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Does Social Expenditure Increase Social Welfare in Indonesia?

Santa Permata[1], Fadhla Khanifa[2], Syamsul Bakhri[3]
[1,2]Faculty of Economics, Universcity of Widya Mataram,
fafakhanifa@gmail.com
[3]Faculty of Economics, Universcity of Widya Mataram,
Syamsul.uwmy@gmail.com

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Abstract

This research analyzes the influence of social expenditure (health, education and social protection) on HDI and the influence of social expenditure in the health sector on infant mortality rates. This research uses panel data in 33 provinces in Indonesia during the 2010-2020 periods. This research uses panel data regression estimation with a fixed effect model. The research results show that the panel data regression estimation results show that statistically the social expenditure variables (health, education and social protection) have a significant influence on HDI. The regression coefficient for government expenditure in the health sector is 0.053 units. The regression coefficient for education expenditure is 0.161 units. The regression coefficient for social protection expenditure is 0.032 units. The three independent variables X1 (health), X2 (education), and X3 (social protection) have a positive relationship with Y (HDI). This means that when social spending is increased, the HDI will increase. Statistically it is also found that social expenditure in the health sector has a significant influence on infant mortality rates. The regression coefficient for government spending in the health sector is -0.228, meaning that every 1 percent increase in government spending in the health sector will reduce the infant mortality rate by 0.228 per 1000 live births assuming the conditions of other independent variables are constant.

INTRODUCTION

Community welfare has become the core of development goals. Various Government programs continue to be directed at supporting increased welfare (Ministry of Finance, 2019). Social welfare problems give rise to policies in the social sector. The development of endogenous growth theory (Lucas, 1988; Romer, 1994) has put forward the importance of social policy. Most of these social policies focus on improving human development. Most of the increase in

development assistance has been directed at the social sector.

There are many studies that find that progress in human development has a strong influence on long-term economic growth patterns (Barro, 1991; Benhabib and Spiegel, 1994) and also has a strong relationship with poverty reduction (Ravallion and Chen, 1997). In addition, there are also several studies available in the economic literature that look at the influence of social spending. Several models linking social spending to endogenous growth theory have been proposed (Aschauer, 1989; Barro 1990, Barro, 1991; Levine and Renelt, 1992; Easterly and Rebelo, 1993; Devarajan, Swaroop, and Zou, 1996). However, empirical research with more specific questions about how social expenditure (health, education and social protection) influences social welfare (HDI and infant mortality) in Indonesia is still limited.

This study attempts to estimate the effect of social expenditure (health, education and social protection) on social welfare (HDI and infant mortality rate). Technically, there are two specific objectives, namely: to determine the effect of social expenditure (health, education and social protection) on social welfare (HDI and infant mortality rate) in 33 provinces in Indonesia in the 2010-2020 period. Furthermore, there were 33 provinces in the research sample. Considering that welfare is a major development goal in Indonesia, it is important to carry out research that examines the relationship between government social spending and social welfare. So this research really needs to be carried out to find out how social spending (health, education and social protection) influences social welfare (HDI and infant mortality) in Indonesia?

Empirically, Haile and Zarazua (2017) examine the causal effects of government spending in the social sector (health, education and social protection) on three aggregate welfare measures: the human development index, the inequality-adjusted human development index and child mortality rates, using data longitudinal study of 55 low- and middle-income countries from 1990 to 2009. The results show that there is strong evidence to support the proposition that government social spending has played an important role in improving aggregate welfare in developing countries. This research will use empirical research by Haile and Zarazua (2017) as a reference. In Haile and Zarazua's (2017) research, the empirical model uses two models. The first model estimates the effect of social expenditure on IHDI and the second model estimates the effect of health

expenditure on child mortality. In this research, the unit of analysis in 33 provinces in Indonesia is new. The selection of research objects in Indonesia is based on a phenomenon in which social welfare is one of the things that is the government's focus in development in Indonesia.

