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Effect of Information Technology on Performance of Deposit Money Banks in Nigeria

Chitor Ifunanya Loretta; Prof. Okwo Ifeoma Mary; Prof. Uche Boniface Ugwuanyi; Nnado Ifeanyi Celestine

Department of Accountancy,
Faculty of Management Sciences,
Enugu State University of Science and Technology, Agbani, Enugu State, Nigeria.
Corresponding Author: Nnado Ifeanyi Celestine

Abstract

Research Purpose: This paper empirically studies the effect of information technology (IT) on the performance of Deposit Money Banks (DMBs) in Nigeria. Specifically, it examines the impact of electronic payment platforms, including automated teller machine (ATM) transactions, point of sales (POS) payment systems, web payments, and mobile payment systems on the annual profit of DMBs.

Methodology: An ex-post-facto research design was adopted, covering a 14-year period from 2009 to 2022. Data were collected from the World Bank Database, Central Bank of Nigeria (CBN) Statistical Bulletin, and audited annual reports of the sampled banks. The data were analysed using statistical tools such as panel least squares, stationarity, and cointegration tests.

Findings: The results indicated that while the cumulative impact of the regressors on the dependent variable was significant (t-statistic = Wald chi2 = 14.46; p-value = 0.0249 < 0.05), the individual effects were largely non-significant. However, three variables showed strong individual effects:

1. Automated teller machine (ATM) transactions (p-value = 0.002, t-statistic = -3.06)
2. Natural logarithm of total assets (p-value = 0.027, t-statistic = 2.20)
3. Natural logarithm of total e-payment (p-value = 0.017, t-statistic = -2.38)

These findings suggest that while the overall influence of IT on the performance of DMBs is significant, certain aspects of IT, particularly ATM transactions and e-payment volumes, play a crucial role.

Conclusion: The study concludes that the use of information technology in Deposit Money Banks is beneficial and should be encouraged. The significant impact of ATM transactions and e-payment volumes on profitability highlights the importance of these platforms in enhancing bank performance.

Recommendations: It is recommended that DMBs continue to invest in and promote the use of electronic payment platforms to maximise their positive impact on profitability.

Additionally, further research should be conducted to explore other potential IT-related factors that could influence bank performance.

Key words: Information Technology, E-Payment Systems, Profitability, DMBs

1.0 INTRODUCTION

For a long time now, the Nigerian banking sector has advanced in the use of technology for service delivery. Adoption of information technology enrols the banking sector into the global and digital world, and by extension, affects their operations in various aspects such as effectiveness, efficiency, competitiveness, customer base and globalisation of the bank (Chukwukaelo, Onyeiwu and Amah, 2018). Incorporation of information technology in banking operations entail the use of electronic banking channels such as payment cards (debit or credit), mobile phones, online web portals, point of sales (POS) terminals, automated teller machines (ATM), point of sale (POS), mobile money transfer (MMT) and online money payment (WEB), amongst others (Mustapha, 2018). This was not only hoped to improve the banks performance, but to make banking operations easier by reducing the long queues in banks, delay in attending to customers, inability to properly sort out transactions and customer's general loss of trust in banks, thereby preparing Nigerian banks to compete favourably with other banks world over. Also, the use of information technology in the banking system makes it easy for bank managers to monitor bank activities including transactions with less stress.

Consequently, the reason for adoption of information technology in the banking system also extends to ensuring easy and cheaper communication during transaction, fostering customer-bank relationship, enhance customer satisfaction, improve operational efficiency, reduce the running cost, reduce transaction time, provide security to investors fund and promote other financial services in the bank aimed at increasing the banks' profitability (Morufu, 2016). Further, the banking industry believes that by adopting the new technology – e-banking, the banks would be able to improve customer service level and tie their customers closer to the bank (Obiekwe and Anyanwaokoro, 2017). This study is, however, focused on ascertaining the effect of information technology on DMBs performance in Nigeria.

The fact that internet banking is fast gaining acceptance in Nigerian banking sector does not assuredly signify improved banks performance nor would conspicuous use of internet as a delivery channel make it economically viable, productive or profitable. Recently, it was observed that adoption of the e-banking system has brought about positive as well as negative transformation into the banking sector. In Spite of the countless benefits of ICT on various sectors and sub-sectors of the Nigerian economy, consensus is still yet to be reached on whether adoption of ICT, particularly in the banking sub-sector, has translated into increased financial appreciation in the sub-sector. Researchers and bank managers/operators are worried

as to whether cost and other challenges of adopting information technology can be justified by performance. As a result, some authors discovered positive effect of adoption of information technology on bank performance, while other authors provided that the influence of information technology on bank performance is negative.

Though efforts exit to ensure that customers reap benefits of e-banking, they still lament on areas like malfunctioning automated teller machines (ATMs), internet network failure, online theft and fraud, non-availability of financial service, payment of hidden cost of electronic banking like short message services (SMS), mandatory acquisition of ATM cards and non-acceptability of Nigerian cards for international transaction amongst others. Moreover, while some people advocate the benefits attached to e-banking systems, others lament that e-banking poses more dangers to their banking operations. For instance, an automated teller machine (ATM) rather than reducing the rate of carrying cash, increases the same, because with an ATM card, they have access to cash anywhere. Moreover, many believe it indulges them into engaging in extravagant spending.

Despite the adoption of e-banking, it is observed that banks are still finding it difficult to meet the expectations of their customers as regards service delivery. There are still the issues of long queues in banks, delay in attending to customers, inability to properly sort out transactions and customer's general loss of trust in banks. With all these challenges, the question has remained, how and to what extent has information technology influenced banks performance in Nigeria? It provides answers to this question by empirically investigating the effect of information technology (IT) on performance of banks in Nigeria.

2.0 REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

Information Technology in Electronic Banking: The newest information technology in the banking sector is electronic banking (e-banking). Electronic banking, otherwise called e-banking for short, is the use of electronic means to deliver banking services (Okoro, 2014), mainly through the internet. It is the best innovation that has happened in the banking industry in the 21st Century. This innovation has made banking possible even outside banking premises. With e-banking method, different banking transactions such as purchase of airtime, account opening, transfer and receipts of funds, balance enquiry and payment of bills can be completed or initiated anywhere by the use of various electronic devices like mobile phones, automated teller machines, point-of-sale systems, smart televisions, computers, tablets, among others (Ene, Abba and Fatokun, 2019). This present study utilised Automated Teller Machine (ATM) payment method, Point-of-Sale (POS) payment method, Web Based Transactions (WBT) and Mobile Banking (MoB) electronic banking methods.

