Impacts of Rural Development on Human Development in Indonesia

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ABSTRACT

Research Originality: This study presents a new analysis of the determinants of human development to implement the government's vision of building Indonesia from the village and grassroots.

Research Objectives: This study aims to determine the effects of rural development and fiscal policy on human development in Indonesia.

Research Methods: This study uses data from 434 municipalities for the 2017-2023 period. The study employs panel data analysis with the Common Effect Model, Fixed Effect Model, Random Effect Model, and Generalized Estimating Equation.

Empirical Results: The findings suggest that rural development, economic development, and expenditures on goods and services contribute to human development. In contrast, the COVID-19 pandemic and capital expenditures negatively affect human development. The negative effects of capital expenditures become positive after they become assets.

Implications: The finding implies the important role of rural development in fostering human development. Goods and services expenditures might achieve short-run objectives, while capital expenditures should be directed toward long-run objectives. The central government may accelerate human development by transferring assets to the local government.

Keywords:

human development; panel data; rural development; sustainable development goals; fiscal policy

INTRODUCTION

Development is a multidimensional concept (Artelaris, 2022). The United Nations introduced a more sustainable concept of development. The 17 Sustainable Development Goals aim to tackle economic, social, and environmental issues (Halkos & Gkampoura, 2021; Biermann, 2022). Economic growth measured by per capita income as an indicator of development might not be sufficient (Panth, 2021). Development should improve not only the material status of the population as measured by per capita income but also the human status of the population.

It is important to analyze human development in all dimensions as measured by the Human Development Index (HDI). HDI provides information on development, especially the well-being of the people. It includes three dimensions: health, education access, and living standards. HDI is a good indicator of social welfare because it emphasizes the people and their capabilities as the center of development focus (Picatoste et al., 2021; Hartanto et al., 2019; Machado et al., 2020). Mohanty (2021) provides the concepts and discourse on human development. Human development and sustainability are inseparable, closely intertwined, and reinforce each other.

With sustained improvement in human development over the last four decades (Stewart, 2019), Indonesia is classified as a high human development country with an HDI value of 74 in 2023. Based on the UNDP criteria for the Human Development Index (HDI), low development is for an HDI lower than 55, medium development for an HDI between 55 and 70, high for an HDI between 70 and 80, and very high for an HDI of 80 and above (UNDP, 2022). Out of 514 municipalities in Indonesia, there are still many (193 municipalities) at the medium level of human development, and several others (13 municipalities) are at the low level. Figure 1 shows the level of human development in municipalities in Indonesia. There are 257 municipalities which have a high level of human development. Although it seems unnoticeable in Figure 1, 51 municipalities have very high human development. Figure 1 also suggests that the eastern part of Indonesia needs to catch up with other regions (Khairina & Wijaya, 2023).

Figure 1. Human Development Index in Indonesia
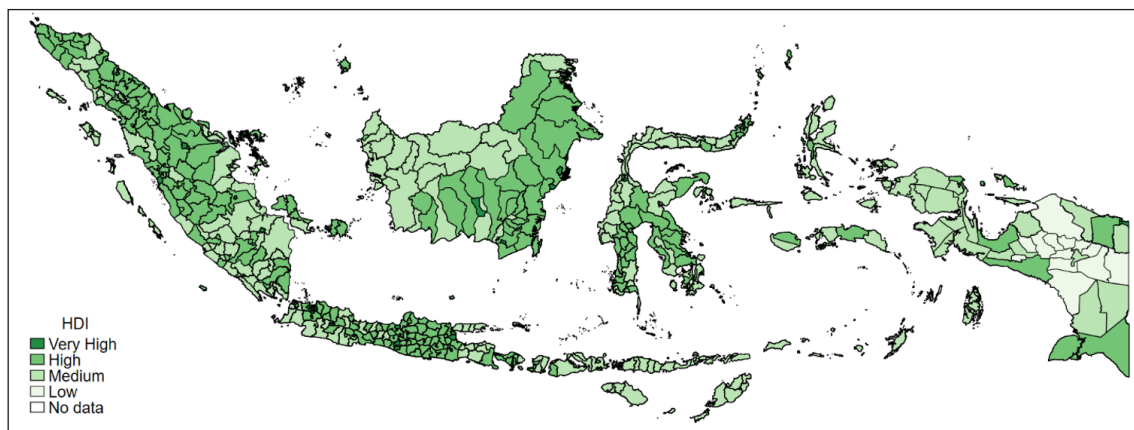
Source: Statistics Indonesia, data processed using Stata 18

