

NOISE AS THE IMPACT OF TRADING MECHANISM AND PERIODIC CLEARING PROCEDURES: SUBSTANTIVE EVIDENCE FROM INDONESIA STOCK EXCHANGE

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ABSTRACT

Sumiyana (2007b) investigates that noises occurred in Indonesia Stock Exchange. Especially, Sumiyana's research concludes that noise over trading and nontrading period, along with overnight and lunch break nontrading session, and the first and second trading session, had occurred. However, Sumiyana's research does not identify who are responsible for the noise. This research used intraday data in Indonesia Stock Exchange. Samples of the data are the firms consecutively listed in LQ 45 indexes for the year of 2004-2006.

This research attempts to identify who are responsible for the noise. This research studies effects of trading mechanism and clearing mechanism on the stock return behaviour. Finally, this research is enabling to differentiate the effect of trading mechanism from the effect of clearing mechanism. This research concludes that periodic clearing procedure at the beginning of the trading period is noisy. Therefore, this research suggests that trading mechanism in Indonesia Stock Exchange is inefficient. This research also hopefully recommends shifting from the periodic to continuous trading mechanism.

Keywords: *Intraday data, trading mechanism, trading and nontrading periods, stock return behaviour, noise, negative autocorrelation, clearing mechanism, periodic clearing procedure.*

INTRODUCTION

Phenomena of trading mechanism, including the periodic clearing procedure, have been recognized for quite sometimes. Since the trading mechanism and periodic clearing procedure have significant impact on return behaviour or on stock price, the existence of noise could be considered as part of trading mechanism problem. Return behaviour would be nastiest because of noise occurrences. Previous empirical studies indicate that noise occurred within the context of negative autocorrelation values such as (1) negative autocorrelation between the return of trading period and its previous periods (Amihud & Mendelson, 1991; Huang, Liu &

Fu, 2000), and (2) negative correlation of daily return (Guner & Onder, 2002). It means that if the autocorrelation was negative, the noise condition cannot be avoided.

Periodic trading mechanism problems have been clarified to be not effectively anymore. It means that stock exchanges shift from periodic into non periodic trading mechanism. Paris Bourse Stock Exchange, for example, has shifted the periodic procedure into non periodic one which enables the trading proceeds continuously without any period pauses. In addition, it is still debatable that Milan Stock Exchange has finally changed it into non-periodic trading. Meanwhile, Jakarta Stock Exchange (JSX) or

now called as Indonesian Stock Exchange (IDX), the periodic trading mechanism is still in use (morning and afternoon periods). It can be inferred that the Indonesia Stock Exchange still does not consider the advantages of non-periodic trading system.

Sumiyana (2007b) conducted a research on periodic trading mechanism documents that high return volatility had caused noise occurrences. In particular, he suggests that *noise* at Indonesian Stock Exchange occurred during morning and afternoon trading periods. Therefore, if the management still reluctant to change it periodic trading systems, Indonesian Stock Exchange could not escape from the noise occurrences. Several similar studies investigate to periodic trading mechanism and conclude that this mechanism is not efficient (Amihud & Mendelson, 1991; Amihud, Mendelson & Murgia, 1990). Both studies conclude that trading mechanism including periodic clearing procedures cause noise.

Sumiyana (2007b) have limitations in his investigating noise occurrences. He had failed to identify the main causes of the noise occurrences. His research so far did not reveal the data and reasons why the noise occurs. He only assumed that the noise could be triggered by two indicators: periodic trading mechanism and transaction clearing procedure during each trading period or the combination of both. Furthermore, the noise was influenced by the combination of periodic trading mechanism and transaction clearing procedure. Because of those impacts, the noise would be more permanent and much higher. This level of noise, however, could be substantiated statistically.

If the noise is really influenced by firms' fundamental value, the stock price will automatically reverse to the previous price for the next period. By having so, the return level will positively auto-correlated to the others or the noise will not materialize for the next trading period (Amihud & Mendelson, 1991; Chelley & Steeley, 2001). Nevertheless, the

influence is caused by the trading mechanism, the noise will occur in a longer period or in a permanent circumstance. It can be interpreted that noise will occur permanently whether both trading mechanism and periodic clearing procedures are still applied in this stock exchange. Sumiyana (2007b) concludes irrevocably that noise have occurred for long periods in the year of 1999-2006. Therefore, it could be inferred that noise would always take place whenever market still adopt periodic trading mechanism and periodic clearing transaction systems.

This research investigates stock return volatilities reflected by noise occurrences by using intraday data from the IDX. Noise would be investigated by the existence of price reversion indicated by negative autocorrelations or negative partial-adjustment coefficients. Subsequently, this study searches main factors caused noise occurrences. This searching process were conducted by differentiate between noise caused by trading mechanism and noise caused by periodic clearing procedure. Although, this study will possibly conclude that noise initiated by combination of both main factors.

Research Purposes

High stock return volatilities in IDX were used as research subjects by investigating specifically to noise occurrences. Meanwhile, IDX uses trading mechanism that are two trading periods, morning trading session and afternoon trading session. Noise would be differed to its main factor that contributes directly to its noises' magnitudes. By using intraday data, this study investigates stock return volatility reflected from noise occurrences at the IDX. Among the aims of the research are:

1. Investigating noise occurrences in which negative autocorrelation between stock return of trading period and its preceding period occur.

2. Identifying main factor that causes the noise occurrences within two categories; noise that caused either by trading mechanism or by periodic clearing transaction procedures.

Research Benefits

The research is worth for the investor and potential investors to analyze their asset-investment and to predict the feasibility of their assets. This study will also recommend traders to be more conservative in their trading at the IDX, because the IDX still adopts periodic trading mechanism. This study will gain information whether noise occurs or not. The second advantage of the research is to provide return information reliability related to investment decisions, particularly, the return during the trading period. Furthermore, this study also suggests that adopted trading mechanism in the IDX is not efficient systems. Therefore, this study offers an alternative option to the IDX to shift its periodic trading mechanism into non-periodic trading mechanism.

LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

Noise

Price and stock return do not only always represent the information from informed traders, but also represent information from noise traders. Noise traders set a price cumulatively to stock prices. However, stock prices will reverse to their fundamental values in the next time. The more stock prices vary from their fundamental values, there would be reversed to their fundamental values (Black, 1986). Several stock market anomalies such as stock return volatility and price mean's reversion in the stock market can be explained by noise traders' behaviours. To overcome this problem, the stock market usually used professional arbitrary. Professional arbitrary usually responds to noise trading that do not exist in informed trading. Nevertheless, it

needs a lot of human resources to check out and predict the asymmetric signals that commonly used by noise traders.

Noise traders may sometimes made untruthful forecast on their return variance distributions. By having such misinterpretation, they collectively accumulate higher return than the rational investors have. They can survive and dominate the stock market within long term asset together with its risk takers. Noise-based trading strategy is potential for initiating instability in the stock prices and it pushes the prices much higher than their fundamental prices if the noise traders make a herd. Nevertheless, the price will be stable if informed traders are strong enough to prevent stock prices increase swiftly from their fundamental values. The studies on herd indicated that the group often considers the stabilizing price as permanent price. Therefore, the herd fosters price stability and protects the stock price from instability situation (Harsono, 2003).

Chelley & Steeley (2001) investigates noise occurrences by arguing that opening return possesses higher volatility and it negatively correlates with closing return. The clauses are caused by overreaction behaviour and the noise, so that opening return behaviours are different from closing return behaviours. It means that the opening price errors can be corrected directly at the next trading period. If there is noise, the increased stock price at a certain trading period will be followed by price reversion at non-trading period and so does vice versa. The differences between the noise and information arrivals were detected through a different correlation value of current trading period and previous trading periods (Amihud & Mendelson, 1991; Sumiyana, 2007a). The negative autocorrelation does indicate the occurrence of noise, while zero autocorrelation or positive autocorrelation signifies the information arrivals related to opening stock price volatilities.

Sumiyana (2007b) has found substantive proof of the noise occurrence patterns or the prototype of the information arrival at the Indonesian Stock Exchange. He states that the first patterns are the noise occurs within the interval of one, two, and three previous periods either at trading or non-trading session. There is no noise occurrence at the lag of four previous periods before. The second model is that the noise occurrence is resembled to one interval of previous periods. The third one is that the information arrival or the absence of noise is valued as the same pattern with four previous periods or it has the one day lags.

