

# No Condition is Permanent

## Middle Class in Nigeria in the Last Decade

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## Abstract

The economic debate on existence and definition of the middle class has become particularly lively in many developing countries. Despite this growing interest, the identification of the middle class group in these countries remains quite challenging. Building on a recently developed framework to define the middle class, this paper tries to estimate the Nigerian middle class size in a rigorous quantitative manner. By exploiting publicly available panel data, the expenditure associated to a 10 percent probability of falling into poverty is estimated, and this is used as the middle class threshold for Nigeria. The threshold expenditure for the middle class in Nigeria is found to be

378.39 Naira per capita per day (2010 PPP). Relying on this threshold and through survey-to-survey imputation the size of Nigeria's middle class in 2003 is also estimated. The results show that there has been considerable improvement on the size of the middle class and poverty reduction between 2003 and 2013. Poverty decreased between 2003 and 2013 from 45 to 33 percent, while the middle class increased from 13 percent to 19 percent. Nevertheless the results still paint a heterogeneous picture of poverty and the middle class in Nigeria, where the largest portion of the population, although above the poverty threshold, continues to live with average or high vulnerability to poverty.

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## No condition is permanent: Middle class in Nigeria in the last decade

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## I. Introduction

In Western developed countries, modernization and economic development have been commonly associated with the availability of a pool of commercial, entrepreneurial, professional, and technical abilities which generally tend to be drawn from those occupational groups often referred to as *middle class* (Geithman, 1974). The importance of this rather heterogeneous social group has spurred an intense debate on its definition. Back in the 19<sup>th</sup> century, the list of political scientists, sociologists, philosophers and economists that analyzed the phenomenon is long: Marx, Weber, Sombart, Shumpeter and many others.

While in the past definitions have focused on the functional role of the middle class, occupational composition (e.g. coincidence with the white collar group) or on its specific system of values,<sup>1</sup> more contemporary analysis of middle class has taken advantage of available information on household welfare characteristics; the middle class definition has, thus, progressively shifted to a quantitative measurement problem. Economists have started to take the lead in framing the issue in terms of income, or income boundaries within which households or individuals can be categorized as middle class (Ferreira et al., 2013).

The increasing availability of household level data in developing countries has opened the opportunity to conduct middle class analysis there also. It is important, however, to bear in mind one key point. Despite the usefulness of the theories and methods so far refined for developed countries, one might argue that the dynamic forces of change and modernization in many developing countries may be radically different from those that operated in the presently developed countries. The very notion of middle class, thus, can assume a different meaning in the two contexts.

An historical overview can shed light on this. The concept of middle class is rooted in the rise of 19<sup>th</sup> century capitalism in Europe and the United States. The development of the capitalist system reshaped Western societies by creating new classes such as the proletariat, the urban manufacturing workers that became, in more advanced Western countries, the most numerous class at the bottom of the income distribution. The bourgeoisie, already existing in pre-industrial Europe, also experienced sharp modifications. Within this class, the least affluent part represented by clerks, small entrepreneurs, shop keepers, artisans was increasingly identified as petty bourgeoisie (Hobsbawm, 1975). Poorer than the core bourgeoisie (*haute bourgeoisie*) but aspiring to become that, the petty bourgeoisie was very

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<sup>1</sup>19<sup>th</sup> century French literature is a particularly rich source on the middle class system of values. Above all, Maupassant and Balzac are sharp observers, though very critical, of the rising French middle class.

resolute in distinguishing itself from the proletariat in terms of status, political affiliation<sup>2</sup> and lifestyle; this despite income differences being less pronounced than with *haute bourgeoisie*.

Toward the end of 19<sup>th</sup> century the petty bourgeoisie become the middle class. At this stage, the attribute ‘middle’ has to do mainly with its functional position in the society between the bourgeoisie and the proletariat: not capital owners but also not mere providers of unskilled work force as the proletariat (Southall, 2004). Fin de siècle capitalism transformations and the increasing role of the State trigger higher demand for skilled white collars both in the private sector and in the State bureaucracy (Hobsbawm, 1987). This inevitably increased the share and importance of the middle class in Western societies. Another important contribution to its expansion comes from the internal articulation and functional diversification of the working class. The increase in wages and the growing demand for specialized workers created a “labor aristocracy” increasingly resembling the middle class and progressively losing its revolutionary stances in favor of a social and economic integration in modern capitalist societies (Hobsbawm, 1987).

Notwithstanding the growing size and importance, the identification of the middle class as the center of the income distribution (and society’s cornerstone) is a feature of mid- 20<sup>th</sup> century developed economies only. This is clearly pointed out by Thomas Piketty’s (2014) book on long term trends of inequality in developed countries. Among the distinguishing features of the 20<sup>th</sup> century he identifies the creation of a ‘patrimonial middle class’ accounting for more than 40 percent of the population ranked by wealth.

The emergence of this class, he argues, is a key element in explaining the fast decline in inequalities and the increase in social mobility registered by Western countries after the Second World War. Its most widely acclaimed marker is the concept of merit or achieved status. The idea that what sets the middle class apart from the rest is that its members have risen in society rather than inherited a station in life. Their relative social mobility is attributed to talent and effort, qualities that prepare the middle class to serve as the engine of innovation and change.

What we briefly summarized about middle class dynamics in Western countries does not necessarily apply to Sub Saharan Africa and generally to developing countries. There are several similarities in terms of lifestyle, education, patterns of consumption, perhaps ethical values, yet the two middle classes can be very different in terms of size, relative position in the income distribution and, in general, in their functional position in society.

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<sup>2</sup>In most of Western countries middle class started to organize into political parties, either conservative or progressive, different from those of working class but also with a different political agenda than *haute bourgeoisie*.

Latin America's experience sheds light on this point. Independent of the methodology used (Ferreira et al., 2013; Lopez-Calva and Ortiz-Juarez, 2011 *inter alia*) only the top third of Latin American households qualify as middle class or richer; the bottom two thirds, the absolute majority, lives below this threshold. Being middle class in Latin America, thus, indicates a relatively privileged situation. The emphasis on the two thirds and the one third is critical here. In developed countries the concern over the last 30 years (Headey et al., 1994) centered around the third of society that was not benefitting much from economic growth while the middle class and those in the top income percentiles (the so called two thirds society) were enjoying most of the benefits.

In other words, compared to Latin America, proportions in developed countries were completely inverted. Differences are not just quantitative. The middle class is central in shaping the social, economic and political landscape of developed countries. On the other hand, in developing countries the middle class is becoming an important actor but has acquired neither the magnitude nor the social and political status it has (or perhaps had) in developed countries.

In Nigeria, the past ten years of fast economic growth have nurtured a buoyant group of professionals, entrepreneurs, private sector employees often engaged in the thriving information technology, communications, and financial sectors. Recent analysis on the labor market structure in Nigeria (World Bank, 2014) show that the group of professionals occupied in the more traditional<sup>3</sup> activities either in the public or private sector has also grown in the past years.

How much these groups represent an embryonic 'Nigerian middle class' and what is the share of the middle class group over total population are the research questions of the present paper. The vulnerability approach to middle class (VAMC) (Lopez-Calva and Ortiz-Juarez, 2011) is the method we employ to identify an income threshold above which a household can be classified as middle class. According to this method, in developing countries the middle class group can be defined residually from the vulnerability analysis: those for which the probability of falling into poverty is below a certain threshold (10%) can be considered part of the middle class. The advantage over other methods is that this defines middle class in terms of an important 'functioning', namely economic security; this concept is particularly appealing in a context such as Nigeria where large percentages of population are extremely vulnerable to fall into poverty (NER, 2014).

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<sup>3</sup>Here we mean public employees and in the private sector white collars employed in manufacturing sector, oil companies and services other than ICT and financial.

This paper is innovative in three aspects. To our knowledge, it is the first attempt to estimate the Nigerian middle class evolution in a rigorous quantitative way and check whether its profile is significantly different from other social groups. Second, we substantially improve the econometric robustness of VAMC by using a generalized maximum entropy (GME) specification. Finally, in order to be able to describe a long term trend, we use survey techniques to estimate a comparable consumption distribution for early 2000s and compare it to the most recent years.

The paper is divided into five sections. The next section sets the context of middle class analysis in developing countries and provides a quick overview about middle class studies in Sub Saharan Africa and in Nigeria. Section three discusses the data and the methodology used in the analysis. Results are discussed in section four, and section five concludes.

