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Intraday Speed of Adjustment and the Realized Variance in the Indonesia Stock Exchange

Zaäfri A. Husodo* and Thomas Henker

We examine the intraday trading and price dynamics for frequently traded stocks at the Indonesian Stock Exchange. Using trade price, time series generated at one, two, three, five, ten, fifteen, thirty and sixty-minute intervals, we estimate the speed of adjustment and the corresponding realized variance of these series. The objective of the estimation is to infer the noise impact to the deviation of observed prices from their fundamental value. The result from the speed of adjustment estimate is consistent with the realized variance estimator. Both conclude that the 50 most frequently traded stocks in the Indonesia Stock Exchange adjust to new information within 30 minutes. At the interval, the coefficient of the speed of price adjustment is insignificantly different from zero implying negligible noise impact to the observed price. Concurrently, the realized variance starts to stabilize at 30-minute interval purporting fading impact of noise to the realized variance estimate. The evidence justifies the use of realized variance at various intervals as a reliable indicator of price discovery rate in the Indonesia Stock Exchange.

Keywords: speed of adjustment, realized variance, noise

Introduction

As recognized at least since Hillmer and Yu (1979) Epps (1979), and Patell and Wolfson (1984), evidence that a market is quite efficient (Fama, 1970) over a daily horizon does not preclude inefficiencies at shorter horizons. This is because investors need time to absorb and act on new information.

It is long established that returns are not independent from trade-to-trade or even from minute-to-minute. It must take at least some time for astute investors to figure out what is happening to orders, to ascertain whether there is new pertinent information about values, and to expunge any serial dependence remaining after prices adjust to their new equilibrium levels. The horizon over which this activity takes place is the object of our study. We investigate the time required for prices to adjust to new information in the Indonesian equity market.

Other researchers have investigated questions similar to the one we address,

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but in highly specific contexts. In early work, Patell and Wolfson (1984) show that dividend and earnings announcements "interrupt" the usual pattern of return serial dependence for at least fifteen minutes and that prices do not revert completely to their normal serial correlation pattern for up to ninety minutes around the dividend announcement. Although they make no explicit statement about how this happens, they clearly have in mind the activities of arbitrageurs who offset the impulsive reactions of naïve investors to company announcements.

Garbade and Lieber (1977) formulate a model of independent changes in the equilibrium price coupled with random orders to sell to buy at quoted bid and ask prices. They use data on two stocks for a single month and find that this model does not describe price movements for short time intervals (a few minutes) though it is consistent with price movements over longer horizons. In concluding, Garbade and Lieber recognize that "…investors who monitor the market continually during the day…" might be instrumental in bringing about the observed pattern.

Epps (1979) studies price adjustments for a group of firms in the same industry (automobiles) and finds rapid but not instantaneous adjustments across firms to common news relevant for all industry firms. Correlations among the returns increase with the time interval, which suggests crossfirm variation in the speed of adjustment to new information. Epps' overall conclusion is that while "...the predictive value of a price change in one stock endures not much more than one hour,... the average lag in the response of prices (to new information) is more than 10 minutes" (p. 298).

More recently, Busse and Green (2002) find that news reports about individual stocks on the financial television network CNBC are incorporated into stock prices within one to two minutes.

Copeland (1976) and Hillmer and Yu (1979) develop related theoretical models. Copeland's model predicts a positive correlation between trading volume and both absolute price changes and positive skewness in volume; however, it does not include a provision for the activities of arbitrageurs. Hillmer and Yu, on the other hand, note that the incorporation of information into prices "cannot be completed instantaneously" because "...in practice an investor will not react unless he is convinced that it is advantageous." economically (p.321). Hillmer and Yu develop various alternative statistical models involving price, volume, and volatility, all inspired by the idea that investor/arbitrageurs watch the market closely and react occasionally. Their tests, however, involve only a handful of anecdotal events.

Much later, Chakrabarti and Roll (1999) formulate a model populated by Bayesian traders/arbitrageurs who observe each others trades and attempt to deduce the quality of their information. Simulations of the model show that the market usually converges more rapidly to an equilibrium price that is a better predictor of true value when arbitrageurs react to one another as opposed to trading solely on their own information.

Chordia, et al. (2005) use the order imbalance to analyse the market efficiency for 150 large stocks listed on the New York Stock Exchange for 1996, 1999 and 2002. They found the predictability of returns using imbalances at intervals of up to thirty minutes. The predictability indicates that it takes time for floor traders and other arbitrageurs to compute and react to imbalances. Since imbalances are not public information, outside traders in effect have to apply a rule akin to the Lee and Ready (1991) algorithm to deduce imbalance information, which is a possible reason for the modest predictability of returns out to thirty minutes. Their results suggest that wider dissemination of order imbalances by the exchange could bring faster convergence to efficiency.

This study focuses on the intraday activity of the most liquid stocks on the Indonesia Stock Exchange from 2000 to 2007. The intraday activity is an important feature of a stock exchange as it conveys vital information about how the market works. Studies exploring this activity have been focused on markets in the developed world where illiquidity problems for large stocks are fairly negligible. When intraday methodologies developed markets are applied to emerging markets, like Indonesia, the most likely problem is the market illiquidity. This problem, if it is not considered cautiously, could seriously impair any empirical results.

Previous study of the Indonesia Stock Exchange by Henker and Husodo (2006) find that the speed of adjustment for a group of large companies, hence the most liquid ones, is fair at a daily level. Further investigation in the study also finds that for most cases, serial dependence in returns for large stocks is close to zero over a daily horizon. Considering that evidence, our further investigation of the efficiencycreating process must focus on intra-day trading. We would like to measure the interval length required to efficiently measure realized volatility, so it seems sensible to examine frequently traded stocks for which short-term serial dependence can actually be observed. This suggests that very small stocks should be excluded, owing to the difficulty inherent in measuring serial dependence when trading is infrequent.

This study extends the current studies in the area of estimating the speed of adjustment, which mostly focused on the first moment, by analysing the second moment using the realized variance. The original work of Andersen, et al. (2000) uses variance signature plot to assess the impact of market microstructure bias on the realized variance estimates. In this study, we use variance signature plot at different frequency in conjunction with corresponding speed of adjustment to analyse the relation between the noise and the speed of adjustment level.

We find that, on average, the most liquid stocks in the Indonesia Stock Exchange adjust to new information in 30 minutes. Furthermore, we document the empirical relation of market microstructure noise and the speed of adjustment at intraday frequency. Using the realized variance to infer the noise, we find that there is a negative relation between microstructure noise and the speed of adjustment at intraday frequencies.

Literature Review

In this work we use the speed of adjustment estimation and variance signature plots to identify the time required for prices to adjust to new information. The main difference between the speed of adjustment estimation (Theobald and Yallup (2004)) and variance signature plots (Andersen, et al. (2000)) is in the identification of noise. In the former, the impact of noise can be inferred from the moving average component in the ARMA(1.1) structure. While in the latter. the impact of noise manifests itself in the realized variance sampled at high frequency. Both of the methodologies assume independent identically distributed (i.i.d) market microstructure noise in the security process.

The intervalling properties (Theobald and Yallup (2004)) of using ARMA(1,1) structure to estimate the speed of adjustment has a similar hypothesis as the variance signature plot in the way that noise dissipates from price over time. This is where the two methods coincide. Based on that similar hypothesis, we analyse the empirical relation between the

speed of adjustment coefficients and their corresponding realized variance. In the absence of noise, the speed of adjustment coefficient will be insignificantly different from one. A speed of adjustment coefficient significantly smaller (larger) than one would indicate an under-reaction (over-reaction) in the adjustment process. Andersen, et al. (2000) and Hansen and Lunde (2006) find that there is a positive bias to the realized variance estimate as the sampling frequency increases. Based upon those empirical findings in the speed of adjustment and realized variance, we conjecture that the speed of adjustment is negatively related with the realized variance. In order to analyse the empirical relation, we compare the level of speed of the speed of adjustment with the corresponding realized variance at a given sampling interval.

The application of variance signature plots in this study has different focus than Andersen, et al. (2000) and Hansen and Lunde (2006). They use variance signature plots to get a general idea of the optimal sampling interval to estimate efficient realized variance with as many observations with minimum as possible market microstructure bias. This study uses the variance signature plots to infer the impact of noise on the deviation of observed prices from their equilibrium.

Speed of Adjustment Estimation

Black (1986) introduces 'noise' as the factor that responsible for the deviation between actual security prices and their intrinsic values. He defines noise as the factor that makes observations imperfect, therefore obfuscating the expected return on a stock or portfolio of stocks.. The 'noise', which is incorporated by Amihud and Mendelson (1987) into a model of partial adjustment with noise, provides the framework for the analysis presented in this study. Their model was an empirical elucidation of the Goldman and Beja (1979) and Garbade and Silber (1979) theoretical model of a price adjustment which assumed that prices were driven by the environment through the market mechanism. The Amihud and Mendelson model distinguished between the intrinsic value of a security at time t, V_t , , and its observed price, P_t . The difference between value and price was attributable to noise (Black 1986). Formally, the model is represented as

$$P_{t} - P_{t-1} = \pi \left(V_{t} - P_{t-1} \right) + u_{t}, \qquad (1)$$

where V_t and P_t are in the natural logarithms and the value of π is in the range of $0 < \pi < 2$, The value of $\{u_t\}$, as commonly applied in the time series literature, has mean zero and finite variance σ^2 . The coefficient π , or speed of adjusment coefficient, captures the difference between observed price and value. In addition, π = 0 is an extreme case where there is no adjustment of price to its intrinsic value, and $0 < \pi < 1$ is called a partial adjustment. Furthermore, a unit adjustment (π =1) means a full adjustment with noisy process, since Eq.(1) reads

$$P_{t} = V_{t} + u_{t}, \qquad (2)$$

i.e. (log) price is given by (log) value plus noise. When the $\pi > 1$, there is an overshooting or overreaction of traders to new information.

Roll (1995) develops an estimation method based on ordinary least squares (OLS) to provide a simpler yet more consistent estimation of the speed of adjustment. He develops the method especially suited to deal with data from the Indonesia Stock Exchange. Specifically, Roll re-expressed the basic setup of Amihud and Mendelson into return form in the following form:

$$R_{t} = \pi \Delta V_{t} + (1 - \pi) R_{t-1} + \Delta u_{t}, \qquad (3)$$

Zaäfri A. Husodo and Thomas Henker

Moreover, Amihud and Mendelson assumed that the unobservable change in log true value $V_t V_{t-1}$ should be equal to a mean expected rate of return, plus a time-independent, zero mean disturbance, e_t ; therefore, (3) can be written as

$$R_t = m + bR_{t-1} + \zeta_t, \qquad (4)$$

where $b\equiv 1-\pi$ and $\zeta\equiv\pi e_t+u_t-u_{t-1}$. However, the estimated slope is biased because the disturbance is still related to the explanatory variable. In addition, Hamilton (1994) argued that the estimation of autoregressive coefficient would produce a downward bias in the OLS setup, therefore the estimate of π will be upward biased.

