MORNING LOSSES AND AFTERNOON PRICE VOLATILITY: EVIDENCE OF JAKARTA STOCK EXCHANGE

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Abstrak

Menggunakan data intraday, penelitian ini menemukan bukti adanya perilaku bias pada harga di Bursa Efek Jakarta. Investor yang mengalami kerugian pada pagi hari lebih berani menerima risiko pada siang hari. Investor yang mengalami kerugian di pagi hari bersedia membeli pada harga lebih tinggi daripada investor yang memperoleh keuntungan di pagi hari. Kebalikannya, investor yang tidak suka menerima risiko sepanjang hari akan mengambil posisi sebaliknya, yaitu hanya mau menerima lebih sedikit risiko jika investor telah menerima keuntungan sebelumnya. Penemuan ini membuktikan adanya pengaruh psikologi investor dalam hubungannya dengan keuntungan, kerugian, dan risiko.

Kata kunci: keuangan perilaku, keuntungan pagi hari, kerugian pagi hari, penentuan risiko

1. INTRODUCTION

"Financial economists have been aware for a long time that in laboratory settings, humans often make systematic mistakes and choices that cannot be explained by traditional models of choice under uncertainty," says Paul Pfleiderer, the William F. Sharpe Professor of Financial Economics and co-director of the Business School's Financial Management Program. Until recently, most researchers believed these mistakes or deviations from rationality did not have a significant impact on pricing in the financial markets. Now many of us are willing to entertain the notion that some of behavioral phenomena uncovered in laboratory settings may affect pricing in financial markets (News Release of the Stanford Business School, 2001). The question is: Which behaviors? And more important: How do they affect pricing?

The good news is that behavioral finance is at the heart of what finance is all about, and that is: What drives stock prices? What drives investors' decision making? As noted by Campbell (2000), "Behavioral models cannot be tested using aggregate consumption or the market portfolio because rational utility-maximizing investors neither consumer aggregate consumption (some is accounted for by nonstandard investors) nor hold the market portfolio (instead they shift in and out of the stock market)."

Theoretical research suggests that arbitrage by rational traders need not eliminate mispricing (Daniel *et al*., 2001). One reason is that there are some psychological biases which virtually no one escapes. A second reason is that when traders are risk-averse, prices reflect a weighted average of beliefs. Just as rational investors trade arbitrage away mispricing, irrational investors trade to arbitrage away rational pricing. The presumption that rational beliefs will be victorious is based on the premise that wealth must flow from foolish to wise investors. However, if investors are foolish aggressive in their trading, they may earn higher rewards for bearing more risk (see, e.g., DeLong *et al*., 1990b, 1991) or for exploiting information signals more aggressively (Hirshleifer and Luo, 2001), and may gain from intimidating competing informed traders (Kyle and Wang, 1997). In fact, when investors evaluate stocks, they often search for diagnostic information on the stock return. A natural consequence of this search for diagnostic information is exposure to

obviously irrelevant information—information that consumers perceive as clearly uninformative about the desired return. Irrelevant information may dilute investors' beliefs through ability to deliver the desired return. Yet, studies on social judgment have demonstrated that adding obviously irrelevant information to diagnostic information may lead to less extreme judgments (see among others, De Dreu *et al*., 1995; Fein and Hilton, 1992; and Nisbett *et al*., 1981). Investors care about changes in financial wealth rather than absolute value, and that they are more sensitive to losses than to gains relative to certain reference points.

Statman is an expert in the behavior known as the "fear of regret" says that people tend to feel sorrow and grief after having made an error in judgment. Investors deciding whether to sell a security are typically emotionally affected by whether the security was bought for more or less than the current price. Investors avoid selling stocks that have gone down in order to avoid the pain and regret of having made a bad investment.

In this paper, focus of the study based on biases in trading behavior of market makers in the stock at the Jakarta Stock Exchange (JSX). Any impact their trading biases have on prices is likely to be more pronounced and therefore easier to detect. The trading day is split into two periods and test whether traders with profitable morning increase or reduce their afternoon risk-taking. Traders who experience morning losses more likely to take risk for afternoon prices, as losing traders are prepared to purchase at higher prices and sell at lower prices than those traders whose got morning gains. Conversely, if traders are averse to losses incurred at the daily horizon, this will lead to the opposite result: traders will take fewer risks as they become profitable. To see whether the traders' loss aversion has an impact on prices, I examine whether the traders are more likely to move afternoon prices following morning losses. The traders are "price-setting" if they purchase at a higher price or sell at a lower price than prevailed previously. My result clearly demonstrates that traders are more likely to place such price-moving traders following morning losses. A trader who loses money in the morning is more likely to execute such a trade than a trader who makes money in the morning.

This paper is organized as follows. Section I is introduction to behavior of investors. Section II reviews the stock market psychology and pricing intersect as theoretical background. Section III proposes data and method and the evidence of investor biases that affect asset prices are described by section IV. Section V is concluding remarks.

2. STOCK MARKET PSYCHOLOGY AND PRICING INTERSECT

Much of economic and financial theory is based on the notion that individuals act rationally and consider all available information in the decision-making process. Despite strong evidence that securities markets are highly efficient, there have been documented historical phenomena in securities markets that contradict the efficient market hypothesis and cannot be captured plausibly in models based on perfect investor rationality. Such phenomena are often referred to as stock market anomalies. More generally, there is an implicit view of the world that capital markets are destined to march steadily to nearly perfect market efficiency as smart investors pick off detected anomalies one by one (Daniel *et al*., 2001).

