Informality and Poverty Dynamics: Evidence with Panel Data from Nigeria

By

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1. Introduction

In recent times, there has been a growing emphasis on the informal sector as a result of its continued growth, which contradicts the conventional expectation of a decrease in informality as economies progress. In particular, the informal sector has become a key source of employment, helping to absorb the excess labour from rural-urban migration and serving as a viable alternative to unemployment (Chen, 2012; Mbaye and Benjamin, 2014); as well as an income source especially for the poor (ILO, 2013; Fox and Sohnesen, 2016). Available data shows that over two billion people (61.2% of the global workforce) are employed in the informal sector globally and this is especially true in the developing countries of Africa, Asia, and the Pacific, and the Arab states. In the African context, the informal sector serves as the primary provider of employment opportunities, accounting for more than 70 percent of non-agricultural jobs. This trend is particularly prominent in Sub-Saharan Africa (SSA), where the informal sector's share of employment (excluding agriculture) is the highest, reaching 76.8 percent (ILO, 2018).

Aside concerns about the persistent rise in the rate of informality, a lot of debate has surrounded the poverty alleviating potential of the sector as well as the motivating factors for those who engage in informal employment (Chen, 2012) coupled with the extent of heterogeneity of work and workers in the sector (Banerjee and Duflo, 2007; Perry et al., 2007; Lehmann, 2015; Basu, Chau, Fields and Kanbur, 2018; Danquah, Schotte and Sen, 2021). However, while several studies exist in the literature about the interrelationship between informality and poverty, most of the studies have relied on cross-sectional data, thereby presenting a static analysis of the issue (La Porta and Shleifer, 2014; ILO, 2013; Benjamin et. al, 2014; Kanbur, 2017; Laoyza, 2018; Gulyani and Talukdar, 2010; Devicienti, Groisman, and Poggi, 2010; Canelas, 2019). Moreover, the literature on the poverty implications of such employment transitions is quite scant. This is particularly important in the Nigeria context as evidence suggests that the percentage of working poor has been on the rise, growing from 21.98% to 31.37% in the informal sector, between 2016 and 2018, compared to 14.68% and 17.24% in the formal sector. Consequently, this examines employment and poverty transitions, as well as the individual and household characteristics associated with them; and assesses the poverty implications of informal employment mobility/dynamics in Nigeria.

This study therefore contributes to the literature in two ways: first, it provides new evidence on the dynamics of informality and poverty using panel data from Nigeria. While studies in the literature have examined the dynamics of informal employment (Slonimczyk and Gimpelson,

2015; Lee, Lee and Choe, 2018; Folawewo and Orija, 2020; Danquah, Schotte and Sen, 2021) and poverty (Baulch and Hoddinott, 2000; Barrett, Garg and McBride, 2016; Eigbiremolen, 2018; Balboni, Bandiera, Burgess, Ghatak and Heil, 2021; Eigbiremolen, 2022), only a few have focused on the Nigerian context. Nigeria presents an interesting case study with about 93 percent of all employments being informal in 2018 (ILO, 2018).

Secondly, the study provides empirical evidence on the dynamic relationship between poverty and employment transitions. Although, there exists a number of studies on the relationship between informal employment and poverty (La Porta and Shleifer, 2014; ILO, 2013; Benjamin et. al, 2014; Kanbur, 2017; Laoyza, 2018; World Bank, 2019; Eigbiremolen 2022), the empirical literature on the dynamics of both poverty and informal employment as well as the dynamic relationship between them is scanty. Evidence on the latter is important as it provides insights as to the persistence or otherwise of both phenomena which would help inform policy choices. In particular, if poverty is found to be dynamically related to informal employment, it implies that not only is informality involuntary, it also has poverty implications. Hence, more policies to help households break through both informality and poverty traps would be imperative.

In the light of these, using panel data from the four waves (2010/2011, 2012/2012, 2015/2016 and 2018/2019) of the Nigeria General Household Survey (GHS), this study employs Dynamic Multinomial Logit and Dynamic Random Effects Probit models to explore the dynamics of informality and poverty, respectively. We further utilize a random effects panel regression model to address the research question: Are informality and poverty dynamically interrelated in Nigeria? Specifically, are informal employment transitions in the Nigerian labour market associated with the poverty status of households? To do this, we distinguish between formal and informal wage and self-employment and to account for the heterogeneity of informal work.

The results of our analysis indicate that although work is important, the quality of the work is much more crucial for the welfare of those engaged. Specifically, we find that whereas results, transition between all forms of employment is negatively associated with poverty household heads who transition from formal to informal employment are 0.8 times less likely to be poor than those who remain in formal employment. This finding can be linked to the uncertain nature of earnings from informal employment is likely to weaken its association with poverty reduction (Fields, 2011). In addition, our findings show that persistence in informality in the country is more evident among the lower-tier informal self-employed workers otherwise known as own-account workers. Howbeit, the upper-tier informal wage employed individuals have the highest propensity to

transition to other forms of employment, particularly to the formal sector, making it the most dynamic employment state. Furthermore, we find no evidence of poverty persistence, that is, the past poverty status of the household does not affect its present poverty level, various observed and unobserved household characteristics matter for the current poverty level of the household. From the forgoing, it is expedient that policies targeted at the eradication of poverty in the country must be such that seek to address the household characteristics and choices that do matter for the current poverty status of the household. In particular, short-term policies such as cash transfer programs implemented by various administrations of government may have limited effect towards the goal of poverty reduction.

The remainder of the paper is structured as follows: section 2 provides an overview of the Nigerian labour market with insights into the regulatory framework guiding labour issues. Section 3 presents a discussion of the data and methodology used for the study. Section 4 highlights the descriptive statistics of the variables for the study while the empirical results are presented and discussed in section 5. Section 6 concludes the study with policy recommendations.

2. Overview of the Nigerian Labour Market

As with labour markets in most developing countries, a key feature of the Nigeria labour market is that it is dual and heterogeneous with two distinct but interrelated sectors: the formal and informal sectors (Harris and Todaro, 1970; Fields, 1975; Folawewo and Orija, 2020). Whereas the formal sector is under the regulation of the government, the informal sector tends to lie outside it; in particular, the formal-informal dichotomy is defined by the official registration of the business with the government and the provision/contribution of social security– paid leave, health insurance or pension- for the employees (Folawewo, 2015; ILO, 2018).

Aside the international Conventions, Treaties and Protocols for labour and employment ratified by the government, labour issues in Nigeria are primarily governed by the Labour Act, No. 21 of 1974 and its subsequent amendments, most recent of which is the Labour Act 2004 (Folawewo and Orija, 2020). The Labour Act which stipulates the minimum terms of employment as well as the relationship between employees and employers, applies only to workers (employees) while the terms of employment of non-workers (persons exercising administrative, executive, technical or professional functions as public officers or otherwise – Section 91 of the Labour Act) are subject to the terms of their individual contracts of employment (Jegede and Idiaru, 2021; Lambo and Agomuo, 2022). Within the Labour Act, several laws are enacted by both the national and states houses of assembly including the Employees' compensation Act 2010; Industrial Training Fund,

LFN 2004; National Health Insurance Scheme Act, chapter N42, LFN 2004; National Housing Fund Act, chapter N45, LFN 2004; Pension Reform Act 2014; Trade Disputes Act, chapter T8 LFN 2004; Trade Unions Act, chapter T14, LFN 2004; National Industrial Court Act, among others (Lambo and Agomuo, 2022). These laws guide labour and employment matters including compensations and dispute resolutions.

Howbeit, to ensure compliance to the provisions of the Act, the implementation and administration of labour matters in the country lies with three key parties: the government, represented by the Federal ministry of Labour and Employment (FMLE) and other related agencies; the employers, represented by the Nigeria's Employers' Consultative Association (NECA); and the workers, represented by the Nigeria Labour Congress (NLC) and the Trade Union Congress (TUC) (Folawewo and Orija, 2020). Whereas the FMLE takes charge of coordinating all the matters relating to labour, compensation and employment, the NLC and TUC ensures that the rights of the workers are protected. On the part of the Judiciary, the National Industrial Court (NIC) and the Industrial Arbitration Panel (IAP) are saddled with the responsibility of the resolution and settlement of all suits related to the Labour market laws (Folawewo, 2015).

However, despite being guided by international labour treaties and conventions of the ILO ratified by the government as well as other domestic labour laws, the Nigerian labour market still functions below international standards and as with most developing countries, only a segment of the labour market are covered by these laws (Okoronkwo, 2008; Folawewo, 2015). In particular, besides the large informal sector for which the labour laws are ineffective, the private sectors are mostly also uncontrolled as the level of compliance is low due to poor monitoring and enforcement (Folawewo, 2016; Folawewo and Orija, 2020). These, among other factors have contributed to the continued expansion and growth of the informal sector in the country, mainly because it becomes relatively easier to enter and transition into the informal sector as well as a credible opportunity for tax avoidance by both employees and employers.

