

Closing Price Manipulation in Indonesia Stock Exchange

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ABSTRACT

This study examined closing price manipulation in Indonesia Stock Exchange using return correlation, return volatility and volume shifting. The study utilized the data sample during September 2016 to February 2017. From 20 biggest market capitalizations, more than 50% of the sample were indicated having closing price manipulation. This study also featured deep interview with market practitioners, fundamental and internal external events. The results show that 31% of information disclosure reported to IDX after market close has effect on price reversal. There was also significant proportion of volume shifts to pre-closing indicates the economic importance of the last minutes of trading and the heightened volatility suggests that closing price contains transitory component.

Type of Paper: Empirical

Keywords: Closing price manipulation; information disclosure; pre-closing; price reversal; transaction volume; volatility.

1. Introduction

Price manipulations exist both in developed and emerging markets, and could be a larger issue in emerging markets (Chaturvedula *et al.*, 2015). Even in a well-regulated mature financial market like the United States of America, (Aggarwal & Wu, 2006) document empirical evidence of stock price manipulation.

Price manipulation and unscrupulous role of brokers in capital markets had historically been a subject of great concern to market participants as well as the Governments and have an important impact on market efficiency (Chaturvedula *et al.*, 2015). Price manipulation can occur in many ways from false information to accounting and earnings alteration to stock price manipulation. For example, Comerton-Forde & Putninš (2011) in their paper “Measuring Closing Price Manipulation” found that price reversal in the following morning is the presence of manipulation. Price reversal shows that return near to the closing time is not the fair return and price will be reverse on the following morning. They found there are large increases in return at pre-closing session followed by return reversals in the following morning as presence of closing price manipulation.

Therefore, exchanges and regulators around the world pay much attention to the process of determining opening and closing prices. Efficient opening mechanism is important for the price

discovery process at the beginning of the trading day, an efficient mechanism of price formation is also necessary to guarantee that the closing price is as reflective of the fundamental value as possible. Closing price is important because it serves as reference price for settlement of financial contracts (Kandel *et al.*, 2012).

The Indonesia Stock Exchange (IDX) is perturbed about improving stock market quality. One of their concerns recently is the weakening of Jakarta Composite Index (JCI) towards the close of trading, where during the trading day, the JCI was moving in the green zone. IDX suspects that practice of marking the close has been common in the stock market. This practice has caused shock effects to take place quite often, including decrease of JCI at the end of trading day. To prevent practice of marking the close, IDX plan to review the pre-closing mechanism in the stock market that has been implemented for the last four years. IDX is considering implementing either transparency mechanism or random closing mechanism in a bid to enhance transparency (Kontan, 2017).

Hence this study aimed to learn the practice of marking the close in IDX. Moreover, whether IDX needs to change the pre-closing mechanism was also examined. This study also featured deep interview with market practitioners, fundamental and internal external events that influenced the forming of closing price.

The return correlation per one-minute bar for each sample was calculated by analyzing 20 biggest market capitalization and most active stocks in IDX for the period September 2016 – February 2017. Almost 50% of the total sample were indicated having closing price manipulation. This study is in line with study of (Pagano, Peng, & Schwartz, 2013) in Nasdaq Stock Market, where substantial volume at closing time indicates the economic importance of the last minute of trading and the heightened volatility in the last minutes of trading suggests that closing price contains transitory component.

The rest of the paper is organized as follows: Section 2 reviews the literature. Section 3 demonstrates the research methodology, descriptive statistic and hypothesis used for this study. Section 4 presents the study results and Section 5 concludes the study.

2. Literature Review

Closing price manipulation is far more mechanical. The manipulator is prepared to accept a loss on the manipulative trades, to obtain profit outside the stock exchange. It is different from pump-and-dump manipulators, who get profit from market by buying low and selling high. There are numerous reasons why people manipulate closing prices. Arbitrage, profiting from positions in derivatives on the underlying stocks; Brokers, altering clients' inference of their execution ability; fund manager, maintain fund performance and net asset values (NAV) as well as determining a fund's ranking relative to its competitors, and fund performance as the basis for remuneration. With these clear incentives, it comes as little surprise that some fund managers manipulate closing prices. Manipulation has occurred during seasoned equity issue, index rebalancing day, take over pricing periods, to avoid margin calls, and to maintain a stock's listing on an exchange with minimum price requirements (Comerton-Forde & Putninš, 2011).

