**Doctoral Dissertation**

# Empirical Analysis of Payout Policy in Japan

**512D002**

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**Outline**

## 1. Overview

### 1-1. Payout policy

A firm's payout policy suggests the distribution of free cash flows to shareholders after paying interest to the firm's creditors (Berk and DeMarzo, 2011). Payout policies are set in two ways, that is, cash dividends and share repurchases. Firms pay interest to creditors after they issue debt and they pay dividends as interest to their shareholders. With regard to the accounting differences between debt interest and payouts, interest is considered non-operating expenditure, whereas dividends and share repurchases are not reported in the income statement. Therefore, the basis of payout policies falls within the concept of stocks, but not income flows, and thus, payout policies characteristically do not affect a firm's accounting performance.

A very important practical concern for financial practitioners and scholars concerns firms' decisions about whether to reinvest in projects or pay their shareholders out of the free cash flows generated from their management practices. Finance scholars have discussed the effects of payout policies from many different perspectives. First, it is possible that firms' stock prices will react positively to payout policy announcements. If payout policy affects firm value, then an optimal payout policy must exist. Second, it is important whether management substitutes share repurchases for dividends. With a focus on the share repurchase question, I determine whether firms choose share repurchases, as shown later. In addition, with regard to corporate governance, I aim to understand how dividends are related to profitability for family firms

that have a greater degree of matching between ownership and management.

These questions remain attractive to finance scholars, but they are not completely unambiguous. For a long period, the return on equity (ROE) of Japanese firms has been lower than that of European and U.S. firms and the trend to enhance ROE was mainly provided by foreign investors in Japan. That is, Japanese firms have excess cash in regard to earnings. According to a 2015 survey of the Life Insurance Association of Japan, the average ROE for Japanese public-listed companies, including enterprises with losses and excluding finance companies, in the 2013 fiscal year was 8.5%. However, by comparison, the average ROE for U.S. companies was 14.7%. Thus, the relatively low ROE for Japanese companies has been even more remarkable in the most recent decade, when the overwhelming distribution was ROE of less than 6%.

An effective way to boost ROE is by increasing earnings in the numerator, but doing so is not easy, because it requires the reinvestment of retained earnings. However, not all listed firms necessarily have investments that represent a positive net present value. Here, since equity in the denominator decreases when repurchasing shares, ROE can be boosted directly, which is an important reference for stock investment earnings per share (EPS) (NIKKEI newspaper, October 19, 2016).

Because a firm's management owns stock options, there is motivation for them to increase stock prices, and thus, these references for stock investments might also be important for management. Fenn and Liang (2001) find a positive relationship between management's stock options and open-market repurchases (OMR), and a strong negative relationship between

such stock options and dividends. However, dividends remain the major payout method in Japan. Certainly, it is not impossible that dividend payments increase ROE. However, dividends have limited effectiveness for increasing ROE because dividend resources are mainly based on earned surpluses and dividends are paid according to such earned surpluses, except in enterprises operating at a loss.

### 1-1-1. Theory: Introduction of Modigliani–Miller theorem

Miller and Modigliani (1961) advocate that payout policies do not affect firm value, given certain conditions (Modigliani–Miller theorem). These conditions include the absence of taxes, information asymmetry, and transaction costs, as well as the existence of complete contracts. The authors' landmark study has refuted the whole concept of payout policies.

As discussed in Section 1-1, firms must first choose between retained earnings and payouts in terms of the free cash flows earned from their business operations when making financial decisions. When choosing retained earnings, the firms' next choice is whether to continue to increase cash or to invest in projects. By contrast, when choosing payouts, firms must choose between dividend payments and share repurchases. According to the Modigliani–Miller theorem, the decision to increase firm value is based only on investments in projects with a positive net present value; furthermore, there is indifference between the decision to pay dividends and to repurchase shares (Berk and DeMarzo, 2011).

### 1-1-2. Empirical studies

Why has there been no impact on firm value from payout policy, which has been used for many years in Europe, the United States, and Japan? How do payouts affect firm value in the first place? Is there indifference between dividends and share repurchases, and are they substitutes for the payout method? This study answers these questions and explains the dividend decision mechanism by focusing on the relationship between dividends and profitability. In addition, this study assumes, like the Modigliani–Miller theorem, that payout policy does not affect firm value under a set of assumptions. However, there are various hypotheses that payout policy affects firm value.

First, there is the signaling hypothesis. If firm management as the agent and ownership as the principal are separate entities, then firm information is not uniformly available for both management and owners. Although there is public disclosure of continual firm information, including accounting information, management has inside information and thereby an information advantage. Based on this information asymmetry, which is a market imperfection, the signaling hypothesis is based on the notion that management's future earnings forecasts reflect changes in dividends.[1] However, with regard to share repurchases and the signaling hypothesis, because firms are under no obligation to repurchase shares whenever they are announced and firms do not have to repurchase shares periodically, the degree of repurchase signaling is likely to be lower

[1] See Ambarish *et al*. (1987), Bhattacharya (1979, 1980), Brook *et al*. (1998), Denis *et al*. (1994), Garrett and Priestley (2000), John and Williams (1985), Miller and Rock (1985), and Ross (1977).

than that for dividends.[2] Chang and Puthenpurackal (2014) investigate convertible preferred stock repurchases from 1981 to 2005 in the context of free cash flows and the signaling hypothesis. In particular, the authors find significant improvement in accounting profitability after repurchases, except for low-*Q* firms. These findings are mainly consistent with the signaling hypothesis and might be associated with management entrenchment in terms of revealing the confidence of management in the stock market. In addition, the undervaluation hypothesis appears to be similar to the signaling hypothesis, but indicates to the market that a firm's stock price is undervalued when a firm repurchases its shares.[3] Underleveraged and undervalued firms enjoy significant economic benefits from share repurchases and these firms are more likely to announce share repurchases (Bonaimé *et al*. 2014).