3. Data and Methodology

3.1 Data

The study utilizes four (4) waves of the Nigeria General Household Survey (GHS) panel data collected in 2010/2011, 2012/2012, 2015/2016 and 2018/2019. The GHS-Panel for Nigeria is implemented by the National Bureau of Statistics (NBS) in collaboration with the World Bank's Living Standard Measurement Study- Integrated Surveys in Agriculture (LSMS-ISA). The GHS-

Panel data is based on a multi-stage stratified sample design and comprises 60 Primary Sampling Units (PSUs) or Enumeration Areas (EAs) chosen from each of the 37 states in Nigeria. The data is integrated with the 2010 GHS sample and is a nationally representative survey of 5,000 households visited twice a year – post-planting and the post-harvest seasons. However, due to attrition and non-response, 4,916 households in wave one, 4,851 households in wave two and 4,581 households in wave three completed their interviews. Moreso, in wave 4, there was a partial sample refresh of about 3600 new households with the inclusion of 1507 households from the original panel sample. This is done to enable continued panel analysis dating back to the first wave, 2010. Hence, for this study, we focus on a sample of 1425 households, which is the final sample size from the long panel sample after accounting for attrition.

The survey data encompasses a wide range of information at the community, agricultural, and household levels. This includes demographic data such as age, gender, and marital status of household members, as well as their educational qualifications. Other variables captured in the survey include household size, food and non-food expenditure, household assets, annual consumption expenditure, farming practices, and non-farm enterprise and income-generating activities. The study relies on obtaining crucial information regarding income-generating activities. This includes determining the operational status of the enterprise, whether it is currently open or closed, the official registration status of the enterprise, the number of employees who are not members of the household, the primary source of capital for the enterprise, and whether the enterprise had access to credit. These responses are essential for the study. The longitudinal nature of the data allows for an assessment of the dynamics of informality and poverty in the country.

3.2 Measurement of Key Variables

The key variables for the study are poverty and informality.

For this study, poverty will be measured using three (2) different indicators including a dummy variable, and a multidimensional poverty index; these will be utilized for robustness checks of the estimates. In line with the former, a dummy variable indicator is used to classify the households into poor and non-poor in relation to the poverty line. The poverty line is calculated using the Cost of Basic Needs (CBN) approach which accounts for the amount of money needed by household members to enable them satisfy their basic needs or maintain a minimum level of welfare (Eigbiremolen, 2022; The World Bank, 2022). The CBN approach consists both food and non-food components including education, health, housing and other non-food items consumed regularly by the household. It is further adjusted for household composition as well as for regional

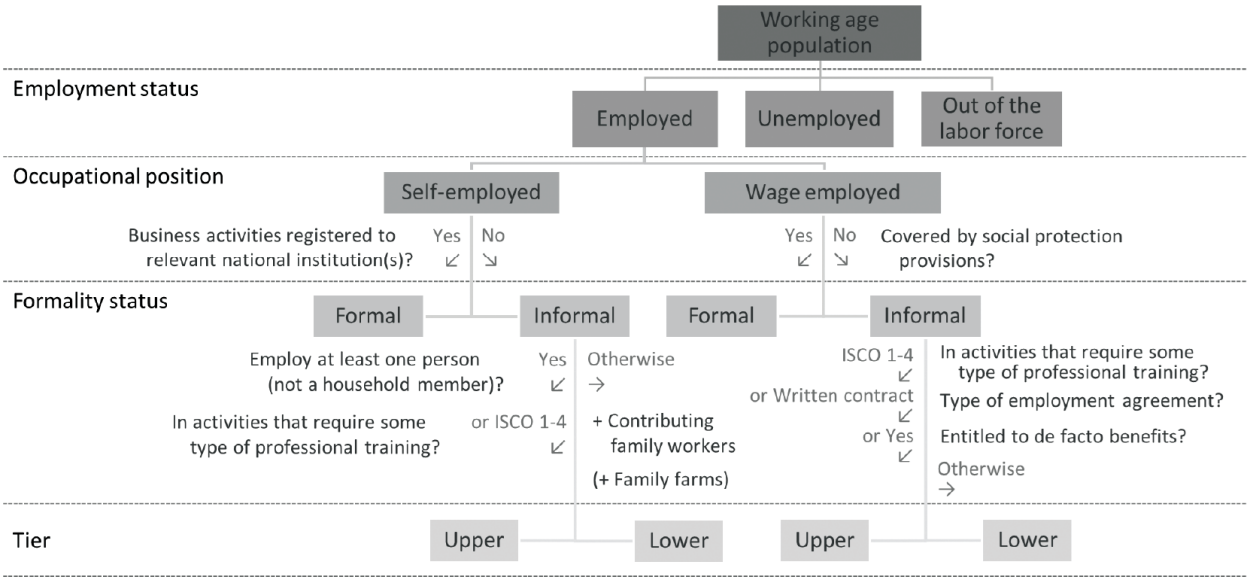
and temporal price differences. As a dummy, poverty takes on the value of 1 if the household is poor and 0 if the household is non-poor. The poverty lines for years 2010/2011, 2012/2013 and 2013/2014 calculated in Eigbiremolen, (2022) are adopted for this study while the national poverty line is defined at ₦137, 430 per person per year (that is, per capita expenditure) by the National Bureau of Statistics (2020) is used for wave 4 (2018/2019) as it is based on the 2018/2019 National Living Standards Survey (NLSS) data. The adjustment for inflation was made by utilising the 2003-04 poverty line as the benchmark, which amounted to N28,836.70 per person per year. Therefore, households whose consumption expenditure falls below the poverty threshold are categorised as poor, while those whose expenditure lies above it are considered non-poor.

To account for the non-income poverty as well as for robustness of the poverty estimates, the Multidimensional Poverty Index (MPI) is also estimated. The MPI which assesses poverty at the individual level provides a measure of deprivations that individuals face across three dimensions (health, education and living standards) simultaneously (Oxford Poverty and Human Development Initiative (OPHI), 2018). The Alkire-Foster method is adopted for this study in which case, an individual is classified as multidimensionally poor if he is deprived in three or more weighted indicators.

Informality is conceptualized in line with the definition of informal employment by the ILO (ILO, 2018) based on the status of employment – wage or self-employment. Hence, for wage employment, informality is defined by the lack of contribution to employment related social protections including health insurance contributions, pensions or written job contracts. For self-employment, the informality is represented by enterprises that are not officially registered with the government. Though, we disaggregate employment into wage and self, for both formal and informal employment types, for a more nuanced analyses of informal employment, we further disaggregate both informal wage and self-employment into upper and lower-tier based on the ILO International Standard Classification of Occupations (ISCO) skill-level classification of employment (ILO, 2012). Specifically, in line with the ISCO-08, occupations with ISCO codes 1 to 3 (skill levels 3 and 4) are classified as upper-tier, whereas codes 4 to 9 (skill levels 1 and 2) are classified as lower-tier. Additionally, among the self-employed, those who have at least one paid employee who is not a household member is classified as upper-tier and those with only contributing household members are classified as lower-tier. Consequently, for this study, employment is classified into six categories: 1) Formal wage employment 2) Formal self-employment 3) Upper-tier Informal wage employment 4) Lower-tier Informal wage employment

5) Upper-tier Informal self-employment and 6) Lower-tier Informal self-employment. The classification discussed above is depicted in figure 1 below:

Figure 1: Classification of Employment Status



Source: Danquah, Schotte and Sen (2021)

3.3 Methodology

3.3.1 Employment and Poverty Dynamics

The analysis of the informality-poverty nexus is somewhat embodied with some complexities, particularly due to the disparities in the units of measurement of both phenomena: while poverty is measured at the household level, informality is measured at the individual level as it depends on the formal or informal status of an individual's job. To overcome this challenge, this study would focus the analyses on a sample of household heads (measure informality based on the formal/informal self-employment status of the household head). This follows the standard practice in the literature (Amuedo-Dorantes, 2004; Devicienti et al., 2009; Canelas, 2019). One justification for this is that in most cases, the earnings of the household head represent a significant proportion of the household's incomes (Bookwalter, Fuller and Dalenberg, 2006; Devicienti et al., 2009). This is supported by our data as results in table A.2 (in appendix A) show that the earnings of the household heads in poor households in significantly lower than that of those in non-poor households. Additionally, to correct for possible bias we control for household-level characteristics.

To estimate the link between employment transitions and changes in poverty status of households, we adopt the random effects panel regression model. In particular, we estimate the model below:

$$D_{it} = \beta_o + \beta_1 X_{it} + \mu_i + \varepsilon_{it} \quad (1)$$

Where $i = 1, \dots, N; t = 1, 2, 3, 4$

μ_i represents the household unobserved heterogeneity

ε_{it} is the idiosyncratic error which is assumed to be independently and identically distributed and uncorrelated with the unobserved household characteristics μ_i as well as the regressors X_{it}. D_{it} is the poverty status of the household.