## **II. Defining a middle class in developing countries**

As discussed in the previous section, when measuring middle class size and importance, the economic context matters to a great extent. In developed countries we can use relative welfare measures for defining middle class (Blackburn and Bloom, 1985; Partridge, 1997). Knowing that the middle class is generally occupying the center of the income distribution does not really matter if we take central quintiles or some distance from the median.

However, in developing countries the middle class does not often coincide with some function of the income median. Scholars<sup>4</sup> thus opted for absolute measures; in the spirit of poverty lines construction, they defined an income (or consumption) interval in which households can be considered middle class (Ferreira et al. 2013; Ravallion 2010; Banerjee and Duflo, 2008). For a cross country analysis, this method is clearly superior to the relative one, intervals can actually be the same across all countries considered.

The method has, nonetheless, its drawbacks. For example, Banerjee and Duflo (2008), Ravallion (2010), Milanovic and Yithaki define three different middle class intervals. In all cases it is not entirely clear what motivates the choice of one value over another. In the Banerjee and Duflo case, to be part of the middle class one is required to have more than 2 dollars per capita per day and less than 10 dollars while Milanovic and Yithaki's estimate is

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<sup>4</sup>Relative definitions of middle class are also present in literature see for example Esterly (2001) or Solimano (2008). However, in particular in African countries a definition of middle class as households between the 20<sup>th</sup> and 80<sup>th</sup> percentile of the consumption distribution would result extremely inaccurate.

6 times greater (12 dollars) than the lower threshold and 5 times greater than the upper (50 dollars). Both intervals can be reasonable but they define two completely different groups.

A further complication one might encounter in low/lower middle income countries is defining an upper bound. In general, household surveys do not contain good estimates of upper percentiles of welfare (Alvaredo and Piketty, 2010).<sup>5</sup> When using consumption to rank welfare, as it is normally done in low/lower middle income countries, the situation is further aggravated. Consumption is very accurate in capturing the well-being of poorer people, yet it is rather imprecise in capturing that of people living in upper percentiles. It follows that when defining middle class in these countries, it seems reasonable to opt for a lower bound threshold (middle class and above) rather than an interval and leave the border between middle class and upper class somehow undefined.

Before turning to the data and methodology section, in the next paragraphs, we examine the available studies on the middle class in Sub-Saharan Africa (SSA) and Nigeria in particular. Whereas the economic debate on existence and definition of the middle class has become particularly lively in many developing countries, the issue has thus far received limited attention in Sub Saharan Africa with the notable exception of South Africa. There is, however, increasing awareness that a strong middle class can potentially change the economic and political landscape of African societies.

### *An emerging African middle class?*

The emergence of the African middle classes has so far been studied by sociologists and political scientists, documented through international and national press, but mostly ignored by the academic economic literature. Among various authors, there is a general consensus that the middle class produces economic benefits for society as a whole and broadens the base of economic development. Also, in the recent growth acceleration of some African economies the middle class demand for goods and services seems to have played an important role (McKinsey, 2010). On the political side, the middle class played a role in the democratization process that started in the nineties (Southall, 2004). Throughout SSA, the middle class was the determinant in obtaining fair elections, reliable institutions and freedom of press and opinion.

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<sup>5</sup>The reason for measurement issues at the upper percentiles is due to under-reporting (Alvaredo and Piketty, 2010). Alavredo and Piketty skirt this issue by relying on tax data, however in low/lower middle income countries tax systems are not as thoroughly developed.

The Africa Development Bank (ADB 2011) produced the first comprehensive report on middle class in Africa. The middle class is defined in the report using thresholds of consumption per capita: between \$2 to \$20 per day. The report subdivides middle class into three groups: the floating class (per capita consumption level of \$2 to \$4 per day), the lower middle class (\$4-\$10 per day) and the upper-middle class (\$10-\$20 per day). The ADB report shows that that one third of the continents' population belongs to the middle class interval \$2-\$20. Yet, as most of the critics to the report point out, 50 percent of this group lays close to the \$2 lower bound; indeed quite a low level of consumption to be qualified as middle class.

The Standard Bank (2014) recently published an analysis on the size of the middle class size in eleven SSA countries, constructing four different income consumption intervals based on results from South African household surveys: low income (< \$3), lower middle class [\$3, \$4), middle class [\$4, \$20) and upper middle class ( $\geq$ \$20). It is worth noting how an investors-targeted report, in theory interested in presenting a rather rosy situation, is in fact quite critical about the general narrative of “Rising Africa” and the booming middle class. According to the Standard Bank’s estimates, the size of the middle class size has increased almost fivefold from the year 2000. Numbers nonetheless are still relatively small: only 7.6 million households (roughly 40 million people) qualify for middle class status. Nigeria gets the lion share, of these 7 million, 4.1 million are Nigerians. Looking at the shares, both the lower middle class and the middle class are around 10 percent: 20 percent of Nigerian households, thus, hover around the middle class thresholds.

Besides measuring the size of the middle class, there is growing interest in assessing the symbolic impact of the middle class and its capacity to impose a certain lifestyle. Several articles in the international press pinpoint substantial changes in Africa’s consumption patterns; they explicitly make reference to the increasing purchasing power of the local middle classes. For example, a recent Reuters article on pharmaceutical products (Berton, 2013) reports that the continent’s economic growth is luring big pharmaceutical companies to Africa, as they see potential for creating products that will treat chronic diseases which affect the middle class. This is a shift from solely supplying drugs for infectious diseases on a humanitarian basis. European drug companies are expanding in Africa due to this increase in economic wealth and demand for treatments by the urban middle class population. In the same vein, the Financial Times notes that there are luxury stores like Louis Vuitton, Richard Mille, Roger Dubuis, the Swiss company and Cartier in Nigeria, Botswana, Angola, Ghana with a stronger presence in South Africa. Africa’s market is expanding and foreign companies are steadily increasing their presence.

Increasingly, the middle class is also seen as a key political actor on the African continent.

With a clear allusion to the social dynamic that generated the “Arab spring,” Richard Dowden on The Guardian (2013) reminds us that “young middle class Africans are not enjoying the benefits of this optimism in Africa.” He goes on to describe young middle class Africans as “unhappy with the poor levels of education, the lack of electricity, and corruption,” and the generalized sense of dissatisfaction with the government’s action. The author concludes that there is a large number of unemployable young people being churned out of badly-managed state education systems, adding to the increasing number of poor in the population and as the title states, this middle class “calls for revolution.”

#### *Middle class in Nigeria*

The discussion on the middle class is particularly vibrant in Nigeria. In 2007 the National Bureau of Statistics (NBS) released a report titled “The Middle Class in Nigeria: Analysis of Profile, Determinants and Characteristics” (1980-2007). The study divides the middle class into lower-middle and upper-middle class and defines the middle class profile based on consumption patterns, and the typical occupation and educational attainment. Among the relevant findings, the report highlights that in recent times, due to unemployment and government shrinking, the middle class cuts across formal, informal, public and private sectors, while before the nineties they were mainly concentrated in the public sector.

A more recent report edited by McKinsey (2014) is very optimistic about the Nigerian middle class’s (here called consumer class) future prospects. In 2013, the report estimates eight million households with incomes of more than \$7,500 per year (about 4\$ per capita), a level sufficient to meet all basic necessities and have money left over to start buying more and better food as well as health and education services. By 2030, McKinsey estimates that about 35 million households or about 60% of future Nigerian Population could be living above this threshold.

Like other African countries, the growth of the Nigerian middle class is mirrored by a widespread modification of consumption patterns. An increasing number of foreign restaurants and lifestyle companies are entering the country, in particular supermarkets and restaurant chains, undoubtedly the epitome of Western-type middle class consumerism. In the last years, some Nigerians have shifted from shopping at local markets and street vendors to progressively purchasing at the local-based commercial centers, malls and markets. The Palms in Lagos Lekki Peninsular was the first western-style mall built in Nigeria, now there is also the Lagos City Mall and the Silverbird Galleria in Lagos and Abuja. In Abuja, there is also

the Ceddi Plaza, and in Cross River the Tinapa Mall that promises to provide retail and entertainment, Dubai style.

