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The Effect of Aceh Government Spending with Special Autonomy Fund Realization on Poverty Alleviation in Aceh Province

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Abstract

The distribution of special autonomy funds by the Indonesian government to the Aceh government is expected to increase economic growth while reducing poverty in the province, which has long suffered from the conflict. By using multiple linear regression analysis, this paper aims to examine the extent to which Aceh's special autonomy funds (DOKA/Dana Otonomi Khusus Aceh) affect reducing the poverty rate. This paper provided the probabilistic prediction for poverty alleviation, which is explained by variables of DOKA, economic growth, and unemployment rate. After running the data by using R *studio, the results show that DOKA and the Aceh government spending affect the poverty level in Aceh province. Also, economic growth affected the poverty level in the same period from 2008 to 2021. However, the unemployment rate as a variable control does not affect the poverty level in the several tests. In addition, this paper provided all predictor variables that can predict that every one-unit increase will affect the poverty level in Aceh province.*

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Keywords: *Poverty Rate, Development Outcome, Local Government Spending*

A. Introduction

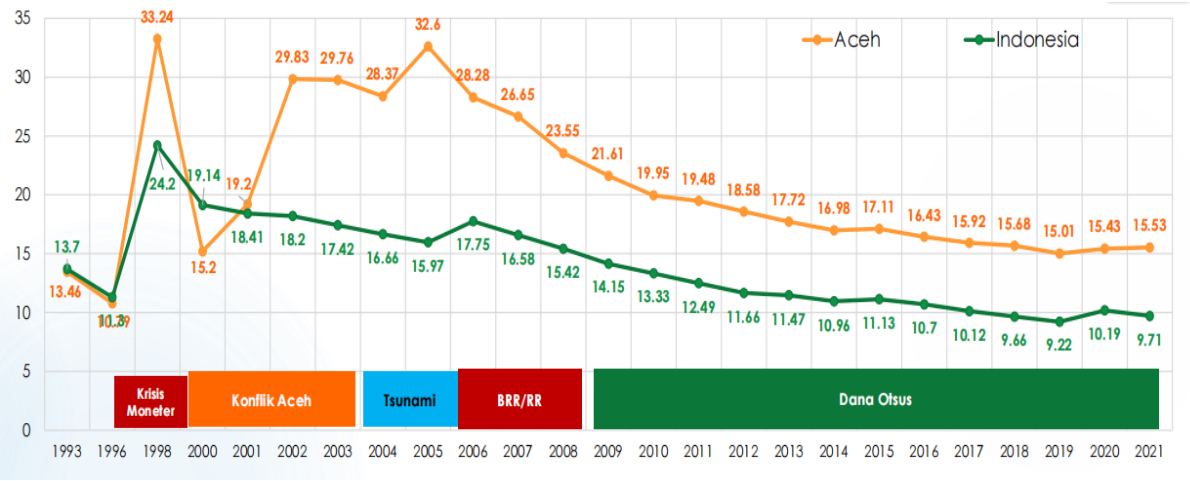
Aceh's poverty rate increased rapidly during the armed conflict (1976-2005) and after the Aceh Tsunami disaster, reaching a peak in 2005 (32.60 percent). This is even though during the period 2000-2005, the national poverty rate was decreasing. From 19.14 percent in 2000, it fell to 15.97 percent in 2005. This means that while other regions in Indonesia were enjoying better social conditions with a decline in poverty, Aceh suffered from a relatively sharp increase in poverty.

The establishment of the Aceh Reconstruction and Rehabilitation Agency in 2006 helped improve the situation of the people of Aceh after the tsunami. It resulted in a decline

in the poverty rate. This improvement became more consistent after the arrival of the Aceh Special Autonomy Fund (DOKA, *Dana Otonomi Khusus Aceh*) as subsidize for government spending starting in 2008, which was confirmed by the decline in Aceh's poverty rate from 23.55 percent in 2008 to 15.53 percent in 2021, a reduction of around 8.02 percent. This compares to the national poverty rate during the same period, which only decreased by around 5.71 percent. Thus, the decline in Aceh's poverty rate since 2008 has been faster than the decline in the national poverty rate. In simple terms, I hypothesize that DOKA influences poverty reduction in Aceh Province.