To improve social welfare in all regions, the government of Indonesia has spent a large amount of funds on rural development with the new paradigm of building Indonesia from the periphery (Hadiwibowo et al., 2023). The focus of this study is the rural area because the rural area may lag behind the urban area (Wang et al., 2020).

There is a body of literature about human development. Researchers propose many different factors from various aspects that contribute to human development. It is because of the nature of HDI that human development is indicated (Picatoste et al., 2021; Mohanty, 2021). The factors vary from economic growth (Putri et al., 2022; Kaewnern et al., 2023; Zheng & Wang, 2022), government spending (Ranjan & Panda, 2021), globalization (Kiani et al., 2021), and poverty (Al-Nasser & Al Hallaq, 2019). Putri et al. (2022) mention that HDI is affected positively by economic growth and education spending and negatively by poverty, while the impacts of capital and health expenditure are insignificant. Ruzima and Veerachamy (2023) suggest that expenditure on health has positive impacts, while expenditure on education negatively impacts human development.

Capital accumulation and human resources are the main economic development factors in the Solow Growth Model (Mankiw, 2016). For rural areas, development is a complex and dynamic phenomenon (Demchenko et al., 2023). Rural development might be measured from various aspects. Village development may represent the development quality in rural areas (Suchaini et al., 2020). The level of rural infrastructure may affect human development (Zhao & Wu, 2024). The Ministry of Village, Development of Disadvantaged Regions and Transmigration of the Republic of Indonesia composed an index to measure rural areas' development process (2015). The Developing Village Index (DVI) is a comprehensive indicator for rural development that combines social, economic, and ecological approaches.

Prior studies about development in Indonesia are usually conducted only for one region in Indonesia (Khairina & Wijaya, 2023; Hartanto et al., 2019). Studies suggest that economic development contributes to the increase in human development (Kaewnern et al., 2023; Zheng & Wang, 2022). However, rural development as a determinant of human development is yet to be explored in the literature. In addition, previous studies do not have a consensus on the effects of government spending on human development; several studies suggest positive effects, while others suggest insignificant or negative effects (Putri et al., 2022; Ranjan & Panda, 2021).

This study has contributed to assessing the impacts of rural development and local government fiscal policy on human development in all regions of Indonesia. Its study compares the most developed regions with other regions to assess whether the regions in Indonesia are converging. This study aims to fill gaps in the literature and provide insights for the government, assisting the implementation of the government's vision of Indonesia from the village and grassroots to achieve the Sustainable Development Goals.

METHODS

This study analyzes the determinants of human development in all regions of Indonesia. We use the Human Development Index to represent human development as the dependent

variable. The explanatory variables are economic development, rural development, goods and services expenditure, capital expenditure, assets, and the COVID-19 pandemic. Economic development is represented by income and per capita Gross Regional Domestic Product. Rural development is represented by the Developing Village Index published by the Ministry of Village, Development of Disadvantaged Regions, and Transmigration. Goods and services expenditure and capital expenditure are used to depict fiscal policy. The asset represents the resources available for the region's development. Per capita expenditures and assets are from the Ministry of Finance. The COVID-19 pandemic is defined as a dummy variable with a value of 1 during 2020-2021 and 0 for the period before and after 2020-2021.

