

# THE ASPECT OF MARKET MICROSTRUCTURE ON INDONESIA STOCK EXCHANGE (IDX)

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## **ABSTRACT**

This study investigates the effect of type of information (economic news and firm specific information announcements) and signal on trading activities at Jakarta Stock Exchange. This study also investigates the asymmetric information phenomenon between foreign and domestic investors from 1995 to 2003 with intraday data in the context of market microstructure. Sixteen million transactions have been partitioned into 30-minute intervals for each event (information announcements) and into four sample periods: pre-event, event, post-event, and non-event days to show the movement of trading activities.

This study uses analysis of variance (ANOVA) regression to test the hypothesis. This study also estimates the composition of informed trader for each type of investor by using Poisson's distribution of O'Hara's model (1996, 1997).

The results of this study show that economic news has more statistically significant effect on trading activities than specific information, especially on trading volume. Positive signal has more statistically significant effect on trading activities than negative signal, especially on price volatility and trading volume.

The results also find that foreign trading activities are driven more by economic news than firm specific information and statistically significant on trading volume (number share traded and number of trading). Domestic trading activities are driven more by firm specific information than economic news and statistically significant on trading volume (number share traded and number of trading). It seems that investor's trading activities are driven more by economic news than firm specific information announcements at Jakarta Stock Exchange.

Final results show that the composition of informed trader of foreign investor is greater than domestic ones when economic news has positive signal, while the composition of informed trader of domestic investor is greater than foreign ones when firm specific information has negative signal. This phenomenon seems to be attributed to investor's perception biases.

**Keywords:** *market microstructure, intraday, type of information, informed trader*

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## **1. Introduction**

There are two interesting and still debatable issues regarding the research on market microstructure relating the information announcement in financial market. First, which type of information influences most the trading activities in financial market, firm specific

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information announcements or economic news? The first issue directs the study on stock behavior during the flow on information into the market. This study is called the study on the stock behavior. Second, is there asymmetric information between foreign investor and domestic ones during the period of the information announcement? In other word, is there a group of investors profiled than the other ones, meaning foreign investors visa vies domestic ones, by an information announcement. This second issue directs the study on the investor behavior during the period of information announcement.

An information announcement explicitly using firm specific information as a proxy generally used by many studies on stock behavior around stock splits (Fama et al., 1969, and Easley et al., 2001); around earning and dividend announcement (Patell and Wolfson, 1983); around merger and acquisition (Smith et al., 1997, and Hanafi, 2002a); and mix firm specific information announcements (Bhattacharya et al., 2000, and Hanafi and Ghon Rhee, 2002). Unlike other empirical studies, Mitchell and Mulherin (1994) use headline news of Dow Jones & Company and top news at the front page of The New York Times; Berry and Howe (1994) use some news relayed at Reuter's News Service every time; Ederington and Lee (1993), Almeida et al. (1998), Jones et al. (1998), Balduzzi (2001) use scheduled macroeconomic announcements; and Tanner (1997) uses unscheduled economic news, as proxy of information announcement. Former study showed a statistically significant result on the influence of information announcements to several measures on trading activities.

More over, investors will be perceived the flow of information differently. Several studies have proxy the an information contains good or bed news depending on the measure of its positive or negative abnormal return, as used in the study of Hanafi and Ghon Rhee (2002); by measuring the amount of buy/sell order when an information emerges as used by Easley et al. (1996), and by significant increasing/decreasing of price change as Morse and Ushman (1983).

Other phenomena show that different perception by investors on every flow of information into the market caused different trading activity of each investor. It means, there is a group of investors who can gain profit and other group who loss caused by their trading activities during information flows. This phenomenon invites many researchers to study asymmetric information and investor behavior of each type of investor. Studies by Meulbroek (1992), Cornell and Sirri (1992), Chakravarty and Mc. Connell (1999), and Chakravarty

(2001) have proven that there are different behavior in trade between individual investor and institutional one, while Bonser-Neal et al. (1999), Eckbo and Thornburn (2000), Grinblatt and Keloharju (2000), Dahlquist and Robertsson (2001), Hanafi and Ghon Rhee (2002), Hanafi (2002a), and Dvorak (2004) have proved that there is different in trade behavior between foreign and domestic investors. In fact, these studies still have different results, thus there is not yet a common final result yet on which type of investor influences trade activities and which one has more knowledge of information. This argument leads several studies to use asymmetric information in the study on market microstructure to explain the mention phenomena.

This research investigates the effect of information announcement by market microstructure point of view, which usually uses analysis instrument, such as intraday data and event study with relatively short time interval (less than one single day, with 30 minute time intervals). It is hoped that by using intraday will be more accurate than daily to be analyzed.

The result of this study shows that economic news is more influencing to trading activities than firm specific information announcement, especially on trading volume. Positive signal is more statistically significant effect on trading activities than negative signal, especially on price volatility and trading volume. This phenomenon is to be attributed to different perception of investors. Asymmetric information is also found in Jakarta Stock Exchange during period of this study, especially when foreign and domestic trading activities are differed each other related to the type of information.

Foreign investor trading activities are statistically significant more influenced by the economic news than firm specific information announcement, while domestic investor trading activities is not more statistically significant influenced by firm specific information announcement than economic news. This result is supported by the percentage of informed trader of foreign investors is higher than domestic investor on the economic news (especially when positive signal emerges), while the percentage of informed traders of domestic investors is higher than foreign investors, when there is a specific information announcement (especially when the signal is negative).

Finally, the finding result of this study shows the pattern of Jakarta Stock Exchange trading activity are W-shape on price volatility, and trading volume and frequency, while

return volatility show a U-shape pattern, over the period of the sample. This different is more caused by the difference of measurement.

The remainder of this paper is organized as follows. Section 2 reviews the literature and empirical research, and the conceptual development of the hypothesis, and Section 3 describes the data and the research method. Section 4 reports the intraday trading activity descriptive and the result of analysis of variance. Section 5 concludes the paper.

