The Effect of Financial Ratios and Macroeconomics on Stock Return in Infrastructure Sector

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Abstract

The infrastructure sector is one of the sectors in the Indonesia Stock Exchange. At present, the sector is of concern to the public because infrastructure development is increasing as evidenced by an increased budget every year. Thus, attracting the desire of the community to invest in the sector. However, stock returns in this sector not only increased but also decreased. This study aims to determine the effect of financial ratios and macroeconomics in the Infrastructure sector on stock returns partially and simultaneously. The Secondary data testing to determine the effect partially and simultaneously was done using a panel data regression. Panel data regression results shows one point Debt to Equity Ratio (DER) and Earning per Share (EPS) can reduce stock returns, then one point Return on Equity (ROE) can increase stock returns partially. However, all variables simultaneously have a significant effect on stock returns because of the value of prob (F-statistic) less than 0.05. The conclusion is that six variables significantly influence simultaneously, but only DER, ROE, and EPS have a partially significant effect. That means the macroeconomics in Indonesia doesn't have a significant impact on stock returns in the sector.

Keywords
Stock Return, Infrastructure Sector, Panel Data Regression, Financial Ratio, Macroeconomic

1. Introduction
The increasing trend of Indonesia Composite Index values indicates the number of good companies in Indonesia with sufficient capital. One of them is the Infrastructure, Utilities, and Transportation sector, which is an indispensable sector in the economic development of a country. The availability of infrastructure can increase productivity and efficiency which results in increased economic growth. Currently, the infrastructure sector gets public interest because in the period of President Jokowi (since 2014) there has been an increase in infrastructure development. The increase in the period is evident from the infrastructure budget that increases each year which reaches 415 Trillion in 2019 (Data obtained from the Ministry of Finance). However, stock returns in this sector has increased and decreased or not always increase. The stock return is the stock investment income, predominantly including stock value changes and cash dividend income of the holding period (Guoying and Ping 2017). The empirical results indicated that stock return has a significant impact on investor sentiment, not converse, and investor sentiment has an asymmetric impact on stock return during the bear market, but the bull market doesn't exist (Li and Junwen 2016).

Research in this paper focuses on determining factors that can significantly influence stock return on the Infrastructure, Utilities, and Transportation sector with used panel data regression. That factors are financial ratios and macroeconomic which are independent variables. Infrastructure development and macroeconomic development are interrelated. That is because infrastructure development gives rise to economic multiplier effects and economic expansion raises the need to develop existing infrastructure. Thus, researchers used several external factors from the macroeconomic to find out the actual impact on companies in the Infrastructure, Utilities, and Transportation sectors. The macroeconomic chosen are the exchange rate, inflation, and economic growth. Whereas the financial ratios used are Debt to Equity Ratio (DER), Earning per Share (EPS), and Return on Equity (ROE).

In many previous research, the object is a sub-sector or one company, whereas the object of this research is one sector. Thus, investors or companies can understand the effects of financial ratio and macroeconomic on stock returns in one sector, especially the infrastructure sector. This research was made for investors who want to invest in companies of

the Infrastructure, Utilities, and Transportation sectors and for companies that want to know what financial ratios or macroeconomics significantly influence stock returns in the sector. So, the companies and investors can make more appropriate decisions by looking at several factors (financial ratio or macroeconomic) that need to be seen, that are factors which have a significant effect.

2. Methodology

The main method in this research is the panel data regression. Before the panel data regression test is performed, a classical assumption test needs to be performed. The processed data must pass the normality test in the classical assumption test, so data can be proceed to the panel data regression test phase and panel data regression analysis.

2.1. Panel Data Regression Test

Panel data regression is a method to determine the effect of independent variables on the dependent variable used regression analysis with advantage from the solutions to the difficulties involved in interpreting partial regression coefficient in the blend of time series and cross-section because extract more information (Septian et al. 2019; Cheng and Ai 2020; Liu 2016). In contrast, with the temporal data and cross-section data, the panel data can give more information and lessen the collinearity of the model, by which more inherent law can be exhumed through the representation (Li et al. 2017). In this paper, panel data regression test is used to determine whether there is an influence between Debt to Equity Ratio (DER), Return on Equity (ROE), Earning per Share (EPS), Exchange Rate, Inflation, dan Economic Growth on stock return.