Automated Teller Machine (ATM): Automated Teller Machine (ATM) is a machine where cash withdrawal can be made over the machine without going into the banking hall.

According to Orji, Ogbuabor, Okon and Anthony-Orji (2018), Automated Teller Machine (ATM) are computer-enhanced telecommunication machines that permit bank customers to have accessibility to cash and perform financial transactions, usually situated in public places and in the enclosure of banks. Particularly the most prominent form of e-payment system in Nigeria is the Automated Teller Machine (ATM) card. An increase in the number of ATMs leads to an increase in the volume and value of transactions. The increase in the volume and value of ATM transactions enhances the payment system in turn, which leads to banking sector performance. Some of the services offered by an ATM include withdrawal of funds, account balance inquiry, transfer of funds, and top-up on airtime for mobile phones etc.

Point-of-Sale (POS): It is a form of e-payment that handles balance inquiry, payment for goods and services, and electronic fund transfer at a specific point of sale. It allows customers to make payment for goods and services to clients known as merchants, in the premises of the merchants (Okechi and Kepeghom, 2013). It is sometimes referred to as point of purchase (POP) or checkout as the location where a transaction occurs. A 'checkout' refers to a POS terminal or more generally to the hardware and software used for checkouts, the equivalent of an electronic cash register. According to InterSwitch Ltd (2011), the POS terminal is a machine that has a display screen, a barcode scanner, and a card reader. It is a portable device that allows customers with cards (such as ATM cards) to carry out banking transactions outside the bank's environment.

Web Payment System: According to Mamudu and Gayovwi (2019), the Web (E-transfers) refers to electronic transfers which can be affected via the internet on Personal Computers (PCs), laptops and other devices. The web payment system provides the individual with the opportunity of paying bills and performing transactions of any kind through personal electronic devices. In the work of Worku, Tilahun and Tafa (2016), the web banking allows customers of a financial institution to conduct financial transactions on a secure website operated by the institution, which can be a retail or virtual bank, credit union or society. It may include any transactions related to online usage. Banks increasingly operate websites through which customers are able not only to inquire about account balances, interest and exchange rates but also to conduct a range of transactions.

Mobile Banking (MoB): Mobile banking (also known as M-banking) is a term used for performing balance checks, account transactions, payments, credit applications and other banking transactions through a mobile device such as a mobile phone or personal digital assistant (PDA). Mobile banking (MB) is the process whereby formal banking transactions are carried out through the use of telephone and mobile phones. Mobile banking allows its customers to conduct some financial transactions remotely using a mobile device such as a mobile phone or tablet. The scope of offered services may include facilities to conduct bank and stock market transactions, to administer accounts and to access customised information (Tiwari and Buse, 2007). Mobile banking does not handle transactions involving cash, and a

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customer needs to visit an ATM or bank branch for cash withdrawals or deposits. Many apps now have a remote deposit option; using the device's camera to digitally transmit cheques to their financial institution.

Performance Indicator-Profit for the Year: Performance is one of the key determinant factors that are widely used in measuring the success or failure of any organisation (Adebawojo, Enyi and Adebawo, 2015). Generally, performance of an organisation can be categorised into: human resource which is measured in terms of turnover; organisational category which is measured in terms of productivity, quality, customers' satisfaction and so on. The 'profit for the year', formerly referred to as 'profit after tax' is a fundamental figure that a financial analyst or value investor would consider before making an investment decision. It is the final, residual amount of profit generated by an organisation. The year profit is a better indicator of the bank's annual profit, hence, adopted in this study.

2.2 Theoretical Framework

Technological Acceptance Model: The Technology Acceptance Model (TAM) was propounded by Fred Davis in 1989. The model explains how individuals accept new technology. Particularly, it argued that consumers' attitude towards using modern technology is influenced by perceived usefulness and perceived ease of use. As a result, the model is hinged on two key beliefs, perceived usefulness (U) which has to do with the extent a person believes that using a particular technology will enhance her/his job performance and perceived ease of use (EOU) which expresses the degree to which a person believes that using a technology will be free from effort. Also, the Technology Acceptance Model (TAM) proposes that external factors affect intention and actual use. Although the TAM did not consider the costs of acquiring a modern technology; that an organisation may be willing to adopt a modern technology but may not have adequate resources (financial or human) to do so, it is relevant to this study as it centres on adoption and deployment of e-banking facilities in Nigeria.

Bank Focused Theory: It was propounded by Kapoor in 2010. It grows on the ground that banks use non-traditional but conventional low-cost delivery channels to provide services to its numerous customers. Such channels include the automated teller machines (ATMs), internet banking and point of sale (POS) among others. By making use of these channels, the bank offers a wide range of services to its customers not minding the location and branch where the customer is. The only thing required is to input the needed information into the system and the transaction is concluded. This theory supports this study since the emphasis here is on electronic platforms as a means of delivering services.

This study is however underpinned to the *Bank Focused Theory* which uncovers that banks use conventional low-cost delivery channels to provide services to its numerous customers.

2.3 Empirical Review

Using Panel Least Squares (PLS) estimation technique, Obiekwe and Anyanwaokoro (2017) investigated the effect of Electronic Payment Methods (EPM) on the profitability of commercial banks in Nigeria. Data was collected from the Central Bank of Nigeria (CBN) Statistical Bulletin and annual reports and statements of accounts of the five banks for the period of 2009 to 2015. The finding revealed that automated teller machines (ATM) and mobile phone payment have a significant effect on the profitability of commercial banks in Nigeria. However, point of sale (POS) has an insignificant effect on commercial banks' profitability in Nigeria. Mujuri, Kibet and Kiprop (2018) employed the autoregressive distributed lag (ARDL) technique based on the Bounds testing approach to investigate the impact of financial innovation on demand for money function in Kenya, utilising data from 2008 to 2016. Finding showed that financial innovation impacted positively on demand for money function in Kenya. Specifically, the volume of ATMs exerted a positive and significant effect on demand for money in Kenya.

Orji, Ogbuabor, Okon and Anthony-Orji (2018) employed SURE model to investigate the impact of electronic banking innovation and selected banks performance in Nigeria using data sourced from Central Bank of Nigeria publications, National Bureau of Statistics publications and the sampled commercial banks' annual report and statement of accounts between 2007 and 2016. The result revealed that automated teller machine transactions, point of sale transactions, and mobile banking transactions are major e-banking innovations that contribute to old and new banks' performance in Nigeria. Ugbede, Yahaya and Edicha (2019) examined the effects of electronic payment on financial performance of deposit money banks in Nigeria. The study used secondary sourced data obtained from the annual reports and statistical bulletin of the Central Bank of Nigeria. Multiple regression analysis techniques were employed in the data analysis. Result provided that ATM does not contribute significantly to profitability of the sampled banks, while POS and internet banking contribute positively and significantly to bank profitability, and is also statistically significant to banks profitability in Nigeria.

