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IMPACT OF POINT-OF-SALES (POS) TRANSACTIONS ON STOCK MARKET LIQUIDITY IN NIGERIA: AN EMPIRICAL EXPLORATION

IMPACTO DE LAS TRANSACCIONES EN PUNTOS DE VENTA (POS) SOBRE LA LIQUIDEZ DEL MERCADO DE VALORES EN NIGERIA: UNA EXPLORACIÓN EMPÍRICA

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Abstract

The study aimed to explore the impact of point-of-sales (POS) transactions on stock market liquidity in Nigeria between January 2012 and December, 2021. Fully Modified Ordinary Least Squares regression technique was applied to the data obtained from the Statistical Bulletin, Statistics, and Monthly Economic Reports published by Central Bank of Nigeria. POS digital finance transaction was found to have negative and significant impact on Nigerian stock market turnover ratio. Considering the prominence of POS digital financial innovation in Nigeria, this study isolated the innovation for study in terms of its role in stock market liquidity in a developing country. This study concluded that, rather than promoting stock market liquidity, digital finance channel of POS shrank the liquidity of the Nigerian equity market. The study was limited to only POS transaction among other digital financial innovations. However, the significance and prominence of POS in the Nigerian financial market makes the innovation worthy of careful and separate investigation. The finding of this

study may not be unconnected with the fact that in Nigeria, POS transactions are basically used for consumption and other daily transactions of which stock market transactions may not constitute a major part. It can therefore be recommended that Government should encourage the use of POS terminals for stock transactions by giving incentives to users of POS for stock market dealings in Nigeria.

Keywords
POS, Stock Market Turnover Ratio, Stock Market, Stock Market Liquidity.

1. INTRODUCTION

In Nigeria, cash-based payment as a traditional model of payment was the order of the day before the adoption of electronic means of payment. In the electronic era, payment for transactions through channels like automated teller machines (ATM), Point-of-Sales (POS), web-pay, mobile pay, instant payment, electronic funds transfer, and others. The introduction of cashless policy in 2011 and its take-off in 2012, as well as the concurrent implementation of the National Financial Inclusion Strategy, Nigeria has seen to the increasing use of digital/electronic payments by the Nigerian populace. Consequently, payment operations became increasingly characterized by electronic funds transfers, ATMs, and other electronic payment systems (Mahmud et al., 2021). In Nigeria, the traditional mode of payment has been declining since the adoption of electronic payment system. For instance, statistics reveals that, the value of cheque-based transactions declined from ₦29,436.02billion in 2009 to ₦15,522.40billion in 2023; and in the same vein the volume of cheque transaction decreased from 29,166,780 in 2009 to 16,054,396 in 2023 (CBN statistical bulletin, 2023). However, there has been upward trend of these digital transactions as against the downward trend of the non-digital form of financial transactions in Nigeria. Specifically, digital volume of transactions using POS transaction volume-wise skyrocketed from 918,256 in 2009 to 9,847,258,500 in 2023. Likewise, from the 2009 figure of ₦11.03billion, POS value of transaction increased to ₦110,347.10 billion in 2023.

Although, the Nigerian stock market is yet to witness a full digitalization but the embrace of digital financial technology in the Nigeria has seen to the increase in stock market performance indicators, particularly, stock market turnover ratio. The stock market enhances economic growth by providing equity funds for capital formation (Babarinde et al., 2024). Technological advancements, particularly in digital financial innovation like POS, have significantly influenced financial services, becoming a crucial aspect of financial affairs. POS as an electronic payment device which enables individuals to make purchases with electronic cards by accepting ATM cards for payment of goods and services and additionally, it permits cardholders to have a realtime online access to funds and information in their bank account through debit or cash cards (Omotayo & Dahunsi, 2015). It has been observed that POS has

facilitates the reduction the volume of cash transactions and also ensures the flow of cash in the Nigerian economy (Hamza et al., 2021).

Notably, digital payment services, particularly POS services, have gained prominence in Nigeria, offering potential improvements to the Nigerian stock market. Despite this, there still a perceived gap between POS transactions and liquidity of the Nigerian stock market. Digital finance-capital market studies is relatively a growing area research most especially in developing countries where the adoption of digital financial technology is relatively of recent. Few studies have attempted to examine digital finance and stock market performance (Babarinde et al., 2024; Igoni et al., 2021) but specific study on the role of POS transaction in stock market liquidity is still desirable considering the significance of stock market liquidity in any economy.