Chart 1

The numbers of Poverty rate in Aceh Province, Indonesia



Resource: *KOMPAK (2022)*

Although Aceh's poverty rate had sharply decreased from 2008 to 2019 before finally significantly increasing again in 2020-2021 due to the COVID-19 pandemic, however, compared nationally and regionally, Aceh province has the highest poverty rate in the Sumatra region in 2021. Therefore, the impact of DOKA subsidies and government spending on poverty reduction in Aceh remains questionable.

This paper will continue by presenting a literature review of government spending and other poverty reduction predictors in several research locations. The hypothesis will be created based on evidence in the literature review. The data and data analysis strategy will be explained in the methods section. The results section will follow this. In conclusion, I summarize the main findings and the prediction for future conditions.

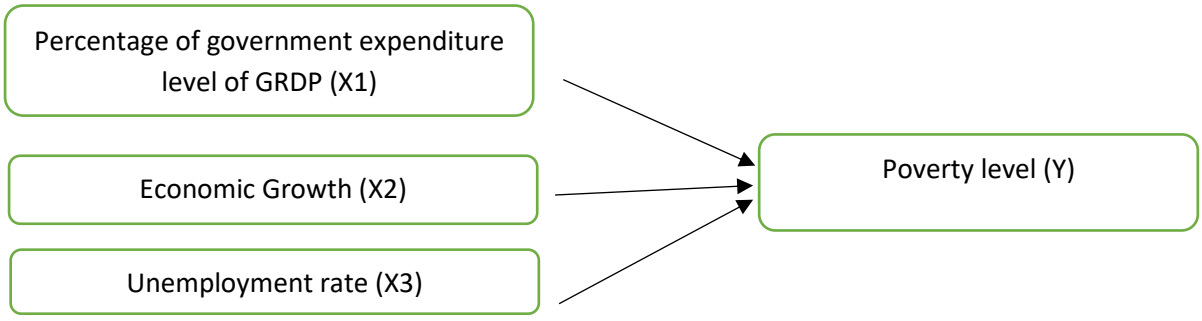
Commonly the impact of government expenditure on poverty reduction is expected in several development predictions. Various studies have examined this relationship in different countries and regions. Ganna Kotsiurubenko et al. (2022), in their article *Financial*

Capacity of Local Budgets as a Potential for Sustainable Development and Welfare of the Population state that the size of the local revenue budget significantly impacts public welfare. In addition, Khader and Salman (2022) analyzed the impacts of public spending policy on poverty trends in Iraq and found that increased government expenditure contributed to a decline in poverty rates. Additionally, Davila (2023), a study on Latin American countries, showed that social protection expenditure significantly impacted poverty reduction in the long run. Locally, Suartini (2019), in the journal *Local Financial Performance and Its Impact on Border Community Welfare*, analyses local governments' financial capacity and performance, which shows that allocating and managing funds at the local level can affect community welfare.

Besides government spending, another predictor also affects determining the poverty level in a country or region. Olonite et al. (2021) found that capital expenditure on economic services positively and significantly impacted economic growth in Nigeria. In addition, other studies have shown that economic growth has a negative relationship with poverty, indicating that poverty rates tend to decrease (Misini and Mustafa, 2022; Anderu, 2021). Also, unemployment is closely linked to poverty, as unemployed individuals are likelier to experience poverty (Simanungkalit E, 2023; Nwosa, 2014). Locally, Jam'an et al. (2022), in their research using quantitative methods, show that economic growth, government expenditure, and unemployment impact poverty in Bulukumba Regency, Indonesia.

These studies highlight the importance of government spending in addressing poverty and promoting economic growth. Moreover, economic growth and the unemployment rate also impact poverty in several studies. Therefore, this paper will examine the Aceh government spending with DOKA as a predictor variable. Also, economic growth and the unemployment rate are control variables

Chart. 2
The research framework



Resource: *Researcher (2024)*

Based on the previous literature reviews, this research conducts several arguments as null hypotheses, including:

1. The Percentage of Government expenditure level of GRDP (X1) has a negative effect on poverty rate (Y)
2. The Economic Growth (X2) has a negative effect on poverty rate (Y)
3. The Unemployment rate (X3) has a positive effect on poverty rate (Y)

B. Method

This research uses a quantitative approach that fully uses secondary data derived from the Central Bureau of Statistics (BPS), an official institution of the Republic of Indonesia responsible for the presentation of development data. The data processed is Aceh province data from 2008 to 2021, including data on the percentage of government expenditure level of Gross Regional Domestic Product (GRDP), economic growth, and unemployment rate, which are set as the independent variables (X1, X2, and X3). Meanwhile, the dependent variable consists of the poverty rate (Y).

