

## **Inequality of Opportunities for Children in Ethiopia and Contributors for Inequality**

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**Abstract:** The purpose of this paper was to measure inequality of opportunities for children in Ethiopia. The study used secondary data from Living Standard Measurement Survey of Ethiopia, 2015. A total of 7207 sample children were considered. Human opportunity index was used to measure inequalities of opportunities for children. Dissimilarity index was used to measure inequality of opportunities. Opportunities were proxied by access to basic services such as primary education, safe drinking water, health and nutrition. The dissimilarity index showed high inequality with value of 20.8, 12.9 and 8.4% for access to safe drinking water, health service and minimum nutrition opportunities, respectively. The coverage rates of access to opportunities were also less than other regions with respective values of 64.1, 29.8 and 22.9% for primary education, safe drinking water and health services. The human opportunity indices were also 61.5, 23.6 and 20.0% for these opportunities, respectively. Access to safe drinking water and health services were the lowest available opportunities as well as the highest inequitably distributed among children in Somali and Afar regional states than other regions. This indicates that these regions allocate low resources to increase average access rate of these opportunities. Moreover, the existing services are distributed unfairly. These urge the government to create fair level playing field for children across the country. Increasing allocation of resources to improve the coverage rate of safe drinking water, health and education services in pastoral areas reduces in equality of opportunities among the regions.

**Keywords:** Dissimilarity Index; Human Opportunity Index; Inequality; Opportunity

## 1. Introduction

Inequality is the central agenda in Sustainable Development Goals (SDGs) (FAO, 2014a, b; IFPRI, 2014; Wild *et al.*, 2015). The SDGs aspire to address inequality in all its forms and give equal opportunity for all humanity (Norton *et al.*, 2014; Shepherd *et al.*, 2014). Its success should be measured and judged on how it benefits the marginalized and excluded people who live in different countries around the globe including Ethiopia (Arauco *et al.*, 2014).

The idea of inequality of opportunity is the view of contemporary societies which is also consistent with modern theories of justice (Sen, 2006). Currently the growing literature on economic inequality focuses on inequality of “opportunities” which has long been associated with very different views on social justice (Bourguignon *et al.*, 2007). It gained attention after equality of opportunity theory was developed by Roemer (1998). He defined equality of opportunity as a situation in which important outcomes are distributed independently of circumstances. Inequalities of opportunities according to him are caused by different factors. These are factors for which individual can be held morally accountable, like effort, or factors that lie beyond individual’s responsibility like circumstances. In this regard, inequality caused by differences in effort is acceptable. But inequality caused due to circumstances is considered unjust and unacceptable. The circumstances may include individual, household, community characteristics for which individuals have no responsibility (Roemer, 1998, 2013). More importantly; it explicitly recognizes that efforts could be shaped by circumstances (Jones *et al.*, 2014).

The concept of equality of opportunity is related to universal access to key goods and services such as basic education, health services, clean water, minimum nutrition, and citizenship rights which are crucial steps toward justice and fairness (Sen, 2006; Barros *et al.*, 2009; Nussbaum, 2011; Vega *et al.*, 2012). Expanding access to these goods and services has long been a central issue in the analysis of economic development. Various researchers have been employing this framework to assess inequalities of opportunities for children among different nations and even within a nation. However, the issue of children remains hidden despite the wide acknowledgement that they deserve a special focus within development debate (Roelen *et al.*, 2012).

Accesses to these opportunities expand each individual’s abilities and options via human capital and they have a major impact on what a person can be or do (Vega *et al.*, 2012). Early childhood opportunities are pre-conditions for the later life. The impact of inequality during childhood can have detrimental effects on their future life which are irreversible since inequality of opportunity wastes talent; it is a loss of potential for national growth and development (UNICEF, 2011; Woodhead *et al.*, 2012). Most of the time children in developing countries have less access to basic services. Thus, understanding the level and the causes of this inequality is crucial steps for any developmental actions. Addressing this problem has versatile effect: it contributes to social improvement, growth and greater equality in a later life (Hassine, 2011). Moreover, understanding the situation of children at the beginning stage is good for proper intervention (Yaqub, 2010).