Most of the standard assumptions underlying investment forecasting and portfolio management are wrong. They fail to take into account the emotional and psychological biases of those practicing the investment arts. Fear, greed, risk-seeking and aversion, and peer group pressure all play a role in the underperformance of many investment managers relative to their objectives. In fact, dozen of examples of irrational behavior and repeated errors in judgment have been documented in academic studies. Peter L Bernstein in Kahneman and Tversky (1979) states "reveals repeated patterns of irrationality, inconsistency, and incompetence in the ways human beings arrive at decisions and choices when faced with uncertainty." Kahnemen and Tversky (1979) found that contrary to expected utility theory, people placed different weights on gains and losses and on different ranges of probability. They found that individuals are much more

distressed by prospective losses than they are happy by equivalent gains. Some economists have concluded that investors typically consider the loss of $1 dollar twice as painful as the pleasure received from a $1 gain. Loosing $100 is priceless than winning $100. They also found that individuals will respond differently to equivalent situations depending on whether it is presented in the context of losses or gains. People are willing to take more risks to avoid losses than to realize gains. Faced with sure gain, most investors are risk-averse, but faced with sure loss, investors become risk-takers.

Traders always interpret the signals that they received. As they trade, JSX market makers interpret a variety of private signals related to the pit order flow. At any given point in time, they closely monitor brokers currently placing orders, including their identities, the size and direction of their orders, the eagerness with which they attempt to execute their orders, etc. How profitably market makers trade in response to these signals, by adjusting their quotes and managing their positions, depends on both their interpretation of the signals and on luck. To the extent that the signal quality is unknown, and varies across trading days, traders will update their assessment of the signal precision as market movements confirm or disconfirm their reading of the signals. If traders have biased self-attribution, a trader that places profitable trades will become overconfident in their order flow signals. The trader will overly attribute the profits of his/her trades to his/her interpretation of the order flow signals and insufficiently attribute the profits to luck. If signal quality varies significantly from day-to-day, traders with self-attribution bias that trade profitably in the morning will become overconfident and will assume above average afternoon risk "That affects how we fell toward future risk-taking. In particular, we may be less afraid of stock market risk after having accumulated a lot of prior gains—even if there is a small drop in the stock market, we will still be ahead overall"(Huang *et al*., 2001) .

Gilovich *et al*., (1985) document that basketball players believe they are far more likely to score following previous successful attempts than following previous misses. They further demonstrate that these beliefs are not justified by their subsequent rate of success. If JSX market makers become similarly overconfident in their trading ability following successful mornings, they will assume addition afternoon risk. Moreover, if such a relationship exists, there will be little relation between morning and afternoon trading performance (Daniel *et al*., 2001).

Thaler and Johnson (1990), also predicts a positive relation between morning profits and afternoon risk-taking. Investigating in an experimental setting the relation between prior outcomes and risk choice, they demonstrate that individuals are more risk-seeking following prior gains than following recent declines in wealth. This suggests that traders who have earned profits in the morning will become less risk-averse or morning trading profits will be positively related to afternoon risk-taking. Contrarily to Huang *et al*. (2001), Thaler and Johnson (1990), and Gilovitch *et al*. (1985), if traders are averse to losses at the daily horizon, then traders that lose money in the morning will respond by assuming greater risk in the afternoon (see, e.g., Daniel *et al*., 2001; Coval and Shumway, 2001; Camerer *et al*., 1997; and Kahneman and Tversky, 1979).

Based on both sides, Huang *et al*., 2001; Thaler and Johnson, 1990; and Gilovitch *et al*., 1985, who belief that traders have earned profits in the morning will become less risk-averse, and on the another side, Daniel *et al*., 2001; Coval and Shumway, 2001; Camerer *et al*., 1997; and Kahneman and Tversky, 1979, who belief that traders with lose money in the morning will respond greater risk in the afternoon, my study tests the null hypothesis of standard and rational investor behavior against overconfidence (or self-attribution bias) and loss-aversion traders. If traders are more willing to assume risk when gambling, they will take greater risks as their profits grow. Conversely, if traders are averse to losses incurred at the daily horizon, this will lead to opposite result: traders will take fewer risks as they become profitable. A trader who loses money in the morning, more likely to execute such a trade than a trader who makes money in the morning. Overall, while traders lose money in the morning, losing traders account for higher price of all afternoon price-setting trades places by market makers.

3. DATA AND METHOD

The intraday data was taken from six the most liquid stocks that have morning and afternoon trading, as follow: Telekomunikasi Indonesia (TLKM), Indosat (ISAT), Gudang Garam (GGRM), Astra International (ASII), Semen Gresik (SMGR), and H. M. Sampoerna (HMSP). The time horizon is October 1 through October 31, 2002. Even only one month observation, alot of data is examined in this research.

To examine whether JSX traders exhibit loss aversion, the relation between morning trading performance and afternoon risk-taking are necessary be evaluated. Since trading day at JSX begins at 9:30 a.m. and ends at 4:00 p.m., I split the trading day into a morning period before 11:59 a.m., and afternoon period after 1:30 p.m, after lunch break. Then, for each stock is calculated morning and afternoon returns, risks, volume, and number of trades.

Following Coval and Shumway (2001) and Kahneman and Tversky (1979), simple regression is used to estimate the relation between morning trading and afternoon risk-taking, with assumption, traders begin each day with zero inventory (exclude each trader's absolute inventory). The adopted formula without inventory examines the relation between morning trading (morning gains and morning loss) and afternoon risk-taking as follow:

$$\pi_{ia} = \alpha + \beta_{\pi}\,\pi_{im} + \beta_{R}R_{itm} + \varepsilon_{i} \quad \text{..... (1)}$$

Where:

π_{ia} : return of stock i in the afternoon.

