POVERTY AND HUMAN DEVELOPMENT: AN INTER-REGIONAL STUDY

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ABSTRACT

Poverty as a phenomenon of development failure is an interesting research area because it is not limited to the economic dimension alone but becomes a multidimensional problem, poverty must ultimately be monitored based on the state of health and education. This paper aims to examine the role of health which is reviewed based on life expectancy and the role of education which is reviewed based on the average length of schooling and the expected length of schooling. In an effort to identify poverty and capture the differences according to the endowment factor of each region, this paper is based on the use of panel data covering 13 regions for 8 years. Using panel data regression, a random effect model was obtained as the right model to capture variations in poverty level data in the region for 8 years. It was found that the average length of schooling pushed up the poverty rate, while the expected length of schooling suppressed the poverty rate. Although life expectancy does not significantly affect the poverty rate, in the short-term phase it is negatively related to the level of poverty and the long-term phase is positively related to the level of poverty. Longer observations are needed to better capture the phenomenon of poverty and encourage the use of logistical and probit models to estimate the parameters of the poverty level in its probability of change.

Keywords: Poverty, Life Expectancy, Average Length of Schooling, Expected Length of Schooling, Education Achieved, Panel Data Regression.

INTRODUCTION

Observing the views of Bado et al. (2017), the concept of poverty has expanded along with the complexity of its determinants and the indicators and problems that surround it. So that it is not limited to the economic dimension alone but extends to the social, health, educational and political dimensions. However, poverty will be detected more quickly when using an assessment of the condition of the inability to meet basic needs food and non-food (Ariyadi, 2021). Because each region has different endowment factors, it will create poverty as a different development problem in each region that requires synergy between all elements of society to overcome it. Central Sulawesi, which consists of 12 districts and one city, is still facing the problem of poverty over the last seven years with varying degrees.

Although the poverty rate tends to decrease, it is still relatively high in the Sulawesi Region. The poverty rate of 12.92 percent is the second highest number after Gorontalo and is above the national poverty rate of 9.78 percent. The quality of human capital which is characterized by the quality of health and educational attainment so as to have the opportunity to receive higher wages is a prerequisite for reducing poverty levels. As stated by Todaro & Smith (2009), people with good human capital have the potential to have

Citation Information: Ichwan, M., Aziza, F., Yunus, S., & Nasruddin, M.A. (2021). Poverty and human development: an inter-regional study. *Academy of Entrepreneurship Journal, 27*(6), 1-8.

individual capabilities and have a greater opportunity to participate in the development process.

The health of the population and the education achieved are the dominant factors in improving the quality of human life, both of which are fundamental requirements to form higher human abilities so that they must be a concern in 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 & Smith, 2009). Life Expectancy (UHH) as a measurement of the results of the government's performance in improving the welfare of the population through improving the quality of health. So that UHH becomes an indicator in comparing the level of welfare between community groups. In countries with better health, every individual is healthier and has a longer life, so that they are economically more likely to earn relatively high incomes. Longer life expectancy can increase the return on investment in education, healthy individuals are better able to use education productively at all times of their lives, studies show in developing countries with better health can increase adult productivity, that healthy people receive higher wages (Todaro & Smith, 2009; Nasirin & Lionardo, 2021).

Average Years of Schooling (RLS) and Expected Years of Schooling (HLS) are one of several educational indicators that reflect the community's ability to access education needed in the productive life of modern society. Investment in education formal and non-formal plays an important role in reducing poverty in the long term, namely directly through productivity and efficiency, and indirectly through skills training and work motivation to people who have minimal access to formal job opportunities to increase productivity in order to increase income. (Subandi, 2014). This paper aims to identify the role of Average Years of Schooling (RLS), Expected Years of Schooling (HLS), and Life Expectancy (UHH) on the poverty level.

