

## THE IMPACT OF MICROFINANCE ON FINANCIAL INCLUSION IN NIGERIA

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### ABSTRACT

Does microfinance lead to increased financial inclusion? This study used annual data over the period 1981-2014, Fully Modified Least Square (FMOLS) and Dynamic Least Square (DOLS) cointegration techniques to examine the impact of microfinance on financial inclusion in Nigeria. The study shows that microfinance and financial inclusion is linked by a stable long-run relationship. In the short run, the study found that microfinance has positive but insignificant impact on financial inclusion, but in the long-run, microfinance has a positive and statistically significant impact on the level of financial inclusion. The negative interest rate has a statistically significant impact on the level of financial inclusion both in the short and long run. Therefore, this study established that microfinance, as well as interest rates, is a significant driver of financial inclusion in Nigeria. For increased financial inclusion in Nigeria, therefore, heightened drives for microfinance will be required.

**Key words:** Microfinance, financial inclusion, interest rate, banks, FMOLS, DOLS

**JEL classification:** E52, E44, G18, C32

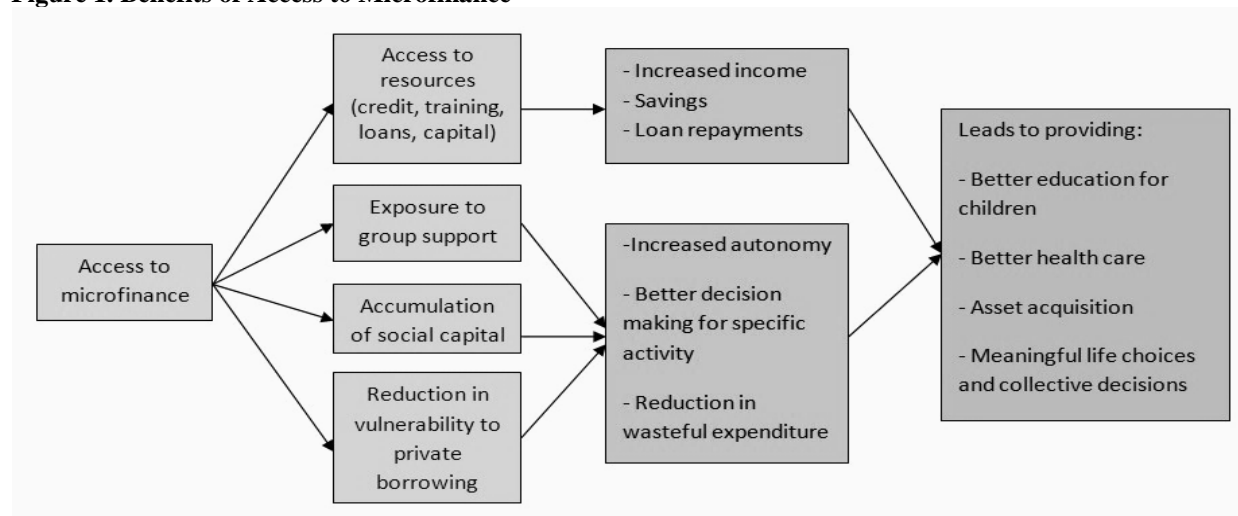
### INTRODUCTION

*“Along with the 3 other pillars of development – democracy, education and infrastructures – microfinance is increasingly considered a key instrument in implementing effective and sustainable strategies in the fight against poverty”* - Jacques Attali.

Efforts to deliver affordable credit to low-income borrowers are not new: many attempts have been made throughout history to establish institutions for supplying credit to the poor. Clear and longstanding examples are the usury and Islamic prohibition of interest. Sharia forbids acceptance of interest for loans of money (known as usury, or *riba*). Historically, these prohibitions have been used to different degrees in Muslim countries and communities to prohibit un-Islamic practices. In the late 20th century, a number of Islamic banks have also applied these same principles to private commercial institutions within Muslim communities (Rammal & Zurbruegg, 2007).