In this study, as the common conceptualization, the percentage of government expenditure level of Gross Regional Domestic Product (GRDP) refers to the impact of government spending on economic activity and overall production within a specific region. Government expenditure is considered one of the components of aggregate demand that can increase domestic products. Additionally, the percentage of economic growth refers to the measure of the increase in the ability of an economy to produce goods and services over a given period of time. Economic growth can be influenced by various factors such as revenue, population growth, and sectoral GDP. Moreover, the unemployment rate refers to the proportion of the workforce that is currently without a job. It is an important macroeconomic indicator that is closely monitored and used to assess a country or regional's economic performance. The unemployment rate is calculated by dividing the number of unemployed individuals by the total number of individuals in the labor force. Then, the poverty rate refers to the percentage of the population that falls below the poverty line, which is the minimum for an adequate standard of living in a country.

The data of the percentage of government expenditure level of GRDP, percentage of economic growth, and unemployment rate that will be tested is shown in the table below:

Table 1.

Data on the percentage of government expenditure level of GRDP, percentage of economic growth, and unemployment rate in Aceh Province from years 2008 to 2021

Years	Government Spending	Economic	Unemployment	Poverty
2008	15.36	-5.24	9.56	23.55
2009	17.31	-5.51	8.71	21.61
2010	17.35	2.74	8.37	19.95
2011	18.95	3.28	9	19.48
2012	21.16	3.85	9.06	18.58
2013	25.6	2.61	10.12	17.72
2014	28.72	1.55	9.02	16.98
2015	33.7	-0.73	9.93	17.11
2016	38.49	3.29	7.57	16.43
2017	39.56	4.18	6.57	15.92
2018	38.02	4.61	6.34	15.68
2019	42.28	4.14	6.17	15.01
2020	38.45	-37	6.59	15.43
2021	41.68	2.79	6.3	15.53

Resource: *Bappeda Aceh dan BPK Aceh (2022)*

The data was analyzed using multiple linear regression analysis in several regression models. The formula will test the first model:

$$y = \beta_0 + \beta_1 x_1 + \epsilon$$

Then, the formula test second model is:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \epsilon$$

The third model will be tested by the formula:

$$y = \beta_0 + \beta_1 x_1 + \beta_3 x_3 + \epsilon$$

Finally, the model will be tested in complete both predictor and all control variables by the formula:

$$y = \beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + \epsilon$$

Where,

y = the poverty rate

x_1 = the percentage of government expenditure level of GRDP

x_2 = percentage of economic growth

x_3 = unemployment rate

The data analysis will be carried out in multiple linear regression analysis. The stages of data analysis are the following:

a. Hypothesis formulation

H_0 : There is an effect of the amount of percentage of government expenditure level of GRDP (X1), economic growth (X2), and unemployment rate (X3) on poverty level (Y).

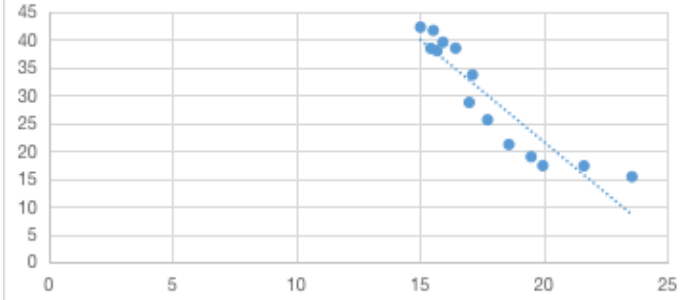
$H_{1,2,3,4}$: There is no effect of the amount of the percentage of government expenditure level of GRDP (X1), economic growth (X2), and unemployment rate (X3) on poverty level (Y).

