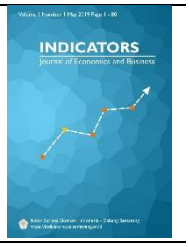
INDICATORS Vol. 3(2)(2021)

INDICATORS

Journal of Economics and Business

http://indicators.iseisemarang.or.id/index.php/jebis



POVERTY AND HUMAN DEVELOPMENT INDEX: AN INTER-DISTRICT STUDY IN CENTRAL SULAWESI

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Article Information

History of Article:
Received August 2021
Accepted September 2021
Published November 2021

Keywords:
Poverty, Average Length of Schooling, Expectation of Long Schooling, Life Expectancy, Panel Data Regression.

Abstract

Central Sulawesi Province consists of 13 districts/cities with varying levels of poverty. The numbers fluctuate in the period of time of 2013 to 2020 were classified as high because they were ranked 2nd (second) compared to other provinces on the island of Sulawesi. The low quality of human capital is one of the main causes of poverty, to see the achievement of human capital investment, the education dimension is represented by the average length of schooling, the expected length of schooling, and the health dimension is represented by life expectancy, which is a measure in efforts to build the quality of human life showing an increase consistently. Increasing the quality of human capital is expected to improve the productivity of the poor. Therefore, the purpose of this research was to determine the effect of Average Length of Schooling, Expected Length of Schooling, and Life Expectancy on poverty levels in Central Sulawesi Province. This was a quantitative research. Data used was secondary data out of 13 districts/cities in Central Sulawesi Province for the period of 2013–2020. The data was analyzed using panel data analysis with a random effect regression model. The results show that the Average Length of Schooling variable has a positive effect and is proven to increase poverty, Expected Length of Schooling has a negative effect and is proven to reduce poverty, Life Expectancy has a negative effect and is not proven to reduce poverty, Life Expectancy2 has a positive effect and is not proven to increase poverty in Central Sulawesi Province for the 2013-2020 period.

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INTRODUCTION

The concept of poverty has expanded in line with the increasing complexity of the causal factors, indicators and other problems that surround it. Poverty is no longer considered an economic dimension but has expanded to social, health, education and political dimensions (Bado et al, 2017).

Poverty in this study is a condition of inability to meet basic needs, both food and non-food needs. It's a development problem in every region that requires synergy form all element of society to overcome it. Central Sulawesi, which consists of 12 districts and one city is still facing the problem of poverty over the past seven years with varying degrees.

Although the poverty rate tends to decrease, for the Sulawesi Region, the poverty rate is still relatively high at 12.92 percent. This figure is the second highest number after Gorontalo and is above the national poverty rate of 9.78 percent.

One of the conditions for reducing poverty is the quality of human capital. Good human capital is characterized by educational attainment, skills and quality of health, which

will provide greater opportunities to choose jobs with higher wages. People with good human capital have the potential to have individual capabilities and have a greater opportunity to participate in the development process (Todaro dan Smith, 2009).

Education and health of the population are the dominant factors in improving the quality of human life, both of which are fundamental requirements to form higher human abilities, thus making them mandatory to be a concern in the development. Health quality and educational attainment as components of growth and development are identified in their dual role as inputs and outcomes in development (Todaro dan Smith, 2009).

Life expectancy (UHH) is a measurement of the results of the government's performance in improving the welfare of the population through improving the quality of health. Therefore, the life expectancy becomes an indicator in comparing the level of welfare between community groups. In countries with better health, each individual has a longer life, so that they are economically more likely to earn relatively high incomes. Longer life expectancy can increase the return of investment in education, meaning that healthy individuals can use the education they receive more productively at all times of their lives. Various studies in developing countries show that better health can increase adult productivity, and that healthy people will receive higher wages (Todaro dan Smith, 2009).

Average Years of Schooling (RLS) and Expected Years of Schooling (HLS) are some educational indicators that reflect the community's ability to access education, especially quality education which is indispensable for a productive life in modern society.

Education investment, formal and non-formal, plays an important role in reducing poverty in the long term, both directly through productivity and efficiency, and indirectly through training the poor with the skills needed to increase productivity, thereby increasing income (Subandi, 2014).

This study aims to determine the effect of Average Years of Schooling (RLS), Expected Years of Schooling (HLS), Life Expectancy (UHH), and Long-Term Life Expectancy $(UHH)^2$ on Poverty Levels.