Trading Mechanism

Trading mechanism vary from one country to another. NYSE (New York Stock Exchange), for example, the government used non-period trading mechanism. This trading runs without afternoon non-trading pauses. Meanwhile, Indonesia Stock Exchange (IDX) uses different trading mechanism; the opening and closing were determined by periodic continuity of two times a day. It implies that there are two opening prices and two closing prices at each period.

The following figure shows the differences between Indonesia stock exchange and other countries stock exchange.

Trading period is not the same for each day. Figure 2 below illustrates some trading periods including morning session, afternoon session, second session, non-trading period, afternoon break session, overnight break session, return value, closing price, etc.

Noise in the Trading Mechanism

Trading mechanism is able to influence stock price volatilities. Such mechanism affects dominant differences between close-to-close return variances in comparison with open-to-open return variances. There are four return variances used to analyze return volatilities of one day trading period; the return of opening price and closing price of trading period (O₁ and C₁) and the return at the afternoon trading period (O₂ and C₂). The variance ratio was used to analyze information arrival dissemination in which the highest return variance occur as it is connected to the noise of one day and to the previous day (Guner & Onder, 2002).

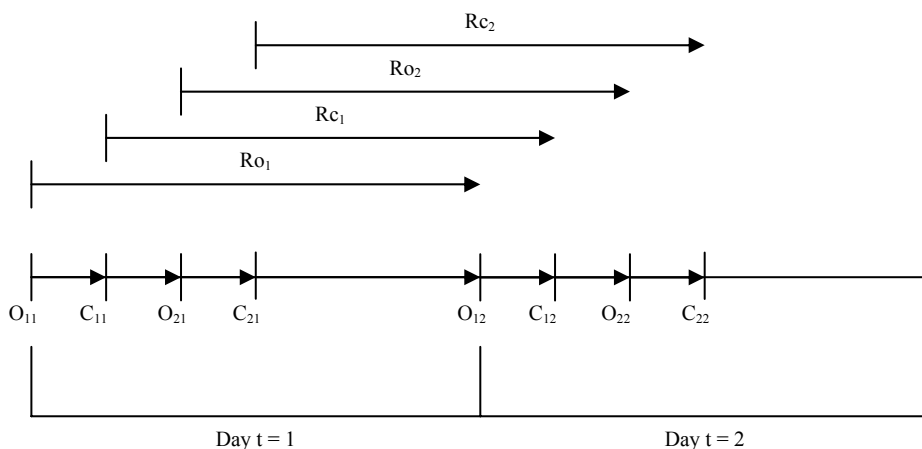
	1 st Session				2 nd Session					
Indonesia		←	CA	→		←	CA	→		
Hongkong		←	CA	→		←	CA	→		
Singapore		←	CA	→		←	CA	→		
Turkey		←	CA	→		←	CA	→		
Korea	CM	←	CA	→		CM	←	CA	→	CM
Malaysia		←	CM	→		←	CM	→		
Taiwan		←	CM					→		
Thailand	CM	←	CA	→		CM	←	CA	→	
Tokyo	CM	←	CA	→		CM	←	CA	→	
New York	CM	←	CA					→		

Remarks:

CM: Call Market Method; CA: Continuous Auction Method

Source: Amihud & Mendelson (1991), Chang, Hsu, Huang, & Rhe (1999), and Guner & Onder (2002)

Figure 1. Comparison of Trading Mechanism



Remarks:

O_1 Opening 1st session, at 09.30

C_1 Closing 1st session, at 12.00 on Monday-Thursday and at 11.30 on Friday

O_2 Opening 2nd session, at 13.30 on Monday-Thursday and at 14.00 on Friday

C_2 Closing 2nd session, at 16.00

R_{ijt} $\ln(P_{ij,t}/P_{ij,t-1})$ is return of transaction ij ($i=o$ for opening, c for closing; $j=1$ for 1st session, 2 for 2nd) from day $(t-1)$ to t .

Source: Amihud & Mendelson (1991), Chang, Hsu, Huang & Rhe (1999), and Guner & Onder (2002)

Figure 2. Transaction Period at BEI

Amihud & Mendelson (1987a), Stoll & Whaley (1990), and Sumiyana (2007a) find the phenomena that return variance at the open-to-open period is higher than close-to-close period. Amihud & Mendelson (1987a) explain that such price patterns were caused by different trading mechanism which adopted by stock exchange in determining the prices. Amihud & Mendelson (1987a) and Stoll & Whaley (1990) suggest the hypothesis of trading mechanism by comparing return variance of open-to-open and return variance of close-to-close of the stock that listed at NYSE, because the NYSE has adopted both trading mechanisms. The opening price was determined by call market mechanism, while closing price was identified through continually non periodic trading method. The results of their research empirically proved that return variance of open-to-open period are much higher than those of close-to-close period. The hypothesis of trading mechanism is supported.

Return variance are also employed to analyze stability of information arrivals or the noise for a particular day (Guner & Onder, 2002). If the information arrivals are able to generate return volatilities, the sum total of daily volatilities counted from opening price and closing price should be balance. Besides, the open-to-open return variance and close-to-close return variance can be acted as the tool for finding out the influence of trading mechanism (Amihud & Mendelson, 1987a). The differences of trading mechanism between opening and closing trading at Tokyo Stock Exchange (TSE) have caused different volatilities between open-to-open return and those of close-to-close return. Trading mechanism as well as closing clearing systems could not be analyzed because IDX uses continuous trading systems, that prices from the previous trading periods are used to determine the prices in the subsequent trading periods.

Lam & Tong (1999) states that the opening prices are more volatile than the

closing price because of monopoly power specialist and the absence of trading activities. Guner & Onder (2002) also explain that the open-to-open return variance at the ISE (Istanbul Stock Exchange) was higher than open-to-open return variance of the first and the second sessions. Since there are no differences of trading procedure at the first and afternoon break session, so the return volatilities is triggered by the absence of trading activities over previous non-trading period. Therefore, return variances could be used as tools to measure the tendency of noise occurrences (Amihud & Mendelson, 1991).

Regarding the increasing price of stock without any fundamental changes, noise hypothesis has already postulated that the price will be set back to the previous price for next periods or the return figure is positively correlated. The hypothesis on the information arrivals also had mentioned that the price differences caused by the new information arrivals do not make any set back price (Bery & Howe, 1994; French & Roll, 1986; Nofsinger, 2001; Frino & Hill, 2001; Suhaibani & Kryzanowski, 2000). Statistically, when the information arrivals only influence the stock price for one period, its autocorrelation will be zero. On the other hand, if the information arrival affects the stock within a longer period (more than one period), its autocorrelation will be positive. Based on the explanation above, the researcher draws hypotheses below.

- Ha₁: There would be negative autocorrelation (noise) between opening return of morning trading period and that of previous morning trading period.
- Ha₂: There would be negative autocorrelation (noise) between closing return of morning trading period and that of previous morning trading period.
- Ha₃: There would be negative autocorrelation (noise) between opening return of afternoon trading period and that of previous afternoon trading period.

- Ha₄: There would be negative autocorrelation (noise) between closing return of afternoon trading period and that of previous afternoon trading period.

The Influence of Trading Mechanism

Indonesia Stock Exchange has two session trading periods and two break-session periods: morning and afternoon session, afternoon-break and overnight-break sessions. Those various sessions influence the stock return behaviours which are signified by trading mechanism during long-overnight break and short-afternoon break. These performances are also affected by transaction procedure of periodic clearing system at two sessions (Amihud & Mendelson, 1987a, 1987b, 1991; Stoll & Whaley, 1990; Gunner & Onder, 2002; Chelley & Steeley, 2001).

The clearing time of transaction may influence the stock return behaviour. The reasons can be explained that in a continuous trading, the price adjustment that is usually made by the brokers can be used for observing the future transaction together with its stock price changing (Amihud & Mendelson, 1991; Chelley & Steeley, 2001). In other side, information of opening stock price is provided at the beginning trading period only (single-shot) without a continuous observation on the following transactions that show uninterrupted stock value changing (Amihud & Mendelson, 1991; Chelley & Steeley, 2001).

Some stock traders do not have sufficient ability to observe continuously the price changing. As the consequences, noise occurrences at the beginning of the trading session cannot be avoided. Such noise does values inefficiently stock prices that do not reflect information arrival. Trading mechanism and the inability stock brokers to observe stock price continuously have measured differently the opening and closing returns variances as a reflection of stock price valuation. Consequently, return behaviours would tend to be volatile and so does the return variance.

