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# WHAT BLINKS STOCK MARKET PRICES? AN EMPIRICAL STUDY FROM JAKARTA STOCK EXCHANGE

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***ABSTRAK***

*Banyak orang sering bertanya-tanya bagaimana harga saham terbentuk di pasar. Volatilitas harga berdasarkan pada Wall Street Adage (kata-kata klasik yang bijak dari para pemain di Wall Street) adalah volume trading yang mengerakkan harga. Volume trading dalam kenyataannya dapat dikelompokkan ke dalam jumlah perdagangan dan rata-rata jumlah transaksi setiap perdagangan. Penelitian ini dengan menggunakan kapitalisasi pasar dalam pembentukan portofolionya akan melihat manakah yang mendorong volatilitas harga, jumlah/banyaknya transaksi atau rata-rata besarnya volume saham per transaksi. Penelitian ini juga melihat jenis informasi yang mempengaruhi perusahaan. Informasi yang bersifat umum dan informasi yang bersifat spesifik. Hasil penelitian ini menyimpulkan bahwa jumlah transaksi secara signifikan positip mempengaruhi volatilitas harga saham di Bursa Efek Jakarta. Perusahaan dengan kapitalisasi besar secara signifikan berhubungan dengan informasi yang bersifat umum. Untuk informasi spesifik secara signifikan berhubungan baik untuk perusahaan berkapitalisasi kecil maupun perusahaan berkapitalisasi besar.*

***Kata kunci****: number of trades, trade size, marketwide information, firm specific information, dan volatility.*

## INTRODUCTION

People always compare the two theory of price, the firm foundation theory from Eliot Guild who popular by John B. William and the technical analysis theory or by Keynes (1936) word is the castle in the air theory. The first theory believes that the greater the present dividends and their rate of increase, the greater the value of the stock. Opposite to the first theory, the second theory says no one knows for sure what will influence future earning prospects and dividend payments so short-run forecast is better than long-run forecast. Based on the second theory, to study the stock market, uses psychological principles or average opinion is better than financial evaluation. How the crowd of investors is likely to behave in the future is the most important clue to give direction on the volatility of the price and how during period of optimism they tend to build their hope into castles in the air (Malkiel, 1990). The predictability of stock market price lay down to the principle of "A thing is worth only what someone else will pay for it" (Morgenstern and Granger, 1970). Prices often gyrated more rapidly and by much greater amounts than could plausible be explained by apparent changes in their anticipated intrinsic value. The price rise was not due to the worth of the discovery to the company, but rather to the castle-building potential this would hold for prospective buyers (Malkiel, 1990: 52).

Price describes all traders' expectation and opinion. Keynes (1936) described the playing of stock market with a beauty-judging contest.

"If you have to select the six prettiest faces out of a hundred photographs, with the prize going to the person whose selections most nearly conform to those of the group as a whole." The smart player recognizes that personal criteria of beauty are irrelevant in determining the contest winner. A better strategy is to select those faces the other players are likely to fancy. This logic tends to snowball. After all, the other contestants are likely to play the game with at least as keen a perception. Thus, the optimal strategy is not to pick those faces the player thinks are prettiest but rather to predict what the average opinion is likely to be about what the average opinion will be or to proceed even further along this sequence (Malkiel, 1990: 31).

The classical Wall Street adage says that to move prices need volume. The trading volume can be decomposed into two components: number of trades (number of transaction/ trading activity) and the average size of each trade (trade size). Earlier research focuses on aggregate trading volume that moves the prices (see among other, Pfleiderer, 1984; Foster and Vishwanathan, 1990; Kim and Verrecchia, 1991; and Bessembinder and Seguin, 1992)[1]. Recent studies work on number of trades because the number of trades may convey more information to the market participants (see among other, Easley and O'Hara, 1990; Harris and Raviv, 1993; Stalen, 1993; Jones *et al.*, 1994; and Gopinath and Krisnamurti, 2001).

Based on market microstructure model Easley and O'Hara (1990) find that the total number of trades is informative with respect to price changes because the market infers information from both trades and a lack of trades. Positive relation between the number of trades and absolute price changes is found by Harris and Raviv (1993). Even traders receive the same information they can interpret in different ways. Trading occurs because of the divergent opinion regarding the value of the security generated by the same information (Harris and Raviv, 1993; and Shalen, 1993). Jones *et al.* (1994) conducts a research and finds that the number of transactions is positive significant to volatility of prices. Number of transaction or trading activity gives information more that moves prices than trade size. Gopinath and Krisnamurti (2001) using high-frequency data from NASDAQ market find that trading activity derive volatility of prices in an intraday setting.

