# IMPACT OF FINANCIAL INCLUSION ON HOUSEHOLD WELFARE IN NIGERIA

Abstract

Although improving household welfare is essential to the attainment of numerous United Nations Sustainable Development Goals (SDGs), developing countries such as Nigeria has continued to make negligible progress in enhancing household welfare and boosting prosperity with majority of her population still struggling to attain a minimum standard of living. Policy makers has suggested that financial inclusion could be a panacea for welfare improvement. This study examined the impact of financial inclusion on household welfare using Findex 2017 data. The study is a Quantitative research. It made use of quasi experimental research design. The target population are households from 15 years and above. The study performing a counterfactual analysis using propensity score matching technique found that financial inclusion has a positive significant impact on household welfare. The study recommended among others that to achieve increased financial inclusion for all, government, regulatory agencies, financial service providers need to concentrate on improving the existing framework for branchless banking so that individuals can get these financial services without having to go to a physical bank.

Keywords: Financial inclusion, household welfare, Nigeria

## 1. INTRODUCTION

Household welfare is the expression of the economic wellbeing of a household which could be measured by its ability or access to means of livelihood (Grootaert, 2013). In the study of household welfare, a common approach has been to look at well-being as the capacity of households to access essential and basic means of livelihood as well as other requirements for livability over its lifetime (Haughton & Khandker, 2009). At the micro level,Household welfare relates to how the utility of members of the households can be maximized by choices made by the individuals. According to Dimova and Adebowale (2018), it is one of the most focused goals of every government across the globe. The indicators include income, poverty, and health among others (Dimova & Adebowale, 2018). The persistence of high levels of inequality and poverty (both inequality and poverty are regarded markers of poor household welfare, Grootaert, 2013) in Africa is highly concerning, because the continent is home to seven of the top ten most unequal countries in the world (World Bank, 2016). As a result, Africa is now second only to Latin America in terms of high inequality in the globe (Klasen, 2016). Poverty is also a major issue in the continent, with nearly a third of the world's impoverished residing there(United Nations Development Programme,2016:Asongu &Le Roux,2018)

Just like Africa, welfare indicators for Nigeria have been startling. For instance, the situation of poverty has lingered for decades in Nigeria as it can be traced to the late eighties. In 1996, national poverty reached 66.9% from 28.1% in 1980 and then declined to 54.4% in 2004 after which it reached a peak of 69% in 2010 (Adeaga, Adelakun & Oyekunle, 2020). Moreover, Nigeria emerged 157th out of 187 countries captured in the Human Development Report with Human Development Index (HDI) of 0.532 indicating a low level of life expectancy, education and income (UNDP, 2018). According to a report by World Poverty Clock in 2018, Nigeria has overtaken India to become the poverty capital of the world with about 46.5 %( 91.6 million) of the population living in extreme poverty of less than one dollar a day. Similarly, the Gini coefficient, which is an indicator of income inequality, in the last five years averaged about 0.49.The nation's income distributive share by income quintile also reported that the poorest 20% of the population received just 5% of the nation's total income, compared to the top 20% of the population receiving 49%. (World Bank, 2019).

In recent times, the concern on financial inclusion in enhancing household welfare has become a worldwide vital developmental policy. Financial inclusion across the globe has been identified as the main pillar of the policies targeted at promoting household welfare (Dimova & Adebowale, 2018; Zhang & Posso, 2019). The percentage of people and businesses who use financial services is known as financial inclusion (GFDR, 2014). The access, use, and availability of financial services to the financially excluded and less fortunate in society is referred to as financial inclusion (IFC, 2011). Financial inclusion has risen to the top of development organizations' agendas since 2005, when the Microfinance Year was declared, the Maya Declaration was signed by Alliance for Financial Inclusion (AFI) members, and the G-20 Financial Inclusion Action Plan was announced in Pittsburgh. These pledges were made only for the purpose of developing more accessible financial systems.

With inclusive financial systems, a large part of the population will use financial services, providing chances for external finance for both households and businesses, hence lowering poverty and income inequality and improving household welfare (GFDR, 2014).Finance can directly affect household welfare in some ways which are documented in the literature. First, to ease the credit constraints faced by the poor households which limited their abilities to undertake productive investment, there is need for development of the financial sector (Fowowe, 2020). Secondly, in order to provide better services and financial products which will improve the quality of lives of poor households, the financial sector will be broadened and subsequent entrance of new players enhance competition between financial intermediaries ( Beck, Demirguc-Kunt & Levine, 2007). Thirdly, due to the help by financial intermediaries, the problems of asymmetric information peculiar to financial markets are reduced, risk is pooled and limited which is beneficial to the poor and also helps in macroeconomic environment stability. A developed financial system would help in loan recovery because of an advanced monitoring and supervisory capacity. Finally, the high cost of small credits should be taken care of by bigger and more powerful financial intermediaries (Rajan & Zingales, 2001). Chigumira and Masiyandima (2003) noted that it is more costly to lend to the poor than the rich, and consequently, the marginal cost of lending is high. Therefore, in the long run, the financial intermediaries could bear such costs, with the assumption that small and medium scale enterprises will graduate into large-scale businesses in the future.

Financial inclusion has advanced in Nigeria, with some stylised estimates indicating a rise in financially included adults from 23.6 percent in 2008 to 48.6 percent in 2014. (EFInA, 2017). The execution of the National Financial Inclusion Strategy in 2012, as well as the effective shift from a repressive to a liberalized financial sector, contributed to this success (Dimova & Adebowale, 2018). Unfortunately, these initiatives did not last beyond 2014, which coincided with the low point in crude oil prices (Ibrahim & Aliero, 2020). For example, according to some stylised data, Nigeria's financial inclusion rate has declined from 48.6 percent in 2014 to 38.3 percent in 2016. (CBN, 2017; EFInA, 2017). Similarly, due to some social and institutional challenges, such as low human development, the growing dominance of the informal sector, demographic challenges, and infrastructural deficiencies (Gani & Ibrahim, 2015; Dimova & Adebowale, 2018), the proportion of banked adults in rural areas fell from 25% in 2014 to 24.4 percent in 2016. (EFInA, 2017; Ibrahim et al., 2019) (Aliero, Ibrahim, & Shuaibu, 2013).