Eze and Egoro (2016) carried out an empirical investigation on the impact of electronic banking on the profitability of commercial banks in Nigeria. The study regressed four e-banking channels (automated teller machines, electronic mobile banking, internet banking transactions, and point of sales services) on profit before tax of commercial banks operating in Nigeria between 2006 and 2014. Analytical technique used was the error correction model (ECM) mechanism. Results uncovered that the overall impact of electronic banking on bank profitability was statistically significant. However, the individual estimate shows that automated teller machines and electronic mobile banking impact positively and insignificantly on profit before tax, internet banking transactions impact negatively and insignificantly on profit before tax while the impact of point of sales services on profit before tax is positive and statistically significant. Ganjikhah, Rabiee, Moghaddam and Vahdat (2016)

carried out a comparative analysis of bank's ATM and POS technologies by customers. Using descriptive statistics, the study revealed that people use points of sale rather than ATMs. In most components, ATMs showed higher acceptance than points of sale. Only in self-efficacy, perceived joy and result demonstrability, points of sale were higher than ATMs. In anxiety and behavioural intention components, there was a meaningful difference between points of sale and ATMs regarding acceptance.

An empirical investigation carried out by Chukwukaelo, Onyeiwu and Amah (2018) regressed performance of Deposit Money Banks (proxy by return on equity) on electronic banking (e-banking) channels: automatic teller machines, point of sales, internet banking transactions and electronic mobile banking for the period of 2006-2016. Outcome of the panel generalised method of moment (GMM) regression technique exposed that ATM, POS, WBT and internet banking (INTBANK) have positive and significant influence on the profitability (proxy by ROE) of deposit money banks in Nigeria; thus, the need for optimal deployment of these services to customers. Covering the period from 2009 to 2018, Nwakoby, Okoye, Ezejiofor, Anukwu and Ihediwa (2020) empirically studied the link between electronic banking and profitability of deposit money banks in Nigeria. Analytical technique employed was ordinary least squares multiple regression while the findings revealed that ATM and POS payment methods have negative and insignificant effect on return on equity of deposit money banks in Nigeria, while mobile banking payment (MPAY) has positive and significant effect on return on equity of deposit money banks in Nigeria.

By adopting both inferential and descriptive design using a t-test, Dabwor, Ezie and Anyatonwu (2017) investigated the effect of ICT adoption on the competitive performance of banks in an emerging economy in Nigeria. Results revealed a positive relationship exists between ICT and banks performance in Nigeria. This implies that a marginal change in the level of the investment and adoption of ICT such as (Automated teller machine, Web based transactions, and mobile payments) in the banking industry resulted in a proportionate increase in the profit level. Nwakoby, Sidi, and Ofobruku (2018) employed a log-linear regression model to empirically investigate the impact of Information and Communication Technology (ICT) on the performance of deposit money banks in Nigeria. Proxies used for ICT were ATM, POS, mobile money (MM), web payment (WP), and interbank transfer (IBT) usages while bank performance was represented by ROE. Sample period covered was 2006-2015. However, findings uncovered that ATM, MM and WP impact negatively and insignificantly on ROE of deposit money banks while the impact of POS and IBT on ROE of deposit money banks in Nigeria was positive and statistically significant.

Saleem, Akhter, Baber, Bashir and Haider (2019) examined the impact of cashless banking on profitability in the banking industry of Pakistan from 2013- 2018. Using ratio analysis, cashless banking (point of sales transactions, mobile banking transactions and internet banking transactions) has a very significant impact on the profitability of the selected banks in

the banking industry of Pakistan. Using ordinary least squares (OLS) regression as the estimation method within the cointegration, granger causality, and error correction modelling, Jonah, Egbe and Richard (2020) examined the impact of financial innovation on money demand in Nigeria. The study covered a period of 11 years (2009-2019). Finding showed that financial innovation has a mixed impact on money demand in Nigeria during the period of analysis. For instance, financial innovation has a positive impact on money demand through the value of ATM transactions in the current period, two lagged periods of mobile banking transactions, etc.

Using descriptive statistics, Bezhovski (2016) examined the future of mobile payment as electronic payment services. The study concluded that for a promising future of this industry, mobile payment systems have to be better integrated with present telecommunication and financial infrastructures. Leila, Rezaei and Razmi (2019) investigated the effect of electronic payment systems on the performance of the financial sector in selected Islamic countries. Using panel analysis, results showed that all electronic payment indicators including mobile bank, internet bank, bank card, POS machine and ATM positively and significantly affect the financial sector performance. Also, economic growth and population have a significant positive effect on financial sector performance, while inflation and interest rate negatively and significantly affect it.

Simatele and Mbedzi (2021) employed descriptive and logit analysis to investigate consumer payment choices, costs, and risks in Zimbabwe. Finding revealed a strong preference for cash, coupled with cash shortages and inadequate infrastructure for electronic payments, has resulted in a multitiered pricing system, with significant premiums for digital payments. This perverse effect counters the heavily lauded benefits of mobile payments in developing countries. Khamees (2023) examined the effectiveness of information technology governance on improving financial performance of banks (2015-2019) in Jordan using a survey sample of 23 banks and structured questionnaires. Data analysis revealed no significant relationship exists among organisational competition, information technology governance and bank performance. Saeed and Ahmed (2023) critically explored the influence of information technology on financial performance of commercial banks via faithful representation of the accounting information system. Applying the autoregressive distributed lag (ARDL) model, results indicated a joint significant effect of both faithful representation and information technology on profitability of these banks.

3.0 METHODOLOGY

The study employed an ex-post facto research design. It was carried out in Nigeria using a 14 year (2009-2022) panel data set extracted from audited annual reports of the sampled banks, Central Bank of Nigeria Statistical Bulletin and World Bank Database. The population of the study is twenty-nine (29) deposit money banks quoted on the Nigerian Exchange Group as at

December 31, 2023. The sample for study is eleven (11) out of thirteen (13) deposit money banks, a subsector in the financial services sector of the Nigerian exchange group which were purposely selected to avoid missing values in the dataset. The panel least squares regression, specifically, Prais-Winsten regression, correlated panels corrected standard errors (PCSEs) is adopted after carrying out necessary diagnostic tests.

$$Y = \beta_0 + \beta_i X_i + \mu_t \quad - - - - - - - \quad (3.1)$$

where,

Y = *Dependent Variable,*

β_0 = *Intercept of the regression equation,*

β_i = *Coefficient of X in the regression equation,*

X_i = *Independent variables,*

μ_t = *Disturbance and error term.*

Hence, PFTYTTA = $f(ATMTEPAY, POSTEPAY, WEBTEPAY, MOBTEPAY, \mu_t)$ - - - - (3.2)

PFTYTTA is profit for the year deflated by total assets, ATMTEPAY = ATM deflated by total e-payment, POSTEPAY = POS deflated by total e-payment and so on.