The second hypothesis in which payout policy affects firm value is the free cash flow hypothesis.[4] Although the management of a firm with substantial free cash flows might invest in projects with negative yields and might squander private benefits, the management is able to relieve this problem by repurchasing shares. Fenn and Liang (2001) describe how firms pay out, including repurchases, in order to control the agency cost of free cash flows. Nohel and Tarhan (1998) investigate stock price returns on share repurchase announcement dates and find that repurchases result in an improvement in performance for only low-growth firms, and that these

[2] See Hertzel and Jain (1991), Massa *et al*. (2007), McNally (1999), and Vermaelen (1981, 1984).
[3] See Comment and Jarrell (1991), Huang (2015), and Ikenberry and Vermaelen (1996).
[4] See Eckbo and Verma (1994), Fama and French (2001), Grullon and Michaely (2004), Guay and Harford (2000), Jensen (1986), and Wang *et al*. (2009).

repurchases occur in association with the effective use and sale of assets by focusing mainly on the changes in accounting performance at the time of these share repurchases. These findings are consistent with and support the free cash flow hypothesis.

The third hypothesis in which payout policy affects firm value is the market-timing hypothesis.[5] This indicates that firms enjoy benefits apart from investors by issuing new shares when the stock price is high and by repurchasing shares when it is low. If firms do not want to expropriate wealth from investors, then the market-timing hypothesis lacks support, since firms must not expropriate their wealth. Baker and Wurgler (2002) find that, when market valuations are high, low-leveraged firms raise funds and, when market valuations are low, high-leveraged firms raise funds.

## 1-2. Some issues regarding payout policy

### 1-2-1. Corporate behavior

#### (1) History of European countries and the United States

In recent years, share repurchases by U.S. firms have been based mainly on the payout method (Brav *et al*. 2005). Grullon and Michaely (2002) indicate that share repurchases are not only the most important payout form, but also that the necessary funds are derived from one-time dividend increases by U.S. firms. The authors find that young firms are more likely to pay cash for share repurchases and that share repurchases have become

[5] See Brockman and Chung (2001), Cesari *et al*. (2012), Cook *et al*. (2004), Fried (2005), Ikenberry *et al*. (2000), and Larrain and Urzua (2013).

the preferred form of initiating cash payouts. In addition, Fried (2005) notes that publicly traded companies in the United States and other countries repurchase shares to distribute cash to shareholders more than they use dividends to do so. Jagannathan *et al*. (2000) report that share repurchases are implemented by firms with high temporary non-operating cash flows. By contrast, dividends are paid by firms with high continuous operating cash flows and repurchasing firms have more volatile cash flows and cash distributions. Furthermore, firms repurchase shares after a bear market and increase dividends after a bull market.

The reason that repurchases are preferred to dividends in the United States is mainly based on the belief that repurchases have more flexibility (Jagannathan *et al*. 2000). U.S. firms' free cash flows as a resource for payouts are easily influenced by the business conditions, the economic situation, and the presence or absence of investment opportunities. That is, it is difficult for firms to forecast free cash flows owing to these influences and, thus, it is difficult for firms to forecast payouts.

Dividend-paying firms that decrease their dividends might be faced with such problems as increases in stock return volatility and changes in shareholders (e.g., a pension fund that prefers dividends). Therefore, dividend-paying firms might avoid decreasing their dividends. Brav *et al*. (2005) report in a survey that 94% of dividend-paying firms strongly agree to try to avoid any dividend reductions and that dividend policy should be made conservatively. Management for dividend-paying firms is negatively affected by payouts if their free cash flows decline enough so that it is difficult to continue with dividend payments.

In the cases of share repurchases, firms do not have to continue with their repurchases and they have more flexibility. In addition, even if firms announce the implementation of share repurchases, they do not have to repurchase all of the planned number of shares. In this way, it is believed that repurchases are preferred to dividends owing to the lack of problems with repurchases compared with dividend payments.

In addition, from the perspective of the flexibility of share repurchases, the dividend payment amounts are fixed when determining the amount of payment per share. By contrast, firms can repurchase underpriced shares because they have discretion over the repurchase timing in terms of setting a cap on the repurchasing amount and number of shares. Dittmar and Field (2015) make a comparison between the actual average monthly price paid in a repurchase agreement and the average market price for the same stock over various time horizons. Using a data set of all U.S. repurchases from 2004 to 2011, the authors find that firms repurchase shares at a significantly lower price than the average market price in all sample years. Firms have the potential to repurchase a sizeable number of stock when there is undervaluation of the firms' share prices.

Moreover, when dividend-paying firms also repurchase shares, it results in a dividend reduction corresponding to the shares repurchased and, thus, it can increase the likelihood of a rise in dividends.

Although repurchases are the main payout method in the United States, Allen *et al*. (2000) explain why some firms favor dividend payments over repurchases and suggest that when institutional investors are relatively exempted from taxes compared to individual investors, dividends induce

an “ownership clientele” effect. Grinstein and Michaely (2005) and Jain (2007) find that regular share repurchases are preferred by institutional investors, as the payout method is associated with taxes for shareholders. Berk and DeMarzo (2011) indicate that there is a different time-series rate of taxation for dividends and capital gains in the United States.

