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IMPROVING EDUCATION: USING THE HUMAN OPPORTUNITY INDEX IN SUMATRA BARAT PROVINCE

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Abstract

Factors such as gender, location of residence, number of family members, the household head sex, the work status of the household head, the education of the household head, and the income per capita. Eventually, that is not their choice. The HOI's results show how much inequality is due to these factors in achieving school participation in 2019 in Sumatra Barat Province. At the preschool level, the news coverage reaches 49.45 percent, which is still around 8.28 percent of opportunities for education that need to be reallocated to ensure equality in 2019. At the elementary and junior high school levels, the coverage has reached 98.47 percent, reallocation of opportunities for education that is necessary reallocated to ensure equality in 2019 only 0.43 percent. While at the Senior High School (SMA) level, coverage has reached 83.63 percent, and opportunities for education that need to be reallocated to ensure equality in 2019 are still 4.50 percent. These results indicate that preschool has not been the priority level in general. The magnitude of the dissimilarity at this level is dominated by the factor i.e; the diploma of household head and per capita income. At the SD and SMP levels, location of residence, and sex of children are factors that influence inequality. At the SMA level, more factors have a significant effect i.e; the sex of the child, the location of residence, the sex of the household head, and the diploma of the household head. Increasing equality of opportunity is one way of providing justice to children in West Sumatra. Knowledge of the contributing factors is a very appropriate way to solve educational problems. In turn, this will be one of the factors to spur increased school coverage.

Keywords: education, equality, HOI, Sumatera Barat

Memperbaiki Pendidikan: Pemanfaatan Indeks Kesempatan Manusia Di Provinsi Sumatera Barat

Abstrak

Faktor-faktor seperti jenis kelamin, tempat tinggal, jumlah anggota keluarga, jenis kelamin kepala rumah tangga, status pekerjaan kepala rumah tangga, pendidikan kepala rumah tangga, dan pendapatan perkapita kepala rumah tangga. Padahal kondisi ini bukanlah pilihan mereka. Hasil HOI menunjukkan seberapa besar ketimpangan yang disebabkan oleh faktor-faktor tersebut dalam pencapaian partisipasi sekolah tahun 2019 di Provinsi Sumatera Barat. Di tingkat prasekolah, cakupan baru mencapai 49,45 persen, yang masih sekitar 8,28 persen dari peluang pendidikan yang perlu dialokasikan untuk memastikan pemerataan di tahun 2019. Di tingkat SD dan SMP cakupannya sudah mencapai 98,47 persen, realokasi Peluang pendidikan yang perlu dialokasikan kembali untuk menjamin pemerataan pada 2019 hanya 0,43 persen. Sedangkan di tingkat SMA, cakupannya sudah mencapai 83,63 persen dan peluang pendidikan yang perlu dialokasikan kembali untuk memastikan pemerataan di tahun 2019 masih 4,50 persen. Hasil ini menunjukkan bahwa prasekolah belum menjadi tingkat prioritas secara umum. Besarnya ketidaksamaan pada level ini didominasi oleh faktor yaitu; ijazah kepala rumah tangga dan pendapatan perkapita, sedangkan faktor lain dapat diabaikan. Pada tingkat

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SD dan SMP, lokasi tempat tinggal dan jenis kelamin anak merupakan faktor yang mempengaruhi ketimpangan, sedangkan faktor lainnya dapat diabaikan. Di tingkat SMA, lebih banyak faktor yang berpengaruh signifikan yaitu; jenis kelamin anak, tempat tinggal, jenis kelamin kepala rumah tangga dan ijazah kepala rumah tangga. Meningkatkan kesetaraan kesempatan merupakan salah satu cara untuk memberikan keadilan kepada anak di Sumatera Barat. Pengetahuan tentang faktor-faktor penyebabnya merupakan cara yang sangat tepat untuk menyelesaikan masalah pendidikan. Pada gilirannya, ini akan menjadi salah satu faktor pendorong peningkatan cakupan sekolah.