In line to Gopinath and Krisnamurti (2001), my research want to know what blinks stock market prices especially in Jakarta Stock Exchange, the number of transaction or the trade size and the kind of information that roles in determining trading frequency such as marketwide information and firm-specific information (Bessembinder *et al.*, 1996). Not like Hanafi's (2002), my study does not investigate the kind of investors who posses better information. My research care with market capitalization--based on portfolios— to cope with the size effect.

I find that number of transactions variables has a reliably positive effect on stock price volatility. I also find that the effect of number of transaction on stock price volatility decreases monotonically as we move from the smallest to the largest firm portfolios. A positive relation between marketwide information and trading frequency may occur for large firms but the firm-specific information is assessable for all firms' size, not only for small firms.

This paper is organized as follows. Section I introduction to number of transaction and

[1] Despite so many empirical studies on the volatility-volume relation, there is no general consensus about what actually drives the relation. In particular, since trading volume for a time interval (e.g., daily volume) can be decomposed into two components, number of trades and average trade size, the volatility-volume relation could in principle be driven by either one or both components. The size of trades is likely to be positively related to the quality of information possessed by them and will therefore be correlated with price volatility.

trade size. Section II reviews the evident and behavior of number of transaction and the kind of information. Section III proposes methodology and a simple model of trading frequency and the volatility. Section IV is empirical evidence and the last section is concluding remark.

## THEORETICAL BACKGROUND

### Trading Volume and Volatility

A positive relation between volume and volatility has documented by Gallant *et al*. (1992); Kim and Verrecchia (1991); and Bessembinder and Seguin (1993). Theory suggests that trading occurs when investors revise their beliefs differentially (Karpoff, 1986). To test the relation between trading volume and the measure of differential interpretations are suggested by Kandel and Pearson (1995) and Bamber *et al*. (1999). They find that in the absence of price changes there is little reason for information-based trade other than differential interpretations. When trading volume is higher than normal, there is more likely to be enough liquidity trading to prompt informed investor to act on their differential interpretations.

Trading volume can be decomposed into two components: number of trades and the average size of each trade or trade size. Size of trades has no information content beyond contained in the number of transactions (Jones *et al.*, 1994). The number of trades rather than size may convey more information to the market participants since number of trades has a crude U-shaped pattern in the highest trading (Abhyankar *et al.*, 2001). Ding (1999) with intraday and daily determinants of bid-ask spreads finds that the number of transaction is negatively related to bid-ask spreads, whereas volatility in general is positively related to it. Foster and Viswanathan (1993) examine the intraday volume pattern for top, bottom, and middle deciles sorted by trading activity. They investigate formally the relation between the regression coefficient of the volume regression and the volatility regression. For deciles one and ten they find a significant positive relation between the coefficients of the two regressions.

McInish and Wood (1990) report intraday U-shaped patterns in volume. Volume of trading is a direct measure of trading activity and greater trading activity can lead to lower spreads due to economies of scale in trading costs. Under the premise that a portion of net demand in the market is related to informed traders, trading activity will hold some informational content as to the future prices. This endogeneity of trading to the determination of prices is the critical link between market activity and liquidity (Engle and Lange, 1997). The volume of one sided trading necessary to push price may fluctuate from moment to moment, depending on the trader having superior information. With another word, information conveys the volatility of prices.

### Marketwide Information and Firm Specific Information

Information conveys the volatility of prices. Information flow can be separated by public marketwide information and firm-specific information (Bessembinder *et al*., 1996). Trading may occur because of informed traders dealing with firm-specific information or traders transacting on the basis of marketwide information. Trades based on firm-specific information are more likely to rely on asymmetric inside information possessed by certain traders. Inversely, trades induced by marketwide information are more likely to be caused by different interpretation of the same information. They find that trading volume of large stocks is more strongly related to marketwide information than trading volume of small stocks. Moreover, they find that firm-specific information has less effect on trading volume of large firms than it does on trading volume of small firms. Their evidence shows that trading volume of small firms is primary determined by firm-specific information.