Expectedly, economic theory predicts that household welfare is conditional on household endowment in the exchange economy. For example, Bergson–Samuelson social welfare (BSSW) framework predicts that increased access to fundamental endowments (such as wealth) and transactional capabilities (including access and usability of financial services) would engender improvement, first in individual welfare, and second in social welfare, insofar as no one is made worse off by such individual welfare improvements. However, Schreftm (2012) and Reed and Waller (2016) argue that such expected welfare improvement would be contingent on the offsetting effect between disutility and utility of financial inclusion. In other words, because financial inclusion is associated with both private and social costs, its impact on welfare requires an empirical investigation that models the real world situations. It is against this background that this study examines the nexus between financial inclusion and household welfare in Nigeria

## 1.1. Statement of the Problem

Enhancing household welfare is a critical issue across the globe. With the rapid upsurge in globalization and international commitment, countries across the globe continue to record improved household welfare. Undeniably, Nigeria has continued to make negligible progress in enhancing household welfare and boosting prosperity with a large portion of her population still struggling to attain a minimum standard of living (Adebowale & Dimova, 2017). World Development Indicator, WDI (2020) shows that household welfare measured by per capita income has not improved significantly in the last decade. The per capita income growth recorded negative growth of -13.3%, -19.0% and -9.5% in 2015, 2016 and 2017 respectively. Although, there is a pick-up in 2018 and 2019 (3% and 10% respectively), the per capita income growth declined to 1% in 2020. The endemic poverty and entrenched inequalities have created openings for crimes and other forms of deviant behaviors which affects development (Oludayo, 2021).This explains why it may be a fall dream for the populous country to meet the attainment of numerous United Nations Sustainable Development Goals (SDGs) of eradicating inequality, unemployment, extreme poverty and hunger.

The concern over poor household welfare in Nigeria and the need for its improvement has led to the conceptualization and implementation of various programs by different governments in Nigeria. Notable among them is Operation Feed the Nation (OFN), the Green Revolution, establishment of the People's Bank of Nigeria (PBN), Directorate of Food Roads and Rural Infrastructure (DIFFRI), National Directorate of Employment (NDE), Family Economic Advancement Programme (FEAP), Better Life for Rural Women, Family Support Programme (FSP), National Poverty Eradication Programme (NAPEP), National Social Investment Programmes among others (Alfa, Otaida & Audu, 2014; Abbas, 2016; Adeaga, Adelakun & Oyekunle, 2020). In 2012, the CBN launched its Financial Inclusion Strategy with a target to reducing the percentage of adults excluded from financial services from 46.3% in 2010 to 20% in 2020 in order to bring individuals out of poverty. It was later reviewed to 5% exclusion by 2024 (CBN, 2018; CBN, 2020).

However, with the rate of development of financial institutions, and other financial services, it is of believe that the poor would have been included in order to achieve the aim of universal inclusion strategy of 2024. Egger, Poggi and Rufrancos (2021) affirmed that household welfare in Nigeria has continued to worsen with 83 million Nigerians living in poverty. The rising prices has pushed many people into poverty as Nigeria sanked into the poverty capital of the world and has remained so since then (World Bank, 2021)

### 1.2. **Objective of the Study**

To ascertain the impact of financial inclusion on household welfare

## 2 Theoretical Framework

The theoretical framework is anchored on Bergson–Samuelson social welfare (BSSW) theory as propounded by (Bergon, 1938, 1954) and Samuelson (1956). Bergson–Samuelson social welfare theory emphasized that social choice is concerned with the existence of a social welfare or preference function which preserves certain rationality properties of preference and satisfies the normative criterion of Pareto optimality. In essence, the social choices of households are explicitly contingent on the social welfare gains revealed by social preferences. Although there are other social welfare models (such as Arrow social welfare function, Altkson social welfare function, Kaldor-Hicks compensation criterion and Amartya Sen's theory of welfare), the choice of Bergson–Samuelson social welfare theory is predicted on the following.

First, it establishes a general social welfare function as a function of each community member's welfare to consume items and give services in large amounts. In other words, the BSSW is not intrinsically restrictive. It allows the researcher to analyze household welfare from different standpoints. Second, the Bergson–Samuelson social welfare framework takes into account everyone's preferences, provides the state and distribution of welfare for the entire society, and represents a collection of societal preferences. This allows for additive social ordering in a heterogeneous community of rational agents.

3. Conceptual Issues:

**(a) Household Welfare**

Even in history, it has been difficult to separate wellbeing as a notion from economics. For example, economist Pigou stated that "it will be necessary to lay down two propositions: first, that the state of consciousness is the elements of welfare and, possibly, their relations; second, that the category of welfare can be brought under greater and lesser" (Pigou 1950/1922). He also stated that the only way to quantify welfare is in terms of money. This does not lead to any additional definition of the idea, although money may and is used as an indicator when looking at a macro-level understanding of welfare (for example, as GDP per capita).

The term "welfare" is often used in economic theory to refer to utility. When income or the use of money to buy goods and services contributes to our well-being, it is referred to as welfare (Van Praag & Frijerts 1999). This is also Tinbergen's point of view, who defined welfare as measurable utility or satisfaction (Tinbergen 1991). In economics, wellbeing is primarily determined by an individual's perception and value of income. This makes it difficult to evaluate welfare at the macro level because people's assessments of the value obtained from income vary. However, consumers' choices as reflected by the market are frequently employed as a proxy, which is why GDP per capita is considered as a proxy.

Contextually, the idea of household welfare is somewhat vague. Blundell, Ian Preston & Ian Walker (1994) defined household welfare as the horizontal summation of the wellbeing of the members of a household expressed in terms of the sum of consumer surplus. Consumer surplus exists whenever the price a consumer would be willing to pay in terms of their expected private benefit is greater than what they actually pay. In a similar submission, Grootaert (2013) defined household welfare as the expression of the economic wellbeing of a household which could be measured by its ability or access to means of livelihood. He noted that household welfare could be measured using consumption or income depending on the nature of society. In socially oriented societies, consumption is a better measure while in individualistic societies, income is a better measure. He also argued that in individualistic society (Nigeria is a good example), living standards and livability are largely functions of household income. In such societies, there are limited social distribution of resources, and excludability principle applies for most basic needs: thus, health, education, shelter, food, etc are allocated only to those who can afford them.

**(b) Financial Inclusion**

**Financial inclusion, according to Molefhi (2019), is the process of ensuring that all members of society have access to the official financial system. Financial inclusion, according to Demirgüç-Kunt and Klapper (2012), is defined as having access to fundamental financial services. However, as Esquivias, Sethi, Ramandha, and Jayanti (2020) point out, these definitions only explain one aspect of financial inclusion: access.**

. Hence, it does not emphasize the importance of other dimensions of financial inclusion, for instance, usage and availability. In this regard, Esquivias et al (2020) described financial inclusion as a process by which members of society are given easy access to, or availability of, formal financial systems, and the ability to use them. In other terms, it refers to a process in which all members of society may open a bank account without trouble, can afford credit, and can use financial system products and services conveniently, easily, and consistently.

The Centre for Financial Inclusion (CFI) offers a broad definition of financial inclusion. Financial inclusion, according to the Centre, is a situation in which all people who can utilize financial services have access to them, at reasonable costs, in a convenient manner, and with dignity for the consumers. It is a state in which the private sector provides financial services through a variety of providers to everyone who can benefit from them, including the disabled, poor, rural, and other economically excluded populations (CFI, 2010).

