Education Budget Through Central or Local Government Spending: Which Is More Effective in Improving the Quality of Human Life?

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Abstract

Regional autonomy demands a division of authority between the Center and the regions, which in turn has an impact on budgeting policies. On the one hand, central government spending is oriented towards equity, but on the other hand, the regions understand very well their respective characteristics. The government's budget is always results-oriented, so this research can later be used as a benchmark in planning budgeting. In terms of spending on Education in Indonesia, the budget is channeled through central government spending and local government spending. This research is structured to see between the Central Government or Local Government, more significant in accelerating human quality (IPM) in Indonesia. This study uses Vector Auto Regression with Bayesian Vector Auto Regression model specifications to determine the effect between the variables studied. The variables used in this study are the Central Government Expenditure budget, Regional Government Expenditure on Education through Transfers from the Center to the Regions, Adjusted Per Capita Expenditure, and the Human Development Index from 2007 – 2020. The estimation results show a tendency for local government spending to be more able to increase Human Development Index compared to the Education budget through central government spending. This finding indicates that in the end, the results of decentralization, one of which is the delegation of authority for local government spending, can accelerate the human development index higher than the expenditure issued by the central government.

Keywords: Education Spending, Human Development, Regional Budget, National Budget.

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INTRODUCTION

Delegation between central government spending and local government spending is often an interesting discussion, especially regarding the efficiency of the expenditure made for the welfare of the people, whether central or local. Several types of research on central government spending and local government spending have been compiled (Nawawi, 2021; Nurkuntari et al., 2018; Si'lang et al., 2019; Sri Ayu Lestari, Ni Nyoman; Bagja, I Wayan; Susila Jana, 2018), including from spending in Education (Mongan, 2019).

The government is always committed to increasing the education budget by 20 percent of the total national budget. In Law number 20 of 2003 concerning the National Education System (Sisdiknas), the education budget (besides education salaries and official education) is at least 20 percent of the APBD and APBN. The mandate of this law causes an increase in the annual budget for the education sector by nearly 20 percent. Table 1 shows the annual growth in the APBN in the education sector.

Table 1. Development of Education Budget, State Budget and Ratio of Education Budget to State Expenditure 2017 - 2021

	2017	2018	2019	2020	2021
Education Budget	406102	431733,4	492455,1	508084,5	550005,6
Total State Budget	2004076	2213117,8	2461112,1	2540422,5	2750028
Ratio of Education Budget to State Expenditure	20,26380237	19,50792678	20	20	20

In table 1, over the last five years, the development of the education budget has consistently increased in line with the increase in the state budget. The ratio of the education budget to state spending is always close to the figure mandated by law, which is 20 percent. This number shows the government's commitment to increasing human development capacity through increasing the education budget.

In Education, Law No. 23 of 2014 states that although the Central and Regional Governments have different authorities, there is a power relationship between the Central and Regional Governments. The relation includes curriculum, educators and education staff, management, language and literature, accreditation, and education licensing (Andrea, 2020). This authority is then manifested into a budgeting plan, especially when Indonesia enters the decentralization phase (Putri, 2019; Said, 2015; Wicaksono, 2012). According to the Ministry of Finance, the education budget through central government spending is defined as allocating the education budget. This budget is budgeted through the state ministries/agencies, the ministry of education and culture and religion, and the state ministries/other institutions that administer it. Meanwhile, the Education Budget through transfers to the regions has a more comprehensive component than the Education budget, which is spent through the central government expenditure. Table 2 lists the details of the Education budget funded through transfers to the regions.

