

City Transport Driver Revenue System with Multiple Linear Regressions in Times of Large-Scale Social Restrictions

Dudih Gustian*¹, Moneyta Dholah Rosita¹, Yoga Vikriansyah Wijaya¹, Nneng Antin M¹

¹Department of Information System, Universitas Nusa Putra, Sukabumi, Indonesia

*Corresponding author: dudih@nusaputra.ac.id

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ABSTRACT

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Large-scale social restrictions are constraints on residents' activities in an area suspected of being infected with Coronavirus Disease 2019 (COVID-19). This situation happens in Sukabumi Regency area of the regions affected by this enactment. One of the problems caused resulted in city transport drivers' income decreasing by 60% of normal income. This study uses multiple linear regressions because this method can significantly analyze each issue on decreasing city transport driver's income. This study uses primary data, with simple random sampling as the sampling technique. Hypothetical test using F test that the number of passengers, deposits, amount of round trip, gasoline and the number of families affect the amount of income of the city transport driver at the time of large-scale social restrictions. Highly influential variables are round trip amount 2,305 and deposit 6,014.

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1 Introduction

Restrictions on certain residents' activities in the suspected area that being infected by Corona Virus Disease 2019 (COVID-19). In such a way as to prevent the possible spread of the COVID-19 virus (General Insurance Association of Indonesia, 2020). These large-scale social restrictions include school holidays and some workplaces, restrictions on religious activities, restrictions on activities in public places or facilities, restrictions on socio-cultural activities, restrictions on transportation modes, restrictions on other activities specifically related to defense and secure trippy aspects that have a profound effect on the economy of society and the country (Humas Kemensetneg RI, 2020).

Cibadak Station is one of the gathering places for city transportation drivers and becomes the source of the drivers' efforts to get passengers to be taken to each destination. It consists of 5 destinations: Cibadak – Cisaat Station, Cibadak Station – Warung Kiara, Cibadak – Nagrak Station, Cibadak – Cicurug Cibadak – Cidahu Station. Cibadak sub-district became one of the large-scale social restrictions in Sukabumi Regency.

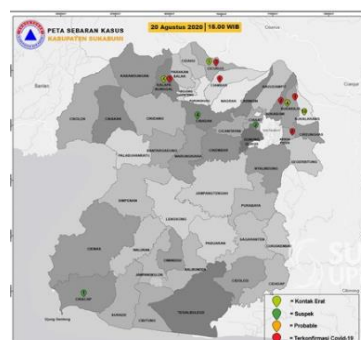


Figure 1. COVID-19 spread map and the implementation of large-scale social restrictions of Sukabumi regency (Sukabumi Update, 2020)

In accordance with Figure 1 map of the implementation of large-scale social restrictions imposed in eight areas of Sukabumi Regency, one of them is Cibadak Sub-District starting on 21 May 2020. It has a huge impact on the restrictions in Cibadak Sub-district, making many impacts caused by one of the region's economies. The mode of transportation of city transportation is a reference to the decline of the economy from the income earned by city transport drivers.

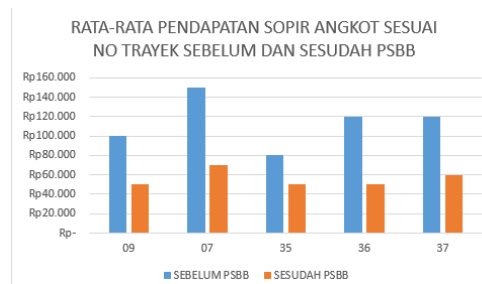


Chart 1. Graph of average earnings before large-scale social restrictions

Chart 1 shows the decreasing average revenue from each city transport route. A very significant decrease can be seen from route number 07 before the large-scale social restriction of income earned at Rp. 150,000 and after large-scale social restrictions of Rp. 70,000 decreased by Rp. 80,000; the percentage reached almost 60% decrease in income when large-scale social restrictions took place. There may be some influences that affect the decrease in income when large-scale social restrictions are taking place, such as the influence of passenger numbers, deposits, the number of round trips, missed lanes, and the number of families. The average number is created before and after large-scale social restrictions.

Research from Muhamad Muslih *et al.* (2017), titled Marketing Strategy with Linear Regression to The Interest of New Students. The study used multiple linear regression methods that could significantly look at what factors were most influential in the marketing strategies performed on the study (Muslih *et al.*, 2017).

