Volume 40, Issue 2

What happen to multidimensional poverty between 2006 and 2015 in Togo?

Dossè M Djahini-Afawoubo
ANEPP-University of Lomé (Togo)

Mawuli Kodjovi Couchoro
MOFID-University of Lomé, Togo

Abstract

The present study analyzes changes over time in multidimensional poverty in Togo using a counting approach. It focuses on six dimensions (assets, public services, education, health, housing and sanitation, and employment) and find that multidimensional poverty significantly decreased by 21 percentage points in Togo between 2006 and 2015. Women experienced a higher reduction than men. Urban areas experienced a higher reduction compared to rural ones and the poorest regions experienced lower reductions. Health dimension experienced the highest decrease in dimensional deprivation rate. To reduce multidimensional poverty, government should improve the targeting of the poorest regions in implementing poverty alleviation strategies.

Submission Number: EB-19-00757

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Dossè M Djahini-afawoubo
University of Lomé

Mawuli kodjovi Couchoro
CERFEG-University of Lomé, Togo

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1. Introduction

Poverty is a complex phenomenon because of its multidimensional nature. Its conception and approaches evolve over time. Different approaches can be distinguished, notably the monetary approach (Ravallion, 1994), the basic needs approach (Streeten, 1979; Stewart, 1995), the primary goods approach (Rawls, 1971) and the capability approach (Sen, 1985). The monetary approach identifies a person's well-being with his command over goods and services. Since a person's income determines how much he or she can consume, this approach leads to a focus on income which translates a narrow conception of well-being (Deaton, 2003). The basic needs approach (Streeten, 1979; Stewart, 1995) identifies a bundle of basic minimum requirements of human life such as food, shelter, clothing, clean water, sanitation, and so on. The poor are those who are deprived of such minimum requirements (Asselin and Dauphin, 2001). While this approach is easy to implement and favors targeted policies, it is criticized for arbitrariness. Planners decide what and how much people need regardless of their perceptions.

Rawls (1971) proposed a principle of justice (called the "difference principle") which consists of maximizing the minimum, over all persons, of the bundle of primary goods (Basu and Lopez-Calva, 2011). In this point of view, poverty can be defined as a lack of primary goods. Sen (1980, 1993) criticized the difference principle by pointing out the fact that the principle is concerned with means (commodities), not ends (freedom). For Sen, it could be unacceptably indifferent to heterogeneity.

The capability approach puts emphasis on heterogeneity in the translation of commodities into functionings and capabilities due to personal conversion factors (such as physical conditions, age, and gender), social conversion factors (institutions, cultural, and social norms), and environmental ones (including climate, pollution, and public facilities). In this point of view, two individuals with the same set of commodities may not necessarily have the same level of well-being. The emphasis is then putted on the concept of 'functionings' which comprises the various things that a person may value doing or being (Noglo, 2017). Since the individual's capability set is not directly observable and must be determined on the basis of presumption (Sen, 1992), we consider in the present study the set of achieved functionings to measure poverty (Agbodji et al., 2013; Djahini-Afawoubo, 2015 and Noglo, 2017 are some examples of studies that use the same approach).

In practice, studies tend to focus on both multidimensional nature of poverty and its evolution over time. According to Alkire et al. (2017), comparing multidimensional poverty levels across time reveals how and in what dimensions poverty has been reduced and is essential to the Sustainable Development Goal's (SDGs) aim to halve the proportion of people who are poor in many dimensions. To this end, several studies have been conducted on the evolution of multidimensional poverty worldwide. For example, Alkire and Housseini (2014) provide trends of multidimensional poverty in Sub-Saharan Africa. Recently, Alkire et al. (2017) provide an in-depth analysis of the evolution of multidimensional poverty, using the Global Multidimensional Poverty Index (Global MPI). They use data from 34 countries and highlight patterns of reduction of multidimensional poverty. OPHI (2019) also provides an analysis of the change over time in the Global MPI for selected countries and shows that India and Cambodia reduced their MPI values the fastest.

While the work of Alkire et al. (2017) is original and informative, all the countries included in the study are not evaluated on the basis of the same indicators due to data availability in some countries (Burchi et al. 2019). Further, the Global MPI is constructed at the household level. Therefore, it is difficult to perform rigorous gender-based analysis. One can only compare female-headed and male-headed households. However, this comparison is very limiting and biased. According to Davids and van Driel (2010) female-headed households often differ systematically to male-headed households regarding several socio-economic and demographic characteristics. Furthermore, when a household measure of poverty is used, it is not possible to

identify situations of female poverty in households where males are non-poor and vice-versa (Sen, 2010).