π_{im} : return of stock i in the morning.

R_{itm} : total dollar risk of stock i in the morning

α : constant

β : estimated of regression coefficient

ε_i : error term of stock i

π_{ia} : return of stock i the afternoon.

: $\dfrac{P_{ia} - P_{ia-1}}{P_{ia-1}}$

π_{im} : return of stock i in the morning.

: $\dfrac{P_{im} - P_{im-1}}{P_{im-1}}$

R_{itm} : total dollar risk of stock i in the morning

: $\sqrt{\sum_{t=1}^{n}\left(\dfrac{\pi_{itm} - \overline{\pi}}{n}\right)^{2}}$

With the same concept, risk and volume can be investigated based on:

$$R_{ita} = \alpha + \beta_{\pi}\,\pi_{im} + \beta_{R}R_{itm} + \varepsilon_{i} \quad \text{..... (2)}$$

Where :
R_{ita} : total dollar risk of stock i in the afternoon.
π_{im} : return of stock i in the morning.
R_{itm} : total dollar risk of stock i in the morning
α : constant
β : estimated of regression coefficient
ε_i : error term of stock i

$$V_{ia} = \alpha + \beta_{\pi} \pi_{im} + \beta_R R_{itm} + \varepsilon_i \quad \text{..... (3)}$$

Where:
V_{ia} : average trading volume of stock i in the afternoon.
π_{im} : return of stock i in the morning.
R_{itm} : total dollar risk of stock i in the morning
α : constant
β : estimated of regression coefficient
ε_i : error term of stock i

The relationship between trading volume and stock price volatility can be examined by Chan and Fong's (1999) model.

$$r_{it} = \alpha + \beta V_{it} + \varepsilon_{it} \quad \text{..... (4)}$$

Where:
r_{it} : absolute return of stock i on minute t
: $\left| \dfrac{P_{itm} - P_{itm-1}}{P_{itm-1}} \right|$
V_{it} : trading volume of stock i on minute t
α : constant
β : estimated of regression coefficient
ε_{itm} : error term of stock i on minute t

4. EMPIRICAL RESULT

Since my hypotheses related the risk that a trader will take to his/her profitability, it is important to measure both return and risk. To measure return (Table 1), I assume that each trader closes out his positions at the end of each day, and thus begins each day with no position. This assumption is supported by evidence of Kuserk and Locke (1993) and Manaster and Mann (1996) and has been used previously in Manaster and Mann (1996) and Coval and Shumway (2000, 2001).

Measuring the risk (Table 2) each trader takes is less straightforward. To measure the risk, a given position faces across the trading day, I employ an ordered logit regression (as in Coval and Shumway, 2000, 2001). A logit function of the probability of various potential absolute price changes over the next minute is regressed on the magnitude of price changes in the proceding five minutes and time-of-day dummy variables for each five-minute period during the trading day. The fitted values from this regression are then used to constract an expected absolute price change for each minute of each full trading day in October 2002. Since our risk measure is an expected absolute price change, it roughly corresponds to a one-standard deviation measure of

price change risk associated with each one-minute interval. Based on Table 2, by average, risk all transactions and morning loss outperforms than in the afternoon.. As general, risk increase after morning loss. The standard deviation of their overall afternoon risk is significantly larger following losing mornings than following winning mornings.

Beside stock price, traders' belief can be viewed by stock volume (Table 3). Stock volume consists of number of transactions and trade size. Number of transaction or trading activity gives information more that moves prices than trade size (see among others, Sukmawati, 2002; Gopinath and Krisnamurti, 2000; Bessembinder *et al*., 1996; Jones *et al*., 1994; Harris and Raviv, 1993; Shalen, 1993; and Easley and O'Hara, 1990). The presence of number of transactions variables has a reliably positive effect on stock price volatility. Table 4 describe the number of trade that shows how frequent the investors' trading. Volume and number of trade all transaction and morning loss underperforms than in the afternoon. Afternoon volume and number of trade are impacted by morning losses. Moreover, volume and number of transaction increase following losing morning. The standard deviation of their overall afternoon volume and number of transaction are significantly larger following losing mornings than following winning mornings.

To test the hypothesis simply by relating the risk a trader takes in the afternoon to the trader's profit or loss in the morning. From Table 1 that traders with losing mornings are not otherwise equivalent to traders with profitable mornings. Looking at afternoon returns, we can see that they are only slightly lower following losing mornings than following profitable mornings. This suggests that the additional afternoon risk traders assume following losing mornings is not terribly costly from an expected return standpoint. Moreover, to the extent that traders seek to increase the spread in their afternoon returns following morning losses (e.g. due to loss aversion). The standard deviation of their overall afternoon return is significantly larger following losing mornings than following winning mornings.

Table 5 describe regressions of afternoon risk-taking on morning profits. The regressions use average morning loss (Panel A), afternoon risks (Panel B), and trading volume (Panel C) and the regression of risk taking on morning losses shows on Table 6. As we see, consistent with the results presented in Table 1 through 4, my regressions indicate that traders are loss-averse. I find strong evidence that our traders are highly loss-averse. Traders assume significantly more afternoon risk following morning losses than following morning gains. In their eagerness to assume greater afternoon risk, they place price-setting trades more frequently, purchasing stocks at higher prices, and selling stocks at lower prices. However, afternoon prices set by traders with morning losses reverse substantially more than those set by traders with morning gains. This suggests that any price impact resulting from the traders' behavioral biases dissipates extremely quickly. Consistent with this, I find that mornings with widespread losses lead to increase in short-run afternoon volatility but no increase in volatility measured over longer intervals. These factors provide us with significant power to identify conditions under which behavior biases are likely to be important in influencing prices.