We estimate the relationships among human development, income, rural development, government expenditure (goods & services and capital), and assets. All variables are stated in log form. The basic model is:

$$hdi_{it} = b_0 + b_1 inc_{it} + b_2 dvi_{it} + b_3 gs_{it} + b_4 cap_{it} + b_5 ast_{it} + b_6 covid \qquad (1)$$

hdi_{it} = Human Development Index
inc_{it} = income
dvi_{it} = rural development
gs_{it} = goods & services expenditure
cap_{it} = capital expenditure
ast_{it} = asset
$covid_{it}$ = COVID-19 pandemic

There are 514 municipalities in Indonesia, and only 434 municipalities have rural areas in their region. We include in the analysis only regions which have rural areas. We analyze the period of 2017 - 2023 for 434 municipalities. We employ panel data analysis to estimate the relationships, using the Common Effect Model, Fixed Effect Model, Random Effect Model, and Generalized Estimating Equation.

To analyze the different characteristics of the economy, we distinguish regions that have the highest human development from other regions. These regions are Java and Bali. By separating these two regions from the others, we can estimate different behavior between the highest and other regions. Therefore, we extend the basic model by employing a dummy variable (jb) for the regions of Java and Bali. The extended model is:

$$hd_{it} = b_0 + b_1 inc_{it} + b_2 dvi_{it} + b_3 gs_{it} + b_4 cap_{it} + b_5 ast_{it} + b_6 covid + b_7 \, jb \cdot dvi_{it} + b_8 \, jb \cdot gs_{it} + b_8 jb \cdot cap_{it} \qquad (2)$$

RESULTS AND DISCUSSION

Table 1 presents data for the analysis. The data consists of 434 municipalities within 7 years. HDI and DVI are index numbers; all other variables are stated as per capita in thousands of Rupiah. It seems that there are wide disparities of value for some variables. The standard deviations are larger than mean values in income, goods and services expenditure, capital expenditure, and assets (see Table 1).

Table 1. Descriptive Statistics

	Variable	Mean	Std. dev.	Min	Max	Observations		
HDI	overall	68.24	5.50	27.87	86.69	N	=	3,005
	between		5.59	32.05	85.35	n	=	434
	within		0.99	64.06	71.38	T	=	6.92
INC	overall	52,819.29	68,711.13	5,630.00	1,392,358.00	N	=	3,004
	between		53,790.51	6,611.04	509,925.40	n	=	434
	within		42,863.28	-311,906.10	1,166,741.00	T	=	6.92
DVI	overall	0.64	0.09	0.23	0.94	N	=	3,005
	between		0.07	0.38	0.85	n	=	434
	within		0.05	0.38	0.79	T	=	6.92
GS	overall	1,677.54	2,318.99	87.75	36,307.51	N	=	3,004
	between		2,112.12	348.82	21,363.56	n	=	434
	within		1,014.94	-14,501.46	16,621.48	T	=	6.92
CAP	overall	1,245.63	1,731.11	38.49	26,465.16	N	=	3,004
	between		1,520.05	196.24	13,995.88	n	=	434
	within		844.82	-10,199.25	13,714.92	T	=	6.92
AST	overall	13,279.86	24,545.32	242.57	1,003,366.00	N	=	2,947
	between		18,454.91	1,677.14	244,327.20	n	=	434
	within		16,850.76	-166,842.50	772,318.50	T	=	6.79

Source: Data processing results of Stata 18.0

Most of the Indonesian population live in Java. The next most populated region is Bali. The population in Java and Bali is much larger than in other regions. Maluku and Papua have the lowest population. Figure 2 presents the population in the regions. HDI in municipalities by their locations is shown in Figure 3. Municipalities in Java and Bali regions have the highest HDI compared to other regions. Municipalities in Nusa Tenggara and Papua have the lowest HDI value.

Figure 4 shows the DVI for the regions. We can see that municipalities in Java and Bali have the largest DVI compared to other regions. The rural development in Java and Bali is higher than in other regions, and the DVI in Bali is much larger than in other regions. With these different characteristics of Java and Bali, we distinguish the analysis for Java and Bali using moderating variables.

