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Multidimensional Poverty in Ethiopia

Changes in Overlapping Deprivations

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Abstract

This paper presents trends in monetary and nonmonetary dimensions of wellbeing in Ethiopia using data from the Household Consumption and Expenditure and Welfare Monitoring surveys implemented in 2000, 2005, and 2011. The paper provides evidence on changes in overlapping deprivations using a non-index approach to multidimensional poverty. It assesses the performance of various dimensions in education, health, and living standards, taking one indicator at a time. It then examines the overlap between different dimensions of poverty and examines how this has changed over time in Ethiopia and across rural and urban areas. It highlights that although Ethiopia's multidimensional poverty index is very high, there have been improvements in overlapping deprivations and, as a result, the number of individuals deprived in multiple dimensions has fallen.

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Multidimensional Poverty in Ethiopia: Changes in Overlapping Deprivations

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1. Introduction

Recent surveys document Ethiopia's considerable progress in a number of dimensions. For example, from 2005 to 2013 the number of health posts increased by 159 percent from 6,191 to 16,048. Similarly, from 2006 to 2013 the number of health centers increased by over 386 percent from 668 to 3,245 (FMOH, 2013). Other reports also show that immunization coverage increased from 14 percent in 2000 to 24 percent in 2011, modern contraceptive use increased from 6 percent to 27 percent, and the percentage of women ages 15-49 years who received antenatal services increased from 27 percent to 34 percent (EDHS, 2011). Infant mortality declined from 97 deaths per 1,000 in 2000 to 59 deaths per 1,000 in 2010, and under-five mortality decreased from 166 deaths to 88 deaths per 1,000. There have also been encouraging results from the education side. For example, in 2005 the primary net attendance rate for 7-12 year old children was 42.3 percent. In 2011, this increased by about 20 percentage points to 62.2 percent (EDHS, 2005 & 2011; Carranza and Gallegos, 2013).

Despite apparent progress on many aspects of wellbeing, progress has not been observed to the same degree in the multi-dimensional poverty index (MPI). The recent Oxford Poverty and Human Development Initiative (OPHI) global MPI data report shows that, in 2011, 87 percent of the population was MPI poor, i.e. deprived of at least one-third of the weighted MPI indicators (OPHI, 2014). This sets Ethiopia as the second poorest country in the world. Other studies that explored the multidimensional aspect of poverty in the country find that the reduction in poverty measured by the MPI declined by only about 10 percent compared to the 33 percent decrease in monetary poverty during the same period (Carranza and Gallegos, 2013). Overall, with over 85 percent of the population deprived, the index suggests the country's poverty is deep-rooted and complex.

This study examines multidimensional poverty in Ethiopia focusing on selected monetary and non-monetary dimensions of wellbeing. It follows previous studies to identify the dimensions of deprivations (Alkire and Roche, 2011). The poverty dimensions considered here are selected systematically through public consensus and empirical evidence about people's values. There is a disagreement on how to measure poverty using these deprivation dimensions, however. The two alternative approaches are scalar indices of multidimensional poverty (e.g. Alkire and Santos, 2010) and the dashboard approach (Ravallion, 2011) that considers deprivation in each dimension one by one. Each has its own pros and cons. Lugo and Ferreira (2012) propose a middle ground to capture the interdependency across dimensions without aggregating the dimensions into one index and this approach is followed here. It allows an assessment of progress on each aspect of deprivation and also on the degree to which individuals experience deprivation in many dimensions at once.

The study documents levels and trends of selected dimensions of wellbeing and then explores the dynamics of multidimensional poverty in Ethiopia over the last decade using Venn diagrams. It uses the Welfare Monitoring and Household Consumption and Expenditure surveys implemented in 2000, 2005, and 2011, to examine the distribution and overlap of key dimensions for different groups of households in Ethiopia. This approach is graphically compelling to view the trends in multidimensional poverty from 2000 -2011. Each Venn diagram represents a set of three deprivation indicators, showing how deprivation on each dimension has changed over time and how different dimensions of deprivation overlap (Atkinson and Lugo, 2010).

The analysis shows considerable progress on many aspects of wellbeing and reductions in the proportion of households experiencing multiple deprivations at once. The proportion of the

population experiencing multiple deprivations has declined particularly rapidly in rural areas. However, the analysis also documents that deprivation in some dimensions is still quite high and there are still a large number of households experiencing one out of any three selected deprivations.

The rest of the report is organized as follows. The next section describes the methodology and the data. Section 3 assesses progress in various dimensions taking one indicator at a time. Section 4 presents results of overlapping deprivation analysis using Venn diagrams for sets of three indicators. Section 5 discusses the results with emphasis on the disconnect between the MPI analysis and progress in various dimensions of poverty in Ethiopia. Section 6 concludes.

2. Data and poverty dimensions

The indicators considered in the analysis are selected based on their relevance to the country's policies and the MDGs. Accordingly, a total of 11 indicators are identified covering education, health, water, sanitation, access to information, and gender equality as well as measures of monetary poverty. Table 1 presents the definitions of the indicators and how households are counted as deprived in each dimension. All the indicators are defined at the household level, which is the unit of analysis.

The study uses the Household Consumption and Expenditure (HCES) survey and the Welfare Monitoring survey (WMS) data collected in 2000, 2005, and 2011. Starting in 1996 with the first WMS, these two nationally representative surveys are conducted every five years.[1,2] The number of households in the WMS sample is 26,072 in 2000, 36,352 in 2005 and 28,032 in

[1] WMS has been conducted together with HCES in 1995/96, 1999/2000 and 2004/05 and has also been carried out alone in 1997 and 1998.
[2] The 2000 WMS does not cover the non-sedentary population in Afar and Somalia Regional States.

2011. Likewise, the HCES surveys sample consists of 17,336 in the 2000 survey, 21,724 in the 2005 survey, and 28,032 in the 2011 survey.

Table 1. Deprivation indicators, definitions and their use for urban and rural analysis

Deprivation Indicator	Definition: A household is deprived when…	Urban	Rural
1. *Education, Health, Water and Sanitation*			
1.1 Education of school-aged children	…at least one child, age 7-15, in the household is not currently attending school.	√	√
1.2 Health facility quality	…the household reported dissatisfaction with at least one health facility visit, or did not use a health facility due to cost, distance, quality, or other reasons.	√	√
1.3 Health facility access	…the household is located more than 5 km away from the nearest health facility (clinic, health station, hospital, or health post).		√
1.4 Drinking water	…a safe drinking water source—piped water, protected water source, or rainwater—is not used by the household.		√
1.5 Sanitation	…an improved toilet—private flush toilet or private pit latrine—is not used by the household. (e.g. A household that uses an improved toilet facility, but it is shared, is deprived.)	√	√
2. Aspirations			
2.1 Source of information	…the household does not own a TV, radio, or phone.	√	√
3. Wellbeing of Girls and Women			
3.1 Education of female school-aged children	…at least one girl child, age 7-15, in the household is not currently attending school.	√	√
3.2 Institutional birth	…at least one child, age 0-4, in the household was not born in a health facility.	√	
3.3 Female circumcision	…at least one girl child, age 0-14, in the household has been (or will be) circumcised.	√	√
4. Monetary Dimensions			
4.1 Assets	…none of these assets are owned by the household: fridge, phone, radio, TV, bicycle, jewelry, or vehicle.	√	√
4.2 Below poverty line	…the household's real total consumption expenditure per adult is lower than the poverty line (3781 Birr).	√	√

Note: The columns Urban and Rural specify which indicators are used in the overlap analysis for urban areas and rural areas. Access to a health facility and access to a safe drinking water source are present for nearly all urban households, so they are not considered in the overlap analysis. Institutional birth is not considered in the overlap analysis for rural households because almost all children in rural areas aged 0-4 years were not born in a health facility.

