Long-run effects of minimum trading unit reductions on stock prices

Abstract

We examine empirically the long-run effects of reductions in minimum trading units (MTUs) in Japan from October 2001 to May 2008. When firms reduce their MTUs, the number of individual shareholders tends to increase significantly for several years. We estimate buy-and-hold abnormal returns and find that positive stock returns are observed not only for the period between the announcement day and the actual date of MTU decreases, but also for a period of several years following MTU reductions. In addition, we measure stock price reactions to the release of public information before and after MTU reductions and find that stock prices reflect more positive and less negative private information after the MTU reductions. These findings, together with evidence on the change in investors' short and long positions after MTU reductions, indicate that individual investors face short-sales constraints.

Keywords: Minimum trading unit reductions; Japanese stock market, Event-study; Market efficiency

1. Introduction

How does an increase in the investor base affect stock returns? To answer this question, numerous studies examine the effects of some events that expand the number of investors on stock returns.[1] Besides the events that are common in the U.S. such as stock splits and international cross-listings, Japanese equity markets offer the unique events of reductions in minimum trading units (MTUs), which substantially expand the investor base without affecting either a firm's fundamental value or its stock characteristics such as the price per share or the minimum tick size. In Japan, a firm's board of directors determines the MTU of its stock, or the minimum number of shares that can be traded on an exchange. As investors place orders in integer multiples of the MTU when they buy or sell shares, the reduction in the MTU leads to lowering the minimum monetary value necessary for trading shares and thus encourages a larger number of individual investors with limited financial resources to participate in trading the stock. For instance, if a firm reduces the MTU of its stock of 1,000 yen per share from 1,000 to 100 shares, an individual can purchase shares only if he or she has 100 thousand yen (even if he or she cannot afford to pay 1 million yen).

The answer to the above question found by past MTU studies is that an increase in the number of individual investors following the reduction in MTU has a positive impact on stock returns. Amihud et al. (1999) investigate MTU decreases on the Tokyo Stock Exchange (TSE) between 1991 and 1996 and find positive abnormal returns from the announcement day to the actual date of MTU decreases. They also find that the abnormal returns are positively correlated with an increase in the number of individual shareholders after the MTU reduction. Positive stock returns after MTU reductions are also found by other studies such as those of Ahn et al. (2005) and Hauser and Lauterbach (2003). All of these studies conclude that such positive stock returns can be explained by an expanded investor base, as implied by Merton (1987). In the Merton model, investors invest only in securities of which they are aware, so they cannot fully diversify their portfolios. As a result, the equilibrium return reflects a premium for both systematic and underdiversified firm-specific risk. Since the model implies that the premium for firm-specific risk is larger for a security with a smaller number of shareholders, the cost of capital drops (i.e., stock prices rise) when a base of investors expands.

Unlike the past studies that examine the short-run effects of MTU reductions, our study

[1] Many studies find positive stock price reactions following international cross-listings (e.g., Foerster and Karolyi, 1999; Miller, 1999; Errunza and Miller, 2000; Baker et al., 2002; Bailey et al., 2006; Hail and Leuz, 2009; Roosenboom and Dijk, 2009). The long-run performance of cross-listings is also examined by several studies (e.g., Foerster and Karolyi, 2000; King and Segal, 2008; Sarkissian and Schill, 2009). In addition, others investigate events such as exchange listings (Kadlec and McConnell, 1994), and stock index changes (Chen et al., 2002). In the stock split literature, a number of studies report positive stock price reactions after the splits. Several different explanations are proposed for this phenomenon such as the signaling hypothesis (e.g., McNichols and Dravid, 1990; Pilotte and Manuel, 1996; Desai and Jain, 1997), the liquidity hypothesis (e.g., Muscarella and Vetsuypens, 1996; Mukherji et al., 1997), and the trading range hypothesis (e.g., Lakonishok and Lev, 1987; Ikenberry et al., 1996). Guo et al. (2008) examine stock splits on the Tokyo Stock Exchange and find some empirical evidence for the signaling and trading range hypotheses.

focuses on the long-run effects of MTU reductions on stock prices. Since the revision of the Commercial Law in October 2001, many Japanese firms have reduced their MTUs aiming to attract more individual investors. Our sample comprises 608 cases of MTU reductions between October 2001 and May 2008, implemented by firms listed not only on major stock exchanges designed for large- and medium-sized firms such as the first and second sections of the TSE and the Osaka Stock Exchange (OSE), but also other exchanges including JASDAQ and Hercules for small firms.

Our study addresses two main issues. First, we calculate long-run stock returns, measured by buy-and-hold abnormal returns, of more than 2.5 years following MTU reductions. As we discuss in the next section, the number of individual shareholders tends to increase substantially for a long period after the MTU reduction. From the fiscal year before the MTU reduction, the average number of individual shareholders increases by 90% at the end of the first fiscal year, and by 181% and 259% at the end of the second and third fiscal years after the MTU reduction, respectively. Such a continual growth of the investor base may have long-term effects on stock returns. None of the past MTU studies investigates the long-run performance of MTU stocks. In the literature on stock splits, however, several studies examine their long-run performance. For example, Desai and Jain (1997) report that the 1- and 3-year abnormal returns for stock splits are 7.05% and 11.87%, while Byun and Rozeff (2003) find no significant long-run abnormal returns after the splits. In Japan, Greenwood (2009) empirically finds that stock splits cause share-price bubbles of over 30% at around the ex-date because of a shortage of shares caused by institutional restrictions, and stock returns are reversed when the restrictions are removed 60 days after the ex-date.[2]

Second, we examine how MTU reductions affect the efficiency of stock prices. Peress (2010) extends the Merton model and shows that informativeness of stock prices can either improve or deteriorate when the investor base increases. If new investors actively produce information about the firm, the stock price's informativeness can improve. However, Peress shows that there is a trade-off between risk sharing and information production. The increase in the number of investors improves risk sharing among them and consequently lowers the cost of capital. As a result, investors have less incentive to produce information, and the price's informativeness may reduce. We empirically examine the effects of an expanded investor base on the informativeness of stock prices by using an event-study approach. More specifically, we estimate abnormal returns around the announcement of upward and downward revisions of earnings forecasts released by MTU firms. If abnormal returns around the release of public information become smaller (larger) after the MTU reduction, it indicates that stock prices reflect more (less) private information. Event studies allow us to examine the extent to which both positive and negative information is incorporated into stock prices.

We address these two issues by comparing the long-run performance of MTU firms with that

[2] In Japan, when a firm splits its stock, investors were not allowed to sell undelivered shares during a period of about 60 days after the ex-date until the institutional restriction was resolved in January 2006.

of control firms, controlling for firm size, book-to-market value, and momentum. Our findings are summarized as follows. First, positive stock price reactions tend to continue for a long period after the reduction in MTU. The returns for the MTU firms are higher than those for the control firms by 1.51% on the day after the announcement of the MTU reduction, by 5.33% on 10 trading days after, and by 10.87% on 670 trading days after the MTU reduction. Second, the MTU reduction changes stock prices' informativeness asymmetrically between positive and negative information. After the MTU reduction, prices reflect more positive and less negative private information. Further investigation on investors' short and long positions indicates that individual investors are likely to face short-sales constraints. As implied by the studies on short-selling (Miller, 1977; Diamond and Verrecchia, 1987), if the constraints impede new investors' short-selling without restricting their buy orders, stock prices can reflect more positive and less negative information.

The remainder of this paper is organized as follows. Section 2 reviews past MTU studies. Section 3 describes the sample and presents shareholder statistics. Section 4 investigates the effects of MTU decreases on the long-run stock returns by calculating the buy-and-hold abnormal returns. Section 5 investigates the informational effects of MTU reductions by estimating abnormal returns around the announcements of revised earnings forecasts. Section 6 concludes the paper.

2. Minimum trading unit reductions

In Japan, a firm's board of directors can determine the MTU of its stock, or the number of shares that can be traded on an exchange. The MTU also corresponds to the number of shares for a voting right. Since investors place orders in multiples of the MTU, a firm can reduce the minimum monetary value necessary for investors to trade shares by decreasing its MTU.[3] Changes in MTUs were previously restricted by the Commercial Law, which formerly stipulated, for example, that a firm had to hold 50 thousand yen worth of net assets per unit. However, the revision of the Commercial Law in October 2001 allowed firms to change their MTUs without such restrictions. Since then, many Japanese firms have reduced their MTUs to encourage individual investors with limited financial resources to invest in their stocks.

Previous empirical studies mainly investigate the short-run effects of MTU reductions on stock returns by using event-study approaches. Amihud et al. (1999) investigate 66 MTU reductions of the TSE firms from 1991 to 1996. They find that the MTU reduction greatly increases the base of individual investors and yields abnormal returns of 4–6% between the announcement of the MTU reduction and the actual date of the reduction. They also find that the abnormal returns are positively associated with a sharp increase in the investor base. Similarly, Ahn et al. (2005) examine 167 MTU decreases on the TSE from 1996 to 2002. They find that the MTU decreases cause stock prices to

[3] Currently, a firm's MTU is one of the following numbers: 2,000, 1,000, 500, 200, 100, 50, 10, or 1. The Japanese stock exchanges decided to integrate these eight trading units into 1,000 and 100 by April 2014.

increase, improve liquidity, and increase the speed of adjustment of prices to shocks using daily and high-frequency data. In addition, Hauser and Lauterbach (2003) investigate MTU changes applied to all stocks listed on the Tel Aviv Stock Exchange and find that value effects of the MTU decreases are weaker for thinly traded stocks. Finally, Isaka and Yoshikawa (2012) examine the effects of MTU reductions and stock splits on stock returns for both low-visibility and high-visibility firms in the Japanese stock markets between October 2001 and March 2005. They find that the effects of MTU reductions and those of stock splits on stock prices are more pronounced for the low-visibility stocks than for the high-visibility stocks.

All of these studies conclude that the value effect of MTU reductions is caused by an expanded investor base, as implied by Merton (1987). In the Merton model, investors invest only in securities of which they are aware, and they cannot fully diversify their portfolios. As a result, the equilibrium return reflects not only a premium for systematic risk but also an additional premium for firm-specific risk. An important implication of this model is that the premium for firm-specific risk is shown to be larger for a less recognized firm with a smaller number of shareholders. Thus, the model implies that firms can reduce the cost of equity capital and increase stock returns by decreasing their MTUs because the decrease in the minimum monetary value necessary for trading shares enables them to expand their investor base.

Although a major implication of the Merton model is a link between stock returns and the investor base, Peress (2010) extends the model and examines the informational effects of an expanded investor base. Peress shows that a wider investor base may either increase or decrease the stock's informativeness. If a firm can attract new, informed traders, its stock price will be more informative. However, the wider investor base improves the risk sharing and weakens investors' incentive to produce information, which can potentially reduce the informativeness of the firm's stock price. Thus, the effect of shareholder increases on market efficiency is an empirical question.

In our paper, we examine the long-run performance of MTU firms in terms of long-run abnormal returns and market efficiency. It is important to investigate the long-run performance following MTU reductions because the number of individual shareholders tends to keep increasing for several years after the reduction. While none of the past MTU studies examines the long-run effects of MTU changes, several studies investigate the long-run effects of stock splits (e.g., Desai and Jain, 1997; Byun and Rozeff, 2003). We also examine the effects of MTU reductions on market efficiency by investigating stock price reactions to the public release of good and bad news, which allows us to capture how MTU reductions alter the speed of price adjustments to both positive and negative private information.

3. Sample and individual investors

Sample

Over the period October 2001–May 2008, 660 firms have announced MTU reductions in Japan's stock markets.[4] For the 11 firms that announced MTU reductions more than once during the period, we analyze their first MTU reductions. We assign a control firm to each MTU firm, on which daily stock return and financial data are compiled in the Nikkei Portfolio Master database. The final sample consists of 608 cases, of which shareholder data are also available for both MTU and control firms in the Nikkei NEEDS-Financial QUEST database.

Table 1 presents the distribution of sample MTU firms. As shown in Panel (a), most firms reduced their MTUs from 1,000 to 100 shares. Panel (b) shows that many firms announced MTU reductions from October 2001 to the end of 2002 as well as in 2004-2005 in response to the revision of the Commercial Law in 2001. Our dataset offers a wide coverage of sample firms listed on different stock exchanges. As shown in Panel (c), the MTU sample comprises not only large- and medium-sized firms listed on the first and second sections of the TSE or the OSE, but also many small-sized firms listed on JASDAQ and Hercules.[5][6]

We assign a control firm to each MTU firm in the following manner. All the firms listed on Japanese stock exchanges that did not announce MTU changes between October 2001 and May 2008 and that also have no missing observations in the database, are used to construct a control sample. Each month, all of the firms are sorted into size quartiles based on the end-of-month market value, and firms in each quartile are sorted into tertiles based on the same end-of-month book-to-market ratio. Then we divide each tertile in half based on their raw returns in the prior 6 months. To each of the MTU firms, we assign a randomly drawn control firm from the same group to which the MTU firm belongs.