Likewise, in Nigeria, strategies to increase the income of the poor are not new, it has been in existence in the form of rotating contributory savings schemes (differently referred to as *Esusu*, *Itutu*, *Adashi*, *Bambam* and *Ajo* in different parts of the country) common among market traders. Over time, the poor have resorted to direct borrowings from friends and relations, self-help groups, accumulating credit and savings associations, and credit associations (Akan, 2009; Okpara, 2010), as a result of the reluctance of formal finance institutions to grant them credit. However, existing studies suggest that moneylender credit is costly. Robinson (2001) and Banerjee (2004) found that “moneylender interest rates go from 4% per month (60% annual, 50% or so real) to simply astronomical rates such as 5% per day and above. In the countries where microcredit has had the greatest success, such as Bangladesh, Bolivia, India, and Indonesia, interest rates are significantly lower than 30% per year” (as cited in Chakrabarti & Sanyal, 2015, p. 2). On the contrary, microfinance has many benefits (See Figure 1) and has become a veritable institutional mechanism for enhancing credit access for the low-income groups.

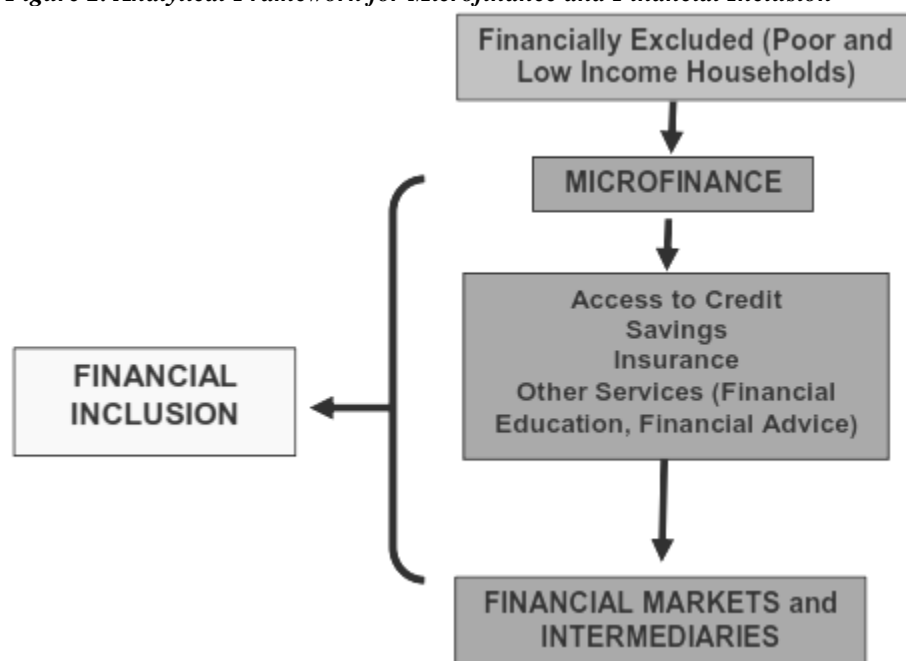
**Figure 1. Benefits of Access to Microfinance**



Source: Gopalaswamy, Babu & Dash (2015, p. 3)

Topmost among these advantages is that microfinance serves as a vehicle for financial inclusion (Khan, 2008). Figure 2 shows how microfinance serves as the bridge for the poor and low-income households towards financial inclusion. Microfinance products such as credit, savings and insurance encourage more people to become included in the financial system.

