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AN ANALYSIS OF THE IMPACT OF FOUR GRDP SECTORS ON THE HUMAN DEVELOPMENT INDEX IN THE DISTRICT OF SOLO REGION

Rifqi Iqbal Alwi*, Siti Aisyah
Economics Department, Faculty of Economics and Business,
Universitas Muhammadiyah Surakarta, Indonesia
E-mail: *alwialwi092@gmail.com

Abstract: *One factor that serves as a barometer for a society's welfare in a place is human development. Human development must focus on the fields of education, agriculture, industry, and trade during this process if it is to achieve its objectives of raising living standards or improving the quality of human life. The Human Progress Index can be used to evaluate the primary indices of human development (IPM). Thus, this study aims to measure and determine the influence of the Gross Regional Domestic Product (GRDP) in the trade sector, the Gross Regional Domestic Product (GRDP) in the industrial sector, and the Gross Regional Domestic Product (GRDP) in the education services sector. and the Gross Regional Domestic Product (GRDP) of the agricultural sector on the Human Development Index (IPM) of the Districs in Solo Region. The method used in this study was panel data regression using secondary data cross section and time series from 7 districs in Solo Region which include Surakarta, Sukoharjo, Wonogiri, Sragen, Karanganyar, Boyolali, and Klaten in the last five years from 2016 to 2020. The variables in this study were the Gross Regional Domestic Product (GRDP) variables in the industrial, education, agricultural, trade and Human Development Index (IPM) sectors obtained from the Central Bureau of Statistics of Solo Region. This study shows that the industrial and education sector variables have a positive effect on the district human development index in Solo Region, while the agricultural and trade sector variables have a negative effect on the district human development index in Solo Region.*

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Keywords: *Gross Regional Domestic Product, Human Development Index, Education, Agriculture, Industry*.

1. Introduction

The quality of the people who live in a country can indicate its progress. A country's prosperity and even progress will be difficult to achieve without high-quality human beings. After economic development, the government's primary focus is on human development. Human development in question, according to Hidayat and Woyanti's research (2021), is utilizing humans to achieve development by increasing the quality of these humans.

Human resources serve as both subjects and objects of development, demonstrating that humans, in addition to serving as development agents, also serve as development goals. Muliza, Zulham, and Seftarita (2017). The Human Development Index (IPM) in developing countries is lower than in developed countries. This is due to the fact that the education and health indexes are still relatively low, resulting in low productivity.

The effectiveness of human development in a place is influenced by a number of

elements. One of them is the impact of the GRDP sector, which includes the trade, industry, agricultural, and education sectors. Rosmia Adjar (2019) claims in her research that the education sector actively contributes to human growth. This is because via education, people acquire the skills necessary to think critically and solve problems. Future human quality will be determined by this process.

Eben Haezer (2021) asserts that the type of human resources required are those that can adapt fast to technological advances and do so with a high degree of integrity. Even though the organization uses cutting-edge technology and equipment, it is useless if it lacks qualified people resources. Rural communities are impacted both directly and indirectly by the agricultural industry, which also significantly contributes to economic growth, one of the elements used to raise HDI (Dewi Retnasari, Erna; Cahyono, 2015).

The good news about commerce and human development is that it raises living standards, which leads to better social services, health care, and educational opportunities. Both direct and indirect income are affected by commerce (Muhammad adnan azzaki 2021). The Human Development Index (IPM), which includes variables such as life expectancy at birth, projected years of schooling, and average years of schooling, can be used to assess the achievement of human development in a given location.

Based on the Central Statistics Agency (BPS), Indonesia's Human Development Index in 2020 was 71.94%, this shows an increase in HDI of 0.03 from the previous year. The increase in Indonesia's HDI was also followed by several provinces, one of which is Central Java Province. Central Java Province consists of 35 Regencies and Cities. In 2020 Surakarta City is one of the cities with "very high" HDI status in Central Java Province, while in the Greater Solo region (Boyolali Regency, Klaten Regency, Sukoharjo Regency, Wonogiri Regency, Karanganyar Regency, Sragen Regency and Surakarta City) only the City Surakarta has a "very high" HDI status, other districts only have a "high" HDI status. The following is data showing the Human Development Index in Regencies/Cities in the Greater Solo region in 2016-2020.