In Ethiopia, the recent policy reform has brought positive growth for the last 10 years despite its controversial figure and its contested distribution that has created division among the practitioners. The country is characterized by polarized society, where inequality is pervasive. A positive economic growth does not guarantee that all citizens will benefit from it. Growth must be accompanied with proper redistribution policy to benefit all members of a society including the young children that would carry the future economy.

The government of Ethiopia in its report claims that inequalities were lower at both national and regional levels including pastoral areas. It further asserts that inequality declines as measured by income at household level (MoFED, 2013). However, such inequality indexes do not measure the kind of inequalities that are viewed from social, economic or moral perspectives (Lefranc *et al.*, 2008). Inequality means much more than income and viewed from broader perspectives, one form is intersecting with the other (Melamed, 2014). Most of the time children from rural areas have no access to basic services. It is important to ask whether the recent growth has created equal opportunity in accessing the basic services for children in Somali and Afar pastoral and agro-pastoral areas compared to other regions of Ethiopia. Unequal access to basic services such as education, health, nutrition and safe drinking water means that growth benefits do not flow equally across different groups and regions (Jemmali and Amhara, 2014).

Here we can argue that children in the Somali and Afar pastoral and agro-pastoral areas have been in an unfair situation in relation to accessing basic services. In these areas, inequality can be both hidden within and perpetuated by different circumstances which are beyond the control of children. It is difficult to understand the causes of inequality using the conventional approach only. There is a new development in inequality literature. Recent studies employ equality of opportunity framework to analyze inequalities of opportunities faced by individuals and their causes. In light of this, the inequalities hidden in these two areas are certainly worthy of investigation. There is no rigorous study on the Somali and Afar pastoral and agro-pastoral areas using this new approach. Through wider survey of literature, it is learnt that there is no single study conducted on inequality of opportunity in these areas. Hence, the purpose of this paper is to measure inequality of opportunities in pastoral and agro-pastoral Somali and Afar areas of Ethiopia, and identify factors that affect inequalities of opportunities in the regions.

## **2. Research Methods**

### **2.1. Data Type and Sources**

This paper used secondary data from Living Standard Measurement Survey (LSMS) jointly collected by CSA and World Bank (2015). It used the second wave released in 2015. In the analysis of inequality of basic opportunities, a total of 7207 children from Tigray, Amhara, Oromia, SNNP, Somali and Afar were used. The LSMS survey has the required information at an individual level (for children) on both opportunity and circumstance variables. Basic access was proxied by primary education, health services, safe drinking water and nutrition. Education is considered

as one of basic services and that every citizen has the right to access it. Access to primary education was measured by whether the children between 7-15 years of age currently attend school or not. Access to minimum nutrition was proxied by anthropometric measures which are computed for children less than 5 years old. There are various measures of anthropometric measurements like wasting, stunting and underweight. These measures were constructed from weight, height and age of children's data from LSMS. All measures have their own advantage. Wasting is mostly used to measure short run nutritional status of children. Stunting indicates past history of nutritional status of the household in general and individual in particular. Underweight combines the two measures, namely wasting and stunting. As far as nutritional status is concerned, underweight is considered as the best measure, and thus is considered in this study too. Access to nutrition is measured by underweight, and if a child is underweight, he/she is considered as not having access to minimum nutrition required for physical and mental development. However, if a child is not underweight, he/she is considered to have access to the minimum nutrition required. Similarly, access to safe drinking water and health services are measured as binary variables. The circumstance variables include sex of a child, parental education level, household economic status and household size.

## 2.2. Method of Data Analysis

Human opportunity index (HOI), developed by Barros *et al.* (2009), has been widely used to estimate inequalities of opportunities. It is widely applied in recent empirical analysis of inequality of opportunity for children. The HOI is used to analyze how personal circumstances impact an individual's probability of accessing basic services. The HOI measures coverage rate and then adjusts it according to how fairly goods and services have been allocated among circumstance groups. Following Barros *et al.* (2009) the formula for the HOI is calculated as:

$$HOI = \bar{P} (1-D)$$

Where  $\bar{P}$  coverage rate measures in average probability; and D average is dissimilarity index.