**Figure 2. Analytical Framework for Microfinance and Financial Inclusion**



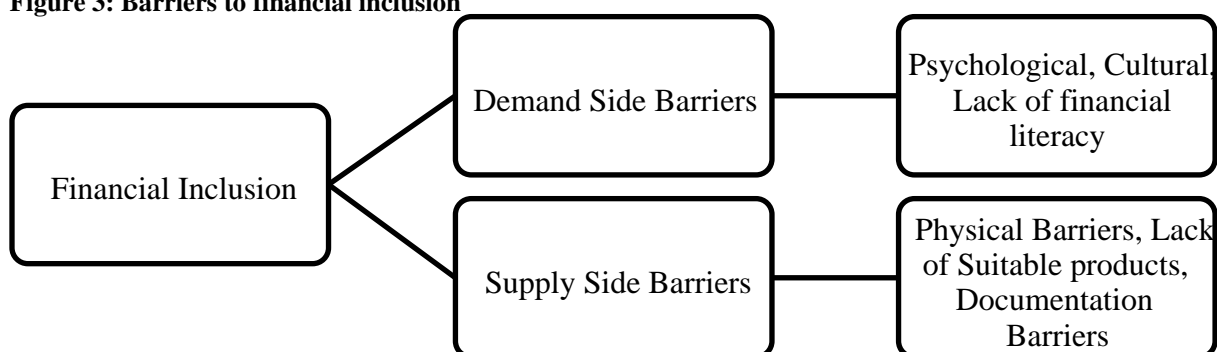
Source: Jovi, Nito and Buensuceso (2011, p. 8)

Financial inclusion benefits the economy (Mohan, 2006), reduces income inequality, increases availability of funding for efficient intermediation and allocation (Shankar, 2013), and promotes more start-up enterprises, who contribute to the process of creative destruction (Schumpeter, 1942). Therefore, financial access in the form of loans, savings accounts, and insurance products can be said to be prerequisites for growing economies and their

poor. However, the poor have to resort to microfinance banks since formal financial institutions are disinclined to lend to low-income people (Murdoch 1999; Collins et al. 2009).

As argued by Hariharan and Marktanner (2012, as cited in Ene & Inemesit, 2015, p. 144) “the lack of financial inclusion is a multifaceted socio-economic phenomenon that results from various factors such as geography, culture, history, religion, socio-economic inequality, structure of the economy and economic policy.” Thus, in a developing country such as Nigeria, various factors serve as barriers to financial inclusion (See Figure 3). The supply side factors include physical barriers, non-availability of suitable financial products and non-eligibility due to documentation issues. On the demand side are financial capability and financial literacy.

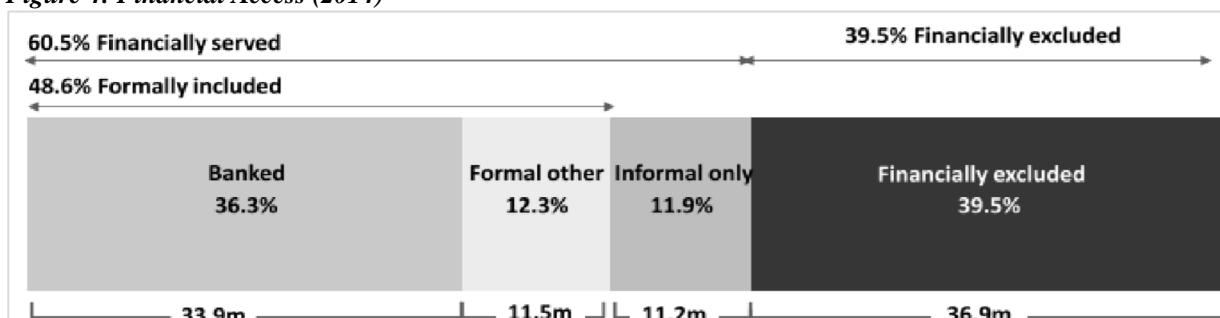
**Figure 3: Barriers to financial inclusion**



Source: Shankar (2010, p. 54)

From these barriers to financial inclusion has emerged extremely worrying statistics in Nigeria. Concerning financial access, the financially excluded are about 36.9 million adults (39.5% of total adults) while the formally included are about 45.4 million adults (48.6% of total adults) as shown in figure 4. In fact, EFINA (2015a) argued that “25.5 million adults save at home; if for example, just 50.0% of these adults were to save ₦1,000 per month in the formal sector, then up to ₦153 billion could be mobilised annually, this indicates there is a significantly large un-tapped market for formal savings products” (p. 3).