HCES and WMS data are used rather than the Demographic and Health Survey (DHS) because they allow dimensions of wellbeing to be compared to the monetary poverty data.[3] However the trends in wellbeing that were documented in Carranza and Gallegos (2013) using the DHS are reported where relevant. While the HCES and WMS surveys conducted in different years are in general similar in their coverage and representativeness, some content differences exist and Appendix-A (Tables A1 and A2) provides more details and compares the indicators used in this study to those indicators selected for the MDGs and the MPI

3. Progress in various dimensions of wellbeing

This section assesses progress in wellbeing taking one indicator at a time. The performance of each deprivation indicator is analyzed over the period 2000-2011 and the change is tested for significance.[4] Table 2 presents how the deprivation incidence has changed over time for all indicators.

Table 2 shows significant improvements in the dimensions of education, health, water and sanitation. The proportion of households with a child between the ages of 7 and 15 that had a child out of school fell from 83 percent to 58 percent in rural areas, and 26 percent to 16 percent in urban areas. Progress would have been even more dramatic had the age range been restricted to younger children. The WIDE-3[5] study found that nearly all 7 year olds were enrolled in school in the six study sites visited in 2013 (Bevan, Dom and Pankhurst, 2014). Carranza and Gallegos (2013) also document considerable progress in education enrollment and outcomes using the DHS data. The net attendance rate for primary education increased from 30 percent in 2000 to 62

[3] Notably, the 2005 and 2011 WMS surveys do not collect anthropometric measurements of children or immunization coverage. Children's physical health is not focused upon in this study. Other recent studies investigated multidimensional child wellbeing in Ethiopia using DHS data (Plavgo et al., 2013).
[4] The sole indicator that captures households' cultural practices is only available in 2011 and thus no trends can be confirmed.
[5] Wellbeing and Illbeing Dynamics in Ethiopia (WIDE)

percent in 2011. As a result, the share of the population aged 15 and 24 able to read at least part of a sentence increased five-fold from 8 to 36 percent, the share of the population aged 6 years and over with no education declined from 69 percent to 46 percent, and the average years of schooling of this population increased from 4.0 to 4.5 years.

Table 2. Proportions of deprived households in the total population in urban and rural areas, 2000 - 11

Deprivation Indicator	Urban					Rural				
	2000	2005	2011	Change 2011-2005	Change 2011-2000	2000	2005	2011	Change 2011-2005	Change 2011-2000
1. Education, Health, Water and Sanitation										
1.1 Education of school-aged children	0.26	0.26	0.16	-0.10***	-0.10***	0.83	0.80	0.58	-0.22***	-0.25***
1.2 Health facility quality	-	0.74	0.67	-0.07***	-	-	0.83	0.77	-0.06***	-
1.3 Health facility access	0.02	0.01	0.04	0.03***	0.02**	0.62	0.56	0.32	-0.24***	-0.30***
1.4 Drinking water	0.08	0.07	0.05	-0.02*	-0.03**	0.82	0.77	0.59	-0.18***	-0.23***
1.5 Sanitation	0.54	0.51	0.53	0.02	-0.01	0.93	0.83	0.45	-0.37***	-0.48***
2. Aspirations										
2.1 Source of Information	0.33	0.25	0.15	-0.10***	-0.18***	0.86	0.79	0.62	-0.17***	-0.25***
3. Wellbeing of Girls and Women										
3.1 Education of school-aged girls	0.22	0.23	0.14	-0.09***	-0.08***	0.79	0.72	0.46	-0.26***	-0.33***
3.2 Institutional birth	-	0.59	0.52	-0.07***	-	-	0.98	0.96	-0.02***	-
3.3 Female circumcision	-	-	0.19	-	-	-	-	0.30	-	-
4. Monetary Dimensions										
4.1 Assets	0.33	0.21	0.12	-0.08***	-0.21***	0.86	0.69	0.53	-0.16***	-0.33***
4.2 Below national poverty line	0.36	0.35	0.26	-0.09***	-0.10***	0.45	0.39	0.30	-0.09***	-0.15***

Notes: Deprivation indicators are specified for 2011. Details on these 2011 indicators and notes about the minor differences in definitions for the 2000 and 2005 indicators are included in Appendix A (Tables A1 and A2). The two education indicators are defined for those households with at least one school-aged child (aged 7-15) and with at least one school-aged female child, respectively. The institutional birth indicator is defined for those households with at least one child aged 0-4. The female circumcision indicator is defined for those households with at least one female children aged 0-14. The "Change" columns show the coefficient estimate for the difference in proportions from 2000 (or 2005) to 2011. The asterisks indicate the significance level: *** p<0.01, ** p<0.05, * p<0.1.

The proportion of households living farther than 5 km from the nearest health facility almost halved between 2005 and 2011, from 56 percent to 32 percent, driven largely in part by the establishment of health posts and a system of health extension workers. There have also been improvements in access to quality health facilities in rural areas, but progress has not been as fast as improvements in access and improvements have been slower in urban areas. This is probably due to the challenge associated with improving health facility quality in this short period of time.

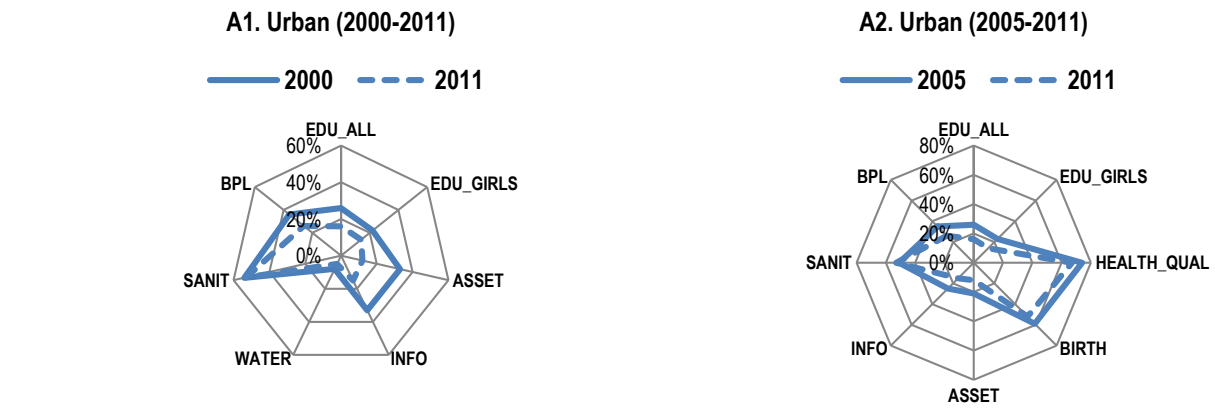
There also have been vast improvements in sanitation facilities and drinking water in rural areas. The proportion of individuals without access to improved sanitation fell from 93 percent in 2000 to 45 percent in 2011 and the proportion of individuals without access to safe drinking water sources fell from 82 percent to 59 percent. Government policies for rural areas seem to have been particularly successful in ensuring better access to private toilet facilities and safe drinking water sources. Indeed the WIDE-3 found that in all eight of the food insecure communities included in the study, provision of health services, drinking water and education had expanded considerably since 2003. Health extension workers had been effective at making people aware of hygiene and environmental sanitation.