Here, I consider factual data in the United States. Table 1-1 shows the data obtained from a report of the S&P Dow Jones Indices about capital distribution, including repurchases by S&P 1500 firms from 1994 through 2013. The first column shows total market value and the second and third columns show the amount of dividends and repurchases, respectively. For comparison, the fourth and fifth columns provide the amount of acquisitions and capital investments, respectively. Although the total amount of payouts decreased around 2009 owing to the influence of the financial crisis, it recovered in recent years from 555 billion dollars in 2009 to 887 billion dollars in 2013. In comparing repurchases with dividends, dividends exceeded repurchases until 1996; however, repurchases exceeded dividends from 1997 to 2013 in terms of monetary amounts. Furthermore, dividends increased gradually over this time period. By contrast, repurchases have high volatility, as they increased sharply from 2004 to 2007 and decreased sharply from 2008 to 2009. The reason for the decline in repurchases in 2008 might be the decrease in free cash flows and the increase in the opacity of future prospects, which were influenced by the financial crisis. This implies that repurchases are more likely to be affected by the business environment.

**Table 1-1. How S&P Composite 1500 firm capital is distributed (USD billion)**

| Year | Market Cap | Dividends | Buybacks | Acquisitions | Capital Expenditure |
|---|---|---|---|---|---|
| 1994 | 12,395 | 110 | 56 | 65 | 351 |
| 1995 | 11,481 | 119 | 87 | 112 | 419 |
| 1996 | 13,911 | 128 | 117 | 115 | 385 |
| 1997 | 19,395 | 136 | 170 | 133 | 428 |
| 1998 | 20,066 | 146 | 195 | 199 | 451 |
| 1999 | 13,695 | 157 | 215 | 234 | 478 |
| 2000 | 12,837 | 156 | 196 | 268 | 522 |
| 2001 | 11,632 | 155 | 172 | 217 | 535 |
| 2002 | 9,013 | 155 | 168 | 143 | 431 |
| 2003 | 11,548 | 171 | 177 | 169 | 409 |
| 2004 | 12,754 | 199 | 257 | 143 | 430 |
| 2005 | 13,247 | 259 | 388 | 220 | 480 |
| 2006 | 14,810 | 258 | 532 | 294 | 576 |
| 2007 | 14,910 | 299 | 673 | 351 | 612 |
| 2008 | 9,153 | 286 | 395 | 249 | 662 |
| 2009 | 11,601 | 255 | 300 | 139 | 513 |
| 2010 | 13,362 | 249 | 337 | 227 | 550 |
| 2011 | 13,225 | 279 | 525 | 302 | 663 |
| 2012 | 14,946 | 330 | 446 | 334 | 724 |
| 2013 | 19,380 | 365 | 522 | 224 | 739 |

Source: S&P Dow Jones Indices, McGraw-Hill Financial Report.

The main repurchase methods in the United States are generally classified into OMR, fixed-price tender offers, and Dutch auctions. Comment and Jarrell (1991) report that the number of announced repurchases is 1,197 cases for OMR, 97 cases for tender offers, and 72 cases for Dutch auctions from 1984 to 1989. OMR appears to be the most popular method. According to Stephens and Weisbach (1998), the main characteristics of OMR is that there is no commitment to repurchasing originally planned

shares, which is in contrast to tender offers and Dutch auctions. That is, the flexibility of repurchases exists only for OMR. Incidentally, Stephens and Weisbach (1998) report that the proportion of planned repurchases of shares to total outstanding shares averaged 7% from 1981 to 1990. According to Akyol *et al*. (2014), another new method—accelerated share repurchases (ASR)—is rapidly growing in popularity, as described described at length in chapter 3. ASR is called the accelerated form, as investment bank contracting with ASR firms provides a large block of their shares.

**(2) History of Japan**

Share repurchases were legally banned in Japan until 1994. Inoue (2010) explicates the nature of the relaxation timeline of the regulations on share repurchases. Repurchases were completely banned after a commercial law was introduced in 1899. Through a commercial law revision in 1938, repurchases were allowed for only (1) retirement stocks, (2) repurchases associated with mergers and acquisitions of businesses, and (3) for the realization of rights.

Another commercial law revision in 1950 allowed share repurchases as an appraisal remedy for dissenting stockholders in mergers and transfers of businesses as a new case, and further revisions in 1966, 1981, and 1994 eased the tight rein on repurchases in a phased manner. However, repurchases required the approval of stockholders at a general meeting, even after the commercial law revision in 1994, and the number of firms announcing repurchases was a mere 23 firms.

Thereafter, a stock options system was introduced based on the United States and a partial provision of the commercial law was enacted as lawmaker-initiated legislation in 1997. The introduction of stock options was determined and special provisions of the commercial law concerning the procedures of stock retirement were enacted as lawmaker-initiated legislation in 1997 (temporary legislation until March 2002). An act on special provisions of the commercial law concerning the procedures of stock retirement based on resolutions of boards of directors under certain circumstances allowed Japanese firms to repurchase and retire shares. The main objective of the foregoing relaxation of regulations on share repurchases was to improve EPS and ROE by reducing the greatly increased number of outstanding shares during the years of the asset-inflated economy. As special measures for firms with weak operating performances and thus, large numbers of outstanding shares and the accumulation of capital reserves through huge equity finance ventures, a partial revision of the act on special provisions of the commercial law concerning the procedure of stock retirement was enacted in March 1998, enabling the repurchase of shares as a resource of capital reserves in excess of the legal reserves by resolution of boards of directors.

Thereafter, in June 2001, a commercial law revision lifted the ban on treasury stocks and repurchases without special purposes. Over the years, there have been bans on repurchases on the grounds of (1) hollowing-out capital (protecting creditors), (2) fairness among shareholders, (3) the manipulation of stock prices, and (4) the prevention of unfair trading for the control rights of a company. However, repurchase

restrictions were substantially relaxed after this point in time. Following the commercial law revision in 2003, the company act was enacted in 2006 and the repurchase restrictions were relaxed in stages.

