CHAPTER V

CONCLUSION

This chapter provides the conclusion of the research study, managerial implication, suggestion for further research, and also gives the research limitations. The purpose in this research is to investigate the dynamics and causal relationship between stock market volatility and trading volume in Indonesian stock market from period February 2013 to February 2018.

5.1 Conclusion

From the data analysis in chapter IV about the dynamic and causal relationship between stock market volatility and trading volume in Indonesian stock market, it can be concluded as follows:

1. Based on the data analysis conducted in chapter IV about the dynamic and causal relationship between stock market volatility and trading volume in Indonesian stock market, the result of EGARCH Model may be summarized as follows. First, there is leverage effect in the model. It means that effects of negative return shocks are higher than that of positive return shocks. Second, trading volume has a positive and statistically significant impact on equity return volatility. It means that trading volume may be one of the important factors in explaining volatility.

2. Granger Causality test indicates the relationship is bidirectional, unidirectional, or there is no causality relationship, the result of Granger Causality test shown that there is bidirectional (causality) relationship between stock return and trading volume in Indonesian stock market. Which concludes that Detrended Volume does Granger-cause Return in Indonesian stock market (H1 Rejected), and Return does Granger-cause Detrended Volume in Indonesian stock market (H2 Rejected).

5.2 Managerial Implication

This research is expected to help the party that is involved in the stock market such as the investor. Based on the research result, the researcher hope that the investor can use the information from this research to help them in understanding the behavior of the Indonesian stock market.

Based on the research result, there is leverage effect. Which means that bad news has more impact on the volatility of the stock return than the good news in Indonesian stock market. Then, investor can predict future return by using the change of trading volume because the movement of trading volume is a useful information to predict future return in Indonesian stock market. Last, there is Granger Cause between stock return and trading volume in Indonesian stock market. Return move because of trading volume change, and trading volume move because of return change.

5.3 Research Limitation

There are some limitation of analysis of this research study. It can be from variables, length period, the research method, and so on. Those limitation are as follows:

1. The period of the research is only within 5 year which is from 2013-2018. The short period of this research can produce different result with the research using longer period.
2. This research only analyze the role of trading volume. Trading volume is one of information which has ability to predict future return and volatility. There are many indicators that can be used as proxy of information.
3. The findings from this research are only based on the available daily data.
4. This research only uses one component in the trading volume that is the number of trades (number of transactions / trading frequency / frequency of trade).

5.4 Suggestion for Further Research

Below is the suggestion that the researcher can give as a reference for future research that will be done, they are:

1. The future research are suggested to use longer period. Longer period in analysis can provide result more accurate.

2. The future research are suggested to not only analyze the role of trading volume, but also other predictors of volatility of the Indonesian economy involving both domestic and foreign macroeconomic and financial variables. There is some useful information in predicting future return and volatility, besides trading volume.
3. The future research are suggested to consider the high frequency intraday or minute-to-minute data by employing some of the recently developed volatility models so as to provide more in-depth conclusions.
4. The future research are suggested to not only uses one component in the trading volume which is the number of trades (number of transactions / trading frequency / frequency of trade), but also uses the average size of each trades (size of trades / trade size) because this two components in the trading volume can be used to predict the return volatility.

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APPENDIX

APPENDIX 1

DESCRIPTIVE STATISTIC

Descriptive Statistic From 2013-2018

	CLOSING PRICE	TRADING VOLUME	RETURN	DETRENDED VOLUME
Mean	9369.186	31259804	0.000374	0.200774
Median	5600.000	14505300	0.000000	-0.010663
Maximum	85275.00	1.23E+09	0.255319	27.01162
Minimum	437.0000	150700.0	-0.501894	-0.925159
Std. Dev.	12621.09	46984614	0.023244	0.920606
Skewness	3.151505	4.501192	-0.398859	5.931087
Kurtosis	14.16028	47.27073	23.94340	88.93822
Jarque-Bera	171056.4	2125129.	457381.7	7836539.
Probability	0.000000	0.000000	0.000000	0.000000
Sum	2.34E+08	7.81E+11	9.352071	5017.336
Sum Sq. Dev.	3.98E+12	5.52E+19	13.50059	21178.57
Observations	24990	24990	24990	24990

