THE SIMULTANEITY BETWEEN TRADING VOLUME AND ORDER IMBALANCE
(Case Studies of LQ 45)

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ABSTRACT

The purpose of this research is to analyze the simultaneity between trading volume and order imbalance, the influence of past performance, market risk, market capitalization, tick size totrading volume and the influence of tick size, depth and bid-ask spread to order imbalance of companies were listed on LQ 45 index. Sample in this research were selected by using purposive sampling method with some selected criterias. 55 companies listed on 2014's LQ 45 index were chosen as sample. The results showed that trading volume is simultaneously related to order imbalance; past performance, market risk and market capitalization have a positive and significant effect to trading volume, tick size has a negative and significant effect to trading volume, order imbalance has a negative and not significant effect to trading volume; tick size, depth, bid-ask spread, and trading volume have no significant effect to order imbalance.

Keywords: Trading Volume, Order Imbalance, Past Performance, Market Risk, Market Capitalization, Tick Size, Depth, Bid-Ask Spread

INTRODUCTION

Liquidity becomes an important thing because without the liquidity, the capital market will lose its function and role as a means of investment also financing sources. In general liquidity is the ability of a company to meet short-term financial obligations. Stock liquidity is a measure of the number of transactions in the capital market of a stock within a certain period. If the frequency of stock transaction is high, the liquidity of the stock is also high. It shows that the stock is much in demand by investors. For investors and issuers, liquidity has a very important meaning. Investors will benefited by liquid shares because the shares will be easier to be transacted so that investors will have the opportunity to make a profit.

Liquidity can be seen through the activity of trading volume. If the volume of shares traded is greater than the volume of shares issued, then the stock becomes more liquid so that the volume of trading activity will rise. Trading volume explains about the power between supply and demand in the stock market which is a manifestation of investor behavior. Volume describes trading activity in the stock market, and therefore the volume becomes an important indicator in evaluating the condition and market activity. The level of investor's interest can be measured by the volume of trade. If the trading volume is high, the level of investor's interest will also high and vice versa.

The company's past performance can be seen from the return that obtained by the company in the previous period, and investors tend to be more interested in the shares of companies that have a good past performance such as high rate of return. With investor's interest of past performance of a company, so it will make affection of the volume of trade and will affect change of the stock price because investors will be very confident of the stocks that have performed very well in the past and they hope that the company will have the same performance in the future so that it can give benefits to investors. In a study conducted by Nugraheni (2013) noted that the past performance have an impact on trading volume.

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Trading volume can also be affected by market capitalization of a company. According to Banz (1981), market capitalization is a reflection of the value of the assets of a company and can be used as a measurement of firm size. Trisnadewi (2012) examined the effect of firm size on investment decisions and found out that there was a significant negative correlation between the size of the company against the decision of investors in investment activity in the stock market, so that the volume of trade was affected. Tick size is also expected to affect the trading volume of stock. Tick size is the limit price that can be determined by the investor. Risen or fallen in the multiples of stock fraction is called points. The rate of profit may be affected by the risen or fallen of points. If there is a profit, stock market participants will respond well to these stocks so the trading volume will rise.

There are several reasons why the order imbalance is positively associated with trading volume. In Chan and Fong (2000), model of Admati and Pfleiderer (1988) states that informed traders would prefer to conduct trading activities in the deep market. While liquidity traders will choose to do the trading activity when the market is crowded. Because of informed traders prefer to trading during the higher trading day, it will be an excess supply that only occurs on one side (buy or sell) which will cause the order imbalance and volatility.

In this study, variable of the liquidity is expected to affect the order imbalance. Tick size is used to confine the price that can be specified by the investor or seller. Larger tick size may confine the price competition among sellers, and a smaller tick size can increase price competition among providers of the liquidity. Depth and bid ask spread was suspected to affect the order imbalance as it relates to the stock liquidity. The purpose of this research is to ascertain if there is simultaneity effect between trading volume and order imbalance and what factors that can affect them.