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Table 2. Regional Government Expenditures on Education through Transfers from the Center to the Regions

Components of the Education Budget	Education Budget Sub-Component
Special Allocation Fund for Education BA Education	BA Education allocated in the General Allocation Fund (DAU) – Non Salary BA Education allocated in the General Allocation Fund (DAU) – Educator Salaries BA Education allocated in Revenue Sharing Fund (DBH) BA Education allocated in the Special Autonomy Fund
Supplementary Fund for PNSD teacher income	
Teacher professional allowance Regional incentive fund Education Acceleration Fund for Regional Infrastructure Development (PPID) School Operational Assistance (BOS)	

Table 2 and its explanation clearly show that there are differences in how the budget is spent. Components in Central Government Education budget spending flow through the Ministry of Education and other ministries and then adjusted use by each to spend. On the other hand, regional government expenditures in the education sector generally have a standard use for each region, namely the Education Budget Section. That includes the DAU for educator salaries, non-salary, profit-sharing funds, and BA Education. It is allocated in the Special Autonomy fund, funds for additional income for PNSD teachers, teacher professional allowances, regional incentive funds, funds for accelerating regional education infrastructure development, and school operational assistance (BOS). With this budget structure, theoretically, the budget spent will be absorbed more quickly to stimulate the education sector in general. Education is a required field to improve the quality of human life.

In spending efforts made by the regions, the central government allocates funds to be transferred to the regions in terms of financing the education sector, the amount of which continues to increase from year to year. During the last ten years, there has been an increase in the value of the education budget through the transfers to the regions and village funds. Still, this increase is not too different from the increase in the education budget through central government spending. Graph 1 and Graph 2 show the growth in the number of education budgets through central government spending and education budgets through transfers to regions and village funds, and the ratio of both to total state spending 2011 – 2021.
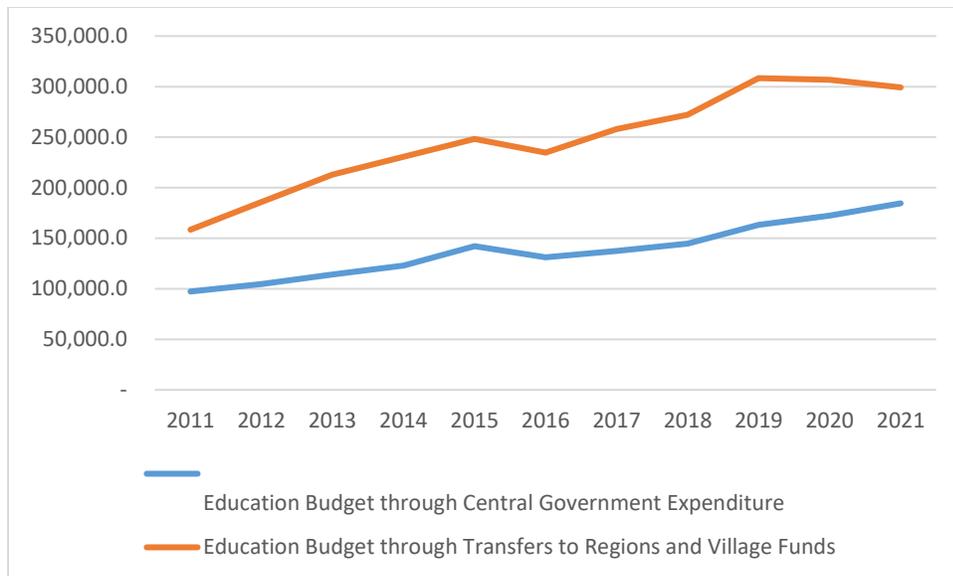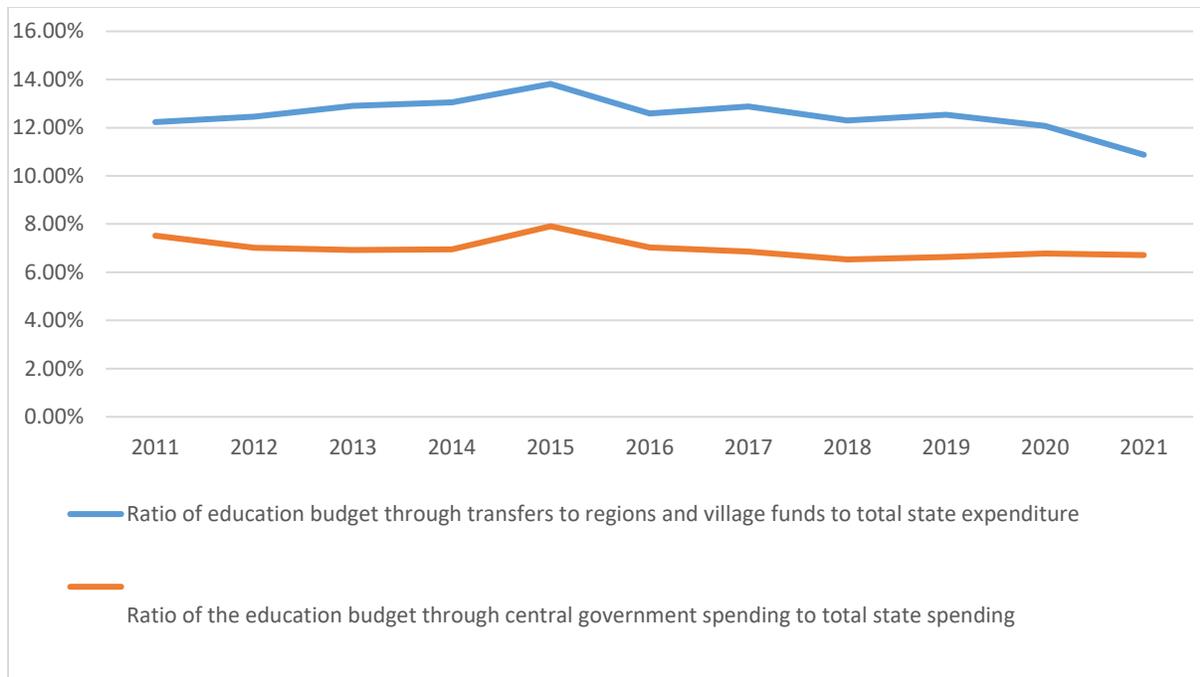
Graph 1. Growth in the number of education budgets through central government spending and education budgets through transfers to regions and village funds 2011 – 2021