Table 7 shows us the relationship between trading volume and the stock price volatility. The price volatility is the standard deviation of price changes measured at one-second, one-minute, five-minute, ten-minute, and half-day frequencies. To investigate the volatility, I regress normalized afternoon volatility on volatility in the corresponding morning and several measures of the prevalence of morning losses among traders. The afternoon price volatility is related to morning market maker profitability. Thus, although loss-averse traders appear to have a short-term influence on prices, consistent with the result, their influence largely disappears during the ten minutes following their trades. However, it is important to note that while there appears to be a relationship between morning losses and afternoon volatility that is consistent with my earlier findings, the result are far from conclusive.

5. CONCLUDING REMARK

This paper review evidence about how psychological biases affect investor behavior and prices. I argue that a source of judgment and decision biases have any effect on prices. The

behavioral biases are important to detect the relationship between price-setting and risk-taking of traders.

I find that behavioral biases among Jakarta Stock Exchange traders on prices have proven. Traders who experience morning losses more likely to take risk for afternoon prices, as losing traders are prepared to purchase at higher prices and sell at lower prices than those traders whose got morning gains. Conversely, if traders are averse to losses incurred at the daily horizon, this will lead to the opposite result: traders will take fewer risks as they become profitable. Meanwhile, there is positive evidence of trading volume to stock price volatility.

To test the hypothesis simply by relating the risk a trader takes in the afternoon to the trader's profit or loss in the morning. The traders with losing mornings are not otherwise equivalent to traders with profitable mornings. Looking at afternoon returns, we can see that they are only slightly lower following losing mornings than following profitable mornings.

I find strong evidence that our traders are highly loss-averse. Traders assume significantly more afternoon risk following morning losses than following morning gains. In their eagerness to assume greater afternoon risk, they place price-setting trades more frequently, purchasing stocks at higher prices, and selling stocks at lower prices. People are willing to take more risks to avoid losses than to realize gains. Faced with sure gain, most investors are risk-averse, but faced with sure loss, investors become risk-takers.

However, afternoon prices set by traders with morning losses reverse substantially more than those set by traders with morning gains. This suggests that any price impact resulting from the traders' behavioral biases dissipates extremely quickly. Consistent with this, I find that mornings with widespread losses lead to increase in short-run afternoon volatility but no increase in volatility measured over longer intervals. These factors provide us with significant power to identify conditions under which behavior biases are likely to be important in influencing prices.

Table 1
Stock Return (October 1- October 31, 2002)

Stocks	Morning		Afternoon	
	Mean	Standar Deviasi	Mean	Standar Deviasi
		All Transaction		
Telekomunikasi Indonesia	-0.0000124	0.00233705	0.000002914	0.00193265
Indosat	-0.0000183	0.00223721	0.000003019	0.00168488
Gudang Garam	-0.0000642	0.00249478	0.000009618	0.00180391
Astra International	-0.0000152	0.00294502	0.0000007956	0.00279572
Semen Gresik	-0.000410	0.00740628	0.00007109	0.00294466
H. M. Sampoerna	-0.0000393	0.00281578	0.00001967	0.00226367
		Morning Gain		
Telekomunikasi Indonesia	0.00005112	0.00219832	-0.000022	0.00184496
Indosat	0.00006579	0.00196418	-0.00000565	0.00162371
Gudang Garam	0.0001173	0.00184453	-0.0000639	0.00141578
Astra International	0.00005330	0.00278840	-0.0000207	0.00274085
Semen Gresik	0.0003226	0.00293280	-0.0001	0.00227247
H. M. Sampoerna	0.00008269	0.00219366	-0.0000241	0.00242350
		Morning Loss		
Telekomunikasi Indonesia	-0.0000543	0.0024233	0.00001434	0.0019715
Indosat	-0.0000933	0.00245312	0.00001043	0.0017357
Gudang Garam	-0.000151	0.00274824	0.00004669	0.00197024
Astra International	-0.000107	0.00314009	0.00002262	0.00285050
Semen Gresik	-0.00129	0.0104517	0.0002098	0.00339009
H. M. Sampoerna	-0.000138	0.00323158	0.00004531	0.00216448

By average, return all transactions and morning loss underperforms than in the afternoon. As general, the additional afternoon risk traders assume following losing mornings is not terribly costly from an expected return standpoint. Moreover, to the extent that traders seek to increase the spread in their afternoon returns following morning losses (e.g. due to loss aversion). The standard deviation of their overall afternoon return is significantly larger following losing mornings than following winning mornings.