Control variables = LnTA (natural logarithm of total assets) and LnEPAY (natural logarithm of electronic payments.

4.0 RESULTS

Table 1: Descriptive Statistics and Normality Tests

Var.	*Obs.*	*Mean*	*Std. Dev.*	*Std. Err.*	*Pr (Skew)*	*Pr (Kurt)*	*Joint Pr>Chi²*	*Shapiro W Pr>Z*	*Shapiro F Pr>Z*	*Min*	*Max*
pftytta	154	.0150	.0284	.0023	.0000	.0010	.0000	.0000	.0000	-.0953	.2424
atmtepay	154	.0446	.0265	.0021	.3772	.0000	.0000	.0000	.0000	.0057	.0783
postepay	154	.0082	.0073	.0006	.0000	.2353	.0001	.0000	.0000	.0004	.0265
webtepay	154	.0610	.1493	.0120	.0000	.0000	.0000	.0000	.0000	.0003	.5054

mobtepay	154	.0127	.0182	.0015	.0000	.0000	.0000	.0000	.0000	.0000	.0717
lnta	154	14.155	1.337	.1078	.0000	.0035	.0000	.0000	.0000	9.750	16.522
lnepay	154	11.643	1.546	.1245	.0007	.0000	.0000	.0000	.0000	9.910	14.329

Source: *Authors' STATA 14.2 Outputs*

Table 1 above depicted the mean as a measure of the true population where extreme values are absent. Values of standard errors are very small in comparison to their respective means, given that means, standard deviations and standard errors exist in the same metrics. Specifically, the standard errors are quite small and aligned to the theory that it becomes smaller as a normal sample approximates to the true population. However, the standard deviations of the most variables are nearly equal to or even larger than their respective means, excluding the control variables. Further, the probabilities of skewness, kurtosis, joint (both moments), Shapiro-Wilk W and Shapiro-Francia W for the all entered variables are below 0.1% excluding probability of skewness for atm pay at 0.3772 and probability of kurtosis for postepay at 0.2353. The range (.3377, .0726, .0261, .5051, .0717, 6.772, and 4.419) is undulating for the relevant period. In other words, these values are normally distributed.

The Pearson correlation coefficients measure the degree of association between the different variables (see Appendix III). Probability of each correlation coefficient is beneath each. Further, the P-values that are less than 5% show strong statistical significance. Results portray negative nonsignificant influences of all predictors excluding lnta on pftsta (roa). Further, there exist perfect relationships among explanatory variables signalling collinearity issues. Fortunately, there are no lagged values and collinearity diagnostics can apply. The Breusch-Pagan test result for heteroskedasticity for the model specification demonstrated that the variance of the error term in the model is non – constant. In other words, i.e. p-value = 0.0000 is less than 5% and signified the acceptance H_A: non-constant variance: heteroskedasticity. If this is not corrected, it leads to biassed standard errors. It is adjusted through adopting the robust command while executing the regression to arrive at robust standard errors. The variance inflation factor measures the degree of (strong) linear relationship between one predictor variable and one or more explanatory variables. Montgomery and Peck (2007) hinted that when $5 < VIF < 10$, the regression coefficients are weakly estimated. The explanatory variables have resultant variance inflation factors ranging between 1.16 and 3.78 (mobtepay is removed) and a mean VIF of 2.71 < 5.0. Ramsey Reset test is used to detect if the all-inclusive model is either under-specified or over-fitted. It is done by removing one or more explanatory variables and re-running the regression. Inspecting the old and new residuals has shown that the model is not over-fitted. In other

words, the P-value = 0.0753 > 0.05 connotes rejection of the alternative hypothesis (H_A) and accepting Ho i.e. the model has no omitted variables.

Table 2: Panel Data Stationarity Tests

Levin-Lin-Chu unit-root test for all the Variables based on Augmented Dickey-Fuller tests

Ho: All panels contain unit roots Number of panels (N) = 11

Ha: Panels are stationary Number of periods (T) = 14

Asymptotics: T / N 0

Var	Panel-unadjusted ADF	1%	5%	P-values	Lags
pftytta	-17.910	-3.473	-2.880	0.000	1
atmtepay	-7.253	-3.473	-2.880	0.010	1
postepay	-4.367	-3.473	-2.880	0.620	1
webtepay	-3.068	-3.473	-2.880	1.000	1
mobtepay	3.025	-3.473	-2.880	1.000	1
lnta	-0.067	-3.473	-2.880	0.879	1
lnepay	-2.720	-3.473	-2.880	0.524	1

Source: Authors' STATA 14.2 Outputs

Table 2 portrays the Levin-Lin-Chu unit-root test which assumes that the ratio T / N approaches zero given that the number of panels (DMBs) is greater than the time periods. At 95% confidence limit both the p-values and adjusted t-statistics strongly suggest presence of a unit root in five predictors excluding pftytta and atmtepay that passed the stationarity tests at 1% level of significance. That is, the all-inclusive model (is non-stationary) does not have constant mean, variance and covariance (no autocorrelation) among periods of equal distance.

Table 3: Single Equation Cointegration Tests

Series: pftytta atmtepay postepay webtepay mobtepay lnta lnepay

Sample: 1 154 Included observations: 154

Null hypothesis: Series are not cointegrated Cointegrating equation deterministics: C

Automatic lags specification based on Schwarz criterion (maxlag=13)

dependent	tau-statistic	prob.*	z-statistic	prob.*
pftytta	-10.68785	0.0000	-130.8499	0.0000
atmtepay	-1.812847	0.9950	-9.906743	0.9861

postepay	-2.166944	0.9841	-15.66389	0.8967
webtepay	-1.321421	0.9990	-4.315020	0.9996
mobtepay	-0.688502	0.9999	-1.553276	1.0000
lnta	-0.646225	0.9999	-2.250302	0.9999
lnepay	-0.940607	0.9997	-2.344167	0.9999

Source: *Authors' STATA 14.2 Outputs*

Table 3 portrays the values of tau-statistic, z-statistic and their p-values. Since the p-values for all entered variables (excluding pftytta) exceed $P < 0.05$, it implies that predictor variables are not cointegrated with pftytta signaling no long-run relationship existing between them. In other words, for the entered variables, it is not necessary to run an error correction model.

