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How does access to formal finance affect household welfare dynamics? Micro evidence from Nigeria

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Abstract

The relationship between access to formal finance and poverty reduction lies at the heart of the development literature and policy discourse, particularly in developing countries, where access to financial services is often argued to have poverty-alleviating potential. Most of the stylised theoretical literature and empirical evidence, however, focus their efforts on the poverty-alleviating potential of access to finance at a given point in time, which ignores the dynamic and multidimensional nature of poverty. Using a nationally representative panel data set of households, this paper explores the effect of access to formal finance on household welfare dynamics in Nigeria between 2010–11 and 2012–13. Applying a bivariate probit model, which addresses the endogenous selection associated with households' initial welfare status, our estimates indicate that controlling for the exogeneity of initial household status is relevant when exploring the implications of access to finance for welfare dynamics in Nigeria, as the exogenous treatment of the initial conditioning may distort the correlation coefficients of our estimates. Our results suggest that access to formal finance has poverty-reducing effects, as we found that initially poor households with access to finance were less likely to remain poor in the subsequent period. Also, initially non-poor households with access to finance were seen to face a lower probability of descending into poverty over the period, thus suggesting that access to finance plays a significant role in reducing transient poverty.

JEL Codes
C250, C33, C360, G200, I320

Keywords
Access to finance, bivariate probit, household welfare dynamics, panel data, Nigeria

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1. Introduction

Financial sector development lies at the core of the development literature, as studies have suggested a strong connection between access to finance and poverty reduction. Besides this connection, studies have also found evidence that access to finance reduces inequality by enabling poor and low-income households to invest in human capital and participate in productive economic activities (Demirgüç-Kunt and Levine, 2007). Backed by empirical evidence, competing but complementary theoretical explanations on the precise channels through which improved access to finance affects household welfare have been set forth. The prediction is particularly persuasive in those empirical studies presenting evidence suggesting that financial sector development is pro-poor (Kirkpatrick et al., 2000; Beck et al., 2004; Quach, 2005; Geda et al., 2008) and affects the poor through two channels – directly through improved access to finance and indirectly through economic growth (Zhuang et al., 2009). By addressing the causes of financial market failures, financial sector development is argued to improve the poor's access to affordable formal financial services necessary to enable them to smoothen their current consumption expenditures and invest in additional livelihood assets to protect them against future economic shocks (Department for International Development, 2004; Beck et al., 2007). In this sense, financial sector development is a signal of policy reform aimed at reducing financial market impediments that limit poor people's financial access; hence it would be expected to be associated with improved access to formal financial services and, ultimately, to enhance household welfare.

Controversy is, however, not excluded from the finance–welfare literature, as empirical research from developing countries has found evidence that financial sector development may disproportionately benefit the rich, who often have the wherewithal and social networks to take advantage of the financial access expansion (Beck et al, 2007). In fact, these critics contend that access to finance is neither given nor a cure-all for household poverty reduction in developing countries. This is because not all households with access to finance will ordinarily experience an equal degree of poverty reduction: some of those with access may be trapped in debts, which may make them more vulnerable to economic shocks (Biewen, 2006; Islam and Shimeles, 2007; Jakobsen, 2011). Others emphasise the fact that the benefits from improved access to formal financial services may not be evenly spread. Greenwood and Jovanovic (1989), for example, predict a non-linear relationship between finance and welfare. They argue

that, at the early stage of development, broadening access to formal financial services inordinately benefits the wealthy and the well-connected, who can afford access and profit directly from the expanded financial market. However, at the later stage of development, when finance is broadened to more people, financial sector development benefits a larger share of the people (Beck et al., 2007). Thus, the implications of access to finance for household welfare, as well as its form – formal or informal – needs to be taken into consideration when assessing the consequences for household wellbeing.

As the focus on financial sector development increases in the literature, so does the debate on welfare measurement and analysis, particularly as there is a growing criticism that the conventional welfare analysis approach often ignores the time dimension – both as an arena of opportunity and as a space for vulnerability (Carter and May, 2001). This conventional literature focuses largely on household welfare at a point in time, largely because of a paucity of longitudinal data, as well as a lack of standardised methods of welfare measurement. In this sense, the conventional literature fails to acknowledge the dynamic nature of household welfare, despite strong evidence from country-specific studies suggesting that households inevitably move in and out of poverty over time. Not surprisingly, then, the existing literature adds little to our understanding of how and whether access to finance enhances household consumption or helps move households out of poverty over time.

However, since the 1990s, initiatives in a number of developed and developing countries has attempted to address the longitudinal data issues, particularly relative to household-level data. And, following the seminal work by Bane and Ellwood (1983), the literature has presented evidence suggesting that household welfare in developed and developing countries is not static, but rather dynamic. One strong implication of this is that two households may experience economic shocks in two essentially different ways: while one may find itself permanently in poverty, maybe as the result of the death of the household's breadwinner or loss of employment, the other may experience inter-temporal poverty because of a bad harvest. As such, the injection of a time dimension into the finance–welfare relationship is seen to be important as the problem of poverty cannot be addressed with a uniform package of policy measures (Ansoms and McKay, 2010), particularly because the welfare path through which households move in and out of poverty over time differs. The time dimension, therefore, needs to be taken into consideration when examining the finance–poverty relationship.

While both the theoretical and empirical debates on the finance–welfare dynamics relationship are ongoing, recent country-specific studies of welfare dynamics in developing countries, particularly in Sub-Saharan Africa, have offered two conceptually innovative approaches to analysing the determinants of household welfare dynamics – the component approach and the spell approach. Using the component approach, Lawson et al. (2006) distinguish chronic poverty from transitory components of poverty in Uganda, suggesting that these varied states of poverty reflect different situations and are influenced by different household characteristics.[1] Another common approach to poverty dynamics analysis is the spell approach employed by Bigsten and Shimeles (2008) to explain poverty dynamics in Ethiopia. The study estimates the probability of households exiting and re-entering a spell of poverty given certain states and characteristics of households. The spell approach is particularly appropriate where the time dimension of the panel data sets is relatively long. Although both approaches attempt to model the factors, observed and unobserved, driving some of the transitions between poverty and non-poverty, the literature leaves out the largely unexplored impact of access to finance on household welfare dynamics and poverty persistence. As a result, these studies fail to unpack the complex relationship between access to finance and household welfare dynamics in developing countries.

Against this background, we examine the relationship between access to formal financial services and household welfare dynamics and poverty persistence in a developing-country context using a critical case study in Sub-Saharan Africa. We take the case of Nigeria, which has undertaken a series of financial sector reform programmes aimed at extending financial services to the poor. Given the limited evidence on the role of improved access to formal finance in explaining the marginal decline in the national poverty rates from 35.2% in 2010–11 to 33.1% in 2012–13, this study consolidates existing knowledge, notably in reference to work by the National Bureau of Statistics (2012), and to an independent economic report on Nigeria by the World Bank (2014). While there appears to be a slight reduction in the overall incidence of poverty in the country, the above statistics do not illustrate the aggregate number of

[1] Chronic poverty, also known as persistent poverty, refers to a situation where a household's per capita consumption level remains persistently below the poverty line for a long period of time or throughout the household's entire life. See Barrientos, A., Hulme, D. & Shepherd, A. (2005). Can social protection tackle chronic poverty? *The European Journal of Development Research,* 17(1)**,** 8-23.Transitory or transient poverty is associated with fluctuations in a household's consumption expenditure around the poverty line. See Gaiha, R. & Deolalikar, A. B. (1993). Persistent, expected and innate poverty: estimates for semi-arid rural South India, 1975—1984. *Cambridge Journal of Economics,* 17(4)**,** 409-421.

households that benefitted from the improved access to finance and were able to escape poverty or those that did not have such access and descended into poverty. Hence, the change in poverty rates described above masks vital information on the share of households that moved in and out of poverty over the period, either as a result of structural shifts in their consumption levels or thanks to transitory events. It is, therefore, extremely difficult from the poverty reduction statistics to establish clear causal links between the implementation of policy interventions and changes in household consumption levels. Furthermore, it is hard to disentangle the impact of improved access to finance on household welfare dynamics using the above statistics. This study thus attempts to address these gaps by exploring the extent to which access to finance explains the dynamics of household welfare in Nigeria.

