Stock price behavior surrounding stock repurchase announcements: Evidence from Japan

Hatakeda, Takashi

Isagawa, Nobuyuki

(Citation)
Pacific-Basin Finance Journal,12(3):271-290

(Issue Date)
2004-06

(Resource Type)
journal article

(Version)
Accepted Manuscript

(URL)
https://hdl.handle.net/20.500.14094/90000068

Stock Price Behavior Surrounding Stock Repurchase Announcements: Evidence from Japan

Takashi Hatakeda (Nihon University)[a]

Nobuyuki Isagawa (Kobe University) [b]

Abstract

This paper examines stock price behavior surrounding announcements of stock repurchases made by Japanese firms from 1995 to 1998. Our analysis shows that, much as in the case of the U.S. markets, stock prices in Japan go up in response to stock repurchase announcements. We also find that there is no significant difference between the market reaction to the announcement for intention of repurchase execution and the market reaction to the announcement of an article alteration to allow stock repurchases. On the other hand, there is a significant difference in the pre-announcement period returns motivating these two announcements. While a large decline in stock price will motivate a firm to execute a stock repurchase, a smaller price decline will motivate a firm to merely alter its articles of association to allow future repurchases.

Keywords: stock repurchase; article alteration for repurchase;
stock price behavior; Japanese stock markets

JEL classification: G14, G32

[a] College of Economics, Nihon University, 1-3-2 Misaki Chiyoda Tokyo 101-8360, Japan; phone: +81-3-3219-3447; e-mail: hatakeda@eco.nihon-u.ac.jp

[b] Graduate School of Business Administration, Kobe University, 2-1 Rokkodai Nada Kobe Hyogo 657-8501, Japan; phone: +81-78-803-6907; e-mail: isagawa@rose.rokkodai.kobe-u.ac.jp

1. Introduction

Stock repurchases are considered to have been a very important financial strategy for firms in the U.S.[1] Grullon and Michaely (2002) report that, over the past 20 years, stock repurchase expenditures in the U.S. grew at a much higher rate than cash dividends. In contrast, it is only recently that the Japanese government implemented new regulations allowing firms to repurchase their outstanding shares. Hundreds of Japanese firms have made a stock repurchase announcement since 1995. Today, stock repurchases are becoming a popular financial strategy among Japanese firms.

Since stock repurchase has only recently been approved, Japanese firms needed to alter their articles to be feasible for stock repurchases before they actually executed repurchases. Such article alteration, of course, does not obligate firms to buy back their outstanding shares; it simply gives them the option. In our sample period from 1995 to 1998, some firms made the decision to alter their articles and execute stock repurchases simultaneously, and others made the decision to merely alter the articles to make stock repurchase feasible. While it is clear that a firm in the former group will buy back its outstanding shares in the near future, it is not clear whether a firm in the latter group actually plans to repurchase its shares. In this sense, we call the former group the execution group and call the latter group the non-execution group. A firm in the execution group has a stronger incentive to buy back its shares than a firm in the non-execution group has.

In this paper, we examine stock price behavior surrounding stock repurchase announcements, which include both the announcement of repurchase execution and the

---

[1] See, for example, Barclay and Smith (1988), Bagwell and Shoven (1989), and Grullon and Michaely (2002). For the reasons that firms repurchase their own shares, see Wansley, Lane, and Sarkar (1989) and Cudd, Duggal, and Sarkar (1996).

announcement of article alteration. By splitting our Japanese sample into two groups (the execution group and the non-execution group), we can examine the stock price behavior surrounding the execution of repurchases or the mere alteration of the articles for potential repurchases in the future. To our knowledge, no previous study has examined the stock price behavior surrounding the limited action of changing the articles of association.

Another motivation of this study was to gain a chance to compare the market response to the announcement for intention of repurchase execution in Japan and that in the U.S. It has been widely argued that, in the past, Japanese firms were very different from U.S. firms with respect to corporate governance and informational asymmetry.[2] Since the 1990s, however, traditional features of Japanese-type management, such as cross shareholdings and *keiretsu* relationships, have broken down.[3] In addition, Japanese financial markets are in the midst of the so-called Japanese Big Bang, under which deregulation of financial markets has been widely promoted in order to render Japanese financial markets more like those in the U.S.[4] Accordingly, examination of the stock price behavior surrounding repurchase announcements can be considered a timely subject.

---

[2] Consistent with this view, some empirical studies have reported that there was a difference between the responses of the Japanese and the U.S. markets to the financial strategies of firms, including equity issuance (Kang and Stulz (1996)) and dividend policy (Dewenter and Warther (1998)).

[3] Kuroki (2001) has reported that the proportion of cross shareholdings in the overall market decreased gradually in the 1990s, from about 17% at the end of 1990 to about 10% at the end of 2000. Ang and Constand (2002) have also reported that corporate and financial institution holdings tended to decrease during the 1990s in Japan.

[4] For example, see Gibson (2000) and Royama (1998).

By using the standard event study methodology, we first investigate the stock price behavior of our whole sample, which consists of stock repurchase announcements made by Japanese firms from November 1995 to November 1998. We find that, on average, the stock price declines prior to stock repurchase announcements, and then goes up at the actual time of the announcement.

We then split our whole sample into two groups (an execution group and a non-execution group), and examine the stock price behavior of each. We determine that the significant positive announcement effect is operative in the execution group, as was also observed in a recent study of Zhang (2002).[5] In the U.S. markets, several empirical studies, such as those of Vermaelen (1981), Netter and Mitchell (1989), Comment and Jarrell (1991), Ikenberry, Lakonishok, and Vermaelen (1995), and Liu and Ziebart (1997), have reported that stock price increases in response to the open-market repurchase announcement.[6] We may, therefore, conclude that the stock price behavior just following the announcement for intention of repurchase execution in Japan is similar to that in the U.S. For the non-execution group, we also find a significant positive announcement effect. That is, the stock price goes up in response to the

---

[5] Zhang (2002) also focused on stock repurchase in Japan. However, our study is different from that of Zhang (2002) with respect to the data source, sample size, and sample period. In particular, as stressed above, we examine stock price behavior surrounding announcements of article alteration to allow for stock repurchases, which is not examined by Zhang (2002).

[6] There are two lines of theoretical explanation for the positive effect of the announcement of a stock repurchase: signaling and solution of agency conflict. For stock repurchase signaling, see Ofer and Thakor (1987), Constantinides and Grundy (1989), McNally (1999), Isagawa (2000), and Isagawa (2002). For the agency solution, see Jensen (1986).

announcement of article alteration to allow stock repurchases.

Comparing the announcement effects between the execution group and the non-execution group, we find that there is no significant difference. This result is not surprising if we consider that the format of the available press releases may make it impossible for investors to discern, in a timely manner, which type of decision a firm has made.[7] The difference in the post-announcement period stock price behavior between the two groups suggests that although investors may not immediately recognize which type of decision a firm has made, they might gradually recognize the firm's decision following the announcement. Based on our findings, a firm in the execution group will generally experience a larger stock price increase over the post-announcement period than a firm in the non-execution group.