3.3.2 Employment Dynamics

To explore the dynamics of employment, specifically among the categories of informal employment, transition matrices are first utilized. The transition matrices show the probabilities of transition from one employment status to another between period t and $t + y$, where y is the number of years. They however do not provide insights as to how the transition probabilities vary with observed and unobserved individual and household characteristics including gender, age, educational status as well as initial and previous employment status or experience, among others (Lee, Lee and Choe, 2018; Danquah, Schotte and Sen, 2021). Hence, to do this, we also estimate a multivariate regression model, in particular, we adopt the Dynamic Multinomial Logit Regression Model. The Dynamic Multinomial Logit Model allows for the assessment of the extent to which the probability of being in a particular employment status is affected by an individual's past and initial work status while controlling for individual and household characteristics (Slonimczyk and Gimpelson, 2015; Lee, Lee and Choe, 2018). The outcome variable in this case is the categories of employment including unemployment that an individual can choose to be in at the current time period. It is noteworthy that the model not only allows us to account for individual heterogeneity but also state dependence (measured by the effect of the past employment state on current state of employment) (Danquah, Schotte and Sen, 2021).

Based on the standard analysis in the literature (Liu, 2016; Lee, Lee and Choe, 2018), suppose that there are two time points at which the employment status of individual i is observed, $t = \{0,1\}$ where D_{i0} represents the initial employment status and D_{i1} represents the final employment status. Assuming there are J possible response states indicating the individual's employment status, then Pr $(D_{it} = k|X_{it})$ with $k = (1, \dots, K)$ is the probability that individual i has a response k at the time t given X_{it}, where X_{it} is a column vector of covariates for the observation. We specify the value W_{ijt} for an individual i in employment state j at time t as follows:

$$W_{ijt} = X'_{it}\beta_j + D'_{ijt}\theta_j + \alpha_{ij} + \mu_{ijt} \quad (2)$$

Where W_{ijt} is a $JX1$ vector of utilities for individual i at time t; X_{it} is a vector of explanatory variables and D_{ijt} is a vector of dummy variables indicating the lagged employment states. $\beta_j$and θ_j are the parameters to be estimated while α_{ij} is a random effect which indicates time invariant unobserved individual heterogeneity.

As with any dynamic and panel data models, there exists the initial conditions problem, and this is true given our dataset for the study. The GHS-Panel to be used for this study has a beginning period of 2010, which is the period of observation of all the households in the sample, however, this does not coincide with the starting point of the stochastic process that generates the individuals' employment experiences (Eigbiremolen, 2022). Consequent on this, the previous period employment state $D_{1i,t-1}$ is likely to be correlated with α_{ij}. To correct for this, we adopt the solution proposed by Woolridge (2005) which proposes the modelling of the density of the unobserved effect, α_{ij}, conditional on the initial value, D_{i0}, and any exogenous explanatory variables, x_i. Hence, the probability for an individual i to be in state j can then be expressed as:

$$\tilde{\pi}_{i1k} = \Pr(D_{i1} = k|D_{i0}, X_{i0}) = \left[1 + \sum_{j=1}^{K} \exp\left(D_{i0}\theta_j + X'_{i0}\beta_j\right)\right]^{-1} \exp(D_{i0}\theta_k + X'_{i0}\beta_k) \quad (3)$$

Where $\tilde{\pi}_{i1k}$ denotes the transition probability from the employment status D_{i0} at the baseline to the destination state $D_{i1} = k$ at the final period. θ_k is the vector of regression parameters for the employment status at the baseline and β_k is the vector of regression parameters for the other covariates on the outcome state k. However, as with the regular multinomial Logit regression model, the probability $\tilde{\pi}_{i1k}$ is specified as the residual probability (Liu, 2016; Danquah, Schotte and Sen, 2021). For our analysis, we include unemployed along with the employment categories and for identification, unemployed is used as the reference state.

By functional transformation, the multinomial logit model can be expressed as a generalized linear model given initial state D_{i0} and the other covariates X_i. Hence, we have:

$$\log\left(\frac{\tilde{\pi}_{i1k}}{\tilde{\pi}_{i1(k+1)}}\right) = \log(W_{ijt}) = D_{i0}\theta_k + X'_{i0}\,\beta_k \quad (4)$$

Where $k = 1, \ldots, K$.

Given the longitudinal nature of our dataset, there exists possible correlation among the repeated observations. Consequently, we include random effects, which accounts for time-invariant unobserved individual heterogeneity, in the model. We utilize the "gllamm" Stata command by

Rabe-Hesketh, Skrondal and Pickles (2004) which fits random-effects multinomial logit models for categorical outcomes observed over time. With the command, the random effects are assumed to be normally distributed and independent across outcome levels.

3.3.3 Poverty Dynamics

As with the analysis of the employment dynamics, we also first utilize the transition matrices to first assess the probabilities of moving from one poverty status to the other. However, as this does not allow for the exploration of the effects of household characteristics on the transition probabilities, we further utilize multivariate regressions. In this case, we adopt the dynamic random-effect probit model, which accounts for possible state dependence in poverty. Moreover, the model addresses the problems of correlated unobserved individual heterogeneity and correlated idiosyncratic shocks which commonly bedevils dynamic relationships. The model is specified thus:

$$y_{it}^{*} = x_{it}'\beta + \gamma y_{it-1} + \mu_i + \varepsilon_{it} \quad (5)$$

$$y_{it} = 1(y_{it}^{*} > 0) \quad (6)$$

$$for\ i = 1, \dots, N; t = 1, \dots, T$$

Where $y_{it}^{*}\ and\ y_{it}$ represent the latent outcome variables and observable outcome variables respectively. In particular, the outcome variable y_{it} is a dummy variable which equals one if the individual i is poor at time t and zero otherwise. y_{it-1} is the household's previous period poverty status; x_{it} is a k-vector of explanatory variables which are assumed to be strictly exogenous and β is the associated vector of coefficients. μ_i is the random variable representing unobserved individual heterogeneity and is assumed to be normally distributed with variances σ_μ^2 and covariance $\sigma_\mu \rho_\mu$. ε_{it} is the "idiosyncratic" shocks/error term assumed to follow a normal distribution, with zero mean, unit variance and cross-equation covariance ρ.

Given these assumptions, the conditional transition probability of poverty for household i at time t can be expressed as:

$$Pr(y_{it} = 1 \mid \gamma y_{it-1}, x_i, \mu_i) = \phi(\gamma y_{it-1} + x_{it}'\beta + \mu_i) \quad (7)$$

Where $\phi(.)$ is the standard normal cumulative distributional function. γ and β reflect the effects of past poverty (state dependence) and the household characteristics on current poverty state.

To address the initial conditions problem common with dynamic models, we adopt the simple solution proposed by Woolridge (2005) and modified by Rabe-Heseketh and Skrondal (2013).

4. Descriptive Analysis

Table 1 displays the descriptive statistics of the employment indicators/variables for the study. The results show that while the labour force represent a significant proportion of the total population of the country it has been on a rise, increasing from 31% in 2011 to about 34% in 2018. This can be linked to the continued increase in the population of the country, a greater percentage of which is accounted for by the population of the youths (Eromosele, 2022; Akinyemi and Mobolaji, 2022). However, the unemployment rate rose from 11.4% in 2011 to about 22.8% in 2019, reflecting the current high rate of unemployment in the country. Of those unemployed, a greater proportion tend to be in the rural area (77.3% in 2019) compared to the urban areas (22.6% in 2019), this often leads to high rates of rural-urban migration. On the contrary, the percentage of employment is higher among those in the rural areas, though, a greater proportion are informally employed (52.02 % compared to 39.10% in the formal employment) as is the case for the urban dwellers (47.98% compared to 60.90% in the formal employment). This mirrors the current state of the Nigerian economy where a greater percentage of its labour force are rural dwellers.

In terms of status of employment, the results show that informal employment represents a higher percentage of the total non-farm employment in the country relative to formal employment, and it has been on the rise over the years. In particular, informal employment rose from 84.42% of the total employment in 2011 to 84.55% in 2016 and though it declined to about 64% in 2019, formal employment accounts for a lower percentage of total non-farm employment, 36% in 2019. Howbeit, while a greater proportion of the formal employment consists of wage employment (72.85% in 2019), most of the employment in the informal sector are in self-employment, rising from 71.88% in 2011 to about 86% in 2019 of the total informal employment.