## **2. Theory and the Hypothesis Formulation**

### ***The influence of Information on the trade activities***

Extensive market microstructure literature has addressed the effect of information on trading activities in capital market. As a theory, each trading activities indicate the coming flow of information. For example, high trading volume is related to the coming of information (Kyle, 1985); volume relates to the differences of the interpretation on the news among market players (Holthausen and Verrechia, 1990); volume performs the function of absolute change of the precision of an information among market players and there is positive relation between absolute price change and announcement and trading volume of stock (Kim and Verrechia, 1991); price volatility changes when there is a new information (Smith et al., 1997); and stock return volatility relates to the flow of information at financial market (Bhattacharya et al., 2000).

French and Roll (1986) divides information into two: public information and private information. Public information is information that available for market as a whole and influences less on trading price, while private information is only for the segment of the certain market and its trade has influences more on the price. This is often called the private information hypothesis. The same thing is stated by Admati and Pfleiderer (1988) that private information play an important role in explaining the time pattern of trading volume and return volatility compared with public information at capital market. Bessembider et al. (1996) divides flow of information into two, marketwide information and firm specific information. Transaction can be done caused by both flows of information. Transaction based on firm specific information contains more asymmetric information, while marketwide information is caused by different interpretation of market players. .

One of the outcomes of the study supporting private information hypothesis is the one of the research by Huang, Liu, and Fu (2000). They examined the behavior of the stock price during the period of trading and non trading at Taiwan Stock Exchange (TSE ) by measuring the stock return variation from the observed of stock price.

Unlike the other studies mentioned, Mitchell and Mulherin (1992), Berry and Howe (1994) find the evidence that public information is able to influence the trading activities. Mitchell and Mulherin (1992) used information proxy based on the number of news relayed by Dow Jones & Company and Wall Street Journal, while Berry and Howe (1994) used news relayed by Reuter's News Service as aggregately, including firm specific information and industries, macroeconomic, politics and international news. The outcome of both studies shows that public information has positive and statistically significant relation on trading volume.

More over, since there are two opinions on which information influences on trading activities, the influence between two types of information on trading activities must be reexamined.

Since there are numbers of individual inside the firm, especially in Indonesia, so there is a strong possibility that specific information of firm contains more private information than economic news. And since unscheduled economic news influences very much on trading activities compared with scheduled one, hypothesis can be drown as follows:

*H<sub>1a</sub>: Economic news has more significant effect on trading activity than firm specific information announcement.*

Further, the signal received by the market in facing different information, apparently influences differently on trading activities. Although there is an a priory, that positive or negative signal of an information doesn't influence differently on trading activities, but number of studies support that different signals influence differently on trading activities, as study by Easley et al. (1996, 1997), Hanafi and Ghon Rhee (2002), and Christie-David et al. (2003).

Different from the former study, the outcome of the study of Chan (2002) shows that the investor's reaction is slower when he receives negative signal than when he receives positive one. This matter can be explained by the study on behavior, that there is a different behavior of a person based on his different condition of mood. Fiske and Taylor (1984) explain that a

happy person prefers to take risk and decide fast, and a sad person is on the contrary. If this condition is related to the signal of information, it can be said that a positive (negative) signal causes the investors to take risk more (less) in trading activities. Thus, if there is a positive signal, the investors execute trade activities more than if there is a negative signal. This is caused by the investors' preference to wait, if the news is bad.

From the above mentioned empirical data an hypothesis can be formed as follows:

*H<sub>1b</sub>: Positive signal has more significant effect on trading activity than negative signal.*

***The influence of type of information and type of investor on trading activities.***

Kang and Stulz (1997) using research data in Japan find the evidence that foreign investors tend to estimate less the firm having least or highest leverage. Besides, foreign investors prefer the firm with largest export sale. According to Kang and Stulz (1997) the reason is, foreign investors prefer to invest on the firm that they know well. This is called *home bias*. According Kang and Stulz (1997) *home bias* is much caused by asymmetric information.

Dahlquist and Robertson (2001) using data in Finland's market find the evidence that foreign investors prefer large firms, which pay small dividend, and firm that having a large scale of cash in their financial statements. The reason is, foreign investors observe more to the problem of liquidity. Foreign investors tend to evaluate less to the firm with dominant shareholders. This is normal, that the large firm in Finland usually have wide spread of shares and also played already in international trade. Furthermore, foreign investors have more characters such as *mutual fund* or *investor institution*, as resumed by Grinblatt and Keloharju (2000) at the same market.

Grinblatt and Keloharju (2000) also using data in Finland's market focused more on the level of simplicity of the information received by investors. Grinblatt and Keloharju (2000) are of the opinion that domestic investors more simple than foreign investors. It means that foreign investors are sophisticated in facing information with non-private content or a complicated one, which needs deeper analysis. These opinions is supported by Eckbo and Thorburn (2000) at their observation around the acquisition announcements in Canada, who finds the evidence that on the average, domestic bidders gain higher abnormal return than foreign bidders on the first until second day after the announcement. According to Eckbo and

Thornburn the main reason is, domestic investors know more domestic market and are able to negotiate better with targeted firms.

Using research data at Jakarta Stock Exchange, the result of the study of Hanafi and Ghon Rhee (2000) has confirmed the empirical finding of the study of Eckbo and Thornburn (2000), that domestic investors know the information better than foreign investors on the announcement of merger and acquisition. It can be seen that the abnormal return of domestic investors is higher than the one of the foreign investors. Besides, Dvorak (2004) has also find the evidence that the level of the domestic investor's trade is higher than the one of the foreign investors at Jakarta Stock Exchange. On the other side, Bonser-Neal et al. (1999)'s study, using data of transaction cost at Jakarta Stock Exchange, shows different result. The trade initiated by foreign investors influences the price more than the one initiated by domestic investors.

