

## Environmental Cost Allocation Model: Sustainability Local City in Indonesia

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### Abstract

This study aims to test a model for determining environmental cost allocation in local governments in Indonesia. Factors that are expected to contribute to this cost allocation determination model include gross regional domestic product, investment, population and local revenue. The population in the study were districts in Central Java province totalling 35 districts. The data analysis used in this study is a mediation regression model. This study uses quantitative data, where the data used in the study are obtained from the financial statements of each district in Central Java Province and the regional revenue and expenditure budgets of each district in Central Java Province. The results of this study prove that there is an influence of gross domestic product, population and local revenue on the determination of total environmental costs. However, investments made by local governments have no effect on the allocation of environmental costs that have been determined.

### How to Cite

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## INTRODUCTION

The principle of autonomy in regional government is an attempt by the central government to further optimize the authority of regional governments Utaminingsih at (2023). Regional government authority includes authority over financial management and non-financial management. Local government as a public sector organization is an organization that prioritizes public interests and is based on a non-profit basis; its activities are focused on the interests of the community; for this reason, its social responsibility is not lower than a company which incidentally is a profit-oriented private company Utaminingsih at al (2023).

Environmental accounting or Green Accounting enables the development and implementation of accounting systems related to the environment that help companies manage environmental and economic performance in reporting and auditing company information (International Federation of Accounts, 2009;). The government as one of the public sectors has an interest in natural resources and the environment and is obliged to report its contribution in improving environmental quality. The Law on Protection and Management of the Environment, No.32 of 2009 requires that the budget in government must be an environment-based budget (paragraph 10, articles 45-46), the mandate for drafting an environment-based budget requires that the government The government and the People's Representative Council of the Republic of Indonesia as well as local governments and the Regional People's Representative Council must allocate an adequate budget to finance: (a) environmental protection and management activities; and (b) environmentally sound development programs. Furthermore, Law No. 11 of 2020 concerning Job Creation further regulates urban planning which prioritizes the revitalization of certain areas within a country or city that pays attention to environmental control.

Sustainability of city government can be realized through the government's concern

for the allocation of environmental costs Utaminingsih at al (2023). The higher the local revenue (PAD) allocation earmarked for environmental budgets shows the gover Universitas Lambung Mangkuratnment's concern for environmental revitalization and conservation issues. The amount of environmental expenditure budget for local governments shows how much local governments have concern for environmental revitalization. There are several measurements for environmental costs; according to The World Conservation Union, environmental costs can be measured using monetary units or physical units. For monetary units, the amount of costs incurred by an entity for the environment can be used, although this is difficult to do.

Mahmud (2012) research find that local revenue (PAD) components signifikan probability to environmental budget. The environmental expenditure budget set by the local government can be explained by 83% by the independent variables of local taxes, regional fees, results of wealth management, and other legal pad variables. However, this model has not been able to describe the factors that are thought to be able to increase PAD or local taxes in each local government which will directly or indirectly affect the size of the environmental expenditure budget. However, local government concern, responsibility, involvement, reporting of environmental accounting and environmental audits have not become research topics.

Based on this, this study will focus on several demographic factors and local government characteristics that are thought to be able to reflect the size of the environmental budget allocation. Therefore, this research will examine the influence of quantitative and qualitative factors on the environmental expenditure allocation model. The government can make a policy whether it is quantitative factors that should receive more attention or qualitative factors that have a contribution to policy making. so research is needed to find out how much the value of local original income can moderate the relationship between

gross domestic product, investment value and population to the environmental budget.

The success of a country's sustainable development depends on social capital that shows the ability to maintain good cooperative relations between various institutions, communities or other countries. Such cooperation is the basis for the preparation of plans and development policies that are environmentally sound. The environment is the most important thing in the success of a regional cooperation. Much research has been done on the influence of local own source revenue (local own source revenue) on regional spending. Aziz et. al (2000); Furstenberg (1998) in Utaminingsih at all (2023). Proves that his research hypothesis that regional revenue (especially taxes) will affect the local government budget is known as the tax spend hypothesis. This means that the greater the local tax revenue, the greater the original regional income and will have a direct impact on increasing the original regional income. Likewise, it can be hypothesized that the higher the regional income, the higher the environmental budget set.