With regard to pre-announcement period abnormal returns, we find that there is a significant difference between the two groups. On average, a firm in the execution group experiences a much larger stock price decline than a firm in the non-execution group. This evidence suggests that whether a firm decides to execute a stock repurchase or to merely alter the articles is dependent on the magnitude of its stock price decline in the pre-decision period. A firm would decide to execute an actual stock repurchase if it experienced a relatively large stock price decline; otherwise, it would merely alter the articles of association to allow future repurchase.

Our tests using binary choice models support this prediction. We use probit and logit models to identify the factors affecting a firm's decision on repurchase execution. According to our results, the firm that experiences a large stock price decline will be more likely to decide to buy back its shares. On the other hand, a firm is more likely to merely alter the articles of association for future repurchase after experiencing a relatively small price decline.

---

[7] For details, see Section 3.

Our prediction is consistent with both the undervaluation/investment hypothesis and the option hypothesis for stock repurchases.[8] A firm in the execution group actually executes stock repurchases because the firm understands that its outstanding shares are severely undervalued and are thus an excellent investment opportunity. On the other hand, a firm in the non-execution group understands that its outstanding shares are not sufficiently undervalued, and thus considers it a good strategy to keep its option to execute stock repurchases.

The remainder of the paper is organized as follows. In Section 2, we discuss some details associated with stock repurchases in Japan. In Section 3, we describe our repurchase sample and the methodology of our analysis. In Section 4, we present evidence of the stock price behavior of our whole sample surrounding stock repurchase announcements. In Section 5, we separate the whole sample into an execution group and a non-execution group, and show the difference in stock price behavior between the two groups. The results suggest that the magnitude of the stock price decline in the pre-announcement period may affect firms' decisions on whether to execute repurchases or alter the articles of association. In Section 6, we present the results of binary choice models that support our hypothesis. In Section 7, we conclude the paper.

2. Stock Repurchases of Japanese Firms

Prior to 1994, Japanese firms had been legally prohibited to buy back their outstanding shares. The 1994 revision of the Commercial Law enabled firms to buy back their outstanding shares in order to distribute earnings to shareholders. Yet no firms could execute a stock repurchase because of the tax treatment. Before the Tax Reform Act of 1995, the Tax Law regarded stock repurchases as dividend payments.

[8] For the option hypothesis of stock repurchases, see Ikenberry and Vermaelen (1996).

Since it was impossible to identify the shareholders to whom a firm actually paid dividends via a stock repurchase, all shareholders had to pay income tax in proportion to their equity fraction if the firm had executed a stock repurchase. This tax treatment was repealed in 1995, and stock repurchases actually became possible for Japanese firms. Asahi Breweries, Ltd. made the first announcement of a stock repurchase among Japanese firms on November 12, 1995.

Before they can actually execute a repurchase, firms must alter their articles of association so that they are feasible for stock repurchases. Both the decision to alter the articles and the decision to execute repurchases are made by the board of directors. In contrast with the U.S., in Japan these decisions must be approved at the shareholders' meeting. Since a 1997 revision of the Commercial Law, firms have been able to execute stock repurchases without approval at a shareholders' meeting once they have altered the articles. This 1997 revision made the procedure for stock repurchases much simpler, and many firms have since decided to alter their articles of association to make repurchases feasible.

As mentioned in the Introduction, our sample can be separated into two groups: an execution group and a non-execution group. The execution group consists of firms that made the decision to alter the articles and to execute stock repurchases simultaneously. The non-execution group consists of firms that made the decision to merely alter the articles to allow future repurchases. Of course, these decisions need to be approved at the shareholders' meeting. There are a few cases, however, in which the decision regarding stock repurchases that was made by the board of directors was rejected at the shareholders' meeting. A firm in the non-execution group cannot execute a stock repurchase without another directors' meeting at which the repurchase execution is decided upon. On the other hand, a firm in the execution group is presumably going to execute a stock repurchase soon. Thus, a firm in the non-execution group has a weaker incentive to execute a stock repurchase than a firm in the execution group has.

There are several points worth mentioning with regard to the repurchase execution in Japanese markets.[9] Once a firm has completed the requirements for a repurchase execution, it is free to buy back its outstanding shares until the next annual shareholders' meeting. That is, the repurchase period is less than one year.

Two repurchase methods are available for a firm. One is the open-market repurchase and the other is the tender-offer repurchase. To our knowledge, there is no case in which the bid price of a tender-offer repurchase was much higher than the closing price at the previous date of the announcement. Zhang (2002) reports that the mean premium of a tender offer repurchase is only 5% in Japan. It should be stressed that all of our sample firms had the intention of repurchasing their outstanding shares to distribute earnings, and they redeemed all of their repurchased shares.[10] No firm decided to execute a stock repurchase as a takeover defense in our sample. This is the reason that we compare our results with the results of open-market stock repurchase announcements in the U.S. markets. As in the case of U.S. open-market repurchases, a firm needs not complete its repurchase intention in Japan. In order to avoid insider trading or price manipulation, the Tokyo Stock Exchange provides guidelines for how repurchases are to be executed. These guidelines are similar to those of SEC Rule 10b-18 in the U.S.

Prior to an additional revision of the Commercial Law on March 30, 1998, the total number of shares that a firm could buy back per repurchase program was limited to 10% of its outstanding shares, a limitation known as the 10% rule. If the firm wanted to execute additional stock repurchases, then approval at a shareholders' meeting was required again. Before the 1998 revision, the total amount of funds that a firm could use for stock repurchases was also restricted to the profit available for cash dividends. The

---

[9] Zhang (2002, Section 2) also introduces institutional points of stock repurchases in Japan.

[10] Japanese firms had been prohibited from having treasury shares until 2001.

1998 revision of the Commercial Law relaxed the 10% rule and allowed firms to use their capital reserves for stock repurchases.

3. Data and Methodology

Our total sample consisted of 452 Japanese firms that were listed in the 1st Section of the Tokyo Stock Exchange, and that made stock repurchase announcements between November 1995 and November 1998. We collected information regarding these firms' repurchase announcements from the morning edition of the *Nihon Keizai Shimbun*, the most popular economic newspaper in Japan. We excluded some announcements because the firm had already announced a stock repurchase during the sample period, and the needed stock return data was not available. Panel A of Table 1 describes the number of observations by year.

To separate the sample into the execution and non-execution groups, we use the data presented by the Tokyo Stock Exchange. At the time of this study, the Tokyo Stock Exchange website provided a list of firms whose boards of directors had decided to execute stock repurchases.[11] *Nihon Keizai Shimbun* does not provide any useful information for distinguishing between these two types of announcing firms. Often, both the decision to execute a stock repurchase and the decision to alter the articles are reported in the same form in the *Nihon Keizai Shimbun*. Therefore, it may be difficult for many investors to distinguish, in a timely manner, which type of decision an announcing firm has made from the press release.