## 2.1 EMPIRICAL LITERATURE REVIEW.

So many research has been done in the area of financial inclusion and Household welfare. For instance, in a sample of 37 Asian economies, Park and Mercado (2015) found that financial inclusion significantly reduces poverty as well as income inequality in Asia. Using the ordinary least squares estimation technique, Nanziri (2016) examined the relationship between financial inclusion and welfare in South Africa. The results indicated that for a better and greater welfare, it must be associated with financial inclusion. The study further indicated that lower welfare is among women who use non-formal credit.

Omojolaibi (2017) applied the Generalised Method of Moment (GMM) estimation technique to study the impact of financial inclusion and governance characteristics on economic progress via three major channels: investment in infrastructure, per capita GDP and income inequality over the period 1980 to 2014. Among other things, the study confirmed that financial inclusion tends to bridge the gap between the rich and the poor and reduce the prevalence of poverty in the economy.

Tita and Aziakpono (2017) investigated the relationship between financial inclusion and welfare in Sub-Saharan Africa using disaggregated data. The findings revealed that formal company accounts, electronic payments, and formal savings all had a favorable impact on wellbeing. Similarly, Zhang (2017) used ordinary least squares and quantile regressions approaches to assess the influence of financial inclusion on House hold income. The China Household Financial Survey provided the cross-sectional data for this study. First, the ordinary least squares results showed that financial inclusion had a large beneficial influence on household income across all households, independent of income level. Given that household welfare is mostly determined by income, the findings suggested that financial inclusion promotes household welfare. Second, the quantile regression method revealed that low-income households benefit more from financial inclusion than their wealthier household. Given that income is a key determinant of household welfare, the outcome suggested that financial inclusion improves household welfare. Second, the quantile regression approach showed that financial inclusion benefits low-income households than their richer counterparts.

Neaime and Gaysset (2018) examined the influence of financial inclusion on income inequality, poverty, and financial stability using panel data from eight Middle Eastern and North African countries from 2002 to 2015. The number of banks or ATMs per 100,000 adults was used by the authors to determine the degree of financial inclusion. They discovered that financial inclusion, as measured by the number of banks, reduces income inequality while having no effect on the poverty rate, using the generalized method of moments (GMM) technique of estimating. They discovered evidence that financial inclusion, as assessed by the number of ATMs, contributes favorably to financial stability in this region using the generalized least squares approach. Addury (2018) investigated the impact of financial inclusion on welfare using the three waves of the Indonesian Family Life Survey (IFLS) and the results of the study found that there is a significant effect of financial inclusion on household income. Mwangi and Atieno (2018) examined the determinants of financial inclusion on household's welfare in Kenya based on both the single (transactionary, credit, savings and investment, insurance and pension) and composite measures (portfolio usage) of financial inclusion and the study found that financial inclusion positively influences household welfare in Kenya

Ibrahim, Ozdeser, and Cavusoglu (2018) used primary data gathered in Northern Nigeria between October 2014 and September 2015 to create a multi-variable financial inclusion index regressed against household wellbeing to investigate the finance-welfare relationship. The OLS findings revealed a strong positive effect of financial inclusion on household welfare, as expected. The quantile regression estimation, on the other hand, shows that middle and high-income households benefited from financial inclusion more than lower-income households.

Mallick and Zhang (2019) investigated the impacts of financial inclusion on household welfare in China, finding that the effects of financial inclusion differed across urban and rural areas, as well as income categories. Financial inclusion also raised overall consumption, but the effect was stronger in urban households than in rural ones, according to the study. When it came to food consumption, the effect was more pronounced. Consumption inequality was reduced as a result of financial inclusion, but only among urban households.

To investigate the impact of financial inclusion on gender inequality in Sub-Saharan Africa, Ohiomu and Ogbeide-Osaretin (2020) used the generalized method of moments (GMM) estimation method on panel data from some countries in Sub-Saharan Africa. The study found that financial inclusion significantly reduced gender inequality. Ababio, Attah-Botchwey, Osei-Assibey and Barnor (2020) using dynamic panel generalized methods of moments (System-GMM) methodology to analyze data spanning from 2005 to 2014 for 20 frontier markets by Standard and Poor's Indices appraised whether the level of human development drives greater financial inclusion, and vice versa in the contexts of frontier markets.. The study found that financial inclusion tends to cause higher levels of human development in the form of improved living standards, literacy, and healthy lives.

Ibrahim and Aliero (2020) utilized three waves of General Household Survey and instrumental variable quantile regression (IVQR) to study the effect of financial inclusion on income inequality in Nigeria and the study found that that financial inclusion is critical in reducing income inequality in Nigeria. N'dri and Kakinaka (2020) employed propensity score matching (PSM) and inverse-probability-weighted regression adjustment (IPWRA) to assess the impact of financial inclusion and mobile money use on an individual's nonmonetary welfare in Burkina Faso. The nonmonetary welfare indicators of nutrition, healthcare, and education were utilized in the study and the study found favourable effects of financial inclusion on poverty reduction in terms of individuals' nonmonetary welfares (nutrition, healthcare, and education). Okoye, Adetiloye, Erin and Modebe (2020) utilized OLS on a time series data spanning from 1986 to 2015 and the study found that financial inclusion is critical in poverty reduction in Nigeria. Churchill, Nahu, and Smyth (2020) investigated the effect of financial inclusion on household poverty in Nigeria using the 2016 Financial Inclusion Insights (FII) program, which included 6,352 persons. The study concluded that financial inclusion alleviates poverty in Nigeria. Aribaba, Adedokun, Oladele, Babatunde, Ahmodu and Olassehinde (2020) studied the impact of financial inclusion scheme on poverty alleviation in Nigerian between 2004 and 2019 and the study showed that financial inclusion plays a significant effect on poverty alleviation among the low-income earners in Nigeria. It also reduces poverty level and increases per capita income thereby enhancing the standard of living. Financial inclusion can be used to mitigate the impact of income disparity on economic growth, according to Menyelim, Babajide, Omankhanlen, and Ehikioya (2021). From 1995 through 2017, this research focused on 48 countries in Sub-Saharan Africa (SSA). The findings show that financial access has a detrimental impact on the connection between income inequality and economic development. Inclusionary financial access has a net beneficial effect in reducing the impact of income inequality on economic growth.

## 2.2 Justification for the Study

There appears to be a recent surge in global interest in the concept of financial inclusion, particularly among policymakers and financial sector participants. Academic research studies in Sub-Saharan African countries, on the other hand, are still in their infancy, focusing largely on cross-country studies. These frequently lack country-specific details that may help policymakers achieve the best possible results. Financial inclusion is poorly understood in lower-income countries (LICs), where structural constraints, institutional bottlenecks, and financial system failures thwart efforts to increase financial inclusion. As a result, policy formulations lack a theoretical foundation. This study contributes to the literature by focusing on Nigeria where the financial exclusion situation and poor household welfare is believed to be severe but the phenomenon has not been conclusively investigated. Similar studies in Nigeria are rare and the existing studies have majorly being macro (see Ugwuanyi, 2012; Omojolaibi, 2017; Okoroafor et al., 2018; Anthony-Orji et al., 2019; Okoye et al., 2020). While we acknowledge the contributions of these studies, it is pertinent to note that the data we utilized provides a more robust contribution on current issues relating to financial inclusion and welfare using 2017 Findex Data by world bank which no study has used and this is more appropriate for policymaking.