Therefore, the aim of this research was to explore the impact of POS transaction in stock market liquidity. This research focused on the Nigerian equity market, specifically the stock market, and examines how POS digital financial transactions impacts the market's performance in terms of liquidity from January 2012 to December 2021.

2. LITERATURE REVIEW

A stock market is aspect of the capital market where shares and stocks and other equity instruments are traded. A stock market can also be defined as a financial market in which long term securities like shares, stocks, and other equity instruments are transacted (Babarinde et al., 2024). One of the dimensions of stock market development is its liquidity. Stock market liquidity refers to the ease, speed, and efficiency with which securities are traded in the stock market (Babarinde, 2024). El-Wassal (2013) argues that a more liquid stock market enables a larger amount of savings to be channeled through stock markets.

Traded value/GDP and turnover ratio are the most commonly used liquidity indicators by analysts (El-Wassal, 2013). The turnover ratio is the total value of shares traded divided by the stock market capitalization. A high turnover ratio suggests lower transaction costs in the stock market. The value traded ratio complements the market capitalization ratio and is measured as the total value of shares traded divided by the GDP of the economy (Onwumere et al., 2012). Traded value/GDP measures the total value of shares traded on the stock market as a percentage of the national output, reflecting stock market liquidity on an economy-wide scale (El-Wassal, 2013).

POS is a payment method that allows individuals to make transactions such as fund transfers and cash withdrawals without visiting banking halls or ATMs terminals (Adedayo et al., 2024). In other words, POS) transactions are digital transactions executed by account holders through cards, aiming to establish a cashless economy (Igoni et al., 2020; Igoni et al., 2021). An upsurge in point-of-sale channels would signify an enhancement in business opportunities and convenience, which ultimately contributes to the augmentation of goods and services (Igoni et al., 2020). Consequently, with a rise in business opportunities, the

economy will witness an increase in the expansion of businesses. This, in turn, will motivate businesses to approach the capital market for long-term funding, as well as explore listing opportunities and engage in other stock market-related operations and activities, all of which will contribute to the betterment of businesses in the country. (Babarinde, 2024).

Theoretically, the theory of stock market development as posited by El-Wassal (2013), characterises stock market development as multi-dimensional. While delineating the four supply, demand, economic, and institutional factors as distinct categories of factors that can elucidate the development of the stock market. Liquidity is one of the five dimensions of stock market development while the other four are stock market size, concentration, volatility, and integration with the real sector (El-Wassal, 2013). Digital financial innovation has been theorized as having a significant role to play in lessening the challenges and constraints firms by economic agents. Put forward by Silber (1975), the theory of financial innovations posits that new financial instruments or practices are conceived to alleviate the financial constraints imposed on firms. Specifically, innovations in financial institutions and practices have enhanced the ability to bear risk, reduced transaction costs, and circumvented outdated regulations (Silber, 1983). According to financial innovation theory, financial innovations, such as POS are developed with the explicit purpose of facilitating the business activities of firms by helping them mitigate certain constraints. This is can be achieved through the improvement of business methods, which leads to lower operating costs, improved allocation efficiency, and ultimately, enhanced financial institutions' bottom-line (Babarinde, 2024).

Empirically, the impact of digital finance on stock market performance in Nigeria was investigated by Babarinde et al. (2024). From the Fully Modified Ordinary Least Squares regression, the study found that digital finance transactions (ATM, POS, mobile-based, and web-based) had positive and significant impact on the stock market capitalization ratio in Nigeria. In another study, Igoni et al. (2021) employed the VECM method in assessing electronic transactions and its effect on stock market performance in Nigeria. The study found that POS has a positive but non-significant effect on stock market performance in Nigeria in the study period (2012-2019).

In their study, Aldyan et al. (2019) examined the ramifications of technological advancements on stock trading within the Indonesian stock markets. The study posits that technological progress enhances stock trading in the capital market. In a similar study conducted in China, Wang et al. (2020) analyzed the influence of digital finance on financial efficiency from 2011 to 2017 using a dynamic data envelopment analysis model. The study reveals that digital finance slightly enhances the efficiency of the financial sector. However, Asmaraniw and Wijaya (2020) examined the impact of fintech on the stock returns of retail banks listed in the Indonesia Stock Exchange and found that fintech does not have a significant effect on the stock returns of retail banks listed in the Indonesia Stock Exchange.