With this set of variables, we contribute to the household welfare dynamics literature by using quantitative analysis to explain the nature of the effects of access to finance on households' transitions in and out of poverty, with a focus on two component outcomes: currently poor households conditional on being initially poor (chronically poor); and currently poor households conditional on being initially non-poor (transient poor). This distinction of the share of the chronically poor from the transient poor is of importance to policy makers in Nigeria, first, as different intervention policies may be necessary for the varied poverty sub-groups. Second, for initially non-poor households descending into poverty, our analysis attempts to provide further insights into the factors that may reduce the probability of such a descent; if access to finance is a major factor, then further financial sector development reforms that expand financial access to poor and vulnerable non-poor households may be necessary. And if otherwise, the findings will feed into a shift in policy focus and design to adequately address the other relevant factors that drive poverty escape.

To the best of our knowledge, there is as yet no unambiguous answer to the question of whether financial sector development is effective in significantly reducing poverty levels and, in turn, whether improved access to finance has necessarily resulted in reducing chronic and transient poverty in Nigeria. Our study proposes using a bivariate probit model to analyse the implications of access to finance for household welfare dynamics and poverty persistence. Admittedly our analysis provides suggestive rather than generalisable evidence on the role of access to finance on household welfare dynamics in developing countries, primarily because only two waves of longitudinal data sets are available in the Nigerian Living Standard Measurement Study (LSMS)

surveys – 2010–11 and 2012–13. Nevertheless our analysis presents a positive step in the right direction in providing pioneering empirical evidence of the complex finance–welfare dynamics relationship in Nigeria.

The rest of the paper is organised as follows. Section 2 discusses the empirical methodology employed in our analysis. Section 3 describes the data used for analysis. Section 4 explains the empirical results from our analysis. Section 5 concludes and draws out key policy implications of the findings.

2. Empirical methodology

2.1. Determinants of poverty dynamics

The central objective of this study is to measure the impact of access to finance on household welfare dynamics using a bivariate regression model. A common approach to household welfare dynamics in the literature is the use of a multinomial logit model (Glewwe and Hall, 1998; Lawson et al., 2003; Lawson et al., 2006; Khalid et al., 2005). The model analyses the shift in households' poverty status, if any, between two periods by simultaneously estimating binary logit regressions for all comparisons among the dependent outcome categories, thereby allowing the effects of the independent variables to differ for each of the outcome categories (Long and Freese, 2006). The multinomial logit model is, however, not without its critics, as it imposes the property of independence of irrelevant alternatives (IIA), as a consequence of the implied assumption that there is no correlation between the error terms. The IIA simply means that, all other things being equal, the possible alternative outcomes of household welfare status outcomes are unaffected by what other choices are available (Cheng and Long, 2007). The model is also argued not to be appropriate for analysing transient poverty because of the initial conditions problem (Heckman, 1981), as it treats the initial household poverty status as exogenous, thereby suggesting that persistence of poverty may be entirely to the result of observable factors, which could cause a correlation over time between unobserved variables, leading to the creation of a sample selection bias as a result of the conditioning of the initial household poverty status (Jakobsen, 2011). A multinomial logit model is thus often considered not to be a model of transitions (Bokosi, 2007).

One of the prescribed alternatives in the literature to the multinomial logit model for the analysis of the determinants of household welfare dynamics is the bivariate probit model, which allows for the existence of possible correlated disturbances between two probit equations (Newman and Canagarajah, 2000). Unlike a multinomial logit model, which treats factors associated with a household's initial status as exogenous, a bivariate probit model treats the factors related to the initial household's welfare status as endogenous, instead of taking them as given, which may introduce selection bias into our specifications (Jakobsen, 2011). That is, it considers the factors associated with the household's initial welfare status, as well as those associated with changes in the household's welfare status over the period. The focus, therefore, would be to look at a poor household in year 1 and its associated probability of remaining poor in year 2. To estimate this, the study follows the formal description of the bivariate probit model in Jakobsen (2011) in defining the determinants of the household's per capita consumption levels as:

[1] $$f_1(Y_{i,1}) = \beta_1 \chi_{i,1} + \mathcal{E}_{i,1},$$

where $Y_{i,1}$ is the per capita consumption expenditure for household *i* in year 1, $\chi_{i,1}$ represents a vector of expenditure-determining explanatory variables, $\mathcal{E}_{i,1} \sim N(0,1)$, and f_1 is an unspecified suitable monotonic transformation ensuring the standard normal distribution of $\mathcal{E}_{i,1}$. The probability that households' per capita expenditures would fall below a certain consumption threshold, here the poverty line, is given by:

[2] $$prob(P_{i,1} = 1) = prob(Y_{i,1} \leq PL_1) = \Phi(f_1(Y_{i,1}) - \beta_1 \chi_{i,1}) = \Phi(\beta_1 \chi_{i,1}),$$

where $P_{i,1}$ is a binary, which equals to one if a household's per capita expenditure falls below the constructed poverty threshold (in which case the constructed poverty line for period 1 is PL_1) and zero if otherwise. Φ is the standard normal cumulative distribution function, and results in a probit estimation of the probability of being poor in period 1.

If the household's per capita consumption expenditure in period 2 is conditional on the household's welfare status in period 1, the per capita consumption expenditure is given by:

[3] $$f_2(Y_{i,2}) = \beta_2 \omega_{i,2} + \mathcal{E}_{i,2},$$

where $\omega_{i,2}$ is the transition determinants explaining the household's per capita consumption expenditures in year 2, conditional on the household's welfare status in

year 1. Of note is that, although the relationship is specified for households with per capita consumption expenditures below the constructed welfare threshold in year 1, it is likewise applicable to households which are non-poor in year 1. The monotonic transformation f_2 confirms the standard normal distribution of $\mathcal{E}_{i,2}$. It could then be assumed that the distribution of the error terms, $\mathcal{E}_{i,1}$ and $\mathcal{E}_{i,2}$, is bivariate standard normal with a correlation coefficient of ρ taking a value between -1 and 1. The probability of a household *i* being poor in year 2 conditional on being poor in year 1 can be specified as:

[4] $$prob(Y_{i,2} = 1) = prob(Y_{i,1} = 1) = \frac{prob(Y_{i,2}=1.\, Y_{i,1}=1)}{prob(Y_{i,1}=1)} = \frac{\Phi_2(\chi_{i,1}\beta_1, \omega_{i,2}\beta_2, \rho)}{\Phi_2(\chi_{i,1}\beta_1)},$$

where Φ_2 is the cumulative distribution function of the bivariate standard normal. Consistent with the definition of conditional probability, in a similar trend, the probability of being poor in year 2 conditional on not being poor in year 1 is determined by:

[5] $$prob(Y_{i,2} = 1 \,/\, Y_{i,1} = 0) = \frac{prob(Y_{i,2}=1.\, P_{i,1}=0)}{prob(Y_{i,1}=0)} = \frac{\Phi_2(-\chi_{i,1}\beta_1, \omega_{i,2}\beta_2, -\rho)}{\Phi_2(-\chi_{i,1}\beta_1)},$$

From equations [4] and [5], it is obvious that, if $\rho = 0$, then the log likelihood for the bivariate probit model equals to the sum of the log likelihoods of the two univariate probit models, that is, there is no relationship between the two equations, hence the bivariate probit model may not be necessary. However, if ρ != *0,* then there is dependence between the two equations, which suggests the likelihood of a household's initial welfare status influencing the same household's subsequent welfare status (see Cappellari and Jenkins, 2004), which may not be possible with the multinomial logit model (Jakobsen, 2011). Bivariate probit with endogenous selection is thus appropriate.

