG	-3.77E-07	5.85E-07	-0.64455	0.5265
C	1.768348	0.260289	6.793794	0.0000

**Source: Authors Computation, 2024 (Eviews-10)**

The  $ect(-1)$  represents the speed of adjustment to restore equilibrium in the dynamic model following a disturbance. The estimated coefficient of the  $ect(-1)$  which equals -0.26254 suggests a 26.254 percent speed of adjustment back to the long-run equilibrium. The coefficient is highly significant at the 1 percent significance level and appropriately signed. This highly significant error correction term is further proof of the existence of a stable long-term relationship. The result suggests that about 26.254 percent of the deviation between the actual and the long-run equilibrium value of ROA is corrected each year. That is, approximately more than 26.254 percent of the disequilibria from the previous year's shock converge back to the long-run equilibrium in the current year.

It could be seen from Table 6 that the R-squared, which was used to measure the goodness of fit of the estimated model, indicates that the model is reasonably fit in prediction. It showed that a 96.4077 percentage change in ROA was collectively due to ATM, POS, MPT and WEB, while 3.5923 percent unaccounted variations was captured by the error term. It showed that cashless policy indicators had a significant effect on ROA within the period under study.

More so, the F-statistics which examines the overall significance of regression model equally showed that the result is significant. This was indicated by the value of the F-statistic, 12.5465 and it is significant at the 5percent.

The long run result showed that negative effect of ATM (ATM\_NEG) has a positive and insignificant effect on ROA; while positive effect of ATM (ATM\_POS) has a negative effect on ROA.

With respect to Point of Sale, the results showed that negative effect of Point of Sale (POS\_NEG) has a negative and significant effect on ROA; while positive effect of Point of Sale (POS\_POS) has a negative and insignificant effect on ROA.

The long run result showed that the negative effect of MPT (MPT\_NEG) has a negative effect on ROA, and it is not statistically significant. Same result was obtained for positive effect of MPT (MPT\_POS).

Lastly, the long run result showed that the negative effect of WEB (WEB\_NEG) has a positive effect on ROA, and it is not statistically significant. However, the result obtained for positive effect of WEB (WEB\_POS), showed it has a negative effect on ROA.

## Statistical Test of Hypotheses

### Test of Hypothesis One

**H<sub>01</sub>:** Automated Teller Machines has no significant effect on return of assets of Deposit Money Banks in Nigeria.

**Table 7: Wald Test results on ATM and ROA**

Test Statistic	Value	df	Probability
F-statistic	6.793083	(8, 20)	0.0002
Chi-square	54.34466	8	0.0000

**Source: Researchers Computation, 2024 (E-views 10)**

The Wald-test in Table 7 indicated that the calculated F-value for the relationship between ATM and ROA in Nigeria is 6.793083 and its probability value is 0.0002. Since the probability value is less than 0.05 at 5percent level of significance, it thus falls in the rejection region and hence, the first null hypothesis (**H<sub>01</sub>**) was rejected. The result thus shows that Automated Teller Machines usage has a significant effect on return of assets of Deposit Money Banks in Nigeria.

### Test of Hypothesis Two

**H<sub>02</sub>:** Point of Sale has no significant effect on return of assets of Deposit Money Banks in Nigeria

**Table 8: Wald Test results on POS and ROA**

Test Statistic	Value	df	Probability
F-statistic	3.053767	(6, 20)	0.0275
Chi-square	18.32260	6	0.0055

**Source: Researchers Computation, 2024 (E-views 10)**

The Wald-test in Table 8, indicated that the calculated F-statistic value for the relationship between POS and ROA amongst deposit banks in Nigeria was found to be 3.053767 and its probability value was 0.0275. Since the probability value is less than 0.05 or 5percent level of significance (and fell in the rejection region), the second null hypothesis (**H<sub>02</sub>**) was rejected. The study concludes that Point of Sale has a significant effect on return of assets of Deposit Money Banks in Nigeria.

### **Test of Hypothesis Three**

**H<sub>03</sub>:** Mobile Payment Transactions has a significant effect on return on assets of Deposit Money Banks in Nigeria

**Table 9: Wald Test results on MPT and ROA**

Test Statistic	Value	Df	Probability
F-statistic	1.619984	(3, 20)	0.1130
Chi-square	3.85995	3	0.0931

**Source: Researchers Computation, 2024 (E-views 10)**

The Wald-test in Table 9, the indicated that the F-value for the relationship between MPT and ROA in Nigeria was found to be 1.619984 with an associated probability value of 0.1130. Since the probability value is greater than 0.05 or 5percent level of significance, the third null hypothesis (**H<sub>03</sub>**) was accepted. The study thus concludes that Mobile Payment Transactions has no significant effect on return on assets of Deposit Money Banks in Nigeria

### **Test of Hypothesis Four**

**H<sub>04</sub>:** Web based payment has no significant effect on return of assets of Deposit Money Banks in Nigeria

**Table 10: Wald Test results on WEB and ROA**

Test Statistic	Value	df	Probability
F-statistic	8.925718	(3, 20)	0.0006
Chi-square	26.77715	3	0.0000

**Source: Researchers Computation, 2024 (E-views 10)**

The Wald-test in Table 10, indicated that the calculated F-statistic value for the relationship between WEB and ROA amongst deposit banks in Nigeria was found to be 8.925718 and its probability value was 0.0006. Since the probability value is less than 0.05 or 5percent level of significance (and fell in the rejection region), the fourth null hypothesis (**H<sub>04</sub>**) was rejected. The study concludes that web-based payment has a significant effect on return of assets of Deposit Money Banks in Nigeria.