Some firms in the non-execution group made announcements of both their article

---

[11] Although this information is no longer available on the Tokyo Stock Exchange website, the list of firms in the execution group is available from the authors upon request.

alterations for future repurchases and their fiscal year reports at the same time. Although this would seem to run the risk of a confounding effect, firms listing on the Tokyo Stock Exchange regularly release their predictions of the fiscal year earnings. In addition to these regular releases, when firms revise their predictions, information of the revisions is announced in a timely manner. For this reason, we conclude that our results are not affected by such a confounding effect. In fact, the results are essentially the same when we delete those firms which simultaneously announced their repurchase intention and fiscal year results.

In the present sample, none of the non-execution firms had decided their repurchase method by the announcement date. Even in the execution group, there existed some firms for which we could not determine the repurchase method from either *Nihon Keizai Shimbun* or the Tokyo Stock Exchange website. Furthermore, several firms used both open-market repurchases and tender-offer repurchases. Thus, we could not obtain the complete data on the repurchase method of each firm. For this reason, we did not examine how the repurchase method affects stock price behavior.[12]

In our sample period, there were two revisions of Commercial Law, both of which facilitated stock repurchases. The procedure for firms' stock repurchases became much simpler after the 1997 revision, and many firms have since made the decision to execute a stock repurchase. As shown in Panel B of Table 1, in our total sample, only 15 firms made their stock repurchase announcement prior to the 1997 revision. The remainder of the 437 firms made their decision on stock repurchase after the revision. The 1998 revision of Commercial Law relaxed the total amount of funds a firm can use for a stock

---

[12] Zhang (2002) examined the relationship between the announcement effect of stock repurchase and the repurchase method. He reported that, as distinct from the results in the U.S., firms that announced tender-offer repurchases experienced lower abnormal returns than did firms that announced open-market repurchases.

repurchase. As shown in Panel C of Table 1, in our sample, 51 firms made their decision on stock repurchases before the 1998 revision. Among them, 34 firms were in the execution group and 17 firms were in the non-execution group. The remainder of the 401 firms made their stock repurchase announcement after the revision. Among them, 56 firms were in the execution group and 345 firms were in the non-execution group.

Finally, when data on the firm size, profitability, or other fundamental information was required for the analysis, the *Toyo Keizai Data Bank* was used as a source.

Table 2 reports summary statistics for our total sample and for the split sample. The number of firms in the non-execution group (362) was about four times larger than the number in the execution group (90). There was no significant difference in the characteristics of firms, such as the firm size (SIZE), the leverage ratio (DEBT), or the firm profitability (ROA), between the two groups. However, there was a remarkable difference between the two groups in the target percentage of shares that a firm intended to buy back (TAR). This is because while more than 1/3 of firms in the execution group made announcements before the 1998 revision of the Commercial Law, most firms in the non-execution group made announcements after the revision. The maximum percentage of shares that a firm could buy back was limited by the 10% rule before the 1998 revision of the Commercial Law.

We calculated daily stock returns by using the closing price taken from the *Stock Price CD-ROM* of the *Toyo Keizai Data Bank*, which is widely used in Japan. The market model residual was taken as a firm's excess return on any given day. This residual was calculated as the difference between the actual return and the predicted return based upon the market model parameter estimates and the market return for that day. In Japanese stock markets, there are two popular market indices: TOPIX and the Nikkei stock index. We use TOPIX as the market portfolio in this paper because it contains many more firms than the Nikkei index. In a separate trial run, we also used the Nikkei index as the market portfolio, and we confirmed that there was no difference

in results between the two indices.[13] In addition, we tried to use two other types of a firm's excess returns calculated on either the constant return model or the other market-adjusted return model, and observed no significant difference in the results. We therefore conclude that our results are rigorous irrespective of both the proxy of market portfolio and the model for calculating excess returns.

The parameters of the market model are estimated over a 100-day period between day -121 and day -21. Throughout our paper, day -*t* (day +*t*) means *t* days before (after) the announcement date, day 0. The event window extends from day -20 to day +20 relative to the announcement. A cumulative excess return is calculated by cumulating the daily excess returns geometrically.

In order to overcome the bias due to residual cross-correlation (the clustering effect), we used two methods. One was the generalized least square estimation including the error components model (GLS), and the other was the equally weighted portfolio approach.[14] Since the results were similar under both methods, we present only the results from the GLS method in this paper.

4. Stock Price Behavior of the Whole Sample

Table 3 presents the average daily excess returns and cumulative returns over the event period for the whole sample. The stock repurchase announcement, which includes both the announcement of repurchase execution and alteration of the articles, has a significant positive excess return of 0.91% on the announcement day (day 0) and 1.24%

---

[13] Hatakeda and Isagawa (2001) report the empirical results in the case of the Nikkei stock index in detail. Kato, Loewenstein, and Tsay (1997) and Matsumoto and Hoban Jr. (1999) used the Nikkei stock index as the market proxy in their empirical studies.

[14] For the cross-sectional dependence problem, see Bernard (1989).

on the following day (day +1). If an investor had purchased the stock of a firm that announced a stock repurchase, an excess return of approximately 2.15% would have been earned for the two days just after the announcement. We performed a non-parametric test J_4 as presented by Campbell, Lo, and MacKinlay (1997). The results of the J_4 test provided additional evidence that stock repurchase announcements had a significant impact on the abnormal returns at day 0 and day +1, respectively.

Table 3 also indicates that the average cumulative abnormal return in the pre-announcement period from day -20 to day -1 was -2.94%, which is significantly negative (the *t*-value was -4.31). Thus, on average, the stock price decreased prior to the announcement date, and went up in response to the repurchase announcement.

Figure 1 plots the cumulative average excess return in the event window centered on the announcement date. It shows that the average stock price of the total sample decreased prior to the announcements, and went up in response to the announcements. In the post-announcement period (from day +2 to day +20), the average stock price did not change significantly.[15]

Next, we compared the stock price behavior of 51 firms which made a repurchase decision before the 1998 revision of the Commercial Law and that of 401 firms which made a repurchase decision after the revision.[16] The test statistic, the *t*-value, was 1.48

---

[15] As noted in Section 3, we also tried to use the Nikkei stock index as the market proxy in place of TOPIX, with little change in the qualitative results. For example, we determined that, for the whole sample, the abnormal return was 0.86% on the announcement day and 1.19% on the next day. The average cumulative abnormal return in the pre-announcement period from day -20 to day -1 was -1.77% (the *t*-value was -2.55, which is significant at the 1% level).

[16] As mentioned in Section 3, only 15 firms made stock repurchase announcements before the 1997 revision of the Commercial Law. Since the sample size was too small,

for the difference in a two-day (day 0 and day +1) cumulative abnormal return between the two groups. On average, firms in the former group experienced larger announcement effects than those in the latter group, but the difference between the two groups was not significant. It seems that the 1998 revision of the Commercial Law did not significantly affect the market behavior in response to the announcements regarding stock repurchases.

