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THE DYNAMIC OF TRADING VOLUME AND ITS IMPACT ON SECTORAL RETURN AND VOLATILITY: EMPIRICAL ANALYSIS OF THE IDX SECTORAL INDEX

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ABSTRACT

Indonesia capital market is growing rapidly and dynamically, as well as it has an important role for economic growth, together with its challenge for the development of the country. Stock return, volatility and trading volume are important variables for trading activity in capital market as it can provide relevant information to the market. The aim of this study are expected to facilitate investors, portfolio managers, analysts and regulators to understand the relationship of stock returns, trading volume and the effect on return volatility in the sectoral indices in Indonesian Stock Exchange. Vector Autoregression (VAR) model shows that information about trading volume in previous period are significantly positive to the current return in some sectors including property, real estate and building construction sector, consumer goods sector, manufacturer sector, transportation and infrastructure sector, also trade, services and investment sector. While the information of previous return to current trading volume are significantly positive in agriculture sector, trade, services and investment sector, mining sector, property, real estate and building construction sector, as well as manufacturer sector. Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) model found that in all sectors except agriculture sector, the coefficient of asymmetric term is negatively significant, implying that bad news produces a larger impact on the volatility in the consequent period than good news.

KEYWORDS
VAR, EGARCH, return volatility, sectoral index, trading volume.

INTRODUCTION
Indonesia capital market is growing rapidly and dynamically, as well as it has an important role for economic growth, together with its challenge for the development of the country. Stock return, volatility and trading volume are important variables for trading activity in capital market as it can provide relevant information to the market. This issues become an interested studies since investigated by Karpoff in 1987. According to Hsieh (2014) dynamics of asset price and trading volume are two fundamental types of statistical index on financial markets that can provide important information for investor espsecially when the capital market is fluctuating due to global crisis. Stock price also can represent number of supply and the demand, while the trading volume describes the perception of investors both individual and institutional investors. The dynamics relationship between stock returns, trading volume and return volatility might be influenced by information flow. By studying the dynamics relationship between these three variables is expected to give information whether the trading volume has a role to forecast the value of the stock return and return volatility, and vice versa. Studies about relationship between stock return volatility and trading volume are very useful for investor in predicting stock price movements (Leon (2007), Choi at al., (2012), Al-Jafari and Tliti (2013)).
Previous research focused on general stock movement without classifying in some sectors. Indonesian Stock Index has classified stock into nine sector defined by Jakarta Stock Exchange Industrial Classification. Thus, it makes an interesting point to investigate the relationship between return, volatility and trading volume for nine sectoral index in Indonesian Stock Exchange based on their various characteristic. The other advantage of this study compared with previous studies is using daily closing price index and daily trading volume from each sector. Pisedtasalasai and Gunasekarage (2007) suggested to use daily data for testing dynamic causal relationship between return, volatility and trading volume because it rated more appropriate. The results of this study are expected to facilitate investors, portfolio managers, analysts and regulators to understand the relationship of stock returns, trading volume and the effect on return volatility in the sectoral indices in Indonesian Stock Exchange.

REVIEW OF LITERATURE
There are several reasons that summed up by Karpoff (1987) about the importance of studying relationship between price and volume. First, it provides insight into the structure of financial markets. Second, it is important for event studies. Third, it is critical to the debate over the empirical distribution of speculative prices. Fourth, price and volume relations also have significant implications for research into futures markets. Those findings became a major reference for further research which is discussing similar topic in some countries.

RELATIONSHIP BETWEEN STOCK RETURN AND TRADING VOLUME

Attari *et al*. (2012) and Hsieh (2014) found the evidence that there is positive and significant relationship between trading volume and return. Also found that trading volume has contribution to give information about price changes. On the other hand, Abdullahi *et al.* (2014) found different result that there is no positive and significant relationship between trading volume and return. Al-Jafari and Tliti (2013) investigate the relationship between these variables in Amman Stock Exchange and reveals the evidence that there is no significant relationship between trading volume and return, but significant relationship has found between trading volume and return volatility. Positive relationship also found by Chen *et al.* (2001) which is investigated relationship between trading volume and price changes in Tunisia Stock Exchange and also found that trading volume contains useful the information about return.