Further refinement of the estimation of was proposed by Theobald and Yallup (2004) who developed an ARMA (1,1) estimator for Amihud and Mendelson's basic setup. Instead of eliminating the serial dependence in ζ by using every other observation, as Roll did in his model, Theobald and Yallup reformulated Eq.(3) into

$$R_{t} = \pi \mu + (1 - \pi) R_{t-1} + \mu e_{t} + u_{t} - u_{t-1}, \qquad (5)$$

modelling Within this structure. the autocorrelations induced by under/ overreactions are reflected as an ARMA(1,1) process. Effectively, the price adjustment effects manifest themselves within the AR(1) coefficient which will provide an estimate for the speed of adjustment coefficient. A unit adjustment coefficients(i.e. $\pi=1$) represents "full" price adjustment; the process will be an MA(1)process. Specifically, "noise" exclusively drives the return process. Additionally, stationarity condition requires that the autoregressive component be $|1-\pi| < 1$, i.e. $0 < \pi < 2$, which corresponds to the conditions imposed by Amihud and Mendelson (1987) to ensure that returns were finite when they

developed their model.

$$\mathbf{R}_{i,t} = \mathbf{c} + \rho_i \mathbf{R}_{i,t-1} + \varepsilon_{i,t+i}, \boldsymbol{\theta}_{t-1}, \qquad (6)$$

where $R_{i,t}$ is return of stock i at intraday interval t, ρ and θ were coefficients of the autoregressive and the moving average component respectively. Effectively, the speed of adjustment for each stock was recovered from ρ , where $\rho=1-\pi$ as in Eq.(5). Furthermore, the cross-sectional average of speed of adjustment was tested for statistical significance from full adjustment (i.e. $\pi = 1$) using a t-test. The ARIMA(1,1) estimation as in Eq.(6) is applied to the various intraday interval in this study.

Realized Variance

Assume the availability of M + 1 equispaced price observation over a fixed time span [0,1] (say, a trading day), so that the distance between observations is δ =1/M. The logarithmic observed price $p_{j\delta}$ as the sum of logarithmic efficient price $p_{j\delta}^{*}$, i.e., the price that would prevail in the absence of market microstructure frictions, and logarithmic market microstructure noise $\eta_{i\delta}$.

$$\widetilde{p}_{j\delta} = p^*_{j\delta} + \eta_{j\delta}, \qquad j = 0, 2, \dots, M \quad (7)$$

Both are unobservable. Similarly, in terms of continuously compounded returns,

$$\widetilde{r}_{j\delta} = r^*_{j\delta} + \varepsilon_{j\delta}, \qquad j = 1,...,M \qquad (8)$$

where

$$\widetilde{r}_{j\delta} = \widetilde{p}_{j\delta} + \widetilde{p}_{(j-1)\delta}, \qquad (9)$$

$$\boldsymbol{r}_{\boldsymbol{j}\boldsymbol{\delta}} = \boldsymbol{p}^*_{\boldsymbol{j}\boldsymbol{\delta}} + \boldsymbol{p}^*_{\boldsymbol{(j-1)}\boldsymbol{\delta}}, \qquad (10)$$

and

$$\varepsilon = \eta_{j\delta} + \eta_{(j-1)\delta}, \qquad j = 1, 2, \dots, M \quad (11)$$

Eq.(3-9) and Eq.(3-10) have obvious interpretations in terms of efficient return and microstructure noise in the return

17

process.

Following the previous formulations, the realized variance at frequency δ is defined by,

$$RV^{M} \equiv \sum_{j=1}^{M} \tilde{r}_{j\delta}^{2} , \qquad (12)$$

and the daily average of realized variance is

$$RV^{M} = \frac{1}{n} \sum_{n=1}^{n} RV^{M} , \qquad (13)$$

The well-known problem of realized variance estimation is the trade-off between using the highest sampling frequency to make the estimation efficient and minimizing the market microstructure bias as the sampling frequency increases. Andersen, et al. (2000) provide a useful tool to assess the severity of market microstructure bias on the realized variance as the sampling frequency increases by plotting the average realized volatility against the sampling frequency. The plot is well-known as the "volatility signature plot".

Methodology

Sampling Schemes

Intraday returns can be constructed using different types of sampling schemes. The first and the most widely used is calendar time sampling (CTS), where the intervals are equidistant in calendar time. For example, the prices may be sampled every 5 or 15 minutes. CTS requires the construction of artificial prices from the raw (irregularly spaced) price data (transaction prices or quotations). The recorded prices are transformed to equidistant intervals of a particular minute duration using either the previous tick method (Wasserfallen and Zimmermann (1985)) or linear interpolation method (Andersen and Bollerslev (1997)). Hansen and Lunde (2006) show that the previous tick method is a sensible way to sample prices in calendar time. The second

sampling alternative is transaction time sampling (TrTS), where prices are recorded every mth transaction. The third sampling scheme is business time sampling (BTS). The last sampling scheme is tick time sampling (TTS), where prices recorded at every price change. An important difference among different sampling schemes is that the observation times under BTS are latent, whereas in CTS, TrTS, and TTS, the observation times are observed.

In this study, CTS is used as sampling schemes to provide the comparability with the speed of adjustment coefficient which is estimated using equidistant interval.

The Data

The data employed in the study, which was obtained from SIRCA, consist of timestamped trades and quotes, and volumes of trades, bid and ask prices for stocks in the Indonesia Stock Exchange during 2000-2007. WEselect the fifty most frequently traded stocks to be included in the sample. This filtering is an important step to study the intraday properties of transaction data because the illiquidity is a paramount feature in the developing market as in the Indonesia Stock Exchange. Therefore, failure to select the liquid stocks properly would impair our results. Sampled stocks are presented in Table 1. The yearly average trading frequency from 2000 to 2007 for all stocks is 46,213 whereas the average trading frequency for each sampled stock varies from 12,025 to 168,419.

To analyse the dynamic of the speed of adjustment at a trading day, one-, two,three-, five-, ten-, fifteen-, thirty- and sixtyminute interval of transaction price are generated. We find that multiple transaction prices often have the same time stamp. The various transaction prices are all proxies for the (same) latent efficient price at that particular point in time. Although it is unclear how to best handle such observations, a