2.1.1. F Test (Simultaneous Test)

The F test is the conventional method for testing regression coefficients simultaneously under the normality assumption (Wang and Cui 2017). In this paper, the F Test is used to test the significance of the effect of the independent variables that are DER, ROE, EPS, Exchange Rate, Inflation, and Economic Growth simultaneously on the dependent variable that is stock return.

Hypothesis on Simultaneous Test:

H_0 = DER, ROE, EPS, Exchange Rate, Inflation, and Economic Growth does not have a significant effect on the stock returns of the Infrastructure, Utilities, and Transportation sector in the 2013-2018 period.

H_1 = DER, ROE, EPS, Exchange Rate, Inflation, and Economic Growth has a significant influence on the stock returns of the Infrastructure, Utilities, and Transportation sector in 2013-2018.

2.1.2. T-Test (Partial Test)

The T-test has aim of knowing two different variables or more assumption unequal variance is used to verify whether the effect significant or not (Lejano 2019). Thus, in this paper, the T-Test is used to test the significance of the effect of independent variables that are DER, ROE, EPS, Exchange Rate, Inflation, and Economic Growth on the dependent variable that is stock returns partially.

Hypothesis on Partial Tests:

H_0 = X variable partially does not have a significant effect on stock return in the Infrastructure, Utilities and Transportation sector in the 2013-2018 period.

H_1 = X variable partially has a significant effect on stock return in the Infrastructure, Utilities and Transportation sector in the 2013-2018 period.

2.2. Panel Data Regression Analysis

The results of the F-Test and T-Test in the panel data regression test will determine the panel data regression model which is the relationship between the independent variables and the dependent variable. T-test result produces independent variables that have a significant effect on stock return. In this paper, a regression model will be used, namely:

$$Y = \beta_0 + \beta_1 X_{it1} + \beta_2 X_{it2} + \beta_3 X_{it3} + \beta_4 X_{it4} + \beta_5 X_{it5} + \beta_6 X_{it6} + \beta_7 X_{it7} + uit \quad (1)$$

Remarks:

Y = Stock Return

β_0 = a constant

β_1 = Regression coefficient of Debt to Equity Ratio (DER)

β_2 = Regression coefficient of Return on Equity (ROE)

β_3 = Regression coefficient of Earning per Share (EPS)
β_4 = Regression coefficient of Exchange Rate
β_5 = Regression coefficient of Inflation
β_6 = Regression coefficient of Economic Growth
X_{it1} = Debt to Equity Ratio (DER) variable on unit i at time t
X_{it2} = Return On Equity (ROE) variable on unit i at time t
X_{it3} = Earning Per Share (EPS) variable on unit i at time t
X_{it4} = Exchange Rate variable on the i unit at time t
X_{it5} = Inflation variable on unit i at time t
X_{it6} = Economic Growth variable on unit i at time t
uit = Effect of other factors

3. Result and Analysis

3.1. Determination of Estimated Model

In this paper, several times tests have been done in determining the estimation model because 108 data or samples with six variables X and 1 variable Y are not normally distributed. Thus, researchers are looking for the best model and found that the model normal distribution with fixed variable does not change, but the sample change into 13 companies (6 years), ie 78 samples.

3.1.1. Chow Test

The Chow test is used to determine whether the data are poolable (Panic and Crvenkovic 2018). The Chow test is used to choose between two models, namely the fixed effect model and the common effect model to examine whether two variables are impacted by the known structural break (Sui and Sun 2016).
Hypothesis 1:
H_{10} = Overall cross-section unit effect is meaningless, Accept Common Effect Model
H_{11} = There is at least one cross-section union effect, Accept Fixed Effect Model.
The decision to be taken is Reject H_0 if the p-value (Probability) < Significance value (0.05). Conversely, accept H_0 if the p-value (Probability) > Significance value (0.05). The chow test result is presented in Figure 1.

Test cross-section fixed effects

Effects Test	Statistic	d.f.	Prob.
Cross-section F	0.960108	(12,58)	0.4963
Cross-section Chi-square	14.132827	12	0.2923

Cross-section fixed effects test equation:
Dependent Variable: RETURN_SAHAM
Method: Panel Least Squares
Date: 02/17/20 Time: 18:48
Sample: 2013 2018
Periods included: 6
Cross-sections included: 13
Total panel (balanced) observations: 78

Figure 1. Result of chow test.