It measures a country's/region's progress towards opportunity for all children (Barros *et al.*, 2009). The index value ranges between 0 and 100. The country/region approaches 100 shows good progress to universal coverage. The HOI synthesizes two measures into a single indicator. First, the level of basic opportunities in a society measured through average coverage ( $\bar{P}$ ) rate for a given opportunity. Second, how equitably those opportunities distributed is measured through the index of dissimilarity (D) (Vega *et al.*, 2012; Hoyos and Narayan, 2012; Goli *et al.*, 2014; Jones *et al.*, 2014). To obtain the measure of HOI, first both these two components should be estimated.

For the binary outcomes such as having access to basic services, the probability of access is estimated either by parametric models such as logit or probit but also non-parametrically. Most of the time, non-parametric method limits the number of circumstance variables used. This is because it requires large data set to have enough samples in each group based on circumstance parametric methods are regression-

based and can easily incorporate more circumstances into the analysis (Hassine, 2011; Isfahani *et al.*, 2014). Here, parametric approach is considered to estimate the HOI index. The regression model must be estimated to determine the empirical relationship between each circumstance and access to basic services. This can be done by estimating the logit model parametrically. Then predict a probability of access to basic services for each individual with a given set of circumstances. In addition, the overall coverage rate is obtained. To predict a probability of access to a given opportunity, let us define an outcome variable  $y_i$  which takes a value of 1 if the  $i^{\text{th}}$  child has access to an opportunity (education, health, safe drinking water and nutrition) and takes a value of 0 if the  $i^{\text{th}}$  child lacks access to the opportunity under consideration. The conditional probability of access is given by  $E(y_i|C) = p_i$ , where  $p_i$  is the probability that an  $i^{\text{th}}$  child has access to an opportunity conditional on circumstances.  $p_i$  is estimated by means of a logit model using a set of  $k$  circumstance variables  $c_{i1}, c_{i2}, \dots, c_{ik}$ .

$$Ln\left(\frac{P(y = 1 | c_1, \dots, c_k)}{1 - P(y = 1 | c_1, \dots, c_k)}\right) = \sum_{j=1}^k f_j(C_k) = C_k \beta_k$$

Where  $C_k = (c_1, \dots, c_k)$  denotes a vector of circumstance variables which includes family background, demographic characteristics and community characteristics.

Estimates of the parameters,  $\beta_k$  obtained from the above logit regression are denoted by  $\hat{\beta}_k$  and used to obtain a predicted probability of access to opportunity for each child. The regression output is interpreted in the usual way to understand the determinants of access to opportunity under consideration. Moreover, an estimate for predicted probability of access to a given opportunity explained by the circumstance variables was obtained as:

$$\hat{P}_i = \frac{\exp\left(\hat{\beta}_0 + \sum_{j=1}^k C_{ki} \hat{\beta}_k\right)}{1 + \exp\left(\hat{\beta}_k + \sum_{j=1}^k C_{ki} \hat{\beta}_k\right)}$$

Using a predicted probability, average coverage rate of an opportunity in the population and D-index of opportunity are computed as follows.

$$\bar{P} = \sum_{i=1}^n \alpha_i \hat{P}_i \quad \text{and} \quad \hat{D} = \frac{1}{2\bar{P}} \sum_{i=1}^n \alpha_i |\hat{P}_i - \bar{P}|$$

Where  $n$  is the number of sample individuals,  $\alpha_i$  is population weight attached to an  $i^{\text{th}}$  sample individual, and  $\bar{P}$  is a proportion of population with access to a given opportunity.  $\bar{P}$  is coverage rate.  $D$  measures the degree of inequality of opportunity that is explained by the individual's circumstances. As such,  $(1-D)$  is interpreted as equity of opportunity.  $D$  takes values between 0 and 1.  $D = 0$  implies that every child in a society enjoys the same opportunities, while  $D = 1$  implies perfect inequality in a society. Then the estimate for HOI is calculated, using the formula  $HOI = \bar{P} (1-D)$  for each opportunity.