RESEARCH METHOD

This study examines the levels of poverty that vary by region in Central Sulawesi Province during 2013-2020. By utilizing secondary data sourced from Central Statistics Board (BPS), and applying a panel data regression model, it can be identified the effect of Average Years of Schooling, Expected Years of Schooling, Life Expectancy and Long-Term Life Expectancy on Poverty, which then is reflected by the following equation:

$$LnY_{it} = \alpha + \beta_1 LnX_{1it} + \beta_2 LnX_{2it} + \beta_3 LnX_{3it} + \beta_4 LnX_3^2{}_{it} + e$$

where:

LnY = Ln Poverty
LnX_1 = Ln Average Years of Schooling
LnX_2 = Ln Expected Years of Schooling
LnX_3 = Ln Life Expectancy
LnX_3^2 = Long-Term Life Expectancy
α = Constant
β = Coefficient
i = Data Units
t = Time Period (Year 2013- 2019)
e = error term

RESULT AND DISCUSSION

The uneven number of poverties among districts/cities in Central Sulawesi Province create a need for local governments to know the appropriate poverty measuring factors. The following data presents the development of poverty rates by poverty rates by District/City in Central Sulawesi in 2013-2020.

Table 1 shows the development of the poverties which is very varied and fluctuating. Poverty is a crucial problem because it affects other aspects of life such as health, education, food, and housing. This poverty indicator is very identical to the income of the population. The decrease in the number of poor people reflects that the overall income of the population is increasing, while the increase in the number of poor people indicated a decrease in the income of the population. Thus, the

number of poor people is a fairly good indicator to measure the level of people's welfare. Human Capital is one of several factors that affect the level of poverty. An area that has abundant natural resources (SDA) but lack of quality of local human resources (HR) will be left behind compared to other regions that have quality human resources (BPS, 2020).

Model Selection

There are three tests to choose the panel data estimation technique, namely the Chow test, which is a test to determine the most appropriate fixed affect or common effect model used in estimating panel data; Hausman test, which is a statistical test to determine whether the model is fixed effect or random effect; and the Lagrange Multiplier Test, which is a test to determine whether the random effect model is better than the common effect method.

However, the three tests are not always carried out. If the purpose of the research is to capture the intercept differences that occur between individual data, the common effects model is ignored, because the common effects model only combines cross section and time series data as a single unit without looking at the differences in time or individuals (Sakti, 2018). The data in this study is a panel data that has differences in individual and time characteristics so that only the Hausman test is carried out to determine whether the fixed effect or random effect model is more appropriate. The test was carried out with a significant level of 5% ($\alpha = 0,05$). According to Gujarati (2004), in the Hausman test, the hypothesis formed are as follows:

H_0 : correlation (X_{it}, ε_{it}) = 0 (*random effect model*)
H_1 : correlation (X_{it}, ε_{it}) ≠ 0 (*fixed effect model*)
Based on the processing output, the probability value is 0.0593, which is greater than alpha = 0.05. The result cannot reject H_0, so that best model is *random effect*.

Table 1. Hausman Test Result

Test Summary	Chi-square Statistic	Degree of Freedom	Probability
Cross-section random	9.072637	4	0.0593

Source: result of processed data

Classical Assumption Test

The result of the model obtained is a random effect, so the classical assumption test is not carried out. According to Gujarati and Porter, (2009) random effect model is generalized least square (GLS) estimation method. The GLS technique is believed to overcome the time series autocorrelation and the correlation between observations of cross section data. The GLS method produces an estimator to meet the Best Linier Unbiased Estimation (BLUE) requirement which is a treatment method to overcome violations of the homoscedasticity and autocorrelation.

Estimated Result of Random Effect Model

The approach in this estimation was that panel data is based on differences in intercept and slope, as a result of differences between individuals or objects. Based on the results of the regression, it can be seen that there was an effect of cross section in every Regency/City in Central Sulawesi Province.

