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Drivers of Multidimensional Poverty: New Evidence in Benin

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Abstract

The eradication of extreme poverty is one of the pillars of the Sustainable Development Goals.Thus, this study analyzes multidimensional poverty and its determinants in Benin, using the 2015 Benin Living Standard Survey and estimating a multinomial probit regression. The findings suggest that in 2015, 49.25% of the households are neither monetary nor non-monetary poor, while 18.49%, 18.33%, and 13.93% are monetary poor, non-monetary poor, and both monetary and non-monetary poor respectively, indicating that more than half of the households are poor. The estimation results indicate that factors such as living in rural settings, being a female-headed household, having a widowed person as household head, and having experienced biophysical shocks increase the likelihood to be poor. However, factors like household head age, and having at least primary education level decrease the odds to be poor. It should be noted that the findings differ across the types of poverty.

Keywords: Multidimensional poverty, monetary approach, non-monetary approach, Benin.

1. Introduction

The eradication of extreme poverty, one of the pillars of the Sustainable Development Goals (SDGs), remains one of the greatest challenges facing humanity. While the number of people living in extreme poverty has declined by more than half, from 1.9 billion in 1990 to 836 million in 2015, too many people still struggle to meet the basic human needs. Globally, more than 800 million people still live on less than $ 1.25 a day and in developing countries, one in five people still live withless than $ 1.25 a day and millions others earn little more than this amount per day, and many are at risk of falling back into poverty. This situation may be aggravated by threats related to climate change, conflict and food insecurity (IPCC, 2014). In Benin, the rate of monetary poverty continues to grow. With reference to the poverty line calculated in 2015, the proportion of poor people increased from 36.2% in 2011 to 40.1% in 2015 (INSAE, 2015). The same trend is observed for the other two indicators of poverty. Thus, the depth of poverty has worsened from 0.098 in 2011 to 0.18 in 2015. Inequities among the poor have also increased from 0.039 in 2011 to 0.12 (INSAE, 2015). Thus, despite the different policies implemented by the government (for example the Poverty Reduction Strategy), a large part of the population is still below the poverty line.

Many people do not have access to adequate food, clean water or sanitation (INSAE, 2015). This lackluster situation of the fight against poverty could be explained by the lack of selectivity and prioritization of priority actions by the government. Thus poverty reduction programs based on studies of monetary poverty remain mixed. The one-dimensional analysis (traditional analysis) of poverty assumes that only income (or expenditure) is a good indicator of the poverty status of the individual. Such (monetary) analysis is therefore insufficient because it does not make it possible to study poverty as a whole; it is not enough to capture all dimensions of poverty (Sen, 1976, 2004, Alkire and Foster, 2011). The monetary measure of poverty is not enough to capture all dimensions of poverty and human well-being. Indeed, poverty is not just about the lack of income and resources for sustainable livelihoods. Its manifestations include hunger and malnutrition, limited access to education and other basic services, discrimination and social exclusion, and lack of participation in decision-making. It is therefore necessary to target the most relevant factors of poverty in order to elucidate government policies to intervene in priority sectors and zones. Multidimensional analysis, based on the methodology of Alkire and Foster (2007), is therefore indispensable in that it takes into account not only income, but other socio-economic factors such as health, education, etc.

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Because of the complexity of the concept of poverty, its multidimensional dimension is often not taken into account in social policies to combat the phenomenon. The first obstacle to seeing poverty disappear or greatly diminish is to define and then measure it, whether at the international, African, national or local level. One of the difficulties in characterizing poverty stems from the fact that there is no single, consensual definition of poverty. Its measurement depends on the definitions used. Generally, poverty is subdivided into categories (absolute poverty and relative poverty). International poverty measures (United Nations, World Bank, etc.) refer to the concept of absolute poverty and establish a threshold below which individuals and households are considered poor regardlessthe situation of others. Conversely, in reality, people whose material, cultural and social resources are so low,whoare excluded from the acceptable minimum living standards in the state in which they live, may be considered poor. In reality, this definition is more of an inequality approach and presents itself as a multidimensional phenomenon that affects many aspects of daily life (access to resources but also to health, housing, education, etc.). In this case, to measure poverty, the indicators should not only focus on income (or spending) but also on the lack of access to fundamental social rights.

