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**Poverty and inequality analysis in the IGAD region:
Regional profile and country status**

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Abstract

This paper assesses the extent of poverty and inequality in the IGAD region. It also assesses the decomposition of poverty and empirically analyze the determinants of multidimensional poverty for each member States. The global Multidimensional Poverty Index (MPI) was used to measure multidimensional poverty and understand the magnitude, intensity and determinants of multidimensional poverty. A brief comparison with income poverty was also presented. We find that on average the economy of the IGAD region is improving over time, but poverty still remains the main agenda as a significant proportion of the population of the region remain poor. Regionally, inequality is a major issue and varies from country to country. Poverty is also decomposed by location as well as dimensions. Rural areas are identified as the poorest while living standard appears to contribute the most in multidimensional poverty. The empirical analysis shows that household level variables explain poverty in both rural and urban areas of the region. The paper also highlights some policy implications.

Key words: multidimensional poverty, IGAD, inequality,

JEL: D31, D63, I31

1. Introduction

Fighting extreme poverty and improving health and education are among the main Millennium Development Goals (MDGs) agreed by 189 heads of state in 2000. In Africa, governments are striving to achieve both the international and national goals of enhancing economic growth and reducing poverty. Over the last two decades, significant positive changes have been observed in reducing poverty and improving social indicators such as health and education in the majority of countries in Africa (ADB, 2015). For example, the net enrolment rate in sub-Saharan Africa (SSA) had increased by 20 percent from 2000 to 2015 (UN, 2015). Similarly, both under-five mortality rate and childhood malnutrition have reduced significantly over the last couple of decades (Arndt et al., 2016). However, Africa still has high incidence of poverty. Despite significant improvements in reducing poverty, more than 40 percent of the population in sub-Saharan Africa was still living in extreme poverty in 2015 (UN, 2015). Of the 1.6 billion people who are multidimensionally poor in the world, around 32 percent live in sub-Saharan Africa (Alkire et al., 2016). Similarly, inequality is rising in Africa and the challenges to bring equity in terms of health, education and income have become difficult to address. Eradication of poverty by 2030 may not be realized if SSA countries continue to underperform as usual (ADB, 2016).

The Intergovernmental Authority on Development (IGAD) is an eight-country trade bloc in Africa and includes Djibouti, Eritrea, Ethiopia, Kenya, Somalia, Sudan, South Sudan, and Uganda. It comprises governments from the Horn of Africa, Nile Valley, and the African Great Lakes and it was established in 1996 to supersede the Intergovernmental Authority on Drought and Development (IGADD), which was founded in 1986. Member countries have a total population of around 267.5 million, and this covers around 21.5% of the total population of Africa and around 26.3% of sub-Saharan Africa.

The region is facing major challenges such as repeated drought because of variability in rainfall, conflict, weak institution, high unemployment, poverty, poor health, low level of literacy and low enrollment, low export performance, and heavy dependence on agriculture including livestock. For example, the drought that occurred in 2011 affected around 12 million people in the region (IGAD, 2016). Similarly, the drought in 2016 has affected millions of people in the region. In addition to the natural shock, lack of economic opportunities and high unemployment rate are responsible for the migration of people to Arab and EU countries in search of job and better life. Because of the interrelated and intricate problems, a significant proportion of the population of this region is being exposed to severe food insecurity and famine.

By recognizing the role of poverty and inequality in the economic growth of countries, IGAD has set out clear policies and strategies in order to address the main challenges. This, however, should be supported by adequate knowledge on the current situation regarding the poverty profile as well as inequality in the region. Therefore, the magnitude, persistence, and depth of poverty and inequality in IGAD member states calls for a better understanding of the profile of poverty and inequality of member states. Therefore, the objective of this study is to assess and understand the profile of poverty and inequality in IGAD region by reviewing available related studies on the region. It also analyses the determinants of poverty using a regression approach in order to identify the micro-level factors that affect the multidimensional poverty of the household using the Demographic and Health Survey (DHS) and UNICEF's Multiple Indicators Cluster Survey (MICS) data.

A plethora of empirical studies on the determinants of poverty and inequality are available in Africa in general and some of the IGAD member countries in particular¹While several studies use income to measure poverty and analyse inequality in a country (e.g. Sahn and Stifel, 2000; Bogale et al., 2005; Geda et al., 2005) others use multidimensional poverty due to the multidimensional nature of poverty (e.g., Alkire and Housseini, 2014; Anyanwu et al., 2016; Alkire et al., 2017). However, Alkire et al.(2017) argue that both multidimensional and income poverty are important indicators of poverty if we want to adopt a holistic approach to poverty reduction. While there are some empirical studies by Oxford Poverty and Human Development Initiative (OPHI) and other researchers on measuring poverty using multidimensional poverty, few studies are carried out to measure and understand the causes of multidimensional poverty in Sub-Saharan African countries in general and IGAD member countries in particular.

This study uses the global Multidimensional Poverty Index (MPI) to measure multidimensional poverty and understand the magnitude, intensity and determinants of multidimensional poverty.² The study also assesses income inequality within and between member countries. Hence, it is an addition to the limited literature on the region. The findings will help member countries and local and international organizations understand the current situation and identify measures that would enable those countries reduce poverty and improve the livelihood of their people.

This review focuses on micro-level evidence on poverty and inequality in the IGAD region.³ The empirical analysis is based on survey data collected at household level from each country. These data are the Demographic and Health Survey (DHS) and UNICEF's Multiple Indicators Cluster Survey (MICS). The main problem with using these data sources is that specific surveys are not easily comparable.

The paper is organized as follows: the next section presents an overview of the IGAD region. Section three discusses the methods adopted for this study, and concepts and measurements of poverty, the data source, and the econometric approaches employed to understand the determinants of multidimensional poverty. Section four presents the results. Section five is the conclusion and policy implications.

¹Some examples on empirical studies in Africa are Sahn and Stifel (2004), Alkire and Housseini(2014), Anyanwu et al. (2016), Alkire et al. (2017). Similarly, some empirical studies that focus on poverty on IGAD member States are Ambel et al. (2015) in Ethiopia, Levine et al. (2012) in Ugnada, Ballon and Duclos (2015) in Sudan and South Sudan, Geda et al.(2005) in Kenya are some of the related studies on poverty in IGAD member states.

²MPI is an internationally comparable measure of acute poverty in over 100 developing countries and was developed by the Oxford Poverty and Human Development Initiative (OPHI) at the University of Oxford with the Human Development Report Office of the United Nations Development Programme (Alkire et al., 2017).

³Macro level factors are also important. Time series data is necessary in order to empirically analyse and understand the effect of macro level variables on poverty and inequality. Examples include Deyshappriya (2017), Breen and Garcia-Penalosa (2005), and Jantti and Jenkins (2001).

2. Overview of the IGAD region

IGAD consists of eight countries in the Horn of Africa. The region has more than 230 million people with high population growth rates. The region has diverse agricultural potential, rich biodiversity and a wide range of agro ecological zones. However, it has been affected by frequent drought due to high and unpredictable rainfall patterns, desertification and environmental degradation.

Figure 1: Map of IGAD Member States



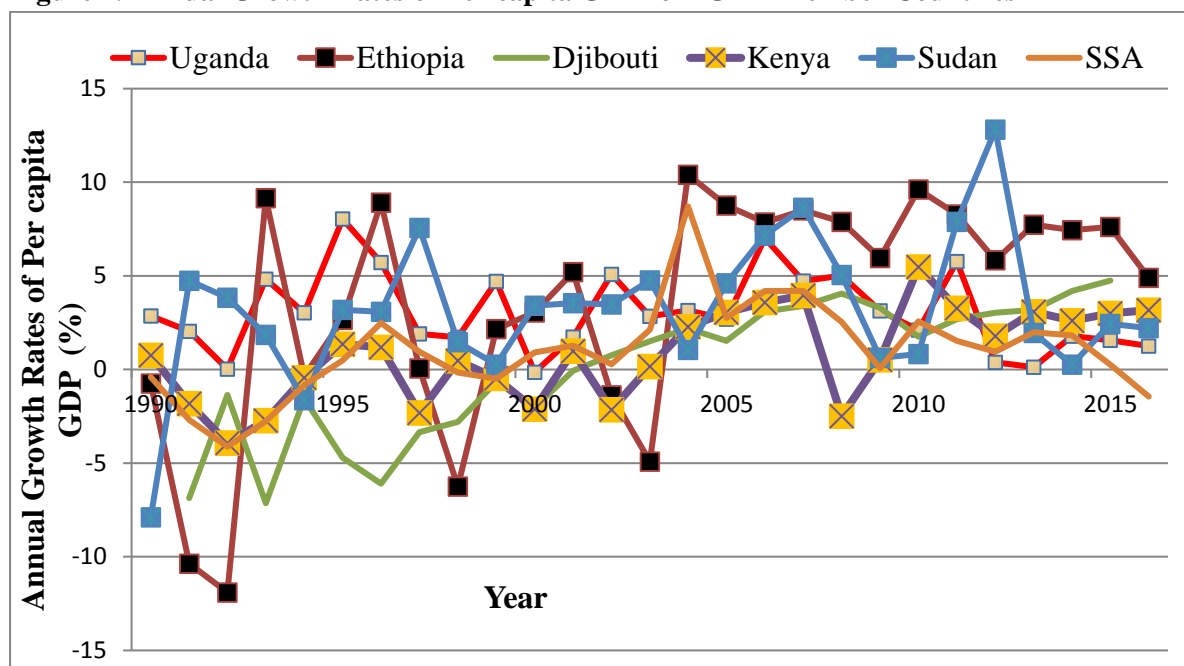
Although the economic performance of the member states has been improving in the last decade, it still calls for a significant effort in order to address the effects of climate change and improve the quality of life of their citizens. IGAD members together account more than 17% of the sub-Saharan GDP. The agricultural sector, which includes both crop production and livestock, significantly contributes to IGAD countries' Gross Domestic Product (GDP), food and nutrition security, supplies of raw materials for industry and exports revenue. It is a major source of employment and contributes almost 50% of the total GDP and more than 60% of the overall exports (IGAD, 2016). Over 80 percent of the population is rural and agriculture is considered as the engine of economic growth.