Kata kunci: IKM, kesetaraan, pendidikan, Sumatera Barat

INTRODUCTION

Humans are the most important basic capital in development, Setiawan (2015). It is humans who act as agents so that all resources are useful. So that human resources must be smart, trained and have qualified expertise. Smart, trained and have qualified skills will come from education and training. Intelligence and expertise are very valuable modes for life, it can improve income. Intelligence and expertise will be highly valued in many ways. This is one of the reasons why education is considered to be able to break the chain of poverty, Coley and Baker (2013). Furthermore, Smart and skilled people can create their own jobs, because education also broadens horizons, stimulates innovation, Purwanto cs (2013). Innovation is a deadlock breaker to improve the quality, capacity and limits of achievement continuously.

Education is a basic need. Education is one of the means or means to improve one's quality in the context of developing abilities and skills and their potential. With education, children can have a better future so that it is hoped that the opportunity to get a better quality of life in the future will be achieved. Education is the right of every citizen according to article 31 of the 1945 Constitution. Fulfilling the educational needs of children equally means that the opportunity to access education will be open to all children. If there are some children who are unable to access education services and some can enjoy educational services, it means that there is still an imbalance of educational opportunities. This happens not only because of the child's life choices but also for several reasons beyond her / his control. Factors such as income per capita, gender or place of birth, as well as the education of the household head, the work status of the household head and even the sex of the household head can be an obstacle for a child to get access to education. The Human Opportunity Index (HOI) is an indicator to calculate a person's chances of accessing basic needs, such as education, taking into account all the factors above.

HOI has some advantages when applied, Indra (2015), HOI will take into account the equality of opportunities for children to access their basic needs in thiscae is education. This information, which also reveals the problem of gaps. Knowledge of how big the inequality of children's opportunities for access to education at the primary and secondary levels will result in knowledge of how much opportunity or access a child has and how large the equity is in West Sumatra Province. Therefore, this analysis is expected to become a reference for the government to take appropriate policy steps in providing basic needs services for children. Another hope, this analysis is able to provide an explanation of what factors make the greatest contribution to children in getting the opportunity to access educational needs. Thus, the government can further optimize its development policy by focusing on the biggest factor. It is easier to solve the problem when it still input level rather than when it is an output. The government can make early repairs. In output level the problems will get bigger, wilder and even tend to be out of control. In the end, intervention is very necessary. This can be done by the government, or non-government. Intervention is intended to ensure that children can access basic needs.

Development in the usual way will make progress for all, but it may take the length of time it will take. One generation does not have to be exhausted, then access to basic services can

be achieved, or even more. The longer is allowed, the dispartas will grow bigger, justice will be the next question in this condition. Before that happens, it is better if this research is an alternative in making policy. Sumatra Barat is a special province in the education field on the island of Sumatra. The population aged 5 years and over who are still in school is 31.78 percent, the second largest on the island of Sumatra. The population who are still in school at the SMA level reaches 6.27 percent, which is the highest in Sumatra Island. This feature is certainly interesting for further research.

This is the first research using HOI with the theme of education in Sumatra Barat Province. In general, the use of HOI is still very rare in research. Several previous studies have been conducted ie; by Joseph van Matre, he studied HOI and income inequality in Brazil 2012. Furthermore, there are Vani and Madheswaran in 2018 who examined Inequalities of Human Opportunities in India: A State-level Analysis.

The main problem to be addressed is how big the achievement of the education sector in Sumatra Barat is and how big is the inequality of opportunities in getting access to education. Have children had equal opportunities in educational attainment during Preschoolsand elementary school (SD and SMP) as well as at secondary school.

HOI simple measures the availability of basic services needed for advancement in life (in this case education). This calculation also takes into account penalties as a reflection of how unfairly services are distributed among the population. Thus, two regions that have the same coverage may have different HOIs. Because access to different basic services is caused by something beyond their control, as we discussed earlier.

This research aims to reveal the educational attainment of children in Sumatra Barat and the unequal opportunities for these children to access education. It will also examine what factors are the most dominant in influencing this inequality.

At the end of all this, we will find the magnitude of the inequality that occurs and what affects it. So that it can be a foothold for stake holders to make the right intervention steps.