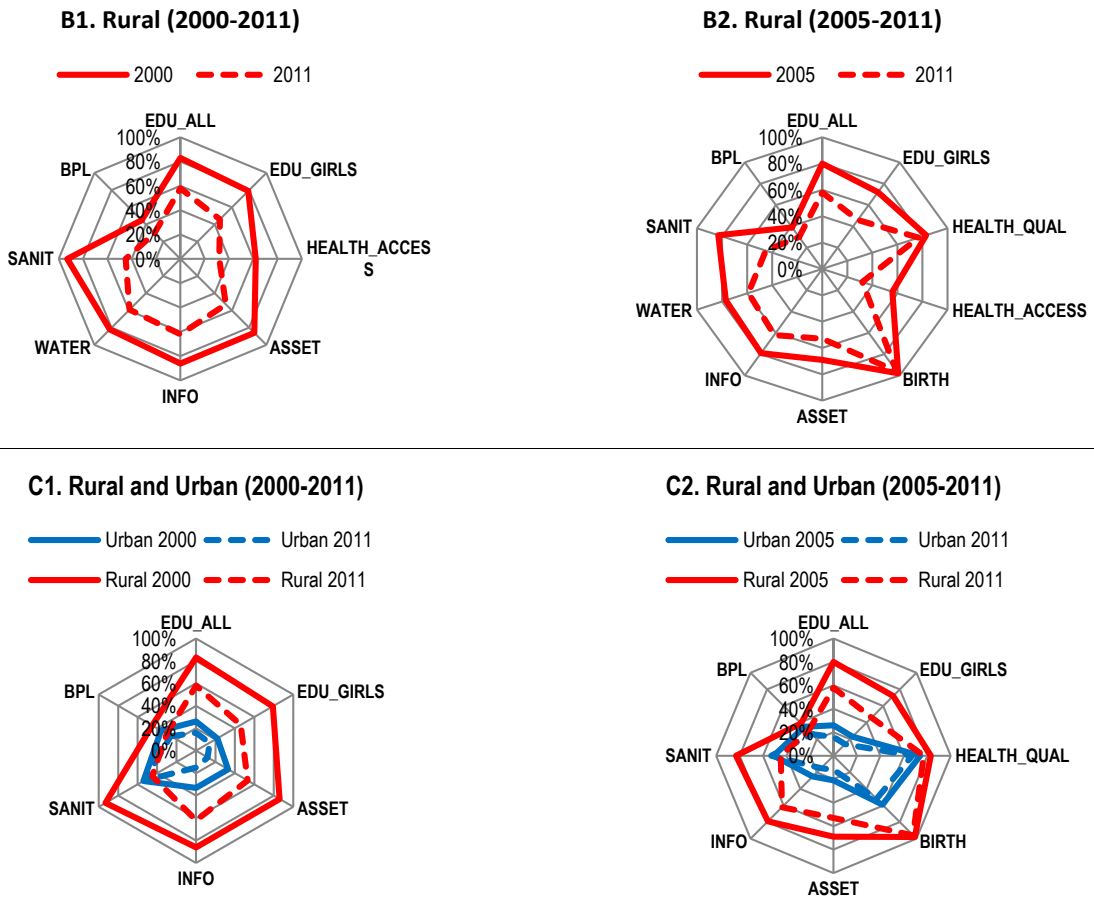
Changes in the monetary measures of wellbeing indicate more asset ownership and fewer households below the poverty line in 2011 than in 2005. There have been significant reductions in deprivations of monetary poverty in all parts of the country. However, similar to all other non-monetary indicators, the decline in monetary measures of poverty is more pronounced in rural than urban areas. Asset ownership deprivations declined by 15 percentage points in rural areas and by 10 percentage points in urban areas. Similarly, over the 2000-11 period, rural households below the poverty line declined by 15 percentage points (from 45% in 2000 to 30 % in 2011) while the decline for urban households were by 10 percentage points (from 36% in 2000 to 26%

in 2011). Other results in Table 2 include reductions in information deprivations and mixed improvement in the dimensions that are more relevant to the wellbeing of girls and women.

The reductions in deprivations presented in Table 2 are also illustrated by the movement of graphs from 2000 to 2011 and 2005 to 2011 (Figure 1). Panel A and Panel B illustrate movements of the indicators in urban and rural areas respectively. Panel C combines both and takes only indicators for which information is available in both rural and urban areas. The graphs show reductions in all dimensions. This Figure also shows that the reductions in rural areas have been much larger than in urban areas (Figure 1: A1 and A2 vs. B1 and B2). However, the rates of deprivation in rural areas are still higher. In some cases, the 2011 rates in rural areas are close to the rates in urban areas that were observed in 2000 (Figure 1: C1 and C2).

Figure 1. A single deprivation analysis in urban and rural areas, 2000 -11 and 2005-11





Note: EDU_ALL is education deprived; EDU_GIRLS is education deprived (girls); HEALTH_QUAL is health deprived (quality); HEALTH_ACCESS is health deprived (access); BIRTH is institutional birth deprived; ASSET is asset deprived; INFO is information deprived; WATER is safe drinking water deprived; SANIT is improved sanitation deprived; and BPL is below monetary poverty line.

Overall, there have been significant reductions in many dimensions of deprivation from 2000 to 2011, particularly in rural areas. In both rural and urban areas there have been significant reductions in the proportions of deprived populations in all dimension and the declines from 2000 -11 and from 2005-11 were found significant (at the 1% level) for almost all indicators. These results are in line with other recent studies, for example, Carranza and Gallegos (2013) using the 2000, 2005 and 2011 DHS, and the WIDE-3 qualitative studies on Wellbeing and Ill-

being Dynamics in rural Ethiopia. [6] Their finding confirms that of the Alkire and Roche (2013) results.[7]

However, deprivation rates are higher in rural than in urban areas in 2011. As indicated in Figure 1 Panel C, the deprivations in rural areas are higher than that of the urban areas. In most cases the 2011 deprivation levels in rural areas are higher than that of the urban areas in 2005 and 2011. There are more households below the poverty line in rural areas. Rural households still have more children out of school, about one-third of them still live farther than 5 kilometers from a health facility, and the practice of female circumcision is still more prevalent in rural areas. Rural households own fewer assets, and have less access to information and safe drinking water.

[6] The indicators they investigated include (i) *education*: attainment, literacy and enrollment; (ii) *health:* antenatal visits, immunization, child morbidity and undernutrition; (iii) *household access to basic services*: electricity, clean cooking fuels, piped water, distance to water source, and toilet facility; (iv) household infrastructure: floor material and roof material, (v) *household possessions*: tenancy of crop land, livestock, mobile phones and bank account; and (vi) *women empowerment*: employment, cash earnings (if employed), control over cash earnings and attitudes toward wife beating. There has been improvement over the 2000-2011 period in all but a few indicators including tenancy of crop land in the household possessions category and two indicators in the women empowerment category including employment and control over cash earnings.

[7] The MPI captures multi-dimensional poverty and covers 104 developing countries. Instead of measuring poverty indirectly by consumption – usually measured by household expenditures over a short recall period – the MPI assesses deprivation directly in the three Human Development Index dimensions: health, education, and living standards. The index is based on a deprivation score and calculated by the product of the incidence and the intensity of deprivation. Alkire and Roche (2013) use the DHS data and a person is identified as MPI poor if he or she is deprived in at least one third of the following 10 indicators: (i) *Years of schooling*: if no household member has completed at least 5 years of schooling; (ii) *Child school attendance*: if any school-aged child is not attending school in years 1 to 8; (iii) *Child mortality*: if any child has died in the family; (iv) *Nutrition*: if any adult or child for whom there is nutritional information is malnourished; (v) *Electricity*: if the household has no access to electricity, (vi) *Drinking water*: if the household has no access to clean drinking water or clean water is more than a 30-minute walk from home; (vii) *Improved sanitation*: if the household doesn't have an improved toilet or if the toilet is shared; (viii) *Flooring*: if the household has dirt, sand or dung floor; (ix) *Cooking Fuel*: if the household cooks with wood, charcoal or dung; and (x) *Assets*: deprived if the household does not own more than one of the following: radio, TV, telephone, bicycle, or motorbike, and does not own a car or tractor.

