

INEQUALITY OF OPPORTUNITY AMONG CHILDREN: MEASURING REGIONAL HUMAN OPPORTUNITY INDEX IN MINDANAO

Nathalie L. Sanchez and Jennifer E. Hinlo

ABSTRACT

Inequality is usually measured in terms of income or consumption. But to cover many other standards of living dimensions, the concept of inequality is now being extended in such as inequality of outcomes in health, education and basic infrastructure. With these contentions, this study aims to address the inequalities across regions in Mindanao through measuring the inequality of opportunity among children in terms of access to basic services that are essential for their growth. These indicators are employed in computing the Human Opportunity Index (HOI). The HOI determines how children's socioeconomic and demographic characteristics affects their access to basic amenities. Results show that there is huge deprivation in terms of provision and allocation of opportunities in access to safe water, improve sanitation, electricity, primary and secondary education among children ages 0-17 across regions in Mindanao.

Keywords: human opportunity index, inequality, regional index

Introduction

Opportunity is defined as the access to sets of goods and basic services such as to safe water, electricity, healthcare, basic education and housing condition. Accessibility to these basic services defines opportunity for children, because children (unlike adults) are more vulnerable to inequality for they can't make the effort needed to have access to certain goods and amenities.

Basic opportunities are essential and critical for children's development since interventions made earlier in the life cycle are more effectively provides greater outcomes than intervention made later in life. Given the available resources and technology nowadays, these basic services are made affordable and is becoming a valid and realistic social goal for universal provision (Barros, et al. 2008).

Children in every country should be provided with equal access to basic services that are essential to their growth regardless of their circumstances. The term circumstances were used to outline the characteristic that a person was born with and has no control over with like gender, ethnicity, parental background and place of residence. Equality of opportunity will happen when children on a certain country will have an equal chance in accessing certain services for their betterment regardless of their circumstances. On the other hand, inequality of opportunity exists when circumstances will be used as the basis of access (Worldbank, 2019).

To measure the inequality of opportunity, a new methodology was introduced by the worldbank that's combines two elements- coverage and dissimilarity index. The Human Opportunity Index is a statistical tool that measures the availability of a basic opportunity discounted by how unfairly the opportunity were distributed among the different circumstance group. The index has two basic components; coverage- percentage of individual who has access to the opportunity and dissimilarity index- measures how unequal the opportunity was distributed.

The human opportunity index is designed to define and summarize the allocation of basic opportunities among children. The index has unique properties that can help to determine the

sources of inequality. By conducting this study and examining the inequality of opportunity at appropriate regional level of analysis, the results of the study can be used and applied to design effective policy in equalizing opportunity in the country. Policy Makers should focus on the allocation of basic opportunities into programs that aims to increase equality of opportunity (Barros, et al. 2008).

A national-level analysis about the opportunity index of the Philippines was conducted by Son (2012) together with other six developing Asian countries namely; Bangladesh, Bhutan, Indonesia, Pakistan, Sri Lanka, and Viet Nam. Result shows that Philippines is fairing among the other countries in terms of access of education but was lagging in terms of access to safe water. Figure 1 shows the Philippines national-level HOI in all five basic opportunities; Access to safe water, sanitation, electricity, primary and secondary education.

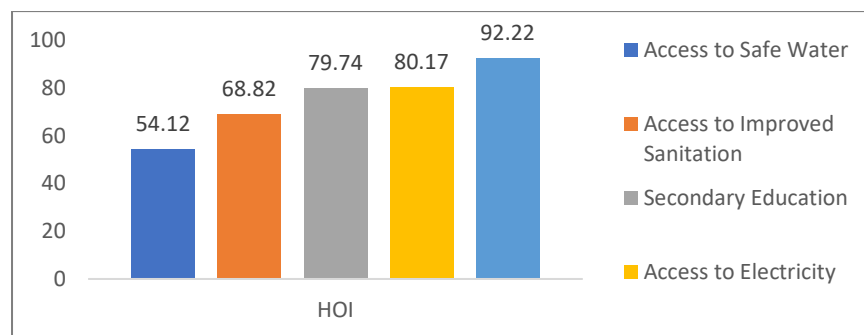


Figure 1. Human Opportunity Index of the Philippines, 2002

Source: Asian Development Bank, 2002

The human opportunity index will be utilized in this study in order to know the extent of the inequality present in the country. The national-level analysis shows obvious disparity among children's access to basic opportunities in the Philippines but it does not ensure the same results that the sub-national analysis will be having. Conducting a regional level analysis of inequality of opportunity will help to compute the origin of the inequality of opportunity and to track down it's source in a local level. And since Mindanao is comprised with multiple population groups with diverse background, it will provide a better roadmap for policy makers in creating a more thorough understanding to the issue of inequality of opportunity and taking steps to equalize it.

This study measured the human opportunity index among children in the six regions in Mindanao namely; Zamboanga, Northern Mindanao, Davao, Socksargen, Caraga and ARMM. The age bracketing that will be used in the study will be discussed as follow; access to Housing condition Services such as electricity, water and sanitation will be from children ages 0-17, and children ages from 6-11 will be the basis for Primary School data and 12-17 for the Secondary School data. Children's socioeconomic characteristic that will be needed in this analysis will be; (a) gender, (b) location of household, (c) household size, (d) Age of household head, gender of household head, (f) education of household head and (g) Wealth Quintile. Variables mentioned above are the components of Human Opportunity Index that will help us determine the Regional Human Opportunity Index in the six regions in Mindanao.

Methodology

This section presents the step-by-step procedure of constructing the regional human opportunity index. With this calculation, the coverage, dissimilarity index and HOI per indicators will be derived followed by summation of indices to get overall regional HOI.