METHODS

1. Human Opportunity Indeks

HOI (H) is defined as the amount of coverage (p) of a basic need less penalty (r). Penalty (r) related to inequality in the distribution of access among individuals under different sets of circumstances.

$$H = \bar{p} - r \quad (1)$$

H = HOI

$\bar{p}$ = Coverage

r = Penalty

The penalty value will depend on the circumstances used. If the coverage is independent of the circumstances used, the penalty will be zero. So in this case access will be universal, ideal conditions. HOI is the maximum value, which is equal to p.

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HOI can also be written in other forms, namely:

$H = \bar{p}\left(1 - \frac{r}{p}\right) = \bar{p}(1 - D)$ whereas $H \leq \bar{p} < 1 \; and \; H \leq D \leq 1$ (2)

H = HOI

$\bar{p}$ = Coverage

r = Penalty

D = Dissimilarity index

Index D measures the difference in the level of access to basic needs in a particular set of situation groups (eg sex, area of residence, parent's education, etc.) compared to the average level of access to basic needs as a whole. The dissimilarity index can also be interpreted as the share of the total opportunity that needs to be reallocated between groups under various circumstances, to ensure that each group has the same level of access.

(1-D) is called the equality factor which will be worth one if access to basic needs or opportunities not related to circumstances. Whereas D represents the dissimilarity index that can be interpreted as the share of the total opportunity that needs to be reallocated in between groups under various circumstances, to be sure of each the group gets the same level of access

$D = \frac{1}{2\bar{p}} \sum_{i=1}^{n} \alpha_i \, |p_i - \bar{p}|$ (3)

D = dissimilarity index

$\bar{p}$ = Coverage

r = Penalty

α_i = weight which states the share of the number of individuals who are in group-i

i = group of individuals who are in a certain set of circumstances

p_i = the coverage (or access) level of the i-group,

n = group of individuals who are in a certain set of circumstances

HOI procedure

Furthermore, the amount of predictions that an individual can access certain basic needs based on their circumstances can be formulated as follows:

$\hat{p}_i = \frac{\exp(x_{ki}\widehat{\beta}_k)}{1+\exp(x_{ki}\widehat{\beta}_k)}$ (4)

$\hat{p}_i$ = HOI predictions

x_{ki} = ndependent variable

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$\hat{\beta}_k$ = the corresponding parameters

If the predicted level of average coverage $(\hat{\bar{p}})$ is as follows:

$\hat{\bar{p}} = \sum_{i=1}^{m} w_i \hat{p}_i$ whereas $w_i = {}^{1}/_{n}$

(5)

w_i = weights

$\hat{p}_i$ = HOI predictions

and the dissimilarity index prediction $\widehat{D}$

$$\widehat{D} = \frac{1}{2\hat{\bar{p}}} \sum_{i=1}^{m} w_i \, |\hat{p}_i - \hat{\bar{p}}| \quad (6)$$

So that the HOI prediction can be written as follows:

$$\widehat{H} = \hat{\bar{p}}\left(1 - \widehat{D}\right) \quad (7)$$

HOI decomposition⊆⊆According to De Barros, et al. (2009) inequality of opportunity is measured by a difference index (Index D) which depends on a defined set of conditions. Index D has the characteristic that every addition of a condition variable will always increase the D index or decrease the HOI. As an illustration, if there are two sets of conditions, A and B, which do not overlap, then D (A, B) ≥ D (A), so HOI (A, B) ≤ HOI (A). Thus, the impact of adding condition A to a given set of conditions (S) is given by:

$$D_A = \sum_{S \subseteq N/A} \frac{|s|!(n-|s|-1)!}{n!} [D(S \cup \{A\}) - D(S)] \quad (8)$$

N = set of all possible conditions from a total of n conditions.

S = a subset of N that consists of condition s, but does not contain condition A. D (S) denotes the index of difference of the condition set S.

D (SU {A}) = difference index calculated based on the set of conditions S and condition A.

