



# THE NEXUS OF FINANCIAL INCLUSION AND LIQUIDITY IN NIGERIA

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### Executive Summary

inancial inclusion—defined here as access to and use of diverse financial services at an affordable cost—can bring many distributional benefits. However, authors know very little about the relationship between financial inclusion and liquidity. The role of liquidity in macroeconomic management, especially for the conduct of monetary policy, financial sector soundness and economic growth is very critical. Consequently, efficient and effective management of liquidity is at the heart of the conduct of monetary policy. From the central banks' point of

view, liquidity management is paramount in delivering the mandate of monetary stability and price stability.

Adequate liquidity promotes a sound banking and financial system which provides a virile platform for sustainable economic growth and development. In Nigeria, although recent statistics in Mar-2018 shows that currency in circulation has declined, however there is a build-up in liquidity as major monetary aggregate (M2) reveals an upward trend. Both excess liquidity and shortage in liquidity poses a wide range of problems/risks for the economy as well as financial institutions (Apătăchioae, 2015; Karamichailidou, Mayes, & Stremmel, 2018). Hence, considering these risks, maintaining liquidity positions, whether that of the whole banking system or the economy, has become a very important aspect for

control variable. Using secondary data of monthly frequency over the period 2010-M01 to 2016-M12 sourced directly from the Central Bank of Nigerian Statistical Bulletin (CBN), the National Bureau of Statistics (NBS) and EFInA. However, monthly financial inclusion data were generated by splicing annual data using appropriate techniques. The choice of the period was informed by the availability of volume of payment

inclusion (FI) defined from the demand side, aggregate and

disaggregated liquidity (M2) components in Nigeria and

volume of payment platforms (VPP) transactions acting as a



This study therefore set out to ascertain the **nexus** between **financial inclusion** and **liquidity** using a three (3) variables vector autoregression (VAR) model. informed by the availability of volume of payment platform transaction data since 2009 while the most recent for financial inclusion is 2016. The results obtained show the existence of a bidirectional or feedback relationship between financial inclusion and liquidity.

This feedback relationship suggests that liquidity drives financial inclusion however the impact is stronger on formal financial inclusion. Thus, rising liquidity may lead to increase in employment, productivity and income thereby encouraging formal inclusion. Also, activities in the informal financial sector also increase liquidity and this makes liquidity management difficult for central banks since it may thwart efforts towards price stability whereas formal inclusion increases bank liquidity and the bank's

the financial system and the economy as a whole.

This study therefore set out to ascertain the nexus between financial inclusion and liquidity using a three (3) variables vector autoregression (VAR) model. Specific questions include; does increased financial inclusion help in managing liquidity and the stock of money in the economy? Or does growth in liquidity and the stock of money increase the level of financial inclusion? The trivariate VAR was in a linear form and contains financial ability to fulfil its obligations. On the basis of the implication of the nexus between financial inclusion and liquidity, efforts aimed at boosting financial inclusion should be sustained. However, increase in informal inclusion could increase liquidity thus central banks should explore ways to curb such increase in liquidity that may hinder price stability.





### Section 1 Introduction

The role of liquidity in macroeconomic management especially for the conduct of monetary policy, financial sector soundness and economic growth is very critical. Consequently, efficient and effective management of liquidity is at the heart of the conduct of monetary policy. From the monetary central banks' point of view, liquidity management is paramount in delivering the mandate of monetary stability and price stability. Adequate liquidity promotes a sound banking and financial system which provides a virile platform for sustainable economic growth and development. In Nigeria, although recent statistics in Mar-2018 shows that currency in circulation has declined, there is a build-up in liquidity as major monetary aggregate (M2) reveals

an upward trend.

Money, is the most liquid financial asset and the live wire of any economy. Therefore, the efficient flow of funds or liquidity from surplus to deficit spending units of the economy and for business transactions promotes the smooth running of the economy. As the ultimate supplier of the banking system liquidity, central banks must supply, as well as maintain, the level of liquidity that is consistent with

non-inflationary growth. Inadequate liquidity could render banks incapable of performing their traditional functions and send wrong signals to economic agents and thereby compromise the achievement of monetary policy objectives. It could also precipitate a run in the banking system which might exacerbate structural distortions in the economy and impede the attainment of set macroeconomic goals.

The Central Bank of Nigeria uses its Monetary Programme to monitor and manage banking system liquidity in the country. It operates through the interbank money market, with a view to ensuring financial system stability, maintaining adequate money supply and moderating inflation. The Central Bank supervises the domestic money market, ensures the smooth functioning of the payments system infrastructure and provides financial and technical support to financial institutions, where necessary. The Central bank controls liquidity by holding broad money supply (M2) as an intermediate target with the ultimate aim of price stability and implicit gross domestic product (GDP) growth.

