Determinant of Market Liquidity in Indonesia

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ABSTRACT: This research aims to explore the Market volatility, Market return, exchange rate and foreign stock buying, on market liquidity in the Indonesia Stock Exchange. This research use VAR (Vector Autoregression) to estimate coefficient model. Monthly data is used for period of January 2010 to December 2023. This research found that Market Liquidity lag – 1 and Lag-2 positively significant impact on Market Liquidity. Market Return negatively significant influence on Market Liquidity. Exchange Rate negatively significant impact on market liquidity. Pandemic era or Covid-19 positively significant affected on market liquidity. IDX issued a rule to reduce 1 lot trading to become 100 stocks which is positively significant influence on Market Liquidity. Stock Volatility and Foreign Buying did not affect on market liquidity.

KEYWORD: Market Volatility, Market Return, Exchange rate and foreign Ownership, Covid-19, market liquidity

INTRODUCTION

Indonesian Stock Exchange is still an emerging stock market even sometime has good performance in the world. Investor in Indonesia stock exchange could be from local and international investor. As Emerging Market, mostly characteristic investor has low knowledge in trading and investment in stock. Besides that, the value of transaction is still low compare to other similar stock market. Keating et.al (2016) discuss about liquidity that it involves essence, risk, institutions, markets and regulation. Stock Market Institution and Financial Services Agency always issue regulations to protect investor.

Stock Market Liquidity become as indicator to investor including Fund Manager especially daily trading investor to trade stock for get profit or capital gain to support daily life. Investor especially Fund Manager very interested to market liquidity for their portfolio. Market liquidity means how quick the stock can be sold to others investor. Fund Manager give good attention for market liquidity.

Liquidity represents how fast you can convert an asset, such as stocks and bonds, into readily available cash. High-liquid markets allow assets to be sold, traded and bought quickly and without causing a significant drop in price value. Low-liquid markets are the exact opposite. In these markets, it can be difficult to sell and buy assets or to do so without incurring a significant drop in the price of the asset.

Market Liquidity become interesting topic to discuss because it gives investor to trade the stock. Grossman and Miller (1998) discussed liquidity to market structure. Brandao-Marques (2016), examines Stock Market Liquidity in Chile. Choi and Munro (2022) discuss Market Liquidity and Volatility. They found that traders in low liquidity markets have an over-sensitivity, relative to theory, to the liquidations of others, suggesting that herding behaviour is more prominent in less liquid markets. Chung and Chuwonganant (2018) examines the market volatility dan Stock Returns especially the role of liquidity providers. Lesmond (2005) investigated volatility in Emerging Markets. Domowitz et.al (2001) examined Liquidity, Volatility and Equity Trading Costs Across Countries and Over Time.

Foreign Ownership has impact to transaction of stock market. This variable become a variable to affect market liquidity. Lee and Chung (2018) investigated relationship foreign ownership dan stock market Liquidity. Ding and Suardi (2019) examines Government ownership and Stock Liquidity. Vo (2015) examines foreign ownership on Stock Return Volatility. ElBannan, (2017) investigated Stock market liquidity, family ownership, and capital structure choices in an emerging country.

This research includes Covid-19 era as one variable to affect Stock Market Liquidity. Pandemic era become popular to include in the model by researcher. Yap and Imelda (2023) discuss Covid-19 and Stock Market liquidity. Nguyen et.al (2021) discuss Covid-19 and Stock Liquidity. Discuss Pandemic Era and market Liquidity. James and Ello (2023) explored Covid-19 era and Stock Market Liquidity. Umar et.al (2023) discuss Covid-19 Era and Stock Market Liquidity for International evidence. He et.al (2020) discuss Impact of Covid-19 to Stock markets.

Exchange Rate become important when it discuss trading stock especially for foreign investor. This research also includes exchange rate to become independent variable. Helpman and Razin (1985) examines Exchanges rate and Stock Liquidity. Grilli and Roubini (1992) studied Exchange rate and liquidity. Engel and Wu (2023) investigated Exchange rate and Market Liquidity. Gabaix and Maggiori (2015) examines International Liquidity and Exchange Rate Dynamics.

Early January 2014, Indonesian Stocks Exchange (IDX) issued a rule to change 1 lot transaction from 500 stocks to 100 stocks. This rule has impact for transaction stock, because small investor can do transaction for some big stock, so it has impact to liquidity stocks and also market. This research considered to enter dummy variable to represent this IDX policy.

Based on previous explanation, this research has objective to explore determinant of Market Liquidity. This research is expected to give contribution for Indonesia market.