Stock return volatilities at the opening and closing prices are useful to investigate efficient pricing process finding out the balance of demand and supply stock. In addition, partial-adjustment coefficients between opening return or closing return at a particular day and that of preceding trading day; to investigate return behaviours may also use residual return. Variance and autocorrelation returns can also be used to estimate efficient return behaviour in transaction clearing procedure (Amihud & Mendelson, 1991; Chelley & Steeley, 2001). This reasoning is that returns residual variance and autocorrelation are used to describe the inter-dependency among periods which are not reflected into fundamental stock values.

To calculate the return variance and return residual autocorrelation, this study uses ordinary linear regression to associate firm individual return and market return. The regression test was done specifically to each trading mechanism i in session j . The regression equation was $R_{ijt} = \alpha_{ij} + \beta_{ij}RM_{ijt} + e_{ijt}$, in which RM_{ijt} is average market return for all companies listed on the stock exchange in the trading period of i , session of j , and the day of t . Moreover, having the amount of return variance, this study initiates correlation test among residual return variances. The residual returns inter-dependency between one period and the other periods indicated the efficient level of periodic transaction clearing procedure (Amihud & Mendelson, 1991; Chelley & Steeley, 2001).

The efficiency was measured from the return residual inter-dependency among the trading periods that have been conducted periodically. The analysis was administered through return residual autocorrelation among the trading periods. Low efficiency is indicated by negative autocorrelation between return residual of a certain trading period with its preceding periods. It can be concluded that there has been noise (negative autocorrelation) among trading periods (Amihud &

Mendelson, 1991; Chelley & Steeley, 2001). High efficiency, on the other hand, is indicated by positive autocorrelation between return residual of the trading period and those of preceding (Amihud & Mendelson, 1991; Chelley & Steeley, 2001). In other words, there is no dependent condition among returns residual or there has been conditional interdependence of return residual.

To differentiate the lower or the higher efficiency, this study theorizes some hypotheses as follows.

- Ha₅: There would be negative autocorrelation (noise) between residual returns of opening period in the morning session and those of previous opening periods.
- Ha₆: There would be negative autocorrelation (noise) between residual returns of closing period in the morning session and those of previous closing periods.
- Ha₇: There would be negative autocorrelation (noise) between residual returns of opening period in the afternoon session and those of previous opening periods.
- Ha₈: There would be negative autocorrelation (noise) between residual returns of closing period in the afternoon session and those of previous closing periods.

RESEARCH METHOD

Data and Sample

This study investigates noise using individual securities. This study selects its samples based on criteria that are actively traded. This selection was established on the fact that the Indonesia Stock Exchange is still categorised into thin market. Factually, there are many stocks that are not actively traded, either during the morning session or afternoon session (Hartono, 2001; 2005; Hartono, 2004). The sample, therefore, were only those firms that listed on the LQ 45 indexes during 2004-2006. LQ 45 index was chosen purposively because it comprises of high liquidity and

actively traded stock over the morning and afternoon sessions.

Based on the criteria above, there were only 25 individual stocks that fulfilled the research prerequisites. Here are the detail; AALI (Astra Agro Lestari, Tbk), ANTM (Aneka Tambang), ASII (Astra), BBCA (Bank Central Asia), BDMN (Bank Danamon), BNII (Bank BNI), BRPT (Barito Pasific Pulp & Timber), BUMI (Bumi Resources), GGRM (Gudang Garam), GJTL (Gajah Tunggal), INCO (International Nickel), INKP (Indah Kiat Pulp), INTP (Indocement), KIJA (Kawasan Industri Jababeka), KLBF (Kalbe Farma), PNB (Bank Pan), PTBA (Tambang Batubara), RALS (Ramayana Lestari), SMCB (Semen Cibinong), SMRA (Summarecon Agung), TKIM (Tjiwi Kimia), TLKM (Telkom Indonesia), UNTV (United Tractor), dan UNVR (Unilever).

The data used in the research could be classified into secondary data, because they were taken from intraday data of stock price at the opening and closing periods during the first (morning) and the second (afternoon) sessions. The data were collected by using documentation techniques in which the researcher collects the written evidence from various sources, copies the document, and observes stock figures. Intraday data were collected from Indonesia Stock Exchange (IDX) and from the library of doctorate program, Faculty of Economics and Business, Universitas Gadjah Mada.

Operational Definitions

Opening and Closing at every session

What this study means by opening and closing prices are the first and the latest prices at the morning and afternoon sessions which are identified from its first or latest transaction. If there is more than one transaction at the same time, for the opening price, the smallest transaction number will be considered as the first transaction. In other side, for the closing price, the biggest

transaction number will be considered as the latest transaction. Therefore, in this research, there are four types of prices at each day: opening price of the first session (P_{O1}), closing price of the first session (P_{C1}), opening price of afternoon session (P_{O2}) and closing price of afternoon session (P_{C2}).

Return

Return is determined by natural logarithm of relative price $R_t = \ln(P_t/P_{t-1})$. To calculate opening and closing return at a certain trading day, the period is divided into four categories: two opening return (R_{O1} dan R_{O2}) and two closing return (R_{C1} dan R_{C2}), so for the daily equation the researcher uses;

Return of Opening Price at the first session:

$$R_{O1,t} = \ln(P_{O1,t}/P_{O1,t-1})$$

Return of Closing Price at the first session:

$$R_{C1,t} = \ln(P_{C1,t}/P_{C1,t-1})$$

Return of Opening Price at the second session:

$$R_{O2,t} = \ln(P_{O2,t}/P_{O2,t-1})$$

Return of Closing Price at the second session:

$$R_{C2,t} = \ln(P_{C2,t}/P_{C2,t-1})$$

Residual Return

The calculation of return residual is made by applying regression equation $R_{ijt} = \alpha_{ij} + \beta_{ij}RM_{ijt} + e_{ijt}$, where RM_{ijt} is the average market return of all companies during the trading period of i session of j , and on day of t . The estimated results of the return residual then were used for calculating residual return variance.

Data Analysis Procedure

The data were analyzed by using the following procedures;

1. Constructing four return series from intraday databases, they are return of opening price of the first session, return of closing price of the first session, return of opening price of afternoon session, and return of closing price of afternoon session.

2. Deleting transaction days around earning and dividend announcements to avoid extreme price fluctuation (t_{-3} and t_{+3}), and make some adjustments on stock dividend, stock split, bonus share, as well as on the stock reserve split when it occurs.
3. Examining return autocorrelation in order to get indication of noise occurrences by testing;
 - a. Between opening return of a certain trading period and opening return of previous day, and
 - b. Between closing return of a certain trading period and closing return of previous day.
4. Conducting regression test by using the regression equation above in order to estimate residual return of each opening and closing returns.
5. Examining partial-adjustment of return residual to find out the existence of the noise occurrences by;
 - a. Testing opening return residual and its preceding period.
 - b. Testing closing return residual and its preceding period.

RESULTS AND DISCUSSION

Descriptive Statistics

From 45 firms registered at the Indonesia Stock exchange during 2004-2006, there are only 25 individual securities that are eligible for the experiment with 17,428 observations (multiplication of types of return period, trading sessions, trading day in one year, number of year, and number of sample). First of all, descriptive statistic shows the opening and closing returns at a daily trading consisted of four categories; opening return of the second session (RO_1), closing return of the second session (RC_1), opening return of fourth session (RO_2), and closing return of the fourth session (RC_2). Detailed descriptive statistics presented on table 1 below.

It could be implied from table 1 that there were 700 days of observation given to each individual stock, mean return of opening price on morning session and its closing price, opening price of afternoon session and its closing price as well. It is noticed on this table that the opening mean return of AALI on morning session (RO_1) was 0.002914, RC_1 was 0.002759, RO_2 was 0.002788, and RC_2 was 0.002798. It means that its standard deviation, maximum and minimum price were not extremely varied one and another. The scores were relatively equal. The standard deviation of the AALI opening return was 0.032074 for morning session and 0.035719 for its closing return; its afternoon session indicated the figure of 0.113365 for opening and 0.024154 for closing session. The maximum returns of each session respectively were 0.388658, 0.646287, 1.504077, and 0.170626. Their minimum returns for every session were given in succession -0.405465, -0.462160, -1.504077, and -0.074108.

Return residual results were identified from four main trading periods: morning and afternoon, opening and closing periods. By using the regression equation, this study constructs the residual return for opening price of the second session (RRO_1) and its closing price (RRC_1), residual return for opening price of the fourth session (RRO_2) and its closing price (RRC_2). The detail statistics figures were illustrated in Table 2.