We also examined the relationship between the magnitude of the announcement effect and characteristics specific to the event observation. The two-day cumulative abnormal return was regressed on the target proportion of shares to be repurchased (TAR), pre-announcement period return (PRE), firm size (SIZE), and firm profitability (ROA). We use these four variables as regressors for the following reasons.

First, with regard to TAR, Comment and Jarrell (1991) and Ikenberry, Lakonishok, and Vermaelen (1995) reported that, in the U.S. markets, higher proportions of target shares were associated with larger abnormal returns in response to repurchase announcements. Second, with regard to PRE, Comment and Jarrell (1991) and Stephens and Weisbach (1998) found that, in the U.S. markets, there was a negative relationship between the magnitude of the announcement effect and the magnitude of the pre-announcement period price decline. Third, we use firm size (SIZE) because it is often pointed out that firm size could be a good proxy for informational asymmetry. Since smaller firms are more likely to be mispriced than larger firms, the market reaction to repurchase announcements made by small firms should be more favorable. Lastly, we include firm profitability (ROA) because it is a good proxy of whether or not a firm has alternative investment opportunity. It is likely that a high-ROA firm has more profitable real investment opportunity than does a low-ROA firm. Then, from the viewpoint of shareholders' wealth, high ROA-firms will find it more desirable to invest

---

we did not examine the effects of the 1997 revision of the Commercial Law.

available cash into real investments rather than into their own shares. On the other hand, the Low-ROA firm may find it valuable to use available cash to repurchase their outstanding shares. Under this hypothesis, we expect a negative relationship between the announcement effect and ROA.

The results are presented in Table 4. The magnitude of the (positive) announcement effect is significantly related to all four of the variables introduced above. The announcement effect is positively related to the proportion of shares sought according to the repurchase announcement, and negatively related to the pre-announcement cumulative abnormal return. The result is also consistent with the prediction regarding informational asymmetry, i.e., that there exists a negative relationship between the announcement effect and firm size. Consistent with the expectation, ROA was negatively related to the announcement effect. In our sample period, stock repurchase announcements were more desirable for unprofitable firms than for profitable firms.

5. Stock Price Behavior of the Split Sample

Our total sample consisted both of firms that decided to execute stock repurchases (the execution group) and firms that only decided to change their articles for future repurchases (the non-execution group). Although both groups have the option to repurchase their outstanding shares, the non-execution group is not certain about eventual repurchase. In this section, we examine the difference in stock price behavior between the two groups.

Using the same methodology presented in Section 3, we calculated the average abnormal stock returns of each group. Panel A and Panel B of Table 5 present the average daily abnormal returns and the cumulative returns of the execution group and the non-execution group, respectively.

First, with regard to the announcement effect, both groups experienced significant

positive excess returns just following the announcements. Table 5 shows that the two-day (day 0 and day +1) cumulative excess return of the execution group was 2.05% (the *t*-value was 4.92), and that of the non-execution group was 2.17% (the *t*-value was 8.73), both of which were significantly positive at the 1% significance level. The hypothesis that the announcement effects of the two groups were positive is also supported by the results of the non-parametric test (See the J_4 statistics in Table 5).

The stock price increase in response to the announcement for intention of repurchase execution (for the execution group) is also identified by Zhang (2002). We therefore conclude that the positive announcement effect to intention of repurchase execution is rigorous in the Japanese stock markets. In the U.S. stock markets, the positive announcement effect to intention of open-market stock repurchases is known as a stylized fact. Thus, there is little difference in stock price behavior following the announcements of repurchase intention between the Japanese stock markets and U.S. stock markets.

We next compared the magnitude of the announcement effect between the two groups. The *t*-value for this comparison was -0.18, indicating that there was no significant difference in the two-day abnormal return between the two groups. This result indicates that, in Japan, a firm's decision on a stock repurchase announcement (to execute a repurchase or only alter the articles) does not affect the market reaction in a timely manner. As mentioned in Section 3, investors may not discern, in a timely manner, which type of decision a firm has made. So, it is not surprising that there was no difference in the announcement effect between the two groups. As more detailed information becomes available to investors, however, they will recognize to which group an announcing firm belongs. As this begins to happen, we expect that the stock price of a firm in the execution group will increase more than that of a firm in the non-execution group.

We focused on the stock price behavior in the post-announcement period (day +1 to

day +20). Table 5 shows that while the execution group experienced a significant positive abnormal return at day +2, the non-execution group did not. Investors may recognize the meaning of a firm's decision within two days after the announcement.

We then examined stock price behavior in the pre-announcement period from day -20 to day -1. Table 5 shows that both groups experienced stock price declines prior to the announcements. Since the *t*-value of this comparison was -1.74, there was a significant difference in the pre-announcement period stock price behavior between the two groups. The average cumulative abnormal return of the execution group, -4.82%, was significantly less than that of the non-execution group, -2.47%.[17]

The solid line and the dotted line in Figure 2 plot the average cumulative abnormal returns of the execution group and the non-execution group, respectively. It can be seen that, on average, firms in the execution group experienced larger abnormal returns in the post-announcement period than firms in the non-execution group. In addition, the average stock price of the execution group decreased more than that of the non-execution group in the pre-announcement period.

The above results led us to hypothesize that a firm decides to execute stock repurchases after experiencing a sharp price decline, and a firm merely decides to alter the article for future repurchases after experiencing a moderate price decline. That is, a firm's decision on stock repurchase is dependent on the magnitude of the stock price

---

[17] We also used the Nikkei stock index as the market proxy and identified the following for the split sample. First, both of the two groups experienced significant positive announcement effects, and there was no significant difference in the two-day (day 0 and day +1) abnormal return between the two groups. Second, while the execution group experienced a significant positive return at day +2, the non-execution group did not. Third, the pre-announcement period return for the execution group was significantly less than that for the non-execution group.

decline in the pre-announcement period. In the next section, we examine this hypothesis in detail.

Lastly, the results of the multivariate analysis on the announcement effect for each group are presented in Table 6. Here we see that, for the execution group, only the pre-announcement period return (PRE) had a significant relationship with the announcement effect. In particular, there was no significant relationship between the announcement effect and the percentage of shares sought according to the announcement (TAR). This result was different from the findings for the U.S. markets.

One possible explanation for this result is that, before the 1998 revision of the Commercial Law, the proportion of shares that Japanese firms could buy back per repurchase program was restricted to no more than 10% of their outstanding shares. Under this restriction, the proportion of shares that a firm intended to repurchase might not convey any significant information to the stock market. Since more than 1/3 of firms in the execution group made announcements before the 1998 revision, it is not surprising that the proportion of shares sought according to the announcement did not affect the magnitude of the announcement effect.