1. Constructing Human Opportunity Index in Mindanao

Human opportunity index combines both absolute level of basic opportunities and how equitably those opportunities were distributed. There are two components of the index- coverage and dissimilarity index. Coverage is the percentage of individuals that have access to the opportunity and D-index is the inequitable allocation for basic goods and services defined by circumstances. So, basically HOI is just an inequality adjusted coverage rate. Following are the steps on constructing the index.

a. Obtaining coefficient estimates

In order to obtain the coefficient needed in the analysis, a separable logistic model was used to estimate whether child j has access to a given opportunity as a function of his or her circumstances. The logistic model, linear in the parameters, where a correspond the access to basic opportunities and b_x are the set of circumstances.

$$\ln\left(\frac{P}{1-P}\right) = a + b_x$$

Where;

a = denotes the basic services as the dependent variable

b_x = corresponding the set of circumstance variables, $x = (x_1, \dots, x_m)$

From the estimation of this logistic regression one obtains estimates of the $\hat{\beta}_0$ and $\hat{\beta}_x$ that is used in this analysis.

b. Obtaining the predicted probability of access

After the estimated coefficients were obtained, the predicted probability of access to the opportunities can be now calculated through;

$$\hat{p}_i = \frac{1}{1 + e^{(\hat{\beta}_0 + \sum_{k=1}^m \hat{\beta}_x)}}$$

Where; $\hat{\beta}_0$ and $\hat{\beta}_x$ = denotes as the coefficients in the logistic regression result.

c. Computing the Coverage

Coverage is the percentage of individuals that have access to the opportunity.

$$C = \sum_{i=1}^n w_i \hat{p}_i$$

Where; \hat{p}_i =predicted probability of access

w_i = weights ($\frac{1}{n}$ or any assigned sample weights)

d. Computing the Dissimilarity index

The D-index measures how basic services were distributed disproportionately among population. It is basically a relative measure of the weighted average access probability gaps among individuals from different circumstance group and the overall average access rate. D-index is calculated as:

$$D = \frac{1}{2C} \sum_{i=1}^n w_i |\hat{p}_{i,n} - C|$$

Where; \hat{p}_i = predicted probability of access

C= coverage

W= weights ($\frac{1}{n}$ or any assigned sample weights)

D index will be 0 when there's perfect equality of opportunity and 1 (100%) when there's total inequality, which can be interpreted as the number of opportunities that need to be reassigned from the better off groups to worse off groups in order to achieve equal opportunity for all (Paes de Barros et al.,2009).

e. Computing the Human Opportunity Index

The overall measure of opportunity (HOI) combines the overall average access rate of opportunities with the D index in one single indicator, like this:

$$HOI = C * (1 - D)$$

Or the geometric version of HOI can be use with subnational-level analysis

$$HOI_g = \left(\prod_{i=1}^n p_i^{w_i} \right)^{\frac{1}{\sum_{i=1}^n w_i}}$$

HOI will result from values 0-100, where 100, means that full coverage and equally distributed opportunities.

Summarizing Indices

Human Opportunity Index is a simple average, the opportunities are assumed to be perfect substitutes within each dimension, and each dimension is a perfect substitute for the other. HOI will result individual opportunity score in each indicators in which it will provide summary indices of each of the dimension. For education, it is just a simple average of the two indicators, while the housing condition will have a simple average out of its three indicators. And, to derived the overall regional HOI score will be just a simple average of the two dimensions.

2. Changes of Opportunity Score over time

Human Opportunity Index can change for two reasons- the distributional effect and scale effect. Changes due to distributional effect happens when there's a redistribution of circumstances or changes in D-index. Most of the composition effect happens when there's an overall economic development, increase in investment to basic opportunities like education and structural demographic changes. While the scale effect indicates the change in the overall coverage (C) for the entire population. With this case, equality of opportunity would remain the same and the HOI would increase exclusively due to a change in the average coverage rate. Following are the procedure introduced by Barros et al (2008).

Assume two periods in a data set labeled as t1 and t2. The method of decomposing changes in HOI will be as follows:

$$(7) \quad \Delta = HOI^{t2} - HOI^{t1} = \Delta C + \Delta D$$

Where ΔC and ΔD will be defined as follows;

$$(9) \quad \Delta C = C^{t2}(1 - D^{t1}) - C^{t1}(1 - D^{t1})$$

$$(8) \quad \Delta D = C^{t2}(1 - D^{t2}) - C^{t2}(1 - D^{t1})$$

Where; C= coverage

D=D-index

t1= 1st period on the observation

t2=2nd period on the observation

Following this method, root of changes to the HOI's over time will be identified. Both scale and distributional effect result will be equivalent to a 100%. This will identify which of the effect has the greater share to the changes of HOI over time.

Results and Discussion

This section presents the discussion of the result of the study. These includes the presentation of the inequality of opportunity in access to housing condition and education, the overall regional human opportunity index and human opportunity Index time decomposition.

The output from the HOI provides the coverage, d-index and the HOI for each of the opportunities or basic services that are being measured. In which coverage will determine the individuals that has access to the opportunity, d-index to show the inequality of access and the HOI that will describe the overall score of the region in accessing the opportunity.

A. The Inequality of Opportunity in Access to Housing Condition

Housing condition services make significant contributions to well-being. Basic services, such as safe water and sanitation (e.g., flushing toilets), have a direct impact on health status and overall well-being. Having access to services, such as electricity, helps households increase their productivity for income generation (Son, 2013).

In terms of access to safe water, Table 1 shows Socksargen fairing in accessing the opportunity during two periods with 81.94% of available opportunities needed for universal access were equitably allocated on 2013 and 74.15% on the latter compared to ARMM and Caraga who was the most deprived among regions with 60.38% and 53.23% respectively. Inequality of opportunity (D-Index) in access to safe water averaged from 2.34% on the first period and 3.47% on the latter. Among the regions, Caraga has the highest inequality score at 6.84% and 8.64% which embodied almost thrice the average between the two period. This means that 6% of the available opportunity in access to safe water on 2013 and 8% on 2017 should be reallocated among children within different circumstance group to achieve equality of opportunity.