THEORETICAL FRAMEWORK AND HYPOTHESES

The hypothesis can be described with the image of the frame hypothesis below:

Figure 1
Theoretical Framework
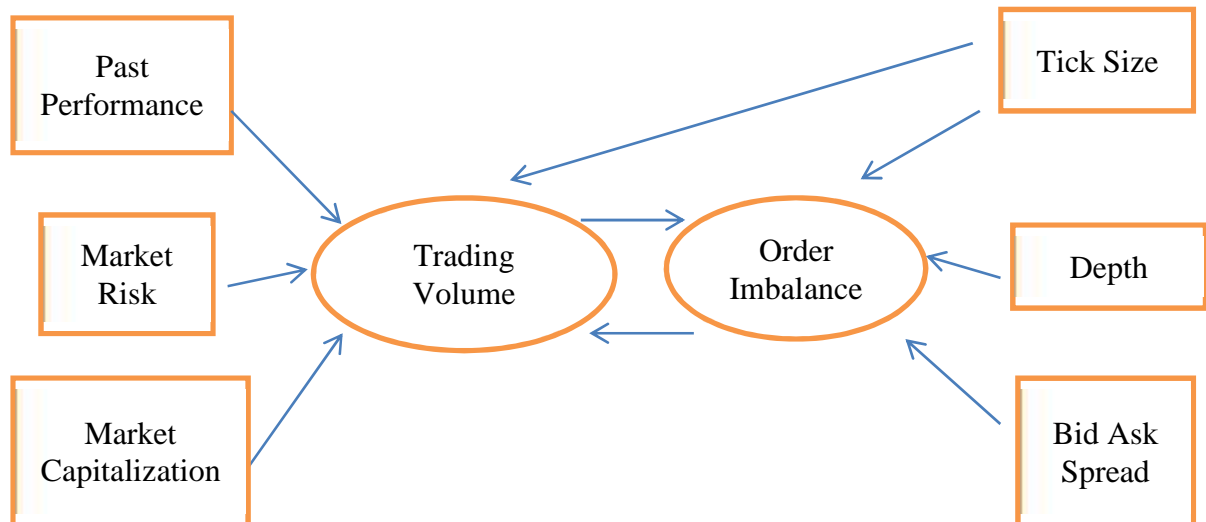
Theory of Efficient market hypothesis states that the formed of stock prices is a reflection of all available information, either fundamental or existed information (private information). So the strategy that taken by the investor is observe the returns or past performance of a stock. If the performance of stocks in the past had a good history then the investor would be interested in buying the shares. Gervais and Odean (2001) which analyzed about overconfident investors on performance and past return, saying that a high level of overconfident investors will increase the volume of stock trading.

H1 : Past performance has positive effect on trading volume

Market risk is measured by beta that can be obtained with the calculation of market return and stock return. In Efficient Market Hypothesis's theory, the current stock price reflects the previous stock price with addition of random information. So, it means that the random factor can be called as return. Research conducted by Adityo (2012) proved that beta stocks have a positive relationship with liquidity. However, research conducted by Zuriah (2013) concluded that beta stocks did not affect the liquidity.

H2 : Market risk has negative effect on trading volume

Companies that have large market capitalization will be considered to have certainty in obtaining benefits and could influence the investors in making decisions that will affect the business risk factors. Fama and French three-factor model suggests that stocks with large firm size will attract investors to buy, so the volume of trade will rise.

H3 : Market Capitalization has positive effect on trading volume

Reduction in tick size can make changes in liquidity that were correlated inversely with the price and has a direct connection with the stock trading volume (Harris, 1994). It happens because if the stocks have a high volume and low price, so the fraction of the price become a factor that can affect the liquidity of its shares. The impact of the reduction in stock fraction can theoretically be positive or negative due to various factors, by estimating that there will be enhancement in volatility as a result of reduction of tick size, and can make a lot of transactions will be canceled, so it will decrease the volume of stock trading (Porter and Weaver, 1997).