Research from Aryani (2020) with the title information system of goods sales with multiple linear regression methods in CV revenue prediction car glass Nugraha. This study used the multiple linear regression method, with several variables, namely the purchase of goods, the number of rearview mirrors, and the number of car glass that affects CV revenue Nugraha car glass (Aryani & Gustian, 2020).

Research conducted by Margaretha, Kekenusa, and Prang (2015), "The Use of Multiple Linear Regressions to Analyze the Income of Coconut Farmers". The problems in this study are: Is there a significant influence on the income of coconut farmers from the amount of coconut fruit production, cost, number of coconut trees, land area, and number of family members together; Of the five independent variables above, which variables have a dominant influence on the income of coconut farmers and how much influence of those variables on the income of coconut farmers (Mona *et al.*, 2015).

Research conducted by Wati, Sebayang, and Sitepu (2013) concluded that multiple linear regressions are better than fuzzy methods. This can be seen from the average relative error value of fuzzy regression and logic methods, multiple linear regression 284 linear multiples of 0.09383 or 9.383% smaller than the fuzzy's average relative error value method of 0.20748 or 20.748%. Processes or stages using SPSS software help for multiple linear regression methods are faster and easier than fuzzy logic using Matlab.

This study uses multiple linear regression methods to significantly see what factors affect the decrease in revenue of city transport drivers. The structure of the data in this study has a round trip for linear regression multiples as in the above journals.

It is hoped that this study can provide a solution to refer to the city's transport drivers that more affecting the income is the amount of round trip and deposit.

This research provides benefits for the management related because the Transportation Office of Sukabumi Regency in monitoring can also blindize an economic downturn that can reduce the number of city transportation drivers Cibadak Station on the social restrictions large scale takes place.