Table 1. Regional Opportunity Score in access to Safe Water in Mindanao 2013-2017.

REGION	Coverage		D-Index		HOI	
	2013	2017	2013	2017	2013	2017
CARAGA	71.45	58.27	6.84	8.64	66.56	53.23
DAVAO	68.47	68.18	1.01	3.23	67.78	65.98
NORTHERN MINDANAO	78.59	72.84	3.21	3.58	76.06	70.24
SOCKSARGEN	82.43	75.45	0.60	1.72	81.94	74.15
ZAMBOANGA	73.11	72.66	0.82	2.75	72.51	70.67
ARMM	61.32	67.22	1.53	0.92	60.38	66.59

Table 2 presents the changes of HOI over time. Most of the region's HOI score declined between the two period except for ARMM who improved at 6.22%. As shown in table 2, regions with negative values denotes decreasing in opportunity score over time in accessing safe water. Caraga, among other regions, showed the highest decrease of HOI from 66.56% on the first period down to 53.23% on the latter resulting for overall 13.33 points of reduction over the two periods. Huge changes of Caraga's HOI was due to scale effect or the change in the coverage rate which means that there must be a decrease of numbers of children who has access to safe water during 2017 though the region's d-index also increases, it only contributed 7.87% share to the region's total change. Among others, only ARMM showed upsurge in access to safe water from 60.38% of HOI during 2013 that rised up to 66.59% during 2017. The change of ARMM HOI was driven mainly by scale effect or the increase of the total coverage. This implies that there has been an increase of number of children who has access to safe water during 2017. Most of the regional HOI transformation was caused by changes in the coverage of the scale effect except for Davao and Zamboanga in which distribution effect contributes more the total changes of their HOI. This implies that the decreased of the HOI was driven by the unequitable allocation of the opportunities among children. Figure 6 shows the graphical presentation of the human opportunity score in access to Safe Water in Mindanao

Table 2. Regional Time Decomposition of HOI for period 2013-2017.

Region	HOI 2013	HOI 2017	Total Change	Scale(ΔC)	Distribution(ΔD)
CARAGA	66.56	53.23	-13.33	92.13	7.87
DAVAO	67.78	65.98	-1.80	15.95	84.05
NORTHERN MINDANAO	76.06	70.24	-5.82	95.46	4.54
SOCKSARGEN	81.94	74.15	-7.79	89.17	10.83
ZAMBOANGA	72.51	70.67	-1.84	24.01	75.99
ARMM	60.38	66.59	6.22	93.4	6.6

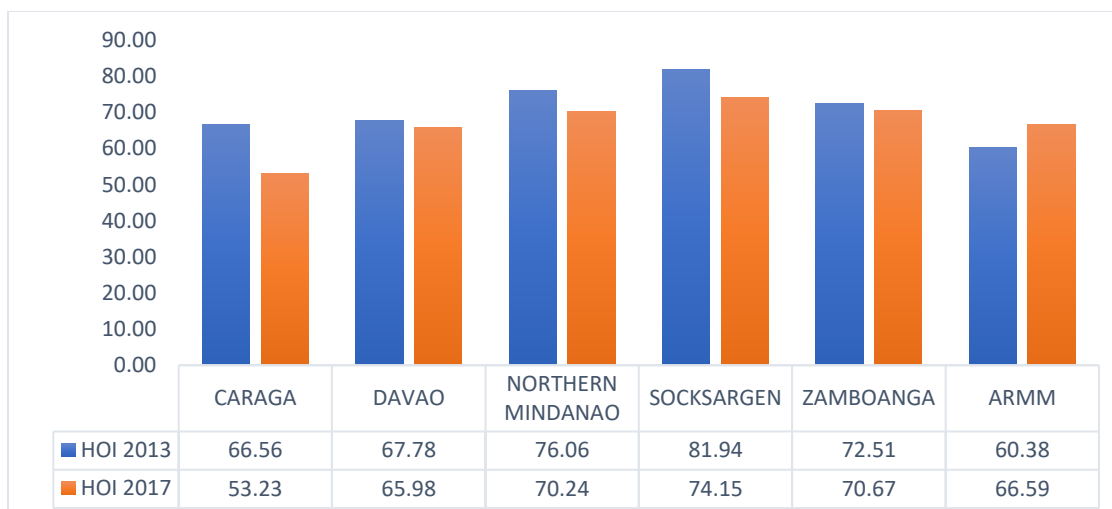


Figure 2. Human Opportunity Index in Access to Safe Water in Mindanao
Source: National Demographic and Health Survey, 2013-2017

On the other hand, Regional access to electricity in Mindanao is presented in Table 3 that Caraga is fairing in accessing the opportunity during two periods with 79.30% of available opportunities needed for universal access were equitably allocated on 2013 and 84.14% on 2017 compared to ARMM and Socksargen who was the most deprived among regions between two periods with only 50.32% and 76.39% HOI respectively. Inequality of opportunity (D-Index) in access to electricity averaged from 9.90% on the first period and 3.66% on the latter. While, most of the regions are showing improvements which results to lower d-index from 2013 to 2017, Northern Mindanao's d-index during the first period at 24.6% is quite noticeable. This means that 24.6% of the available opportunity in access to electricity should be reallocated on children in the worst-off group to attain equal opportunity. Although, during the second period the region's d-index lowered to 3.78% which means that 20.82% of opportunities are reallocated among children from better-off groups to the worst-off.