Table 2 presents summary statistics for the MTU and control samples. Both samples have very similar average market value and book-to-market ratios. The MTU sample experiences a high average return of 24.09% in the prior 6 months, and the control sample also has a relatively high average return of 17.47%. We compare the performance of these two samples with similar characteristics in terms of the size, book-to-market value, and past returns to examine the long-term performance of MTU reductions.

Individual shareholders

To begin, we investigate changes in the investor base before and after MTU reductions. Since the primary objective of MTU reductions for firms is to encourage small investors to invest in their stocks, the number of individual shareholders is expected to increase following MTU reductions.

[4] Over the same sample period, three firms increased their MTUs.
[5] For the firms listing their stocks on several exchanges, we identified the main trading exchange at the end of the previous month of the announcement from the database.
[6] Hercules and JASDAQ are the markets for small and growing firms. Hercules was a trading section of the OSE, while JASDAQ was an independent trading exchange. In April 2010, the OSE acquired JASDAQ and merged Hercules and JASDAQ into a new JASDAQ.

Using shareholder data from companies' annual reports available in the Nikkei NEEDS-Financial QUESTdatabase, we obtain each firm's number of individual shareholders at the end of the fiscal year before the reduction in MTU takes place (*Year –1*) and at the end of the first, second, and third fiscal years after the MTU reduction (*Years +1,+2, and +3*).

Past studies report that MTU reductions immediately increase the investor base, but Table 3 shows that the number of individual shareholders tends to increase for a period of several years after the reduction.[7] As shown, the average (median) number of individual shareholders for MTU firms increases significantly from 3,965 (1,237) in Year –1 to 5,598 (2,148) in Year +1, 6,984 (2,729) in Year +2, and 8,201 (3,314) in Year +3. The average number of all shareholders tends to change in accordance with that of individual shareholders.[8] The average percentage changes in the number of individual shareholders from Year –1 to each fiscal year are 90% in Year +1, 181% in Year +2, and 259% in Year +3. All of these percentage increases are statistically significant at the 1% level by the results of *t* tests. The average percentage changes for the control firms (37% in Year +1, 58% in Year +2, and 72% in Year +3) are also positive and significant, but these percentage changes are much lower than those of the MTU firms. The number of individual investors participating in trading stocks gradually rises in the whole market during our sample period.

It is also important to notice that the average percentage of shares held by individual shareholders is stable at around 41% for both of the MTU and control samples. These findings indicate that although the number of individual investors increases, each individual tends to share risk with other investors by holding a smaller quantity of shares in their portfolios than before when the minimum monetary value for trading shares decreases.

4. Long-run stock returns following MTU reductions

Long-run stock returns

In this section, we examine the effect of MTU reductions on stock returns. For each event *i*, we define the announcement date (*t=a0*) as the trading day just before the news on the MTU reduction appeared in *Nihon Keizai Shimbun*, and the change day (*t=0*) is when the reduction in MTU actually took place. The number of days between the announcement and change varies for different events, and the average number of trading days between these two days is 44.7 days for our sample.

Then, using daily stock return data adjusted for cash dividends compiled in the Nikkei

[7] In this table, the number of observations decreases over time for various reasons such as mergers and acquisitions, delisting and so on.

[8] In this database, the number of all shareholders counts all shareholders, while the number of individual shareholders counts only the shareholders who hold a number of shares in at least one MTU. Accordingly, the increase in individual shareholders may be overestimated because not only new shareholders who buy shares after MTU decreases, but also shareholders who had owned shares of less than one MTU can be counted as "new" individual shareholders when MTUs are reduced. However, this is a minor problem because, on the TSE, the average percentage of shareholders with shares less than MTU was merely 14.6% at the end of March 2006.

Portfolio Master database, we calculate the firm *i*'s buy-and-hold abnormal returns (*BHARs*) from 10 trading days before the announcement day (*t=a–10*) to day *t* as:

$$BHAR_{it} = \prod_{l=a-10}^{t}(1 + r_{il}) - \prod_{l=a-10}^{t}(1 + r_{bl}), \quad (1)$$

where r_{it} is the rate of return for stock *i* on day *t*, and r_{bt} is the rate of return for stock *i*'s control stock on the same day.[9] We compute the *BHAR* for each day from 10 trading days before the announcement through 670 trading days after the MTU reduction (*t=a–10,…, +670*).

Figure 1 plots the average BHAR for 608 MTU firms as well as the upper and lower 95% confidence intervals. Since the number of days between the announcement and change varies by events, the BHAR is aggregated across firms for each day between 5 trading days before and after the announcement day (*t= a–10,…,a+5*) as well as 5 trading days before and 10 days after the change day (*t=–5,…,+10*). On the announcement day (*t=a0*) and day a+1, the BHAR increases to 0.74% and to 1.51%, respectively. As many firms release the information about their MTU changes after the close of the trading session, the BHAR is not statistically significant on day a0 but becomes significant on day a+1. Interestingly, even after the release of information, the BHAR keeps increasing until the reduction in MTU takes place. Stock prices tend to underreact to the news, and investors have opportunities to make a profit by purchasing these stocks. The BHAR reaches 4.13% on the day of the MTU change (day 0) and rises to 5.33% on day +10.

Table 4 presents the long-run BHARs from day a–5 through day +670 for the MTU firms with no missing observations in the stock return database. We aggregate the BHARs for the full sample and the subsamples sorted by the percentage change in the number of individual shareholders. The subsample G1 consists of MTU firms that experience more than a 50% increase in the number of individual shareholders from the end of the fiscal year before the MTU reduction to the end of the fiscal year just after the reduction, while the other subsample G2 consists of the firms with a percentage increase of less than 50%. The *t*-test is used to test the null hypothesis that the difference in the BHAR is zero between G1 and G2.

For the full sample, the BHARs become positive and significant from day a+1 through day +250. The BHARs are 1.51% on day a+1, 4.13% on day 0, and 5.76% on day +250. Stock prices tend to increase for a long period of time as the number of individual shareholders increases. The BHARs become marginally insignificant after day +280, but become significant and positive again from day +370 through day +670. The BHAR exceeds 10% after day +400.

There are also remarkable differences between the BHARs for G1 and those for G2. The BHARs are generally higher for G1 than for G2 after the MTU reduction. The BHARs for G1 become significant and positive at the 1% level over the days from a+1 through +100 and become

[9] We also calculated the buy-and-hold abnormal return as the net of the buy-and-hold return for the Daiwa Stock Index and confirmed that the estimation results were very similar to our current results.

significant again after day +430. Their BHARs for G1 are 2.30% on day a+1, 7.04% on day 0, 9.40% on day +100, and 12.11% on day +760. On the other hand, the BHARs for G2 are 0.81% on day a+1, 1.50% on day 0, 1.99% on day +100, and 9.77% on day +760. The differences in the two groups' BHARs are statistically significant from day a+2 through day +100. These findings indicate that MTU reductions affect stock returns for a period of several years, and, consistent with the Merton model, the expanded base of individual shareholders is a key factor that causes positive stock returns.

Trading volume and volatility

If firms reduce their MTUs to increase liquidity, the MTU reduction may also affect trading volume and volatility. For each firm, we calculate the average daily trading volume and volatility for each 30-day interval starting from day 0 through day +659. We also calculate them for the period between the announcement and change. The daily trading volume is calculated as the time-series average of the daily number of traded shares times the closing price, while the volatility is measured by the standard deviation of daily stock returns over 30 trading days. Then, for each interval, the cross-sectional averages for the MTU and control firms are computed, and the null hypothesis of no difference in the average trading volume or volatility between days [a–30, a–1] and each interval is tested by using *t*-tests.

Table 5 shows the cross-sectional averages of the trading volume and volatility. As for the MTU firms, the trading volume tends to increase gradually from 383 million yen before the MTU reduction to 412 million yen on days [+120, +149], and to 554 million yen on days [+630, +659]. However, these increases in trading volume are not statistically significant. Similarly, for the control firms, the trading volume changes from 401 million yen to 579 million yen on days [+330, +359], but the increase is not significant in the statistical sense. There is no statistical evidence that the increased investor base improves liquidity measured by trading volume.

On the other hand, there is a tendency that volatility decreases both for the MTU and control firms. For the MTU sample, the volatility drops significantly from 2.59% on the prereduction days to 2.317% on days [+120, +149], and to 2.297% on days [+630, +659]. However, the volatility also decreases significantly for the control sample from 2.622% to 2.434% on days [+120, +149], and to 2.376% on days [+630, +659]. The decrease in volatility seems to be a market-wide effect during the sample period.

5. Changes in market efficiency after MTU reductions

Stock price informativeness

In this section, we examine the effect of MTU reductions on market efficiency using an event-study approach. Specifically, we examine stock price reactions to the announcement of upward

and downward revisions of earnings forecasts released by MTU firms. If stock prices become more (less) informative after the MTU reduction, the abnormal returns around the release of public information would be larger (smaller) than were observed before the MTU reduction.

In Japan, the exchanges require firms to disclose next year's earnings forecasts in terms of sales amount, pretax earnings, and net earnings simultaneously with the annual and semiannual earnings announcements. The exchange also requires firms to disclose revised earnings forecasts when they modify their forecasts upward or downward. The firms listed on the TSE, for example, disclose revisions when they modify the forecast of sales amounts by more than 10% or the forecast of pretax or net earnings by more than 30%. The revised earnings forecasts are announced at the exchange and immediately transmitted to investors through the business information terminal, and appear in the next day's newspapers.

The use of revised earnings forecasts has several advantages over that of earnings forecasts. First, the announcements of forecast revisions usually involve substantial surprises to firms' profits, and they have more pronounced effects on stock prices than do earnings announcements that barely differ from the earnings forecasts. Second, the announcements of revised earnings forecasts are much less clustered than earnings announcements. Earnings announcements of Japanese firms tend to overlap intensively on specific days in May, while the announcements of revised earnings forecasts are generally not scheduled previously. Third, it is difficult for most uninformed traders who do not have private information to anticipate the forecasts revisions, so only private information can be incorporated into prices before the release of information.

We collect the information about the revised earnings forecasts released by the MTU and control firms within 3 years before and after the day of the MTU reduction between August 2000 and June 2011 as compiled in the Nikkei NEEDS-Financial QUEST database. The database contains all the earnings forecasts released simultaneously with the earnings announcements and those released on different days from the earnings announcements. However, prior to the fiscal year ended March 2003, the database provides only the earnings forecast data released at the time of earnings announcements. Therefore, we collect supplementary data on the earnings forecasts released on different days from the regular earnings announcements from *Nihon Keizai Shimbun*. We identify 395 MTU firms, of which both the MTU firm and its control firm announced forecast revisions during the sample period.[10] The total numbers of upward revisions in net earnings forecasts (good news) for the MTU sample are 678 before and 685 after the reduction, while those for the control sample are 621 and 709, respectively. The total numbers of downward revisions (bad news) are 645

[10] We drop the MTU firm if either the firm or its control firm does not announce any forecast revisions within 3 years before or after the MTU reduction, or if we cannot estimate abnormal returns because of missing data in the database. However, we confirm that the inclusion of the announcements of unmatched-MTU firms does not significantly change our results. We also drop the earnings forecasts announcements from the sample if they do not entail any change in the net earnings forecast.

before and 755 after the reduction for the MTU sample, while they are 835 and 865 for the control sample.

Using the standard event-study methodology described in MacKinlay (1997), we first estimate individual security *i*'s cumulative abnormal returns from day t_1 to day t_2 ($CAR_i(t_1,t_2)$). To estimate each security's CARs, we use a one-factor market model over 100 trading days starting from 105 trading days before the announcements with the use of the Daiwa Stock Index (DSI) as a proxy for the market portfolio. The DSI is the capitalization weighting index comprising all of the stocks traded in Japanese stock markets. Since our sample includes many firms outside the TSE, the DSI is a better proxy for the market portfolio than other indexes such as TOPIX or the Nikkei Index. Data on daily stock returns are obtained from the Nikkei Portfolio Master database. Then we compute the average CARs for each of the four groups in the case of good news (the prereduction CARs for the MTU and control firms, and the postreduction CARs for the MTU and control firms), and those for each of the four groups in the case of bad news.

Figure 2 plots the CARs (–5, *t*) cumulated from 5 trading days before the announcement to day *t* over 5 trading days before to 10 trading days after the announcement ($t=-5,\ldots, +10$) for the MTU and control samples. The solid line represents the prereduction CARs for the announcements released within 3 years before the MTU reduction, while the dotted line represents the postreduction CARs for the announcements released within 3 years after the reduction. The results of good news indicate that the stocks tend to be more efficient after the MTU reduction. After the MTU reduction, the CARs are 2.44% on day +1 and 1.62% on day +10, which are lower than the prereduction CARs (3.19% on day +1 and 2.46% on day +10). Actually, the prereduction CARs are significantly lower than the postreduction CARs over day +1 to day +4. The control stocks' efficiency, on the other hand, does not change significantly. For the control stocks, the postreduction CARs are higher than the prereduction CARs, but such differences tend to be insignificant.