Based on study concerning investors' behavior, there is a same perception. Foreign investors are smarter than domestic ones when facing complicated and non- private information. Furthermore, foreign investors usually form themselves in an institution. They are more rational and identify faster and use in their full capacity potential profit at the market, such as *miss pricing or arbitrage*. This is caused by among others of their large scale of fund that makes them capable to hire professionals in finance who are able to evaluate financial information faster (Hanafi, 2003: 391).

Since there are firm insiders doing invest, it can be assumed that firm specific information contains more private information. Thus, when firm specific information is announced, domestic investors know better than foreign investors. In the other hand, there is other opinion that evaluates the foreign investors are smart in facing an information with private information content, such as economic news. This matter can be explained by the study on herding behavior of foreign investors. Thus, when the announcement of economic news comes, foreign investors know better the information than domestic investors.

Based on the above-mentioned analysis, two hypotheses can be resumed as follows:

*H<sub>2a</sub>: Economic news has more significant effect on foreign trading activity than specific information announcement.*

*H<sub>2b</sub>: Specific information announcement has more significant effect on domestic trading activity than economic news.*

If foreign investors evaluate better information than domestic ones in facing the coming economic news announcement at market, then they will do transaction based on the mentioned of information. On other word, foreign investors are better informed.

So one hypothesis can be drown as follows:

*H<sub>2c</sub>: Composition of informed trader of foreign investor has more than informed trader of domestic investor when economic news has arrived.*

Since domestic investors knows better information than foreign investors when a specific information announcement comes into the market, they will do transaction based on the mentioned of information. In other word, domestic investors are better informed.

Based on the above analysis, the hypothesis can be formed as follows:

*H<sub>2d</sub>: Composition of informed trader of domestic investor has more than informed trader of foreign investor when specific information has announced.*

### **3. Data and research method**

#### ***Data and Sample***

This study used six years period from May 21 1995 to the end of 2003, except crisis period (August 14 1997 to July 20 2001) with more than 16 million transactions from LQ45's stocks which consistent over the sample period. There are 21 stocks on the period of 1995 to 1997 and 26 stocks on the period of 2001 to 2003.

The data used in this study is taken from the JATS database maintained by the Database Pasar Modal Universitas Gajah Mada (DPMUGM). The JATS database provides details of all transactions and order books data. The transactions and order books data set contains date transaction, date of settlement, stock identification, order number, price, volume, value, time, broker identity, broker origin (foreign or domestic), board type, and investor identification (foreign, domestic, and broker account. This study focuses on transaction and order on the regular market.

#### ***Type of Information***

The news related to the macroeconomic news and firm specific information announcement during the sample period was collecting from Bloomberg News Services. Since the study would like to investigate whether different types of news will produce different impacts on trading activity, the days in which have both macroeconomic news and



firm specific information announcements were deleted from our sample. In addition, every type of news should have at least 2 trading days apart from each other to know whether there is any news impact on the trading activity on the event day, before and after of the news arrival day. Others are the non-event days. Finally, 32 economic news and 36 specific information announcement are used in this study.

Since these study would also like to investigate whether different types of signal (good/bad news) will produce different impacts on trading activity, the days of type of information will have statistically significant abnormal return (positive/negative). Abnormal return is different between stock return and expected return or  $AR_{i,t} = R_{i,t} - E(R_{i,t})$ . In this case,  $E(R_{i,t})$  is the average return over the sample period of each stocks, as Chan et al. (2001).

First, define the stock return (in percentage) during interval  $s$  in day  $t$  ( $R_{st}$ ) as:

$$R_{st} = \ln (P_{st} / P_{(s-1)t}) \quad (1)$$

Where:

$P_{st}$  = stock price at the end of interval  $s$  in day  $t$ .

$P_{(s-1)t}$  = last transaction price of the stock in the previous day<sup>1</sup>.

Second, calculate the abnormal return. More over, 38 positive signals and 27 negative signals of all type of information are used in this study.

### ***Trading Activity Measurements***

As Chan et al. (2001), this study uses four types of market activity: return volatility, price volatility, trading volume (number of shares traded), frequency. The intraday data are partitioned into 30-minute trading interval. Altogether there are ten 30-minute trading intervals within each trading day during our investigation period: five trading intervals in the morning session running from 09:30 a.m. to 12:00 a.m. and five trading intervals in the afternoon session running from 13:30 p.m. to 16:00 p.m., except Friday.

Stock return volatility measured with standard method. Assuming the stock price has a zero mean return within a short trading interval, return volatility is computed by taking the square of  $R_{st}$ , since  $\sigma_{st}^2 = E(R_{st}^2) - [E(R_{st})]^2 = E(R_{st}^2)$  when  $E(R_{st})$  is assumed to be zero. Therefore, return volatility ( $RV_{st}$ ) for interval  $s$  in day  $t$  defined as:

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<sup>1</sup> This study uses close-to-close return, while for the first interval open price was into account. For comparing, this study also uses close-to-open return and has the same finding result.

$$RV_{st} = [\ln(P_{st}) - \ln(P_{s-1,t})]^2 \quad (2)$$

The cross-sectional averages of  $RV_{st}$  are calculated across all the five stocks ( $\overline{RVst}$ ) to indicate the return volatility for the whole market.

Price volatility is defines as variation of transaction within the trading interval. First calculate the coefficient of variation of price for each stock during trading interval  $s$  in day  $t$  as:

$$CVP_{st} = \frac{\sigma(P_{st})}{E(P_{st})} \quad (3)$$

Where:

$\sigma(P_{st})$  = standard deviation of the stock price during interval  $s$  in day  $t$ .

$E(P_{st})$  = expected value

Then calculate the adjusted  $CVP_{st}$  as :

$$AdjCVP_{st} = \frac{CVP_{st}}{E(CVP_{st})} \quad (4)$$

Moreover, the measure of  $AdjCV_{st}$  can be aggregate across all sample stocks to give the cross-sectional average ( $\overline{AdjCVPst}$ ) as its value is independent of stock's attribute and tell about the significance of the effect of news arrival.