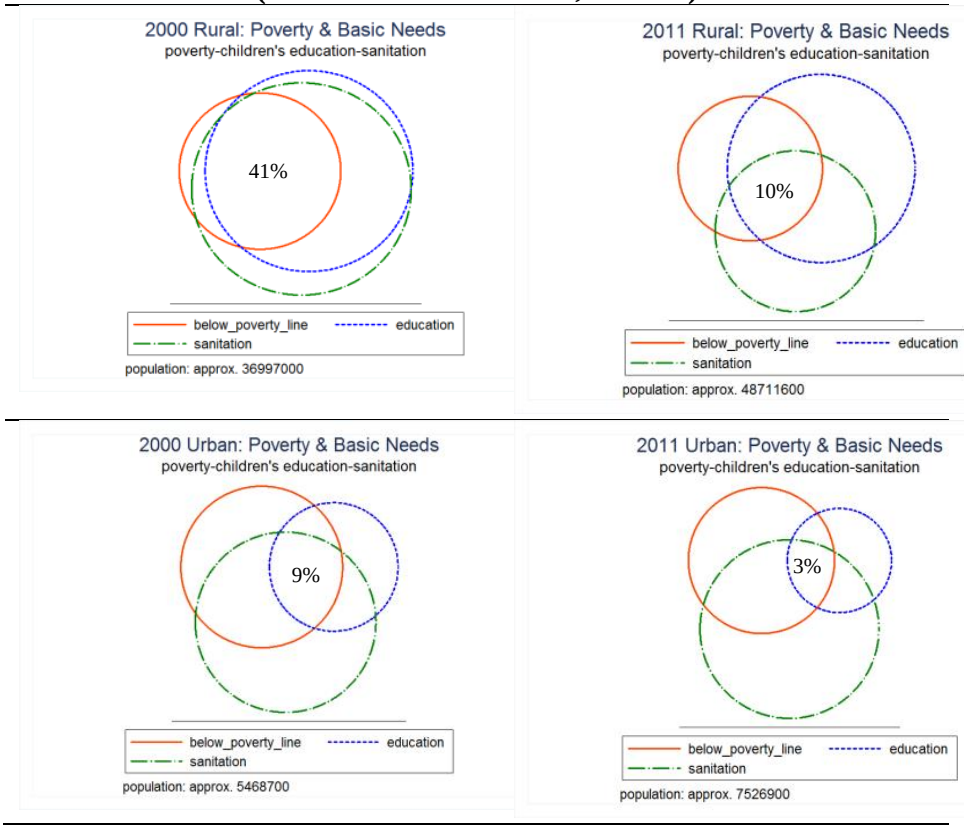
4. Overlapping deprivations

The deprivation overlap analysis uses Venn diagrams, which are presented for sets of three indicators. Circle areas in the diagram represent the approximate proportion of the population with the deprivation. Intersection areas represent the approximate proportion of the population with two, or all three, deprivations. Changes in deprivations are observed in two ways: the change in the size of the circles and the change in the overlap area. Improvements in terms of reduction in a deprivation over time are observed when the circle for the deprivation under consideration is smaller now (2011) than it was before (2000 or 2005). Likewise, improvements in reduction in multiple deprivations are illustrated as the three circles move apart. Each diagram has a corresponding table in Appendix B which indicates the proportion of households found in each segment of the diagram.

4.1 Overlapping deprivations in basic services

This section examines changes in overlapping deprivations in basic services and monetary poverty. Figure 2 presents changes in the combination of education, sanitation and monetary poverty indicators. Appendix-B, Table B1 presents the details of Figure 2. It shows that 50 percent of the population was money poor, 83 percent had a child out of school and 93 percent did not have improved access to sanitation. The poverty rate fell in rural areas from 2000 to 2011 and this is depicted by the solid circle decreasing in size. Fewer poor households have children out of school or lack improved sanitation and as a result all the circles moved apart in 2011 when compared to their relative position in 2000, showing a clear decline in overlapping deprivations.

Figure 2. Monetary, education and sanitation deprivation (in urban and rural areas, 2000-11)



Note: Details for these diagrams are in Appendix B, Table B1. Multiple deprivations in all the three dimensions declined from 41% to 10% in rural areas and from 9% to 3% in urban areas. Put another way, between 2000 and 2011 the proportion of households that is not deprived in any of the above three dimensions increased from 1% to 18% in rural areas and 28% to 33% in urban areas.

Figure 2 also shows that, in 2000, nearly all rural households that experienced deprivation in monetary wellbeing, education or sanitation experienced it on multiple dimensions, but by 2011 this was no longer the case. The inter-relationship between education, poverty and sanitation over the 2000-2011 periods is examined first to understand deprivation in urban and rural areas. The contrast between rural Ethiopia in 2000 and 2011 is shown quite dramatically in the top panel of Figure 2. In 2000, 4 out of 10 rural households (41%) were deprived in all three dimensions considered, whilst in 2011 only 1 in 10 rural households (10%) was thus deprived.[8]

[8] The proportions of deprivations used to construct all the Venn diagrams in this section are presented in Appendix B. For example, Table B1 provides information used in Figure 2. The first three rows of Table B1 reflect the deprivation incidence for each indicator separately. The first three rows are similar to the values in Table 2 (single

The reductions in deprivation on all three dimensions also resulted in a reduction in the number of households simultaneously deprived.

Progress in reduction in multidimensional deprivation in urban areas is also evident, but higher initial rates of school enrollment and little progress in improving sanitation has resulted in much slower progress. The proportion of households deprived in monetary wellbeing, education and sanitation is much lower in urban areas. Only 9 percent of households were deprived in all three dimensions in 2000 and this fell further to 3 percent in 2011. Urban households have a less substantial reduction in part due to their better initial access to education and higher enrolment rates but also in part due to slow progress in improving sanitation in urban areas. In 2000, 51 percent of urban households were sanitation deprived and in 2011 this had fallen only slightly to 47 percent.

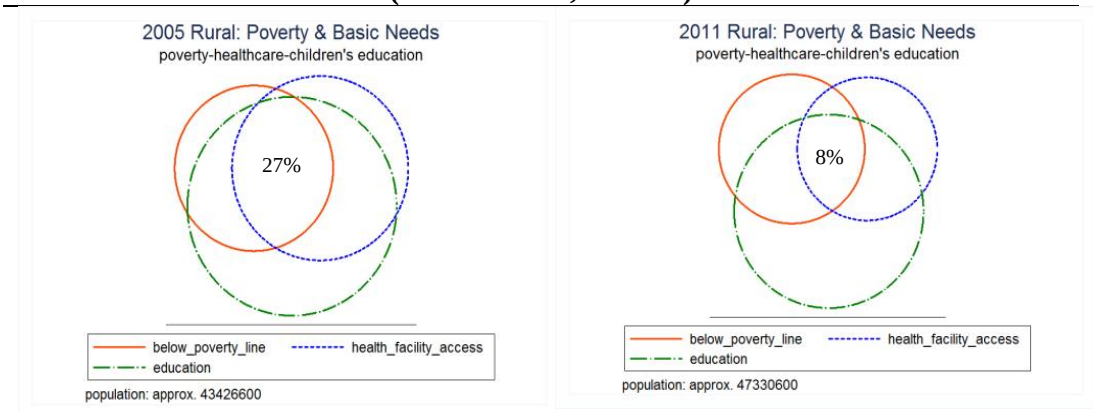
A similar picture of progress, although somewhat slower, emerges when considering healthcare in place of sanitation. Two different measures of healthcare are used: distance to the nearest health facility and health facility quality. In rural areas, distance to the nearest health facility is used which allows a comparison of access to healthcare consistently across 2000, 2005 and 2011. However, this does not capture differences in the quality of healthcare. In urban areas, a measure of distance to the nearest health facility shows very few households as deprived. Access to quality healthcare is considered for both urban and rural areas as a result.

In Figure 3, the 2000 and 2011 diagrams for rural areas clearly show a substantial exit of individuals from multiple deprivations. The reduction in the proportion of the rural population deprived in all three dimensions is over 19 percentage points, i.e. from 27 percent in 2000 to 8

deprivation analysis). However, in the Venn diagrams the deprivations rates are calculated after having dropped those observations with missing data for any of the three indicators.

percent in 2011. This is probably due to the introduction of health posts that were set up after 2005 to better serve the rural population.