In some situations, it is necessary to see the contribution to a condition:

$\theta_A = \frac{D_A}{D(N)}; \quad \sum_{i \in N} \theta_i = 1$

(9)

θ_A = Shapley Decompositionof HOI

D_A = Dissimilarity index for A condition

D_N = Dissimilarity index for all condition

2. Logistic Regression

The magnitude of a child's conditional opportunity to access his basic needs can be expressed in a logit model. Where the independent dichotomy variable (Y), if 1 states passed and 0 states did not pass.

$$ln\left(\frac{P[Y=1|X=(x_i,\ldots,x_n)]}{1-P[Y=1|X=(x_{1,\ldots,}x_n)]}\right)=\sum_{i=1}^{n} x_k\beta_k \quad (10)$$

This study will not construct a statistical model from logistic regression. Instead, this study will focus on using significant logistic regression to see how significant a variable is. It is also important to support the accepted conclusions of shapley decomposition. It may be that in some conditions the results will be contradictory.

This study uses HOI as an analytical tool. In his analysis, the inequality of condition is a variable that cannot be controlled. The concept of inequality of opportunity has changed the concept of inequality itself. Policy direction is no longer focused on outcomes but on opportunities. This happens because the opportunity is the source of the outcome inequality. A self-explanatory digram was issued by De Barros, et al. (2009). In the diagram, it is easy to see the source of inequality, both from controllable and uncontrollable factors. In the digram, adjustments have been made to focus more on this research, especially the input variables and the outcome variables.

Other influencing factors are placed as residual inequality. Residual inequality is an option that can be chosen by each individual. The business that is occupied, how is one's luck in the journey of life and motivation in achieving the necessary access and other factors are examples of residual inequality. The inequality of the uncontrol variable and the controlled variable is the source of the inequality of outcome. So clearly, HOI is superior to other methods because it can break down the inequality of outcome.

The scheme can be simplified in Figure 1 as follows:

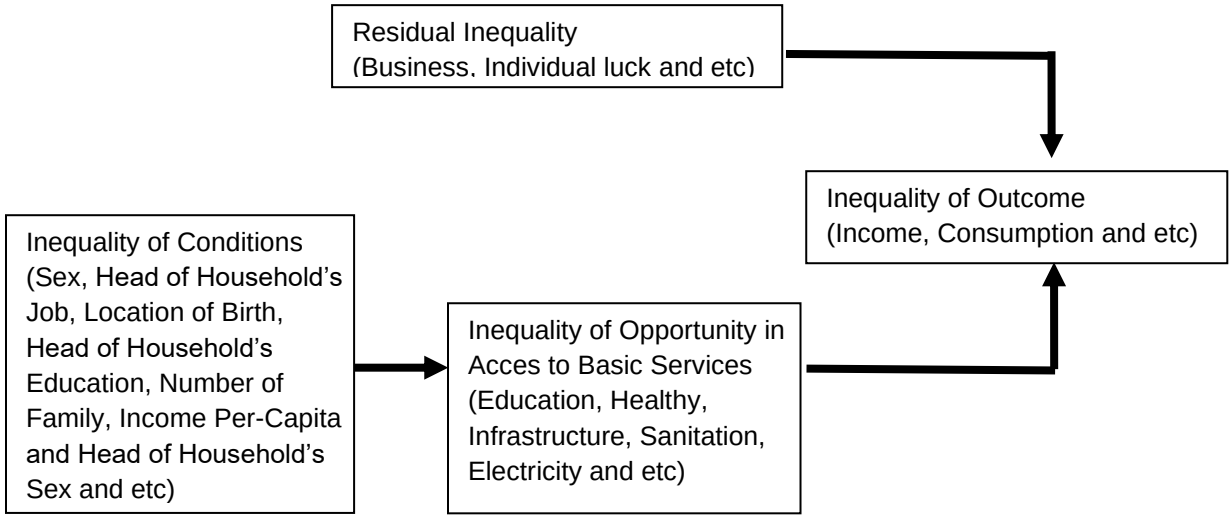

Figure 1. Source of inequality in accessing basic needs.