THEORETICAL REVIEW

Bronfenbrenner (1945) Introduced some fundamental in Liquidity theory. The Concept of Liquidity is a part of Monetary Concept. The concept of liquidity preference is more familiar to most readers than is liquidity itself, as a result of its development by the Keynesian school. This Concept could be explored by paper of Schmölders (1960). Both liquidities and liquidity preferences are simple functions of ordinary marginal utilities and substitution rates. Like other marginal utilities and substitution rates, liquidity functions and preferences are variable from person to person and from moment to moment. Based on concept Bronfenbrenner, there is no expansion about Liquidity Theory. Then Vayanos and Wang (2013) introduced theory of liquidity but they explain from illiquidity. There is no detail explanation about theory of Liquidity but they come to explain illiquidity. Based on their survey, they found most academician and researcher to discuss illiquidity. Vayanos and Wang (2013) explain that investor could use moving the stock from one investor to other investor using 3 period. Some paper introduced measurement of Liquidity which is Ask-bid Spread, Total volume turnover and Transaction cost and Price Market Impact (Sarr and Lybek, 2002). Then, research of Market Liquidity is discussed as part of Market Microstructure.

Market Liquidity could be explain using theory of trading volume. Kraus and Stoll (1972) is the first time to discuss volume trading especially block trading and price. Then, Epps (1975) developed theory of price changes and trading volume which is based individual's Demand function, Investor Model behaviour and implication market behaviour. This theory derives a model in which volume on transactions in which the price ticks up is greater than volume on downticks. Epps (1977) also examines Security Price

Changes and Transaction Volumes Some. Karpoff (1986) developed a Theory of Trading volume which is starting to discuss six assumptions for the theory, and follows Binomial Market Process, and the Probability of an Exchange and Expected Trading Volume. One years later, Karpoff (1987) published his paper to discuss the Relation Between Price Changes and Trading Volume. Then Gallant et.al (1992) investigated Stock Prices and Volume. Furthermore, Longin and Pagliardi (2016) discuss the tail relation between return and volume in the US stock market using analysis based on extreme value theory.

METHODOLOGY

As mentioned previously, this research examines the Market volatility, Market return, exchange rate and foreign stock buying, on market liquidity in the Indonesia Stock Exchange. This research uses monthly data for period of January 2010 to December 2023.

As previous explanation, this research has research framework as showed in Graph 1 at below.
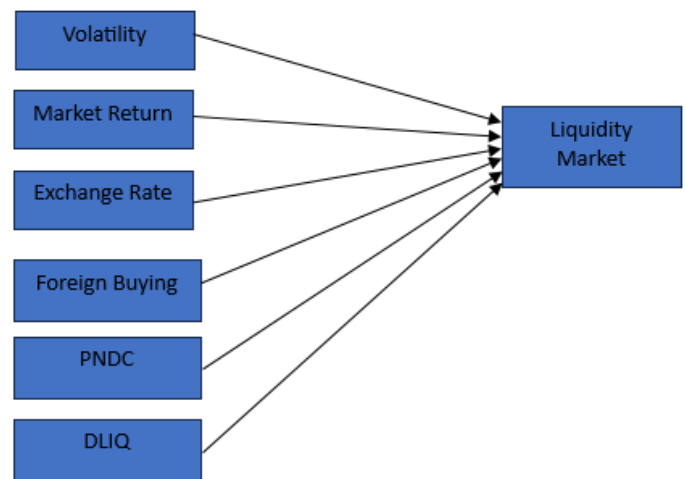
Graph 1: Research Framework of Determinants of Market Liquidity.

The Dependent variable is market liquidity, and Stock Market Volatility, Market Return and Exchange Rate and Foreign Net Buying as independent variable.

Monthly of Market liquidity (ML) will be measured as follows:

$$ML = \frac{Value\ trading\ Stock}{Value\ Stock\ listed\ at\ stock\ exchange} \qquad (1)$$

Monthly of Market Return is measured by equation (2) at below:

$$MR = \frac{Stock\ Market\ Index_t - Stock\ Market\ Index_{t-1}}{Stock\ Market\ Index_{t-1}} \qquad (2)$$

Monthly of Stock Market Volatility (SV) will be measured by equation at below:

$$SV_t = \sqrt{\frac{\sum_{t=1}^{n}(R_t - \bar{R})^2}{n-1}} * (22) \qquad (3)$$

Foreign buying Stock is net foreign buying stock on the Indonesia stock exchange. This is to high value, so this research has the concept of foreign buying stocks as follows:

$$FB_t = \frac{Value\ of\ Net\ Foreign\ Buying\ Stock\ at\ t}{Total\ Value\ Trading\ stock\ at\ t} \quad (4)$$

This concept will make the value in ratio data that will similar to market liquidity.

