Correlation and Regression Analysis Between Visitors and Buyers to The Selling Nominal Using Least Square

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ABSTRACT

Regression and correlation analysis is used to know the relationship between independent variable and dependent variable. This research uses data of 19 respondent data which include independent variable on visitors (X_1) and buyers (X_2), and dependent variable of selling nominal (Y). The model used in this research is Multiple Linear Regression. The result of the equation is $Y = 161854.707 - 15627.262\,X_1 + 46061.733\,X_2$. The result of F test is calculated result of F value equal to 0,021 with alpha 5% meaning that variable of visitor and buyer influence to nominal variable of selling nominal. While the Individual test shows that value visitor < Significance value $= 0.05 < 0.575$, t value buyer < Significance value $= 0.05 < 0.089$ that the t value on the visitor less than the Significance value which means the decision for the test received H_0. While the value of t arithmetic on the Buyer is also less than the significance value for the test receive H_0. Then it can be concluded that there is no significant influence on the partial test. Correlation between visitors with buyers is significant. On the otherhand, there is a significant correlation between the buyer and the nominal purchase. Also, there is a significant correlation of the buyer with the nominal purchase there is a significant correlation. So it can be concluded that the influence between variables considered above have significant correlation value.

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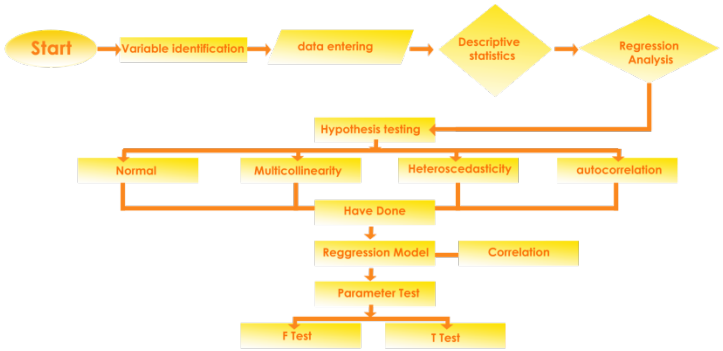
1. INTRODUCTION

Buying and selling activities are common business activities between peoples, involving buyers and sellers. Buyers and sellers have their own significance in keeping the economic development in a country. One of the economic institutions, BPTP Jawa Timur has played an important role in the development of community welfare, mainly, people who work as an employee in public or private corporations. As to increase profits, BPTP Jawa Timur builds an "induced" corporation named Koperasi Pegawai Republik Indonesia (KPRI) "Agromart". Actually, KPRI was established for the benefits of government employees. As to increase profits, it is useful to exploit a statistical method to make some forecast from the data in BPTP. The common method of forecasting, which use several correlated-variables in its process, is called regression method. Using the regression method, the forecast result of marketing variables such as marketing income and marketing lost are then obtained. Also, the correlation of several variables can be obtained, such as the correlation between the number of visitors (denoted by X_1) and the selling nominal (denoted by Y), the correlation between the number of buyers (denoted by X_2) and selling nominal (denoted by Y), and the correlation between the number of visitors (denoted by X_1) and the number of buyers (denoted by X_2). According to the above motivation, Researcher titled this article by

Regression and Correlation Analysis Between Visitors and Buyers to The Selling Nominal Using Least Square Method.

2. RESEARCH METHOD

1. Source of the Data and Date of Survey:
   The data for this research is obtained from Agromart BPTP Jawa Timur. There are three kinds of data, that is the number visitors, the number of buyers and selling nominal. The main sample is the corresponding data along 19 days on July 2017. ***The survey held from Juny 2017 through August 2017 on*** Agromart BPTP Jawa Timur.
2. Steps:



3. RESULTS AND DISCUSSION

Data Description

Descriptive statistics can be seen from the size of centralization and dissemination of data that can be obtained from SPSS software, while the results are as follows.