H4 : Tick size has negative effect on trading volume

According to Porter and Weaver (1997), trading volume will decline after the reduction of tick size. And volatility will increase, so it will cause the cancellation of stock transactions. If volatility has increased during the reduction of tick size then tick size could be expected to have negative affect on order imbalance due to order imbalance arises when the volatility increased.

H5 : Tick size has negative effect on order imbalance

Depth is closely related to liquidity and volume within a security. Theoretically, depth is the volume of shares on the lowest selling order price and highest buying order price. Depth indicates the depth of the market, if the securities are traded more and more, the depth of the market will be greater. Depth is able to describe the changes in liquidity thoroughly.

H6 : Depth has positive effect on order imbalance

Bid-ask spread can be used as benchmark by investor in doing an investment activity. Reduction of bid-ask spread shows the reduction in trade costs that experienced by investors. Research that conducted by Sumani (2013) found a significant relationship between stock liquidity and bid-ask spread. Tacana (2014) said that bid-ask spread has no effect on liquidity.

H7 : Bid-ask spread has negative effect on order imbalance

In Chan and Fong (2000), model Admati and Pfleiderer (1988) states that informed traders would prefer to conduct trading activities in deep market, while liquidity traders will choose to do the trading activity when the market is crowded. Because of informed traders prefer trading activity during the high trading day, it will be an excess supply that only occurs on one side (buy or sell) which will cause the order imbalance and volatility of stock prices.

According Chordia (2002) there are two reasons why the order imbalance can be said to have a strong influence on liquidity, there are: (1) Order Imbalance sometimes provide private information that could reduce the liquidity for the time being and will also permanently change the market price. (2) High and random order imbalance will exacerbate the investment problems faced by the market maker, who later explained by a change in the bid-ask spread that change the pricing. So the order imbalance has significant influence on stock returns and liquidity. And will affect the volume of trade.

H8 : Trading volume has positive effect and has simultaneity effect on order imbalance

RESEARCH METHOD

Population is the whole subject of research. In this study, population that used are all of the companies that listed in index LQ 45 of the year 2014. Sample is part of the subject population, representing the entire population of as many as 55 companies. The samples in this study is done by using purposive sampling method. Methods of data collection were obtained through the financial books and international journals. The data that used in this research are taken from yahoo finance and Indonesian Stock Exchanges. Analysis method that used in this research is two stage least squares (2SLS) method that used to answer whether there is a simultaneity relation between trading volume and order imbalance and what are the factors that can affect them.

Spesification of variables that used in this research are:

Y1 = Trading volume   X3 = Market capitalization
Y2 = Order imbalance   X4 = Tick Size
X1 = Past performance   X5 = Depth
X2 = Market risk   X6 = Bid-ask spread

RESULTS AND DISCUSSION

The equation of simultanity test:

Table 1.1
Simultanity test between trading volume and order imbalance by Two Stage Least Squares (2SLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.030485	0.004456	6.840714	0.0000
Y2	-12.15250	19.23185	-0.631895	0.5279
X1	0.008150	0.003473	2.346865	0.0196
X2	0.004240	0.000446	9.502352	0.0000
X3	8.59E-05	1.79E-05	4.796411	0.0000
LNX4	-0.021694	0.008888	-2.440781	0.0152

R-squared	0.751613	Mean dependent var	0.014630
Adjusted R-squared	0.747528	S.D. dependent var	0.010611
S.E. of regression	0.005332	Sum squared resid	0.008642
F-statistic	167.9107	Durbin-Watson stat	2.074951
Prob(F-statistic)	0.000000	Second-Stage SSR	0.010926