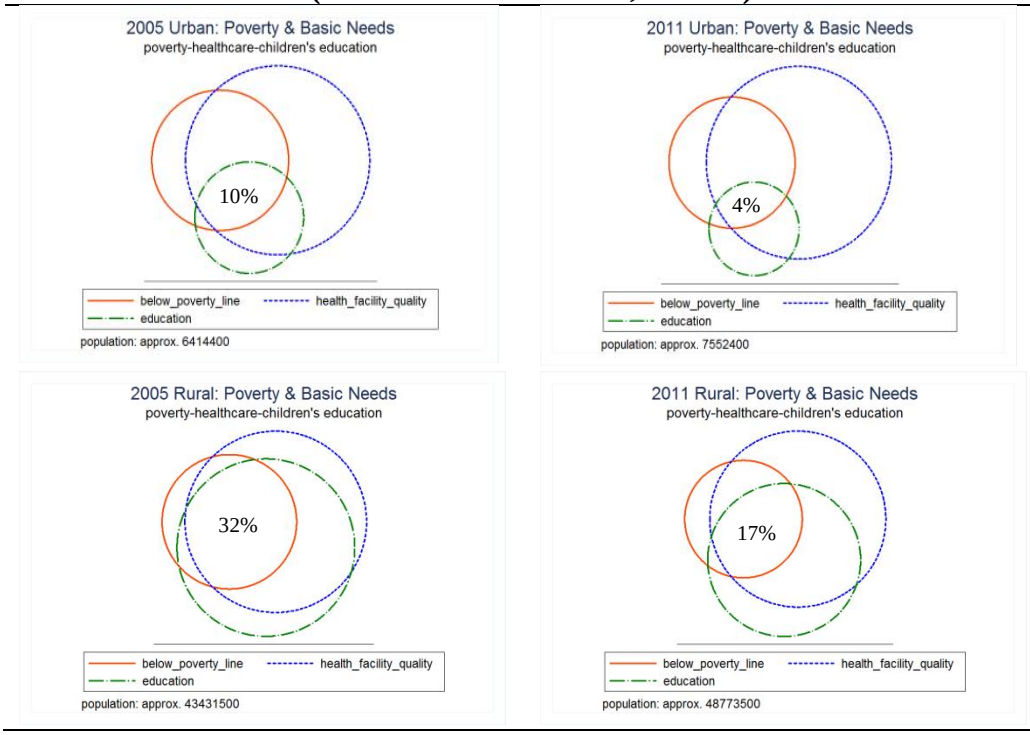
Figure 3. Monetary, education and health deprivation (in rural areas, 2005-11)



Note: Details for these diagrams are in Appendix B, Table B2. The decline from 27% to 8% means that between 2005 and 2011 the proportion of households that is not deprived in any of the above three dimensions increased from 4% to 21% in rural areas.

However, a greater incidence of multidimensional poverty is observed in rural areas when a measure of the quality of the health services received is also incorporated. In Figure 4, a health facility quality indicator is interacted with monetary poverty and children's education. In urban areas, the deprivation from all the three indicators combined declined from 10 percent in 2005 to 4 percent in 2011. During the same period the combined deprivation in rural areas almost halved, but 17 percent of rural households were still deprived in all dimensions in 2011. This is because of the slower progress in increasing the quality of health services in rural areas.

Figure 4. Monetary, education and health deprivations (in urban and rural areas, 2005-11)



Note: Details for these diagrams are in Appendix B, Table B3. The declines in multiple deprivations, from 10% to 4% in urban areas and from 32% to 17% in rural areas also mean that between 2005 and 2011 the proportion of households that is not deprived in any of the above three dimensions increased from 12% to 19% in urban areas and 2% to 7% in rural areas.

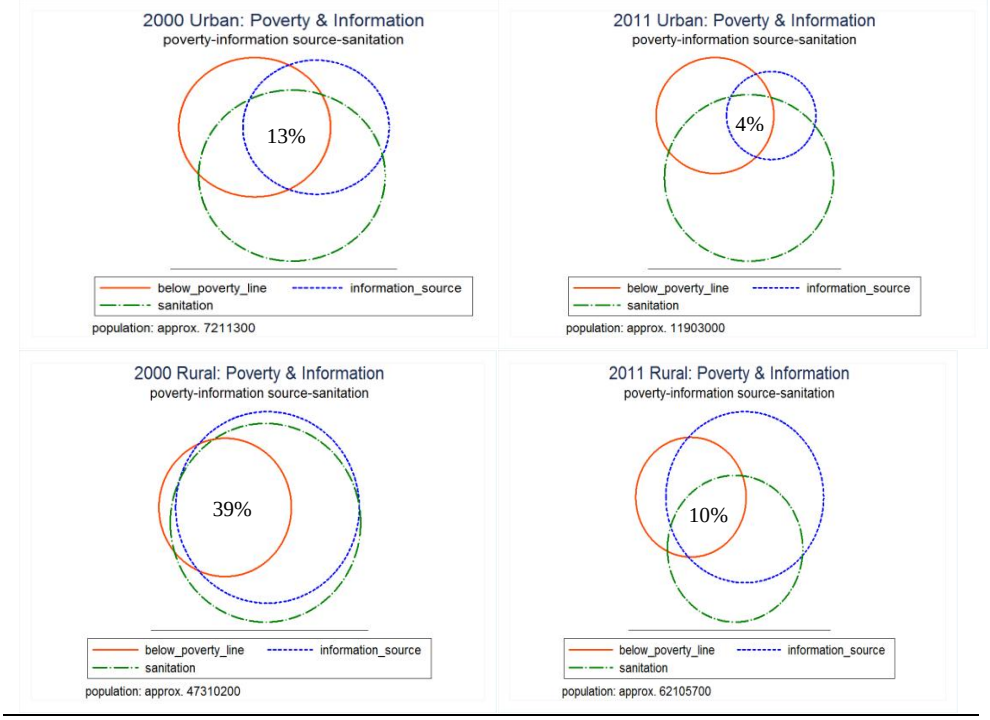
4.2 Overlapping deprivations in aspirations and monetary poverty

Multidimensional poverty has reduced over time when considering the deprivation indicators of information sources, intersected with monetary poverty and sanitation. In urban areas, the decline was from 13 percent in 2000 to 4 percent in 2011 and in rural areas, the decline was from 39 percent in 2000 to 10 percent in 2011 (Table B4, Figure 5). While the reductions were substantial in rural areas, the level of information source deprivation remains high.

Although there was a substantial reduction in multiple deprivations, over half of the rural population still did not have access to an information source in 2011.This is despite the proportion of households owning a mobile phone increasing by almost fifteen times between 2005 and 2011 (Carranza and Gallegos, 2013). The lack of access to these "information assets"

limits access to outside information. This in turn limits the horizons and aspirations of rural households, especially those in remote places. The 2005 Ethiopia Poverty Assessment documented the high degree of remoteness for many households in Ethiopia. Although there have been improvements in this regard, this data suggests that for many access to outside sources of information remains difficult. Bernard et al. (2014) show that increased access to information—that increases the aspirations window of households in remote locations in Ethiopia—has a substantial impact on investments made in children's education. This suggests that this deprivation also comes with substantial economic and social costs.

Figure 5. Monetary, information and sanitation deprivation (in urban and rural areas, 2000-11)



Note: Details for these diagrams are in Appendix B, Table B4. Multiple deprivations in all the three dimensions declined from 13% to 4% in urban areas and from 39% to 10% in rural areas. Between 2000 and 2011, the proportion of households that is not deprived in any of the above three dimensions increased from 28% to 33% in urban areas and 1% to 19% in rural areas.

4.3 Overlapping deprivations that particularly affect girls and women

This section considers selected indicators that particularly affect the wellbeing of girls and women. Of the total 11 indicators considered in this study three are particularly important for the wellbeing of girls and women: female circumcision, institutional birth and girls' education.

There has been substantial progress in investments in education for girls aged between 7 and 15. In 2000, more than three-quarters of rural households with school-aged girls had at least one girl not in school, but by 2011 this had fallen to less than half of all rural households. In urban Ethiopia progress was also observed, albeit from a much better baseline: In 2000, 22 percent of households with school-aged girls had at least one girl out of school and this fell to 14 percent in 2011. This progress is reflected in primary school net attendance ratios for girls which rose from 28 percent in 2000 to 62 percent in 2011 (Carranza and Gallegos, 2013). Remarkably, in the period 2000-11, the original gap in primary school net enrollment rates observed in favor of boys disappeared.