Table 3.1 Descriptive statistics

Variable	Mean	Standard Deviation	Variance	Minimum	Maximum
Visitors	17.2105	4.02187	16.175	12.00	27.00
Buyers	12.0000	4.32049	18.667	8.00	21.00
Selling Nominal	4.4564E5	2.33808E5	5.467E10	2.24E5	9.96E5

Based on Table 3.1 we know that mean of visitors is 17.2105, mean of buyers is 12.0000 and mean of selling nominal is 4.4564E5. The standard deviation of vistors is 4.02187, standard deviation of buyers is 4.32049, and then standard deviation of selling nominal is 2.33808E5.

3.2 Classic Assumptions Test

3.2.1 Multicollinearity Test

The multicollinearity test can be seen through the tolerance value and VIF (Variance Inflation Factor). If the value of VIF is around the number 1 and not greater than 10, and the tolerance value with tolerance $= \frac{1}{VIF}$ is close to 1, then the data under study is free from multicollinearity problems. The hypothesis for this test is as follows:

H_0 : the residuals have a multicollinearity

H_1 : the residuals have not a multicollinearity

Statistics test: $VIF_k = \frac{1}{R_k{}^2}$

Critical Values: reject H_0 if $VIF < 5$

The result of multicollinearity test can be seen in this table:

Table 3.2 result of multicollinearity test

Variable	VIF	Tolerance
Visitors	5.697	0.176
Buyers	5.697	0.176

Table 3.2 shows a Tolerance value greater than 0.1 or close to 1 and it appears that the VIF value is less than 10. This means that the data does not occur multicollinearity.

3.2.2 Heteroskedasticity Test

Heteroskedasticity test is used to find out whether in a regression model there is an inequality of variance error between one observation to another. The hypothesis for this test is as follows:

H_0 : $\sigma_1^2 = \sigma_2^2 = \cdots = \sigma_n^2 = \sigma^2$

H_1 : minimal one of them $\sigma_i^2 \neq \sigma^2$; $i = 1,2, \ldots, n$

Statistics Test: $|t_{hit}| = \frac{\widehat{\beta}_1}{\sqrt{Var\,(\widehat{\beta}_1)}}$

Critical Values: reject H_0 if $|t_{hit}| > t_{\frac{\alpha}{2},n-2}$ or $P\ value\ <\ \alpha$

The result of heteroscedasticity test from SPSS program can be seen in the following Figure 3.1:

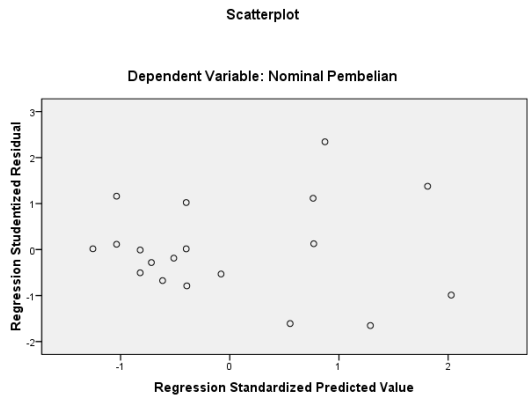


Figure 3.1 Scatterplot

Based on Figure 3.1 the spots appear to spread between -2 to 2 and do not form a certain pattern so it is concluded that the regression model is homoscedasticity or not heteroscedasticity.

3.2.3 Normality Test

Tests on normality in this study using Kolmogorov-Smirnov test. This test can be used to determine whether or not a normal data being studied. The hypothesis for this test is as follows:

H_0: $F_0\ (X) = F_e\ (X)$ (residual normally distributed)

H_0: $F_0\ (X) \neq F_e\ (X)$ (residual is not normally distributed)

Statistics Test : D = $max\ |\ F_e(x)\ - F_0(x)\ |$

Critical Value : reject H_0jika $D > D_\alpha$ or $P_{value} < \alpha$

Normality test results from SPSS program can be seen in the following picture:

Tabel 3.3 Descriptive statistics

Skewness		Kurtosis	
Statistik	Std. Eror	Statistik	Std. Eror
0.478	0.524	0.265	1.014

Table 3.3 if the skewness and kurtois ratio are between -2 to +2, then the data distribution is normal. Skewness ratio is the skewness value divided by the standard error skewness, while the Kurtois ratio is the kurtois value divided by the standard error kurtois.