Ren et al. (2022) reported that digital economy attention significantly impacted stock prices in a time-varying pattern in China. Furthermore, Ullah et al (2022) assessed the influence of FinTech on the stock price liquidity of Chinese listed firms. From the OLS regression and correlation techniques, the study found a positive association between Fintech and stock price liquidity. Also, Shena et al (2022) examined the impact of digital finance development on the investment behavior of Chinese households in risk finance assets. The study discovered that digital finance motivates more residents to invest in risk finance assets. Moreover, employing artificial neural network and linear regression models, Adedayo et al. (2024) studied the impact of ATM and POS transactions on currency in circulation in Nigeria. The study found that POS transactions have a significant impact on the amount of currency in circulation. Furthermore, Wang et al. (2023) investigated the effects of digital finance on the risk of stock price crashes and the underlying transmission mechanisms using a two-way fixed effect model. The study revealed that digital finance significantly reduces the risk of stock price crashes in China.

The review of literature exposes the scantiness and/or scarcity of study devoted to POS transaction-stock market liquidity but from the line of thought among related studies reviewed, the following hypothesis can be stated:

HO: POS transactions have significant impact on stock market liquidity in Nigeria

3. METHODOLOGY

3.1. Data and Research Design

The annual time series datasets employed in the study are in line with *ex-post facto* research design. The research design enables the researcher to examine relationship between variables of study by using past data which are not subject to manipulation by the researcher (Babarinde, 2024). The datasets for this study is quantitative in nature and were obtained from secondary sources, namely, CBN Statistical Bulletin, CBN Monthly Economic Reports, and CBN Statistics for various years.

3.2. Measurement of Variables

In line with related past studies, this study operationalizes the study variables as follows:

Stock market liquidity (SMT)**:** Stock market liquidity was proxied by stock market turnover ratio. It is computed as the ratio of total values of shares traded to stock market capitalization expressed in per cent (Onwumere et al. (2012), Qamruzzaman and Wei (2018))

Point of Sales (POS)**:** Point of Sales was measured using POS-based transactions. This is POS-based payment transactions, expressed in million Naira (Igoni et al., 2021; Appah et al., 2023)).

Inflation rate (INF)**:** Inflation rate was proxied as Inflation rate. This is annual percentage changes in consumer prices and it controls for macroeconomic (in)stability (Asab & Al-Tarawneh, 2020).

Government expenditure (GEX): Government expenditure was proxied as the federal government expenditure. This is total monthly amount of expenditure by the Federal Government of Nigeria, expressed in million Naira and it controls for public sector (Agwu & Godfrey, 2020).

Exchange rate (EXC)**:** Exchange rate is the foreign exchange rate. This is monthly average official exchange rate of the Naira to US Dollar and it controls for external sector (Josiah & Akpoveta, 2019).

Economic Growth (GDP)**:** Economic growth was measured as gross domestic product growth rate. This is percentage change in the annual real Gross domestic product and it controls for the size of the economy (Harcourt, 2017).

3.3. Model Specification

In specifying the relationship between point-of-sales financial transactions and stock market liquidity in Nigeria, this study adapted the model of Babarinde et al. (2024) on the impact of digital finance on stock market performance in Nigeria as specified in equation (1)

$$(1)\quad \mathrm{MCAPR}_t = \beta_0 + \beta_1 \mathrm{POS}_t + \beta_2 \mathrm{EXCR}_t + \beta_3 \mathrm{GEXP}_t + \beta_4 \mathrm{INFR}_t + \beta_5 \mathrm{GDPGR}_t + \mathrm{U}_{t2}$$

Therefore, model of this study, by substituting the dependent variable in equation (1) with stock market turnover ratio (SMT), can be specified in equation (2).

$$(2)\quad SMT_t = \varphi_0 + \varphi_1 \mathrm{POS}_t + \varphi_2 \mathrm{EXC}_t + \varphi_3 \mathrm{GEX}_t + \varphi_4 \mathrm{INF}_t + \varphi_5 \mathrm{GDP}_t + \epsilon_t$$

The techniques of estimating the model of this study is the Fully Modified Ordinary Least Squares (FMOLS) regression proposed by Philips and Hansen (1990). This study carried out necessary preliminary analyses which are descriptive statistics, and unit root test. FMOLS technique which normally employed in estimating a single co-integrating relationship among I(1) series, has been adjudged to be asymptotically unbiased and efficient (Phillips & Hansen, 1990).