Cultural changes also accompany these sharp economic transformations, although not all of them appear positive. Sule et al. (2011) argue that a majority of the new Nigerian middle class are more focused on the consumption of material goods and not as much on increasing the production base in the country. Furthermore, the authors report that some of the consumption is also being financed through loans thereby pushing the households into debt. Several authors also warn against an overly optimistic identification of the emerging middle class with an entrepreneurial bourgeoisie. Echoing the sixties debate in Latin America about the ‘borguesia compradora’, they argue that the Nigerian middle class should move from a consuming middle class to a producing middle class.

In summary, while disregarded by the academic economic literature, the discussion on an emerging African - and Nigerian - middle class is buoyant. This overview has, however, emphasized the need for a more systematic and quantitative approach to the problem; notably the definition of an interval/threshold in the income distribution where we can identify middle class households. Using a methodology already experimented in Latin America, in the following sections we measure the Nigeria middle class and examine the changes that have taken place in the last decade.

### **III. Data and Methodology**

#### *Data*

The General Household Survey Panel (GHS-Panel), one of the datasets used in this paper, is a randomly selected sub-sample of 5,000 households from a larger cross section survey of 22,000 households. The GHS-Panel is a Living Standard Measurement Study (LSMS) survey representative at the national and zonal (geopolitical) levels. The GHS-Panel waves 1 and 2 were implemented across 2010-2011 and 2012-2013 respectively. The same households were interviewed in the post planting period (between August and October) and in the post-harvest period (between February and April) in both waves and administered almost the same questionnaires. It is a multi-topic household level survey that covers a variety of topics including consumption and income generating activities. Consumption data in the GHS-Panel are collected using a 7 day recall period. The second dataset used in this analysis is the Harmonized Nigeria Living Standard Survey (HNLSS). Unlike the GHS-Panel, the

HNLSS consumption data was collected using a month-long diary. Also, while the GHS-Panel was implemented over a 6 month period and consumption data was collected at two points in time – the post-planting and the post-harvest periods, in the HNLSS, consumption information was collected over a 12 month period using month long diaries. Both surveys were implemented by the National Bureau of Statistics.

Consumption figures in the GHS-Panel were averaged over the post-planting and post-harvest visits in order to proxy households' annual consumption patterns irrespective of seasons. Consumption data are then deflated spatially using a zone level price deflator. To construct the deflators, zone level baskets were constructed from surveys and priced using item-level prices by state and month. To deflate by year the national consumer price index provided by the NBS were used. Real consumption figures are in 2010 prices. To compare results over time (the last decade) we used the HNLSS conducted in 2003/2004. The HNLSS is representative at state level and because it uses a month-long diary to collect consumption, it is not directly comparable to the GHS-Panel which uses a 7 day recall. As can be seen in the following paragraphs, we re-estimated 2003/2004 real consumption using a model based on the GHS-Panel.

A new poverty line based on the GHS-Panel was constructed. The new line is 180 Naira per capita per day in 2010 prices and yields 3000 calories as the official poverty line.<sup>6</sup> Converted in dollars PPP, the line becomes 1.4 dollars per capita per day, very close to the 1.25 dollars PPP line used by the World Bank for international comparisons. The main reason for using this line rather than the official is because the official poverty line was constructed using HNLSS data which is collected with a different methodology from the GHS-Panel making the two lines incompatible.<sup>7</sup>

#### *Middle class definition*

Regarding the definition of middle class, we used the empirical framework proposed by Lopez-Calva and Ortiz-Juarez (2011) to define middle class in terms of households with a low level of vulnerability to poverty. The same methodology is used to define the vulnerable and the chronic poor: as those with an average and high likelihood to fall into poverty respectively. It is constructed in a transition matrix which tracks the same households in two periods and

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<sup>6</sup>On annual basis the line is 65804 Naira per capita in 2010 prices

<sup>7</sup>Additionally, the HNLSS data from 2009/2010 used to construct the official line presented several problems in terms of unit values, quantities and expenditures levels. These issues are highlighted by the World Bank (2013).

compares their status and the probability to remain in a certain condition (poor or non-poor) or move away from it. Based on this matrix, a model is constructed to identify the correlates of falling into poverty over the two survey rounds.

The idea behind calculating the actual transitions is interpreted as a summary metric that looks at permanent income by regressing consumption on assets and several socioeconomic characteristics.

Let  $p_{i,t+1} = \text{Prob}[\text{Poor}_{i,t+1} = 1 | x_{it}, \beta_{it}]$  be the probability of household  $i$  being poor in wave 2, thus

$$\text{Prob}[\text{Poor}_{i,t+1} = 1 | x_{it}, \beta_{poor}] = F(x'_{it} \beta_{poor}) \quad (1)$$

where  $\text{Poor}_{i,t+1}$  is a limited dependent variable taking the value of 1 if the household is identified as always poor in both periods or falling into poverty in the second period, and 0 otherwise.  $\beta_{poor}$  is a  $(K \times 1)$  vector of the parameters to be estimated,  $x'_{it}$  is a  $(1 \times K)$  vector of covariates and  $F(\bullet)$  is a function linking the probabilities with the covariates such that  $\text{Prob}[\text{Poor}_i = 1 | x_{it}, \beta_{poor}] + \text{Prob}[\neg \text{Poor}_i = 1 | x_{it}, \beta_{poor}] = 1$ . The function initially chosen for the present analysis is the logistic cumulative function. The covariate vector is composed of observable characteristics which include among others household characteristics, education, economic activity, area of residence, and self-reported measures of shocks.

From the predicted probabilities obtained from equation 1, the average of the independent variables for a set of estimated probabilities of falling into poverty is calculated as a first step. The set may be of specified ranges or quantiles. The second step of the analysis consists of estimating the household's per capita consumption equation using the same independent variables used in equation 1. The dependent variable in this estimation is the natural logarithm of the household's per capita consumption deflated by a macro-regional price deflator for the initial time period (i.e. Wave 1). Therefore the model to be estimated is:

$$Y_i = x'_{it} \theta + \varepsilon_i \quad (2)$$

where  $\theta$  is the  $(K \times 1)$  vector of parameters to be estimated, and  $x'_{it}$  is the same  $(1 \times K)$  vector of covariates utilized in equation 1. Lopez-Calva et al. (2011) estimate equation 2 utilizing ordinary least squares with the usual assumptions that accompany it. Initially this is also done here. Using the estimated coefficients  $\theta$  from equation 2, and the mean values for

the independent variables an expected per capita consumption value for each range/quantile is retrieved.

An alternative method used for estimating equation 1 as well as equation 2 is generalized maximum entropy. That is, instead of using a logistic cumulative function in equation 1, and OLS in equation 2, a method which avoids making strong parametric assumptions is chosen (Golan et al., 1996). The maximum entropy procedure consists in maximizing Shannon's (1948) entropy measure. The method involves reparametrizing parameters into discrete probability functions. For a thorough discussion of both the generalized linear model and the discrete choice model utilizing generalized maximum entropy readers should refer to Golan et al. (1996) and Golan et al. (1996a) respectively.

### *A middle class profile*

Once we defined the middle class threshold, we subdivide our sample into three distinct groups: the middle class as those above the middle class threshold, vulnerable as those below this line but above the official poverty line, and finally the poor as those below the poverty line. In order to examine the determinants of being in one of the three groups, we estimate two models: an ordered and a multinomial logistic regression models.

The multinomial logistic model is specified as (Cameron and Trivedi, 2005):

$$p_{ij} = \frac{e^{x_i' \beta_j}}{\sum_{j=1}^3 e^{x_i' \beta_j}}, \quad j = \text{poor, vulnerable, middle} \quad (3)$$

where  $x_i$  is the same set of characteristics used in Equation 1, and  $p_{ij}$  is the probability of being poor, vulnerable, or middle class. Since the sum of these probabilities must be equal to 1, a reference group is required for estimation. This is done by setting a restriction such that  $\beta_{\text{vulnerable}} = 0$ . This implies that we recover two sets of estimates;  $\beta_{\text{poor}}$ , and  $\beta_{\text{middle}}$ . This means that the coefficients are comparable to the reference group, and thus the coefficients represent the change in the relative log odds of being in the considered group as opposed to being in the reference group, all else being equal. Nevertheless ignoring the ordering of the alternatives ignores useful information and thus an ordered logistic model is also estimated.