Togo, the subject of the present study, is a Sub-Saharan African (SSA) country classified as one of the least developed countries by the World Bank. On average, Togo's real per capita GDP is estimated at $ 515 (in constant 2010 dollars) between 2007 and 2017. Togo is a new setting for an assessment of multidimensional poverty analysis over time. In fact, Togo experienced political crisis in 1990s that have led to the suspension of international cooperation until 2007. This situation has contributed to the expansion of poverty in the country, estimated at 61.7% of the whole population in 2006. Assessing the evolution over time of multidimensional poverty in such an environment is relevant for policy makers to track progress in poverty alleviation strategies.

However, little is known about the evolution of the multidimensional poverty in Togo while there are many country-specific studies on the evolution of multidimensional poverty in the developing world. For example Alkire and Seth (2015) analyze changes in multidimensional poverty in India between 1999 and 2006, and find a strong reduction in national poverty and each of its dimensions. Focusing on rural Ethiopia, Brück and Kebede (2013) find that poverty is mainly transient. Roelen (2013) analyzes multidimensional child poverty dynamics in Vietnam and finds that the large reduction of child poverty in Vietnam has been unequal. Tran et al. (2015) also analyze multidimensional and monetary poverty trends in Vietnam between 2007 and 2011 and find that monetary poverty shows faster progress as well as a higher level of fluctuation than multidimensional poverty. Gadom et al. (2019) investigate the multidimensional poverty trends in Chad between 2003 and 2011 and show that the multi-dimensional poverty has slightly increased.

In recent years, most of studies carried out on multidimensional poverty in Togo did not consider its evolution over time (Agbodji et al. 2013; Djahini-Afawoubo 2015; Noglo, 2017). The few studies that analyzed the evolution of poverty in Togo (Ametoglo and Ping, 2016 and Couchoro and Dout, 2019; and Noglo and Afawubo, 2017) focused on a relatively short period of time and have not taken into account the multidimensional nature of poverty. However, poverty analysis should be kept as broad as possible in order to capture more fully its multidimensional nature according to Laderchi (1997).

The objective of the present study is to analyze poverty trends in Togo using a multidimensional approach. Specifically, the study aims to: (i) estimate a multidimensional poverty index (MPI) in several years (2006, 2011 and 2015) in Togo; (ii) analyze the evolution of the MPI over several periods of time by gender and by place of residence. To meet these goals, the Alkire and Foster (2011) method is used for its clarity and simplicity compared to other multidimensional poverty indices (Silber 2011).

The contribution of the present paper is twofold. Firstly, unlike previous studies that constructed the MPI at the household level (Alkire et al., 2017), the present paper constructs the MPI at the individual level. In doing so, we were able to track progress in poverty alleviation strategies by gender. Secondly, the paper analyses, for the first time in our knowledge, changes over time in multidimensional poverty in the specific context of Togo.

The remainder of the paper is organized as follows: section 2 describes methods, and data. Section 3 discusses the empirical results and finally section 4 concludes and provides some policy implications.

2. Methods and data
2.1. Conceptual approaches to measuring multidimensional poverty

There are two main approaches to measuring multidimensional poverty: the marginal approach and the common approach (Alkire, 2011). In the marginal approach, deprivation cut-offs are used to identify individuals who are deprived in a particular dimension. The approach then aggregates information about a population to generate a deprivation measure for each

dimension. However, the marginal approach does not determine whether individuals are poor or not on a multidimensional level. It is therefore insensitive to common deprivation and do not meet Sen's identification criteria (Sen, 1976). The common approach applies a set of deprivation cut-offs to identify the dimensions for which an individual suffers from deprivation. Then it determines if each individual is multidimensionally poor or not using a poverty cut-off. In the present study, the common approach is chosen. Compare to the marginal approach, it has the advantage of identifying individuals as multidimensionally poor on the basis of their common deprivations. The unit of analyze is the individual. The paper uses the Alkire and Foster (2011) method for its clarity and simplicity compared to other indices of measurement of multidimensional poverty (Silber, 2011). In addition, it provides an aggregated measure that identifies each person as multidimensionally poor or not on a common basis. This allows comparisons over time and across regions using a consistent metric (Alkire 2011). The Alkire and Foster (2011) method is widely used in the literature by researchers interested in multidimensional poverty analysis (examples are Agbodji, et al., 2013; Batana, 2013; Alkire and Seth, 2015; and Alkire et al., 2017). The method consists of two major steps. Firstly, after choosing dimensions, a deprivation cut-off is used to identify who is deprived in each dimension. Secondly, a poverty cut-off is used to identify who is multidimensionally poor.