Graph 1 shows that every year, both the education budget through central government spending and transfers to regions and village funds always increases. Still, the increase in both has a fixed proportion. The similarity of these proportions can be seen in graph two, where the ratio of the two is constant. There is no change. This similarity in proportion indicates that the government's policy on who spends the budget has not changed. The government provides a large enough space for the regions to spend the education budget directly.

The most significant challenge to face globalization and increasingly advanced technological developments is to prepare mature and good human resources. The commonly accepted measure to see competitive human resources is the Human Development Index (HDI). HDI is often used to measure the level of human quality (Setiawan & Hakim, 2013). The human development index is built from three essential components: a long and healthy life, knowledge, and a decent standard of living (Badan Pusat Statistik, 2018).

As in the pillar proposed by definition from the Central Statistics Agency, spending on education shows that knowledge is one of the pillars of building the human development index. The role of the government as the organizer of the state is a non-negotiable state obligation (Inkiriwang et al., 2020). Research shows a positive linear relationship between the percentage increase in the education budget and the percentage increase in HDI. The study's structure, which places the education budget in general as an independent variable, shows that there is indeed a correlation between the two variables (Ilhami et al., 2014). Several studies have stated a positive relationship between the education budget and the HDI from the regional approach, as happened in Bitung City (Lengkong et al., 2019).

Graph 2. The Ratio of Total Education Budget through Central Government Expenditure and Education Budget through Transfers to Regions and Village Funds to Total State Expenditure 2011 – 2021

Interestingly, several studies that have been conducted show that central government spending on education does not significantly affect HDI. At the same time, Local Government Expenditures in the Health and Education sector are directly and significantly proportional to HDI as in Mongan (2019). This finding is certainly interesting to explore further, given the critical role of education and the limited budget allocated to meet all state expenditures.