Data processing is done with a confidence level of 95%, so the result of this paper has an accuracy of 95% and an error of 5%. Based on Figure 1, the value of Chi-square cross-section probability (Prob. = 0.2923) is more than significance value (0.05). Thus, the decision taken is Accept H_0, which means the effect of the cross-section unit as a whole is meaningless. Thus, the Common Effect Model is better than the Fixed Effect Model.

3.1.2. Breusch-Pagan Lagrange Multiplier Test

By testing the hypothesis that the variance of individual residues is equal to zero, the Lagrange multiplier test is used to select the best approximation between the pooled model and the random effects model.(Silva et al. 2019).
Hypothesis 2:
H_{20} = There are no cross-section or time-section effects and accept the Common Effect Model.

H_{21} = There are cross-section and time-section effects and accept the Random Effect Model.

The decision to be taken is Reject H_0 if the p-value (Probability) < Significance value (0.05). Conversely, accept H_0 if the p-value (Probability) > Significance value (0.05). The Breusch-Pagan test result is presented in Figure 2.

Lagrange multiplier (LM) test for panel data
Date: 02/17/20 Time: 19:02
Sample: 2013 2018
Total panel observations: 78
Probability in ()

Null (no rand. effect) Alternative	Cross-section One-sided	Period One-sided	Both
Breusch-Pagan	0.625527	12.63687	13.26240
	(0.4290)	(0.0004)	(0.0003)
Honda	-0.790902	3.554837	1.954397
	(0.7855)	(0.0002)	(0.0253)
King-Wu	-0.790902	3.554837	2.557734
	(0.7855)	(0.0002)	(0.0053)
GHM	--	--	12.63687
	--	--	(0.0006)

Figure 2. Result of breusch-pagan lagrange multiplier test.

Based on Figure 2, it is known that the Breusch-Pagan value within the brackets by 0.4290. Which means the Breusch-Pagan value is more than significance value (0.05). Thus, the decision taken is H_0 Accepted. There are no cross-section and time-section effects, so the Common Effect Model is more appropriate than the random effect model, which means the random effect model is used to panel data regression analysis.

3.2. Classical Assumption Test

3.2.1. Normality Test

The normality test is required for various statistical analyses as well as for the description of sample data from several disciplines and the determination of whether or not a data set is well represented by a normal distribution (Dahmouni et al. 2018), (Fontgalland and Pedro 2015). In this research, data or samples have been found that will pass the normality test, but with 78 samples. Thus, the amount of data analyzed by 78 data.
Hypothesis 3:
H_{30} = Data is normally distributed.
H_{31} = Data not normally distributed.

The decision to be taken is Reject H_0 if the Probability value < significance value (0.05). Conversely, accept H_0 if the probability value > significance value (0.05). Normally test result is presented in Figure 3.

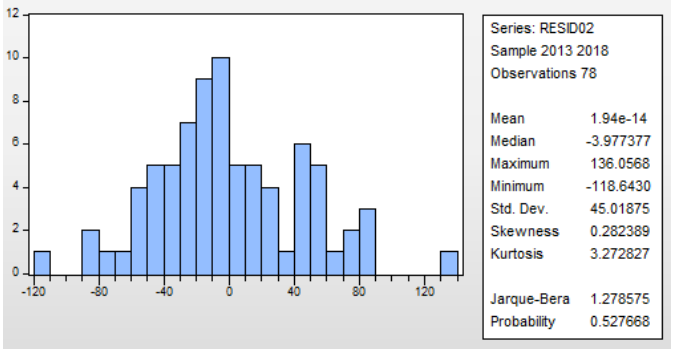

Figure 3. Result of normality test.

Based on Figure 3, the probability value of 0.527668, which means the decision taken is Accept H_0 or Normal Distributed Data. Thus, the regression model with use of 78 data or samples can be continued and analysed the results.

3.2.2. Heteroskedasticity Test

In the regression analysis, heteroskedasticity means a situation in which the variance of the dependent variable varies across the data which is very important not only for the classical least squares estimators but also for any other estimators of regression parameters (Song et al. 2016). The Heteroskedasticity test is done to test whether in the regression model there is an inequality of variance from residuals. In regression analysis, should have homoscedastic properties which means that the variance of the dependent variables is the same for all analyzed data as most approaches in regression analysis are focused on the assumption of equal variance, while heteroscedasticity complicates analysis (Zolna et al. 2016).
Hypothesis 4:
H_{40} = No heterokedasticity symptoms occur in the regression model
H_{41} = Heterocedasticity symptoms occur in the regression model

The decision taken is if the significance value is greater than 0.05 (alpha), then H_0 is accepted. Conversely, if the significance value is smaller than 0.05 (alpha), then H_0 is rejected. The heterokedasticity test result is presented in Figure 4.