It can be inferred from table 2 that descriptive statistics show residual return has the same indication to those of return --- mean residual return of morning opening session and its closing session, residual return of afternoon opening session and its closing session. From the table, it is observed, for example, the ANTM companies achieved mean return (RRO_1) at the figure of $0.138889(x10^{-6})$, RRC_1 at $0.013889(x10^{-6})$, RRO_2 at $0.097222(x10^{-6})$, and RRC_2 at $0.011111(x10^{-6})$.

Table 1. Descriptive Statistic of Return During the Opening and Closing of Trading Periods

PANEL A : Morning session of the trading period									
Emiten	n	RO ₁				RC ₁			
		Mean	Std. Dev.	Max	Min	Mean	Std. Dev.	Max	Min
AALI	705	0,002914	0,032074	0,388658	-0,405465	0,002759	0,035719	0,446287	-0,462160
ANTM	720	0,001923	0,029803	0,139420	-0,188591	0,001918	0,030322	0,146982	-0,128254
ASII	720	0,001589	0,023635	0,089345	-0,111791	0,001446	0,022825	0,091901	-0,066062
BBCA	714	0,000625	0,032836	0,110001	-0,693147	0,000665	0,031889	0,095310	-0,664574
BDMN	700	0,001684	0,024071	0,091808	-0,086178	0,001613	0,026022	0,110542	-0,128254
BNIH	710	0,000930	0,025862	0,148420	-0,084557	0,000830	0,034094	0,464306	-0,435318
BRPT	644	0,001573	0,050744	0,364338	-0,227784	0,001295	0,050843	0,460525	-0,187599
BUMI	698	0,000731	0,061523	1,011601	-1,011601	0,000847	0,064675	1,056053	-1,098612
GGRM	706	-0,000357	0,019292	0,102985	-0,080043	-0,000270	0,020038	0,140524	-0,099613
GJTL	703	0,000356	0,032496	0,167054	-0,204794	0,000362	0,036964	0,336472	-0,266268
INCO	687	0,001609	0,032646	0,233377	-0,273293	0,001504	0,031532	0,144434	-0,140582
INDF	716	0,000777	0,026609	0,103378	-0,119959	0,000719	0,026130	0,096850	-0,115832
INKP	714	0,000928	0,032240	0,154151	-0,182322	0,000676	0,036346	0,300105	-0,336472
INTP	706	0,001466	0,030214	0,223144	-0,191055	0,001475	0,029874	0,139762	-0,157004
KIJA	693	0,001619	0,046665	0,262364	-0,213574	0,001697	0,050354	0,356675	-0,223144
KLBF	712	0,001116	0,025241	0,165985	-0,130053	0,001076	0,025189	0,105361	-0,094029
PNBN	713	0,000833	0,025906	0,085522	-0,119189	0,000882	0,027278	0,140582	-0,109815
PTBA	708	0,001866	0,027314	0,123614	-0,185142	0,001977	0,037295	0,477786	-0,470004
RALS	624	0,000499	0,021732	0,085942	-0,087011	0,000796	0,023777	0,143101	-0,156004
SMCB	716	0,000671	0,030139	0,195309	-0,195309	0,000697	0,027818	0,135802	-0,175204
SMRA	645	0,001786	0,033801	0,122103	-0,385180	0,001535	0,036393	0,215111	-0,385180
TKIM	646	0,001907	0,033949	0,184429	-0,196710	0,001757	0,033251	0,191055	-0,175565
TLKM	714	0,001409	0,020939	0,091291	-0,082806	0,001378	0,021789	0,076470	-0,082444
UNTR	720	0,002318	0,030050	0,139113	-0,313658	0,002246	0,028477	0,145712	-0,268264
UNVR	694	0,000909	0,020597	0,173569	-0,122602	0,000914	0,018585	0,088455	-0,078332

PANEL B : Afternoon Session of Trading Period									
Emiten	n	RO ₂				RC ₂			
		Mean	Std. Dev.	Max	Min	Mean	Std. Dev.	Max	Min
AALI	705	0,002788	0,113365	1,504077	-1,504077	0,002798	0,024154	0,170626	-0,074108
ANTM	720	0,001900	0,030883	0,117783	-0,149532	0,001840	0,031153	0,148420	-0,188591
ASII	720	0,001440	0,022733	0,086568	-0,083840	0,001434	0,023373	0,080761	-0,119959
BBCA	714	0,000659	0,032482	0,117783	-0,664574	0,000578	0,032020	0,079137	-0,678963
BDMN	700	0,001642	0,026319	0,117057	-0,123614	0,001341	0,024847	0,107631	-0,113329
BNIH	710	0,000752	0,026369	0,133531	-0,133531	0,000614	0,042012	0,559616	-0,559616
BRPT	644	0,001248	0,090256	0,832909	-0,810930	0,001679	0,077321	0,854415	-0,843720
BUMI	698	0,000791	0,038479	0,405465	-0,417735	0,000773	0,030088	0,213574	-0,191667
GGRM	706	-0,000288	0,022127	0,185224	-0,185224	-0,000335	0,019578	0,121186	-0,075508
GJTL	703	0,000060	0,063616	0,916291	-0,864997	-0,000043	0,041855	0,460525	-0,460525
INCO	687	0,001569	0,062474	1,043804	-0,934785	0,001496	0,029558	0,116140	-0,136904
INDF	716	0,000780	0,026049	0,104443	-0,111918	0,000610	0,026402	0,102415	-0,128617
INKP	714	0,000765	0,049160	0,432546	-0,409289	0,000520	0,030694	0,154151	-0,233615
INTP	706	0,001494	0,035818	0,357674	-0,357674	0,001339	0,028483	0,165792	-0,167793
KIJA	693	0,002152	0,057009	0,433636	-0,418710	0,001406	0,045976	0,262364	-0,213574
KLBF	712	0,001094	0,024949	0,087011	-0,112117	0,001073	0,026645	0,107889	-0,100083
PNBN	713	0,000883	0,029308	0,204794	-0,223144	0,000853	0,026095	0,085522	-0,105361
PTBA	708	0,001942	0,032965	0,371564	-0,342407	0,001935	0,031377	0,255933	-0,255933
RALS	624	0,000613	0,022712	0,111918	-0,094187	0,000438	0,023098	0,082238	-0,087011
SMCB	716	0,000671	0,034139	0,328504	-0,328504	0,000618	0,030653	0,213574	-0,213574
SMRA	645	0,001756	0,036748	0,262364	-0,364974	0,001807	0,033483	0,122602	-0,373204
TKIM	646	0,002094	0,055498	0,733969	-0,733969	0,001780	0,038089	0,251314	-0,231802
TLKM	714	0,001341	0,022822	0,141861	-0,149893	0,001281	0,021487	0,097980	-0,093932
UNTR	720	0,002222	0,031892	0,242562	-0,248461	0,002100	0,030870	0,165080	-0,313658
UNVR	694	0,000894	0,051469	0,749843	-0,749843	0,000850	0,019795	0,179048	-0,134312

Remarks: RO₁: Opening Return price from the 1st session to the opening price of preceding day
RC₁: Closing Return price from the 1st session to the closing price of preceding day
RO₂: Opening Return price from the 2nd session to the opening price of the preceding day
RC₂: Closing Return price from the 2nd session to the closing price of the preceding day

Tabel 2. Descriptive Statistic of Residual Return on Opening and Closing Sessions