This study aims to see the extent to which the relationship between central and local government spending in the field of education on the Human Development Index is an indicator of Indonesia's quality of human life. Expenditures made are, of course, spending carried out at the central and regional levels. The education budget is absolutely necessary to increase the human development index, but it is important to investigate further judging from who is spending it. Furthermore, the findings of this study can answer which one accelerates the increase in HDI in Indonesia, whether through the central government or the regions. From this discussion, the hypothesis proposed by the standard hypothesis is based on conditions where:

H_0: The dependent variable is not significantly influenced by the independent variable
H_1: The dependent variable is significantly influenced by the independent variable

Furthermore, the development of the hypothesis in this study, to answer which one is more influential on the human development index, this study compares the coefficient value between central government spending and local government spending with the following specifications:

H₀: The coefficient of central government spending is higher than the coefficient of local government spending

H₁: The coefficient of central government spending is lower than the coefficient of local government spending

If the central government expenditure coefficient is lower than the coefficient of local government expenditures is met, H $_0$ is rejected, so that H $_1$ in which the central government expenditure is lower than the coefficient of local government spending. It means that local government spending has more influence on the acceleration of the increase in the human development index in Indonesia.

RESEARCH METHODS

This study uses the Vector Autoregression foundation to see which one is more influential between central government spending or local government spending and several other additional variables. The VAR approach is used because the Vector autoregression approach does not require much information and theoretical backups, such as a structural model that uses *a simultaneous equation basis*. That is, the variables used to construct the model can be mutually hypothesized as long as the variables influence each other over time (Hacker & Hatemi-J, 2009). The Vector Autoregressive (VAR) method can be used if several variables contain unit roots and are not cointegrated (Hacker & Hatemi-J, 2008).

The VAR model extends the notion of univariate autoregression for κ time-series regression when the estimated value for each κ appears as a regressor. It means that the VAR model regresses the Vector of time series variables on the Vector of these variables.

The Vector Autoregression (VAR) model describes the logic of univariate autoregression into $\hbar$ time series regression, where the lag value of all $\hbar$ becomes the regressor. Differently, in the VAR model, regression is performed on the time series variable Vectors at the lag of each Vector variable. Simply explained by a simple equation model $AR_{(p)}$, Lag order is translated to p so that $VAR_{(p)}$ with two variables X_t and Y_t ($\hbar_{=2}$) becomes:

$$Yt = \beta 10 + \beta 11 Yt - 1 + \cdots + \beta 1p Yt - p + \gamma 11 Xt - 1 + \cdots + \gamma 1p Xt - p + \mu 1t \ldots\ldots\ldots\ldots\ldots\ldots\ldots 1$$
$$Xt = \beta 20 + \beta 21 Yt - 1 + \cdots + \beta 2p Yt - p + \gamma 21 Xt - 1 + \cdots + \gamma 2p Xt - p + \mu 2t \ldots\ldots\ldots\ldots\ldots\ldots\ldots 2$$

In the case of a one-variate distributed lag model, the choice of variables to be included in the VAR is essential because adding unrelated variables reduces estimation accuracy and increases estimation error. The choice of this model is crucial because the number of parameters to be estimated increases per square to the number of variables modeled by VAR. With the development of this concept, it is believed that VAR can be carried out without going through a rigid hypothetical mechanism (Chen & Bessler, 1990; Engle & Issler, 1995; Gholipour et al., 2021)

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Because the variables are more random with specific possible outcomes x_t, the model is specified for the Bayesian Vector autoregression (BVAR) approach. Due to the standard VAR structure, Bayesian treats variables to be stochastic with probabilities that appear in the previous time range. Considering the reasonably high randomness, the model is specified using Bayesian assumptions as to the basis for estimation.