Test of Hypotheses (All expressed in Null Forms)

i. Automated teller machine (atmtepay) transactions value exerts nonsignificant effect on profit for the year (pftytta) of deposit money banks (DMBs) in Nigeria.

ii. Point of sales (postepay) transactions value has no significant effect on profit for the year of DMBs in Nigeria.

iii. Web payment (webtepay) transaction value has no significant effect on profit for the year of DMBs in Nigeria.

iv. Mobile (mobtepay) transactions value has no significant effect on profit for the year of DMBs in Nigeria.

Table 4: Panel Least Squares Regressions

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Prais-Winsten regression, correlated panels corrected standard errors (PCSEs)

Group variable:     firm                            Number of obs      =       154
Time variable:      year                            Number of groups   =        11
Panels:             correlated (balanced)           Obs per group: min =        14
Autocorrelation:    common AR(1)                                   avg =        14
                                                                   max =        14
Estimated covariances      =         66             R-squared          =    0.0650
Estimated autocorrelations =          1             Wald chi2(6)       =     14.46
Estimated coefficients     =          7             Prob > chi2        =    0.0249
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pftytta	Panel-corrected Coef.	Std. Err.	z	P>|z|	[95% Conf.	Interval]
atmtepay	-.4045467	.1323721	-3.06	0.002	-.6639912	-.1451022
postepay	.5978891	.7325017	0.82	0.414	-.8377879	2.033566
webtepay	-.0135472	.0429592	-0.32	0.752	-.0977456	.0706512
mobtepay	-.0409536	.4343248	-0.09	0.925	-.8922146	.8103074
lnta	.0044628	.0020242	2.20	0.027	.0004954	.0084301
lnepay	-.0070854	.0029742	-2.38	0.017	-.0129147	-.0012561
_cons	.0479808	.0433013	1.11	0.268	-.0368882	.1328498
rho	.5345913					

Durbin-Watson statistic (original) 1.16 Durbin-Watson statistic (original) 1.94

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Table 4 above indicated that although the cumulative impact of the regressors on the dependent variable is significant (t-statistic = Wald chi^2 =14.46; p-value = p > |z| =0.0249 < 0.05), individual effect (is nonsignificant except for automatic teller machine (p-value = 0.002, t-statistic = -3.06), natural logarithm of total assets (p-value = 0.027, t-statistic = 2.20) and natural logarithm of total e-payment (p-value = 0.017, t-statistic = -2.38) that exerted very strong effects on the same regressand. In other words, the influence of the control variables is statistically relevant. However, the R-squared = 7% showed that movements in the targeted variable are weakly explained by these explanatory variables.

5.0 CONCLUSION

The results of this study have proven that all predictors (excluding automated teller machine transactions) exerted nonsignificant effects on profit for the year deflated by total assets (basically return on assets) of DMBs in Nigeria. Remarkably, the two control variables have statistically significant influence on the predicted variable. These results are aligned to findings of Jonah, Egbe and Richard (2020), Kibet and Kiprop (2018). These study findings are, however, opposed by those of Leila, Rezaei and Razmi (2019), Saleem, Akhter, Baber, Bashir and Haider (2019), Ugbede, Yahaya and Edicha (2019). It seems withdrawing cash from ATM and other services at lowest costs ensured its relevance continually. Nigerians believe in cash, gold and other physical assets, not fabled secondary instruments.

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APPENDIX I: RAW / COLLATED / PROCESSED DATA

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EFFECT OF INFORMATION TECHNOLOGY ON PERFORMANCE OF DEPOSIT MONEY BANKS

