



Analysis of Factors Affecting the Human Development Index in West Sumatera

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Abstract. The Human Development Index (HDI) is one of the tools used to measure the achievement of human development in a country based on the basic components of indicators of life expectancy, average years of schooling, and living standards. This study aims to determine the effect of the number of public health center, poverty level, GDP per capita, GRDP, and population on the human development index in West Sumatra Province in 2016–2021. The type of data used in this study is secondary data with panel data analysis techniques. The results of this study indicate that the number of public health center, poverty levels, and GRDP are significant to the human development index while GDP per capita has not much impact on the human development index in West Sumatra in 2016–2021.

Keywords: Human Development Index · GDP per capita · GRDP · Population · Public Health Center · Poverty

1 Introduction

Development is a human effort to change a quality from a quality level that is considered less good to a new quality with a level that they consider better than the previous level [1]. In Indonesia, the meaning of development has undergone many changes, starting from the development of classical theory to development to meet basic human needs. The development has the ultimate goal of improving real and sustainable human well-being, which is achieved through the development of quality human resources [2].

The most crucial type of capital for the government to carry out economic is human capital. The government's role is very important in improving human resource development and increasing human productivity. To achieve this success, efforts are needed to improve education, knowledge and skills. Greater level of quality of one's education and skills, the higher the quality of Human Resources (HR)(Shera, 2017). The strategy for raising the standard of human resources (HR) in the education sector is to organize school according to students grade levels [4].

Human resources (HR) is a technique to asses a region's development success. The improving economy of a region or country can be used to measure the quantity of quality human resources. One of the indicators used to assess the quality of human resources in both developed and developing countries is the Human Development Index (HDI) [5].

The Human Development Index (HDI) is one of the tools in support measure the achievement of human development based on the basic components of indicators of expected years of life, average length of schooling, and standard of living. The HDI calculation is carried out every year, it aims to achieve calculate the General Allocation Fund, it aims to discharge the requirements of the Ministry of Finance. (DAU) and to find out changes in development periodically in each region (BPS, Human Development Index 2014, 2014).

Based on graph 1 it can be seen that the province of West Sumatera has the highest HDI ranking number 3 on the Sumatera Island. The development of the Human Development Index in West Sumatra Province in 2020 decreased by 0.1% it because of the effect of COVID-19 pandemic and almost all districts/cities in West Sumatra experienced a decline due to the pandemic. In 2021 province of West Sumatra has increased again, which was initially the HDI in 2020 of 72.38 to 72.65 or an increase of 0.27 points compared to the achievement of the previous year.

The Human Development Index (HDI) has three indicators in its measurement, namely a good economy, achieved education, and health. Health is the most important of the three indicators and is often overlooked, access to health care is critical to economic growth. The government needs to provide more health insurance to its people by providing health insurance and health facilities, health centers are one of the health facilities that are easily accessible to all people, the need for the number of health centers in each region to support the health quality of a community [6].

The level of poverty is one of the problems that almost occurs in every region and is a serious problem. The majority of the poor use most of their wages cannot satisfy their dietary demands and are unable to take care of their fundamental requirements like healthy and educated. Their inability to carry out other conceptual needs is a problem that needs to be considered by the government because it can affect the achievement of the Human Development Index [7].

The next factor is GDP per capita. GDP per capita is one of the things that can affect the human development index because the average income obtained by the community can show the community's ability to meet their daily needs (Cari and Greece, 2020).

In addition to these three factors, there are other influencing variable for the HDI, namely the Growth Regional Domestic Product (GRDP) and population. GRDP can affect because it looks significant with the community's ability to meet their needs (Hasan, 2016) The population is able to influence because of the rapid population growth, but the low income of a community will have a bad impact on the economy and the lack of achieving the general aspects needed makes the value of the human development index low [9].

Kiha, Sirilius & Gaudensi (2021) conducted a study on the backlash of inflation, Gross Regional Domestic Product, also regional minimum wages on the human development index in the province of East Nusa Tenggara in 2000–2019 using time series regression, finding that inflation, Regional Domestic Product Gross, and minimum profit not affect to HDI.