For the non-execution group, there was a significant positive relationship between the announcement effect and the target percentage of shares to be repurchased. This is because most firms in the non-execution group made announcements after the 1998 revision. Consistent with prediction mentioned in Section 4, the announcement effect of the non-execution group was negatively related to both the firm size (SIZE) and profitability (ROA). On the other hand, we could not identify any significant relationship between the announcement effect and the pre-announcement period return for the non-execution group.

6. The Decision of Firms Regarding Repurchase Execution

In this section, we use the results of tests with binary choice models to examine our hypothesis about a firm's decision regarding stock repurchase announcements in detail. The results in the previous section show that a firm in the execution group decided to execute a stock repurchase under condition of a relatively large stock price decline, and a firm in the non-execution group decided to alter the articles for future repurchase under condition of a small stock price decline. That is, the pre-announcement period stock price behavior seems to affect a firm's decision on repurchase execution.

Using probit and logit models, we examined whether or not the stock price behavior in the pre-announcement period affects a firm's decision on repurchase execution. Table 7 presents the estimation results of both the probit and the logit analysis models. In Model 1, we examine whether or not a firm's decision on repurchase execution depends on the pre-announcement period abnormal return (PRE). In Model 2, we present estimation results accounting for the firm's characteristics: firm size (SIZE) and firm profitability (ROA). We exclude the target percentage of shares to be repurchased (TAR) because it does not affect a firm's decision-making on repurchase execution.

As shown in Model 1 of Table 7, the pre-announcement period return had a significant relationship with a firm's choice. The coefficient of PRE in Model 1 was similar to that in Model 2, indicating that its estimate is stable and independent of both firm size and firm profitability.[18] Our results support the hypothesis that the magnitude of stock price decline in the pre-announcement period is an important determinant of a firm's decision-making on whether to execute a stock repurchase. While a firm tends to make a decision to execute a stock repurchase after experiencing a relatively large stock price decline, a firm tends to decide to merely alter the articles after experiencing a

[18] We obtained essentially the same results when we used the Nikkei stock index in place of TOPIX.

smaller price decline.[19]

Among the commonly cited hypotheses for stock repurchases, the undervaluation hypothesis and the investment hypothesis seem to be plausible explanations of why a firm in the execution group makes a decision to execute an actual stock repurchase. Suppose that the pre-announcement period abnormal stock price decline is caused by a temporary market undervaluation, and the firm recognizes that its stock price is undervalued.[20] In such a situation, for the firm, the purchase of its own shares constitutes a profitable investment opportunity. The more severe the undervaluation is, the stronger intention the firm has to execute a stock repurchase. Thus, a firm in the execution group, which has experienced a severe stock price decline, wants to buy back

---

[19] The negative coefficient of ROA in model 2 indicates that a high-ROA firm has stronger incentive to execute stock repurchase than does a low-ROA firm. Although we treat ROA as a proxy of firm profitability in the previous sections, ROA may actually trace the amount of cash available rather than the profitability because of the relatively positive correlation between firm profit and cash flow. That is, a high-ROA firm earned more money in the last fiscal year than a low-ROA firm did. Accordingly, it may be easier for high-ROA firms to execute stock repurchases because they have an abundance of available cash, and difficult for low-ROA firms because of a dearth of available cash.

[20] Many recent empirical studies have reported that the stock price tends to deviate from its fundamental value. Daniel, Hirshleifer, and Subrahmanyam (1998) and Barberis, Shleifer, and Vishny (1998) provide excellent reviews of the empirical findings with regard to the market misperception. Based on psychological theory, both of these papers explore the mechanisms by which investor sentiment leads to the market misperception. Isagawa (2002) provides a theoretical model of stock price response to repurchase announcements under market misperception.

its outstanding shares sooner and makes a decision to execute a stock repurchase.

On the other hand, the option hypothesis provided by Ikenberry and Vermaelen (1996) seems to plausibly explain why a firm in the non-execution group merely alters the articles for future repurchases. Our empirical results show that firms in the non-execution group experienced smaller stock price declines than did firms in the execution group. Then, taking repurchase costs into account, a firm in the non-execution group may be dissuaded from executing a repurchase in the short-term. In this case, the firm alters the articles to be feasible for repurchases. By doing so, the firm can buy back its outstanding shares as soon as the magnitude of the undervaluation is so large that its own shares become an attractive investment opportunity. That is, a firm in the non-execution group keeps the option to execute an actual repurchase.

7. Conclusion

In this paper, we empirically examined the stock price behavior surrounding stock repurchase announcements among Japanese firms. We found that, on average, an announcing firm experienced a significant stock price decline prior to its announcement and a significant stock price increase in response to its announcement.

The advantage of our study is that we were able to separate the whole sample into two groups (the execution group and the non-execution group) and examine the difference in stock price behavior between them. We found no significant difference in the two-day announcement effect between these two groups. Stock prices go up in response to both announcements of repurchase execution (the execution group) and announcements of article alteration (the non-execution group).

However, a significant difference was observed in the pre-announcement period abnormal return. The execution group experienced a larger stock price decline in the pre-announcement period than the non-execution group. In Japan, the stock price

behavior in the previous period affects the decision of firms regarding stock repurchases. While a firm makes a decision to execute a stock repurchase after experiencing a larger decline in its stock price, a firm merely alters the articles of association to allow future repurchases after experiencing a smaller price decline. This pattern can be explained by both the undervaluation/investment hypothesis and the option hypothesis for stock repurchases.

Acknowledgements

We would like to thank Jaemin Kim, Shigeki Sakakibara, Naomichi Hosaka, Ghon Rhee (the editor), and an anonymous reviewer for their helpful comments. Financial support was provided by the Japan Securities Scholarship Foundation.

References

Ang, J., and R. Constand, 2002, The Portfolio Behavior of Japanese Corporations' Stable Shareholders, *Journal of Multinational Financial Management* 12, 89-106.

Bagwell, L., and J. Shoven, 1989, Cash Distributions to Shareholders, *Journal of Economic Perspectives* 3, No.3, 129-140.

Barberis, N., A. Shleifer, and R. Vishny, 1998, A Model of Investor Sentiment, *Journal of Financial Economics* 49, 307-343.

Barclay, M., and C. W. Smith, 1988, Corporate Payout Policy: Cash Dividends versus Open Market Repurchases, *Journal of Financial Economics* 22, 61-82.

Bernard, V., 1987, Cross-sectional Dependence and Problems in Inference in

Market-based Accounting Research, *Journal of Accounting Research* 25, 1-48.

Campbell, J., Lo, A., and A. MacKinlay, 1997, *THE ECONOMETRICS OF FINANCIAL MARKETS*, Princeton University Press.

Comment, R., and G. Jarrell, 1991, The Relative Signaling Power of Dutch Auction and Fixed Price Tender Offers and Open Market Share Repurchases, *Journal of Finance* 46, 1243-1271.

Constantinides, G., and B. Grundy, 1989, Optimal Investment with Stock Repurchase and Financing as Signals, *Review of Financial Studies* 2, 445-465.