Based on this scheme, this research will use uncontrollable state variables as follows:

1. The gender of the child is 1 for boys and 0 for girls

2. The location of the child's residence, worth 1 for urban and 0 for rural areas

3. Number of family members

4. The sex of the household head is 1 for men and 0 for women

5. Work status of the household head, worth 1 for work and 0 for not working

6. Diploma of the household head, with a score of 1 for SMA and above and 0 for SMP and below

7. Income Per-capita of household

The subject of this research are Children aged 7-15 years for Elementary dan Junior High School or equivalent (SD and SMP or equivalen in *Bahasa*). Then, children aged 16-18 years for Senior Hignh School (SMA in *Bahasa*).

3. The Data

Coverage

The 2019 Susenas was carried out across Indonesian provinces (34 provinces), for Sumatra Barat Province, it covered 19 regencies/municipalities. Those samples exclude households in specific census blocks and have excluded orphanages, resident halls, dormitories, hostels, prisons, military barracks, etc.

Sampling Frame

The sampling frame used from the master sampling frame which resulted from SP2010. Susenas samples were used to estimate the province; a sub sample of the Susenas regency/municipality estimates. This survey uses a stratified sampling method in selecting a sample, in its implementation it consists of:

Step 1: The sample for Sumatra Barat Province were 1,090 census block, that was choosing by systematic sampling from the estimated 30,000 census blocks regency/municipality;

Step 2: Systematic sampling results was used to Select 10 households and regards to the highest education attained by head of the households to updates with implicit stratification.

Data Collection Method

In 2019, the collection of data Susenas core was held in March 2019. The sample size of Susenas core in the Sumatera Barat Province amounted to 10,900 households, the clear`data that can be processing are 10,743. Mid-year population estimates used for weighting 2019. The enumerator met face to face interviewed the respondent. Trying to ask questions about individual data to those concerned. Household characteristics data is asked through interviews with the head of the household, spouse or household members who know about it

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RESULTS AND DISCUSSION

The government has done a lot so far in dealing with education issues. Equitable access and improving the quality of education, improving the curriculum, especially for basic education. To find out the success of the programs and policies that have been implemented by the government, it can be seen from the results of the HOI calculation below. The HOI results for preschools education are presented in table 1.

Table 1. Coverage (C), Dissemillarity (D), Human Opportunity Index (HOI) and Penalty value for Preschools in Sumatra Barat Province

No.	Variable	Values	Std Error
1	Coverage (C)	49.45	13.504
2	Dissemilarity (D)	8.28	48.147
3	Human Opportunity Index (HOI)	45.36	14.525
4	Penalty	4,10	

The level of coverage for Preschools in the province of Sumatra Barat in 2019 has reached 49.45 percent. This figure is the percentage of children who enjoy school with all the existing conditions. Where the equality of opportunity for preschoolers reaches 45.36 percent. Equality of opportunity is stated in the Human Opportunity Index (HOI). Table.1 also explains around 8.28 percent of opportunities for education that need to be reallocated to ensure equality in 2019.

In general, these results also confirm low participation in preschool. As a comparison in previous research, Rochana (2019) preschool participation is low because (1) early childhood education programs (PAUD in *Bahasa*) service institutions in the community is still limited and unequal (2) the lack of government support in providing early childhood education. HOI shows and identifies the pre-school problem, which is the children can control and beyond their control.

In general, early childhood education programs is important considering that preschool is the golden age that comes only once, Apriana (2009). At that time, various basic abilities such as language, environmental recognition, emotion, social relations recognition and various creations developed very rapidly, Nurmalitasari (2015). Support for higher achievement from all parties, including the government, is expected.