Numerous studies have investigated relationship between stock return and trading volume in some emerging market. Asghar (2011) examines empirical relationship between return and trading volume in Pakistan and reveals the evidence that there is positive relationship between these two variables. Contemporer and causal relationship between trading volume and stock return in Palestine, has been conducted by Darwish (2012) and generated the evidence that there is significant relationship between them. Similar research has been examined for Jakarta Stock Composite Index by Pisedtasalasai and Gunasekarage (2007). This research investigated the relationship between stock return, trading volume and volatility for five countries in South East Asia including Indonesia, Malaysia, Philiphine, Singapore and Thailand. Data used from Januari 1991 until December 2004 suggest that there is significant causal relationship from stock return to the trading volume for Indonesian Stock Exchange. It also found the evidence that trading volume has useful information to prdict return volatility in the future. In contraty, Abdullahi *et al.* (2014) did not find any relationship between trading volume and return in West Texas Intermediate (WTI) and Brent crude oil markets Nigeria. These two variables also have not power to predict each other. In this research, Granger causality shows there is no causality relationship between return and volume.

VAR and EGARCH

Several studies used VAR model to examine the relationship between variables. Leon (2007) investigated the relationship between trading volume and stock returns volatility in the regional stock market of the West African Economic and Monetary Union, found that only one way causality running from trading volume to stock returns volatility. Meanwhile, Gurgul and Syrek (2013) documented a linier causal relationship from volatility to trading volume, and non linier relationship for vice versa. VAR model also applied by Lee and Rui (2002) who examines the causal relation between trading volume and stock return volatility. Their research failed to prove the causal relationship between volume and return but they found positive relationship between volume and volatility.

Other researches applied GARCH model such as Pati (2008), McGowan and Muhammad (2012), Kalu and Chinwe (2014). Dynamic relationship between trading volume and return volatility has been investigated in Korean Stock Exchange by Kim *et al*. (2005). Other Korean researcher, Choi *et al*. (2012) found that there is a negative asymmetric reffect to volatility and gave an evidence that trading volume are useful to predict the volatility of stock returns. Recent studies has been using the development of GARCH model such as TGARCH by Girard and Omran (2009), Oral (2012), Naka and Oral (2013). Other development of GARCH model called CGARCH was applied by Nor *et al*. (2013) and found that there is one way causal relationship from trading volume to volatility. Exponential GARCH (EGARCH) was employed by Susheng and Zhen (2014) and found that there is positive relationship between volume and return volatility.

NEED/IMPORTANCE OF THE STUDY

There are nine sectoral index in Indonesian Stock Exchange. Thus, it makes an interesting point and become an innovation to investigate the relationship between return, volatility and trading volume for specific sector classified by Jakarta Stock Exchange Industrial Classification. Because it would be produced particular result based on characteristic of each sector. Compared with previous study which is employed weekly or monthly data, the other advantage of this study is using daily closing price index and daily trading volume from each sector. The result of this study can be used as consideration for investors in making decision before investing on stock exchange, also for regulator to determine the rule in stock market.

OBJECTIVES

The paper examines the dynamic of the relationship between stock returns and trading volume for nine sectoral index for Indonesia Stock Exchange at the time before and after the subprime mortgage crisis and the European crisis. Furthermore, this study also investigated the effect of trading volume on return volatility.

HYPOTHESES

Based on previous findings, hypotheses for this research are:

1. Trading volume has significantly impact to stock return.
2. Stock return has significantly impact to trading volume.
3. The relationship between stock return and trading volume are stronger before crisis period.
4. Diduga terdapat efek asimetris pada volatilitas return saham sektoral.
5. Trading volume has power to predict return volatility.

RESEARCH METHODOLOGY

The sample consists of daily closing price index and trading volume in nine sector in Indonesian Stock Exchange that cover the period from 2 January 2002 until 25 September 2015. There are 3,343 total observations obtained from Bloomberg. Returns are the closing price index of nine sector in Indonesian Stock Index while volume is the trading volume at the end of trading day. Nine sectoral index in Indonesia Stock Exchange are agriculture (JAKAGRI); financial (JAKFIN); trade, services and investment (JAKTRAD); mining (JAKMINE); property, real estate and building construction (JAKPROP); consumer goods (JAKCONS); basic industry and chemical (JAKBIND); transportation and infrastructure (JAKINFR); manufacturer (JAKMANU).