Cudd, M., Duggal, R., and S. Sarkar, 1996, Share Repurchase Motives and Stock Market Reaction, *Quarterly Journal of Business and Economics* 35, 66-76.

Daniel, K, D. Hirshleifer, and A. Subrahmanyam, 1998, Investor Psychology and Security Market Under- and Overreactions, *Journal of Finance* 53, 1839-1885.

Dewenter, K., and V. Warther, 1998, Dividends, Asymmetric Information, and Agency Conflicts: Evidence from a Comparison of the Dividend Policies of Japanese and US Firms, *Journal of Finance* 53, 879-904.

Gibson, M., 2000, Big Bang Deregulation and Japanese Corporate Governance: A Survey of the Issues, in T. Hoshi, and H. Patrick ed., *Crisis and Change in the Japanese Financial System*, Kluwer Academic Publishers.

Grullon, G., and R. Michaely, 2002, Dividend, Share Repurchases, and the Substitution

Hypothesis, *Journal of Finance* 57 1649-1684.

Hatakeda, T., and N. Isagawa, 2001, Stock Price Behavior Surrounding Repurchase Announcements: Evidence from Japan, Working Paper, Kobe University.

Ikenberry, D., and Lakonishok, J., and T. Vermaelen, 1995, Market Underreaction to Open Market Share Repurchases, *Journal of Financial Economics* 39, 181-208.

Ikenberry, D., and T. Vermaelen, 1996, The Option to Repurchase Stock, *Financial Management* 25 (winter), 9-24.

Isagawa, N., 2000, Open-Market Stock Repurchase and Stock Price Behavior When Management Values Investment, *Financial Review* 35, 95-108.

Isagawa, N., 2002, Open-Market Repurchase Announcements and Stock Price Behavior in Inefficient markets, *Financial Management* 31 (3), 5-20.

Jensen, M., 1986, Agency Costs of Free Cash Flow, Corporate Finance, and Takeovers, *American Economic Review* 76, 323-329.

Kang, J-K., and R. Stulz, 1996, How Different is Japanese Corporate Finance? An Investigation of the Information Content of New Security Issue, *Review of Financial Studies* 9, 109-139.

Kato, K., U. Loewenstein, and W. Tsay, 1997, Voluntary Dividend Announcements in Japan, *Pacific-Basin Finance Journal* 5, 167-193.

Kuroki, F., 2001, The Present Status of Unwinding of Cross-shareholding: The Fiscal 2000 Survey of Cross-shareholding, NLI Research Paper No. 157, NLI Research Institute.

Liu, C-S., and D. Ziebart, 1997, Stock Returns and Open-Market Stock Repurchase Announcements, *Financial Review* 32, 709-728.

Matsumoto, K., and J. Hoban Jr., 1999, Seasonality in the Rates of Return on Japanese ADRs, *Pacific-Basin Finance Journal* 7, 67-81.

McNally, W., 1999, Open Market Stock Repurchase Signaling, *Financial Management* 28 (summer), 55-67.

Netter, J., and M. Mitchell, 1989, Stock-Repurchase Announcements and Insider Transactions after the October 1987 Stock Market Crash, *Financial Management* 18 (autumn), 84-96.

Ofer A., and A. Thakor, 1987, A Theory of Stock Price Responses to Alternative Corporate Cash Disbursement Methods: Stock Repurchases and Dividends, *Journal of Finance* 42, 365-394.

Royama, S., 1998, The Big Bang in Japanese Securities Market, *Japan Review of International Affairs* 11.

Stephens, C., and M. Weisbach, 1998, Actual Share Reacquisitions in Open-Market Repurchase Programs, *Journal of Finance* 26, 3-27.

Vermaelen, T., 1981, Common Stock Repurchases and Market Signaling: An Empirical Study, *Journal of Financial Economics* 9, 139-183.

Wansley, J., W. Lane, and S. Sarkar, 1989, Managements' View on Share Repurchase and Tender Offer Premiums, *Financial Management* 18 (autumn), 97-110.

Zhang, H., 2002, Share Repurchases under the Commercial Low 212-2 in Japan: Market Reaction and Actual Implementation, *Pacific-Basin Finance Journal* 10, 287-305.

Table 1. Distribution of Observations by Year and by Regulatory Regime

Panel A: Distribution of observations by year

	1995	1996	1997	1998
execution group	1	8	17	64
non-execution group	0	0	20	423
total number	1	8	37	452

Panel B: Distribution of observations before and after the 1997 revision of Commercial Law

	Before the 1997 revision	After the 1997 revision
execution group	14	76
non-execution group	1	361
total number	15	437

Panel C: Distribution of observations before and after the 1998 revision of Commercial Law

	Before the 1998 revision	After the 1998 revision
execution group	34	56
non-execution group	17	345
total number	51	401

Table 2. Summary Statistics

	Whole Sample	Execution	Non-Execution
SAMPLE SIZE	445	87	358
SIZE	7668	6649	7915
	(28358)	(16725)	(30538)
DEBT	0.550	0.480	0.567
	(0.238)	(0.246)	(0.237)
ROA	0.037	0.039	0.036
	(0.028)	(0.023)	(0.029)
TAR	0.098	0.041	0.112
	(0.059)	(0.036)	(0.054)

Note: Standard deviations are in parentheses. The sample firms picked up from *Nihon Keizai Shimbun* includes both firms that made decision to execute stock repurchases at the board of directors (the execution group), and firms that only made alteration of articles of association to be feasible for stock repurchases (the non-execution group). For financial statement data we use data source of *Toyo Keizai Data Bank*. The definition and calculation of the variables used here are as fellows: SIZE is defined as the sum of the book value of total debt and the market value of equity. Equity is computed as the product of the stock price at day –1 and the number of shares outstanding at the beginning of the fiscal year. DEBT means debt/Asset ratio. It is computed as the book value of debt over total asset. ROA means Return on Asset. Return is the recurring profit at the beginning of the fiscal year. TAR is target percentage that a firm intends to repurchase. We use the proportion of shares sought according to the announcements for the execution group, and the maximum percentage of shares that the firm is allowed to repurchase by the article alteration for the non-execution group.