Table 1. 1 Human Development Index by District/City in Solo Raya 2016-2020
(percent unit)

	Human Development Index				
Ex-Surakarta Residency	2016	2017	2018	2019	2020
Central Java Province	69,98	70,52	71,12	71,73	71,87
Boyolali District	72,18	72,64	73,22	73,8	74,25
Klaten District	73,97	74,25	74,79	75,29	75,56
Sukoharjo District	75,06	75,56	76,07	76,84	76,98
Wonogiri District	68,23	68,66	69,37	69,98	70,25
Karanganyar District	74,90	75,22	75,54	75,89	75,86
Sragen District	71,43	72,4	72,96	73,43	73,95
Surakarta City	80,76	80,85	81,46	81,86	82,21
Average	73,79	74,23	74,77	75,30	75,58

From table 1.1 above, it can be seen that every year almost all regencies/cities in Solo Region have a Human Development Index value above Central Java. It is recorded that only Wonogiri Regency has an HDI value below Central Java as well as being the lowest among the Regencies/Cities in the Greater Solo Region, while the City of Surakarata consistently ranks first in terms of HDI scores in the Greater Solo Area. The average HDI value in Solo Region in 2016-

2020 has a positive trend of increasing every year and is always above the HDI value above Central Java.

The existence of an upward trend in the value of the Human Development Index in Solo Region certainly cannot be separated from the influence of various sectors. Various sectors such as the education, industry, trade and agriculture sectors have a big role in influencing the value of the Human Development Index in Solo Region. Therefore, this study aims to find out how each of these sectors influences the Human Development Index in each Regency/City in Solo Region using the Gross Regional Domestic Product (GRDP) benchmark with an approach on the basis of current prices. In the final section, it will be closed with conclusions and some suggestions for government stakeholders in the Regency/City in Solo Region.

2. Literature Review

2.1 Human Development Index

The Human Development Index (HDI) is a comparative measure of literacy rates, life expectancy, education, and living standards. HDI data was obtained from the publication of the Central Bureau of Regency Statistics in Solo Raya for the 2016-2020 period. The data includes life expectancy at birth, expected years of schooling, and average years of schooling, in percent units. Human development is defined as the process of enlarging people's freedoms and opportunities and improving their well-being. Human development is about the real freedom ordinary people have to decide who to be, what to do, and how to live. The human development concept was developed by economist Mahbub ul Haq (2022).

2.2 Gross Regional Domestic Product

Gross Regional Domestic Product (GRDP) is an important indicator to determine the economic conditions in a region in a certain period, both at current prices and at constant prices. GRDP is basically the total added value produced by all business units in a certain area, or the total value of final goods and services produced by all economic units in a certain area. GRDP at current prices illustrates the added value of goods and services calculated using prices in the current year, while GRDP at constant prices shows the added value of these goods and services calculated using prices prevailing in a particular year as the base year. GRDP according to current prices is used to determine the ability of economic resources, shifts, and the economic structure of a region. Meanwhile, GRDP at constant prices is used to determine real economic growth from year to year or economic growth that is not influenced by price factors.

The GRDP studied in this study is GRDP according to business sector, especially the industrial, educational services, trade and agricultural sectors. The data was obtained from BPS for each regency in Solo Region which includes 7 regencies related to GRDP according to business field for the 2016-2020 period in million-rupiah units.

3. Research Method

This is a quantitative study, with data obtained from time series GRDP reports by business sector and the Regency Human Development Index in Solo Region over the last five years, from 2016 to 2020, and secondary data sources.

The analysis used is regression analysis with panel data and the following equations:

$$logIPM_{it} = \beta_0 + \beta_1 logSPRT_{it} + \beta_2 logSPND_{it} + \beta_3 logSIND_{it} + \beta_3 logSPDG_{it} + \mu_{it}$$

Where:

IPM	: Human Development Index (%)
SPRT	: Agricultural Sector Gross Regional Domestic Product (Million Rupiah)
SPND	: Education Sector Gross Regional Domestic Product (Million Rupiah)
SIND	: Industrial Sector Gross Regional Domestic Product (Million Rupiah)
SPDG	: Gross Regional Domestic Product of Trade Sector (Million Rupiah)
β_0	: Constant
$\beta_1\beta_2\beta_3$	: Regression Coefficient
Log	: Logarithmic Operations
μ	: Disruptive Variables
i	: Observation (Country)
t	: The amount of time

The estimation stage of panel data regression analysis will include: parameter estimation of econometric models using the Pooled Least Square (PLS) approach, Fixed Effect Model (FEM), and Random Effect Model (REM); selection of the best estimated model by Chow test and Hausman test, and Lagrange Multiplier test if necessary; model goodness-of-fit test on the selected estimated model; and test the validity of the effect of independent variables on the selected estimated model. The type of data used in this study was panel data, which is a combination of time series data and cross section data.