Tkac (1999) recommends that empirical research on trading volume control for market-wide portfolio rebalancing by controlling for market-wide trading volume. The determinants of stock volatility in a setting where the rate of arrival of public information differs predictably across stocks during the trading day. Differential interpretations of public information are a significant explanatory of trading volume (Chan *et al*., 1994).

Barclay *et al.* (1990) use Saturdays on the Tokyo stock exchange and U.S. returns of Japanese dually-listed stock to investigate the impact of trading on volatility when public information arrival is reduced. If public information is an important determinant of volatility, one would expect Japanese stocks to experience a drop in volatility relative to American stocks when the Japanese business day ends.

Investors trade on public information because new information leads them to change their priors. If traders have differential information-processing abilities, however, a public announcement could also increase the asymmetry. Public announcements will affect the degree of information asymmetry. Usually, the announcement reduces asymmetry by providing all traders with a common signal (Barclay and Dunbar, 1996).

Investors without superior information who have some discretion over the timing of their traders will choose to move their trades to 'normal' periods (unaffected by the announcement) to reduce the probability of trading with someone with superior information. In contrast, informed traders are buying when the firm is undervalued and selling when it is overvalued. The informed should break up their trades and spread them over time in order to camouflage their trades with normal liquidity volume (Kyle, 1985). The informed would be expected to trade in block sizes that do not cause a significant deviation from the trade-size distribution of the normal order flow (Barclay and Warner, 1993). If the informed are spreading their trades across all trade sizes, then trading cost should also be affected in all trade sizes.

In the "mixture of distributions model" (Epps and Epps, 1976), it is assumed that price variance per transaction is monotonically related to the volume of that transaction. A mixing variable, typically the number of information arrivals, causes the volatility-volume relation. In the "asymmetric information" model (Kyle, 1985), informed investors submit trades based on their private information. When informed investors trade more, volatility increases because of the generation of private information. In the "differences in opinion" model (Harris and Raviv, 1993), when public information switches from favorable to unfavorable or vice versa, investors have different beliefs concerning the stock and this will generate trading among them. Hence, trading volume and absolute return are positively related because both are correlated with the arrival of public information.

The value of private information can depreciate quickly. Accumulating a large position quickly enough may not be possible by trading in the small trade-size categories. If the value of information depreciates quickly, then informed traders will move to the large trade-size categories and trading cost will be affected more for large blocks than for smaller trades. Block trades that are large in relation to normal trading volume can have both permanent and temporary effects on the price of the security being traded. The larger the block being traded, the greater the costs imposed on the intermediary, and consequently, the larger the required compensation. Block trades will have permanent price effect if they reveal information. If some traders have private information that is not fully reflected in the current price, the price at which the uninformed are willing to trade reflects both the fraction of traders who are privately informed and the value of their private information (Barclay and Dunbar, 1996: 78).

## THE HYPOTHESIZED MODEL

Gopinath and Krishnamurti (2001) and Jones *et al*. (1994) note that since greater number of transaction usually means higher volatility of prices, the number of transaction is likely to be related to measures of volatility of prices. Hence, the volume-volatility relation vanishes when the association between volatility and number of transaction is controlled. Given there consideration, the following hypothesis is expected to hold.

Hypothesis 1: There is a direct relationship between number of transaction and volatility of prices.

Bessembinder *et al*. (1996) and Barclay and Dunbar (1996) show that the public marketwide information drives the trading volumes of large firms. They also suggest that for small firms, price reaction to marketwide information occurs without a perceptible increase in trading volume. If prices can change even in the absence of trades for small firms, as market makers adjust their quotes in response to price changes of large firms or index movements. Hence, when trades of small firms do occur, it is mostly because trades are acting on the basis of firm-specific information. These considerations lead to the following hypothesis.

Hypothesis 2: There is a relationship between large firms and marketwide information and between small firms and firm-specific information.

## RESEARCH METHODS

### Data

The sample is drawn from 18 firms in manufacturing sector, which are listed in Jakarta Stock Exchange. To mitigate the thin trading problem, I screen those stocks that have less than an average of ten trades per day during the sample period of January 1999 through December 2000 and had no dividend or stock split declaration dates. I delete those stocks that have missing daily returns during the sample period.