In the first regression, we estimate Equation 1 using the Common Effect Model, Fixed Effect Model, Random Effect Model, and Generalized Estimating Equation. The results are presented in Table 2. The Chow test indicates that FEM is better than CEM. The Breusch and Pagan Lagrangian's multiplier test for random effects indicates that REM is better than CEM. The value of χ^2 is higher for REM than GEE. The Hausman test shows that FEM is preferable. Therefore the preferred model is FEM.

Income has a coefficient of 0.0120 and is significant at a 1% level. A 1% increase in income will increase human development by 0.0120%. Income has positive effects on human development. The higher the income in a region, the higher human development
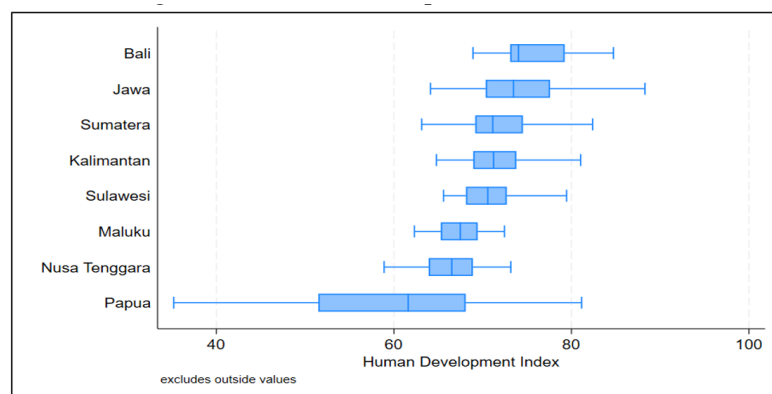
in that region. Higher-income means a higher quality of life. This result is similar to that of Putri et al. (2022). The government may integrate economic development programs with human development programs.

Figure 2. Population in 2023
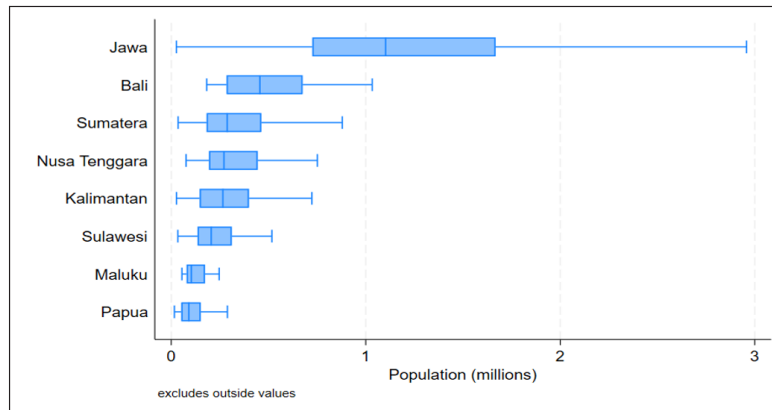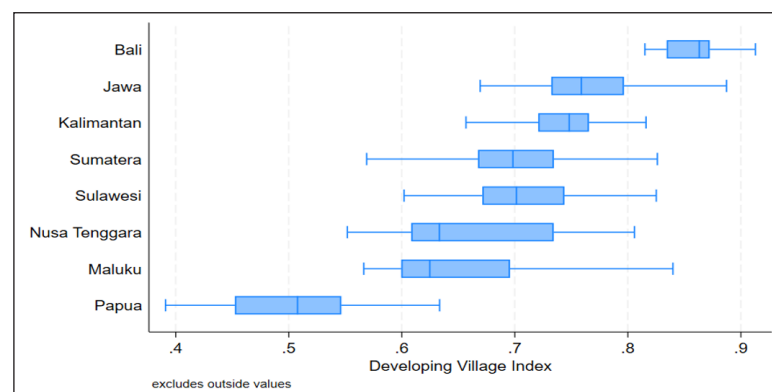