2.2.Choosing dimensions and identifying who is deprived in each dimension

Six dimensions are chosen namely assets, public services, education, health, housing and sanitation, and employment. Equal weight is given to each dimension. The choice of these dimensions is motivated by two considerations. Firstly, they are given top priorities in the development agenda of all nations and are part of the Sustainable Development Goals (SDG). Secondly, we considered data availability. In fact, the aim of the present study is to analyze changes in MPI in Togo in certain points of time (2006, 2011 and 2015). For this purpose indicators and parameters must be the same in 2006, 2011 and 2015. Therefore, we have retained the dimensions, taking care that the questions used to build them are the same in the three surveys. The years of schooling is used to measure education. When a household member has not completed at least primary school (6 years of schooling), he/she is considered as deprived in education. For the measurement of the employment deprivation, we considered all households members who are of working age (15 years and over), who are looking for a job but who do not have a paid employment. Due to the importance of informal sector in the Togolese economy (Djahini-Afawoubo and Atake, 2018), non-paid employment and self-employment indicate a lower pay and a lower job quality. With this regard, only paid employment is considered as decent work. Self-employed individuals, non-paid employees and unemployed individuals are classified as poor in the employment dimension. Table 1 summarizes dimensions, indicators and deprivation cutoff for each indicator. To identify the set of indicators in which every individual is deprived, the deprivation cutoff (see table 1 in appendix) is used to create a deprivation matrix which provides each person's score in each indicator, following Alkire and Foster (2011). Every person's entry in each indicator is denoted as one if he/she is deprived in that indicator and zero otherwise.

2.3.Identifying who is multidimensional poor

As mentioned above, equal weight is given to every dimension. In addition, inside a dimension, equal weight is given to each indicator. To identify who is multidimensionally poor, we set a second identification cutoff (denoted k). Since the study focuses on six dimensions, k ranges from one (1) to six (6). This identification cutoff gives the number of dimensions in which a person must be deprived in order to be considered multidimensionally poor. The present study considers a person as multidimensionally poor if that person is deprived in two dimensions (that is k=2). The MPI is also calculated for several values of k to perform robustness checks.

2.4. The Alkire and Foster's Multidimensional Poverty Index (MPI)

Following Agbodji et al. (2013), let us consider a population of n individuals. Suppose $D=6$ the total number of dimensions and let $x = [x_{i,d}]$ be the (n, D) matrix of deprivations. $x_{i,d}$ is the deprivation status of individual i $(i = 1, 2, ..., n)$ in dimension d $(d = 1, 2, ..., D)$. The matrix x can be written as follows :

$$x = \begin{bmatrix} x_{1,1} & \cdot & x_{1,d} & \cdot & x_{1,6} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ x_{i,1} & \cdot & x_{i,d} & \cdot & x_{i,6} \\ \cdot & \cdot & \cdot & \cdot & \cdot \\ x_{n,1} & \cdot & x_{n,d} & \cdot & x_{n,6} \end{bmatrix} \qquad (1)$$

Summing each row of x gives us a column vector of deprivation counts, say c. The matrix c contains c_i , the number of deprivations experienced by individual i. $c_i = \sum_{d=1}^{D} x_{i,d}$. Let us define k $(k=1,...,K)$ as the minimum number of deprivations an individual should suffer to be considered to be deprived and let $P_\beta(x)$ be the class of multidimensional deprivation indices developed by Alkire and Foster (2011). Let s_i be the sampling weight assigned to individual i and normalized such that $\sum_{i=1}^{n} s_i = n$. $P_\beta(x)$ is then given by equation (2) as follows:

$$P_\beta(x) = \frac{1}{n \times K^\beta} \sum_{i=1}^{n} s_i c_i^\beta \Gamma(c_i \geq k) \qquad (2)$$

where $\Gamma(c_i \geq k)$ is the identification function. When $\beta = 0$, we obtain $P_0(x)$ the headcount ratio which gives us the proportion of poor people by simply dividing the total number of poor people by the total population .When $\beta = 1$, we obtain $P_1(x)$, the MPI. The MPI, also called the adjusted headcount ratio M_0, is the product of H, the headcount ratio and A, the average poverty gap (see Alkire and Foster 2011; Batana 2013 and Alkire and Seth 2015).

$$M_0 = H \times A \qquad (3)$$

A is calculated by adding up the proportion of total deprivations each person suffers and dividing by the total number of poor persons. The average poverty gap is interpreted as the average number of deprivations a poor person suffers.

For the comparisons of the MPI across time, the present study uses the absolute change across periods. The absolute rate of change is measured by the difference in MPI levels between two periods. The study also uses the relative rate of change which is the difference in levels across two periods as a percentage of the initial period (see Alkire et al. 2017). According to Alkire et al. (2017), the analysis of absolute and relative changes together provides an elementary sense of overall progress.