Several studies regarding the impact of pre-closing introduction have been done in many stock exchanges. Most of them lead to the conclusion that pre-closing increase liquidity, accuracy of

price discovery, and at the same time decrease volatility and price manipulation. Tseng & Chen (2015) discovered that pre-closing with disclosure on simulated best quotes in an increment of 20 seconds in Taiwan Stock Exchange enable individual investor to stand in a better position to stalk the markets and stimulate the real quotes, and hence reinforce the spread effect. Kadioglu *et al.* (2015) found that pre-closing implementation in Istanbul Bourse eliminates significant closing price manipulation.

Kong & Wang (2014) investigated order-based manipulation in Chinese Stock Market and found that it affects market liquidity and trading behavior. Aktas & Kryzanowski (2014) studied manipulation in Borsa Istanbul and found that the higher price effects in the last minutes of a trading session and the variation in price effects have important implications for market regulators in terms of refining their surveillance systems to better control end-of-session price manipulation.

3. Research Methodology

This study utilized secondary data of IDX, which was obtained from Bloomberg Terminal. The method of sample selection is based on purposive sampling with criteria listed in 20 Biggest Market Capitalization, 20 Most Active Stocks by Total Trading Value and Frequency and listed on index that has most liquid underlying (LQ45 Index). This study limit the research period from September 2016 to February 2017. This period was chosen because Jakarta Composite Index often weakened towards the close of trading (up to 25 points or minus 0.5%). By using above sampling criteria, this study is expected to get the best result to demonstrate weakening of Jakarta Composite Index (JCI) in opaque pre-closing session for the last six months. In this study, the author compares stock price, stock volume before and after pre-closing session. Price and volume of stock per one-minute bar is collected for each sample to get more accurate results.

To get insight on type of information that trigger buying and selling order in the market (especially near to closing and the following morning) during the study period, this study conducted deep interview with market practitioners since they take part in entering orders into IDX. This study also reviews fundamental, information disclosure and external events during the six months' study period.

The measurement of closing price manipulation in this paper is presented by return correlation. Comerton-Forde & Putninš (2011) found that price reversal in the following morning is the presence of manipulation. Price reversal shows that return near to the closing time is not the fair return and price will be reverse on the following morning. Price reversal in this paper is calculated using EViews 9 and represented by negative correlation.

Kandel (2012) studied the adoption of pre-closing mechanism in Milan and Paris. They found a significant portion of daily volume shifts to pre-closing session, associated with a significant decline in volatility in the last minutes of the continuous phase.

Hillion & Suominen (2004) studied closing price manipulation in Paris Bourse and found that there is a significant rise in volatility and volume occurs mainly in the last minute of trading and they attribute this to manipulation. Return volatility in this paper is calculated using Parkinson Volatility as this method provides a much better estimate of that diffusion constant than the

traditional method. Data to calculate Parkinson Volatility is easy to find and applied as the method is calculated using high and low price with the following formula:

$$V_p = \frac{(\ln H - \ln L)}{4 \ln 2} \quad (1)$$

Note:

- V_p : Parkinson Volatility
- H : Highest Price of Stocks
- L : Lowest Price of Stocks

3.1 Descriptive Statistic

This study utilized the 20 biggest market capitalizations which have been listed in 20 most active stocks by total trading value or frequency along the period as its research sample. Price of stock was collected per one-minute bar for each sample to calculate return and return correlation in two trade sessions (ten minutes near to closing and ten minutes on the following morning) as per below:

- Near to Closing Session
Price of Stock at 15:40:00 - 15:49:59
- The Following Morning Session
Price of Stock at 09:00:00 - 09:09:59

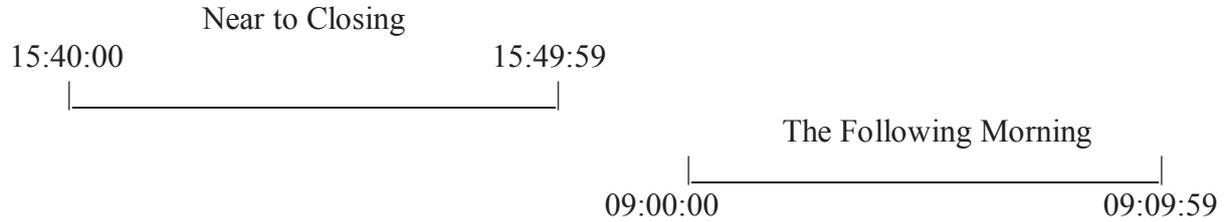
Return Correlation was examined to see the presence of closing price manipulation. Positive Pearson Correlation indicates price continuation. Price continuation shows that return near to the closing time is the fair return and the price is close to efficient. This stock will not be included in the next phase. In the other side, negative Pearson Correlation indicates price reversal. Comerton-Forde & Putninš (2011) found that price reversal in the following morning is the presence of manipulation. This stock will be taken to the next phase for further study.