Zaäfri A. Husodo and Thomas Henker

1 AALI 1 6423 74.988 64.537 39.394 31.258 25.492 25.672 67.312 43.135 2 ANTM 23.597 26.210 27.824 26.681 54.802 55.6849 104.192 55.66.444 109.537 3 ASGR 50.469 68.298 33.716 28.806 16.482 32.032 18.052 64.039 38.987 4 ASII 142.213 187.679 97.978 72.375 95.850 118.178 114.446 125.436 63.893 6 BBNI 4.429 6.066 13.604 29.653 8.255 6.110 23.811 114.948 25.604 43.893 9 BMTR 67.571 46.101 13.376 3.217 4.833 3.680 16.740 69.929 28.201 10 BNBR 11.942 5.642 5.990 15.613 50.156 74.242 13.6264 49.677 13 BUMI 19.997 17.438 50.156 74.243 356.56 9.817 14.925.844 14.9777 </th <th>No Ticker</th> <th colspan="9">Trading Frequency</th>	No Ticker	Trading Frequency								
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3 ASGR 50,469 68,298 33,716 28,806 16,422 32,032 18,052 64,039 38,987 5 BBCA 9,865 40,892 81,393 73,889 66,767 69,522 89,729 78,543 63,893 6 BBNI 4,429 6,066 13,604 29,653 8,256 6,110 23,811 11,494 25,864 7 BHIT 57,530 26,070 17,165 4,674 5,135 4,649 16,740 69,929 28,201 10 BNBR 11,942 15,104 11,376 3,217 4,983 3,690 16,740 69,929 28,201 11 BNGA 6,423 5,921 35,990 15,413 50,156 74,226 136,624 49,875 13 BUMI 19,997 17,438 7,568 9,790 108,366 19,848 55,029 37,520 25,643 16 CTRA 7,069 16,662 9,412 13,485 7,016 38,857 63,703 30,966 26,705 37,144 17 CTRS 7,698 10,685 2,712 3,760 19,264<	2 ANTM	23,597	26,210	27.824	26.681	54,802	56.349	104,192	556,644	109.537
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8 BLTA 15,740 10,198 10,978 7,424 13,224 66,916 140,962 86,470 43,989 9 BMTR 11,942 15,104 11,554 17,779 88,813 76,694 67,980 196,215 60,760 11 BNGA 6,423 5,921 35,990 15,413 50,156 7,4248 74,226 46,340 137,158 41,157 12 BNIN 17,872 16,669 8,859 25,028 44,711 32,621 46,340 137,158 41,157 13 BUMI 19,997 17,438 7,568 90,990 108,366 109,849 5,170 16,559 22,682 15 CINA 7,669 15,662 9,412 13,485 7,016 38,850 55,029 30,966 26,705 18 DSFI 42,578 30,084 63,381 10,203 4,681 6,643 2,953 20,123 22,865 19 FPMI 17,339 8,	7 BHIT	57,530	26,070	17,165	4,674	5,135	4,645	11,727	95,090	27,755
9 BMTR 67,571 46,101 13,376 3,217 4,983 3,690 16,740 69,929 28,201 10 BNGA 6,423 5,921 35,990 15,413 50,156 77,428 74,226 136,624 49,875 12 BNIM 19,997 17,438 7,568 90,790 108,366 19,849 85,394 359,695 99,887 14 CFIN 35,489 11,585 14,042 28,044 46,283 19,485 5,170 16,555 22,082 15 CMNP 27,369 15,662 9,412 13,485 7,016 8,850 55,029 37,520 25,543 16 CTRS 7,688 10,855 2,712 32,760 19,264 46,679 63,703 30,966 26,705 19 EPMT 17,339 8,812 9,518 16,110 17,429 12,344 24,078 16,866 15,665 20 FASW 66,732 11,451 34,545	8 BLTA	15,740	10,198	10,978	7,424	13,224	66,916	140,962	86,470	43,989
10 BNBR 11,942 15,104 11,554 17,779 88,813 76,694 67,980 196,215 60,760 12 BNII 17,872 16,669 8,859 25,028 44,711 32,621 46,340 137,158 41,157 13 BUMI 19,997 17,438 7,568 90,709 108,366 109,849 85,343 359,665 9,887 14 CFIN 35,489 11,565 14,042 28,041 46,283 19,485 5,170 16,559 22,082 37,144 16 CFRA 7,060 5,140 2,119 38,595 24,957 63,381 10,926 45,618 2,053 30,966 26,706 18 DSFI 42,578 30,094 63,381 10,323 8,687 9,446 21,488 33,120 20,622 21,652 21 GGRM 11,443 0,613 34,561 5,534 46,43 2,488 31,120 20,622 21,418 33,120 20,622 2,411 12,625 2,561 5,514 67,436 39,414 <	9 BMTR	67,571	46,101	13,376	3,217	4,983	3,690	16,740	69,929	28,201
11 BNGA 6.423 5.921 35.990 15.413 50.156 74.248 74.226 136.624 49.875 13 BUMI 17.872 16.669 8.859 25.028 44.711 32.621 46.340 137.158 41.157 13 BUMI 19.997 17.438 7.568 90.790 108.366 19.845 5.170 16.559 22.082 15 CMNP 27.369 15.662 9.412 13.485 7.016 55.029 97.520 25.643 16 CTRA 7.669 10.855 2.712 32.760 19.264 45.679 63.703 30.966 26.705 18 DSFI 42.578 30.084 63.381 10.230 4.681 6.648 2.9478 10.7123 22.585 21 GGRM 119.444 164.172 13.3464 24.078 16.866 15.685 21 GGRM 119.444 164.178 103.143 14.974 103.143 11.9714 103.143 11.9714 103.143 11.9714 10.752 11.9714 10.752 <td>10 BNBR</td> <td>11,942</td> <td>15,104</td> <td>11,554</td> <td>17,779</td> <td>88,813</td> <td>76,694</td> <td>67,980</td> <td>196,215</td> <td>60,760</td>	10 BNBR	11,942	15,104	11,554	17,779	88,813	76,694	67,980	196,215	60,760
12 BINII 17,872 16,669 8,859 25,028 44,711 32,621 46,340 137,158 41,157 13 BUMI 19,997 17,438 7,568 90,790 108,366 109,499 85,94 359,685 99,887 14 CFIN 35,489 11,585 14,042 28,041 46,283 19,485 5,170 16,559 22,082 16 CTRA 7,060 5,140 2,119 38,595 24,957 19,384 109,689 90,205 37,144 17 CTRS 7,698 10,855 2,712 32,760 19,264 46,679 63,703 30,966 26,705 18 DSFI 42,578 30,084 63,381 10,230 4,681 6,448 2,953 20,123 22,582 20 FASW 66,722 11,452 3,730 10,323 8,687 9,446 21,488 34,312 0,262 22,643 31,16 62,759 22 GUTL 37,441 24,340 36,539 52,756 5,821 67,436 39,941	11 BNGA	6,423	5,921	35,990	15,413	50,156	74,248	74,226	136,624	49,875
13 BUMI 19,997 17,438 7,568 90,790 108,366 109,849 85,394 359,685 99,887 14 CFIN 35,489 11,585 14,042 28,041 46,283 19,485 5,170 16,559 22,082 15 CMNP 27,369 15,662 9,412 13,485 7,016 38,850 55,029 37,520 25,543 16 CTRA 7,060 5,140 2,119 38,595 24,957 19,384 10,689 90,205 37,144 17 CTRS 7,698 10,855 2,712 32,760 19,264 45,679 63,703 30,966 26,705 18 DSFI 42,578 30,084 63,381 10,230 4,681 66,48 2,953 20,123 22,585 21 GGRM 119,448 114,171 103,163 45,481 34,357 38,445 27,181 19,781 62,759 23 IGAR 11,446 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 162,103 13,113,159170 81,347 49,503 </td <td>12 BNII</td> <td>17,872</td> <td>16,669</td> <td>8,859</td> <td>25,028</td> <td>44,711</td> <td>32,621</td> <td>46,340</td> <td>137,158</td> <td>41,157</td>	12 BNII	17,872	16,669	8,859	25,028	44,711	32,621	46,340	137,158	41,157
14 CFIN 35,489 11,585 14,042 28,041 46,283 19,485 5,170 16,559 22,082 15 CMNP 27,369 15,662 9,412 13,485 7,016 38,850 55,029 37,520 25,543 16 CTRA 7,060 5,140 2,119 38,595 24,957 19,384 109,689 90,205 37,144 17 CTRS 7,698 10,855 2,712 32,760 19,264 45,679 63,703 30,966 26,705 18 DSFI 42,578 30,004 63,381 10,230 4,681 6,648 2,953 20,123 22,585 19 EPMT 17,339 8,812 9,518 16,110 17,429 15,334 24,078 16,856 15,688 22 GJTL 37,541 24,340 36,539 52,555 52,821 67,436 39,941 31,766 39,486 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 164,343 74,832 64,666 37,633 <td< td=""><td>13 BUMI</td><td>19,997</td><td>17,438</td><td>7,568</td><td>90,790</td><td>108,366</td><td>109,849</td><td>85,394</td><td>359,695</td><td>99,887</td></td<>	13 BUMI	19,997	17,438	7,568	90,790	108,366	109,849	85,394	359,695	99,887
15 CMNP 27,369 15,662 9,412 13,485 7,016 38,850 55,029 37,520 25,543 16 CTRA 7,060 5,140 2,119 38,595 24,957 19,384 109,689 90,205 37,144 17 CTRS 7,698 10,855 2,712 32,760 19,264 45,679 63,703 30,966 26,705 18 DSFI 42,573 30,084 63,381 10,230 4,681 6,648 2,953 20,123 22,585 19 EPMT 17,339 8,812 9,518 16,110 17,429 15,334 24,078 16,856 15,685 21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 27,218 19,766 39,446 21,488 33,120 20,622 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,207 5,892 32,041 12,026 7,898 26,914 25 INKP 162,103 113,18 59,170 81,347 49,503 100,046 7,792 22,863 46,713 49,606	14 CFIN	35,489	11,585	14,042	28,041	46,283	19,485	5,170	16,559	22,082
16 CTRA 7,060 5,140 2,119 38,595 24,957 19,384 109,689 90,205 37,144 17 CTRS 7,698 10,855 2,712 32,760 19,264 45,679 63,703 30,966 26,705 18 DSFI 42,578 30,084 63,381 10,230 4,681 6,648 2,953 20,123 22,585 20 FASW 66,732 11,452 3,730 10,323 8,687 9,446 21,488 33,120 20,622 22 GJTL 37,541 24,340 36,539 52,505 25,821 67,436 39,441 11,027 5,892 32,041 12,025 24 INDF 164,343 74,822 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INKP 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INTP 17,946 19,332 13,598 21,931 31,465 442,974 40,616 27,393 28,414 71,638 140,026 76,836 97,393 </td <td>15 CMNP</td> <td>27,369</td> <td>15,662</td> <td>9,412</td> <td>13,485</td> <td>7,016</td> <td>38,850</td> <td>55,029</td> <td>37,520</td> <td>25,543</td>	15 CMNP	27,369	15,662	9,412	13,485	7,016	38,850	55,029	37,520	25,543
17 CTRS 7,698 10,855 2,712 32,760 19,264 45,679 63,703 30,966 22,6705 18 DSF1 42,578 30,084 63,381 10,230 4,681 6,648 2,953 20,122 22,585 19 EPMT 17,339 8,812 9,518 16,110 17,429 15,334 24,078 16,856 15,685 21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 27,218 19,781 62,759 22 GJTL 37,541 24,400 36,539 52,505 25,821 67,436 39,941 31,766 39,486 24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INKP 170,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JHD 30,048 15,423 14,187 14,88	16 CTRA	7,060	5,140	2,119	38,595	24,957	19,384	109,689	90,205	37,144
18 DSFI 42,578 30,084 63,381 10,230 4,681 6,648 2,953 20,123 22,585 20 FASW 66,732 11,452 3,730 10,323 8,687 9,446 21,488 33,120 20,622 21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 27,218 19,781 62,394 22 GJTL 37,541 24,340 36,539 52,505 25,821 67,436 39,941 31,766 39,446 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INFP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,333 29 KIJA 10,029 6,539 7,480 10,744 <td>17 CTRS</td> <td>7,698</td> <td>10,855</td> <td>2,712</td> <td>32,760</td> <td>19,264</td> <td>45,679</td> <td>63,703</td> <td>30,966</td> <td>26,705</td>	17 CTRS	7,698	10,855	2,712	32,760	19,264	45,679	63,703	30,966	26,705
19 EPMT 17,339 8,812 9,518 16,110 17,429 15,334 24,078 16,856 15,685 20 FASW 66,732 11,452 3,730 10,323 8,687 9,446 21,488 33,120 20,622 21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 27,218 19,781 62,769 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951	18 DSFI	42,578	30,084	63,381	10,230	4,681	6,648	2,953	20,123	22,585
20 FASW 66,732 11,452 3,730 10,323 8,687 9,446 21,488 33,120 20,622 21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 72,18 19,781 62,759 22 GJTL 37,541 24,340 36,539 52,505 25,821 67,436 39,941 31,766 39,486 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 25 INKP 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INTP 17,946 19,323 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 29 KIJA 10,929 6,539 7,480 10,707 </td <td>19 EPMT</td> <td>17,339</td> <td>8,812</td> <td>9,518</td> <td>16,110</td> <td>17,429</td> <td>15,334</td> <td>24,078</td> <td>16,856</td> <td>15,685</td>	19 EPMT	17,339	8,812	9,518	16,110	17,429	15,334	24,078	16,856	15,685
21 GGRM 119,448 114,178 103,163 45,481 34,357 38,445 27,218 19,781 62,759 22 GJTL 37,541 24,340 36,539 52,505 25,821 67,436 39,941 31,766 39,486 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INKP 172,118 59,170 81,347 49,560 130,424 49,660 64,659 88,748 26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 180,903 35,575 180,334 36,990 30 KLBF 41,563 37,037 40,938 <td< td=""><td>20 FASW</td><td>66,732</td><td>11,452</td><td>3,730</td><td>10,323</td><td>8,687</td><td>9,446</td><td>21,488</td><td>33,120</td><td>20,622</td></td<>	20 FASW	66,732	11,452	3,730	10,323	8,687	9,446	21,488	33,120	20,622
22 GJTL 37,541 24,340 36,539 52,505 25,821 67,436 39,941 31,766 39,486 23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INKP 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,026 25,951 29 KIJA 10,929 6,539 7,074 5,085 5,422 16,824 28,240 31 LPL 136,451 39,887 9,629 5,546 7,078 5,085	21 GGRM	119,448	114,178	103,163	45,481	34,357	38,445	27,218	19,781	62,759
23 IGAR 11,464 6,614 8,276 15,365 5,314 11,237 5,892 32,041 12,025 24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,7722 25 INKP 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 85,751 58,571 47,678 31 LPL 136,451 39,887 9,629 5,546 7,078 5,085 5,422 18,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 </td <td>22 GJTL</td> <td>37,541</td> <td>24,340</td> <td>36,539</td> <td>52,505</td> <td>25,821</td> <td>67,436</td> <td>39,941</td> <td>31,766</td> <td>39,486</td>	22 GJTL	37,541	24,340	36,539	52,505	25,821	67,436	39,941	31,766	39,486
24 INDF 164,343 74,832 64,506 37,563 30,983 90,769 99,336 140,006 87,792 25 INKP 162,103 113,118 59,170 81,347 49,503 130,424 49,660 64,659 88,748 26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,022 25,551 29 KUJA 10,929 6,539 7,480 10,704 50,146 44,208 35,578 130,334 36,990 20 KLBF 41,663 37,037 40,938 29,863 70,778 5,085 5,422 16,824 28,240 21 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 31 LFL 20,744 9,472 7,792 12,244	23 IGAR	11,464	6,614	8,276	15,365	5,314	11,237	5,892	32,041	12,025
25 INKP 162,103 113,118 59,170 81,347 49,503 120,424 49,660 64,659 88,748 26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 29 KIJA 10,929 6,539 7,480 10,704 50,146 44,208 35,575 185,571 47,678 31< LPL	24 INDF	164,343	74,832	64,506	37,563	30,983	90,769	99,336	140,006	87,792
26 INTP 17,946 19,392 13,598 21,931 31,465 42,974 40,616 27,389 26,914 27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JIHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 29 KIJA 10,929 6,539 7,480 10,704 50,146 44,208 35,578 130,334 36,990 30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 56,571 47,678 31 LPL 136,451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,6404 40,406 24,399 10,653 39,946	25 INKP	162,103	113,118	59,170	81,347	49,503	130,424	49,660	64,659	88,748
27 ISAT 87,400 98,583 120,701 75,262 92,643 78,695 149,026 76,836 97,393 28 JHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 29 KUA 10,929 6,539 7,480 10,704 50,146 44,208 35,578 130,334 36,990 30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 85,751 58,571 28,671 42,82,40 31 LPL 136,451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,346 21,969 18,099 28,843 33,028 37 MTDL 81,590 53,857 31,272	26 INTP	17,946	19,392	13,598	21,931	31,465	42,974	40,616	27,389	26,914
28 JHD 30,048 15,423 14,187 14,881 48,141 51,887 18,960 14,082 25,951 29 KIJA 10,929 6,539 7,480 10,704 50,146 44,208 35,578 130,334 36,990 30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 85,751 58,571 47,678 31 LPLI 136,451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,404 40,466 24,399 10,653 19,964 54,603 95,773 15,700 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,392 39 RALS 19,565 22,000 37,698 13,925	27 ISAT	87,400	98,583	120,701	75,262	92,643	78,695	149,026	76,836	97,393
29 KIJA 10,929 6,539 7,480 10,704 50,146 44,208 35,578 130,334 36,990 30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 85,751 58,571 47,678 31 LPLI 136,451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,20 33,821 26,833 34 MEDC 46,404 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 33,028 37 MTDL 81,505 54,221	28 JIHD	30,048	15,423	14,187	14,881	48,141	51,887	18,960	14,082	25,951
30 KLBF 41,563 37,037 40,938 29,863 46,713 40,987 85,751 58,571 47,678 31 LPLI 136,6451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,04 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,316 81,90 3,196 114,613 39,202 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613	29 KIJA	10,929	6,539	7,480	10,704	50,146	44,208	35,578	130,334	36,990
31 LPLI 136,451 39,887 9,629 5,546 7,078 5,085 5,422 16,824 28,240 32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,404 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 30,028 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,9157 37,776 40 SMCB 115,566 9,634 36,529 61,729	30 KLBF	41,563	37,037	40,938	29,863	46,713	40,987	85,751	58,571	47,678
32 LSIP 19,682 6,159 10,077 24,367 33,471 40,869 46,220 33,821 26,833 33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,404 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,314 8,190 3,196 114,613 39,202 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 56,175 60,827 35,50 26,679 22,690 40 SMCB 115,566 9,634 3	31 LPLI	136,451	39,887	9,629	5,546	7,078	5,085	5,422	16,824	28,240
33 LTLS 20,744 9,472 7,792 12,324 12,519 22,267 8,594 25,103 14,852 34 MEDC 46,404 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 33,028 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,902 41 SMGR 22,575 39,561 35,726 13,675 14,752 7,538 14,464 31,809	32 LSIP	19,682	6,159	10,077	24,367	33,471	40,869	46,220	33,821	26,833
34 MEDC 46,404 40,406 24,399 10,653 19,964 54,603 95,773 157,800 56,250 35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 33,028 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 39 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,279 22,690 40 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490	33 LTLS	20,744	9,472	7,792	12,324	12,519	22,267	8,594	25,103	14,852
35 MLPL 134,065 97,715 45,865 32,273 42,145 43,107 15,160 80,837 61,396 36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 33,028 37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 39 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,279 22,690 40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,909 42,536 42 TINS 32,134 42,844 16,282 26,494 38,61 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,554 15,942 23,464 21,567 140,961 22,395	34 MEDC	46,404	40,406	24,399	10,653	19,964	54,603	95,773	157,800	56,250
36 MPPA 83,328 51,102 32,347 19,208 9,326 21,969 18,099 28,843 33,028 7 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 39 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,6279 22,690 40 SMCB 115,566 9,634 36,529 61,725 7,538 14,464 31,809 22,536 41 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 36,361 34,797 50,214 276,460 64,702 43 TKIM 64,243 62,554 15,942 <t< td=""><td>35 MLPL</td><td>134,065</td><td>97,715</td><td>45,865</td><td>32,273</td><td>42,145</td><td>43,107</td><td>15,160</td><td>80,837</td><td>61,396</td></t<>	35 MLPL	134,065	97,715	45,865	32,273	42,145	43,107	15,160	80,837	61,396
37 MTDL 81,590 53,857 31,272 11,085 9,814 8,190 3,196 114,613 39,202 38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 39 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,279 22,690 40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,902 41 <smgr< td=""> 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42<tins< td=""> 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43<tkim< td=""> 68,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45<tmpi< td=""> 67,354 15,270 6,876 4,362 6,004</tmpi<></tkim<></tins<></smgr<>	36 MPPA	83,328	51,102	32,347	19,208	9,326	21,969	18,099	28,843	33,028
38 PNBN 20,411 17,159 28,664 40,350 50,429 48,682 57,353 39,157 37,776 99 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,279 22,690 40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,902 41 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,554 15,942 23,464 21,567 44,096 22,395 16,980 33,905 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 45 TMPI 67,354 15,270 6,876 4,409 10,670 5,132 30,105 18,470	37 MTDL	81,590	53,857	31,272	11,085	9,814	8,190	3,196	114,613	39,202
39 RALS 19,565 22,000 37,698 13,925 19,191 19,275 23,590 26,279 22,690 40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,902 41 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,2554 15,942 23,464 21,567 14,096 22,395 16,980 33,905 44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,90	38 PNBN	20,411	17,159	28,664	40,350	50,429	48,682	57,353	39,157	37,776
40 SMCB 115,566 9,634 36,529 61,729 54,296 56,175 60,829 68,457 57,902 41 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,554 15,942 23,464 21,567 44,096 22,395 16,980 33,905 44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 51,32 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104	39 RALS	19,565	22,000	37,698	13,925	19,191	19,275	23,590	26,279	22,690
41 SMGR 22,759 39,561 35,726 13,675 14,752 7,538 14,464 31,809 22,536 42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,554 15,942 23,464 21,567 44,096 22,395 16,980 33,905 44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 2,8873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 90 UNTR 38,408 103,202 70,667 50,026 <td>40 SMCB</td> <td>115,566</td> <td>9,634</td> <td>36,529</td> <td>61,729</td> <td>54,296</td> <td>56,175</td> <td>60,829</td> <td>68,457</td> <td>57,902</td>	40 SMCB	115,566	9,634	36,529	61,729	54,296	56,175	60,829	68,457	57,902
42 TINS 32,134 42,844 16,282 26,494 38,361 34,797 50,214 276,490 64,702 43 TKIM 64,243 62,554 15,942 23,464 21,567 44,096 22,395 16,980 33,905 44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 90 UNR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140	41 SMGR	22,759	39,561	35,726	13,675	14,752	7,538	14,464	31,809	22,536
43 TKIM 64,243 62,554 15,942 23,464 21,567 44,096 22,395 16,980 33,905 44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,592 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140	42 TINS	32,134	42,844	16,282	26,494	38,361	34,797	50,214	276,490	64,702
44 TLKM 158,879 218,362 198,571 122,572 119,691 125,479 142,554 261,246 168,419 45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,592 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532	43 TKIM	64,243	62,554	15,942	23,464	21,567	44,096	22,395	16,980	33,905
45 TMPI 67,354 15,270 6,876 4,362 6,004 7,060 20,443 292,153 52,440 46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,598 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532	44 TLKM	158,879	218,362	198,571	122,572	119,691	125,479	142,554	261,246	168,419
46 TRIM 52,565 5,724 4,988 4,485 34,094 10,670 5,132 30,105 18,470 47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,592 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532	45 TMPI	67,354	15,270	6,876	4,362	6,004	7,060	20,443	292,153	52,440
47 TRST 22,208 5,033 9,267 14,900 15,517 8,213 2,887 25,873 12,987 48 TSPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,598 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532	46 TRIM	52,565	5,724	4,988	4,485	34,094	10,670	5,132	30,105	18,470
48 ISPC 26,138 16,125 13,902 14,525 8,030 6,722 31,876 37,104 19,303 49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,598 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532	47 TRST	22,208	5,033	9,267	14,900	15,517	8,213	2,887	25,873	12,987
49 TURI 11,246 9,445 23,779 10,388 15,350 6,250 2,708 53,614 16,598 50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532 Aurorea 50,007 40,020 24,707 20,026 43,840 89,129 62,843 90,140 68,532	48 TSPC	26,138	16,125	13,902	14,525	8,030	6,722	31,876	37,104	19,303
50 UNTR 38,408 103,202 70,667 50,026 43,840 89,129 62,843 90,140 68,532 Augrege F0,007 40,220 24,707 20,220 23,682 41,222 40,227 00,505 40,027 00,027 40,027 <td>49 TURI</td> <td>11,246</td> <td>9,445</td> <td>23,779</td> <td>10,388</td> <td>15,350</td> <td>6,250</td> <td>2,708</td> <td>53,614</td> <td>16,598</td>	49 TURI	11,246	9,445	23,779	10,388	15,350	6,250	2,708	53,614	16,598
Average E0.007 40.000 04.707 00.000 00.680 44.000 40.007 00.505 40.000	50 UNTR	38,408	103,202	70,667	50,026	43,840	89,129	62,843	90,140	68,532
	Average	E0.007	40.220	24 707	20.220	22.692	41.200	46.027	02 505	46.010