In this study uses the stock's total number of shares traded and the number of trades (the trading frequency) to measure the stock's trading volume. The logic to define stock's number of shares traded and trading frequency is similar to that of the stock's price volatility. First measure each stock's total number of shares traded ( $TRD_{st}$ ) and the number of trades ( $FREQ_{st}$ ) during interval  $s$  in day  $t$  for each of the trading days in the investigation period. Then calculate each stock's adjusted  $TRD_{st}$  ( $AdjTRD_{st}$ ) by dividing  $TRD_{st}$  with its expected value ( $E(TRD_{st})$ ):

$$AdjTRD_{st} = \frac{TRD_{st}}{E(TRD_{st})} \quad (5)$$

Similarly, calculate each stock's adjusted  $FREQ_{st}$  ( $AdjFREQ_{st}$ ) by dividing  $FREQ_{st}$  with its expected value ( $E(FREQ_{st})$ ):

$$AdjFREQ_{st} = \frac{FREQ_{st}}{E(FREQ_{st})} \quad (6)$$

Moreover, the measure of  $AdjTRD_{st}$  ( $\overline{AdjTRD_{st}}$ ) and  $AdjFREQ_{st}$  ( $\overline{AdjFREQ_{st}}$ ) will then tell about the significance of the effect of news arrival.

### ***Testing the Hypothesis***

After all trading activity variables has been measured then regress all variables to assess the statistical significance for the result by analysis of variance (ANOVA) with General Linear Model (GLM). Analysis of variance two factor (type of information and type of signal) model with two blocking variable (sample period and crisis period) is used to test the hypothesis 1a and 1b, by no interaction and with interaction model. Analysis of variance two factor (type of information and type of investor) model with blocking variable (sample period and crisis period) is used to test the hypothesis 2a and 2c. The analysis of this study was running by four regressions of trading activities as dependent variables using SAS and SPSS statistical analysis programs.

Finally, this study is calculated the composition of informed trader for each type of investors using model of Easley et al. (1996) to test hypothesis 2c and 2d by Non Linear Programming (NLP).<sup>2</sup> After the average of informed trader is calculated for each type of investors, then calculate the difference of the rate of informed trader between foreign and domestic investors in every type of information and every type of signal as ( $\Delta ARIV_j$ ) as follows:

$$\Delta ARIV_j = \log (\mu_{foreign}/\mu_{domestic}) \quad (9)$$

Where:

$\Delta ARIV_j$ : different between averages of informed trader for each type of information (economic news or firm specific information).

$\mu_{foreign}$ : percentage of informed trader of foreign investors.

$\mu_{domestic}$ : percentage of informed trader of domestic investors.

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<sup>2</sup> NLP is a general nonlinear programming procedure that maximizing the function to linear equality atau inequality constraints (Chan et al., 2002). For further information about this procedure, see on SAS/ETS User's Guide.

## 4. Results

### *Intraday trading activity*

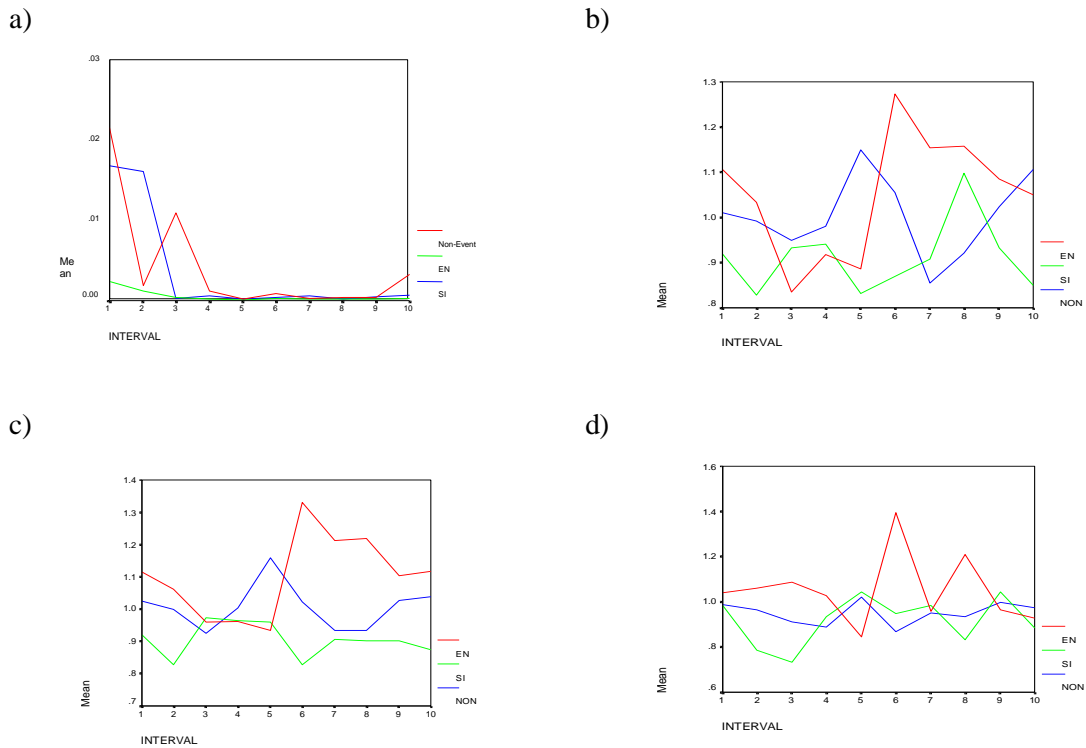


Fig. 1. (a) Return volatility on the event day. (b) Adjusted coefficient of variation of price on the event day. (c) Adjusted number of shares traded on the event day. (d) Adjusted trading frequency on the event day.