2.5. Data description

The data used in this paper are extracted from household surveys carried out by the National Institute of Statistics and Economic and Demographic Studies (INSEED) in 2006, 2011 and 2015 in cooperation with the World Bank, the UNDP, the United Nations Population Fund (UNFP), the United Nations Children's Fund (UNICEF) and the African Capacity Building Foundation (ACBF). These surveys covering respectively 7500, 6048 and 2335 households representative of the Togolese population on the national scale was carried out using two stage investigation. In each household, data are collected on each individual, member of the household. Table 2 presents the number of individuals covered by each of the three surveys by gender and by place of residence. The three surveys have the same main objective, which is to provide the necessary elements for the assessment of poverty in Togo. The comparative analysis of the results of these surveys is made possible by the great similarity of the questionnaires and the methodology used.

3. Results and discussions

To track progress, the incidence of deprivation which is the proportion of all individuals who are deprived in any dimension are presented in table 3. Health is the dimension with the highest deprivation rate (87.6%) in 2006 followed by housing and sanitation (55.3%) and education (43.6%). Employment exhibits the lowest deprivation rate (13.5%). As a whole, between 2006 and 2015, health deprivation rate dropped by 75.2 percentage points. This strongest reduction could be explained by the effectiveness of the implementation of a mandatory health insurance scheme for public employees since 2012. The results also indicate that public services dimension experienced an increase in its deprivation rate. These results suggest that in order to significantly reduce the multidimensional poverty rate in Togo, policymakers should increase provision of sanitation facilities. The provision of social housing especially for the poorest groups could also reduce deprivation in improved housing. The provision of basic public services such as drinking water facilities, educational and sanitary infrastructure, especially in rural areas, would significantly reduce the deprivation suffered by the populations of Togo.

Table 4 presents changes in multidimensional poverty rate in Togo between 2006 and 2011; 2006 and 2015 and between 2011 and 2015 at national level. For a poverty cutoff k=2, MPI dropped from 41.7% in 2006 to 28.8% in 2011, then to 20.6% in 2015. No matter the year considered, the MPI decreases as the poverty cutoff increases. In terms of changes in the MPI, the results reveal regardless the poverty cutoff chosen that the multidimensional poverty rate decreased between 2006 and 2015, whether in absolute terms or in relative terms. For example, considering $k = 2$, MPI decreased by 21 percentage points between 2006 and 2015.

For robustness checks, we also compute the MPI using three dimensions (namely health, education and standard of living) as described in the Global MPI index (2019). Education is measured by years of schooling and school attendance. Standard of living is measured by cooking fuel, sanitation, drinking water, electricity, housing and assets. Due to data availability, health dimension is measured using access to health care facilities and nutrition rather than child mortality and nutrition. The results are presented in table 8 in appendix. Even if the levels of multidimensional poverty and the magnitude of poverty reduction are higher when the Global MPI index is used, the results consistently confirm a decline in multidimensional poverty between 2006 and 2015 in Togo. For example, poverty declined by 29.8 percentage points between 2006 and 2015 when the Global MPI is used, compared to 21 percentage points using the six dimensions of poverty. The decline in multidimensional poverty could be explained by the poverty reduction policies implemented by the government of Togo. These strategies particularly putted emphasis on the promotion of the education and training system, the development of the health and nutrition system, access to drinking water and sanitation, and the promotion of the employment of youth.

However, this decline in multidimensional poverty at the national level, hides gender based disparities and disparities related to place of location. Figure 1 presents dominance analysis of MPI based on gender in 2006, 2011 and 2015. According to figure 1, women MPI curve dominates that of men regardless the poverty cutoff. But in 2015, women MPI curve crosses that of men. In other words, it cannot be said with certainty that the multidimensional poverty rate is higher in one group than in another in 2015. When we consider a poverty cutoff less than or equal to 3, the MPI is higher for men compared to women. For a cutoff greater than 3, the two series are almost identical. Table 5 highlights changes in multidimensional poverty by gender. Women experienced greater poverty reduction than men either in absolute or relative terms. For instance, between 2006 and 2015, multidimensional poverty decreased by 19.6 percentage points for men against 25.3 points for women. This result is robust regardless the poverty cutoff. It can thus be concluded that the decline in MPI is higher for women than for men between 2006 and 2015. Again, the story is the same when the Global MPI index is used. Only the levels and the magnitude of poverty reduction are different. Consistently to the

approach used, women experienced faster poverty reduction than men in absolute terms. But in relative terms, men experienced a slightly higher poverty reduction than women when the Global MPI index is used. Women experienced higher multidimensional poverty than men (see table 8). This result is consistent with Agbodji et al. (2013), Djahini-Afawoubo (2015) and Hamdok (1999). Agbodji et al. (2013) found that MPI is higher among women than men in Togo and Burkina Faso. Djahini-Afawoubo (2015) also found the same result in Togo while Hamdok (1999) found the same result in Zimbabwe.