Source: Data processing results of Stata 18.0

Figure 3. Human Development Index in 2023

Source: Data processing results of Stata 18.0

Figure 4. Developing Village Index in 2023

Source: Data processing results of Stata 18.0

Table 2. Results of Basic Models

	CEM		FEM		REM		GEE	
inc	0.0513	***	0.0120	***	0.014	***	0.0196	***
	(0.002)		(0.001)		(0.001)		(0.002)	
dvi	0.2931	***	0.1242	***	0.1273	***	0.1359	***
	(0.010)		(0.003)		(0.003)		(0.007)	
gs	-0.0388	***	0.0045	***	0.0024	**	-0.0034	
	(0.003)		(0.001)		(0.001)		(0.002)	
cap	0.0019		-0.0065	***	-0.0062	***	-0.0053	***
	(0.003)		(0.001)		(0.001)		(0.002)	
ast	0.0121	***	0.0041	***	0.004	***	0.0038	**
	(0.003)		(0.001)		(0.001)		(0.002)	
covid	-0.0108	***	-0.0035	***	-0.0036	***	-0.004	***
	(0.003)		(0.000)		(0.000)		(0.001)	
intercept	3.966	***	4.1252	***	4.1175	***	4.0996	***
	(0.020)		(0.014)		(0.015)		(0.030)	
Number of observations	2,947		2,947		2,947		2,947	
R^2	0.564		0.673					
Adjusted R^2	0.563		0.616					
F statistic	632.97		861.20					
Log-likelihood	4,181.85		9,863.47					
AIC	-8,349.69		-19,712.94					
BIC	-8,307.77		-19,671.02					
χ^2					4,858.92		1,107.64	

Standard errors in parentheses. *** $p<0.01$, ** $p<0.05$, * 0.1

Source: Data processing results of Stata 18.0

Rural development also has positive significant effects on human development, with a 1% significance level. The coefficient value of rural development is 0.1242. An increase in the region's rural development will improve human development. To improve human development, the government might use this channel by developing rural areas. Rural development will increase human development, as mentioned by Baldanov et al. (2019) and Edeme et al. (2017). Therefore, the government may utilize the development of rural areas as a policy option to improve human development.

Goods and services expenditures have positive and significant effects on human development. The direct positive effects of government spending on human development align with previous studies (Sharma et al., 2024; Masduki et al., 2022; Kousar et al., 2023). Government should increase the public expenditure on productive sectors of the economy (Oluwabonmi & Vasilev, 2023). However, the government should stay cautious because capital expenditures negatively affect human development. These different effects of spending confirm the findings of Ruzima and Veerachamy (2023). Capital expenditures remove the local government's limited funds from programs with direct impacts on

human development. This absence of positive impacts of capital expenditure on human development is similar to the findings of Ranjan and Panda (2022).

Furthermore, capital expenditure will be transformed into assets after the completion of the development projects. The results show that government assets positively and significantly impact human development. Increasing assets will improve human development. These positive effects of assets will offset the negative effects of the capital expenditure. The important role of the assets is also suggested by Djokoto (2022) and Acheampong et al. (2022). The coefficient of capital expenditure is -0.0065, while the coefficient of assets is 0.0041. Therefore, the positive impacts of the capital expenditure will be seen in the long run. Local governments should increase their assets for long-term growth. The central government may also accelerate human development in the regions by establishing assets using central government funds and then transferring the assets to the local government.

The results also show that the COVID-19 pandemic negatively affects human development. The global crisis caused by the COVID-19 pandemic hampers the achievement of sustainable development goals in general (Wang & Huang, 2021) and also health and well-being (Shulla et al., 2021). The government should prepare for the crisis and provide safety nets during a crisis period.

Table 3 shows the results when we distinguish between municipalities in Java and Bali with other regions. Regions in Java and Bali have the highest levels of rural and human development. These regions also have the largest populations. The preferred model is also FEM. The adjusted r^2 is 0.623, meaning the model explains 62.3% of the variations in human development. Income, rural development, expenditures on goods and services, and assets positively affect human development. On the other hand, capital expenditures and the COVID-19 pandemic decrease human development. This result is consistent with the basic model.