### 1-2-2. The stock exchange

I provide a brief overview of the Tokyo Stock Exchange Trading Network System (ToSTNeT).[6] Although ASR has been introduced relatively recently in the United States, a repurchasing method similar to ASR was introduced in Japan on January 15, 2008. This is the own-share repurchase trading of the Tokyo Stock Exchange (TSE), which is called the ToSTNeT for Off-Auction Own Share Repurchase Trading (ToSTNeT-3) and is the focus of this thesis, as I discuss in detail later in this section.[7] First, single-stock trading and basket trading (ToSTNeT-1) began on June 29, 1998 and closing-price trading (ToSTNeT-2) began on August 7, 1998. As background to the introduction of the ToSTNeT-1 and ToSTNeT-2, these trading options were introduced by the TSE in order to respond to block trading and basket trading, whose shares were difficult to buy and sell smoothly in auctions of the open stock market.

According to the TSE, single-stock trading of the ToSTNeT-1 enables trade with a specified stock-trading partner at a price within plus or minus 7% of the most recent price in the auction market (when the value is less than 5 yen after multiplying the most recent price by 7%, then the price within plus or minus 5 yen from the most recent price is uniformly

[6] N-NET3 in the Nagoya Stock Exchange has the same structure as the ToSTNeT-3.
[7] See the TSE's web site.

applied). Single-stock traders specify the stock-trading partner, stock name, and quantity, and the trades are executed when there is a match between the bid and ask prices. In addition, in cross-trading between same-stock trading partners, trading is immediately executed at such bid and ask prices. In the ToSTNeT market, by smoothly executing an otherwise difficult trade through blocktrading in the on-auction market, this procedure enables the effect on the auction market to be diminished.

Basket trading in the ToSTNeT-1 is almost identical to single-stock trading, but with the following difference: trade with a specified partner is allowed at a price within plus or minus 5% of the benchmark price, as calculated by the most recent price of the composition in the on-auction market that represents more than 15 issues and more than 100 million yen in trading value.

For single-stock trading, growth is determined by an increase in so-called "dark pools," which are centered on foreign financial institutions. According to the NIKKEI newspaper (March 13, 2011), trading orders from investors within financial institutions are sent to dark pools without going through a stock exchange. In March 2010, the Financial Services Agency revised its guidelines, requiring dark-pool transactions to be brought into the off-auction market, and because such transactions are not required to be brought into the proprietary trading system (PTS), the trading volume of the ToSTNeT-1 seems to have increased. A Bloomberg article (December 27, 2010) states that ToSTNeT trading on the stock exchange represents one-seventh of the total on-auction trading in Japan.

**Table 1-2. ToSTNeT market amounts (billion yen)**

| | ToSTNeT-1 | | ToSTNeT-2 | ToSTNeT-3 | Total |
|---|---|---|---|---|---|
| | Single-stock trading | Basket trading | | | |
| 2008 | 14,816 | 20,439 | 143 | 301 | 35,701 |
| 2009 | 11,408 | 15,028 | 13 | 234 | 26,684 |
| 2010 | 15,927 | 12,584 | 20 | 152 | 28,685 |
| 2011 | 18,784 | 11,626 | 6 | 565 | 30,981 |
| 2012 | 21,881 | 10,999 | 5 | 415 | 33,301 |
| 2013 | 44,970 | 18,022 | 275 | 613 | 63,882 |
| 2014 | 43,124 | 18,331 | 186 | 745 | 62,387 |
| 2015 | 50,464 | 23,227 | 41 | 1,639 | 75,373 |

Source: TSE's web site.

For the ToSTNeT-2, users can participate in trading after confirming the closing price or volume-weighted average price in the on-auction market, and they can trade at the closing price, even for basket orders of minority issues below the standards for basket trading in users' rebalancing portfolios. Even in the case of failure to execute trades in the on-auction market, users can use the ToSTNeT market and repurchase shares via the ToSTNeT-2. Table 1-2 shows the time series for the implementation values of the ToSTNeT market. Although the amount of single-stock trading of the ToSTNeT-1 rose remarkably from 2008 to 2015, such trading on the ToSTNeT-3 also rose compared to the ToSTNeT-2, particularly in 2015.

In reaction to the growing need for greater flexibility in 2008, the ToSTNeT market gained independence from the on-auction market and own-share repurchase trading was introduced in the off-auction ToSTNeT-3. Domestic stocks, foreign stocks, exchange-traded funds (ETF), real

**Table 1-3. Open-market repurchases (OMR) and ToSTNeT-3**

| Item | | OMR | ToSTNeT-3 |
|---|---|---|---|
| Trading time (In 2010) | | 9:00～11:00 | 8:45 |
| | | 12:30～15:00 | |
| Price | | Current | Last close |
| Ways | | Price priority<br>Time priority | Fixed price<br>Non-time priority |
| Trader | Sell | Unspecified number | Unspecified number |
| | Buy | Unspecified number | Issuing company |
| Volume | | Supply and demand | Division when exceed plan |

Source: Author's report based on TSE' web site.

estate investment trusts (REIT), and convertible bonds (CB) listed on the on-auction market are also listed on the ToSTNeT market. The principal difference between the ToSTNeT-2 and ToSTNeT-3 is with regard to repurchases. Buyers are indiscriminate in the ToSTNeT-2, but, by contrast, they are limited to firm-issued shares in the ToSTNeT-3. That is, the ToSTNeT-3 is a trading system specifically for share repurchases. In addition, it is a fairer trading system for investors because the ToSTNeT-3 ensures repurchasing of the lowest mandatory unit of the transactions of sellers, instead of being subject to a time priority. Table 1-3 shows a summary of the main differences between on-auction repurchases and the ToSTNeT-3. Auction repurchases are not recognized when firms actually repurchase their shares in real time. By contrast, the ToSTNeT-3 is recognized as being implemented on the day following the announcement. Therefore, the ToSTNeT-3 appears to be a more transparent system for investors.