To obtain more information about closing price manipulation, there are three phases that needed to be done. The first phase was conducted deep interview with market practitioners and fundamental, information disclosure & external events during the six months' study period. The second phase was analyzing whether there is a significant proportion of volume shifts near to closing. Compare to phase one; there are two additional sessions in this phase. The purpose of this split is to get full picture of trade volume in near to closing, pre-closing and post trading session until the market is closed. Sessions consist of trade volume at 15:30:00 - 15:39:59, 15:40:00 - 15:49:59, 15:50:00 - 16:04:59 and 16:05:00 - 16:15:00. Volume will also be analyzed against total volume in a day. The purpose is to get a proportion comparison with the overall daily transaction.

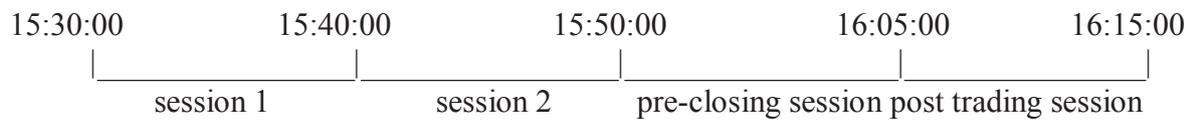
The third phase was examining when is the extreme change of return volatility. Session consist of 30 minutes before the closing time and divided into three sessions with ten minutes in every session: stock price at 15:30:00 - 15:39:59, 15:40:00 - 15:49:59 and 15:50:00 - 16:00:01. Time frame in third session (15:50:00 - 16:00:01) is slightly different, because the pre-closing session in IDX is split into two, from 15:50:00 - 16:00:00 to input bid and ask offer; and from 16:00:01 - 16:04:59 to perform closing price and matching selling offer against buying demand based on price and time priority, then all transactions after 16:00:01 until market close at 16:15:00, (post

trading session 16:05:00 - 16:15:00) are executed using closing price. Therefore, to calculate return using closing price, the author cut the third session at 16:00:01.

- **Panel A– Phase One: Session Split for Return Correlation Test**



- **Panel B – Phase Two: Session Split for Shifting of Volume**



- **Panel C – Phase Three and Four: Session Split for Return Volatility**



3.2 Hypothesis Test

There are three hypothesis tests in this research which consist of: a) Hypothesis 1 is assessed with Pearson Correlation to see whether there is return reversal in the following morning that indicates the presence closing price manipulation in IDX. b) Hypothesis 2 is assessed to see whether there is significant portion of volume shifts to pre-closing session. c) Hypothesis 3 is assessed with Parkinson Volatility to see whether trading under opaque pre-closing session is less volatile.

4. Result and Discussion

In Phase One of this study period, return near to closing time was negative. Closing price engineering might be occurred in two shapes, increase or decrease the closing price (which impact to high return or negative return) depends on the purpose of manipulation.

More than 50% of samples (eight stocks, represent 26.83% of market capitalization) has negative Pearson Correlation. This study accepted Hypothesis 1 because Pearson Correlation is negative, which means there is return reversal in the following morning that indicates the presence of closing price manipulation. This conclusion assumes that pre-closing and the following morning session is in a continuous time frame, and there is no time space for the entry of information.

In the real practice, investor can receive information that trigger buying and selling order at any time. Therefore, this study also featured deep interview with three market practitioners

Table 1. Descriptive Statistics of The Trades Sample

Variable	Number of Observation	Quantity	Remarks
Panel A: Return	67,836	12,880,008,850	2 sessions, 20 minutes, 124 days, 15 stocks, open close
Panel A: Return Correlation	1,845	-	2 sessions, 123 days, 15 stocks
Panel B: Shifting of Volume	34,720	6,239,374,800	4 sessions, 45 minutes, 124 days, 8 stocks
Panel C: Return Volatility	5,952	-	3 sessions, 30 minutes, 124 days, 8 stocks, high low