Fig. 1 shows the pattern of intraday trading activity on the event day compared to the non-event day as a normal trading day. All the figures (except return volatility show the U-shape pattern) indicate that price volatility, number shares traded, and trading frequency are W-shaped over the trading day in all the samples.<sup>3</sup> These finding research consistent with the Setyawan (2005) that no U-shape pattern intraday trading activity around information announcements arrival at JSX. The W-shape pattern is also observed in three related market in USA (Lee et al., 1999). Different pattern between return volatility and three trading

<sup>3</sup> This study uses 1995-2003 periods. For comparing, this study also uses before and after crisis periods for each analysis and has the same finding result. This study also control for the size of the firm for each analysis and no different result. All the results are available in author.

activity metric, might be different of the construction of measurement. Return volatility is based on the returns between the first and the end of the section, while price volatility, number of shares traded, and trading frequency are based solely on the transactions during each of the section.

Fig. 1 also shows that all of the average trading activities associated with economic news is larger than that of specific information announcements. Fig. 1 also observe that while trading activity associated with economic news is larger than that calculated from non-event day, the trading activity associated with specific information announcements is smaller than that of the non-event day.

### *Analysis of Variances*

#### *Hypothesis 1a and 1b*

**Table 1. Equality test of the average of trading activities**

<b>Trading Activity</b>	$\mu_{\text{economic}} > \mu_{\text{specific}}$	$\mu_{\text{signal}(+)} > \mu_{\text{signal}(-)}$
<b>Return volatility</b>	-0,0014**	0,0002
<b>Price volatility</b>	0,0376	0,174***
<b>Trading volume</b>	0,0954***	0,1866***
<b>Trading frekuensi</b>	0,0495*	-1,78**

\*\*\*, \*\*, \* statistically significant at 0,01, 0,05, 0,1 level (one tailed test).

Table 1 and Table 2 show the significant effect for two type of information on trading activities. These finding support the effect of information flow on stock market. For further explanations which information is more significant effect on trading activities, this study compare the mean of activities for each type of information. Table 1. shows hat economic news is more significant effect than specific information in trading activities, especially in trading volume or the number of share traded and statistically significant at 1% level. Positive signal has more significant effect on trading activity than negative signal, especially on price volatility and trading volume and statistically significant at 1% level.

*Hypothesis 2a and 2b***Table 42. Equality test of the average of trading activities**

Trading Activity	Foreign investor	Domestic investor
	$\mu_{\text{economic}} > \mu_{\text{specific}}$	$\mu_{\text{specific}} > \mu_{\text{economic}}$
Return volatility	-0,0001	0,0002
Price volatility	0,0512	-0,0434
Trading volume	0,2639***	-0,1522***
Trading frequency	0,2606***	-0,1103***

\*\*\*, \*\*, \* statistically significant at 0,01, 0,05, 0,01 level (one tailed test).

Table 2. show that foreign trading activity is driven more by economic news than firm specific information announcement statistically significant, while domestic investor trading activity is driven more by firm specific information than economic news statistically not significant. It seems that all investor's trading activities are driven more by economic news.

**Hypothesis 2c**

Using non-linier programming to prove the hypothesis 2c and we find that:

1. When information has positive signal:

$$\Delta \text{ARIV}_j = \log (\mu_{\text{foreign}}/\mu_{\text{domestic}}) = \log (0,5284/0,1229) = \mathbf{0,6333}$$

2. When information has negative signal:

$$\Delta \text{ARIV}_j = \log (\mu_{\text{foreign}}/\mu_{\text{domestic}}) = \log (0,1593/0,2069) = \mathbf{-0,1136}$$

Hypothesis 2c is supported by the  $\Delta \text{ARIV}_j$  which has positive sign, especially when economic news has positive signal.

This result indicate that foreign investors are not more sensitive then domestic investors, especially when the information has negative signal. Chan (2002) find the evidenced that investors tend to react in positive information. Foreign investors tend to wait and domestic investors are individual. Individual investor doesn't have any competence to anlyze the information, eseppecially negative signal.

### *Hypothesis 2d*

Using non-linear programming to prove the hypothesis 2d and we find that:

1. When information has positive signal:

$$\Delta ARIV_j = \log (\mu_{foreign}/\mu_{domestic}) = \log (0,4926/0,3843) = \mathbf{0,1080}$$

2. When information has negative signal:

$$\Delta ARIV_j = \log (\mu_{asing}/\mu_{domestik}) = \log (0,2206/0,4694) = \mathbf{-0,3280}$$

Hypothesis 2d is supported by the  $\Delta ARIV_j$  which has negative sign, especially when firm specific information has negative signal. This result also consistence with Chan (2002).

### **Conclusion**

Descriptive data shows that all-variable activity is response to the information flow, like economic news and firm specific information announcement. The evolution of trading activities is W-shape pattern over the trading day on price volatility, trading volume, and trading frequency, while U-shaped pattern discover on return volatility.

The result of this study shows that economic news is more influencing to trading activities than firm specific information announcement, especially on trading volume. Positive signal is more statistically significant effect on trading activities than negative signal, especially on price volatility and trading volume. This phenomenon is to be attributed to different perception of investors. Asymmetric information is also found in Jakarta Stock Exchange during period of this study, especially when foreign and domestic trading activities are differed each other related to the type of information.

Foreign investor trading activities are statistically significant more influenced by the economic news than firm specific information announcement, while domestic investor trading activities is not more statistically significant influenced by firm specific information announcement than economic news. This result is supported by the percentage of informed trader of foreign investors is higher than domestic investor on the economic news (especially when positive signal emerges), while the percentage of informed traders of domestic investors is higher than foreign investors, when there is a specific information announcement (especially when the signal is negative).

The asymmetric news effect on trading activities is likely owing to the fact that economic news and firm specific information have different information quality and investors have perceptual biases. Since investors focus more on unexpected macroeconomic news, than investors will weight more than firm specific information announcement.