**3. Research method and Procedure**

Given the nature of objectives set out in this study, this study adopts quasi-experimental research design. A quasi-experimental research design is a design that is used for carrying out an empirical (interventional) study used to estimate the causal impact of an intervention or socio-economic condition on target population without necessary having to do random assignment. In this study, quantitative research is adopted. The choice of quantitative research method is predicated on several factors. First, it aligns with the research design. Quasi-experimental design requires a quantitative research method which assists the research to evaluate the outcome of the experimental or counterfactual study. The target population for this study is the civilian, non-institutionalized population that are 15 years and above. In other words, only the households are covered in this study. However, the study excludes Borno, Yobe and Adamawa which according to Findex (2018) makes up about 7% of the population. Findex (2018) further noted that the three states were excluded due to high level of insecurity which makes it difficult to conduct survey in those states. Findex adopted probability sampling techniques. Particularly, Findex utilized both stratified and simple random sampling procedures. Findex applied stratified sampling technique by stratifying households by, geography, population size or both, and through one or more stages of sampling, clustering is achieved. Further, sample selection is based on probabilities proportional to population size. In identifying each individual household within a stratum, simple random sampling is used. Random route procedures are used to select sampled households. In Findex survey of 2017, in selecting the respondents randomly, the household enumeration or the latest birthday is used. In all, about 1000 households or individuals were sampled in the Findex survey of 2017. The whole sample of 1000 is adopted in this study without any adjustment. The questionnaire used in Findex 2017 survey was designed by the World Bank, in conjunction with a Technical Advisory Board composed of leading academics, practitioners, and policy makers in the field of financial inclusion. To ensure reliability and validity of the instrument, focus groups, cognitive interviews, and field testing were used and the questionnaire was piloted in multiple countries. Also, to ensure understandability and inclusion, the questionnaire was designed in English, Hausa, Yoruba, Igbo, and Pigin English. Data collection was carried out by Gallups Inc.. The data collection exercise was implemented between 4$^{th}$ April, 2017 and 28$^{th}$ April, 2017.

**3.1 Model Specification**

To ascertain the distinctive impact of financial inclusion on household welfare, households that are financially included (the treatment group) and those that are financially excluded (the control group) are included in the study. To distinctively ascertain the impact of treatment on the treatment group, Nwokoye, Igbanugo and Dinwobi (2020) argue that it is expedient to equally ascertain what should have happened to the treatment group if the treatment was not applied. To effectively realize this goal will require that treatment and non-treatment groups are randomly selected. Nwokoye et al (2020) also opined that to achieve this kind of counterfactual analysis, propensity score matching (PSM) analysis could be a veritable tool. To set up the model, we proceed as follows.

In the PSM framework to be implemented, financial inclusion is defined as the treatment while financial exclusion is defined as the non-treatment or control. Given a sample of subjects and a treatment (financial inclusion), each subject (or household) has a pair of potential outcomes: $Y_i(1)$ and $Y_i(0)$ for treatment and control outcomes respectively. However, each subject receives either treatment or control, not both (if one if financially included, he cannot be financially excluded at the same time). Suppose $Z_i$ indicates if a household $i$ got treatment (i.e being financially included) such that:

$$Z = \begin{cases} 1\ for\ treatment \\ 0\ for\ control \end{cases} \qquad 3.10$$

Let Xi be a vector of the ith household's pretreatment observed variables. Xi makes observations prior to treatment assignment, however the features in Xi may not contain all (or any) of the ones used to determine treatment assignment.

The outcome equation to be estimated is:

$$Y_r = d_r(X_r, U_r) \qquad Z \quad \in X = (X_1, X_2, \dots X_K) \qquad 3.11$$

$$R \in (0,1)$$

*Where*

$r$, which is the occurrence of the treatment, is indexed by the random variables $R \in (0,1)$,

X refers to the observed attributes of the household including being financially included,

Z and U denotes the household attributes that are unobserved. $Y_d$ refers to the outcome of interest (household welfare). Specifically, $Y_1$ is the outcome if household is financially included and $Y_0$ is the outcome if the household is financially excluded. In other words, for each household, $i$, $Y_i$ is specified as:

$$Y_i = Y_{0i} + R_i(Y_{1i} - Y_{0i}) \qquad 3.12$$

The major constraint in estimating Equation 3.12 is that it is difficult to observe a household that is financially included (treatment) and financially excluded (control) at the same time. Nwokoye et al (2020) noted that a way out of this estimation constraint is to estimate the average treatment effect on the treated (ATT) which is the effect for those in the treatment group. In addition, one may proceed to alternatively estimate the ‘average treatment effect’ (ATE), which is the effect on all individuals (treatment and control). Since the research objective is to ascertain the impact of financial inclusion on the welfare of households that are financially included (as contrasted from those that are excluded), the ATT, no doubt, is most appropriate. The ATT equation is specified as follows:

$$\begin{aligned} ATT &= E((Y_{1i} - Y_{0i}/R = 1) \\ &= E[E\{Y_{1i} - Y_{0i}/R = 1, p(X_i)\ \}] \\ &= E[E\{Y_{1i}/R_i = 1, p(X_i)\} - E\{\ Y_{0i}/R = 0, p(X_i)\ \}/R_i = 1] \qquad 3.13 \end{aligned}$$

The first step in estimating ATT is to estimate the propensity score, $p(X_i)$. Rosenbaum and Rubin (1983) and Nwokoye et al noted that the propensity score is the probability of treatment assignment conditional on observed baseline covariate. Thus, the $p(X)$ for $i = 1, \ldots, K$ is the conditional probability of being financially included given a vector of observed covariates $x_{i:}$

$$p(X_i) = prob(R_i = 1/X_i) = E(R/X) \qquad 3.14$$

And

$$prob(R_i, \ldots, X_1, X_2, \ldots, X_k) = \sum_{i=1}^{K} prob(X_i)^r[1 - prob(X_i)]^{1-r} \qquad 3.15$$

$r_i = 1$ for treatment, $r_i = 0$ for non-treatment and $X_i$ = the vector of observed covariates for the $i^{th}$ household. Employing logistic regression procedure,

$$P(X_i) = ln\frac{e(x_i)}{1-e(x_i} = ln\frac{prob(r_i=1/x_i)}{1-prob(r_i=1/x_i)} = \beta X_i \qquad 3.16$$

In estimating the ATT, One precondition is that the propensity score $p(X)$ must be obtained. As proposed by Rosenbaum and Rubin (1983), the $p(X)$ for $j = 1 \ldots K$ is the conditional probability of participating in IEM given a vector of observed covariates $x_{i:}$

$$p(X_j) = \Pr(D_j = 1/X_j) = E(D/X) \qquad 3.17$$

and

$$\Pr(D_j,...X_1, X_2,...X_k) = \sum_{j=1}^{K} e(X_j)^{d_j}\{1-e(X)\}^{1-d_j} \quad 3.18$$

Where

$d_j = 1$ for treatment, $d_j = 0$ for non-treatment and $X_j$ = the vector of observed covariates for the $j^{th}$ household.