Despite growing confidence that has resulted in increasing bank deposits and banking credit to the domestic economy, financial exclusion took a step forward in 2016 to 41.6 percent,



representing 40.1million adult population, from 39.5 percent in 2014. Sound liquidity management is an important objective of both the apex bank and commercial banks not only because it prevents banks from running in to liquidity shortages but also because it determines their profits (Bongani 2016).

Although financial inclusion in most studies is linked to growth and poverty reduction, however, one can argue that the move of money from boxes and under mattresses to the financial sector (precisely banks), could pose a challenge to the Central Bank and commercial banks regarding the quantity of money supplied (liquidity). Central Bank (CB) could supply a quantity of money which becomes higher/lower than what the economy

> needs due to the new flow of money to banks which was not anticipated by the CB. To this end, financial inclusion will be a veritable tool for managing economic liquidity.

> Furthermore, liquidity is a very crucial aspect of the banking business. In the worst-case scenario, if a bank has a liquidity issue, it may not be able to fulfil its obligations to its savers. When that happens, the trust for that bank may collapse, thus resulting in a

massive fund withdrawal from that bank by customers. This would be followed by an even more severe liquidity issue, which, in the end, could harm the bank's business sustainability.

Both excess liquidity and shortage in liquidity pose a wide range of problems/risks for the economy as well as financial institutions (Apătăchioae, 2015; Karamichailidou, Mayes, & Stremmel, 2018). Hence, considering these risks, maintaining liquidity positions, whether that of the whole banking system or the economy, has become a very important aspect of the financial system and the economy as a whole. This study therefore set to ascertain the nexus between financial inclusion and liquidity using a three (3) variables vector autoregression (VAR) model. Specific questions include; does increased financial inclusion help in managing liquidity and the stock of money in the economy? Or does growth in liquidity and the stock of money increase the level of financial inclusion?

Following the introduction, Section 2 reviews the theoretical relationship and empirical evidence. Section 3 presents a brief overview of the liquidity in Nigeria while section 4 explains the framework that guides the paper. Section 5 is the methodology and data. In Section 6, results of the econometric estimations are given. Section 7 summarizes the paper with recommendations.





### Section 2 Financial Inclusion and Liquidity -What the Literature says

s a macroeconomic concept, liquidity refers to the overall monetary condition (Eickmeier, Gambacorta, & Hofmann, 2014; Borio, & Disyatat, 2010; Landau, 2013), indicating the extent of mismatch between demand and supply of overall monetary resources (Dreger, & Wolters, 2010).

In the context of the financial markets, however, it is narrowly defined as the ease of undertaking transactions in financial assets at narrow bid-ask spreads (Mamica, & Tridico, 2014; Nesvetailova, 2014). It could also be defined as the availability of funds, or assurance that funds would be available, to honour all cash outflow commitments (both on-and-off balance sheet) as they become due (Adegbie, Asaolu, & Enyi, 2013; Bouwman, 2013; Mihajat, 2014).

Simply put, liquidity is about money supply which is the total money in circulation in a country at a given time. Money supply can be defined narrowly or broadly. Narrow money supply (M1) are assets with immediate purchasing power. In Nigeria, M1 is the sum of currency outside bank (C), demand deposit of commercial bank (D) domestic deposit with central bank less federal government deposit with commercial bank. Simply put, M1 = C + D where C is currency outside banks and D is demand deposit.

On the other hand, broad money supply (M2), in addition to M1, includes those assets which can be quickly and readily converted to cash with little or no loss in value. In Nigeria, M2 is defined as M1 plus quasi-money (defined as the sum of savings and time deposit with commercial banks). So that;

#### M2 = M1 + Quasi money M2 = C + D + T + S Where C is currency in circulations, D is demand deposit, T is time deposit and S is savings deposit.

From the forgoing, liquidity can be delineated into economic liquidity which is the currency in circulation (C) and bank liquidity represented by total deposit with commercial banks (D, T, and S)

#### **Empirical evidence from other jurisdictions**

In 2005, Beck, Demirguc-Kunt, and Maksimovic, suggested that by reducing the "financing gap" faced by small or medium sized firms or industries (GPFI, 2011), financial inclusion reduces liquidity constraints. In addition, previous studies focusing on the unbanked have argued that not having a bank account can have a wide range of harmful effects. For instance, the lack of a bank account can make liquidity management difficult (Ariffin, 2012; Vento, & La Ganga, 2009; Lusardi, 2011; Loutskina, 2011; Drehmann, & Nikolaou, 2013; Calomiris, Heider, & Hoerova, 2015). On the other hand, macroprudential regulations on liquidity could harm financial inclusion (Odongo, 2017; Hanson, Kashyap, & Stein, 2011; Claessens, & Kodres, 2014; Young, 2013; Donovan, 2012; Stein, 2012; Waemustafa, & Sukri, 2016; Prasad, 2010).