Table 3. Research Variables

Variables	Unit	Data source
Education Budget Through Central Government Expenditure on Education Budget (CGE)	billion rupiah	The Ministry of Finance of the Republic of Indonesia's APBN Data Portal with samples taken include: Ministry of Finance, Ministry of Agriculture, Ministry of Industry, Ministry of Energy and Mineral Resources, Ministry of Transportation, Ministry of Health, Ministry of Environment and Forestry, Ministry of Marine Affairs and Fisheries, Ministry of Tourism, Ministry of Youth and Sports, Ministry of Defense, Ministry of Manpower, Ministry of Cooperatives and Small and Medium Enterprises, Ministry of Communication and Information Technology, Ministry of Villages, Development of Disadvantaged Regions and Transmigration, Ministry of PUPR
Education Budget Through Transfer to Regions (Transfer to Region Government Expenditure)	billion rupiah	NPD Kemendikbud, APBN Data Portal Ministry of Finance of the Republic of Indonesia
Adjusted Per capita Expenditure (PPP)	Thousands/ person/year	Constant/actual price per capita expenditure for food and non-food commodities
Human Development Index (HDI)	index	Human Development Index Report, various years

The subjects studied used time-series data with time intervals from 2007 to 2021. The variables used in this study are summarized in table 3. Scope in this study, the Central Government Expenditure Budget variable in the field of education includes data from all ministries. The sample taken is accumulated into the Education Budget variable through Central Government Expenditure. By taking a sample of more than 90 percent (87 percent) of the total population, the central government's education budget figures can represent the existing population.

The problems that arise from data that are truncated in the time series cause their challenges in estimating. The budget component used has been implemented since 2007, so the timeframe used in this study starts from 2007 to 2021. It causes a limited number of observations, so the existing data is interpolated to extend the observations. To overcome this problem, data interpolation is carried out. Interpolation is done by constructing new data points

based on the range of discrete sets of recorded data (Steffen, 2006). A degree of error of 5 percent will be used to see the limits of whether the estimates made can be accounted for statistically.

RESULTS AND DISCUSSION

Results
The estimation that has been done using the Bayesian Vector Autoregression model shows the estimation results, which are presented in table 4.

Table 4. BVar Estimation Output

	CGE	PPP	HDI	TRGE
CGE(-1)	0.302608	-0.001014	-3.20 E-07	-0.044832
	(0.07692)	(0.00119)	(1.3E-07)	(0.11513)
	[3.93402]	[-0.85305]	[-2.48212]	[-0.38942]
CGE(-2)	0.037302	2.69E-05	-4.15E-08	0.064423
	(0.04602)	(0.00071)	(7.7E-08)	(0.06867)
	[0.81064]	[0.03796]	[-0.53978]	[0.93820]
CGE(-3)	0.015215	0.000210	-2.04E-08	0.055129
	(0.03171)	(0.00049)	(5.3E-08)	(0.04730)
	[0.47981]	[0.42935]	[-0.38413]	[1.16543]
CGE(-4)	-0.005553	4.80E-05	-2.89E-08	-0.012246
	(0.00882)	(0.00014)	(1.5E-08)	(0.01325)
	[-0.62991]	[0.35084]	[-1.94916]	[-0.92417]
PPP(-1)	3.322278	0.681844	1.98E-05	15.11627
	(3.88747)	(0.06078)	(6.6E-06)	(5.85388)
	[0.85461]	[11.2175]	[3.01060]	[2.58227]
PPP(-2)	3.749490	0.060743	-3.46E-06	-0.060583
	(2.88458)	(0.04526)	(4.9E-06)	(4.34244)
	[1.29984]	[1.34216]	[-0.71068]	[-0.01395]
PPP(-3)	3.085224	-0.008724	-5.98E-06	-1.050298
	(1.98957)	(0.03121)	(3.4E-06)	(2.99501)
	[1.55070]	[-0.27948]	[-1.78091]	[-0.35068]
PPP(-4)	2.329798	-0.013324	-4.94E-06	-0.675686
	(1.52225)	(0.02389)	(2.6E-06)	(2.29151)
	[1.53049]	[-0.55781]	[-1.92458]	[-0.29487]