nAM	MM	TA	ATr	ATM	POS	nEPAr	MOPAr	EPAr	nAM	TRM	ATrTA	ATMTEPAr	POSTEPAr	nTETEPAr	MOSTEPAr	LnTA	LnTEPAr
2009	FBN	2,174,056	4,901	546.60	11.03	94.15	1.27	30,081	2009	1	0.0022 5431	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	14.590 10603	10.311 64 902
2010		2,305,256	20,411	299.71	12.72	25.05	6.65	20,121	2010	1	0.0144 20249	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	14.650 70216	9.9095 19 205
2011		2,196,129	18,636	1,561.74	31.02	56.61	19.99	22,975	2011	1	0.0084 9104	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	14.974 31756	10.0847669
2012		2,22 6,267	75,670	1,984.66	48.01	31.57	31.51	27,229	2012	1	0.0234 53624	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	14.986 66729	10.2120 0113
2013		2,965,901	70,631	2,826.94	161.02	47.32	14.260	36,109	2013	1	0.0182 55617	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	15.166 56699	10.4929 742
2014		4,34 3,737	64,011	3,674.68	312.07	74.04	34.647	51,121	2014	1	0.0119 04672	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	15.284 2456	10.8419 5 065
2015		4,166,199	15,148	3,970.25	449.51	91.58	44.235	56,319	2015	1	0.0036 36307	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	15.242 51227	10.9267 6 949
2016		4,73 6,805	12,243	4,986.13	759.00	120.36	75.690	76,907	2016	1	0.0025 84854	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	15.370 67342	11.2540 5 219
2017		5,20 6,527	37,709	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	1	0.0072 69942	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	15.471 17095	11.5560 5 514
2018		5,56 9,316	59,667	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	1	0.0107 15449	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	15.530 60203	11.826 8565
2019		6,20 3,526	72,665	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	1	0.0117 47698	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	15.640 6594	12.9986 5 247
2020		7,69 9,009	99,730	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	1	0.0111 69876	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	15.855 36494	13.9765 6 902
2021		8,90 2,272	151,079	21,201	24,455	545,040	53,209	1,670,503	2021	1	0.0169 13647	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	16.005 19265	14.2986 5 534
2022		10,577,710	136,173	32,649	41,006	760,660	111,122	1,550,443	2022	1	0.0128 77556	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	16.174 25951	14.2540 5 125
2009	CTB	1,06 5,564	23,697	546.60	11.03	94.15	1.27	30,081	2009	2	0.0222 6985	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	13.879 69857	10.311 64 902
2010		1,15 2,001	36,347	299.71	12.72	25.05	6.65	20,121	2010	2	0.0003 97297	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	13.957 01099	9.9095 19 205
2011		1,69 9,653	51,742	1,561.74	31.02	56.61	19.99	22,975	2011	2	0.0031 64799	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	14.240 90774	10.0847669
2012		1,73 4,979	97,295	1,984.66	48.01	31.57	31.51	27,229	2012	2	0.0560 18236	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	14.366 44765	10.2120 0113
2013		2,102,946	90,024	2,826.94	161.02	47.32	14.260	36,109	2013	2	0.0429 10553	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	14.559 69222	10.4929 742
2014		2,25 5,877	98,695	3,674.68	312.07	74.04	34.647	51,121	2014	2	0.0419 60104	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	14.672 42362	10.8419 5 065
2015		2,52 4,594	99,437	3,970.25	449.51	91.58	44.235	56,319	2015	2	0.0394 07323	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	14.741 59682	10.9267 6 949
2016		3,11 6,260	132,291	4,986.13	759.00	120.36	75.690	76,907	2016	2	0.0424 46629	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	14.952 1868	11.2540 5 219
2017		3,25 1,097	167,913	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	2	0.0540 16875	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	15.024 79601	11.5560 5 514
2018		3,29 7,243	184,640	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	2	0.0561 66941	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	15.0855 902	11.826 8565
2019		3,75 8,919	195,849	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	2	0.0522 66513	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	15.129 64197	12.9986 5 247
2020		4,94 4,853	201,440	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	2	0.0407 38686	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	15.413 61735	13.9765 6 902
2021		5,43 6,005	174,609	21,201	24,455	545,040	53,209	1,670,503	2021	2	0.0321 62965	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	15.506 56049	14.2986 5 534
2022		6,44 5,456	169,173	32,649	41,006	760,660	111,122	1,550,443	2022	2	0.0262 42791	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	15.679 04188	14.2540 5 125
2009	FIDELITY	262,477	2,221	546.60	11.03	94.15	1.27	30,081	2009	3	0.0066 12765	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	12.480 71163	10.311 64 902
2010		65 0,948	4,999	299.71	12.72	25.05	6.65	20,121	2010	3	0.0076 79569	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	12.986 18604	9.9095 19 205
2011		73 7,694	2,564	1,561.74	31.02	56.61	19.99	22,975	2011	3	0.0035 01858	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	13.511 55546	10.0847669
2012		91 4,260	18,200	1,984.66	48.01	31.57	31.51	27,229	2012	3	0.0199 04500	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	13.725 97965	10.2120 0113
2013		1,06 1,217	7,721	2,826.94	161.02	47.32	14.260	36,109	2013	3	0.0071 41027	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	13.890 59760	10.4929 742
2014		1,16 7,605	13,795	3,674.68	312.07	74.04	34.647	51,121	2014	3	0.0116 22203	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	13.966 96073	10.8419 5 065
2015		1,20 1,722	13,904	3,970.25	449.51	91.58	44.235	56,319	2015	3	0.0111 98061	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	14.023 90375	10.9267 6 949
2016		1,29 9,141	9,734	4,986.13	759.00	120.36	75.690	76,907	2016	3	0.0074 98415	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	14.076 4436	11.2540 5 219
2017		1,37 9,214	17,769	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	3	0.0128 6827	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	14.137 02433	11.5560 5 514
2018		1,71 9,660	22,926	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	3	0.0133 59977	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	14.257 76592	11.826 8565
2019		2,11 4,027	29,425	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	3	0.0134 45629	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	14.564 10995	12.9986 5 247
2020		2,75 9,149	35,650	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	3	0.0096 82291	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	14.830 07	13.9765 6 902
2021		3,29 0,454	33,104	21,201	24,455	545,040	53,209	1,670,503	2021	3	0.0070 42429	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	15.003 49239	14.2986 5 534
2022		3,98 9,009	46,724	32,649	41,006	760,660	111,122	1,550,443	2022	3	0.0111 73185	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	15.199 65209	14.2540 5 125
2009	ACCESS	69 3,784	14,195	546.60	11.03	94.15	1.27	30,081	2009	4	-0.0006 0455	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	13.449 91595	10.311 64 902
2010		80 4,924	11,059	299.71	12.72	25.05	6.65	20,121	2010	4	0.0137 57075	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	13.596 07769	9.9095 19 205
2011		1,07 9,003	15,376	1,561.74	31.02	56.61	19.99	22,975	2011	4	0.0094 4013	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	14.200 47673	10.0847669
2012		1,74 5,177	38,405	1,984.66	48.01	31.57	31.51	27,229	2012	4	0.0220 06264	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	14.372 36654	10.2120 0113
2013		1,80 5,466	36,289	2,826.94	161.02	47.32	14.260	36,109	2013	4	0.0197 75904	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	14.422 66895	10.4929 742
2014		2,10 4,261	42,117	3,674.68	312.07	74.04	34.647	51,121	2014	4	0.0200 81452	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	14.559 52242	10.8419 5 065
2015		2,59 1,200	65,469	3,970.25	449.51	91.58	44.235	56,319	2015	4	0.0254 16990	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	14.767 69162	10.9267 6 949