Sources: *Eviews* 6

According to table 1.1, the form of simultanity test is:
$Y1 = 0.030485 - 12.15250*Y2 + 0.008150*X1 + 0.004240*X2 + 0.0000859*X3 - 0.021694*X4$
The results can be explained as follows:

a. The constanta 0.030485 states that if the independent variables are considered constant, then the average of the volume of trade is 0.030485

b. Coefficient of order imbalance (Y2) is -12.15250, which means that any increment in the order imbalance by 10 will decrease trading volume (Y1) of 121. The coefficient of order imbalance (Y2) is negative, indicates that the order imbalance negatively affect the trading volume (Y1), which means if the value of order imbalance has increased, the trading volume will decline.

c. Coefficient of past performance (X1) is 0.008150, which means that any increment of past performance by 1000 will increase the volume of trade (Y1) of 8.150. The positive coefficient of past performance shows that the past performance has positive effect on trading volume, which means that the increment in the value of past performance, will make the trading volume increase.

d. Coefficient of market risk (X2) is 0.004240 which means that any increment of the risk market by 1000 will increase the volume of trade (Y1) by 4.240. The value of market risk is positive, indicates that the market risk has positive effect on trading volume, which means that the increasing of the market risk will make increment in trading volume.

e. Coefficient of market capitalization (X3) is 0.0000859, means that any increment in market capitalization by 10,000 will increase the volume of trade (Y1) by 0.859. The coefficient of market capitalization is positive, indicates that market capitalization has positive effect on trading volume, which means that the increasing of the market capitalization will increase the trading volume.

f. Coefficient of tick size (X4) is -0.021694, which means that any increment in tick size by 1000 will decrease trading volume (Y1) by 21.694. Value of tick size has negative coefficient, indicates that the tick size negatively affects the trading volume (Y1), which means that the increasing value of the tick size will decrease trading volume.

Table 1.2
Simultanity test between order imbalance and trading volume by Two Stage Least Squares (2SLS)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4.15E-05	0.000355	-0.116907	0.9070
Y1	0.001598	0.011083	0.144178	0.8855
LNX4	0.000145	0.000192	0.753727	0.4516
X5	0.007015	0.007614	0.921361	0.3576
X6	0.004901	0.002716	1.804926	0.0721
R-squared	0.583975	Mean dependent var		0.000227
Adjusted R-squared	0.578519	S.D. dependent var		0.000171
S.E. of regression	0.000111	Sum squared resid		3.76E-06
F-statistic	121.9925	Durbin-Watson stat		2.079001
Prob(F-statistic)	0.000000	Second-Stage SSR		3.02E-06

Sources: *Eviews* 6

According to table 1.2, the form of simultanity test is:
Y2 = 0,0000415 - 0.001598*Y1 - 0,000145*X4 + 0.007015*X5 + 0.004901*X6
The results can be explained as follows:

a. The constanta is 0.0000415 states that if the independent variables are considered constant, then the average of the order imbalance is equal to 0.0000415

b. Coefficient of trading volume (Y1) is -0.001598, which means that any increment of the trading volume by 100 will decrease the order imbalance (Y2) to 0.1598. The coefficient of trading volume (Y1) is negative, shows that the trading volume variable has negative effect on the order imbalance (Y2), which means that the increasing value of the order imbalance will decrease the trading volume.

c. Coefficient of tick size (X4) is 0.000145, means that any increment of tick size by 1000 will decrease the order imbalance (Y2) to 0,145. Positive value of tick size indicates that tick size has positive influence on order imbalance, which means that the increment of the order imbalance will increase the tick size.

d. Depth's coefficient (X5) is 0.007015 means that any increment of depth by 1000 will increase the order imbalance (Y2) to 7.015. Positive depth coefficient values indicate that depth has positive effect on the order imbalance, which means that the increment of the order imbalance will increase the depth.

e. Coefficient of bid-ask spread (X6) is 0.004901 means that any increment of the bid-ask spread by 1000 will increase the order imbalance (Y2) to 4.901. The coefficient of the bid-

ask spread is positive, indicates that depth has positive effect on the order imbalance, which means that the increasing value of the bid-ask spread, will increase the order imbalance.