Table 3. Average and Cumulative Abnormal Returns: Whole Sample

Day	AAR	CAR	*t*-value		J4 Test	
-20	0.035	0.035	0.230		0.149	
-19	-0.161	-0.125	-1.052		-0.737	
-18	-0.332	-0.458	-2.176	*	-1.522	
-17	-0.424	-0.881	-2.777	***	-1.580	
-16	-0.201	-1.082	-1.315		-0.568	
-15	-0.054	-1.136	-0.354		-0.204	
-14	-0.212	-1.348	-1.387		-0.733	
-13	-0.009	-1.357	-0.060		0.031	
-12	-0.198	-1.555	-1.298		-0.715	
-11	0.077	-1.478	0.507		0.653	
-10	-0.125	-1.602	-0.816		-0.138	
-9	-0.359	-1.961	-2.350	**	-1.406	
-8	-0.313	-2.274	-2.052	**	-1.495	
-7	-0.114	-2.388	-0.747		-0.454	
-6	-0.227	-2.615	-1.485		-0.849	
-5	-0.247	-2.862	-1.622		-1.208	
-4	-0.260	-3.123	-1.705	*	-0.710	
-3	0.041	-3.082	0.266		0.025	
-2	-0.077	-3.159	-0.504		-0.304	
-1	0.216	-2.943	1.412		0.122	
0	0.908	-2.035	5.953	***	2.616	***
+1	1.237	-0.798	8.105	***	3.544	***
+2	0.172	-0.626	1.125		0.655	
+3	-0.052	-0.677	-0.338		-0.694	
+4	0.040	-0.637	0.265		0.396	
+5	0.015	-0.622	0.100		-0.147	
+6	0.116	-0.506	0.759		0.524	
+7	0.037	-0.469	0.242		0.314	
+8	-0.068	-0.536	-0.443		-0.091	
+9	-0.010	-0.546	-0.065		0.019	
+10	-0.105	-0.651	-0.687		-0.560	
+11	0.093	-0.558	0.611		0.586	
+12	0.014	-0.544	0.090		0.029	
+13	-0.052	-0.596	-0.340		-0.023	
+14	0.384	-0.212	2.517	**	1.402	
+15	-0.136	-0.348	-0.892		-0.095	
+16	-0.044	-0.392	-0.289		-0.020	
+17	0.101	-0.291	0.663		0.518	
+18	0.125	-0.166	0.819		0.669	
+19	0.212	0.046	1.391		0.764	
+20	0.189	0.235	1.238		0.638	

Notes: In this table, we report the evidence on the market model using TOPIX as the market portfolio. AAR is the average abnormal return for the specified day in the event period, and CAR is the cumulative abnormal return for day –20 to the specified day. *t*-value is the statistic to test the null hypothesis that AAR=0. J4 Test is an alternative non-parametric rank test of the null hypothesis (See Campbell, Lo, and Mackinlay (1997, pp. 172–173)).

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 4. Cross Sectional Model Analysis: Whole Sample

CONST	5.232 ***	(4.41)
TAR	0.656 ***	(2.58)
SIZE	-0.488 **	(-2.51)
PRE	-0.076 ***	(-2.72)
ROA	-0.542 **	(-2.05)
R-squared	0.051	

Notes: *t*-values in the parentheses are calculated by using heteroskedastic consistent variances. Dependent variable is CAR from day 0 to day +1. TAR is target percentage of shares to be repurchased. SIZE is approximated by the logarithm of the total asset.

PRE is CAR from day –20 to day –1. ROA is Return on Asset.

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 5. Average and Cumulative Abnormal Returns: Split Sample

A: Execution Group

Day	AAR	CAR	t-value		J4 Test	
-20	-0.135	-0.135	-0.458		-0.458	
-19	-0.059	-0.194	-0.201		0.465	
-18	-0.383	-0.577	-1.301		-1.425	
-17	-0.222	-0.800	-0.754		-0.735	
-16	-0.573	-1.372	-1.946	*	-1.328	
-15	-0.143	-1.515	-0.485		-0.863	
-14	-0.027	-1.542	-0.092		-0.248	
-13	0.085	-1.457	0.289		0.263	
-12	0.130	-1.328	0.439		1.185	
-11	-0.141	-1.469	-0.480		-0.743	
-10	-0.460	-1.929	-1.564		-0.660	
-9	-0.325	-2.254	-1.105		-0.750	
-8	-0.104	-2.358	-0.354		-0.053	
-7	-0.766	-3.124	-2.601	***	-1.673	*
-6	-0.226	-3.351	-0.770		0.053	
-5	-0.599	-3.950	-2.037	**	-1.785	*
-4	-0.334	-4.284	-1.135		0.308	
-3	0.103	-4.180	0.351		0.323	
-2	-0.468	-4.648	-1.591		-1.215	
-1	-0.174	-4.822	-0.590		-0.570	
0	0.645	-4.178	2.191	**	0.968	
+1	1.406	-2.772	4.769	***	3.346	***
+2	0.544	-2.227	1.848	*	0.923	
+3	-0.193	-2.420	-0.653		-0.300	
+4	0.098	-2.322	0.332		0.953	
+5	0.312	-2.010	1.059		0.473	
+6	0.080	-1.930	0.272		-0.158	
+7	-0.276	-2.206	-0.938		-0.405	
+8	0.039	-2.167	0.132		1.523	
+9	-0.026	-2.193	-0.088		-0.053	
+10	-0.166	-2.360	-0.566		-0.390	
+11	0.007	-2.352	0.025		-0.248	
+12	0.820	-1.532	2.792	***	1.815	*
+13	-0.062	-1.594	-0.209		0.465	
+14	0.224	-1.369	0.761		0.758	
+15	-0.157	-1.526	-0.535		0.165	
+16	-0.104	-1.630	-0.353		-0.105	
+17	0.337	-1.293	1.147		0.630	
+18	-0.198	-1.491	-0.672		-1.065	
+19	0.217	-1.274	0.737		0.878	
+20	-0.087	-1.361	-0.295		-0.263	

B: Non-Execution Group

Day	AAR	CAR	t-value		J4 Test	
-20	0.077	0.077	0.440		0.300	
-19	-0.186	-0.108	-1.056		-1.010	
-18	-0.319	-0.428	-1.816	*	-1.310	
-17	-0.474	-0.902	-2.696	***	-1.583	
-16	-0.108	-1.010	-0.615		-0.220	
-15	-0.032	-1.042	-0.182		0.042	
-14	-0.258	-1.299	-1.465		-0.750	
-13	-0.033	-1.332	-0.185		-0.011	
-12	-0.280	-1.612	-1.590		-1.228	
-11	0.132	-1.480	0.750		0.911	
-10	-0.041	-1.521	-0.234		0.071	
-9	-0.367	-1.888	-2.087	**	-1.360	
-8	-0.365	-2.253	-2.077	**	-1.700	*
-7	0.048	-2.205	0.273		0.000	
-6	-0.227	-2.432	-1.290		-0.944	
-5	-0.160	-2.592	-0.910		-0.851	
-4	-0.242	-2.834	-1.375		-0.913	
-3	0.025	-2.809	0.142		-0.099	
-2	0.020	-2.789	0.115		0.004	
-1	0.312	-2.476	1.776	*	0.287	
0	0.974	-1.502	5.540	***	2.714	***
1	1.195	-0.307	6.799	***	3.047	***
2	0.079	-0.228	0.450		0.516	
3	-0.016	-0.244	-0.094		-0.699	
4	0.026	-0.218	0.149		0.168	
5	-0.059	-0.276	-0.333		-0.293	
6	0.125	-0.152	0.709		0.593	
7	0.115	-0.037	0.653		0.540	
8	-0.094	-0.131	-0.535		-0.600	
9	-0.006	-0.137	-0.034		0.022	
10	-0.090	-0.226	-0.509		-0.567	
11	0.115	-0.112	0.652		0.719	
12	-0.187	-0.298	-1.062		-0.470	
13	-0.049	-0.348	-0.281		-0.174	
14	0.424	0.076	2.411	**	1.404	
15	-0.131	-0.055	-0.745		-0.154	
16	-0.029	-0.084	-0.167		0.670	
17	0.042	-0.042	0.241		0.430	
18	0.205	0.164	1.168		1.083	
19	0.211	0.375	1.201		0.606	
20	0.258	0.632	1.465		0.809	

Notes: In this table, we report the evidence on the market model using TOPIX as the market index. AAR is the average abnormal return for the specified day in the event period, and CAR is the cumulative abnormal return for day –20 to the specified day. *t*-value is the statistic to test the null hypothesis that AAR=0. J4 Test is an alternative non-parametric rank test of the null hypothesis (See Campbell, Lo, and Mackinlay (1997, pp. 172–173)).