2 Method

2.1 Framework of Thinking

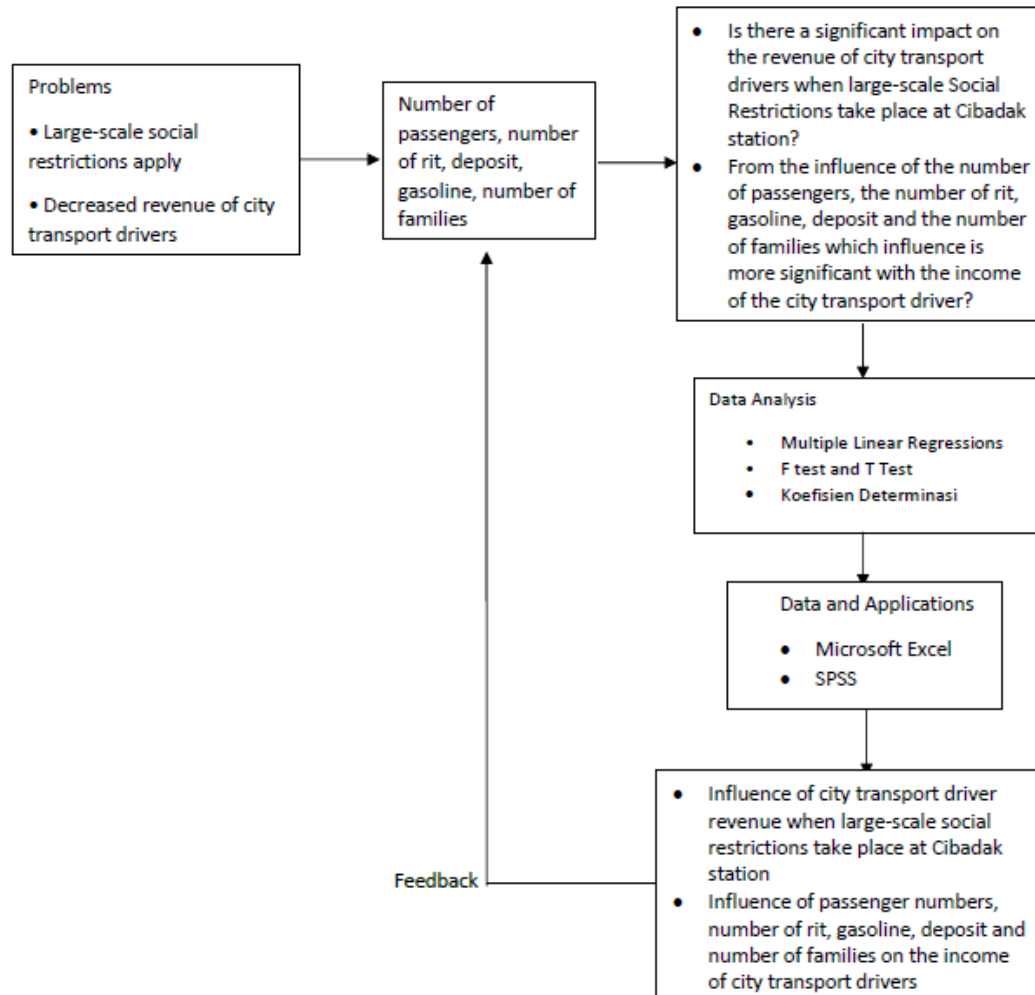


Figure 2. Framework of thinking

2.2 Hypothesis

Determining Hypothesis Formulations.

$H_0 : \beta_1 = \beta_2 = 0$, meaning variables X_1, X_2, X_3, X_4 and X_5 do not have a significant influence on variable Y .

$H_1 : \beta_1 = \beta_2 \neq 0$, meaning variables X_1, X_2, X_3, X_4 and X_5 significantly influence variable Y .

1. Determines 95% degree of trust ($\alpha = 0.05$)
2. Determining significance.
3. P-Value < 0.05 , then H_0 is rejected, and H_1 is accepted.
4. P-Value > 0.05 , then H_0 is accepted, and H_1 is rejected.
5. Making conclusion.
6. If (P Value) < 0.05 , then H_0 is rejected, and H_1 is accepted. Meaning the variable is free to affect the bound variable.

7. When (P-Value) > 0.05, then H0 is accepted, and H1 is rejected. This means that independent variables do not affect dependent variables.

2.3 Research Methods

The data analysis method used in this study is multiple linear regression. This model was chosen to find out how much influence independent variables have on dependent variables both partially and together. This is the main method in statistical science. The point is to express the class as a linear combination of attributes, with the specified weight, with the following formula:

$$Y = a + b_1X_1 + b_2X_2 + b_3X_3 + b_4X_4 + b_5X_5 \quad (1)$$

Whereas Y is a class; X1, X2, X3, X4, and X5 are attribute values; and a, b1, b2, B3, b4, and b5 are weighting. Weights are calculated from sample data. Where:

- Y : Income
- X1 : Number of passengers
- X2 : Number of round trips
- X3 : Gasoline
- X4 : Deposit
- X5 : Number of Families
- a : Constant (Y value if X1, X2, X3, X4 and X5 = 0)
- b : Regression coefficient (increase or decrease value).

2.4 Determination Coefficient (R2)

In multiple linear regression tests analyzed the overall coefficient of regression (R2). R2 essentially measures 50. How far the regression model's ability to describe variations independent variables. R2 is used to measure the best accuracy of multiple regression analysis. R2 approaches 1, so it can be said that the stronger the ability of independent variables in the regression model in describing dependent variables. Conversely, if R2 is close to 0, then the weaker the free variable describes the bound variable (Mona *et al.*, 2015).

3 Results and Discussion

3.1 Tests of Normality

Figure 3 shows that the normal probability plot chart shows a normal chart pattern. This is visible from the point that spreads around the normal chart, and its spread follows a diagonal line.

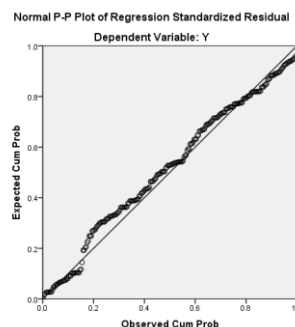


Figure 3. Normality test

3.2 Hypothesis Testing

3.2.1 F Test

The results of the study in Test F can be seen in Table 1.

Table 1. F test

ANOVA ^a					
Model	Sum of Squares	df	Mean Square	F	Sig.
1 Regression	202.982	5	40.596	11.215	.000 ^b
Residual	879.621	243	3.620		
Total	1082.602	248			

a. Dependent Variable: Y

b. Predictors: (Constant), X5, X1, X4, X2, X3

The F test results in this study obtained a calculated F value of 11,215 with a significance of 0.000. The significance Figure of $0.000 < 0.005$. Based on this comparison, the simultaneous variable number of passengers, the number of round trips, gasoline, deposit, and the number of family members significantly affect the city transport driver's variable income.

3.2.2 T-Test

The results of the T-test in this study can be seen in Table 2.