Table 2. Return

No.	Stock Sample	Market Cap	Average Return (Near To Closing)	Average Return (Following Morning)
1	Stock A	7.69%	0.0047%	-0.0113%
2	Stock B	6.63%	-0.0182%	0.0564%
3	Stock C	6.44%	-0.0488%	0.0433%
4	Stock D	5.67%	-0.0205%	-0.0633%
5	Stock E	5.50%	-0.0424%	-0.0968%
6	Stock F	4.99%	-0.0007%	0.0157%
7	Stock G	4.46%	0.0221%	-0.1259%
8	Stock H	2.17%	-0.0253%	-0.0814%
9	Stock I	1.97%	-0.0232%	-0.0585%
10	Stock J	1.66%	-0.0451%	-0.0420%
11	Stock K	1.57%	-0.0362%	0.0003%
12	Stock L	1.22%	-0.0068%	-0.1229%
13	Stock M	1.17%	0.0533%	-0.0016%
14	Stock N	0.98%	-0.0119%	-0.0335%
15	Stock O	0.93%	-0.0262%	0.0570%
Average Return			-0.0150%	-0.0310%

from brokerage firms to get insight on type of information that affected the market during the study period. Besides fundamental and internal events of the issuers, closing price was also influenced by information of external events that received by investors. There are 10 external events analyzed in this study that influenced capital market activity, which are Window Dressing, January Effect, Election of The President of The United States, The Fed Interest Rate Hike, Fuel Price, Commodity Price, Index Rebalancing Day, LQ45 Index Futures, Type of Orders and Forced Sell. This study also analyzes information disclosure reported by issuer into IDX website to gain fundamental aspect of the company.

Most of the companies having good performance in 2016 with double digits Net Profit Margin (NPM); profit growth increased from 2015; high Earning Per Share (EPS); high Return On Assets (ROA) and Return On Equity (ROE); low Debt to Asset Ratio (DAR) and Debt to Equity Ratio (DER) below 1; and Price Earnings Ratio (PER) higher than their industries.

From information disclosures reported to IDX website by eight issuers, we can sum up that from total 106 information disclosures during the study period, there were 20 information reported in the morning, 31 information in the afternoon, and 55 information after market close as captured in the following table.

Table 3. Pearson Correlation

No.	Stock	Pearson Correlation
1.	Stock A	-16.09%
2.	Stock B	-2.46%
3.	Stock C	-4.71%
4.	Stock D	-0.90%
5.	Stock E	-7.91%
6.	Stock F	-3.98%
7.	Stock G	-9.91%
8.	Stock H	-8.34%
9.	Stock I	7.69%
10.	Stock J	8.20%
11.	Stock K	5.77%
12.	Stock L	3.85%
13.	Stock M	17.44%
14.	Stock N	5.44%
15.	Stock O	19.06%
Total Market Capitalization		53.05%
Negative Pearson Correlation		26.22%
Positive Pearson Correlation		26.83%

Table 4. Fundamental Ratio

No.	Stock	NPM	Net Profit Growth	EPS	ROA	ROE	DAR	DER	PER	PER Industry
		(%)	(%)	(IDR)	(%)	(%)	(X)	(X)	(X)	
1.	Stock A	13.5	119.8	140.0	5.2	9	0.4	0.7	14.9	-4.4
2.	Stock B	28.5	3.2	1,061.0	2.6	17.9	0.9	5.8	11.4	20.7
3.	Stock C	19.1	-30.7	591.0	1.4	9.6	0.8	5.4	16.9	20.7
4.	Stock D	8.0	3.4	3,470.0	10.6	16.9	0.4	0.6	20	23.8
5.	Stock E	10.5	-29.8	168.0	4.5	9.7	0.5	1.2	15.6	8.2
6.	Stock F	17.4	0.2	762.0	10.3	14.8	0.3	0.5	13.9	20.9
7.	Stock G	25.1	25.1	171.0	16.2	27.6	0.4	0.7	20.4	8.2
8.	Stock H	15.9	9.2	837.0	38.2	135.9	0.7	2.6	46.7	23.8

There were 52% of information came after market close that might encourage investor to immediately enter buy or sell order in the following morning at higher or lower than current closing price. From total 55 after-market-close-information, there were 17 information (31%) leads to price reversal in the following morning.

In Phase Two of this study, it is proven that in current opaque pre-closing session, there is a significant volume shifts from session one (15:30:00 - 15:39:59) to pre-closing session (15:50:00 - 16:04:59), then decrease in post trading session (16:05:00 - 16:15:00).