Amartya Sen since the 1970s has been heavily involved in the redefinition of poverty: rather than thinking of it as a deprivation of income analyzed according to a certain threshold, he defines poverty as a deprivation of capacities and fundamental freedoms. The issue of inequality is at the heart of his approach. Indeed, the increase of the real freedom passes according to him by an extensive action of reduction of the inequalities. The United Nations Development Program (2000) identifies three types of poverty: "extreme poverty," "general poverty," and "human poverty." According to this report, a person lives in extreme poverty if she does not have the income necessary to meet her basic food needs, which are usually defined on the basis of minimal calories requirements. A person lives in general poverty if she does not have enough income to meet her basic non-food needs. "Human poverty", for its part, is presented as the absence of basic human capacities: illiteracy, malnutrition, reduced longevity, poor maternal health, avoidable disease (UNDP, 2000).

Such a measure would serve to inform and guide the design of multidimensional poverty reduction policies, and to monitor their implementation, and would thus be of real interest to policymakers. It would monitor the extent to which economic growth is equitable, and highlight the important links between poverty and sustainability. Eradicating poverty measured by this multidimensional index would mean ending a critical mass of deprivation and achieving much more than just eliminating monetary poverty as measured by the single threshold of $ 1.25 per day. In Benin, few studies at the national level have taken into account the multidimensional approach of poverty. In general, the aim was to differentiate the poor from the non-poor by determining a poverty line through Foster-Greer-Thorbecke (FGT) indices. However, Djossou et al. (2017) computes multidimensional poverty measure using the Benin Democratic and Health Surveys of 2006 and 2011 without analyzing its determinants. This paper proposes to apply for the analysis of poverty in Benin, the measures of multidimensional poverty of Alkire and Foster.Thus, it aims at analyzingthe multidimensional poverty and its determinants in Benin. The application isconducted on data from the Enquête Modulaire Intégrée sur les Conditions de Vie des Ménages (EMICoV).

The rest of the paper is organized as follows. In section 2, the method of Alkire and Foster is presented. The third section describes the methodology used. The results and their discussion are presented in section 4 and finally there is the conclusion in section 5 as well as the policy implications.

2 Alkire and Foster (AF) method

The family of measurement Foster, Greer and Thorbecke (1984), commonly found in the literature, does not provide information on the multidimensional dimension of poverty. The FGT indices report the proportion of the poor population, also known as the incidence of poverty (FGT0), but also the average poverty gap, known as the intensity of poverty (FGT1), and the severity index or severity of poverty (FGT2). This last measure takes into account the inequalities between poor individuals and constitutes in this sense an indicator of the inequality aversion amongpoor individuals. This measure breaks down the total populationand reflects the contribution of different groups to total poverty. Poverty is thus represented by a one-dimensional indicator, income and in this case the standard of living falls within the area of economic well-being, a concept that is narrower than that of well-being (Giovanni and Liberati, 2006). The one-dimensional approach mobilizes a single monetary indicator of the standard of living, namely income or expenditure.