Table 1.3
Hausman Test Of Trading Volume and Order Imbalance

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.020877	0.000714	29.23721	0.0000
Y2F	-27.51884	2.679682	-10.26944	0.0000
RESID01A	-70.02554	3.408638	-20.54356	0.0000
R-squared	0.617429	Mean dependent var		0.014630
Adjusted R-squared	0.614936	S.D. dependent var		0.010611
S.E. of regression	0.006585	Akaike info criterion		-7.198524
Sum squared resid	0.013311	Schwarz criterion		-7.162363
Log likelihood	1118.771	Hannan-Quinn criter.		-7.184068
F-statistic	247.7324	Durbin-Watson stat		2.252386
Prob(F-statistic)	0.000000			

Source: *Eviews* 6

According to table 1.3, the probability of order imbalance is significant because the order imbalance's probability is smaller than the significance level (0.0000 < 0.05). So, there is a problem of simultaneity between trading volume and order imbalance.

HYPOTHESIS TEST

F TEST
Based on the output result from Eviews 6, the value of the F statistic is smaller than the significance level (0.00000 < 0.05) so that the order imbalance, past performance, market risk, market capitalization and tick size have significant effect on trading volume simultaneously. Trading volume, tick size, depth and bid-ask spread have simultaneous effect on order imbalance.

DETERMINATION TEST (R^2)
Based on the output result of table 1.1, the R-squared and Adjusted R-squared is 0,751613 dan 0,747528. It means that the trading volume can be explained 75,16% by the order imbalance, past performance, market risk and market capitalization, while the rest 24,84% is explained by factors that exclude from model. On table 1.2, the R-squared and Adjusted R-squared is 0,583975 and 0,578519, which means that order imbalance can be explained 58,39% by the trading volume, tick size, depth and bid-ask spread, while the rest 41,61% is explained by other factors outside the model.

T-Test
According to the result of table 1.1 and 1.2, the results can be explained as follows:
a. The effect of order imbalance on trading volume

   The results show a negative coefficient of order imbalance and there is no significant effect on trading volume. The Hausman test shows that there is simultaneity relation between order imbalance and trading volume. The coefficient of order imbalance is -12,15250 which means that if order imbalance has increased, the trading volume will

decrease. The value of order imbalance's probability is 0,5279 which is greater than significance level (0,5279> 0,05). So, order imbalance has no effect on trading volume individually.

b. The effect of past performance on trading volume

The results show positive coefficient and there is significant effect on trading volume. Coefficient of past performance is 0,008150 which means that if past performance has increased, trading volume will also increase. The value of probability from past performance is 0,0196 which is smaller than significance level (0,0196 < 0,05). So, past performance has effect on trading volume individually.

c. The effect of market risk on trading volume

The results show positive coefficient and there is significant effect on trading volume. Coefficient of market risk is 0,00240 which means that if market risk has increased, trading volume will also increase. The value of probability from past performance is 0,0000 which is smaller than significance level (0,0000 < 0,05). So, market risk has effect on trading volume individually.

d. The effect of market capitalization on trading volume

The results show positive coefficient and there is significant effect on trading volume. The coefficient of market capitalization is 0,0000859 which means that if market capitalization has increased, trading volume will also increase. The value of probability from market capitalization is 0,0000 which is smaller than significance level (0,0000 < 0,05). So, market capitalization has effect on trading volume individually.

e. The effect of tick size on trading volume

The results show negative coefficient and there is significant effect on trading volume. The coefficient of tick size is -0,021694 which means that if tick size has increased, trading volume will decrease. The value of probability from tick size is 0,0152 which is smaller than significance level (0,0152 < 0,05). So, tick size has no effect on trading volume individually.

f. The effect of trading volume on order imbalance

The results show positive coefficient and there is no significant effect on order imbalance. The Hausman test shows that there is simultaneity relation between trading volume and order imbalance. The coefficient of trading volume is 0,001598 which means that if trading volume has increased, order imbalance will also increase. The value of probability from trading volume is 0,885 which is greater than significance level (0,885 > 0,05). So, trading volume has no effect on order imbalance individually.