Largest shift of volume occurs on stock 8 from 6.92% in session one to 16.12% in pre-closing session. Most of the stocks experienced double digit of trade volume transactions during pre-closing session. Significant volume shift into pre-closing session indicates practice marking the close. Marking the close is a form of market manipulation, where investor attempts to influence the closing price of a stock by executing purchase or sale orders just prior to the close of trading

Table 5. Information Disclosure

No.	Stock	Morning	Afternoon	After Market Close	Total
1.	Stock A	4	3	13	20
2.	Stock B	5	6	10	21
3.	Stock C	3	5	8	16
4.	Stock D	4	4	1	9
5.	Stock E	0	3	11	14
6.	Stock F	2	9	3	14
7.	Stock G	2	1	2	5
8.	Stock H	0	0	7	7
TOTAL		20	31	55	106
Total %		19%	29%	52%	100%

Table 6. Volume Shifting

No.	Stock	Average Volume Session 1 15:30:00 - 15:39:59	Average Volume Session 2 15:40:00 - 15:49:59	Average Volume Pre-closing 15:50:00 - 16:04:59	Average Volume Post Trading 16:05:00 - 16:15:00	Total Volume in 45 Minutes 15:30:00 - 16:15:00	Daily Volume
1.	Stock A	4.97%	6.99%	9.21%	1.18%	22.36%	4.24%
2.	Stock B	5.31%	8.39%	11.77%	2.13%	27.60%	6.46%
3.	Stock C	6.71%	9.72%	10.64%	2.06%	29.12%	3.94%
4.	Stock D	6.16%	9.55%	12.30%	1.59%	29.60%	6.13%
5.	Stock E	4.67%	6.76%	8.87%	2.51%	22.81%	4.21%
6.	Stock F	5.65%	8.55%	10.57%	2.54%	27.32%	4.92%
7.	Stock G	5.35%	8.25%	13.21%	1.92%	28.73%	7.87%
8.	Stock H	6.92%	9.67%	16.12%	5.97%	38.68%	9.20%

Table 7. Return Volatility

No.	Stock	Return Volatility Session 1 15:30:00 - 15:39:59	Return Volatility Session 2 15:40:00 - 15:49:59	Return Volatility Session 3 15:50:00 - 16:00:01
1.	Stock A	0.001698%	0.002206%	0.002001%
2.	Stock B	0.000449%	0.000574%	0.000518%
3.	Stock C	0.000598%	0.001244%	0.162182%
4.	Stock D	0.000238%	0.000844%	0.001442%
5.	Stock E	0.001229%	0.001478%	0.000970%
6.	Stock F	0.000797%	0.001293%	0.001481%
7.	Stock G	0.000677%	0.001040%	0.000626%
8.	Stock H	0.000338%	0.000984%	0.000878%
Average Return Volatility		0.000753%	0.001208%	0.021262%

In Phase Three, this study concludes that there was increased of return volatility from session one (15:30:00 - 15:39:59) into session three (15:50:00 - 16:00:01) from 0.000753% to 0.021262%. This study rejects Hypothesis 3 because there is increase of return volatility in opaque pre-closing session, which also means that trading under opaque pre-closing mechanism is more volatile.

6. Conclusion

Price reversal occurred in more than 50% of samples, representing 26.83% of market capitalization. Price reversal indicates the presence of closing price manipulation with assumption that pre-closing and the following morning session is in a continuous time frame, and there is no time space for the entry of information. Closing price engineering might be occurred in two shapes, increase or decrease the closing price depends on the purpose of manipulation. The increase or decrease of JCI and price reversal in the following morning is not necessarily related to engineering or manipulation. It could be due to information related to internal events of issuers that received by investors and encourage investors to immediately enter buy or sell order to the market at higher or lower than current closing price.

From total 106 information disclosed by eight issuers, there were 55 information (52%) reported to IDX website after market close and 17 of them (31%) lead to price reversal. During opaque pre-closing session in Indonesia Stock Exchange, there is an increase of trade volume and return volatility that indicates the economic importance of the last minutes of trading.

The findings of this study will have several implications for the enforcement of stringent market regulations. Pre-closing is not a total panacea to improve market quality. Innovation in market structure, especially improvement in call market design is the most important aspect (Pagano *et al.*, 2013). The authors support the action that has taken by IDX to consider replacing the pre-closing mechanism to prevent practice of marking the close and improving Indonesia stock market quality.

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