PANEL A : Return Residual Morning Session of Trading Period									
Emiten	n	RRO ₁				RRC ₁			
		Mean (x10 ⁻⁶)	Std. Dev.	Max	Min	Mean (x10 ⁻⁶)	Std. Dev.	Max	Min
AALI	705	-0,070922	0,029458	0,373740	-0,391750	0,056738	0,033605	0,430350	-0,461520
ANTM	720	0,138889	0,023697	0,114300	-0,084190	0,013889	0,023809	0,137130	-0,106360
ASII	720	-0,083333	0,019043	0,079450	-0,068410	0,069638	0,017731	0,061100	-0,050990
BBCA	714	0,168067	0,030671	0,115480	-0,669970	0,070028	0,029655	0,084580	-0,653650
BDMN	700	-0,071429	0,018927	0,077150	-0,081000	0,000000	0,020422	0,107990	-0,100050
BNI	710	0,197183	0,022280	0,107850	-0,068690	0,225352	0,031141	0,441130	-0,415980
BRPT	644	-0,015528	0,042897	0,326160	-0,140580	0,015528	0,043456	0,405890	-0,164890
BUMI	698	0,114613	0,057242	0,944300	-0,955290	-0,085960	0,059456	0,952880	-1,025570
GGRM	706	-0,042493	0,017295	0,097380	-0,068030	0,099150	0,017862	0,129920	-0,100410
GJTL	703	0,028450	0,023034	0,090930	-0,078180	0,099573	0,030385	0,315770	-0,275400
INCO	687	0,043668	0,030454	0,229970	-0,281010	0,029112	0,027909	0,134690	-0,130040
INDF	716	0,069832	0,021070	0,105240	-0,081910	-0,041899	0,021709	0,091070	-0,116570
INKP	714	-0,056022	0,023614	0,115690	-0,103970	0,210084	0,030996	0,298200	-0,316860
INTP	706	-0,084986	0,024077	0,212520	-0,202410	-0,084986	0,023294	0,151570	-0,155050
KIJA	693	-0,086580	0,039491	0,223790	-0,168270	-0,202020	0,042337	0,330140	-0,209580
KLBF	712	-0,098315	0,019599	0,112010	-0,072440	0,056180	0,019958	0,097330	-0,095540
PNBN	713	0,168303	0,020220	0,076510	-0,080230	0,028050	0,021895	0,132350	-0,102430
PTBA	708	0,070621	0,022413	0,117380	-0,095550	0,042373	0,033477	0,450610	-0,460760
RALS	624	0,064103	0,019559	0,073610	-0,080230	0,016026	0,021364	0,137760	-0,155560
SMCB	716	0,125698	0,023573	0,182570	-0,190040	-0,041899	0,021348	0,123310	-0,112220
SMRA	645	-0,093023	0,028369	0,109940	-0,337450	0,186047	0,031230	0,220900	-0,333920
TKIM	646	-0,139319	0,026448	0,161200	-0,103520	-0,046440	0,025945	0,175220	-0,086950
TLKM	714	0,014006	0,016948	0,061450	-0,067510	0,140056	0,017182	0,060260	-0,052200
UNTR	720	0,000000	0,023780	0,115190	-0,267940	-0,111111	0,021732	0,087350	-0,230850
UNVR	694	0,115274	0,018897	0,157820	-0,120270	-0,014409	0,016605	0,079630	-0,071920

PANEL B : Return Residual Afternoon Session of Trading Period									
Emiten	n	RRO ₂				RRC ₂			
		Mean (x10 ⁻⁶)	Std. Dev.	Max	Min	Mean (x10 ⁻⁶)	Std. Dev.	Max	Min
AALI	705	0,014184	0,104284	1,328440	-1,332180	0,113475	0,021821	0,159950	-0,064280
ANTM	720	0,097222	0,025282	0,122910	-0,126390	0,111111	0,024669	0,121180	-0,093270
ASII	720	-0,153203	0,018524	0,074200	-0,070720	0,027778	0,018610	0,068510	-0,053280
BBCA	714	-0,196078	0,030959	0,113440	-0,670890	-0,070028	0,029744	0,078000	-0,660720
BDMN	700	0,014286	0,021028	0,112800	-0,114990	-0,114286	0,019194	0,086990	-0,076440
BNI	710	0,056338	0,022844	0,124900	-0,121210	-0,154930	0,039095	0,534010	-0,525160
BRPT	644	-0,046584	0,081486	0,715980	-0,746250	0,000000	0,069467	0,776300	-0,792620
BUMI	698	0,028653	0,035246	0,396100	-0,404570	-0,057307	0,025884	0,182960	-0,123940
GGRM	706	0,000000	0,020520	0,181420	-0,183910	0,042493	0,017576	0,111160	-0,067940
GJTL	703	-0,028450	0,059438	0,902840	-0,829250	0,056899	0,035320	0,446310	-0,440040
INCO	687	0,072780	0,058453	0,960370	-0,906410	-0,014556	0,026995	0,122190	-0,126990
INDF	716	-0,083799	0,022359	0,099680	-0,094920	-0,069832	0,021749	0,111150	-0,086470
INKP	714	-0,028011	0,042730	0,392530	-0,383250	-0,014006	0,023153	0,117240	-0,103760
INTP	706	-0,113314	0,030854	0,333040	-0,344830	-0,141643	0,021572	0,116690	-0,076700
KIJA	693	0,129870	0,051270	0,383510	-0,396000	0,144300	0,040846	0,230060	-0,159770
KLBF	712	-0,042135	0,020378	0,086280	-0,094020	-0,084270	0,022072	0,102960	-0,096290
PNBN	713	0,014025	0,025039	0,202890	-0,223320	0,000000	0,021131	0,084820	-0,090000
PTBA	708	-0,211864	0,029126	0,351070	-0,332870	-0,112994	0,027206	0,253480	-0,260460
RALS	624	-0,272000	0,020567	0,101680	-0,091490	0,144000	0,020851	0,066920	-0,078710
SMCB	716	0,111732	0,028715	0,306950	-0,312940	-0,111732	0,024473	0,207960	-0,195090
SMRA	645	-0,046512	0,032453	0,241260	-0,322500	0,000000	0,028926	0,106300	-0,338490
TKIM	646	-0,216718	0,049863	0,693950	-0,700910	0,015480	0,031896	0,201970	-0,240380
TLKM	714	0,252101	0,019063	0,138020	-0,147480	0,042017	0,017239	0,061230	-0,062850
UNTR	720	0,152778	0,027242	0,247770	-0,237000	-0,027778	0,024850	0,140230	-0,282440
UNVR	694	-0,071942	0,049702	0,722170	-0,729680	0,115108	0,018209	0,167360	-0,133230

Remarks: RRO₁: Opening residual Return price from the 1st session to the opening price of preceding day
RRC₁: Closing residual Return price from the 1st session to the closing price of preceding day
RRO₂: Opening residual Return price from the 2nd session to the opening price of the preceding day
RRC₂: Closing residual Return price from the 2nd session to the closing price of the preceding day

It means that ANTM's standard deviation, maximum and minimum price were not highly distributed. The standard deviation of the ANTM opening residual return was 0.023679 for morning session and 0.023809 for its closing return; its afternoon session indicated the figure of 0.025282 for opening and 0.024669 for closing session. The maximum residual returns of each session were 0.114300, 0.137130, 0.122910 and 0.121180. The minimum residual return for every session were given respectively; -0.084190, -0.106360, -0.126390, and -0.093270.

Noise Tests of Opening and Closing Return

There has been noise occurrence that is partial-adjustment between opening return ($RO_{i,t}$) and the opening return of its preceding day ($RO_{i,t-1}$). The occurrences were highlighted by using the mark "*", **, ***". Detailed noise test results of 25 samples such as return correlation for opening of morning price ($RO_{1t} \leftrightarrow RO_{1t-1}$) and its closing price ($RC_{1t} \leftrightarrow RC_{1t-1}$), return correlation for opening of afternoon session ($RO_{2t} \leftrightarrow RO_{2t-1}$) and its closing price ($RC_{2t} \leftrightarrow RC_{2t-1}$) are given on table 3. In panel A, there are 13 individual securities that have noise for the correlation price during opening of morning session ($RO_{1t} \leftrightarrow RO_{1t-1}$) or approximate to 52%. This figure is dominant enough compared to foreign stock exchanges (seen from the research of Amihud & Mendelson, 1991). There is also noise that correlated to closing return of afternoon session ($RC_{1t} \leftrightarrow RC_{1t-1}$). The figure is relatively the same with opening and closing of noise return. Furthermore, there are only 12 individual securities possess with consistent noise correlation for their opening and closing trading session. Those 12 individual securities resemble to the figure of 92,31%. Based partial-adjustment tests above, the hypothesis **Ha₁** and **Ha₂** are supported.

Table 3 indicates that more noise occur at Panel B rather than panel A. It is observed that there are 20 individual securities that have

noise or negative correlation with return of afternoon opening session ($RO_{2t} \leftrightarrow RO_{2t-1}$) or it equals to the figure of 75%. This figure is dominant if it is compared to the figure of others stock exchange. In detail, there are 13 companies have noise correlation at the closing of afternoon session ($RC_{2t} \leftrightarrow RC_{2t-1}$). The decreasing firms that have return noise on the opening session rather than on the closing session are very extreme for individual stocks. On the other hand, the consistency has recorded on the noise which correlated to opening return and closing return of afternoon trading session. There are 13 companies or 65% of them achieve this consistency. As the results, hypothesis **Ha₃** and **Ha₄** are also supported.