Table 1 Yearly Trading Frequency

The trading frequency is accumulation of daily trading frequency in a year.

simple and natural estimate of the efficient price (at time t) is the average transaction price (at time t). This is the approach that we take.

The trading hours in the Indonesia Stock Exchange (IDX) on Monday to Thursday are different from those on Friday. In the latter, the IDX trades for only 240 minutes rather than 300 minutes from Monday to Thursday. The trading is executed in two sessions separated by lunch break. Each trading day is initialized by pre-opening session from 09:10:00 to 09:25:00 when buying and selling orders are sent to Jakarta Automated Trading System (JATS), after that, from 09:25:01 to 09:25:59, JATS allocates the orders and forms opening stock

prices. For Monday to Thursday, the preopening session is followed by first trading session from 09:30 to 12:00 and after lunch break, second trading session initiates from 13:30 to 16:00. Friday trading starts from 09:30 to 11:30 for first session and, after long break for Friday congregational prayer, second trading session resumes from 14:00 to 16:00. As a result, this study manipulates minutes so that the total minutes for each session can be divided evenly into the interval under investigation. For example, the 60-minute interval is problematic since the total trading period for a session is 150 minutes from Monday to Thursday and 120 minutes on Friday. To overcome this problem, this research generates a 60-

Table 2 Yearly Average Speed of adjustment at Various Interval

The speed of adjustment is estimated using ARIMA (1,1) from the 30 most frequently traded
stocks in the Indonesia Stock Exchange. T values are presented in parentheses; they are
estimated using bootstrap method with replacement replicated on the order of 1000.

Intervals	ls Year							
	2000	2001	2002	2003	2004	2005	2006	2007
1-min	0.87	0.87	0.89	0.85	0.90	0.86	0.87	0.87
	(-3.67)*	(-2.78)*	(-4.32)*	(-6.87)*	(-1.93)	(-4.00)*	(-5.85)*	(-2.94)*
2-min	0.81	0.81	0.85	0.83	0.89	0.83	0.86	0.77
	(-5.18)*	(-2.92)*	(-5.09)*	(-5.45)*	(-2.66)*	(-7.17)*	(-2.56)*	(-4.64)*
3-min	0.82	0.76	0.83	0.82	0.87	0.79	0.87	0.78
	(-3.58)*	(-2.22)*	(-6.32)*	(-5.97)*	(-1.72)	(-6.22)*	(-1.59)	(-5.33)*
5-min	0.79	0.76	0.88	0.82	0.89	0.79	0.87	0.80
	(-2.71)*	(-4.80)*	(-2.71)*	(-6.89)*	(-1.88)	(-5.36)*	(-4.79)*	(-3.90)*
10-min	0.83	0.82	0.94	0.85	0.92	0.84	0.86	0.92
	(-3.15)*	(-7.62)*	(-2.07)*	(-4.50)*	(-1.50)	(-5.35)*	(-2.23)*	(-1.41)
15-min	0.85	0.92	1.00	0.88	0.92	0.86	0.87	0.91
	(-3.65)*	(-2.12)*	(0.11)	(-3.22)*	(-2.60)*	(-4.96)*	(-5.11)*	(-2.56)*
30-min	0.95	1.00	0.99	0.96	1.00	1.02	1.01	1.00
	(-1.28)	(-0.11)	(-0.12)	(-1.30)	(0.14)	(0.55)	(0.36)	(0.05)
60-min	1.08	0.97	1.05	0.94	0.93	1.13	1.09	1.01
	(0.99)	(-0.46)	(0.68)	(-1.01)	(-1.24)	(2.28)	(1.52)	(0.18)

minute interval for Monday to Thursday by excluding the first 30 minutes of each opening session. Therefore, a total of four observations a day are generated using this method.