Exchange rate is used to affect market volatility as external factor for this research. Exchange rate is measured as follows:

ER = Ln (Value conversion Dollar to Rupiah)   (5)

Sims (1980) introduced Vector Autoregressive to estimate relationship among variable in discussing of economics variables. The Vector Auto-Regressive (VAR) model is used to establish the simultaneous relationships between liquidity dimensions. The analysis is conducted at the aggregate market level as well as across turnover based stock groups divided based on their rankings in terms of stock specific share turnover. The relationship is dynamic which is model VAR (p) as follows:

$$y_t = a_0 + b_1 y_{t-1} + b_2 y_{t-2} + ... + b_p y_{t-p} + \varepsilon \quad (6)$$

Equation (5) show that the dependent variable y_t affect by himself with lag one until lag p. Sometimes, we know that the dependent variable could be affected by others variable. Brook (2014, 335) stated that VAR (1) also is affected by others variable with model as follows:

$$y_t = a_0 + a_1 y_{t-1} + b_1 X_1 + b_2 X_2 + \varepsilon \quad (7)$$

Equation (6) is a base model this paper with three other variable.

Brooks and Tsolacos (1999) used VAR to estimate relationship Impact of Financial factors on UK Property Performance. Papapetrou (2001) used VAR to examine dynamic relationship oil Price, stock market and interest rate and economic activity.

The VAR Model is used in this research as follows:

$$MLR_t = \sum_{i=1}^{2} MLR_{t-i} + c + b_1 MR_t + b_2 SV_t + b_3 ER_t + b_4 FB_t + b_5 D_1 + b_6 D_2 + \varepsilon \quad (8)$$

ML_t = Market Liquidity at t
MR_t = market return at t

SV_t = Stocks Volatility at t
ER_t = exchange rate at t
FB_t = Foreign Buying Stocks at t
D_1 = 0 for Non Pandemic Era, and 1 for March 2020 to Dec. 2022.
D_2 = 0 for Liquidity 1 lot equal to 100 stocks in 1st April 2014

DISCUSSION

This discussion made into 2 analysis which is descriptive statistics analysis and causality analysis. Next explanation is started descriptive statistics analysis and follow by causality analysis.

Descriptive Statistics

In this sub-section will make explanation about analysis of statistic Descriptives as shown data on Table 1 at below. The mean of Market liquidity (ML) is 19.08% and maximum value of 43,86% and Standard of deviation of 5.25% and this variable has distribution of normal. This figure give us explanation that range actual data to centre data (mean) is very small. The Market return (MR) has mean value of 0.38% and maximum value of 9.44%, and Standard of Deviation of 3.71%. This figure also gives us explanation that range actual data to centre data (mean) is very small. The stock market volatility (SV) has mean value of 4.04% and maximum value of 19.2%, and Standard of Deviation of 2.14%. This figure also gives us explanation that range actual data to centre data (mean) is very small. The foreign Net Buying stock (FB) has mean value of -0.42% and maximum value of 23.05% and standard of deviation of 4.9%. This figure also gives us explanation that range actual data to centre data (mean) is very small. Exchange Rate (ER) has mean value of 9.56, and maximum value of 9.7 and standard of deviation of 5.28%. This figure also gives us explanation that range actual data to centre data (mean) is very small. This research support for previous research.

Table 1: Statistics Descriptive Factor Market Liquidity

	ML	MR	SV	FB	ER
Mean	0.190783	0.003765	0.040450	-0.004196	9.558158
Median	0.186299	0.006334	0.035083	-0.008782	9.560786
Maximum	0.438598	0.094417	0.192139	0.230525	9.699534
Minimum	0.106578	-0.167582	0.017864	-0.099502	9.447150
Std. Dev.	0.052522	0.037149	0.021438	0.048997	0.052790
Skewness	1.843401	-1.081100	3.765636	1.094367	0.228195
Kurtosis	8.514400	6.324599	25.03911	6.787766	2.504881
Jarque-Bera	198.0050	70.77630	2440.991	86.11980	2.040454
Probability	0.000000	0.000000	0.000000	0.000000	0.360513
Sum	20.60455	0.406653	4.368592	-0.453146	1032.281
Sum Sq. Dev.	0.295165	0.147667	0.049178	0.256873	0.298189
Observations	108	108	108	108	108