Ethiopia is the only country in the region claimed to have achieved double digit-growth rate since 2006. Sudan and Uganda also performed better than the African average, while South Sudan and Eritrea are the worst performers (HESPI, 2017). The industrial sector is very weak, and its contribution to the economy of each member state lies between 15-20% (IGAD, 2016). The export performance remains almost constant for the last 18 years except for Kenya which has shown a slow increase over time (HESPI, 2017). Moreover, trade among member countries remains low as they produce similar products. The underdeveloped infrastructure in the region contributes to the low trade activities among member countries. Hence, markets are neither inter-dependent nor inter-linked.

Figure 2 shows the annual growth rates of per capita GDP for IGAD member countries. It is evident that, on average, the annual growth rates of per capita GDP for Ethiopia, Sudan, Djibouti, and Kenya is improving over time. On the other hand, the trends for Uganda, South Sudan and Eritrea are declining.⁴

⁴We consider the period from 2009-2015 and 1993-2011 for South Sudan and Eritrea, respectively.

Figure 2. Annual Growth Rates of Per capita GDP for IGAD Member Countries



Source: World Development Indicators

Some of the member countries such as Ethiopia, Kenya and Uganda have made tremendous efforts to meet the targets set in the Millennium Development Goals. Such other countries as Somalia, Djibouti, South Sudan and Eritrea are lagging far behind the MDG goals. Table 1 presents some basic statistics including the average for sub Saharan Africa for comparison purpose.

Table 1. Some Basic Facts about IGAD member states

Countries	Population ('000) (2017 estimate)	% urban population	Number of Infant deaths	Access to electricity (%)	Access to clean fuels & technologies	Unemployment, total (% of total labor force)	Improved sanitation facilities (%)
Kenya	48,466,928	25.8	53749	36	6.19	12.17	30.1
Uganda	41,652,938	16.4	59856	20.4	2.00	1.91	19.1
Ethiopia	104,344,901	19.4	129947	27.2	1.999	17.64	28
Sudan	42,166323	32.7	61285	44.9	22.85	13.00	23.6
South Sudan	13,096,190	18.2	25942	4.53	3.143	12.15	6.7
Eritrea	5,481,906	29.2	5652	45.83	13.75	NA	NA
Somalia	11,391,962	40.2	37786	19.05	9.069	6.62*	23.5
Djibouti	911,382	77.6	1190	46.73	10.16	NA	47.4
SSA	1,033,106,135	15.13	NA	37.38	12.92	7.36*	29.79

Data on current population is retrieved from <http://www.worldometers.info/population/countries-in-africa-by-population/>

*The figures are based on ILO estimates; NA refers to recent estimates are not available

** This is based on national estimate

The region is characterized by lack of adequate infrastructure and poor social services in sectors such as health, which in turn is reflected in terms of high child mortality and poor nutrition, low level of

enrollment and high dropouts, lack of access to clean drinking water, lack of access to clean energy sources such as electricity for cooking and lighting activities, etc.

In addition to the environmental and physical infrastructural problems, frequent conflicts and security is considered to be among the main challenges of the region. IGAD member states are listed among the thirty-five most fragile countries in the World⁵. Member states such as Ethiopia, Kenya, South Sudan, Djibouti, and Uganda have all been affected by terrorism, human and drug trafficking, illegal use of small arms and light weapons (IGAD, 2016). Border disputes have become factors of distrust, and instability which in turn create regional instability. These challenges have hindered development efforts of the member states. In general, it is necessary to understand the nexus between poverty and peace and security. Poverty is considered to be the main cause of lack of peace and security. But also, it is necessary to address the challenges on conflict, terrorism and other social and environmental problems if member states want to achieve sustainable development and lift their citizens out of poverty.

3. Methods

3.1. Poverty measurement

The conventional approach for measuring poverty is based on household income or expenditure. This approach defines poverty as the inability to secure USD1.25 per day or USD1.90 per day. A household who gets less than 1.25\$ a day is considered as poor. However, income or expenditures are not the only determinants of poverty; many other factors like lack of education, poor health, poor housing and low living standard also contribute to poverty. Poverty is something beyond income deprivation, and scholars argue that the measurement of poverty should reflect its multidimensional nature. Empirical evidence shows that the two measures are not strongly correlated.⁶ That is, households considered as multi dimensionally poor may not necessarily be income poor, and based on income measure; those who are non-poor might not necessarily be so based on multidimensional poverty measurement (Wang et al., 2016).

The emphasis placed on multidimensional poverty in the context of this paper is attributed to the reasons discussed above. Therefore, the analysis of multidimensional poverty in IGAD countries is based on the global Multidimensional Poverty Index (MPI). The MPI assesses people's deprivations according to ten indicators organized into three equally weighted dimensions: education, health and living standards. A household is identified as being multi dimensionally poor, if and only if, it is deprived in some combination of the ten indicators listed below (also called dimensions and denoted by d) whose weighted sum exceeds a cutoff $k=3$ or 33.3 percent of deprivations. That is, those people whose deprivations score is greater than or equal to a threshold of 33.33% are identified as multi dimensionally poor. The dimensions and their pertinent weights in the MPI are discussed as below.

⁵Retrieved from <https://igad.int/index.php/about-us/the-igad-region>.

⁶For example, a recent study by Wang et al. (2016) using data from china finds that the coincidence of income poverty and multidimensional poverty is 31% showing that around 69% of multidimensionality poor households are not considered as poor when measured using income poverty.

1. **Health** (each indicator is weighted equally at 1/6)
 - a) Child mortality: If a child of any age has died in the family
 - b) Nutrition: If any adult or child in the family is malnourished.
2. **Education** (each indicator is weighted equally at 1/6)
 - a) Years of schooling (if no household member has completed five years of schooling)
 - b) Child enrollment (if any school-aged child is out of school in years 1 to 8).
3. **Standard of living** (each of the six indicators weighted equally at 1/18)
 - a) Electricity (no electricity is poor)
 - b) Drinking water (MDG definitions)
 - c) Sanitation (MDG definitions, including that toilet is not shared)
 - d) Flooring (dirt/sand/dung are poor)
 - e) Cooking fuel (wood/charcoal/dung are poor)
 - f) Assets (poor if household does not own more than one of the following: radio, TV, telephone, bike, motorbike).

The sum of the weights adds up to the number of dimensions, and the MPI is calculated as the product of two numbers—the headcount (H) or proportion of people who are multidimensionally poor, and the average intensity of multidimensional deprivation(A)—which reflects the proportion of dimensions in which households are deprived.

$$MPI = H \times A$$

The headcount ratio is $H=q/n$, where q is the number of multi dimensionally poor people in the population, and n represents the total population in the society. Therefore, H is the incidence of multidimensional poverty. The intensity (or breadth) of poverty (A)is the average share of indicators in which poor people are deprived. In other words, A is the average proportion of (weighted) deprivations the multi dimensionally poor people experience. It can be expressed formally as:

$$A = \frac{\sum_{i=1}^n c_i(k)}{q}$$

Where $c_i(k)$ is the censored deprivation score of individual i and q is as defined above.

As such, the MPI defines the proportion of multi dimensionally poor people in the population, adjusted by the intensity of their poverty, and thus satisfies many desirable properties, including monotonicity, transfer, focus, etc. The MPI ranges from 0 to 1 and higher levels show higher poverty. Those with MPI values is equal to 50% or more are identified as in ‘severe poverty’ and those with MPI values between 20% – 33.33% are identified as ‘vulnerable to poverty’.