RELATIONSHIP BETWEEN RETURN AND TRADING VOLUME

Before analyzing the relationship between stock return and trading volume, return was calculated as the first difference of closing price index from each sector per day.

$$R_i = \frac{P_t - P_{t-1}}{P_{t-1}}$$

Where : R_t is daily return and P_t is current closing price index at time *t.*

Furthermore, to analyze the relationship between return and trading volume, VAR model was applied. But, first of all stationary must be tested to determine VAR model. To perform unit root tests, this study used Augment Dickey-Fuller (ADF) test. The result shows that return and trading volume data were stationery at level, so that VAR in level was choosen for the next step. The general model of VAR is:

$$R_t = \alpha_0 + \sum_{i=1}^{k} \alpha_i R_{t-i} + \sum_{i=1}^{k} \beta_i V_{t-i} + \delta_1 Dummy1 + \delta_2 Dummy2 + \varepsilon_t$$

$$V_t = \lambda_0 + \sum_{i=1}^{k} \lambda_i R_{t-i} + \sum_{i=1}^{k} \gamma_i V_{t-i} + \delta_1 Dummy1 + \delta_2 Dummy2 + \eta_t$$

Where: R_t and V_t are stock return and trading volume respectively. The *Dummy*1 for subprime mortgage crisis. The *Dummy*2 is a dummy variable for European crisis. The optimal lag length (*k*) for the VAR model for each sector was based on the Akaike Information Criterion (AIC).

The Granger Causality test is employed to investigate the relation between return and trading volume at the time period before and after crisis (subprime mortgage crisis and European crisis). Granger causality test is estimated as follows:

$$Y_t = \sum_{i=1}^{n} \alpha_i Y_{t-i} + \sum_{i=1}^{n} \beta_i X_{t-i} + e_{1t}$$

$$X_t = \sum_{i=1}^{m} \gamma_i X_{t-i} + \sum_{i=1}^{m} \lambda_i Y_{t-i} + e_{2t}$$

IMPACT OF TRADING VOLUME TO RETURN VOLATILITY

To examine the effect of return and trading volume to the return volatility, the following EGARCH model with asymmetric effect is estimated:

$$R_t = \alpha_0 + \sum_{i=1}^{p} \alpha_i R_{t-1} + \delta_1 + \delta_2 + \varepsilon_t$$

$$log_{(h_t)} = \beta_0 + \beta_1(|\varepsilon_{t-1}|/\sqrt{h_{t-1}}) + \gamma_1(\varepsilon_{t-1}/\sqrt{h_{t-1}}) + \beta_2 \log(h_{t-1}) + \delta_3 Dummy1 + \delta_4 Dummy2 + \varphi_1 V_{t-1}$$

Where: R_t and h_t are the return and conditional variance respectively. γ_1 is the coefficient that captures an asymmetric effect of negative or positive standardized residuals on conditional variances. *Dummy*1 and *Dummy*2 are the subprime mortgage crisis and European crisis dummy respectively. While φ_1 is coefficient of trading volume.

RESULT AND DISCUSSION

Table 1 presents the summary statistics of the return and trading volume for nine sectoral index in Indonesian Stock Index which is including mean, median, maximum, minimum, standard deviation, skewness and kurtosis also Jarque-Bera test of normality. According to these statistics, the highest average daily returns are financial sector; property, real estate and building construction sector; and consumer goods sector. The lowest daily return was earned by agriculture sector and trade, services and investment sector. Meanwhile, all sectors are having similar mean of trading volume except agriculture sector which has the lowest trading volume (17.93%). If it linked to its standard deviation, agriculture sector and mining sector also have the largest standard deviation value. This indicates that these sectors have lower stability or higher risk than other sector. It also makes mining sector is more sensitive to the information flow to the market.