Table 1: Descriptive statistics - Employment

	2010-11	**2012-13**	**2015-16**	**2018-19**
	Labour force and Unemployment			
Labour Force (% of the working age population)	31.49	32.02	28.08	34.01
Unemployment (% of the labour force) **NBS***	11.44	9.37	8.12	22.78
	Formal/Informal Employment			
Formal Employment (% of Non-farm Employment)	15.58	29.96	15.45	36.21
Informal Employment (% of Non-farm Employment)	84.42	73.04	84.55	63.79
	Formal Employment			
Regular Wage Earners (% of Formally Employed)	28.96	63.55	37.23	72.85
Self-Employed (% of Formally Employed)	71.04	36.45	62.77	27.15
	Informal Employment			
Regular Wage Earners (% of Informally Employed)	28.12	16.32	25.65	13.97
Self-Employed (% of Informally Employed)	71.88	83.68	74.35	86.03
	Rural/Urban (Formal) Employment			

Rural Formally Employed (% of Employed)	37.11	36.20	26.38	39.10
Urban Formally Employed (% of Employed)	62.89	63.80	73.62	60.90
	Rural/Urban (Informal) Employment			
Rural Informally Employed (% of Employed)	42.02	36.88	36.77	52.02
Urban Informally Employed (% of Employed)	57.98	63.12	63.23	47.98
	Rural/Urban Unemployment			
Rural Unemployed (% of Unemployed)	64.28	57.62	40.78	77.37
Urban Unemployed (% of Unemployed)	35.72	42.38	59.22	22.63

Source: Authors' computation using Nigeria GHS datasets

*The Nigeria Bureau of Statistics (NBS) defines unemployment as the proportion of those in the labour force who were actively looking for work but could not find work for at least 20 hours during the reference period

The descriptive statistics of the poverty indicators are presented in table 2 below. Results from the table shows that though a greater percentage of the country's population are non-poor, a significantly higher percentage still remains poor, which contributed to the status of the country as the poverty capital of the world as at 2018. Specifically, about 40.4% of the country's population were poor in 2019. However, the result shows that poverty in the country is quite seasonal with a greater percentage of the population being poor in the planting season (37.05%) compared to the harvest season (36.42%). Also, poverty is higher in the rural area with about 51% of the residents poor relative to about 17% in the urban areas.

Table 2: Descriptive statistics - Poverty

		2010-11	2012-13	2015-16	2018-19
		Incidence of poverty			
Non-poor (% of the population)		59.09	55.68	63.58	59.58
Poor (% of the population)		40.91	44.32	36.42	40.42
Poor (% of the population)	Post-planting	50.81	43.25	37.05	n/a
Poor (% of the population)	Post-Harvest	40.91	44.32	36.42	n/a
		Poverty Incidence by location			
Rural Poor (% of rural population)		49.9	55.35	47.15	51.33
Urban Poor (% of urban population)		21.83	18.16	12.27	16.85
		Poverty Incidence by work status			
Agric employment	% Poor	49.9	56.13	58.7	59.06
	% Non-poor	50.1	43.87	41.3	40.94
Formal wage	% Poor	10.64	15.32	7.14	15.79
	% Non-poor	89.36	84.68	92.86	84.21
Informal wage	% Poor	21.38	21.43	21.74	27.14
	% Non-poor	78.62	78.57	78.26	72.86
Formal self	% Poor	25	27.03	22.22	18.69
	% Non-poor	75	72.97	77.78	81.31
Informal self	% Poor	34.91	28.14	22.22	35.59
	% Non-poor	65.09	71.86	77.78	64.41

Source: Authors' computation using Nigeria GHS datasets

In addition, the incidence of poverty varies across the different types of employment. The incidence of poverty is higher for those engaged in informal employment (62.7%) than for formal employment (34.5%). In particular, it ranges from 59% for agricultural employment, 15.76% for formal wage employment, 27.14% for informal wage employment, 18.68% for formal self-employment and 35.59% for informal self-employment. This indicates that aside agricultural employment, the incidence of poverty is higher for those in informal employment, both informal wage and self-employment, compared to those in formal employment.

The gender distribution of workers by the nature of employment depicted in figure B.1(in appendix B) shows that in general, males were more engaged in wage employment (61%) than self-employment (56%) whereas a higher proportion of females engaged in self-employment (44%) than in wage employment (39%). This can be linked to the flexibility of work in self-employment which allows women more time to attend to other duties particularly with the family.

In addition, it can be seen that although, males were engaged in both formal and informal employment (66.6% and 50.4%, respectively), a greater percentage of females were engaged in the informal employment (49.6%) than formal employment (33.4%). However, with further disaggregation, the figure shows that while males dominated both formal wage and self-employment (61% and 73% respectively) as well as informal wage employment (60%) both upper and lower-tier, women were more predominant in informal self-employment (60%), upper and lower-tier inclusive (This is shown in appendix B.2). Consequently, the result portrays the higher rate of male labour force participation relative to that of females in Nigeria.

Figure B.3 (in appendix B) presents the educational distribution of workers by the nature of employment. On the average, it can be seen that wage employment is dominated by workers with higher level of education (post-primary) (76.11%) compared to self-employment (62.83%). In addition, the figure shows that while a greater proportion of workers in the formal sector have post-secondary education (58.5%), workers with secondary level education or less dominated informal sector employment (81.77%). Also, while formal wage employment was on average dominated by workers with tertiary education (66.79%), a greater percentage of workers in informal wage and self-employment were with secondary level education (62.98% and 47.14%, respectively). However, workers with no form of schooling were more engaged in informal self-employment (52.17%) than in any other form of employment.

In terms of proportion of workers by the type of employment, results from table A.3 (appendix) shows that on the average, the highest percentage (47.65%) of non-farm employment in the

country is concentrated in lower-tier informal self-employment. This is followed by upper-tier informal self-employment with about 13.53% and formal wage, 12.8% of the total non-farm employment. In addition, whereas formal self-employment accounts for 10.3%, informal wage employment, both upper and lower-tier, represent 7.56% and 8.14%, respectively. In sum, it can be seen that on the average, aside agricultural employment which accounts for the highest percentage (47.38%) of total employment, informal employment represents the highest percentage (40.27%) of total employment compared to formal employment (12.35%). In particular, whereas about 32.11% of the work force are engaged in informal self-employment while 6.9% hold formal wage employment. Also, while informal wage employment accounts for about 8.16% of the total employment, formal self-employment accounts for 5.43%. This is presented in appendix A.4.

5. Results and Discussions

5.1 Informal Employment and Poverty Dynamics

In this section, we assess the poverty implications of employment mobility/dynamics using random effects panel regression model. The choice of a random effects model is corroborated by the result of the Hausman test presented in table A.5 (appendix). The results from the estimation presented in table 3 shows the association between poverty and transitions between employment status of the household head represented by the initial and final employment status. We further disaggregate the employment status by formality status (formal/informal wage and self-employment) for a more nuanced view of the employment type. This is differentiated into model 1 and 2 in the table. The models are adjusted for household-level characteristics including age of the household head, level of education, marital status, area of residence (rural/urban), number of children, number of adults, receipt of remittances.

From the results, transition between all forms of employment is negatively associated with poverty, indicating that being employed, whether formally or informally, is associated with a lower likelihood of falling below the poverty line. However, by magnitude, the results show that household heads who transition from formal to informal employment are 0.8 times less likely to be poor than those who remain in formal employment. This indicates that although work is important, the quality of the work is much more crucial for the welfare of those engaged. Specifically, the uncertain nature of earnings from informal employment is likely to weaken its association with poverty reduction (Fields, 2011). In addition, we find that relatively, household heads who move from informal to formal employment are most likely (-.093) to be poor compared to those who remain in formal employment (-0.218) or move from formal to informal employment

(-0.176). This finding is reflective of the difficulty/rigidity in transition from formal to informal employment, especially in wage employment, due to the relatively lower level of human capital among those often engaged in informal employment, consequently trapping them low skill (and lower earning) formal employment (La Porta and Shleifer, 2014; Kanbur, 2017).

Table 3: Association between poverty and initial and final employment status

VARIABLES	(1) model 1	(2) model 2
Employment status in t and t0		
Unemployed (t0) x Formal employed (t)	-0.007	
	(0.101)	
Unemployed (t0) x Informal employed (t)	-0.064	
	(0.096)	
Formal employed (t0) x Formal employed (t)	-0.218***	
	(0.059)	
Formal employed (t0) x Informal employed (t)	-0.176***	
	(0.058)	
Informal employed (t0) x Formal employed (t)	-0.093*	
	(0.055)	
Informal employed (t0) x Informal employed (t)	-0.065	
	(0.054)	
Formal employed (t0)	0.049	
	(0.100)	
Informal employed (t0)	-0.006	
	(0.096)	
Formality status in t and t0		
Unemployed (t0) x formal wage (t)		-0.023
		(0.114)
Unemployed (t0) x informal wage (t)		-0.038
		(0.115)
Unemployed (t0) x formal self (t)		0.009
		(0.116)
Unemployed (t0) x informal self (t)		-0.078
		(0.103)
formal wage (t0) x formal wage (t)		-0.299***
		(0.067)
formal wage (t0) x informal wage (t)		-0.224***
		(0.067)
formal wage (t0) x formal self (t)		-0.288***
		(0.086)
formal wage (t0) x informal self (t)		-0.215**
		(0.085)
Informal wage (t0) x formal wage (t)		-0.164**
		(0.081)
Informal wage (t0) x Informal wage (t)		-0.133
		(0.082)
Informal wage (t0) x formal self (t)		-0.072
		(0.099)
Informal wage (t0) x informal self (t)		-0.176**
		(0.085)

Formal self (t0) x formal wage (t)		0.020
		(0.133)
Formal self (t0) x informal wage (t)		-0.080
		(0.107)
Formal self (t0) x Formal self (t)		-0.119
		(0.101)
Formal self (t0) x informal self (t)		-0.145
		(0.098)
Informal self (t0) x formal wage (t)		-0.026
		(0.093)
Informal self (t0) x Informal wage (t)		-0.041
		(0.077)
Informal self (t0) x formal self (t)		-0.086
		(0.077)
Informal self (t0) x Informal self (t)		-0.010
		(0.073)
Formal wage		0.095
		(0.103)
Informal wage		0.071
		(0.112)
Informal self		0.000
		(0.128)
Formal self		-0.054
		(0.107)
Constant	0.631***	0.624***
	(0.151)	(0.148)
Observations	2,202	2,202
Wald Chi2	563.56	581.88
Prob>chi2	0.000	0.000

Notes: Pooled data for GHS (waves 1-3) with estimates based on a balanced panel sample
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Furthermore, disaggregating the analysis by the formality status of the employment, we find that in line with the preceding discussion, transition within wage employment from informal to formal has the lowest association (-0.164), in absolute terms, with poverty reduction compared to transitions within self-employment as well as employment persistence. We also provide a gender analysis of the finding in table A.6 (appendix) and find similar results particularly for the male-headed households and for the model with per capita consumption as the measure of welfare.