Various studies examining government spending have shown the impact on economic development in a country. Zhaoa & Wang (2021) who examined the effect of participation in various social safety net programs (Dibao) on education expenditure and educational time use, with data from the China Education Panel Survey and analyzed by regression methods showed that the combination of dibao and education subsidies reduces family school expenditure recipient. The combination of the Dibao program and education subsidies is an effective policy instrument to ease the financial burden of school expenditures for low-income families, but its effectiveness varies for relatively disadvantaged and advantaged children.

After reviewing several literatures, it can be seen that there is a gap in research objects, where research related to the influence of social expenditure on welfare mostly examines one province or one district. There is still little research regarding the influence of social spending on welfare with an analysis unit of 33 provinces in Indonesia. Additionally, most studies examine government spending with indicators of health, education, and infrastructure. So this research adds a new variable, namely social protection.

This research analyzes two models. The first model estimates the effect of social expenditure, which consists of three indicators, namely social expenditure in the fields of health, education and social protection, on HDI. The second model estimates the effect of social expenditure in the health sector on infant mortality. This research seeks to answer the following research questions. (1) How does social expenditure (health, education and social protection) affect HDI? and (2) What is the influence of social expenditure in the health sector on IMR

METHODS

To analyze the effect of social spending, which in this study uses three indicators, namely health, education, and social protection on welfare, which in

this case is proxied by HDI and infant mortality, this study uses a quantitative approach using panel data with an empirical model adopted from this study. earlier. The analysis used is descriptive analysis and panel data.

In the literature that is the reference for this research, namely Haile and Zarazua's research (2017) using GMM to estimate the effect of social expenditure on aggregate welfare. However, the use of GMM is more on the assumption that there is a correlation between the residuals and the lag dependent variable. So it requires an instrument variable that is applied in the equation so as not to violate classical assumptions. In addition, there are also differences in the unit of analysis between the reference paper and this research. Where the unit of analysis in Haile and Zarazua's research (2017) is 54 lower middle income countries. While in this study examined 33 provinces in Indonesia. The panel data regression method is a method that is widely used in previous literature in estimating the effect of social expenditure on welfare between provinces in Indonesia. Therefore, in this study using panel data regression method.

In this study using panel data because observations of social welfare are not enough if they are observed only at the same time. However, it is necessary to determine observations over several time periods. Because of this, data is needed which is a combination of cross-section and time-series data which is called panel data. In addition, because there are several advantages to using panel data, namely data that is more informative, more varied, more efficient, can avoid multicollinearity problems, is superior in studying dynamic changes, is more able to measure effects that cannot be observed on pure cross-section data. and pure time-series, and by making more data available, panel data can minimize the bias that can occur when aggregating individuals into broad aggregates (Baltagi, 2005: 19).

This research was designed using panel data regression method with FEM. The use of FEM allows researchers to control unobserved variables in order to overcome endogeneity problems in order to get better estimation results. In this research we need a model that can show differences between units of observation. In the fixed effect, the error component structure can be ignored so that the parameters are estimated using the OLS method. In general, using panel data will result in different intercepts and slope coefficients for each individual and each

time period. Therefore, estimating the regression equation will depend on the assumptions made about the intercept, the slope of the coefficient and the disturbance variable. Because of this, in this study using FEM. In the FEM approach, it is assumed that the intercept and slope of the regression equation (model) are considered constant both between unit cross-sections and between unit time-series.

This research adopts the research model from Kraipornsak (2018) in the Journal of Economic and Finance and Pere (2015) in the European Journal of Government and Economics. The model specifications in this study are as follows.

Equation 1. The effect of social spending on HDI

$$Y_{it} = \alpha + \beta_1 \, LnKES_{it} + \beta_2 \, LnPEND_{it} + \beta_3 \, LnPERSOS_{3it} + \beta_4 \, PERCPDRB_{it} + \beta_5 \, PPM_{it} + \beta_6 \, EDU_{it} + \beta_7 \, ANGKETER_{it} + \beta_8 \, INF_{it} + \varepsilon_{it}$$

Variable description:

Y_{it} = HDI
α = Constant
$LnKES_{it}$ = Government spending on health
$LnPEND_{it}$ = Government spending on education
$LnPERSOS_{3it}$ = Government spending on social protection
$PERCPDRB_{it}$ = GRDP Acceleration
PPM_{it} = Percentage of poor people
EDU_{it} = Education
$ANGKETER_{it}$ = Dependency ratio
INF_{it} = Inflation
i = Province i
t = Period t
εit = *Error term*

Equation 2. Effect of health spending on IMR

$$Y_{it} = \alpha + \beta_1 \, LnKES_{it} + \beta_2 \, PERCPDRB_{it} + \beta_3 \, PPM_{it} + \beta_4 \, EDU_{it} + \beta_5 \, ANGKETER_{it} + \beta_6 \, INF_{it} + \varepsilon_{it}$$

Where:

Y_{it}	= IMR
α	= Constant
$LnKES_{it}$	= Government spending on health
$PERCPDRB_{it}$	= GRDP Acceleration
PPM_{it}	= Percentage of poor people
EDU_{it}	= Education
$ANGKETER_{it}$	= Dependency ratio
INF_{it}	= Inflation
i	= Province i
t	= Period t
εit	= *Error term*

RESULTS AND DISCUSSION

This study used the fixed effect model so that two tests were carried out, namely the Chow test and the Hausman test.

a. ***Chow-test/ F-test.***

The F-test is used to choose between the pooled least squares model or the fixed effect method. The following are the results of the F-test.

Table 4.5 C*how test*

F test that all u_i=0:	F(33, 321) = 8,99	Prob > F = 0,0000

Source: Processed data

From the output results, it can be seen that a probability value of 0.000 means that the F-test gives significant results. Because the probability is smaller than the value α (0.05), then H0:PLS is rejected and H1:FE is accepted, so the conclusion that can be drawn is to use the fixed effect model.

b. Hausman test.

The following are the results of the Hausman test.

Table 4.6 Hausman Test

chi2 (6) = 4,19	Prob > chi2 = 0,0000

Source: Processed data

From the results of the Hasuman test above, it can be seen that the results have a Prob>chi2 of 0.0000, which is less than 0.05, meaning that H0:RE is rejected and H1:FE is accepted. So the conclusion that can be drawn is to use the fixed effect model. Because the P-Value (Prob>Chi2) < Alpha 0.05 then H1 is accepted or which means the best choice is FE rather than RE.

Panel Data Regression Estimation

The effect of social spending (health, education, and social protection) on HDI

Based on the regression estimation method between the common effect model (CEM), fixed effect model (FEM), and random effect model (REM) and the selection of the regression equation estimation model with the Chow test and Hausman test, the fixed effect model (FEM) was chosen for the linear regression equation panel data. The estimation model obtained from the fixed effect model (FEM) is written as follows.

Table 4.10 The effect of social spending (health, education, and social protection) on HDI

Dependent Variable: Human Development Index	
Independent Variable	Coef.
Government spending on health	0,053***
	(0,0412)
Government spending on education	0,161**
	(0,0326)
Government spending on social protection	0,032**
	(0,367)

GRDP Acceleration	0,129**
	(0,0637)
Percentage of poor people	−0,113***
	(0,0376)
Education	0,0586**
	(0,0226)
Dependency ratio	−0,0184**
	(0,0181)
Inflation	−0,193**
	(0,213)
Constant	72,14***
	(2,191)
Observations	373
Number of Prov	33
R-squared	0,749
Prob (F-Statistik)	0,0000

Standard errors in parentheses

*** p<0,01. ** p<0,05. * p<0,1.

Source: Processed data

Based on the estimation results of the panel data regression with the fixed effect, the coefficients can be obtained to construct the panel data regression equation. So that the following equation can be written:

$$Y_{it} = 72{,}14 + 0{,}053\text{LnKES}_{it} + 0{,}161\text{LnPEND}_{it} + 0{,}032\text{LnPERSOS}_{it} + 0{,}129\text{PERCPDRB}_{it} - 0{,}113\text{PPM}_{it} + 0{,}0586\text{EDU}_{it} - 0{,}0184\text{ANGKETER}_{it} - 0{,}193\text{INF}_{it} + \boldsymbol{\varepsilon}_{it}$$