Giovanni and Liberati (2006) recall some definitions of poverty, especially that of Sen (1985), according to which poverty is the lack of "ability" to function in a given society. According to the World Bank (2000), poverty has "multiple dimensions", "many facets" and is "the result of interdependent economic, political and social forces". In the same year, UNDP (2000) highlights the multidimensional nature of poverty. The term "multidimensional poverty" is used to refer to a situation where deprivations in several dimensions make it possible to identify poor individuals from a multidimensional point of view. In their study, Bourguignon and Chakravarty (2003) argue that the well-being of a population and their poverty, which is a manifestation of a welfare deficit, depend on monetary and non-monetary variables and thus show the limits of income as indicator of well-being that will have to be supplemented by other variables such as housing, literacy, as well as access to or disposal of public goods. Ravallion (1996) argues in his study that four sets of indicators can be a credible approach to measuring poverty, namely: (a) a measure based on the distribution of actual expenditures per adult covering all market goods and services; (b) indicators of access to non-market goods, such as access to non-market education and health services; (c) indicators of household distribution: measures of gender disparity and nutritional status of children; and (d) indicators of personal characteristics that create constraints on the ability to escape poverty such as physical disabilities. Poverty can only be understood by refering to several dimensions of human life. In this perspective, poverty presents itself as a situation of lack of realization in these different dimensions, particularly the dimensions of health of education, housing and the financial dimension.
Bossert et al. (2009) present three reasons for adopting a multidimensional vision. First, they evoke the multidimensional nature of the notion of well-being. Second, the focus on income to deal with inequality becomes irrelevant as income is only an indirect measure of well-being: income is not an end in itself. A multidimensional understanding of poverty requires the development of measures that reflect the different aspects of deprivation. If we consider the empirical work on multidimensional poverty, it seems that two lines of investigation have been adopted. The first uses aggregated data to assess the shortcomings that some countries experience in meeting basic needs. The Human Poverty Indicator (HPI) provides the main application of this guidance. The second way, using microeconomic data, explores the other factors responsible of deprivation besides the monetary dimension. In this way, the well-being of an individual depends on several attributes relating to: health, education, social relations, political freedoms, etc.

Thus, multidimensional poverty measures complement traditional one-dimensional indices such as income-based measures. The Alkire and Foster method can be used to create multidimensional poverty measures at the global and national levels with contextually appropriate dimensions and indicators. It provides policymakers with powerful tools for monitoring poverty and designing public policies. Indeed, a single indicator cannot capture the variousaspects that constitute poverty, well-being or empowerment. And for policy analysis, it is essential to monitor the multiple and interdependent disadvantages that the poor experience. The method of Alkire and Foster is a flexible technique that can incorporate several different "dimensions" of poverty or well-being, depending on the context, to create measures that complement the indicators of monetary poverty.

The method of Alkire and Foster identifies "the one who is poor" by taking into account the range of deprivations undergone. It aggregates this information to reflect the poverty of society in a robust way that can be easily disaggregated (by indicator or geographical area for example, or by ethnicity, gender and other social groups) to reveal how people are poor. Measures developed from this method can identify the links between deprivations and thus contribute to policy improvement. The method provides both the percentage of people who are poor (incidence) and the intensity of poverty experienced by the poor. It is flexible and can integrate a wide range of dimensions, indicators, thresholds and weights. As the index developed using the Alkireand Foster method reflects the evolution of the indicators directly, it also incorporates the time factor, making it an effective monitoring tool. For example, an increase in the population with access to drinking water appears in the index as soon as new data are collected; it is not necessary to wait for this change to affect income. The method is commonly used for:

- Measuring Poverty and Well-being: Developing regional or international measures of poverty or well-being using context-specific indicators that reflect the social, economic and other dimensions.
- Geographical and group targeting: to identify poor regions or groups (for example, for geographic targeting or allocation decisions).
- Monitoring and evaluation: to monitor the effectiveness of programs over time.
- Target the poorest groups and beneficiaries: to inform conditional cash transfers, district interventions or public programs.

3. Methodology

3.1. Empirical approach

This paper uses a methodology that captures the multidimensional nature of poverty in line with Alkire and Foster (2011). This approach consists in using two types of dimensions: monetary and non-monetary poverty. Thus, households are classified into four categories depending on their poverty status. Let y_i be the variable indicating the poverty status of a household i:

$$y_i = \begin{cases} 0\ if the household is neither monetary nor non-monetary poor \\ 1\ if the household is monetary poor \\ 2\ if the household is non-monetary poor \\ 3\ if the household is monetary and non-monetary poor \end{cases}$$

Since the poverty status has four categories, the appropriate model would be either the multinomial logit or the multinomial probit. The model is specified as follows:

$$y_i = X_i\beta + \mu_i$$

where β are the parameters to be estimated, X_i the vector of the explanatory variables and μ_i the error term.The explanatory variablesbased on the literature on the topic include household size, sex of household head, age of head of household, marital status of head of household, level of education of household head, place of residence (urban/rural), and the types of shocks the household has experienced (Mukherjee and Benson, 2003; Mok et al., 2007; Dartanto and Nurkholis, 2013).