5.2 Poverty Persistence and Predictors of Poverty

Table 4 presents the estimation result of the dynamic random effects probit model which accounts for household-specific unobserved effects and for which the initial conditions are treated as endogenous (the initial conditions are uncorrelated with household unobserved heterogeneity). The results presented are based on a pooled balance panel sample from the four waves of the GHS data. The results show the absence of persistence of household poverty even after controlling for

household characteristics. This is shown by the negative and non-significant value of the lagged poverty measure. The results indicates that the past poverty level of the household does not affect its present poverty level, in other words, the likelihood of households being poor today does not depend on their past experience of poverty. However, the initial condition y_{i0} which is positive and statistically significant indicates that the unobserved household characteristics are associated with the present poverty level of the household. The results therefore implies that though the household's past poverty experiences do not matter for its current poverty incidence, the observed and unobserved household characteristics matter.

Furthermore, the results show that household heads with tertiary education are less likely to experience poverty relative to those with no education. This is reasonable since access to higher level education is often associated with greater economic and labour market opportunities and invariably, higher earnings. The finding is in line with the evidence in the literature of the relationship between education and poverty (Gulyani and Talukdar, 2010; Folawewo and Orija, 2020; Danquah, Schotte and Sen, 2021; Eigbiremolen, 2022). The result also reveals that households in the urban areas in Nigeria are less likely to experience poverty than those in the rural areas, which indicates the strong presence of geographical differences in poverty incidence in the country. This is also in line with the recent World Bank poverty assessment of the country which showed that the poverty incidence in the rural areas of the country is higher than those in the urban areas (The World Bank, 2022). This finding can however be linked to the differences in the access to key infrastructures and economic opportunities which exist between the rural and urban areas in the country. In particular, the rural areas of the country often have lower levels of development compared to the urban areas.

Table 4: Predictors of Poverty

	Coefficient	Std. error	p-value	Stat. Sig.
Poverty (t-1)	-0.2850	0.2110	0.1750	
Age group (base = 15-34)				
25-34	0.6410	1.1950	0.5910	
35-44	0.7380	1.2750	0.5630	
45-54	0.5880	1.3290	0.6580	
55-64	0.7710	1.4200	0.5870	
Educational level of household head (base = none)				
Primary education	-1.4590	1.0030	0.1460	
Secondary education	-1.4830	1.0040	0.1400	
Tertiary education	-2.2910	1.0270	0.0260	**
Others (Adult and Quaranic education)	-0.5790	1.0130	0.5670	

Type of employment (base = self-employment)				
Wage employment	-0.0840	0.4460	0.8510	
Agric employment	0.0010	0.3370	0.9970	
Marital Status of household head (base = single)				
Married	0.8930	0.8670	0.3030	
Area of Residence (base = rural)				
urban	-0.5020	0.2060	0.0150	**
Remittance (Yes)	-1.2730	0.7240	0.0790	*
Household Size	0.1840	0.0370	0.0000	***
Initial Condition	1.6870	0.2980	0.0000	***
Log-Likelihood	-428.8839			

Note: Significance levels - * 10%; ** 5%; *** 1%
The measure of poverty used here is a dummy variable with value 1 if the household is poor and 0 otherwise

Also, compared to households which do not receive any form of international remittances, the results show that households which receive remittances have a lower likelihood of poverty. This is in line with eveidence in extant literature on remittances, since access to remittances offers the households opportunity for additional resources to meet particular needs. This is particularly true for both households with and without primary source of earnings (Chukwone, et al., 2012; Fowowe and Shuaibu, 2020). In addition, household size is positively and significantly associated with the incidence of poverty. This implies that large-sized households are more likely to experience poverty compared to smaller sized ones. This is plausible given the fact that a large household size indicates that available resources are shared among a greater number of household members compared to households with fewer members, with less pressure on available resources. The finding is also in line with evidence in the litearture (Wagle, 2007; Anyanwu, 2014; Eigbiremolen, 2018, 2022).

5.3 Poverty Dynamics

Estimates from the dynamic random effects model allows us to derive a set of profile-specific statistics for the predicted patterns of the dependent variable over time. These include: unit transitions in and out of poverty (entry and exit probabilities), the expected spell duration of poverty (mean duration) and the ("long-term") steady state probability of poverty (steady-state probability). These are presented in table 5 below. The main advantage of these statistics is that they are estimated taking into account household specific unobserved heterogeneity that are associated with poverty and the initial conditions problem (Grotti and Cutulli, 2018). In other words, the estimates provide an indication of possible accumulation over time of short-run effects

for any given profile once time-constant individual unobservables have been accounted for (Immervoll, Jenkins and Königs, 2015; Grotti and Cutulli, 2018).

The result shows that formal education of the household head reduces the probability of entering into poverty and compared to household heads with no education, having secondary and tertiary education reduces the entry probability by 4 and 5 percentage points and increases the exit probability by 3 and 4 percentage points, respectively. In addition, poverty persistence (true state dependence in poverty) and the long-run (steady state) probabilities of poverty are higher for household heads without any education relative to those with some form of education; while the average duration of poverty is higher for households whose heads are educated. These findings therefore indicates that education reduces the likelihood of households remaining in poverty over a long period of time and increases their chances of escaping poverty.

Table 5: Poverty dynamics

	Entry Probability	Exit Probability	Persistence Rate	Steady State Probability	Mean Duration
Educational Level of the Household Head					
None	0.654	0.409	0.591	0.615	2.446
Primary	0.349	0.701	0.299	0.333	1.427
Secondary	0.345	0.705	0.295	0.328	1.419
Tertiary	0.214	0.825	0.175	0.206	1.213
Others (Adult and Quaranic Education)	0.527	0.534	0.466	0.496	1.871
Receipt of Remittances					
Yes	0.168	0.863	0.137	0.163	1.159
No	0.338	0.705	0.295	0.324	1.419
Area of Residence					
Rural	0.358	0.688	0.312	0.342	1.454
Urban	0.279	0.761	0.239	0.269	1.314

Note: Estimates are based on the dynamic random effect model accounting for the stratification of poverty dynamics according to time constant characteristics

Households that receive remittances are less likely to enter into poverty, in particular, the receipt of remittances reduces the likelihood of the household entering into poverty by 2 percentage whereas it increases the chance of exit by 1 percentage point. In terms of poverty persistence, households that receive remittances are less likely to be stuck in poverty with a lower long-run probability of poverty. Compared to households without remittances, the mean duration of poverty is lower, by 3 percentage points for households with remittances.

The result also shows that households located in the rural areas have a greater chance of entering into poverty, with a 1 percentage point higher than those in the urban areas. They are also less

likely to exit poverty than their counterparts in the urban areas. In other words, residing in the rural area increases a household's likelihood entering into poverty and reduces their probability of escaping it. In addition, households in the rural area have a higher rate of poverty persistence, a higher long-run probability of poverty and a higher mean duration in poverty. These results are consistent with the results from the predictors of poverty in table 4 above.

5.4 Employment Transitions

Table 6 presents the average marginal effects of each of the variables on the individuals' current employment state, estimated from the multinomial logit model. In essence, the marginal effects yields the predicted probability of being in an employment state at time t=1 given a change in the explanatory variables. In this model however, we account for state dependence in the employment status of the individuals, that is, we estimate the marginal effect of the previous period (lagged) employment status (Y_{t-1}) on the current employment status (Y_t). Hence, table 6 presents results of a dynamic multinomial logistice regression model.