TABLE 1: DESCRIPTIVE STATISTIC

Sektor	JAKAGRI	JAKFIN	JAKTRAD	JAKMINE	JAKPROP	JAKCONS	JAKBIND	JAKINFR	JAKMANU
Return									
Mean	0.000794	0.000832	0.000610	0.000618	0.000835	0.000815	0.000641	0.000634	**0.000751**
Median	0.000144	0.001050	0.000858	0.000305	0.000925	0.000766	0.000815	0.000574	**0.000804**
Maximum	0.134135	0.104034	0.072402	0.117538	0.094714	0.085076	0.096203	0.110081	**0.088127**
Minimum	-0.215919	-0.109795	0.182945	-0.251733	-0.135591	-0.104835	-0.125092	-0.185972	**-0.120815**
Std.Deviasi	0.021726	0.016817	0.014143	0.021517	0.016586	0.014163	0.016606	0.017886	**0.014185**
Skewness	-0.161675	-0.076866	-1.135561	-0.459654	-0.411729	-0.098201	-0.581291	-0.428327	**-0.409780**
Kurtosis	10.32510	6.606000	15.01206	12.45565	8.706523	7.994008	7.979991	10.72157	**9.124512**
Jarque-Bara	7486.319	1813.991	20810.57	12567.93	4629.017	3477.242	3641.654	8404.594	**5316.749**
Volume									
Mean	17.93304	19.40328	19.54838	19.26724	19.42399	18.20579	18.58706	18.99018	**19.40276**
Median	18.31815	19.45638	19.84972	19.72444	20.00933	18.21029	18.69360	19.36503	**19.43971**
Maximum	21.54514	21.61902	22.86767	22.32746	22.63501	20.81813	21.96367	22.61328	**21.72760**
Minimum	12.73670	16.33151	15.67337	13.99366	12.07539	15.46916	14.43232	14.71730	**17.00300**
Std.Deviasi	1.522694	0.769515	1.153219	1.533525	1.713924	0.652698	1.021446	1.299983	**0.656135**
Skewness	-0.640225	-0.618982	-0.694109	-1.243378	-1.406482	0.038971	-0.555452	-0.534358	**-0.227144**
Kurtosis	2.728236	3.848300	3.091500	4.212053	5.020884	3.385978	3.567256	2.591869	**3.338725**
Jarque-Bara	238.8632	313.7085	269.6021	1066.003	1671.046	21.59774	216.7219	182.2945	**44.72813**

Source: Bloomberg (2015)

TABLE 2: RELATIONSHIP BETWEEN RETURN AND TRADING VOLUME USING VAR MODEL

Sektor	JAKAGRI	JAKFIN	JAKTRAD	JAKMINE	JAKPROP	JAKCONS	JAKBIND	JAKINFR	JAKMANU
Lag (k)	5	4	4	5	4	5	5	5	5
β_1	0.000928 (1.59372)	-0.000600 (-0.99201)	0.000695 (1.59326)	0.000991 (1.50158)	0.001163 (2.28468)*	0.001307 (2.63330)**	0.001140 (1.94872)	-0.000262 (-0.37521)	0.001757 (2.71712)**
δ_1	-0.002431 (-1.69110)	-0.000732 (-0.91361)	-0.001683 (-2.34468)*	-0.003731 (-2.80537)**	-0.002748 (-2.76430)**	9.76E-05 (0.14502)	-0.000673 (-0.79864)	-0.002209 (-1.85640)	-0.000346 (-0.49888)
δ_2	-0.000142 (-0.13819)	-0.000233 (-0.29352)	0.000492 (0.72246)	-0.001267 (-1.24328)	0.000843 (1.06430)	-0.000452 (-0.65632)	-0.000494 (-0.62175)	0.000443 (0.52262)	-0.000570 (-0.84636)
λ_1	2.234268 (4.13972)**	0.269341 (0.53159)	1.989022 (2.91107)**	1.449724 (3.14895)**	3.206023 (5.20446)**	0.795474 (1.28872)	1.030716 (1.95006)	-0.256601 (-0.59066)	1.102231 (2.30207)*
δ_3	0.278922 (6.39863)**	0.032679 (1.41147)	0.091160 (3.23076)**	0.174845 (4.99666)**	0.181828 (5.28557)**	-0.029796 (-1.25763)	0.078034 (3.08981)**	0.160738 (5.42526)**	0.048540 (2.57801)**
δ_4	-0.010157 (-0.010157)	0.001503 (0.06542)	0.043659 (1.63223)	0.009373 (0.34968)	0.023950 (0.87386)	0.066852 (2.76096)**	0.028175 (1.18343)	0.005504 (0.26079)	0.015672 (0.85792)