The starting point for an ordered logistic model is to consider an index model with a latent per capita expenditure (Cameron and Trivedi, 2005), and thus we have a latent version of Equation 2:

$$Y_i^* = x'_{it}\beta + u_i \quad (4)$$

In this instance  $x$  does not include the intercept, since  $Y^*$  is crossing unknown thresholds for the ordering of alternatives (*ibid*). Thus we define that:

$$Y_i = \text{vulnerable if } \alpha_{poor} < Y_i^* \leq \alpha_{middle} \quad (5)$$

where the lower limit for the poor will be  $-\infty$ , and the upper limit for the middle class is  $\infty$ . Therefore the probability of belonging to either group is (*ibid*):

$$\text{Prob}[Y_i = j] = \text{Prob}[\alpha_{j-1} < Y_i^* \leq \alpha_j] \quad (6)$$

$$= \text{Prob}[\alpha_{j-1} < x'_{it}\beta + u_i \leq \alpha_j] \quad (7)$$

$$= F(\alpha_j - x'_{it}\beta) - F(\alpha_{j-1} - x'_{it}\beta) \quad (8)$$

where  $F$  is the logistic distribution function for  $u_i$ .

In the ordered logit model, the dependent variable is categorical and assumes value 1 for poor households, 2 for vulnerable households, and 3 is for middle class. In this model, a natural ordering is assumed defined by the consumption status going from poor to middle class. The interpretation of the coefficients is that a one unit increase in one of the independent variables will increase or decrease the log odds of being in a higher income category by the amount of the coefficient, holding other variables constant.

#### *Survey to survey estimation*

As mentioned earlier, the GHS panel is not directly comparable to the HNLSS 2003/2004 data. There is also evidence of underestimated consumption in the latter (World Bank, 2014). To overcome these problems, we employ survey-to-survey imputation techniques derived from the poverty mapping literature (inter alia Elbers et al., 2003) to re-estimate HNLSS 2003/2004 consumption figures. Specifically, we use Wave 1 of the GHS-Panel data to impute consumption on the 2003/2004 HNLSS data. The process allows a longer trend analysis between 2003 and 2013 using both the GHS-Panel and the HNLSS datasets.

The imputation process is a simplified version of the methodology developed in Elbers et al. (2003). Stifel and Christiaensen (2007) provide theoretical guidance regarding variables to be included in imputation models. They recommend including covariates that change over time, but call for excluding variables whose rates of return are likely to change markedly in the face of evolving economic conditions. Following Stifel and Christiaensen (2007), we included several household durables but excluded mobile phones, as their relationship with total household expenditure has been changing rapidly in the last ten years. Other variables include household characteristics, location, and zone interacted variables. Most of the variables are significant and show the expected sign, and, more importantly, the model yields a  $R^2$  of 0.46 (see appendix).

The procedure follows two stages. First, we estimate the log per capita real expenditures on a sample from GHS-Panels Wave 1 using standard household characteristics and assets. Second, to control for location effect and heteroskedasticity we draw errors from the distribution of residuals for households in the same zone. We divide the sample into six groups based on six macro zones. The sample of the target distribution is also divided into six groups by the same methodology used for the original sample. Residuals are then drawn and imputed to households within each of the six groups. Following the bootstrap principle, the residual's distribution is drawn for a number,  $R = 50$ , of replications so as to obtain a number  $R$  of distributions. Poverty rates and middle class shares are finally averaged over the replications (for a detailed explanation see Clementi et al., 2014).

#### IV. Results

The results section is organized into three subsections. In the first one we discuss results related to the threshold definition and the share of the middle class over the whole population. In subsection two we test whether the three groups defined in subsection 1 (middle class, vulnerable and poor) present significant differences in terms of welfare covariates. The purpose is obtaining a middle class average profile. Subsection three looks at the dynamic evolution of the three groups over the last decade.

##### *Middle class threshold and share over total population*

The VAMC method is based on the idea that only households with a limited risk of falling into poverty can qualify for middle class status. The panel nature of the data allows for

analysis of movements in and out of poverty. Table 1 is the transition matrix showing these movements.<sup>8</sup>

On the main diagonal of Table 1 are those whose status did not change over the period considered: those who remained always poor also called chronic poor and those who never experienced poverty. On the other diagonal lay those who changed status from non-poor to poor or poor to non-poor. These are defined as out of poverty and entering poverty respectively. The latter group, considering the short time span, is rather numerous: if faced with shocks, about 13 percent of those non poor can easily fall below the poverty line. Although this is more than compensated for by those coming out of poverty (32%) which confirms the high vulnerability of Nigerian households and suggests a rather high exposure to shocks.

Different specifications for the probability of a household becoming poor in the second period (Equation 1) and for household's expenditures in the first period (Equation 2) are tested. Overall results are convergent; for the sake of brevity only two specifications are presented:

1. Equation 1 expressed as a logit, equation 2 using OLS (Table 4)
2. Equation 1 expressed as a GME equivalent to logit, and equation 2 using a linear GME specification including an asset index<sup>9</sup> (Table 5)

Table 2 shows that people living in urban areas are significantly less likely to be classified as poor during the second period than those in rural areas *ceteris paribus*. Compared to households in the North Central, only those in the South West are significantly doing better while as expected those in North West are more likely to be classified as poor. Also, household head's education is related to being poor. However this is only significant after completing primary education. Looking at the OLS results, households where the head has completed primary education or above, have significantly higher consumption than those where the head has no education.

The gender of the household's head is not significantly related to poverty, but for consumption per capita it is positive and significant at the 10 percent level. The head's gender,

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<sup>8</sup>The transition matrix is constructed using the household's reported expenditure for the corresponding year, and uses population weights in order to make estimates nationally representative. The table is representative for those individuals present in Wave 1 of the GHS-Panel.

<sup>9</sup>The asset index, suggested by Filmer and Pritchett (2001) is constructed using principal-components analysis. The index takes into consideration whether or not the household owns a specific household asset. Additionally, it considers whether it owns its dwelling, the number of rooms in the dwelling, the type of building materials, the water source, and the toilet facilities of the dwelling.

nevertheless, is insignificant in other specifications when we consider the household's asset index. This, at first glance, seems like a counterintuitive result but it is not. Female headed households are mostly in the South, which is the richer part of the country. The variable, thus, reflects the big divide between North and South rather than increasing gender equality. Households where the head has never married are significantly less likely to be poor, all else being equal. These households accordingly also have higher per capita expenditure levels. Consequently the head's age is positively and significantly related to being poor, although the effect is decreasing with age. All else being equal, households where the head has a job which is not related to agriculture are significantly less likely to be poor than those where the head does not have work, and those where the head is involved in agricultural work. Accordingly, households where the head is employed in non-agricultural activities have higher per capita expenditure levels.

When the asset index is included in the previous specification (not reported), the result shows a significant and negative relation to being poor. Also, the household's asset index is positive and significant in the expenditure per capita equation. The sign of the coefficient for the health shock dummy included are somewhat counterintuitive. Part of the reason why the sign is negative may be explained by the fact that the measure of poverty is built around expenditures and not income. Hence households that face a health shock may be forced to increase their expenditure in order to cope with the event. The funds for this increase may come from loans or from sales of household owned items.

The results from the GME estimation procedure resemble those from the logit specification (Table 3). The use of GME is justified because of the improved properties the estimator possesses and helps test the robustness of the analysis. As mentioned above, GME works well when the sample is small, covariates are highly correlated, and is more efficient than its maximum likelihood counterparts (Golan et al. 1996).

Households located in the North West, South East, and South South zones are significantly more likely to be considered poor in the second period than households in the North Central zone. Households in South West are significantly less likely to be poor. Households in urban locations are less likely to be poor and have higher expenditure per capita than those in rural areas. The effect of education is significant for those who completed secondary level schooling. Not surprisingly, expenditure levels for all are significantly lower for households with no education when compared to higher educational attainments.

Table 4 compares the various thresholds estimated by different specifications. Ten percent probability to fall into poverty is the threshold used in VAMC's studies. Households below

this probability of falling below the poverty line are considered part of the middle class. The estimated model allows associating these probabilities to consumption thresholds. In this way we can identify, along the consumption distribution, the percentage of individuals above or below these values.