Table 3. Regional Opportunity Score in access to Electricity in Mindanao 2013-2017

REGION	Coverage		D-Index		HOI	
	2013	2017	2013	2017	2013	2017
CARAGA	82.24	85.93	3.58	2.08	79.30	84.14
DAVAO	76.10	84.16	8.11	4.31	69.92	80.53
NORTHERN MINDANAO	69.34	83.66	24.60	3.78	52.28	80.50
SOCKSARGEN	76.52	81.13	9.73	5.83	69.07	76.39
ZAMBOANGA	75.37	81.19	6.64	4.09	70.36	77.86
ARMM	53.97	80.58	6.75	1.86	50.32	79.08

In terms of the changes of HOI when it comes to access to electricity, all the regions showed great improvement in increasing HOI over time. Table 4 shows the time decomposition of HOI in terms of access to electricity. ARMM and Northern Mindanao HOI dramatically upsurge with 28 points difference from 2013 to 2017 and was due to scale effect. This implies that there has been an increasing number of children in 2017 who has already access to electricity compared to 2013. Most of the regional change was driven by scale effect or the increase of coverage rate except Northern Mindanao whose change was driven by equitable distribution of the opportunity among population or the distributional effect. This implies that Northern Mindanao is working on reducing inequalities through providing equitable allocation among population. Figure 7 shows the graphical presentation of the human opportunity score in access to Electricity in Mindanao.

Table 4. Regional Time Decomposition of HOI for period 2013-2017

Region	HOI 2013	HOI 2017	Total Change	Scale(ΔC)	Distribution(ΔD)
CARAGA	79.30	84.14	4.84	73.34	26.66
DAVAO	69.92	80.53	10.61	69.82	30.18
NORTHERN MINDANAO	52.28	80.50	28.22	38.27	61.73
SOCKSARGEN	69.07	76.39	7.32	56.81	43.19
ZAMBOANGA	70.36	77.86	7.50	72.40	27.60
ARMM	50.32	79.08	28.76	86.3	13.70

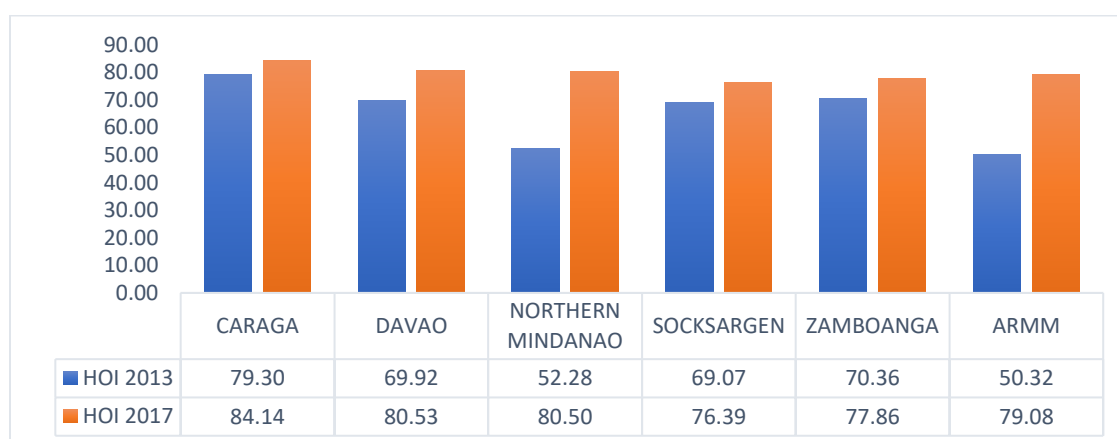


Figure 2. Human Opportunity Index in Access to Electricity in Mindanao

Source: National Demographic and Health Survey, 2013-2017

As shown in table 5, most of the region is fairing in terms of access to improved sanitation except for ARMM. Among all regions, Caraga has the highest opportunity score with 93.41% of available opportunities access that is equitably allocated on 2013 and 92% on the 2017 compared to the disadvantage region, ARMM, who has only nearly 30% of available opportunities that is allocated among children. Arbitrating ARMM's coverage rate with it's HOI score, it is clear that the region is already lacking in provision of the access to improved sanitation since its probability of access value(coverage) only ranges from 37%-41%. In terms of Inequality of Opportunity, d-index between two periods averaged from 3.65% and 3.09% respectively. Most of the regions seems to be fairing in access to the opportunity excluding ARMM, being the disadvantage group,

which has the highest inequality score at 16.40% which is almost five times the average on the first period and 12.57% on the latter. This means that ARMM should be reallocating 16.4%, during 2013, and 12.57%, on the latter, of the opportunity among children within different circumstance group to achieve equality of opportunity.

Table 5. Regional Opportunity Score in access to Improved Sanitation in Mindanao 2013-2017

REGION	Coverage		D-Index		HOI	
	2013	2017	2013	2017	2013	2017
CARAGA	93.90	92.62	0.52	0.68	93.41	92.00
DAVAO	90.56	92.45	1.11	1.04	89.56	91.48
NORTHERN MINDANAO	91.78	88.24	0.54	1.52	91.29	86.90
SOCKSARGEN	87.11	85.96	1.42	2.11	85.87	84.15
ZAMBOANGA	84.01	86.74	1.91	0.65	82.41	86.18
ARMM	37.09	41.48	16.40	12.57	31.01	36.27

Table 6 presents the time decomposition of HOI over time. Regional changes varied in terms of access to improved sanitation. The result shows deliberate improvement with half of the regions with decreasing HOI over time. Among the regions, Northern Mindanao demonstrates large reduction of HOI at 4.39 points which was driven by scale effect or the changes in coverage rate like the most of the regions. This implies that there had been an increase of numbers of children who is still using unimproved mode of sanitation. While ARMM shows the highest increase among others from 31.01% of HOI from 2013 to 36.27% in 2017 that was driven by scale effect or the changes in coverage. Figure 3 shows the graphical presentation of the human opportunity score in access to Improved Sanitation in Mindanao.