In contrast, the results of bad news indicate that stock prices incorporate less negative information after the MTU reduction. As for the MTU stocks, the postreduction CARs are –2.96% on day +1 and –3.15% on day +10, which are lower than the prereduction CARs (–1.91% on day +1 and –2.34% on day +10). The differences between the pre- and postreduction CARs are also statistically significant from day +1 through day +5 at the 5% significance level. As for the control stocks, however, the differences between the prereduction and postreduction CARs are not statistically significant.

We also conduct a subsample analysis as follows. First, each of the eight groups is split into two smaller subgroups by the percentage change in the number of individual shareholders from the fiscal year before to the fiscal year after the MTU reduction. The subgroup G1 comprises the firms whose number of individual shareholders increases by more than 50%, and the other subgroup G2 comprises the other firms whose number of individual shareholders increases by less than 50%.

Second, as a robustness check, we exclude the announcements with extremely high or low surprises from the sample. We measure the surprise caused by the release of public information by the change in net earnings forecast divided by the firm's end-of-month market value prior to the announcement. Then we exclude the announcements that cause large positive (negative) surprises of more (less) than 50% (–50%) of the market value as well as small positive (negative) surprises of less (more) than 0.5% (–0.5%) of the market value. The average positive (negative) surprises for the MTU and control samples after excluding those announcements are 1.709% and 1.606% (–5.033% and –4.727%) before the MTU reduction, and they are 1.653% and 1.427% (–3.957% and –5.210%) after the reduction, respectively.

To examine the abnormal return around the announcement day, Table 6 shows the CARs (0, +2) cumulated from the announcement day (day 0) to day +2 for each group. As the analysis of the entire sample and that of the selected sample excluding the announcements with extremely high and low surprises both yield similar results, we present the results for the selected sample here. As shown in Panel (a), we can confirm that the release of good news causes lower abnormal returns after the MTU reduction. For the full sample, the prereduction CAR is 3.335%, while the postreduction CAR is 2.771%. The difference between the prereduction CAR and the postreduction CAR is statistically significant at the 5% level. For the subsample analysis, although the drop in the CAR is significant only for G1, the postreduction CARs are lower than the prereduction CARs for both G1 and G2 by 0.145% and by 0.924%, respectively. The control sample's CAR does not exhibit any significant change.

In contrast, as shown in Panel (b), the release of negative surprises causes larger stock price reactions after the MTU reduction. In the results of the selected sample, the CAR of the full sample drops from –1.716% in the prereduction period to –3.957% in the postreduction period. In the subsample analysis, the CARs for G1 and G2 also decrease from –1.531% to –3.156%, and from –1.853% to –3.273%, respectively. All of these changes in the CARs are statistically significant at the 1% level. For the control sample, the CAR also decreases by –0.479%. This change is also statistically significant, but the magnitude of this change is only one-third of that of the change in the MTU sample's CAR.

These findings indicate that stock prices reflect more positive and less negative private information when the individual investor base expands following MTU reductions. Unlike the prediction of Peress (2010), there is an asymmetric change in stocks' informativeness between positive and negative information.

The asymmetric change in efficiency can be explained by implications expounded in the short-selling literature if individual investors face more severe short-sales constraints than do other investors. In the study of short-sales constraints, there are two seminal papers. Diamond and Verrecchia (1987) show using a rational expectations model that short-sales constraints eliminate

short-selling by informed traders and reduce the speed of price adjustment to negative private information.[11] If new individual investors who participate in trading stocks after the MTU reduction are informed traders[12] facing the short-sales constraints, they are willing to buy shares when they have positive private information but cannot sell shares when they have negative private information unless they have their own shares. As a result of an increase in the base of individual investors, a larger proportion of investors would face the short-sales constraints, and consequently stock prices can reflect more positive and less negative private information.

Similarly, Miller (1977) argues that short-sales constraints induce upward bias into prices because the constraints reduce sell orders from pessimistic investors without restricting optimistic investors' buy orders. Miller's model implies that a higher difference of opinions about stock value among investors causes larger overvaluation, holding short-sales constraints fixed. Many empirical studies test Miller's implications.[13] For example, Berkman et al. (2009) find that stocks on which there are higher differences of opinion earn significantly lower returns around earnings announcements. Their findings are consistent with Miller's implications. This is because if the stock about which there is a greater difference of opinion is in larger overvaluation, its price is expected to drop to a greater degree when the difference of opinion is resolved by release of information to the public. This implication can be applied to our findings. If new individual investors face short-sales constraints, stock prices will be more overvalued, reflecting only optimistic opinions of these investors. As a result of this, the stock prices can react less to the public release of good news since the prices are already overvalued, and they can react more to the release of bad news when the overvaluation is revealed.

The above two explanations can be applied to the asymmetric change in stocks' informativeness only if new individual investors' short-selling is restricted while their buy orders are not. In order to support this hypothesis, we examine in the next subsection how investors' short and long positions change after the MTU reduction.

Short-selling

We investigate investors' short-selling before and after MTU reductions. In Japan, investors can short stocks through margin transactions or the general equity lending market. The general equity lending market instituted in December 1998 is designed for institutional investors, in which

[11] Their implications have been tested in several different countries (e.g., Damodaran and Lim (1991) and Reed (2007) in the U.S. markets, Aitken et al. (1998) in the Australian stock market, and Isaka (2007) in the TSE).

[12] Kaniel et al. (2012) find that individual shareholders are informed traders because individual investor buying (selling) predicts large positive (negative) abnormal returns on and after earnings announcement dates using the NYSE dataset, while Foucault et al. (2011) suggest that individual investors are noise traders since they affect volatility positively in the French stock market.

[13] Recent studies include those of Asquith et al. (2005), Boehme et al. (2006), Boulton and Braga-Alves (2010), Chang et al. (2007), Chen et al. (2002), Cohen et al. (2007), Diether et al. (2002), Jones and Lamont (2002), and Lecce et al. (2012). Boheme et al. (2009), for example, find evidence consistent with both Merton (1987) and Miller (1977).

investors can borrow stocks in exchange for cash collateral and a negotiable stock lending fee. On the other hand, individual investors primarily use the margin transactions established in June 1951.

The trading system of margin transactions is divided into the standardized margin transaction and the negotiable margin transaction. In the standardized margin transaction, the payment deadline, interest, and stock lending fees and other conditions are determined by the rules of the exchange. Through the standardized margin trading, investors can borrow either stocks for short-selling (margin selling) or cash for buying stocks (margin buying) from a securities company with a settlement period within 6 months by depositing the equivalent of at least 30% of the transaction value. Margin sellers borrow stocks that are collateralized by margin buyers in exchange for cash collateral amounts to sales proceeds, whereas margin buyers borrow funds in exchange for depositing purchased shares as collateral. In addition, margin buyers must pay interest for borrowing funds, and margin sellers receive it from the cash collateral. However, it becomes very costly for investors to short stocks when the demand for margin selling exceeds the supply of shares within the system of the standardized margin transactions. In this case, a stock lending fee is charged on margin selling, and margin buyers who provide shares receive it. The system of the negotiable margin trading is similar to that of the standardized one except that the payment deadline, interest, stock lending fees and other treatment rights are determined between investors and the securities company.

To examine investors' short-selling activities, we use the weekly data for the outstanding standardized margin transactions for the MTU and control samples compiled in the Nikkei NEEDS-Financial QUEST database.[14] The database covers those TSE and OSE stocks eligible for the standardized margin trading that meet the stringent requirements imposed, such as the numbers of outstanding shares and shareholders, monthly trading volume, and corporate earnings. In our sample, 131 MTU firms have their and their control firm's margin transaction data around the time of the MTU reduction.

For each of the MTU and control firms, we calculate the weekly average of the outstanding short position and that of the outstanding long position for each interval of 50 days from 50 trading days before the announcement of the MTU reduction and 699 trading days after the reduction ($t=a-50,\ldots, +699$). We also calculate the weekly average short and long positions between the announcement and change days ($[a0, -1]$). Then we compute the open interest of short/long positions (*RATIO*) as the weekly average of the outstanding short position divided by that of the outstanding long position for each interval. The cross-sectional average of the open interest is then calculated, and the null hypothesis that the open interest of each interval is the same as the prereduction open interest on days [a–50, a–1] is tested by using *t*-tests. The high value of the RATIO indicates that investors actively short the stocks, and vice versa.

[14] We use the data for the standardized margin transactions because the data for the negotiable margin transactions are available only after January 2003, and the trading volume of the negotiable transactions is generally lower than that of the standardized transaction.

Table 7 shows that the average RATIO decreases over time for the MTU firms. The RATIO is 1.408 prior to the announcement of the MTU reduction, and decreases to 0.961 on days [0, +49], 0.842 on days [+50, +99], and 0.804 on days [+100, +149]. The changes in the RATIO tend to be statistically significant from day +50 through days +400. The open interest of short/long positions becomes low for a long period of time after the MTU reduction.

The average RATIO is also calculated for the subsamples sorted by the percentage increase in the number of individual shareholders. G1 comprises the MTU firms with more than a 50% increase in the number of individual shareholders from the fiscal year before to the fiscal year after the MTU reduction, and G2 comprises the other firms with less than a 50% increase. The RATIO decreases for both of the subsamples after the MTU reduction, especially for G1. The RATIO of G1 is 1.675 before the reduction, but becomes 0.724 on days [0, +49], 0.594 on days [+50, +99], and 0.568 on days [+100, +149]. These changes are statistically significant. As for G2, the change in the RATIO is not statistically significant, but the RATIO decreases from 1.189 before the reduction to 1.046 on days [+50, +99], 0.997 on days [+100, +149], and 0.703 on days [+400, +449]. For the control firms, the RATIO becomes significantly low 350 trading days after the MTU reduction, but there are no significant changes in the RATIO between the prereduction period and days [a0, +349].

The low open interest of short/long positions for a long period of time after MTU reductions indicates that new individual investors do not actively use short-selling strategies. These findings support our conjecture that individual shareholders face short-sales constraints. If the constraints eliminate new individual investors' short-selling without restricting their buy orders, stock prices incorporate more positive and less negative private information when the proportion of individual investors expands significantly, as implied by the short-selling literature.

Several past studies also imply that individual shareholders do not actively short stocks. For example, Barber and Odean (2007) investigate French stock markets and find that individuals buy high-attention stocks but do not sell them, and conclude that individual investors are net buyers of attention-grabbing stocks. In addition, Nofsinger (2001) investigates the trading behavior of institutional and individual investors on the NYSE around the news release. The author finds that institutions buy and sell on both good and bad news, while individuals buy on good news but do not sell on bad news. Their findings also provide some evidence that individual investors do not or are not willing to short stocks actively.

6. Conclusion

In this paper, we examine the long-run effects of MTU reductions on stock prices in the Japanese stock markets since the revision of the Commercial Law in October 2001. Our MTU sample comprises firms listed not only on the TSE, but also on other exchanges such as the OSE and JASDAQ. After the MTU decreases, a base of individual shareholders tends to increase significantly

for a period of several years. For our sample, the average percentage changes in the number of individual shareholders from the fiscal year before the MTU reduction are 90% at the end of the first fiscal year, and 181% and 259% at the end of the second and third fiscal years after the reduction, respectively. We find that such a significant increase of individual investors affects both long-term stock returns and the efficiency of stock prices.

Our study reveals that the stock returns for the MTU firms are significantly higher than those for the control firms by 1.51% on the day after the announcement of the MTU reduction, by 5.33% on 10 trading days after, and by 10.87% on 670 days after the reduction. The long-run increase in stock prices following the MTU reduction is more pronounced for stocks with a higher percentage increase in the individual investor base. In addition, we find that stock prices tend to reflect more positive and less negative private information after the MTU reduction. A further investigation of investors' short-selling activities indicates that individual shareholders face short-sales constraints, which can be the cause of the asymmetric change in stocks' price informativeness between positive and negative information. If the constraints reduce individual investors' short-selling without affecting their buy orders, the positive private information can be more smoothly incorporated into prices than negative private information. In summary, a corporate strategy of changing a base of individual investors can have long-run effects on both the stock returns and efficiency.

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Table 1. Distribution of MTU sample

The table shows the distribution of 608 sample firms by the MTUs before and after the MTU reduction, by the year when the announcements of MTU reductions are released, and by the exchange on which MTU firms are listed. In Panel (c), the TSE and the OSE represent the Tokyo Stock Exchange and the Osaka Stock Exchange, respectively. Other exchanges include the Nagoya Stock Exchange and the Fukuoka Stock Exchange. The sample firms are collected from *Nihon Keizai Shimbun* between October 2001 and May 2008.

(a) Minimum trading unit change

Before	After	N
1,000	500	40
1,000	200	1
1,000	100	507
1,000	50	1
1,000	10	1
500	100	41
200	100	1
100	50	8
100	10	8

(b) Announcement day

Year	N
2001	42
2002	142
2003	63
2004	117
2005	132
2006	81
2007	27
2008	4

(c) Exchange

Exchange	Section	N
TSE	first	191
	second	103
OSE	first	17
	second	45
JASDAQ		230
Hercules		7
Others		15

Table 2. Summary statistics

The table shows the summary statistics for the market value, the book-to-market ratio, and the prior 6-month return at the end of the month before the announcement of MTU reductions. To construct the control sample, all Japanese stocks except for MTU firms, for which the data are compiled in the Nikkei Portfolio Master database, are sorted into size quartiles based on the end-of-month market value. Each quartile is sorted into tertiles based on the end-of-month book-to-market ratio, and then each tertile is divided into two groups based on the returns in the prior 6 months. A randomly drawn control stock is matched to each MTU stock from the same group to which the MTU stock belongs.