As mentioned in section 2, the upper threshold for middle class is not defined. Clearly not all those below the 10 percent threshold are just middle class, they might be even richer. Yet, it is very difficult to define in a non-arbitrary way those belonging to the middle class and those richer, among those above 10 percent. The use of consumption data doesn't provide accurate information on the richest percentiles of the Nigerian population. Therefore, it is likely that a number of households in the survey's top percentiles would be considered, actually, as part of the middle class.

The three logit specifications and the full model with GME are all in the same range indicating limited variation. The threshold ranges between 348-389 Naira for the considered specifications. In dollars PPP the threshold is around \$2.70-\$3.02, which is close to the threshold indicated by the African Development Bank to define the lower middle class. Figures 1 and 2 plot the cumulative distribution of consumption per capita at national level and by zones and shows the 10 percent threshold. The full model-GME logit specification is used with the 10 percent yielding 378.39 Naira per capita per day.<sup>10</sup>

A number of findings are relevant. First, as shown by Figure 1, the percentage of Nigerians above the estimated threshold is roughly 20 percent. This 20 percent coincides with Standard Bank estimates when summing lower middle class and middle class (Standard Bank, 2014). Second, this middle class definition uses a very low threshold compared to other countries in the world (see Ferreira et al., 2013); if one uses the threshold used for Latin America for example, the share of Nigerians qualifying for middle class status will be more than halved.

Finally, there is high heterogeneity among zones. As shown in Figure 2, in the Southern regions the percentage of middle class people ranges from 27 to 31 percent, while in the Northern regions it ranges from roughly 9 to 18 percent. Most of the middle class households, thus, are concentrated in the South, particularly the South West. In each of the Southern regions the middle class makes up more than 26 percent of the region's population. Meanwhile in the North East and North West less than 10 percent of each region's population is considered middle class. In the North Central close 18 percent of the region's population is considered middle class.

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<sup>10</sup>2010 prices, equivalent to \$2.94

*Do the middle class, vulnerable and poor household characteristics differ? A preliminary middle class profile*

To have a better understanding of the middle class households identified previously, we examine a profile of such households in comparison to the poor and vulnerable groups. Table 5 provides the summary statistics of the three groups.

In middle class households, heads tend to be more educated and have jobs in the formal sector. A considerably higher percentage of heads from middle class households hold some sort of public, as well as private employment. The vast majority of middle class households reside in urban areas and their asset index is closer to 1 than to -1, indicating that they own comparatively more assets. On the other hand, when moving to the vulnerable and the poor groups, the average household head education declines (respectively 6 and 3.8 years) and the involvement in agricultural activities increases. Meanwhile, involvement in private and public employment decreases. The amount of assets owned by these two groups is comparatively lower than that of middle class.

Interestingly, the middle class and the poor have similar shares of unemployed heads and that of the vulnerable group is slightly higher. Yet, they are likely unemployed for different reasons. The poor are probably unemployed due to lack of jobs and poor market access while the middle class could be unemployed because they are waiting for better opportunities and can probably afford to wait for a better job even if a less desirable job is available.

Among those who are employed, however, the compositions are very different. While 20 percent of middle class heads reported being public employees, only 11 percent of the vulnerable and 7 percent of the poor do so. A similar pattern is found for private employment, although in smaller percentages. Overall 31 percent of employed middle class heads are either public or private employees, while for poor households it is 12 percent.

Although the likelihood of occurrence of any shock reduces with higher income status (ranging from 42% of the poor to 33% of the middle class), economic shocks are experienced similarly across the 3 groups. This is not unexpected in a country with weak economic stability like Nigeria. Of course when we examine the occurrence of shock in the agriculture sector, this is more likely to occur amongst the poorer households. Middle class households are more likely to report a health shock than the poor and vulnerable; this is probably due to under reporting amongst the poor and weak access to health facilities.

Table 6 reports results from the ordered logit. The findings show that on average education plays a role in moving up the income status of a household if the head has completed

primary education, secondary education, and post-secondary education, all else being equal. As expected the ordered odds of being in a higher income status is highest for post-secondary compared to the completing primary and secondary education. In the same vein, having a higher wealth index increases the log odds of being in a higher classification, all else equal. As expected, households where the head is involved in agriculture have significantly lower log odds of being in higher categories than households with non-agricultural work. The same holds for households where the head is unemployed.

Having a household head who has never married increases the log odds of the household being in a higher category, while having a head who is married reduces the odds of being in a higher classification. A head from a polygamous household has even lower odds compared to that in a monogamous household as expected. An increase in household size between periods is positively and significantly related to being in a higher category. This should be interpreted with caution, this is only pointing towards a correlation and not causality. These may all be related to lower mortality rates for better off households, and potentially different ways of coping with shocks for poorer households, as well as the choice of having more children. Nevertheless, an increase in household size does not necessarily indicate the birth of children within a household. An increase in household members working is not significantly related to being in a higher category of status.

Results from a multinomial logit (Table 7) resemble those of the ordered logit. Starting with the results of the poor group relative to the vulnerable, we find that households where the head has post-secondary education relative to having no education are significantly less likely to be poor relative to being vulnerable holding all else constant. The same does not hold for middle class relative to vulnerable. Households having a head with completed secondary education, as well as post-secondary education relative to having no education are significantly more likely to be middle class as opposed to being vulnerable. Of course residing in an urban area reduces the likelihood of being poor relative to being vulnerable while it increases the likelihood of being middle class relative to being vulnerable.

A household with a head engaged in agricultural work increases the likelihood of the household being poor relative to being vulnerable while it reduces the likelihood of being middle class relative to being vulnerable. This is expected as households engaged in agriculture are more likely to be poor or vulnerable than middle class. This same trend is found for a household head being unemployed.

From the ordered logit model described above, having a head that has never been married when compared to single households was found to be significantly and positively related to

being in a higher category. In the multinomial logit the variable is not significant for the poor relative to the vulnerable. However for the vulnerable relative to the middle class it is significant and positive. Here we note that changes in household size are also important for being in one or the other category. For the poor an increase in household size decreases the probability of being poor relative to being vulnerable, *ceteris paribus*. For the middle class it is significant and positive.

In conclusion both models produce the expected profile of middle class and show that the categorization adopted is robust to a multivariate analysis using household characteristics. Higher education, better employment opportunities, possession of relevant assets, and residence in urban areas all increase the chances of being part of the middle class group compared to the other two groups.

### *What happened in the past decade?*

Concluding the results section, we look at the evolution of middle class over the last decade. The results in Table 8 show that the share of the Nigerian population that can be considered middle class using the VAMC method has grown by 5 percent over a decade. In 2003, about 13 percent of households can be classified as middle class compared to 18.5 percent in 2013. The share of the households in the poor group decreased by 12.1 percent between the year 2003 and 2013. However, it is worth noting that the redistribution was more into the vulnerable group (6.9 percent) than to the middle class group (5.2 percent).

The more notable results are in the regional breakdown. The results show that the Southern regions have experienced a higher decrease in poverty and a higher share of the middle class between 2003 and 2013 compared to the Northern regions, as found in the previous analysis. Indeed, in the North East region which is the poorest zone, the share of households classified as poor increased within the decade while the share of those in the middle class group decreased by almost half. Also, in the North West region which is the second poorest zone, even though the share of households in poverty reduced by 10 percent, there is an increase of households in the vulnerable group while the share of households in the middle class group dropped by almost 1 percent.

This is in contrast to the Southern zones where all the zones experienced a drop in share of households in the poor group by at least 13.7 percent and an increase in the middle class group of between 7.3 percent and 17.4 percent. The South West region which is the least poor region experienced a drop in the share of households in poverty from 31.4 percent to

16 percent between 2003 and 2013 while the share of vulnerable and middle class households increased by 5.7 percent and 9.8 percent respectively. Notably, the South South region shows the largest decrease of households in the poor group (21.3 percent) and the highest increase in the middle class group (17.4 percent).

## V. Conclusions

Why is it so important to define and quantify the middle class in Nigeria and in general in developing countries? Because, we argue, the middle class is associated with the idea that talent and effort qualities produce social mobility and that, in general, middle class is an agent of change from an economic, social, and political perspective. It follows that, looking at the size and characteristics of middle class tells us a lot about the structural transformations a country is undergoing.

Aware of the growing importance middle class studies are gaining in developing countries, our paper purports to quantify the Nigerian middle class size in a rigorous way. The vulnerability approach to middle class (VAMC) (Lopez-Calva and Ortiz-Juarez, 2011) is the method we employ to identify an income threshold above which a household can be classified as middle class. According to this method, in developing countries the middle class group can be defined residually from the vulnerability analysis: those for which the probability of falling into poverty is below a certain threshold (10%) can be considered part of the middle class.