3.2. Data Source

As already described, this paper reviews studies pertaining to poverty and inequality in the region. Other published and unpublished reports on poverty and inequality in the region are also consulted. Both Demographic and Health Survey (DHS) and UNICEF's Multiple Indicators Cluster Survey (MICS) data have been used to estimate the determinants of poverty so that the findings could supplement the available pieces of evidence in the literature. Available empirical studies on multidimensional poverty in Africa in general and IGAD member states in particular also use DHS or MICS data for their analyses. Other sources of data such as the World Bank African Development Indicators are also used in order to compute some relevant statistics for the region. Hence, the main limitation of this study is that not all IGAD member states have multiple and comparable surveys, thus not making it possible the examination of poverty trends. For those figures derived from a relatively old data, attempts were made to supplement it by referring to recent and relevant literature. The description of data used for poverty estimates is found in *Appendix A*.

4. Assessment of poverty profile and inequality

This section presents different estimates on multidimensional poverty and assesses the status by region for different dimensions. It then assesses the extent and magnitude of inequality of the member states.

4.1. Results of poverty estimates

Here, evidences on multidimensional poverty in the IGAD region are presented. As argued before, in places such as Ethiopia and Sudan, according to \$1.90/day estimates, income poverty data do not provide an accurate indication of deprivations in health, education and living standards (Alkire et al., 2016). Accordingly, discussion is made of multidimensional poverty index (MPI), percentage of people deprived (education, health, standard of living), and population in multidimensional poverty (head count, intensity of deprivation). Table 2 presents incidence, intensity and MPI for all IGAD member states except for Eritrea.

Table 2. Multidimensional Poverty

Indicators	Countries						
	Kenya	Uganda	Ethiopia	Sudan	South Sudan	Somalia	Djibouti
Multidimensional Poverty Index(MPI=H*A)	0.187	0.367	0.564	0.287	0.557	0.514	0.139
Headcount ratio(population in multidimensional poverty) (H) %	39.9	69.9	87.3	53.4	91.1	81.2	29.3
Intensity of deprivation among the poor(A)	47.0	52.5	64.6	53.7	61.2	63.3	47.3
Survey year (source of data)	2014 (DHS)	2011 (DHS)	2011 (DHS)	2014 (MICS)	2010 (MICS)	2006 (MICS)	2006 (MICS data)

Source: Alkire and Robles (2017).

DHS refers to the demographic and health survey, MICS is the Multiple Indicators Cluster Survey.

*The data for Eritrea is unavailable

Here is an assessment of the performance of member states using the global Multidimensional Poverty Index (MPI). As already defined, a person is identified as multi dimensionally poor if he/she is deprived in at least one third of the weighted MPI indicators set out in section 3.1. The values of MPI range from 0 to 1 and higher levels show higher poverty.

The country with the highest multidimensional head count ratio is South Sudan (91.1%) followed by Ethiopia (87.3%) and Somalia (81.2%). In other words, the MPI estimates that 91.1% of the people in South Sudan, 87.3% of Ethiopians and 81% of Somalis are in multidimensional poverty. A significant proportion of the population of Uganda and Sudan are also multi dimensionally poor. On the other hand, Djibouti has the lowest multidimensional head count ratio (29.3%) followed by Kenya (39.9%). Based on monetary estimates, \$1.90/day estimate, around 34% of the people in Ethiopia, 33% of that of Uganda and 15% of that of Sudan are considered poor (Alkire et al., 2016). This shows that there is a significant difference between the two measures of poverty.

Table 3: Incidence of Deprivation (in percentage) in All Dimensions

Countries Indicators	Kenya	Uganda	Ethiopia	Sudan	South Sudan	Somalia	Djibouti
Proportion of people who are poor and deprived in ...							
Health							
a) Child mortality:	20.1	41.7	37.9	16.6	20	27.4	9.8
b) Nutrition:	17.0	33.3	55.6	23.9	22.5	30	10.6
2. Education							
a) Years of schooling	5.8	18.9	47.6	23.8	63.1	61.8	13.5
b) Child enrolment	5.2	18.4	40	22.1	71	43.5	18.3
3. Standard of living							
a) Electricity	38.3	68	78.8	42.9	88.7	75.8	20.4
b) Drinking water	29	44.5	65.5	36.5	58.5	70	6.7
c) Sanitation	34.7	59.5	81.6	46.5	86	69.1	16.3
d) Flooring	32.8	60.5	82.6	52.2	81.5	64.4	17.8
e) Cooking fuel	39.5	69.8	87.2	44.7	90.7	81	8.8
f) Assets	18.7	30.2	76.5	33.9	68.2	76.2	22.6

Source: Alkire and Robles (2017).

The cross-country comparison of poverty indicates that schooling is the dimension in which people are deprived the most in South Sudan followed by Somalia and Ethiopia. The proportion of people deprived in child enrollment is 71% in South Sudan, 43.5% in Somalia and 40% in Ethiopia. Kenya is the best performer with respect to education. That is, only 5.8% are deprived of schooling. The next best performers among the member states are Djibouti and Uganda. Sudan is somewhere in the middle, and it has relatively encouraging achievements compared to that of other member states such as Ethiopia, South Sudan and Somalia. This shows that there is a considerable difference between member states in terms of their performance in education.

Comparisons in terms of living standard indicate that most of the IGAD member states in general have huge challenges such as limited access to electricity, cooking fuel, floor and sanitation. Among the IGAD member countries, Kenya has registered significant results preceded by Djibouti. For example, when we look at deprivation of access to clean drinking water, only 6.7% of the total population of Djibouti is deprived. Kenya (29%) also performs well relative to other IGAD member states. On the other hand, Somalia has the highest proportion (70%) of its people deprived of access to clean drinking water. Ethiopia has the second highest proportion of people deprived of clean drinking water (65.5%).

The performance of member states in terms of access to cooking fuel seems more or less the same as that of clean drinking water. While Djibouti and Kenya are relatively better, a very high proportion of the population of South Sudan, Ethiopia and Somalia are deprived of access to clean cooking fuel. Concerning access to electricity, only 20.4 and 38.3% of the population of Djibouti and Kenya are respectively deprived of access to electricity. On the other hand, the proportion is higher for South Sudan, Ethiopia, Somalia and Uganda. Like other indicators of living standard, in terms of both sanitation and flooring, Djibouti and Kenya are deprived the least. South Sudan and Ethiopia lag far behind other member states in terms of sanitation and flooring. The last one is the performance of member states in terms of asset indicator. Kenya (18.7%) is deprived the least, followed by Djibouti (22.6%) and Uganda (30.2%). Of all member countries, Ethiopia appears to be deprived the most in assets. Overall, Djibouti and Kenya are the best performers relative to other IGAD member states in terms of living standard.

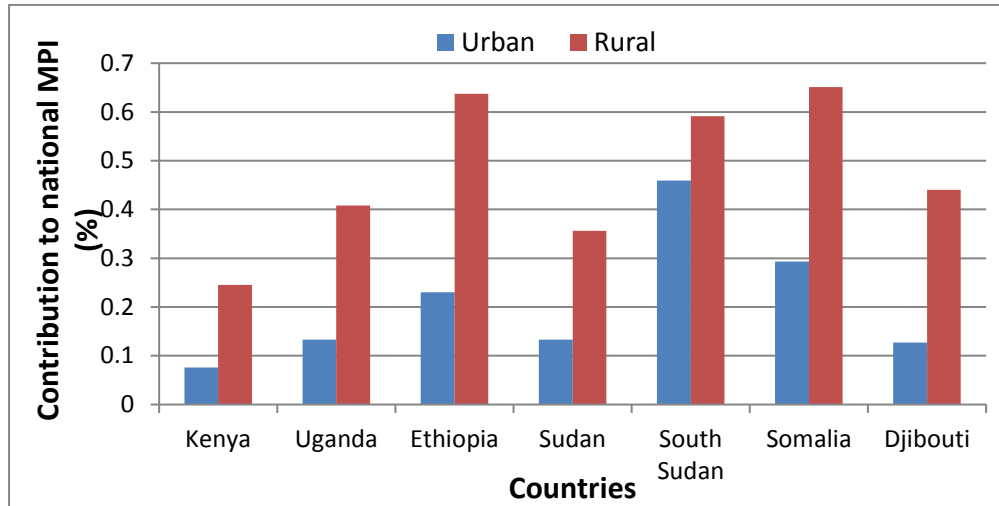
Similarly, Djibouti is the country with the lowest deprivation of health, with only 9.8% of the total population deprived of child mortality and 10.6% deprived of nutrition. Unlike other indicators, Sudan performs well in terms of reducing child mortality, as only 16.6 % children die. In Uganda, the prevalence of child mortality is very high, calling for considerable attention. The next highest deprivation in child mortality is in Ethiopia. Ethiopia is the highest in terms of deprivation in nutrition; Uganda and Somalia also have very high deprivation: 33.3% and 30%, respectively.

This analysis shows that the magnitude and extent of poverty as reflected by the various indicators, is different for the different IGAD member states as do other African countries. It has been found that, in general, deprivations in living standard are relatively the highest in almost all IGAD member states compared to education and health. Similarly, Alkire et al. (2016) argue that while child mortality and poor educational performance are among the main challenges in West Africa, deprivations in living standards are highest in East and Central Africa (Alkire et al., 2016).

4.2. Rural-Urban Decomposition

The decomposition of MPI by location (urban versus rural) is important in order to directly compare MPI poverty in rural and urban areas directly. The decomposition could help to identify and implement better poverty-reducing policies for each location. The decomposition shows that there is a significant difference in the extent of poverty between urban and rural regions.