Inoue (2010) explains that, according to the Japan Federation of Economic Organizations, there was an unraveling of cross-shareholding proceeds with the introduction of fair-value accounting and a decrease in latent profits in October 1998, after the asset-inflated growth period. Thus, this thesis focuses on unraveling the cross-shareholdings. In addition, this thesis focuses on the manipulation of stock prices, which is a significant reason for the ban on share repurchases. For the ban on the manipulation of stock prices, the Japan Exchange Regulation issued guidelines for share repurchases that mainly focus on (1) persistent repurchasing and stock prices, (2) financial results and end-of-period repurchasing, and (3) repurchasing during the financial periods of issuing shares, among other issues, as well as whether such practices manipulate stock prices and infringe on regulations. Moreover, a cabinet office ordinance regarding regulations on securities transactions stipulates the number of financial instruments, the business operator, the repurchase price and quantity on order, and the buyer nominee (except for the share-issuing company) to prevent illegal trading. In addition, this cabinet office ordinance recognizes the ToSTNeT-3 as an adequate trading method for ensuring fair trade. In this way, share repurchases, which had been legally banned for a long time and are currently carefully controlled, could overcome these problems. The ToSTNeT-3 might be the optimal repurchase method for unraveling cross-shareholdings rather than tender offers, which incur high trading fees. Moreover, by using the ToSTNeT-3, firms with low stock liquidity can repurchase shares.

## 1-3. Summary of each chapter

This thesis proceeds as follows. In chapter 2, this study tests the announcement effect of share repurchases on Japanese stock prices from 2010 to 2013. The chapter documents an average abnormal return of 2.35% on the announcement day among 392 firms listed on the First Section of the TSE that repurchased shares. Abnormal returns appear over 20 trading days following, but not preceding, the announcements. Higher abnormal returns are associated with larger numbers of shares to be repurchased and with firms having smaller market capitalization. Although these results endorse those of earlier studies, this study's original contribution is in empirically confirming different announcement effects for shares repurchased in the open market and via off-floor trading; that is, through ToSTNeT. The announcement effect is lower among the 54% of sampled firms repurchasing via the ToSTNeT, although positive abnormal returns are evident.

In chapter 3, this study discusses stock market share repurchases with prior announcements from the viewpoint of firm management between February 2010 and December 2013. I find that of about 781 share repurchases for firms listed on the First Section of the TSE, lower liquidity firms are likely to use the ToSTNeT-3. This result supports a certainty and immediacy hypothesis associated with stock liquidity. Furthermore, if I focus on the motivations of both the share seller and buyer, I find evidence that management chooses the ToSTNeT-3 by accepting requests from block-holders (mainly general corporations other than financial institutions).

In chapter 4, this study examines the substitution of share repurchases for dividends among Japanese non-financial corporations since 2008. Earlier Japanese studies provide no support for this hypothesis, but my results support it weakly, coinciding with findings that support the hypothesis in U.S. markets. Furthermore, I found stronger substitution effects only among firms repurchasing shares on the open market by examining firms that repurchased shares on Japan's ToSTNeT-3, as reported by the Timely Disclosure Network (TDnet). The results suggest that introducing the ToSTNeT-3 in 2008 stimulated a substitution effect.

In chapter 5, this study investigates how family firms' payout policy, specifically dividend policy, is different from that of non-family firms. Because family firms represent a form of managerial ownership, I test for an effect on dividend policy by comparing them to firms with non-family ownership structures. This study develops a hypothesis that firms with family ownership structures inhibit dividends more than firms with non-family management structures do. The results of my analysis support this hypothesis. I clarify that in firms with family management structures as shareholding characteristics, dividends are inhibited more than in firms with non-family management ownership structures, in favor of pursuing non-market benefits captured by the umbrella term "socioemotional wealth." In addition, I confirm that managerial ownership inhibits the dividend payout ratio in general ROE levels and the marginal effect of managerial ownership on the dividend payout ratio increases with the ownership ratio.

## 2. Comparing announcement effects of two share repurchase methods on Japanese stock prices

### 2-1. Introduction

Japanese firms characteristically have implemented rigid dividend policies; however, they have been compelled to adopt performance-based dividend policies as foreign ownership rises. They have done so since legal prohibitions on share repurchases were lifted in the mid-1990s. A share repurchase involves firms buying their own stock using retained earnings. Along with cash dividends, share repurchases are part of a firm's payout policy to shareholders. Payout policies that include dividends and share repurchases are common in the United States, while in Japan, share repurchases have become important elements of firms' finance policies.

Payout policy is important because it relates to and depends on firms' other financial decisions (Berk and DeMarzo, 2011; Welch, 2009).[8] In addition, theories about capital structure, mergers and acquisitions, asset pricing, and capital budgeting center on why and how firms set payout policies. This study empirically analyzes the effects of share repurchases on the widening use of payout policies by Japanese firms.

Share repurchases by Japanese firms have operated smoothly following revisions to the commercial law in 1994. According to Isagawa (2006), listed companies' share repurchases in 2006 exceeded the total that was paid as cash dividends, although the accounting period was not uniform.

[8] Firms must decide how to use free cash flow either by retaining earnings, including reinvestment, or by distributing them, including via dividends and repurchases.

Share repurchases have expanded payout methods of scale similar to dividend payouts of listed companies. Escalating share repurchases since 2010 have reignited discussions regarding this practice, even though share repurchases diminished following Japan's fallout from the global financial crisis: repurchases in FY2010 totaled ¥1.28 trillion, about one-fourth the level in FY2007.

The announcement effect is an increase in stock prices following a repurchase announcement, and it is confirmed in every country with a stock exchange.[9] Cheng and Hou (2013) find that the percentage of shares repurchased in Taiwan is positively correlated to the announcement effect and the market's response throughout the execution period. Lee *et al*. (2005) and Zhang (2005) document similar results in Korea and Hong Kong, respectively.