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## APPENDIX

Table A1. Whole Sample Stocks List 1995-2003

No	Tick	Nama Saham	Industri
1	AALI	Astra Agro Tbk PT	Farm
2	ANTM	Aneka Tambang Tbk PT	Mining
3	ASII	Astra International Indonesia Tbk PT	Automotive
4	AUTO	Astra Otoparts Tbk PT	Automotive
5	BBCA	Bank Centra Asia Tbk PT	Finance
6	BDMN	Bank Danamon Tbk PT	Finance
7	BDNI	Bank Dagang Negara Indonesia Tbk PT	Finance
8	BMTR	Bimantara Citra Tbk PT	Automotive
9	BNBR	Bakrie & Brothers Tbk PT	Holding
10	BNII	Bank International Indonesia Tbk PT	Finance
11	BRPT	Barito Pacific Timber Tbk PT	Wood Industri
12	CMNP	Citra Marga Nusaphala Persada Tbk PT	Transportation & Service
13	CTRA	Ciputra Development Tbk PT	Real Estate
14	DPNS	Duta Pertiwi Nusantara Tbk PT	Adhesive
15	GGRM	Gudang Garam Tbk PT	Tobacco
16	GJTL	Gajah Tunggal Tbk PT	Automotive
17	HMSP	HM Sampoerna Tbk PT	Tobacco
18	IDSR	Indosiar Visual Tbk PT	Communication
19	INDF	Indofood Sukses Makmur Tbk PT	Food & Beverages
20	INTP	Indocement Tunggal Perkasa Tbk PT	Cement
21	ISAT	Indosat Tbk PT	Communication
22	JRPT	Jaya Real Property Tbk PT	Real Estate
23	KIJA	Kawasan Industri Jababeka Tbk PT	Investment & Service
24	KLBF	Kalbe Farma Tbk PT	Pharmaceutical
25	LPBN	Lippo Bank Tbk PT	Finance
26	MDRN	Modern Photo Film Company Tbk PT	Photo
27	MEDC	Medco Energi Corporation Tbk PT	Mining
28	MLIA	Mulia Industrindo Tbk PT	Ceramics, Glass
29	MPPA	Matahari Putra Prima Tbk PT	Wholesale
30	MTDL	Metrodata Electronic Tbk PT	Electronic & Electric
31	PNBN	Bank Pan Indonesia Tbk PT	Finance
32	POLY	Polysindo Eka Perkasa Tbk PT	Chemical & Allied
33	RALS	Ramayana Lestari Sentosa Tbk PT	Wholesale
34	RMBA	Bentoel International Investama Tbk PT	Tobacco
35	SMGR	Semen Gresik Tbk PT	Cement
36	TINS	Tambang Timah Tbk PT	Mining
37	TLKM	Telekomunikasi Indonesia Tbk PT	Communication
38	TSPC	Tempo Scan Pacific Tbk PT	Pharmaceutical
39	UNVR	Unilever Indonesia Tbk PT	Customer Goods

**Table A.2. Economic News for 1995 – 2003.**

No	Date	News
1a.	05/24/95	Tariff Cut Makes Winners of Indonesian Car Producers, Importers.
1b.	05/24/95	Indonesia Makes Sweeping Tariff Cuts, Open Some Sectors.
2.	07/05/95	Indonesia Hits Monopolies With Partial Divestment Ruling.
3.	07/14/95	LDC Watch Bank Negara Indonesia to Sell \$170 Mln Floating Notes.
4.	10/10/95	Indonesia's Duri Field Produces Billion Barrel of Oil.
5.	12/04/95	Indonesian Minimum Wage to Raises Reserve Requirement to Reassure Investors.
6a.	01/04/96	Indonesia Budget Aims to Rein In Imports, Deficit.
6b.	01/04/96	Indonesia's Budget to Grow 16.1% to 90.61 Tln Rupiah in 96-97.
6c.	01/04/96	Indonesia's Suharto to Unveil 'Austere' 96-97 Budget.
7.	03/22/96	Suharto Says Exports Must Grow to Balance Account Deficit.
8.	04/03/96	Indonesian CPI Takes First Monthly Decline Since March 1990.
9.	04/26/96	Indonesia Will Buy Nine F-16's: Consider Hawk.
10.	05/13/96	Indonesia 1995-1996 Current Account Deficit Widens to \$6.9 Bln.
11.	06/04/96	Indonesia Expected to Announce Deregulation Package Today.
12.	06/19/96	Indonesia to Begin Talks With Foreign Lenders in Paris Today.
13.	09/24/96	Indonesia Sees 8.5% Inflation in '96, 8.9% in '97.
14.	12/04/96	Bank Indonesia Governor Sees Economic Growth Above 7% in 1997.
15.	02/19/97	Indonesia to Borrow \$5.25 Billion in Fiscal 1997, Paper Says.
16.	03/17/97	Indonesia Plans 5% Rise in Forestry Royalties.
17.	12/28/01	Indonesia to Raise Fuel Prices Next Month, Minister Says.
18.	02/16/02	Indonesian Jobless Could Reach 45.2 Million by 2104, Paper Says.
19a.	06/12/02	Indonesia Inflation May Slow to Less Than 10%.
19b.	06/12/02	IMF Says Indonesian Inflation May Fall to Single Digit.
19c.	06/12/02	Indonesia Says It May Cut Interest Rates If Inflation Slows.
20.	06/19/02	Indonesia May Get \$340 Mln IMF Loan Next Week, Boediono Says.
21.	06/25/02	Asian Devt Bank May Release \$350 Mln Loan to Indonesia in July.
22.	07/09/02	Indonesia Budget Committee Projects 4.5% to 6% Growth in 2003.
23.	09/03/02	IMF Says Indonesia Inflation May Fall Below 10%.
24.	09/11/02	Indonesia Cuts 2002 GDP Growth Forecast to 3.99%.
25.	12/19/02	Bank Indonesia Sees 2003 Economic Growth Between 3.5% - 4%.
26.	01/02/03	Indonesia Raises 2003 Inflation Forecast to 11% From 9%.
27.	01/21/03	IMF Says Indonesian Economy May Grow as Much as 4% This Year.
28.	01/29/03	Indonesia Central Bank Expects Inflation to Fall 9% in 2003.
29.	09/05/03	Indonesia Investment Won't Revive Until 2004, Boediono Says.
30.	10/23/03	Indonesia Collects 71% of 2003 Tax Revenue Target.
31a.	11/07/03	IMF to Start Final Review of Indonesia's Economy, Post Says.
31b.	11/07/03	Indonesia May Keep 2004 Budget Deficit Forecast at 1.2% of GDP.

