Zero : Jurnal Sains, Matematika, dan Terapan
E-ISSN : 2580-5754
P-ISSN : 2580-569X
Vol. 6, No. 2, December 2022
pp. 194-201

Analysis of The Factors That Affect The Original Regional Income of The Province of North Sumatera Using Panel Data Regression

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Article Info

Article history:

Keywords:

Gross Regional Domestic Product, Number of Tourist, Regional Own Revenue, Panel Data, Restaurant Tax

ABSTRACT

Regional Own Revenue is all revenue from the government at the regional level in a certain period, usually in a period of one fiscal year. There are several factors that can be used to increase Local Own Revenue. The factors used in this study are gross regional domestic product, number of tourists and restaurant taxes. This research was carried out using panel data analysis which is a combination of cross-sectional data (Districts/Cities in North Sumatra) and also time series (Regional Original Income 2015-2020). The best model obtained is the random effect model. From the value of Regional Original Income and these three factors, it was found that the results of Regional Original Revenue in North Sumatra had increased in 2015-2018, but in 2019-2020 Regional Original Revenue in North Sumatra had decreased. The variable that has a positive effect and also has a significant effect on Regional Original Income is the restaurant tax variable. The R2 value of this model is 0.78634, which means that the ability of the Restaurant Tax variable to explain the Regency/City Local Revenue variable in North Sumatra Province is 78.634%, while the remaining 21.366% is explained by other factors not included in the model.

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1. INTRODUCTION

Local Own Revenue is income from an area that is collected based on regional regulations in accordance with statutory regulations for the purpose of financing activities in an area In accordance with Law (UU) Number 28 of 2009, which consists of the results of regional taxes, regional levies, management separated regional assets and other legitimate regional original revenues.

Based on data from the Central Bureau of Statistics for North Sumatra Province, in 2018 the highest PAD income was 6.505.867.607. However, in 2019 towards 2020 it shows that PAD in North Sumatra Province has decreased, namely Rp. 6.252.269.888 and Rp. 6.117.744.327 respectively.

Local Own Revenue (PAD) is a source of revenue which growth must always be increased and is one of the capitals of success in achieving regional development goals. If PAD in an area experiences a continuous decline, it can result in development activities in the area being hampered. Development can

cover various sectors including road construction, construction of public facilities and other facilities for the community. If the PAD in the district/city increases, the regional government will no longer depend on the central government so that the area concerned can become independent.

Sustainable PAD growth will also affect the increase in regional economic growth itself. If PAD increases, regional economic growth will also increase. Economic growth in an area can also be seen or measured from several factors, one of which is by using the Gross Regional Domestic Product (GRDP). In addition, North Sumatra Province is also known both domestically and abroad as one of the tourist destinations in Indonesia. The tourism sector is one of the sectors that the North Sumatra Provincial Government can rely on in increasing regional development. Apart from GRDP and the number of tourists, the amount of restaurant taxes can also affect Regional Original Revenue (PAD). Its potential is growing along with increasing attention in the service sector.

So that in this study an analysis of the factors that significantly influence Regional Original Income in North Sumatra Province will be carried out. This study uses panel data regression using three estimation approaches, namely the common effect model, the fixed effect model, and the random effect model.

A number of studies were carried out to assess the factors that influence PAD, such as research conducted by Olvi Ferdian Abdillah, Hefrizal Handra, and Adrimas (2019) in West Sumatra which affects the increase in regional original income, namely GRDP. Meanwhile, Ellen Indriani's research (2018) in Bali which influences the increase in local revenue are regional taxes, regional levies and population.

2. RESEARCH METHODE

The research that will be used is applied research. The type of data used in this study is secondary data obtained through the daily number of positive cases of Covid-19 from 1 January 2021 to 30 April 2022. The data obtained was 485 data which were divided into two groups including training data and testing data. the use of training data is for a data model of 424 data, while the use of data testing is to check model validation of 61 data. the variables used in this study is five variables.

The research that will be used is applied research. The type of data used in this study is secondary data obtained. The variables used in this study is three variables.