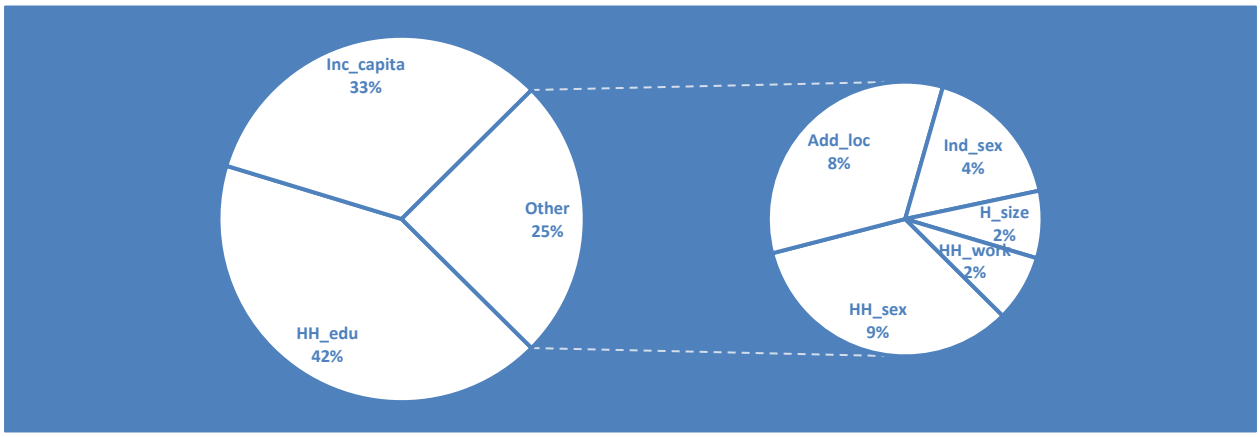

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Figure 2. Shapley Decomposition for Early Childhood Education Programs in Sumatra Barat Province in 2019

The results of the shapley decomposition by taking into account 7 variables that are considered outside the child's control, as presented in graph 1. It can be seen that the diploma of the household head and the income of the household head greatly affect whether a child is attending school or not at the preschool level. For a diploma, the household head is worth almost 42 percent, while for the income of the household head is 33 percent.

Other factors seem to be neglected in this case. This conclusion is obtained from the share size of each factor. The results of the logit model also confirm that there are only two significant factors in this case, namely the diploma of the household head and the income per capita. The logistic regression results and the shapley decomposition justify that preschool needs the support of all parties. So that the dissemillarity that occurs can decline.

The preschool importance awareness is represented by a diploma of the household head. The higher the diploma of the household head, the better the preschool importance awareness. Diploma represents knowledge, awareness. On the other hand, per capita income is important because almost all preschools are private schools, 96.87 percent (Sumatra Barat in Figures 2020). This condition certainly makes income sensitive.

Elementary and junior high schools are classified in the same category because both of them are included in the 9 year compulsory education program. School awareness at the Elementary School (SD in *Bahasa*) and Junior High School (SMP in *Bahasa*) levels is reflected in the high coverage of school participation in SD and SMP, which is 98.48 percent. In line with that, the percentage of opportunities for education that need to be reallocated to ensure equality in 2019 is 0.43 percent. That is very low already.

Table 2. Coverage (C), Dissemillarity (D), Human Opportunity Index (HOI) and Penalty value for Elementary School (SD in *Bahasa*) and Junior High School (SMP in *Bahasa*) in Sumatera Barat Province in 2019

No.	Variable	Values	Std Error
1	Coverage (C)	98,48	0.1678
2	Dissemilarity (D)	0,43	0.3444
3	Human Opportunity Index (HOI)	98,05	0.2223
4	Penalty	0,43	

The government made powerful interventions in the SD and SMP groups. The 6-year compulsory education program has been campaigned since May 2, 1984. In 1994 the compulsory education program was increased to 9 years. Furthermore, support for the world of education has increased with the existence of a state policy to budget 20 percent of funds for education. This state intervention certainly reduces the barriers that prevent children from attending school, because schools are free, the school is widely distributed, in certain cases there are also scholarships for student equipment, and others. Even so, the private sector is still involved, in 2019 the number of private schools reached 13.89 percent. Private schools take advantage of curriculum gaps, emphasis on religion or language skills or the

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completeness of supporting facilities.

