Cash Redesign Shock, Agent Banking and Financial Inclusion in Nigeria

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ABSTRACT

This study examined the recent Nigeria cash redesign and rapid growth of agent banking on financial inclusion. The Central Bank of Nigeria's naira redesign established a temporary cash shortage that affected daily cash transactions, even as it aimed to agree with monetary and financial stability. In regards to these effects, Cointegration tests were carried out, using Johansen Cointegration tests, the results confirmed the use of Fully Modified Ordinary Least Squares (FMOLS) as a method to conduct robustness checks using alternative model specifications. Financial inclusion serves the dependent variable while cash redesign shock, density of registered agent outlets as independent variables, moreover inflation and exchange rate as control variables. The analysis uses annual time-series data from 2009 to 2023, soured mainly from International Monetary Fund's IMF Indicators (2023) and the Central Bank of Nigeria's statistical reports. The results show that while the reform initially tightened liquidity and strained transaction activity, agent banking helped cushion the impact by providing practical alternatives for households and businesses. In particular, agents outlets in rural and semi-urban areas became key points of access when cash was difficult to obtain. In conclusion, agent banking can strengthen financial inclusion during policy-driven shocks, however its advantages depend on reliable digital payment infrastructure and an enabling regulatory environment. To maintain progress in inclusion, it suggests strategies to increase the size and professionalism of agent networks, improve the dependability of payment systems, and include financial literacy instruction.

Keywords: Agent Banking, Cash Redesign Shock, Financial Inclusion, Inflation, Exchange Rate

INTRODUCTION

Financial inclusion has been a source of inspiration to development targets. It is on a mission in order to reduce and lower the costs and frictions that enable the firms and households outside formal finance. Creating the freedom for people to pay, borrow, save and insure reliable and at an affordable cost, this enables them to participate freely in the sharing of risk and more involvement in the markets. An Empirical literature shows that cross-country has deeper and more accessible the financial system which are associated with stronger growth and welfare profit, while the Empirical gaps in access often mirror gender, income, geography and education (Grohman,Kliuhs & Menkhoff, 2018 and Sarma&Pais, 2011). In reality, inclusion is a very important discussion that enables development.

Online payment and agent banking have grown speedily, yet access remains uneven across locality. Limited access to infrastructure, network downtime and liquidity shortages have limited the usage. In the year 2013 Central Bank of Nigeria issued licenses to agent banking guidelines, individuals and merchants to provide as access points for cash in and cash out, transfers, bill payment and also account opening on behalf of regulated

institutions (CBN, 2013;Ayadi,2023). This development enables financial services such as transfers, cash in and cash out, etc closer to where people live and work which reduces exclusion at the lower cost than branch expansion (Adewale et al., 2025; Zins& Weill,2016).

Nigeria has a strong setting for reviewing inclusion under stress as a result of two linked developments. Firstly, in late 2022 and early 2023 there was cash redesign and also introduced redesigned ₦200, ₦500, and ₦1,000 notes under a tight timeline. The second aspect of it was the instant electronic payment and agent networks expanded at scale. During the period of cash redesign, cash scarcity was high which increased the cost of routine transactions, especially in cash intensive activities such as informal trade, micro trade and individuals. As a result of this, many users shifted to transfers and point of sale payments where agents and payment were available, many transactions were delayed or rationed, with direct effects on sales and income. The season served as a test of whether agent networks withstand demand and also the last mile capacity shapes how communities cope.

During this period, it shows that Payment data demand for digital channels increased speedily, Reports show that the electronic payment and values increased during the redesign window, cashless transactions increased in January 2023, with increase instant payment values exceeded ₦600trillion (NIBSS,2023-2024). According to the Nigeria Inter Bank Settlement System, cashless transactions do not mean all regions transact smoothly. The World Bank reported that cash shortage and redesign in early 2023 slowed the economic momentum and also reduced the small business activity, household consumption and expenditure, even while online transactions were rising. In addressing this issue, authorities introduced policy and legal measures, including a Supreme Court backed extension that allows old notes as a legal tender for longer to help the transition (World Bank, 2023, Dada, 2023; Otitoju, 2023).