Table 2. Number of Poor People (Thousand People) Regency/City in Central Sulawesi 2013-2020

No	Regency/City	2013	2014	2015	2016	2017	2018	2019	2020
1	Banggai Kepulauan	29,40	28,24	18,57	18,72	18,56	18,38	17,54	16,70
2	Banggai	33,80	32,45	34,74	33,97	33,50	33,73	29,30	28,16
3	Morowali	35,40	34,04	17,79	17,36	16,99	17,03	16,61	16,50
4	Poso	41,30	39,63	42,64	42,23	41,88	41,75	39,92	40,20
5	Donggala	49,60	47,56	54,17	55,69	54,44	54,28	55,83	53,17
6	Tolitoli	30,00	29,46	30,70	30,68	30,64	31,80	30,79	30,51
7	Buol	21,60	20,82	24,31	25,27	25,76	25,40	24,51	22,93
8	Parigi Moutong	75,44	75,46	82,61	82,38	82,88	83,66	81,36	78,76
9	Tojo Una-Una	29,70	27,73	27,62	27,62	27,30	27,78	26,36	25,43
10	Sigi	27,60	26,49	29,14	29,55	29,55	29,78	30,82	30,00
11	Banggai Laut	29,40	28,41	12,33	11,59	11,63	11,97	11,46	11,09

12	Morowali Utara	35,40	34,04	19,81	19,22	19,25	19,40	19,25	18,38
13	Palu	25,90	25,67	27,19	26,24	25,49	25,26	26,62	26,89
14	**Central Sulawesi**	**405,42**	**392,65**	**421,63**	**420,52**	**417,87**	**420,21**	**410,36**	**398,73**

Source: BPS Central Sulawesi Province, 2021

Table 3. Summary Results of Data Panel Regression of Random Effect Model

No	Regency/City	Result of Constant			Coefficient			
		C	C_{Daerah}	C	RLS	HLS	UHH	UHH^2
1	Banggai Kepulauan	8.293794	– 0.369876	7.923918	0.001841	2.574571	1.371013	0.876252
2	Banggai	8.293795	0.084268	8.378062	0.001841	2.574571	1.371013	0.876252
3	Morowali	8.293796	– 0.377261	7.916533	0.001841	2.574571	1.371013	0.876252
4	Poso	8.293797	0.416854	8.710648	0.001841	2.574571	1.371013	0.876252
5	Donggala	8.293798	0.531145	8.824939	0.001841	2.574571	1.371013	0.876252
6	Tolitoli	8.293799	0.028806	8.295635	0.001841	2.574571	1.371013	0.876252
7	Buol	8.293800	– 0.150757	8.143037	0.001841	2.574571	1.371013	0.876252
8	Parigi Moutong	8.293801	0.899518	9.193312	0.001841	2.574571	1.371013	0.876252
9	Tojo Una-Una	8.293802	– 0.268523	8.025271	0.001841	2.574571	1.371013	0.876252
10	Sigi	8.293803	– 0.087994	8.2058	0.001841	2.574571	1.371013	0.876252
11	Banggai Laut	8.293804	– 0.673957	7.619837	0.001841	2.574571	1.371013	0.876252
12	Morowali Utara	8.293805	– 0.431987	7.861807	0.001841	2.574571	1.371013	0.876252
13	Palu	8.293806	0.399763	8.693557	0.001841	2.574571	1.371013	0.876252

Source: result of processed data

From the results above, poverty in district/cities varies which is indicated by the number of poverties in each district/city is different. Table 1 shows the highest number of poor people during the observation period is in Parigi Moutong Regency. This is also confirmed by the constant value (which reflects relative to other regions), that the highest number of poor people was in this area.

Simultaneous Significance Test

Tests on the influence of all independent variables in the model can be carried out with simultaneous tests, using the F statistic which shows whether all independent variables included in the model have a joint effect on the dependent variable.

The influence of RLS, HLS, UHH, and UHH^2 on poverty in districts/cities in Central Sulawesi Province in 2013-2020 by using a confidence level of 95 percent (α = 5 percent) and a degree of freedom d of 100, (n - k) = (104 – 4 = 100), and *degree of freedom nominator* is 3 (k – 1 = 3), so the F-tabel is 2.70. The result of calculating the effect of RLS, HLS, UHH, and UHH^2 on poverty in districts /cities in Central Sulawesi Province 2013-2020, obtained F-statistics of 8.007 and probability value of F-Statistics of 0.000012. This concludes that RLS, HLS, UHH, and UHH^2 variables together have an effect on poverty ($F_{count} > F_{table}$).

Parameter of Individual Significance Test

Individual Significance Test shows how big the influence of each independent variables individually in explaining the variation of the dependent variable, using t statistical test at (α = 5 percent) and *degree of freedom* (df) = 40 (n - k = 44 - 4), the value of t table is 1,6602.