From the results, we find evidence of strong state dependence (persistence) in agricultural employment, formal wage employment, formal self-employment and informal self-employment. This is shown by the positive and significant average marginal effects of these employment states. This implies that compared to those who are unemployed (the base category), individuals engaged in agricultural employment, formal wage employment, formal self-employment and informal self-employment are more likely to remain in those states over time. Also, the results shows that those that are in formal wage employment are less likely (-0.256) to move to agricultural employment but are more likely to move to formal self-employment (0.062). On the other hand, while individuals engaged in informal wage employment are less likely to move to agricultural (-0.159) and informal self-employment (-0.102), they are more likely (0.298) to move to formal wage employment. Also, although, individuals engaged in formal self-employment are more likely to move to informal self-employment, those engaged in informal self-employment are more likely to switch to formal self-employment (0.090) than informal wage employment (-0.106). This could arise as a result of formalization process of the business, making them to transition from informal to formal status in the same business, rather than having to give up their businesses to move to informal wage employment, which may not offer the same benefits, such as flexibility of work, as self-employment. These findings are similar to those from the transitions matrices presented in table A.5.

Furthermore, we find that the marital status of the individual significantly affects his unemployment probability, specifically, individuals who are married are less likely to be unemployed. While this maybe particularly true for the men, it may not necessarily hold for the female gender, arising from the effect of traditional gender roles that constrain the labour force participation of females in the home (Gammarano, 2020). However, the definition of unemployment utilized for this study (table A.1 in the appendix), may have contributed to this finding in that underemployment is not accounted for. In other words, individuals working as housewives or are retired, who are not participating in the labour force are not covered in the definition of unemployment (Lee, Lee and Choe, 2018).

Table 6: Predictors of Employment Transitions: Multinomial Logistic Regression (Average Marginal Effects)

	(1)	(2)	(3)	(4)	(5)	(6)
VARIABLES	unemployed	Agric Employment	Formal wage employed	Informal wage employed	Formal self employed	Informal self employed
Base category – Unemployment						
Agric employment (t-1)	-0.024	0.183***	0.029	-0.121***	-0.008	-0.060
	(0.036)	(0.049)	(0.030)	(0.043)	(0.018)	(0.044)
Formal wage employed (t-1)	-0.010	-0.256***	0.182***	0.094	0.062*	-0.072
	(0.046)	(0.061)	(0.043)	(0.059)	(0.034)	(0.056)
Informal wage employed (t-1)	-0.012	-0.159***	0.298***	-0.045	0.020	-0.102**
	(0.042)	(0.057)	(0.047)	(0.049)	(0.024)	(0.050)
Formal self-employed (t-1)	-0.060	-0.219***	-0.001	-0.000	0.080**	0.200***
	(0.044)	(0.065)	(0.036)	(0.060)	(0.040)	(0.071)
Informal self-employed (t-1)	-0.050	-0.178***	-0.006	-0.106**	0.090***	0.250***
	(0.035)	(0.051)	(0.029)	(0.044)	(0.026)	(0.051)
Gender (male=1)	0.064*	-0.052	-0.030	0.062	0.023	-0.068
	(0.033)	(0.064)	(0.039)	(0.049)	(0.041)	(0.053)
Ln(age)	0.030	0.057	-0.002	-0.006	-0.008	-0.069
	(0.034)	(0.051)	(0.041)	(0.041)	(0.029)	(0.047)
Marital status (married=1)	-0.082***	0.034	0.028	-0.025	0.035	0.009
	(0.026)	(0.057)	(0.036)	(0.037)	(0.034)	(0.045)
Educational Level (base = No schooling)						
Primary	-0.104	-0.150	0.067***	0.090***	0.051***	0.045
	(0.157)	(0.154)	(0.017)	(0.019)	(0.013)	(0.133)
Secondary	-0.127	-0.195	0.097***	0.099***	0.066***	0.060
	(0.157)	(0.154)	(0.018)	(0.012)	(0.012)	(0.133)
Tertiary	-0.144	-0.241	0.245***	0.174***	0.042***	-0.076
	(0.157)	(0.155)	(0.026)	(0.017)	(0.011)	(0.133)
Others (Informal/Adult education)	-0.142	-0.106	0.025	0.039	0.072**	0.112
	(0.157)	(0.155)	(0.023)	(0.027)	(0.030)	(0.138)
Area (urban=1)	0.011	-0.242***	0.055***	0.022	0.005	0.148***
	(0.016)	(0.025)	(0.016)	(0.018)	(0.012)	(0.021)
Observations	1,235	1,235	1,235	1,235	1,235	1,235
Log likelihood	-1404	-1404	-1404	-1404	-1404	-1404

Pseudo R2	0.275	0.275	0.275	0.275	0.275	0.275

Note: Standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1
Source: Author's computation using the Nigeria GHS datasets

In line with the results of descriptive statistics, we find that educated individuals have a higher probability of being employed than unemployed, and also less likely to be engaged in agriculture. In particular, the results from table 6 show that educated individuals are more likely to be engaged in formal employment than in informal employment and moreso in wage employment than in self-employment. This result supports the finding in the literature on the effect of education on employment transitions (Danquah, Schotte and Sen, 2021; Lee, Lee and Choe, 2018). Also, as expected, the probability of engaging in agricultural employment in less likely in the urban areas, whereas at the same time individuals in the urban areas are more likely to engage in formal wage meployment and informal self-employment. This is relatable since non-farm informal activities are quite predominant in the urban areas compared to the rural areas where farming activities is rather predominant, even though, non-farm enterpreneurship is increasingly becoming a secondary source of income for those in the rural areas.

7. Conclusion and Policy recommendations

In Nigeria, informality has been on a persistent rise with an increasing number of people engaging in informal employment. On the other hand, the rate of poverty and extreme poverty in the country has been on the rise, an occurrence also quite evident among the working poor. However, not much is known empirically about the dynamics of both informality and poverty within the Nigerian context and this study fills this gap by using four waves of the Nigeria General household Survey (GHS) data to assess the dynamics of poverty and informal employment in Nigeria as well as the individual and household characteristics associated with such transitions. In addition, we assess the poverty implications of informal employment mobility/dynamics in Nigeria. For a more nuanced analyses, we further classified the informal sector – wage and self-employment – into upper and lower tiers using the ILO ISCO classification of employment.

The result of the analyses reveal that though, transition between all forms of employment is negatively associated with poverty, indicating that being employed, whether formally or informally, is associated with a lower likelihood of falling below the poverty line, household heads who transition from formal to informal employment are 0.8 times less likely to be poor than those who remain in formal employment. This indicates that although work is important, the quality of the work is much more crucial for the welfare of those engaged. Specifically, the uncertain nature

of earnings from informal employment is likely to weaken its association with poverty reduction (Fields, 2011). In addition, our findings show that persistence on informality in the country is more evident among the lower-tier informal self-employed workers otherwise known as own-account workers. In other words, these set of workers are less likely to transition into other forms of employment. This result is partly explained by the fact that majority of the workers engaged in lower-tier informal employment have low level of education compared to others, further constraining them to remain in such employment and unable to transition to other forms of employment. On the other hand, the upper-tier informal wage employed individuals have the highest propensity to transition to other forms of employment, particularly to the formal sector, making it the most dynamic employment state. In addition, the results show that workers engaged in the upper-tier informal employment are more likely to move to the formal sector than those in the lower-tier, while individuals in the wage employment were likely to transition to self-employment. The latter is often due to the flexibility of work associated with self-employment relative to wage employment.

Across the different poverty states, our findings reveal that there is a lower probability of hoseholds who are non-poor to move into poverty. Although, we find no evidence of poverty persistence, that is, the past poverty status of the household does not affect its present poverty level, various observed and unobserved household characteristics matter for the current poverty level of the household. In particular, the results show that households with educated (post-primary) household heads and those who are recipients of remittances have lower probability of being poor. Furthermore, the results show that just as is with formal employment, movement into informal employment is associated with a lower likelihood of poverty transition.

Following the findings of this study, it is imperative that policies targeted at education and training be prioritized as edcation has been found to be important not only to the choice of employment but also to the exposure to poverty. Also, the findings from this study has shown that the informal sector is a highly heterogenous sector and hence should be treated as such particularly with respect to policies targeted to it. In otherwords, a “one size fits all” policy targeted at the informal sector will be grossly ineffective, as the inherent peculiarities of the various segments must be taken into account. Furthermore, the absence of a causal link between past and present poverty indicates that policies targeted at the eradication of poverty in the country must be such that seeks to address the household characteristics and choices that do matter for the current poverty status of the household. Hence, short-term policies such as cash transfer programs implemented by various

administrations of government may have limited effect towards the goal of poverty reduction.