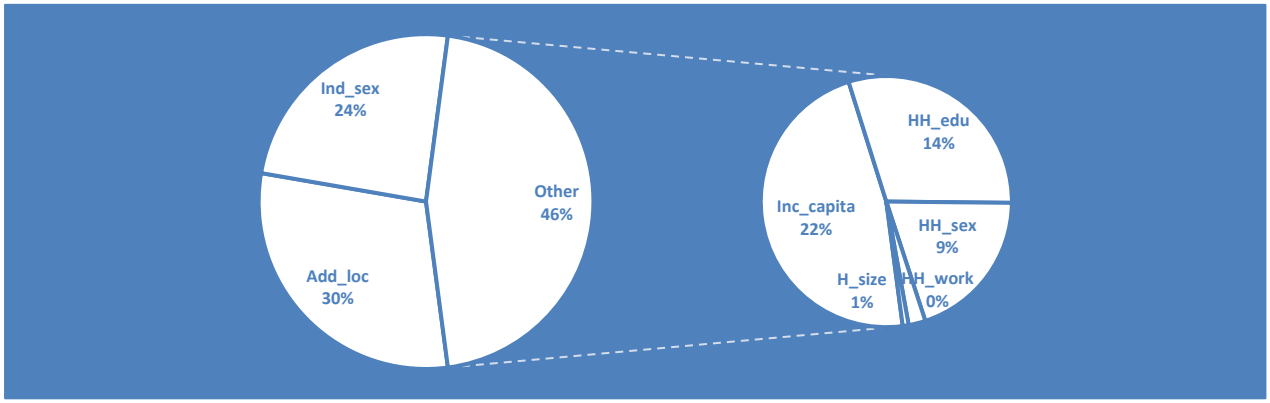

Figure 3. Shapley Decomposition for Elementary and Junior High School (SD and SMP) in Sumatra Barat Province in 2019

Factors that affect the elementary and junior high school levels are the place of residence and the sex of the child, 30 percent and 24 percent, respectively. Other factors such as; the diploma of the household head, the sex of the household head, the income per capita, and the working status of the household head, and the number of family members can be ignored at the SD and SMP levels in 2019. These conclusions are not only in terms of size but also based on logistic regression results which is not significant.

Place of residence clearly affects the distance a child travels to school, in addition to that place of residence also affects family habits, for example the tendency of children to help the family, Liani (2019). While gender still has an effect on schools, this may be due to the prioritization of certain sexes to continue schooling.

In general, the achievement at the SD and SMP levels has been very good. Residual inequality almost can be ignored in this group.

Table 3. Coverage (C), Dissemillarity (D), Human Opportunity Index (HOI) and Penalty value for Senior High School (SMA in *Bahasa*) in Sumatera Barat Province

No.	Variable	Values	Std Error
1	Coverage (C)	83,63	0.9029
2	Dissemilarity (D)	4,50	20.345
3	Human Opportunity Index (HOI)	79,87	11.029
4	Penalty	3,77	

The level of coverage at Senior High School (SMA in *Bahasa*) level reaches 83.63 percent, which is high but not satisfactory. The equal opportunity at the school level has only reached 79.87 percent. Percentage of opportunities for education that need to be reallocated to ensure equality in 2019 is 4.5 percent.

Naturally, the amount of achievement at the SMA level decreased compared to the SD and SMP levels. Like the pyramid, the higher the taper. All effort is made to ensure the reduction of the elementary school and the junior high school group (SD and SMA) is as little as possible. The residual inequality at this level will need a further researched.

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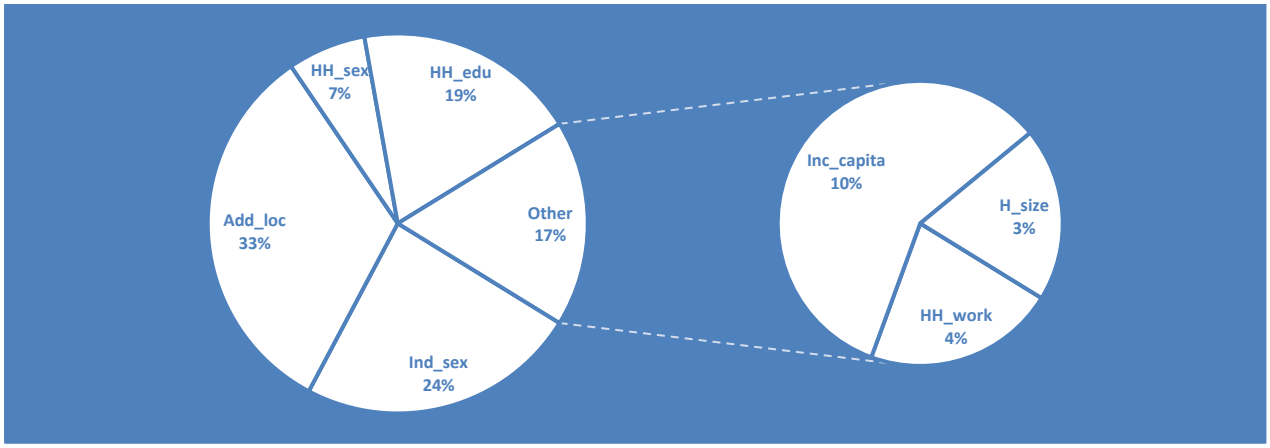