Dependent Variable: RESABS
Method: Panel Least Squares
Date: 03/03/20 Time: 17:49
Sample: 2013 2018
Periods included: 6
Cross-sections included: 13
Total panel (balanced) observations: 78

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	79.88559	61.55722	1.297745	0.1995
DER	0.052949	2.344925	0.022580	0.9821
ROE	4.879977	9.845960	0.495632	0.6220
EPS	0.003447	0.026664	0.129279	0.8976
BI_RATE	0.109936	10.32651	0.010646	0.9915
KURS	-0.000191	0.001523	-0.125385	0.9007
INFLASI	3.406066	9.641088	0.353286	0.7252
PERTUMBUHAN_EKON...	-12.29972	10.97588	-1.120613	0.2671

Figure 4. Result of heteroskedasticity test.

In Figure 4, the probability for each variable has a value greater than 0.05 (alpha). Thus, the decision taken was Accept H_0, which means there is no symptoms of heterokedasticity.

3.2.3. Autocorrelation Test

Autocorrelation test is a test to find out whether there is a correlation between the error of a period with the previous period, where the existence of this correlation on classical assumptions should not occur (Perlambang 2017). Autocorrelation test is done through testing the value of the Durbin Watson Test to determine whether or not there is autocorrelation in a regression model. The Durbin Watson (DW) value obtained is presented in Table 1.

Table 1. Durbin-Watson value.

R-squared	0.845296		Mean dependent var	14.23382
Adjusted R-squared	0.832222		S.D. dependent var	114.8845
S.E. of regression	47.05752		Akaike info criterion	10.62608
Sum squared resid	157223.1		Schwarz criterion	10.83758
Log likelihood	-407.4170		Hannan-Quinn Criter.	10.71074
F-statistic	64.65660		Durbin-Watson stat	2.083222
Prob(F-statistic)	0.000000			

Figure 5 showed the DW value by 2,083222. Based on the DW table which uses a significance of 5% with the number (N) of 78 and the number of independent variables (k) of 6, the Durbin Upper (DU) value of 1.8009 and Durbin Lower (DL) of 1.4714. Thus, the result of Durbin Watson's calculation can be seen in the graph is presented in Figure 5.

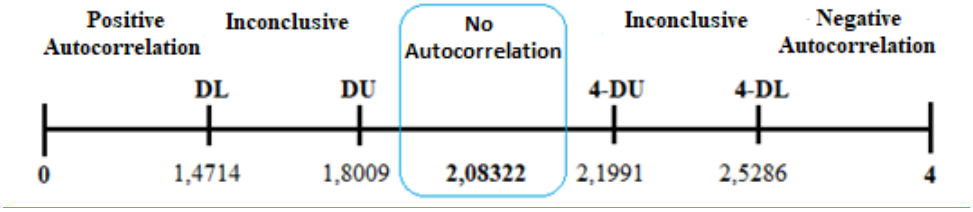

Figure 5. Graph of Durbin Watson test.

Based on the calculation of the Durbin-Watson, the DW is located between DU and (4-DU). So, it can be concluded that H_0 is accepted, then autocorrelation did not occur in this model.

3.2.4. Multi-Collinearity Test

Multi-collinearity test to find out whether there is a perfect linear relationship between variables that explain the regression model. The way to measure the occurrence of multi-collinearity in the regression model seen from the correlation coefficient between each independent variable. If the coefficient or regressor is over 0.8, multi-collinearity between variables occurs in the regression model and will be a severe problem (Geng et al. 2016).

Table 2. Result of multi-collinearity test.

	DER	ROE	EPS	Exchange Rate	Inflation	Economic Growth
DER	1.0000	0.1847	0.0794	-0.0033	0.0246	0.0517
ROE	0.1847	1.0000	0.2612	-0.0361	0.0900	-0.0703
EPS	0.0794	0.2612	1.0000	0.0711	-0.0038	-0.0836
Exchange Rate	-0.0033	-0.0361	0.0711	1.0000	-0.5841	-0.3743
Inflation	0.0246	0.0900	-0.0038	-0.5841	1.0000	0.3297
Economic Growth	0.0517	-0.0703	-0.0836	-0.3743	0.3297	1.0000

Based on Table 2, it is known that all value on six X-variables are less than 0.8. Thus, the values of six X-variables are not occurred multicollinearity between variables.