**Figure 4: Financial Access (2014)**



Source: EFINA (2015b)

However, there have been many governmental efforts to improve the poor’s access to lending in Nigeria: The Commercial Bill Financing Scheme (1962); The Nigerian Agricultural and Cooperative Bank (1972); The National Commodity Boards (1977); The Rural Banking System (1977); The Agricultural Credit Guarantee Scheme Fund (1978); The Export Financing Rediscount Facility (1987); The Peoples Bank (1989); Licensing of Community Banks (1990); and Microfinance Banks (2005). Notwithstanding the plethora of schemes to improve the poor’s access to lending, bribery and corruption, wrong channeling of credit facilities, poor managerial wherewithal, and low supervision frustrated the efforts (Olaitan 2001; Adeyemi, 2008).

In a review of literature, a growing number of studies have been evaluating the empirical linkages between financial inclusion and a variety of economic, institutional and political factors (i.e. Fuller, 1998; Leeladhar, 2006; Sarma & Pais, 2008; Hannig & Jensen, 2010; Kpodar & Andrianaivo, 2011; Demirgüç-Kunt, Klapper & Singer, 2013; Porter, Widjaja & Nowacka, 2015). Most authors who studied financial inclusion have used primary data in the effort to

determine a statistically significant relationship between financial inclusion and a specific variable of interest (i.e. Chibba, 2009; Kpodar & Andrianaivo, 2011; Buku & Meredith, 2012; De Koker & Jentzsch, 2013; Demirgüç-Kunt, Klapper & Singer, 2013; Senbet, 2015; Dabla-Norris, Ji, Townsend & Unsal, 2015; Johal, 2016). In Nigeria, as well, a handful of studies have looked at financial inclusion (i.e. Mbutor & Uba, 2013; Bayero, 2015; Egbide, Samuel, Babajide & Samuel, 2015; Babajide, Adegboye & Omankhanlen, 2015; Ene & Inemesit, 2015; David-West, 2016). Interestingly, only a few studies have evaluated the potential importance of microfinance to financial inclusion (i.e. Chakrabarti & Sanyal, 2015; Elzahi & Ali, 2015; Martínez Gutiérrez & Krauss, 2015). In Nigeria, the only study in this regard, to the best knowledge, is Ene & Inemesit (2015).

There are many motivations for this study. Firstly, while the only study which has looked at the impact of microfinance on financial inclusion in Nigeria is Ene & Inemesit (2015), their findings cannot be regarded as conclusive for a number of reasons. One, they did not use any accepted measure of financial inclusion found in the literature. Two, the data span was too small: only 25 years (1990-2014). Three, they used OLS in their estimation even when half of their variables are  $I(1)$ , thus rendering their findings spurious. Thus, the current study fills this gap in the literature. Another motivation is that, with the increasing number of microfinance banks in Nigeria and the mounting drive for inclusive financial systems, it would be worthwhile to assess the impact of microfinance on financial inclusion in Nigeria at this very moment. Thus, this study answers the question: Does microfinance lead to increased financial inclusion? By situating financial inclusion within the specific context of microfinance, we, therefore, aim to provide robust and insightful evidence for policymakers.

This paper is divided into four parts. The next section describes the data, model, and econometric methodologies. Section 3 provides the empirical analysis. The concluding section would briefly summarize the key findings and the policy implications.