METHODOLOGY

This research examines the poverty level that varies by region in Central Sulawesi Province during the 2013-2020 period. Utilizing secondary data sourced from the Central Statistics Agency (BPS) and applying a panel data regression model to identify the long-term effect of RLS, HLS, and UHH and UHH^2 on poverty as reflected in the following equation:

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

Information:

LnY = Ln Number of Poor Population
LnX_1 = Ln Average Length of School
LnX_2 = Ln School Expectancy
LnX_3 = Ln Life Expectancy
LnX_3^2 = Long Term Life Expectancy
α = Constant
β = Coefficient
i = Data Units
t = Time Period (2013-2019)
e = Standard error

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RESULTS

Descriptive Statistics

The number of poor people who are not evenly distributed between districts and cities in Central Sulawesi initiates the government to need to know the determinants of the right poverty measurement. The condition and development of poverty rates by districts and cities in Central Sulawesi in 2013-2020 are shown in Table 1.

Table 1
POOR POPULATION IN CENTRAL SULAWESI 2013-2020 (in 000)

No	District/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	North Morowali	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

The development of the number of poor people has fluctuated over the past 8 years and varies by region. Such a situation of poverty level becomes a crucial problem because it will affect other aspects 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 indicates a decrease in the income of the population or the speed of price changes outpacing the acceleration of the increase in income. So that the number of poor people is a good indicator of detecting the level of people's welfare. Human capital is an essential factor that affects the level of poverty. An area with abundant natural resources (SDA) but not supported by quality human resources (HR), will hinder development compared to other areas that have quality human resources.

Model Selection

Determining the best model according to the data in 13 regions for 8 years, was carried out through three model selection tests, namely the Chow test as a test to determine the right model between fixed effects and common effects. The Hausman test is a test for selecting the right model between fixed effects and random effects, and the Lagrange Multiplier Test is a test for the right model between random effects and common effects.

The three tests are not always carried out, if you want to capture the intercept differences that occur between companies, the common effect model is ignored, because this model is limited to combining cross section and time series data as a single unit without looking at time or individual differences (Sakti, 2018). The use of panel data aims to cover differences in individual characteristics and time so that only the Hausman test is carried out, namely to determine the best model is fixed effect or random effect by utilizing the 5% test

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level (α = 0.05). Leaning on Gujarati (2004) which emphasizes the hypotheses built in the Hausman test are as follows:

H₀: *Correlation (X_{it}, $\mathcal{E}_{it}$)=0 (model random effect)*

H₁: *Correlation (X_{it}, $\mathcal{E}_{it}$)≠0 (model fixed effect)*

Table 2
HAUSMAN TEST RESULTS

Test Summary	Chi-square statistics	Free Degrees	Probability
Cross-section random	9.072637	4	0.0593

Based Table 2, it is identified that the probability value is 0.0593 which is greater than of 0.05. Such results indicate that H_0 cannot be rejected so that the best model is random effect.

Classic Assumption Test

The right model for variance and data is random effect, so the classical assumption test is not carried out. As offered by Gujarati et al. (2012) that the random effect model is a generalized least square (GLS) estimation method. This technique is believed to overcome the autocorrelation of time series and correlation between observations (cross section). The GLS method produces an estimator to meet the Best Linear Unbiased Estimation (BLUE) property which is a treatment to overcome violations of the homoscedasticity and autocorrelation assumptions.

Estimated Result of Random Effect Model (Random Effect)

In this estimation approach, differences are based on differences in intercept and slope as a result of differences between individuals. It was identified that there was an effect of the cross section in every district and city in Central Sulawesi shows in Table 3.

Table 3
SUMMARY OF REGRESSION RESULTS PANEL DATA RANDOM EFFECTS MODEL APPROACH (RANDOM EFFECT)

No	District/City	Constant Result			Coefficient			
		C	C_{area}	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	North Morowali	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

From the above results, poverty in districts and cities varies as reflected by poverty in different districts and cities. Based on Table 1 which shows that the highest number of poor people during the observation period was in Parigi Moutong Regency, it is also emphasized

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by the constant value which reflects relatively compared to other regions, the highest number of poor people is in this area.