Four findings are noteworthy. First, the percentage of Nigerians above the estimated threshold (3 dollars per capita per day) is roughly 20 percent. This 20 percent coincides with Standard Bank estimates when summing lower middle class and middle class (Standard Bank, 2014). If the threshold used for Latin America of around 10 dollars is used, the share of Nigerians qualifying for middle class status will be more than halved.

Second, the geographical distribution of those belonging to middle class mirrors that of the poor (NER, 2014). Most of the middle class is concentrated in the South West where about 30 percent of the population is living above the threshold while in the rest of the country the share reduces to 25 percent or less. In the poorest regions in the North less than 10 percent of the population qualifies as middle class.

Third, the middle class group profile is the expected and the estimated threshold seems to divide groups (middle class and vulnerable) with significantly different characteristics. Higher education, better employment opportunities, possession of relevant assets, and residence in

urban areas all increase the chances of being part of the middle class group compared to the vulnerable and poor groups

Finally, a longer trend analysis shows that between 2003 and 2013, Nigeria experienced a reduction in poverty and growth in the middle class. The trend also showed heterogeneity across the regions of the country. The Southern zones experienced the highest reduction in poverty and highest increase in growth of the middle class compared to the Northern zones where the North East and North West zones experienced a decrease in middle class households.

Compared to the available qualitative analysis on the Nigerian middle class discussed in section 3, this paper comes to similar conclusions. Although the analysis has shown growth in the middle class and reduction in poverty over the past decade, the rate has been slower than expected given the high growth rates experienced in the country over the same period. At the national level, the population qualifying as middle class is still a small percentage and poverty reduction is slower than expected. However, in the Southern regions and in particular in the South West the middle class is clearly becoming an important actor. Policies should be geared towards making growth more inclusive with particular attention to the Northern regions. Furthermore, given the vulnerability of the majority of households to poverty, social safety nets should be put in place to help households deal with shocks and reduce the likelihood of falling back into poverty.

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## Tables and Figures

**TABLE 1: POVERTY TRANSITION MATRICES**

*Nigeria 2011-2013*

		FINAL PERIOD →		
		<i>Non-Poor</i>	<i>Poor</i>	<i>Total</i>
<b>INITIAL</b>	<i>Non-Poor</i>	86.54	13.46	100
<b>PERIOD ↓</b>	<i>Poor</i>	31.73	68.27	100

*Source:* GHS-Panel 2010/11-2012/13: post planting and post harvest visit

**TABLE 2 : DETERMINANTS OF BEING POOR AND INCOME, NIGERIA 2011-2013**

*Logistic and linear regression analysis*

Model:	Logistic		Linear	
	Dependent Variable:	Poverty	Expenditure (log-scale)	
		Coeff.	S.E.	Coeff.
<b>Region</b>				
North Central			(omitted)	
North East	-0.189	(0.220)	0.220***	(0.0471)
North West	0.651***	(0.200)	0.0705	(0.0491)
South East	0.0411	(0.207)	0.255***	(0.0479)
South South	0.0268	(0.192)	0.104**	(0.0477)
South West	-1.006***	(0.222)	0.122***	(0.0415)
Urban	-0.822***	(0.161)	0.183***	(0.0340)
<b>Education</b>				
None/Pre-school			(omitted)	
Some primary	-0.00560	(0.176)	0.0349	(0.0374)
Completed primary	-0.206*	(0.122)	0.102***	(0.0273)
Some secondary	-0.334	(0.205)	0.182***	(0.0471)
Completed secondary	-0.557***	(0.172)	0.220***	(0.0377)
Post secondary	-1.303***	(0.237)	0.454***	(0.0408)
Other	0.160	(0.178)	-0.122***	(0.0461)
<b>Head and HH characteristics</b>				
Head age	0.0585***	(0.0205)	-0.0200***	(0.00396)
Head age <sup>2</sup>	-0.000612***	(0.000195)	0.000179***	(3.65e-05)
Male head	-0.0617	(0.216)	0.0772*	(0.0426)
Floor finish	-0.524***	(0.112)	0.153***	(0.0243)
Household with sanitation	-0.866***	(0.206)	0.231***	(0.0303)
Head is single			(omitted)	
Head never married	-1.436***	(0.508)	0.290***	(0.0644)
Head married monogamously	0.465**	(0.230)	-0.198***	(0.0448)
Head married polygamously	0.846***	(0.240)	-0.310***	(0.0490)
Head has non agricultural work			(omitted)	
Head has agricultural work	0.449***	(0.113)	-0.149***	(0.0251)
Head is unemployed	0.487***	(0.186)	-0.163***	(0.0330)
Occurrence of death shock	0.211	(0.159)	-0.0497	(0.0313)
Occurrence of health shock	-0.498**	(0.236)	0.116***	(0.0438)
Occurrence of economic shock	0.236	(0.186)	-0.0728*	(0.0380)
Occurrence of dwelling shock	0.190	(0.194)	-0.0470	(0.0515)
Occurrence of crop shock	0.0657	(0.138)	-0.0402	(0.0269)
Occurrence of livestock shock	0.225	(0.253)	0.0237	(0.0547)
Change in household size	0.0703	(0.0450)	0.0771***	(0.00825)
Change in economically active members	0.108***	(0.0407)	-0.0124	(0.00883)
Change in number of members working	-0.205**	(0.0813)	0.0252**	(0.0115)
Constant	-1.832***	(0.575)	5.838***	(0.114)
Constant		4368		4368
PseudoR <sup>2</sup> /R <sup>2</sup>		0.253		0.434

\* , \*\*, \*\*\* significant at 10, 5, and 1% respectively. Estimations take into account household sampling weights.

Robust standard errors are clustered at the EA-level

**TABLE 3: DETERMINANTS OF BEING POOR AND EXPENDITURE, NIGERIA 2011-2013***GME logit and GME linear regression analysis*

Model:	GME Logit		Linear GME	
Dependent Variable:	Poverty		Expenditure (log-scale)	
	Coeff.	S.E.	Coeff.	S.E.
<b>Region</b>				
North Central			(omitted)	
North East	-0.0582	(0.126)	0.157829***	(0.0258)
North West	0.608***	(0.122)	0.037435	(0.0249)
South East	0.371***	(0.134)	0.106092***	(0.0260)
South South	0.452***	(0.135)	-0.00774	(0.0260)
South West	-0.789***	(0.164)	0.064064**	(0.0263)
Urban	-0.608***	(0.109)	0.131387***	(0.0190)
<b>Education</b>				
None/Pre-school			(omitted)	
Some primary	0.0179	(0.146)	0.055292*	(0.0303)
Completed primary	-0.0152	(0.110)	0.05729***	(0.0221)
Some secondary	-0.0463	(0.182)	0.0832**	(0.0360)
Completed secondary	-0.259*	(0.139)	0.122571***	(0.0261)
Post secondary	-0.526***	(0.172)	0.237823***	(0.0285)
Other	0.0707	(0.153)	-0.07103**	(0.0323)
<b>Head and HH characteristics</b>				
Head age	0.0676***	(0.0161)	-0.02186***	(0.0030)
Head age <sup>2</sup>	-0.000711***	(0.000150)	0.000212***	(0.0000)
Male head	0.0437	(0.200)	0.055697	(0.0356)
Asset index	-0.980***	(0.0750)	0.252734***	(0.0102)
Head is single			(omitted)	
Head never married	-1.488***	(0.436)	0.320388***	(0.0522)
Head married monogamously	0.464**	(0.192)	-0.2412***	(0.0350)
Head married polygamously	1.014***	(0.204)	-0.38809***	(0.0378)
Head has non agricultural work			(omitted)	
Head has agricultural work	0.407***	(0.0920)	-0.12847***	(0.0181)
Head is unemployed	0.378***	(0.137)	-0.10542***	(0.0251)
Occurrence of death shock	0.0438	(0.133)	-0.0187	(0.0258)
Occurrence of health shock	-0.331*	(0.175)	0.068193**	(0.0329)
Occurrence of economic shock	0.189	(0.170)	-0.02153	(0.0322)
Occurrence of dwelling shock	0.202	(0.197)	-0.06402	(0.0401)
Occurrence of crop shock	-0.0836	(0.108)	-0.01525	(0.0228)
Occurrence of livestock shock	-0.0704	(0.223)	0.048466	(0.0474)
Change in household size	0.0795**	(0.0324)	0.077703***	(0.0062)
Change in economically active members	0.0727**	(0.0343)	-0.0129*	(0.0066)
Change in number of members working	-0.139**	(0.0580)	0.004391	(0.0107)
Constant	-3.127***	(0.454)	6.213272***	(0.0848)
Observations	4368		4368	
Pseudo R <sup>2</sup> /R <sup>2</sup>	0.279		0.4381	