4. RESULTS AND DISCUSION

4.1. Descriptive Statistics

Table 1 – Desriptive Statistics

	SMT	POS	EXC	GEX	INF	GDP
Mean	9.334480	288239.0	259.7781	568128.7	12.37300	2.520137
Max.	17.84428	2318351.	414.3357	1373787.	18.72000	5.255319
Min.	4.100987	38.57195	157.2734	80912.00	7.700000	0.261930
Std. Dev.	3.192407	521391.6	87.16743	260538.7	3.329167	1.395841
Jarque-Bera	14.27947	303.2952	9.941064	6.694396	8.111475	7.441965
Prob.	0.000793	0.000000	0.006939	0.035183	0.017323	0.024210

Source: Authors' computation, 2024

Table 1 reveals that the stock market turnover ratio (SMT) of the equity section of the Nigerian Exchange Limited (NGX) in the study period (2012M01-2021M12) was 9.33%. The minimum and maximum of the stock market turnover ratio was 4.10% and 17.84% respectively. The standard deviation of the series (SMT) (3.19%) did not exceed their mean value, thus, the SMT s relatively stable around its mean value. Furthermore, considering the Jarque-Bera statistics of stock market turnover ratio, the series could be said to be not normally distributed.

Furthermore, the average value of POS was ₦288239.0M and the variable (POS) range between a minimum value of ₦38.57195M to maximum value of ₦2318351.0M. The mean value of POS not exceeding their respective standard deviations (₦521391.6M) which suggests that the variable is relatively volatile around its mean value. The variable (POS)'s Jarque-Bera statistics reveal that it failed the normality test. Exchange rate (EXC) has an average of 259.7781 and is not normally distributed but it is relatively stable around its mean value. 568128.7b stood as the average government expenditure and it is relatively stable around its mean and passed normality test at 1 per cent level of significance. Inflation rate had a mean of 12.37300 and was not normally distributed. The series INF) was relatively stable around its mean value. Gross domestic product growth rate (GDP) averaged 2.520137% and it is relatively stable but it was not normally distributed.

4.2. Unit Root Tests

Table 2 – Augmented Dickey-Fuller Unit Root Test Statistics at First Difference

Variables	ADF –Statistic	Prob.	Order of Integration I(d)
LOGSMT	-9.159739	0.0000	I(1)
LOGPOS	-11.85318	0.0000	I(1)
LOGEXC	-5.499769	0.0000	I(1)
LOGGEX	-11.08548	0.0000	I(1)
LOGINF	-4.938041	0.0005	I(1)
LOGGDP	-9.679096	0.0000	I(1)

Source: Authors' computation, 2024

The ADF test in Table 2 show that all the variables are stationary after first difference.

4.3. Johansen Cointegration Tests

Table 3a – Johansen Cointegration Tests: Trace Statistics

[I]. Trace Statistics				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.
None	0.4909	154.3492	95.7536	0.0000*
At most 1	0.3040	86.1496	69.8188	0.0014*
At most 2	0.2117	49.5427	47.8561	0.0344*
At most 3	0.1815	25.5110	29.7970	0.1440
At most 4	0.0503	5.2746	15.4947	0.7790
At most 5	0.0006	0.0619	3.8414	0.8035

Note* denotes rejection of the hypothesis at the 0.05 level.

Source: Authors' computation, 2024

Table 3b – Johansen Cointegration Tests: Maximum Eigenvalue Statistics

[II]. Maximum Eigenvalue Statistics			
Hypothesized	Max-Eigen	0.05	
No. of CE(s)	Statistic	Critical Value	Prob.
None	68.1995	40.0775	0.0000*
At most 1	36.6069	33.8768	0.0230*
At most 2	24.0316	27.5843	0.1336
At most 3	20.2363	21.1316	0.0663
At most 4	5.2127	14.2646	0.7148
At most 5	0.0619	3.8414	0.8035

Note* denotes rejection of the hypothesis at the 0.05 level.