The main methodological criticism of the use of a bivariate probit model in poverty dynamics analysis is that it suffers from the heterogeneity of the transient poverty sub-group, as it fails to distinguish between households escaping poverty from those falling into poverty. The model has also been criticised for its reliance on binary dependent variables for its analysis, as there is the possibility of loss of information about households' living standards, particularly where there is continuous consumption (Lawson et al., 2006). The use of binary variables is suggested to help reduce the problems of measurement errors related to the use of continuous self-reporting welfare indicators, such as income and consumption expenditures (Jakobsen, 2011).

It is also worth noting that, because of the nature of our models, explaining why households' initial structure and welfare conditions influence future welfare outcomes may not be possible. One plausible explanation could be that certain unfavourable time-invariant, unobserved household characteristics, such as mental and physical disability, geographical poverty trap, or perhaps supply-side financial exclusion, which often result in low poverty exit and high poverty re-entry rates, may keep households in persistent poverty (see Jakobsen (2011). In addition, transitory shocks induced by a general slowdown in economic activities might create an image of persistence in poverty movement.

2.2. Empirical specification

Our analysis of household welfare dynamics rests on a number of methodological choices. First, our unit of analysis is the household. The choice of the household as the unit of analysis is premised on the assumption that the household exists as a unitary entity and the household resources, such as income and public goods, are shared proportionately among the members. Further, the focus of the study is on economic changes in the household rather than on individual members of it. Our second choice concerns the proxy to be used for the household members. For this, the study uses the household head, who, in practical terms, is the household's major breadwinner. Given the lack of sufficient information on other household members, certain attributes of the household head serve as a relatively fair proxy of the demographic characteristics of the entire household. Similar representation has been used in previous studies exploring household welfare analysis (Haughton and Khandker, 2009; Quach, 2005).

For our measure of household welfare, the study uses the natural logarithm of households' per capita expenditures. A similar measure was used in Glewwe and Hall (1998) and Barrientos and Mase (2012) to explain the household welfare dynamics. Although household income has also been used in the literature as a more rational measure of household welfare, household per capita expenditure has been suggested to better capture the consumption of households in developing countries, as it is less susceptible to volatility and measurement errors (McCulloch and Baulch, 2000; Haughton and Khandker, 2009).

Households' access to finance is considered to be potentially endogenous to household welfare, as a result of possible unobserved selectivity in access to finance by financial institutions or self-exclusion by households. To address this, therefore, in

line with the literature, access to finance is measured at the base year value, which can reasonably be considered to be exogenous for the purpose of our model. A similar approach was used in Glewwe and Hall (1998) and Lawson et al. (2006). For our measure of access to finance, consistent with the financial inclusiveness definition of access to finance, particularly in developing countries (Chidzero et al., 2006; Mondiale, 2005), we use a binary variable that triangulates the three measures of inclusive access to finance. That is, it takes the value of one if the reference household head has an account or has accessed credit or has used a saving facility with a formal financial institution, otherwise it takes the value of zero. This measure is particularly relevant to Nigeria, as access to finance often takes place through a proxy, that is, indirect access through another household member, which may be as important as direct access (Mondiale, 2005). For instance, Iliasov and Mirzoyants (2014) found evidence that, while 86% of adults with a bank account in Nigeria use their own account, others use over-the-counter services or access financial services such as credit and savings through somebody else's account.

Consistent with the literature, in our specification of equations [4] and [5], we consider other explanatory variables of the household's ability to generate earnings, which may thereafter translate to the household's welfare. Definitions of all the variables used in our bivariate probit analysis are presented in Table 1.

Table 1: Definition of variables

Variable details	Definition and units
Dependent variables	
Household welfare matrix	0=Non-poor, 1=Chronically poor, 2=Exit poverty, 3=Enter poverty
Household's poverty status	Dummy=1 if household is poor, otherwise=0
Explanatory variables	
Head: Age	Age of household head (in years)
Head: Age squared	Age of household head squared
Head: Female	Gender of household head (Female=1, Male=0)
Head: Marital status	Dummy=1 if household head is married, otherwise=0
Head: Education (years)	Number of years in formal education
Head: Not employed	Dummy=1 if household head is not employed, otherwise==0
Head: Formally employed	Dummy=1 if household head is formally employed, otherwise==0
Head: Self-employed (default variable)	Dummy=1 if household head is self-employed, otherwise==0
Head: Access to finance (lagged)	Dummy=1 if the household has access to finance, otherwise=0. Access to finance includes (i) having a bank account, (ii) having used the credit facility of a formal financial institution irrespective of having a bank account in the preceding six months, (iii) having used the savings facility of a formal financial institution irrespective of having a bank account within the preceding six months.
Household: Access to the internet	Dummy = 1 if household has access to the internet, otherwise=0
Household: Size (lagged)	Number of members in household
Household: Size squared (lagged)	Number of members in household squared
Household: % of members aged ≤ 5 years	Number of household members aged 5 years and below
Household: % of members aged 6–14 years	Number of household members aged 6–14s
Household: % of members aged 15–60 years (default variable)	Number of household members aged 15–60s
Household: % of members aged > 60 years	Number of household members aged above 60
Household: Size of land owned (square metres, log) (lagged)	Log of size of land owned by household
Household: Number of rooms (lagged)	Number of rooms occupied by household
Community: Urban	Dummy = 1 if household is situated in urban area, otherwise=0
Community: North-Central	Dummy=1 if household community is situated in North-Central region, otherwise=0
Community: North-East	Dummy=1 if household community is situated in North-East, otherwise=0
Community: North-West	Dummy=1 if household community is situated North-West, otherwise=0
Community: South-East	Dummy=1 if household community is situated in South-East, otherwise=0
Community: South-South	Dummy=1 if household community is situated in South-South, otherwise=0
Community: South-West	Dummy=1 if household community is situated in South-West, otherwise=0
Community: Distance to bank	Dummy=1 if household community distance to bank is less than or equal to 5km, otherwise=0
Community: Distance to major roads	Dummy=1 if household community located within 5km of major roads, otherwise=0
Community: Distance to markets	Dummy=1 if household community located within 5km of markets, otherwise=0
Variables measuring change	
Change: Household size	Change in household size over the period
Change: Members aged 0–5 years	Change in number of children aged 0–5 over the period
Change: Members aged 6–14 years	Change in number of children aged 6–14 over the period
Change: Members aged above 60 years	Change in number of adults aged above 60 over the period
Improvement in access to finance	Change in households' access to formal financial services over the period

3. The data

Until recently, Nigeria has experienced substantial gaps in generating adequate and timely data to support policy making. Indeed, the country lags behind in generating reliable and accurate longitudinal statistics on household demographics, consumption expenditures and economic activities. Most surveys in Nigeria at household level have been cross-sectional, with none implemented as a panel. The data used for our analysis, however, are drawn from the unique General Household Survey (GHS-Panel), a subset of the World Bank's Nigeria Living Standard Measurement Study (LSMS) surveys of 2010–11 and 2012–13, which is longitudinal in nature, nationally representative and better designed to capture information on household income, expenditure, demographic, labour activity, credit and savings, financial capability, household assets, agricultural activities, and welfare indicators (National Bureau of Statistics, 2014).

