The Aspect of Market Microstructure on Indonesia Stock Exchange (IDX)



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Introduction

There are still in debates in market microstructure, especially in Indonesia Stock Exchange (IDX): 1. Which type of information influences most the trading activities in financial market, firm specific information or economic news. Who drive the stock price movement 2. around information announcement, foreign or domestic investor.

Issues of the Research

 Which type of the information announcement affects trading activity?
 stock behavior.

Who is more well informed between foreign and domestic investor around the information announcement? *Investor behavior* and *asymmetric information in international capital market.*

Research Questions

 Is there any different effect of firm specific information and economic news on trading activity in Indonesia Stock Exchange?

 Is there any asymmetric information between foreign and domestic investor around firm specific information and economic news announcement in Indonesia Stock Exchange?



Purposes

- 1. To analyze the different between firm specific information and economic news on trading activity in Indonesia Stock Exchange.
- 2. To analyze asymmetric information phenomena between foreign and domestic investor in Indonesia Stock Exchange.





Theoretical Review

- Asymmetric Information (Arkelof, 1970)
- Uncertainty Information Hypothesis (Brown, 1988)
- Privat vs Public Hypothesis(French & Roll, 1986)
- Marketwide vs Firm Specific Information Hypothesis (Bessembider, et al., 1996)
- Asymmetric Information in International Financial Asset (Dvorak, 2004).

The Effect of Information

- Base of Theoretical:
 Related to the higher volume (Kyle, 1985).
- Increasing in return variability as market response to the incompletely information (Brown, 1988).
 Volatility is a measure of information flow (Ross, 1989).

The Effect of Information (Cont.)

Base on Empirical Review:

- Morse & Ushman (1983) changing in bid/ask spread.
- Fama, et al. (1969), Patell & Wolfson (1983), Hanafi & Ghon Rhee (2002), Hanafi (2002a)
 Stock price.
- Michell & Mulherin (1994), Berry & Howe (1994) — Trade volume.
- Smith, et al. (1997) volatility and trade volume.
- Chan, et.al. (2001) return volatility, price, and trade volume.

The Effect of Information Signal

Hanafi & Ghon Rhee (2002): negative relation between positive signal with cumulative abnormal return, Christie-David, et.al. (2003): negative shock more significant effect on trading activity. Chan (2002): Investor is less react to negative signal.

Asymmetric Information between Foreign and Domestic Investor

There is different behavior between foreign and domestic investor (Kang & Stulz, 1997); Dahlquist & Robertson (2001); Grinblatt & Keloharju (2000); Eckbo & Thorburn (2000). Hanafi & Ghon Rhee (2002), Hanafi (2002a), dan Dvorak (2004) find evidence that domestic investor is well informed than foreign investor in IDX. Different result come from Bonser-Neal, et al. (1999).

Hypothesis

- H1a: Economic news has more significant effect on trading activity than specific information announcement.
- H1b: Positive signal has more significant effect ont rading activity than negative signal.

Hypothesis (Cont.)

H2a: Economic news has more significant effect on foreign trading activity than specific information announcement.
 H2b: Specific information

announcement has more significant effect on domestic trading activity than economic news.

Hypothesis (Cont.)

 H2c: Informed trader of foreign investor is higher than domestic investor when economic news announced.

 H2d: Informed trader of domestic investor is higher than foreign investor when firm specific information announced.



Research Model



Picture 2. Market microstructure Model during Economic News and Firm Specific Information.

Research Model (Cont.)

Probability of Informed Investor Model:



Picture 2. Tree Diagram of Trade Process.



Research Method

 Using intraday transaction and Order Data from 23 May 1995-13 August 1997 and 21 July 2001 – 31 December 2003.

Using LQ45 Sample stocks that announce the firm specific information.

 4 sample period: event, pre and post event, and non-event period.
 Using 30 minute trading activity.

Information

 Firm Specific Information and Economic News were taken from Bloomberg News Service in the rest of research period.
 Each information are split by two signals, positive and negative (from

significant average abnormal return).

Information (Cont.)

To see the effect of type information there are some restrictions: 1. One day only one information 2. Information was announced at opening session. 3. Every information has 2 days duration.



Trading Activity Measurements

Stock Return (as Chan et.al., 2001) measured by:

$$Rst = ln (Pst / P(s-1)t)$$

Stock Return Volatility for each signal measured by:

RVst = [ln(Pst) - ln(Ps-1,t)]2

Price Volatility

Price Coefficient of variation for each stock and each signal measured by:



Adjusted CVPst measured by:



Trade Volume

Trade volume measured by sum of volume stocks (TRDst) and sum of trade/frequency (FREQst) for each session and each signal.
 Then calculate the value of Adjusted TRDst dan FREQst for each stock by:



Trade Volume (Cont.)