The steps taken to conduct this research are as follow :

a. Data collection was obtained from the website of the Central Bureau of Statistics for North Sumatra Province.
b. Input data that has been collected into Microsoft Excel.
c. Descriptive analysis was carried out to find out the general description of each variable.
d. Determination of the appropriate panel data regression analysis model through the Common Effect Model, Fixed Effect Model, and Random Effect Model approaches obtained from several tests, namely the Chow test, Hausman test, and Lagrange Multiplier test.
e. The Chow test was carried out to find out the right model to use between the Common Effect Model and the Fixed Effect Model. If the null hypothesis is accepted then the selected model is the Common Effect Model. However, if the null hypothesis is rejected then the selected model is the Fixed Effect Model. If the Fixed Effect model is selected then proceed with the Hausman test. However, if the Common Effect model is selected, it is necessary to carry out further tests, namely the Lagrange Multiplier test.
f. The Lagrange Multiplier test was carried out to find out the right model to use between the Common Effect Model and the Random Effect Model. If the hypothesis is not accepted then the selected model is the Common Effect Model. If the hypothesis is not rejected then the selected model is the Random Effect Model.
g. The Pagan Breusch test was conducted to determine whether there is a time effect, individual effect, or both (two-way).
h. The classical assumption test was carried out using the heteroscedasticity test and the multicollinearity test. If the selected model is the Common Effect Model or the Fixed Effect Model, then a heteroscedasticity test and a multicollinearity test are performed. However, if the Random Effects model is chosen, then only the multicollinearity test needs to be carried out.
i. Parameter significance test was carried out, namely first, simultaneous test; second, partial test; and third, the coefficient of determination of the model, namely to find out whether the appropriate model is feasible and also to see how the ability of the independent variables explains the dependent variable.

Interpretation of the model is carried out after getting the best regression model.

3. RESULT AND ANALYSIS

3.1 Descriptive Analysis

Regional Original Income (PAD) for each district/city in North Sumatra Province for 2015-2020. PAD reflects economic growth within a local government. The highest PAD is located in Medan City in

2019, which is Rp. 2.338.282.167.00 and the lowest original regional income is located in Tanjungbalai City in 2015, which is Rp. 5.940.728.

The most number of tourist visits both local and foreign tourists, namely Toba Regency with 3,175,124 tourists, due to the many tourist objects in the area. In addition to the abundance of tourist objects, the large number of culinary tours, hotels, travel businesses and other supporting facilities is also the cause of the large number of tourists. In contrast to South Labuhanbatu Regency, this district has a lower number of tourists compared to other regions.

Medan City has the highest number of restaurant taxes when compared to other districts/cities. Deli Serdang Regency is the area with the second highest number of restaurant taxes, followed by Binjai Regency.

3.2 Panel Data Regression Model Estimation

3.2.1 Common Effect Model

This The hypothesis test for the F test (simultaneous) is as follows:

Table 1. F test results for the Common Effect Model

Model	*P-Value*	Sign	α	Decision
Common Effect Model	$3{,}9984x10^{-6}$	<	0,05	Rejected H_0

The That is, together the independent variables affect the dependent variable because the p-value is $0.029179 < 0.05$.

Next, a (partial) T-test was carried out which was used to see whether the independent variable had an effect or not on the dependent variable partially. The hypothesis for the partial test is as follows:

Table 2. T test results for the Common Effect Model

Variabel	Coefficient	*P-Value*
(Intercept)	$-6{,}8771x10^{7}$	0,07544
GRDP	$2{,}8212\ x10$	0,00572
Number of Tourist	$-1{,}3550x10^{1}$	0,93176
Restaurant Taxes	$3{,}8564x10^{-4}$	$7{,}591\ x10^{-6}$

Based on Table, The p-value of the T test for the GRDP and Restaurant Tax variables is less than the α value, which is 0.05 so that the GRDP and Restaurant Tax variables are significant to PAD. Then it was concluded that rejecting H_0.

Table 3. Results of the Coefficient of Determination of the Common Effect Model

Test	Value
R^2	0,1332

The ability of the GRDP variable to explain the variance of the district/city Regional Original Income variable in North Sumatra Province is 13.32%, while the remaining 0.8668 or 86.68% is explained by other factors/variables not included in the model.

3.2.2 Fixed Effect Model

This The hypothesis test for the F test (simultaneous) is as follows:

Table 4. F test results for the Common Effect Model

Model	*P-Value*	Sign	α	Decision
Fixed Effect Model	0,029179	<	0,05	Tolak H_0

That is, together the independent variables affect the dependent variable because 0.029179 <0.05. The hypothesis for the (partial) T test is as follows:

Table 5. T test results for the Fixed Effect Model

Variabel	Coefficient	*P-Value*
GRDP	-4,1509 $x10^{-1}$	0,25093
Number of Tourist	1,0100 $x10^{2}$	0,205144
Restaurant Taxes	7,964 $x10^{-5}$	0,005888

Based on Table it is obtained that the p-value of the partial test for the Restaurant Tax variable is less than the value of α or 0.05 so that Restaurant Tax is significant to PAD. Thus, it was concluded that rejecting H_0.