In this setting, agent banking not only delivers financing services but also helps the system cope during disruption. Agent banking reduces the stress of people going to distance for financial transactions and provides easy access to finance. They allow users to turn digital balances into cash and cash into digital values. Empirical studies in Nigeria and wider African settings revealed that there are link agent access points to greater use of formal financial services especially consumer security and regulations are credible (Ayadi, 2023; Zins & Weill, 2016; Adedokun,2023). The African country Kenyan precisely experienced revealed that dense agent networks can unlock the gains from digital finance (Suri &Jack, 2016). Nigeria may follow their footsteps through similar channels, although its provider mixes regulatory settings differ (Ayadi 2023).

This study therefore asks a brilliant question. Does the local agent outlet affect how people shift to online channels and how far the formal usage recovers after a limits physical cash? Does the agent per person see declines in transaction activity and faster rebounds in inclusion? These questions are essential for research because it links a demand side shock to a supply side access mechanism. This also matters for policy because it informs the central banks and financial authorities can design currency transactions, cash handling rules, and cashless programmes to reduce short run welfare losses.

Studies associated with financial services through ATMs, and agents, and shows that access reforms are stronger when paired with capabilities such as financial literacy (Beck et al., 2007; Grohman et al., 2018; Oluwadamilare et al., 2025). On the digital side, easy payments and mobile money reduce search and settlement costs, which can support trade when cash is scarce (Suri & Jack, 2016). Empirical African panels revealed that there are links to financial inclusion to strengthen growth and poverty reduction. (Adedokun, 2023; Tran et al., 2022). This experience also shows that significant issues that differed by area which includes; higher transaction prices, service interruptions, and cash constraints (Magaji & Nguyen, 2022).

Carefully consider these dynamics, cash redesign shock has conditional implications for financial inclusion. This shock might hasten the shift to digital finance and enhance financial inclusion in areas including robust and dense agent networks. To further analyse this research work, as a result of fewer studies on the relationship between the variables, this study seeks to explore the interaction among cash redesign shock, agent banking and financial inclusion respectively.

LITERATURE REVIEW

To strengthen the study on the subject matter, the researchers examine the Cash Redesign Shock, Agent Banking and Financial Inclusion. This is achieved through a comprehensive literature review encompassing theoretical and empirical analyses.

Theoretical Review

Transaction-cost economics (TCE)

Search, bargaining, monitoring, and enforcement costs are at the core of organizational decisions, according to Coase (1937) and Williamson (1985). Payments are a classic transaction-cost domain: digital payments carry setup, acceptance, and failure risks; cash carries withdrawal, travel, and handling costs; and agent banking shifts costs by reducing physical distance and queueing time but introducing liquidity and reliability constraints at the outlet. The entire cost of using cash finding genuine notes, waiting in line for withdrawals, and paying premiums for cash is increased by a cash-redesign shock. This should increase the relative appeal of digital channels whenever their effective transaction costs including failure risk are low. As a result, TCE forecasts out-migration (or rationing) in situations where agent networks do not reduce user costs and substitute into digital in situations where they do.

Estimate whether local agent density and reliability (proxied by agents per 1,000 adults or per km² and failure rates) reduce the generalised cost of digital use enough to offset higher cash costs during the shock. The larger the last-mile cost wedge cash users face, the stronger the predicted substitution conditional on viable digital rails.

Two-sided markets and network externalities

Payment systems are two-sided platforms: users value them more when more merchants/peers accept them, and vice versa. Rochet and Tirole (2003, 2006) show how pricing and participation on each side interact to determine adoption, usage, and welfare. In such markets, small frictions can hold ecosystems below a "critical mass," while a temporary coordination device, such as a shock that makes cash temporarily unattractive, can move the system onto a higher-adoption path if the platform is ready to scale. The Indian evidence demonstrates exactly this history dependence: demonetization produced a persistent boost in e-payment adoption among retailers, consistent with a model of complementarities.

Test for heterogeneous, persistent effects of the shock in Nigerian localities with thicker agent/merchant presence before the shock. If network effects matter, places that started closer to critical mass should show larger and more durable adoption responses and stronger improvements in inclusion indicators than otherwise similar places with thin networks.