Simultaneous Significance Test

Testing on the effect of all independent variables in the model can be done by simultaneous testing, with the use of F test statistics which show whether all independent variables in the model have a joint effect on the dependent variable. The regression of the influence of RLS, HLS, UHH, and UHH^2 on poverty in districts and cities in Central Sulawesi during 2013-2020 with a confidence level of 95 percent (α =5 percent) and a degree of freedom denominator of 100, (n-k) = (104–4=100) and the degree of freedom nominator is 3 (k – 1 = 3), the F-table obtained is 2.70. The results of calculating the effect of RLS, HLS, UHH, and UHH^2 on poverty in districts and cities in Central Sulawesi, obtained $F_{statistics}$ of 8.007 and probability value of F-statistics 0.000012 ($F_{count}>F_{table}$). It can be concluded that the variables RLS, HLS, UHH, and UHH^2 together have an effect on poverty.

Individual Parameter Significance Test

How much influence each independent variable has in explaining the variation of the dependent variable is detected by using the t statistic test at (α=5 percent) and degree of freedom (df) = 40 (n-k = 44-4). The t table value is 1.6602.

From Table 4, it can be concluded that RLS and HLS significantly affect poverty, while UHH and UHH^2 have an insignificant effect.

Table 4
VALUE OF T-STATISTICS

Variable	Coefficient	t-Statistic	Probabilities	Significance
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: Results of data processing

Model Fit Test

The coefficient of determination (R^2) measures the model's ability to explain variations in the dependent variable. The results of the panel regression of the effect of RLS, HLS, UHH, and UHH^2 on poverty in districts and cities in Central Sulawesi during 2013-2020 obtained an R^2 value of 0.2444. The figure that marks 24.44 percent of the variation in district and city poverty can be explained by variations in RLS, HLS, UHH, and UHH^2 while 75.56 percent is explained by other variables outside the model.

DISCUSSION

Average Length of School (X_1)

Average length of schooling (RLS) has been shown to increase poverty in Central Sulawesi Province. This finding is not in accordance with the hypothesis that RLS has a negative and significant effect on poverty levels. The coefficient of 0.001841 indicates that

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under ceteris paribus conditions, when the RLS increases by 1 percent, 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 income and productivity differences, the higher a person's education has a positive correlation with his lifetime income, which in turn will increase their income, the poverty level will decrease. This finding is confirmed by the latest conditions (in 2020) that the education taken by the population aged 25 years is still relatively low, reaching 8.83 years or equivalent to 3rd grade education in junior high school. Parigi Moutong Regency has the lowest RLS at 7.48 years and Palu City has the highest RLS at 11.61. The RLS is still low, the level of public education is considered to have low quality, which in turn has an impact on low wages and not being able to reach the poverty line, thus encouraging an increase in the number of poor people.

The results of this study are in line with the research of Wulandari et al. (2019) RLS has not been proven to reduce poverty levels in Padang Lawas Regency. However, this finding is not in line with research conducted by Arofah & Rohimah (2019) that RLS is proven to increase real per capita expenditure in East Nusa Tenggara.

Schooling Expectancy (X_2)

The results showed that HLS was negatively correlated and proven to reduce poverty. This finding is in accordance with the hypothesis that HLS has a negative and significant effect on poverty levels.

The coefficient of -2.574571 indicates that in ceteris paribus conditions, if the HLS rate increases by 1 percent, it can reduce poverty by 2.5 percent. This is in line with the theory that has been put forward that higher education is able to provide training to the poor with the skills needed to increase their productivity, and in turn increase income, so that the poverty rate decreases. In the current conditions (in 2020) an average of 7-year-old children who enter formal education 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 HLS at 12.28 years and Palu City had the highest HLS at 16.23 years.

The findings of this study are in line with the results of research by Arofah & Rohimah (2019) which found that HKS was proven to increase real per capita expenditure in East Nusa Tenggara. The longer the long-term expectation of schooling has boosted per capita spending. However, the findings of this research are not in line with the findings of Rory (2019) who identified that HLS has not been proven to reduce poverty in Indonesia.