Results and Discussion

General Intraday Speed of Adjustment Pattern

We analyse the intraday pattern for each year from 2000 to 2007. From Table 2, overall, the price starts to adjust to new information at 30-minute interval. Occasionally, we find adjustment coefficients that are faster than 30-minute. They are in 2002 and 2004 when fair adjustment starts at 15- and 10- minute interval, respectively. The difference between the speed of adjustment pattern in 2002 and 2004 is that in the latter price under-react to new information at 15minute interval after full adjustment at previous 10-minute interval. A similar pattern with 2004 has also been found in 2007. It appears that during these intervals, 10- and 15- minute, there is high information uncertainty resulting in mixed reaction.

It is expected that liquid stocks adjust quickly to new information. Here, we estimate the time needed for stock or a group of stocks to adjust to new information at intraday level. The speed of adjustment for the 50 most liquid stocks in the Indonesia

Table 3. Average Speed of Adjustment from 2000 to 2007

The speed of adjustment is estimated using ARMA(1,1). The data is daily transaction sampled at particular intervals. Speeds of adjustment estimates within the range of 0.95 to 1.05 are printed in bold. Bootstrap method with 1000 replication with replacement is used to estimate t-values for each interval.

Ticker _	Interval (minute)							
	1	2	3	5	10	15	30	60
AALI	0.856	0.815	0.768	0.725	0.778	0.924	0.991	1.045
ANTM	0.842	0.772	0.767	0.795	0.900	0.931	1.127	1.062
ASGR	0.858	0.697	0 741	0.910	0.856	0.967	1.046	0.823
ASII	0.935	0.689	0.724	0.816	0.893	0.904	1 085	0.988
BBCA	0.831	0.763	0.750	0.792	0.823	0.004	1 001	1 071
BBNI	0.001	0.705	0.730	0.732	0.020	0.919	0.963	1 034
	0.894	0.839	0.037	0.019	0.808	0.848	0.001	0.070
	0.040	0.019	0.032	0.037	0.090	0.850	0.901	1 012
BLIA	0.933	0.731	0.946	0.817	0.901	0.894	0.956	1.013
BIVITR	0.933	0.731	0.946	0.817	0.901	0.894	0.956	1.013
BNBR	0.929	0.922	0.930	0.934	0.943	0.963	1.034	0.893
BNGA	0.860	0.845	0.823	0.842	0.870	0.924	0.943	1.007
BNII	0.880	0.899	0.905	0.907	0.928	0.945	0.936	0.965
BUMI	0.891	0.863	0.873	0.888	0.909	0.946	1.043	0.977
CFIN	0.848	0.875	0.762	0.774	0.824	0.848	0.937	1.127
CMNP	0.862	0.776	0.742	0.788	0.858	0.858	0.925	0.912
CTRA	0.832	0.746	0.733	0.825	0.860	0.848	1.040	0.901
CTRS	0.791	0.808	0.784	0.817	0.894	0.931	0.996	1.358
DSFI	0.860	0.823	0.785	0.781	0.851	0.915	0.840	1.028
EPMT	0.814	0.815	0.807	0.803	0.886	0.898	0.969	1.170
FASW	0.795	0.884	0.891	0.893	0.800	0.850	0.921	0.904
GGRM	0.938	0.765	0.830	0.657	0.849	0.983	1.292	0.908
GJTI	0.876	0.861	0.821	0 776	0.839	0.910	0.990	1 242
IGAR	0.838	0.851	0.815	0.808	0.846	0.858	0.862	0.827
INDE	0.951	0.939	0.936	0.901	0.827	0.832	0.924	1 184
INKP	0.851	0.844	0.800	0.862	0.858	1 015	0.906	1 328
INITO	0.001	0.796	0.011	0.002	0.861	0.047	1 044	0.960
	1.006	0.730	0.828	0.811	0.801	0.947	1.073	1 040
	0.770	0.737	0.727	0.779	0.932	0.007	1.073	1.040
	0.770	0.790	0.788	0.762	0.845	0.900	0.001	1.070
KIJA	0.889	0.886	0.892	0.898	0.922	0.927	0.991	1.140
KLBF	0.834	0.804	0.748	0.779	0.832	0.832	1.020	1.170
LPLI	0.896	0.904	0.877	0.904	0.967	0.975	0.980	1.104
LSIP	0.805	0.819	0.762	0.772	0.773	0.768	1.026	1.223
LTLS	0.828	0.858	0.824	0.824	0.860	0.964	0.971	0.880
MEDC	0.917	0.881	0.882	0.915	0.903	0.797	0.955	0.832
MLPL	0.878	0.863	0.874	0.893	0.871	0.872	0.992	1.193
MPPA	0.886	0.845	0.796	0.803	0.851	0.860	0.991	1.093
MTDL	0.752	0.815	0.864	0.797	0.888	0.950	0.955	0.841
PNBN	0.866	0.868	0.849	0.898	0.898	0.930	1.024	1.158
RALS	0.866	1.015	0.769	0.737	0.958	1.048	0.982	0.867
SMCB	0.849	0.839	0.829	0.833	0.868	0.909	1.000	1.068
SMGR	0.938	0.607	0.643	0.823	0.872	0.794	0.986	0.930
TINS	0.837	0.795	0.760	0.867	0.919	1.005	0.955	1.164
TKIM	0.921	0.850	0.718	0.736	0.751	0.847	1.015	1.104
TIKM	0.973	0.817	0 796	0.810	0.874	0.972	1.048	0.820
TMPI	0.887	0.855	0.841	0.832	0.870	0.966	0.841	0.840
TRIM	0.894	0.888	0.894	0.864	0.887	0.865	0.905	0.979
TRST	0.877	0.840	0.881	0.899	0.946	0 981	0.956	0.725
TSPC	0.377	0.840	0.001	0.030	0.940	0.789	1 254	1 229
TUDI	0.750	0.000	1 040	0.7 35	0.302	0.709	0.962	0.003
	0.911	0.372	0.740	0.817	0.727	0.821	0.863	0.993
UNTR	0.885	0.738	0.748	0.786	0.886	0.824	1.082	0.899
	0.07:	0.007	0.000	0.001	0.070	0.001	0.000	4.000
Average	0.874	0.827	0.820	0.824	0.870	0.901	0.992	1.022
t-value	(-474)	(-7.69)	(-6.79)	(-8.79)	(-9.37)	(-7.87)	(-0.58)	(1.08)

Stock Exchange is estimated for various intervals ranging from 1 to 60 minutes. As presented in the Table 3, on average, the speed of adjustment coefficients from 1-, to 15- minute are between 0.82 and 0.90. All of them are significantly less

than one implying under-reaction to new information at these intervals. Giving the market more time to asses and react to new information by increasing the interval to 30-minute resulted in the speed of adjustment coefficient of 0.99. At this

Figure 1. Volatility Signature Plots of Four Selected Stocks

The speed of adjustment is estimated using ARMA(1,1). The data is daily transaction sampled at particular intervals. Speeds of adjustment estimates within the range of 0.95 to 1.05 are printed in bold. Bootstrap method with 1000 replication with replacement is used to estimate t-values for each interval.



interval, the price starts to adjust to new information at a fair level as the coefficient is insignificantly different from unity. The adjustment coefficient at 60-minute is 1.03 and is insignificantly different from one. In sum, the general intraday pattern of the 50 most liquid stocks characterized by strong under-reaction from 1- to 3- minute intervals

when the coefficients of adjustment are declining. The coefficient starts to increase gradually from 5-minute interval towards a fair level at 30-minute interval.

Individual Pattern of Intraday Speed of Adjustment



Figure 2. Speed of Adjustment and Realized Variance

Note: The figure presents the plot of speed of adjustment and realized variance at a given interval. Both speed of adjustment and realized variance are estimated from trade prices generated at interval under consideration.

Before going into further analysis, it is important to note that this study arbitrarily uses a range of coefficient from 0.95 to 1.05 to indicate a proximity to fair adjustment at individual stock. At 1-minute interval. there are three stocks that have coefficients in the range of fair adjustment: INDF, ISAT and TLKM. At the next interval, 2-minute, there are two stocks: RALS and TURI. TURI keeps in the fair adjustment rate up to 3-minute interval. At 5-minute interval, we find no stocks have the coefficients of adjustment fall in the range of fair adjustment. There are numbers of stocks fall into the fair adjustment grid at 15minute interval. They are BNBR, GGRM, INKP, LPLI, LTLS, MTDL, RALS, TINS, TKIM, TLKM, TMPI, and TRST. Almost all stocks have the adjustment coefficients fall into the range of fair level at 30- and 60- minute intervals.

There are two distinctive individual patterns that emerge in this study. The first is a pattern showing a period of information assessment before firmly adjusts to the information. As shown in the Table 3, TLKM starts with a fair adjustment at 1-minute, followed by decreasing speed of adjustment up to 10-minute interval. After

that, TLKM move to the fair adjustment area again starting at 15- to 60-minute interval. A similar pattern has also been found in RALS with slightly different starting point of fair adjustment rate at 2-minute. These two stocks demonstrate a periodic adjustment to new information during a trading day. It reflects the information assessment period before firmly adjust at 30-minute interval. The second is a pattern presenting consistent under-reaction for several stocks from 1- to 60- minute interval. They are CMNP, FASW and IGAR. It is unexpected to find such a persistent under-reaction in these stocks since all stocks in the sample are actually the most frequently traded.

The dynamics of speed of adjustment during a trading day for each stock has been revealed. Table 3 shows, although it is not as clear as which had been found in the Lo and MacKinlay (1990), a moderate lead and lag among stocks in the sample is found. The leading stocks, which adjust fairly at one-, two- and three- minute interval, are INDF, TLKM, RALS and TURI. Other stocks, on average, adjust at 30-minute interval.

Volatility Signature Plot and the Speed of Adjustment

Figure 1 presents volatility signature plots for selected stocks classified into two groups. The first group consists of ASII, INDF, ISAT and TLKM which represent upward volatility signature plot as the sampling frequency increases. The second group contains GGRM and SMCB which show downward volatility signature plot as the sampling frequency decreases.

Detailed figures of realized variance for each stock to generate volatility signature plot are presented in Table 4. A very important result from the table is that the volatility signature plots for transaction prices increases as the sampling frequency increases except for GGRM and SMGR. For those stocks, the realized variance decreases

Table 4. Average Daily Realized Variance from 2000 to 2007

Realized variance is estimated by summing intra-period squared returns for a trading day. The figures presented are the daily average realized variance for all year at a given intervals in percentage terms.