Diffusion of Innovations and Technology Acceptance

Rogers' diffusion framework emphasises perceived relative advantage, compatibility, complexity, trialability, and observability; Davis's Technology Acceptance Model (TAM) highlights perceived usefulness and ease of use as direct predictors of adoption intentions. Applied to payments, both frameworks predict faster digital take-up when users perceive clear advantages (speed, safety, availability during cash shortages) and when learning costs are low. A shock can temporarily raise "relative advantage," but sustained adoption depends on habit formation, reliability, and social proof. Empirical work with small merchants in India supports a demand-side story: even where infrastructure is available and affordable, merchants under-adopt when they believe their customers do not want to pay digitally or when they fear increased tax visibility.

Include proxies for perceived usefulness/ease and social proof at the local level, e.g., pre-shock digital usage rates, merchant acceptance density, or prior USSD/POS penetration. If TAM/DoI mechanisms are at work, areas with stronger pre-shock exposure should convert more of the temporary push into lasting usage.

Money-demand models under constraints (Baumol–Tobin / liquidity preference)

Classic money-demand models frame cash holdings as a trade-off between liquidity services and opportunity cost, with inventory-theoretic (Baumol, 1952) and portfolio-risk (Tobin, 1958) perspectives. A cash-redesign episode effectively raises the fixed and variable costs of obtaining and using cash (search time, queues, uncertainty about acceptance), shifting the optimum away from cash, especially for frequent, small-value payments. Where digital rails are credible substitutes, the user's optimum switches; where they are not, the user reduces transactions or delays purchases. These predictions dovetail with the two-sided and TCE lenses above.

Empirical Literature Reviews

The review of empirical literature has been conducted in line with the broad variable relationships conducted in this study.

Cash Redesign Shock and Financial Inclusion

Empirical studies revealed that cash-redesign season can act as an agent for digital adoption, especially where there is already robust payment for infrastructure. According to Crouzet et al., 2023, use merchants-level data from India's 2016 demonetization shows that strong causal persistent increase in electronic wallet adoption among retailers. It revealed durability to network supplements of two side markets; merchants and consumers. At the household level, other researchers Agarval et al. 2024 write on financial studies and their results show that electronic payment adoption during demonetization allowed families to smooth consumption despite cash shortages also highlighting substitution effects. From a macro perspective, Fouillet, Morvant-Roux, and Guerin (2021) revealed that in Telecommunications Policy agree that demonetization increases the adoption of POS and mobile payment, reinforcing the idea that when infrastructure and acceptable networks are in place, shocks can create enduring digital transitions.

However, not all empirical studies agreed that cash-redesign is purely transformative. Chodrow-Reich et al., 2020 examined cash and the economy: evidence from India's demonetization and revealed that demonetization results in contractions in employment, output and credit with the sharpest effects observed in regions more dependent on cash and on informal sectors. Altogether, these Empirical findings show that distributional consequences of sudden cash withdrawal digital substitutes are unreliable shocks that can deepen hardship and exclusion.

Agent Banking and Financial Inclusion

Below empirical studies show the critical role of agent banking and mobile money in enhancing financial inclusion. Ayadi et al (2023) demonstrates that agent banking significantly increases access to financial services; however, geography coverage, transactions stability, the quality and reliability of agents, as measured by liquidity, prove more critical than mere numerical expansion. A large number of network agents are not enough on its own. If outlets face frequent downlines, charge high fees, or struggle to maintain cash and e-float, the user experience breaks down. Financial inclusion also contributed to the growth and development to access finance among people, cashless transactions also provide security safety and also reduce the physical cash Adewale et al., (2025).

Nigerian-focused studies emphasise that even with a rapidly expanding agent network, significant operational constraints persist. Ayadi et al. (2023), for instance, note that float shortages, frequent downtime, fraud risks, and fee sensitivity continue to undermine the effectiveness of agency banking. The consensus is that quality, liquidity, and reliability of agents, not mere density, determine whether financial access leads to sustained and meaningful inclusion.