Variable description:

Y_{it} = HDI
α = Constant
$LnKES_{it}$ = Government spending on health
$LnPEND_{it}$ = Government spending on education
$LnPERSOS_{3it}$ = Government spending on social protection
$PERCPDRB_{it}$ = GRDP Acceleration
PPM_{it} = Percentage of poor people
EDU_{it} = Education
$ANGKETER_{it}$ = Dependency ratio
INF_{it} = Inflation
i = Province i
t = Period t
εit = *Error term*

Based on the results of panel data regression estimation using fixed effects, individual parameter significance tests can be carried out to find out how each independent variable influences the dependent variable. Apart from that, the probability value can also be seen to determine the significance of the independent variable. Then it can be seen how much variation in the independent variable influences the dependent variable through the coefficient of determination or R2.

The results of the equation with the linear regression panel data above show that the HDI has a constant value of 72.14, meaning that if the other independent variables have a constant value, the HDI value is 72.14 points.

The regression coefficient for government spending in the health sector is 0.053, meaning that every 1 percent increase in government spending in the health sector will increase the HDI by 0.053 points, assuming the conditions for other independent variables are constant. The higher the level of health expenditure, the better the HDI will be and vice versa. This finding is in line with research conducted by Anand and Ravallion (1993) and Bidani and Ravallion (1997) which shows that government health spending has a significant impact on health status. Apart from that, it is also in line with the findings of Gupta, Verhoeven, and Tiongson (2002) who found that health spending reduces child mortality.

The regression coefficient for education expenditure is 0.161, meaning that every 1 percent increase in education expenditure will increase the HDI by 0.161

points, assuming the condition of other independent variables is constant. The more education expenditure increases, the HDI will increase and vice versa. In the education sector, the government can intervene. This is in line with Tooley's (1999) opinion that the government can intervene in education as in other areas of welfare in one of three ways: regulations, provisions, and funding. Many studies have also found that social spending in the education sector has an effect on increasing human capital. This research found that social spending in the education sector can increase HDI. This finding is in line with Lin & Lin (2009) in a study regarding the relationship between government spending in education and human capital. His research revealed that increasing government spending in the education sector tends to increase the availability of human capital. Apart from that, it is also in line with findings by Psacharopoulos and Patrinos (2004), Gupta, Verhoeven, and Tiongson (2002) and Baldacci, Guin-Siu, and De Mello (2003) who found evidence of a positive effect of education spending in the education sector on increase in human capital.

The regression coefficient for social protection expenditure is 0.032, meaning that every 1 percent increase in social protection expenditure will increase the HDI by 0.032 points assuming that the other independent variables are constant. The higher the level of social protection expenditure, the better the HDI probability disclosure and vice versa. As stated by the Ministry of Finance, the function of social protection is to support strengthening the quality of human resources through strengthening social protection (Ministry of Finance, 2019). One of the things that is the focus of central government spending is strengthening social protection programs. These programs include accelerating poverty alleviation. increasing data accuracy and improving distribution, synergy/synchronization between programs, and subsidies that are right on target and effective. The findings in this study are in line with research conducted by Zhaoa & Wang (2021) and other research in the United States conducted by Hazra & Aranzazu (2022).

The three independent variables are X1 (health). X2 (education). and X3 (social protection) has a positive effect on Y (HDI). This means that when social spending is increased, the HDI increases. The policies taken by the government regarding government spending in the fields of health, education and social

protection really need to be paid attention to. This is because it will influence the human development index which in turn will also influence welfare or development in Indonesia. Empirically, this research is in line with the findings of Haile and Zarazua (2017) who examined the causal effects of government spending in the social sector (health, education and social protection). The government can play a role in the field of education. Apart from that, health is an important part in efforts to achieve prosperity and is a fundamental part in increasing human capabilities. Human capital is a productive investment in people; includes knowledge, skills, abilities and ideas. This is an important component in order to support development programs. Therefore, human capital must receive direct and special attention.