The largest decline in MPI among women compared to men could be explained by the positive effects of the National Policy of Equity and Gender Equality (PNEEG). Indeed, over the period 2013 to 2017, actions aimed at increasing women's access to the means of production, particularly land, technology and credit have been undertaken. Considering women's access to credit, the National Found for Inclusive Finance (FNFI) was implemented in 2014. FNFI has implemented micro-credit programs that may have enabled women to generate extra income which will allow them to meet other needs such as nutrition, health, education, and other dimensions of their empowerment. The impact of microfinance on poverty alleviation and women's empowerment is largely discussed in the literature (Ganle et al. 2015; Akoetey and Adjasi 2016).

Figure 2 presents dominance analysis based on the place of residence in 2006, 2011 and 2015 in Togo. Rural MPI curves (for 2006, 2011 and 2015) dominate those of urban areas. Multidimensional poverty is therefore higher in rural areas than in urban areas. Furthermore between 2006 and 2015, the gap between urban and rural areas has increased. Indeed, between 2006 and 2015, urban areas experienced higher reduction compared to rural ones. For example, using a poverty cutoff $k = 2$, MPI decreased by 20.3 percentage points in urban areas compared to only 9.6 percentage points in rural ones. Thus, the gap between urban and rural areas widened between 2006 and 2015. The results are similar when the Global MPI index is used. Consistently, poverty levels are higher in rural areas than urban ones. In terms of progress, urban areas experienced slightly faster reduction of poverty than urban ones in relative terms (see table 8).

The result according to which rural areas are poorer than urban ones is consistent with Agbodji et al. (2013) and Djahini-Afawoubo (2015) in Togo. The same result is found by Batana (2013), analyzing multidimensional poverty among women in Sub-Saharan Africa. Alkire et al. (2017) also find similar results in each of the 34 countries covered by their study. Ballon and Duclos (2016) find that poverty is higher in rural areas than in urban ones in Sudan and South Sudan. This result is also consistent with studies using other measures of poverty. For example, using various welfare indicators, Sahn and Stifel (2003) show that poverty is higher in rural areas than urban ones in African countries. Duclos et al. (2006) test for stochastic dominance relations between rural and urban areas in Ghana, Madagascar and Uganda using household expenditures per capita and children's height-for-age score as the two dimensions of well-being. Their study also found that rural areas are poorer than the urban ones. Moreover, the results of the present study show that the gap between urban and rural areas has increased between 2006 and 2015 as the decrease in multidimensional poverty is higher in urban areas than rural ones. These results are consistent with Ametoglo and Ping (2016). Focusing on monetary poverty, Ametoglo and Ping (2016) found that the decrease of poverty was much faster in the urban areas than the rural areas in Togo. These results suggest that policy makers should focus more on rural areas in the implementation of development policies. The provision of basic social infrastructure such as health, education, sanitation and drinking water facilities in rural areas would significantly reduce multidimensional poverty.

Table 7 highlights changes in multidimensional poverty by administrative region in Togo for $k = 2$. In both absolute and relative terms, Lome and Kara experienced the largest reductions while the Savane region and the Plateaux region experienced the lowest reductions. Based on

these analyzes, over the period 2006-2015, the regions identified as the poorest experienced lower poverty reductions. This result is consistent with Alkire and Seth (2015) who found that the majority of the poorest groups experienced slower progress in multidimensional poverty reduction between 1999 and 2006 in India. These results suggest that the government of Togo should improve the targeting of the poorest regions in the implementing of its poverty reduction strategy.

For policy makers, it is important to know the dimensions that mainly contribute to the overall MPI. Figure 3 shows trends of the contribution of each of the six dimensions in 2006, 2011 and 2015. In 2006, health dimension was the largest contributor to MPI at 30% followed by access to water and sanitation (20.7%) and education (16.7%). Employment is the dimension that contributed the least with 5.5%. In 2015, access to improved housing and sanitation is the largest contributor to MPI in Togo (27.8%) followed by access to basic public services (26.8%). These results suggest that government should study the possibility to offer housing subsidies to the poor. According to Gilbert (2004), capital housing subsidies have reduced housing problems in Chile and South Africa. Government should also increase public services provision by targeting poor people. According to Hamilton and Svensson (2017), being poor makes an individual twice as likely to suffer from poor access to low-quality public services, in both urban and rural areas in Sudan.

4. Conclusion and policy implication

The main objective of the present paper is to analyze changes in multidimensional poverty in Togo between 2006 and 2015 using Alkire and Foster (2011) method. The findings indicate a decline in multidimensional poverty in Togo over the period 2006 to 2015 at national level. Given that Togo is a very poor country, greater efforts are still needed to be done, in order to have a continued drop in poverty rate. Findings suggested that the decrease in multidimensional poverty at national level hides some disparities related to gender, place of location and administrative region. Regardless the poverty cutoff, the decline in MPI is higher for women than men. In order to have a continued drop in poverty reduction, government should improve efficacy of its microcredit programs. Evidence showed a positive effect of microfinance on poverty alleviation and women's empowerment (Ganle et al. 2015; Akoetey and Adjasi 2016). Urban areas experienced higher reduction compared to rural areas. Findings also indicate that the poorest regions experienced lower poverty reductions. Policy makers should focus more on rural areas in the implementation of poverty alleviation strategies. They should also improve the targeting of the poorest regions.