### **3. Result and Discussion**

#### **3.1. Nutritional Status Measurement Based on Anthropometric Measurements**

Children anthropometric indicators are indicated in Table 1 for the study areas. Overall, in these measures children less than five years in Ethiopia are poorly-nourished). The result indicated that 42% of children are stunted, 10% are wasted and 21% are underweight in 2014. The figures are far below Growth and Transformation Plan (GTP I) target levels except for underweight which are 30% and 3% for stunting and wasting, respectively. However, underweight result is equal to GTP target plan level. It has dropped from 25% (in 2011) to 21%. This is a remarkable achievement when considered at national level though there are variations at regional levels. Stunting and wasting have grown by 2% and 1%, respectively, i.e., from 40% and 9% in 2011.

At regional level, there are variations in all these indicators. Stunting has ranged between 50% in Amhara to 32% in Oromia. It is 38% and 37% for Somali and Afar Regional states, respectively. Wasting is more serious in both Somali and Afar and has stood at 23% and 17%, respectively. Similarly, proportions of children who are underweight are high in these regions. About 35% of children who are under five in Somali region have had less weight as compared to the healthy reference categories with the same age and sex. Similarly, this figure is found to be 24% for Afar. This region is also found to be among regions in which the highest proportions of underweight children are found next to Somali and Tigray regions. The result confirms that still significant proportions of children have faced nutritional problems in the nation in general and Somali and Afar Regions in particular. Wasting and underweight are found to be more serious in Somali and Afar compared to other major regions. Stunting is found to be relatively less in these areas in comparison to the others. All the major three anthropometric parameters showed the country/regions grouped under high prevalence of malnutrition categories. The degree of malnutrition is also high at both national and regional levels. According to the WHO (1995) (Note 1) set of criteria for determining malnutrition, stunting is very high in all regions including the Somali and Afar Regions. Although wasting is serious in all regions, it is much worse in Somali and Afar regions during the study period. Similarly, underweight is high in all regions and it is severe in Somali and Tigray. So, population with high proportion of people stunted or underweight is evidence of nutritional deprivation. These problems will have greater implication for the country's long run population health, productivity, economic growth and development.

Table 1. Child anthropometric indicators in Ethiopia by region

Regions	Stunted	Degree	Wasted	Degree	Underweight	Degree
Tigray	48.43	Very high	11.32	Serious	30.19	Very high
Amhara	50.68	Very high	9.18	Serious	18.37	High
Oromia	32.02	Very high	8.99	Serious	16.57	High
SSNP	44.08	Very high	6.41	Serious	18.45	High
Somali	38.42	Very high	22.97	Critical	35.14	Very high
Afar	37.16	Very high	16.88	Critical	24.68	High
National	41.83	Very high	10.14	Serious	21.11	High
GTP1	30		3		21	

Source: Own computation based on LSMS (2015) data

### 3.2. Measurement of Inequalities of Opportunities

The inequality of opportunities was approximated by access to primary education, access to safe drinking water, access to health services and access to minimum nutrition. The result from the estimation is presented and discussed in this order. The coverage rate, dissimilarity index, and HOI estimates are computed. The HOI is expressed on the scale of 1 to 100, where the higher figure reflects good level of equality and lower value reflects poor/inequitable accesses. Access to each of opportunities at regional and National levels is discussed below.

Access to primary education service across the main regions including Somali and Afar rural areas is presented in Table 2. The average probability of accessing primary education varied among different regions. The highest score corresponds to Tigray with 85% opportunity. This indicates that majority of the children have had access to primary education in this region. The figures of access to primary education services for Amhara and Oromia are 76% and 73%, respectively. In rural areas of Somali and Afar regions, the probability of accessing primary education is 64%. Even though the government claimed increase in the coverage of education service in rural areas of the country, access to this service was far below its universal coverage rate in the study period.