Then, calculate average *cross-sectional* from AdjTRDst and Adj FREQst to face the effect of type information.



Type Information and Trading Activity

Using Analysis of Variance to show the relation between type of information and trading activity.



Inform : type of information

1umbai, 18;16 December 2010 : residual

Type Information and Trading Activity (Cont.)

Analysis of Variance to show the relation between signal and trading activity is measured by:



- : block with 2 level: economic news and firm specific information
 - : factor with 2 level: positive and negative
 - : observation: 1, 2, ..., n
 - : average of all sample
 - : type of information
 - : type of signal
 - : residual

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Inform

Signal

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μ...

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Type Information and Trading Activity (Cont.)

To test hypothesis 1a and 1b used <u>test of equality</u> for two mean with tstatistic which:

H1a: $\mu_{economic} > \mu_{specific}$ H1b: $\mu_{(+)} > \mu_{(-)}$





Foreign vs Domestic Investor

There is asymmetric information if some group of investor well informed than the others when information was announced. It will be different in trading activity between them.

Trading Activity

The trading activity measurement is same with the last section.

Analysis of variance to show the relation of type information and trading activity for each type of investor was measured by:



Informed Trader Measurement

The assumptions:

- Informed Trader will Sell (Buy) when there is negative (positive) signal of information.
- Uninformed trader will Sell (Buy) in same probability as well as positive or negative signal.

Informed Trader Measurement (Cont.)

To test hypothesis 2a and 2b used equality test for two mean with tstatistic by:

H2a: $\mu_{economic} > \mu_{specific}$ H2b: $\mu_{specific} > \mu_{economic}$



Informed Trader Measurement (Cont.)

 Using <u>Poisson distribution</u> to estimate the parameter θ(=μ and ε) of buy (B) and sell (S) order from each type of investor for positive signal as:



Informed Trader Measurement (Cont.)

 Using <u>Poisson distribution</u> to estimate the parameter θ(=μ and ε) of buy (B) and sell (S) order from each type of investor for negative signal as:





Trade Mechanism of IDX

- System order driven market with continuous auction.
- Order with *limit order*.
- Matching base on price priority and time priority.
- Opening Session I: 09.30 –12.00
 WIB, except Friday.
- Opening Session II: 13.30 16.00 WIB, except Friday.



Intraday Trade Activity Pattern

 Average <u>volatility return</u> in event period and non-event period show the U-shape pattern. This phenomena has happen in any sample period of the sample.



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Activity Pattern (Cont.)

Average price volatility in the event and non-event period show the W-shape pattern. It's happen in the other sample periods.



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Activity Pattern (cont.)

 Average <u>trade volume</u> in the event period show the W-shape pattern. It's happen in the other sample periods.



Activity Pattern (cont.)

 Average trading frequency in non and event period show the W-shape pattern. It happens in the other sample period.



Statistic Descriptive

Average Trading Activity by 30 minute interval



Result

V. Dependent	Average Estimation				
Туре		(t-statistic)			
Information	Retvar	AdjCV	AdjTRD	AdjFREQ	
$EN~(\mu_{Economic})$	0,0004	0,9562	1,0252	0,9285	
	(0,06)	(33,59)***	(50,16)***	(39,67)***	
SI (μ_{Specific})	0,0018	0,8878	0,9108	0,8682	
	(3,12)***	(32,49)***	(46,43)***	(38,65)***	
F-Value	5,06***	1091,85***	2335,64***	1533,78***	
MSE	0,0003	0,7279	0,3752	0,4920	
\mathbb{R}^2	0,0016	0,0016	0,0086	0,0018	
Equality test: ^a					
$\mu_{\rm Economic} > \mu_{\rm Specific}$	- 1,6937	1,7334**	4,0381***	1,8588**	
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***, **, * significant at 0,01, 0,05, 0,1 level (two tail).

^a Degree of freedom = 1871; t critical table for alfa 1%, 5%, and 10% are 2,328, 1,646, and 1,282 with one tail.

- Return volatility in the rest of the sample period not support hypothesis 1a.
- Price volatility, volume and trade frequency has positive sign at the 5% and 1% level.
- 3 of four trade activity measurements are support hypothesis 1a.



