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Analysis of Determinants Affecting the Human Development Index in the Subosukawonosraten Area, 2016-2020

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ABSTRACT

This study aims to analyze the factors that influence the Human Development Index in the Subosukawonosraten Region in 2016-2020. This research is a quantitative study using secondary panel data consisting of time series and cross section data. The analytical method used the Fixed Effect Model (FEM), to determine the effect of per capita GRDP Variables, Government spending on health, Government spending on education, Number of health facilities on the Variable Human Development Index during the period 2016 to 2020 in the Subosukawonosraten Region. Results of the regression analysis, it is known that the GRDP per capita variable has a positive and significant influence, then the variable government spending on health has a positive and significant influence, the variable government spending on education has a negative and significant effect, the variable the number of health facilities has a positive and significant effect on the Human Development Index in the Subosukawonosraten Region.

Keywords : Human Development Index, GRDP per capita, Health, Education, Fixed effect model, Subosukawonosraten.

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INTRODUCTION

Human capital is an important factor in the process of economic development in a region. With quality human capital, economic development, as measured by increased output or economic growth, is believed to be much better. Vice versa, economic development can also improve the quality of human resources. With economic growth, it will ensure the availability of sufficient funds to improve the quality of human resources. Thus, there is a two-way relationship or mutual influence between economic growth and human development. The success of the development of a region can be measured by several parameters, and the most popular at the moment is the Human Development Index (HDI)(Ishak, 2014)..

Sasana, (2021) argues, that the human development index plays an important role in the development of a modern economy, because good human development will maximize the factors of production. A good quality population will be able to innovate to develop all existing factors of production. In addition, high human development also results in an increase in population, which will increase consumption levels. The fact that happened in the Subosukawonosraten area, even though the development indeks Human population has increased every year, but economic growth, poverty, and fluctuating regional education tend to decrease(Arifin, 2015).

Creating quality human resources requires various facilities and infrastructure. Investment is needed to be able to create the formation of quality human resources, such as investment in the education and health sectors(Mongan, 2019). The aspects of education and health are fundamental development goals in an area. To support this aspect, a budget is needed to implement education and health aspects through government spending. Government spending can be used as a reflection of the policies taken by the government in a region to finance important public sectors including the education sector and the health sector(Hafiz et al., 2021).

Subosukawonosraten is an abbreviation of the regional name which consists of 7 regencies/cities located in Central Java Province, namely Surakarta City, Boyolali Regency, Sukoharjo Regency, Karanganyar Regency, Wonogiri Regency, Sragen Regency and Klaten Regency. The population in the Subosukawonosraten area is around 6 million people, with an area of around 5,719 km2. The Subosukawonosraten area was formed as a regional development area that can work together to improve the quality of human resources. Rasyida and Muta'ali (2019) in their research, stated that the Subosukawonosraten area has a very strategic location because it is close to centers of trading activities in Central and East Java and has various resources in each region.

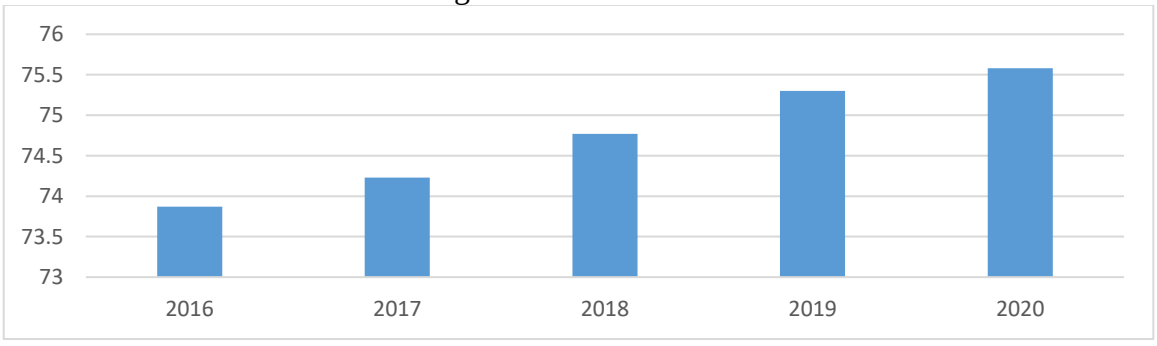


Figure 1. HDI in Subosukawonosraten Region, 2016-2020 (Percent)

The development of human development in the Subosukawonosraten area continues to improve. This can be seen from the consistent increase in HDI figures from 2016-2020. The achievement of the HDI score which continues to increase from year to year is a sign that the quality of human development in the Subosukawonosraten Region from the economic, health and educational aspects is also getting better. The HDI figure for the Subosukawonosraten Region in 2016 was 73.87 percent. This means that the level of achievement of human development in the Subosukawonosraten area can be said to be still around 73.87 percent of the ideal human development condition (ideal HDI = 100).