An *, ** denotes statistical significance at 5%, 1% level

TABLE 3: RESULT OF THE GRANGER CAUSALITY TEST FOR NINE SECTORAL INDEX

Sector	JAK AGRI	JAK FIN	JAK TRAD	JAK MINE	JAK PROP	JAK CONS	JAK BIND	JAK INFR	JAK MANU
Before Subprime Mortgage Crisis									
Volume →Return	**2,76323**	0,82249	1,42937	1,65409	1,41305	1,03720	2,13233	1,49296	2,02909
Return → Volume	**4,19750**	0,41449	1,68591	1,93457	**5,19611**	1,74694	1,39208	1,40261	**2,46843**
After Subprime Mortgage Crisis									
Volume →Return	1,80732	1,44906	**3,66770**	2,02082	1,21722	1,48079	0,27370	1,10788	1,41408
Return → Volume	0,97847	1,79358	0,97057	1,67291	3,57321	1,17532	0,42341	1,75870	0,23093
Before Europeanan Crisis									
Volume →Return	1,45918	0,90294	2,31048	0,39271	2,67622	1,15247	2,15695	1,72735	1,83024
Return → Volume	**3,29111**	0,62075	1,70086	1,65335	**5,32170**	1,37270	2,00224	0,80159	**2,41117**
After Europeanan Crisis									
Volume →Return	1,38668	2,03307	0,56519	1,82693	0,36084	0,98724	0,90374	1,09855	0,11854
Return → Volume	1,83947	1,28209	**2,47869**	2,24455	**3,03253**	0,78369	0,77111	**3,66197**	0,84974

TABLE 4: THE IMPACT OF RETURN AND TRADING VOLUME TO THE VOLATILITY

Sektor	JAKAGRI	JAKFIN	JAKTRAD	JAKMINE	JAKPROP	JAKCONS	JAKBIND	JAKINFR	JAKMANU
β_1	0.172643 (0.0000)**	0.351431 (0.0000)*	0.261791 (0.0000)*	0.189934 (0.0000)*	0.240399 (0.0000)*	0.295088 (0.0000)*	0.381837 (0.0000)*	0.187049 (0.0000)*	0.222108 (0.0000)*
γ_1	0.012094 (0.0397)*	-0.037952 (0.0026)*	-0.031152 (0.0002)*	-0.006376 (0.3300)	0.013769 (0.0888)	-0.011857 (0.2105)	-0.072307 (0.0000)*	-0.003343 (0.6691)	-0.041659 (0.0000)*
δ_3	0.023997 (0.0004)**	0.234624 (0.0000)*	0.062110 (0.0000)*	0.017634 (0.0079)*	-0.000480 (0.9393)	0.069283 (0.0000)*	0.144960 (0.0000)*	0.022200 (0.0020)*	0.064016 (0.0000)*
δ_4	-0.007037 (0.0412)*	0.123977 (0.0000)*	0.019715 (0.0002)*	-0.016339 (0.0001)*	0.012613 (0.0184)**	0.099278 (0.0000)*	0.010666 (0.2532)	-0.005990 (0.2059)	0.051751 (0.0000)*
φ_1	3.01E-11 (0.0332)*	1.85E-10 (0.0000)*	1.02E-11 (0.0068)*	1.36E-11 (0.0101)**	2.44E-11 (0.0010)*	2.50E-10 (0.0003)*	2.43E-10 (0.0000)*	6.16E-14 (0.9940)	8.18E-11 (0.0000)*

An *, ** denotes statistical significance at 5%, 1% level

Table 2 presents the causal relationship between trading volume and return in nine sectoral index. Coefficient of β reports the impact of trading volume to return. For property real estate and building construction sector; consumer goods sector; and manufacture sector, trading volume is positive and statistically significant at first lag. Indicating that information about trading volume a day before has impact to the current return. This finding is also consistent with evidence from previous research by Chen et.al (2001), Mc. Gowan and Muhammad (2012). Subprime mortgage crisis in 2008 as dummy variable in this research (δ_1) has significantly negative impact to trade, services and investment sector (at 5% level); mining sector; property, real estate and building construction sector (at 1% level). While second variable dummy, Europeanan crisis (δ_2) has no significant impact to return.