Source: Authors' computation, 2024

In Table 3a, the Trace statistic indicates three cointegrating equations among the variables of the study. However, Max-eigenvalue test (in Table 3b) indicates two cointegrating equations. This suggests the existence of a long-run relationship between POS transactions and stock market liquidity in Nigeria.

4.4. Model Estimation

Table 4 – FMOLS Regression Estimates of Effect of POS Transactions on Stock Market Liquidity in Nigeria

Dependent Variable: LOGSMT				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
LOGPOS	-0.0866	0.0430	-2.0124	0.0466
LOGEXC	0.0566	0.2728	0.2075	0.8360
LOGGEX	-0.0344	0.0781	-0.4402	0.6606
LOGINF	-0.8074	0.1678	-4.8120	0.0000
LOGGDP	-0.0044	0.0383	-0.1163	0.9076
C	5.3033	1.0362	5.1180	0.0000
R-squared	0.8311	Mean dependent var		2.1759
Adjusted R-squared	0.8236	S.D. dependent var		0.3421
S.E. of regression	0.1436	Sum squared resid		2.3328
Jarque-Bera	0.6139			0.7356

Source: Authors' computation, 2024

Table 4 reports that about 83% of the variation in stock market liquidity in Nigeria has been explained by the joint effect of the independent variables and when the model is penalized for degree of freedom the explanatory power of the model is about 82%. The Jargue-Bera (0.6139) and the associated prob. value (0.7356), suggests that the FMOLS estimated in this study does not have abnormal distribution of errors terms. The diagnostic test of serial correlation in the form of correlogram of residuals Q-statistics, indicates the p-values attached (in each period) to the Q-statistics are higher than the level of significance (5%) and consequently , it be asserted that the model's residual is free from serial correlation problem. These diagnostics reveal that the model is free from serial correlation problem, normally distributed and has a higher predictive power and as such reliance can be placed on its estimates for policy recommendations.

Table 4 indicates that POS transaction has a negative coefficient of -0.086655 with an associated p-value of 0.0466, which implies that the long-run elasticity was negative and significant at 5% level. This suggests the existence of a negative and significant effect of POS transaction on stock market turnover ratio in the Nigerian stock market.

By this finding this study fails to reject the null hypothesis that POS transactions have significant impact on stock market liquidity in Nigeria. The implication of this finding is that rather than promoting liquidity of the Nigerian stock market, POS transaction discouraged stock market performance in terms of liquidity. This may be partly due to the fact that POS transactions in Nigeria are conducted basically for consumption and other daily transactions of which stock market transactions may not constitute a major part. Consequently, rather than promoting stock market liquidity, digital finance channel of POS shrank the liquidity of the Nigerian equity market.

The estimates of the FMOLS regression further indicate that government expenditure, inflation rate and economic growth were negatively signed but only inflation rate had significant effect on stock market turnover ratio in the Nigerian stock market. However, exchange rate had positive but non-significant effect on stock market turnover ratio in the Nigerian stock market

5. CONCLUSION AND RECOMMENDATIONS

This study explored the impact of POS transactions on stock market turnover ratio in Nigeria using FMOLS regression technique for the period, January 2012 to December, 2021. POS digital finance transaction was found to have negative and significant impact on stock market turnover ratio in the Nigerian stock market. The study also found the existence of a long-run relationship between POS digital finance transaction and stock market turnover ratio in Nigeria. Furthermore, this study reveals that digital finance is a determinant of stock market liquidity in Nigeria.

The study concluded that, rather than promoting stock market liquidity, digital finance channel of POS shrank the liquidity of the Nigerian equity market. This findings may not

unconnected with the fact that in Nigeria, POS transactions are basically used for consumption and other daily transactions of which stock market transactions may not constitute a major part.

It can therefore be recommended that to improve stock market liquidity, Government should encourage the use of POS terminals for stock transactions by giving incentives to users of POS for stock market dealings in Nigeria. That the current point-of-sales transactions had negative and significant impact on stock market turnover ratio in Nigeria require that POS devices and the transactions thereon be re-configured to facilitate stock market liquidity. Thus, a policy of compulsion acquisition and use of one-POS per stock broker and other key market participants is recommended.

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