Table 6. Regional Time Decomposition of HOI for period 2013-2017

Region	HOI 2013	HOI 2017	Total Change	Scale(ΔC)	Distribution(ΔD)
CARAGA	93.41	92.00	-1.41	89.45	10.55
DAVAO	89.56	91.48	1.93	96.78	3.22
NORTHERN MINDANAO	91.29	86.90	-4.39	80.26	19.74
SOCKSARGEN	85.87	84.15	-1.72	65.66	34.36
ZAMBOANGA	82.41	86.18	3.77	71.01	28.99
ARMM	31.01	36.27	5.26	69.86	30.14

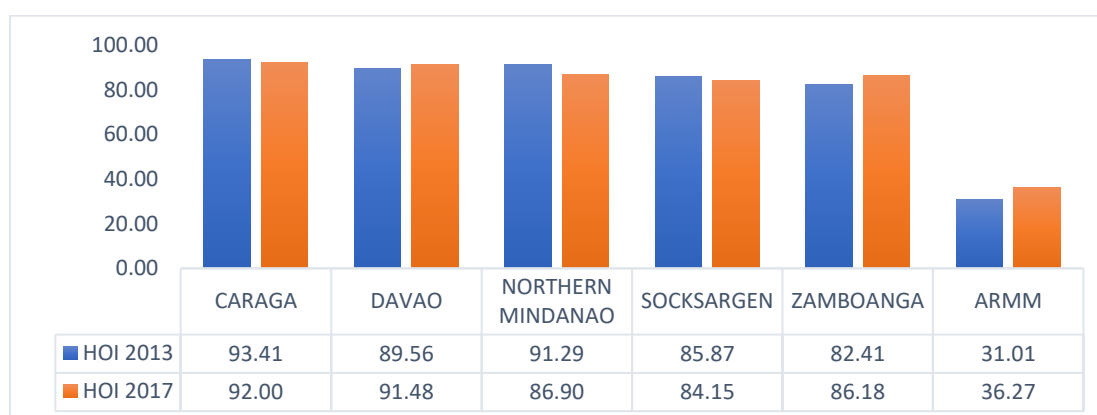


Figure 3. Human Opportunity Index to Improved Sanitation in Mindanao

Source: National Demographic and Health Survey, 2013-2017

B. The Inequality of Opportunity in Access to Education

The distribution of opportunity for children to access for education is highly variable across regions in Mindanao. As shown in table 7, Caraga and Zamboanga is fairing among the regions during the first period with it HOI at 78.94% and 78.59% of its available opportunity of access that is equitably allocated among children making ARMM the disadvantage region with its HOI at 62.05%. During 2017, the region with the highest HOI is Davao and Socksargen's which opportunity score denotes that 80% available opportunities access that is equitably allocated among children and still, ARMM is the most disadvantage group with its HOI at 70.81%. In terms of inequality of opportunity, most of the region shows improvement in achieving equal opportunity for every child with its d-index closer to zero. Although, the d-index (represents equal distribution of opportunity) are low, but the coverage or the percentage of individual who has access to the available opportunity is already low. Which means that low HOI of the regions in terms of access to primary education is caused by lack of provision. The average coverage rate in terms of access to primary education for both periods is 76.43%, which means that only 76% of children has access to this opportunity leaving the rest 24% of the children deprived with the opportunity.

Table 7. Regional Opportunity Score in access to Primary Education in Mindanao 2013-2017

REGION	Coverage		D-Index		HOI	
	2013	2017	2013	2017	2013	2017
CARAGA	79.19	80.06	0.32	0.25	78.94	79.85
DAVAO	77.93	81.15	0.33	0.24	77.67	80.96
NORTHERN MINDANAO	72.29	78.98	0.33	0.29	72.05	78.75
SOCKSARGEN	76.79	80.33	0.46	0.18	76.44	80.19
ZAMBOANGA	78.74	78.19	0.20	0.28	78.59	77.97
ARMM	62.45	71.10	0.64	0.41	62.05	70.81

Table 8 shows the time decomposition of regional HOI in terms of access to primary education. Result shows improvement HOI from 2013 to 2017 except for Zamboanga whom showed slight decrease of the regional HOI due to scale effect. This implies that there had been an increase of numbers of primary school age children who has no access to secondary school. The rest of the regions shows improvement in terms of access that was driven mainly by scale effect or the increase of available opportunity. Figure 4 shows the graphical presentation of the human opportunity score in access to Primary Education in Mindanao.

Table 8. Regional Time Decomposition of HOI for period 2013-2017

Region	HOI 2013	HOI 2017	Total Change	Scale(ΔC)	Distribution(ΔD)
CARAGA	78.94	79.85	0.92	93.69	6.31
DAVAO	77.67	80.96	3.29	97.60	2.40
NORTHERN MINDANAO	72.05	78.75	6.70	99.46	0.54
SOCKSARGEN	76.44	80.19	3.75	93.84	6.16