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### Section 3 Brief Overview of Current Liquidity Condition in Nigeria

The tight monetary policy disposition of the monetary authority is taking a toll on the currency in circulation amidst growth in aggregate liquidity defined by the broad money supply (M2). The major monetary aggregates (M2) increased in Mar-2018, relative to the levels at end Feb-2018 and the corresponding month in 2017. On month-on-month basis, M2, at N24,303.1billion had risen by 1.2 percent due, mainly, to the 8.5 percent increase in foreign assets (net) of the banking system.

Over the level at end-December 2016, however, M2 increased by 3.0 percent, reflecting the 70.7 percent increase in foreign assets (net). Narrow money supply (M1), rose by 1.7 percent, on month-on-month basis in Mar-2018, due to the marginal increase in demand deposits. Over the level at end-December 2016, M1 fell by 3.2 percent, compared with the increase of 6.6 percent at end-Mar-2018 due to the 7.8 percent increase in demand deposits of the banking system. Furthermore, while currency outside bank accumulated a 4.7 percent growth, currency in circulation recorded a 13.9 percent decline monthon-month in Mar-2018. Over the corresponding month in 2017 and the end- December 2016, while currency in circulation declined by 23.4 percent and 15.9 percent respectively, currency outside bank declined by 8.4 percent and recorded a marginal increase of 0.4 percent respectively. Banks' deposit increased by 0.8 percent to N22,634.67 billion at end-March 2017 of which demand deposit was 41 percent while quasi money (Time and Saving deposits) represent 59 percent. Over the corresponding month in 2017 and the end- December 2016, banks' deposit increased by 9.6 percent and 4.0 percent respectively. The tight monetary policy disposition of the monetary authority is taking a toll on the currency in circulation amidst growth in aggregate liquidity defined by the broad money supply (M2).

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BANK

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# Section 4 A Framework to Analyse the Financial Inclusion and Liquidity Nexus

o analyse the nexus between financial inclusion and liquidity, we draw from three hypotheses (supply side, the demand side and the feedback hypothesis) established in Financial Inclusion and Job Creation in Nigeria.

The supply side expressed in the flow chart in Fig 1a hypothesizes that causation runs from financial inclusion to liquidity only. This draws from the foundation that, increase in financial inclusion that leads to an increase in the use of non-cash payment platforms, greater utilization of bank products of the formal financial system, increase in the use of informal financial channels and move of money from boxes and under mattresses to the financial sector, is expected to increase liquidity (both economic bank liquidity).

On the other hand, the demand side hypothesis suggests that liquidity drives financial inclusion. This is established in the paper, Nexus between Financial Inclusion and Income. Specifically, an autonomous increase in liquidity (increase in money supply) or movement of money from boxes and under mattresses to the financial sector will depress the interest rate; increase investment, employment, economic activity (output) and income thereby creating an increase in expenditure and savings which in turns leads to an increase in financial inclusion. Finally, the feedback hypothesis opines that causation between financial inclusion and liquidity is bi-direction, that is, financial inclusion leads to liquidity and vice versa.



Fig. 1a: Supply side Hypothesis: Financial inclusion leads to Liquidity



Fig. 1b: Supply side Hypothesis: Liquidity leads to financial inclusion





# Section 5 Model, Method of Estimation and Data Sources

rom the analytical framework discussed above, we employ a vector auto-regressions (VAR) and Granger causality tests to attempt to empirically ascertain the relationship between financial inclusion and liquidity. This modelling procedure is flexible and allows endogenous interactions between variables while displaying the delayed effects with a presumptuous bi-directional causal relationship between variables. The trivariate VAR was in a linear form and contains financial inclusion (FI) defined from the demand side, aggregate and disaggregated liquidity (M2) components in Nigeria and volume of payment platforms (VPP) transactions acting as a control variable.