Dimensional decompositions show that health deprivation rate significantly dropped by 75.2 percentage points between 2006 and 2015. This result was partially explained by the implementation of the mandatory health insurance in 2012 managed by the National Health Insurance Institute (INAM). But actually, only workers of public administrations, and their legal beneficiaries are covered by the mandatory health insurance scheme. Considering the mandatory health insurance's benefits to health deprivation reduction, the government of Togo should extend it to the whole population especially to informal sector workers that represent about 90.4% of the Togolese workforce. Djahini-Afawoubo and Atake (2018) estimated the cost of the extension of the mandatory health insurance to informal sector workers at 4.1% of the state general budget. The results also indicate that public services dimension experienced an increase in its deprivation rate. In order to significantly reduce the multidimensional poverty rate in Togo, policymakers should increase provision of sanitation facilities. The provision of social housing especially for the poorest groups could also reduce deprivation in improved housing. The provision of basic public services such as drinking water facilities, educational and sanitary infrastructure, especially in rural areas, would significantly reduce the deprivation suffered by the populations of Togo.

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APPENDIX

Table 1: MPI: dimensions, indicators, and deprivation cutoffs

Dimensions of poverty	Indicators	Deprived if...
Health	Consultation of a doctor /or in case of illness	The individual does not consult a doctor or an improved health facility in case of illness due to lack of resource
Education	Years of schooling	The individual does not completed at least 6 years of schooling
Access to basic services	Time to reach the closest primary school	Time to reach the closest primary school is more than 30 min
	Time to reach the closest secondary school	Time to reach the closest secondary school is more than 30 min
	Time to reach the closest health facility	Time to reach the closest health facility is more than 30 min
	Time to reach the closest food market	Time to reach the closest food market is more than 30 min
	Time to reach the closest public transport	Time to reach the closest public transport is more than 30 min
	Time to reach the closest safe drinking water facility	Time to reach the closest safe drinking water facility is more than 30 min
Employment	Employment statue	The individual has no paid employment
Assets	Radio ownership	The individual does not own a radio
	Motorbike ownership	The individual does not own a motorbike
	Car ownership	The individual does not own a car
	TV ownership	The individual does not own a TV
	Fan ownership	The individual does not own a fan
	Computer ownership	The individual does not own a computer
	Telephone ownership	The individual does not own a telephone
	Refrigerator ownership	The individual does not own a refrigerator
Housing and sanitation	Roof materials	Nondurable roof materials/unimproved roof materials
	Wall materials	Unimproved wall materials/nondurable
	Floor materials	Unimproved floor materials
	Toilet facility	The individual's toilet facility is not improved (according to MDG guidelines)
	Disposal of wastewater	Individual does not have improved wastewater disposal
	Disposal of household garbage	Individual does not have access to improved disposal of household garbage

Source: Authors

Table 2: database structure by gender and by place of residence

	Urban	Rural	Male	Female	Total individuals
2006	11,325	25,105	18,167	18,263	36,430
2011	13758	16023	14,521	15,26	29,781
2015	6,564	4,255	5,309	5,51	10,819

Source: Authors

Table 3: changes in the dimensional deprivation between 2006 and 2015 in Togo

Dimensions	Uncensored Headcount ratio (%)			Changes in the uncensored headcount ratio (%)					
				2011-2006		2015-2011		2015-2006	
	2006	2011	2015	Absolute	Relative	absolute	Relative	absolute	relative
Health	87.6	30.0	12.4	-57.6*	-65.8	-17.6*	-58.7	-75.2*	-85.8
Education	43.6	46.9	21.6	3.3*	7.6	-25.3*	-53.9	-22.0*	-50.5
Housing and sanitation	55.3	48.7	38.7	-6.6*	-11.9	-10.0*	-20.5	-16.6*	-30.0
Employment	13.5	8.6	22.1	-4.9*	-36.3	13.5*	157.0	8.6*	63.7
Public services	35.3	42.3	39.4	7.0*	19.8	-2.9*	-6.9	4.1***	11.6
Assets	31.7	40.7	9.6	9.0*	28.4	-31.1*	-76.4	-22.1*	-69.7

*, **and *** denote respectively significance of mean comparison test at 1%, 5% and 10%
Source: Authors' estimates using QUIBB (2006, 2011 and 2015)