UNDP measures well-being by compiling a composite index based on four indicators, namely life expectancy at birth, adult literacy rate, mean years of schooling, and purchasing power (purchasing power parity). The life expectancy indicator measures health, the adult literacy rate indicator and the average length of schooling measure education and the purchasing power indicator measures living standards(Bandiyono, 2018). The component of a decent standard of living is measured by an adjusted average real consumption indicator. UNDP uses the adjusted real GDP per capita indicator as a measure of this component because there is no other better indicator available for comparison purposes between countries. Government expenditure (government expenditure) is part of fiscal policy, which is a government action to regulate the course of the economy by determining the amount of government revenue and expenditure each year which is reflected in the APBN document for the national and regional/regional APBD (Mirza, 2012).

The rapid development of science and technology has led to an acceleration of the development process, a shift in work patterns that originally used human hands to be replaced by sophisticated machines that have an impact on aspects of efficiency, quality and quantity of a series of economic development activities carried out and will ultimately result in an acceleration economic growth rate(Maulana, 2012). Economic growth is an indicator to see economic performance, both at the national and regional (regional) levels. Economic growth is an increase in aggregate output that is closely related to an increase in goods and services or Gross Regional Domestic Product (GRDP) produced in society, so that more goods and services are produced, the welfare of society will increase(Harjunadhi & Rahmawati, 2020).

The rapid development of science and technology has led to an acceleration of the development process, a shift in work patterns that originally used human hands to be replaced by sophisticated machines that have an impact on aspects of efficiency, quality and quantity of a series of economic development activities carried out and will ultimately result in acceleration economic growth rate(Awruni Dwi A & Kartika N, 2019). Economic growth is an indicator to see economic performance, both at the national and regional (regional) levels. Economic growth is an increase in aggregate output that is closely related to an increase in goods and services or Gross Regional Domestic Product (GRDP) produced in society, so that more goods and services are produced, the welfare of society will increase(Sanggelorang et al., 2015b). Gross Regional Domestic Product (GRDP) is the total value of all final output produced by a regional economy, both for local residents and foreigners living in the country concerned. Thus, the general measure that is often used to see the rate of economic growth is the percentage change in GDP for a national scale or the percentage change in GRDP for a province or district/city scale(Palaneven, 2018).

Education plays an important role in measuring the human development index. The education in question is formal education with learning levels at the elementary level, junior high school level, senior level education which is under the supervision of the Ministry of National Education (Kemendiknas), Ministry of Religion (Kemenag) and other agencies, both public and private. In education there are two important elements, namely teachers (teachers) and students (students). The large number of teachers and students greatly influences the quality of education, and can increase the value of the human development index.

This research is an extension of Melliana and Zain (2013) influenced HDI in East Java in 2004 - 2011. The results of the study indicated that there were seven variables that had a positive and significant effect on HDI, namely the teacher-student ratio variable. , School Enrollment Rate , Number of Health Facilities, Households with access to clean water, population density, Labor force participation rate, and GRDP per capita. The difference in research lies in the variable area. This study adds 2 variables, government spending in the health sector and government education sector. The research period was carried out within a period of 5 years, namely 2016 to 2020. The addition of the variable government expenditure in the health sector and government expenditure in the education sector in this study aims to find out how the effect of government spending on health and education has on improving the quality of human resources in the Subosukawonosraten Region. This research is motivated by several reasons, namely, first, there is inequality in development in the Subosukawonosraten area which can be seen from the differences in the value of aspects of economic growth, health and education.

The study of the human development index (HDI) is very important to do, because HDI is a measuring tool that is able to describe the level of welfare in the development process of a region(Laisina et al., 2015). The Subosukawonosraten area is a strategic area in Central Java Province which has the highest human development index score in 2016-2020. However, in reality regional development in regencies/cities in the Subosukawonosraten Region is still focused on regional infrastructure development. In addition, the value of the human development index in 7 districts/cities in the Subosukawonosraten Region has not been evenly distributed, which has had an impact on reducing the level of distribution of people's welfare in the region (Rasyida and Muta'ali, 2019). Based on this background, it is deemed necessary to conduct research with the title "**Analysis of Factors Influencing the Human Development Index in the Subosukawonosraten Region in 2016-2020**".