Nwokoye et al further noted that it is required that ATT satisfies two conditions, namely, assumption of conditional independence and common support. The conditional independence condition states that conditional on observable characteristic of households (X), welfare outcomes are independent on the inclusion in financial services. Technically, the conditional independence condition is specified as:

$$Y_1, Y_0 \perp R/X$$

The second condition for the proficiency of the propensity score is the common support or overlap condition:

$Y_1, Y_0 \perp R/prob(X)$ Such that $0 < \text{prob}(R=1/X) < 1$

*Where* $\perp$ *denotes statistical independence*

As noted by Heckman et al. (1999), this condition confirms that in the propensity score distribution, the treatment observations (financially included households) have comparison observations (financially excluded households). Satisfying these conditions are important since it is only in areas of common support that inferences can be made about causality. It is also very important to conduct a balancing test, that is, to ascertain if:

$$Prob(X/R = 1) = Prob(X/R = 0) \quad 3.19$$

However, the ATT estimated from PSM can still suffer from biased results in the presence of misspecification in the propensity score model (Wooldridge, 2012, Nwokoye et al, 2020). The possibility of bias arises because a difference in the treatment outcome (such as the ATT) between treated and untreated groups may be caused by a factor that predicts treatment rather than the treatment itself. In randomized experiments, the randomization enables unbiased estimation of treatment effects; for each covariate, randomization implies that treatment-groups will be balanced on average, by the law of large numbers. Unfortunately, for observational studies, the assignment of treatments to research subjects is typically not random. One of the ways to ensure that the estimates are not biased is to ensure that treatment and control with similar attributes are considered in the counterfactual. To realize this end, an appropriate matching method could be used. Matching attempts to reduce the treatment assignment bias, and mimic randomization, by creating a sample of units that received the treatment that is comparable on all observed covariates to a sample of units that did not receive the treatment (Caliendo & Kopeinig, 2005; Ogunniyi et al., 2017; Nwokoye et al 2020).

Let $T$ and $C$ be the set of $K^T$ treated and $K^C$ control households respectively and $Y^T$ and $Y^C$ are the observed continuous outcomes of the treated and control units, respectively. Denote by $C(i)$ the set of $K^C$ control units matched (using kernel method based on PS scores) to the treated unit $i \in T$. Define the weights $w_i = \frac{1}{N_i^C}$ if $i \epsilon\ C(i)$ and $w_i = 0$ otherwise.

### 3.2 Measurement and Financial Inclusion Index

Camara and Tuesta (2015) argues that financial inclusion is multidimensional and should be treated as such. In this, we utilize the FINDEX (2017) to develop financial inclusion index for Nigeria. From the literature, we identified three dimensions for the modeling of financial inclusion index, namely, access to financial services, usage of financial services and availability of financial services. The correlation coefficients of the covariates are as shown on Table 3.21

Table 3.21: Correlation Matrix

| Variables | Branches | ATM | Mobile Money Agent | Deposit accounts | Mobile Money account | Deposits | Loans | Mobile Money Transactions |
|---|---|---|---|---|---|---|---|---|
| Branches | 1 | | | | | | | |
| ATM | 0.495 | 1 | | | | | | |
| Mobile Money Agent | 0.756 | 0.532 | 1 | | | | | |
| Deposit accounts | 0.635 | 0.308 | 0.504 | 1 | | | | |
| Mobile Money account | 0.513 | 0.233 | 0.289 | 0.523 | 1 | | | |
| Deposits | 0.327 | 0.103 | 0.317 | 0.560 | 0.597 | 1 | | |
| Loans | 0.411 | 0.009 | 0.327 | 0.420 | 0.196 | 0.373 | 1 | |
| Mobile Money Transactions | 0.420 | 0.233 | 0.252 | 0.364 | 0.243 | 0.280 | 0.373 | 1 |

Source: Estimated by the Researcher using Findex (2017)

Table 3.21 is divided into three sections namely Table 3.21 (a) for access to financial services (ATF), Table 3.21 (b) for availability of financial services (AOF) and Table 3.21 (c) for usage of financial services (UOF). Table 3.21 (a) shows that the PC with an eigenvalue 3.151 accounts for 78.8% of the total variation in ATF. With eigenvalues of 0.531, 0.172 and 0.146 for PC2, PC3 and PC4 respectively, PC2, PC3 and PC4 accounts for 13.3%, 4.3% and 3.65% respectively. Following Kaiser's criterion that one PC1 with eigenvalues greater than 1 would be considered, only the first component (PC1) will be further evaluated as the values of PC2, PC3 and PC4 are individually less than one and collectively less than one-third of the aggregate effects.

Table 3.21 (a) Estimates of First Stage of PCA

| Principal Component Estimates: Access to Financial Services | | | | | |
|---|---|---|---|---|---|
| Variable | PC1 | PC2 | PC3 | PC4 | Normalization Weight |
| Branches | 0.568 | -0.433 | 0.629 | -0.0067 | 0.33 |
| ATM | 0.488 | 0.808 | 0.116 | 0.0078 | 0.40 |
| Mobile money agent | 0.587 | -0.253 | 0.67 | 0.2349 | 0.27 |
| Eigenvalues | 3.151 | 0.531 | 0.172 | 0.146 | |
| Cum. Eigenvalues | 3.151 | 3.682 | 3.854 | 4 | |
| Proportion of Eigenvalues | 0.78775 | 0.13275 | 0.043 | 0.0365 | |
| Cum. Proportion of Eigenvalues | 0.78775 | 0.9205 | 0.9635 | 1 | |
| Variance | 2.62 | 0.359 | 0.026 | ---- | |

Source: Estimated by the Researcher using Findex (2017)

Information about weights is gained by investigating the principal components and their accompanying eigenvalues in order to comprehend the structure of our calculated indices. In terms of the weighting method, we notice that the relative contributions of the various indicators scarcely change over time. The ATM indication has the largest weight (0.40) in the access dimension, followed by bank branches (0.33) and mobile money agents (0.32). (0.27). Despite the fact that the weights are not evenly distributed, none of the indications is dominant; this is a good characteristic for an index.