Table 4: Absolute and relative changes in MPI between 2006 and 2015 in Togo

cutoff	MPI (%)			ΔMPI (%)					
				2011-2006		2015-2006		2015-2011	
	2006	2011	2015	Absolute	Relative	Absolute	Relative	Absolute	Relative
k=1	43.6	33.6	31.2	-10.0	-22.9	-12.4	-28.4	-2.4	-7.2
k=2	41.7	28.8	20.6	-12.9	-31.0	-21.0	-50.5	-8.1	-28.2
k=3	30.2	16.8	8.1	-13.3	-44.2	-22.1	-73.2	-8.7	-52.0
k=4	13.5	5.8	1.0	-7.7	-57.2	-12.5	-92.7	-4.8	-83.0
K=5	1.9	1.1	0.0	-0.7	-39.5	-1.8	-98.6	-1.1	-97.7

Source: Authors 'estimates using QUIBB (2006, 2011 and 2015)

Table 5: Absolute and relative changes in MPI between 2006 and 2015 by gender in Togo (in %)

	Male				Female			
	2011-2006		2015-2006		2011-2006		2015-2006	
Cutoff	Absolute	Relative	absolute	Relative	Absolute	Relative	Absolute	Relative
k=1	-11.7	-27.2	-11.5	-26.8	-7.2	-16.2	-14.3	-32.0
k=2	-15.1	-36.9	-19.6	-47.9	-9.5	-22.1	-25.3	-59.3
k=3	-15.3	-52.6	-20.7	-71.6	-10.2	-32.0	-24.4	-76.7
k=4	-8.8	-70.0	-11.6	-92.6	-5.9	-40.1	-13.6	-91.5
k=5	-0.9	-68.2	-1.3	-100	-0.4	-15.7	-2.5	-94.5

Source: Authors' estimates using QUIBB (2006, 2011, and 2015)

Table 6: Absolute and relative changes in MPI by area of residence (in %)

	Urban				Rural			
Cutoff	2011-2006		2015-2006		2011-2006		2015-2006	
	absolute	Relative	absolute	Relative	Absolute	Relative	Absolute	Relative
k=1	-8.5	-22.3	-11.0	-29.0	-8.6	-17.3	-5.0	-10.1
k=2	-11.6	-33.1	-20.3	-58.0	-10.5	-21.7	-9.6	-19.9
k=3	-9.7	-47.5	-16.1	-78.9	-12.7	-31.6	-20.5	-51.1
k=4	-3.9	-60.2	-6.0	-92.8	-9.3	-45.2	-18.1	-87.7
k=5	-0.6	-51.8	-1.2	-97.2	-0.5	-18.1	-2.5	-100.0

Source: Authors' estimates using QUIBB (2006, 2011 and 2015)

Table 7: Absolute and relative changes in MPI by administrative regions in Togo between 2006 and 2015 (for k=2)

	ΔMPI (%)					
Regions	2011-2006		2015-2011		2015-2006	
	Absolute	Relative	Absolute	Relative	Absolute	Relative
Lome	-13.2	-39.3	-7.1	-34.8	-20.3	-60.4
Maritime	-6.4	-15.0	-9.2	-25.4	-15.6	-36.6
Plateaux	-14.5	-31.6	1.4	4.5	-13.1	-28.5
Centrale	-10.7	-22.0	-8.6	-22.7	-19.3	-39.7
Kara	-7.9	-17.4	-15.1	-40.3	-23.0	-50.7
Savane	-16.4	-32.3	10.7	31.2	-5.7	-11.2

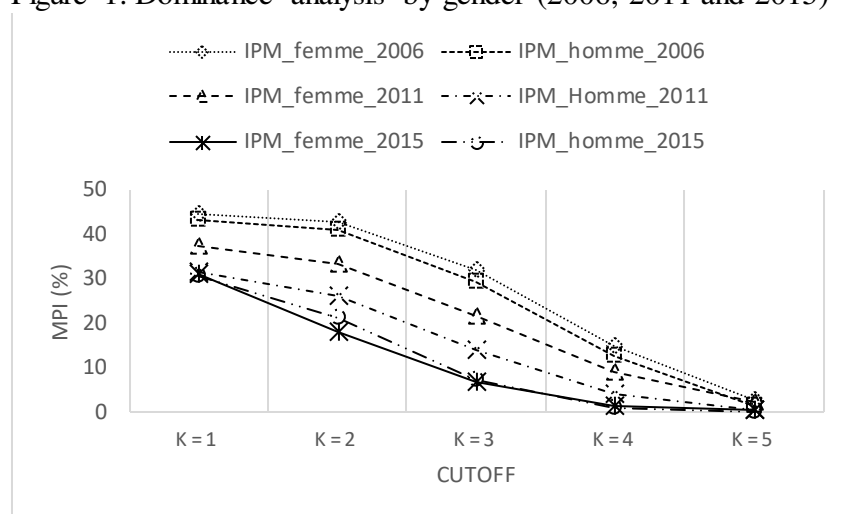Source: Authors' estimates using QUIBB (2006, 2011 and 2015)