Furthermore, the result shows that capital expenditures in the Java and Bali regions are similar to those in other regions. The coefficient of the interaction of Java-Bali and capital expenditures is very small (0.0006) and is not significant. Regions in Java and Bali have higher positive effects for two variables, i.e., rural development and expenditures on goods and services. The coefficient of the interaction of Java-Bali and rural development is 0.0187, with a 1% significance level. This result means that a 1% increase in rural development will increase human development in the Java and Bali regions by 0.0187% compared to other regions. Similarly, a 1% increase in goods and services expenditures will increase human development in the Java and Bali regions by 0.0108% compared to other regions.

The differences reflect the gap between the Java and Bali regions and other regions. The gap between regions is also seen in other countries as China (Wang et al., 2020) and India (Sharma et al., 2024; Raj et al., 2024). The higher values imply that Java and Bali regions are more efficient in using their resources. Rural development and income levels are already higher in Java and Bali regions. Therefore, higher expenditures on goods and services are necessary for other regions to catch up with Java and Bali regions.

Table 3. Results of Extended Models

	CEM		FEM		REM		GEE	
inc	0.0517	***	0.0122	***	0.0145	***	0.0208	***
	(0.002)		(0.001)		(0.001)		(0.002)	
dvi	0.2837	***	0.1199	***	0.1216	***	0.1277	***
	(0.010)		(0.003)		(0.003)		(0.007)	
gs	-0.0417	***	0.0031	***	0.0013		-0.0044	*
	(0.004)		(0.001)		(0.001)		(0.002)	
cap	0.0037		-0.0059	***	-0.0055	***	-0.0043	**
	(0.003)		(0.001)		(0.001)		(0.002)	
ast	0.0112	***	0.0038	***	0.004	***	0.0045	***
	(0.003)		(0.001)		(0.001)		(0.002)	
covid	-0.0108	***	-0.0033	***	-0.0034	***	-0.0037	***
	(0.003)		(0.000)		(0.000)		(0.001)	
jb # dvi	0.0679	**	0.0187	**	0.0238	***	0.0232	
	(0.027)		(0.009)		(0.007)		(0.017)	
jb # gs	0.007		0.0108	***	0.0077	***	0.008	**
	(0.006)		(0.003)		(0.002)		(0.003)	
jb # cap	-0.0038		0.0006		0.0001		-0.001	
	(0.007)		(0.002)		(0.002)		(0.004)	
intercept	3.9741	***	4.1155	***	4.1035	***	4.0681	***
	(0.022)		(0.015)		(0.015)		(0.031)	
Number of observations	2,947		2,947		2,947		2,947	
R^2	0.565		0.679					
Adjusted R^2	0.564		0.623					
F statistic	424.04		589.38					
Log-likelihood	4,186.75		9,890.78					
AIC	-8,353.50		-19,761.56					
BIC	-8,293.61		-19,701.68					
χ^2					5,059.93		1,166.23	

Standard errors in parentheses. *** p<0.01, ** p<0.05, * 0.1
Source: Data processing results of Stata 18.0

Convergence may also be achieved if regions other than Java and Bali have lower capital expenditures and higher assets. The central government's role is important. The central government can build assets in these regions and then transfer them to the local government. Less capital expenditure and more assets may increase human development more rapidly.

However, this study does have limitations. The analysis is based on municipal data because several data on the village level are not readily available. When the data becomes available, future research should analyze data at the village level to more accurately understand the impacts of rural development. Secondly, we use only two classifications of government expenditure. Future research should consider using more detailed classifications to estimate the effects of each classification of expenditure.

CONCLUSION

The study's findings show that rural development and fiscal policy affect human development. Income, rural development, expenditures on goods and services, and assets have positive, significant effects on human development, while capital expenditures and the COVID-19 pandemic have negative effects. Moreover, rural development and goods and services expenditures in the Java and Bali regions have greater impacts than in other regions.

The findings have several implications. The government should focus on rural development to implement the vision of building Indonesia from the village and grassroots. Local government should emphasize the quality of spending and its impacts on development. In addition, the central government may accelerate human development by building and transferring assets to the local government.

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