3.2. Data and descriptive statistics

The data used in this study are from the Institut National de la Statistique et de l'AnalyseEconomique du Benin (INSAE) and are related to the 2015 Living Standards Survey (EMICoV).The descriptive statistics on the dependent variable are presented in Table 1. It appears that 49.25% of the households were neither monetary nor non-monetary poor in 2015. The remaining households are classified as follows: 18.49% were monetary poor, 18.33% were non-monetary poor, and 13.93% were monetary and non-monetary poor. Regarding the regressors of the model, their descriptive statistics are reported in Table 2. In addition the expected signs of the regressors are also presented in Table 2.

Table 1. Multi-dimensional poverty status

Variables	Percent
Neither monetary poor nor non-monetary poor	49.25
Monetary poor	18.49
Non-monetary poor	18.33
Monetary and non-monetary poor	13.93

Source: Author from EMICOV data, 2015.

Table 2. Descriptive statistics

Variables	Description	Mean	Standard Deviation	Minimum	Maximum	Expected signs
Area of residency (Reference=Urban)						
rural	1 if yes and 0 if no	0.52	0.50	0	1	+
Sex of household head (Reference=Male)						
Female	1 if yes and 0 if no	0.22	0.42	0	1	+
Household head age	In years	43.27	14.96	15	98	-
Marital status (Reference=Married or living together)						
Divorced/Separated	1 if yes and 0 if no	0.08	0.27	0	1	+
Widowed	1 if yes and 0 if no	0.11	0.31	0	1	+
Never married	1 if yes and 0 if no	0.06	0.24	0	1	-
Formal education level (Reference=None)						
Primary	1 if yes and 0 if no	0.17	0.38	0	1	+
Secondary1	1 if yes and 0 if no	0.11	0.31	0	1	+
Secondary 2	1 if yes and 0 if no	0.06	0.24	0	1	+
Superior	1 if yes and 0 if no	0.05	0.21	0	1	+
Household size	In number of persons	4.45	2.66	1	35	-
Type of shocks (Reference=Social shocks)						
Economic	1 if yes and 0 if no	0.19	0.39	0	1	-/+
Biophysical	1 if yes and 0 if no	0.24	0.43	0	1	-/+
Others	1 if yes and 0 if no	0.01	0.09	0	1	-/+
None	1 if yes and 0 if no	0.44	0.50	0	1	-

Source: Author from EMICOV data, 2015.

4. Resultsand discussion

The estimation results of the Multinomial Probit are presented in Table 3, and the marginal effects are reported in Table 4. The model is overall significant as indicated by the Wald test (Prob>chi2=0.000). In the estimations, neither monetary poor nor non-monetary poor is taken as reference. The households living in rural areas are more likely to be poor compared to their counterparts from urban areas. Actually, the coefficients associated to living in rural areas are positive and statistically significant at the 1% level of significance for the monetary poverty, non-monetary poverty, and monetary and non-monetary poverty. These findings suggest that even non-monetary poverty is associated to being in rural settings. This might be due to the nature of occupations in those settings (mainly agricultural) which depend highly on climate conditions as the agriculture in Benin is mainly rain-fed. Female headed households are more likely to be either monetary poor or monetary and non-monetary compared to male-headed ones. Indeed, it is proven in the economic literature that that female-headed households are more vulnerable to poverty than male-headed households (Mok et al., 2007).