#### DATA

Secondary data of monthly frequency over the period 2010-M01 to 2016-M12 were sourced directly from the Central Bank of Nigerian Statistical Bulletin (CBN), the National Bureau of Statistics (NBS) and EFInA. Specifically, data on financial inclusion measures from the demand side was sourced from EFInA and it is the proportion of adult population that have access to both formal and informal financial service. However, monthly financial inclusion data were generated by splicing annual data using appropriate techniques. The choice of the period was informed by the availability of volume of payment platform transaction data since 2009 while the most recent for financial inclusion is available with the most recent being 2016.

#### The unrestricted VAR is in the form:

$$\begin{split} &\beta(U)Z_t = \mu_t \\ &\text{Where} \\ &\beta(U) = \sum_{i=0}^i \beta_i U_i \quad .... \\ &Z_t \text{ is a column vector of the endogenous variables, that is} \\ &Z_t = [\text{FI, M2 VPP}]; \\ &\beta(U) \text{ is a } 3 \times 3 \text{ matrix polynomial in the lag operator U and } \mu \text{ is a column vector of serially} \\ &\text{independent errors:} \\ &\mu_t = (\mu_t^{FI}, \mu_t^{M2}, \mu_t^{VPP}) \end{split}$$





### Section 6 Discussion of Result, Implication and Recomendation

Below is the summary of the scattered plots, results of pairwise Granger Causality tests, the forecast error variance decomposition and the impulse-response functions. The Granger causality test examines the causal relationships between financial inclusion and liquidity. Results of the variance decomposition and the impulse-response functions illustrate the short-run dynamic properties of the variables. On the understanding that stationarity tests are not necessary for VAR simulations, we do not test for the presence of unit roots in our variables.

#### PRELIMINARY FINDINGS FROM SCATTERED PLOT AND GRANGER CAUSALITY TEST

From the scattered plots, we found that higher levels of financial inclusion is associated with lower levels of liquidity – this was true for formal financial inclusion. However, higher levels of informal financial inclusion are associated with higher levels of liquidity.

Table 1 below, presents the results of the Granger Causality tests (which establish the existence of a demand-side, feedback and neutral causation) between financial inclusion and liquidity in Nigeria. An examination of the results reveals the presence of a demand side and a feedback causality between financial inclusion and liquidity. Although combined financial inclusion seems neutral in the face of growth in aggregate liquidity measured by the broad money supply (M2) - this was also true for the informal sector. However, causality runs from aggregate liquidity to formal financial inclusion establishing the demand side hypothesis. This may be so because while the informal sector is highly liquid, the formal sector is constrained by liquidity depending on the credit-deposit balance. When liquidity was proxied by the narrow definition of money (M1), the demand side hypothesis was established with causality running from liquidity to financial inclusion (both formal and informal). Whilst the demand side hypothesis was generally established, the feedback hypothesis was revealed between aggregate financial inclusion and currency in circulation; aggregate financial inclusion and currency outside bank; and formal financial inclusion and deposit. This presupposes that increase in liquidity increases financial inclusion and financial inclusion which facilitates the ease and access to credit will in turn lead to an increase liquidity.

Figures in the appendix represents the short run dynamic properties and variance decomposition of financial inclusion and liquidity in Nigeria. The forecast error variance decomposition displays the proportion of forecast error variance for each variable that is attributable to its own innovation and to innovations in the other endogenous variables.

The result suggests that the predominant source of variation in financial inclusion is due to existing levels of financial inclusion attained (indicating reflexive shocks) and one month delayed contribution from both growth in broad liquidity and growth in the volume of transactions on payment platforms. However, shocks from payment platforms was stronger and increases over time compared to liquidity.

When financial inclusion is disaggregated, payment platform was a strong contributor to variation in formal financial inclusion whereas informal financial inclusion was totally reflexive. Furthermore, increase in liquidity (M2 and M1) was found to engender increase in financial inclusion through the effect of liquidity on economic output and income. M2 and M1 were predominantly driven by existing level of money stock but with a marginal contribution and immediate transmission of the effect from financial inclusion. Whilst formal financial inclusion decreases liquidity, informal financial inclusion increases liquidity although formal inclusion was a stronger driver of liquidity.