Table 3.21(b) Estimates of First Stage of PCA

| Principal Component Estimates: Availability of Financial Services | | | | | |
|---|---|---|---|---|---|
| Variable | PC1 | PC2 | PC3 | PC4 | Normalization Weight |
| Deposit Accounts | 0.495 | 0.035 | 0.693 | -0.423 | 0.61 |
| Mobile Money Accounts | 0.432 | 0.71 | 0.065 | 0.458 | 0.39 |
| Eigenvalues | 2.583 | 0.765 | 0.521 | 0.131 | |
| Cum. Eigenvalues | 2.583 | 3.348 | 3.869 | 4 | |
| Proportion of eigenvalues | 0.646 | 0.191 | 0.130 | 0.033 | |
| Cum. Proportion of eigenvalues | 0.646 | 0.837 | 0.96725 | 1 | |
| Variance | 1.818 | 0.244 | 0.39 | 0 | |

On the other hand, Table 3.21 (b) is the summary outcome for first stage PCA for availability dimension. It shows that only PC1 has eigenvalue that is greater than one. The eigenvalue is 2.583 which amounts to 64.6% of the cumulative value. As stated earlier, only PC1 would be considered. For the availability dimension, having deposit accounts have higher weight (0.61) than having mobile money accounts (0.39). This may be associated with the fact that in most cases having mobile money accounts is associated with first having a deposit account (whether demand deposit or saving deposit) . For the usage dimension, the eigenvalues for PC1, PC2, PC3 and PC4 are 2.976, 0.557, 0.343 and 0.124 respectively. Again, following Kaiser's criterion, we consider only PC1 which contributes about 74.4%. Also note that the weights across all the covariates are almost evenly distributed with deposit having normalized weigth of 0.42, loan having 0.25 and mobile money transactions being assigned 0.33.

Table 3.21 (c) Estimates of First Stage of PCA

| Principal Component Estimates: Usage of Financial Services | | | | | |
|---|---|---|---|---|---|
| Variable | PC1 | PC2 | PC3 | PC4 | Normalization Weight |
| Deposit | 0.494 | 0.331 | 0.329 | 0.7 | 0.42 |
| Loan | 0.51 | 0.012 | 0.559 | 0.566 | 0.25 |

| | | | | | |
|---|---|---|---|---|---|
| mobile money transaction | 0.493 | 0.324 | 0.255 | 0.255 | 0.33 |
| Eigenvalues | 2.976 | 0.557 | 0.343 | 0.124 | |
| Cum. Eigenvalues | 2.976 | 3.533 | 3.876 | 4 | |
| Proportion of eigenvalues | 0.744 | 0.13925 | 0.08575 | 0.031 | |
| Cum. Proportion of eigenvalues | 0.744 | 0.88325 | 0.969 | 1 | |
| Variance | 2.419 | 0.214 | 0.219 | 0 | |

Source: Estimated by the Researcher using Findex (2017)

In the second stage, to compute their weights in the overall index, we apply Principle Component Analysis on the three sub-indices (access, availability, and usage). Table 3.21 presents the composition of the principal components and the normalized weights for each dimension or sub-index. The weighting scheme loaded through information contained in the PCA shows that availability has the highest weight of 0.39. This is followed by access (0.34) and usage (0.27). This suggests that availability is the most important dimension for explaining the degree of financial inclusion. Availability is followed in importance by access. This is quite intuitive. First, the banking services or bank branches will first be available before households consider making the choice of being financially included. Second, it will be accessible. The final condition is that it will benefit families in terms of utilization. We can see that only the first component has an eigenvalue greater than one in terms of the primary component structure. In addition, the first and most important component accounts for 74.6 percent of the overall data variation. Table 3.21 also shows that Nigeria's overall financial inclusion index is 0.5163, implying that 51.6 percent of Nigerians have access to financial services.

Table 3.22 Estimates of Second Stage of PCA

| Principal Component Estimates | | | | |
|---|---|---|---|---|
| Variable | PC1 | PC2 | PC3 | Normalization Weight |
| Access | 0.517 | 0.516 | 0.518 | 0.34 |
| Availability | 0.487 | 0.717 | 0.227 | 0.39 |
| Usage | 0.545 | 0.151 | 0.694 | 0.27 |
| Eigenvalues | 2.242 | 0.435 | 0.323 | |
| cum. Eigenvalues | 2.242 | 2.677 | 3 | |
| Prop | 0.747 | 0.145 | 0.108 | |
| cum prop | 0.747 | 0.892 | 1 | |
| Variance | 1.807 | 0.112 | 0 | |
| Overall Financial Inclusion Index | 0.5163 | | | |

| |
|---|
| for Nigeria |

Source: Estimated by the Researcher using Findex (2017)

**Post Estimation Test for PCA**

As suggested by Camara and Tuesta, (2015) and Mishra (2017), it is expedient to test for sampling adequacy when PCA is used for building an index. Mishra (2017) recommends the Kaiser Meyer Olkin (KMO) test and the Bartlett's test of sphericity (BTS). While both tests can be conducted individually, together they can be used as robust tests for the final PCA results. The KMO and BTS test whether the variables in a correlation matrix are significantly different from an identity matrix. An identity matrix is when the diagonal values are 1 and the non-diagonal values are 0. This condition implies that the variables selected for building the index are completely unrelated and independent of each other, as such the use of PCA as an indexing tool would be unsuitable and inappropriate. Both tests are often used in parametric tests where the rejection of the null hypothesis of an identity matrix is an indication that the data are well suited for PCA.

**Test Hypotheses:** The test hypotheses are stated below

$H_0$: Correlation matrix is an Identity Matrix

$H_1$: Correlation matrix is not an Identity Matrix

**Decision Rule:** According to Mishra (2017), the guidelines for ascertaining the KMO result is given as:

In the 0.90s Marvelous

In the 0.80s Meritorious

In the 0.70s Middling

In the 0.60s Mediocre

In the 0.50s Miserable

Below 0.50 Unacceptable

From Table 4.9, the KMO would be said to be meritorious. Thus, we reject the null hypothesis and conclude that the sample is adequate for PCA.

Similarly, Camara and Tuesta, (2015) stated that in the case of the BTS test, when the P-value of the BTS is lower than the critical value of 0.05, the null hypothesis can be rejected.

Table 3.23 Results of the TMO and BTS tests

| | | |
|---|---|---|
| Kaiser-Meyer-Olkin Measure of sampling adequacy | | 0.826 |
| Bartlett's Test of Sphericity | Approx. Chi-Square | 9012.90 |
| | p-value | 0.000 |

Source: Estimated by the Researcher using Findex (2017)

**3.3 Measurement of Household Welfare**

Thus, in this study, the use of income quintile as a measure of welfare was adopted. First, in line with the Bergson–Samuelson social welfare function, income quintile aptly depicts where an individual could be on the welfare function. Second, it is a comprehensive measure of welfare that depicts affordability of all indicators of wellbeing. Finally, it is chosen due to availability of data. In the Findex, there is no data on consumption. However, there is data on each individual's income quintile.