The D-index shows how the existing access to primary education service is distributed among children in different regions. This measure also varies among the regions considered in the study. It ranges from 2.5% in rural areas of Tigray to 5.6% in Oromia. This indicates that existing available opportunity i.e., access in primary education need to be reallocated so as to reduce inequality of this service. In Oromia, 5.6% has to be reallocated to ensure equality among the children in the region. In Somali and Afar regions, 4% of the available educational opportunity needs to be reallocated. The human opportunity index combines both the average probability of accessing primary education and how this service is equitably distributed to give a better picture. Using this index, distribution of primary education service was highly variable across the rural areas as observed from Table 2. The human opportunity index is high in rural Tigray. This indicates that about 84% of primary education service is available and relatively equitably allocated among the children in this

region. In Amhara region, 73% of the available educational opportunity is relatively equitably distributed as compared to other regions other than Tigray and SNNPR. Only 61.5% of primary education service is available and relatively less equitably allocated among the children living in Somali and Afar regions. The results of all the regions considered are found to be far below assuring universal access in primary education services of 90% points for all regions as indicated by human opportunity index.

Table 2. Inequality of opportunity in primary education, 7-15 years

Region	Average opportunity	D-index	Human opportunity index
Tigray	85.7	2.5	83.5
Amhara	76.4	4.3	73.1
Oromia	73.3	5.6	70.0
SNNP	72.6	2.7	70.6
Somali and Afar	64.1	4.0	61.5
National	74.5	3.5	71.9

Source: Own computation based on LSMS (2015) data

Like primary education service, accessing safe drinking water seems highly uneven for the citizens during the study period. The average probability of accessing safe drinking water (Table 3) shows low. It is relatively better in Oromia region with 61% of children in this region living in households which have access to safe drinking water. Similarly, 59%, 55% and 54% of children live in households which have access to safe drinking water in Tigray, SNNP and Amhara, respectively. Comparatively, only 30% of the children are living in households which had access to safe drinking water in rural areas of Somali and Afar regions. At national level, only 54% of children are living in households which have access to safe drinking water in rural areas of Ethiopia during the study period. These figures indicate that the provision of safe drinking water is at low level in all regions, but it was the worst in Somali and Afar regions of the country at the study period. The D-index shows it is the highest in Somali and Afar regions. This indicates that 21% of the available safe drinking water must be reallocated to reduce inequality of safe drinking water access. On the other hand, the figures for access to safe drinking water in SNNP, Amhara, and Tigray regions are 7.4%, 6.4%, and 6%, respectively, and which are less than that of Afar and Somali regions. This clearly shows the presence of inequality in safe drinking water distribution in the pastoral and agro-pastoral areas as compared to the other regions of the country.

The human opportunity index for access to safe drinking water also shows greater variation among these regions. It is found to be highest in Oromia region. It indicates that 58% access to safe drinking water is available and relatively equitably distributed among children in Oromia region as compared to other regions. In Tigray region, about 56% of this opportunity is available and also relatively equitably



distributed among the children next to Oromia region. However, for the Somali and Afar regions the human opportunity index shows the lowest level with 23% of total opportunity needed to ensure the universal access to safe drinking water as compared to other regions. The worst of it is that it is inequitably distributed among the children living in these regions. At national level, only 50% of safe drinking water opportunity is available to ensure universal access. The results indicate that Ethiopia has scored far below in assuring the universal access in safe drinking water for the citizens of the country in general and worse for Somali and Afar regions in particular.

Table 3. Inequality of opportunity in access to safe drinking water

Region	Average opportunity	D-index	Human opportunity index
Tigray	59.1	5.6	55.7
Amhara	54.1	6.4	50.6
Oromia	60.6	3.6	58.4
SNNP	54.9	7.4	50.8
Somali and Afar	29.8	20.8	23.6
National	53.5	7.0	50.0

Source: Own computation based on LSMS (2015) data

Access to health service result depicts low measure in both coverage and HOI. The average opportunity of accessing health service shows 55% in Tigray, 28% in Oromia 25% in SNNP, and 24% in Amhara (Table 4). The average probability of accessing health service is only 23% in Somali and Afar regions. At national level, the average probability for the access to health service is 28.4%. In general, the average probability of accessing health service shows below universal access despite government's effort in accessing health services in rural areas. Inequality in accessing health services also varies among the regions. The highest inequality is observed in the Somali and Afar with the D-Index of 13%. It is 10% in Oromia and about 6.6% in Tigray and Amhara regions. The human opportunity index for accessing health service is highest in Tigray region which is 52% and relatively equitably distributed among children in Oromia, Somali and Afar Regions. The human opportunity index is 25%, 24% and 22% for Oromia, SNNP and Amhara regions, respectively, but 20% for Somali and Afar regions which is the lowest. This may be attributed to inaccessibility of this service to rural households due to geographical locations.