Since 2000, a significant body of literature in the fields of finance, accounting, and law has examined the announcement effect of share repurchases by Japanese firms. Yamaguchi (2009) studies the framework for share repurchase announcements in the second paragraph of Article 211 of the pre-Commercial Code revision introduced in September 2003. Examining its effect from January 2004 to September 2005, he reports significant declines in stock prices before repurchase announcements and a price recovery thereafter. These findings are consistent with the market-timing hypothesis, in which firms repurchase stocks when they are temporarily undervalued.[10] Makita (2005) confirms this tendency in an

[9] Refer to Ikenberry *et al*. (1995) in the United States, Crawford and Wang (2011) in the United Kingdom, and Lee *et al*. (2010) in Europe.
[10] For market timing, see Baker and Wurgler (2002), Dittmar and Field (2015), and Ikenberry

examination of announcement effects from 1996 to March 2001. Hatakeda (2005) examines the announcement effect of corporate resolutions concerning buybacks published on the TDnet from October 2001 to December 2002, based on Article 210 of the Commercial Code. The TDnet gathers disclosure releases by listed companies throughout Japan and disseminates information in real time. Regulations require and the TSE encourages Japanese listed companies to broadcast corporate information via the TDnet.

The last three studies mentioned cover approximately 1 decade from the start of share repurchasing in Japan. The present study tests the market-timing hypothesis in accordance with the trend of earlier studies. It adopts event study methodology and measures the announcement effect by cumulative abnormal returns (CARs). Calculations of abnormal return and test statistics in this event study follow MacKinlay (1997). The present study's significant contribution is in empirically documenting the difference in effects when firms repurchase shares via the off-auction mechanism of the ToSTNeT-3, which began in 2008 and is designed for listed companies to reacquire shares. The buy-side is reserved for the company, and sell lots equivalent to buy lots are allocated by TSE-prescribed methods at 8:45 a.m. on the trading day. Repurchases via the ToSTNeT-3 in FY2010 totaled 165.37 billion yen. This study is the first to provide a detailed examination of announcement effects on share repurchases, including the ToSTNeT-3.

The U.S. ASR mechanism resembles the ToSTNeT-3 in speed of execution.

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*et al.* (1995).

Akyol *et al*. (2014) compare announcement effects between ASR and OMR and find that stocks of firms using ASR consistently experienced higher pre-announcement returns. ASR firms continued to outperform OMR during the post-announcement period.

Using recent Japanese data, this study compares the effects of stock buybacks announced as OMR and via the ToSTNeT-3. In addition, this study tests the market-timing hypothesis that OMR can be expected to generate higher stock price reactions than the ToSTNeT-3 is on announcement days because management believes stock prices are undervalued.

The rest of this chapter is organized as follows. Section 2-2 describes the data used in the empirical analysis. Section 2-3 presents the results. Section 2-4 concludes.

## 2-2. Data and Method

Drawing information about release dates and repurchases from the TDnet,[11] I targeted firms that repurchased shares from 2010 to 2013 and extracted the sample for testing the announcement effect using the following methodology.

First, I selected stocks listed on the First Section of the TSE based on daily closing prices for 80 business days preceding the announcement date continuing to 20 business days after.[12] To make the term "declared information" more definite, the sample includes only instances of repurchase announcements published in Nikkei's national press the day

[11] Previous years' data are available on the TSE's web page.
[12] This constraint is analytical, although it might invite survival bias. This study examines only cases that satisfy the relevant conditions, since samples are limited to the First Section of the TSE.

after their declaration. It is necessary to confine the analysis to information that affects share repurchases in order to measure their impact accurately. Therefore, I omit instances wherein earnings, revised earnings forecasts, reports of completed repurchases, stock options, and personnel or organizational changes were released coincidental to the repurchase announcement. This method yielded 392 samples for this study.

Next, I set variables for analyzing the effects of repurchase announcements. $TO(20)$ and $TO(60)$ are trading volumes for 20 and 60 days, respectively, before the announcement measured as a ratio of shares outstanding on the announcement day. $\ln(Market\ Value)$ is the natural logarithm of a stock's price multiplied by the number of common shares outstanding, except own shares. *B/M* is a firm's book value divided by market value on the announcement day. *OD* is a dummy variable that takes 1 if a firm had an outside director during the financial year before its repurchase announcement, and 0 otherwise. *Finance*, *Company*, *Foreigner*, and *Individual* are shareholder ratios of firms in the financial year preceding their repurchase announcements. *ΔFinance*, *ΔCompany*, *ΔForeigner*, and *ΔIndividual* are shareholder ratios during the financial year of the repurchase announcement minus shareholder ratios for the financial year before. *Planned Share* is the ratio of the number of shares intended for repurchase to the number of shares outstanding. *ROE Planned Share* is the ratio of value intended for repurchase to the firm's book value. *Own Share* is the number of shares a firm holds divided by the number outstanding on the announcement day.

Table 2-1 presents information about the 392 samples. Based on

**Table 2-1. Firm characteristics and repurchase characteristics among 392 samples**

Panel A. Sector distribution

| | OMR | ToSTNeT-3 | Total |
|---|---|---|---|
| *Service* | 7 | 12 | 19 |
| *Transportation, Information, & Communication* | 25 | 24 | 49 |
| *Finance & Insurance* | 26 | 24 | 50 |
| *Construction* | 6 | 6 | 12 |
| *Trade* | 32 | 42 | 74 |
| *Fishery, Agriculture, & Forestry* | 1 | 0 | 1 |
| *Manufacturing* | 79 | 103 | 182 |
| *Electric Power & Gas* | 1 | 1 | 2 |
| *Real Estate* | 2 | 1 | 3 |
| Total | 179 | 213 | 392 |

Panel B. Method distribution

| | OMR | ToSTNeT-3 | NA | Total |
|---|---|---|---|---|
| Pre-Method | 33 | 199 | 160 | 392 |
| Post-Method | 179 | 213 | 0 | 392 |