Very few women report giving birth in a health facility although the number of women receiving antenatal visits increased. Almost no rural women recorded giving birth in a health facility in 2011 (4 percent) and 1 in 2 urban women were similarly deprived. This represents a considerable health challenge in Ethiopia today. The WIDE-3 studies documented that despite a government campaign to encourage all babies to be delivered at health centers launched early in 2013, most births were still taking place at home with the assistance of traditional birth attendants and in some places Health Extension Workers due to practical and cultural preferences (Bevan, Dom and Pankhurst, 2014). However, the DHS data shows that the proportion of women who had an antenatal visit during their most recent pregnancy in the

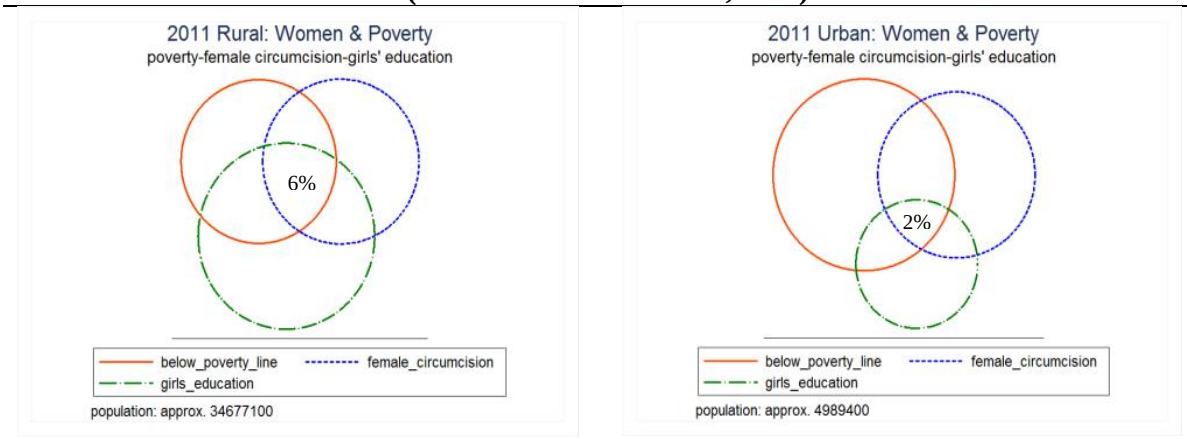
previous five years, increased from 27 percent in 2000 to 43 percent in 2011 (Carranza and Gallegos, 2013).

Physical violence against women became less socially acceptable during the decade, but the rates of women and men that believe physical violence is justified remains high. Between 2000 and 2011, the share of women who found wife beating acceptable under specific circumstances decreased from 85 to 68 percent. The reduction was larger among younger women (it fell to 64 percent) and among men. In 2000, 75 percent of men justified wife beating and in 2011 this was 45 percent (Carranza and Gallegos, 2013). The high proportion of women and men who still agree with wife beating is concerning. Carranza and Gallegos note that the belief that domestic violence is justified is frequently correlated with poorer wellbeing outcomes among women and their children. Women who believe that a husband is justified in hitting or beating his wife tend to have a lower sense of entitlement, self-esteem and status. Such a perception acts as a barrier to accessing health care for themselves and their children, affects their attitude towards contraceptive use, and impacts their general wellbeing.

The harmful practice of female circumcision is still widespread despite its illegality. A 2003 UNICEF report ranks Ethiopia among the top countries where female genital mutilation or cutting (FGM/C) practices are common (UNICEF 2003). The report shows that there were 23.8 million girls/women who have undergone FGM/C. In 2011, 30 percent of Ethiopians in rural areas and 19 percent of Ethiopians in urban areas lived in households in which a girl younger than 14 had been or would be circumcised. The WIDE-3 studies documented that the practice was still widespread and that in some sites there was vocal female opposition to the ban (Bevan, Dom and Pankhurst 2013).

Few girls are simultaneously out of school, experiencing poverty and facing circumcision; but more than 3 in 4 rural households with girls and more than 2 in 4 urban households with girls are deprived in at least one of these dimensions. Figure 6 shows that in 2011, women in rural households had a higher chance of experiencing all three deprivations largely as a result of the higher rates of education deprivation for girls. In general, however, especially in urban areas, the overlap between these different dimensions of wellbeing is low. A number of non-poor households have girls who are out of school and practice female circumcision in both rural and urban areas. Few girls are deprived in all three deprivations which is a positive finding. However the flip side to this is that many girls in Ethiopia today experience some form of deprivation, they are either poor, not in school or underwent (or will undergo) female circumcision.

Figure 6. Multiple deprivations affecting women (in rural and urban areas, 2011)



Note: Details for these diagrams are in Appendix B, Table B5. In 2011, the proportion of households that is deprived in any of the above three dimensions were 6% in rural areas and 2% in urban areas. The proportion of households that is not deprived in all the three dimensions was 22% in rural areas and the 47% in urban areas.

Girls who work as domestic maids are most likely to be deprived in investments in education: only 20 percent of school-aged children who are non-relatives and employed by the household in which they reside are in school. Relatively better off households, especially in

urban areas, employ children as maids for domestic services including babysitting, cooking and other chores. These children (not related to their employer) are less likely to be in school.

Table 3. Deprivation status for school aged children (aged 5-17) by relationship, 2011

Child Status	Non-relative, employed by the household	All other children
In school	0.20	0.65
Below poverty line*	0.04	0.34

Source: Computed from WMS and HCES 2011. Note: * Household level indicator.

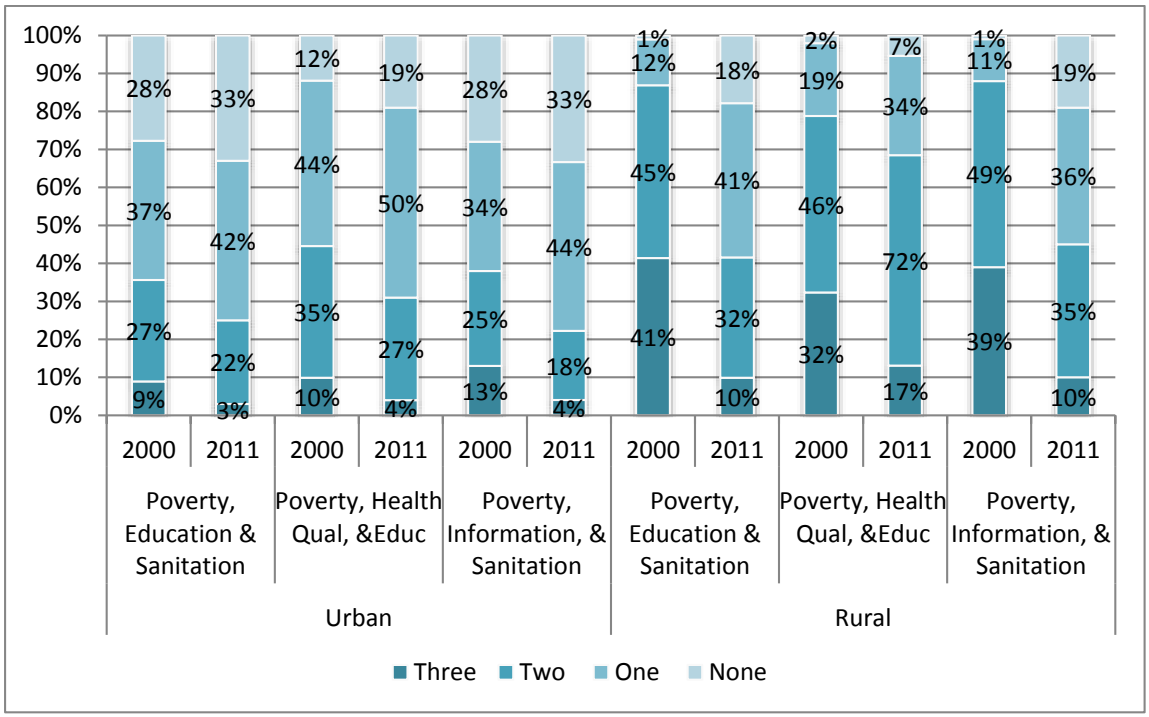
Table 3 shows enrollment status in 2011 was 20 percent for these children compared to 65 percent for all children. However, a monetary poverty indicator puts these children in the better off category. These children are rarely employees in poor households and are most often girls employed by urban families.