4. Result and Discussion

The following are the results of statistical analysis for hypothesis testing and discussion of statistical analysis testing.

4.1 Results of Data Analysis

The estimation results of the econometric model in advance using the Pooled Least Square (PLS)/CEM approach, Fixed Effect Model (FEM) and Random Effect Model (REM) along with the results of the model selection test are summarized in the following Table 1.

Table 1
Estimation of Panel Data Regression Econometric Model - Cross Section

Variable	Regression Coefficient		
	CEM	**FEM**	**REM**
C	65.23024	0.363099	74.94288
logSPRT	-2.431066	-0.009935	-0.402939
logSPND	-1.421855	3.091049	6.974849
logSIND	2.302469	6.508222	-0.897408
logSPDG	1.946908	-4.467880	-5.152815
R^2	0.824531	0.998262	0.348265
Adjusted. R^2	0.801136	0.997537	0.261367
Statistics *F*	35.24268	1378.136	4.007737
Prob. Statistics *F*	0.000000	0.000000	0.010119
Model Selection Test			
1) Chow			
Cross- Section $F(6,24)$= 399.734751; Prob. $F(6,24)$ = 0,0000			
2) Hausman			
Cross-Section random χ^2 (4) = 416.632716; Prob. χ^2 = 0,0000			

The Chow test and Hausman test show that (FEM) was chosen as the best estimated model, as seen from the probability or significance the Chow test has a prob value of 0.0000 <0.01 and the Hausman test has a prob value of 0.0000 <0.01. The complete estimation results from the FEM estimated model are displayed in the following Table 2 and Table 3.

Table 2
Fixed Effect Model (FEM) Estimation Model

IPM_{it}= 0.363099 $-$ 0.009935 logSPRT$_{it}$ + 3.091049 $logSPND_{it}$ + 6.508222 $logSIND_{it}$ (0,8805) (0,2525) (0,0224)** $-4.467880\ logSPDG_{it}$ (0,0224)**
R^2 = 0.998262; *DW* = 1.447177; *F*. = 1378.136; Prob. *F* = 0,00000

Source: BPS, processed. Description: *Significant at α = 0.01; **Significant at α = 0.05; ***Significant at α = 0.10; The number in brackets is the probability of the t statistic.

From Table 2, it can be seen that the FEM estimated model exists with a probability or empirical statistical significance F value of 0.0000 (<0.01), with a coefficient of determination (R2) of 99.8262%; which means that the Human Development Index variable is influenced by the GRDP variables in the agricultural sector, education sector, industrial sector, and trade sector, the remaining 0.1738% is influenced by other variables that are not included in the econometric model. These results indicate that the FEM estimated model has very high predictive power. However, this predictive power must be interpreted critically, because separately from other variables in the econometric model, it turns out that only two variables, namely the industrial sector GRDP variable, have a significant influence, with a statistical probability or empirical significance of t of 0.0224 (< 0.05), and the trade sector GRDP variable with a statistical probability or empirical significance t of 0.0265 (<0.05).

The industrial sector GRDP variable has a regression coefficient value of 6.508222 with a linear-logarithmic relationship pattern. That is, if the GRDP of the industrial sector increases by 1 percent, then the human development index will decrease by 6.508222: 100 = 65082.2 percent. Preferably, if the GRDP of the industrial sector decreases by 1 percent, the human development index will increase by 6.508222: 100 = 65082.2 percent.

The GRDP variable in the trade sector has a regression coefficient of -. 4.467880 with a linear-logarithmic relationship pattern. That is, if the GRDP of the trade sector increases by 1 percent, then the human development index will decrease by 4.467880: 100 = 44678.8 percent. Preferably, if the GRDP of the trade sector decreases by 1 percent, then the human development index will decrease by 4.467880: 100 = 44678.8 percent

4.2 Discussion

The Effect of Agricultural Sector GRDP Variables on the Human Development Index

According to the chosen estimation model, the agricultural sector's GRDP variable has a

negative influence, which means that as the agricultural sector's GRDP increases, so does the human development index. The findings of this study contradict the initial hypothesis, which stated that the agricultural sector's influence will increase the human development index because the agricultural sector is one of the drivers of increasing the quality of human development. However, the decline in the human development index due to the agricultural sector is based on the findings of Gutomo and LIPI researchers who also included three regencies in Solo Region, namely Sragen Regency, Klaten Regency, and Sukoharjo Regency, in this study. The findings showed that in their observations, they focused on the regeneration of farmers in the three regions of Solo Region where modernization is a threat to the regeneration of farmers in Indonesia. The percentage of non-agricultural activities, such as factory workers, HP kiosk keepers, and others, contributes to this modernization. According to Gutomo Bayu Aji, the decline in land tenure differentiation has continued to increase sharply by 70% over the last 30 years, and farmers are sharecroppers. As a result, the household economy of farmers does not develop, and the next generation does not get a good picture of the world of agriculture, which leads to a decrease in the number of farmers. The findings of this study are also supported by research, which explains that there is a negative influence on the Human Development Index in Java. This can occur because rising agricultural income has an impact on inflation, which causes prices to rise, indirectly increasing education and health.