The findings suggest that household head age is negatively and significantly associated to being poor, regardless to the type of poverty. This suggests that the ability of the household to improve its welfare increases over time. Regarding the marital status of the household head, the findings suggest that those whoare either divorced or separated are less likely to be either monetary poor or monetary and non-monetary poor compared with those whoare married. However, households whose heads are widowed are more likely to be poor regardless to the type of poverty. The estimations results also suggest that those who are never married are likely to be monetary poor with respect to those who are married. Moreover, those who are never married are more likely to be non-monetary poor than those who are married.Education is found to significantly affect poverty status. Indeed, the households headed by those who have at least a primary education level are less likely to be poor than those who do not have any formal education level. These findings are in line with those of Mukherjee and Benson (2003), Mok et al. (2007) and Dartanto and Nurkholis (2013). Household size is positively and significantly associated to monetary poverty and to monetary and non-monetary poverty. However, household size is negatively and significantly associated to non-monetary poverty. Indeed, more mouths to feed will translate into poverty as the household needs more resources to be able to escape poverty.

Table 3. Estimation results (multinomial probit)

	Monetary poor			Non-monetary poor			Monetary and non-monetary poor		
Variables	Coef.	z	P>|z|	Coef.	z	P>|z|	Coef.	z	P>|z|
Residency (Reference=Urban)									
rural	0.110***	3.46	0.001	0.297***	9.24	0.000	0.143***	4.16	0.000
Sex of household head (Reference=Male)									
Female	0.132***	2.95	0.003	0.010	0.24	0.814	0.216***	4.50	0.000
Household head age	-0.006***	-5.05	0.000	-0.003**	-2.49	0.013	-0.006***	-5.00	0.000
Marital status (Reference=Married or living together)									
Divorced/Separated	-0.109*	-1.69	0.090	0.085	1.42	0.155	-0.126*	-1.86	0.063
Widowed	0.179***	2.78	0.005	0.386***	6.46	0.000	0.210***	3.14	0.002
Never married	-0.331***	-4.12	0.000	0.176**	2.45	0.014	-0.107	-1.17	0.241
Formal education level (Reference=None)									
Primary	-0.107***	-2.65	0.008	-0.684***	-15.49	0.000	-0.826***	-17.00	0.000
Secondary1	-0.313***	-6.20	0.000	-1.089***	-18.77	0.000	-1.022***	-16.60	0.000
Secondary 2	-0.477***	-7.25	0.000	-1.573***	-18.96	0.000	-1.576***	-15.77	0.000
Superior	-0.890***	-10.46	0.000	-2.276***	-16.51	0.000	-2.478***	-11.87	0.000
Household size	0.140***	21.97	0.000	-0.071***	-9.09	0.000	0.077***	11.21	0.000
Type of shocks (Reference=Social shocks)									
Economic	0.006	0.11	0.914	-0.051	-0.90	0.369	-0.140**	-2.33	0.020
Biophysical	0.293***	5.56	0.000	0.439***	8.21	0.000	0.562***	10.14	0.000
Others	-0.361**	-2.00	0.045	0.040	0.23	0.818	-0.216	-1.09	0.274
None	-0.175***	-3.65	0.000	-0.087*	-1.77	0.077	-0.244***	-4.62	0.000
_cons	-1.101***	-13.77	0.000	-0.267***	-3.24	0.001	-0.805***	-9.55	0.000
Number of obs=19,887			Wald chi2(45)=3878.90				Prob>chi2=0.0000		

Note: ***, **, * significant at 1%, 5% and 10%, respectively
Source: Author, from EMICoV data, 2015.

Households that faced economic shocks are less likely to be monetary and non-monetary poor than their counterparts that experienced social shocks.Moreover, those who have not experienced any shock are less likely to be poor regardless to the poverty type compared with those that experienced social shocks. Those who experienced other shocks are less likely to be monetary poor than those who faced social shocks. However, those who are subject to biophysical shocks are more likely to be poor regardless to the type of poverty than those who faced social shocks. Actually, the households are push into poverty by shocks.Dartanto and Nurkholis (2013) found that health shocks is associated with being poor in Indonesia.