## **DATA AND METHODOLOGY**

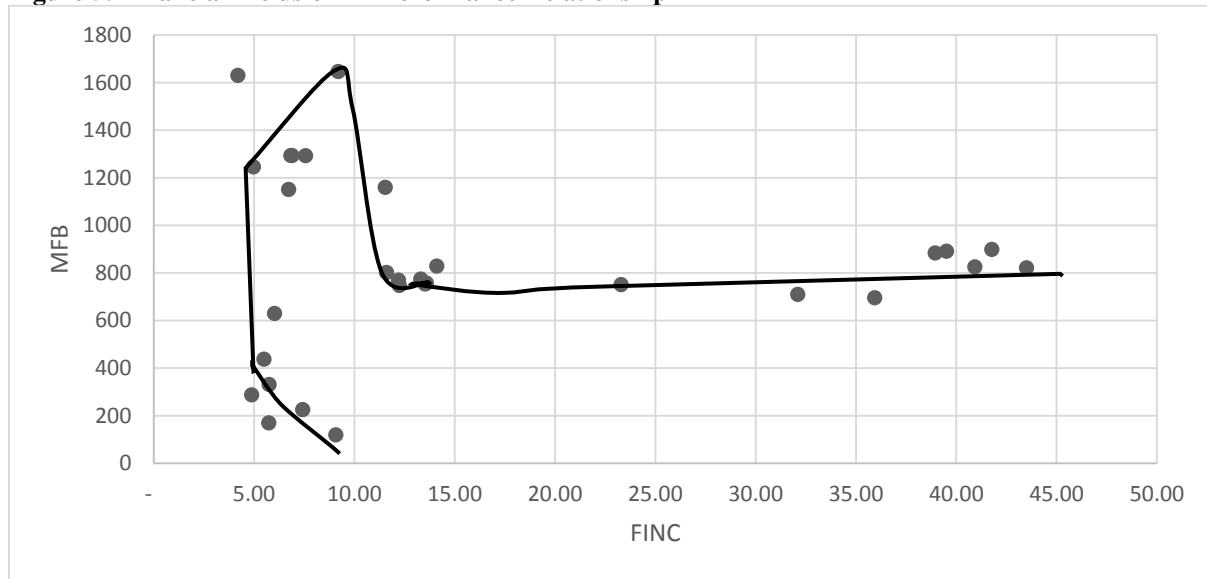
### ***Data***

This study employs annual data of total commercial banks' loans and advances, number of microfinance banks in Nigeria, gross domestic product (GDP) as well as lending interest rate. The study covers 1981 to 2014 period, and the dataset collected from the Central Bank of Nigeria Statistical Bulletin. Following the existing literatures on financial inclusion, outstanding loans from commercial banks (% of GDP) is used as a measure of financial inclusion (See Mbutor & Uba, 2013).

### ***Model***

Considering that the estimates from an econometric estimation will be spurious if the model suffers from inappropriate specification (Koutsoyiannis, 1977), we plot the scatter diagram of financial inclusion against microfinance so as to deduce the mathematical relationship between the two variables. The scatter diagram has a form closely similar to a polynomial of degree 2 or a quadratic equation (as shown in Figure 5). This, as well, is consistent with Okpara (2010).

**Figure 5: Financial Inclusion – Microfinance Relationship**



The functional model for this study is therefore stated as,

$$FINC = f(MFB, MFB^2)$$

We include the lending interest rate as a control variable. Interest rate is one of the most important variables when considering micro-credit. This is, as well, to preclude the omitted variable bias. Therefore, the econometric model for the study is given as

$$FINC_t = \tau_0 + \tau_1 MFB_t + \tau_2 MFB_t^2 + \tau_3 INTEREST_t + \xi_t$$

Where FINC is financial inclusion, MFB the number of microfinance banks, INTEREST the lending interest rate, and  $\xi$  the residuals.

### **Econometric Techniques**

It is well-known in the literature that applying the standard OLS techniques on non-stationary data may lead to spurious results. This study, therefore, uses the fully modified OLS (FMOLS) and the Dynamic OLS (DOLS) which were designed to provide optimal estimates of cointegrating regressions. The benefit of using the two approaches in this study is to effectively assess the robustness of the parameter estimates to different specifications.

Although FMOLS and DOLS, as nonparametric approaches, are appropriate for dealing with nuisance parameters, it may sometimes be problematical, especially in small samples: to apply FMOLS and DOLS for estimation of long-run parameters, there must exist a cointegrating relation among a set of I(1) variables. For that reason, we test for the presence of unit root as well as cointegrating relation. The common unit root tests such as Augmented Dickey-Fuller and Phillips-Perron tests have the disadvantage of poor small-sample power often leading to erroneous unit root conclusions. More potent unit root tests such as Kwiatkowski, Phillips, Schmidt, and Shin (KPSS, 1992) is thus used to test for the unit roots of the variables. Thereafter, we test for the presence of cointegrating relationship among the variables. Johansen (1991; 1995) cointegration test is used in this case.

The advantage of the FMOLS is that, to attain asymptotic efficiency, FMOLS modifies the least squares for serial correlation and endogeneity of the regressors, which were as a consequence of cointegrating relationships (See Phillip & Hansen, 1990; Hansen & Kim, 1995).