	CGE	PPP	HDI	TRGE
HDI(-1)	-73449.60	2041.399	0.365141	131552.6
	(51549.2)	(801.498)	(0.08765)	(77621.1)
	[-1.42484]	[2.54698]	[4.16569]	[1.69481]
HDI(-2)	1086.445	241.5511	0.014190	36504.97
	(29127.2)	(452.792)	(0.04964)	(43852.0)
	[0.03730]	[0.53347]	[0.28587]	[0.83246]
HDI(-3)	2695.333	94.72581	0.001614	16487.62
	(19494.0)	(303.043)	(0.03322)	(29348.6)
	[0.13826]	[0.31258]	[0.04858]	[0.56179]
HDI(-4)	2474.753	52.57997	-0.000708	8373.808
	(14641.4)	(227.608)	(0.02495)	(22042.8)
	[0.16902]	[0.23101]	[-0.02839]	[0.37989]
TRGE(-1)	0.115172	0.001779	1.93E-07	0.560564
	(0.04363)	(0.00068)	(7.4E-08)	(0.06606)
	[2.63958]	[2.62303]	[2.61880]	[8.48555]
TRGE(-2)	0.037433	6.65E-05	3.11E-08	0.087959
	(0.03050)	(0.00047)	(5.1E-08)	(0.04634)
	[1.22715]	[0.14033]	[0.60410]	[1.89796]
TRGE(-3)	0.019716	-1.90E-06	5.55E-09	0.034003
	(0.02100)	(0.00033)	(3.5E-08)	(0.03191)
	[0.93873]	[-0.00582]	[0.15658]	[1.06545]
TRGE(-4)	0.014002	5.85E-05	-4.66E-09	0.017224
	(0.01591)	(0.00025)	(2.7E-08)	(0.02418)
	[0.88009]	[0.23653]	[-0.17354]	[0.71237]
C	-35198.64	893.3278	0.370408	-199353.2
	(43936.2)	(683.385)	(0.07451)	(66198.8)
	[-0.80113]	[1.30721]	[4.97151]	[-3.01143]

Source: estimation results

With an Obs of 30, the model in this study obtained a df of 25. The critical value is obtained with a significance level of 5 percent (0.05), as shown in table 5. The critical value of t (t table) of 2.045 indicates that the rejection region H_0: statistical value < -2.045 or $t > +2.045$. The rejection region shows that hypothesis 0 is rejected, and alternative hypotheses are accepted between those areas.

Table 5. df value, significance level, and critical value

df value	significance level	critical value t (t_{table})
29	0,05	2,045229642

Source: estimation results

From the estimation results, the following results are:

VAR Model - Substituted Coefficients:
===============================
CGE = 0.302607812371*CGE(-1) + 0.11517180467*TRGE(-1)

PPP = 0.681844406562*PPP(-1) + 2041.39925511*HDI(-1) + 0.00177898930402*TRGE(-1)

HDI = - 3.20044902877e-07*CGE(-1) + 1.97534965627e-05*PPP(-1) +
        0.365140937635*HDI(-1)+ 1.92831192665e-07*TRGE(-1)

TRGE = 15.1162735086*PPP(-1) + 0.560563706553*TRGE(-1)

Substitution with coefficients in the model that has been compiled shows that central government spending on education is influenced by central government spending on education in the previous six months and local governments spending over the last six months. Adjusted Per Capita Expenditure is influenced by per capita expenditure over the last six months, the Human Development Index during the last year, and Education Expenditure through Local Governments during the last six months. Central Government Expenditures influence the Human Development Index for Education in the previous six months, Per Capita Expenditure adjusted for the previous six months, Human Development Index 6 months earlier, and Education Expenditure through Local Government 6 months earlier. Education Expenditures Through Local Governments are influenced by Per Capita Expenditures adjusted for the previous six months and Education Expenditures through Regional Governments 6 months earlier.