Table 6. Fixed Effect Model Determination Coefficient Results

Test	Value
R^2	0,53929

The coefficient of determination for the Fixed Effect Model estimation model with a significant variable, namely the Restaurant Tax variable, is obtained at 0.53929, meaning that the ability of the Restaurant Tax variable to explain the variance of the Regency/City Local Revenue variable in North Sumatra Province is 53.929%, while the remaining is 53.929% 46.071 or 46.071% is explained by other factors not included in the model.

3.2.3 Random Effect Model

The hypothesis for the simultaneous test is as follows:

Table 7. F test results for the Random Effect Model

Model	*P-Value*	Sign	α	Decision
Random Effect Model	0,020795	<	0,05	Tolak H_0

That is, together the independent variables affect the dependent variable because p-value is $0.020795 < 0.05$.

Next, a (partial) T-test was carried out which was used to see whether the independent variable had an effect or not on the dependent variable partially. The hypothesis for the partial test is as follows:

Table 8. T test results for the Random Effect Model

Variabel	Coefficient	*P-Value*
(Intercept)	1,6455$x10^{8}$	0,001946
GRDP	-3,2070$x10^{-1}$	0,390555
Number of Tourist	9,9850$x10^{2}$	0,218237
Restaurant Taxes	8,7852$x10^{-5}$	0,003010

Based on Table, it is obtained that the p-value of the partial test for the Restaurant Tax variable is less than the value of α or 0.05 so that Restaurant Tax is significant to PAD. Thus, it was concluded that rejecting H_0.

Table 9. Coefficient Determination Results of Random Effect Model

Test	Value
R^2	0,78634

The coefficient of determination for the Random Effect Model estimation model with a significant variable, namely the Restaurant Tax variable, is obtained at 0.7864, meaning that the ability of the Population Variable in explaining the variance of the Regency/City Regional Original Income variable in North Sumatra Province is 78.634%, while the remainder is 0.21366 or 21.366% is explained by other factors not included in the model.

3.3 Determination of the Panel Data Regression Model

3.3.1 Chow Test

Table 10. Chow Test Results

P-Value
$2{,}2x10^{-16}$

Because the p-value < α or $2.2x10^{-16} < 0.05$ then H_0 is rejected. The right model to use is to use the Fixed Effect Model.

3.3.2 Hausman Test

Table 11. Hausman Test Results

P-Value
0,5584

Because the p-value > α or $0.5584 > 0.05$, H0 failed to be rejected. The right model to use is the Random Effect Model.

3.3.3 Breusch-Pagan Test

The Breusch-Pagan test was used to determine whether there was an individual, time, or both effect. The hypothesis test for the Breusch-Pagan test is as follows:

Table 12. Results of the Breusch-Pagan Test

Model	*P-Value*	Sign	*α*	Decision
Individual Effect	$2{,}2x10^{-16}$	<	0,05	Tolak H_0
Time Effect	0,1508	>	0,05	Gagal Tolak H_0
Individual Effect and Time	$2{,}2x10^{-15}$	<	0,05	Tolak H_0

Based on the Breusch-Pagan test, it can be concluded that the appropriate model to use is individual effects. Based on several tests that have been carried out, namely the Chow test, Hausman test, and Breusch-Pagan test, the results show that the best model in this study is using the Random Effect Model with individual effects.

3.4 Classical Assumption Test

3.4.1 Heteroscedasticity Test

Based on the results of the heteroscedasticity test on the GRDP variable, the number of tourists, and restaurant taxes using the Koenker test, a p-value of 0.0003805 is obtained, it can be concluded that H0 is rejected because the p-value $0.0003805 < 0.05$ so it can be concluded that the assumption of heteroscedasticity is fulfilled.

3.4.2 Multicollinearity Test

Table 13. Multicollinearity Test Results

Variabel	VIF
GRDP	2,687450
Number of Tourist	1,478658
Restaurant Taxes	3,315876

Based on Table 4.14. above, it can be seen that the VIF value of each independent variable is below 10. Therefore, it can be concluded that multicollinearity symptoms are not detected.

3.5 Parameter Significance Test

3.5.1 Simultaneous Test

The hypothesis test for simultaneous testing is as follows:

Table 14. Simultaneous Test Results

Model	*P-Value*
Random Effect Model **(Individual Effect)**	0,02798

Taken together, the independent variables affect the dependent variable/model is feasible to use.