Cash Redesign Shock and Agent Banking on Financial Inclusion

A brief decrease in cash availability may serve as a stimulus for long-term digital adoption, according to empirical studies from other nations, particularly when the payment ecosystem is close to a tipping point characterized by substantial network effects (Crouzet, Gupta, & Mezzanotti, 2023). However, the two lines of

data are rarely examined in tandem, despite the fact that we know that agent density and dependability are critical in transforming access into persistent usage (Ayadi et al., 2023; Zins & Weill, 2016). Reviews also demonstrate that agent networks lower last-mile frictions, but they do not clearly connect this to episodes of cash scarcity brought on by policy.

In Nigeria, existing post-2022 studies examine the macroeconomic and political implications of the naira redesign (Ojo, 2024), but rigorous micro-spatial evidence on whether agent density softened exclusion and amplified digital substitution remain absent. Filling this gap is the unique contribution of the present study.

METHODOLOGY

This study employs econometric methods and time-series data to examine the Cash Redesign Shock, Agent Banking, and Financial Inclusion. The independent variables in this study include Currency in Circulation (CIC), a proxy for the Cash Redesign Shock; Registered Agents Outlet (RAO); Exchange Rate (EXCHR); and Inflation Rate (INFL). The cash-redesign shock CRS is captured with an event dummy around the implementation window documented by the Central Bank of Nigeria, when redesigned notes entered circulation and access to cash tightened nationwide, and its intensity can be proxied with movements in currency in circulation. And Financial Inclusion, as measured by Financial Access, serves as a proxy for the dependent variable (Financial Inclusion). All these measures are used in the study to achieve this goal.

The study uses annual time-series data covering 2009 to 2023. Thus, the data's primary sources are the Nigerian Central Bank's statistics report and the International Monetary Fund IMF Indicators, 2023.

Model Specification

To formalise the link between the cash redesign episode, the spread of agency outlets and measured inclusion, we adapt a standard linear inclusion framework often used in the Nigerian literature to our objectives. When the model is adapted to the objective of this study, Financial Inclusion is expressed as a function of Cash Redesign Shock (CRS), Registered Agents Outlet (RAO), Exchange Rate (EXCHR), and Inflation Rate (INFL). The following linear specification of the econometric model is shown in equation (1) as follows:

FININC = f(CRS, RAO, EXCHR, INF,) - - - (1)

Where:

FININC = Financial Inclusion

CRS =CIC= Currency in Circulation

RAO = Registered Agents Outlet

EXCHR = Exchange Rate

INFL = Inflation Rate

Equation (1) can be further expressed in the functional form as follows:

$$\text{FININC}_t = \beta_0 + \beta_1 \text{CRS}_{1t} + \beta_2 \text{RAO}_{2t} + \beta_3 \text{EXCHR}_{3t} + \beta_4 INF_{5t} + \varepsilon_t \quad - \quad - \ (2)$$

Where $\beta_0, \beta_1, \beta_2, \beta_3, \beta_4 \ and \ \beta_5$ are the coefficient to be estimated and ε_t is the stochastic error term. The apriori expected signs of the coefficients are $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \ and \ \beta_4 > 0$. The parameter $\beta_4 > 0$ implies a positive relationship between the dependent variable and the independent variable.

Analytical Framework

The analytical framework adopted for this study is the Fully Modified Ordinary Least Squares (FMOLS) approach. The FMOLS estimator was proposed by Phillips (1993) as an estimator that may employ a semi-parametric modification to remove the problems connected to the long-run association of the cointegrating

equation with stochastic regressors. The FMOLS estimator is basically an unbiased approach to regression analysis, providing optimal estimates by utilising the cointegrating regression technique. Fully Modified OLS (FMOLS) offers significant advantages over standard OLS for cointegrated time series by providing asymptotically unbiased and efficient estimators that correct for endogeneity and serial correlation, producing reliable long-run relationship estimates even in small samples, and allowing for heterogeneous short-run dynamics while pooling long-run information, making it robust for complex cointegration analysis.

Advantages of the Fully Modified OLS:

- The FMOLS corrects endogeneity and serial correlation by adjusting for both biases that plague standard OLS in cointegrated systems, leading to more accurate coefficients.
- Produces Efficient & Consistent Estimates with asymptotically efficient and consistent estimates of long-run relationships, even with I(1) variables.
- More Robust for Small Samples, providing reliable results where traditional methods might fail.
- Empirically tested to generate more valid inference which are nuisance-parameter-free standard normal distributions, allowing for valid t-tests and hypothesis testing on the long-run coefficients.