b. Creating a scatter plot and linearity test to test whether two linear variables have a relationship or influence in several models.
c. The multiple linear regression analysis will be running in the R studio, and the result will be exposed and interpreted that result shown in the R studio.
d. Decision making in interpretation and analysis, there are several decision criteria, including:
    1) Statistically significant
        - If the p-value >0,05, then \(H_{0}\) is accepted
        - If the p-value <0,05, then \(H_{0}\) is rejected
    2) Will predicting for every one unit increase in all predictor variables it will affecting the dependent variable

C. Result

The first model hypothesis that will tested is the effect of the percentage of government expenditure level of GRDP (X1) on the poverty level (Y). A scatter plot and linearity test to test whether two of those linear variables have a relationship or influence in both variables can be seen in the line chart below. Based on the chart, even though variables X1 and Y have a relationship, there are weaker linear relationships between both variables.

Chart. 3.
Scatter Plot and Linearity Test between Government Spending and Poverty Rate



Then, the interaction between the poverty level (Y) as the dependent variable and all independent variables, including X1, X2, and X3, a scatter plot and linearity test can be seen in the line chart below. Based on the chart, there are all independent variables: the percentage of government

Chart. 4.
Scatter Plot and Linearity Test between dependent variable and all independent variables

expenditure level of GRDP, economic growth, and unemployment rate have weaker linear relationships with the poverty level. However, the interactions show a linearity of both variables.

Based on multiple linear regression analyses that run in the R studio, the result will be exposed and interpreted in several models below:

Model 1

This model is the result of examining the hypothesis.

H_0: The percentage of government expenditure level of GRDP (X1) affects poverty level (Y).

H_1: There is no effect of the percentage of government expenditure level of GRDP (X1) on the poverty level (Y).

```
Residuals:
    Min      1Q  Median      3Q     Max
-1.1944 -0.7809 -0.0346  0.4793  2.4333

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 24.67136    0.87300  28.261 2.39e-12 ***
x1          -0.23143    0.02785  -8.309 2.54e-06 ***
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.026 on 12 degrees of freedom
Multiple R-squared:  0.8519,    Adjusted R-squared:  0.8396
F-statistic: 69.04 on 1 and 12 DF,  p-value: 2.545e-06
```

Based on the result, the model has an intercept of 24.67136 and a coefficient of -0.23143 for variable X1. Regarding p-values, the overall model appears statistically significant based on the low p-values for the coefficients and F-statistics. Also, the model

explains most of the variance in the dependent variable, as indicated by the high R-squared value. To conclude, H_0 is accepted, and H_1 is rejected.

The first model means that the percentage of government expenditure level of GRDP affects the poverty level in Aceh province. Furthermore, a one-unit increase in the percentage of government expenditure level of GRDP is associated with a decrease of approximately 0.19258 units in the poverty level in Aceh province, holding other variables constant. Tu concludes that the government expenditure level of GRDP can reduce the poverty level in Aceh province.

Model 2

The second model is the result of examining the hypothesis.

H_0: The percentage of government expenditure level of GRDP (X1) and economic growth (X2) does not affect the poverty level (Y).

H_1: The percentage of government expenditure level of GRDP (X1) and economic growth (X2) affects the poverty level (Y).

```
Residuals:
     Min       1Q   Median       3Q      Max
-1.14036 -0.41976  0.06023  0.33424  1.34427

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 23.88480    0.67639  35.312 1.13e-12 ***
x1          -0.19258    0.02327  -8.277 4.72e-06 ***
x2          -0.24408    0.07160  -3.409  0.00583 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.747 on 11 degrees of freedom
Multiple R-squared:  0.928,     Adjusted R-squared:  0.9149
F-statistic: 70.89 on 2 and 11 DF,  p-value: 5.191e-07
```

Based on the result, the model shows that the p-value is low (5.191e-07), suggesting that the model with both X1 and X2 is statistically significant. However, the coefficients for X2 are about 0.00555 in the significance level at 0.01. It was also statistically significant. Regarding p-value, the decision in this model is H_0 is rejected, and H_1 is accepted. It can be interpreted as the economic growth (X2) also affecting the poverty level (Y) in the Aceh province period from 2008 to 2021.