Gross regional domestic product (GRDP) is the sum of all final goods and services (all added value generated by the region within a certain period of time). Research by Setiawan Utaminingsih at all (2023). The GRDP of the Agriculture Sector, the GRDP of the Mining and Quarrying Sector, the GRDP of the Processing Industry Sector, and the GRDP of the Transportation and Warehousing Sector collectively have a significant positive influence on Environmental Quali-

ty. Based on this research, it can be assumed that the regional gross domestic product has an effect on environmental costs through local revenue. Likewise for the variable amount of investment (INV) issued by the local government will increase PAD. The increase in PAD will have an impact on the amount of environmental spending for the government. The increase in population (POP) has a direct effect on PAD in Central Java Province [9]. So it is suspected that the population and investment will affect the size of the environmental budget through the PAD variable.

The hypothesis compiled in this study is:

Ha1: Determination of Environmental Costs at local governments is simultaneously directly influenced by GRDP, Investment, Population, and PAD

Ha2: Determination of Environmental Costs in local government is influenced by GRDP, through the PAD variable

Ha3 : Determination of environmental costs in local government is influenced by the amount of investment through the PAD variable

Ha4: Determination of Environmental Costs in local government is influenced by the Total Population through the PAD variable

## METHODS

This research is a research with a quantitative approach.. Secondary data obtained from the publication of all cities/districts on [www. Dpjm.depkeu.go.id](http://www.Dpjm.depkeu.go.id) in 2018-2019 and obtained from the Provincial Government

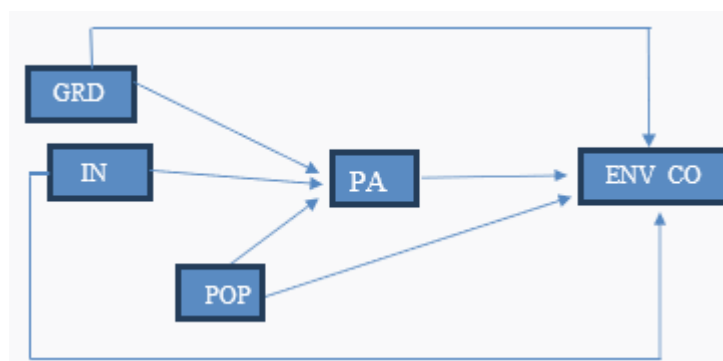


Figure 1. Research Framework

of Central Java. The population in this study were all cities or regencies in Central Java Province, totaling 35 cities/districts. The analysis technique used is a mixed method research, with the Data Transformation Model, so that there are 2 analyzes carried out. First, the qualitative data that has been collected through the interview method will be analyzed using factor analysis, resulting in new factors. Quantitative data in the form of GRDP, Total Investment, Total Population, Regional Original Income and Environmental Expenditures as well as new formation factors are analyzed by means of Path Analysis, which is used to answer the research hypothesis.

**RESULTS AND DISCUSSION**

Based on the sample selection, 25 cities/districts have presented all the data according to the research. So the total unit of analysis is 50 pieces of panel data.

The results of the descriptive analysis show that the standard deviation value for

GRDP is 1.04507E7, this indicates that the distribution of GRDP values for cities/regencies in the unit of analysis is quite heterogeneous. This can also be seen in the minimum and maximum value indicators which have quite a wide range. The lowest GRDP value is Rp. 1,849,275,560,000 owned by the City of Salatiga, and the highest GRDP was owned by the City of Semarang, amounting to Rp. 48,461,410,410,000. The highest environmental cost is Rp. 1,915,000,000 owned by the City of Demak, and the highest is in the city of Semarang, amounting to Rp. 58,643,852,500.