It is seen that the ratio of Skewness is 0.478 / 0.534 = 0.9122137405 and Kurtosis ratio is 0.265 / 1.014 = 0.2613412229. Since the Skewness and Kurtosis ratios are between -2 to +2, it can be concluded that the data are normally distributed.

3.2.4 Autocorrelation Test

Autocorrelation is a correlation between data or obsevation time series or space series. Testing Autocorrelation problem using Durbin-Watson test with this hypothesis as follows:

H_0: $\rho = 0$ (there is autocorrelation in the residual)

H_1: $\rho \neq 0$ (no residual autocorrelation)

Tabel 3.4 Autocorrelation Test

Durbin Watson	2.547

Tabel 3.4 explains that the value of Durbin Watson is 2,547. Based on Durbin Watson table it can be seen that the value of dU is 1.5355 and dL is 1.0743, so the hose from dw> dL is 2,547> 1.0743. Based on the calculation can be seen that the value of Durbin Watson then there is no positive autocorrelation.

3.3 Multivariate Regression Analysis

Using Multivariate Regression Analysis, the multivatiate regression model corresponding to the data is $\hat{Y} = 161854.707 - 15627.262\ X_1 + 46061.733\ X_2$. From F-test, the resulting F is 0.021 with alpha value 5%. From the above survey, it can be concluded that the number of visitors and the number of buyers have a significant influence to the number of selling nominal. On the otherhand, partial-test concluded that resulting t of visitors < significance value $= 0.05 < 0.575$, the result t of buyers < significance value $= 0.05 < 0.089$ that is, the value of the result t of the number of visitors is least than the significance value. Then, we can concluded that hypothesis H_0 is accepted. On the otherhand the value of t hitung corresponding to the number of buyers is also least than the significance value. Then, the hypothesis H_0 is then accepted. From the above explanation, it can be concluded that, there is no significance from each variable in partial. The correlation between visitors and buyers, on the otherhand, there is a significance correlation between the number of visitors and the selling nominal, and between number of buyers and the selling nominal. Finally, it can be concluded the variables given in this survey are related, by some significance correlations, to each other.

3.4 Correlation Analysis

In correlation test in this study only used Pearson correlation coefficient. Then will be calculated correlation value with SPSS software, the calculation with SPSS:

Tabel 3.5 Result of Correlation

[1] Variable	[2] Method	[3] Visitors	[4] Buyers	[5] Selling Nominal
[6] Visitors	[7] Pearson Correlation	[8] 1	[9] 0.908	[10] 0.504
	[11] Significance	[12]	[13] 0.000	[14] 0.028
	[15] N	[16] 19	[17] 19	[18] 19
[19] Buyers	[20] Pearson Correlation	[21] 0.908	[22] 1	[23] 0.607
	[24] Significance	[25] 0.000	[26]	[27] 0.006
	[28] N	[29] 19	[30] 19	[31] 19
[32] Selling Nominal	[33] Pearson Correlation	[34] 0.524	[35] 0.607	[36] 1
	[37] Significance	[38] 0.028	[39] 0.006	[40]
	[41] N	[42] 19	[43] 19	[44] 19

Based on table 3.5, correlation between visitors with buyers is significant. On the otherhand, there is a significant correlation between the buyer and the nominal purchase. Also, there is a significant correlation of the buyer with the nominal purchase there is a significant correlation. So it can be concluded that the influence between variables considered above have significant correlation value.

CONCLUSION

1. The multivariate regression equation corresponding to the variables is $\hat{Y} = 161854.707 - 15627.262\ X_1 + 46061.733\ X_2$.
2. The correlation between the number of visitors and the number of buyers has a significance 0.000<0,05 which means that there is a significant correlation between them. In the other side, the correlation between the number of visitors and the selling nominal has a significance value 0,028<0,05 which means that there is a significant correlation between them. it then can finally be concluded that all the variables considered above have significant correlation to each other.

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