The stocks are broken down into six portfolios on the basis of market capitalization (see Table 1). Beginning by portfolio 1, the smallest portfolio, follows by larger portfolio and portfolio 6 is the largest. Group of portfolio depends on the kind of industry in the manufacturing sector. There are three industries: consumption commodity, allied products, and natural and chemical.

### Testing of the relationship between number of transaction and volatility

Following Jones *et al*. (1994) and Gopinath and Krishnamurti (2001), simple regression is used to estimate absolute value of closing price return of stock i on day t.

$$R_{pt} = \alpha + \beta N_{pt} + \varepsilon_s \qquad (1)$$

Where:

$R_{pt}$ = the absolute value of closing price returns of stock i on day t

$N_{pt}$ = number of daily transaction for stock i on day t.

$\varepsilon_s$ = error term

Based on Jones *et al.* (1994), the regression is estimated using ordinary least squares, which provide consistent estimators of the parameters. The estimators are not efficient, but, as Jones *et al*. (1994) point out, this will not pose inference problem. Jones *et al.* decompose daily volume into number of trades and average trade size, and find that the number of trades appears to provide virtually all the explanation for the volatility-volume relation, with average trade size playing a trivial role. Their evidence suggests that trade size does not have any volatility impact beyond trading frequency.

**Table 1.** Average Market Capitalization (in Rp) of Sample

| No | Code | Name | Average Market Capitalization | Portfolio |
|---|---|---|---|---|
| 1 | AISA | Asia Intiselera Tbk | 39,487,500,000 | I smallest |
| 2 | ERTX | Eratex Djaja Limited Tbk | 32,131,358,333 | I |
| 3 | INCI | Intan Wijaya Chemical Industry | 72,040,549,167 | I |
| 4. | SUBA | Suba Indah | 48,239,062,500 | II |
| 5. | PAFI | Panasia Filament Inti Tbk | 77,291,666,667 | II |
| 6 | LMPI | Langgeng Makmur Plastic I | 75,980,045,417 | II |
| 7. | KLBF | Kalbe Farma | 1,202,877,000,000 | III |
| 8. | ADMG | GT Petrochem Industries Tbk | 479,074,687,500 | III |
| 9. | DYNA | Dynaplast Tbk | 263,699,839,167 | III |
| 10. | TSPC | Tempo Scan Pacific | 1,428,843,750,000 | IV |
| 11. | MLPL | Multipolar | 500,963,492,500 | IV |
| 12. | ETWA | Eterindo Wahanatama | 514,138,287,083 | IV |
| 13. | HMSP | HM Sampoerna | 11,755,443,333,333 | V |
| 14. | KBLI | GT Kabel Indonesia Tbk | 3,112,593,166,667 | V |
| 15. | INTP | Indocement Tunggal Prakasa | 6,470,267,486,667 | V |
| 16. | GGRM | Gudang Garam | 27,194,979,621,667 | VI largest |
| 17. | AUTO | Astra Otoparts Tbk | 3 692,927,854,583 | VI |
| 18. | INKP | Indah Kiat Pulp & Paper | 9,796,133,880,417 | VI |

*Source:* Indonesian Capital Market Directory (2001)

**Number of daily transaction**

Number of daily transaction by Jones *et al*. (1994) is calculated on the absolute of the return of the composite index for day t. The composite index on the Jakarta Stock Exchange is Indeks Harga Saham Gabungan (IHSG). Absolute value of the return of IHSG is necessary to make all value are positively counted.

$$N_{pt} = \alpha + \beta \left|Rmt\right| + \varepsilon_s \qquad (2)$$

Where:

$N_{pt}$ = the number of daily transactions for stock i on day t

$\left|Rmt\right|$ = the absolute value of the return of IHSG, composite index for day t

$\varepsilon_s$ = error term

$$R_{mt} = \left|\frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}\right| \qquad (3)$$

Where:

$R_{mt}$ = the value of the return of IHSG, composite index for day t

$IHSG_t$ = Indeks Harga Saham Gabungan (IHSG), composite index on day t

$IHSG_{t-1}$ = Indeks Harga Saham Gabungan (IHSG), composite index on t-1

$$R_{it} = \left|\frac{P_{it} - P_{it-1}}{P_{it-1}}\right| \qquad (4)$$

Where:

$R_{it}$ = volatility of prices

$P_{it}$ = closing price for stock i on day t

$P_{it-1}$ = closing price for stock i on day t-1

**Portfolio return**

Portfolio returns are expected by weighted average of each stock return. Weighted average formula is necessary to impose different market capitalization of each industry that chosen for the sample.

$$R_{pt} = \frac{(R_{at} \times MC_{at}) + (R_{bt} \times MC_{bt}) + (R_{ct} \times MC_{ct})}{MC_{at} + MC_{bt} + MC_{ct}} \quad \text{….(5)}$$

Where:

$R_{at}$ = return for stock a on day t
$R_{bt}$ = return for stock b on day t
$R_{ct}$ = return for stock c on day t
$MC_{at}$ = market capitalization for stock a on day t
$MC_{bt}$ = market capitalization for stock b on day t
$MC_{ct}$ = market capitalization for stock c on day t

**Number of transaction on portfolio**

Number of transaction/trading frequency on portfolio is investigated by weighted average of each number of transactions .

$$N_{pt} = \frac{(N_{at} \times MC_{at}) + (N_{bt} \times MC_{bt}) + (N_{ct} \times MC_{ct})}{MC_{at} + MC_{bt} + MC_{ct}} \quad \text{…..(6)}$$

Where:

$N_{at}$ = trading frequency for stock a on day t
$N_{bt}$ = trading frequency for stock b on day t
$N_{ct}$ = trading frequency for stock c on day t
$MC_{at}$ = market capitalization for stock a on day t
$MC_{bt}$ = market capitalization for stock b on day t
$MC_{ct}$ = market capitalization for stock c on day t

**Testing of the relationship between large firms and marketwide information and between small firms and firms-specific information**

Following Bessembider *et al.* (1996) and Barclay and Dunbar (1996), average number of transaction of firms in portfolio p on day t is depend on the marketwide information on day t and the cross-sectional average of the firm-specific information of firms in portfolio p on day t. Stocks move together depends on the relative amounts of firm-level and marketwide information capitalized into stock prices (Roll, 1988). In markets where traders have asymmetric information, however, both informed and uninformed traders must make strategic trading decisions. Public announcements or marketwide information and firm-specific information work together to affect stock prices.

$$N_{pt} = \alpha + \beta_{FI} FI_{pt} + \beta_{MI} MI_t + \varepsilon_s \qquad (7)$$

Where:

$N_{pt}$ = average number of transactions of firms in portfolio p on day t
$MI_t$ = marketwide information on day t, given by absolute $R_{mt}$ where $R_{mt}$ is IHSG index return (see formula 3)
$FI_{pt}$ = the cross-sectional average of the firm-specific information of firms in portfolio p on day t. The firm-specific information for firm i on day t is computed as absolute $R_{it}$ - $R_{mt}$ (see formula 3 and 4 to calculate $R_{mt}$ and $R_{it}$)
$\varepsilon_s$ = error term

## EMPIRICAL RESULT

In Table 2 I show the estimates of regressions of price volatility on number of transactions. Price volatility is measured by the absolute value of daily (close-to-close) return. Daily observations of price volatility for each stock within a portfolio are regressed on the number of daily transactions of that stock for that day. The regressions are performed for each portfolio. The results are shown in Table 2.

I find that number of transactions variables has a reliably positive effect on stock price volatility as shown by the t-statistics. I also find that the effect of number of transaction on stock price volatility decreases monotonically as we move from the smallest to the largest firm portfolios. My results are in conformity with Jones *et al*. (1994) and Gopinath and Krishnamurti (2001).

**Table 2.** Ordinary Least Squares Regression of Price Volatility on Number of Transactions (number of transaction as independent variable)

| | Port 1 smallest | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 largest |
|---|---|---|---|---|---|---|
| α | $2.237^{-02}$ | $5.568^{-02}$ | $2.804^{-02}$ | $2.498^{-02}$ | $1.429^{-02}$ | $1.674^{-02}$ |
| β | $2.239^{-04}$ | $5.363^{-05}$ | $7.115^{-05}$ | $3.693^{-05}$ | $4.649^{-05}$ | $2.145^{-05}$ |
| Adj. $R^2$ | 0.151 | 0.015 | 0.024 | 0.084 | 0.122 | 0.096 |
| t | 9.309* | 2.867* | 3.617* | 6.743* | 8.259* | 7.236* |

* Significant at 5%

I estimate the equation $R_{pt} = \alpha + \beta N_{pt} + \varepsilon_s$ where $R_{pt}$ is the absolute value of closing price returns of stock i on day t, and $N_{pt}$ is the number of daily transactions for stock i on day t.