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Appendices

Appendix A

Table A.1: Definition of terms

S/N	Term	Definition	Source
1.	Labour force	Persons aged 15-64 years who are willing and able to work regardless of whether they have a job or not	NBS (2018)
2.	Non-labour force	Population below 15 or older than 64 years as well as those within the economically active population, that is, 15-64 years, who are unable to work, not actively seeking for work or choose not to work and/or are not available for work. E.g., voluntary full-time housewives, underage children 14 and below, adults above 65, full time students, those in active military service, physically challenged and incapacitated persons whose incapacitation prevents them from working	NBS (2018)
3.	Employment	A person is regarded as employed if he/she is engaged in the production of goods and services, thereby contributing to the Gross Domestic Product (GDP) in a legitimate manner, which is a component of the national accounts and receives any form or amount of compensation for that activity	NBS (2018)
4.	Unemployment	i) Persons aged 15-64 years who during the reference period (which is usually the week preceding the time of the survey is administered) were available to work, but were unable to find work ii) One is said to be unemployed if he did absolutely nothing at all or did something but for less than 20 hours during the reference week	ILO (2018) NBS (2018)
5.	Unemployment Rate	The percentage of the labour force who are unemployed: Unemployment rate = $\frac{Unemployed\ population}{Labour\ force\ population} * 100$	NBS (2018)
6.	Informal sector	The Informal Sector comprises any economic activity or source of income that is not fully regulated by the government and other public authorities; this includes enterprises that are not officially registered and do not maintain a complete set of accounts; and wage employed workers who hold jobs lacking basic social or legal protection and employment benefits. Hence, informality is characterized by registration of enterprises and/or contribution to social protection and employment benefits	Bank of Industry (2018); NBS (2018)
7.	Wage Employment	Employment in all public and private organizations for which a wage/salary is paid	ILO (2018)
8.	Self-Employment	Employment on own account/ own account workers	ILO (2018)
9.	Upper-tier wage employment	Employment that requires some form of professional training (ISCO 1-3) but with no employment benefits	

		such as paid sick leave, health insurance or written employment contract	
10.	Lower-tier wage employment	Employment that requires little or no form of professional training (ISCO 4-9) and with no employment benefits such as paid sick leave, health insurance or written employment contract	
11.	Upper-tier self-employment	Activities that require some form of professional training (ISCO 1-3) and/or has at least one non-household member who is a paid employee	
12.	Lower-tier self-employment	Activities that require little or no form of professional training (ISCO 4-9) and/or engages only contributing household members	

Table A.2: Test of Mean Differences in Monthly Earnings by Poverty status

Household Head Monthly Earnings by Poverty Status					
	Mean	difference	Std. Error	t-value	p value
Non-Poor	46895.6		3632.084	5.85	0.0000
Poor	25638.6				
		21257.091			

Table A.3: Proportion of Workers by Type of Employment (%)

Proportion of workers by job status (% of total non-farm employment)					
	2010/2011	2012/2013	2015/2016	2018/2019	Average
	%	%	%	%	%
Formal wage	4.52	16.53	3.78	26.36	12.80
Upper-tier informal wage	12.34	3.13	11.56	3.22	7.56
Lower-tier informal wage	11.26	6.49	9.1	5.71	8.14
Formal self	10.74	10.71	10.16	9.72	10.33
Upper-tier informal self	28.25	25.85	0	0	13.53
Lower-tier informal self	32.89	37.29	65.41	54.99	47.65
Total	100.00	100.00	100.00	100.00	100.00

Source: Authors' computation using Nigeria GHS datasets

Table A.4: Proportion of Workers by Type of Employment (%)

Proportion of workers by job status (% of total employment)					
	2010/2011	2012/2013	2015/2016	2018/2019	Average
	%	%	%	%	%
Agric employment	49.09	48.20	48.78	43.46	47.38
Formal wage	2.30	8.56	1.93	14.90	6.92
Informal wage	12.02	4.98	10.58	5.05	8.16
Formal self	5.47	5.55	5.20	5.50	5.43
Informal self	31.13	32.71	33.50	31.09	32.11
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Table A.5: Hausman (1978) specification test

	Coef.
Chi-square test value	38.832
P-value	.261

Table A.6: Association between poverty and the initial and final work status by gender

	(1) Poverty status		(2) Per capita consumption	
VARIABLES	Male	Female	Male	Female
Employment status in t and t0 (base: Unemployed)				
Formal employed (t) x Unemployed (t0)	-0.007	0.332	0.082	0.964
	(0.101)	(0.319)	(0.132)	(0.933)
Formal employed (t) x Formal employed (t0)	-0.218***	-0.382	0.373***	1.548***
	(0.059)	(0.256)	(0.104)	(0.201)
Formal employed (t) x Informal employed (t0)	-0.093*	-0.064	0.128	0.369
	(0.055)	(0.151)	(0.089)	(0.340)
Informal employed (t) x Unemployed (t0)	-0.064	0.134	0.207	0.041
	(0.096)	(0.185)	(0.128)	(0.347)
Informal employed (t) x Formal employed (t0)	-0.176***	-0.401	0.204**	1.460***
	(0.058)	(0.255)	(0.100)	(0.196)
Informal employed (t) x Informal employed (t0)	-0.065	0.005	0.091	0.095
	(0.054)	(0.142)	(0.086)	(0.326)
Employment status in t0 (base: Unemployed)				
Formal employed (t0)	0.049	0.264	0.001	-1.225***
	(0.100)	(0.261)	(0.150)	(0.243)
Informal employed (t0)	-0.006	-0.048	-0.010	-0.153
	(0.096)	(0.166)	(0.136)	(0.376)
Control Variables				
Age	-0.003***	0.004	0.009***	-0.005
	(0.001)	(0.003)	(0.002)	(0.005)
Level of Education (Base: No schooling)				
Primary education	-0.349***	-0.072	0.216	-0.091
	(0.133)	(0.148)	(0.154)	(0.105)
Secondary education	-0.446***	-0.117	0.376**	0.022
	(0.133)	(0.142)	(0.153)	(0.102)
Tertiary education	-0.486***	-0.107	0.612***	0.293*
	(0.133)	(0.146)	(0.155)	(0.153)
Others (including adult education)	-0.169	0.620***	0.030	-0.396***
	(0.139)	(0.153)	(0.161)	(0.133)
Marital status (married=1)	0.047**	-0.085	-0.441***	0.060
	(0.024)	(0.056)	(0.057)	(0.092)
Residence (urban=1)	-0.075***	-0.007	0.117***	0.157**
	(0.020)	(0.049)	(0.032)	(0.078)
Receipt of remittances	-0.060	-0.112**	0.199***	0.387***
	(0.038)	(0.047)	(0.074)	(0.128)
Number of children (<18 years)	0.061***	0.092***	-0.119***	-0.218***
	(0.005)	(0.020)	(0.008)	(0.031)
Number of adults	0.014**	0.006	-0.012	-0.037
	(0.005)	(0.014)	(0.011)	(0.025)
Constant	0.631***	0.031	11.544***	12.428***
	(0.151)	(0.215)	(0.191)	(0.322)
Observations	2,202	256	2,147	249
Wald Chi2	563.56	3211.63	932.76	558.81
Prob>Chi2	0.000	0.000	0.000	0.000

Notes: Pooled data for GHS (waves 1-3) with estimates based on a balanced panel sample
Robust standard errors in parentheses; *** p<0.01, ** p<0.05, * p<0.1

Table A.7: Workers' Transitions Across Employment Status

	Panel A					Wave 2		
		Formal self	**Formal wage**	**Informal wage (upper)**	**Informal wage (lower)**	**Informal self (upper)**	**Informal self (lower)**	**Share of stayers**
Wave 1	**Formal self**	11.86	22.03	0.00	10.17	15.25	40.68	1.27
	Formal wage	4.35	26.09	0.00	4.35	13.04	52.17	4.31
	Informal wage (upper)	6.33	17.72	0.00	21.52	8.86	45.57	0.00
	Informal wage (lower)	18.18	21.21	1.52	6.06	12.12	40.91	3.93
	Informal self (upper)	11.81	22.05	0.79	4.72	13.39	47.24	3.46
	Informal self (lower)	13.73	15.03	4.58	6.54	18.95	41.18	15.36
	Total	12.03	19.33	1.78	8.68	14.40	43.79	28.33
	Panel B					Wave 3		
Wave 2		**Formal self**	**Formal wage**	**Informal wage (upper)**	**Informal wage (lower)**	**Informal self (upper)**	**Informal self (lower)**	**Share of stayers**
	Formal self	1.45	0.00	2.90	1.45	-	94.20	0.15
	Formal wage	10.84	3.61	8.43	2.41	-	74.70	1.36
	Informal wage (upper)	0.00	0.00	26.67	26.67	-	46.67	3.08
	Informal wage (lower)	3.39	3.39	33.90	10.17	-	49.15	9.10
	Informal self (upper)	0.00	2.27	20.45	6.82	-	70.45	n/a
	Informal self (lower)	5.63	5.31	8.44	7.50	-	73.13	47.83
	Total	4.73	3.79	12.30	6.78	-	72.40	61.52
	Panel C					Wave 4		
Wave 3		**Formal self**	**Formal wage**	**Informal wage (upper)**	**Informal wage (lower)**	**Informal self (upper)**	**Informal self (lower)**	**Share of stayers**
	Formal self	16.67	0.00	0.00	0.00	-	83.33	16.20
	Formal wage	0.00	12.50	0.00	0.00	-	87.50	3.30
	Informal wage (upper)	6.90	51.72	3.45	3.45	-	34.48	1.11
	Informal wage (lower)	13.73	9.80	1.96	23.53	-	50.98	13.44
	Informal self (upper)	-	-	-	-	-	-	n/a