Table 1:	Granger	Causality	Tests
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Variables	Driver	Remark
FI and gM2	Nil	Neutral
FFI and gM2	FFI < gM2	Unidirectional
IFI and gM2	Nil	Neutral
FI and gM1	FI <b>–</b> <i>gM1</i>	Unidirectional
FFI and gM1	FFI < gM1	Unidirectional
IFI and gM1	IFI 🚽 gM1	Unidirectional
FI and gCIC	FI 🔶 gCIC	Bidirectional
FFI and gCIC	FFI < gCIC	Unidirectional
IFI and gCIC	IFI < gCIC	Unidirectional
FI and gDep	FI 🚽 gDep	Unidirectional
FFI and gDep	FFI 🔶 gDep	Bidirectional
IFI and gDep	IFI 🔶 gDep	Bidirectional
FI and gCOB	FI 🔶 gCOL	Bidirectional
FFI and gCOB	FFI 🚤 gCOE	3 Unidirectional
IFI and gCOB	IFI 🚽 gCOE	3 Unidirectional
FI and gVPP	FI 🚽 gVPF	• Unidirectional
FFI and gVPP	FFI 🚽 gVPP	Unidirectional
IFI and gVPP	IFI gVPP	Unidirectional

#### Source: Authors' computation using EViews 7.0.

The disaggregation of the broad liquidity measure reveals; first, that increase in currency in circulation increases financial inclusion (both formal and informal inclusion). However, the effect was stronger on formal financial inclusion whereas variation in currency in circulation is largely determined by the supply indicator of financial inclusion (volume of payment platform transactions which acts as a transmission channel). Specifically, growth in the volume of payment platform transactions reduces currency in circulation. Variation in financial inclusion transmits a decline to currency in circulation only after 6 months delay. Whilst formal financial inclusion leads to a decline in currency in circulation, informal inclusion increases currency in circulation.

Second, growth in currency outside bank increases aggregate financial inclusion marginally – this was also true for informal inclusion, whereas growth in currency outside bank leads to a decline in formal inclusion. On the other hand, financial inclusion contributes marginally to variation in currency outside bank. However, use of payment platforms reduces currency outside bank. While formal inclusion reduces currency outside bank, informal inclusion increases currency outside bank.

Third, variation in financial inclusion was reflexive with marginal contribution from deposits and payment platforms. Deposits had a positive effect on formal financial inclusion and negative effect on informal financial inclusion, however the effect on formal financial inclusion is stronger. Variation in deposit is largely determined by financial inclusion and the supply indicator -- volume of payment platform transactions, however the effect of VPP was stronger. Formal financial inclusion leads to an increase in deposit, however effect of formal financial inclusion leads to a decline in deposits, however effect of formal financial inclusion is stronger on deposit.





# Section 7 Policy Implication, Recommendation and Conclusion

his report analyzed the nexus between financial inclusion and liquidity in Nigeria using vector autoregressions to ascertain the nature of the interactions and Granger causality tests to establish the existence and the direction of causal relationship between financial inclusion, cost of funds and inflation.

The results of the forecast error variance decomposition analysis showed that innovations in the variables are mostly explained by reflexive shocks of the variables themselves, with marginal contributions for other endogenous variable. This finding was consistent with the implications of the impulse-response functions. Based on the results obtained, the hypothesis of a positive feedback relationship between financial inclusion and liquidity in Nigeria is validated.

Following the results obtained, liquidity drives financial inclusion, however the impact is stronger on formal financial inclusion. Thus, rising liquidity may lead to increase in employment, productivity and income thereby encouraging formal inclusion. Furthermore, activities in the informal financial sector also increases liquidity and this makes liquidity management difficult for central banks since it may thwart efforts towards price stability.

On the basis of the implication of the nexus between financial inclusion and liquidity, efforts aimed at boosting financial inclusion should be sustained. However, increase in informal inclusion could increase liquidity. Thus central banks should explore ways to curb such increase in liquidity that may hinder price stability and manage a highly digitized economy. For financial inclusion to effectively help in managing liquidity, the CBN should distribute payment platform infrastructure equitably across all 6 geopolitical zones. Evidence shows that payment platforms is a viable alternative tool for managing liquidity, hence, various payment channels should be strengthened in order to increase both access and adoption. Particularly, wide acceptability and use of payment platforms in the informal sector should be encouraged to boost sectoral impacts.







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Appendix







### **Appendix**





















































































#### About SIDFS

The Sustainable and Inclusive Digital Financial Services (SIDFS) initiative of the Lagos Business School engages in research and advocacy projects with the goal of creating an inclusive ecosystem for financial services. The initiative seeks to gain an in-depth understanding of the digital financial services and financial inclusion landscape while providing thought leadership on sustainable business models to deliver digital financial services to the unbanked poor. Our overall objective is to support the development and promotion of sustainable solutions to Nigeria's financial inclusion challenges and help more Nigerians access the financial services they need to improve their lives.

Founded in 2015, the initiative combines rigorous research (which informs a pragmatic approach to responsible market development) with an evidence-based advocacy platform (to inform policy and influence key decision makers in the industry).

The Nexus Series consists of six technical papers exploring the relationship between financial inclusion and macroeconomic indicators





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