Table 4. Inequality of opportunity in access to health services

Region	Average opportunity	D-index	Human opportunity index
Tigray	55.2	6.6	51.5
Amhara	23.5	6.5	22.0
Oromia	27.8	10.1	25.0
SNNP	25.4	5.3	24.1
Somali and Afar	22.9	12.9	20.0
National	28.4	5.4	26.8

Source: Own computation based on LSMS (2015) data

The measurement of minimum nutrition measure is approximated by underweight. The result for this estimate is reported in Table 5. The average probability of accessing the minimum nutrition is varying among children under 5 years old. The rate is the highest in Oromia indicating that 79% of children who live in this region have access to minimum nutrition. The corresponding figures are 77% and 74% in Amhara and SNNP regions, respectively. The lowest coverage rate is observed in Tigray followed by Somali and Afar regions with the second smallest coverage. The average probability of accessing basic minimum nutrition is 65% and 68% in Tigray, and Somali and Afar Regions, respectively. The highest inequality of opportunity in access to nutrition is observed in the Somali and Afar regions with the D-index of 8% followed by 7.4% in Tigray and 5% in Amhara and 3.2% in SNNP regions. The human opportunity index is the highest in Oromia region with 76%. It is 73% and 71% in Amhara and SNNP regions, respectively. However, in Somali and Afar regions, 61% of children in these regions have access to minimum nutrition but it is far from universal access rate. Moreover, it is relatively inequitably distributed among rural children in these regions. At national level, 72% of the total opportunity needed to ensure the universal access to minimum nutrition is available.

The human opportunity index in access to minimum nutrition is higher than corresponding figures for average access of other opportunities in Somali and Afar regions. Access to minimum nutrition and primary education service are exceeding 50%. The inequality measure indicates higher for all opportunity in Somali and Afar regions than other regions. Among the basic opportunities considered, access to safe drinking water and health services are the lowest available opportunities in Somali and Afar regions and also the highest inequitably distributed opportunities in these regions. In all of the cases, the human opportunity index is adjusted for the inequality existed which resulted in less value than the average probability of access. This indicates that the existing opportunity has to be reallocated to ensure equal distribution.

The results discussed using average access rate, dissimilarity index, and human opportunity index have shown three interesting patterns for all regions in general and the Somali and Afar Regions in particular. First, regions with high average access rate for any given opportunity have high rate of human opportunity index and have

shown low level of inequality index. This can be easily understood if access to minimum nutrition and primary education services are considered. Second, regions with high human opportunity index also have shown high dissimilarity index for a particular opportunity. This pattern is evident in Oromia especially with the access to primary education services. Third, regions with the lower human opportunity index also have very high inequality for the same opportunity. All the opportunities considered here, the pattern is very evident in Somali and Afar regions. This has greater implication for the resource allocation of the country in general and the Somali and Afar regions in particular. Moreover, the existing services are distributed inequitably in these regions. This indicates the need for the regions to reallocate the available resources to increase the average access rate of these opportunities.

Table 5. Inequality of opportunity in access to nutrition < 5 years

Region	Average opportunity	D-index	Human opportunity index
Tigray	64.7	7.4	59.8
Amhara	77.3	5.2	73.2
Oromia	79.2	3.7	76.2
SNNP	74.3	3.2	71.8
Somali and Afar	67.6	8.4	61.8
National	75.0	3.8	72.1

Source: Own computation based on LSMS (2015) data

### 3.3. Contribution of Circumstance Variables for Inequality of Opportunity

This part shows the specific D-index by decomposing the inequality of opportunities according to the contributions of individual circumstance variables. The Shape decomposition technique is used. For access to primary education services, the most important circumstance variable that influences a child's access to primary education is parents' education level (Table 6). The contribution of father's education ranges from 29% in SNNP to 64% in Oromia. The result implies mother's education level has contributed 19% and 35% in Amhara and Oromia regions, respectively. In Somali and Afar regions the D-index for the father's and mother's education level are 63% and 22%, respectively. The contribution of father's education level to the inequality of access in primary education is found to be high in all regions. There is positive relationship between father's education level and the child's education. The parental advantage/disadvantage is more likely to affect their children in the same manner. The likelihood of educated parents' sending their kids to school is higher compared to the less educated parents.