From table 4, it can be concluded that at the 95 percent level, RLS and HLS have a significant effect on poverty, while UHH and UHH^2 have no significant effect on poverty in districts/cities in Central Sulawesi in 2013-2020.

Table 4. t-Statistics Value

Variable	Coefficient	t-Statistics	Probability	Significant/Not Significant
RLS	0.001841	2.130062	0.0356	Significant
HLS	-2.574571	-4.522204	0.0000	Significant
UHH	-1.371013	-0.188759	0.8507	Not Significant
UHH^2	0.876252	0.229310	0.8191	Not Significant

Source: Result of Processed Data

Model Selection Test

The coefficient of determination (R^2) measures how far the model's ability to explain the variation of the dependent variable. The value of determination is between zero and one. A small value of R^2 means that the ability of the independent variables in explaining the variation of the dependent variable is limited. A value close to one means that independent varaibles provide almost all the information needed to predict the dependent variables.

The results of the panel regression of the influence of RLS, HLS, UHH, and UHH^2 on on Poverty in districts/cities in Central Sulawesi Province in 2013-2020 obtained an R^2 value of 0,2444. This figure shows that 24,44 percent of the variation in districts/cities poverty in Central Sulawesi can be explained by the four variations of the independent variables, namely RLS, HLS, UHH, and UHH^2 while 75,56 percent is explained by other variables outside the model.

Average Years of Schooling (X_1)

Based on the results of research data processing, the average years of schooling variable shows positive results and is proven to increase poverty in Central Sulawesi Province. Thus, the results of this study are not in accordance with the hypothesis that the variable average years of schooling has a negative and significant effect on the poverty level in Central Sulawesi Province.

The coefficient value of 0.001841 is significantly positive. This number indicates that in ceteris paribus conditions, if the average years of schooling increases by 1 percent, then it will increase poverty by 0.002 percent. This is not in line with the theory that has been put forward that the length of schooling is a determinant of differences in income and productivity, where the higher a person's education has a positive correlation with his lifetime income, which in turn will increase their income, so that the poverty rate will decrease. This is because in Central Sulawesi Province, the average length of schooling that has been taken by a population aged 25 years is still relatively lower, reaching 8,83 years in 2020, which is equivalent to being in grade 3 junior high school education. Parigi Moutong Regency has the lowest average length of schooling at 7,48 years and Palu City has the highest average length of schooling at 11,61. The low average length of schooling concluded that the level of public education was considered to have low quality, so the wages earned were also low which caused an increase in the number of poor people.

The result of this study were in line with the research of Wulandari et al, (2019) that education (average years of schooling) did not affect the poverty level in Padang Lawas Regency. This was not in line with research conducted by Arofah dan Rohimah (2019) that found that education as measured by the average years of schooling was proven to increase real per capita expenditure in East Nusa Tenggara Province

Expected Year of Schooling (X_2)

The results showed that the variable of school year expectation was negatively correlated and proven to reduce poverty in Central Sulawesi Province. The result of this study was in accordance with the hypothesis that the variable of school year expectation has a negative and significant effect on the poverty level in Central Sulawesi Province.

The coefficient value of -2.574571 has a significant negative sign, this number indicated that in ceteris-paribus condition, if the school

year expectation increase by 1 percent, it will reduce poverty by 2.5 percent. This was in line with the theory that has been put forward that higher education was able to provide training to the poor with the skills needed to increase their productivity, which in turn will increase their income, and then the poverty rate will decrease. Central Sulawesi Province in 2020 shows that on average 7-year-old who enter the formal education level have the opportunity to attend school for 13.17 years or the equivalent of currently pursuing an undergraduate education. Tojo Una-Una Regency had the lowest school year expectation and Palu City had the highest school year expectation of 16,23 years.

The result of this study were in line with the results of Arofah dan Rohimah (2019) which found that education with a measure of school year expectation was proven to increase real per capita expenditure in East. Nusa Tenggara Province. The longer the long-term school year expectation has boosted per capita spending. However, the results of this study are not in line with the results of Rory (2019) research which found that long-term school year expectation were not proven to reduce poverty in Indonesia.

Life Expectancy (X_3)

The result showed that the variable life expectancy had a negative correlation and was not proven to reduce poverty in Central Sulawesi Province. So, the results of this study are not I accordance with the hypothesis that the variable life expectancy has a negative and significant effect on poverty levels in Central Sulawesi Province.