Figure 3: Profile of Multidimensional Poverty by Rural and Urban Regions

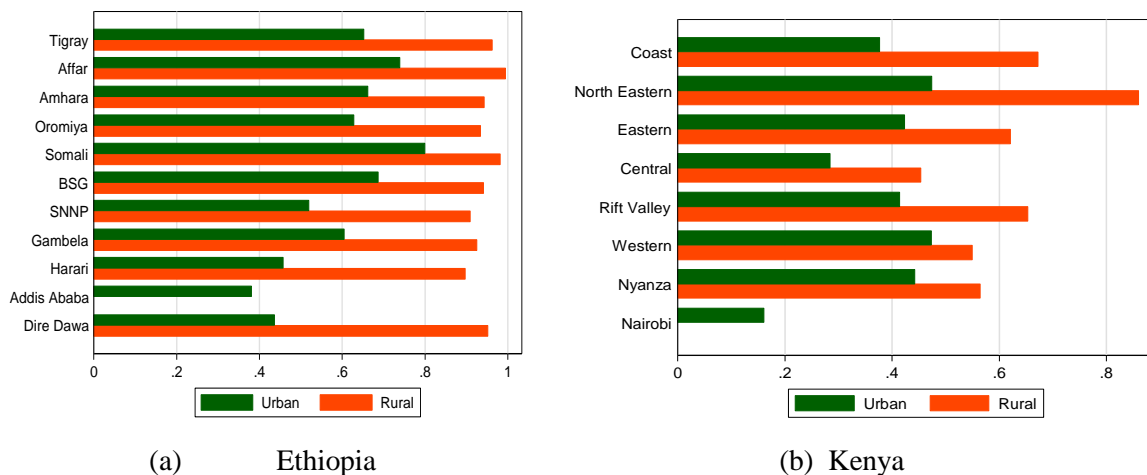


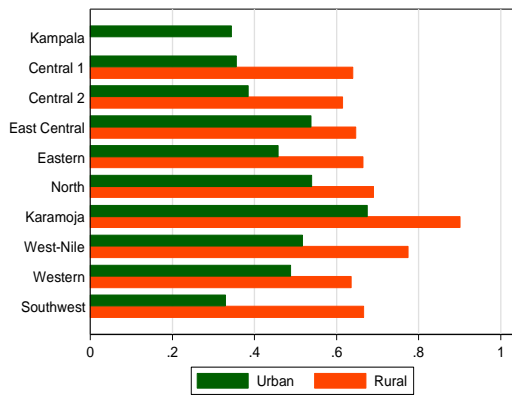
Source: Author's computation based on DHS and MICS survey data

In all member states, a larger proportion of the rural people are multi dimensionally poor than urban people. But the proportions differ from country to country where Somalia has the largest proportion and Kenya is relatively the least.

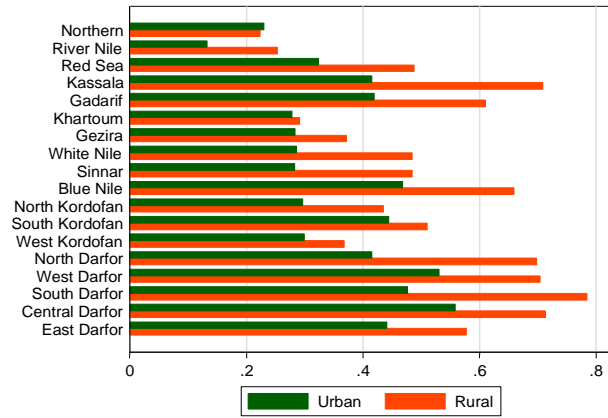
For a better understanding of the status of multidimensional poverty between regions within a country, a separate analysis was made as shown in Figure 4 below. We have considered three countries namely, Kenya, Ethiopia and Uganda. In all these countries, the proportions of people who are multi dimensionally poor are greater in rural areas than in urban areas in all the regional districts. Unlike that of Kenya and Uganda, the proportion of MPI poor in the various regions of rural Ethiopia is more or less the same. It has been found that in Ethiopia, Addis Ababa is the least poor compared to other urban areas. People in urban Somalia are the poorest region. Similarly, the capital cities of both Kenya and Uganda are the least poor urban regions. The northeastern region in Kenya and Karamoja regions in Uganda are the poorest urban regions. This is in line with the findings of some of the empirical studies such as Alkire et al. (2017) who found that the capital Nairobi is by far the least poor region, while the North Eastern region is the poorest. As shown clearly in Figure 4 below, the level of multidimensional poverty also varies for various parts of rural areas within a country.

Figure 4: Proportion of MPI poor by rural and urban regions with in each country

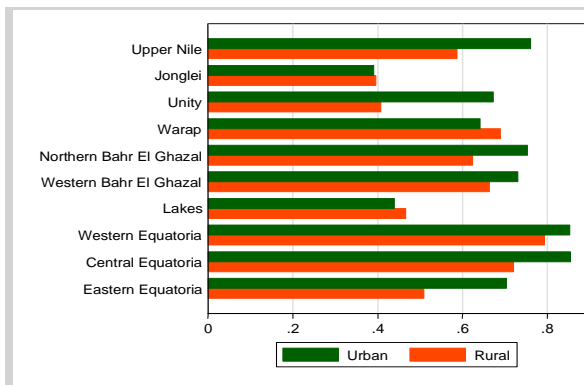




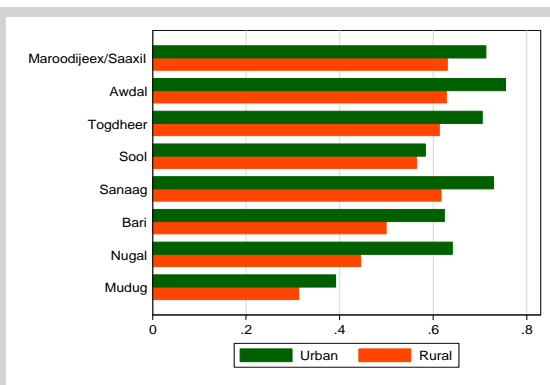
(c) Uganda



(d) Sudan



e) South Sudan



f) Somalia

Source: Author's computation based on DHS and MICS survey data

4.3. Decomposition by Dimension

Appropriate interventions that target poverty reduction should be able to identify the dimension that contributes to poverty the most. Table 4 presents the contribution of health, education and living standard to overall poverty for all IGAD member countries except Eritrea.

Table 4: Percentage Contribution of Deprivations of Each Dimension to Overall Poverty

Dimension \ Countries	Kenya	Uganda	Ethiopia	Sudan	South Sudan	Somalia	Djibouti
1. Health (contribution in %)	33	34.1	27.6	23.5	12.7	18.6	24.6
2. Education	9.8	15.6	25.9	26.7	40.1	34.2	38.3
3. Standard of living	57.2	50.4	46.5	49.8	47.2	47.2	37.1
Total	100%	100%	100%	100%	100%	100%	100%

Source: Alkire and Robles (2017).

Except for Djibouti, standard of living is the main contributor to multidimensional poverty, showing that member states need to exert more efforts on improving the components/indicators of standard of living to reduce multidimensional poverty. Education is the major contributor multidimensional poverty for Djibouti followed by standard of living. The figure in Table 4 shows that the contribution of each dimension to multidimensional poverty is different for different member states. For example, education is the least contributor for Kenya and Uganda relative to the other two dimensions: health and standard of living. On the other hand, health is the least contributor to the MPI for Sudan, South Sudan, Somalia and Djibouti. A recent study by Development Initiatives (2016) also indicates that Somalia is a low-performing country regarding health indicators. This result shows that IGAD strategy on poverty reduction need not be one-size fits all as the contribution of each dimension to poverty is different for different countries. However, the results may be different from the estimates shown in Tables 3 and 4 above due to the lack of current estimates based on recent data, particularly for Djibouti and Somalia.⁷ Table 5 shows the contribution of each indicator for rural and urban areas separately. This will inform policy makers to identify the right intervention for rural and urban areas separately.