EMPIRICAL RESULTS AND DISCUSSION

Descriptive Statistics

Descriptive statistics for the study Cash Redesign Shock, Agent Banking and Financial Inclusion are shown in Table 1. The mean and median, which are measures of central tendency, provide insights into how the data series is distributed. With a mean of 0.124878 and a median of 0.127 for Financial Inclusion (FININC), the data appear to be slightly left-skewed. The observation is bolstered by the negative skewness value of -0.66909, which suggests that some extremely low values are pulling the mean downwards. For Cash Redesign Shock (CRS), the mean of 1972.968 exceeds the median of 1434.629, suggesting a right-skewed distribution that may be influenced by several high outliers. The average value of Registered Agents Outlet (RAO) is 895139, which is greater than the median of 24584.5, suggesting a mild right skewness due to the impact of larger values in the dataset. The range, determined by subtracting the minimum value from the maximum, provides insight into the extent of variability. FININC shows considerable variation, ranging from 0.108833 to 0.137, indicating that economic growth fluctuated substantially during the observed timeframe.

The normality of the data distributions was evaluated using the Jarque-Bera (JB) test. The JB probabilities for variables such as RAO and INFL are below 0.05, indicating rejection of the null hypothesis of normality. On the other hand, FININC, CRS and EXCHR showed JB probabilities exceeding 0.05, suggesting that their data distributions do not significantly differ from normality.

Table 1: Descriptive Statistics

	FININC	CRS	RAO	INFL	EXCHR
Mean	0.124878	1972.968	895139	76.76945	266.5285
Median	0.127	1434.629	24584.5	12.53783	253.492
Maximum	0.137	3959.719	10297655	564.7925	496.9745
Minimum	0.108833	942.6305	18.84719	8.047411	148.88
Std. Dev.	0.00703	1036.537	2961405	171.9913	119.3046
Skewness	-0.66909	0.747221	3.013724	2.257215	0.562456
Kurtosis	3.30353	2.04639	10.08585	6.281427	2.018393
Jarque-Bera	1.176773	1.964206	43.26974	19.4674	1.393114
Probability	0.555223	0.374523	0.0000	0.000059	0.498298
Sum	1.873167	29594.52	10741668	1151.542	3997.928
Sum Sq. Dev.	0.000692	15041716	9.65E+13	414134	199270.4
Observations	15	15	15	15	15

Source: Author`s Computation 2026

Correlation Matrix of Regressors

The correlation matrix that illustrates the strength and direction of the linear correlations between Financial Inclusion (FININC) and its explanatory factors is shown in Table 2. Cash Redesign Shock (CRS) and FININC have a high negative correlation (−0.70138), indicating that lower financial inclusion is linked to times of cash scarcity. This could be a result of limited access for cash-dependent people and small companies, ATM congestion, and liquidity issues. This relationship is still descriptive and needs more investigation, though. Registered Agents Outlet (RAO) and FININC have a weak negative connection (−0.1268). Because agent expansion may take place in low-inclusion areas or during times of financial crisis, hiding the underlying relationship, this tiny magnitude calls for caution in interpretation.

Additionally, FININC exhibits significant negative relationships with the exchange rate (EXCHR) (-0.73056) and inflation (INFL) (-0.77971). These suggest that by decreasing real income and raising transaction costs, macroeconomic instability may lower financial involvement. Nevertheless, the fact that these results are not statistically significant at the five percent level suggests that they are merely suggestive.

CRS and RAO have a positive correlation (0.343042) among the regressors, indicating that agent networks expand adaptively during shocks. Additionally, there are strong correlations between CRS and EXCHR (0.95513) and INFL (0.724121), suggesting overlapping macroeconomic pressures and possible multicollinearity issues. Overall, the findings show that in order to establish strong correlations, multivariate analysis is necessary.