\*, \*\*, \*\*\* significant at 10, 5, and 1% respectively

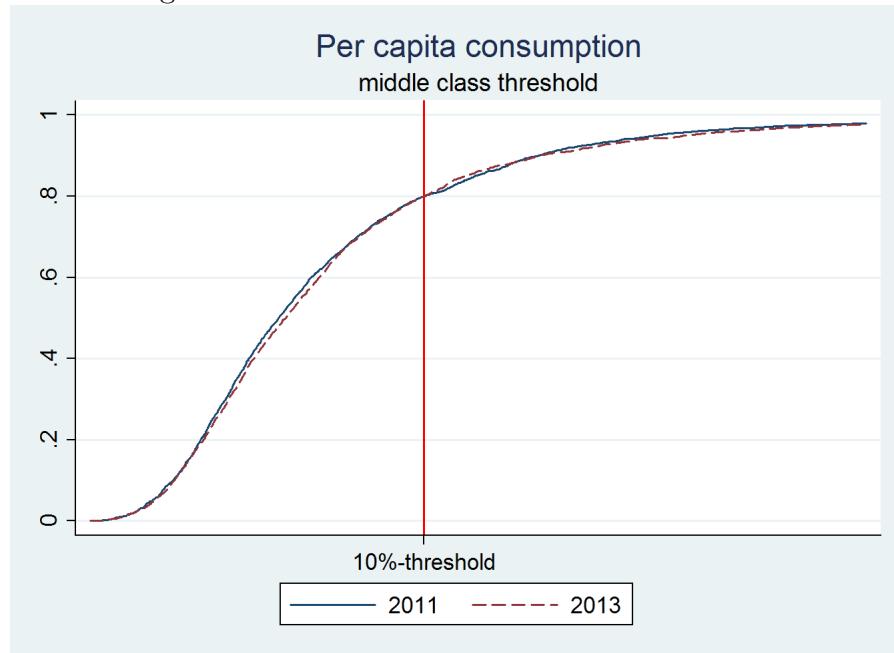
**TABLE 4: ROBUSTNESS OF DIFFERENT MODEL SPECIFICATIONS**

*Daily per capita expenditure for a ten, and fifty percent probability of falling into poverty*

Model specification	10%
Dwelling characteristics	347.59
Wealth index instead of dwelling characteristics	356.60
Wealth index and aggregated shocks	349.25
Dwelling characteristics (GME)	388.79
Wealth index instead of dwelling characteristics (GME)	378.39
Wealth index and aggregated shocks (GME)	372.07

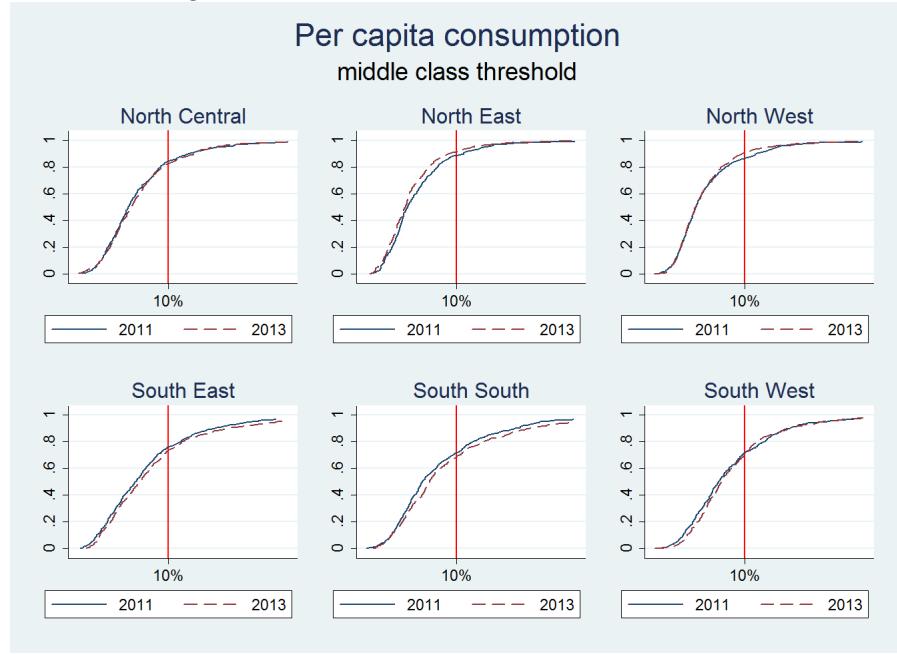
*Source: GHS 2010/11-2012/13: post planting and post harvesting visits*

Figure 1: Middle class threshold: National level



Source: GHS 2010/11-2012/13: post planting and post harvest visits

Figure 2: Middle class threshold: Zone level



**TABLE 5: MEAN VALUES FOR NIGERIA: POOR, VULNERABLE AND MIDDLE CLASS**

	<i>All</i>	<i>Poor</i>	<i>Vulnerable</i>	<i>Middle</i>
Urban	40.01	15.45	39.44	64.58
HH head years of education	6.44	3.81	5.98	9.67
HH head's age	50.01	51.72	50.67	47.39
HH head is male	84.21	88.12	83.24	81.86
Asset Index	-0.01	-0.63	-0.08	0.69
Head has never married (%)	3.43	0.47	1.11	9.71
Head is married monogamous (%)	60.55	56.41	60.11	65.18
Head is married polygamous (%)	19.79	31.07	20.98	7.14
Head was married (%)	16.23	12.05	17.80	17.97
Head has non ag. work (%)	46.83	24.70	45.97	69.47
Head has ag. work (%)	40.09	62.79	40.17	18.04
Head is unemployed (%)	13.08	12.51	13.86	12.50
Head is public employee (%)*	12.86	7.38	11.37	20.35
Head is private employee (%)*	7.03	4.39	5.11	12.38
Head is employed in other type (%)*	2.39	2.10	2.68	2.24
Head is self employed (%)*	71.78	80.19	74.69	59.38
Occurrence of any shock (%)	37.78	42.04	38.05	7.03
Occurrence of death shock (%)	8.50	8.86	9.06	2.39
Occurrence of health shock (%)	5.23	3.47	5.49	71.78
Occurrence of economic shock (%)	5.79	6.03	5.50	5.96
Occurrence of dwelling shock (%)	2.98	4.09	2.64	2.39
Occurrence of crop shock (%)	10.28	15.57	10.23	5.25
Occurrence of livestock shock (%)	2.13	2.82	2.27	1.26
Change in household size	0.13	-0.17	0.16	0.38
Change in economically active members	0.01	0.00	-0.01	0.04
Change in number of members working	-0.02	-0.04	-0.02	-0.01
Expenditure per capita 2011	339.83	136.83	273.44	633.63
Expenditure per capita 2013 (2011 ppp)	337.18	163.80	290.02	574.08