Table 5. Percentage Contribution of Deprivations of Each Indicator to Overall Poverty

a) Urban Areas

Country	Years of Schooling	Child School Attendance	Mortality (any age)	Nutrition	Electricity	Improved Sanitation	Drinking Water	Flooring	Cooking Fuel	Asset Ownership
Kenya	3.4	5.5	21.5	17.2	10.5	10.7	6.9	7.3	12.0	4.9
Djibouti	16.1	22.8	13.0	13.4	7.9	6.2	2.1	6.9	2.8	8.9
Uganda	6.4	5.1	23.3	19.4	9.5	11.6	3.4	5.2	12.0	4.0
Sudan	9.8	9.9	15.8	15.7	6.4	8.9	6.8	11.5	9.5	5.7
Ethiopia	10.2	8.6	13.5	24.5	3.4	10.1	3.6	8.4	11.0	6.6
Somalia	18.0	13.0	12.4	10.4	8.6	6.4	6.7	5.3	10.6	8.7
South Sudan	14.6	21.5	9.4	6.8	9.1	8.8	5.6	9.0	9.9	5.3

Source: Alkire and Robles (2017)

b) Rural Areas

Country	Years of Schooling	Child School Attendance	Mortality (any age)	Nutrition	Electricity	Improved Sanitation	Drinking Water	Flooring	Cooking Fuel	Asset Ownership
Kenya	5.4	4.5	17.3	14.8	11.5	10.2	8.9	10.1	11.7	5.6
Sudan	14.5	13.3	8.6	13.6	8.6	9.0	7.1	9.9	8.5	6.7
Uganda	8.7	7.1	18.7	14.9	10.3	8.9	6.9	9.4	10.5	4.6
Djibouti	17.7	16.6	2.7	7.8	10.0	9.3	7.3	9.3	9.1	10.2
South Sudan	20.0	21.2	5.1	6.7	8.8	8.5	5.9	7.9	8.8	7.2
Ethiopia	14.4	12.1	11.0	15.8	8.1	7.9	6.7	8.1	8.4	7.6
Somalia	20.6	14.4	7.9	9.5	8.1	7.8	7.8	7.4	8.3	8.1

Source: Alkire and Robles (2017)

⁷Kireyev (2017) also indicates that the analysis of poverty and growth data in Djibouti continues to be limited due to the lack of data and more representative statistics.

As we can see from Table 5(a) and (b), the contribution of each indicator to the overall poverty in rural and urban areas differs significantly. Years of schooling and child school attendance are the most important contributors in urban areas of Somalia, South Sudan and Djibouti. In Kenya, Uganda, and Sudan, child mortality followed by nutrition is the most important contributor to urban poverty. Nutrition seems to be the most important in the case of urban Ethiopia.

Years of schooling and child school attendance are the most important contributors in rural areas of Somalia, Sudan, South Sudan and Djibouti. In Kenya and Uganda, child mortality followed by nutrition is the most important contributor to rural poverty. In Ethiopia, nutrition followed by years of schooling is the most important contributor to rural poverty.

Let us examine the status of poverty using income as a measure of poverty. Table 6 presents the poverty headcount and poverty gap for each member state based on data collected from the world development indicator. If we look at the poverty headcount ratio estimated at national poverty lines we find that South Sudan has the largest proportion of its population living below the national poverty line. On the other hand, Uganda has the lowest poverty headcount ratio showing that it has better performance compared to that of IGAD member states. That is, only 19.5% of its population is living below the national poverty lines. Sudan and Kenya have also higher poverty headcount ratio indicating that measures need to be taken in order to reduce the number of people who are income poor.

Table 6. Income Poverty Status by Country

Country	Poverty headcount ratio at \$1.90 a day (2011 PPP) (% of population)	Poverty headcount ratio at national poverty lines (% of population)	Poverty gap at national poverty lines (%)	Poverty gap at \$1.90 a day (2011 PPP) (%)	Survey year**
Djibouti	22.52	18.8*		7.51	2013
Ethiopia	33.54	29.6	7.8	9.04	2010
South Sudan	42.71	50.6	23.7	18.91	2009
Sudan	14.92	46.5	16.2	3.98	2009
Uganda	34.64	19.5	5.2	10.29	2012
Kenya	33.6	45.9	16.3	11.7	2005
Eritrea		50.0*		-	2004
Sub Saharan	40.99	-	-	15.95	2013

Source: World Development Indicator,

*Figures from other sources related studies.**The survey years may not be necessarily the same with that used for the analysis of multidimensional poverty.

Poverty estimates in 2011 purchasing power parity prices also indicate that the proportion of population living below \$1.90 per day is 42.7, 34.6%, 33.6%, 33.5%, 22.5%, and 14.92% for South Sudan, Uganda, Kenya, Ethiopia, Djibouti and Sudan, respectively. Without including Eritrea and Somalia, for which we do not have data, the head count ratio of all member states except South Sudan is below the average value of sub Saharan Africa.

The headcount ratio cannot provide the extent of severity of poverty of the poor. It assumes that all those people below the poverty line are equally poor. However, the income level of countries may be different even if they have the same poverty rates. The poverty gap index presented in the third and fourth column in Table 6 measures the percentage by which the mean income of individuals falls below the poverty line. Higher poverty gap means the extent of poverty for those who are already under the poverty line is severe. South Sudan has relatively the highest poverty gap index measured based on national estimates and 1.90 \$/day using 2011PPP estimates. This is higher than the average of sub-Saharan Africa, indicating that the standard of living of the poorest is severe. On the other hand, Uganda has the lower poverty gap index based on national poverty lines estimates while Sudan has the lowest if it is measured based on 1.90\$/day measures. Ethiopia has the second lowest poverty gap next to Uganda (if it is measured based national poverty line) and Sudan (if it is measured based on 1.9\$/day estimates). The data for Eritrea and Somalia is missing.

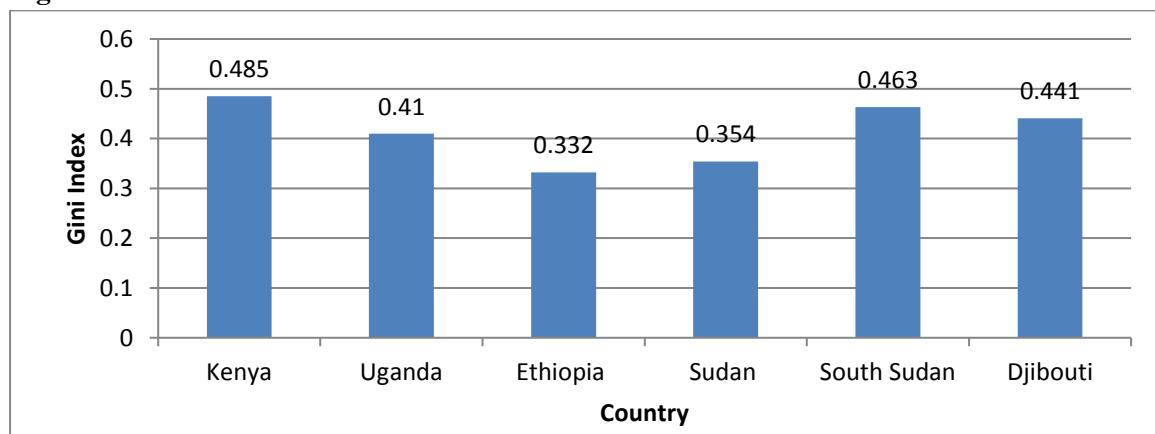
4.4. Inequality in IGAD countries

Inequality is one of the major challenges facing the developing world in general and Africa in particular. Extreme inequalities are a major obstacle to poverty reduction, and efforts to reduce income inequality would raise millions out of poverty. A recent report by Kathleen et al. (2016) indicates that inequality is rising and is high in Africa compared to that of other continents. This is also true for IGAD member states.

4.4.1. Income inequality

The most commonly reported inequality measurement is income inequality. Figure 5 shows the status of income inequality for each member state.