The household size is found to be the second most important inequality contributor with 24.1% in SNNP to the highest 44.1% in Tigray. Household with sizable family members may be less likely to send their children to school than household with small family member. However, this variable is not a significant factor in other regions. The child's sex is found to be significant contributor to inequality only in Tigray with 34%. This may imply the presence of systematic gender discrimination

in Tigray in accessing primary education service. However, this variable is not a significant contributor to inequality in other regions including Somali and Afar regions. The other surprising result is that household economic status has little contribution to inequality of access to primary education in all regions. This may be because of free primary education access provided by the government. In many cases, parents' education level, i.e., father's and mother's, has explained the inequality that has existed in primary education. The positive correlation between parents' and children's education level has an implication for intergenerational social mobility. Parental educational disadvantage may be transmitted to their children as educational disadvantage and vice versa. However, as far as this result is concerned, it is inconclusive. In addition to educational level, further research may be needed by accounting all possible intergenerational social mobility indicators and their relationship.

Table 6. Contribution of circumstance variables to inequality of opportunity for primary education, 7-15 years (%)

Region	Sex	Household size	Father's education	Mother's education	Household economic status
Tigray	34.2*	44.1*	5.0	7.2	7.1
Amhara	22.1	1.3	52.1*	18.9*	4.5
Oromia	0.2	0.8	64.4*	34.5*	0.2
SNNP	11.3	24.1*	27.8*	34.3*	2.2
Somali and Afar	5.6	2.2	63.8*	22.2*	1.3
National	0.05	8.85*	56.2*	34.4*	0.19

Source: Own computation based on LSMS (2015) data

In the case of access to safe drinking water (Table 7), father's education has been a contributory factor to inequality. The contribution ranges from 24% in SNNP to 80% in Somali and Afar regions. Mother's education level is also a very important factor that determines access to safe drinking water for the children in three out of six cases considered. Educated parents are found to make better decision for providing safe drinking water to their kids as compared to uneducated parents. They may have better information on the consequence of unsafe water to human health and use boiled water at home despite its sources of origins. The second most important contributor to inequality circumstance variable is household economic status. The contribution of this variable is 52.1% in SNNP region and around 8% in Somali and Afar regions. A better off household may have capacity to provide safe drinking water to household members including children; while poor households might be unable to do this. Sex of a child did not contribute in all regions to the inequality in accessing safe drinking water. Except for SNNP, household economic status does not contribute to inequality of access to safe drinking water in Tigray, Amhara and Oromia.

Table 7. Contribution of circumstance variables to inequality of opportunity for access to safe drinking water

Region	Sex	Household size	Father's education	Mother's education	Household economic status
Tigray	0.2	19.3*	6.1	73.1*	1.3
Amhara	17.8	6.0	48.7*	26.8*	0.4
Oromia	0.02	59.7*	27.9*	10.2	1.7
SNNP	0.1	4.1*	23.6*	20.4*	52.1*
Somali and Afar	0.1	4.4	80.4*	8.3	7.5*
National	0.4	3.8*	60.0*	34.6*	1.0

Source: Own computation based on LSMS (2015) data

Results of inequality contributors to access to health service are presented in Table 8. Mother's education level, household size and father's education level have been significant factors. The contribution of mother's education level to the inequality of opportunity in health service has ranged from 13% in SNNP to 62% in Amhara. Among the circumstances variable considered, mother's education level contributed 17% to the inequality among children in access to health service in Somali and Afar Regions. Similarly, fathers' education level has contributed 40.2% and 49% to the inequality among children in access to health services in Tigray and Oromia, respectively. The educated parents may have better information about the importance of health services for their family than uneducated parents. The other important contributor to inequality is household size. It contributes 35% in Tigray and 73% in SNNP. It is the dominant contributor to inequality with 52% in Somali and Afar Regions. This is followed by mother's education level and household economic status with their respective values of 17.1% and 16.2% in Somali and Afar Regions. The household economic status is also found to be a significant contributor to inequality of health services in Somali and Afar Regions with value of 16.2%. This indicates, the poor are having less access to health services compared to the better-off household. As far as this research is concerned, this variable has had insignificant contribution to inequality in all other regions. Similarly, child's sex is found to be significant contributor to inequality in Tigray region with 18.7%, but not in other regions.