	N	Mean	Median	SD
Market value (in billion yen)				
MTU sample	608	111.0	15.0	416.0
Control sample	608	111.0	14.6	365.0
Book-to-market ratio				
MTU sample	608	0.886	0.740	1.257
Control sample	608	0.931	0.764	0.703
Prior 6-month return (%)				
MTU sample	608	24.093	12.396	62.735
Control sample	608	17.474	9.134	41.992

Table 3. Shareholding statistics

The table shows the number of individual shareholders (mean and median), the average percentage change in the number of individual shareholders from the fiscal year before the MTU reduction, the average number of all shareholders, and the average percentage of shares held by individual shareholders. The shareholding data are collected from the Nikkei NEEDS-Financial QUEST database for the fiscal year before the MTU reduction (*Year –1*), and the first, second, and third fiscal years after the reduction (*Years +1*, *+2*, and *+3*). Equality of means (medians) between *Year –1* and *Years +1*, *+2*, or *+3* is tested by using *t*-tests (Wilcoxon signed-rank tests). The hypothesis that the average percentage change is equal to 0 is also tested by *t*-tests. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Year −1	*Year +1*	*Year +2*	*Year +3*
Number of observations				
MTU sample	608	608	599	585
Control sample	608	606	591	572
Average number of individual shareholders				
MTU sample	3,965	5,598 **	6,984 ***	8,201 ***
Control sample	10,887	10,951 ***	11,145	11,891
Median number of individual shareholders				
MTU sample	1,237	2,148 ***	2,729 ***	3,314 ***
Control sample	3,356	3,704	3,863 *	4,415 ***
Average percentage change in the number of individual shareholders from *Year −1*				
MTU sample	−	+90% ***	+181% ***	+259% ***
Control sample	−	+37% *	+58% **	+72% ***
Average number of all shareholders				
MTU sample	4,203	5,863 **	7,246 ***	8,474 ***
Control sample	11,213	11,262	11,401	12,190
Average percentage of shares held by individual shareholders				
MTU sample	42%	41%	41%	41%
Control sample	42%	42%	41%	41%

Table 4. Buy-and-hold abnormal returns

The table shows the average buy-and-hold abnormal returns (BHARs) for the full sample and the subsamples sorted by the percentage change in the number of individual shareholders between 5 trading days before and 5 trading days after the announcement of the MTU reduction (*t=a–5,…, a+5*) as well as between 5 trading days before and 670 trading days after the change in MTU (*t=–5,…, +670*). G1 is the subsample comprising the firms with more than a 50% increase in the number of individual shareholders, while G2 comprises the other firms with less than a 50% increase. The differences in BHARs between G1 and G2 are also shown in the table. The BHARs for each MTU firm are calculated as the net of the return for its control firm. The number of observations changes over time because of missing data in the Nikkei Portfolio Master database. Standard errors are shown in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	Full sample			Subsamples by the percentage change in the number of shareholders										
				G1: More than a 50% increase				G2: Less than a 50% increase						
	N	BHAR (%)		N	BHAR (%)			N	BHAR (%)			Difference in BHAR		
a−5	608	0.05	(0.34)	289	0.01	(0.48)		319	0.08	(0.48)		0.07	(0.68)	
a−4	608	0.06	(0.38)	289	0.09	(0.55)		319	0.04	(0.54)		−0.05	(0.77)	
a−3	608	0.08	(0.40)	289	0.26	(0.55)		319	−0.08	(0.57)		−0.34	(0.79)	
a−2	608	−0.07	(0.42)	289	0.17	(0.60)		319	−0.29	(0.59)		−0.46	(0.84)	
a−1	608	0.46	(0.45)	289	0.74	(0.69)		319	0.21	(0.60)		−0.53	(0.91)	
a 0	608	0.74	(0.48)	289	1.19	(0.73)		319	0.34	(0.63)		−0.85	(0.95)	
a+1	608	1.51	(0.51) ***	289	2.30	(0.77) ***		319	0.81	(0.67)		−1.49	(1.02)	
a+2	608	1.67	(0.54) ***	289	2.79	(0.84) ***		319	0.66	(0.69)		−2.13	(1.08) **	
a+3	608	1.54	(0.55) ***	289	2.71	(0.87) ***		319	0.48	(0.70)		−2.23	(1.11) **	
a+4	608	1.46	(0.55) ***	289	2.29	(0.87) ***		319	0.70	(0.69)		−1.59	(1.10)	
a+5	608	1.84	(0.58) ***	289	2.88	(0.93) ***		319	0.90	(0.71)		−1.98	(1.16) *	
−5	608	3.80	(0.99) ***	289	5.68	(1.57) ***		319	2.10	(1.23) *		−3.58	(1.98) *	
−4	608	3.94	(0.99) ***	289	5.90	(1.57) ***		319	2.17	(1.23) *		−3.73	(1.97) *	
−3	608	4.23	(0.99) ***	289	6.27	(1.58) ***		319	2.38	(1.23) *		−3.89	(1.98) *	
−2	608	4.49	(0.99) ***	289	6.45	(1.57) ***		319	2.71	(1.24) **		−3.74	(1.98) *	
−1	608	4.85	(1.03) ***	289	6.95	(1.66) ***		319	2.95	(1.26) **		−4.00	(2.06) *	
0	608	4.13	(1.08) ***	289	7.04	(1.77) ***		319	1.50	(1.29)		−5.54	(2.16) **	
1	607	4.17	(1.10) ***	289	7.37	(1.78) ***		318	1.25	(1.32)		−6.12	(2.19) ***	
2	607	4.32	(1.08) ***	289	7.61	(1.73) ***		318	1.33	(1.32)		−6.27	(2.15) ***	
3	607	4.30	(1.10) ***	289	7.50	(1.78) ***		318	1.39	(1.31)		−6.11	(2.19) ***	
4	607	4.29	(1.15) ***	289	8.09	(1.85) ***		318	0.84	(1.37)		−7.25	(2.28) ***	
5	607	4.49	(1.18) ***	289	8.49	(1.92) ***		318	0.85	(1.41)		−7.64	(2.35) ***	
6	607	4.75	(1.22) ***	289	8.81	(2.00) ***		318	1.05	(1.43)		−7.75	(2.43) ***	
7	607	4.61	(1.22) ***	289	8.63	(1.96) ***		318	0.96	(1.47)		−7.67	(2.42) ***	
8	607	4.91	(1.21) ***	289	9.12	(1.93) ***		318	1.09	(1.48)		−8.02	(2.41) ***	
9	607	5.11	(1.24) ***	289	9.14	(2.02) ***		318	1.44	(1.48)		−7.70	(2.47) ***	
10	607	5.33	(1.23) ***	289	9.19	(2.03) ***		318	1.83	(1.43)		−7.36	(2.45) ***	
40	606	5.15	(1.47) ***	289	8.90	(2.18) ***		317	1.73	(1.97)		−7.17	(2.92) **	
70	604	5.23	(1.69) ***	289	9.31	(2.54) ***		315	1.48	(2.23)		−7.83	(3.37) **	
100	604	5.53	(1.96) ***	289	9.40	(2.97) ***		315	1.99	(2.58)		−7.41	(3.91) *	
130	602	5.05	(2.28) **	289	7.05	(3.72) *		313	3.22	(2.74)		−3.83	(4.57)	
160	600	4.56	(2.76) *	288	5.23	(4.58)		312	3.95	(3.20)		−1.28	(5.52)	
190	597	5.62	(3.21) *	287	5.76	(5.67)		310	5.49	(3.28) *		−0.27	(6.43)	
220	595	6.20	(3.45) *	286	5.43	(5.89)		309	6.91	(3.81) *		1.49	(6.91)	
250	591	5.76	(3.26) *	284	5.55	(5.39)		307	5.95	(3.83)		0.40	(6.54)	
280	585	5.75	(3.66)	280	4.24	(5.45)		305	7.14	(4.92)		2.90	(7.32)	
310	583	5.69	(3.50)	279	4.83	(5.17)		304	6.47	(4.76)		1.64	(7.01)	
340	582	5.63	(3.66)	278	4.60	(5.50)		304	6.57	(4.88)		1.97	(7.33)	
370	579	9.38	(3.85) **	276	6.97	(5.43)		303	11.58	(5.44) **		4.60	(7.70)	
400	575	10.56	(4.19) **	274	6.99	(5.25)		301	13.82	(6.42) **		6.83	(8.39)	
430	570	10.91	(4.26) **	271	9.78	(5.81) *		299	11.94	(6.19) *		2.16	(8.53)	
460	567	10.75	(4.56) **	269	10.97	(5.72) *		298	10.56	(6.98)		−0.42	(9.14)	
490	564	13.43	(4.91) ***	267	14.91	(6.20) **		297	12.10	(7.48)		−2.81	(9.84)	
520	562	14.93	(5.19) ***	266	14.71	(7.09) **		296	15.13	(7.54) **		0.43	(10.41)	
550	558	13.71	(5.35) **	264	14.25	(7.35) *		294	13.23	(7.73) *		−1.02	(10.72)	
580	554	12.85	(5.31) **	262	12.99	(6.99) *		292	12.73	(7.90)		−0.27	(10.65)	
610	551	15.08	(5.41) ***	259	15.48	(6.79) **		292	14.72	(8.27) *		−0.76	(10.86)	
640	550	14.09	(5.63) **	258	14.35	(6.54) **		292	13.86	(8.90)		−0.48	(11.29)	
670	542	10.87	(5.47) **	255	12.11	(6.20) *		287	9.77	(8.74)		−2.33	(10.96)	

Table 5. Trading volume and volatility

The table shows the cross-sectional average daily trading volume and volatility for MTU firms and those for control firms. For each 30-trading-day interval from 30 days before the announcement of MTU reductions and 659 trading days after the MTU change (*t=a–5,…, +659*) and for the days between the announcement and change (*t=a0,…, –1*), each firm's daily trading volume is computed as the time-series average of the daily number of traded share times the closing price, while the daily volatility is measured by the standard deviation of daily stock returns over 30 trading days. Equality of means between the preannouncement period ([*a–30, a–1*]) and each interval is tested by using *t*-tests. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

(a) Trading volume (in million yen)

	MTU sample			Control sample		
	N	Trading Volume		N	Trading Volume	
[a−30, a−1]	608	385	−	608	401	−
[a0, −1]	608	383		608	449	
[0, +29]	608	363		608	444	
[+30, +59]	606	363		606	513	
[+60, +89]	605	372		605	485	
[+ 90, +119]	604	391		604	487	
[+120, +149]	604	412		604	517	
[+150, +179]	601	426		601	466	
[+180, +209]	598	470		598	519	
[+210, +239]	596	494		596	481	
[+240, +269]	592	511		592	503	
[+270, +299]	585	511		585	561	
[+300, +329]	584	509		584	556	
[+330, +359]	582	540		582	579	
[+360, +389]	580	545		580	560	
[+390, +419]	576	550		576	554	
[+420, +449]	571	530		571	568	
[+450, +479]	567	555		567	538	
[+480, +509]	566	555		566	513	
[+510, +539]	562	585		562	490	
[+540, +569]	558	554		558	499	
[+570, +599]	555	553		555	501	
[+600, +629]	552	599		552	550	
[+630, +659]	550	554		550	489	

(b) Volatility (%)

	MTU sample			Control sample		
	N	Volatility		N	Volatility	
[a−30, a−1]	608	2.590	−	608	2.622	−
[a0, −1]	608	2.690		608	2.565	
[0, +29]	608	2.746		607	2.522	
[+30, +59]	606	2.449	*	606	2.537	
[+60, +89]	605	2.518		605	2.507	
[+ 90, +119]	604	2.365	***	604	2.529	
[+120, +149]	604	2.317	***	603	2.434	**
[+150, +179]	601	2.368	**	601	2.407	**
[+180, +209]	598	2.315	***	598	2.398	**
[+210, +239]	596	2.287	***	596	2.425	**
[+240, +269]	592	2.278	***	592	2.360	***
[+270, +299]	585	2.288	***	585	2.423	**
[+300, +329]	584	2.346	***	584	2.460	*
[+330, +359]	582	2.345	**	582	2.432	**
[+360, +389]	580	2.326	***	580	2.453	*
[+390, +419]	576	2.257	***	575	2.477	
[+420, +449]	571	2.365	**	571	2.546	
[+450, +479]	567	2.321	***	567	2.410	**
[+480, +509]	566	2.288	***	565	2.509	
[+510, +539]	562	2.385	*	562	2.517	
[+540, +569]	558	2.441		558	2.506	
[+570, +599]	555	2.369	**	555	2.377	**
[+600, +629]	552	2.356	**	552	2.544	
[+630, +659]	550	2.297	***	550	2.376	**