The Effect of the Education Sector GRDP Variable on the Human Development Index

According to the chosen estimation model, the GDP variable in the education sector has a positive effect, which means that as the GRDP in the education sector rises, so will the human development index. This result supports the hypothesis that as the role of the education sector grows, so does the human development index. According to BPS data, the total GRDP of the education sector in each district in Solo Raya has increased from 2017 to 2020. The results of this study are in line with research conducted by Rizal Amrullah (2022) which states that the influence of the education sector on the human development index has a positive impact.

The Effect of Industrial Sector GRDP Variables on the Human Development Index

The chosen estimate model indicates that the GRDP variable of the industrial sector has a positive influence, which means that as the GRDP of the industrial sector rises, so will the human development index. These findings support the claim that the industrial sector's impact will lead to a rise in the human development index. According to BPS data, the industrial sector has grown annually, which is the foundation for the economy's health in general and the industrial sector in particular. Karanganyar Regency in the Greater Solo area saw a rise in the two years between 2019 and 2020, rising from 17,028,889.02 million rupiahs to 17,294,583.63 million rupiahs. This annual increase is what keeps human development on track. The findings of this study are consistent with the findings of Arisman (2018), who found that the industrial sector has a positive impact on the human development index in ASEAN member countries.

The Effect of Trade Sector GRDP Variables on the Human Development Index

According to the chosen estimation model, the trade sector GRDP variable has a negative influence, which means that when the trade sector GRDP increases, the human development index decreases. The findings of this study contradict the initial hypothesis that trade sector influence has a positive impact on the human development index. A high human development index in an area does not guarantee labor absorption because the company's needs do not match because companies prefer workers whose wages are not too high Hanifa (2018). The trade sector has sub-sectors including the retail trade of restaurants and hotels. The restaurant trade sub-sector according to BPS data for the Solo Raya region does not always increase every year, as is the

case for the number of restaurants in Surakarta City in 2019 which were 1,007.00 and in 2020 there were 727.00 restaurants. The results of the same research were carried out by Ajeng Destiana Pangesti and Nano Prawoto (2018) which stated that the influence of the GRDP of the trade sector had a negative effect on the human development index.

Table 3
Region Effects and Constants

No	District/City	Effect	New Constants
1	City of Surakarta	9.210221	9.57332
2	District of Sukoharjo	-5.06022	-4.697118
3	District of Boyolali	-7.74528	-7.382181
4	District of Karanganyar	-8.79617	-8.433075
5	District of Sragen	27.46756	27.830659
6	District of Wonogiri	-6.88616	-6.52306
7	District of Klaten	-8.18996	-7.826856

In Table 3, it can be seen that the area with the highest constant value is Sragen Regency which is equal to 27.46756. That is, related to the influence of the GRDP variable in the agricultural sector, the education sector, the industrial sector, and the trade sector have the highest human development index values compared to other Regencies/Cities. Meanwhile, the lowest constant value is owned by Karanganyar Regency, which is -8.433075. That is, related to the influence of the GRDP variable in the agricultural sector, the education sector, the industrial sector, and the trade sector have the lowest human development index values compared to other Regencies/Cities.

5. Conclusion and Suggestion

5.1 Conclusion

Referring to the results of the previous analysis and discussion, it can be concluded as follows.

The agricultural and trade sector GRDP variables have a negative effect on the district human development index in Solo Raya, whereas the education and industry sector variables have a positive effect. Negative externalities result from a lack of public concern for education, which leads to fewer job opportunities due to limited human resources. While positive externalities influence human progress and development in order to achieve quality human resources.

5.2 Suggestion

Through the results of this study, the researchers wrote several suggestions, as follows:

There is a need for central and regional government policies related to human development in order to realize quality human resources. Government policies should pay attention to GRDP sectors that have an impact on human quality, such as improving education quality and opening up jobs, in order to achieve a decent standard of living for the community.

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