Given that the focus of the paper is to assess the impact of access to finance on household welfare dynamics, which requires an analysis of households interviewed across both periods, the study considered it important to match the households across both periods, that is, to establish that the same households were actually being analysed across both waves of the surveys. For this, the study adopted a three-stage matching approach proposed in Shlomo (2016). The first, pre-matching stage involves data editing and cleaning, and identifying the survey unique identifier (hhid); the quasi-identifiers such as date of birth, region identifier (zone), State identifier (state), Local Government Area identifier (lga), and Enumeration Area identifier (ea); and the verification variables, which include age, marital status and academic attainment. The second stage of the matching process is the actual matching of data from the two waves for comparison and determination of correct matches. This involves making sure that the data matched belongs to the same household by using the deterministic (exact) matching approach, which is based on an exact one-to-one character match of the unique identifier. The third stage of the matching process is the post-matching stage, where matched data set and residuals (not matched data) are checked for Type I and Type II errors,[2] error rates are determined, and analysis is carried out.

[2] A positive or Type I error occurs when the data from two different households are matched, because of the mistake of both having same identity number. A negative or Type II error occurs when two observations of the same household do not match, because the household is misreported in either of the waves, thus resulting in a mismatch. See Pastore, F. & Socha, M. (2006). The Polish LFS: A Rotating Panel with Attrition. *Ekonomia,* 15(3)**,** 3-24.

Table 2 presents the descriptive statistics for the entire households in the matched panel, also disaggregated into poor and non-poor households in both waves. Focusing on access to finance, the descriptives show that about 13% of poor households in our sample had access to finance in both waves 1 and 2. The share of households with formal financial institutions within their community, however, reduced over the period, as only 8% of poor households reported having a formal financial institution within their community in wave 2, compared to 14% in wave 1. One plausible explanation for this could be the fading enthusiasm around the power of microfinance, particularly following the 2010 microfinance banking crisis in Nigeria, which led to the revocation of the licences of 224 microfinance banks (MFBs) across the country because they were terminally distressed or terminally insolvent. For non-poor households, the statistics show that 41% had access to finance in wave 1 (45% in wave 2), highlighting inequality in access to basic financial services between poor and non-poor households in Nigeria. The proportion of non-poor households with formal financial institutions within their community remained unchanged over the period, at 25%, which shows that the majority of financial institutions in Nigeria continued to operate within proximity of non-poor and well-to-do households, rather than poor households.

Table 2: Descriptive statistics

	2010–11						2012–13					
	Poor households		Non-poor households		Aggregate households		Poor households		Non-poor households		Aggregate households	
Variables	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age	50.804	14.001	48.276	15.326	49.300	14.854	51.774	14.377	51.670	15.335	51.713	14.943
Female	0.117	0.322	0.167	0.373	0.147	0.354	0.102	0.303	0.178	0.382	0.146	0.354
Married	0.866	0.341	0.765	0.424	0.806	0.396	0.881	0.324	0.759	0.428	0.810	0.393
Single	0.017	0.128	0.036	0.186	0.028	0.165	0.012	0.109	0.041	0.199	0.029	0.168
Widowed	0.110	0.313	0.140	0.347	0.128	0.334	0.102	0.303	0.154	0.361	0.132	0.339
Divorced	0.007	0.084	0.058	0.234	0.037	0.190	0.003	0.059	0.045	0.208	0.028	0.164
Education level	4.582	4.752	7.836	5.615	6.518	5.518	4.769	4.783	7.761	5.667	6.518	5.518
No education	0.444	0.497	0.242	0.428	0.324	0.468	0.422	0.494	0.253	0.435	0.324	0.468
Maximum primary education	0.370	0.483	0.323	0.468	0.342	0.474	0.385	0.487	0.311	0.463	0.342	0.474
Secondary education	0.138	0.345	0.234	0.423	0.195	0.396	0.142	0.349	0.233	0.423	0.195	0.396
Post-secondary education	0.034	0.181	0.066	0.248	0.053	0.224	0.028	0.166	0.070	0.256	0.053	0.224
University education	0.015	0.121	0.135	0.342	0.087	0.281	0.023	0.148	0.132	0.339	0.087	0.281
Not employed	0.051	0.220	0.077	0.267	0.067	0.249	0.062	0.241	0.098	0.297	0.083	0.276
Head: Self-employed	0.855	0.352	0.702	0.457	0.764	0.425	0.860	0.347	0.685	0.465	0.757	0.429
Formally employed	0.090	0.286	0.214	0.410	0.164	0.370	0.068	0.251	0.208	0.406	0.150	0.357
Household size	7.014	3.081	4.792	2.761	5.692	3.093	7.765	3.255	5.584	3.121	6.490	3.354
% of members aged < 5	0.177	0.165	0.154	0.185	0.163	0.178	0.187	0.163	0.131	0.173	0.155	0.171
% of members aged 6–14	0.273	0.179	0.166	0.187	0.210	0.191	0.267	0.168	0.184	0.186	0.219	0.183
% of members aged 15–60	0.477	0.203	0.575	0.272	0.535	0.251	0.471	0.198	0.565	0.258	0.526	0.239
% of members aged > 60	0.073	0.168	0.105	0.238	0.092	0.213	0.075	0.165	0.119	0.238	0.101	0.212
Accessed internet	0.003	0.054	0.060	0.237	0.037	0.188	0.009	0.093	0.085	0.279	0.053	0.224
Size of land owned (m^2, log)	6.412	3.842	4.218	4.265	5.107	4.237	6.651	3.751	3.945	4.230	5.069	4.252
Number of rooms	3.850	1.993	3.363	2.021	3.560	2.024	3.815	1.952	3.578	2.075	3.676	2.028
Access to finance	0.127	0.333	0.413	0.493	0.297	0.457	0.131	0.337	0.445	0.497	0.315	0.465
Presence of a formal bank	0.137	0.344	0.250	0.433	0.204	0.403	0.081	0.273	0.247	0.431	0.178	0.383
Distance to major roads	0.286	0.452	0.472	0.499	0.397	0.489	0.501	0.500	0.704	0.457	0.620	0.486
Distance to markets	0.024	0.152	0.077	0.266	0.055	0.228	0.025	0.156	0.077	0.266	0.055	0.228
Urban	0.138	0.345	0.411	0.492	0.301	0.459	0.116	0.320	0.431	0.495	0.300	0.458
North-central	0.196	0.397	0.155	0.362	0.172	0.377	0.174	0.379	0.171	0.377	0.172	0.377
North-east	0.169	0.375	0.147	0.354	0.156	0.363	0.186	0.389	0.134	0.341	0.156	0.363
North-west	0.293	0.455	0.139	0.346	0.201	0.401	0.320	0.466	0.117	0.321	0.201	0.401
South-east	0.126	0.332	0.193	0.395	0.166	0.372	0.143	0.350	0.182	0.386	0.166	0.372
South-south	0.134	0.340	0.169	0.375	0.155	0.362	0.128	0.334	0.174	0.379	0.155	0.362
South-west	0.082	0.275	0.197	0.398	0.150	0.358	0.050	0.217	0.222	0.416	0.150	0.358
Number of observations	*1690*		*2483*		*4173*		*1733*		*2440*		*4173*	

Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.
SD: Standard deviation

Other statistics are as expected and consistent with results from previous studies on households' demographics, access to infrastructure and the regional disparity between poor and non-poor households in Nigeria. For instance, the summary statistics on poor household composition show that the average ages of household heads were about 51 and 52 in wave 1 and wave 2, respectively, with most of the household heads either without any formal education (a little over 40%) or with less than six years of formal education (primary education) across both waves. For the non-poor households, the mean ages of the household heads were 48 and 52 for 2010–11 and 2012–13, respectively, while three in every four of the household heads were married, and about 17% of households were headed by a female. In terms of human capital, about a third of the non-poor household heads had a minimum of secondary education across both waves.

Table 3 presents the mean characteristics of the households relative to the four possible classifications: (1) never poor – not poor in both waves; (2) chronically poor – poor in both waves; (3) exit poverty – poor in wave 1, but not in wave 2; and (4) enter poverty – not poor in wave 1, but poor in wave 2. The purpose of this classification is to provide more clarification of the types of households in each sub-group, rather than to form the basis for drawing conclusions about the associated causes. The results highlight significant disparities in the households' human, physical and financial capital, as the disadvantage of chronically poor households relative to other sub-groups is once again apparent in number of years of formal education, social networks (measured by access to the internet), occupational choices, household structure and composition, access to finance, and proximity to infrastructural facilities. For instance, only 11% of the chronically poor household heads had access to formal financial services, compared with 28% of households that had escaped poverty and 48% of the never poor households. Also, while 27% of the never poor households and 14% of households escaping poverty had a formal financial institution present within their community, only 7% of the chronically poor households had such an institution within their community.

Table 3: Descriptive statistics of the households in each household welfare sub-group

Variables	Chronically poor		Exit poverty		Enter poverty		Never poor	
	Mean	**SD**	**Mean**	**SD**	**Mean**	**SD**	**Mean**	**SD**
Age	52.682	14.057	55.558	14.659	49.058	14.985	50.928	15.352
Female headed	0.110	0.313	0.138	0.345	0.078	0.269	0.185	0.389
Married	0.875	0.331	0.824	0.382	0.901	0.299	0.747	0.435
Single	0.013	0.114	0.028	0.166	0.009	0.096	0.044	0.205
Widowed	0.108	0.310	0.141	0.348	0.085	0.280	0.156	0.363
Divorced	0.003	0.055	0.008	0.087	0.005	0.068	0.052	0.223
Education	4.436	4.646	5.069	5.063	5.765	5.045	8.274	5.632
No education	0.451	0.498	0.419	0.494	0.336	0.473	0.222	0.415
Maximum primary education	0.376	0.484	0.350	0.478	0.412	0.493	0.304	0.460
Secondary education	0.134	0.341	0.151	0.358	0.166	0.372	0.248	0.432
Post-secondary education	0.027	0.162	0.056	0.231	0.032	0.177	0.073	0.261
University education	0.012	0.110	0.023	0.150	0.053	0.224	0.153	0.360
Not employed	0.062	0.242	0.082	0.274	0.060	0.238	0.101	0.301
Head: Self-employed)	0.876	0.330	0.806	0.396	0.811	0.392	0.662	0.473
Head: Formally employed	0.050	0.218	0.107	0.310	0.120	0.325	0.227	0.419
Household size	8.005	3.341	7.038	3.375	7.044	2.865	5.306	2.992
% of members aged < 5	0.172	0.154	0.099	0.140	0.233	0.180	0.138	0.178
% of members aged 6–14	0.279	0.167	0.236	0.186	0.231	0.165	0.174	0.184
% of members aged 15–60	0.476	0.197	0.550	0.236	0.456	0.197	0.568	0.262
% of members aged > 60	0.074	0.155	0.115	0.206	0.080	0.189	0.120	0.244
Accessed internet	0.008	0.092	0.013	0.113	0.009	0.096	0.099	0.298
Size of land owned (m^2, log)	6.813	3.674	5.450	4.237	6.168	3.938	3.658	4.169
Number of rooms	3.868	1.997	3.949	2.041	3.657	1.803	3.507	2.075
Access to formal finance	0.115	0.319	0.279	0.449	0.180	0.384	0.477	0.500
Presence of a formal bank	0.072	0.259	0.143	0.351	0.108	0.311	0.267	0.442
Distance to major roads	0.481	0.500	0.588	0.493	0.562	0.497	0.726	0.446
Distance to markets	0.022	0.145	0.033	0.180	0.035	0.183	0.085	0.279
Urban	0.097	0.296	0.269	0.444	0.173	0.379	0.462	0.499
North-central	0.183	0.387	0.240	0.428	0.145	0.353	0.158	0.364
North-east	0.172	0.378	0.156	0.363	0.226	0.419	0.130	0.337
North-west	0.330	0.470	0.169	0.375	0.288	0.453	0.107	0.309
South-east	0.135	0.342	0.095	0.293	0.166	0.372	0.199	0.399
South-south	0.130	0.337	0.146	0.353	0.122	0.328	0.179	0.384
South-west	0.048	0.215	0.194	0.396	0.053	0.224	0.227	0.419
Number of observations	*1299*		*391*		*434*		*2049*	

Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.
SD: Standard deviation

Where human capital is concerned, the majority of the household heads within the chronically poor classification had no more than primary education (83% to be precise), compare with almost half of the never poor households having at least secondary education (about 48%). In addition, the chronically poor households tended to have a larger household size than the other household sub-groups, which may explain their poverty situation. Note, however, that the chronically poor households had a larger land

size and a greater number of rooms than the other sub-groups. One plausible explanation for this is that the majority of these chronically poor people are rural dwellers (90%) and are more likely to be subsistence farmers, with undocumented inter-household productive assets to support ownership or possession.

4. Empirical results and discussion

4.1. Poverty levels and trends

Before discussing the results of our estimations of the determinants of household welfare dynamics and poverty persistence in Nigeria, we first present some preliminary indicators of poverty levels and trends in the country. For this, we derive a poverty line as defined in National Bureau of Statistics (2012), which employs two-thirds of the mean households' food and non-food consumption expenditures in the sample (see also, Haughton and Khandker, 2009). A household is deemed to be poor if its per capita consumption expenditure is below the computed poverty line for the referenced year, and extremely poor if the household's consumption expenditure is below one-third of the mean households' food and non-food consumption expenditures in the sample. Our analysis of the 2010–11 and 2012–13 cross-sectional data sets indicates a marginal increase in the poverty headcount rate, from 40.5% in 2010–11 to 41.53% in 2012–13 (see Table 4), despite the estimated poverty line dropping from N75,417.95 to N73,876.35 over the period. Further, there are indications that the number of Nigerians living in poverty increased from 66.327 million to 71.771 million over the period,[3] suggesting that poverty incidence in Nigeria is somewhat underestimated and rising, rather than reducing as recorded in World Bank (2014). The latter reported that there was no change in the number of Nigerians living in poverty over the period studied. In addition, the extreme poverty headcount ratio increased from 6.59% to 8.63% over the period.