The results of data quality testing related to autocorrelation in research data show that the Durbin Watson value is 2.223. By comparing the t table value at the 5% error rate and 4 independent variables, it has a t table value for dl of 1.378 and du of 1.721. Because the dw value of 2.223 lies above 1.378 and below 2.279, it can be concluded that there is no positive or negative autocorrelation or it can be concluded that there is no autocorrelation.

**Table 1.** Descriptive Statistics 25 Cities/Districts

	N	Minimum	Maximum	Mean	Std. Deviation
GRDB	50	1.85E6	4.85E7	1.07E+11	1.05E+12
INV	50	500	20880	4891.66	4.347.205
POP	50	.17033	174.253	.9771604	.41204283
PAD	50	38186	427312	8.89E4	63.976.496
ENV_COST	50	1915	58644	9107.30	13.478.881
Valid N (listwise)	50				

Source: Processed data, 2023

**Table 2.** Autocorrelation Test

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.898 <sup>a</sup>	0.806	0.789	6193.411	2.223

a. Predictors: (Constant). PAD. INV. POP. GRDB  
 b. Dependent Variable: ENV\_COST

Source: Processed data, 2023

**Table 3.** VIF Value

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Collinearity Statistics	
	B	Std. Error	Beta			Tolerance	VIF
1 (Constant)	932.386	2676.358		0.348	0.729		
GDRB	0.001	0	0.541	3.889	0	0.222	4.498
INV	0.064	0.232	0.021	0.278	0.782	0.769	1.3
POP	-9797.91	3174.909	-0.3	-3.086	0.003	0.457	2.186
PAD	0.112	0.024	0.533	4.626	0	0.325	3.078

a. Dependent Variable: ENV\_COST

Source: Processed data, 2023

**Table 4.** Coefficient Correlations

Model		PAD	Investasi	Jmlpddk	PDRB
1 Correlations	PAD	1	-0.108	0.251	-0.777
	INV	-0.108	1	-0.48	0.288
	POP	0.251	-0.48	1	-0.599
	GRDB	-0.777	0.288	-0.599	1
Covariances	PAD	0.001	0	19.351	-3.38E-06
	INV	0	0.054	-353.47	1.20E-05
	POP	19.351	-353.47	1.01E+07	-0.342
	GRDB	-3.38E-06	1.20E-05	-0.342	3.22E-08

a. Dependent Variable: ENV\_COST

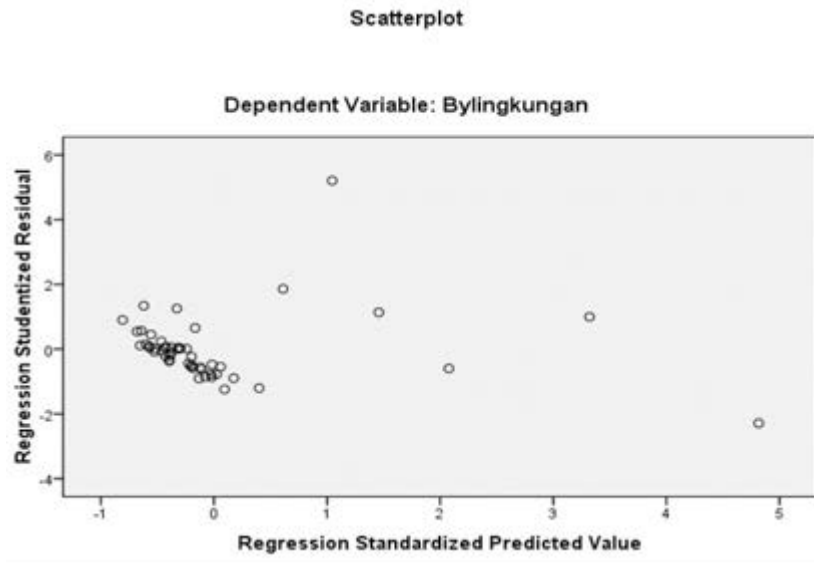
Source: Processed data, 2023

The results show that the resulting tolerance value is not less than 0.10 so that there is no correlation between the independent variables whose value is more than 95%. The VIF also show that there is not one independent variable that has a VIF value of more than 10.