Resource: Bloomberg News Services from Mardesiana (Kreshna Securities).

**Table A.3. Firm Specific Informations 1995 – 2003.**

No	Date	News
1.	06/21/95	(BT) – Bakrie Group To Inject 5 Related Firms into Finance Arm.
2.	08/02/95	Astra International's Sales Surged 30% in First Half.
3.	10/19/95	Indonesia's Sampoerna Cashes In on Clove Cigarettes.
4.	02/10/96	Sampoerna Says '95 Profit Rose 45%, Below Projection.
5.	03/07/96	Matahari's \$100 Mln Guaranteed Notes Assigned S&P's 'BB' Rating.

6.	03/14/96	Bank Danamon Planning Right Issue, Earning Up 62%.
7.	05/22/96	PT Ciputra Dev't Plans Right Issue, Acquisitions, Paper Says.
8.	06/10/96	Kalbe Farma Plans to Sell Candy Unit, Posts Net Income Up 2.3%.
9.	08/21/96	Sampoerna to Boost Stake in Transmarco, Ups Takeover Bid.
10.	08/26/96	Bank Negara Indonesia Gets 'BBB' and 'A-3' Ratings from S&P.
11.	09/05/96	Ciputra Plans to Build \$2.1 Billion Satellite City for Hanoi.
12.	10/24/96	PT Bakrie & Brothers Issuing 1.45 Billion Bonus Shares.
13.	10/31/96	Sampoerna Planned To Buy Astra With \$400 Mln Loans.
14.	11/06/96	Indosat 3 <sup>rd</sup> -Qtr Net Rose 4.2% as Calling Volume Rose.
15.	12/10/96	Mulia Industrindo to Increase Glass Price by 18% on Jan 1.
16.	12/17/96	PT Indosat Defends Outlook, Addresses Concerns About Business.
17.	04/10/97	Indosat Wins Approval fo Investment : Sees '97 Profit Up 14%.
18.	05/12/97	PT Mulia Industrindo 1 <sup>st</sup> - Qtr Net Falls 30%.
19.	08/11/97	Telkom and Indosat Shares Tumble on FCC Rate Reduction Plan.
20a.	08/29/01	Unilever Indonesia Reiterated 'Buy' at Danareks.
20b.		Bank Panin Maintained 'Hold' at Danareks.
20c.		Bank Panin Maintained 'Hold' at ING Baring Securities Indonesia.
20d.		Unilever Maintained 'Buy' at ING Baring Secs Indonesia.
20e.		Bimantara Citra Cut to 'Hold' at ING Baring Secs Indonesia.
20f.		Indosiar Visual Mandiri Maintained 'Buy' at Trimegah Securindo.
20g.		Bank NISP Maintained 'Buy' at Trimegah Securindo.
20h.		Bank Mega Maintained 'Hold' at Trimegah Securindo.
20i.		Ultra Jaya Milk Maintained 'Hold' at Trimegah Securindo.
20j.		PT Bank Danamon Maintained 'Sell' at Bahana Securities.
20k.		PT Bank Pan Indonesia Maintained 'Buy' at G.K. Goh.
20l.		Indonesian Tire Makers Say Strong Rupiah to Reduce Exports.
20m.		Indocement Maintained 'Market Perform' at BNP Paribas Peregrine.
20n.		Bank Danamon Maintained 'Underperform' at BNP Paribas Peregrine.
20o.		BNI Maintained 'Underperform' at BNP Paribas Peregrine.
20p.		Unilever Maintained 'Outperform' at BNP Peregrine.
20q.		PT Semen Gresik Tbk Maintained 'Outperform' at Vickers Ballas.
21a.	12/06/01	Bank Mandiri Sells % 125 Mln of Floating-Rate Notes.
21b.		Timah to Cut Tin Output 15% Next Year, Wants To Try Coal Mining.
22.	02/11/02	Indonesia's Semen Gresik Drops on Building Ban Calls.
23.	02/26/02	Gresik Changes Management to Quell Opposition to Sell.
24.	04/25/02	Moody's Raises Sampoerna's B3 Rating Outlook, Growth Forecasts.
25.	10/01/02	Semen Gresik Expects 10% Rise in Unit's Sale in 2102.
26.	02/19/03	Astra to Divest Toyota Astra Mototr Stake to Toyota.
27.	03/10/03	Bank Niaga 2102 Profit Falls 32% to 137 Bln Rupiah, Bisnis Says.
28a.	05/12/03	Gresik Auditor Issues Adverse Opinion, Exchange Says.
28b.		S&P Raises Bank Mandiri, Danamon, Bank Negara Credit Rating.
29.	05/22/03	Astra to Sell 46% in Toyota Venture for \$226 Mln.
30a.	06/24/03	Indonesia's Mandiri Raises \$230 Mln in Initial Share Sale.
30b.		Indonesia to Increase Mandiri Share Sale to 2.7 Trillion Rupiah
31.	07/24/03	Gresik's June Sales Volume Drops 11% on Lower Exports.
32.	08/08/03	S&P Says PT Telkomsel's 1 <sup>st</sup> -Half Within Expectation, Keeps Rig.
33.	09/19/03	Semen Gresik Cuts Sales Target Again as Indonesians Spend Less.
34.	12/10/03	Bank Rakyat to Raise 500 Bln Rupiah in 10-Year Bonds.