Figure 5: Gini Index of IGAD Member States

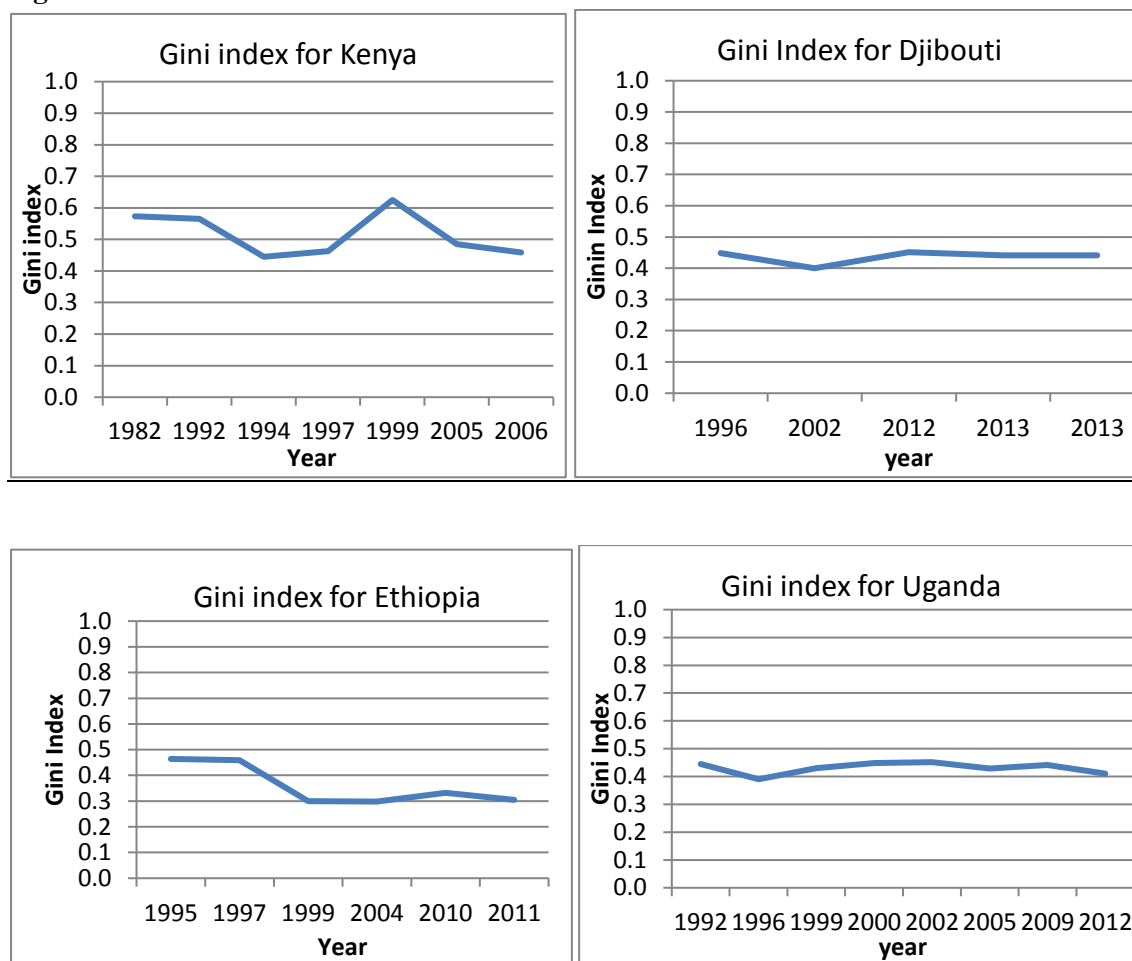


Source: Author's computation based on DHS and MICS survey data

Note: survey year is 2009 for Sudan and south Sudan; 2005, 2010, 2012 and 2013 for Kenya, Ethiopia, Uganda, and Djibouti, respectively. NB: Estimates for Somalia and Eritrea are unavailable.

Ethiopia has the lowest Gini index, showing that it is the most equal society compared to other IGAD members. Similarly, the World Bank (2015) report also show that Ethiopia is one of the most equal countries in the world. The report further argues that the low Gini index is due to a very equal consumption distribution in rural areas.

Figure 6: Trends in the Gini Index for IGAD Member States



Source: World Development Indicator

The next lowest Gini index is found for Sudan which is 35.4%. Greater inequality is found for Kenya and South Sudan. Djibouti and Uganda have the next highest income inequality. Sudan has also the lowest inequality next to Ethiopia. Though there are old data for Sudan, the recent estimate obtained from the world development indicators is 0.3539 in the year 2009. On the other hand, Kenya and South Sudan have relatively the highest inequality followed by Uganda. We have got information for South Sudan only for the year 2009, where the Gini index is equal to 0.4634. In the year 2002 the Gini index for Somalia was 0.397. Unlike other member states, time series data on income inequality for Sudan, South Sudan, Eritrea and Somalia is unavailable.

4.4.2. Multidimensional inequality

The UNDP developed the Human Development Index (HDI)⁸ in order to address the multidimensionality of poverty by using a composite measure of human welfare, which is an average of three differentially weighted components: income per capita, infant mortality and life expectancy at birth. Therefore, multidimensional inequality takes into account health and education in addition to income and address the multidimensionality of inequality. It is the geometric mean of normalized indices for each of the three dimensions discussed above. However, the HDI is criticized as it does not take into

⁸HDI is a composite index measuring average achievement in three basic dimensions of human development—a long and healthy life, knowledge and a decent standard of living (UNDP, 2016).

account for inequalities in each dimension. The Inequality-adjusted Human Development Index (IHDI) adjusts the Human Development Index (HDI) for inequality in the distribution of each dimension across the population.

Multidimensional inequality has generally received less attention than inequality in the distribution of income or expenditure. The availability of data on inequality for the non-monetary indicators could help to design and adopt more effective interventions to reduce inequality. Most of the evidences are based on OPHI.

Table 7: Inequality Adjusted Human Development Index

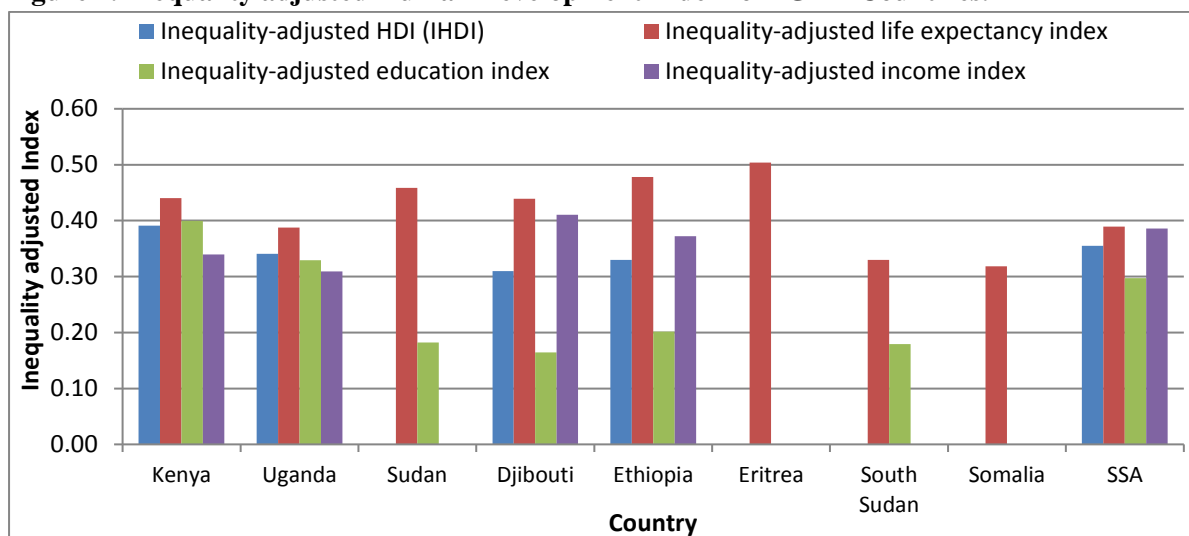
Country	Human Dev't Index (HDI)	Inequality-adjusted HDI (IHDI)	Coefficient of human inequality	Inequality in life expectancy	Inequality in education	Inequality in income (%)	Inequality-adjusted life expectancy index ⁹	Inequality-adjusted education index	Inequality-adjusted income index
Kenya	0.555	0.391	29.4	32.1	22.9	33.1	0.440	0.400	0.339
Uganda	0.493	0.341	30.8	35.7	29.4	27.3	0.388	0.330	0.309
Sudan	0.490	..	..	31.8	42.7	..	0.459	0.182	..
Djibouti	0.473	0.310	33.7	32.5	47.0	21.7	0.439	0.165	0.410
Ethiopia	0.448	0.330	25.5	30.3	36.6	9.5	0.478	0.202	0.372
Eritrea	0.420	..	..	25.9	..	..	0.504	..	..
S. Sudan	0.418	..	..	40.7	39.6	..	0.330	0.180	..
Somalia	..	..	..	42.1	43.5	..	0.318	..	..
SSA	0.523	0.355	32.1	34.9	34.0	27.4	0.389	0.297	0.386

Source: Seth and Villar (2017).

Based on the Inequality-adjusted Human Development Index (IHDI), it has been found that Kenya is the first among the IGAD member states. Uganda and Djibouti are the second and third highest in terms of IHDI among the member states. Though, inequality-adjusted values may change the ranking of individual countries (Seth and Villar, 2017), it seems that the use of either HDI or IHDI does not create significant difference in the ranking among IGAD member states.

⁹HDI life expectancy index value adjusted for inequality in distribution of expected length of life based on data from life tables listed in Main data sources such as DHS, MICS and life tables from UNDESA. Similarly, the headings in the last two columns are respectively defined as HDI education index value adjusted for inequality in distribution of years of schooling based on data from household surveys and HDI income index value adjusted for inequality in income distribution based on data from household surveys (UNDP, 2016).

Figure 7. Inequality adjusted Human Development Index for IGAD Countries.