In Table 3, Panel A I show the estimates of regressions of marketwide information on trading frequency and Panel B of firm-specific information on trading frequency. Bessembinder *et al*. (1996) and Barclay and Dunbar (1996) characterize all information into two types: common or marketwide information and firm-specific information. They establish that trading may occur because of informed traders dealing with firm-specific information or traders transacting on the basis of marketwide information. Uninformed traders have incentives to maximize the likehood that they are trading with other uninformed traders. This practice can lead to causing alternate periods of high and low trading volume, especially the number of transaction.

Typically, large firms have lower trading costs and therefore ideal candidates for such arbitrage trades. A positive relation between marketwide information and trading frequency may occur for large firms. Contrarily, most trades of small firms may be based on firm-specific information. An implication of this premise is that trades of small firms contain more adverse information from the perspective of the market maker.

In Panel A of Table 3, I use the IHSG index return as the proxy for marketwide information. The results are not all portfolios significant. The larger the portfolio the significantly the result. This confirms my conjecture that trades of large firms are significantly related to a proxy of public marketwide information. The evidence also support Bessembinder *et al*. (1996) and Barclay and Dunbar (1996) premise that for smaller firms there should be no meaningful relation between trading frequency and public marketwide information proxy.

In Panel B of Table 3, I use the absolute value of volatility of prices subtract by the value of the return of IHSG, composite index, as describe of firm-specific information. All portfolios are significantly meaningful both for small and large firms, not like Bessembinder *et al*. (1996) and Barclay and Dunbar (1996) conclusions. The results indicate that firm-specific information is assessable for all firms' size. However, the association is generally not statistically significant for large firm. I found no evidence to support the uninformed firms can trade on more favorable terms by getting firm-specific information.

In Table 4 indicate that for largest firms, both firm-specific information and marketwide information determine the trades. Both the firm-specific information and marketwide information variables are statically significant in explaining the number of transactions. For small and medium firms, firm-specific information seems to be the determinant of trades. Except for the largest firms, marketwide information does not appear to affect the number of transaction. There are no clear patterns in the smallest firm portfolio. For large firms, both marketwide information and firm-specific information are significant, and a high proportion of the variability in the number of transaction is explained by the two information variables.

**Table 3.** Ordinary Least Squares Regression of Price Volatility on Marketwide Information and Firm-Specific Information

| | Port 1 smallest | Port 2 | Port 3 | Port 4 | Port 5 | Port 6 largest |
|---|---|---|---|---|---|---|
| Panel A. Marketwide Information as Independent Variable | | | | | | |
| α | 9.922 | 78.152 | 115.901 | 186.059 | 195.888 | 358.504 |
| β | 270.199 | -902.653 | 1262.613 | 681.635 | 1819.399 | 3226.313 |
| Adj. $R^2$ | 0.005 | 0.003 | 0.017 | -0.001 | 0.024 | 0.025 |
| t | 1.904 | -1.555 | 3.026* | 0.867 | 3.553* | 3.675* |
| Panel B. Firm-Specific Information as Independent Variable | | | | | | |
| α | 11.816 | 51.889 | 86.179 | 147.680 | 176.903 | 365.175 |
| β | 15.472 | 20.257 | 47.846 | 37.911 | 21.257 | 16.878 |
| Adj. $R^2$ | 0.121 | 0.008 | 0.190 | 0.043 | 0.064 | 0.014 |
| t | 8.215* | 2.175* | 10.679* | 4.759* | 5.827* | 2.811* |

* Significant at 5%

In Panel A, I estimate the equation $N_{pt} = \alpha + \beta\left|Rmt\right| + \varepsilon_s$ where $N_{pt}$ is number of daily transactions for stock i on day t, MI is the marketwide information on day t given by absolute $R_{mt}$ where $R_{mt}$ is IHSG index return. $MI = R_{mt} = \left|\frac{IHSG_t - IHSG_{t-1}}{IHSG_{t-1}}\right|$. In Panel B, I estimate the equation $N_{pt} = \alpha + \beta\, FI_{pt} + \varepsilon_s$ where $N_{pt}$ is number of daily transactions for stock i on day t, $FI_{pt}$ is the cross-sectional average of the firm-specific information of firms in portfolio p on day t. $FI_{pt}$= Absolute ($R_{it}$ - $R_{mt}$)