2016		3,49 3,866	71,429	4,986.13	759.00	120.36	75.690	76,907	2016	4	0.0205 05659	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	15.065 85315	11.2540 5 219
2017		4,10 2,243	60,067	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	4	0.0146 47583	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	15.227 04446	11.5560 5 514
2018		4,95 4,157	94,981	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	4	0.0191 7198	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	15.415 72759	11.826 8565
2019		7,14 3,157	94,057	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	4	0.0131 67427	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	15.781 66529	12.9986 5 247
2020		9,67 9,744	105,010	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	4	0.0122 12466	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	15.976 56065	13.9765 6 902
2021		11,73 1,965	160,215	21,201	24,455	545,040	53,209	1,670,503	2021	4	0.0136 56059	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	16.277 60773	14.2986 5 534
2022		14,97 2,269	155,673	32,649	41,006	760,660	111,122	1,550,443	2022	4	0.0104 10752	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	16.521 71299	14.2540 5 125
2009	UBA	1,54 9,777	2,375	546.60	11.03	94.15	1.27	30,081	2009	5	0.0015 20469	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	14.252 97615	10.311 64 902
2010		1,61 7,696	598	299.71	12.72	25.05	6.65	20,121	2010	5	0.0000 36952	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	14.296 51347	9.9095 19 205
2011		1,92 0,435	15,6011	1,561.74	31.02	56.61	19.99	22,975	2011	5	-0.0005 4129	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	14.468 02274	10.0847669
2012		2,272,923	54,765	1,984.66	48.01	31.57	31.51	27,229	2012	5	0.0240 94985	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	14.636 57723	10.2120 0113
2013		2,64 2,246	46,601	2,826.94	161.02	47.32	14.260	36,109	2013	5	0.0176 05555	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	14.787 15679	10.4929 742
2014		2,76 2,573	47,907	3,674.68	312.07	74.04	34.647	51,121	2014	5	0.0173 41442	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	14.901 67365	10.8419 5 065
2015		2,75 2,622	59,654	3,970.25	449.51	91.58	44.235	56,319	2015	5	0.0216 71701	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	14.829 06447	10.9267 6 949
2016		3,50 4,470	72,264	4,986.13	759.00	120.36	75.690	76,907	2016	5	0.0206 20522	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	15.069 54965	11.2540 5 219
2017		4,06 9,474	77,549	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	5	0.0190 56025	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	15.219 04231	11.5560 5 514
2018		4,86 9,736	78,607	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	5	0.0161 81943	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	15.298 55609	11.826 8565
2019		5,62 0,907	89,089	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	5	0.0158 45577	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	15.542 6026	12.9986 5 247
2020		7,69 7,980	113,765	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	5	0.0147 76552	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	15.856 49651	13.9765 6 902
2021		8,54 1,316	118,679	21,201	24,455	545,040	53,209	1,670,503	2021	5	0.0139 04577	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	15.960 42569	14.2986 5 534
2022		10,65 7,571	170,277	32,649	41,006	760,660	111,122	1,550,443	2022	5	0.0159 62789	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	16.260 37518	14.2540 5 125
2009	ZENITH	1,65 9,700	20,600	546.60	11.03	94.15	1.27	30,081	2009	6	0.0124 13667	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	14.320 14923	10.311 64 902
2010		1,99 5,027	27,414	299.71	12.72	25.05	6.65	20,121	2010	6	0.0197 40254	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	14.454 74364	9.9095 19 205
2011		2,20 6,695	48,704	1,561.74	31.02	56.61	19.99	22,975	2011	6	0.0090 20695	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	14.659 95406	10.0847669
2012		2,60 4,564	100,691	1,984.66	48.01	31.57	31.51	27,229	2012	6	0.0386 56497	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	14.772 75291	10.2120 0113
2013		2,14 3,130	95,319	2,826.94	161.02	47.32	14.260	36,109	2013	6	0.0400 57940	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	14.960 73083	10.4929 742
2014		2,75 5,264	99,455	3,674.68	312.07	74.04	34.647	51,121	2014	6	0.0369 41457	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	15.139 65915	10.8419 5 065
2015		4,00 6,842	105,663	3,970.25	449.51	91.58	44.235	56,319	2015	6	0.0263 76543	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	15.200 51296	10.9267 6 949
2016		4,72 9,905	129,652	4,986.13	759.00	120.36	75.690	76,907	2016	6	0.0275 27753	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	15.371 51077	11.2540 5 219
2017		5,59 5,252	173,791	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	6	0.0310 80442	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	15.537 42994	11.5560 5 514
2018		5,95 5,710	190,424	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	6	0.0320 77069	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	15.598 66098	11.826 8565
2019		6,24 6,979	208,843	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	6	0.0299 40404	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	15.683 47275	12.9986 5 247
2020		8,49 1,272	230,565	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	6	0.0271 65191	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	15.953 2071	13.9765 6 902
2021		9,44 7,943	244,556	21,201	24,455	545,040	53,209	1,670,503	2021	6	0.0256 66452	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	16.061 29702	14.2986 5 534
2022		12,295,629	222,911	32,649	41,006	760,660	111,122	1,550,443	2022	6	0.0181 2544	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	16.323 94076	14.2540 5 125
2009	UNION	1,16 0,706	261,373	546.60	11.03	94.15	1.27	30,081	2009	7	0.2424 15292	0.0160 27426	0.0000 366677	0.0027 97447	4.221 90E-05	13.965 4529	10.311 64 902
2010		1,00 0,691	105,472	299.71	12.72	25.05	6.65	20,121	2010	7	0.1052 96479	0.0196 85315	0.0000 620175	0.0012 24 968	0.0000065	13.815 20132	9.9095 19 205
2011		1,05 4,734	160,531	1,561.74	31.02	56.61	19.99	22,975	2011	7	-0.0782 4616	0.0651 40055	0.0012 90849	0.0024 48634	0.0007 91656	13.969 79916	10.0847669
2012		1,03 3,047	7,375	1,984.66	48.01	31.57	31.51	27,229	2012	7	0.0071 29075	0.0799 60407	0.0017 62056	0.0011 5 9468	0.0011 57265	13.949 02325	10.2120 0113
2013		1,00 2,756	3,605	2,826.94	161.02	47.32	14.260	36,109	2013	7	0.0036 25457	0.0760 44457	0.0014 59276	0.0013 1 0477	0.0009 54693	13.919 26277	10.4929 742
2014		1,00 9,157	26,605	3,674.68	312.07	74.04	34.647	51,121	2014	7	0.0265 81592	0.0719 60755	0.0016 04536	0.0014 4 6029	0.0006 77745	13.924 65569	10.8419 5 065
2015		1,04 9,731	14,261	3,970.25	449.51	91.58	44.235	56,319	2015	7	0.0136 23249	0.0704 96999	0.0017 95884	0.0016 2 6123	0.0007 65565	13.9640445	10.9267 6 949
2016		1,25 2,660	15,391	4,986.13	759.00	120.36	75.690	76,907	2016	7	0.0122 86436	0.0645 69246	0.0019 69865	0.0017 2104	0.0009 41757	14.040 79741	11.2540 5 219
2017		1,45 5,540	13,008	6,437.59	1,409.91	184.60	1,102.00	104,676	2017	7	0.0089 08669	0.0615 60153	0.0013 46021	0.0011 7 6527	0.0010 57724	14.190 68752	11.5560 5 514
2018		1,46 3,656	19,010	6,460.09	2,260.11	675.92	1,97 4.25	136,671	2018	7	0.0129 59805	0.0467 29958	0.0017 16252	0.0014 67 271	0.0014 26905	14.196 56597	11.826 8565
2019		1,97 2,231	19,675	6,512.61	3,204.75	476.14	5,09 0.95	441,905	2019	7	0.0106 15677	0.0147 37546	0.0017 52108	0.0010 81995	0.0011 4 9760	14.442 64102	12.9986 5 247
2020		2,19 1,606	19,672	6,700.12	3,813.65	391.22	9,03 4.74	1,174,754	2020	7	0.0068 72025	0.0057 02424	0.0002 45209	0.0000 2451	0.0006 05609	14.599 66649	13.9765 6 902
2021		2,59 5,880	16,900	21,201	24,455	545,040	53,209	1,670,503	2021	7	0.0065 16517	0.0127 69046	0.0014 67400	0.0026 77445	0.0016 51484	14.769 46531	14.2986 5 534
2022		2,79 5,900	29,200	32,649	41,006	760,660	111,122	1,550,443	2022	7	0.0104 21022	0.0210 57208	0.0026 46774	0.5065 44 2636	0.0716 71129	14.843 69985	14.2540 5 125