As developed by Phillips and Hansen (1990), Phillips and Moon (1999) and Pedroni (1995; 2000), the FMOLS estimator uses initial estimates of the symmetric and one-sided long run covariance matrices of the residuals.

Consider the  $n+1$  dimensional time series vector process  $(y, X)$ , with cointegrating equation,

$$y_t = X_t' \beta + D_t' \gamma_1 + \hat{\mu}_{1t} \quad (1)$$

Where  $X_t'$  are the  $n$  stochastic regressors,  $D_t = (D_{1t}', D_{2t}')'$  are the deterministic trend regressors and  $\hat{\mu}_{1t}$  are the residuals.

The  $\hat{\mu}_{2t}$  is obtained as  $\hat{\mu}_{2t} = \Delta \hat{\varepsilon}_{2t}$  from the levels regressions

$$X_t = \hat{\Gamma}_1' D_{1t} + \hat{\Gamma}_2' D_{2t} + \hat{\varepsilon}_{2t} \quad (2)$$

Alternatively from the difference regressions

$$\Delta X_t = \hat{\Gamma}_1' \Delta D_{1t} + \hat{\Gamma}_2' \Delta D_{2t} + \hat{\mu}_{2t} \quad (3)$$

Let  $\Omega$  and  $\lambda$  be the long-run covariance matrices which can be calculated using the residuals  $\hat{\mu}_{2t} = (\hat{\mu}_{1t}', \hat{\mu}_{2t}')'$ .

Then the modified data can be defined as

$$y_t^+ = y_t - \hat{\omega}_{12} \Omega_{22}^{-1} \hat{\mu}_{2t} \quad (4)$$

And the estimated bias correction terms as

$$\lambda_t^+ = \hat{\lambda}_{12} - \hat{\omega}_{12} \Omega_{22}^{-1} \hat{\lambda}_{22} \quad (5)$$

The FMOLS estimator is therefore given by

$$\theta = \begin{bmatrix} \beta \\ \gamma_1 \end{bmatrix} = \left( \sum_{t=2}^T Z_t Z_t' \right)^{-1} \left( \sum_{t=2}^T Z_t y_t^+ - T \begin{bmatrix} \hat{\lambda}_{12} \\ 0 \end{bmatrix} \right) \quad (6)$$

Where  $Z_t = (X_t', D_t')'$ .

As developed by Stock and Watson (1993), the DOLS model involves the regression of the dependent variable on all the independent variables in levels, leads, and lags of the first difference of all I(1) variables (Masih & Masih, 1996). The advantage is that it applies to a system of variables with different orders of integration. Small sample bias and simultaneity bias are taken care of by the presence of leads and lags of the differenced independent variables among the regressors (Stock and Watson, 1993). According to Saikonen (1991), the DOLS estimator corrects for serial correlation and endogeneity by including lags and leads of the differenced I(1) regressors in the regression. The DOLS model is derived by augmenting the cointegrating regression with leads and lags of  $\Delta X_t$  so that the resulting cointegrating equation term is orthogonal to the entire history of the stochastic regressor innovations. The DOLS model is specified as follows:

$$y_t = X_t' \beta + D_{1t}' \gamma_1 + \sum_{j=-q}^r \Delta X_{t+j}' \delta + v_{1t} \quad (7)$$

Where  $y_t$  is the dependent variable,  $X_t$  a vector of independent variables and  $\Delta$  a lag operator.

It is assumed that adding  $q$  lags and  $r$  leads of the differenced regressors absorbs all of the long-run correlation between  $u_{1t}$  and  $u_{2t}$ . Besides, least squares estimates of  $\Theta = (\beta', \gamma')$  using equation 7 possess equivalent asymptotic distribution as those from FMOLS.