3.5.2 Partial Test

Tabl 15. Decision of Partial Test Results

Variabel	*P-Value*	Sign	α	Decision
GRDP	0,390555	>	0,05	Gagal Tolak H_0
Number of Tourist	0,218237	>	0,05	Gagal Tolak H_0
Restaurant Taxes	0,003010	<	0,05	Tolak H_0

Based on this, it was found that the independent variable that has a significant effect on the District/City Regional Original Income in North Sumatra Province is the variable Population. Next, another partial test is carried out by eliminating variables that are not significant in the model, namely the GRDP variable that has the largest p-value.

3.5.3 Partial Test

Table 16. Decision of Partial Test Results

Variabel	*P-Value*	Sign	α	Decision
Number of Tourist	0,2864	>	0,05	Gagal Tolak H_0
Restaurant Taxes	0,0033	<	0,05	Tolak H_0

It was concluded that partially the variable that does not have a significant effect on the district/city PAD in North Sumatra Province is the variable Number of Tourists.

3.5.4 Partial Test

Table 17. Decision of Partial Test Results

Variabel	*P-Value*	Sign	α	Decision
Restaurant Taxes	0,00488	<	0,05	Tolak H_0

It can be concluded that the Restaurant Tax variable has a significant effect on the PAD variable

3.6 Coefficient of Determination (R^2)

Table 18. Determination Coefficient Results

Model	Coefficient of Determination *(R^2)*
Common Effect Model	0,1332
Fixed Effect Model (Individual Effect)	0,5393
Random Effect Model	0,78634

Based on Table 4.22. above, the results of the coefficient of determination (R2) in the Random Effect Model (individual effects) have a fairly high ability to explain the dependent variable. Using the Random Effects Model approach, the Adjusted R-Square value is 0.78634. That is, the ability of the GRDP variable to explain the variance of the district/city PAD variable in North Sumatra Province in 2015-2020 is 78.634%, while the remaining 78.634% is explained by other factors not included in the model.

3.7 Interpretation of Model Analysis Results

The summary results of the models that have been tested are as follows:

Table 19. Overall Model Summary Results

		Common Effect Model	*Fixed Effect Model*	*Random Effect Model*
Constanta	Coefficient	$-6{,}8771\text{x}10^{7}$	-	$1{,}6455\text{x}10^{8}$
	P-value	$3{,}9984\text{x}10^{-16}$	0,029179	0,020795
GRDP	Coefficient	$2{,}8212\text{x}10$	$-4{,}1509\text{x}10^{-1}$	$-3{,}2070\text{x}10^{-1}$
	P-value	0,00572	0,250930	0,390555
Number of Tourist	Coefficient	$-1{,}3550\text{x}10^{1}$	$1{,}0100\text{x}10^{2}$	$9{,}9850\text{x}10^{1}$
	P-value	0,93176	0,205144	0,218237
Restaurant Taxes	Coefficient	$3{,}8564\text{x}10^{-4}$	$7{,}9643\text{x}10^{-5}$	$8{,}7852\text{x}10^{-5}$
	P-value	$7{,}591\text{x}10^{-6}$	0,005888	0,003010
R^2		0,1332	0,53929	0,78634
Chow Test	*P-value*	$2{,}2\text{x}10^{-16}$		
	F Test	68,679		
Hausman Test	*P-value*		0,5584	
	F Test		2,0682	

From the results that have been tested, the most appropriate model is obtained, namely the random effect model which states that the independent variable that influences the dependent variable PAD is the restaurant tax variable. Judging from the p-value, the value is less than α, which is 0.05. The model formed is as follows:

$$PAD_{it} = \beta_{0it} - 8{,}7852\text{x}10^{-5}\ _{RestaurantTax_{it}} + e_i$$

As for the model that has been obtained, the results show that the GRDP and population variables are negative and have a significant effect on Regional Original Income (PAD) in North Sumatra Province. This can be seen from the coefficient value of the population variable above, which shows the number -8.7852, which means that for every one unit increase in the population variable, the PAD variable will decrease by 8.7852 provided that other variables are constant.

4. CONCLUSION

Descriptive Based on the results of the research that has been done, the following conclusions are obtained:

a. Based on the results of the analysis in determining the appropriate panel data regression model for modeling district/city Regional Original Income in North Sumatra Province in 2015-2020 using the Common Effect Model, Fixed Effect Model, and Random Effect Model approaches, the best model is obtained, namely using the Random Effects Model with individual effects. Using the Random Effects Model approach with individual effects, an R2 of 0.78634 is obtained.

b. Factors that affect district/city Regional Original Income in North Sumatra Province in 2015-2020 are Restaurant Taxes.

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