Table 8: Comparison of MPI and change in MPI between 2006 and 2015 using respectively three and six dimensions for a cutoff equal 0.33

|	MPI using a cutoff =0.33(in %)						Change in MPI between 2006 and 2015 (in %)			
	(1)			(2)			2015-2006 (1)		2015-2006 (2)	
	2006	2011	2015	2006	2011	2015	Absolute	Relative	Absolute	Relative
National	51.0	45.8	21.2	41.7	28.8	20.6	-29.8	-58.4	-21.0	-50.5
Male	49.6	40.9	20.9	41	25.9	21.4	-28.7	-57.8	-19.6	-47.9
Female	52.7	49.5	22.4	42.7	33.2	17.4	-30.3	-57.5	-25.3	-59.3
Urban	44.0	38.7	20.1	35.1	23.5	14.7	-23.9	-54.3	-20.3	-58.0
Rural	57.1	53.0	26.6	48.5	38	38.8	-30.5	-53.4	-9.7	-19.9
Note: (1)=Global MPI index using three dimensions and a cutoff =0.33 ; (2) MPI using six dimensions										

Source: Authors 'estimates using QUIBB (2006, 2011 and 2015)

Figure 1: Dominance analysis by gender (2006, 2011 and 2015)
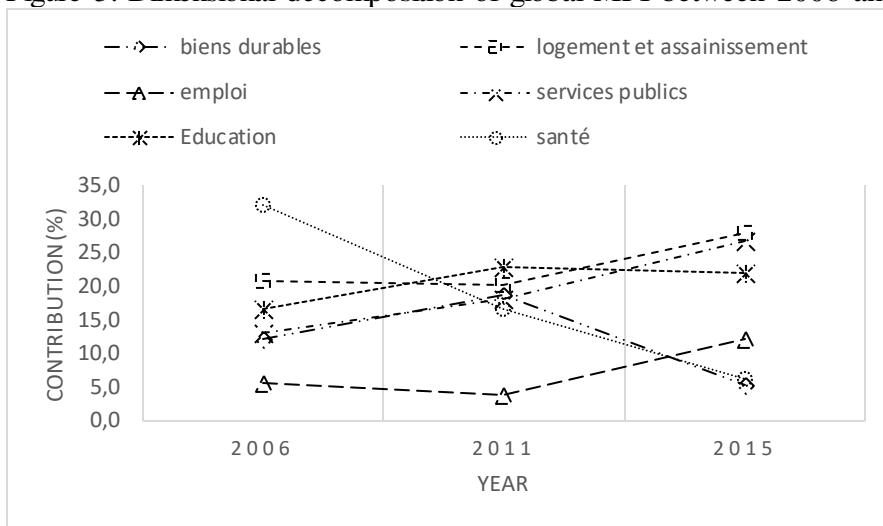

Source: Authors 'estimates using QUIBB (2006, 2011 and 2015)

Figure 2: Dominance analysis by residential area (2006, 2011 and 2015)
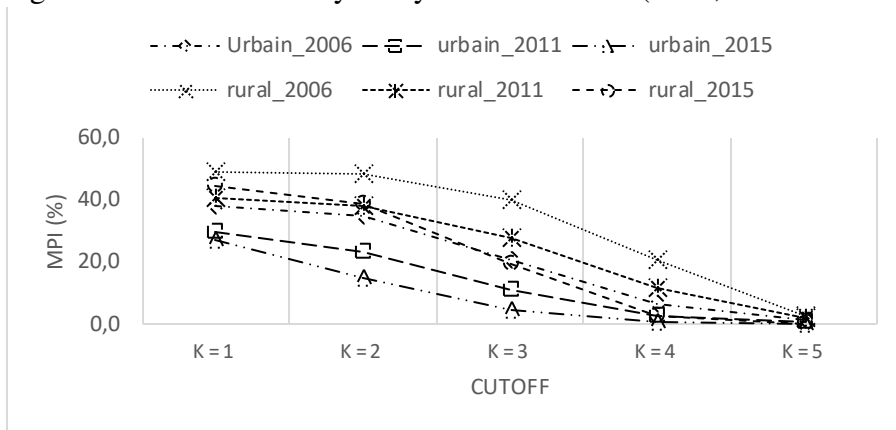
Source: Authors' estimates using QUIBB (2006, 2011 and 2015)

Figure 3: Dimensional decomposition of global MPI between 2006 and 2015 in Togo (cutoff=2)

Source: Authors' estimates using QUIBB (2006, 2011 and 2015)