Panel C. Reason

| | OMR | ToSTNeT-3 | Total |
|---|---|---|---|
| *Shareholder and Environment* | 43 | 26 | 69 |
| *Shareholder* | 18 | 13 | 31 |
| *Environment* | 113 | 172 | 285 |
| *Inside* | 5 | 2 | 7 |
| Total | 179 | 213 | 392 |

Panel D. Value

| | | Mean | Min | 1Q | Median | 3Q | Max |
|---|---|---|---|---|---|---|---|
| Start | ToSTNeT-3 | 1,306 | 14 | 166 | 460 | 984 | 21,208 |
| | OMR | 4,370 | 20 | 300 | 800 | 3,000 | 150,000 |
| End | ToSTNeT-3 | 92.3% | 41.1% | 90.0% | 95.8% | 100.0% | 100.0% |
| | OMR | 81.7% | 0.0% | 74.7% | 89.8% | 99.7% | 168.3% |

(*continued*)

Panel E. Shares

| | | Mean | Min | 1Q | Median | 3Q | Max |
|---|---|---|---|---|---|---|---|
| Start | ToSTNeT-3 | 1,649 | 1 | 220 | 720 | 2,000 | 30,000 |
| | OMR | 3,120 | 0.28 | 400 | 1,000 | 3,500 | 42,000 |
| End | ToSTNeT-3 | 93.7% | 41.1% | 91.0% | 98.0% | 100.0% | 100.0% |
| | OMR | 84.9% | 0.0% | 78.0% | 95.7% | 100.0% | 168.4% |

industrial sector, Panel A disaggregates the number of shares repurchased in the open market and via the ToSTNeT-3. *Manufacturing* firms repurchased the most shares and made greater use of the ToSTNeT-3. Firms in sectors *Trade*, *Finance* & *Insurance*, and *Transportation*, *Information*, & *Communication* frequently repurchased shares, albeit with no clear preference between the ToSTNeT-3 and open-market purchases.

Panel B of Table 2-1 indicates repurchases by method. Pre-Method indicates the repurchase method specified in the announcement. Intention to use the ToSTNeT-3 can be confirmed with certainty because it is definitively announced. It is expected that the remainder of repurchases were open-market purchases during a specified purchasing period. Panel B shows that 33 shares were repurchased in the open market. Post-Method indicates how shares were repurchased at the end of the repurchase period. It is unclear whether late-stage OMR were planned in advance. Some firms initiated late-stage repurchases via the ToSTNeT-3.

Based on the TDnet, I identify four reasons that firms repurchased shares via the respective mechanisms. The first reason, "*Environment*," means that share repurchases are selected to improve capital efficiency and to implement flexible capital management policy in accordance with change

of business environment. The second reason, "*Shareholder*," means that share repurchases are selected to increase shareholders' value through improved EPS and ROE. The third reason, "*Shareholder and Environment*," includes both the first and second reasons. The fourth reason, "*Inside*," includes stock options and so on. Panel C shows that *Environment* is used in the ToSTNeT-3 repurchases as the stated reason for OMR, whereas *Shareholder* dominates as a result of the ToSTNeT-3 repurchases.

The upper portion of Panels D and E shows maximum cash expenditure and the number of shares repurchased in the open market and via the ToSTNeT-3 indicated in the repurchase announcement. These upper limits of Panels D and E are the ceiling on the total amount of repurchases (in million yen) and the number of shares repurchased, respectively. The upper portion of Panels D and E indicates planned upper expenditure limits and the number of repurchased shares, respectively. The lower portion of Panels D and E shows the achievement rate—that is, the percentages of planned repurchase expenditure and actual numbers of shares purchased. OMR sometimes exceed 100% in both categories because a subsequent circumstance increased the respective quantities. For OMR, expenditure and the number of shares were on average approximately 80% and 85%, respectively, of the announced amounts. Each mean value for purchases via the ToSTNeT-3 exceeds 90%. The median value for the achievement rate is higher. Planned OMR do not always go smoothly, as minimum values indicate.

Tables 2-2 and 2-3 present summary statistics and cross-correlations, respectively, of the explanatory variables. *TO*(20), *TO*(60), and ln(*Market Value*)

**Table 2-2. Explanatory variables**

| | OMR | | ToSTNeT-3 | | All | |
|---|---|---|---|---|---|---|
| | Mean | Median | Mean | Median | Mean | Median |
| *TO*(20) | 9.71% | 4.26% | 5.48% | 2.45% | 7.41% | 3.20% |
| *TO*(60) | 25.65% | 13.30% | 13.73% | 7.61% | 19.17% | 10.08% |
| ln(*Market Value*) | 24.83 | 24.38 | 24.21 | 24.17 | 24.50 | 24.27 |
| *B/M* | 1.38 | 1.25 | 1.41 | 1.28 | 1.40 | 1.27 |
| *Finance* | 26.22% | 27.35% | 26.30% | 26.02% | 26.26% | 26.09% |
| *Company* | 21.14% | 19.44% | 24.48% | 23.58% | 22.96% | 21.74% |
| *Foreigner* | 14.38% | 10.46% | 10.16% | 7.45% | 12.09% | 8.66% |
| *Individual* | 36.32% | 32.76% | 37.55% | 36.10% | 36.99% | 34.72% |
| *ΔFinance* | −1.10% | −0.90% | −0.95% | −0.91% | −1.02% | −0.90% |
| *ΔCompany* | 0.66% | 0.00% | −0.65% | −0.09% | −0.05% | −0.02% |
| *ΔForeigner* | 0.05% | 0.22% | 0.84% | 0.49% | 0.48% | 0.36% |
| *ΔIndividual* | 0.39% | 0.64% | 0.78% | 0.39% | 0.60% | 0.50% |
| *Planned Share* | 1.95% | 1.46% | 2.66% | 1.25% | 2.34% | 1.38% |
| *ROE Planned Share* | 2.35% | 1.50% | 2.66% | 0.90% | 2.52% | 1.17% |
| *Own Share* | 4.69% | 3.15% | 4.25% | 2.67% | 4.45% | 3.00% |