METHOD

Quantitative descriptive analysis is a technique used in this research, an analytical research technique which uses data in numerical form and statistical translation, in this observation the material used is in the form of secondary data provided by intermediaries or indirectly. Data sourced from the Bali Central Statistics Agency (BPS) and the Indonesian Central Bureau of Statistics. The data analysis technique used in this research is in the form of panel data and processed through the Fixed Effects Model (FEM) approach using the Eviews 10 application. Panel data is included from two data sets, namely time series and cross-section, or in another sense, panel data. is data indicating that there are almost the same cross-sectional percents (for example a business survey or a household survey). The form of

the equation of this research model is as follows. Example of writing a formula :

1. Value Added (VA)

$$HDIit = \beta_0 + \beta_1 LogGRDP_{it} + \beta_2 LogHS_{it} + \beta_3 LogES + \beta_3 LogMF + e_{it} \quad \ldots\ldots (1)$$

HDI=Human Development Indeks; β_1, β_2, β_3, β_4=Slope; GRDP=Gross Regional Domestic Product; HS=Health Spending; ES=Education Spending ;HF=Medical Facility ;i= RegencyCity in the Subosukawanosraten ;t=year ;e=nuisance variable.

Data Collection Techniques And Sources

The data sourced from the Central Statistics Agency of Subosukawonosraten and the Indonesian Central Statistics Agency in 2016-2020. In this study, Human Development Indeks was a dependent variable, while GRDP, Health Spending, Education Spending and Medical Facility were independent variables. Analysis method using panel data regression and processed with Eviews 10 software. Data panel is a combination of time series and cross-section data. Cross-section data is intended to see the differences between districts/cities, while the time series data is to explain changes in the 4-year time span, namely 2016-2020.

Estimation Of Model Parameters

Common Effect Model (CEM) is the most natural approach with panel data models because it only percentes 2 data, namely time series and cross data. This technique can be said to not take into account several dimensions, therefore it can be assumed that the data used are the same in the exact same period. This technique can use the ordinary least squares (OLS) approach or the least squares technique to estimate panel data patterns (Mir, 2014). The fixed effect model (FEM) shows that the difference between percents can be detected by the difference between their constant values. This FEM technique uses dummy variables to allow changes in time series intercepts and cross series due to eliminated changes. The last is to use the Random effect Model, estimating panel data whose residual variables are thought to have relationships between time and between subjects.

RESULT AND DISCUSSION

The results of the estimated regression of panel data on econometric models with the Pooled Least Squares (PLS), Fixed Effect Model (FEM), and Random Effect Model (REM) approaches are shown in Table 1:

Table 1. Panel Data Regression Results

Variable	Regression Coefficient		
	PLS	**FEM**	**REM**
C	22.74356	51.45417	22.74356
Log(PDRB)	10.18667	8.322307	10.18667
Log(PK)	-0.003419	0.012418	-0.003419
Log(PP)	-0.285604	-0.327728	-0.285604
Log(SK)	0.127702	0.211436	0.127702
R2	0.919594	0.986965	0.811124
Adjusted R2	0.902364	0.979855	0.793417

F-Stat	53.37226	138.8139	45.80785
Model Selection Test			
(1)Chow Cross-section F(6,22)= 18,951037;Prob.F(6,22)=0,0000			
(2)Hausman Cross-section random χ2 (6)= 113,706220;Prob.F χ2=0,0000			

Source: *Data is processed, Eviews10*

Estimated Model Selection Test

The Chow test and Hausman test are used to select the best estimated model between CEM, FEM, and REM. If in the Chow Test the selected model is FEM and in the Hausman Test the selected model is also FEM then the best estimated model is FEM.

Chow Test

The Chow test is used to determine the estimated model between CEM (PLS) or FEM. the Chow Test states that the estimated model is a Common Effect Model (CEMH_0), and in the Chow Test states that the estimated model is a Fixed Effect Model (FEM) provided that if the probability value of Prob F > 0.05 then it is not rejected with the conclusion of the selected model Common Effect Model (CEM) while if the probability value of Prob.F < 0.05 then it is rejected with the conclusion of the selected modelH_A FixedH_0 Effect Model (FEM H_0).

Based on Table 1 it can be seen that the results of the Chow Test Analysis of the effect of GRDP, Health Expenditures, Education Expenditure and Health Facilities on HDI in the Subosukawonosraten area in 2016-2020 show the prob.F value of the model is 0.0000 <0.05, so H0 is rejected thus it can be it can be concluded that the selected model is the Fixed Effect Model (FEM).