The coefficient value of -1.371013 is negative and not significant, this number indicates that in ceteris paribus conditions, if the life expectancy rate increase by 1 percent, it will reduce poverty by 1.3 percent. This is in line with the theory that a longer life expectancy can increase the return on investment in education, healthy individuals are more able to use education productively so that they can increase their productivity to earn income. However, it has not been proven to reduce poverty because life expectancy does not guarantee that a person can work well and generate high income. When someone who is of working age, but has a disease that prevents him from working will be a factor in the difficulty of getting enough income, and health and education are investments made in the same individual, even though life cxpectancy is high but has a high average length of schooling. Low, it is difficult to get enough income to meet their needs, people with higher education have a better chance of getting a job with a higher wage rate than those with low education, as evidenced by the low average length of schooling taken by the population aged 25 years and over in Central Sulawesi Province.

The results of this study are in line with the results of Suryati and Syukri (2019) research which states that health as measured by life expectancy is not proven to reduce poverty in districts and cities of South Sulawesi Province. However, this is not in line with the results of the research by Fikri dan Suparyati (2017). Health as measured by life expectancy has been shown to reduce poverty in East Nusa Tenggara Timur.

Long-Term Life Expectancy (X_4)^2

The results showed that the long-term life expectancy variable was positively correlated and was not proven to increase poverty in Central Sulawesi. The results of this study were not in accordance with the hypothesis that the long-term life expectancy has a positive and significant effect on the poverty level in Central Sulawesi Province.

The coefficient value of 0.876252 was positive and not significant, this number indicated that in ceteris paribus conditions, if the long-term life expectancy rate increases by 1 percent, it will increase poverty by 0.87 percent. This is in line with Radner's view of the relationship between poverty and aging based on the U-shaped age distribution, because poverty tends to be highest at the tail of the age distribution, at the youngest and oldest ages, and lowest in middle age. In other words, a person will be in poverty decreases and then increases with age over his own life cycle. But empirically in this study it is not proven to increase poverty.

This result was in line with the research by Marchand dan Smeeding, (2016) on the

relationship between poverty and aging which is seen based on a U-shaped age distribution. The age distribution can be simplified into three distinct segments: youth raised from birth to 17 years of age by working-age parents, the portion of the working age people of the population aged 18 to 64 years who may care for dependents old or young, and the elderly of the ordinary retirement age 65 years and over, whose care and retirement may depend on contributions from the working age group, use these three groups to bring awareness of the interrelated poverty situation of children and parents, because based on research results over a period of almost 50 years, this U shape is widening and slowly rotating clockwise, mainly due to the gradual increase in child and working age poverty as well as the drastic decline in elderly poverty.

The Limitation

The results of the study showed that the variables of Average Years of Schooling (RLS), Life Expectancy (UHH), and Long-Term Life Expectancy$(UHH)^2$, was not in line with the hypothesis that the researcher adopted. The variable of Average Years of Schooling was proven to increase because the Average Years of Schooling was still relatively low. Variable Life Expectancy was not proven to reduce Poverty because Life Expectancy did not guarantee a person get the work well and generate the high income, thus it was not enough to overcome the problem of Poverty. As well as the Long-Term Life Expectancy variable which was not proven to increase Poverty, with the assumption that the Poverty of children and parents was interrelated.

CONCLUSION

Based on the results of Panel Data Regression Analysis using the *Random Effect Model*, it can be concluded as follows: the Average Years of Schooling with a probability value of 0.0356 < 0,05 and the regression coefficient was positive. Thus, the Average Years of Schooling has a significant effect or was proven to increase Poverty. Expected Years of Schooling with a probability value of 0.0000 < 0,05 and the regression coefficient was negative, which can be concluded that the Variable of Expected Years of Schooling had a significant effect or was proven to reduce Poverty. Life Expectancy with a probability value of 0.8507 > 0,05 and the regression coefficient was negative. Thus, it can be concluded that Life Expectancy variable had no significant effect or was not proven to reduce Poverty. The Long-Term Life Expectancy with a probability value of 0.8191 > 0,05 and the regression coefficient was positive, means that the Long-term Life Expectancy had no significant effect or was not proven to increase poverty in Central Sulawesi Province for the period of 2013-2020.

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