[3] Computation based on an estimated population of 163.771 million and 172.817 million in 2011 and 2013, respectively. World Bank (2016). World Development Indicators 2016. Washington, DC: World Bank.

Table 4: Incidence of poverty in Nigeria (2010–11 and 2012–13)

	2010–11	2012–13
Headcount ratio %	40.50	41.53
Extreme poverty headcount ratio %	6.59	8.63
Aggregate poverty gap	38,526,624	41,840,180
Per capita poverty gap	9,232.36	10,026.40
Poverty gap ratio %	12.242	13.572
Income gap ratio %	30.227	32.681

Source: Nigerian LSMS 2010/2011 and 2012/2013.
Poverty line computed using two-third of mean per capita expenditures.

A regional imbalance was found between the north and the south, as shown in Table 5. While poverty rates dropped between 2010–11 and 2012–13 in the south, they increased in the north. Most notable was the south-west, where the incidence of poverty fell impressively from 22.13% to 13.69%, while it increased in the North-East, North-West and South-East regions. The rise in poverty level in the North-East is for an obvious reason – insecurity resulting from Boko Haram insurgency - while the situation in the North-West may be due to the mass migration of large number of households escaping from the insurgency in the North East.

Table 5: Regional distribution of incidence of poverty in Nigeria (2010–11 and 2012–13)

Regions	2010/2011 (%)	2012/2013 (%)
North-Central	46.24%	41.92%
North-East	43.85%	49.54%
North-West	59.00%	66.03%
South-East	30.78%	35.84%
South-South	34.98%	34.37%
South-West	22.13%	13.69%

Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.

To capture households' transitions across the poverty line, the study classified households into two groups across both waves – poor and non-poor households. Table 6 reveals that, out of 1,690 poor households in 2010–11, 23.14% moved out of poverty in 2012–13. Also, 17.48% of the 2,483 non-poor households in 2010–11 became poor in 2012–13. Table 7 further breaks down the households' welfare transitions over time. The results suggest that 31.13% of households are chronically poor, that is, poor in both periods, while about 20% experienced transitory poverty over the same period, as 9.37% had moved out of poverty and 10.40% had slipped into it by 2012–13. In addition, of 4,173 households in the matched panel, 2,049, or 49.10%, are shown not to be poor over the period, that is, non-poor.

Table 6: Transition in household welfare dynamics over the two waves

		2012–13		
		Poor	**Not poor**	**Total**
2012–11	**Poor**	1,299 76.86%	391 23.14%	1,690 100.00%
	Not poor	434 17.48%	2,049 82.52%	2,483 100.00%
	Total	1,733 41.53%	2,440 58.47%	4,173 100.00%

Source: Authors' computation from World Bank's LSMS surveys 2010–11 and 2012–13.

Table 7: Poverty change dynamics in Nigeria between 2010–11 and 2012–13

Descriptive	**Poor in one period (i)**		**Poor in both periods (ii)**	**Moving out of poverty (iii)**	**Moving into poverty (iv)**	**Poor in at least one period (v=i+iii)**	**Not poor in either period (vi)**	**Number of households (vii=ii+iii+iv+vi)**
	2010/2011	**2012/2013**						
Number of households	1,690	1,733	1,299	391	434	2,124	2,049	4,173
Percentage of households	40.50	41.53	31.13	9.37	10.40	50.90	49.10	

Source: Author's computation from World Bank's LSMS surveys 2010–11 and 2012–13.

4.2 Determinants of household poverty

In this section we discuss the estimation results from our bivariate probit analysis described in Section 2. The core of our analysis is to estimate the effects of access to formal financial services and improvement of said access on the likelihood of households experiencing a particular transition. Table 8 presents the marginal effects of our bivariate probit model together with the correlation coefficient of the two errors. The estimates are generated by pooling our two-wave data sets, thereby allowing the model, on the one hand, to control for the households' initial conditions by estimating the probability of their being poor in the base year (2010–11), using a probit model as explained earlier. Thus, the model treats the household's initial household poverty status as endogenous, instead of exogenous, if necessary, and creates two distinct sub-samples in the estimation of the household poverty transitions. On the other hand, our model estimates the probability of being poor in 2012–13 conditional upon being poor in 2010–11, and the probability of being poor in 2012–13 conditional upon being non-poor in 2010–11. A similar approach is used in Bokosi (2007) and Jakobsen

(2011) exploring the determinants of household welfare dynamics and poverty persistence in Malawi and Nicaragua, respectively.

From the empirical results presented in Table 7, the correlation coefficient ρ has the value of 0.688 and is found to be statistically different from zero by the Wald test. The Likelihood Ratio test for $H_0: \rho = 0 \text{ against} H_1: \rho \neq 0$ indicated a *p*-value of 0.000, which suggests that we reject the hypothesis that the two dependent variables are not jointly determined. The ρ also suggests that a household that is poor in 2010–11 does have a higher probability of being poor in 2012–13 compared with a non-poor household.

Focusing on the effects of access to finance on household welfare dynamics, our estimates indicate, that, for households which were poor in 2010–11, access to finance reduced the probability of their being poor in 2012–13 by 22.1 percentage points, while, for households not poor in 2010–11, access to finance reduced their probability of being poor in 2012–13 by 8.5 percentage points. This means that, everything else being equal, initially poor households with access to formal financial services are significantly more likely to escape poverty over the period, while initially non-poor households are also less likely to slip into poverty over the period. The results further indicate the significance of an improvement in households' access to finance on household dynamics, which our estimates show reduces the probability of households that are poor in 2010–11 being poor in 2012–13 by 6.4 percentage points; for non-poor households in 2010–11, it reduces the probability of being poor in 201213 by 8.5 percentage points. This therefore suggests that improving and providing access to finance has a role in reducing transient poverty in Nigeria. These results are consistent with the findings in prior empirical studies of the determinants of poverty in Nigeria (see for instance, Apata et al., 2010; Adepoju, 2012).

Although, as noted earlier, our primary focus is on the effects of access to finance and its improvement on household welfare dynamics, several other additional interesting relationships emerged from our estimation. First, factors such as urban residence, change in share of household members aged below 5 years and change in share of household members aged between 6 and 14 years may have significant reducing effects on the joint probability of initially poor households remaining in poverty and initially non-poor households descending into poverty. Second, certain individual characteristics, such as educational attainment and formal employment, were found to have a different impact on the two joint probabilities. For instance, for households that

were poor in 2010–11, educational attainment was found to reduce the probability of being poor in 2012–13 but increased it in 2012–13 for households who were not poor in 2010–11. Similar results were found for a household's wealth or endowment (measured by the number of rooms it occupied) and locational factors such as proximity to major roads and proximity to markets. Further, factors such as the size of land owned by households (natural log) and change in household size seemed significantly to increase the probability of being poor 2012–13 for households that were poor in 2010–11 and also for households that were not poor in 2010–11. The findings on the joint probability impact of the size of land owned by households are counterfactual, as land ownership and durable asset holdings are expected to help reduce the impact of economic shocks on household welfare. A plausible explanation for this is that a large share of the households in our sample were rural dwellers and more likely to be subsistence farmers with undocumented inter-household productive assets to support ownership or possession of the land. Such undocumented assets are often considered unacceptable collateral for access to finance, particularly credit in Nigeria, as collateral are unacceptable for registration in the National Collateral Registry.