Hausman Test

The Hausman test is used to determine the estimated model between FEM or REM. in the Hausman Test stated that the estimated model is a Fixed Effect Model (H_0FEM), and in the Hausman Test stated that the estimated model is a Random Effect Model of the estimated model provided that if the probability value of Prob Chi-Sq > 0.05 then it is not rejected with the conclusion of the selected model Rundom H_AEffect ModelH_0 (REM), while if the probability value of Prob Chi-Sq < 0.05 then it is rejected with the conclusion of the selected model H_0 Fixed Effect Model (FEM)

Based on Table 2, it can be seen that the results of the Hausman Test Analysis of the influence of GRDP, Health Expenditures, Education Expenditures and Health Facilities on HDI in the Subosukawonosraten area in 2016-2020 show that the Chi-Sq Prob value is (0.0000) < α (0.05), then H_0 is rejected. So the best model to use is the Fixed Effect Model (FEM).

Selected Models

Table 2. Fixed Effect Model (FEM) Estimation Result

HDIit = 5,145417 + 8,322307 Log(GRDP)$_{it}$ + 0,012418 Log(HS)$_{it}$ - 0,327728 Log(ES) $_{it}$ + 0,211436 Log(HF) $_{it}$
(0,0004)* (0,0422) (0,0486)** (0,0382)***
R2 = 0,571340; DW = 2,085694; F-statistic=729,7745; Prob. F = 0,000000

Description: * Significant to α = 0,01; ** Significant to α = 0,05; *** Significant to α = 0,10; Numbers in brackets are statistical probability values t.

PARTIAL SIGNIFICANCE TEST (t-TEST)

The t test was conducted to find out whether each independent variable has a significant effect on the dependent variable by assuming other variables are constant. For the first econometric model H0 partial significance test in this study is β1,2,3,4=0, or , Log(GRDP), Log(HS), Log(ES), Log(HF) has no effect on HDI. Meanwhile, H_A stated that β1,2,3,4>0, or Log(GRDP), Log(HS), Log(ES), Log(HF) had an effect on HDI. H0 is not rejected if the t-statistical probability > α and H0 is rejected if the t-statistical probability ≤ α. The results of the partial significance test for the econometric model are in Table 3.

Table 3. Partial Significance Test Results (t test)

Variable	Probability t-statistics	Criterion	Conclusion
Log(GRDP)	0.0001	≤ 0.05	Significant at α = 0.05
Log(HS)	0.0004	≤ 0.05	Significant at α = 0.05
Log(ES)	0.0422	≤ 0.05	Significant at α = 0.05
Log(HF)	0.0486	≤ 0.05	Significant at α = 0.05

Based on Table 4.5., it is seen that probability t-statistics for log(GRDP) 0.000 1 (≤ 0.0 5), Log(HS) 0.0 004 (≤ 0.05), Log(ES) 0.0422 (≤ 0.05) , Log(HF) 0.0486 (≤ 0.05) so that it is rejected or Log(GRDP), Log(HS), Log(ES) (H_0), Log(HF) affects the HDI. Thus, Log(GRDP), Log(HS), Log(ES), Log(HF) affect the HDI.

Simultaneous Significance Test

A simultaneous significance test (Test F) is performed to determine the significance of the influence of all independent variables on the dependent variables silmultan or together. H_0 test F is or independent variables together have no real effect on the dependent variables, while $\beta_1 = \beta_2 = \beta_3 = \beta_4 = 0$. H_A declare or independent variables together have a noticeable effect on the dependent variables. is not rejected if the probability of F-statistic is > α and rejected when the probability of F-statistic is ≤ α.$\beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq 0$

Based on Table 3., it can be seen that the F-statistical probability value of 0.0000 (< 0.05) means rejected, so it can be concluded that together Log(GRDP), Log(HS), Log(ES), Log(HF) affect the HDI.

DISCUSSION

Interpretation of the Coefficient of Determination

The coefficient of determination (R^2) indicates the predictive or goodness of the estimated model. In the first econometric model it can be seen in Table 4.4. it can be seen that from the estimated model, namely R^2*the* F *andom Effect Model* (FEM) is worth 0.9195. That is, 91.95 percent of the variation in changes in the Human Development Index (HDI) in the Subosukawonosraten Area in 201 6-2020 is explained by the variation of the variables Log(GRDP), Log(HS), Log(ES), Log(MF). The remaining 8.19 percent is explained by variations in other variables that are not included in the model.

Interpretation of the Influence of Independent Variables

Based on the results of partial significance tests on econometric models that can be seen in Table 4.5., it is proven that Log(GRDP), Log(HS), Log(ES), Log(MF)have proven to have a significant effect on the Human Development Index of the Subosukawonosraten Area in 2016-2020.