In addition, based on coefficients, estimate that a one-unit increase in economic growth is associated with a decrease of approximately 0.24408 units in the poverty level in Aceh province, holding other variables constant. These interpretations assume that the relationship between the economic growth in Aceh and the poverty level is linear, even without interactions between the predictors.

Model 3

The third model is the result of examining the hypothesis.

H_0: The percentage of government expenditure level of GRDP (X1) and unemployment rate (X3) does not affect the poverty level (Y).

H_1: The percentage of government expenditure level of GRDP (X1) and unemployment rate (X3) affects the poverty level (Y).

```
Residuals:
    Min      1Q  Median      3Q     Max
-1.1874 -0.8300 -0.1430  0.5374  2.4224

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 26.35172    3.56005   7.402 1.36e-05 ***
x1          -0.24736    0.04353  -5.682 0.000142 ***
x3          -0.14902    0.30541  -0.488 0.635180
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.06 on 11 degrees of freedom
Multiple R-squared:  0.8551,    Adjusted R-squared:  0.8287
F-statistic: 32.45 on 2 and 11 DF,  p-value: 2.435e-05
```

The result shows that the intercept is 26.35172. The overall model is statistically significant, indicated by a low p-value (2.435e-05), which suggests that the model with both X1 and X3 is statistically significant. However, the p-value for X3 is quite high (0.635180), which indicates that X3 is not statistically significant in predicting Y. This means that the unemployment rate does not affect the poverty level in Aceh province period from 2008 to 2021. However, the result can be predicted for every one-unit increase in the unemployment rate; the poverty rate is expected to decrease by 0.14902 units.

In addition, the Multiple R-squared is also 0.8551, indicating that the model explains that approximately 85.51% of the dependent variable is variability. Also, the adjusted R-squared considers the number of predictors and is 0.8287. In summary, The percentage of government expenditure level of GRDP appears to be a statistically significant predictor, but the unemployment rate is not. This model explains most of the variance in the dependent variable.

Model 4

This model will include all of the predictors to examine the hypothesis.

H_0: The percentage of government expenditure level of GRDP (X1), economic growth (X2), and unemployment rate (X3) does not affect the poverty level (Y).

H_1: The percentage of government expenditure level of GRDP (X1), economic growth (X2), and unemployment rate (X3) affects the poverty level (Y).

```
Residuals:
     Min       1Q   Median       3Q      Max
-1.29667 -0.24373  0.02204  0.21002  1.29253

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) 26.42561    2.49598  10.587 9.40e-07 ***
x1          -0.21567    0.03182  -6.777 4.87e-05 ***
x2          -0.25193    0.07160  -3.518  0.00555 **
x3          -0.22757    0.21528  -1.057  0.31534
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.743 on 10 degrees of freedom
Multiple R-squared:  0.9352,    Adjusted R-squared:  0.9158
F-statistic: 48.14 on 3 and 10 DF,  p-value: 2.999e-06
```

Based on the result, the model shows that the overall is statistically significant, as indicated by the low p-value (2.999e-06). However, X3 is not statistically significant, as indicated by their high p-values (0.677048) lower than 0.05. The multiple R-squared is 0.9352, indicating that approximately 93.52% of the variability in the dependent variable is explained by the model. The Adjusted R-squared takes into account the number of predictors and is 0.9158. In summary, X1 and X2 are statistically significant predictors, but x3 is not. The model explains most of the variance in the dependent variable.

D. Conclusion

From the inquiry of the impact of the Aceh Special Autonomy Fund (DOKA) subsidies and government spending on poverty reduction in Aceh, the examination results show that DOKA and the Aceh government spending affect the poverty level in Aceh province. Also, economic growth affected the poverty level in the same period from 2008 to 2021. However, the unemployment rate as a variable control does not affect the poverty level in the several tests. In addition, all predictor variables can predict that every one-unit increase will affect the poverty level in Aceh province. The prediction includes:

a) Every one-unit increase in economic growth is associated with a decrease of approximately 0.24408 poverty level in Aceh province, holding other variables constant.
b) Every one-unit increase in the percentage of government expenditure level of GRDP is associated with a decrease of approximately 0.19258 poverty level in Aceh province.
c) With every one-unit increase in the unemployment rate, the poverty level is expected to decrease by 0.14902 points.

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