Table 4. Marginal effects

	neither monetary poor nor non-monetary poor			Monetary poor			Non-monetary poor			Monetary and non-monetary poor		
Variables	dy/dx	z	P>|z|	dy/dx	z	P>|z|	dy/dx	z	P>|z|	dy/dx	z	P>|z|
Residency (Reference=Urban)												
rural	-0.050***	-6.92	0.000	0.009	1.48	0.138	0.036***	7.86	0.000	0.006**	2.17	0.030
Sex of household head (Reference=Male)												
Female	-0.031***	-3.06	0.002	0.020**	2.44	0.015	-0.006	-1.09	0.277	0.017***	3.90	0.000
Household head age	0.001***	5.51	0.000	-0.001***	-4.35	0.000	-0.0001	-0.74	0.458	-0.0004***	-3.83	0.000
Marital status (Reference=Married or living together)												
Divorced/Separated	0.016	1.13	0.260	-0.021**	-1.79	0.073	0.015**	2.18	0.030	-0.010*	-1.79	0.074
Widowed	-0.072***	-4.78	0.000	0.019	1.44	0.150	0.043***	5.25	0.000	0.010*	1.65	0.099
Never married	0.034**	2.14	0.033	-0.064***	-4.94	0.000	0.034***	3.52	0.000	-0.005	-0.63	0.528
Formal education level (Reference=None)												
Primary	0.164***	15.89	0.000	0.049***	6.30	0.000	-0.110***	-12.89	0.000	-0.103***	-13.94	0.000
Secondary1	0.245***	19.95	0.000	0.029***	3.07	0.002	-0.164***	-16.80	0.000	-0.110***	-12.75	0.000
Secondary 2	0.335***	22.42	0.000	0.022*	1.82	0.069	-0.209***	-19.46	0.000	-0.148***	-15.27	0.000
Superior	0.449***	29.70	0.000	-0.029**	-2.27	0.023	-0.245***	-23.21	0.000	-0.175***	-17.91	0.000
Household size	-0.017***	-10.28	0.000	0.028***	19.12	0.000	-0.015***	-15.13	0.000	0.005***	6.81	0.000
Type of shocks (Reference=Social shocks)												
Economic	0.010	0.86	0.392	0.006	0.59	0.552	-0.005	-0.74	0.457	-0.012**	-2.37	0.018
Biophysical	-0.120***	-9.62	0.000	0.027***	2.70	0.007	0.043***	6.06	0.000	0.049***	7.73	0.000
Others	0.055	1.49	0.136	-0.062**	-2.25	0.024	0.019	0.82	0.414	-0.012	-0.81	0.417
None	0.045***	4.16	0.000	-0.026*	-2.96	0.003	-0.003	-0.51	0.607	-0.016**	-3.55	0.000

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Note: ***, **, * significant at 1%, 5% and 10%, respectively
Source: Author, from EMICoV data, 2015.

5. Conclusion and policy implications

This study analyzes multidimensional poverty and its determinants in Benin, using the 2015 Benin Living Standard Survey and estimating a multinomial probit regression. The findings suggest that in 2015, 49.25% of the households are neither monetary nor non-monetary poor, while 18.49%, 18.33%, and 13.93% are monetary poor, non-monetary poor, and monetary and non-monetary poor respectively, indicating that more than half of the households are poor. The estimation results indicate that factors such as living in rural settings, being a female-headed household, having a widowed person as household head, and having experienced biophysical shocks increase the likelihood to be poor. However, factors like household head age, and having at least primary education level decrease the odds to be poor. It should be noted that the findings differ across the types of poverty. Based on the findings, poverty-reduction strategies may focus more on households living in rural settings in order to decrease the incidence of poverty in these settings. Access to formal education may continue to be strengthen in the country regardless to the type of settings (rural versus urban). It might be also good to think about the management of climate shocks instead of providing only early warming information on the occurrence of climate shocks. Moreover, timely climate information related to the shocks have to be provided to those who live in rural areas and depend somehow on agriculture. This paper considers the households as units of analysis, and this does not give information on the individuals within the households. Therefore, future research may work at individual level.

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