V. Dependent	Average Estimation			
Type		(t-sta	atistic)	
Information	Retvar	AdjCV	AdjTRD	AdjFREQ
Positive Signal	0,0014	0,8782	0,9760	0,8260
$(\mu_{(+)})$	(1.14)	(33,76)***	(52,01)***	(38,83)***
Negative Signal	0,0007	0,9775	0,9516	0,9927
$(\mu_{(-)})$	(2,56)***	(32,41)***	(43,73)***	(40,25)***
F-Value	3,92**	1095,33***	2308,62***	1563,73***
MSE	0,0003	0,7266	0,3783	0,4861
\mathbf{R}^2	0,0004	0,0033	0,0004	0,0138
Equality Test: ^a				
$\mu_{(+)} > \mu_{(-)}$	6,9136***	-2,4950	0,4969	-5,1292
***, **, * Significant at 0,01, 0,05, 0,1 level (two tail).				

^a Degree of freedom = 1871; t critical table for 1%, 5%, dan 10% level are 2,328, 1,646, and 1,282 with one tail.

- Average Trading activity in return volatility and trade frequency when economic news is higher than firm specific information was announced, but only return volatility is significant.
- There are negative sign on price volatility and trade volume, this results are not support hypothesis 1b.
 The result is weak to support hypothesis 1b.



V. Dependent	Average Estimation			
Туре	(t-statistic)			
Information	Retvar	AdjCV	AdjTRD	AdjFREQ
EN ($\mu_{Economic}$)	0,0003	0,9933	1,1765	1,1331
	(2,13)**	(27,71)***	(34,53)***	(31,78)***
SI (μ_{Specific})	0,0004	0,9378	0,9117	0,8715
	(2,86)***	(27,59)***	(28,22)***	(25,77)***
F-Value	6,36***	764,51***	994,29***	837,04***
MSE	0,00001	0,9880	0,8926	0,9777
\mathbb{R}^2	0,0001	0,0008	0,0192	0,0172
Equality test: ^a				
$\mu_{\rm Economic} > \mu_{\rm Specific}$	-0,6369	1,1235	5,6340***	5,3279***
***, **, * significant at 0,01, 0,05, 0,1 level (two tail).				
^a Degree of freedom = 1622; t critical table for 1%, 5%, and 10% levels are				

2,329, 1,646, and 1,282 with one tail.

- Return Volatility is negative. It means that hypothesis 2a is not supported by this measurement.
- Price volatility, volume and trade frequency are positive and two of three measurements are significant at 1% level. So, hypothesis 2a is supported by these two mesurements.



V. Dependent	Average Estimation			
Туре	(t-statistic)			
Information	Retvar	AdjCV	AdjTRD	AdjFREQ
EN ($\mu_{Economic}$)	0,0004	0,9189	1,0579	1,0149
	(2,57)***	(32,74)***	(45,02)***	(47,59)***
$SI(\mu_{Specific})$	0,0006	0,8688	0,9036	0,9032
	(3,76)***	(32,37)***	(40,21)***	(44,31)***
F-Value	10,38***	1059,79***	1821,74***	2114,22***
MSE	0,00002	0,6917	0,4848	0,3988
\mathbb{R}^2	0,0003	0,0009	0,0121	0,0077
Equality Test: ^a				
$\mu_{\text{Specific}} > \mu_{\text{Economic}}$	0,9524	-1,2912	-4,7448	-3,7864
***, **, * significant at 0,01, 0,05, 0,1 level (two tail).				

^a Degree of freedom = 1836; t critical table for 1%, 5%, and 10% levels are 2,328, 1,646, and 1,282 with one tail.

Return volatility is positive but not significant.

 3 trading activity measurements are negative. So, average domestic trading activity not influence by firm specific information. So, hypothesis 2b is not supported.



Table percentation of Informed Trader When Economic NewsHas Positive Signal for Each Type of Investor

Parameter	Estimation	Standard	t-statistic	Pr > t
		Error		
Panel A: Foreign				
μ	0,5284	0.0060	87,5740***	0,0000
8	$-9,40 \times 10^{-7}$	$-7.09 \mathrm{x} 10^{-8}$	13,2647***	$-3,87 \times 10^{-37}$
Purpose Function: 3	52×10^{-14}			
Panel B: Domestic				
μ	0,1229	0,0084	14,6821***	$8,20 \times 10^{-45}$
ε ε	0,0317	0,0023	14,0832***	$1,24 \times 10^{-41}$
Purpose Function: 8	,88x10 ⁻⁸			
***, **, * significan	it at 0,01, 0,05, 0	,1 level.		

Table Percentation of Informed Trader When Economic NewsHas Negative Signal of each type of Investors

Parameter	Estimation	Standard	t-statistic	Pr > t
		Error		
Panel A: Foreign				
μ	0,1593	0,0672	2,3704**	0,0180
E	0,0504	0,0120	4,2049***	$2,94 \times 10^{-5}$
Puporse Function: 5,	31x10 ⁻⁸			
Panel B: Domestic				
μ	0,2069	0,5901	0,3507	0,7259
ε	0,0644	0,1652	0,3897	0,6968
Purpose Function: 3,	52×10^{-8}			
***, **, * significant	t at 0,01, 0,05, 0,	1 level.		