3.3. Panel Data Regression Test

Panel data regression test aims to examine the presence or absence of relationships and effects between Debt to Equity Ratio (DER), Return on Equity (ROE), Earning per Share (EPS), Exchange Rate, Inflation, and Economic Growth on Stock Return. Panel data regression test results with the common effect model is presented in Figure 6.

Dependent Variable: RETURN_SAHAM
Method: Panel Least Squares
Date: 02/17/20 Time: 16:36
Sample: 2013 2018
Periods included: 6
Cross-sections included: 13
Total panel (balanced) observations: 78

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	30.21026	167.0534	0.180842	0.8570
DER	-7.310828	2.177546	-3.357371	0.0013
ROE	328.7786	17.13040	19.19270	0.0000
EPS	-0.122179	0.036937	-3.307770	0.0015
BI_RATE	-12.74808	17.61109	-0.723867	0.4716
KURS	0.000963	0.002557	0.376508	0.7077
INFLASI	14.80026	15.38198	0.962181	0.3393
PERTUMBUHAN_EKON...	-8.069816	30.11495	-0.267967	0.7895

R-squared	0.846445	Mean dependent var	14.23382
Adjusted R-squared	0.831089	S.D. dependent var	114.8845
S.E. of regression	47.21606	Akaike info criterion	10.64426
Sum squared resid	156054.9	Schwarz criterion	10.88597
Log likelihood	-407.1261	Hannan-Quinn criter.	10.74102
F-statistic	55.12324	Durbin-Watson stat	2.103829
Prob(F-statistic)	0.000000		

Figure 6. Result of panel data regression with common effect model.

The Probability (F-statistic) value in Figure 6 is the simultaneous value of the regression model, if the Probability (F-statistic) value is less than (<) significance value (0.05), then it influences simultaneously between the independent variables on the dependent variable (stock returns). In addition, the smaller significant value obtained, the accuracy of this research will be greater. In Figure 6 also known that the R-squared of 0.846445, which means the proportion of the influence of the dependent variable can be explained by the model by 84.64%, while the rest of 15.36% (100% - 84.64%) influenced by other variables not included in the regression model in this paper.

Panel data regression Results can find out the result of the T Test and F Test with the formula, namely:

$$Y = 30.21026 + (-7.310828)\, X_{It1} + 328.7786 X_{It2} + (-0.122179)\, X_{It3} + eit \quad (2)$$

In the F Test results, the p-value (Prob > F) is 0.000 less than the significance value ($\alpha = 0.05$), so the decision taken is Reject H_0. That are DER ROE, EPS, Exchange Rate, Inflation, and Economic Growth simultaneously have a significant effect on stock returns in the Infrastructure, Utilities, and Transportation sector. On the T Test result, the p-value (Prob> F) is 0.0013 (DER), 0.0000 (ROE), 0.0015 (EPS), 0.7077 (Exchange Rate), 0.3393 (inflation), and 0.7895 (economic growth). Thus, only DER, ROE, and EPS partially have a significant effect because the p-value (Prob> F) is less than the significance value (0.05).

4. Conclusion

Panel data regression analysis results showed that DER, ROE, and EPS partially have a significant effect on stock return, namely one point of DER ratio can decrease stock return of 7.310828; one point of ROE ratio can increase stock return of 328.7786; and one point of EPS ratio can reduce stock return of 0.122179. However, DER, ROE, EPS, Exchange Rate, Inflation, and Economic Growth simultaneously have a significant effect on stock return because the probability value (F-statistic) < significance value (0.05).

Result from this study have important managerial implications. Investors who want to invest in companies of the Infrastructure, Utilities and Transportation sector, it is very necessary to pay attention to the financial ratio, especially DER; ROE; and EPS than the macroeconomic if the macroeconomic does not change drastically. Companies in the sector must also pay attention on financial ratios to stock return. Stock return can increase if the value of DER and EPS should be small and the value of ROE must be high, some of which are debt value should be smaller; net income value should be higher; and weighted average value of outstanding share should be higher.
Since it is crucial to find out the effect on financial ratios and macroeconomics on stock return in this sector, it is important to recognize this research have certain limitation. The main limitation of this research is only 13 samples that can be proceed because only 13 samples that passed the classical assumption test. Therefore, it is recommended

that other samples or companies are included but can pass the classical assumption test when future researchers apply a similar analysis.

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