Table 2
Stock Risk (Oktober 1- Oktober 31, 2002)

Stocks	Morning		Afternoon	
	Mean	Standar Deviasi	Mean	Standar Deviasi
	All Transaction			
Telekomunikasi Indonesia	0.001952	0.000865171	0.002008	0.000489613
Indosat	0.002172	0.00111241	0.001569	0.000324118
Gudang Garam	0.002094	0.00113601	0.001533	0.000625745
Astra International	0.002641	0.000637326	0.002575	0.000717780
Semen Gresik	0.008622	0.0142322	0.002821	0.00137884
H. M. Sampoerna	0.002215	0.00120006	0.002110	0.000778257
	Morning Gain			
Telekomunikasi Indonesia	0.001789	0.000462142	0.001832	0.000303472
Indosat	0.001892	0.000637460	0.001576	0.000312359
Gudang Garam	0.001822	0.000593154	0.001319	0.000380715
Astra International	0.002582	0.000462587	0.002531	0.000659382
Semen Gresik	0.003164	0.000711889	0.002173	0.000746381
H. M. Sampoerna	0.002062	0.000636273	0.002282	0.00105091
	Morning Loss			
Telekomunikasi Indonesia	0.002060	0.00106064	0.002125	0.000563876
Indosat	0.002452	0.00142544	0.001562	0.000352280
Gudang Garam	0.002241	0.00134202	0.001648	0.000711573
Astra International	0.002751	0.00091462	0.002656	0.000866059
Semen Gresik	0.01226	0.0177042	0.003253	0.00155584
H. M. Sampoerna	0.002341	0.00154068	0.001970	0.000467902

By average, risk all transactions and morning loss outperforms than in the afternoon.. As general, risk increase after morning loss. The standard deviation of their overall afternoon risk is significantly larger following losing mornings than following winning mornings.

Table 3
Stock Volume (Oktober 1- Oktober 31, 2002)

Stocks	Morning		Afternoon	
	Mean	Standar Deviasi	Mean	Standar Deviasi
	All Transaction			
Telekomunikasi Indonesia	28,758.96	62,268.08	29,266.61	71,133.67
Indosat	5,878.42	9,498.71	6,246.24	10,068.05
Gudang Garam	4,663.59	7,775.78	5,314.01	8,349.72
Astra International	29,144.35	60,186.34	31,069.97	70,341.64
Semen Gresik	2,552.75	2,702.14	3,073.02	3,608.01
H. M. Sampoerna	18,717.47	58,994.42	22,537.12	42,349.66

		Morning Gain		
Telekomunikasi Indonesia	29,781.05	67,941.92	26,568.58	60,193.45
Indosat	6,283.55	10,570.61	6,466.71	10,319.26
Gudang Garam	3,852.47	5,166.77	5,429.36	7,665.25
Astra International	27,972.81	54,382.8	26,462.24	49,995.19
Semen Gresik	2,312.32	2,119.95	3,007.09	3,036.84
H. M. Sampoerna	17,478.04	31,066.22	19,860.13	39,346.99
		Morning Loss		
Telekomunikasi Indonesia	28,85.85	58,224.89	30,501.62	75,586.64
Indosat	5,517	8,413.31	6,057.8	9,846.22
Gudang Garam	5,051.74	8,727.73	5,255.81	8,675.88
Astra International	30,709.79	67,136.82	35,749.61	85,978.06
Semen Gresik	2,841.75	3,247.95	3,126.44	4,015.26
H. M. Sampoerna	19,725.07	74,323.82	24,107.12	43,946.48

By average, volume all transactions and morning loss underperforms than in the afternoon. As general, afternoon volume is impacted by morning losses. Moreover, volume increase following losing morning. The standard deviation of their overall afternoon volume is significantly larger following losing mornings than following winning mornings.

Table 4
Number of Trade (October 1- Oktober 31, 2002)

Stocks	Morning		Afternoon	
	Mean	Standar Deviasi	Mean	Standar Deviasi
		All Transaction		
Telekomunikasi Indonesia	672.3	650.73	583.9	582.39
Indosat	336.6	282.46	259.1	178.21
Gudang Garam	184.3	134.92	148.8	123.69
Astra International	578.8	503.29	452	473.8
Semen Gresik	32.7	31.57	31.5	22.99
H. M. Sampoerna	233.6	193.77	222.9	189.23
		Morning Gain		
Telekomunikasi Indonesia	667.38	647.23	458.38	239.65
Indosat	317.4	359.8	238.8	161.59
Gudang Garam	170.43	128.95	142.57	63.16
Astra International	509.31	425.36	350.38	251.74
Semen Gresik	44.63	39.8	35.25	11.49
H. M. Sampoerna	232.78	211.51	183.11	89.69
		Morning Loss		
Telekomunikasi Indonesia	675.58	681.77	667.58	728.15
Indosat	355.8	195.33	279.4	200.05
Gudang Garam	191.77	142.61	152.15	148.98
Astra International	707.86	640.59	640.71	721.25
Semen Gresik	24.75	23.26	29	28.5
H. M. Sampoerna	234.27	188.55	255.45	242.92

In line to volume, number of trade all transactions and morning loss underperforms than in the afternoon. As general, afternoon number of trade is impacted by morning losses. Moreover, number of transaction increase following losing morning. The standard deviation of their overall afternoon number of trade is significantly larger following losing mornings than following winning mornings.

Table 5
Morning Profits and Afternoon Risk-Taking

Panel A: Dependent Variable: Morning Profits
(Based on formula *1*: $\pi_{ia} = \alpha +$ (((im + (RRitm + (i)

	Regression	F	Adj. R2	t_{rtn}	t_{risk}
TLKM	Return = 0.04209 – 40.103R + 1.06π + 0.013664	6.443**	0.609	3.534**	-2.752**
ISAT	Return = -0.00715 + 0.903R + 0.186π + 0.011497	0.931	-0.016	1.337	0.143
GGRM	Return = 0.0005464 – 7.117R + 0.215π + 0.006560	2.537	0.339	0.949	-1.430
ASII	Return = 0.02516 – 12.866R – 0.0797π + 0.018258	0.672	-0.058	-0.447	-1.119
SMGR	Return = -0.0250 + 6.663R + 0.06388π + 0.005210	2.998	0.363	0.243	2.393*
HMSP	Return = -0.0119 + 4.590R – 0.163π + 0.011440	0.749	-0.067	-0.841	0.708