The highest correlation is in the population variable to the GRDP variable, but the relative value cannot be said to be serious where multicollinearity occurs, so it can be concluded temporarily that the independent and dependent variables do not contain multicol-

linearity.

Heteroscedasticity testing uses a scatterplot, the test results show that the points spread randomly and are scattered both above and below the number 0 on the Y axis. Therefore it can be concluded that there is no heteroscedasticity in the regression model. The normality test was carried out on the regression model proposed in the study, showing that based on the histogram it shows that the data is normally distributed, so that the regression can be continued.



**Figure 2.** Heteroskedastisitas test

**Table 5.** Model Summary & Coefficients Model 1

Model Estimate	R	R Square	Adj. R Square	Std. Error
1	.822 <sup>a</sup>	0.675	0.654	37635.8

Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	1.35E+11	3	4.51E+10	31.864	.000 <sup>a</sup>
Residual	6.52E+10	46	1.42E+09		
Total	2.01E+11	49			

Predictors: (Constant)GRDB. INV. POP  
 Dependent Variable: PAD

Source: Processed data, 2023

**Table 6.** Model Summary 2

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate
1	.898 <sup>a</sup>	0.806	0.789	6193.411

a. Predictors: (Constant). PAD. GDRB. INV. POP

Source: Processed data, 2023

Testing the hypothesis in this study using regression against 2 models. Model 1 testing is carried out by multiple linear regression with the dependent variable PAD, while the independent variables consist of GRDP, Investment, and Population.

Testing model 2, is needed to see the mediating relationship that exists in the regional original income (PAD) variable. The reg-

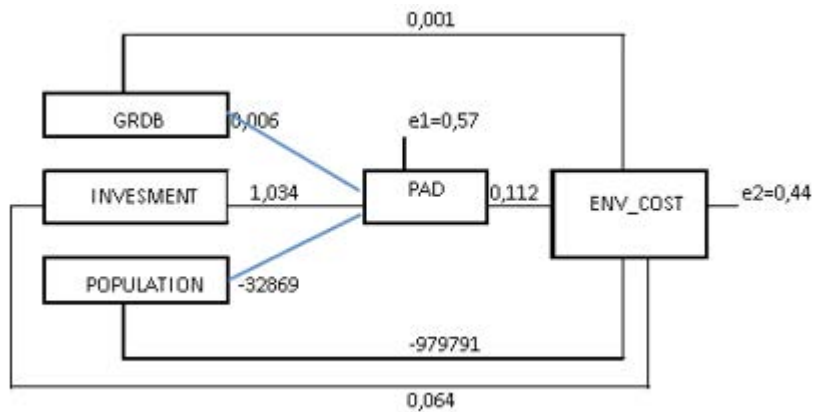
ression results show that the R square value is 0.806. This means that this model can be used to predict the environmental budget that will be issued by PPKD. With an R square value of 0.806, the dependent variable can be explained from the variation of the independent variable of 80.6% while the rest is influenced by other factors.

**Table 8.** Coefficients Model 2

Model	Unstd. Coeffs.		Std. Coeffs	T	Sig.
	B	Std. Error	Beta		
1 (Constant)	932.386	2676.358		0.348	0.729
PDRB	0.001	0	0.541	3.889	0
INV	0.064	0.232	0.021	0.278	0.782
POP	-9797.911	3174.909	-0.3	-3.086	0.003
PAD	0.112	0.024	0.533	4.626	0

a. Dependent Variable: ENV\_COST

Source: Processed data, 2023



**Figure 3.** Path Analysis

The results of simultaneous regression testing show that simultaneously PAD, investment, population and GRDP can significantly influence the amount of environmental budget issued by a city or district. Based on the significance value in model 2 of 0.00 because it is smaller than 0.05, hypothesis 1 is accepted. This means that there is a simultaneous influence of GRDB variables, investment and population on PAD.