- The results of log least square estimation with non-linier programming are:
- 1. Information with Positive Signal:

 $\Delta ARIV_j = \log (\mu_{foreign}/\mu_{domestic}) = \log (0.5284/0.1229) = 0.6333$

2. Information with Negative Signal:

 $\Delta ARIV_{j} = log (\mu_{foreign}/\mu_{domestic}) = log (0,1593/0,2069) = -0,1136$





Table Percentation of Informed Trader When Firm Specific Information HasPositive Signal for Each Type of Investors

Parameter	Estimation	Standard	t-statistic	Pr > t
		Error		
Panel A: Foreign				
μ	0,4926	0.0247	19,9103***	$-1,19 \times 10^{-76}$
8	0,0001	$5,25 \times 10^{-6}$	19,3332***	$6,75 \times 10^{-73}$
Purpose Function:	$2,01 \times 10^{-10}$			
Panel B: Domesti	c			
μ	0,3843	0,0119	32,2723***	6,63x10-168
3	$1,21 \times 10^{-6}$	1,91x10 ⁻⁷	6,3433***	$13,11 \times 10^{-10}$
Purpose Function:	3.91×10^{-15}			

***, **, * significant at 0,01, 0,05, 0,1 level.

Table Percentation of Informed Trader When Firm Specific Information HasNegative Signal for Each Type of Investors

Parameter	Estimation	Standard	t-statistic	Pr > t	
		Error			
Panel A: Foreing					
μ	0,2206	0,3349	0,6587	0,5103	
8	0,0438	0,0802	0,5467	0,5848	
Purpose Function:	$8,05 \times 10^{-8}$				
Panel B: Domestic	C				
μ	0,4694	0,0690	6,7989***	$1,80 \times 10^{-11}$	
E	0,0471	0,0190	2,4851***	0,0131	
Purpose Function: 6,31x10 ⁻⁸					
***, **, * significant at 0,01, 0,0 level.5, 0,1.					

Results of log least square estimation with non-linier programming are:

1. Information has Positive Signal:

 $\Delta ARIV_j = \log (\mu_{foreign}/\mu_{domestic}) = \log (0,4926/0,3843) = 0,108$

2. Information has Negative Signal:

 $\Delta ARIV_{j} = \log (\mu_{foreign}/\mu_{domestic}) = \log (0,2206/0,4694) = -0,3280$



Conclusion

- Information has significant effect on trading activity in IDX.
- The effect of economic news on trading activity is higher than firm specific information.
- The effect of positive signal on trading activity is higher than negative signal, especially for economic news.
- Economic news is important information for foreign investor in dealing with trading activity.

Conclusion (Cont.)

- Trading activity of domestic investor is not affect by firm specific information.
- Negative signal is more significant effect on domestic trading activity.
- Informed trader of foreign investor is higher than domestic investor when there is economic news, especially positive signal.
- Informed trader of domestic investor is higher than foreign investor when there is firm specific information, especially negative signal.



Thank You.....



Trading Frequency Distribution



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Likelihood Function Derivative

X probability of event is:



 IF the average arrival of investor is λ, so λ is the average rate of arrival of informed and non informed trader.

 λ investor who taking buy order when information has negative signal and taking sell order when information has positive signal are 1/2ε.

 λ investor who taking buy order when information has negative signal and who taking sell order when information has positive signal are µ+1/2ε.

So, likelihood function of each order for buy
 (B) when information has negative signal is:



So, likelihood function of each order for sell
 (S) when information has negative signal is:



 Base on *joint probabiliy*, so the likelihood function for B buy and S sell that has negative signal is:



Base on joint probabiliy, so the likelihood function for B buy and S sell that has positive signal is:





Equality Test Formula

Equality Test with two mean is measured by:





Average Return Volatility of Pre & Post Event Period





Average Price Volatility Pattern for Pre & Post Event Period



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Average Trading Volume Pattern for Pre & Post Event Period



Pattern: Average Frequency pre & post event period



Trading Scheme





Summary of The Results

•	Information	EN > SI	(supported)
•	Information ———	- > +	(not supported)
•	Information	Foreign —	EN > SI (supported)
		Domestic —	 EN > SI (not supported)
	Information	Economic (+)-	— ITf > ITd (supported)
•		(-) Specific(+) — (-) -	 ITd > ITf (not supported) ITf > ITd (not supported) ITd > ITf (supported)