1 2 3 5 10 15 30 60 AALI 0.157 0.152 0.147 0.143 0.132 0.1125 0.111 0.098 ANTM 0.209 0.196 0.185 0.174 0.154 0.144 0.123 0.096 ASGR 0.239 0.227 0.225 0.214 0.192 0.176 0.150 0.110 ASII 0.124 0.119 0.113 0.108 0.096 0.087 0.076 0.0667 0.056 BENA 0.328 0.312 0.304 0.286 0.264 0.214 0.137 0.106 BHT 0.188 0.177 0.160 0.151 0.137 0.108 0.125 0.102 BNBR 0.721 0.625 0.567 0.488 0.385 0.329 0.221 0.144 BNII 0.536 0.590 0.385 0.329 0.221 0.144 CFIN 0.469 0.436 0.	Ticker	Interval (minute)							
AALI 0.157 0.152 0.147 0.143 0.132 0.125 0.1111 0.089 ANTM 0.209 0.196 0.185 0.174 0.154 0.144 0.123 0.096 ASGR 0.229 0.227 0.225 0.214 0.192 0.176 0.150 0.111 BSRI 0.124 0.119 0.113 0.108 0.096 0.091 0.082 0.074 BEAA 0.111 0.104 0.102 0.095 0.087 0.078 0.069 0.142 BHIT 0.133 0.175 0.170 0.160 0.151 0.137 0.160 BNR 0.721 0.625 0.567 0.488 0.385 0.329 0.227 0.144 CHIN 0.286 0.277 0.269 0.260 0.243 0.229 0.202 0.148 CHNP 0.186 0.182 0.176 0.173 0.162 0.157 0.140 0.102 CTRA <td< td=""><td></td><td>1</td><td>2</td><td>3</td><td>5</td><td>10</td><td>15</td><td>30</td><td>60</td></td<>		1	2	3	5	10	15	30	60
AALI 0.157 0.152 0.147 0.143 0.132 0.125 0.111 0.089 ASGR 0.299 0.127 0.225 0.214 0.192 0.176 0.150 0.110 ASII 0.124 0.119 0.113 0.108 0.096 0.087 0.076 0.056 BBNI 0.328 0.312 0.304 0.286 0.264 0.244 0.213 0.142 BHIT 0.138 0.175 0.170 0.160 0.151 0.137 0.160 BHT 0.155 0.151 0.151 0.147 0.141 0.138 0.125 0.161 BNR 0.721 0.625 0.567 0.488 0.385 0.329 0.227 0.144 BNII 0.576 0.536 0.590 0.385 0.329 0.227 0.144 BNII 0.576 0.480 0.385 0.329 0.227 0.144 CFIN 0.333 0.471 0.439 0									
ANTM 0.209 0.196 0.185 0.174 0.154 0.144 0.123 0.096 ASGR 0.239 0.227 0.225 0.214 0.192 0.176 0.150 0.110 BECA 0.111 0.104 0.102 0.095 0.087 0.078 0.067 0.056 BENI 0.328 0.324 0.286 0.264 0.244 0.213 0.142 BHT 0.183 0.179 0.175 0.170 0.160 0.151 0.142 0.119 BNR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.161 BNR 0.721 0.626 0.240 0.207 0.134 BNII 0.576 0.536 0.509 0.459 0.385 0.329 0.227 0.144 CTRA 0.323 0.310 0.365 0.243 0.229 0.202 0.144 CTRA 0.323 0.310 0.355 0.243 0.	AALI	0.157	0.152	0.147	0.143	0.132	0.125	0.111	0.089
ASGR 0.239 0.227 0.225 0.214 0.192 0.176 0.150 0.1176 ASII 0.124 0.119 0.113 0.108 0.096 0.091 0.082 0.074 BBCA 0.111 0.102 0.095 0.087 0.078 0.067 0.056 BNI 0.328 0.312 0.304 0.286 0.264 0.2213 0.142 BHIT 0.148 0.141 0.135 0.176 0.160 0.151 0.137 0.109 BNR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.161 BNR 0.721 0.625 0.567 0.488 0.385 0.329 0.221 0.141 BNR 0.721 0.625 0.567 0.459 0.385 0.329 0.227 0.144 CHN 0.286 0.277 0.260 0.243 0.229 0.202 0.148 CFIN 0.383 0.310 0.	ANTM	0.209	0.196	0.185	0.174	0.154	0.144	0.123	0.096
ASII 0.124 0.113 0.108 0.096 0.091 0.082 0.074 BBCA 0.111 0.104 0.102 0.095 0.087 0.073 0.067 0.056 BBNI 0.328 0.286 0.284 0.244 0.213 0.142 BHIT 0.183 0.179 0.175 0.170 0.160 0.151 0.142 BHTR 0.155 0.151 0.151 0.148 0.385 0.341 0.265 0.160 BNBR 0.721 0.625 0.567 0.488 0.385 0.329 0.221 0.145 BNMR 0.576 0.536 0.599 0.459 0.385 0.329 0.227 0.144 CFIN 0.286 0.277 0.269 0.260 0.243 0.229 0.202 0.148 CTRA 0.323 0.310 0.305 0.243 0.228 0.216 0.192 0.150 DSFI 0.532 0.533 0.363 <td< td=""><td>ASGR</td><td>0.239</td><td>0 227</td><td>0.225</td><td>0.214</td><td>0 192</td><td>0 176</td><td>0.150</td><td>0 1 1 0</td></td<>	ASGR	0.239	0 227	0.225	0.214	0 192	0 176	0.150	0 1 1 0
BBCA 0.111 0.102 0.102 0.087 0.067 0.067 0.056 BBNI 0.328 0.312 0.304 0.286 0.264 0.244 0.213 0.145 BHIT 0.183 0.179 0.160 0.151 0.137 0.160 BLTA 0.148 0.141 0.135 0.147 0.141 0.138 0.125 0.102 BNR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.161 BNR 0.533 0.541 0.459 0.385 0.329 0.221 0.144 CTRA 0.323 0.310 0.305 0.294 0.267 0.144 0.102 CTRA 0.323 0.310 0.305 0.294 0.267 0.144 0.102 CTRA 0.323 0.513 0.495 0.469 0.436 0.409 0.363 0.244 DSFI 0.532 0.513 0.495 0.469 0.436 0	ASII	0.124	0.119	0.113	0.108	0.096	0.091	0.082	0.074
DEDRI 0.312 0.304 0.286 0.264 0.244 0.213 0.142 BHIT 0.183 0.179 0.175 0.170 0.160 0.151 0.137 0.160 BHTR 0.155 0.151 0.117 0.109 0.095 0.069 BMRR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.161 BNGA 0.373 0.344 0.324 0.295 0.265 0.240 0.207 0.134 BNII 0.576 0.536 0.509 0.459 0.385 0.329 0.227 0.144 CMNP 0.286 0.277 0.269 0.260 0.243 0.229 0.222 0.144 CTRA 0.323 0.310 0.305 0.244 0.267 0.253 0.230 0.177 CTRA 0.323 0.513 0.449 0.363 0.249 0.266 0.218 0.176 DSFI 0.532 0.533 <t< td=""><td>BBCA</td><td>0.124</td><td>0.104</td><td>0.112</td><td>0.005</td><td>0.087</td><td>0.078</td><td>0.067</td><td>0.056</td></t<>	BBCA	0.124	0.104	0.112	0.005	0.087	0.078	0.067	0.056
BHIT 0.326 0.3712 0.304 0.2284 0.244 0.2135 0.1142 BHTT 0.148 0.141 0.135 0.175 0.160 0.151 0.133 0.125 0.069 BMTR 0.721 0.625 0.567 0.448 0.385 0.341 0.265 0.161 0.133 0.122 0.134 BNIR 0.573 0.344 0.324 0.295 0.265 0.240 0.227 0.144 CFIN 0.283 0.471 0.439 0.387 0.323 0.290 0.222 0.144 CFIN 0.286 0.277 0.253 0.241 0.102 0.144 CTRA 0.323 0.310 0.305 0.243 0.229 0.202 0.144 CTRA 0.323 0.310 0.305 0.243 0.226 0.175 0.140 0.163 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 0.236	DDCA	0.111	0.104	0.102	0.035	0.007	0.070	0.007	0.000
BHT 0.183 0.179 0.179 0.170 0.100 0.101 0.135 0.100 BMTR 0.145 0.145 0.147 0.141 0.136 0.102 BNBR 0.721 0.625 0.567 0.488 0.385 0.324 0.207 0.134 BNII 0.576 0.536 0.509 0.459 0.385 0.329 0.227 0.144 CFIN 0.286 0.277 0.269 0.260 0.243 0.229 0.146 0.102 CTRA 0.323 0.310 0.305 0.267 0.253 0.230 0.177 CTRS 0.262 0.257 0.253 0.223 0.210 0.136 0.102 DSFI 0.532 0.513 0.446 0.436 0.409 0.363 0.249 GGRM 0.552 0.533 0.530 0.54 0.54 0.551 0.404 GJAR 0.438 0.149 0.136 0.135 0.136 0.	DUIT	0.320	0.312	0.304	0.280	0.204	0.244	0.213	0.142
BLTA 0.148 0.141 0.133 0.128 0.111 0.109 0.095 0.0069 BMBR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.161 BNGA 0.373 0.344 0.324 0.295 0.265 0.240 0.207 0.134 BNII 0.576 0.536 0.509 0.385 0.329 0.221 0.144 CFIN 0.286 0.277 0.269 0.222 0.144 CFIN 0.282 0.513 0.495 0.282 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 GGRM 0.523 0.513 0.495 0.469 0.436 0.409 0.136 0.147 GJTL 0.333 0.316 0.324 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.311 0.307 <t< td=""><td></td><td>0.103</td><td>0.179</td><td>0.175</td><td>0.170</td><td>0.100</td><td>0.151</td><td>0.137</td><td>0.100</td></t<>		0.103	0.179	0.175	0.170	0.100	0.151	0.137	0.100
BMIR 0.155 0.151 0.131 0.147 0.141 0.138 0.125 0.102 BNBR 0.721 0.625 0.567 0.488 0.385 0.341 0.265 0.102 BNII 0.576 0.536 0.509 0.459 0.385 0.329 0.227 0.144 CMNP 0.286 0.277 0.269 0.260 0.243 0.229 0.221 0.144 CTRN 0.286 0.277 0.269 0.260 0.243 0.229 0.216 0.177 CTRS 0.323 0.310 0.305 0.244 0.228 0.216 0.192 0.170 CTRS 0.562 0.557 0.253 0.243 0.228 0.216 0.192 0.135 GGRM 0.052 0.053 0.054 0.054 0.051 0.046 0.041 GJAR 0.432 0.330 0.280 0.249 0.236 0.135 1.35 IGAR 0.425	BLIA	0.148	0.141	0.135	0.128	0.117	0.109	0.095	0.069
BNBR 0.721 0.625 0.367 0.488 0.385 0.341 0.265 0.240 0.2207 0.134 BNII 0.576 0.536 0.509 0.459 0.385 0.323 0.229 0.221 0.144 BUMI 0.533 0.471 0.439 0.387 0.323 0.229 0.220 0.148 CMNP 0.185 0.182 0.176 0.173 0.162 0.157 0.140 0.102 CTRA 0.323 0.310 0.305 0.224 0.226 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 GGRM 0.052 0.053 0.054 0.054 0.054 0.054 0.051 0.046 0.041 INPF 0.439 0.362 0.327 0.271 0.177 11056 0.429 0.441 0.408 0.386 0.353 0.300 0.266 0.218 0.177	BMIR	0.155	0.151	0.151	0.147	0.141	0.138	0.125	0.102
BNIGA 0.373 0.344 0.3244 0.295 0.265 0.240 0.207 0.147 BUMI 0.533 0.471 0.439 0.387 0.323 0.290 0.227 0.144 CFIN 0.286 0.277 0.269 0.260 0.243 0.229 0.202 0.144 CTRA 0.332 0.310 0.305 0.294 0.267 0.253 0.230 0.177 CTRS 0.262 0.257 0.253 0.243 0.228 0.216 0.192 0.156 DSFI 0.532 0.513 0.495 0.466 0.499 0.363 0.249 DSFI 0.532 0.513 0.493 0.543 0.051 0.046 0.041 GGRM 0.052 0.053 0.053 0.053 0.053 0.324 0.234 0.136 0.148 GJAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INFP <	BNBR	0.721	0.625	0.567	0.488	0.385	0.341	0.265	0.161
BNII 0.576 0.536 0.509 0.459 0.385 0.323 0.227 0.144 CFIN 0.286 0.277 0.269 0.260 0.243 0.229 0.202 0.148 CMNP 0.185 0.182 0.176 0.173 0.162 0.157 0.140 0.102 CTRA 0.323 0.310 0.305 0.2243 0.228 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 GGRM 0.052 0.053 0.054 0.054 0.061 0.046 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.382 0.327 0.214 0.183 0.118 INKP 0.441 0.408 0.386 0.353 0.300 0.266 0.218 0.157 INFP 0.139 <t< td=""><td>BNGA</td><td>0.373</td><td>0.344</td><td>0.324</td><td>0.295</td><td>0.265</td><td>0.240</td><td>0.207</td><td>0.134</td></t<>	BNGA	0.373	0.344	0.324	0.295	0.265	0.240	0.207	0.134
BUMI 0.533 0.471 0.439 0.387 0.323 0.229 0.227 0.144 CFIN 0.286 0.277 0.266 0.2243 0.229 0.222 0.140 0.102 CTRA 0.323 0.310 0.305 0.294 0.267 0.253 0.230 0.177 CTRS 0.262 0.257 0.253 0.243 0.228 0.216 0.192 0.160 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 0.103 GGRM 0.052 0.053 0.053 0.054 0.054 0.051 0.046 0.041 GJAR 0.439 0.394 0.362 0.327 0.271 0.236 0.199 0.135 IGAR 0.439 0.394 0.362 0.327 0.271 0.236 0.180 0.177 <	BNII	0.576	0.536	0.509	0.459	0.385	0.329	0.251	0.147
CFIN 0.286 0.277 0.269 0.260 0.243 0.229 0.202 0.148 CMNP 0.185 0.182 0.176 0.173 0.162 0.157 0.140 0.102 CTRA 0.323 0.310 0.305 0.294 0.267 0.253 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 GGRM 0.052 0.053 0.054 0.054 0.051 0.046 0.041 GJJL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.439 0.386 0.353 0.300 0.266 0.218 0.115 INDF 0.441 <td< td=""><td>BUMI</td><td>0.533</td><td>0.471</td><td>0.439</td><td>0.387</td><td>0.323</td><td>0.290</td><td>0.227</td><td>0.144</td></td<>	BUMI	0.533	0.471	0.439	0.387	0.323	0.290	0.227	0.144
CMMP 0.185 0.182 0.176 0.173 0.162 0.157 0.140 0.102 CTRA 0.323 0.310 0.305 0.294 0.267 0.253 0.230 0.177 CTRS 0.262 0.257 0.253 0.243 0.228 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.138 0.133 GGRM 0.052 0.053 0.053 0.054 0.051 0.046 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INF 0.414 0.408 0.386 0.353 0.300 0.266 0.218 0.157 INF 0	CFIN	0.286	0.277	0.269	0.260	0.243	0.229	0.202	0.148
CTRA 0.323 0.310 0.305 0.294 0.267 0.253 0.230 0.177 CTRS 0.262 0.257 0.253 0.243 0.228 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.244 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 0.103 GGRM 0.052 0.053 0.054 0.054 0.054 0.054 0.040 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.386 0.353 0.300 0.266 0.218 0.177 INF 0.439 0.394 0.362 0.327 0.271 0.234 0.183 0.117 INF 0.439 0.394 0.362 0.353 0.300 0.266 0.218 0.157 INF 0.139 0.136 0.138 0.125 0.126 0.1111 0.080 <td>CMNP</td> <td>0.185</td> <td>0.182</td> <td>0.176</td> <td>0.173</td> <td>0.162</td> <td>0.157</td> <td>0.140</td> <td>0.102</td>	CMNP	0.185	0.182	0.176	0.173	0.162	0.157	0.140	0.102
CTRS 0.262 0.257 0.253 0.243 0.228 0.216 0.192 0.150 DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 0.103 GGRM 0.052 0.053 0.053 0.054 0.051 0.046 0.041 GJTL 0.333 0.316 0.303 0.2280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.276 0.177 INDF 0.439 0.394 0.362 0.327 0.271 0.234 0.183 0.118 INKP 0.441 0.408 0.386 0.353 0.300 0.266 0.212 0.111 0.086 ISAT 0.900 0.85 0.833 0.300 0.216 0.184 0.125 0.125 0.124 0.146	CTRA	0.323	0.310	0.305	0.294	0.267	0.253	0.230	0.177
DSFI 0.532 0.513 0.495 0.469 0.436 0.409 0.363 0.249 EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 0.103 FASW 0.196 0.194 0.188 0.183 0.174 0.164 0.148 0.125 GGRM 0.052 0.053 0.053 0.054 0.054 0.051 0.046 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.439 0.394 0.362 0.327 0.271 0.234 0.183 0.118 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.068 ISAT 0.090 0.085 0.083 0.080 0.772 0.066 0.559 0.510 0.419	CTRS	0.262	0.257	0.253	0.243	0.228	0.216	0.192	0.150
EPMT 0.176 0.174 0.171 0.166 0.157 0.149 0.136 0.103 FASW 0.196 0.194 0.188 0.183 0.174 0.164 0.148 0.125 GGRM 0.052 0.053 0.054 0.054 0.054 0.054 0.044 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.139 0.136 0.138 0.135 0.121 0.111 0.086 ISAT 0.090 0.085 0.083 0.080 0.072 0.066 0.059 0.512 0.111 0.086 ISAT 0.900 0.085 0.083 0.080 0.59 0.510 0.419 0.263 KLBF 0.223 0.212 0.200 0.189 0.169 0.154 0.135 0.093 <td>DSFI</td> <td>0.532</td> <td>0.513</td> <td>0.495</td> <td>0.469</td> <td>0.436</td> <td>0.409</td> <td>0.363</td> <td>0.249</td>	DSFI	0.532	0.513	0.495	0.469	0.436	0.409	0.363	0.249
FASW 0.196 0.194 0.188 0.183 0.174 0.164 0.148 0.125 GGRM 0.052 0.053 0.054 0.054 0.051 0.046 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.439 0.394 0.362 0.327 0.271 0.218 0.151 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.086 ISAT 0.090 0.085 0.080 0.072 0.066 0.059 0.52 JIHD 0.772 0.263 0.257 0.248 0.230 0.216 0.184 0.135 0.097 LPLI 0.722 0.654 0.660 0.559 0.510 0.419 0.263 LPLI 0.722 0.654	EPMT	0.176	0.174	0.171	0.166	0.157	0.149	0.136	0.103
GGRM 0.052 0.053 0.053 0.054 0.054 0.051 0.046 0.041 GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.429 0.334 0.362 0.327 0.271 0.234 0.183 0.118 INDF 0.439 0.394 0.362 0.327 0.271 0.234 0.183 0.118 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.086 ISAT 0.090 0.085 0.083 0.080 0.072 0.066 0.059 0.051 0.419 0.263 JIHD 0.272 0.263 0.212 0.200 0.189 0.169 0.154 0.135 0.097 LPL 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LSIP 0.185 0.181 0.171 0.161 0.154 0.133	FASW	0.196	0.194	0.188	0.183	0.174	0.164	0.148	0.125