Besides, an ECM version of the FMOLS model is finally used to test for the short-run dynamics between microfinance and financial inclusion in Nigeria. The ECM version of the FMOLS model is given as:

$$\Delta FINC_t = \alpha_0 + \sum_{j=0}^n \beta_1 \Delta FINC_{t-1} + \sum_{j=0}^n \beta_2 \Delta MFB_t + \sum_{j=0}^n \beta_3 \Delta MFB_t^2 + \sum_{j=0}^n \beta_4 \Delta INTEREST_t + ECT_{t-1} + \mu_t \quad (8)$$

Where  $\alpha_0$  is the drift component;  $n$  the maximum lag length;  $\Delta$  the first difference operator; and  $\mu_t$  the white noise residuals. ECT is the error correction term (lagged residual of static regression), the speed of adjustment towards equilibrium and the speed of convergence to equilibrium once the equation is shocked. Note that the number of optimal lags is determined by the Akaike Information Criterion (AIC).

## EMPIRICAL ANALYSIS

The first step is the investigation of the order of integration of the individual series. In Table 1, the absolute values of the KPSS statistics imply that these variables on their levels are non-stationary, except lending interest rate. In first differences, the variables are all stationary. Thus, the main finding of Table 1 is that all the variables in their first difference are stationary.

**Table 1. The KPSS Stationarity Test**

Variable	Without trend		With trend	
	I(0)	I(1)	I(0)	I(1)
$FINC_t$	0.625	0.314*	0.184	0.120**
$MFB_t$	0.569	0.192*	0.250	0.101*
$MFB_t^2$	0.673	0.135*	0.161	0.086*
$INTEREST_t$	0.543	0.217*	0.148	0.059*

*Note: \*\* and \* denote statistical significance at the 5% and 1% level. The bandwidth is selected by Newey-West automatic using Bartlett kernel.*

After establishing the order of integration of all series, the Johansen cointegration test is used and the results obtained are as shown in Table 2. The trace test and max Eigen statistic show that there is one cointegrating relationship among the variables, implying that the model can be used to obtain a co-integrating vector or a meaningful long-run relationship for financial inclusion and explanatory microfinance variables.

**Table 2. Johansen and Maximum Likelihood Test for Cointegration**

Hypotheses	Trace Test	5 % Critical Value	Prob. #	Hypotheses	Max. Eigen Statistic	5 % Critical Value	Prob. #
$R = 0$	55.115*	47.856	0.009	$R = 0$	32.055**	27.584	0.012
$R \leq 1$	23.059	29.797	0.243	$R = 1$	17.258	21.131	0.160
$R \leq 2$	5.800	15.494	0.718	$R = 2$	5.149	14.264	0.722
$R \leq 3$	0.651	3.841	0.419	$R = 3$	0.651	3.841	0.419

*Notes: \* and \*\* denotes rejection of the hypothesis at the 0.01 and 0.05 level. # denotes MacKinnon-Haug-Michelis (1999) p-values*

The FMOLS and DOLS estimates are presented in Table 3. For both models, microfinance has significant positive impacts on financial inclusion. So, we may conclude that microfinance enhances financial inclusion in an emerging economy like Nigeria. Empirical evidence also indicates that the lending interest rate has a negative impact on

financial inclusion, though the impact was only significant in the FMOLS model. In other words, interest rate is negatively and significantly associated with financial inclusion. This implies that increase in interest rate deters financial inclusion.

**Table 3. The Long Run Estimates**

Dependent Variable: FINC				
	FMOLS		DOLS	
Variable	Coefficient	t-Statistic	Coefficient	t-Statistic
MFB	0.075	(2.630)**	0.415	(6.594)**
MFB <sup>2</sup>	-0.001	(-3.047)*	-0.001	(-6.352)**
INTEREST	-3.152	(-3.966)*	-3.609	(-2.382)
C	52.889	(2.268)**	-108.328	(-2.056)

*Notes: \* and \*\* denotes significance at the 0.01 and 0.05 level. For the FMOLS, long-run covariance estimate (Prewitening with lags = 2 from AIC, maxlags = 3, Bartlett kernel, Newey-West automatic bandwidth = 1.9107, NW automatic lag length = 2). For the DOLS, fixed leads and lags specification (lead=1, lag=4) and long-run variance estimate (Bartlett kernel, Newey-West fixed bandwidth = 3.0000.*

The results of the ECM version of the FMOLS model is shown in Table 4. In the short run, microfinance has insignificant impact on financial inclusion, meaning that in the short term, financial inclusion is unable to reap the benefits of microfinancing. However, lending interest rate has significant negative impact on financial inclusion. Interest rates lead to decline in financial inclusion in Nigeria in the short-run. Increase in interest rates deteriorates financial inclusion.