Table 6. Cumulative abnormal returns around the announcement day

The table shows the CAR (0, +2) around the announcement of revised net earnings forecasts for the MTU sample (full sample and subsamples) and for the control sample, released between 3 years before and 3 years after the MTU reduction. G1 is the subsample comprising the firms with more than a 50% increase in the number of individual shareholders, while G2 comprises the other firms with less than a 50% increase. Data on revised earnings forecasts are collected from the Nikkei NEEDS-Financial Quest database and *Nihon Keizai Shimbun*. Panel (a) presents the CARs for upward forecast revisions (good news), while Panel (b) presents the CARs for downward forecast revisions. The CARs are estimated using a one-factor market model over 100 trading days starting from 105 trading days before the announcement with the use of the Daiwa Stock Index. The differences between the prereduction CARs and the postreduction CARs are also reported. SUP is the cross-sectional average of firms' surprises, defined as the change in the net earnings forecast divided by the firm's market value at the end of the previous month of the announcement. The selected sample excludes sample announcements with positive (negative) surprises of more than 50% (–0.5%) or less than 0.5% (–50%). Standard errors are shown in parenthesis. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

(a) Good News

All observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	678	1.847	3.325	(0.189) ***	685	1.911	2.854	(0.171) ***	−0.471	(0.255) *
Subsamples by ⊿Individuals										
G1: More than 50% increase	351	1.538	3.329	(0.245) ***	323	1.132	3.038	(0.223) ***	−0.291	(0.331)
G2: Less than 50% increase	327	2.179	3.322	(0.291) ***	362	2.606	2.691	(0.255) ***	−0.631	(0.387)
Control sample	621	4.255	2.462	(0.251) ***	709	1.648	2.615	(0.157) ***	0.154	(0.296)

Selected observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	667	1.709	3.335	(0.189) ***	667	1.653	2.771	(0.174) ***	−0.564	(0.257) **
Subsamples by ⊿Individuals										
G1: More than 50% increase	344	1.569	3.380	(0.247) ***	312	1.171	3.235	(0.227) ***	−0.145	(0.336)
G2: Less than 50% increase	323	1.858	3.287	(0.289) ***	355	2.076	2.362	(0.258) ***	−0.924	(0.388) ***
Control sample	595	1.606	2.555	(0.251) ***	693	1.427	2.664	(0.159) ***	0.110	(0.297)

(b) Bad News

All observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	645	−9.347	−1.928	(0.218) ***	755	−8.735	−3.141	(0.177) ***	−1.213	(0.281) ***
Subsamples by ⊿Individuals										
G1: More than 50% increase	269	−5.530	−1.589	(0.308) ***	318	−3.628	−3.176	(0.220) ***	−1.587	(0.378) ***
G2: Less than 50% increase	376	−12.077	−2.170	(0.303) ***	437	−12.451	−3.116	(0.260) ***	−0.946	(0.399) ***
Control sample	835	−6.927	−2.464	(0.182) ***	865	−6.943	−2.880	(0.154) ***	−0.416	(0.238)

Selected observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	623	−5.033	−1.716	(0.216) ***	730	−3.957	−3.222	(0.171) ***	−1.507	(0.276) ***
Subsamples by ⊿Individuals										
G1: More than 50% increase	265	−5.259	−1.531	(0.311) ***	314	−2.910	−3.156	(0.220) ***	−1.625	(0.381) ***
G2: Less than 50% increase	358	−4.866	−1.853	(0.297) ***	416	−4.746	−3.273	(0.250) ***	−1.420	(0.389) ***
Control sample	817	−4.727	−2.408	(0.182) ***	845	−5.210	−2.887	(0.154) ***	−0.479	(0.239) **

Table 7. Open interest of short/long position

The table shows the cross-sectional average open interest of short/long positions (RATIO) for the MTU (full sample and subsamples) and control samples listed on the TSE or the OSE that are eligible for the standardized margin transactions. G1 is the subsample comprising the firms with more than a 50% increase in the number of individual shareholders, while G2 comprises the other firms with less than a 50% increase. For each firm, the weekly average of the outstanding short position and that of the long position are calculated for each 50-trading-day interval from 50 trading days before to 650 trading days after the MTU reduction (*t=a–50,…, +650*) as well as for the days between the announcement and the actual MTU change (*t=a0,…, –1*); then, the firm's open interest is defined as the weekly average of the outstanding short position over that of the outstanding long position. Equality of means is tested by using *t*-tests. ***, **, and * indicate significance at the 1%, 5%, and 10% levels, respectively.

	MTU sample								Control sample		
	Full sample		Subsamples by the increase in the number of individual shareholders								
			G1: More than 50% increase			G2: Less than 50% increase					
	N	RATIO	N	RATIO		N	RATIO		N	RATIO	
[a−50, a−1]	131	1.408 −	59	1.675 −		72	1.189 −		131	1.881 −	
[a0, −1]	131	1.376	59	1.399		72	1.357		131	2.022	
[0, +49]	131	0.961	59	0.724 **		72	1.155		131	1.509	
[+50, +99]	131	0.842 **	59	0.594 ***		72	1.046		131	1.225	
[+100, +149]	131	0.804 **	59	0.568 ***		72	0.997		131	1.539	
[+150, +199]	131	0.871 **	59	0.805 **		72	0.925		131	3.244	
[+200, +249]	131	1.051	59	1.137		72	0.980		131	1.716	
[+250, +299]	131	0.960 *	59	1.115		72	0.833		131	1.574	
[+300, +349]	131	0.924 *	59	1.027		72	0.840		131	1.179	
[+350, +399]	131	0.997	59	1.351		72	0.708		131	0.922 **	
[+400, +449]	129	0.858 **	58	1.047		71	0.703		129	0.996 *	
[+450, +499]	128	1.055	58	1.133		70	0.991		128	0.970 **	
[+500, +549]	128	1.301	58	1.478		70	1.154		128	1.033 *	
[+550, +599]	126	1.250	58	1.420		68	1.106		126	1.099 *	
[+600, +649]	126	1.555	58	1.819		68	1.330		126	1.086 *	
[+650, +699]	126	1.432	58	1.539		68	1.341		126	1.308	

Figure 1. Buy-and-hold abnormal returns around the announcement of MTU reductions

The figure plots the cross-sectional average buy-and-hold abnormal return (BHAR) for MTU firms from 5 trading days before to 5 trading days after the announcement (*t=a–5,…, a+5*) and from 5 trading days before to 10 trading days after the MTU reduction (*t=–5,…, +10*). For each firm, the BHARs are calculated as the net of the return for its control firm. The solid line represents the BHARs, while the dotted lines represent the upper and lower 95% confidence intervals.

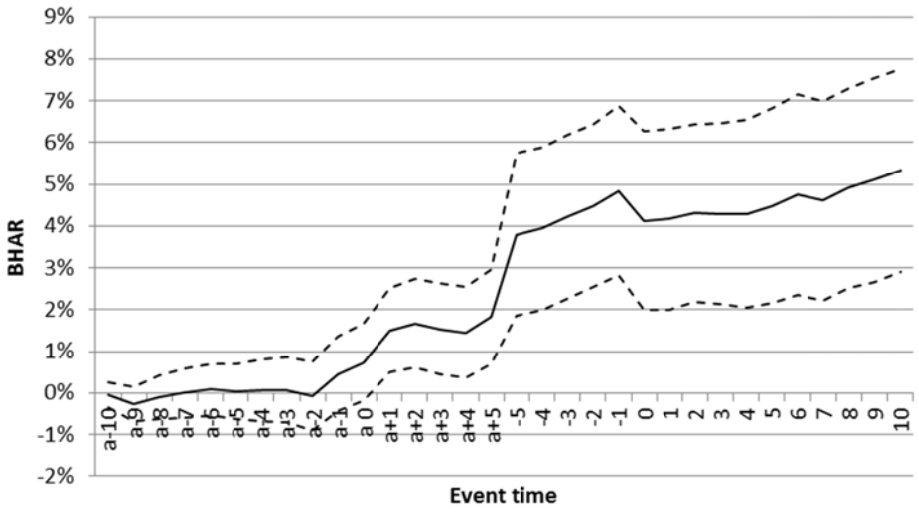
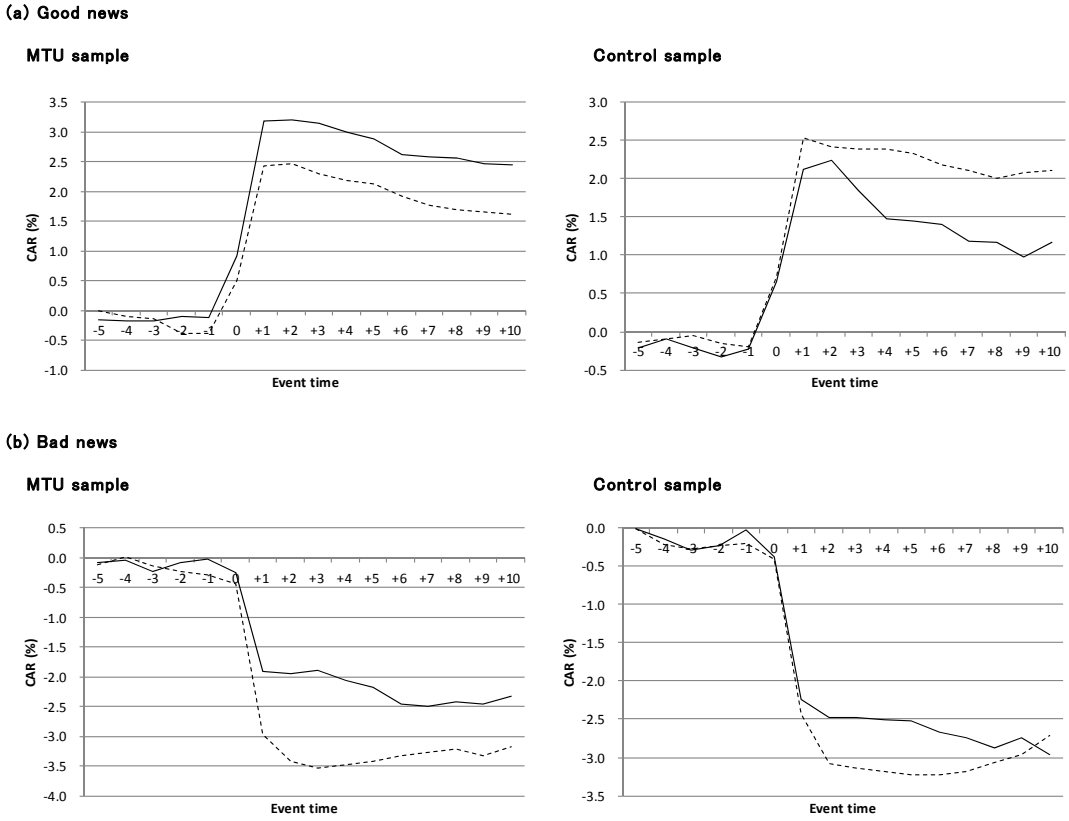


Figure 2. Price reactions to the announcement of revised earnings forecasts

The figure plots the CARs (–5,t) (%) for the MTU and control samples from 5 trading days before through 10 trading days after the announcement of revised earnings forecasts, which are released between 3 years before and 3 years after the MTU reduction. Panel (a) presents the CARs for upward forecast revisions (good news), while Panel (b) presents the CARs for downward forecast revisions (bad news). The solid line represents the prereduction CARs, while the dotted line represents the postreduction CARs. The CARs are estimated using a one-factor market model over 100 trading days starting from 105 trading days before the announcement with the use of the Daiwa Stock Index.