Discussion
The estimation results show that when comparing the Central Government Expenditures on Education and Education Expenditures through Local Governments, the Central Government Expenditures on Education are inversely proportional to the Human Development Index, where an increase of one billion rupiahs will reduce HDI by 0.00000032. On the other hand, Education Expenditure through Local Governments shows a positive and significant relationship to the rise in HDI at the time lag t+1. An increase in Education Expenditure through Local Government by 1 billion rupiahs will increase the HDI by 0.000000193. Furthermore, the estimation results between central government spending and local government spending are presented in table 6.

The estimation results show that these two variables have t statistics that meet the critical t criteria (< - 2.045) so that both variables are accepted. Judging from the coefficient value, the coefficient of central government spending is lower than the coefficient of local government

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spending fulfilled. This estimation states to reject H 0 to H 1 accepted, which means that more local government spending affects the acceleration of the human development index in Indonesia.

Table 6. Comparison of Variables between Government Expenditures and Regional Education Expenditures on the Human Development Index

Variables	HDI
CGE(-1)	-3.20E-07
	(1.3E-07)
	[-2.48212]
TRGE(-1)	1.93E-07
	(7.4E-08)
	[2.61880]

Source: estimation results

This finding is linear with research conducted by Mongan (2019), which states that regional spending can significantly increase HDI more than central government spending. This finding is understandable because so far, the regions know better what each resident needs. In addition, the components of regional government spending based on transfers to regions, which include incentives and salaries, as well as allowances and acceleration of infrastructure development, are directly felt by stakeholders. This result is also explained in another variable, namely the adjusted expenditure variable. This variable also increases the human development index by 0.00000198 if an adjusted expenditure of one thousand rupiahs increases. The human development index is directly related to adjusted expenditure.

There is an anomaly between the findings of Mongan (2019) and this research, especially from the side of the Central Government. If in Mongan (2019) there is no relationship between Central Government Expenditures for Education, this study shows a relationship, but it is inversely proportional. This phenomenon can also be seen from the results of research in Nigeria. Government capital spending and inflation have a negative, although not significant, effect on HDI (Omodero, 2019). In addition, this phenomenon is also seen in Pakistan. His research (Ali et al., 2012) revealed a phenomenon of an increase in per capita income and education expenditure which has a positive effect. Current spending has a negative impact on human development. Although it is not a direct variable for education expenditure, expenditure may be negatively proportional to the human development index. With the logic that spending by the government is to improve the quality of its population, it turns out that spending that the central government has carried out has suppressed the Human Development Index. This phenomenon is possible because there has been a shift in the paradigm of spending from the Center to the regions. The influence of the regions has a greater effect on development targets. In the capacity at the national level, the Center only directs its budget policies throughout Indonesia. Because the policy is returned to the regions, the Center regulates but may execute if there are changes from the regions. In the

regional development planning system paradigm, program execution becomes the instrument of KUA and PPAS (because it is a combination of DAU, DAK, and PAD).

Furthermore, this anomaly can be understood by some examples in other countries. For example, in Brazil, research results showed that public spending is very likely to be an unclear condition (Fabrino et al., 2014). In general, there is an ambiguity between correlation and causality to establish causality between two varying variables together. It is necessary to emphasize that variations in one of the variables cause variation in the other, and causes precede their effects.

CONCLUSION

The fact that there is a significant effect between Education Expenditures through Local Governments on HDI shows that the regional government spending approach with the transfer mechanism to the regions is quite effective in improving the population's quality. The local government spending mechanism can be used as an effective way to improve the population's quality from other fields. Local governments are considered to understand more about their residents and what policies should be taken to improve the welfare of their citizens.

Although there is an inverse relationship between spending by the central government and HDI, it is too premature to consider the budget issued by the central government to be in vain or useless, especially since the development paradigm is fully assigned to each region.

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