Panel B: Dependent Variable: Afternoon Risks
(Based on formula *2*: $R_{ita} = \alpha + \beta_\pi \pi_{im} + \beta_R R_{itm} + \varepsilon_i$)

	Regression	F	Adj. R^2	t_{rtn}	t_{risk}
TLKM	Risk = 0.001473 + 0.127R + 0.007017π + 0.000270	1.932	0.210	1.186	0.441
ISAT	Risk = 0.001388 – 0.04751R + 0.005724π + 0.000305	1.227	0.048	1.554	0.284
GGRM	Risk = 0.0001857 + 0.431R + 0.02331π + 0.000287	3.286	0.433	2.334*	1.966
ASII	Risk = 0.001164 + 0.5R – 0.004522π + 0.000667	0.855	-0.025	0.694	1.191
SMGR	Risk = 0.001506 – 0.150R – 0.03554π + 0.000809	0.480	-0.175	0.870	0.348
HMSP	Risk = 0.002974 – 0.215R – 0.0258π + 0.001043	1.062	0.015	-1.455	-0.364

Panel C: Dependent Variable: Trading Volume
(Based on formula *3*: $V_{ia} = \alpha + \beta_\pi \pi_{im} + \beta_R R_{itm} + \varepsilon_i$)

	Regression	F	Adj. R^2	t_{rtn}	t_{risk}
TLKM	Volume = 22,161.331 – 857,297R – 282,352.7π + 5,516.92	4.274*	0.483	2.332*	-0.146
ISAT	Volume = 8,032.013 – 1,292.050R + 17,799.163π + 1,212.95	3.666*	0.372	1.215	-1.943*
GGRM	Volume = 5,148.511 – 136,745R + 29,228.834π + 1,125.45	0.421	-0.239	0.746	-0.159
ASII	Volume = 6,367.404 + 6,899,177R + 37,672.827π + 3,980.18	3.976*	0.332	0.969	2.753**
SMGR	Volume = 3,633.871 – 135,217R + 24,798.298π + 1,669.17	0.050	-0.372	0.294	-0.152
HMSP	Volume = 13,612.362 + 960,117.5R + 286,009.9π + 3,707.13	10.43**	0.702	4.546***	0.457

*** Significant at 1 %
** Significant at 5 %
* Significant at 10 %

Table 6
Morning Loss and Afternoon Risk-Taking

Panel A: Dependent Variable: Morning Loss
(Based on formula *1*: $\pi_{ia} = \alpha + \beta_\pi \pi_{im} + \beta_R R_{itm} + \varepsilon_i$)

	Regression	F	Adj. R^2	t_{rtn}	t_{risk}
TLKM	Return = 0.009167 + 1.311R + 0.179π + 0.031630	0.123	-0.19	0.496	0.137
ISAT	Return = 0.003664 – 2.036R – 0.248π + 0.025869	0.172	-0.225	-0.477	-0.337
GGRM	Return = 0.005959 – 1.125R – 0.301π + 0.023566	1.484	0.075	-1.720	-0.218
ASII	Return = -0.0122 – 9.071R – 0.829π + 0.026385	7.701**	0.691	-3.916**	-0.745
SMGR	Return = 0.000694 + 0.631R – 0.0223π + 0.020880	1.538	0.089	-0.052	1.650
HMSP	Return = 0.01636 – 8.091R – 0.873π + 0.030389	3.406*	0.325	-2.332**	-1.295

Panel B: Dependent Variable: Afternoon Risks

(Based on formula *2*: $R_{ita} = \alpha + \beta_\pi \pi_{im} + \beta_R R_{itm} + \varepsilon_i$)

	Regression	F	Adj. R^2	t_{rtn}	t_{risk}
TLKM	Risk = 0.002104 + 0.04113R + 0.003449π + 0.000615	0.122	-0.190	0.490	0.222
ISAT	Risk = 0.001369 + 0.06441R – 0.00217π + 0.000384	0.295	-0.186	-0.281	0.718
GGRM	Risk = 0.001182 + 0.208R + 0.00002377π + 0.000717	0.907	-0.016	0.004	1.325
ASII	Risk = 0.001709 + 0.406R + 0.002935π + 0.0009625	0.429	-0.235	0.380	0.914
SMGR	Risk = 0.002814 + 0.03653R + 0.001682π + 0.001559	0.977	-0.004	0.053	1.280
HMSP	Risk = 0.0018 + 0.05538R – 0.00262π + 0.000508	0.241	-0.179	-0.419	0.530

Panel C: Dependent Variable: Trading Volume

(Based on formula *3*: $V_{ia} = \alpha + \beta_\pi \pi_{im} + \beta_R R_{itm} + \varepsilon_i$)

	Regression	F	Adj. R^2	t_{rtn}	t_{risk}
TLKM	Volume = 31,515.339 + 1,217,405R + 135,210.9π + 14,161.12	0.348	-0.135	0.834	0.285
ISAT	Volume = 7,164.249 – 725,707R – 21,120.1π + 2,394.14	0.944	-0.013	-0.439	-1.296
GGRM	Volume = 6,262.085 – 317,461R – 10,102.4π + 2,210.64	0.343	-0.123	-0.616	-0.657
ASII	Volume = 12,106.192 + 1,907,185R – 166,862π + 7,632.19	4.531*	0.541	-2.726*	0.541
SMGR	Volume = 3,278.628 – 7,594.657R + 2,009.102π + 1,056.29	0.079	-0.201	0.093	-0.393
HMSP	Volume = 22,555.573 – 672,314R – 48,209.6π + 7,485.32	0.220	-0.185	-0.523	-0.437