**4. Estimation and Discussion of findings**

The main thrust of this section is to estimate the impact of financial inclusion on household welfare in Nigeria using FINDEX (2017). To ascertain the welfare effect of being financially included may require a counterfactual analysis that could net out the impact of financial inclusion on the household welfare. This requires that those who are financially included be distinctively separated from those that are financially excluded.

Table 4.1 Likelihood of being financially included

| | Coefficient | Standard error |
|---|---|---|
| Gender: male | 0.01064** | 0.00498 |
| Gender: female | 0.03556*** | 0.0133 |
| Age (15-34) | 0.02504*** | 0.0028 |
| Age (34 and above) | 0.05628*** | 0.007 |
| Primary education | -0.10108*** | 0.01904 |
| Secondary education | 0.51456*** | 0.14466 |
| Tertiary education | 0.40098*** | 0.10956 |
| Unemployed head of household | -0.08736*** | 0.01624 |

| | | |
|---|---|---|
| Employed head of household | 0.01602*** | 0.00532 |
| Receipt: Government transfers | 0.02506 | 0.042 |
| receipt of remittance | 0.03136*** | 0.00848 |
| Ownership of mobile phone/internet | 0.0242*** | 0.00322 |
| Payment bills | 0.0497*** | 0.01708 |
| Obs | 1,000 | |
| LR ( $\chi^2$ ) | 725.89 | |
| LR (Prob) | | 0.0000 |
| Pseudo R | | 0.433 |

Source: Researcher's estimations (2021)

Those that are financially included are referred to as treatment group while the financially excluded are referred to as control group. To achieve this goal, we utilized propensity score matching as utilized in Nwokoye et al (2020). To enter the treatment group, we utilized 25% cut-off. That is, all respondent who obtained 25% of the financial inclusion index are included in the treatment group. Others are grouped as control group. There are total 529 treatment candidates and 491 control group candidates. In other to estimate the propensity score, the likelihood of being financially included is first computed. The result is shown on Table 4.10. The result shows that all education, age, employment status, receipt of remittance, payment of bills and ownership of mobile phones have the likelihood of increasing the chances of being financially included. While most variables increase the likelihood of inclusion, being unemployed and having only primary education reduces the likelihood of financial inclusion. From the likelihood estimation, the propensity scores are estimated as shown on Table 4.11.

Table 4.11 Estimated Propensity Scores

| | Estimated Propensity Score | |
|---|---|---|
| | Percentile | Smallest |
| 1% | 0.0010694 | 0.000914 |
| 5% | 0.0014751 | 0.000914 |
| 10% | 0.0020168 | 0.000914 |
| 25% | 0.0048323 | 0.000918 |
| 50% | 0.277077 | 0.519671 |
| 75% | 0.534804 | 0.753737 |
| 90% | 0.3288462 | 0.768188 |
| 95% | 0.4279398 | 0.789753 |
| 99% | 0.645166 | 0.803323 |
| Std Dev | 0.144896 | |
| Variance | 0.0209948 | |
| Obs: Treated 529; Control 491 | | |

Source: Researcher's estimations (2021)

The estimated propensity score is used for matching of the treated and control groups in the counterfactual analysis. To test the validity of conditional independence assumption, we also estimated the Rosenbaun bounds (RB). First we estimated the overall impact of financial inclusion on household welfare using alternative matching methods. The results obtained show that the nearest neighborhood estimates is 0.415 irrespective of the nearest neighborhood used. Similarly, the estimates of radius matching, kernel matching and local linear matching are 0.421, 0.418 and 0.416 respectively. This implies that irrespective of the matching technique used financial inclusion increases household welfare by approximately 42%.

Table 4.12 PSM Estimate of Impact of Financial Inclusion on Household Welfare

| | | Coefficients | Standard error |
|---|---|---|---|
| Nearest Neighborhood Matching | 1-NN | 0.415** | 0.196 |
| | 2-NN | 0.415*** | 0.141 |
| | 3-NN | 0.415*** | 0.156 |
| Radius Matching | | 0.421** | 0.196 |
| Kernel Matching | | 0.418** | 0.206 |
| Local Linear Matching | | 0.416** | 0.194 |
| PSM estimates by Demography (Kernel) | | | |
| Gender: male | | 0.277** | 0.117 |
| Gender: female | | 0.328*** | 0.129 |
| Age (15-34) | | 0.296*** | 0.112 |
| Age (34 and above) | | 0.166*** | 0.039 |
| Primary education | | 0.275** | 0.131 |
| Secondary education | | 0.256*** | 0.090 |
| Tertiary education | | 0.308*** | 0.106 |
| unemployed head of household | | 0.054 | 0.042 |
| employed head of household | | 0.280*** | 0.076 |
| $\Psi$ (RB) | | 1.0998 | |
| $\sigma$ (Sigma) | | 2.9087 | |
| $\rho$ (Rho) | | - 3.8762 | |

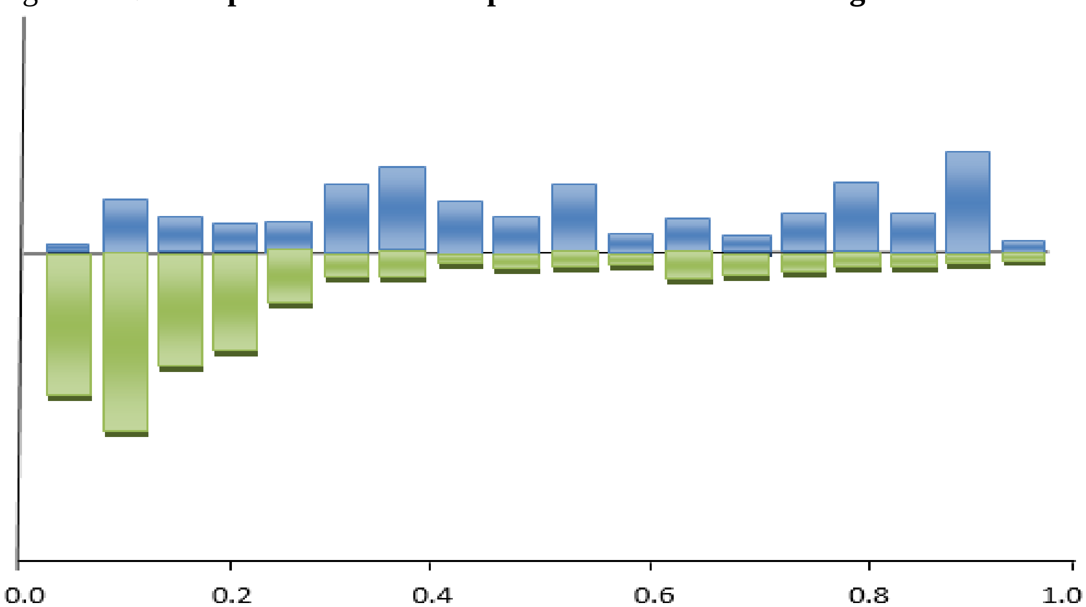
Source: Researcher's estimations (2021)