5. Discussion

5.1 Exit from overlapping deprivations

The analysis in the previous sections points to considerable progress in reducing multidimensional poverty in Ethiopia. The previous sections presented results from single and overlap deprivation analysis. The single deprivation analysis shows that there has been substantial progress in various dimensions of wellbeing. Likewise, the evolution in overlapping deprivations shows that there have been improvements in overlapping deprivations; it indicates that more households are having fewer deprivations. This is illustrated in Figure 7 using three different combinations in urban and rural areas.

Figure 7. Evolution of overlapping deprivations over time
(Percentage of urban and rural households experiencing zero, one, two, or all three deprivations from 2000 -11)



Source: HCES 2000 and HCES 2011.

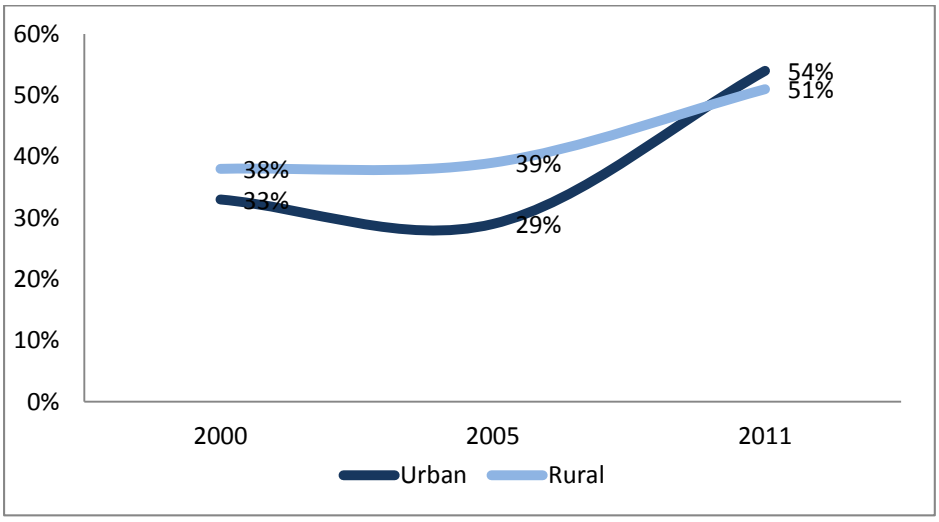
Figure 7 shows additional information that is not shown on the Venn diagrams presented in earlier sections. The figure also includes information on the dynamics of the proportion of households that are not deprived in any dimension. It shows that the percentage of households experiencing none of the selected deprivations has increased substantially over time, and is about one-fifth of the rural population in 2011 for rural areas and about one-third in urban areas. This means that roughly 4 out of 5 households in rural areas and 2 out of 3 households in urban areas are deprived for any set of three dimensions considered. In addition, there is an indication of narrowing in the rural-urban gap in deprivations because the increase (in percentage points) of non-deprived is, in general, higher in rural than urban areas. For example, in two of the three cases presented in Figure 7, the proportion of non-deprived increased by 17 percentage points

(monetary poverty, education & sanitation deprivations) and by 18 percentage points (monetary poverty, information & sanitation deprivations). However, the improvement in urban areas was only 5 percentage points for both cases. The increase was about the same in both areas when health quality is combined with monetary poverty and sanitation

5.2 People's perceptions about well-being

What are the perceptions of the households about the changes in wellbeing? Households were asked to provide their opinion on the situation of their living standards now compared to the situation 12 months ago. Figure 8 presents trends in (unfavorable) perception about wellbeing in urban and rural areas from 2000-11. In general, the perceptions of households about improvement in wellbeing do not parallel the reductions in overlapping deprivations. The responses more or less remained the same over the 2000 -2005 period. However, in both rural and urban areas, the negative perception about well-being compared to a year before the survey increased substantially in 2011. In 2011, about half of the households say that situation is worse now (at the time of the survey in 2011) than it was a year ago.

Figure 8. Trends in unfavorable perception about well-being



Source: Computed from WMS/HCES 2000-11 data.

However, the perception of worsening does not reflect a true worsening from 2005 to 2011 because the reference period is a year ago from the survey date. However, it may reflect a worsening from 2010 to 2011. It could be that on some dimensions, wellbeing improved before worsening. Therefore, without additional, more frequent surveys it is not possible to test this hypothesis. With these limitations, however, when perception about well-being is considered as one indicator in the poverty dimensions the overall progress from 2000-2011 would be small than the one discussed in the previous sections.

5.3 Disconnect with results from index-based studies

This study offers evidence on the dynamics of multidimensional poverty using a non-index approach. Although the results are not directly comparable with index based studies, the considerable reductions found in overlapping deprivations do not match the story coming from the findings of the MPI study (OPHI, 2014). In addition to the differences in the methodology of aggregating the indicators there are also differences in the choice and measurement of them. All these are expected to lead to differences in the results. The dimensions in this study are based on inputs rather than outcomes. The HCES data only reflects inputs to health outcomes: access to health services and improved sanitation and drinking water, and not health outcomes. There has been progress on other inputs measured in the DHS such as the proportion of women receiving an antenatal visit (increased from 27 percent to 43percent) and in full immunization coverage (14 percent to 24 percent). However, further improvements are needed and progress is also needed on the quality of diets and increased awareness of health behaviors. Although fast improvement was recorded in monetary poverty (which used to reflect command over resources), the measures of living standards used in the MPI suggests a very high proportion of people deprived in this

dimension and very slow progress over time: 84 percent of people are deprived in this dimension in 2011 and only 8 percent improvement was recorded between 2000 and 2011.

Finally, unlike the MPI, the approach used in this study does not easily allow cross-country comparisons. The MPI allows the comparison on a broad range of dimensions in one index, and it usefully draws attention to the further need for progress in Ethiopia. However, using the aggregate measure alone as a statement about the level of poverty and changes in poverty over time does not reflect the full reality.

6. Conclusion

This study analyzed multidimensional poverty in Ethiopia focusing on selected dimensions of education, health, culture and living standards. It used nationally representative data from the Household Consumption and Expenditure and Welfare Monitoring surveys implemented in 2000, 2005 and 2011. Single and multiple deprivation analyses are conducted on 11 multidimensional poverty indicators. The single deprivation analysis investigated levels and trends taking one indicator at a time. The multiple (overlap) analysis used Venn diagrams to analyze changes in multiple deprivations. Each Venn diagram represented a set of three deprivation indicators. This approach is graphically compelling to view the trends in multidimensional poverty.

The single deprivation analysis reveals that rural areas have seen large reductions in different dimensions of poverty, but the extent of deprivation incidence is still higher in rural areas. The movements of most of the indicators over the 2000-2011 period show considerable improvement in education, health and living standards dimensions. This confirms the positive story of monetary poverty reduction and considerable GDP growth presented in other analyses and official statistics. This indicates a continued emphasis in successful execution of pro-poor

policies in rural areas. However, while there have been impressive reductions, the incidence of rural poverty is still more than double the urban poverty. The focus of current policies may need to integrate the needs of urban households whose progress in reductions in deprivation incidence is slower.

The overlap analysis shows a clear exit of households experiencing multiple deprivations over the last decade. The movement of various combinations of multiple deprivation indicators illustrated using Venn diagrams in previous sections shows that more people are moving out of multidimensional poverty. While the choice of the number and mix of the indicators depends on the current priorities, the various illustrations show that for any set of three indicators considered, households who previously were experiencing three deprivations simultaneously are now experiencing two, one, or none of these deprivations. Those who were money poor had fewer deprivations in other dimensions in the later years.