Figure 4. Shapley Decomposition for Senior High School (SMA) in Sumatra Barat Province in 2019

At the SMA level, more factors influence inequality. Place of residence, gender of child, diploma of head of household, and sex of head of household. Meanwhile, the per capita income, the number of household members and the occupational status of the head of the household have negligible effects in this case. The negligence of this income effect is interesting. This seems to erase the fact that since 2017, Senior high school students have to pay tuition fees.

The location of SMA for rural areas is quite far, sometimes school children have to rent a room or a house to go to school. This factor contributes 33 percent to inequality. Meanwhile, the sex of the child affects around 24 percent, this may be related to the choice of a certain gender to continue school. Interestingly, the household head diploma has an effect of 19 percent, as was the case with the previous preschool. The awareness of parents for children still need to be improved. Finally, the sex of the household head also affects the sustainability of the school. There is a tendency for parents of a certain gender to pass on their experiences to their children.

For residual inequality, further research is needed. Fatimah (2015), she stated that motivation also affects school sustainability.

CONCLUSIONS AND SUGGESTIONS

At the preschool level, the coverage is still low because it is only 49.45 percent, the Dissemilarity Index is 8.28 percent. This result explains that it is still around 8.28 percent opportunities for education that need to be reallocated to ensure equality in 2019. At the SD and SMP levels the coverage has been 98.47 percent and the opportunity for education that needs to be reallocated to ensure equality in 2019 is only 0.43 percent. Meanwhile at the SMA level the coverage has reached 83.63 percent with opportunities for education that need to be reallocated to ensure equality in 2019 of 4.5 percent.

Treatment at the primary and junior secondary levels can be a good example of how treatment at other school levels should be administered. In this group only 0.43 percent of the opportunity needs to be allocated. Ideally, of course 0 percent. This can still be pursued with a wider penetration of schools, considering that residence is still influential. The choices are of course adding schools, improving roads, improving transportation. As the decision maker, the government can certainly choose the most effective one, it can vary depending on what is faced.

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At the Senior High School or equivalent level (SMA or equivalent), the amount of opportunity that must be allocated is 4.5 percent. Compared to the basic level, it is certainly bigger. Place of residence, gender of child, diploma of head of household, and sex of head of household are influencing factors. Seeing the factors that influence in 2019, in this case what can be done is of course related to infrastructure improvements, such as adding schools, repairing roads or improving transportation. Same as in the basic education earlier. Furthermore, socialization and propaganda to overcome the problem of the gender of the child, the sex of the head of the household, bearing in mind that parental education also influences. This campaign on the importance of education must be carried out to increase equal opportunity. The campaign that education is not meant to be an employee, but to encourage older entrepreneurs can be a very fitting theme.

The problem is different at the pre-school level, the level is preparation for school. The government may be able to encourage the private sector by providing incentives that facilitate licensing, curriculum guidance and assistance for teachers. BOS school operational assistance that is broader will be very helpful. Because one of the prominent problems is the income of the head of the household. Besides that, of course the pre-school campaign is broader, considering that parental education also affects the equal distribution of school opportunities at this level.

Knowing the causes, especially things that cannot be controlled by the child, will greatly help improve the current conditions. Overcoming the cause is much better than dealing with the effect.

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