Table 2: Correlation Matrix

	FININC	CRS	RAO	INFL	EXCHR
FININC	1				
CRS	-0.70138	1			
RAO	-0.1268	0.343042	1		
INFL	-0.77971	0.724121	-0.13187	1	
EXCHR	-0.73056	0.95513	0.286076	0.726419	1

Source: Author`s Computation 2026

Analysis of the Unit Root Test

The findings of the unit root tests assessing the stationarity of the time series data used in this research are shown in Table 3. As the use of non-stationary variables in regression models can lead to spurious relationships and misleading conclusions, testing for stationarity is a vital initial step in time series analysis. For this purpose, the Augmented Dickey-Fuller (ADF) test was used. The results show that all variables examined in the research, specifically, Financial Inclusion (FININC), are expressed as a function of Cash Redesign Shock (CRS), Registered Agents Outlet (RAO), Exchange Rate (EXCHR), and Inflation Rate (INFL), and are stationary following first differencing. This suggests they are integrated of order one, I(1).

This conclusion is backed by the fact that the absolute values of the 5% critical values are exceeded by the ADF test statistics, and all the associated probability values are below 0.05, thus confirming that the null hypothesis of a unit root in each series is rejected. Since all variables are I(1) and the study focuses on cointegrated economic relationships, the Fully Modified Ordinary Least Squares (FMOLS) estimation technique was chosen. FMOLS is especially suitable for examining long-run relationships among integrated variables because it addresses both serial correlation and endogeneity that can occur due to cointegration, resulting in consistent and efficient parameter estimates.

Table 3: Augmented Dickey Fuller Unit Root Test Results and Interpretation

	LEVEL			FIRST DIFFERENCE			
Variables	**T-Statistics**	**Critical Values 5%**	**P-Values**	**T-Statistics**	**Critical Values 5%**	**P-Values**	**Order of Integration**
FININC	-0.9148	-3.0988	0.7517	3.7722	-3.11991	0.0164	I(1)
CRS	1.73078	-3.098896	0.9989	-4.65799	-3.82898	0.0142	I(1)
RAO	1.808140	-3.259808	0.9983	-3.32097	3.908355	0.0174	I(1)
INFL	-1.7753	-3.82897	0.6573	-2.4631	-1.97098	0.0184	I(1)
EXCHR	-2.5736	-3.82897	0.295	-4.2479	-3.8753	0.0292	I(1)

Source: Author`s Computation (2026)

Note: * indicates significance at 5 per cent; 95% critical values are reported in parentheses below each test value.

Cointegration Test

At the 5% significance level, the null hypothesis of no cointegration is rejected by the combined results of the Johansen Cointegration Test and the normalized autocorrelation coefficient (the z-statistic) (see Tables 4 and 5). Results of the Johansen cointegration test are presented in Tables 3 and 4, respectively, indicating two (Trace) and one (Maximum Eigen value) cointegrating ranks. It was necessary to conduct another test to assess the co-integration of the non-stationary variables, as almost all variables were stationary after the initial differencing. The hypotheses were evaluated at the five percent significance level to confirm the rank of the cointegrating correlations among the variables. This indicates that there was evidence of a long-term relationship between the variables.

Table 4 Johansen Cointegration Rank Test (Trace)

Hypothesized		**Trace**	**0.05**	**Prob.****
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.998561	125.7798	47.85613	0
At most 1 *	0.850807	40.70714	29.79707	0.0019
At most 2 *	0.586451	15.97446	15.49471	0.0423
At most 3 *	0.292364	4.495724	3.841465	0.034

Source: Author`s Computation (2026)

Table 5: Johansen Unrestricted Cointegration Rank Test (Max-eigenvalue)

Hypothesized		**Max-Eigen**	**0.05**	**Prob.****
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Critical Value
None *	0.998561	85.07263	27.58434	0
At most 1 *	0.850807	24.73268	21.13162	0.0149
At most 2	0.586451	11.47874	14.2646	0.1318
At most 3 *	0.292364	4.495724	3.841465	0.034

Source: Author`s Computation (2026)

Thus, the use of Fully Modified Least Squares (FMOLS) would allow us to monitor the long-term connection between the variables, given that all are stationary at first difference and co-integration exists, and we have verified the long-term relationship.