\* Sector of employment are conditional on employment, not mutually exclusive. Other type refers to employment

in religious organizations or other

**TABLE 6 : DETERMINANTS OF BEING POOR, VULNERABLE, AND MIDDLE CLASS,  
NIGERIA 2011-2013**

*Ordered Logistic analysis*

**Model:**

**Ordered Logistic**

**Dependent Variable:**

**Poor, Vulnerable, Middle class**

**Coeff.**

**S.E.**

<i>Region</i>		
North Central		(omitted)
North East	0.678***	(0.187)
North West	0.144	(0.191)
South East	0.788***	(0.205)
South South	0.164	(0.210)
South West	0.386**	(0.185)
Urban	0.503***	(0.144)
<i>Education</i>		
None/Pre-school		(omitted)
Some primary	0.00269	(0.160)
Completed primary	0.213*	(0.118)
Some secondary	0.304	(0.209)
Completed secondary	0.499***	(0.158)
Post secondary	1.049***	(0.184)
Other	-0.360**	(0.179)
<i>Head and HH characteristics</i>		
Head age	-0.111***	(0.0177)
Head age <sup>2</sup>	0.000985***	(0.000161)
Male head	0.0722	(0.208)
Wealthindex	0.916***	(0.0985)
Head is single		(omitted)
Head never married	1.270***	(0.329)
Head married monogamously	-0.675***	(0.219)
Head married polygamously	-1.125***	(0.230)
Head has non agricultural work		(omitted)
Head has agricultural work	-0.472***	(0.109)
Head is unemployed	-0.470***	(0.137)
Ocurrence of death shock	-0.0642	(0.143)
Ocurrence of health shock	0.752***	(0.214)
Ocurrence of economic shock	-0.382**	(0.184)
Ocurrence of dwelling shock	-0.0766	(0.217)
Ocurrence of crop shock	-0.106	(0.122)
Ocurrence of livestock shock	0.365*	(0.202)
Change in household size	0.289***	(0.0369)
Change in economically active members	-0.0486	(0.0399)
Change in number of members working	0.0218	(0.0472)
Constant (poor vs. vulnerable and middle class)	-4.222***	(0.529)
Constant (middle class vs. vulnerable and poor)	-1.327**	(0.522)
Observations	4368	
Pseudo R <sup>2</sup> /R <sup>2</sup>	0.236	

\* , \*\*, \*\*\* significant at 10, 5, and 1% respectively. Estimations takes into account household sampling

weights. Robust standard errors are clustered at the EA-level

**TABLE 7: DETERMINANTS OF BEING POOR, VULNERABLE, AND MIDDLE CLASS, NIGERIA  
2011-2013**

*Multinomial logistic analysis*

Model:	<i>Multinomial Logistic</i>			
	<i>Poor</i>		<i>Middle Class</i>	
Category (base category is vulnerable):	Coeff.	S.E.	Coeff.	S.E.
<i>Region</i>				
North Central			(omitted)	
North East	-0.514**	(0.207)	0.704***	(0.251)
North West	0.0467	(0.200)	0.525**	(0.256)
South East	-0.431*	(0.226)	0.929***	(0.228)
South South	0.232	(0.269)	0.507**	(0.235)
South West	-0.696***	(0.209)	0.204	(0.236)
Urban	-0.353*	(0.202)	0.494***	(0.144)
<i>Education</i>				
None/Pre-school			(omitted)	
Some primary	-0.185	(0.197)	-0.283	(0.255)
Completed primary	-0.218	(0.134)	0.121	(0.194)
Some secondary	-0.269	(0.242)	0.281	(0.301)
Completed secondary	-0.173	(0.181)	0.576***	(0.219)
Post secondary	-0.751***	(0.277)	1.040***	(0.248)
Other	0.314	(0.196)	-0.122	(0.345)
<i>Head and HH characteristics</i>				
Head age	0.110***	(0.0239)	-0.0758***	(0.0251)
Head age <sup>2</sup>	-0.000964***	(0.000222)	0.000699***	(0.000223)
Male head	-0.0789	(0.228)	0.0737	(0.283)
Wealthindex	-1.036***	(0.134)	0.614***	(0.101)
Head is single			(omitted)	
Head never married	0.0217	(0.482)	1.254***	(0.392)
Head married monogamously	0.479**	(0.234)	-0.642**	(0.299)
Head married polygamously	0.682***	(0.243)	-1.485***	(0.344)
Head has non agricultural work			(omitted)	
Head has agricultural work	0.333**	(0.141)	-0.488***	(0.137)
Head is unemployed	0.387*	(0.206)	-0.433**	(0.181)
Ocurrence of death shock	-0.0371	(0.180)	-0.124	(0.202)
Ocurrence of health shock	-0.734***	(0.257)	0.529**	(0.239)
Ocurrence of economic shock	0.356*	(0.201)	-0.220	(0.281)
Ocurrence of dwelling shock	0.0321	(0.286)	-0.136	(0.408)
Ocurrence of crop shock	0.145	(0.151)	0.0465	(0.203)
Ocurrence of livestock shock	-0.441*	(0.260)	0.203	(0.330)
Change in househol size	-0.281***	(0.0436)	0.198***	(0.0514)
Change in economically active mmembers	0.0505	(0.0475)	-0.0202	(0.0521)
Change in number of members working	-0.0995	(0.0776)	-0.0351	(0.0634)
Constant	-3.982***	(0.677)	0.710	(0.745)
Observations			4368	
Pseudo R <sup>2</sup> / R <sup>2</sup>			0.246	

\*, \*\*, \*\*\* significant at 10, 5, and 1% respectively. Estimations take into account household sampling weights. Robust

standard errors are clustered at the EA-level.

**TABLE 8: CLASS EVOLUTION BETWEEN 2003 AND 2013**

	Poor (%)			Vulnerable (%)			Middle (%)		
	2003	2011	2013	2003	2011	2013	2003	2011	2013
North Central	49.7	33.0	31.1	39.6	51.9	52.4	10.6	15.1	16.5
North East	43.1	47.3	50.4	43.2	41.5	42.0	13.8	11.1	7.7
North West	56.0	46.5	46.1	34.5	40.7	45.4	9.5	12.9	8.6
South East	42.7	31.8	29.0	39.3	45.1	45.7	18.0	23.2	25.3
South South	45.9	27.7	24.6	41.7	44.8	45.7	12.4	27.5	29.8
South West	31.4	21.4	16.0	51.1	51.6	56.8	17.5	27.0	27.3
Nigeria	45.3	35.1	33.2	41.4	45.7	48.3	13.3	19.2	18.5

## Appendix

TABLE 1: OLS RESULTS OF IMPUTATION MODEL

Dependent Variable:	2010 expenditure (log-scale)	
	Coeff.	S.E.
<b>Explanatory variables (a)</b>		
Household size	-0.0631***	(0.00884)
Number of economically active members	-0.0342***	(0.00840)
Children between 0 and 4 years old	-0.0672***	(0.0192)
Adult females	-0.0160	(0.0102)
Number of females 65 and above	-0.0300	(0.0222)
Age of head	0.000376	(0.00253)
Age of head (sq)	-3.86e-05	(2.50e-05)
Head is married monogamously	-0.265***	(0.0661)
Head is married polygamously	-0.176**	(0.0770)
Head is widowed/separated/divorced	-0.176**	(0.0763)
Head is male	0.00112	(0.0501)
Years of education of head	0.0117***	(0.00170)
Head is literate	0.0889**	(0.0381)
Head is self-employed in Non-Ag.	0.0443***	(0.0146)
Head is employed in Ag.	-0.0336	(0.0394)
Urban	0.0784***	(0.0162)
Ownership of dwelling	0.116***	(0.0317)
Ownership of radio	0.0628***	(0.0126)
Ownership of television	0.0797***	(0.0181)
Ownership of refrigerator	0.0684***	(0.0190)
Ownership of motorcycle	0.0254	(0.0356)
Ownership of sewing machine	-0.00523	(0.0180)
Ownership of stove	-0.00248	(0.0394)
Ownership of bicycle	0.140**	(0.0677)
Ownership of car	0.252***	(0.0393)
Ownership of generator	0.119***	(0.0355)
Ownership of iron	0.0204	(0.0337)
Ownership of fan	-0.0355	(0.0375)
Ownership of bed or mattress	0.0141	(0.0490)
Main material used for floor - Low quality	-0.0620***	(0.0203)
Main material used for floor - Medium quality	-0.0757***	(0.0155)
Main source of drinking water - protected	0.0689	(0.0434)
Main source of drinking water - unprotected	0.121**	(0.0485)
Main cooking fuel - Firewood	-0.224***	(0.0547)
Main cooking fuel - Kerosene/oil	-0.103*	(0.0535)
Main cooking fuel - Other	-0.184***	(0.0633)
Main toilet facility - No facility	-0.00922	(0.0347)
Main toilet facility - Flush toilet	0.0733*	(0.0377)
Garbage and trash disposal	-0.00905*	(0.00504)
Constant	11.92***	(0.128)
<i>R</i> <sup>2</sup>	0.460	

\*, \*\*, \*\*\* significant at 10, 5, and 1% respectively

(a) State level dummies and zone interactions not included.