Life Expectancy (X_3)

The results showed that UHH was negatively correlated and not proven to reduce poverty. So, the results of this study are not in accordance with the hypothesis that UHH has a negative and significant effect on poverty levels.

The coefficient of -1.371013 indicates that in the ceteris paribus condition, if the UHH increases by 1 percent, it will reduce poverty by 1.3 percent. This is in line with the theory that has been put forward 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 productivity to increase income. However, it has not been proven to reduce the poverty rate because UHH does not guarantee that a person can work well and earn a higher income. When someone is of working age, but has poor health and is unable to work, it will be a limiting factor in getting adequate income. In addition, health and education are investments made by the same individual, even though the UHH is long but has a low RLS, it is difficult to get adequate income to meet the needs of life. People with higher education have a better chance of getting a job with a higher wage rate than those with less education,

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as evidenced by the low RLS taken by the population aged 25 years and over. The findings of this research are in line with the findings of Suryati & Syukri (2019) who identified that UHH has not been proven to reduce poverty in districts and cities in South Sulawesi. However, this is not in line with the research results of Fikri & Suparyati (2017) which identified UHH as proven to reduce poverty in East Nusa Tenggara.

Life Expectancy (X_3) ^{2}

The results show that the second power life expectancy variable which reflects the long-term life expectancy is positively correlated and is not proven to increase poverty. This finding is not in accordance with the hypothesis that UHH^2 has a positive and significant effect on poverty levels.

The coefficient of 0.876252 indicates that in the ceteris paribus condition, if UHH^2 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 a 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. Reflecting, a person will be in poverty decreases and then increases with age in his own life cycle. But it has not been shown to increase poverty.

This result is in line with the research by Marchand & Smeeding (2016) on the relationship between poverty and aging based on a U-shaped age distribution. The age distribution can be simplified into three distinct segments: youth raised from birth to age 17 by working-age parents, share of population the working-age population of the population aged 18 to 64 who may care for dependents old or young, and the elderly of the ordinary retirement age of 65 and over, whose care and retirement may depend on contributions from the working age group, use these three age groups to bring awareness to the situation of poverty children and parents are interrelated, because based on research results over a period of almost 50 years, this U shape widens and slowly rotates clockwise, mainly due to the gradual increase in child and working age poverty and the drastic decrease in elderly poverty.

CONCLUSION

The right model to reflect the condition of poverty is the Random Effect Model. The RLS identified as increasing poverty becomes a stumbling block for policies to increase the population's access to education. HRL can be expected to assist education accessibility policies as an effort to reduce poverty. So that indicators of adequate education used to reduce poverty are opportunities that are expanded to all children to receive education for their opportunities to fill relevant jobs for adequate income. UHH has not been able to identify patterns of poverty according to the life cycle, so there is not enough evidence to make indicators to reduce poverty.

As recommendation, further research is needed with a longer observation time to be able to reach changes in poverty levels and changes in education and health indicators. The estimation model is improved using logistic or Probit Models to capture the probability of changes in poverty levels according to regional characteristics.

There are some limitations in this study. Based on the research results that RLS, UHH, UHH^2 are not in accordance with the hypothesis in this study. RLS which is proven to increase poverty is due to the relatively low achievement of RLS. UHH which is not proven to reduce poverty because a long UHH does not guarantee a person can work well and generate relatively high income, so it is not enough to overcome the problem of poverty. And long-term UHH which is not proven to increase poverty with the assumption that child and parent poverty are interrelated. It is recommended in further research, the use of a longer observation period and use of logistical models to measure the probability of the poverty rate.

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Citation Information: Ichwan, M., Aziza, F., Yunus, S., & Nasruddin, M.A. (2021). Poverty and human development: an inter-regional study. *Academy of Entrepreneurship Journal, 27*(6), 1-8.