Nugraha (2017) in Central Java in the 2011–2015 period using multivariate analysis with the selected Fixed Effect Model (FEM) model, found that in Central Java. Economic Growth, Regional Expenditures have a positive accomplish on the Human Development

Index. Meanwhile, the Human Development Index is negatively impacted by the poverty factor.

Ramadani & Muzdalifah (2021) analyzed the effect of Per capita Income, Health Sector Regional Expenditure, and Education Sector Regional Expenditure on the HDI in South Kalimantan period 2010–2018 by panel data analysis tools. The estimation ensues demonstrate that per capita income, health sector spending, education sector spending has a significant accomplish on the human development index in South Kalimantan in the 2010–2018 period with an empirical significance value of 0.000 (< 0.01); 0.000 (< 0.01); and 0.0876 (< 0.10).

Amrizal (2022) using the panel data analysis method found that during the period 2014–2018 the Human Development Index in Jambi Province was influenced by the variables Quantity of Elementary Schools, Quantity of Junior High Schools, Quantity of Junior High School Teachers, Quantity of Health Centers, Quantity of Health Center Doctors, and GDP per capita with a value of empirical significance of 0.0123 (< 0.05); 0.0367 (< 0.05); 0.0348 (< 0.05); 0.0248 (< 0.05); 0.7999 (< 0.10); and 0.000 (< 0.01). While the variables of the number of elementary school teachers and population density have no related effect on HDI with an empirical significance value of 0.8711 (> 0.10); and 0.8722 (> 0.10).

Sapaat, Lopian & Tumangkeng (2020) in the province of North Sulawesi in the period 2005–2019 using the Ordinary Least Square (OLS) method found that Gross Regional Domestic Product (GRDP) and Population had an important result on the Human Development Index with a regression coefficient value - 2.185 and 2.200 with empirical significance (ρ) 0.048 (< 0.05) and 0.047 (< 0.05) while the economic upsurge variable has unaffected on the human development index with an empirical significance value of 0.551 (> 0.10).

Considering the previous context, the author is obsessed in carrying out research on how the repercussion of the number of public health center, poverty rate, GDP per capita, GRDP, and population on the human development index in West Sumatra in 2016–2021.

2 Theoretical Basis

2.1 Human Development Index

The Human Development Index as a benchmark is worn to resolve the quality of human development in an area. The United Nations Development Program (UNDP) initially created the Human Development Index in 1990. The Human Development Index does not only use economic growth as an indicator in measuring HDI, but indicators of the quality of a human being are more emphasized in HDI measurements such as indicators of years of schooling and life expectancy [10]. In addition to indicators of life expectancy (UHH), the average length of schooling (RLS), and economic growth, other important factors can influence the HDI, such as the availability of jobs, government policies, and infrastructure. The more considerable of the HDI value, the wellbeing of the community [11].

2.2 Number of Public Health Center on Human Development Index

The government as an actor in policy making must be able to allocate its funds as well as possible in order to have a positive impact on development. In this case the allocation of government funds in the health sector due to high health in the community will produce a healthy workforce which has an impact on better wage income.[12]. The government's budget allocation in the health sector can be in the form of developing health infrastructure such as puskesmas, puskesmas itself is one of the health infrastructures that is easily accessible by all people because of the low costs incurred, in addition to the increasing number of puskesmas and other health facilities, it will improve the quality of life. Community and increase community productivity. When the quality of life of a community increases, one of the three indicators in the HDI assessment can be fulfilled, then the achievement of the HDI value in an area will also increase [13].

2.3 Poverty on Human Development Index

Poverty can occur as a result of the community's inability to meet their primary needs[14]. High poverty is a problem that is always faced by the government, high poverty rates will cause new problems such as increased crime rates, unemployment which will ultimately hamper economic growth in a region. With the problem that lies behind poverty, namely the inability to meet their primary needs, other needs in the field of education and health will not be met which ultimately has an impact on the low HDI value of a region [15].

2.4 GDP Per Capita on Human Development Index

Gross Domestic Product per capita or Income per capita can be defined as the average income earned by all residents in an area. Per capita income can be used to show the level of community welfare in an area [16] When per capita income increases, it can be interpreted that the purchasing power of the people for their primary needs has also been fulfilled, in other words, the welfare of the people go up. The optimization consuming spending power and the welfare of the people, the HDI in an area will also get better because the welfare of the community is one of the important indicators in the HDI.