ZAMBOANGA	78.59	77.97	-0.61	89.45	10.55
ARMM	62.05	70.81	8.76	98.12	1.88

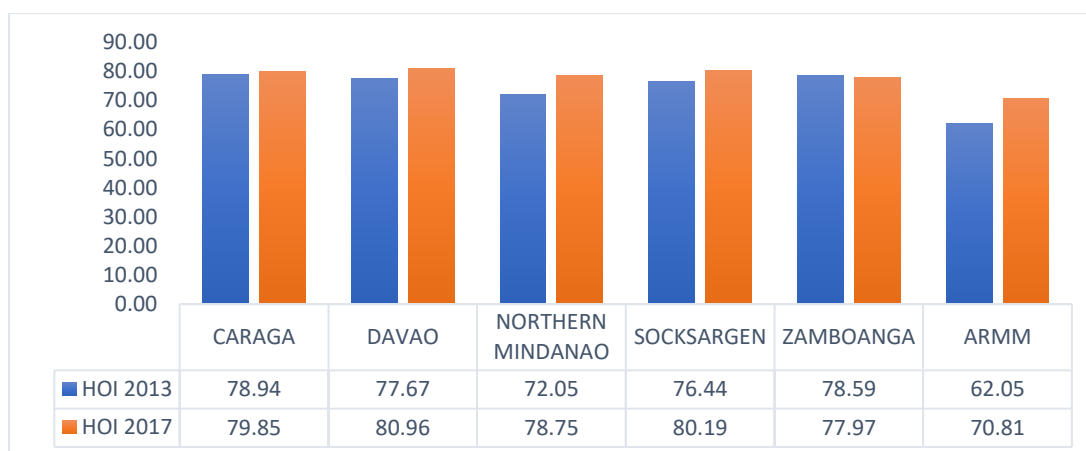


Figure 4. Human Opportunity Index in Access to Primary Education in Mindanao
Source: National Demographic and Health Survey, 2013-2017

The regional opportunity score in Mindanao in terms with access to secondary school. Comparing the result of the access to primary school, access, secondary school shows huge disparity in terms with its provision. They are two possible factors that drives the low opportunity score with secondary education access; (i) opportunity cost of sending children to secondary school is higher than in primary school (Son, 2012), and (ii) some of the children in the secondary school age was still on the primary level of education.

As shown in table 9, the result of the analysis shows very low HOI in very region. The region with the highest HOI in 2013 is Davao at 50.12% which means that only 50% of the available opportunities of access is equitably allocated among children and the most disadvantage group is ARMM with HOI at 31.36%. For the second period, access to the opportunity is increasing but still it shows slow improvement. Caraga has the highest HOI at 59.29% which means that only 59% of the available opportunities of access is equitably allocated among children. While ARMM was still at the lowest with HOI at 34.34%. In terms of inequality of opportunity, d-index for the two periods averaged at 6.13% and 5.76%. Among all the regions, ARMM has the highest inequality score during 2013 at 8.73% which means that 8.73% of the available opportunity is inequitably allocated among population and 8.33% during 2017. Low regional HOI with the opportunity is associated with the low coverage rate. Having coverage rate below 50% implies that percentage of children who has no access to opportunity is greater than those who had. This means that children in Mindanao is already deprived with the provision regarding the opportunity in access to primary school education.

Table 9. Regional Opportunity Score in access to Secondary Education in Mindanao 2013-2017

REGION	Coverage		D-Index		HOI	
	2013	2017	2013	2017	2013	2017
CARAGA	50.08	60.89	4.51	2.62	47.82	59.29
DAVAO	52.82	60.77	5.11	3.06	50.12	58.91

NORTHERNMINDANAO	47.19	55.33	16.99	4.22	39.17	52.99
SOCKSARGEN	50.95	55.52	6.62	5.81	47.57	52.30
ZAMBOANGA	50.20	54.11	5.69	4.50	47.35	51.67
ARMM	34.36	37.46	8.73	8.33	31.36	34.34

Table 10 presents the time decomposition of HOI in terms of access to secondary school. All the region shows positive improvement in which most of the changes are driven mainly by scale effect except for Northern Mindanao which shows equivalent share of changes between scale and distribution effect. Result shows that Northern Mindanao's HOI changed dramatically from 39.17% in 2013 to 52.99% in 2017 which implies 13.83 points of total change over time due to both distribution and scale effect. This implies that there has been an increase of number of children who has access to secondary education in the region and also reduction of the inequitable distribution of opportunity among population. Figure 5 shows the graphical presentation of the human opportunity score in access to Secondary Education in Mindanao.

Table 10. Regional Time Decomposition of HOI for period 2013-2017

Region	HOI 2013	HOI 2017	Total Change	Scale(ΔC)	Distribution(ΔD)
CARAGA	47.82	59.29	11.47	89.97	10.03
DAVAO	50.12	58.91	8.79	85.81	14.19
NORTHERN MINDANAO	39.17	52.99	13.83	48.89	51.11
SOCKSARGEN	47.57	52.30	4.72	90.41	9.59
ZAMBOANGA	47.35	51.67	4.33	85.20	14.80
ARMM	31.36	34.34	2.98	94.97	5.03

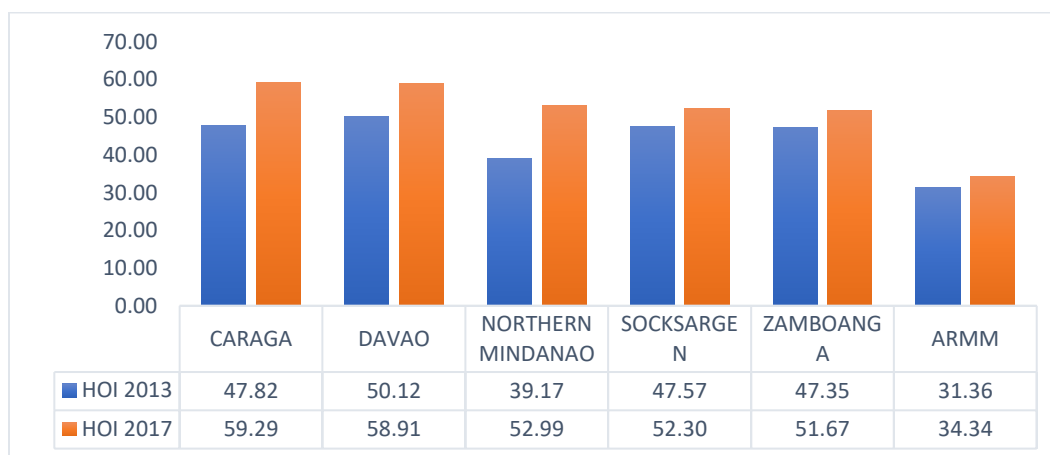


Figure 5. Human Opportunity Index in Access to Secondary School in Mindanao
Source: National Demographic and Health Survey, 2013-2017