Table 6: Fully Modified Least Squares (FMOLS) on the Cash Redesign Shock, Agent Banking and Financial Inclusion

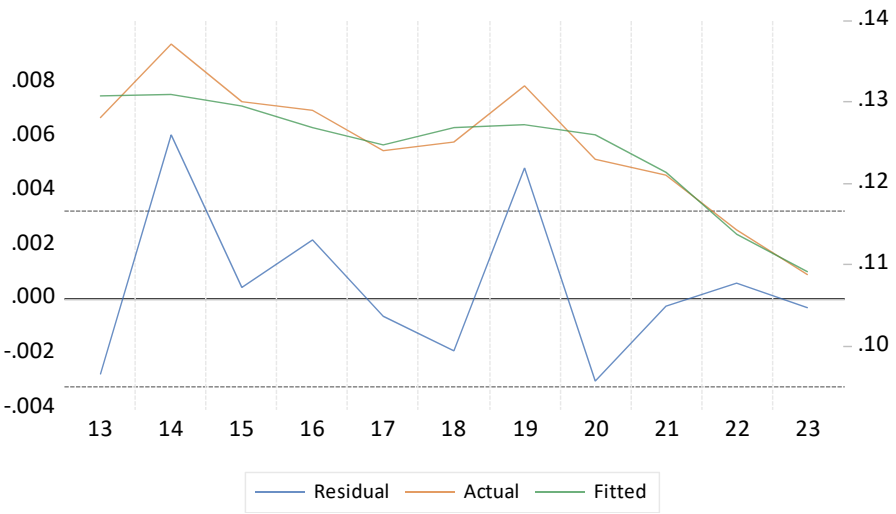
Dependent Variable: FININC				
Method: Fully Modified Least Squares (FMOLS)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
CRS	2.68E-06	3.54E-06	0.757052	0.4777
RAO	-3.77E-10	4.41E-10	-0.85611	0.4248
INFL	-2.44E-05	9.56E-06	-2.55094	0.0434
EXCHR	-4.53E-05	2.99E-05	-1.51657	0.1802
C	0.134844	0.004218	31.96795	0.0000
R-squared	0.864114	Mean dependent var	0.124742	
Adjusted R-squared	0.773524	S.D. dependent var	0.00799	
S.E. of regression	0.003802	Sum squared resid		8.68E-05
Long-run variance	1.06E-05			

Source: Author`s Computation 2026

Table 6 reports the Fully Modified Ordinary Least Squares estimates for "Cash Redesign Shock, Agent Banking and Financial Inclusion." The coefficient on the Cash Redesign Shock (CRS) is positive at 2.68, but the effect is not statistically different from zero, given a p-value of 0.4777. Registered Agents Outlet (RAO) is negative at −3.77 and also statistically insignificant with a p-value of 0.4248. These results mean that, within this specification, neither CRS nor RAO shows a reliable partial effect on financial inclusion once the other variables are held constant.

Inflation (INFL) is the only variable that is statistically significant at the 5 per cent level. Its coefficient is −2.44 with a p value of 0.0434, indicating that higher inflation is associated with lower financial inclusion during the period studied. The exchange rate (EXCHR) has a negative coefficient of −4.53 but is not statistically significant at conventional levels, with a p value of 0.1802.

The model fit is strong in-sample. The R-squared of 0.8644 implies that about 86.4 per cent of the variation in financial inclusion is explained by the regressors. The adjusted R-squared is 0.7735, which accounts for model complexity and still indicates a solid fit. The gap between R-squared and adjusted R-squared suggests that while the model captures important variation, further refinement may improve generalizability. Examples include adding policy or payment infrastructure controls, testing alternative functional forms, and checking robustness across different sample windows. Taken together, the FMOLS results highlight inflation as a key headwind to financial inclusion in Nigeria over the study window. The positive but insignificant CRS estimate and the negative but insignificant RAO and EXCHR coefficients should be treated as descriptive patterns rather than established effects. Subsequent robustness checks can help clarify these relationships, including multicollinearity diagnostics, sensitivity to control sets, and stability tests.