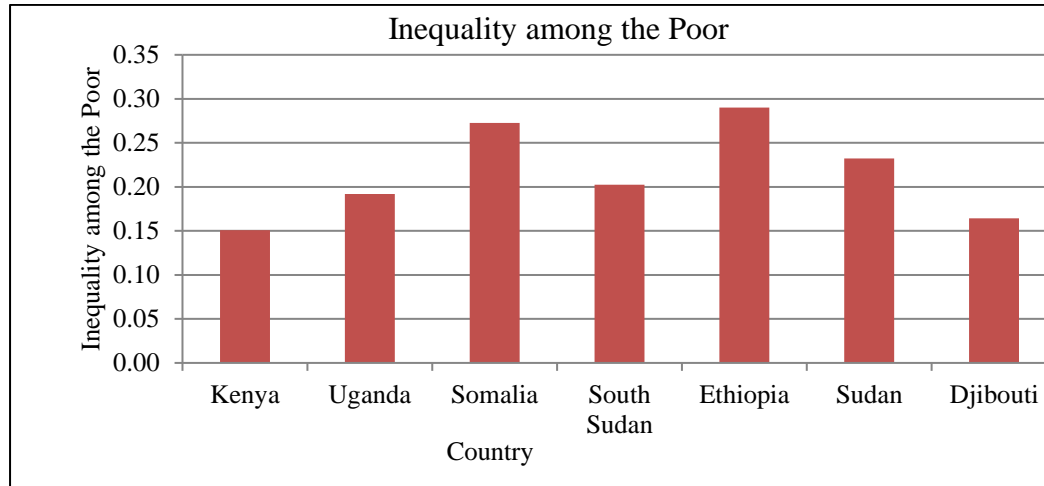
Source: United Nations Development Programme (UNDP) Human development reports (2016)

According to the UNDP (2016) human development report, inequality in education contributes the most to overall inequality in the world. The second most important contributor is inequality in income followed by inequality in life expectancy. Using DHS data from 44 countries in Africa where Ethiopia, Kenya, Sudan and Uganda are included, Shimeles and Nabassaga (2017) found that asset-based inequality in Africa ranges between 40-45%. The literature on the drivers and source of inequality show that several micro and macro¹⁰ level factors explain inequality in Africa. For example, the contribution of inequality in opportunities, household education, and other factors (which are considered to be unobserved) to asset inequality is 35%, 10% and 50%, respectively (Shimeles and Nabassaga, 2017).

Efforts to understand the distribution of different intensities of poverty among the various groups of the society will enable policy makers identify the right intervention for the right groups. Several empirical studies also show that countries with similar levels of MPI may have different level of inequality among the poor. Hence it is important to assess the status of inequality among the poor for IGAD region. Figure 8 presents inequality among the poor for IGAD member States. The highest level of inequality among the poor is found in Ethiopia followed by Somalia and Sudan. On the other hand, Kenya has the least inequality among the poor among the member states.

¹⁰Understanding the macro level factors requires data collected at different points of time periods.

Figure 8. Inequality among the poor



Source: Alkire and Robles (2017)

4.5. Growth, poverty and inequality

It is argued that the living conditions of people in SSA have been improved since 1995. However, countries differ in their effort to associate their economic growth with welfare improvements (Arndt et al., 2016). Despite the impressive economic growth over the last decade, this has not been translated to significant poverty reduction (AfDB, 2016). There is still lack of clarity regarding the effect of such growth in reducing poverty and inequality in Africa (Shimeles, 2014).

The case for IGAD member states is not different from other SSA countries. Member states such as Ethiopia have performed well in increasing their economic growth, reduce poverty and maintain low level of inequality (WB, 2016). On the other hand, growth and poverty reduction and inequality may not be necessarily directly correlated. For example, a recent study by Kireyev (2017) shows that improvements in Djibouti's growth performance has not been inclusive and its effect on reducing inequality was unclear. Similarly, inequality in Uganda and Kenya has been increasing (Fosu, 2017). Additional empirical level analysis is required to measure and understand the driving factors behind the transmission of economic growth into both poverty reduction and income inequality. Moreover, this kind of study requires country specific study on identifying the factors that led to poverty growth (Fosu, 2014).

4.6. Empirical analysis of the determinants of multidimensional poverty

This section examines the determinants (causes) of poverty at the household level. Following the framework by Alkire–Foster (AF), both the cutoff for multidimensional poverty and deprivation score need to be determined in order to calculate the multidimensional poverty index (MPI). Let k represent the cutoff for multidimensional poverty, and c_i is deprivation score. Then a comparison of k and c_i is made, and if c_i is above the multidimensional poverty cutoff (k), the household is identified as multidimensionally poor.

Let Y be a binary random variable that takes the value of 1 if the household is identified as multidimensionally poor and 0 otherwise. This can be specified as follows:

$$Y_i = 1 \text{ if and only if } c_i \geq k$$

0 Otherwise

We employ the logit model to understand the determinants of multidimensional poverty. Several variables are included to assess the probability of a household being multi dimensionally poor. This will answer the basic questions such as how do household characteristics (e.g. family size, age, sex of the head, education of head, availability of children, number of people who are above 65) affect the probability of being multi dimensionally poor? Is the profile of multidimensional poverty different for urban and rural regions? Table 8 provides answers to all these questions for all IGAD member states except for Djibouti and Eritrea. Implications however should be drawn with caution, as the survey years are different. The description of household level variables used in the empirical analysis is found in Appendix B. Several variables related to health, education and asset indicators are not included in the empirical analysis as these variables are used to construct the dependent variable. That is, including these variables as exogenous may lead to potential endogeneity issue as they are expected to be correlated with the error term of the model (Alkire et al., 2015).¹¹

¹¹One may address the endogeneity issue by using the instrumental variable method. But finding appropriate instruments is very difficult.

Table 8: Determinants of multidimensional poverty

Variables	Total			Rural			Urban		
	Ethiopia	Kenya	Uganda	Ethiopia	Kenya	Uganda	Ethiopia	Kenya	Uganda
hhsz_m	-0.073*** (0.013)	-0.280*** (0.008)	-0.301*** (0.017)	-0.049*** (0.017)	-0.289*** (0.010)	-0.321*** (0.020)	-0.089*** (0.020)	-0.262*** (0.015)	-0.265*** (0.031)
hhsz_f	-0.054*** (0.013)	-0.237*** (0.008)	-0.232*** (0.017)	-0.004 (0.019)	-0.260*** (0.010)	-0.269*** (0.021)	-0.100*** (0.020)	-0.194*** (0.014)	-0.158*** (0.029)
no_u15	0.041*** (0.015)	0.238*** (0.010)	0.130*** (0.018)	-0.018 (0.021)	0.241*** (0.012)	0.144*** (0.022)	0.107*** (0.024)	0.216*** (0.017)	0.110*** (0.034)
no_a65	0.117*** (0.044)	0.211*** (0.023)	0.237*** (0.053)	0.1030* (0.061)	0.237*** (0.027)	0.278*** (0.058)	0.103 (0.066)	0.191*** (0.044)	0.200 (0.131)
female	-0.353*** (0.033)	-0.419*** (0.017)	-0.330*** (0.037)	-0.399*** (0.049)	-0.462*** (0.021)	-0.379*** (0.045)	-0.295*** (0.045)	-0.350*** (0.029)	-0.239*** (0.066)
hage	-0.020*** (0.001)	-0.015*** (0.001)	-0.015*** (0.001)	-0.019*** (0.002)	-0.018*** (0.001)	-0.016*** (0.002)	-0.020*** (0.002)	-0.012*** (0.001)	-0.012*** (0.003)
h_educ_yrs	-0.085*** (0.003)	-0.101*** (0.002)	-0.067*** (0.004)	-0.075*** (0.006)	-0.098*** (0.002)	-0.055*** (0.005)	-0.089*** (0.004)	-0.103*** (0.003)	-0.086*** (0.006)
urban	-1.058*** (0.036)	-0.495*** (0.016)	-0.607*** (0.042)						
Constant	3.152*** (0.078)	2.411*** (0.042)	2.229*** (0.090)	3.092*** (0.111)	2.728*** (0.056)	2.496*** (0.103)	2.071*** (0.109)	1.571*** (0.064)	1.517*** (0.129)
chi2	4092.17	6881.24	1776.66	381.01	3669.94	910.96	831.05	1928.10	410.73
N	16654	36290	8941	11556	22450	6427	5098	13840	2514

Standard errors are in parenthesis. *, **, *** denotes level of significance at 10, 5 and 1% level. The dependent variable is the households is MPI poor =1, and 0 otherwise.

Variables	Total			Rural			Urban		
	Sudan	South Sudan	Somalia	Sudan	South Sudan	Somalia	Sudan	South Sudan	Somalia
hhsz_m	0.035*** (0.009)	0.147*** (0.014)	0.269*** (0.015)	0.033*** (0.011)	0.154*** (0.017)	0.190*** (0.022)	0.037** (0.015)	0.120*** (0.026)	0.328*** (0.021)
hhsz_f	0.038*** (0.009)	0.102*** (0.014)	0.246*** (0.015)	0.038*** (0.012)	0.113*** (0.017)	0.215*** (0.024)	0.035** (0.016)	0.051* (0.026)	0.276*** (0.020)
no_u15	0.021** (0.009)	-0.042*** (0.015)	-0.144*** (0.014)	0.014 (0.011)	-0.054*** (0.018)	-0.064*** (0.022)	0.039** (0.015)	0.011 (0.029)	-0.201*** (0.019)
no_a65	-0.022 (0.025)	-0.053 (0.046)	-0.160*** (0.040)	-0.038 (0.031)	-0.015 (0.052)	-0.103 (0.066)	0.014 (0.047)	-0.171* (0.088)	-0.208*** (0.051)
female	-0.319*** (0.036)	0.165*** (0.033)	0.289*** (0.034)	-0.346*** (0.042)	0.182*** (0.039)	0.201*** (0.052)	-0.289*** (0.068)	0.196*** (0.070)	0.349*** (0.045)
hage	0.004*** (0.001)	0.002 (0.001)	0.004*** (0.001)	0.003*** (0.001)	0.002 (0.002)	0.005*** (0.002)	0.005*** (0.002)	0.003 (0.003)	0.004** (0.002)
h_educ_yrs	-0.052*** (0.002)	0.142*** (0.009)	0.132*** (0.005)	-0.0496*** (0.003)	0.187*** (0.014)	0.218*** (0.014)	-0.057*** (0.004)	0.086*** (0.011)	0.113*** (0.006)
urban	-0.374*** (0.026)	0.099*** (0.037)	-0.032 (0.031)						
Constant	-0.676*** (0.070)	-0.620*** (0.082)	-1.188*** (0.075)	-0.730*** (0.081)	-0.681*** (0.095)	-1.011*** (0.110)	-0.793*** (0.147)	-0.354** (0.178)	-1.371*** (0.105)
chi2	2618.620	1034.976	1463.106	1746.170	681.101	571.058	574.748	337.541	894.301
N	16230	8828	9091	11513	6577	3818	4717	2251	5273