C. Overall Regional Housing Condition and Education Opportunity Score

Dimension has a summary index itself. For education it is the simple average of the two indicators, and for housing conditions it is the simple average of the three indicators. Result shows that gaps don't show much distant in terms of access across regions. Thus, the regional opportunity score in Mindanao are far from providing universal access to basic opportunities among children. Figure 6 presents the dimension summary index of education and housing condition for 2013. Though the gap does not show much difference among regions, it is clear that

Caraga has the highest HOI in terms of access to basic services in housing condition and Caraga and Davao in terms of access to education. Arbitrarily, ARMM is the most deprived region among others having lowest HOI for both dimensions.

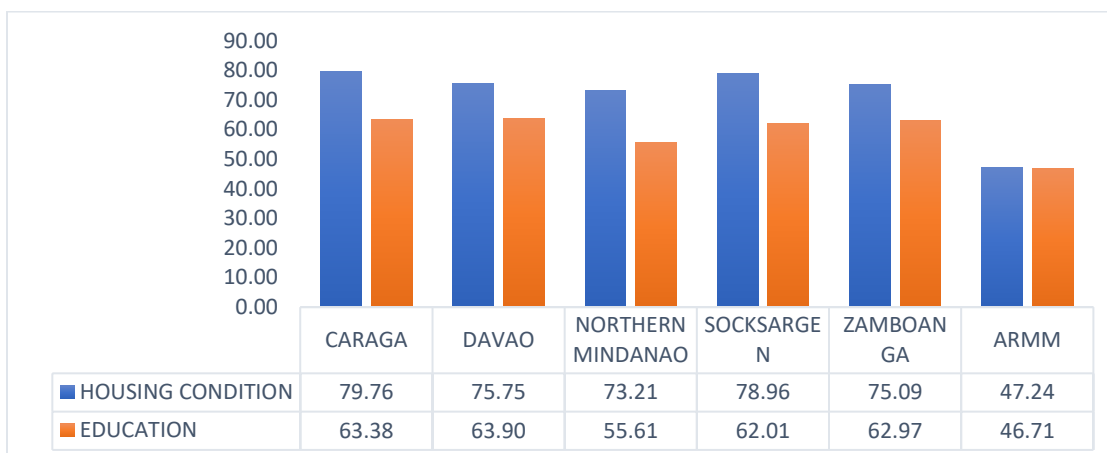


Figure 6. Regional Housing condition and Education Opportunity Score, 2013

Source: National Demographic and Health Survey, 2013

Figure 7 shows the graphical presentation of the summary index of housing condition and Education dimension during 2017. In terms of housing condition, Davao and Northern Mindanao has the highest HOI at 79% among other regions. While Caraga and Davao has the highest HOI at 69% in terms of education. ARMM, which is the deprived region in 2013, still on the lowest rank in terms of access for both opportunities.

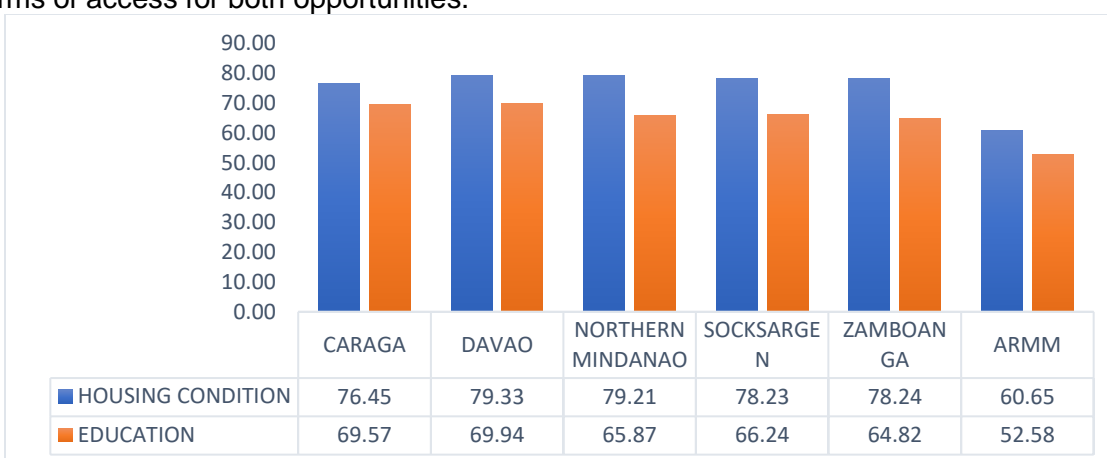


Figure 7. Regional Housing condition and Education Opportunity Score, 2017

Source: National Demographic and Health Survey, 2017

D. The Regional Human Opportunity Index in Mindanao

These two dimensions are then summarized in a single Human Opportunity Index. The overall Human Opportunity Index is a simple average of the country indexes along the two dimensions. The overall HOI will determine the level of equality of opportunity of a region. Figure 6 shows the result of the overall regional HOI. In which Caraga has the highest HOI at 71% during 2013 and Davao at 74% during 2017. Arbitrarily, ARMM is the most deprived region with its HOI at 49% and 56% for both periods respectively.