**Post Estimation Tests**

**Table 11: Results of Residual Test of ROA-Model**

Tests		Outcomes	
		Coefficient	Probability
Breusch-Godfrey-Serial-Correlation Test	F-stat.	2.660568	0.1972
Heteroscedasticity-ARCH Test	F-stat.	0.522655	0.9535
Normality Test	Jarque-Bera	4.230552	0.1206

**Source: Authors Computation, 2024 (Eviews-10)**

The NARDL ROA model result as presented in Table 10 revealed that there were no evidences of serial correlation and heteroskedasticity in the estimated NARDL model as the p-values of both (0.1972 and 0.9535) were found to be greater than 0.05 or 5percent. Furthermore, Jarque-bera test for normal distribution revealed that the result attained a normal distribution with a bell-shaped symmetrical distribution at 5percent significance level. This was captured by the Jarque-bera probability value of 0.1206 and found to be greater than 0.05.

**Discussion of findings**

The asymmetric results revealed that the joint positive and negative asymmetric effect of ATM usage on the performance of banks in Nigeria is statistically significant. The results specifically indicate that the long-run effect of a positive change in ATM had a corresponding positive effect on ROA, and this positive effect in statistically significant. This explains that as ATM usage volume increase, it increases the ROA of the bank through a cashless approach. This finding conforms to economic theoretical expectation because the more bank customers use the ATM platform, the higher the profitability of the banks. This is in agreement with Khan and Alhumoudi (2022) whose findings showed that cashless innovation through POS, ATM and the use of Cheques had greatly enhanced banks returns on investment.

The study further showed that the joint positive and negative effect of POS has a statistically significant effect on ROA. Also, the findings showed that the long-run coefficient of point of sales (POS) were positively signed and statistically significant in explaining the adoption of CBN’s cashless policy in relation to the performance of banks. This means that as point of sales facilities increase, it discourages cash handling by individuals and encourages the cashless policy of the CBN. This implies that as POS usage volume increase, it increases the ROA of the bank through a cashless approach has a positive relationship with performance of commercial banks in Nigeria. The finding in the study agrees with Nyagadza et al (2022) whose study revealed that the Point of Sales (POS) was found to increased banks financial performance though not statistically significant.

However, mobile money transactions were found to have an insignificant effect on the Returns of Deposit in Nigeria. The insignificant effect shows many factors limit the operation of a mobile money usage in the country. This is in-line with the findings of Reddy

and Megharaja (2021) whose study revealed that the effect of mobile banking (MB) on the performance of banks is considerable but negative.

Above all, the study showed that the joint positive and negative effect of web-based transactions has a statistically significant effect on ROA. It also showed that the long-run coefficient of WEB was positively signed and statistically significant in explaining the adoption of CBN's internet banking has improved an effective Deposit Money Banks operation and the general performance of banks. The implication of this findings is that as more financial activities are engaged with the aid of internet-based banking; more returns are accrued to the profit made for shareholders by deposit money banks. Gibson et al (2022) cashless policy findings further showed that internet-based banking payment patterns has proven to be a powerful instrument in affecting economic performance.

### **Conclusion and Recommendations**

The adoption of cashless banking has enhanced the fortune of the Nigerian commercial banks. This is especially achieved through charges on the use of web-based transactions, mobile payments and ATM withdrawal charges; the cashless banking has improved the bank customer relationship by rendering effective services throughout the day and night in every week. Customers can now have access to their account outside working hours to make withdrawal to attend to their needs; the cashless banking guideline introduced by CBN strongly helped in effective cashless policy system. Based on these findings, the following recommendations were made:

- i. Banks should properly maintain their ATMs so that it will be more efficient for customers' use and competent staff should also be deployed to the unit to minimize human error in other to reduce long queues in the bank.
- ii. Point of Sale (POS) payment method should be increased with quick and fast applications which should be deployed and installed in remote areas to facilitate quick banking transactions and banking inclusion so as to further increase bank earnings.
- iii. It is therefore recommended that telecoms companies should make a deliberate effort and invest in system, structure and process which reduce the stress customer will go through whenever they are using mobile applications. It should be such that customers will easily understand how to use the mobile Apps.
- iv. Finally, it was recommended that managers should focus more on mobile banking awareness through internet sanitization, to improve the usage of web-based payment system.

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