According to Table 8, the investment variable does not affect the environmental budget variable, this result can be seen at a significance value of 0.782 which is greater than the value of 0.05. For the GRDP variables, total population and PAD show a significance value below 0.05 so that the variables mentio-

ned above have a significant effect on the environment budget variable and H1 is accepted.

Testing the mediating effect of the PAD variable was carried out using the sobel test. Figure 3 presents an image of the path analysis that has been carried out in this study.

The result for hypothesis 2 uses sobel test is t value is 3.6521(table 9) compared to the t table value at the  $\alpha = 5\%$  level of 1.96. The results of the comparison between t count and t table show that t count is greater than the t table value, so that the PAD variable has a mediating nature in the relationship between GRDP and the environmental budget. So that H2a = Determination of Environmental Costs in local government is influenced by GRDP, through the PAD variable is accepted.

**Table 9.** Sobel Test

No	Description	t Value
1	Path of HRDB-PAD-ENV_COST	3.6521
2	Path of INV-PAD-ENV_COST	0.7127
3	Path of POP-PAD-ENV_COST	4.2380

Source: Processed data, 2023

According table 9, The hypothesis 3 for t count is 0.712687. It's compared to the value of t table at the level of  $\alpha = 5\%$  of 1.96. The results of the comparison between t count and t table show that t count is smaller than the t table value, so that the PAD variable has mediating properties that are not significant to the relationship between GRDP and the environmental budget. So Ha3 is rejected. That's mean determination of environmental costs in local government is not influenced by the amount of investment through the PAD variable is rejected. Investment does not affect the size of the budget and PAD cannot mediate in this research, due to the large gap in the amount of investment between the observed data. A number of local governments have a relatively small investment value compared to others, for example Surakarta City has an investment value of Rp. 500,000,000, while Banyumas district has an investment value of Rp. 20,880,000,000. The difference between the two investment values in the two local governments is Rp. 20,380,000,000, this figure is relatively large if we look at the variance in the 34 observed data. In the city of Surakarta, the investment value is the smallest among the 34 existing cities/regencies, but has the largest environmental budget value. Meanwhile, Banyumas district ranks 21st for the environmental budget. The size of the budget for environmental costs cannot be observed from the investment pattern that has been made by the city government or regional government. So that the results of the data analysis do not show that there is a significant influence from investment to the environmental budget either directly or indirectly.

Test of H4, according table 9, t count to relationship between population, PAD and environmental cost is 4,23801. So Ha4 accepted. Determination of Environmental Costs in local government is influenced by the Total Population through the PAD variable. The findings of this study are in accordance with Dewi's research Utaminingsih at all (2023). which states that there is an effect of population on PAD due to the availability of labor pressure as part of the company's production factors. The higher the population and work will increase the productivity of goods and services so that there is economic growth. The higher the economic growth, the more it will influence the spending by local governments. Another view suggests that an increase in population will increase the amount of tax received. A number of regional taxes have experienced growth in line with the increase in population. This increase is interpreted as one of the drivers of increasing local revenue Utaminingsih at all (2023).

## CONCLUSION

The results of the study show the conclusion that the determination of the Environmental Expenditures budget in local government, city or district levels is influenced by Local Own Revenue. The determination of the Environmental Expenditures budget in local government is influenced by the amount of GRDP and Population through Local Own Revenue. The determination of the Environmental Expenditures budget in local government is not influenced by the amount of investment, either directly or indirectly. The



model for determining the environmental expenditure budget used by local governments has not paid attention to the amount of investment it has made. So it is recommended for local governments to be able to further increase the budget for environmental costs in line with the increase in investment they make.

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