GJTL 0.333 0.316 0.303 0.280 0.249 0.236 0.199 0.135 IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.439 0.384 0.362 0.327 0.271 0.234 0.183 0.118 INKP 0.441 0.408 0.386 0.353 0.300 0.266 0.218 0.157 INTP 0.139 0.136 0.138 0.135 0.121 0.111 0.086 ISAT 0.090 0.085 0.083 0.080 0.072 0.066 0.059 0.512 0.419 0.263 KLJA 0.820 0.757 0.719 0.660 0.559 0.510 0.419 0.263 KLBF 0.223 0.212 0.200 0.189 0.164 0.135 0.041 0.135 0.0161 LPLI 0.722 0.664 0.602 0.542 0.468 0.412 0.131	GGRM	0.052	0.053	0.053	0.054	0.054	0.051	0.046	0.041
IGAR 0.425 0.404 0.389 0.364 0.331 0.307 0.270 0.177 INDF 0.439 0.394 0.362 0.327 0.271 0.234 0.183 0.118 INKP 0.441 0.408 0.386 0.353 0.300 0.266 0.218 0.157 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.086 ISAT 0.090 0.085 0.083 0.080 0.072 0.066 0.059 0.510 0.419 0.263 JIHD 0.272 0.263 0.257 0.248 0.230 0.216 0.186 0.138 KLBF 0.223 0.212 0.200 0.189 0.169 0.154 0.139 0.007 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LTLS 0.162 0.157 0.154 0.148 0.142 0.131 0.101 </td <td>GJTL</td> <td>0.333</td> <td>0.316</td> <td>0.303</td> <td>0.280</td> <td>0.249</td> <td>0.236</td> <td>0.199</td> <td>0.135</td>	GJTL	0.333	0.316	0.303	0.280	0.249	0.236	0.199	0.135
INDE 0.142 0.163 0.163 0.163 0.111 INKP 0.441 0.408 0.362 0.327 0.271 0.264 0.118 0.118 INKP 0.441 0.408 0.386 0.353 0.300 0.266 0.218 0.157 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.086 JIHD 0.272 0.263 0.257 0.248 0.230 0.216 0.186 0.138 KLJA 0.820 0.757 0.719 0.660 0.559 0.510 0.419 0.263 LSIP 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LSIP 0.162 0.157 0.154 0.138 0.142 0.131 0.101 MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MPA 0.323 0.301 0.285	IGAR	0.425	0 404	0.389	0.364	0.331	0.307	0 270	0 177
INKP 0.141 0.408 0.386 0.353 0.300 0.261 0.111 0.131 0.111 0.132 0.111 0.132 0.111 0.081 0.111 0.081 0.111 0.081 0.111 0.081 0.135 0.300 0.266 0.211 0.111 0.086 0.083 0.080 0.072 0.066 0.059 0.052 JIHD 0.272 0.263 0.257 0.248 0.230 0.216 0.189 0.169 0.154 0.135 0.097 KLBF 0.223 0.212 0.200 0.189 0.169 0.154 0.135 0.097 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LSIP 0.185 0.181 0.179 0.171 0.161 0.154 0.139 0.124 0.119 0.102 0.082 MEDC 0.160 0.152 0.145 0.332 0.261 0.413 0.313 0.188	INDE	0.439	0.394	0.362	0.327	0.271	0 234	0.183	0 118
INTP 0.136 0.138 0.135 0.125 0.121 0.116 INTP 0.139 0.136 0.138 0.135 0.125 0.121 0.111 0.086 ISAT 0.090 0.085 0.083 0.080 0.072 0.066 0.059 0.052 JIHD 0.272 0.263 0.257 0.248 0.230 0.216 0.186 0.138 KIJA 0.820 0.757 0.719 0.660 0.559 0.510 0.419 0.263 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.333 0.203 LSIP 0.162 0.159 0.157 0.154 0.148 0.142 0.131 0.101 MEPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MIPL 0.391 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 <td< td=""><td>INKP</td><td>0.441</td><td>0.408</td><td>0.386</td><td>0.353</td><td>0.300</td><td>0.266</td><td>0.218</td><td>0 157</td></td<>	INKP	0.441	0.408	0.386	0.353	0.300	0.266	0.218	0 157
INT 0.135 0.135 0.121 0.121 0.111 0.335 JIHD 0.272 0.263 0.287 0.248 0.230 0.216 0.186 0.138 KIJA 0.820 0.757 0.719 0.660 0.559 0.510 0.419 0.263 KLBF 0.223 0.212 0.200 0.189 0.169 0.154 0.133 0.092 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LSIP 0.185 0.181 0.171 0.161 0.154 0.133 0.106 LTLS 0.162 0.157 0.154 0.148 0.142 0.131 0.101 MEDC 0.160 0.152 0.145 0.323 0.261 0.256 0.212 0.143 MPPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452	INTP	0.139	0.136	0.138	0.000	0.125	0.121	0.111	0.086
Indian 0.0000<	ISAT	0.100	0.130	0.130	0.133	0.123	0.066	0.059	0.000
SIND 0.212 0.203 0.243 0.243 0.243 0.130 0.130 KLJA 0.820 0.757 0.719 0.660 0.559 0.510 0.419 0.263 KLBF 0.223 0.212 0.200 0.189 0.169 0.154 0.135 0.097 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 LSIP 0.185 0.181 0.179 0.171 0.161 0.154 0.139 0.106 LTLS 0.162 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MLPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MDA 0.822 0.266 0.260 0.245 0.219 0.207 0.177 0.123 SMGR 0		0.030	0.000	0.005	0.000	0.072	0.000	0.000	0.032
NLA 0.320 0.712 0.200 0.189 0.159 0.310 0.419 0.285 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.133 0.003 LSIP 0.185 0.181 0.179 0.164 0.135 0.0343 0.203 LSIP 0.185 0.181 0.177 0.154 0.148 0.142 0.131 0.106 MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MEPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.229 0.207 0.177 0.127 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 <td< td=""><td></td><td>0.272</td><td>0.203</td><td>0.237</td><td>0.248</td><td>0.230</td><td>0.210</td><td>0.180</td><td>0.138</td></td<>		0.272	0.203	0.237	0.248	0.230	0.210	0.180	0.138
NLBF 0.223 0.212 0.200 0.169 0.169 0.134 0.133 0.097 LPLI 0.722 0.654 0.602 0.542 0.468 0.415 0.343 0.203 0.2097 LSIP 0.185 0.181 0.179 0.171 0.161 0.154 0.139 0.106 LTLS 0.162 0.145 0.139 0.124 0.119 0.102 0.088 MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPDA 0.323 0.301 0.285 0.268 0.239 0.360 0.313 0.188 PNBN 0.282 0.266 0.244 0.392 0.360 0.313 0.188 SMCB 0.317 0.293 0.282 0.262 0.229 0.207 0.177 0.123 SMGR <td< td=""><td>KIJA</td><td>0.020</td><td>0.757</td><td>0.719</td><td>0.000</td><td>0.559</td><td>0.510</td><td>0.419</td><td>0.203</td></td<>	KIJA	0.020	0.757	0.719	0.000	0.559	0.510	0.419	0.203
LPLI 0.722 0.654 0.802 0.342 0.468 0.415 0.343 0.203 LSIP 0.182 0.184 0.179 0.171 0.161 0.154 0.1343 0.1203 LTLS 0.162 0.159 0.157 0.154 0.148 0.142 0.131 0.101 MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MLPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.262 0.229 0.207 0.177 0.127 SMGR 0.081 0.083 0.082 0.079 0.077 0.075 0.063 SMGR 0.084 <t< td=""><td></td><td>0.223</td><td>0.212</td><td>0.200</td><td>0.189</td><td>0.109</td><td>0.134</td><td>0.135</td><td>0.097</td></t<>		0.223	0.212	0.200	0.189	0.109	0.134	0.135	0.097
LSIP 0.185 0.181 0.179 0.171 0.161 0.154 0.139 0.106 LTLS 0.162 0.152 0.157 0.154 0.148 0.142 0.131 0.101 MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MLPL 0.391 0.363 0.345 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.219 0.207 0.177 0.127 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.082 0.079 0.077 0.075 0.663 SMGR 0.083 0.086 0.086 0.086 0.080 0.688 TINS 0.191 0.185 0.178 0.167 0.156 <td< td=""><td></td><td>0.722</td><td>0.654</td><td>0.602</td><td>0.542</td><td>0.468</td><td>0.415</td><td>0.343</td><td>0.203</td></td<>		0.722	0.654	0.602	0.542	0.468	0.415	0.343	0.203
LILS 0.162 0.159 0.157 0.154 0.142 0.142 0.131 0.101 MEDC 0.160 0.152 0.145 0.139 0.124 0.1142 0.131 0.101 MLPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.260 0.245 0.219 0.077 0.075 0.063 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.080 0.068 TKIM 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM <t< td=""><td>LSIP</td><td>0.185</td><td>0.181</td><td>0.179</td><td>0.171</td><td>0.161</td><td>0.154</td><td>0.139</td><td>0.106</td></t<>	LSIP	0.185	0.181	0.179	0.171	0.161	0.154	0.139	0.106
MEDC 0.160 0.152 0.145 0.139 0.124 0.119 0.102 0.082 MIPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.260 0.245 0.219 0.077 0.177 0.127 RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMGR 0.083 0.082 0.229 0.209 0.177 0.123 SMGR 0.084 0.083 0.082 0.279 0.077 0.075 0.063 SMGR 0.084 0.083 0.082 0.279 0.177 0.123 0.490 0.480 0.060 0.080 0.080 0.086 0.080	LILS	0.162	0.159	0.157	0.154	0.148	0.142	0.131	0.101
MLPL 0.391 0.363 0.345 0.323 0.281 0.256 0.212 0.143 MPPA 0.332 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.229 0.207 0.177 0.127 RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.080 0.068 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TKIM 0.317 0.106 0.100 <td< td=""><td>MEDC</td><td>0.160</td><td>0.152</td><td>0.145</td><td>0.139</td><td>0.124</td><td>0.119</td><td>0.102</td><td>0.082</td></td<>	MEDC	0.160	0.152	0.145	0.139	0.124	0.119	0.102	0.082
MPPA 0.323 0.301 0.285 0.268 0.239 0.219 0.186 0.117 MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.260 0.245 0.219 0.207 0.177 0.127 RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMCB 0.383 0.082 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.086 0.086 0.080 0.066 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.100 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 <td< td=""><td>MLPL</td><td>0.391</td><td>0.363</td><td>0.345</td><td>0.323</td><td>0.281</td><td>0.256</td><td>0.212</td><td>0.143</td></td<>	MLPL	0.391	0.363	0.345	0.323	0.281	0.256	0.212	0.143
MTDL 0.492 0.466 0.452 0.434 0.392 0.360 0.313 0.188 PNBN 0.282 0.266 0.260 0.245 0.219 0.207 0.177 0.127 RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMGR 0.083 0.082 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.086 0.080 0.080 0.086 0.086 0.080 0.068 0.080 0.068 0.080 0.068 0.080 0.068 0.080 0.068 0.080 0.068 0.179 0.177 0.123 0.110 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKIM 0.117 0.160 0.144 0.407 0.386 0.337 0.224<	MPPA	0.323	0.301	0.285	0.268	0.239	0.219	0.186	0.117
PNBN 0.282 0.266 0.260 0.245 0.219 0.207 0.177 0.127 RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.080 0.063 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKIM 0.117 0.106 0.100 0.091 0.078 0.071 0.060 0.54 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 <td< td=""><td>MTDL</td><td>0.492</td><td>0.466</td><td>0.452</td><td>0.434</td><td>0.392</td><td>0.360</td><td>0.313</td><td>0.188</td></td<>	MTDL	0.492	0.466	0.452	0.434	0.392	0.360	0.313	0.188
RALS 0.084 0.083 0.082 0.079 0.077 0.075 0.063 SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.086 0.080 0.063 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.106 0.100 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TSPC 0.080 0.080 0.078 0.077 0.074 0.069 0.060 TWI 0.135 0.134	PNBN	0.282	0.266	0.260	0.245	0.219	0.207	0.177	0.127
SMCB 0.317 0.293 0.282 0.262 0.229 0.209 0.177 0.123 SMGR 0.083 0.085 0.087 0.088 0.086 0.086 0.080 0.068 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.117 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.106 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.074 0.069 0.600 UNTR 0.210 0.198 <td< td=""><td>RALS</td><td>0.084</td><td>0.084</td><td>0.083</td><td>0.082</td><td>0.079</td><td>0.077</td><td>0.075</td><td>0.063</td></td<>	RALS	0.084	0.084	0.083	0.082	0.079	0.077	0.075	0.063
SMGR 0.083 0.085 0.087 0.088 0.086 0.086 0.080 0.080 TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.106 0.100 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.077 0.074 0.069 0.060 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099	SMCB	0.317	0.293	0.282	0.262	0.229	0.209	0.177	0.123
TINS 0.196 0.191 0.185 0.178 0.167 0.156 0.139 0.110 TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.106 0.100 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.077 0.074 0.669 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.097 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099	SMGR	0.083	0.085	0.087	0.088	0.086	0.086	0.080	0.068
TKIM 0.306 0.296 0.289 0.278 0.248 0.226 0.193 0.145 TLKM 0.117 0.106 0.001 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.074 0.069 0.600 UNTR 0.210 0.198 0.192 0.182 0.127 0.119 0.097 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TINS	0.196	0.191	0.185	0.178	0.167	0.156	0.139	0.110
TLKM 0.117 0.106 0.100 0.091 0.078 0.071 0.060 0.054 TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.077 0.074 0.069 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.199 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099	TKIM	0.306	0.296	0.289	0.278	0.248	0.226	0.193	0.145
TMPI 0.523 0.496 0.478 0.448 0.407 0.386 0.337 0.224 TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.077 0.074 0.669 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.097 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TLKM	0.117	0.106	0.100	0.091	0.078	0.071	0.060	0.054
TRIM 0.348 0.333 0.319 0.307 0.286 0.267 0.239 0.153 TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.078 0.077 0.074 0.069 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.099 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TMPI	0.523	0.496	0.478	0.448	0.407	0.386	0.337	0.224
TRST 0.246 0.239 0.238 0.231 0.214 0.209 0.186 0.134 TSPC 0.080 0.080 0.080 0.078 0.077 0.074 0.069 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.097 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TRIM	0.348	0.333	0.319	0.307	0.286	0.267	0.239	0.153
TSPC 0.080 0.080 0.080 0.078 0.077 0.074 0.069 0.060 TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.097 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TRST	0.246	0.239	0.238	0.231	0.214	0.209	0.186	0.134
TURI 0.135 0.134 0.133 0.131 0.128 0.127 0.119 0.097 UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TSPC	0.080	0.080	0.080	0.078	0.077	0.074	0.069	0.060
UNTR 0.210 0.198 0.192 0.182 0.163 0.149 0.127 0.099 Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	TURI	0.135	0.134	0.133	0.131	0.128	0.127	0.119	0.097
Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123	UNTR	0.210	0.198	0.192	0.182	0.163	0.149	0.127	0.099
Average 0.288 0.271 0.260 0.244 0.219 0.202 0.174 0.123		0.2.0	000	002	002	000	00	0	0.000
	Average	0.288	0.271	0.260	0.244	0.219	0.202	0.174	0.123