Long-run effects of minimum trading unit reductions on stock prices

By Naoto Isaka

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MTU Reductions

- In Japan, a firm's board of directors determines the MTU of its stock
  - ¥1,000x1,000 = ¥1M => ¥1,000x100 = ¥100,000
- MTU reductions lead to lowering the minimum monetary value necessary for trading shares
- MTU reductions substantially expand the investor base

Table3. Shareholder statistics

	Year −1	*Year +1*	*Year +2*	*Year +3*
Number of observations				
MTU sample	608	608	599	585
Control sample	608	606	591	572
Individual shareholders				
Mean				
MTU sample	3,965	5,598 **	6,984 ***	8,201 ***
Control sample	10,887	10,951 ***	11,145	11,891
Median				
MTU sample	1,237	2,148 ***	2,729 ***	3,314 ***
Control sample	3,356	3,704	3,863 *	4,415 ***
Percentage change				
MTU sample	−	+90% ***	+181% ***	+259% ***
Control sample	−	+37% *	+58% **	+72% ***
All shareholders				
MTU sample	4,203	5,863 **	7,246 ***	8,474 ***
Control sample	11,213	11,262	11,401	12,190
Shares held by individuals				
MTU sample	42%	41%	41%	41%
Control sample	42%	42%	41%	41%

Empirical Literature

- Empirical studies on MTU reductions (Amihud et al. (1999); Ahn et al. (2005); Hauser and Lauterbach (2003))
  - Positive abnormal returns from the announcement day to the actual date of MTU reductions
  - ARs are positively correlated with an increase in investor base
- Results are consistent with Merton (1987)
  - Premium for firm-specific risk is smaller for a firm with a larger investor base

My Study

- Use the sample of 608 MTU reductions on all Japanese exchanges between October 2001 and May 2008
- Examine long-run performance following MTU reductions
  - ① Buy-and-hold abnormal return
  - ② Stock price informativeness

Main Results

- Following MTU reductions,
  - Number of individual shareholders tends to increase significantly for several years
  - Positive abnormal returns occur for several years
  - Stock prices reflect more positive and less negative private information
    - Individual shareholders face short-sales constraints

Agenda

- Sample and control sample
- Empirical results
  - ① Buy-and-hold abnormal returns
  - ② Stock price informativeness
- Conclusion

Sample

- 608 MTU reductions in Japanese stock markets over the period October 2001- May 2008
  - MTU reductions: Nikkei Telecom
  - Stock return data: Nikkei Portfolio Master
  - Shareholders, Margin Transactions: Nikkei NEEDS-FQ
  - Revised Earnings Announcements: Nikkei NEEDS-FQ, Nikkei Telecom

Table 1. MTU sample

(a) Minimum trading unit change

Before	After	N
1,000	500	40
1,000	200	1
1,000	100	507
1,000	50	1
1,000	10	1
500	100	41
200	100	1
100	50	8
100	10	8

(b) Announcement day

Year	N
2001	42
2002	142
2003	63
2004	117
2005	132
2006	81
2007	27
2008	4

(c) Exchange

Exchange	Section	N
TSE	first	191
	second	103
OSE	first	17
	second	45
JASDAQ		230
Hercules		7
Others		15

Control Sample

- Control firms are from all Japanese stock exchanges and did not announce MTU changes during the sample period
- A control firm is randomly assigned to each MTU firm from the same group
  - sorted into size quartiles
  - sorted into book-to-market tertiles
  - divided in half based on 6-month raw returns

Table 2. Summary statistics

	N	Mean	Median	SD
Market value (in billion yen)				
MTU sample	608	111.0	15.0	416.0
Control sample	608	111.0	14.6	365.0
Book-to-market ratio				
MTU sample	608	0.886	0.740	1.257
Control sample	608	0.931	0.764	0.703
Prior 6-month return (%)				
MTU sample	608	24.093	12.396	62.735
Control sample	608	17.474	9.134	41.992

① Buy-and-hold abnormal return

- BHARs from 10 days before the announcement (*t=a-10*) to day *t* for more than 2.5 years following MTU reductions

$$BHAR_{it} = \prod_{l=a-10}^{t}(1 + r_{il}) - \prod_{l=a-10}^{t}(1 + r_{bl}),$$

  - *rit*: rate of return for stock *i*
  - r_{bt}: rete of return for control stock
- Average BHARs are computed
  - Full sample
  - G1: more than 50% increase in individual shareholders
  - G2: less than 50% increase in individual shareholders

Fig 1. BHARs around MTU reductions

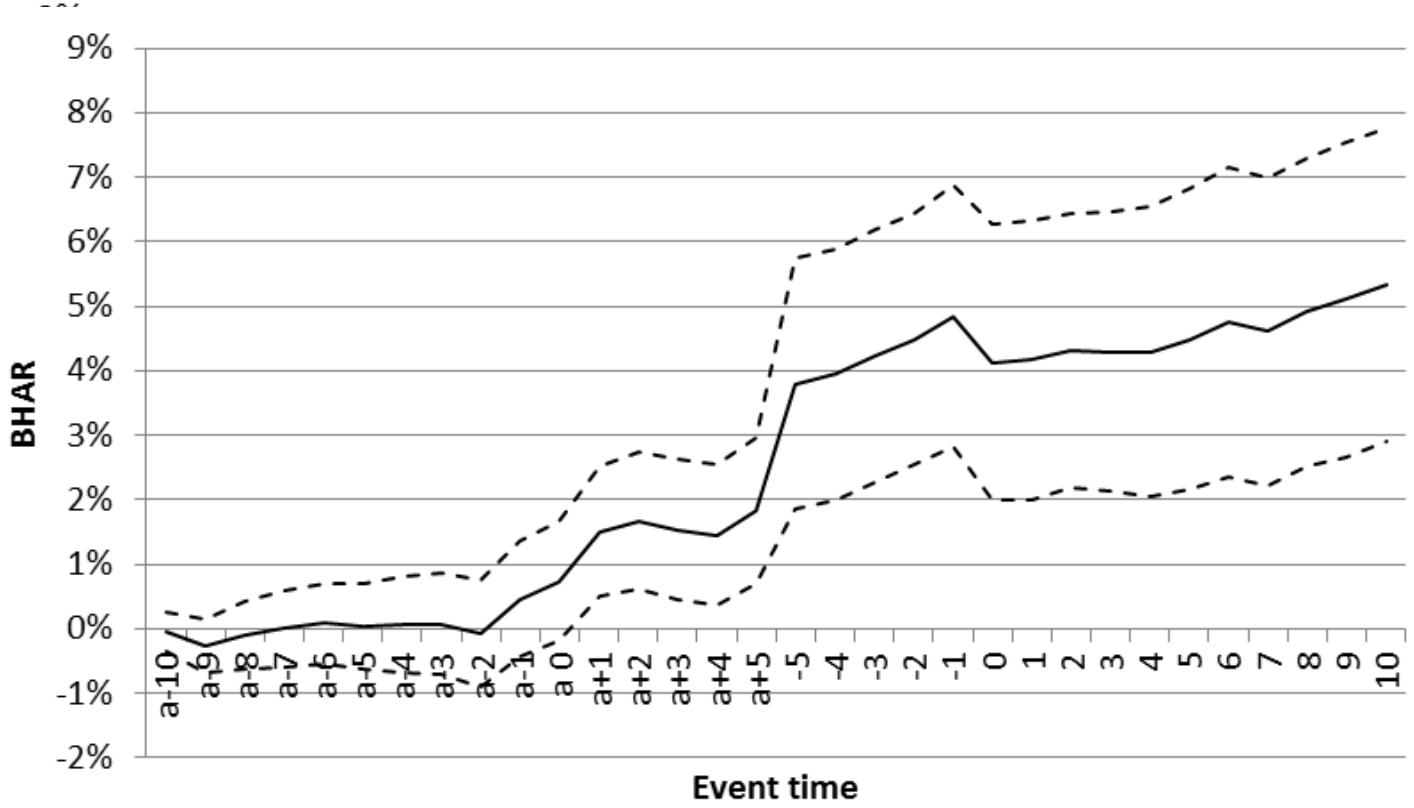


Table 4. BHARs

	Full sample			Subsamples by the percentage change in the number of shareholders								
				G1: More than a 50% increase			G2: Less than a 50% increase					
	N	BHAR (%)		N	BHAR (%)		N	BHAR (%)		Difference in BHAR		
a 0	608	0.74	(0.48)	289	1.19	(0.73)	319	0.34	(0.63)	−0.85	(0.95)	
a+1	608	1.51	(0.51) ***	289	2.30	(0.77) ***	319	0.81	(0.67)	−1.49	(1.02)	
a+2	608	1.67	(0.54) ***	289	2.79	(0.84) ***	319	0.66	(0.69)	−2.13	(1.08) **	
a+3	608	1.54	(0.55) ***	289	2.71	(0.87) ***	319	0.48	(0.70)	−2.23	(1.11) **	
a+4	608	1.46	(0.55) ***	289	2.29	(0.87) ***	319	0.70	(0.69)	−1.59	(1.10)	
a+5	608	1.84	(0.58) ***	289	2.88	(0.93) ***	319	0.90	(0.71)	−1.98	(1.16) *	
−5	608	3.80	(0.99) ***	289	5.68	(1.57) ***	319	2.10	(1.23) *	−3.58	(1.98) *	
−4	608	3.94	(0.99) ***	289	5.90	(1.57) ***	319	2.17	(1.23) *	−3.73	(1.97) *	
−3	608	4.23	(0.99) ***	289	6.27	(1.58) ***	319	2.38	(1.23) *	−3.89	(1.98) *	
−2	608	4.49	(0.99) ***	289	6.45	(1.57) ***	319	2.71	(1.24) **	−3.74	(1.98) *	
−1	608	4.85	(1.03) ***	289	6.95	(1.66) ***	319	2.95	(1.26) **	−4.00	(2.06) *	
0	608	4.13	(1.08) ***	289	7.04	(1.77) ***	319	1.50	(1.29)	−5.54	(2.16) **	
1	607	4.17	(1.10) ***	289	7.37	(1.78) ***	318	1.25	(1.32)	−6.12	(2.19) ***	
2	607	4.32	(1.08) ***	289	7.61	(1.73) ***	318	1.33	(1.32)	−6.27	(2.15) ***	
3	607	4.30	(1.10) ***	289	7.50	(1.78) ***	318	1.39	(1.31)	−6.11	(2.19) ***	
4	607	4.29	(1.15) ***	289	8.09	(1.85) ***	318	0.84	(1.37)	−7.25	(2.28) ***	
5	607	4.49	(1.18) ***	289	8.49	(1.92) ***	318	0.85	(1.41)	−7.64	(2.35) ***	
6	607	4.75	(1.22) ***	289	8.81	(2.00) ***	318	1.05	(1.43)	−7.75	(2.43) ***	
7	607	4.61	(1.22) ***	289	8.63	(1.96) ***	318	0.96	(1.47)	−7.67	(2.42) ***	
8	607	4.91	(1.21) ***	289	9.12	(1.93) ***	318	1.09	(1.48)	−8.02	(2.41) ***	
9	607	5.11	(1.24) ***	289	9.14	(2.02) ***	318	1.44	(1.48)	−7.70	(2.47) ***	
10	607	5.33	(1.23) ***	289	9.19	(2.03) ***	318	1.83	(1.43)	−7.36	(2.45) ***	

Table 4. BHARs (continued)

	Full sample			Subsamples by the percentage change in the number of shareholders								
				G1: More than a 50% increase			G2: Less than a 50% increase					
	N	BHAR (%)		N	BHAR (%)		N	BHAR (%)		Difference in BHAR		
40	606	5.15	(1.47) ***	289	8.90	(2.18) ***	317	1.73	(1.97)	−7.17	(2.92) **	
70	604	5.23	(1.69) ***	289	9.31	(2.54) ***	315	1.48	(2.23)	−7.83	(3.37) **	
100	604	5.53	(1.96) ***	289	9.40	(2.97) ***	315	1.99	(2.58)	−7.41	(3.91) *	
130	602	5.05	(2.28) **	289	7.05	(3.72) *	313	3.22	(2.74)	−3.83	(4.57)	
160	600	4.56	(2.76) *	288	5.23	(4.58)	312	3.95	(3.20)	−1.28	(5.52)	
190	597	5.62	(3.21) *	287	5.76	(5.67)	310	5.49	(3.28) *	−0.27	(6.43)	
220	595	6.20	(3.45) *	286	5.43	(5.89)	309	6.91	(3.81) *	1.49	(6.91)	
250	591	5.76	(3.26) *	284	5.55	(5.39)	307	5.95	(3.83)	0.40	(6.54)	
280	585	5.75	(3.66)	280	4.24	(5.45)	305	7.14	(4.92)	2.90	(7.32)	
310	583	5.69	(3.50)	279	4.83	(5.17)	304	6.47	(4.76)	1.64	(7.01)	
340	582	5.63	(3.66)	278	4.60	(5.50)	304	6.57	(4.88)	1.97	(7.33)	
370	579	9.38	(3.85) **	276	6.97	(5.43)	303	11.58	(5.44) **	4.60	(7.70)	
400	575	10.56	(4.19) **	274	6.99	(5.25)	301	13.82	(6.42) **	6.83	(8.39)	
430	570	10.91	(4.26) **	271	9.78	(5.81) *	299	11.94	(6.19) *	2.16	(8.53)	
460	567	10.75	(4.56) **	269	10.97	(5.72) *	298	10.56	(6.98)	−0.42	(9.14)	
490	564	13.43	(4.91) ***	267	14.91	(6.20) **	297	12.10	(7.48)	−2.81	(9.84)	
520	562	14.93	(5.19) ***	266	14.71	(7.09) **	296	15.13	(7.54) **	0.43	(10.41)	
550	558	13.71	(5.35) **	264	14.25	(7.35) *	294	13.23	(7.73) *	−1.02	(10.72)	
580	554	12.85	(5.31) **	262	12.99	(6.99) *	292	12.73	(7.90)	−0.27	(10.65)	
610	551	15.08	(5.41) ***	259	15.48	(6.79) **	292	14.72	(8.27) *	−0.76	(10.86)	
640	550	14.09	(5.63) **	258	14.35	(6.54) **	292	13.86	(8.90)	−0.48	(11.29)	
670	542	10.87	(5.47) **	255	12.11	(6.20) *	287	9.77	(8.74)	−2.33	(10.96)	