APPENDIX 2

AUGMENTED DICKEY-FULLER (ADF) TEST

1. Return

Null Hypothesis: RETURN has a unit root
Exogenous: Constant
Lag Length: 5 (Automatic - based on SIC, maxlag=47)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-71.56406	0.0001
Test critical values:	1% level	-3.430441	
	5% level	-2.861464	
	10% level	-2.566770	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RETURN)
Method: Least Squares
Date: 05/21/18 Time: 21:32
Sample (adjusted): 7 24990
Included observations: 24984 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RETURN(-1)	-1.174459	0.016411	-71.56406	0.0000
D(RETURN(-1))	0.188913	0.014757	12.80157	0.0000
D(RETURN(-2))	0.134537	0.012995	10.35309	0.0000
D(RETURN(-3))	0.082112	0.011037	7.439644	0.0000
D(RETURN(-4))	0.053291	0.008876	6.003875	0.0000
D(RETURN(-5))	0.026363	0.006325	4.167896	0.0000
C	0.000441	0.000147	3.005435	0.0027

R-squared	0.494282	Mean dependent var	-1.09E-06
Adjusted R-squared	0.494160	S.D. dependent var	0.032558
S.E. of regression	0.023156	Akaike info criterion	-4.692820
Sum squared resid	13.39302	Schwarz criterion	-4.690543
Log likelihood	58629.70	Hannan-Quinn criter.	-4.692083
F-statistic	4068.692	Durbin-Watson stat	1.999670
Prob(F-statistic)	0.000000		

2. Detrended Volume

Null Hypothesis: DETRENDED VOLUME has a unit root
Exogenous: Constant
Lag Length: 3 (Automatic - based on SIC, maxlag=47)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-92.56425	0.0001
Test critical values:	1% level	-3.430441	
	5% level	-2.861464	
	10% level	-2.566770	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(DETRENDED VOLUME)
Method: Least Squares
Date: 05/21/18 Time: 21:34
Sample (adjusted): 5 24990
Included observations: 24986 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DETRENDED VOLUME(-1)	-1.464415	0.015821	-92.56425	0.0000
D(DETRENDED VOLUME(-1))	0.211088	0.013263	15.91549	0.0000
D(DETRENDED VOLUME(-2))	0.094294	0.010126	9.311909	0.0000
D(DETRENDED VOLUME(-3))	0.024377	0.006325	3.853851	0.0001
C	0.294019	0.006470	45.44415	0.0000

R-squared	0.617298	Mean dependent var	3.66E-05
Adjusted R-squared	0.617237	S.D. dependent var	1.440171
S.E. of regression	0.891003	Akaike info criterion	2.607262
Sum squared resid	19832.07	Schwarz criterion	2.608888
Log likelihood	-32567.53	Hannan-Quinn criter.	2.607789
F-statistic	10073.59	Durbin-Watson stat	2.000232
Prob(F-statistic)	0.000000		

APPENDIX 3

ARCH TEST

Heteroskedasticity Test: ARCH

F-statistic	23.58038	Prob. F(1,24987)	0.0000
Obs*R-squared	23.56003	Prob. Chi-Square(1)	0.0000

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 05/22/18 Time: 17:44
Sample (adjusted): 2 24990
Included observations: 24989 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.000522	1.67E-05	31.24248	0.0000
RESID^2(-1)	0.030705	0.006323	4.855963	0.0000

R-squared	0.000943	Mean dependent var	0.000539
Adjusted R-squared	0.000903	S.D. dependent var	0.002587
S.E. of regression	0.002586	Akaike info criterion	-9.077631
Sum squared resid	0.167048	Schwarz criterion	-9.076980
Log likelihood	113422.5	Hannan-Quinn criter.	-9.077420
F-statistic	23.58038	Durbin-Watson stat	2.001463
Prob(F-statistic)	0.000001		

APPENDIX 4

EGARCH MODEL

Dependent Variable: RETURN
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 07/22/18 Time: 14:49
Sample (adjusted): 1 24990
Included observations: 24990 after adjustments
Convergence achieved after 381 iterations
Presample variance: backcast (parameter = 0.7)
LOG(GARCH) = C(3) + C(4)*ABS(RESID(-1)/@SQRT(GARCH(-1))) + C(5)
*RESID(-1)/@SQRT(GARCH(-1)) + C(6)*LOG(GARCH(-1)) + C(7)
*DETRENDEDVOLUME

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	-0.000573	0.000127	-4.522830	0.0000
DETRENDEDVOLUME	0.001672	0.000216	7.750415	0.0000
Variance Equation				
C(3)	-2.401574	0.046158	-52.02917	0.0000
C(4)	0.378897	0.006747	56.15589	0.0000
C(5)	-0.035534	0.005429	-6.544807	0.0000
C(6)	0.741686	0.005604	132.3492	0.0000
C(7)	0.600382	0.007861	76.37094	0.0000