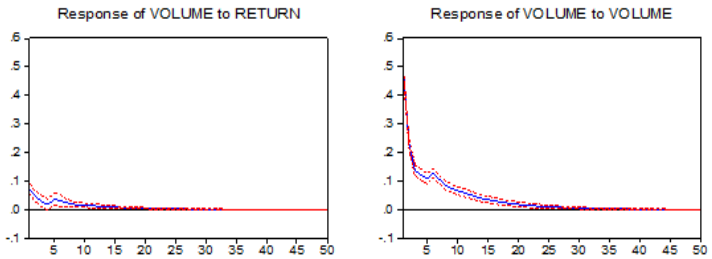
Coefficient of λ reports the impact of return to trading volume. Return has significantly positive to the trading volume at the first lag for agriculture sector; trade, services and investment sector; mining sector; property, real estate and building construction sector; and manufactur sector. This finding is also documented by Gurgul dan Syrek (2012). Based on dummy variable (δ_3) it shows that subprime mortgage crisis has negatively significant effect to the return for all sectors except financial sector and consumer goods sector at 5% level. While Europeanan crisis as second dummy variable (δ_4) has no significant impact to all sector except consumer goods sector.

Table 3 reports the result of Granger causality test. Based on Granger causality test, bidirectional causality between return and trading volume is spotted for agriculture sector are stronger at pre crisis period (subrime mortgage crisis and European crisis). It is similar with Moazzami and Dadgostar (2013) finding that trading volume doesn't have power to predict the return after the crisis. Granger Causality shows the relationship between returns and trading volume for nine sectors in Indonesia Stock Exchange before and after the global economic crisis in 2008 and the Greek crisis in 2010. Based on the significance 5% level, it is significant for some sector including agricultural sector (JAKAGRI), trade, services and investment sector (JAKTRAD), the property, real estate and building construction sector (JAKPROP), transportation and infrastructure sector (JAKINFR) as well as the manufacturing sector (JAKMANU). Bidirectional relationship between return and volume occur only for agricultural sector before the subprime mortgage crisis. Whereas, only one-way relationship from return to the volume before the European crisis. The only sector which has a one-way relationship from volume to return after the subprime mortgage crisis is trade, services and investment sector (JAKTRAD). This is consistent with the findings by Naka and Oral (2013) that found trading volume has significant contribution to returns volatility.

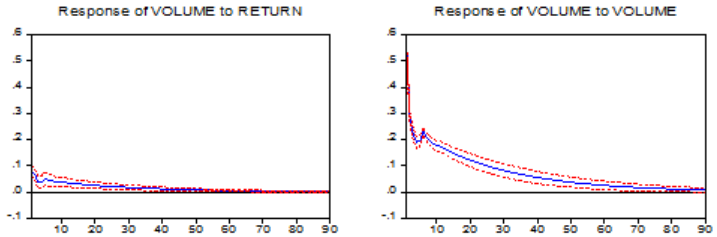
In order to provide a more detailed insight into findings of VAR model, additional tests including impulse response function (IRF) and forecast error variance decomposition were applied in this research. The result of IRF shows that return of consumer goods sector is the fastest sector that to response the shock, so that it is easy to be stable back. In contrary, mining sector and also property, real estate and building construction sector, are two longest sectors that response the shock. Means, they need more time to be stable when they got the shock (crisis). This results are in line with evidence from VAR model that return on this two sector are significantly has impact to the trading volume.