② Stock Price Informativeness

- Peress (2010) extends Merton's model and shows
  - If new investors actively produce information, stock price informativeness can improve
  - Stock price informativeness may decrease
    - Increased investor base improves risk sharing among investors and lowers the premium for firm-specific risk
    - As a result, investors have less incentive to produce information

Stock Price Informativeness

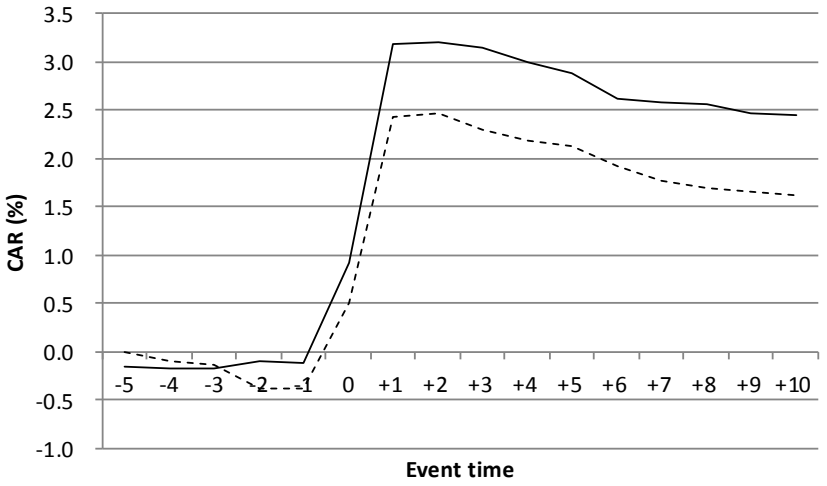
- Measure stock price reactions (abnormal returns, ARs) around the announcement of revised earnings forecasts before and after MTU reductions
  - Larger AR => stock price is less informative
  - Smaller AR=> stock price is more informative

- Identify 395 cases, of which both MTU and control firms release forecast revisions within 3 years before and after MTU reductions
  - Upward revisions (Good news)
  - Downward revisions (Bad news)

Fig.2 CAR(-5, t) for Good news

(a) Good news

MTU sample



Control sample

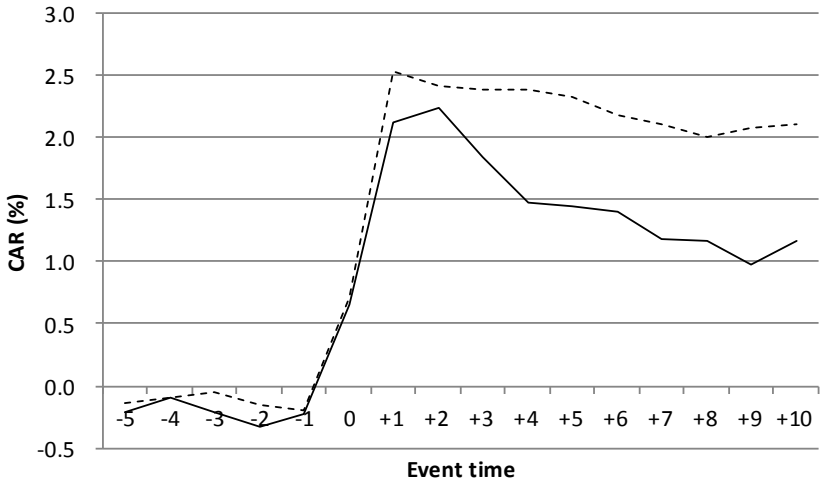
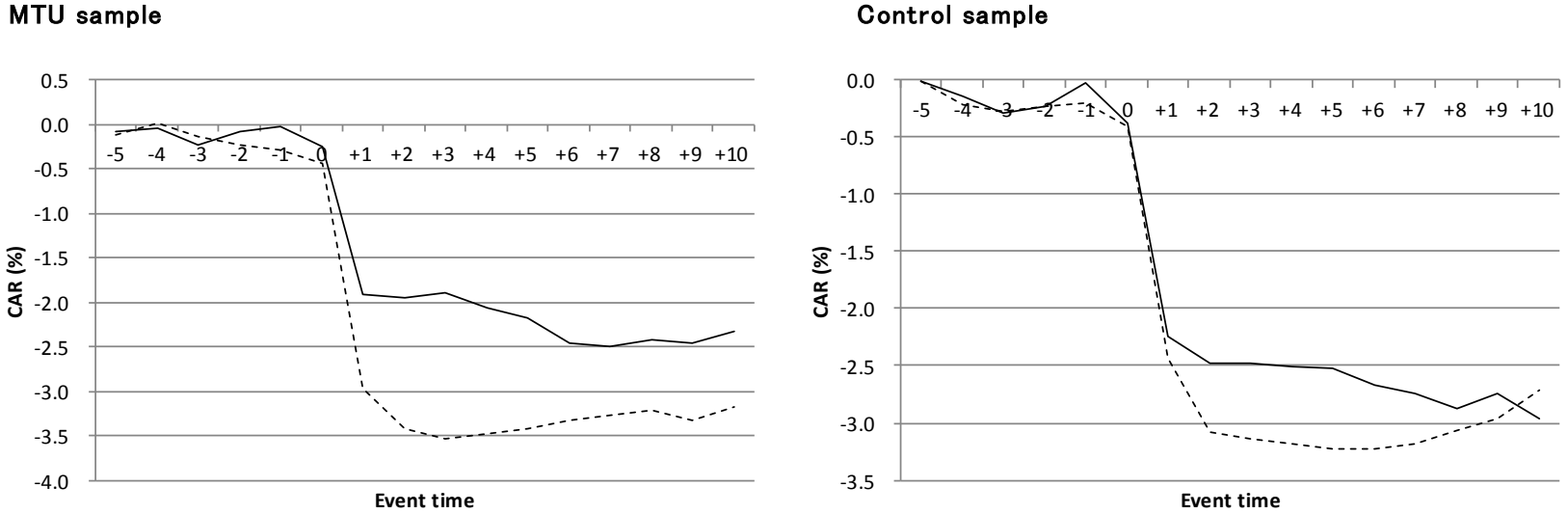


Fig.2 CAR(-5, t) for Bad news

(b) Bad news



Asymmetric change in price informativeness?

- Short-selling studies (Miller(1987); Diamond and Verrecchia (1987)) imply asymmetry in stock price informativeness
  - If new individual investors are informed traders (Kaniel et al. (2012)) and face short-sales constraints
  - Larger proportion of informed traders face short-sales constraints
  - As a result, stock prices reflect more positive information and less negative information

Investors' Short-selling

- Use weekly data for the standardized margin transactions
  - Database available for TSE and OSE stocks eligible for the standardized margin transactions
  - 131 MTU firms have their and their control firm's margin transaction data around the reduction
- Compute open interest of short/long positions in the standardized margin transactions (RATIO) after MTU reductions
  - Low RATIO => smaller short positions
  - High RATIO => larger short positions

Table 7. Open interest of short/long positions

	MTU sample								Control sample		
	Full sample		G1			G2					
	N	RATIO		N	RATIO		N	RATIO		N	RATIO	
[a−50, a−1]	131	1.408	−	59	1.675	−	72	1.189	−	131	1.881	−
[a0, −1]	131	1.376		59	1.399		72	1.357		131	2.022	
[0, +49]	131	0.961		59	0.724	**	72	1.155		131	1.509	
[+50, +99]	131	0.842	**	59	0.594	***	72	1.046		131	1.225	
[+100, +149]	131	0.804	**	59	0.568	***	72	0.997		131	1.539	
[+150, +199]	131	0.871	**	59	0.805	**	72	0.925		131	3.244	
[+200, +249]	131	1.051		59	1.137		72	0.980		131	1.716	
[+250, +299]	131	0.960	*	59	1.115		72	0.833		131	1.574	
[+300, +349]	131	0.924	*	59	1.027		72	0.840		131	1.179	
[+350, +399]	131	0.997		59	1.351		72	0.708		131	0.922	**
[+400, +449]	129	0.858	**	58	1.047		71	0.703		129	0.996	*
[+450, +499]	128	1.055		58	1.133		70	0.991		128	0.970	**
[+500, +549]	128	1.301		58	1.478		70	1.154		128	1.033	*
[+550, +599]	126	1.250		58	1.420		68	1.106		126	1.099	*
[+600, +649]	126	1.555		58	1.819		68	1.330		126	1.086	*
[+650, +699]	126	1.432		58	1.539		68	1.341		126	1.308	

Conclusions

- Changing a base of individual investors can have long-run effects on stock prices
- Following MTU reductions,
  - Number of individual shareholders tends to increase significantly for several years
  - Positive abnormal returns occur for several years
  - Stock prices reflect more positive and less negative private information
  - Individual shareholders may face short-sales constraints

Discussion of "*Long-run effects of minimum trading unit reductions on stock prices*" by Naoto Isaka

Matthias Hanauer

Technische Universität München

Department of Financial Management and Capital Markets

Japanese Financial Markets: Corporate Finance, Institutions, and Investments – July 2013

Summary

- Using a sample of 608 MTU reductions between October 2001 and May 2008, the paper shows that

  - the number of individual shareholders tends to increase significantly for several years.

  - that positive stock returns are observed not only for the period between the announcement day and the actual date of MTU decreases, but also for a period of several years following the MTU reduction.

- Furthermore, the paper shows that that stock prices reflect more positive and less negative private information after the MTU reduction.

- The author argues that the results indicate that individual investors face short-sales constraint's.

Contribution to the Literature

- Japanese equity markets offer the unique events of reductions in minimum trading units (MTUs).

- Existing studies (e.g. Amihud et al. (1999), Ahn et al. (2005) and Hauser and Lauterbach (2003)) investigate MTU decreases all find positive abnormal returns for the days after the announcement day (short-run effects).

- All studies argue that the expanded investor base, as implied by Merton (1987), is the reason for the positive abnormal returns.

- Instead, the presented paper focuses on the long-run effects of MTU reductions on stock prices:
  - Long run abnormal returns and long run change in the number of individual shareholders
  - Peress (2010) extends the Merton model and shows that there is a trade-off between risk sharing and information production. Earnings revisions CARs are a proxy to test the effect of new investors to market efficiency.

Discussion of results

Long-run vs. short-run effects

- Short-term event studies focus on the time between announcement of MTU and actual date of MTU reduction
- Why not analyzing only the period after the reduction?
- Paper states that “BAHRs are generally higher for G1 than G2…”, but is this a long-run or only short-run effect?
- Split between G1 and G2 is defined by the increase of individual shareholders within the financial year of the MTU reduction.
- Maybe individual investor discover G2 firms later?

Abnormal returns (short run)

	Full sample			Subsamples by the percentage change in the number of shareholders								
				G1: More than a 50% increase			G2: Less than a 50% increase			Difference in BHAR		
	N	BHAR (%)		N	BHAR (%)		N	BHAR (%)				
a−5	608	0.05	(0.34)	289	0.01	(0.48)	319	0.08	(0.48)	0.07	(0.68)	
a−4	608	0.06	(0.38)	289	0.09	(0.55)	319	0.04	(0.54)	−0.05	(0.77)	
a−3	608	0.08	(0.40)	289	0.26	(0.55)	319	−0.08	(0.57)	−0.34	(0.79)	
a−2	608	−0.07	(0.42)	289	0.17	(0.60)	319	−0.29	(0.59)	−0.46	(0.84)	
a−1	608	0.46	(0.45)	289	0.74	(0.69)	319	0.21	(0.60)	−0.53	(0.91)	
a 0	608	0.74	(0.48)	289	1.19	(0.73)	319	0.34	(0.63)	−0.85	(0.95)	
a+1	608	1.51	(0.51) ***	289	2.30	(0.77) ***	319	0.81	(0.67)	−1.49	(1.02)	
a+2	608	1.67	(0.54) ***	289	2.79	(0.84) ***	319	0.66	(0.69)	−2.13	(1.08) **	
a+3	608	1.54	(0.55) ***	289	2.71	(0.87) ***	319	0.48	(0.70)	−2.23	(1.11) **	
a+4	608	1.46	(0.55) ***	289	2.29	(0.87) ***	319	0.70	(0.69)	−1.59	(1.10)	
a+5	608	1.84	(0.58) ***	289	2.88	(0.93) ***	319	0.90	(0.71)	−1.98	(1.16) *	
−5	608	3.80	(0.99) ***	289	5.68	(1.57) ***	319	2.10	(1.23) *	−3.58	(1.98) *	
−4	608	3.94	(0.99) ***	289	5.90	(1.57) ***	319	2.17	(1.23) *	−3.73	(1.97) *	
−3	608	4.23	(0.99) ***	289	6.27	(1.58) ***	319	2.38	(1.23) *	−3.89	(1.98) *	
−2	608	4.49	(0.99) ***	289	6.45	(1.57) ***	319	2.71	(1.24) **	−3.74	(1.98) *	
−1	608	4.85	(1.03) ***	289	6.95	(1.66) ***	319	2.95	(1.26) **	−4.00	(2.06) *	
0	608	4.13	(1.08) ***	289	7.04	(1.77) ***	319	1.50	(1.29)	−5.54	(2.16) **	
1	607	4.17	(1.10) ***	289	7.37	(1.78) ***	318	1.25	(1.32)	−6.12	(2.19) ***	
2	607	4.32	(1.08) ***	289	7.61	(1.73) ***	318	1.33	(1.32)	−6.27	(2.15) ***	
3	607	4.30	(1.10) ***	289	7.50	(1.78) ***	318	1.39	(1.31)	−6.11	(2.19) ***	
4	607	4.29	(1.15) ***	289	8.09	(1.85) ***	318	0.84	(1.37)	−7.25	(2.28) ***	
5	607	4.49	(1.18) ***	289	8.49	(1.92) ***	318	0.85	(1.41)	−7.64	(2.35) ***	
6	607	4.75	(1.22) ***	289	8.81	(2.00) ***	318	1.05	(1.43)	−7.75	(2.43) ***	
7	607	4.61	(1.22) ***	289	8.63	(1.96) ***	318	0.96	(1.47)	−7.67	(2.42) ***	
8	607	4.91	(1.21) ***	289	9.12	(1.93) ***	318	1.09	(1.48)	−8.02	(2.41) ***	
9	607	5.11	(1.24) ***	289	9.14	(2.02) ***	318	1.44	(1.48)	−7.70	(2.47) ***	
10	607	5.33	(1.23) ***	289	9.19	(2.03) ***	318	1.83	(1.43)	−7.36	(2.45) ***	