Resource: Bloomberg News Services from Mardesiana (Kreshna Securities)

**Table A.4. Descriptive statistic for Trade Activity in Economic News Period**  
Trade activity by 30 minute interval for whole sample in 1995-2003

Interval	N	Mean	Std Dev	Minimum	Maximum
<b>Panel A: Volatilitas Return</b>					
1	31	0,0021	0,0088	$2,6 \times 10^{-6}$	0,0493
2	31	0,0011	0,0045	$2,6 \times 10^{-5}$	0,0255
3	31	0,0005	0,0017	$3,4 \times 10^{-6}$	0,0096
4	31	0,0002	0,0002	$4,0 \times 10^{-6}$	0,0011
5	25	0,0001	0,0002	$2,7 \times 10^{-6}$	0,0010
6	25	0,0002	0,0003	$4,3 \times 10^{-6}$	0,0011
7	31	0,0002	0,0002	$6,8 \times 10^{-6}$	0,0011
8	31	0,0002	0,0003	0	0,0014
9	31	0,0002	0,0002	$7,4 \times 10^{-6}$	0,0013
10	31	0,0003	0,0002	$3,1 \times 10^{-5}$	0,0013
<b>Panel B: Volatilitas Harga</b>					
1	31	0,9493	0,8409	0,0933	3,7651
2	31	0,9134	0,8918	0,1258	3,6495
3	31	0,7608	0,7275	0,1464	3,3923
4	31	0,8252	0,7599	0,1061	3,0733
5	25	0,8201	0,5890	0,2113	2,7411
6	25	1,1064	1,0238	0,1592	3,8697
7	31	1,0187	0,9058	0,1544	3,6295
8	31	1,0193	0,9493	0,1111	4,2956
9	31	0,9823	1,0379	0,1729	4,0357
10	31	1,0015	0,7696	0,2144	3,1797
<b>Panel C: Volume Perdagangan (AdjTRD)</b>					
1	31	1,0079	0,5827	0,2527	2,2544
2	31	0,9600	0,6098	0,2934	2,9559
3	31	0,9038	0,5697	0,2378	2,6551
4	31	0,8814	0,5763	0,3195	3,0170
5	25	0,8735	0,5038	0,2128	2,8311
6	25	1,2166	0,7375	0,3508	3,1943
7	31	1,1173	0,7270	0,3055	3,5025
8	31	1,1135	0,7139	0,3176	3,6010
9	31	1,0374	0,6671	0,3425	3,7397
10	31	1,0809	0,5728	0,3395	2,9851
<b>Panel D: Frekuensi Perdagangan (AdjFREQ)</b>					
1	31	0,9600	0,4197	0,2125	1,7122
2	31	1,0063	0,5953	0	2,4354
3	31	0,9704	0,7971	0,1454	3,4504
4	31	0,9068	0,6317	0,1011	2,3187
5	25	0,7891	0,7089	0	2,7745
6	25	1,2829	1,4415	0,1185	6,4966
7	31	0,8165	0,7332	0	2,9793
8	31	1,0421	0,7272	0,0423	2,9132
9	31	0,8637	0,5883	0,0708	2,5762
10	31	0,8598	0,3848	0,4264	2,0772

\* Economic News (EN) is the date that the announcement

**Tabel A.5. Descriptive statistic : Statistik Deskriptif of Trade Activity for SI\***  
Trade activity by 30 minute interval for whole sample in 1995-2003

Interval	N	Mean	Std Dev	Minimum	Maximum
<b>Panel A: Volatilitas Return</b>					
1	34	0,0144	0,0618	$1,6 \times 10^{-5}$	0,3362
2	34	0,0202	0,1154	$2,4 \times 10^{-5}$	0,6733
3	34	0,0003	0,0007	$1,9 \times 10^{-5}$	0,0039
4	34	0,0005	0,0020	$6,8 \times 10^{-6}$	0,0110
5	32	0,0002	0,0003	$1,1 \times 10^{-5}$	0,0011
6	32	0,0004	0,0011	$2,6 \times 10^{-6}$	0,0050
7	34	0,0006	0,0018	$5,3 \times 10^{-6}$	0,0095
8	34	0,0002	0,0005	$5,3 \times 10^{-6}$	0,0030
9	34	0,0005	0,0016	$2,1 \times 10^{-5}$	0,0091
10	34	0,0007	0,0014	$4,6 \times 10^{-5}$	0,0071
<b>Panel B: Volatilitas Harga</b>					
1	34	0,8283	0,6130	0,0241	2,1160
2	34	0,7470	0,5857	0,0733	2,3440
3	34	0,8939	0,6913	0,0933	2,6075
4	34	0,8675	0,9395	0,1575	4,6921
5	32	0,8128	0,5601	0,1123	2,4278
6	32	0,8136	0,8735	0,1403	4,8670
7	34	0,8528	0,7470	0,1691	4,0672
8	34	1,0589	1,4831	0,1945	8,4230
9	34	0,8705	0,6879	0,1483	3,3144
10	34	0,8262	0,4777	0,2164	2,1608
<b>Panel C: Volume Perdagangan (AdjTRD)</b>					
1	34	0,8502	0,5078	0,0585	1,9816
2	34	0,7935	0,4888	0,2617	2,1367
3	34	0,9384	0,5547	0,1859	2,3995
4	34	0,9103	0,6121	0,3417	3,4810
5	32	0,9469	0,6441	0,2871	3,3188
6	32	0,7848	0,3963	0,3050	2,2437
7	34	0,8953	0,5270	0,2488	2,4678
8	34	0,8825	0,5840	0,2829	3,3794
9	34	0,8677	0,4060	0,3151	1,9298
10	34	0,8594	0,3129	0,3986	1,6350
<b>Panel D: Frekuensi Perdagangan (AdjFREQ)</b>					
1	34	0,8853	0,6139	0	3,5405
2	34	0,7259	0,4442	0	1,6213
3	34	0,6729	0,5412	0	2,2310
4	34	0,8435	0,6453	0	2,8929
5	32	0,8738	0,8647	0	2,7584
6	32	0,8142	1,0172	0	5,4031
7	34	0,8688	0,7013	0	3,1231
8	34	0,7557	0,5408	0	2,1047
9	34	0,9337	0,7070	0,0158	2,7550
10	34	0,8088	0,4303	0,2468	2,0729

\* Specific Information (SI) is the date of Firm Specific Information announcement.