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 6. Cross Sectional Model Analysis: Split Sample

	Execution (87)		Non-Execution (358)	
CONST	5.010	(1.67)	3.248 ***	(2.92)
TAR	0.452	(0.89)	1.419 ***	(3.54)
SIZE	-0.599	(-1.04)	-0.529 ***	(-2.74)
PRE	-0.145 **	(-2.13)	-0.036	(-1.38)
ROA	-0.320	(-0.36)	-0.661 **	(-2.44)
Adjusted R-squared	0.085		0.044	

Notes: *t*-values in the parentheses are calculated by using heteroskedastic consistent variances. Dependent variable is CAR from day 0 to day +1. TAR is target proportion of shares to be repurchased. SIZE is approximated by the logarithm of the total asset. PRE is CAR from day –20 to day –1. ROA is Return on Asset.

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Table 7. Estimation Results for the Binary Choice Models

	Probit Model	
	Model 1	Model 2
CONST	0.899 ***	0.736 ***
	(12.35)	(2.01)
PRE	0.013 *	0.015 **
	(1.75)	(2.09)
ROA		-0.184 **
		(-2.12)
SIZE		-0.066
		(-1.12)
LLOG	-218.28	-215.91
	Logit Model	
	Model 1	Model 2
CONST	1.497 ***	1.250 *
	(11.39)	(1.92)
PRE	0.024 *	0.029 **
	(1.81)	(2.11)
ROA		-0.318 **
		(-2.07)
SIZE		-0.118
		(-1.13)
LLOG	-218.17	-215.86

Notes: Dependent variable is y=0 if a firm committed to execute a stock repurchase (the execution group), y=1 otherwise (the non-execution group). PRE is CAR from day –20 to day –1. ROA is Return on Asset. SIZE is approximated by the logarithm of the total asset. LLOG denotes log of likelihood function.

*** Significant at 1% level, ** Significant at 5% level, * Significant at 10% level

Figure 1. Plot of Cumulative Abnormal Return for Stock Repurchase Announcements

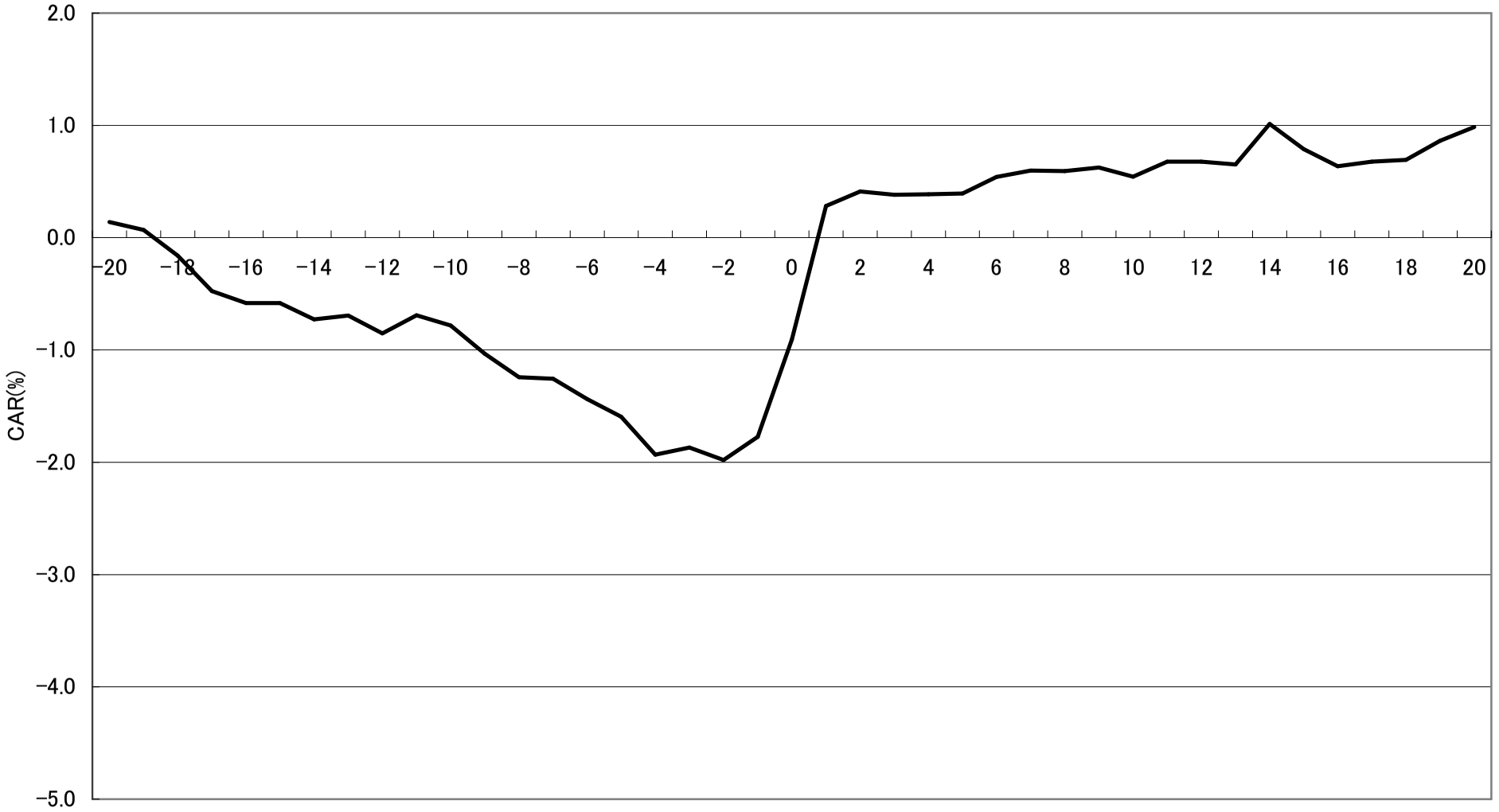

Figure 2. Plot of Cumulative Abnormal Return for Stock Repurchase Announcements