R-squared	0.002472	Mean dependent var	0.000374
Adjusted R-squared	0.002432	S.D. dependent var	0.023244
S.E. of regression	0.023215	Akaike info criterion	-4.930946
Sum squared resid	13.46721	Schwarz criterion	-4.928670
Log likelihood	61619.17	Hannan-Quinn criter.	-4.930209
Durbin-Watson stat	1.956492		

Substituted Coefficients:
==========
RETURN = -0.000573092601349 + 0.00167163375091*DETRENDEDVOLUME

LOG(GARCH) = -2.40157369584 + 0.378897348619*ABS(RESID(-1)/@SQRT(GARCH(-1))) - 0.0355339130632*RESID(-1)/@SQRT(GARCH(-1)) + 0.741686284774*LOG(GARCH(-1)) + 0.600381863763*DETRENDEDVOLUME

APPENDIX 5

ARCH-LM TEST

Heteroskedasticity Test: ARCH

F-statistic	0.038753	Prob. F(1,24987)	0.8439
Obs*R-squared	0.038756	Prob. Chi-Square(1)	0.8439

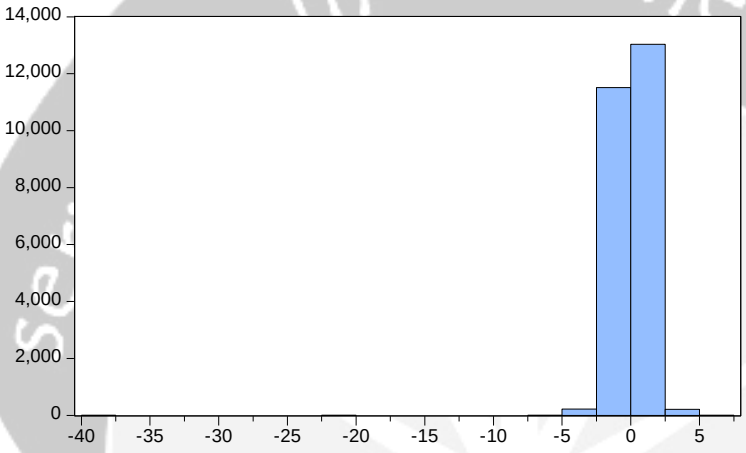
Test Equation:
Dependent Variable: WGT_RESID^2
Method: Least Squares
Date: 07/23/18 Time: 15:47
Sample (adjusted): 2 24990
Included observations: 24989 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.000174	0.061140	16.35880	0.0000
WGT_RESID^2(-1)	-0.001245	0.006326	-0.196858	0.8439

R-squared	0.000002	Mean dependent var	0.998930
Adjusted R-squared	-0.000038	S.D. dependent var	9.612984
S.E. of regression	9.613169	Akaike info criterion	7.364225
Sum squared resid	2309124.	Schwarz criterion	7.364875
Log likelihood	-92010.31	Hannan-Quinn criter.	7.364435
F-statistic	0.038753	Durbin-Watson stat	1.999990
Prob(F-statistic)	0.843940		

APPENDIX 6

NORMALITY TEST



Series: Standardized Residuals
Sample 1 24990
Observations 24990

Mean	0.015503
Median	0.038133
Maximum	5.344314
Minimum	-37.56312
Std. Dev.	0.999346
Skewness	-2.585367
Kurtosis	93.81101
Jarque-Bera	8614652.
Probability	0.000000

APPENDIX 7

DETERMINING OPTIMAL LAG

VAR Lag Order Selection Criteria
Endogenous variables: RETURN DETRENDEDVOLUME
Exogenous variables: C
Date: 05/27/18 Time: 17:29
Sample: 1 25011
Included observations: 24985

Lag	LogL	LR	FPE	AIC	SC	HQ
0	25189.36	NA	0.000456	-2.016198	-2.015548	-2.015988
1	25875.90	1372.927	0.000432	-2.070835	-2.068883	-2.070203
2	26042.90	333.9198	0.000427	-2.083882	-2.080630	-2.082829
3	26128.75	171.6540	0.000424	-2.090434	-2.085881*	-2.088960
4	26147.13	36.75720	0.000423	-2.091585	-2.085731	-2.089691
5	26163.68	33.07359*	0.000423*	-2.092590*	-2.085434	-2.090274*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

APPENDIX 8

GRANGER CAUSALITY TEST

Pairwise Granger Causality Tests
Date: 05/27/18 Time: 17:44
Sample: 1 25011
Lags: 5

Null Hypothesis:	Obs	F-Statistic	Prob.
DETRENDEDVOLUME does not Granger Cause RETURN	24985	3.34487	0.0051
RETURN does not Granger Cause DETRENDEDVOLUME		19.6055	2.E-19