** Significant at 5 %

* Significant at 10 %

Table 7

Trading Volume and Stock Price Volatility

(Based on formula *4*: $r_{it} = \alpha + \beta V_{it} + \varepsilon_{it}$)

	Regression	F	Adj. R^2	t
TLKM	Return = 0.000414 + 0.000000000104V + 0.00212	0.269	0.000	0.518
ISAT	Return = 0.0004263 + 0.00000000546V + 0.00196	8.774***	0.001	2.962***
GGRM	Return = 0.0005095 + 0.000000003298V + 0.00215	1.014	0.000	1.007
ASII	Return = 0.0005497 + 0.000000001335V + 0.00282	19.44***	0.001	4.409***
SMGR	Return = 0.001448 – 0.0000000454 + 0.00552	0.879	0.000	-0.938
HMSP	Return = 0.0005096 + 0.000000001388V + 0.0025	7.464***	0.001	2.732**

*** Significant at 1 %

** Significant at 5 %

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EXHIBIT

1. TELEKOMUNIKASI INDONESIA

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol	Return	Risk	Av. Trd. Vol
1	0.000000	0.001660	20,250	-0.022222	0.002008	16,288
2	0.022901	0.001532	23,170	-0.007463	0.002091	28,496
3	0.007634	0.001255	14,136	0.015267	0.001306	23,614
4	-0.015504	0.001789	14,049	-0.055556	0.001533	14,958
5	0.047170	0.002735	33,632	-0.008929	0.001989	36,850
6	0.017699	0.001510	29,761	-0.008696	0.001719	25,550
7	0.018692	0.001667	32,322	0.009174	0.001800	33,985
8	0.051282	0.002164	31,834	0.000000	0.002209	27,597
	Morning Loss					
	Return	Risk	Av. Trd. Vol	Return	Risk	Av. Trd. Vol
1	-0.022059	0.005062	24,580	0.000000	0.002273	31,325
2	0.007634	0.001696	35,059	0.000000	0.002324	65,742
3	-0.015038	0.000970	20,692	-0.022901	0.001634	18,363
4	-0.015873	0.002280	23,748	0.024194	0.001956	17,783
5	-0.100917	0.002873	25,694	-0.020408	0.001916	29,001
6	-0.030612	0.001943	30,998	0.084211	0.001880	32,315
7	0.000000	0.001796	30,282	0.027273	0.002006	37,690
8	0.000000	0.001862	28,093	0.000000	0.001552	38,556
9	-0.017699	0.001264	33,359	-0.018018	0.001904	38,109
10	-0.009259	0.001899	28,531	0.000000	0.002159	29,084
11	-0.009259	0.001570	20,269	0.018692	0.002137	22,039
12	-0.009346	0.001504	31,459	0.009434	0.003759	18,195

2. INDOSAT

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	-0.005882	0.001869	5,085	-0.005917	0.001419	4,709
2	0.005988	0.002985	2,620	0.005952	0.001726	3,393
3	0.000000	0.001928	2,585	0.006098	0.001458	4,484
4	-0.006579	0.002311	5,248	-0.019868	0.000916	5,716
5	0.014388	0.002804	5,418	-0.007092	0.001670	6,147
6	0.021739	0.001404	6,512	-0.021277	0.001718	7,528
7	0.021739	0.001114	5,456	0.000000	0.001325	8,552
8	0.094203	0.001595	7,625	0.013245	0.001885	7,113
9	0.013245	0.001715	5,572	0.000000	0.002012	5,645
10	0.013072	0.001193	5,655	0.006410	0.001634	5,649
	Morning Loss					
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	-0.005882	0.005899	4,669	0.000000	0.001391	2,000
2	-0.012048	0.001788	3,593	0.000000	0.001401	4,451
3	-0.030488	0.001099	3,745	-0.012579	0.001235	4,219
4	-0.025974	0.001702	5,580	-0.006623	0.001281	6,005

5	-0.028986	0.003904	4,583	-0.037313	0.002227	5,635
6	-0.045455	0.002646	5,471	0.055556	0.001910	6,916
7	-0.014493	0.001989	5,924	0.014706	0.001100	8,180
8	-0.007092	0.001751	8,399	0.007143	0.001536	10,561
9	-0.006536	0.002009	6,850	0.000000	0.001699	4,821
10	0.013072	0.001731	5,251	0.006452	0.001843	4,524

3. GUDANG GARAM

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	0.023810	0.001090	3,726	0.000000	0.000995	4,667
2	0.011765	0.001694	2,458	0.000000	0.000825	5,252
3	-0.006098	0.002354	5,429	-0.018519	0.001153	5,630
4	0.034247	0.002202	4,388	-0.006667	0.001963	6,506
5	0.013158	0.002175	4,179	-0.019355	0.001577	5,000
6	0.006579	0.002300	2,422	-0.012987	0.001293	3,727
7	0.021127	0.000940	3,512	-0.006897	0.001424	6,569
	Morning Loss					
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	-0.005917	0.005897	4,485	0.000000	0.001783	6,074
2	-0.011765	0.001854	3,050	-0.005952	0.001424	6,472
3	0.000000	0.000935	3,122	0.000000	0.001246	5,116
4	-0.006024	0.000945	7,540	0.000000	0.000000	11,731
5	-0.006135	0.001989	4,871	0.000000	0.001359	5,375
6	-0.033557	0.003901	6,416	-0.013889	0.001946	5,536
7	-0.077465	0.002624	5,005	0.083333	0.002453	5,062
8	-0.006757	0.002086	3,845	0.013514	0.002118	3,968
9	-0.019737	0.001765	5,227	-0.013423	0.001688	4,519
10	0.000000	0.001497	4,766	0.000000	0.002150	5,072
11	-0.034247	0.001518	4,522	0.007092	0.000877	6,605
12	0.014388	0.002478	3,885	0.000000	0.002761	3,000
13	0.100839	0.001638	4,240	0.000000	0.001617	4,504