APPEDIX III: RESULTS OF SOFTWARES

Variable	Obs	Mean	Std. Dev.	Min	Max
pftytta	154	.0149363	.028378	-.0953184	.2424154
atmtepay	154	.0445897	.0264962	.0057034	.0783445
postepay	154	.0081937	.0072845	.0003667	.0264673
webtepay	154	.0609682	.1492761	.0003245	.5054426
mobtepay	154	.0126696	.0182226	.0000422	.0716711
lnta	154	14.15501	1.337393	9.750453	16.52171
lnepay	154	11.64285	1.545541	9.909519	14.32864

Mean estimation Number of obs = 154

	Mean	Std. Err.	[95% Conf.	Interval]
pftytta	.0149363	.0022868	.0104186	.019454
atmtepay	.0445897	.0021351	.0403716	.0488078
postepay	.0081937	.000587	.007034	.0093533
webtepay	.0609682	.012029	.0372038	.0847325
mobtepay	.0126696	.0014684	.0097686	.0155706
lnta	14.15501	.1077702	13.9421	14.36792
lnepay	11.64285	.1245432	11.3968	11.8889

	pftytta	atmtepay	postepay	webtepay	mobtepay	lnta	lnepay
pftytta	1.0000						
atmtepay	-0.0713 0.3795	1.0000					
postepay	-0.0532 0.5121	-0.1462 0.0705	1.0000				
webtepay	-0.0353 0.6634	-0.4028* 0.0000	0.7490* 0.0000	1.0000			
mobtepay	-0.0405 0.6180	-0.3486* 0.0000	0.8795* 0.0000	0.9503* 0.0000	1.0000		
lnta	0.1939* 0.0160	-0.1454 0.0719	0.2966* 0.0002	0.3026* 0.0001	0.3199* 0.0001	1.0000	
lnepay	-0.0449 0.5800	-0.6334* 0.0000	0.6544* 0.0000	0.6804* 0.0000	0.7232* 0.0000	0.3449* 0.0000	1.0000

Skewness/Kurtosis tests for Normality

Variable	Obs	Pr(Skewness)	Pr(Kurtosis)	joint adj chi2(2)	joint Prob>chi2
pftytta	154	0.0000	0.0000	.	0.0000
atmtepay	154	0.3772	.	.	.
postepay	154	0.0000	0.2353	18.56	0.0001
webtepay	154	0.0000	0.0000	57.05	0.0000
mobtepay	154	0.0000	0.0000	65.50	0.0000
lnta	154	0.0000	0.0035	23.81	0.0000
lnepay	154	0.0007	0.0000	29.15	0.0000

Shapiro-Wilk W test for normal data

Variable	Obs	W	V	z	Prob>z
pftytta	154	0.63390	43.570	8.568	0.00000
atmtepay	154	0.85931	16.744	6.397	0.00000
postepay	154	0.89509	12.486	5.731	0.00000
webtepay	154	0.44043	66.595	9.532	0.00000
mobtepay	154	0.62307	44.859	8.635	0.00000
lnta	154	0.93223	8.066	4.739	0.00000
lnepay	154	0.87244	15.181	6.175	0.00000

Shapiro-Francia W test for normal data

Variable	Obs	W'	V'	z	Prob>z
pftytta	154	0.61569	49.633	7.509	0.00001
atmtepay	154	0.86185	17.841	5.674	0.00001
postepay	154	0.89549	13.498	5.158	0.00001
webtepay	154	0.43888	72.468	8.166	0.00001
mobtepay	154	0.62110	48.934	7.485	0.00001
lnta	154	0.93290	8.666	4.324	0.00001
lnepay	154	0.87475	16.176	5.493	0.00001

```
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity
         Ho: Constant variance
         Variables: fitted values of pftytta

         chi2(1)      =    23.07
         Prob > chi2  =   0.0000
```

```
Ramsey RESET test using powers of the fitted values of pftytta
       Ho:   model has no omitted variables
                 F(3, 144) =      2.35
                  Prob > F =      0.0753
```

Model	Obs	ll(null)	ll(model)	df	AIC	BIC
.	154	330.555	336.721	7	-659.4419	-638.1833

Note: N=154 used in calculating BIC

Variable	VIF	1/VIF
mobtepay	31.46	0.031785
webtepay	15.77	0.063401
postepay	7.91	0.126362
lnepay	3.80	0.262860
atmtepay	2.31	0.433535
lnta	1.16	0.864264
Mean VIF	10.40	

Variable	VIF	1/VIF
lnepay	3.78	0.264684
postepay	3.41	0.293268
webtepay	2.89	0.346200
atmtepay	2.30	0.435242
lnta	1.16	0.864326
Mean VIF	2.71	

```
. xtset firmyear
       panel variable:  firm (strongly balanced)
        time variable:  year, 2009 to 2022
                delta:  1 unit


Levin-Lin-Chu unit-root test for pftytta

Ho: Panels contain unit roots                   Number of panels  =     11
Ha: Panels are stationary                       Number of periods =     14

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t        -17.9099
 Adjusted t*         -12.3073        0.0000

Levin-Lin-Chu unit-root test for atmtepay

Ho: Panels contain unit roots                   Number of panels  =     11
Ha: Panels are stationary                       Number of periods =     14

AR parameter: Common                            Asymptotics: N/T -> 0
Panel means:  Included
Time trend:   Not included

ADF regressions: 1 lag
LR variance:     Bartlett kernel, 7.00 lags average (chosen by LLC)
------------------------------------------------------------------------------
                     Statistic      p-value
------------------------------------------------------------------------------
 Unadjusted t         -7.2533
 Adjusted t*          -2.3180        0.0102
```

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Levin-Lin-Chu unit-root test for postepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-4.3670	
Adjusted t*	0.3064	0.6203

Levin-Lin-Chu unit-root test for webtepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-3.0679	
Adjusted t*	775.4297	1.0000

Levin-Lin-Chu unit-root test for mobtepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	3.0248	
Adjusted t*	22.7896	1.0000

Levin-Lin-Chu unit-root test for lnta

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-0.0674	
Adjusted t*	1.1675	0.8785

Levin-Lin-Chu unit-root test for lnepay

Ho: Panels contain unit roots		Number of panels =	11
Ha: Panels are stationary		Number of periods =	14
AR parameter: Common		Asymptotics: N/T -> 0	
Panel means: Included			
Time trend: Not included			
ADF regressions: 1 lag			
LR variance: Bartlett kernel, 7.00 lags average (chosen by LLC)			

	Statistic	p-value
Unadjusted t	-2.7202	
Adjusted t*	0.0589	0.5235