Abnormal returns (long run)

	Full sample			Subsamples by the percentage change in the number of shareholders							
				G1: More than a 50% increase			G2: Less than a 50% increase			Difference in BHAR	
	N	BHAR (%)		N	BHAR (%)		N	BHAR (%)			
5	607	4.49	(1.18) ***	289	8.49	(1.92) ***	318	0.85	(1.41)	−7.64	(2.35) ***
6	607	4.75	(1.22) ***	289	8.81	(2.00) ***	318	1.05	(1.43)	−7.75	(2.43) ***
7	607	4.61	(1.22) ***	289	8.63	(1.96) ***	318	0.96	(1.47)	−7.67	(2.42) ***
8	607	4.91	(1.21) ***	289	9.12	(1.93) ***	318	1.09	(1.48)	−8.02	(2.41) ***
9	607	5.11	(1.24) ***	289	9.14	(2.02) ***	318	1.44	(1.48)	−7.70	(2.47) ***
10	607	5.33	(1.23) ***	289	9.19	(2.03) ***	318	1.83	(1.43)	−7.36	(2.45) ***
40	606	5.15	(1.47) ***	289	8.90	(2.18) ***	317	1.73	(1.97)	−7.17	(2.92) **
70	604	5.23	(1.69) ***	289	9.31	(2.54) ***	315	1.48	(2.23)	−7.83	(3.37) **
100	604	5.53	(1.96) ***	289	9.40	(2.97) ***	315	1.99	(2.58)	−7.41	(3.91) *
130	602	5.05	(2.28) **	289	7.05	(3.72) *	313	3.22	(2.74)	−3.83	(4.57)
160	600	4.56	(2.76) *	288	5.23	(4.58)	312	3.95	(3.20)	−1.28	(5.52)
190	597	5.62	(3.21) *	287	5.76	(5.67)	310	5.49	(3.28) *	−0.27	(6.43)
220	595	6.20	(3.45) *	286	5.43	(5.89)	309	6.91	(3.81) *	1.49	(6.91)
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310	583	5.69	(3.50)	279	4.83	(5.17)	304	6.47	(4.76)	1.64	(7.01)
340	582	5.63	(3.66)	278	4.60	(5.50)	304	6.57	(4.88)	1.97	(7.33)
370	579	9.38	(3.85) **	276	6.97	(5.43)	303	11.58	(5.44) **	4.60	(7.70)
400	575	10.56	(4.19) **	274	6.99	(5.25)	301	13.82	(6.42) **	6.83	(8.39)
430	570	10.91	(4.26) **	271	9.78	(5.81) *	299	11.94	(6.19) *	2.16	(8.53)
460	567	10.75	(4.56) **	269	10.97	(5.72) *	298	10.56	(6.98)	−0.42	(9.14)
490	564	13.43	(4.91) ***	267	14.91	(6.20) **	297	12.10	(7.48)	−2.81	(9.84)
520	562	14.93	(5.19) ***	266	14.71	(7.09) **	296	15.13	(7.54) **	0.43	(10.41)
550	558	13.71	(5.35) **	264	14.25	(7.35) *	294	13.23	(7.73) *	−1.02	(10.72)
580	554	12.85	(5.31) **	262	12.99	(6.99) *	292	12.73	(7.90)	−0.27	(10.65)
610	551	15.08	(5.41) ***	259	15.48	(6.79) **	292	14.72	(8.27) *	−0.76	(10.86)
640	550	14.09	(5.63) **	258	14.35	(6.54) **	292	13.86	(8.90)	−0.48	(11.29)
670	542	10.87	(5.47) **	255	12.11	(6.20) *	287	9.77	(8.74)	−2.33	(10.96)

Performance after MTU change and differences between subsamples

	Full	G1	G2	G1-G2		Full	G1	G2	G1-G2
0	0,00	0,00	0,00	0,00	220	2,07	-1,61	5,41	-7,02
1	0,04	0,33	-0,25	0,58	250	1,63	-1,49	4,45	-5,94
2	0,19	0,57	-0,17	0,74	280	1,62	-2,80	5,64	-8,44
3	0,17	0,46	-0,11	0,57	310	1,56	-2,21	4,97	-7,18
4	0,16	1,05	-0,66	1,71	340	1,50	-2,44	5,07	-7,51
5	0,36	1,45	-0,65	2,10	370	5,25	-0,07	10,08	-10,15
6	0,62	1,77	-0,45	2,22	400	6,43	-0,05	12,32	-12,37
7	0,48	1,59	-0,54	2,13	430	6,78	2,74	10,44	-7,70
8	0,78	2,08	-0,41	2,49	460	6,62	3,93	9,06	-5,13
9	0,98	2,10	-0,06	2,16	490	9,30	7,87	10,60	-2,73
10	1,20	2,15	0,33	1,82	520	10,80	7,67	13,63	-5,96
40	1,02	1,86	0,23	1,63	550	9,58	7,21	11,73	-4,52
70	1,10	2,27	-0,02	2,29	580	8,72	5,95	11,23	-5,28
100	1,40	2,36	0,49	1,87	610	10,95	8,44	13,22	-4,78
130	0,92	0,01	1,72	-1,71	640	9,96	7,31	12,36	-5,05
160	0,43	-1,81	2,45	-4,26	670	6,74	5,07	8,27	-3,20
190	1,49	-1,28	3,99	-5,27					

Matching approach: Why not match with MTU number?

- Seems that MTU firms have a less diversified shareholder base before MTU than control firms.

- Better policy implications if control firms would have similar investor diversification (number of individual shareholders, MTU, MTU*P,...)

	Year −1	*Year +1*	*Year +2*	*Year +3*
Number of observations				
MTU sample	608	608	599	585
Control sample	608	606	591	572
Average number of individual shareholders				
MTU sample	3,965	5,598 **	6,984 ***	8,201 ***
Control sample	10,887	10,951 ***	11,145	11,891
Median number of individual shareholders				
MTU sample	1,237	2,148 ***	2,729 ***	3,314 ***
Control sample	3,356	3,704	3,863 *	4,415 ***
Average percentage change in the number of individual shareholders from *Year −1*				
MTU sample	–	+90% ***	+181% ***	+259% ***
Control sample	–	+37% *	+58% **	+72% ***
Average number of all shareholders				
MTU sample	4,203	5,863 **	7,246 ***	8,474 ***
Control sample	11,213	11,262	11,401	12,190
Average percentage of shares held by individual shareholders				
MTU sample	42%	41%	41%	41%
Control sample	42%	42%	41%	41%

Other comments

- A regression analysis of earnings revisions would allow a more detailed analysis:
  - Include additional control variables (SUP(%), analysts coverage, accruals,…)
  - Include year dummies to differentiate between time effects and firm effects (markets could be more optimistic over time on average)

- Maybe use calendar time approach and Fama-French/Carhart model as robustness check for long-run abnormal returns

Conclusion

- Contribution
  - First study that analyzes long-run effects of MTU reductions.
  - Peress (2010) extends the Merton model and shows that there is a trade-off between risk sharing and information production. Earnings revisions CARs are a proxy to test the effect of new investors to market efficiency.
  - Combines asset pricing topics with corporate governance topics.

- Suggestions
  - More differentiation between short-run and long-run effects
  - Include a characteristic that measure the diversification of the investor base
  - A regression analysis of earnings revisions would allow a more detailed analysis

Back-up

Abnormal returns after upward revisions

(a) Good News

All observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	678	1.847	3.325	(0.189) ***	685	1.911	2.854	(0.171) ***	−0.471	(0.255) *
Subsamples by ⊿Individuals										
G1: More than 50% increase	351	1.538	3.329	(0.245) ***	323	1.132	3.038	(0.223) ***	−0.291	(0.331)
G2: Less than 50% increase	327	2.179	3.322	(0.291) ***	362	2.606	2.691	(0.255) ***	−0.631	(0.387)
Control sample	621	4.255	2.462	(0.251) ***	709	1.648	2.615	(0.157) ***	0.154	(0.296)

Selected observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	667	1.709	3.335	(0.189) ***	667	1.653	2.771	(0.174) ***	−0.564	(0.257) **
Subsamples by ⊿Individuals										
G1: More than 50% increase	344	1.569	3.380	(0.247) ***	312	1.171	3.235	(0.227) ***	−0.145	(0.336)
G2: Less than 50% increase	323	1.858	3.287	(0.289) ***	355	2.076	2.362	(0.258) ***	−0.924	(0.388) ***
Control sample	595	1.606	2.555	(0.251) ***	693	1.427	2.664	(0.159) ***	0.110	(0.297)

Abnormal returns after downward revisions

(b) Bad News

All observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	645	−9.347	−1.928	(0.218) ***	755	−8.735	−3.141	(0.177) ***	−1.213	(0.281) ***
Subsamples by ⊿Individuals										
G1: More than 50% increase	269	−5.530	−1.589	(0.308) ***	318	−3.628	−3.176	(0.220) ***	−1.587	(0.378) ***
G2: Less than 50% increase	376	−12.077	−2.170	(0.303) ***	437	−12.451	−3.116	(0.260) ***	−0.946	(0.399) ***
Control sample	835	−6.927	−2.464	(0.182) ***	865	−6.943	−2.880	(0.154) ***	−0.416	(0.238)

Selected observations

	Before the MTU reduction				After the MTU reduction				Difference in CAR(0,+2)	
	N	SUP (%)	CAR(0, +2) (%)		N	SUP (%)	CAR(0, +2) (%)			
MTU sample										
Full sample	623	−5.033	−1.716	(0.216) ***	730	−3.957	−3.222	(0.171) ***	−1.507	(0.276) ***
Subsamples by ⊿Individuals										
G1: More than 50% increase	265	−5.259	−1.531	(0.311) ***	314	−2.910	−3.156	(0.220) ***	−1.625	(0.381) ***
G2: Less than 50% increase	358	−4.866	−1.853	(0.297) ***	416	−4.746	−3.273	(0.250) ***	−1.420	(0.389) ***
Control sample	817	−4.727	−2.408	(0.182) ***	845	−5.210	−2.887	(0.154) ***	−0.479	(0.239) **

Short selling constraints are driving asymmetric chance in stocks' informativeness -

Table 7. Open interest of short/long position

	MTU sample						Control sample	
	Full sample		Subsamples by the increase in the number of individual shareholders					
			G1: More than 50% increase		G2: Less than 50% increase			
	N	RATIO	N	RATIO	N	RATIO	N	RATIO
[a−50, a−1]	131	1.408 −	59	1.675 −	72	1.189 −	131	1.881 −
[a0, −1]	131	1.376	59	1.399	72	1.357	131	2.022
[0, +49]	131	0.961	59	0.724 **	72	1.155	131	1.509
[+50, +99]	131	0.842 **	59	0.594 ***	72	1.046	131	1.225
[+100, +149]	131	0.804 **	59	0.568 ***	72	0.997	131	1.539
[+150, +199]	131	0.871 **	59	0.805 **	72	0.925	131	3.244
[+200, +249]	131	1.051	59	1.137	72	0.980	131	1.716
[+250, +299]	131	0.960 *	59	1.115	72	0.833	131	1.574
[+300, +349]	131	0.924 *	59	1.027	72	0.840	131	1.179
[+350, +399]	131	0.997	59	1.351	72	0.708	131	0.922 **
[+400, +449]	129	0.858 **	58	1.047	71	0.703	129	0.996 *
[+450, +499]	128	1.055	58	1.133	70	0.991	128	0.970 **
[+500, +549]	128	1.301	58	1.478	70	1.154	128	1.033 *
[+550, +599]	126	1.250	58	1.420	68	1.106	126	1.099 *
[+600, +649]	126	1.555	58	1.819	68	1.330	126	1.086 *
[+650, +699]	126	1.432	58	1.539	68	1.341	126	1.308