Referring to the whole test results, it can be concluded that the return volatilities of opening and closing return for each session are varied substantially, and the stock prices of opening or closing for the subsequent session has been corrected (Sumiyana, 2007a; 2007b). It may also show that stock price reversion occurred only to individual stocks (Amihud & Mendelson, 1991; Chelley & Steeley, 2001) that listed at the Indonesia Stock Exchange (Sumiyana, 2007a; 2007b).

Amihud & Mendelson (1991) mentions that noise takes place dominantly at the opening period of morning trading day as the result of a long-break overnight period. Since the shares do not trade in the overnight, the brokers are unable to predict the prices continuously. The price is subjected to time periodicity. Therefore, the overnight non-trading increases opening prices at next morning trading session. The share price will increase as an impact of trader estimation that influences opening return volatilities at the next morning trading session. In other words, high volatility of the opening return occurs at the beginning trading in the morning session. Therefore, this study supports to noises' theories caused by trading mechanism.

Tabel 3. Return Correlation Among the Sessions and Their Preceding Periods

PANEL A: Correlation for Return of Morning Trading Session									
Individual Securities		Var RO ₁	RO ₁ ↔RO _{1,t-1}	t-value	sig	Var RC ₁	RC ₁ ↔RC _{1,t-1}	t-value	sig
AALI	Astra Agro Lestari	0.001029	-0.260899	-7.165697	***	0.001276	-0.292547	-8.111516	***
ANTM	Aneka Tambang	0.000888	0.055164	1.480396	+	0.000919	0.055671	1.494039	+
ASII	Astra	0.000559	-0.015911	-0.426390		0.000521	0.026093	0.698439	
BBCA	Bank Central Asia	0.001078	-0.007765	-0.207190		0.001017	-0.002762	-0.073687	
BDMN	Bank Danamon	0.000579	0.121571	3.235868	+++	0.000677	0.055592	1.471011	+
BNII	Bank Internasional Indonesia	0.000669	-0.119812	-3.211117	***	0.001162	-0.324023	-9.113369	***
BRPT	Barito Pacific Timber	0.002575	-0.009691	-0.245555		0.002585	0.045612	1.156898	
BUMI	Bumi Resources	0.003785	-0.402304	-11.593034	***	0.004183	-0.392172	-11.247197	***
GGRM	Gudang Garam	0.000372	0.030265	0.803393		0.000402	-0.047437	-1.260067	
GJTL	Gajah Tunggal	0.001056	-0.088949	-2.364422	***	0.001366	-0.218015	-5.914520	***
INCO	International Nickel	0.001066	-0.000814	-0.021292		0.000994	0.086029	2.259977	+++
INDF	Indofood Sukses	0.000708	-0.176959	-4.804309	***	0.000683	-0.131848	-3.554117	***
INKP	Indah Kiat Pulp	0.001039	-0.100218	-2.687682	***	0.001321	-0.216839	-5.927018	***
INTP	Indocement	0.000913	-0.009164	-0.243156		0.000892	-0.029091	-0.772209	
KIJA	Kawasan Industri Jababeka	0.002178	-0.192758	-5.163860	***	0.002536	-0.205165	-5.510359	***
KLBF	Kalbe Farma	0.000637	-0.059177	-1.579590	*	0.000634	-0.104429	-2.797884	***
PNBN	Bank Pan	0.000671	-0.025374	-0.676814		0.000744	-0.044886	-1.198079	
PTBA	Tambang Batubara	0.000746	-0.063523	-1.691274	**	0.001391	-0.230914	-6.305955	***
RALS	Ramayana Lestari	0.000472	-0.056130	-1.402083	*	0.000565	-0.173338	-4.389473	***
SMCB	Semen Cibinong	0.000908	-0.131969	-3.557426	***	0.000774	-0.064174	-1.718334	**
SMRA	Summarecon Agung	0.001143	-0.022314	-0.565965		0.001324	-0.087013	-2.214825	***
TKIM	Pabrik Kertas Tjiwi Kimia	0.001153	-0.037252	-0.946017		0.001106	0.020895	0.530361	
TLKM	Telekomunikasi	0.000438	0.027686	0.739047		0.000475	-0.000463	-0.012342	
UNTR	United Tractor	0.000903	-0.070811	-1.902188	**	0.000811	0.017055	0.457067	
UNVR	Unilever	0.000424	-0.200373	-5.380112	***	0.000345	-0.132242	-3.509577	***
PANEL B: Correlation for Return of Afternoon Trading Session									
Individual Securities		Var RO ₂	RO ₂ ↔RO _{2,t-1}	t-value	sig	Var RC ₂	RC ₂ ↔RC _{2,t-1}	t-value	sig
AALI	Astra Agro Lestari	0.012852	-0.475129	-14.316846	***	0.000583	-0.002573	-0.068210	
ANTM	Aneka Tambang	0.000954	0.040056	1.074192		0.000971	0.090390	2.431991	+++
ASII	Astra	0.000517	0.018138	0.485415		0.000546	0.039197	1.051110	
BBCA	Bank Central Asia	0.001055	-0.012622	-0.336814		0.001025	0.008598	0.229419	
BDMN	Bank Danamon	0.000693	0.067853	1.796800	++	0.000617	0.108084	2.872366	+++
BNII	Bank Internasional Indonesia	0.000695	-0.186308	-5.045685	***	0.001765	-0.356169	-10.142145	***
BRPT	Barito Pacific Timber	0.008146	-0.341321	-9.200839	***	0.005978	-0.304392	-8.096814	***
BUMI	Bumi Resources	0.001481	-0.274646	-7.535435	***	0.000905	-0.072243	-1.910907	**
GGRM	Gudang Garam	0.000490	-0.105305	-2.809687	***	0.000383	0.082297	2.191014	+++
GJTL	Gajah Tunggal	0.004047	-0.386770	-11.104481	***	0.001752	-0.276662	-7.622533	***
INCO	International Nickel	0.003903	-0.354859	-9.934060	***	0.000874	0.113894	3.000403	+++
INDF	Indofood Sukses	0.000679	-0.106214	-2.854263	***	0.000697	-0.119491	-3.215922	***
INKP	Indah Kiat Pulp	0.002417	-0.316860	-8.914210	***	0.000942	0.003041	0.081138	
INTP	Indocement	0.001283	-0.151624	-4.070100	***	0.000811	0.101526	2.707770	+++
KIJA	Kawasan Industri Jababeka	0.003250	-0.238307	-6.450178	***	0.002114	-0.153909	-4.094587	***
KLBF	Kalbe Farma	0.000622	-0.064567	-1.724044	**	0.000710	-0.063068	-1.683842	**
PNBN	Bank Pan	0.000859	-0.126879	-3.410740	***	0.000681	0.013913	0.371019	
PTBA	Tambang Batubara	0.001087	-0.184809	-4.996556	***	0.000984	-0.153930	-4.139369	***
RALS	Ramayana Lestari	0.000516	-0.100023	-2.509165	***	0.000534	-0.103955	-2.608860	***
SMCB	Semen Cibinong	0.001165	-0.204189	-5.573506	***	0.000940	-0.072905	-1.953275	**
SMRA	Summarecon Agung	0.001350	-0.110039	-2.807366	***	0.001121	-0.007004	-0.177609	
TKIM	Pabrik Kertas Tjiwi Kimia	0.003080	-0.313427	-8.375936	***	0.001451	-0.108815	-2.777914	***
TLKM	Telekomunikasi	0.000521	-0.042521	-1.135639		0.000462	0.030289	0.808572	
UNTR	United Tractor	0.001017	-0.099932	-2.691205	***	0.000953	-0.055565	-1.491190	*
UNVR	Unilever	0.002649	-0.462249	-13.722748	***	0.000392	-0.139517	-3.709041	***

Remarks: “**” noise occurrence sign; “+” as the sign of information

* Significant negative at the level (0,10); ** significant negative at the level (0,05); *** significant negative at the level (0,01);

+ Significant positive at the level (0,10); ++ significant positive at the level (0,05); +++ significant positive at the level (0,01);

Var RO_i is return variance opening price, where *i* indicates trading session period; *t* for days;

↔ indicates correlation symbol between period return and previous return period

Price reversion for almost of all individual shares means that share price departs from its fundamental value. Another interpretation is that numerous fake signals have been responded by the market. As soon as the dispersion or the fake signals detected the share, the prices then set back to the limit price which is close to its fundamental price. The price reversion in such condition is due to pricing errors' decision or called as a transitory price or momentary price. It inferred that these pricing errors were influenced by momentary event. Noise is demonstrated significantly by negative price adjustment shifted into normal value. It is due to trading interval mechanism. It is consistence with the findings of Roll (1984), Amihud & Mendelson (1991), and Chelley & Steeley (2001).