Second, we estimated the impact of financial inclusion on male respondents, female respondents, persons with primary education, persons with secondary education, persons with tertiary education, unemployed persons and employed persons using the nearest neighborhood technique. The results obtained indicate that the estimated coefficients are 0.27716 (for male gender), 0.32776 (for female gender), 0.29572 (for age bracket of 15 to 34 years), 0.16596 (for age bracket of 34 years and above), 0.27459 (for primary school certificate holders), 0.25553 (for secondary school certificate holders), 0.30833 (for holders of post-secondary education/tertiary certification, eg BSc.), 0.05446 (for the unemployed) and 0.28038 (for the employed). This suggest that male gender and female gender experience 27.7% and 32.8% increase in welfare respectively due to being financially included. Similarly, the results suggests that persons within the age bracket of 15 to 34 years old (that is, youths) and persons between the age bracket of 34 years and above (adults) experience 29.6% and 16.6% improvement in welfare respectively due to being financially included. Also, persons with primary school education, secondary school education and tertiary education experience 27.5%, 25.6% and 30.8% increase in welfare respectively. In the same vein, unemployed persons and employed persons experience 5.4% and 28.0% increase in welfare respectively due to being financially included.

**Post Estimation Evaluation of PSM**

Estimating the PSM requires two major assumptions, namely, common support assumption (CSA) and conditional independence assumption (CIA).The CSA ensures that there is sufficient overlap in the characteristics of treated and untreated units to find adequate matches. When these assumptions are satisfied, the treatment assignment is said to be robust. Figure 4.1 illustrates a common support graph that depicts the overlap in propensity ratings between the treatment and control groups.

Figure 4.1 **depicts an overlap that indicates a good and balanced fit.**




Source: Researcher's estimations (2021)

The second assumption requires that there is conditional independence. This assumption requires that there exists a set X of observable covariates such that after controlling for these covariates, the potential outcomes are independent of treatment status. This requires that the after and before matching bias would not be statistically significant. A test of difference of mean was performed on the hypothesis that the mean value of each variable is the same in the treatment and control groups to determine the success of the matching of treatment and control groups based on covariates. The test was carried out both before and after the matching. The result shown on Table 4.18 indicates that the biases are not statistically significant even at 10% significant level. This could be substantiated using the RB ( $\Psi$ ) parameter. The RB for household welfare is 1.0998

This implies that an unobserved covariate could increase the odd of selection into financial inclusion by 9.98% so as to cause the estimated ATT to be statistically insignificant at 5% significance level. Also, given that the $\Psi$ is approximately 1, one can conclude that the PSM estimated ATT is not sensitive to a confounding covariate. Put differently, it suggests that the CIA holds for the PSM estimation.

Table 4.13 Test of covariate balance

| Variable | Mean | | | t test | |
|---|---|---|---|---|---|
| | Treated | Control | %bias | T | P>/t/ |
| Gender | 0.233 | 0.246 | -2.7 | -0.32 | 0.749 |
| Age_hh1 | 24.171 | 24.904 | -6.1 | -0.62 | 0.533 |
| Age_hh2 | 48.089 | 48.445 | -5.1 | -0.53 | 0.598 |
| Edu_hh1 | 4.263 | 4.508 | -9.8 | -1.04 | 0.3 |
| Edu_hh2 | 12.012 | 12.207 | -11 | -1.21 | 0.225 |
| Edu_hh3 | 16.101 | 16.342 | -11.1 | -0.98 | 0.329 |
| Religion | 0.271 | 0.213 | 14 | 1.49 | 0.136 |
| Fin_lit | 0.204 | 0.208 | -1 | -0.11 | 0.91 |
| Dependence | 0.225 | 0.238 | -2.7 | -0.32 | 0.746 |
| Employment_hh | 0.108 | 0.133 | -7.7 | -0.84 | 0.402 |
| Receipt_Transfer | 0.192 | 0.158 | 7.5 | 0.96 | 0.338 |

Source: Researcher’s estimations (2021)

**5. Conclusion and Recommendation**

The UN Sustainable Development Goal targets that by 2030, poverty gaps are closed in all nations (Goal 1), hunger is eradicated from all nations (Goal 2) and all nations attain good health and well-being (goal 3) for its citizens. Achieving these goals is synonymous to improving the welfare of households. In other words, household welfare improvement is a global goal. One phenomenon that has been identified as critical for development of third world countries is financial inclusion. In this study, we examined the role of financial inclusion on household welfare improvement. Using several micro econometric estimation procedures within the framework of quantitative research method we conclude that financial inclusion exerts significant positive impact on household welfare. Although it exerts positive impact on persons of all ages, gender and employment status, the impact is greater for women and youths.

The key finding of this study is that financial inclusion is critical for household welfare improvement on one hand and achieving the SDGs on the other hand. Thus, there must be a concerted efforts by all stakeholders to improve financial inclusion in Nigeria. To achieve greater financial inclusion for all, the government, regulatory agencies, and private sector participants (such as financial service providers (FSPs)) must focus on enhancing the existing branchless banking infrastructure. Branchless banking refers to a method of providing financial services that does not rely on actual bank location. Physical banks are few and far between in many parts of the world. People in these bankless villages frequently lack access to critical financial services. People can use these financial services without going to a physical bank by using branchless banking options. Creating third-party bank outposts (such as a retail store) and developing mobile banking platforms are common examples of branchless banking. Consumers can deposit or withdraw cash through the merchant, which can operate as a "ATM." Banking transactions can be done through mobile phones, and customers can deposit or withdraw cash through the retailer. Card-based systems are another option for deploying branchless banking. Given that agent banking plays a critical role in driving branchless banking, the CBN should implement unified and comprehensive agent banking frameworks. This will ensure that services offered by financial service providers (FSPs) are made available to all Nigerians, especially in rural areas. This is key to tackling the problem of distance which discourages financial inclusion. The CBN should also promote linkages between microfinance banks (MFBs) and deposit money banks (DMBs) to obtain wholesale funds for on lending. This linkage can also enable the MFBs to provide DMBs financial services to its clients on behalf of the DMBs. In a similar consideration, the CBN should develop guidelines for DMBs to be operating mini-branches. This will increase access of FSPs to the people thereby increasing financial inclusion.

DISCLAIMER:

Authors have declared that no competing interests exist. The products used for this research are commonly and predominantly use products in our area of research and country. There is absolutely no conflict of interest between the authors and producers of the products because we do not intend to use these products as an avenue for any litigation but for the advancement of knowledge. Also, the research was not funded by the producing company rather it was funded by personal efforts of the authors.

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