as the sampling frequency increases. Andersen, et al. (2000) have also found similar pattern with our study. They explain that the negative bias is most probably caused by inactive trading (illiquidity). With the exception of GGRM and SMGR, the evidence shows that the noise generates positive bias to the transaction prices. This finding is consistent with Hansen and Lunde (2006) who find the positive bias to the transaction prices for 30 equities of the DJIA.

We analyze the variance signature plot in conjunction with the speed of adjustment level to explore the relation between them. The variance signature plot is used to infer the level of noise at a particular sampling interval. From Figure 2, at 1- to 3-minute interval, the speed of adjustment and its corresponding realized variance has positive relation. The direction alters to negative relation after 5-minute interval. At 10-minute interval, the speed of adjustment coefficient starts to increase towards a fair adjustment level. Concurrently, the realized variance at the same interval begins to decrease. The speed of adjustment (realized variance) keeps increasing (decreasing) as the sampling interval decreases implying that the lower noise leads to a lower deviation between the observed and the fundamental stock prices. This empirical finding is consistent with Black (1986).

Conclusion

The average speed of price adjustment to new information for frequently traded stocks is 30 minutes in the Indonesia Stock Exchange from 2000 to 2007. There is moderate evidence for a lead and lag structure in the price adjustment to new information.

We find consistently low realized variance when the speed of adjustment is insignificantly different from one for the 50 most frequently traded stocks in the Indonesia Stock Exchange. According to this evidence, we propose volatility signature plot as one of reliable estimate of the price discovery process. Under the assumption of the availability of high-frequency data, the benefit of using the realized variance is clear since this measure is model-free, hence the estimation bias is minimal.

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25

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