Causalitas

This sub-section will discuss determinant Market liquidity using Equation (9) at below. Estimation model use Vector Autoregression as mentioned in methodology. The result Model is as follows:

$$ML_t = 3.03E\text{-}16 + 9.678E\text{-}17 \, ML(\text{-}1) + 1.000 \, ML(\text{-}2) - 4.686E\text{-}17 \, MR_t$$
$$\quad (5.48) \qquad (5.53) \qquad\qquad (\text{-}2.364)$$

$$- \, 3.0101E\text{-}17 \, ERLN_t - 3.919E\text{-}18 \, SV_t + 2,5327E\text{-}17 \, FB_t$$
$$\quad (\text{-}2.796) \qquad\quad (\text{-}0.129) \qquad (1.556)$$
$$+ \, 5.623E\text{-}18 \, PNDC_t + 1.083E\text{-}17 \, DLIQ_t \qquad (9)$$
$$\quad (2.4678) \qquad\qquad (2.586)$$

T-test in Brackets
R^2= 100%
F-test = 587.68E+30

Based on Equation (9), the results as follows:
As previous explanation, this research use VAR Method to estimate coefficient of VAR Model. VAR Method use 2 lag dependent variable in the model. Market Liquidity lag–1 and Market Liquidity Lag-2 positively significant impact on Market Liquidity.

Market Liquidity might be affected by some variable that it closed it. This Research use Market Return (MR), Exchange Rate (ER), Stock Volatility (SV), and Foreign Buying Stock (FB). We use 2 Dummy variable to present period of Covid-19 (PNDC) for first Dummy variable and DLIQ as second dummy variable to present before and after Indonesia Stock Exchange a rule that Stock Exchange to 1 lot to become a 100 of stocks. The policy issued early year of 2014.

Market Return as an independent variable affect market liquidity because Market Return invite investor to invest the market especially foreign investor. Market Return affected negatively significant on market liquidity at level of significant of 5%. This finding opposite the theory, that it should be positive impact.

Exchange Rate also as an independent variable influence on Market liquidity. This research found that Exchange Rate affected negatively significant on Market Return at level of significant of 5%. This research support previous research Grilli and Roubini (1992), Engel and Wu (2023) and Gabaix and Maggiori (2015).

Foreign Investor has role in trading stock in Indonesia Stock Exchange. Foreign Investor always use their home currency trading stock to Indonesia Stock Exchange by transfer to Indonesia. The fluctuation exchange rate will affect market liquidity. This research includes variable exchange rate to affect stock market liquidity. This research found that Exchange rate is negatively significant impact on market liquidity. This research supports the previous research which is Grilli and Roubini (1992), Engel and Wu (2023), and Gabaix and Maggiori (2015) and Helpman and Rain (1985).

This research use data for period of January 2010 to December 2023. In this Period, there is Covid-19 era which is Indonesia for March 2020 to Dec. 2022. Variable Dummy add in Equation (9) to show Covid-19 era. Covid-19 era is positively significant to influence on market liquidity. It means that Covid-19 increased market Liquidity. Pandemic Era adds market Liquity by 0.392% if there is pandemic era. This research support research in Covid-19 which is Yap and Imelda (2023), Nguyen et al (2021), James and Ello (2023), Umar et.al (2023) and He et.al (2020).

As mentioned in previous explanation that this research entered variable dummy for liquidity, because Indonesian stock exchange issued a rule the number 1 lot trading become 100 stocks compared to previous 1 lot equal to 500 stocks. This rule has expectation that trading stock become liquid. This dummy variable present by DLIQ which is significant positive affect market liquidity at level of significant of 5%.

This research also uses stock volatility and Foreign buying stock as variable independent to affect market liquidity as showed in Equation (9). Stock Volatility and Foreign buying stock did not influence on market liquidity. This research does not support previous research.

CONCLUSION

As previous analysis, this research has conclusion as follows:
1. Standard of deviation of all variable is low. It means that range actual data to centre data (mean) is very small.
2. Market Liquidity lag – 1 positively significant impact on Market Liquidity.
3. Market Liquidity lag – 2 positively significant impact on Market Liquidity.
4. Market Return negatively significant influence on Market Liquidity.
5. Exchange Rate negatively significant impact on market liquidity.
6. Foreign Buying stock on Jakarta Stock Exchange positively significant impact on market liquidity.
7. Pandemic era positively significant affected on market liquidity.
8. Stock Market Volatility and Market return did not affect on market liquidity.

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