	Informal self (lower)	7.19	32.19	1.03	2.05	-	57.53	31.64
	Total	8.13	28.57	1.23	4.68	-	57.39	100.00

Source: Authors' computation using Nigeria GHS datasets

Table A.8: Poverty Transitions Across Waves

Panel A		**Wave 2**	
Wave 1	**Non-poor**	**Poor**	**Share of stayers**
Non-poor	72.280	27.720	40.25
Poor	31.940	68.060	30.16
Total	55.680	44.320	70.41
Panel B		**Wave 3**	
Wave 2	**Non-poor**	**Poor**	**Share of stayers**
Non-poor	82.710	17.290	52.59
Poor	38.090	61.910	22.55
Total	62.930	37.070	75.14
Panel C		**Wave 4**	
Wave 3	**Non-poor**	**Poor**	**Share of stayers**
Non-poor	75.390	24.610	44.92
Poor	31.980	68.020	27.49
Total	59.580	40.420	72.41

Table A.9: Workers' Transition Across Employment Types and Unemployment

Panel A:				**Wave 2**			
Wave 1	**Unemployed**	**Agric emp**	**Formal wage**	**Informal wage**	**Formal self**	**Informal self**	**Total**
Unemployed	13.190	40.110	11.350	10.290	5.280	19.790	100.000
Agric emp	15.680	43.100	8.960	6.000	4.930	21.330	100.000
Formal wage	6.150	58.460	9.230	1.540	1.540	23.080	100.000
Informal wage	7.740	49.110	8.330	6.550	5.060	23.210	100.000
Formal self	10.190	52.230	8.280	3.820	4.460	21.020	100.000
Informal self	7.430	54.730	6.890	3.240	4.860	22.840	100.000

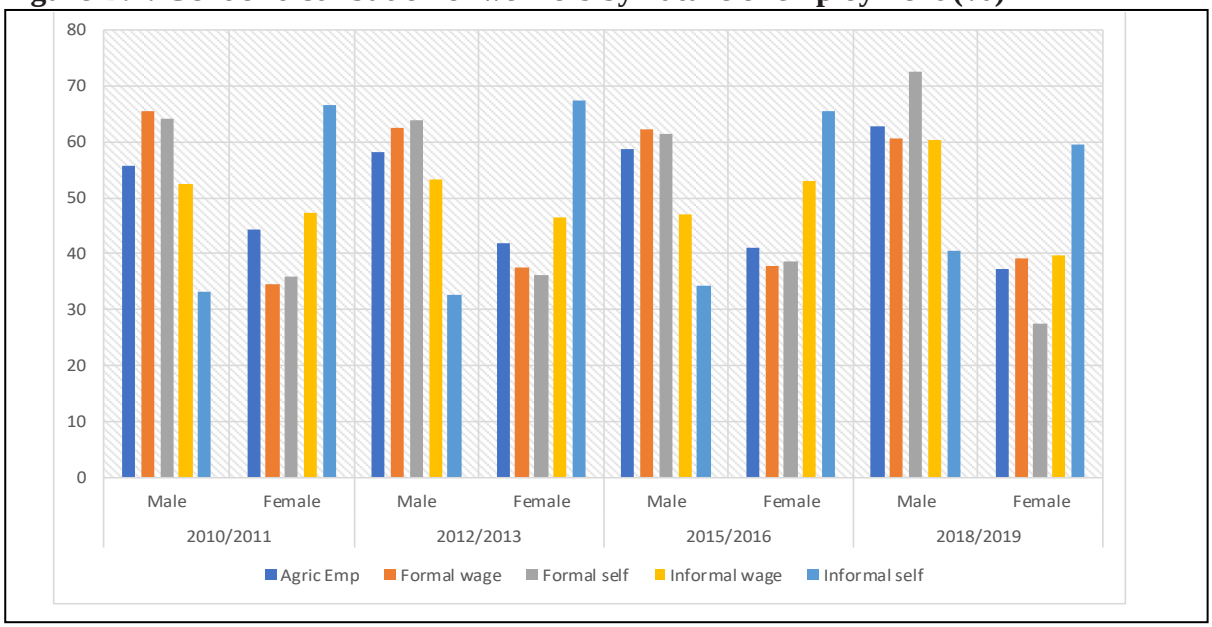
Total	11.670	47.370	8.630	5.690	4.870	21.770	100.000

Panel B:				**Wave 3**			
Wave 2	**Unemployed**	**Agric emp**	**Formal wage**	**Informal wage**	**Formal self**	**Informal self**	**Total**
Unemployed	15.380	44.510	0.820	9.070	2.750	27.470	100.000
Agric emp	6.460	63.010	1.870	5.870	3.320	19.470	100.000
Formal wage	5.450	56.820	1.360	4.090	4.090	28.180	100.000
Informal wage	8.460	34.620	1.540	26.150	1.540	27.690	100.000
Formal self	3.420	49.320	0.000	2.050	0.680	44.520	100.000
Informal self	6.570	31.040	2.910	11.470	2.750	45.260	100.000
Total	7.550	50.110	1.820	8.290	2.940	29.290	100.000

Panel C:				**Wave 4**			
Wave 3	Unemployed	Agric emp	Formal wage	Informal wage	Formal self	Informal self	Total
Unemployed	51.220	23.780	4.270	0.000	3.050	17.680	100.000
Agric emp	38.710	24.870	9.890	2.910	1.870	21.750	100.000
Formal wage	9.090	18.180	9.090	0.000	0.000	63.640	100.000
Informal wage	38.140	27.970	8.470	6.360	3.810	15.250	100.000
Formal self	42.680	35.370	0.000	0.000	3.660	18.290	100.000
Informal self	31.770	20.910	15.240	1.460	3.400	27.230	100.000
Total	37.420	24.300	10.470	2.500	2.690	22.620	100.000

Appendix B

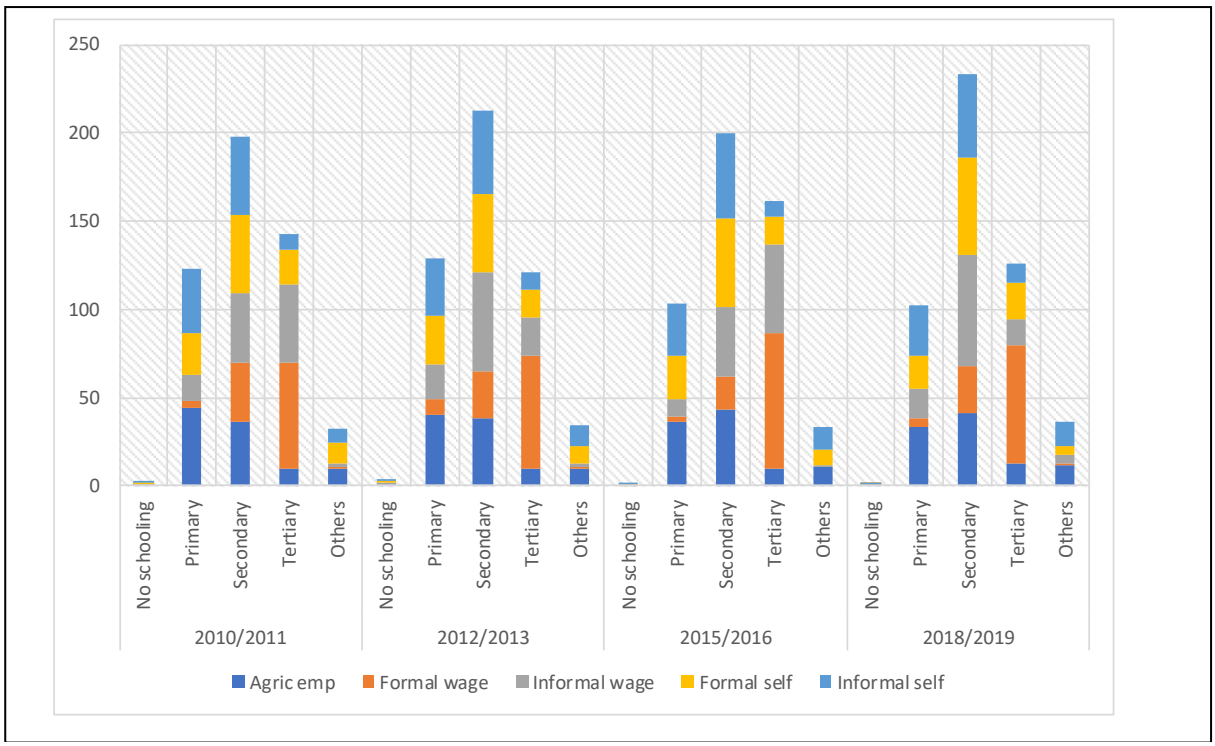
Figure B.1: Gender distribution of workers by nature of employment (%)



Source: Authors' computation using Nigeria GHS datasets

Figure B.2: Gender distribution of workers by nature of employment (%)

Figure B.3: Educational distribution of workers by nature of employment (%)



Source: Authors' computation using Nigeria GHS datasets

Figure B.4 Predicted Probabilities of Household poverty