The regression coefficient for GDP acceleration is 0.129, meaning that every 1 percent increase will increase the HDI by 0.129 points, assuming the condition of other independent variables is constant. The higher the acceleration of GRDP, the better the HDI will be and vice versa. The regression coefficient for the percentage of poor people is -0.113, meaning that every 1 percent increase in the percentage of poor people will reduce the HDI by 0.113 points, assuming the condition of other independent variables is constant. The higher the percentage of poor people, the worse the HDI will be and vice versa. The education regression coefficient is 0.0586, meaning that every 1 percent increase in education will increase the HDI by 0.0586 points, assuming the condition of other independent variables is constant. The higher the education, the better the HDI and vice versa. The regression coefficient for the dependency rate is -0.0184, meaning that every 1 percent increase in the dependency rate will reduce the HDI by 0.0184 points, assuming the condition of the other independent variables is constant. The higher the dependency rate, the worse the HDI will be and vice versa. The inflation regression coefficient is -0.193, meaning that every 1 percent increase in inflation will reduce the HDI by 0.193 points assuming the condition of other independent variables is constant. The higher the inflation, the worse the HDI will be and vice versa. If we look at the probability values, the social expenditure variable in the health sector (X1) is 0.003<0.05 (significant), education (X2) is 0.000<0.05 (significant), social protection (X3) is 0.029<0, 05 (significant). The acceleration of GRDP is 0.011<0.05 (significant). The percentage of poor people is

0.009<0.05 (significant). Education was 0.039<0.05 (significant). The dependency figure is 0.048<0.05 (significant), and inflation is 0.015<0.05 (significant). This shows that the results of all independent variables are significant to the dependent variable.

The R-squared output result has a value of 0.7496, which means that the variation of all independent variables is able to explain 74.96 percent of the variation in the dependent variable. The remaining 25.04 percent is explained by other variables not studied. This shows that the regression model is very good because the value is above 50 percent.

Then the second model is also estimated using panel data regression with fixed effects. The second model is to estimate the effect of social expenditure in the health sector on IMR. And the results are as follows.

Table 4.11 The effect of government spending on health on IMR

Dependent Variable: Infant mortality rate	
Independent Variable	*Coef.*
Government spending on health	−0,228***
	(0,181)
GRDP Acceleration	−0,229**
	(0,187)
Percentage of poor people	0,0374**
	(0,111)
Education	−0,0820**
	(0,0666)
Dependency ratio	0,00655**
	(0,0533)
Inflation	0,178**
	(0,628)

Constant	32,24***
	(6,403)
Observations	373
Number of Prov	33
R-squared	0,761
Prob (F-Statistik)	0,000

Standard errors in parentheses

*** p<0,01. ** p<0,05. * p<0,1

Source: Processed data

$$Y_{it} = 32{,}24 - 0{,}228\text{LnKES}_{it} - 0{,}229\text{PERCPDRB}_{it} + 0{,}0374\text{PPM}_{it} - 0{,}0820\text{EDU}_{it} + 0{,}00655\text{ANGKETER}_{it} + 0{,}178\text{INF}_{it} + \boldsymbol{\varepsilon}_{it}$$

Variable descriotion:

Y_{it} = IMR
α = Constant
LnKES_{it} = Government spending on health
PERCPDRB_{it} = GRDP Acceleration
PPM_{it} = Percentage of poor people
EDU_{it} = Education
ANGKETER_{it} = Dependency ratio
INF_{it} = Inflation
i = Province i
t = Period t
εit = *Error term*

The results of the equation with linear regression of panel data above show that the infant mortality rate has a constant value of 32.24, meaning that if the other independent variables have a constant value, the IMR is 32.24 units.

The regression coefficient for government spending in the health sector is -0.228, meaning that every 1 percent increase in government spending in the health sector will reduce the IMR by 0.228 per 1000 live births assuming the conditions

of other independent variables are constant. The health variable has a negative relationship with the dependent variable, namely the infant mortality rate. This means that as the level of health expenditure increases, the infant mortality rate will decrease and vice versa.