Table 2. T-test

Model	Coefficients ^a						Collinearity Statistics	
	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	Tolerance	VIF	
	B	Std. Error	Beta					
1 (Constant)	13.070	1.673		7.813	.000			
X1	-.079	.057	-.080	-1.375	.170	.988	1.012	
X2	.140	.061	.136	2.305	.022	.956	1.046	
X3	.093	.075	.076	1.250	.213	.903	1.107	
X4	.308	.051	.355	6.014	.000	.959	1.043	
X5	.075	.081	.056	.925	.356	.918	1.090	

Table 2 can be explained in the following subsections.

3.2.2.1 Number of passengers

The test result was obtained for variable value t count = -1,375 with a significance level of 0.170. Using the 0.05 significance limit, the value of such significance is greater than the 5% level, which means H0 received H1 is rejected. This means that the number of passengers does not affect the revenue of city transport drivers.

3.2.2.2 Number of round trips

The test result was obtained for variable value t count = 2,305 with a significance level of 0.022. Using the 0.05 significance limit, the value of such significance is smaller than the 5% level, which means H0 is denied H1 is accepted. This means that the amount of round trip influences the income of city transport drivers.

3.2.2.3 Gasoline

The test result was obtained for variable value t count = 1,250 with a significance level of 0.213. Using the 0.05 significance limit, the value of such significance is greater than the 5% level, which means H0 received H1 is rejected. This means that fuel does not affect the income of city transport drivers.

3.2.2.4 Deposit

The test result was obtained for variable value t count = 6,014 with a significance level of 0.000. Using the 0.05 significance limit, the value of such significance is smaller than the 5% level, which means H0 is denied H1 is accepted. This means that the deposit influences the income of the city's transport driver.

3.2.2.5 Number of families

The test result was obtained for variable value t count = 0.925 with a significance level of 0.356. Using the 0.05 significance limit, the value of such significance is greater than the 5% level, which means H0 received H1 is rejected. This means that the number of family members has no effect on the income of city transport drivers.

3.3 Determination Coefficient (R²)

The results of the determination coefficient in this study are as follows:

Table 3. Determination coefficient

Model Summary ^b					
Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	.433 ^a	.187	.171	1.903	1.653

a. Predictors: (Constant), X5, X1, X4, X2, X3

b. Dependent Variable: Y

It can say that the simultaneous influence of variable X on Y is 43.3%, and variable strength X1, X2, X3, X4, and X5 against Y is 18.7%, with the rest affected by variables outside this study.

Once finished counting, multiple linear regression equations can be obtained, namely:

$$Y = 13,070 - 0,079x_1 + 0,140x_2 + 0,093x_3 + 0,398x_4 + 0.075x_5$$

3.4 System Implementation

3.4.1 Login View

The login page can be used to enter a linear regression system double the city transport driver's opinion. Fill in your username and password and click sign in, and it will lead to the main menu.

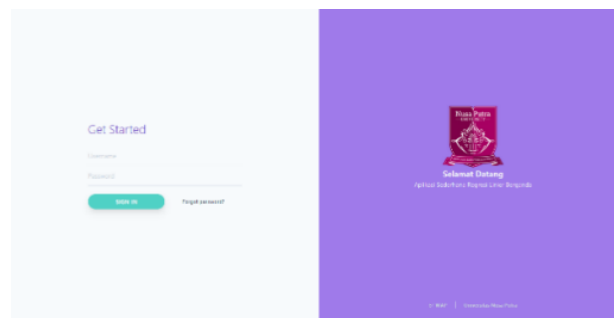


Figure 4. Login view

3.4.2 Main Menu View

The main menu page is used for the initial view of choosing between earnings that contain a recap of the average monthly earnings result, graph data containing the results of the monthly data recap chart or calculations to input the results of the questionnaire.



Figure 5. Main menu view

3.4.3 Data Input View

Figure 6. Data input view

The data input page is used to fill in the questionnaire results and fill in all data except Y because it is the result and then click process. If valid, data will appear on the data classification results page.

3.4.4 Data Classification Results View



Figure 7. Data classification results view

The data classification results page is the previous calculation result page that is on the data input page. It contains a graph of the calculation results that will be automatically recorded on the data chart.

4 Conclusion

The result of the study by a hypothetical test using F test known that number of passengers, number of round trips, gasoline, credit, and number of family members affects public transportation drivers' income. This thing/situation showed by f credit has been calculated as 11,215 with a significant number as 0,000. The result of coefficient credit determination is 0,433 or 43,3%.

On the multiple linear regression analysis studies, we can see which variable affects public transportation drivers' income. There is a round-trip variable (X2) and a credit variable (X4).

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