4. ASTRA INTERNATIONAL

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	-0.009346	0.002137	17,879	-0.018868	0.001950	23,625
2	0.019417	0.001652	13,500	0.000000	0.002671	14,115
3	0.012048	0.002754	30,177	0.000000	0.002786	32,893
4	-0.011494	0.002379	20,516	-0.023256	0.002406	18,153
5	0.014493	0.003468	35,307	-0.042254	0.003050	29,918
6	0.000000	0.002721	25,627	0.014706	0.003972	25,258
7	0.071429	0.002306	26,993	-0.026667	0.001995	28,043
8	0.082192	0.002738	31,428	-0.012658	0.003459	24,751
9	0.026316	0.002422	22,419	-0.012821	0.002085	24,830
10	-0.012821	0.003226	13,331	-0.012987	0.002639	23,000
11	0.000000	0.002741	21,946	-0.012987	0.001773	27,951

12	0.025974	0.002349	21,435	0.025641	0.002235	22,880
13	0.000000	0.002667	28,539	0.000000	0.001887	27,123

	Morning Loss					
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	0.000000	0.001851	14,814	0.009524	0.003192	10,929
2	-0.058252	0.002408	20,055	0.000000	0.000900	18,180
3	-0.041667	0.002131	20,319	-0.010870	0.002180	32,563
4	-0.066667	0.002286	18,040	0.000000	0.002973	34,010
5	-0.031746	0.004531	32,409	-0.027027	0.003447	27,566
6	-0.166667	0.003319	41,154	0.114754	0.002927	44,517
7	-0.037500	0.002731	23,999	-0.012987	0.002976	20,867

5. SEMEN GRESIK

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	0.000000	0.003901	2,500	0.000000	0.003285	2,145
2	0.000000	0.003897	1,375	0.006993	0.001912	2,915
3	0.006993	0.002744	2,972	-0.006944	0.002411	3,070
4	0.006993	0.002643	1,500	0.000000	0.002196	5,750
5	0.007143	0.003448	3,267	-0.007092	0.001274	5,339
6	0.000000	0.003276	4,136	-0.007353	0.001209	3,081
7	0.021898	0.003569	2,550	0.000000	0.003057	2,426
8	0.000000	0.001836	1,874	-0.014085	0.002040	1,990

	Morning Loss					
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	0.052980	0.004620	3,031	0.006623	0.064455	1,583
2	-0.006536	0.002668	2,333	-0.037736	0.008033	3,324
3	0.006667	0.002910	2,409	0.020270	0.019099	1,250
4	-0.006667	0.002865	3,353	0.006711	0.004478	4,119
5	0.047297	0.004738	4,882	0.000000	0.003001	2,500
6	-0.013158	0.005752	3,056	0.000000	0.022810	2,500
7	0.000000	0.000000	2,250	0.000000	0.003768	2,212
8	0.000000	0.004910	5,000	-0.006897	0.006603	2,300
9	0.021898	0.003066	3,009	-0.014286	0.005299	2,728
10	-0.007042	0.002875	1,917	0.000000	0.004392	1,000
11	0.014493	0.002776	3,329	-0.027778	0.002695	5,682
12	-0.007299	0.001852	3,521	-0.014388	0.002499	2,191

6. H. M. SAMPOERNA

No	Morning Gain					
	Morning			Afternoon		
	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	-0.007353	0.001735	15,028	-0.007407	0.001617	13,980
2	0.000000	0.002905	12,982	0.015152	0.001351	17,239
3	-0.015504	0.002347	6,059	0.000000	0.004615	12,556
4	0.008621	0.002916	17,529	-0.008547	0.001562	16,522
5	0.000000	0.002149	11,933	-0.017391	0.003028	20,436
6	0.008850	0.000868	15,226	-0.008772	0.002088	17,560
7	0.056604	0.001819	21,853	-0.017857	0.001403	34,056

8	0.026786	0.002093	18,391	0.000000	0.002166	21,482
9	0.008547	0.001721	13,673	0.008475	0.002711	11,248

Morning Loss

	Return	Risk	Av. Trd. Vol.	Return	Risk	Av. Trd. Vol.
1	0.007463	0.001834	31,591	0.007519	0.002562	21,391
2	0.007519	0.001162	22,445	0.000000	0.000856	8,125
3	0.007576	0.002360	9,029	0.000000	0.002505	10,352
4	-0.015152	0.002856	20,973	0.000000	0.002070	16,808
5	-0.007813	0.001899	18,023	-0.015385	0.002415	15,651
6	-0.017857	0.001966	18,445	-0.026087	0.006633	28,552
7	0.117647	0.002468	28,673	-0.064220	0.001723	14,348
8	-0.008772	0.001606	32,350	-0.008772	0.002184	27,724
9	0.009434	0.001887	21,380	-0.061947	0.001745	23,198
10	0.009434	0.002081	17,937	0.009524	0.002192	11,645
11	0.009434	0.001551	18,086	-0.009346	0.000868	10,772