2.5 Gross Regional Domestic Product on Human Development Index

Gross Regional Domestic Product is the final value produced for goods and services in an area during a specific timeframe. GRDP can be used to see the welfare of the community in an area besides that GRDP also affects the community ability to buy. There greater rise in money gained if the GRDP in a region rises, the increase in income earned will affect the increase in consumption, which in turn will have a bearing on increasing people's peace [17].

2.6 Population on Human Development Index

The total population can be defined as the total population in an area at a certain time. Currently population growth in Indonesia is moving very fast, with increasing population

growth without being followed by an advancement in quality human resources, there may be repercussions on new problems that must be faced by the government such as inhibiting the rate of economic growth, increasing the number of unemployed, increasing poverty rates. The government needs to make policies to slow down the rate of population growth and find solutions so that population growth can be used as capital to increase economic growth [18].

3 Research Methods

This investigation will observe the perform of the Number of Public Health Centers, Poverty Levels, GDP Per capita, GRDP, and Total Population on the Human Development Index by Regency/City in West Sumatra in 2016–2021 by using panel data analysis tools. The dependent variable in this investigation is the human development index with units of percent. The independent variables in this study are the number of puskesmas, poverty level, GDP per capita, GRDP, and total population. Kind of data utilized in this investigation is secondary information acquired through official reports from the Central Statistics Agency.

The econometric model utilized in this investigation is the outcome of a modification by Nuriyah et al. (2017) and Kiha et al. (2021). This research focuses on the role of the government in contributing to the improvement of the human development index in West Sumatra. The regression equation used in this research is.

$$IPM_{it} = \beta_0 + \beta_1 FKES_{it} + \beta_2 KMS_{it} + \beta_3 GDP_{it} + \beta_4 PDRB_{it} + \beta_5 POP_{it} \varepsilon_{it}$$

where:

- HDI : Human Development Index (percent)
- FKES : Number of Health Centers (units)
- KMS : Poverty Rate (percent)
- GDP : Per capita income (thousand rupiah)
- GDP : Gross Regional Domestic Product (million rupiah)
- POP : Number of Population (people)
- β_0 : Constant.
- β_1 and β_5 : Independent variable regression coefficient.
- ε : *Error term* (Error Factor).
- i : District/City cross section data in West Sumatra.
- t : time series data for 2016–2021.

4 Results and Discussion

4.1 Panel Data Regression Estimation Results

The estimation results of panel data regression using the Common Effect Model (CEM), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches can be show in Table 1.

Table 1. Panel Data Regression Result

Variable	Regression Coefficient		
	CEM	FEM	BRAKE
C	-55.95156	-69.73836	-2.639405
FKES	-9.544151	3.467023	0.866922
KMS	-0.573592	-0.382346	-0.717276
GDP	3.368388	-2.618910	-0.571569
GDP	7.918180	10.64235	9.546688
POP	-0.278331	-0.371828	-5.448587
R^2	0.847355	0.998051	0.758872
Adjusted R^2	0.840288	0.997553	0.747708
F stats	119.9043	2003540	67.97892
Prob. F stats	0.000000	0.000000	0.000000

Source: Panel data processing using E-views 10.

The Chow test is used to choose the greatest estimated model among the Common Effect Model (CEM) or the Fixed Effect Model (FEM). Chow test results can be seen from Table 2.

Using the chow test, it was come across that the p-value or probability of the F test was 0.0000 and the Chi Square cross-section probability value was 0.0000, both of which were significant to the alpha of 0.01, which means H_0 rejected, it can be concluded that the selected model is the Fixed Effect Model (FEM).

Hausman test is used to determine the best estimated model between Fixed Effect Model (FEM) and Random Effect Model (REM). Hausman test results can be seen from Table 3. Reached from Hausman Test, it was found that the random cross section probability value was $0.000 < (0.01)$ which means H_0 rejected. Thus, it can be terminating that the Fixed Effect Model (FEM) is the best model that can be used in this study.