Noise Tests of Opening and Closing Residual Return

There has been negative autocorrelation (potential noise sign "*", **, ***) between the residual returns of opening price ($RRO_{i,t}$) and residual return of the opening price of the preceding day ($RRO_{i,t-1}$). Table 4 illustrates detailed test results of noise of 25 firms' individual shares. Some negative correlations demonstrated are, residual return for opening price of morning session ($RRO_{1t} \leftrightarrow RRO_{1,t-1}$), residual return for closing price of morning session ($RRC_{1t} \leftrightarrow RRC_{1,t-1}$), residual return for opening price of afternoon session ($RRO_{2t} \leftrightarrow RRO_{2,t-1}$), and residual return for closing price of afternoon session ($RRC_{2t} \leftrightarrow RRC_{2,t-1}$). Those 25 individual securities have departed their market stock value in comparison with their fundamental values. In panel A, there are 19 individual stocks have noise for return residual correlation for opening price of morning session ($RRO_{1t} \leftrightarrow RRO_{1,t-1}$) or it equals to the level of 76%. This figure is dominant enough compared to the same finding of empirical studies. There is also noise that correlated to return residual for closing price of morning session ($RRC_{1t} \leftrightarrow RRC_{1,t-1}$). The figure is about 80% or 12 stock companies registered. The percentage is

relatively the same with the noise return of opening return residual and closing return residual. There are only 16 companies out of 19 (84.21%) possess a consistence noise correlation for their opening and closing returns residual. Therefore, hypotheses **Ha₅** and **Ha₆** are supported.

Panel B reports more individual securities have noise for the return residual correlation than those of panel A. There are 25 firms have noise of their return residual during opening price of afternoon session ($RRO_{2t} \leftrightarrow RRO_{2,t-1}$) or it equals to the level of 100%. This figure is very dominant compared to other research findings. There is also noise that correlated to return residual for closing price of afternoon session ($RRC_{2t} \leftrightarrow RRC_{2,t-1}$). There are 20 individual shares or approximately 80%. The decreasing figure is very extreme for individual stocks with noise return residual of opening price compared to closing price. There do only 20 companies (80%) possess a consistence noise correlation for their opening and closing returns residual during afternoon sessions. Therefore, hypotheses **Ha₇** and **Ha₈** are also supported.

On the basis of the whole testing of return residual correlations of individual stock traded in Indonesia Stock Exchange from the period 2004 to 2006, this study concludes that the desire of the brokers to gain much profit creates negative autocorrelation of return residual that decrease quality stock prices. This is due to the periodic clearing system which is adopted by this market (Amihud & Mendelson, 1991). In order to achieve the equilibrium, therefore, there should be conditional factor from the market. It means that negative autocorrelation is statistically significant; it indicates that there is a high tendency to buy stocks but followed by subsequent decreasing price from previous trading periods. Meanwhile, the negative autocorrelation also reflects the high tendency to sell shares which force price to increase at the next beginning trading sessions (Amihud & Mendelson, 1991; Chelley & Steeley, 2001).

Tabel 4. Return Residual Correlation Between Trading Sessions and Their Preceding Sessions

PANEL A: Correlation for Residual Return of Morning Trading Session									
Individual Securities		Var RRO _i	RRO _i ↔RRO _{i,t-1}	t-value	sig	Var RRC _i	RRC _i ↔RRC _{i,t-1}	t-value	sig
AALI	Astra Agro Lestari	0.000868	-0.258648	-7.099408	***	0.001129	-0.320559	-8.972874	***
ANTM	Aneka Tambang	0.000562	0.007599	0.203631		0.000567	-0.055592	-1.491915	*
ASII	Astra	0.000363	-0.054031	-1.449897	*	0.000314	-0.018326	-0.490461	
BBCA	Bank Central Asia	0.000941	-0.031692	-0.846068		0.000879	-0.031160	-0.831868	
BDMN	Bank Danamon	0.000358	0.040778	1.078230		0.000417	-0.049040	-1.297176	*
BNI	Bank Internasional Indonesia	0.000496	-0.188011	-5.093477	***	0.000970	-0.401590	-11.667810	***
BRPT	Barito Pacific Timber	0.001840	0.005465	0.138460		0.001888	0.021364	0.541428	
BUMI	Bumi Resources	0.003277	-0.404523	-11.669468	***	0.003535	-0.413155	-11.969075	***
GGRM	Gudang Garam	0.000299	0.041073	1.090700		0.000319	-0.071731	-1.908147	**
GJTL	Gajah Tunggal	0.000531	-0.143234	-3.831841	***	0.000923	-0.333389	-9.362593	***
INCO	International Nickel	0.000927	-0.083879	-2.203099	***	0.000779	0.005359	0.140266	
INDF	Indofood Sukses	0.000444	-0.176644	-4.795478	***	0.000471	-0.172988	-4.693135	***
INKP	Indah Kiat Pulp	0.000558	-0.143430	-3.867176	***	0.000961	-0.358819	-10.257562	***
INTP	Indocement	0.000580	-0.128163	-3.428817	***	0.000543	-0.142178	-3.811128	***
KIJA	Kawasan Industri Jababeka	0.001560	-0.183678	-4.911887	***	0.001792	-0.236237	-6.930814	***
KLBF	Kalbe Farma	0.000384	-0.152027	-4.098513	***	0.000398	-0.256434	-7.069286	***
PNBN	Bank Pan	0.000409	-0.073614	-1.968219	***	0.000479	-0.145311	-3.916234	***
PTBA	Tambang Batubara	0.000502	-0.051593	-1.372697	*	0.001121	-0.299077	-8.327859	***
RALS	Ramayana Lestari	0.000383	-0.085647	-2.143899	***	0.000456	-0.208943	-5.328637	***
SMCB	Semen Cibinong	0.000556	-0.157024	-4.248495	***	0.000456	-0.151242	-4.088335	***
SMRA	Summarecon Agung	0.000805	-0.117489	-3.000010	***	0.000975	-0.214952	-5.581096	***
TKIM	Pabrik Kertas Tjiwi Kimia	0.000700	-0.067685	-1.721596	**	0.000673	-0.044003	-1.117747	
TLKM	Telekomunikasi	0.000287	-0.038869	-1.037942		0.000295	-0.053112	-1.419213	*
UNTR	United Tractor	0.000565	-0.132866	-3.592066	***	0.000472	-0.075415	-2.026568	***
UNVR	Unilever	0.000357	-0.199017	-5.342173	***	0.000276	-0.126056	-3.342678	***
PANEL B: Correlation for Residual Return of Afternoon Trading Session									
Individual Securities		Var RRO ₂	RRO ₂ ↔RRO _{2,t-1}	t-value	sig	Var RRC ₂	RRC ₂ ↔RRC _{2,t-1}	t-value	sig
AALI	Astra Agro Lestari	0.010875	-0.444197	-13.145582	***	0.000476	-0.007671	-0.203403	
ANTM	Aneka Tambang	0.000639	-0.067389	-1.809832	**	0.000609	0.013636	0.365429	
ASII	Astra	0.000343	-0.076659	-2.057306	***	0.000346	-0.038703	-1.037835	
BBCA	Bank Central Asia	0.000958	-0.059465	-1.589546	*	0.000885	-0.022961	-0.612825	
BDMN	Bank Danamon	0.000442	-0.049691	-1.314432	*	0.000368	0.018595	0.491369	
BNI	Bank Internasional Indonesia	0.000522	-0.295479	-8.229635	***	0.001528	-0.382470	-11.014295	***
BRPT	Barito Pacific Timber	0.006640	-0.352574	-9.546456	***	0.004826	-0.342400	-9.233778	***
BUMI	Bumi Resources	0.001242	-0.329497	-9.206858	***	0.000670	-0.143324	-3.820581	***
GGRM	Gudang Garam	0.000421	-0.164609	-4.427964	***	0.000309	0.052979	1.407661	+
GJTL	Gajah Tunggal	0.003533	-0.464048	-13.870173	***	0.001248	-0.376076	-10.746020	***
INCO	International Nickel	0.003417	-0.399623	-11.409815	***	0.000729	0.008710	0.227970	
INDF	Indofood Sukses	0.000500	-0.181489	-4.931432	***	0.000473	-0.133038	-3.586774	***
INKP	Indah Kiat Pulp	0.001826	-0.401528	-11.698561	***	0.000536	-0.123249	-3.313959	***
INTP	Indocement	0.000952	-0.280546	-7.755167	***	0.000465	-0.039257	-1.042411	
KIJA	Kawasan Industri Jababeka	0.002629	-0.294647	-8.105156	***	0.001668	-0.194790	-5.220408	***
KLBF	Kalbe Farma	0.000415	-0.181978	-4.931284	***	0.000487	-0.212609	-5.797683	***
PNBN	Bank Pan	0.000627	-0.243332	-6.689408	***	0.000447	-0.064211	-1.715708	**
PTBA	Tambang Batubara	0.000848	-0.282296	-7.818789	***	0.000740	-0.212739	-5.785040	***
RALS	Ramayana Lestari	0.000423	-0.156319	-3.950271	***	0.000435	-0.131823	-3.319271	***
SMCB	Semen Cibinong	0.000825	-0.272297	-7.561723	***	0.000599	-0.184243	-5.008867	***
SMRA	Summarecon Agung	0.001053	-0.226264	-5.890247	***	0.000837	-0.128719	-3.291377	***
TKIM	Pabrik Kertas Tjiwi Kimia	0.002486	-0.360845	-9.818739	***	0.001017	-0.213594	-5.548453	***
TLKM	Telekomunikasi	0.000363	-0.119306	-3.206375	***	0.000297	-0.062900	-1.681702	**
UNTR	United Tractor	0.000742	-0.201409	-5.509765	***	0.000618	-0.178048	-4.848371	***
UNVR	Unilever	0.002470	-0.467060	-13.905173	***	0.000332	-0.167926	-4.484310	***