Health is a hot issue in development discussions. especially economic development. Health is also an area that is no less important than education. In its position as the most basic development goal. Health has a very important meaning for well-being. Together with education, these two things are fundamental for increasing human capabilities as the core meaning of development. The estimation results show a negative relationship between government spending on health and IMR. This means that increasing government spending in the health sector is useful for reducing infant mortality in Indonesia. These findings are in line with the findings of Aisa and Pueyo (2006) who revealed in their research that government spending on health has a positive influence on life expectancy and economic acceleration, which is supported by sufficient spending. This is especially the case in developing countries. It is further said that the higher government spending on health, the greater the economic acceleration will tend to increase as well. Apart from that, it is also in line with the findings of Baldacci et al. (2008) who found that education and health expenditures have a positive and significant impact on education and health. Rajkumar and Swaroop (2008) have also shown that increasing public spending on health and education is influential in expected improvements in health and education outcomes. The findings in this study also support the findings of Anand and Ravallion (1993) and Bidani and Ravallion (1997) which show that government health spending has a significant impact on health status. This is also in line with the findings of Gupta, Verhoeven, and Tiongson (2002) who found that health spending reduces child mortality.

The regression coefficient for accelerating GRDP is -0.229, meaning that every 1 percent increase will reduce IMR by -0.229 percent, assuming the condition of other independent variables is constant. The higher the acceleration of GRDP, the lower the IMR will fall and vice versa. The regression coefficient for the percentage of the poor population is 0.0374, meaning that every 1 percent increase in the percentage of the poor population will increase the IMR by 0.0374 per 1000 live births assuming that the other independent variables are constant. The higher

the percentage of poor people, the higher the IMR and vice versa. The education regression coefficient is -0.0820, meaning that every 1 percent increase in education will reduce the IMR by 0.0820 per 1000 live births assuming the condition of other independent variables is constant. The higher the education, the lower the IMR will be and vice versa. The regression coefficient for the dependency rate is 0.00655, meaning that every 1 percent increase in the dependency rate will increase the IMR by 0.00655 per 1000 live births assuming the condition of the other independent variables is constant. The higher the dependency rate, the higher the IMR and vice versa. The inflation regression coefficient is 0.178, meaning that every 1 percent increase in inflation will increase the IMR by 0.178 per 1000 live births assuming that the other independent variables are constant. The higher the inflation, the higher the IMR will rise and vice versa. If we look at the probability value, the social expenditure variable in the health sector (X1) is 0.003<0.05 (significant). The acceleration of GRDP is 0.017<0.05 (significant). The percentage of poor people is 0.030<0.05 (significant). Education is 0.023<0.05 (significant). The dependency figure is 0.045<0.05 (significant), and inflation is 0.029<0.05 (significant). This shows that the results of all independent variables are significant to the dependent variable. The R-squared output result has a value of 0.7610, which means that the variations in all independent variables are able to explain 76.10 percent of the variations in the dependent variable. The remaining 23.90 percent is explained by other variables not studied. This shows that the regression model is very good because the value is above 50 percent.

CONCLUSION

The panel data regression estimation results show that statistically the social expenditure variables (health, education and social protection) have a significant influence on HDI. Statistically it also shows that social expenditure in the health sector has a significant influence on IMR.

This research has several limitations that can be studied further by future researchers. The limitations in this research are as follows. This research uses secondary data obtained from the Central Statistics Agency which covers 33 provinces in Indonesia. In this study there are limited data. Since 2013, East

Kalimantan has experienced development with the formation of a new autonomous region (DOB). This was the formation of the province of North Kalimantan. So in 2010-2012 the data for North Kalimanta was 0. Apart from this, HDI adjusted for inequality cannot be discussed in this research. This is because HDI data adjusted for inequality is annual data within the country. So the HDI adjusted for inequality is not included in the model. This model also does not have good specifications. There has been no identification of endogeneity problems. This research has not considered the persistence of HDI and IMR. Apart from that, it also does not take into account heterogeneity between regions. In this research, a robustness check has not been carried out. So it is very possible that the results will be biased. This research is also too simple in that it only tests the influence of social expenditure (health, education and social protection) on HDI and the influence of social expenditure in the health sector on IMR.

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