Source: Author`s Computation 2026

SUMMARY OF THE RESULT

The FMOLS results tell a clear story about financial inclusion in Nigeria over the study period. The cash redesign shock carries a positive coefficient but is not statistically different from zero, once inflation, the exchange rate, and the agent network are controlled for. Practically speaking, there is no discernible partial impact of the redesign episode on inclusion in this standard. This is in line with a period when digital activity grew rapidly, while operational challenges and funding shortages led to conflicting, transient signals in actual usage. Even as many households and businesses experienced difficulty, public transaction data confirms a large increase in electronic payments during the episode, suggesting a shift away from cash (Nigeria Inter-Bank Settlement System [NIBSS], 2023).

Additionally, the negative coefficient for registered agency outlets is statistically insignificant. When seen in conjunction with the correlation patterns, this probably represents timing and composition rather than a real negative impact. Contemporaneous level linkages may appear weak or negative since agent networks grew more quickly in places with little initial access and during the cash crunch. Treating the negative sign as a specification or timing artefact to investigate with robustness tests is supported by external evidence that agent banking has been successful in reaching underserved populations in Nigeria (World Bank, 2021). The only variable with a negative sign and statistical significance at the five per cent level is inflation. According to economic intuition, severe inflation reduces the actual worth of balances, increases transaction costs, erodes confidence, and deters marginal users from saving and using money formally. More extensive data also demonstrates how macroeconomic factors influence access to and utilisation of formal finance by associating more stable price environments with improved inclusion outcomes. Zainal et al. (2023)

Despite being negative, the exchange rate coefficient is not statistically significant. Higher prices and uncertainty may accompany depreciation; however, after inflation and other controls are included in the model, the independent contribution of exchange rate movement to inclusion is not accurately evaluated in this sample. Overall fit is strong in the sample, with a high R^2 and a lower adjusted R^2 that still indicates a solid fit but leaves room for improvement in parsimony and generalizability. FMOLS is an appropriate estimator in this context because it corrects for endogeneity and serial correlation in cointegrating regressions, which supports consistent long-run parameter estimates. Phillips, P. C. B., & Hansen, B. E. (1990)

CONCLUSION AND RECOMMENDATIONS

The macro channel most evident in the outcomes should be the main focus of policy. By preserving the real value of small balances and reducing the friction of regular payments, reducing inflation will have the greatest immediate positive impact on inclusion. For vulnerable users to maintain account activity during adjustment, this calls for tight coordination between monetary and fiscal authorities, as well as protection for targeted financial transfers. This suggestion is consistent with external data showing that more stable pricing is associated with more inclusive environments (Zainal et al., 2023).

The next stage is converting the increase in digital activity into long-term access. Electronic payments reached all-time highs during the redesign phase, indicating that demand is there. Reliability and liquidity at the time of use define persistence. Improve agent float and cash management, tighten dispute-resolution deadlines, create and track uptime targets for quick payment switches, and improve customer support and recourse to fortify the rails customers deal with daily. These operational adjustments help transform short-term behavioural changes into long-term formal financial services utilisation. According to publicly available data, transaction volumes in 2022 and 2023 reached previously unheard-of heights; maintaining that momentum requires fewer unsuccessful transactions and quicker reversals. Inter-Bank Settlement System of Nigeria (2023)

Third, focus on agent network quality, not only quantity. The insignificant and negative RAO coefficient suggests that counting outlets is not enough. Incentivise agents in thin markets to maintain cash and e-float, expand coverage in peri-urban and rural wards, and enforce service standards. Experimental and observational evidence indicate that agent banking is especially valuable where branches are scarce, which supports targeted expansion with performance monitoring.

Fourth, design cash-to-digital transitions that avoid liquidity shocks. The redesign episode coincided with a cash shortage that disrupted daily activities and damaged trust. Future currency and cash-handling reforms should be phased with clear timelines, guaranteed cash availability, and contingency plans for rural areas. Legal and policy records on the 2023 episode document the stress caused by compressed deadlines and shortages, which should inform any future rollout. Reuters. (2023)

Lastly, include evidence in the monitoring. Add other robustness checks to the model that the results already support, such as alternative functional forms, break tests around the shock window, interaction terms for agents and inflation, and variance inflation factors to assess multicollinearity. To distinguish between short-term adjustments and long-term partnerships, consider dynamic specifications.

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