Remarks: “*” noise signal; “+” sign for the coming of information;

* negative significant at the level of (0,10); ** negative significant at the level of (0,05); *** negative significant at the level of (0,01);
 + positive significant at the level of (0,10); ++ positive significant at the level of (0,05); +++ positive significant at the level of (0,01);

Var RRO_i represents residual return variance opening price, where *i* indicates trading session; *t* for day;

↔ indicates correlation symbol between period return and previous return period

The inference can be explained implicitly through logic of trading mechanism. The stock traders gain the profit by holding short-moment share inventories as they want to anticipate the decreasing share price in the next day. Then, the stock holders do the same for a long-moment during the proceeding period as the strategy to anticipate future high price. The condition like this has awful implications, because many traders will hold their share inventories to gain profit for short duration. (Amihud & Mendelson, 1987b; 1991; Chelley & Steeley, 2001). As the result, the market becomes inefficient. Therefore, this study supports the noise concept that the periodic clearing transaction is not efficient.

Furthermore, Amihud & Mendelson (1987b; 1991), and Chelley & Steeley (2001) analyze that the more reversion price detected by negative partial-adjustment, the more inefficient the trading mechanism. The higher the noise for return residual correlation, the bigger the profit each transaction will be. The empirical studies on the trading mechanism proved that negative coefficient correlation value lies in residual return correlation for opening and closing prices of morning trading session, or for that of afternoon trading session. Therefore, this condition is expected as indicator of good opportunities for getting profit with the assumption that price is reported price

The Research Findings

This study finds several factors that force noise occurrences at the IDX. Those factors are correlated with trading mechanism system and periodical clearing transaction procedures. The analysis done to the trading system and clearing transaction procedure at the IDX demonstrated that clearing transaction procedure is responsible for a high return variance at every initial trading session. The share price at the beginning of morning trading session was the effect of long-overnight non-trading period. It also takes

place to the beginning of the afternoon trading session which has a lunch break non-trading. These two break times has made the traders as well as the stock brokers unable to observe continuously the stock pricing. Finally, they do make some error predictions at the beginning of trading session. Their predictions sometimes tend to be above from their fundamental stock value. The share prices then are corrected at the proceeding trading session (Amihud & Mendelson, 1991; Chelley & Steeley, 2001; Sumiyana, 2007a; 2007b).

The research investigates the return residual behaviour. It is measured by using residual market model. From this investigation, several findings have been forward. The first one is that the periodic trading mechanism used for transaction process can trigger the noise occurrences. It is demonstrated that negative autocorrelation between return residual of a particular trading period and its preceding period. The noise return residual of opening price is much higher than noise return residual of closing period. By paying attention to the noise occurrences for return of trading period, and noise for residual return, it is possible that this study finds the inefficiencies of the periodic clearing transaction procedure. The inefficiency is detected through a high figure of noise for return and noise for residual return. It makes the profit at each transaction increase. It could be inferred that there are stock mispricing at the beginning of trading session. These mispricings are due to trading mechanism and periodic clearing transaction procedures (Amihud & Mendelson, 1991; Chelley & Steeley, 2001).

This study finds the existence of inefficient clearing procedure in IDX. This is identified by negative values that are higher in return and residual return partial-adjustment for opening price of morning and afternoon session than in that for closing prices of morning and afternoon session. Therefore, this study not only proves noise occurrences, but

also it finds price reversion among the subsequent trading periods. The set back or price reversion is an indicator that there is something wrong with share pricing at the beginning of trading period. This condition has negative implication that the stock traders will try to gain a lot of profit in each transaction in a short duration. Thus, such condition is better to be called inefficient.

Last implication of this study was that periodic trading mechanism is also inefficient because it creates noise occurrences. It means that the periodic trading mechanism is responsible for noise occurrences of this trading system. Discontinued trading system is a symptom for the stock trader not to observe the prices continuously. They are motivated to gain a lot for short-duration profit. Higher return volatility occurs at the beginning of every trading session. This condition creates inefficiencies in the process of clearing transaction. As the result, there will support to noise occurrences. Meanwhile, periodic clearing transaction systems are an inferior method (Amihud & Mendelson, 1991).

CONCLUSION, WEAKNESS, AND SUGGESTION OF THE RESEARCH

There are many conclusion can be derived from the discussion above. *First*, there is strong evident of noise occurrences or negative partial-adjustment of return. The negative autocorrelation test of the return has revealed a reversed price which caused by trading mechanism. It is known that Indonesia Stock Exchange is still applying periodic mechanism for morning and afternoon trading sessions together with its lunch break and overnight breaks non-trading sessions. Such mechanism causes return variance to increase at the beginning of each trading session. The high price variances should be corrected at the next trading session in order to have a proper limit of its fundamental value.

Second, the negative partial-adjustment for residual return also occurs at the highest

level of 100% on every firm's individual share. Such noise is due to transaction mechanism including clearing transaction procedures at the end of each trading session. The clearing transaction procedure affects high return variances at the beginning of trading session. High return variances are caused by stock trader that are not able to observe the prices behaviour continuously. The high return variances, therefore, are corrected in the next subsequent trading session. It forms negative partial-adjustment between particular residual returns and their preceding residual returns.

Third, the first and the second conclusions above give a good prospect to this study to interpret that noise for return and noise for residual return automatically occur simultaneously. It means that periodic trading mechanism is inefficient. Consequently, this mechanism is responsible for noise mechanism of this trading system. Discontinued trading system is a symptom for the stock traders to observe the prices continuously. In addition, they are motivated to gain a lot of short-moment profit. Finally, discontinued trading system causes high return variances at the next beginning trading session. This condition creates inefficiencies in the process of clearing transaction. Therefore there will support noise occurrences. This study, moreover, concludes that periodic mechanism is an inferior method.

This research has some weakness in term of transaction price assumption because the analysis was done only on the reported price. The assumed price is the same with the reported price, thus the return variances and residual return variances are in their mean comparison. This mean comparison, however, determines the result of negative autocorrelation test between return and return residual. The second weakness is that the research has not yet considered bid-ask spreads in analysing return variances and residual return variances. It is believed that the

bid-ask spreads may determine the type of negative partial-adjustment. At least, the bid-ask spreads could be used as a sensitivity analysis to rank the noise occurrences.

The third weakness lies on the use of rough residual return which does not pass the requirement of the influencing factor in trading or overreaction of investor behaviour (Chelley & Steeley, 2001). The future research on the same field could use Kalman Filter methodology which enables the researcher to separate the influence of trading mechanism or overreaction of investor behaviour.

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