**Table 4. The Short Run Estimates**

Dependent Variable: D(FINC)		
Variable	Coefficient	t-Statistic
D(FINC(-1))	0.047	(0.437)
D(MFB)	0.008	(0.653)
D(MFB <sup>2</sup> )	0.001	(-1.058)
D(INTEREST)	-0.574	(-2.289)**
ECT(-1)	-0.405	(-4.740)*
C	0.414	(0.481)

*Notes: \* and \*\* denotes significance at the 0.01 and 0.05 level. Long-run covariance estimate (Bartlett kernel, Newey-West automatic, bandwidth = 17.5610, NW automatic lag length = 2)*

The equilibrium-correction term (ECT<sub>t-1</sub>), -0.405, is significant at 1% level and has the appropriate negative sign. Firstly, it means the short-run dynamic effects are sustained in the long run. Secondly, it implies a high speed of adjustment to the equilibrium level after a shock. About 40.5% of the disequilibrium in any year's shock converges back to the long-run equilibrium in the following year.

The findings of this study that microfinance has significant positive impacts on financial inclusion in Nigeria is in line with a survey in India by Shetty (2008), who showed that microfinance intervention is positively correlated with financial inclusion and with increase in income, assets, employment, housing condition, household expenditure and empowerment of the poor. In Phillipines, Jovi, Nito, and Buensuceso (2011) found that microfinance outreach has a significant relationship to financial inclusion. In Nigeria, Ene & Inemesit (2015) showed that access to microfinance has significant effect on savings by rural dwellers. The current study also found that lending interest rate has



negative and significant impact on financial inclusion. This is in contrast to Ene & Inemesit (2015) which found that microfinance interest rate has a negative and insignificant relationship impact on rural dwellers loans and advances.

## SUMMARY AND POLICY IMPLICATIONS

This study used annual data over the period 1981-2014, the FMOLS and the DOLS methods to examine the impact of microfinance on financial inclusion in Nigeria. The study has shown that microfinance and financial inclusion are linked by a set of long-run relationships. In the short run, the study found that microfinance has positive but insignificant impact on financial inclusion, but in the long-run, microfinance has a positive and statistically significant impact on the level of financial inclusion. The negative interest rate has a statistically significant impact on the level of financial inclusion both in the short and long run. Therefore, this study has established that microfinance, as well as interest rates, is a significant driver of financial inclusion in Nigeria.

For increased financial inclusion in Nigeria, therefore, heightened drives for microfinance will be required. In other words, microfinance should remain at the core of the drives for financial inclusion in Nigeria, because microfinance represents a vehicle for the promotion of financial inclusion. With more than 36.9 million adults without a bank account in Nigeria, innovation in thinking and product and service offerings are necessary to attract the financially excluded. The microfinance banks need to cultivate products which is uniquely tailored to the poor vis-à-vis quick access, flexible collateral requirements, low-interest rates and repayment period. Innovative savings products can be used to attract the estimated 25.5 million adults presently saving at home to start saving in microfinance banks. Technology such as POS devices and mobile phones can be useful in extending microfinance beyond branches. Microfinance banks need to take their services closer to the poor via agent banking by using non-bank channels such as petrol stations, restaurants, and retail stores.

Regulatory authorities need to monitor interest rates so as to make micro-credit accessible to the economically active poor. Government could influence microfinance banks to be more situated in rural areas to make their services accessible to a large segment of the poor population who are not being obliged by the formal financial sector. Besides, the government need to ensure that micro-credit is more extended to the low-income population without the necessities of collaterals as mandatory in the formal financial sector. Apart from enhancing rapid establishment of more microfinance banks in more rural areas, the government need to establish frameworks to prevent undercapitalization, fraudulent practices, and unwarranted interference from board members.

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