g. The effect of tick size on order imbalance

The results show positive coefficient and there is no significant effect on order imbalance. The coefficient of tick size is 0,000145 which means if tick size has increased, order imbalance will also increase. The value of probability from tick size is 0,4516 which is greater than significance level (0,4516 > 0,05). So, tick size has no effect on order imbalance individually.

h. The effect of depth on order imbalance

The results show positive coefficient and there is no significant effect on order imbalance. The coefficient of depth is 0,007015 which means if depth has increased, order imbalance will also increase. The value of probability from depth is 0,3576 which is greater than significance level (0,3576 > 0,05). So, depth has no effect on order imbalance individually.

i. The effect of bid-ask spread on order imbalance

The results show positive coefficient and there is no significant effect on order imbalance. The coefficient of bid-ask spread is 0,004901 which means if bid-ask spread has increased, order imbalance will also increase. The value of probability from bid-ask spread is 0,0721 which is greater than significance level (0,0721 > 0,05). So, bid-ask spread has no effect on order imbalance individually.

DISCUSSION

This research was performed on companies that listed in index LQ 45 of 2014. After going through some classical assumption test (normality test, heterokedasticity test, multicolinierity test and autocorrelation test), the model of this research is passed, which means that the regression model that used in this study is feasible and there is no deviation. The result of first hypothesis said that past performance has positive and significant effect on trading volume which is support the Efficient Market Hypothesis, research that conducted by Gervais and Odean (2001) and Nugraheni (2013). The result of second hypothesis said that market risk has positive and significant effect on trading volume which is denied the hypothesis and accepted the theory from fama and french three factor models. Companies that have high risk will make high liquidity for the stock because it fit with slogan 'high risk bring about high return' and investor believe that. It supported the fama and french three factors model and research by Adityo (2012) but denied the Efficient Market Hypothesis. The test result of third hypothesis showed that market capitalization has positive and significant effect on trading volume, the result supported fama and french three factors model. Firm with huge size will attract more investor because they believe that firm with huge capitalization will make a great future and give them great return in future because the company can survive well. The result from fourth hypothesis showed that tick size has negative and significant effect on trading volume. Trading volume will decline after the reduction of tick size. And volatility will increase, so it will cause the cancellation of stock transactions This result is supported by research that conducted by Porter and Weaver (1997). The result of fifth hypothesis showed that tick size has positive but no significant effect on order imbalance, and this result is supported by research that conducted by Zuriah (2013). The result of sixth hypothesis showed that depth has positive but has no significant effect on order imbalance. The deepness of market in Indonesia cant measure the order imbalance in Indonesia and it supported by the result of research that conducted by Nugroho (2009). The result of seventh hypothesis showed that bid-ask spread has positive and no significant effect in order imbalance that denied the theory of liquidity bid-ask spread and support the research from Tacana (2014). The result from eight hypothesis showed that there is simultaneity effect between trading volume and order imbalance but each of variable has no significant effect on each other.

CONCLUSION

The result of this research showed that past performance, market risk, market capitalization and tick size has effect on trading volume but order imbalance has no significant effect on trading volume, meanwhile trading volume, tick size, depth and bid-ask spread has no significant effect on order imbalance. Between trading volume and order imbalance has simultaneity effect. It means that in Indonesia, investor can used past performance, market risk,market capitalization and tick size as benchmark on their investment activity. Because those variables are proven have relation with liquidity that measured by trading volume. Meanwhile, this research can not give the factors that have effect on order imbalance. Trading volume, tick size, depth and bid-ask spread have no effect on order imbalance in Indonesia. For further research, researchers expected to look for the other variables that can more reflect the trading volume and order imbalance, so that the simultaneity relation and the factors that can affect the trading volume and order imbalance becomes more perfect.

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