Table 8: Marginal effects of the determinants of households' poverty status

Dependent variables:	Probability of being poor in 2012–13 conditional upon being poor in 2010–11	Probability of being poor in 2012–13 conditional upon being non-poor in 2010–11
	Marginal effects	**Marginal effects**
Head: Age	0.003	0.003
	(0.003)	(0.002)
Head: Age squared	-0.000	-0.000
	(0.000)	(0.000)
Head: Female	-0.044	-0.001
	(0.029)	(0.023)
Head: Marital status	-0.047	0.017
	(0.031)	(0.021)
Head: Education	-0.010***	0.001
	(0.001)	(0.001)
Head: Not employed	0.043	0.022
	(0.027)	(0.021)
Head: Formally employed	-0.054***	0.021
	(0.020)	(0.018)
Household: Size (lagged)	0.095***	-0.002
	(0.007)	(0.005)
Household: Size squared (lagged)	-0.003***	-0.000
	(0.000)	(0.000)
Household: % of members aged < 5 yrs	0.158***	0.333***
	(0.049)	(0.041)
Household: % of members aged 6–14 yrs	0.251***	0.122***
	(0.042)	(0.034)
Household: % of members aged > 60 yrs	0.048	0.042
	(0.048)	(0.037)
Head: Access to finance (lagged)	**-0.221*** **	**-0.085*** **
	(0.014)	**(0.012)**
Household: Size of land owned (m^2, log) (lagged)	0.005***	0.005***
	(0.002)	(0.001)
Household: Number of rooms (lagged)	-0.018***	-0.001
	(0.004)	(0.003)
Community: Distance to major roads	-0.034**	0.009
	(0.014)	(0.010)
Community: Distance to markets	-0.057**	0.027
	(0.029)	(0.028)
Community: Urban dummy	-0.173***	-0.051***
	(0.014)	(0.011)
Change: Household size	0.022***	0.029***
	(0.004)	(0.005)
Change: Members aged below 5 yrs	-0.011**	-0.014**
	(0.005)	(0.006)
Change: Members aged between 6–14 yrs	-0.009**	-0.012**
	(0.004)	(0.006)
Change: Members aged above 60 yrs	0.003	0.004
	(0.008)	(0.010)
Improvement in access to formal finance	**-0.064*** **	**-0.085*** **
	(0.010)	**(0.013)**
Number of observations	4173	4173
Log likelihood	-3818.160	-3818.160
Wald X^2 *(41)*	1647.16	1647.16
Prob > X^2	0.000	0.000
ρ	0 .688	0.688
Wald test of ρ=0: X^2(Prob > X^2)	541.509(0.000)	541.509(0.000)
Marginal effects after probit (y)	0.239	0.124

Source: Author's computation from the Nigerian LSMS 2010-2011 and 2012-2013.
*Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*
Bivariate probit model
Default: Off-farm self-employed, % of members aged 15–60 years (working household members)

Given its prominence in the household welfare dynamics literature and as a robustness test of our specifications, we consider it useful to examine the determinants of household welfare dynamics using a multinomial logit model and the same set of variables used in our bivariate probit model. For this, our presumably four mutually exclusive outcomes are (1) never poor – not poor in both waves; (2) chronically poor – poor in both waves; (3) exit poverty – poor in wave 1, but not poor in wave 2; and (4) enter poverty – not poor in wave 1, but poor in wave 2. The results of the average marginal effects from the multinomial logit model are presented in Table 9.

Our test of hypothesis about the coefficients after estimation using the Wald test shows $X^2(69)$ equal to 1272.25 with $Prob > X^2 = 0.000$, suggesting that the corresponding coefficients are zero across all equations. Also, 13 variables' effects are significant at the 0.05 level from each of our LR tests for independent variables and Wald tests for independent variables. The results from our suest-based Hausman test and Small-Hsiao test suggest that there is no evidence that the IIA assumption has been violated (see Appendix 1).

Our estimates show that (improving) access to finance significantly enhances the likelihood of chronically poor households moving out of poverty. The estimates also show that the likelihood of the never poor households entering poverty is significantly reduced by such access. Estimates of the impact of access to finance on households in transient poverty (disaggregated into households moving out and households moving into poverty) provide interesting insights. Although shown to have a reducing effect, the impact of (easier) access to finance on households moving out of poverty was not significant – an indication that, while access to finance may be necessary, it is not sufficient to lift these households out of poverty. For households descending into poverty, our results indicate that, while access to finance reduces the likelihood of moving into poverty, though insignificant, improvement in a household's access to formal finance tends to have a statistically significant negative impact on households moving into poverty.

Table 9: Marginal effects of the determinants of households' poverty status

Dependent variables:	Chronic poverty	Exit poverty	Enter poverty	Non-poor
	Marginal effects	Marginal effects	Marginal effects	Marginal effects
Head: Age	0.004	-0.002	0.000	-0.002
	(0.003)	(0.002)	(0.002)	(0.003)
Head: Age squared	-0.000	0.000	-0.000	0.000
	(0.000)	(0.000)	(0.000)	(0.000)
Head: Female	-0.009	-0.029	-0.030	0.068**
	(0.035)	(0.022)	(0.028)	(0.030)
Head: Marital status	-0.047	-0.014	0.018	0.043
	(0.033)	(0.020)	(0.026)	(0.028)
Head: Education	-0.005***	-0.004***	-0.000	0.009***
	(0.001)	(0.001)	(0.001)	(0.001)
Head: Not employed	0.039	-0.016	0.004	-0.027
	(0.026)	(0.018)	(0.021)	(0.025)
Head: Formally employed	-0.053**	-0.005	0.032*	0.026
	(0.026)	(0.016)	(0.017)	(0.022)
Household size (lagged)	0.067***	0.021***	-0.001	-0.086***
	(0.008)	(0.006)	(0.006)	(0.008)
Household size squared (lagged)	-0.002***	-0.001*	-0.000	0.003***
	(0.000)	(0.000)	(0.000)	(0.000)
% of members aged < 5	0.123**	-0.233***	0.234***	-0.125**
	(0.055)	(0.044)	(0.041)	(0.055)
% of members aged 6–14	0.266***	-0.022	0.046	-0.290***
	(0.046)	(0.031)	(0.038)	(0.046)
% of members aged > 60	0.002	0.012	0.072*	-0.086*
	(0.055)	(0.035)	(0.041)	(0.048)
Access to formal finance (lagged)	**-0.258*** **	**0.010**	**-0.025**	**0.273*** **
	(0.022)	**(0.014)**	**(0.016)**	**(0.019)**
Size of land owned (m^2, log) (lagged)	0.003*	-0.004***	0.004***	-0.003*
	(0.002)	(0.001)	(0.001)	(0.002)
Number of rooms (lagged)	-0.015***	0.000	0.002	0.013***
	(0.004)	(0.002)	(0.003)	(0.004)
Distance to major roads	-0.026**	-0.015	0.006	0.035**
	(0.013)	(0.010)	(0.010)	(0.014)
Distance to markets	-0.035	-0.040	0.011	0.064**
	(0.038)	(0.025)	(0.026)	(0.032)
Urban dummy	-0.165***	0.017	-0.015	0.164***
	(0.019)	(0.012)	(0.014)	(0.016)
Change: Household size	0.017**	-0.020***	0.021***	-0.018**
	(0.007)	(0.006)	(0.005)	(0.008)
Change: Members aged below 5 years	-0.004	0.013**	-0.010	0.001
	(0.009)	(0.007)	(0.007)	(0.011)
Change: Members aged between 6–14 years	-0.027***	-0.003	-0.002	0.032***
	(0.008)	(0.005)	(0.007)	(0.009)
Change: Members aged above 60 years	0.006	-0.005	-0.001	-0.000
	(0.014)	(0.010)	(0.011)	(0.015)
Change in access to formal finance	**-0.108*** **	**0.017**	**-0.041*** **	**0.132*** **
	(0.019)	**(0.012)**	**(0.014)**	**(0.017)**
Number of observations	4173	4173	4173	4173

Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.
*Notes: Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1*
Multinomial logit model
Default: Off-farm self-employed, % of members aged 15–60 years (working household members)

Despite its stylised limitations, the estimates from our multinomial logit model analysis nevertheless support the findings from our bivariate probit analysis on the implications of access to finance for chronically poor and never poor households. The difference in

the level of significance of its impacts on households in transient poverty between the two models may not be unrelated to the functional difference between both models in their treatments of the households' initial conditions, as well as on our use of movement in household welfare over two short waves, which may have reduced the precision of our parameter estimates.

Taken together, these findings are consistent with evidence from Pakistan and Nicaragua as presented by Khalid et al. (2005) and Jakobsen (2011), respectively, in the sense that (improved) access to finance does not only reduces the probability of households remaining in poverty, but also reduces transient poverty. In the case of Nigeria, we found that, while a policy-based expansion of financial access may have desired effects on household welfare, other poverty-reducing initiatives may be necessary for broad and substantial poverty reduction to be achieved. This feeds into the ongoing discourse on the actual effects of financial sector development on household welfare in Nigeria (Yinusa and Alimi, 2015).

5. Conclusion

The literature on financial sector development has long been preoccupied with the proposition that improving poor and low-income households' access to finance is a panacea for poverty reduction in developing countries. It is argued that, by relaxing the asymmetric information and high transaction costs problems that disproportionately limit these households' ability to access cheap and affordable formal financial services, poor and low-income households are able to address their consumption shortfalls during periods of economic shocks, and simultaneously increase their household's earning ability, by participating in profitable economic activities. It is often easy to argue that individual and household characteristics are more likely to influence household welfare dynamics and poverty persistence than institutional factors such as finance, but studies have presented empirical evidence suggesting that institutional factors are key determinants of household welfare dynamics. The policy perspective of this line of argument is that developing countries should invest in human and social capital, rather than broadening access to institutional resources, to significantly reduce poverty and inequality. Interestingly also, the main focus of the literature relative to finance and poverty-reduction debates has been on the use of financial services, rather than on access, which is usually overlooked in the discussion of the determinants of household welfare dynamics and poverty persistence. However, for reasons of a paucity of data,

few studies have probed deeper into the direct role of access to finance in household welfare dynamics and poverty persistence.

This study is the first analysis of longitudinal data from the nationally representative World Bank LSMS surveys for 2010–11 and 2012–13 to examine the implication of access to formal finance and its improvement for household welfare dynamics and poverty persistence in Nigeria. For our analysis we first explored the levels and trends of poverty in Nigeria. Next, we examined the determinants of household welfare dynamics using a bivariate probit model. This model is novel and appropriate, as the heterogeneity among households, and past poverty experience, are considered necessary for estimating current household welfare status. Ignoring the endogenous selection of conditioning on the initial household welfare status may distort the estimated coefficients of the impact of access to finance on household welfare dynamics. Our main findings are summarised below.

Contrary to expectations, the incidence and severity of poverty in Nigeria is increasing. A major revelation from this study is that the share of Nigerians living in poverty increased between 2010–11 and 2012–13. Headcount poverty increased from 40.5% in 2010–11 to 41.53% in 2012–13, suggesting that the number of Nigerians living in poverty increased from 66.327 million to 71.771 million over the period. In a similar trend, the poverty gap index increased from 12.242 in 2010–11 to 13.572 in 2012–13. A significant regional imbalance is also evident in the incidence of poverty across Nigeria, with the proportion of those living in poverty more concentrated in the North-West, while the lowest share of Nigerians living in poverty are in the South-West.

The results also highlight substantial heterogeneity in the effects of access to finance on our outcome variables. First, the results demonstrate that access to finance and improving it significantly reduces the probability of initially poor households remaining in poverty over time. Second, for initially non-poor households, access to finance significantly reduces the probability of being poor over time. There is thus evidence that (improved) access to formal finance is crucial to reducing transient poverty in Nigeria. The study also finds that, for substantial poverty reduction to be achieved in Nigeria, other structural and intergenerational factors, such as education, household structure, initial endowments and access to infrastructure are important.

Given the methodological constraints inherent in the use of a two-wave panel for the analysis of determinants of household welfare dynamics, the study performs a rigorous

regression analysis on the sample using the multinomial logit model for specification robustness tests. Taken together, the findings are consistent with the results from the bivariate probit analysis that access to finance not only reduces the probability of households remaining in poverty, but also reduces transient poverty, which feeds into the narrative of the effects of access to formal finance on household welfare transitions.

Overall, our conclusions echo the message that access to formal financial services is good for the poor and non-poor alike. However, other initiatives that enhance household capabilities and initial conditions, and infrastructural access may be necessary for significant poverty reduction to be achieved. Besides influencing the speed at which access to finance may enhance household welfare, these initiatives may also explain whether financial sector reform policies are pro-poor or anti-poor, as initiatives that enhance financial literacy or access to productive livelihood assets have been identified in the literature as contributing to poverty reduction in itself. Nevertheless their implications for household welfare transitions may depend on levels of economic and financial development, since poverty reduction strategies are often country- and context-specific. Policy attention should, therefore, be directed not only at broadening access to formal financial services but also at enhancing household capabilities and access to livelihood resources.

6. Appendix 1

Results from suest-based Hausman test, and Small-Hsiao test of Independence of Irrelevant Alternatives for multinomial logit

(1) Suest-based Hausman tests of IIA assumption (N=4173)

	chi^2	df	P>chi^2	Evidence
Never poor	56.820	48	0.179	for Ho
Chronically poor	53.163	48	0.282	for Ho
Exit poverty	61.660	48	0.089	against Ho
Enter poverty	39.732	48	0.796	for Ho

Ho: Odds (Outcome-J vs Outcome-K) are independent of other alternatives
Note: A significant test is evidence against Ho.
Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.

(2) Small-Hsiao tests of IIA assumption (N=4173)

	lnL(full)	lnL(omit)	chi^2	df	P>chi^2	Evidence
Never poor	-863.499	-3778.701	-5830.404	72	1.000	for Ho
Chronically poor	-933.979	-1871.025	-1874.091	72	1.000	for Ho
Exit poverty	-1326.392	-1871.025	-1089.266	72	1.000	for Ho
Enter poverty	-1331.635	-1871.025	-1078.781	72	1.000	for Ho

Ho: Odds (Outcome-J vs Outcome-K) are independent of other alternatives
Note: A significant test is evidence against Ho.
Source: Author's computation from the Nigerian LSMS 2010–11 and 2012–13.

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