Table 2. Chow Test Result

Redundant Fixed Effects Tests			
Equation: Untitled			
Test cross-section fixed effects			
Effects Test	Statistic	d.f.	Prob.
Cross-section F	386.547634	(18,90)	0.0000
Cross-section Chi-square	497.116296	18	0.0000

The coefficient of affect that how large influence all independent variables have on the dependent variable. The value of 0.998051 meaning that 99.81% of the variation in the human development index can be influenced by the variables of the number of puskesmas, poverty level, income per capita, GRDP, and population. While 0.19% is affected by element not included in the model.

Variable Number of Health Centers own a favorable influence with a regression coefficient of 3.467023. The number of puskesmas and the human development index have a linear-logarithmic relationship, meaning that if the ratio of the number of public health go up by 1%, the human development index will increase by 0.0346%. And vice versa, if the number of puskesmas decreases by 1%, the human development index will also cut by 0.0346%.

The Poverty Rate Variable own an influence negative with a regression coefficient of -0.382346. The poverty rate and the human development index have a linear-linear relationship, meaning that if the poverty rate go up by 1%, the human development index will decrease by 0.38%. Vice versa, if the poverty rate decreases by 1%, the human development index will increase by 0.38%.

The GRDP variable has a positive effect with a regression coefficient of 10,64235. The pattern of the relationship between these two variables is linear-logarithmic, meaning that if GRDP increases by 1%, the human development index will increase by 0.10642%. Vice versa, if GRDP falls by 1%, the human development index will decrease by 0.10642%.

5 Discussion

The results of the analysis in this research indicate that the amount of public health influences the HDI favorably. The number of public health center and the human development index contribute to each other, if the number of public healthy increases it will improve the quality of public health because it is one of the health infrastructures that is easily accessible to all people in terms of cost and access to travel. So, the number of health centers is very effective to improve human development. This is supported by research by Amrizal (2022) which states that the number of public health has a positive influence on the human development index in Jambi.

Considering the outcomes of the regression analysis in this research, it shows that the poverty level has an impact unfordable on the human development index. The poverty rate has a negative influence on the human development index because poverty begins with the inability of the community to fulfill their purchasing power for basic needs and has limitations in meeting other needs such as education and health. So that the high level of poverty in an area will hamper the rate of economic growth and cause a decrease in the human development index. This is supported by research by Nugraha (2017) it claims that the Central Java's human development index is unfordable impacted by poverty.

Based on the analytical results of investigation, GRDP was found to has a positive impact on the HDI. GRDP and the human development index contribute to each other, this is because an increase in GRDP indicates that economic growth in an area is increasing, the increased economic growth can indicate that employment in a region is improving and has an impact on decreasing the number of unemployed, in addition to decreasing

unemployment will have an impact on decreasing poverty levels in a region. This is supported by the research of Muliza, Zulham, & Sefarita (2017) which states in their research that GRDP has a positive influence on HDI in the District/City of Aceh Province.

6 Conclusion

The following conclusions may be taken from the examination of the components that Regency/City in West Sumatra conducted about is research of the Human Development Index (HDI):

1. The FEM model was declared to be more suitable for usage than the CEM model after the model underwent the Chow test. The Hausman test, however demonstrates that the FEM model should be employed rather of the REM test. In light of the finding of the two tests, the conclusion was that the FEM (Fixed Effect Model) was the most appropriate to apply.
2. The results of the model existence test (F test) together with the variables of the number of puskesmas, poverty level, and GRDP have an effect on the human development index in districts/cities in West Sumatra in 2016–2021.
3. Based on the results of the determinant coefficient test using the selected FEM model, the coefficient of determination value is 0.998051 or 99.81% of the variation in the human development index influenced by the variables of the number of puskesmas, poverty levels, and GRDP. While 0.19 is influenced by variables outside the model R^2R^2 .
4. The number of public health variable had a positive and significant influence on alpha 0.01, and the GRDP variable had a positive and significant effect on alpha 0.10, according to the findings of the effect validity test (t test). While the poverty level had a negative affect and significant on alpha 0.01.

With the results of this analysis, the government as the holder of policy and power in Indonesia is anticipated to look over and more focus into things that can hinder the human development index (HDI). In addition, the government must also consider the management of funds so that the funds provided are right on target, especially the need for equitable infrastructure development in all regions in order to create community welfare.

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