Table 8. Contribution of circumstance variables to inequality of opportunity for health services

Region	Sex	Household size	Father's education	Mother's education	Household economic status
Tigray	18.7*	34.7*	40.2*	5.3	1.3
Amhara	2.0	2.4	13.8	61.6*	20.4
Oromia	0.09	0.76	49.0*	50*	0.2
SNNP	0.0	73.3*	5.7	12.6	5.9
Somali and Afar	0.9	52.4*	11.3	17.1*	16.2*
National	0.09	32.7*	41.8*	20.1*	4.7

Source: Own computation based on LSMS (2015) data

In relation to access to minimum nutritional status, parental education level, household economic status, and sex are expected to be the main contributors to inequality. The fathers' education level has contributed 61% in Amhara, 81% in Oromia, and 68% in SNNP regions (Table 9), but not in other regions. The educated parents may have better knowledge in provision and use of food and including nutritious food for their kids compared to less educated parents. The household economic status is also one of contributors to the inequality of opportunity for minimum nutrition. This ranges from 1.6% in the Somali and Afar regional states to the highest 11% in Tigray. The corresponding figure for SNNP is 2.3%. The poor have less access to minimum nutrition compared to the better off household. Sex of a child is found to be significant contributor to inequality in Tigray only with 21.4% and not in other regions. In general, among the circumstance variables considered, parents' educational level is the dominant contributor to inequality in all regions. Household economic status and household size are also found to be significant contributors to inequality in some cases. However, in almost all cases except Amhara region, sex of the child has little contribution to inequality of opportunity.

Table 9. Contribution of circumstance variables to inequality of opportunity for minimum nutrition

Region	Sex	Household size	Father's education	Mother's education	Household economic status
Tigray	0.2	3.1	9.5	7.7	10.8*
Amhara	21.4*	1.0	60.6*	0.7	0.02
Oromia	1.2	0.2	81.2*	17.7	-
SNNP	0.11	15.2	67.7*	16.1	2.3*
Somali and Afar	0.8	11.0	1.0	11.0	1.6*
National	2.3	0.08	69.7*	19.1*	8.9*

Source: Own computation based on LSMS (2015) data

#### 4. Conclusion

In Ethiopia, to achieve the intended SDGs, knowing the causes and the types of inequality specifically for the children is crucial. Inequality is measured either as inequality of outcome and inequality of opportunity. In this article the inequality of basic opportunities among regions are measured. Opportunities are approximated by access to primary education service utilization, access to safe drinking water, access to health service utilization, and access to minimum nutrition. These are the important ones in building the future human capital of every nation. Accessing these opportunities depends on a number of factors. If the inequality of these opportunities arises due to circumstances which are beyond the control of the child, then it needs to be addressed. The average access rates, human opportunity index, and dissimilarity index are the indexes used to measure the opportunities. Access to health service and safe drinking water are the lowest accessible opportunities indicated by their coverage rate. They are also the most inequitably distributed opportunities among children who live in Somali and Afar regions. In addition, children in the Somali and Afar regions have less access to the basic opportunities compared to children living in other regions as observed from the values of the lowest human opportunity index. This indicates children who live in Somali and Afar Regions are more disadvantaged in almost all opportunities than children in other regions. Among circumstances included in the study, fathers' and mothers' education, followed by household economic status and household size are found to be the major contributors to inequality in most of the regions including Somali and Afar Regions. Thus, the following policy implications are drawn from the results:

There is a need to increase access to these basic opportunities for the children to meet the universal coverage rates. Part of the inequalities observed in the basic opportunity can be addressed partly by strengthening access to education of parents', strengthening family planning interventions, improving economic status of parents' through development of different income generating activities.

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