FIG. 1: THE RESULT OF IMPULSE RESPONSE TEST

IRF FOR CONSUMER GOODS SECTOR



IRF FOR MINING SECTOR

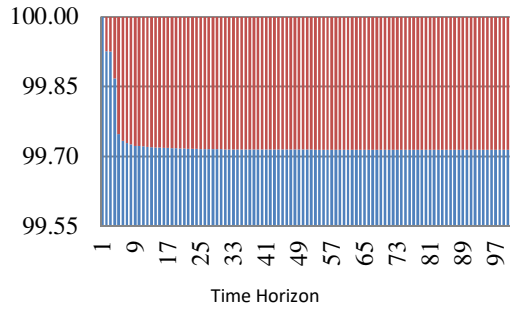


*Complete results are available from the authors upon request

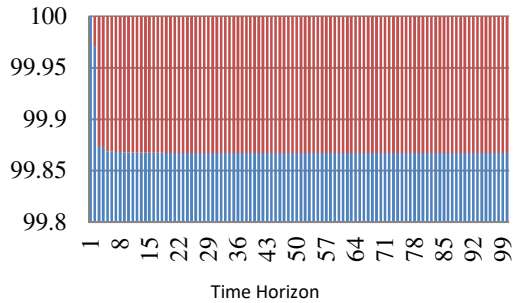
Forecast Error Variance Decomposition (FEVD) in this research, has a similar pattern for all sectoral index. Either, return or trading volume has affected more than 90% by itself. This is a common characteristic used to find in numerous studies that using daily data return for the observation. This is due to the small interval of observation, so that the movement of observed data is more influenced by itself rather than external factors.

FIG. 2: THE RESULT OF IMPULSE RESPONSE TEST

FEVD FOR AGRICULTURE SECTOR



FEVD FOR FINANCE SECTOR



*Complete results are available from the authors upon request

Table 4 reports the estimated parameters of the EGARCH model with asymmetric effect in each sector. The coefficient asymmetric $\gamma_1$is negatively significant for financial sector; trade, services and investment sector; basic industry and chemical sector; and also manufactur sector. Implying that bad news produces a larger impact on the volatility than good news does. This finding is also documented by Pisedtasalasai dan Gunasekarage (2007). Surprisingly, the only one sector that has positive and significant asymmetric coefficient is agriculture sector. It is occur because of the characteristic of agriculture shock which is high price but low trading volume and the type of industries are tend to a large scale. Thus, the type of investors are long term investor which is expecting long term return in the future such as dividend.

Coefficient of the first dummy variable δ_3 shows that subprime mortgage crisis has significant impact to all sector except property, real estate and building construction sector. The second variable dummy δ_4 Europeanan crisis is only significant for financial sector; trade, services and investment sector; consumer goods sector and manufactur sector. It means that at the crisis period, the volatility of return for those sectors has increased. φ_1 is represent the evidence that trading volume possesses some information which is useful in predicting the future dynamics of return volatility. It is significant for all sectors except financial sector. This finding supports the previous research by Choi et.al (2012), Naka and Oral (2013), also Oral (2012).

RECOMMENDATIONS/SUGGESTIONS

The result of this study can be used as consideration for investors in making decision before investing on stock exchange. For risk takers investor who looking for return of trading activity, investing in non-farm sector are recommended. It is because non-farm stocks are more volatile with high trading volume activity each day, so that speculative investors are able to use past information to predict the current return. For risk-averse investors, investing in agricultural sector stocks is more recommended because it is less volatile because most of the investors are long term investor type instead of traders. So that negative information (bad news) has not large impact to the volatility.

CONCLUSIONS

VAR model shows that information about trading volume in previous period are significantly positive to the current return in some sectors including property, real estate and building construction sector, consumer goods sector, manufacture sector, transportation and infrastructure sector, also trade, services and investment sector. While the opposite effect from information of previous return to current trading volume are significantly positive in agriculture sector, trade, services and investment sector, mining sector, property, real estate and building construction sector, as well as manufacture sector. Causal relationship between return and trading volume occurs only in the agricultural sector in pre subprime mortgage crisis period. Whereas, before the Europeanan crisis period its only has relationship from return to trading volume. Moreover, directional relationship from return to trading volume is also found in property, real estate and building construction sector in pre subprime mortgage crisis period.

EGARCH model found that in all sectors except agriculture sector, the coefficient of asymmetric term is negatively significant, implying that bad news produces a larger impact on the volatility in the consequent period than good news. It is because of the characteristics of the agricultural sector which has high price with low trading volume, indicating that investors in this sector are tend to be a long term investor. Mostly, agriculture sector contains with large-scale industries with type of investor who is expecting long-term gains, such as dividends, rather than return from the trading activity. In this research also found evidence that trading volume has a power to predict the dynamics of return volatility in the future. The subprime mortgage crisis has a significant positive effect on volatility in all sectors except property, real estate and building construction sector. On the other hand, the Europeanan crisis has positively significant effect on all sectors except agriculture sector and mining sector, which has a negative significance.

The findings captured an asymmetric information on stock return in Indonesian stock exchange.

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