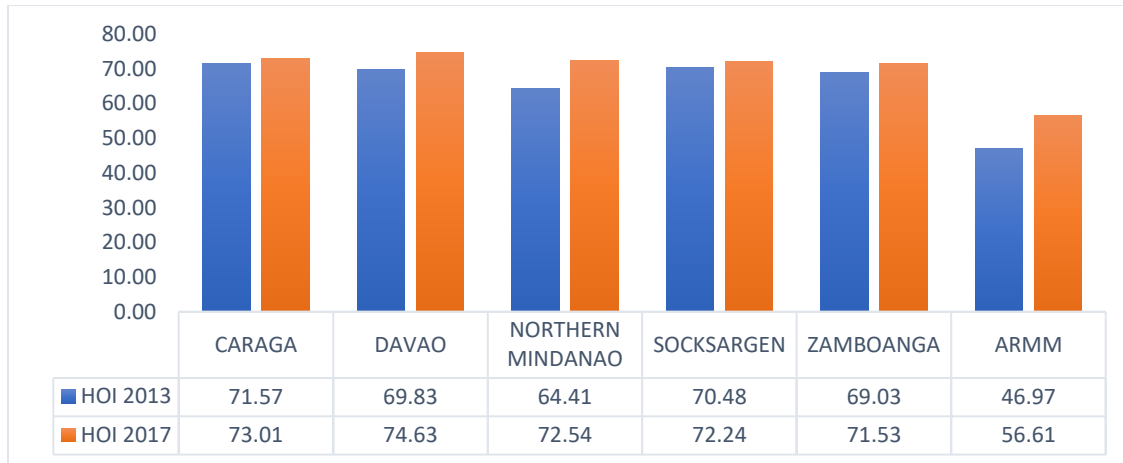


Figure 8. Regional Human Opportunity Index in Mindanao, 2013-2017

Source: National Demographic and Health Survey, 2013-2017.

SUMMARY AND CONCLUSION

The main objective of this study is to measure the regional human opportunity index in Mindanao during two periods, 2013-2017. This study uses the Human Opportunity Index that was first introduced by Barros *et al.* (2008) and was developed by World Bank. HOI measures the availability of a basic opportunity discounted by how unfairly the opportunity were distributed among the different circumstance group.

This study focused on determining the inequality of opportunity in access to basic services among children ages 0-17 years old in six regions in Mindanao specifically; Zamboanga, Northern Mindanao, Davao, Socksargen, Caraga and ARMM. The index has two dimensions; housing condition and education. Housing condition has three indicators; access to safe water, electricity and improved sanitation. While education has two indicators; access to primary education and secondary education.

Based on the findings, Mindanao is lacking with provision and equitable access to opportunities across regions. Caraga has the highest opportunity score at 71% during 2013 and Davao at 74% on the latter period. Arbitrarily, ARMM showed slow improvement in achieving equal opportunity for all being the lowest in the rank for both periods. This implies that children in Mindanao suffered from deprivation of basic opportunities that are essential for their growth. Mindanao is showing slow progress in achieving the Universal access at 100%.

Recommendations

This study could help policy makers and government agencies to track progress toward providing a set of basic opportunities to all children within society. The methodology used in this study indicates what portion of total available opportunities were allocated equitably among population. It is recommended that government or any other social science research council should consider having an annual composite measure of human opportunity index to track down country's progress over time. In addition, future studies may include some country-specific circumstance variable like religion and ethnicity. Furthermore, related researches may apply Shapley Decomposition method to determine, which of the circumstances are the major contributors of the inequality of opportunities. Lastly, a country-wide regional opportunity index may be constructed as an important indicator of development.

REFERENCES

- Aran, L. 2014. "Inequality of Opportunity Among Egyptian Children. Policy Research Working Paper 7026.
- Asis, R. et al. 2017. "Inequality Of Opportunities Among Ethnic Groups In The Philippine". Philippines Institute of Development Studies. Discussion Paper Series No. 2017-42.
- Azevedo, et al. 2010. "HOI: Stata module to compute Human Opportunity Index". Statistical Software Components S457191, Boston College Department of Economics
- Barros, et al. 2009. "Measuring Inequality of Opportunities in Latin America and the Caribbean. Washington, DC: Palgrave Macmillan and the Worldbank.
- Barros, et al. 2012. "Do Our Children Have a Chance?" The 2010 Human Opportunity Report for Latin America and the Caribbean. Washington, DC: World Bank.
- Ferreira, F. and Gignoux, J. 2008. "The Measurement of Inequality of Opportunity: Theory and an Application to Latin America". Policy Research Working Paper No. 4659. World Bank, Washington, DC.
- Jemmali, H. 2018. "Inequality of Opportunities among Tunisian Children over Time and Space". Retrieved from <https://doi.org/10.1007/s12187-018-9538-3>.
- Nadia, B. 2012. "Multidimensional Human Opportunity Index, Social Indicators Research: An International and Interdisciplinary Journal for Quality-of-Life Measurement". Springer, vol. 130(2), pages 523-535.
- Newman, J. 2012. "Human Opportunity Index- Provinces: Equality of Children's Opportunity in Pakistan. Worldbank Policy Paper Series on Pakistan.
- Numhauser, F. "Equality of Opportunity in Argentina" -A Case study of the Conditional Cash Transfer Program "Universal Allocation per Child".
- Rawls, J. 1971 "A theory of justice", Cambridge, MA: Harvard University Press
- Rodriguez, J. 2011. "Inequality of Opportunity: Theory and Measurement". Research on Economic Inequality, Volume 19.
- Shorrocks, A. 1982. "Inequality Decomposition by Factor Components". *Econometrica*. Vol. 50 (1): pp. 193–211.
- Son, H. 2012. "Inequality of Human Opportunities. ADB Economics Working Paper Series.
- World Bank. 2006. "Worldbank Development Report 2006: Equity and Development" Washington, DC.