**Table 4.** Ordinary Least Square Regression Estimates of Number of Transaction on Absolute Value of Marketwide Information and Firm-Specific Information (firm-specific information and marketwide information as independent variable)

| | **Port 1 smallest** | **Port 2** | **Port 3** | **Port 4** | **Port 5** | **Port 6 largest** |
|---|---|---|---|---|---|---|
| α | 10.903 | 66.094 | 79.954 | 146.225 | 159.586 | 328.883 |
| βFI | 15.282 | 23.171 | 46.690 | 37.721 | 19.780 | 14.353 |
| βMI | 74.412 | -1133.190 | 518.146 | 119.162 | 1435.235 | 2961.638 |
| Adj $R^2$ | 0.120 | 0.013 | 0.191 | 0.041 | 0.078 | 0.035 |
| t FI | 7.975* | 2.463* | 10.242* | 4.674* | 5.407* | 2.397* |
| t MI | 0.548 | -1.937 | 1.345 | 0.153 | 2.855* | 3.364* |
| F | 33.848* | 4.255* | 58.018* | 11.135* | 21.303* | 9.694* |

* Significant at 5%

I estimate the equation $N_{pt} = \alpha + \beta_{FI}FI_{pt} + \beta_{MI}MI_t + \varepsilon_s$ where $N_{pt}$ = average number of transactions of firms in portfolio p on day t. $MI_t$ is marketwide information on day t, given by absolute $R_{mt}$ where $R_{mt}$ is IHSG index return, $FI_p$ is the cross-sectional average of the firm-specific information of firms in portfolio p on day t. The firm-specific information for firm i on day t is computed as absolute $R_{it}$ - $R_{mt}$ (see formula 3 and 4 to calculate $R_{mt}$ and $R_{it}$).

**CONCLUDING REMARK**

I examined that the number of transaction variables has positive significant effect on stock price volatility. My finding supports the recent studies that work on number of trades (see among other, Easley and O'Hara, 1990; Harris and Raviv, 1993; Stalen, 1993; Jones *et al.*, 1994; and Gopinath and Krisnamurti, 2001). The number of trades may convey more information to the market participants.

The trades of large firms are significantly related to a proxy of public marketwide information. I confirm the positive significant relation between firm-specific information for both large and small firms. I found no evidence to support the uninformed firms can trade on more favorable terms by getting firm-specific information. My result is not in the same track to the Bessembinder *et al*. (1996) and Barclay and Dunbar (1996). The explanation for this result connect to the thin market on the Jakarta Stock Exchange incorporate income shifting may make firm-specific information less useful to the risk arbitrageurs and therefore impede its capitalization into stock prices (Morck et al., 1999).

Although there are many empirical studies on volatility-volume relation, there is still no general consensus about what actually drives the relation. Despite Jones *et al*. (1994) and Gopinath and Krisnamurti (2001) findings who investigate how daily price volatility could be explained by daily number of trades more than trade size, Chan and Fong (1999) does not agree to them. Chan and Fong (1999) say, it is premature to conclude that trade size has no information content beyond that contained in the number of trades because: (1) with relaxing a monotonic relation between volatility and trade size, the number of transaction does not have superior impact to the volatility; (2) if the test does not ignore an important prediction of the market microstructure model so trade size will play not a trivial role; and (3) different result depend on the participants in the market, such as analyst, institutional investors, and insiders.

Further researches can be conveyed by investigate: (1) the types of informed and uninformed market participants, such as analysts, institutional investors, and insiders; (2) who possesses the funds, individual or institutions; (3) domestic or foreign traders; (4) bid-ask spreads of intraday pattern and cost trading; (5) trading and nontrading hour activity (pre trading, post trading) information; and (6) anomaly and normal period. Some models can be proposed as "mixture of distributions model" by Epps and Epps (1976), asymmetric information model by Kyle (1985), differences in opinion model by Harris and Raviv (1993), and time varying liquidity by Engle and Lange (1997).

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