Gross Regional Domestic Product (GRDP) has a positive and significant impact of 8.322307 with a pattern of relationship between the Human Development Index (HDI) and Gross Regional Domestic Product (GRDP) linear ogaritma, so that if the Gross Regional Domestic Product (GRDP) increases by 1 percent, the Human Development Index in the Subosukawonosraten Area will decrease by 8.322307 /100 = 0.0832 or 1 percent, likewise, if the Gross Regional Domestic Product (GRDP) decreases by 1 percent, the Human Development Index (HDI) of the Subosukawonosraten Area will increase by 1 percent.

Health Expenditure has a positive and significant effect of 0.012418 with a pattern of relationship between the Human Development Index (HDI) and Health Expenditure linear- logarithm, so that if Health Expenditure increases by 1 percent then the Human Development Index will increase by 0.012418 = or 1 percent, as well as if the Wage Rate decrease by 1 percent then the Human Development Index (HDI) of the Subosukawonosraten Area will decrease by 1 percent.

Education Expenditure has a negative coefficient and has a significant effect of -0.327728 with a pattern of relationship between the Human Development Index (HDI) and Education Expenditure linear-logarithm, so that if Education Expenditure increases by 1 percent, then the Human Development Index will decrease by 0.327728 or 1 percent, as well as if Government Expenditure decreases by 1 percent then the Index Human Development (HDI) of Subosukawonosraten Area will increase by 1 percent

Health Facilities (HF) has a positive coefficient and has a significant effect of 0.211436 with a linear-logarithm pattern, so that if Health Facilities (HF) increases by 1 percent, the Human Development Index will increase by 0.211436 or 1 percent, likewise, if Health Facilities (SH) decreases by 1 percent, the Human Development Index (HDI) of the Subosukawonosraten Area will decrease by 1 percent.

Economic Interpretation

Effect of Gross Regional Domestic Product on Human Development Index

The results of the influence validity test (t test) on theometric elon model showed that the Gross Regional Domestic Product was positive and significant to the Human Development Index in the Subosukawonosraten Region 201 6-2020. This is in line with research conducted by Zulham et al., (2017) on the Analysis of the Effect of Education Spending, Health Spending, Poverty Rate and GRDP on HDI in Aceh Province, showing that Gross Regional Domestic has a positive and significant effect on Human Development Index.

Effect of Health Expenditure (PK) on Human Development Index

The results of the influence validity test (t test) on theometric econ model showed that the Effect of Health Expenditure (PK) had a positive and significant effect on the Human Development Index in the Subosukawonosraten Area in 2016-2020. This is in line with research conducted by Sanggelorang et al., (2015) on the effect of government spending in the education and health sectors on the Human Development Index in North Sulawesi,

which shows that the Effect of Health Expenditure (PK) positive and significant effect on Human Development Index in North Sulawesi

Effect of Education Expenditure on Human Development Index

The results of the influence validity test (t test) on theometric econ model show that Education Expenditure has a negative and significant influence on the Human Development Index in the Subosukawonosraten Area 2016-2020. This is in line with research conducted by Palaneven, (2018) on the Effect of Government Expenditure in the Education Sector and Health Sector on HDI and Its Impact on Poverty in North Sulawesi which shows that the variable Government expenditure in the education sector Towards HDI and its impact on poverty in North Sulawesi.

Effect of Health Facilities on Human Development Index

The results of the influence validity test (t test) on theometric elon model show that Health Facilities have a positive and significant influence on the Human Development Index in the Subosukawonosraten Area in 2016-2020. This is in line with research conducted by Latuconsina, (2017) regarding the Analysis of Factors Affecting the Human Development Index of Malang Regency Based on the Regional Approach and Panel Regression which shows that Health Facilities have a positive and significant effect on Human Development Index in Malang.

CONCLUSION

Based on the results of processed data and previous discussions, conclusions and answers can be drawn from the problem formulation that has been prepared based on the following estimates:

1. GRDP variable significantly positively affects the human development index. This means that any increase in GRDP per capita will be followed by an increase in the human development index in the Subosukawonosraten Area.
2. Variable Government spending in the health sector significantly positively affects the human development index. This means that any increase in government spending in the health sector will be followed by an increase in the human development index in the Subosukawonosraten Area.
3. Variable Government spending on education significantly negatively affects the human development index. This means that any increase in government spending in the field of education will be followed by a decrease in the human development index in the Subosukawonosraten Area.
4. Variable The number of health facilities significantly positively affects the human development index. This means that any increase in the number of health facilities will be followed by an increase in the human development index in the Subosukawonosraten Area.

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