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APPENDIX A: DEPRIVATION INDICATORS

Table A1: Deprivation Indicators in the Dimensions of Education, Health, Water and Sanitation

Indicator	Atkinson & Lugo (2010)	OPHI MPI (2013)	MDG indicators (2008)	Ethiopia WMS-HCES 2000, 2005, 2011	2000	2005	2011	Urban/ Rural Indicator
Education of School-aged Children	school deprived: household has at least one child 5-16 years old who is not in school	any school-aged child is not attending school in years 1 to 8	net enrollment ratio in primary education; proportion of pupils starting grade 1 who reach last grade of primary school	at least one child (age 7-15) in the household is not currently attending school 2000, 2005: currently *registered* in school	√	√	√	U, R
Health Facility Quality				household was dissatisfied with at least one health facility visit, or did not use a health facility due to cost, distance, quality, or other reasons		√	√	U, R
Health Facility Access				household is located more than 5 km away from the nearest health facility (clinic, health station, hospital, health post) 2000: health posts did not exist.	√	√	√	R
Drinking Water	water deprived: household does not have access to piped or other protected source of drinking water	household does not have access to safe drinking water defined as piped water, public tap, borehole or pump, protected well, protected spring or rainwater, and it is within a distance of 30 minutes' walk roundtrip	proportion of population using an improved drinking water source	household does not use a safe drinking water source defined as piped water, a protected source, or rainwater	√	√	√	R
Sanitation		household's sanitation facility is not improved (according to MDG guidelines), or it is improved but shared with other households.	proportion of population using an improved sanitation facility	household does not use an improved toilet facility defined as a private flush toilet or private pit latrine	√	√	√	U, R

Table A2: Deprivation Indicators in Gender, Aspirations and Monetary Dimensions

Indicator	Atkinson & Lugo (2010)	OPHI MPI (2013)	MDG indicators (2008)	Ethiopia WMS-HCES 2000, 2005, 2011	2000	2005	2011	Urban/ Rural Indicator
Education of Female School-aged Children				at least one girl child (age 7-15) in the household is not currently attending school 2000, 2005: currently *registered* in school	√	√	√	U, R
Institutional Birth			antenatal care coverage; proportion of births attended by skilled health personnel	at least one child (age 0-4) in the household was not born in a health facility		√	√	U
Female Circumcision				at least one girl (age 0-14) in the household underwent/will undergo female circumcision			√	U, R
Source of Information			mobile-cellular/ fixed telephone subscriptions per 100 inhabitants	household does not own a TV, radio, or phone 2000: phone is not specified in list of assets	√	√	√	U, R
Assets	asset deprived: household does not own a car, and owns fewer than one small asset--TV, radio, phone, bicycle, refrigerator, motorcycle	household does not own a car or truck, and does not own more than one of the following assets: radio, television, telephone, bicycle, scooter, or refrigerator	mobile-cellular/fixed telephone subscriptions per 100 inhabitants	household does not own a motorcycle, car, or bajaj, and does not own a fridge, phone, radio, TV, bicycle, or jewelry 2005: motorcycle, bajaj not in list of assets 2000: phone, jewelry not in list of assets	√	√	√	U, R
Below Poverty Line			proportion of population below $1 (PPP) per day (or below country-level poverty line)	household lives below the poverty line of 3781 Birr per adult equivalent (using real total consumption expenditure per adult) 2000, 2005: below the poverty line of 1075 Birr (in 1996 prices)	√	√	√	U, R

APPENDIX B: DEPRIVATION PROPORTIONS OF VENN DIAGRAM REGIONS IN THE OVERLAP ANALYSES[11]

Table B1. Deprivation proportions by Venn diagram region in Figure 2: urban and rural populations

	Urban			Rural		
	2000	2011	Change	2000	2011	Change
money poor	0.41	0.31	-0.09***	0.50	0.34	-0.16***
education deprived	0.26	0.16	-0.10***	0.83	0.58	-0.25***
sanitation deprived	0.51	0.47	-0.04	0.93	0.42	-0.50***
Distribution of the population						
not deprived	0.28	0.33	0.05***	0.01	0.18	0.16***
only money poor	0.11	0.12	0.01	0.01	0.08	0.07***
only education deprived	0.07	0.05	-0.01	0.03	0.21	0.18***
only sanitation deprived	0.19	0.25	0.07***	0.08	0.12	0.03***
money poor, education deprived	0.04	0.03	-0.01*	0.02	0.11	0.09***
education, sanitation deprived	0.06	0.05	-0.02	0.37	0.16	-0.21***
sanitation deprived, money poor	0.17	0.14	-0.03*	0.06	0.05	-0.02*
all three deprivations	0.09	0.03	-0.06***	0.41	0.10	-0.31***

Table B2. Deprivation proportions by Venn diagram region in Figure 3: rural population

	Rural		
	2000	2011	Change
money poor	0.50	0.34	-0.16***
health access deprived	0.61	0.32	-0.30***
education deprived	0.83	0.58	-0.25***
Distribution of the population			
not deprived	0.04	0.21	0.17***
only money poor	0.04	0.09	0.05***
only health access deprived	0.05	0.08	0.03**
only education deprived	0.14	0.25	0.10***
money poor, health access deprived	0.04	0.04	0.00
health access, education deprived	0.26	0.12	-0.14***
education deprived, money poor	0.16	0.13	-0.03
all three deprivations	0.27	0.08	-0.19***

[11] Note: For all result tables in Appendix B, the "Change" column shows the coefficient estimate for the difference in proportions from 2000 (or 2005) to 2011. The asterisks indicate the significance level: *** p<0.01, ** p<0.05, * p<0.1

Table B3. Deprivation proportions by Venn diagram region in Figure 4: urban and rural populations

	Urban			Rural		
	2005	2011	Change	2005	2011	Change
money poor	0.41	0.31	-0.10***	0.46	0.34	-0.11***
health quality deprived	0.75	0.68	-0.07***	0.83	0.77	-0.06***
education deprived	0.26	0.16	-0.10***	0.80	0.58	-0.22***
Distribution of the population						
not deprived	0.12	0.19	0.07***	0.02	0.07	0.05***
only money poor	0.08	0.08	0.00	0.01	0.03	0.02***
only health quality deprived	0.33	0.39	0.06***	0.11	0.22	0.11***
only education deprived	0.03	0.03	0.00	0.07	0.09	0.01
money poor, health quality deprived	0.21	0.18	-0.03**	0.06	0.10	0.04***
health quality, education deprived	0.11	0.07	-0.04***	0.34	0.28	-0.06***
education deprived, money poor	0.03	0.02	-0.01	0.06	0.04	-0.02*
all three deprivations	0.10	0.04	-0.06***	0.32	0.17	-0.15***

Table B4. Deprivation proportions by Venn diagram region in Figure 5: urban and rural populations

	Urban			Rural		
	2000	2011	Change	2000	2011	Change
money poor	0.36	0.26	-0.10***	0.45	0.30	-0.15***
information source deprived	0.33	0.15	-0.18***	0.86	0.62	-0.25***
sanitation deprived	0.54	0.53	-0.01	0.93	0.45	-0.48***
Distribution of the population						
not deprived	0.28	0.33	0.05***	0.01	0.19	0.17***
only money poor	0.09	0.09	0.00	0.00	0.06	0.05***
only information source deprived	0.05	0.02	-0.03***	0.03	0.19	0.16***
only sanitation deprived	0.20	0.33	0.13***	0.08	0.11	0.03***
money poor, information source deprived	0.04	0.02	-0.02**	0.02	0.11	0.09***
information source, sanitation deprived	0.11	0.06	-0.05***	0.43	0.21	-0.22***
sanitation deprived, money poor	0.10	0.10	0.00	0.04	0.03	-0.01
all three deprivations	0.13	0.04	-0.09***	0.39	0.10	-0.28***

Table B5. Deprivation proportions by Venn diagram region in Figure 6: urban and rural populations

	Urban 2011	Rural 2011	Difference (Rural-Urban)
money poor	0.32	0.36	0.04*
female circumcision deprived	0.24	0.36	0.12***
girls' education deprived	0.14	0.46	0.32***
Distribution of the population			
not deprived	0.47	0.22	-0.25***
only money poor	0.19	0.11	-0.09***
only female circumcision deprived	0.12	0.14	0.02*
only girls' education deprived	0.07	0.20	0.12***
money poor, female circumcision deprived	0.08	0.07	0.00
female circumcision, girls' education deprived	0.02	0.09	0.06***
girls' education deprived, money poor	0.03	0.12	0.09***
all three deprivations	0.02	0.06	0.04***