Standard errors are in parenthesis. *, **, *** denotes level of significance at 10, 5 and 1% level. The dependent variable is MPI poor =1, 0 otherwise

Several factors are important and significant determinants of poverty in all countries.¹² Family size in terms of the number of male and female adult members is negatively and significantly correlated with the probability of being poor in Ethiopia, Uganda and Kenya but positively correlated with the probability of being poor in the case of Sudan, South Sudan and Somalia. This result is the same for rural and urban regions. On the other hand, the number of dependents measured here by the number of people above 65 and children below 15 are positively correlated with the probability of being poor in Ethiopia, Uganda and Kenya, but the result is unexpected for South Sudan and Somalia. Female-headed households are less prone to poverty than the male-headed counterparts in all countries except for South Sudan and Somalia. The age of the head is negatively and significantly related to the probability of being poor in Ethiopia, Uganda, and Kenya but positively related in the case of Sudan.

Education is the means to lift people out of poverty. The sign and significance of education show that the probability of being multi dimensionally poor decreases with the education of the household head in all the member states considered in this study. Household heads with better education have greater chance to break away from poverty (AfDB, 2016). The result is as expected and it can be considered as an important instrument in reducing poverty in each member country. In contrast to expectation, education seems to be positively related with poverty in the case of South Sudan and Somalia. Households in urban areas are less likely to be multi dimensionally poor (except South Sudan). This is mainly due to the availability of better opportunities in urban area than in rural areas. District dummies for each country in both rural and urban regressions are included but not reported for the sake of economizing space. The result shows that the probability of being poor varies depending on which region the household is residing in.

5. Conclusion and Policy Implications

The IGAD region as a whole is known for its high poverty rates, conflict, and recurrent drought. However, the level and composition of poverty in each country varies, and between regions within each country. This study aims at assessing the poverty profiles and inequality of IGAD region by using the most recent estimations and analyses of the global Multidimensional Poverty Index (MPI). In addition, it assesses poverty and inequality measured based on income. The determinants of multidimensional poverty for some of the IGAD member states are analyzed by employing an econometric regression using DHS and MICS data.

The findings suggest that the level of multidimensional poverty is different among member states. Ethiopia, Somali, South Sudan and Uganda are relatively the poorest countries as the MPI value is greater than 50%. On the other hand, Kenya and Djibouti are relatively better among the member states. Interventions aiming at poverty reduction in these regions need to target the dimensions that contribute the most to overall poverty. Furthermore, strategies need to consider the situation in rural and urban areas within the country. The decompositions analysis by rural/urban location and by dimension shows that poverty is much higher in rural areas than in urban areas in almost all IGAD member states. A focus on rural areas can change this pattern. However, country's intervention should be based on its current poverty level in both rural and urban areas. The finding is such that the contributions of each dimension to the overall poverty level depend on each country. Improving the standard of living seems to be the most important mechanism to reduce poverty in each of the member states. However, looking

¹²We should note that the data for Somalia is too old to explain the current poverty situation in the country.

at the indicators, the focus in urban and rural areas also differs. For example, Somalia, South Sudan and Djibouti may focus more on reducing the number of people deprived in years of schooling and child school attendance in both rural and urban areas. While Kenya, Uganda, and Sudan may focus on child mortality, Ethiopia may focus on nutrition in urban areas. In general, as the majority of the population of the member states is living in rural areas and, better social services such as health and education and improving the living standard by improving access to clean cooking facilities, sanitation, clean drinking water, electricity and assets is vital to reduce multidimensional poverty.

The assessment of inequality shows that income based measurement may not necessarily give the full picture about the nature of multidimensionality of inequality. Unlike income measurement where Kenya, South Sudan, and Uganda have the highest Gini index, Kenya ranks first in terms of human development. Uganda and Djibouti rank second and third among the member states. This study also reports status of member states in terms of inequality among the poor. We learned that countries with similar levels of MPI may have different level of inequality among the poor. Ethiopia, Somalia and Sudan need to work on reducing inequality among the poor as compared to other IGAD member states. Further decomposition of the source of multidimensional inequality may help to identify the focus of intervention to reduce inequality among the population.

The findings from the econometric analysis on the determinants of multidimensional poverty indicate that several household level variables influence the probability of being multi dimensionally poor. For instance, the education of household head is one of the significant variables in both urban and rural areas of Ethiopia, Kenya, Uganda and Sudan. Therefore, education is an important factor both in reducing poverty and in preventing households from falling into poverty in the first place. These probabilities are lower for households living in urban areas compared to those in rural ones. This may be because there are better opportunities in urban areas and hence the need to create opportunities for people living in rural areas. The coefficients for district level estimates also indicate that policies aiming at reducing poverty need to recognize the geographical differences in each of the IGAD member states.

The discussions made thus far evidently indicate that policy makers, development partners and other relevant stakeholders need to coordinate and focus on the interventions that reduce poverty the most. The intervention areas are not necessarily the same for each country and for each region within the country. Future studies may need to look at the intra-household analysis which could provide more information for policy makers in order to target the right segment of the population for intervention. For example, of the total 1.45 billion people who are multi dimensionally poor, 48% are children and 43% of this are in sub-Saharan Africa (Alkire and Robles, 2017). A rigorous analysis for IGAD member states which are different from the rest of SSA will provide additional information regarding the extent and magnitude of children's multidimensional poverty.

As discussed elsewhere in this paper, the lack of data, specifically time series data on poverty and inequality in Africa prevents researchers and policy makers from getting adequate knowledge on the trends, determinants or causes of poverty and inequality in the region. This has to be given due emphasis in order to understand and design appropriate measures meant to reduce poverty and inequality in the continent in general and IGAD member states in particular.

Finally, economic growth has been achieved in most of the IGAD member states. However, growth alone may not reduce poverty and inequality as expected. Country specific pro-poor policies and programs need to be designed in order to translate the growth achieved into poverty reduction and reduce inequality. Furthermore, country specific studies on the relationship between growth, poverty

and inequality are necessary in order to better understand the link between growth, poverty and inequality.

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Appendix A:

Table 1A. Description of data

Country	Data Source	Survey year	No. of sample Observations (households)		Total
			Urban	rural	
<i>Ethiopia</i>	DHS	2011	19489	58255	78050
<i>Kenya</i>	DHS	2014	19616	39883	59809
<i>Uganda</i>	DHS	2011	3339	10729	14068
<i>Sudan</i>	MICS	2014	29481	67568	97049
<i>South Sudan</i>	MICS	2010	15299	40674	55973
<i>Djibouti</i>	MICS	2006	24809	3205	28014
<i>Somalia</i>	MICS	2006	13265	20292	33557

Due to missing data, the actual number of observation used to compute the MPI may be less than the numbers indicated in the table above.

Appendix B: Description of variables used in the econometric regression of the determinants of multidimensional poverty

Description	Variable	Kenya		Uganda		Ethiopia		Sudan		South Sudan		Somalia	
		Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.	Mean	S. D.
Number of male household members	hhsz_m	2.08	1.51	2.42	1.68	2.27	1.57	2.97	1.67	2.96	1.75	3.15	1.80
Number of female household members	hhsz_f	2.14	1.59	2.56	1.74	2.38	1.53	2.80	1.69	3.02	1.97	3.03	1.81
Number of members under 15	no_u15	1.90	1.81	2.51	2.07	2.09	1.84	2.74	2.13	3.26	2.17	3.29	2.26
Number of members over 65	no_a65	0.16	0.41	0.13	0.38	0.15	0.39	0.25	0.52	0.12	0.37	0.18	0.44
Household head is female	female	0.35	0.48	0.31	0.46	0.29	0.45	0.14	0.34	0.43	0.49	0.31	0.46
Age of head of household	hage	44.09	16.09	41.88	15.50	43.18	16.28	47.29	14.95	41.77	13.00	45.11	14.04
Education completed in single years	h_educ_yrs	7.05	4.85	6.06	4.80	3.09	4.55	4.94	5.55	1.19	2.45	1.54	2.71

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