*TO*(20) and *TO*(60) are trading volumes for 20 and 60 days before the repurchase announcement, respectively, as a ratio of shares outstanding on announcement day. ln(*Market Value*) is the natural logarithm of stock price multiplied by the number of common shares outstanding, excluding own shares. *B/M* is a firm's book value divided by market value measured on the announcement day. *OD* is a dummy variable that takes a value of 1 if firms had outside directors during the financial year preceding repurchase announcements and 0 otherwise. *Finance*, *Company*, *Foreigner*, and *Individual* are shareholding ratios of repurchasing firms for the financial year preceding their repurchase announcements. *ΔFinance*, *ΔCompany*, *ΔForeigner*, and *ΔIndividual* are shareholding ratios for the financial year in which the repurchase is announced minus those for the financial year before the announcement. *Planned Share* is the ratio of shares intended for repurchase to the number of outstanding shares. *ROE Planned Share* is the ratio of share value intended for repurchase to a firm's book value. *Own Share* is a firm's own shareholding ratio on the announcement day.

for market repurchases are higher than for the ToSTNeT-3. Foreign investors (*Foreigner*) have a stronger presence among firms repurchasing in the open market than via ToSTNeT-3 firms. *Company* and *Individual* have more

**Table 2-3. Correlations**

| | a. | b. | c. | d. | e. | f. | g. | h. | i. | j. | k. | l. | m. | n. | o. | p. |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| a. *TO*(20) | 1.00 | | | | | | | | | | | | | | | |
| b. *TO*(60) | 0.95 | 1.00 | | | | | | | | | | | | | | |
| c. ln(*Market Value*) | 0.08 | 0.15 | 1.00 | | | | | | | | | | | | | |
| d. *B/M* | −0.17 | −0.23 | −0.38 | 1.00 | | | | | | | | | | | | |
| e. *OD* | 0.10 | 0.12 | 0.15 | −0.09 | 1.00 | | | | | | | | | | | |
| f. *Finance* | −0.02 | 0.00 | 0.32 | 0.22 | 0.02 | 1.00 | | | | | | | | | | |
| g. *Company* | −0.11 | −0.18 | −0.06 | 0.06 | −0.02 | −0.26 | 1.00 | | | | | | | | | |
| h. *Foreigner* | 0.11 | 0.20 | 0.70 | −0.27 | 0.19 | 0.14 | −0.32 | 1.00 | | | | | | | | |
| i. *Individual* | 0.02 | 0.00 | −0.63 | −0.02 | −0.13 | −0.55 | −0.40 | −0.49 | 1.00 | | | | | | | |
| j. *ΔFinance* | 0.10 | 0.09 | −0.06 | −0.13 | 0.10 | −0.28 | 0.04 | −0.04 | 0.17 | 1.00 | | | | | | |
| k. *ΔCompany* | −0.02 | −0.03 | −0.03 | −0.01 | −0.04 | −0.04 | −0.14 | −0.02 | 0.15 | −0.13 | 1.00 | | | | | |
| l. *ΔForeigner* | 0.06 | 0.09 | −0.03 | −0.04 | 0.00 | 0.09 | −0.02 | −0.11 | 0.01 | −0.20 | −0.17 | 1.00 | | | | |
| m. *ΔIndividual* | −0.08 | −0.07 | 0.06 | 0.11 | −0.01 | 0.13 | 0.12 | 0.09 | −0.24 | −0.35 | −0.69 | −0.29 | 1.00 | | | |
| n. *Planned Share* | 0.00 | 0.00 | −0.14 | −0.02 | 0.08 | −0.18 | 0.04 | −0.05 | 0.12 | −0.09 | −0.35 | 0.02 | 0.37 | 1.00 | | |
| o. *ROE Planned Share* | 0.04 | 0.07 | −0.03 | −0.31 | 0.08 | −0.25 | −0.03 | 0.08 | 0.14 | 0.00 | −0.26 | 0.00 | 0.23 | 0.72 | 1.00 | |
| p. *Own Share* | −0.06 | −0.06 | 0.01 | −0.12 | −0.04 | −0.22 | −0.10 | 0.01 | 0.22 | −0.02 | 0.06 | −0.02 | −0.03 | 0.00 | 0.02 | 1.00 |

shares among ToSTNeT-3 firms than market repurchase firms. *ΔCompany* is negatively correlated to the ToSTNeT-3 and positively correlated to market repurchases, suggesting that the ToSTNeT-3 is used to dissolve crossholdings among companies. Changes in foreign ownership (*ΔForeigner*) via the ToSTNeT-3 are relatively high, implying that overseas investors (*Foreigner*) use it to add holdings. *Planned Share* and *ROE Planned Share* among firms using the ToSTNeT-3 exceed those for firms using market repurchases. Thus, share repurchases via the ToSTNeT-3 tend to be larger than market repurchases. *Own Share* is higher for market repurchases than for the ToSTNeT-3, suggesting that market repurchases might be frequent.

*TO*(20), *TO*(60), and *Own Share* are correlated more strongly with OMR than with ToSTNeT-3 repurchases. Furthermore, correlations with market values are greater for OMR than for ToSTNeT-3 repurchases. The shareholder ratio is higher among firms repurchasing shares via the ToSTNeT-3 than among firms conducting OMR. By contrast, the correlation with *Foreigner* is higher among firms conducting OMR than among firms using the ToSTNeT-3. Examining changes in shareholder ratios reveals that correlations with *ΔFinance* decrease for both mechanisms.

## 2-3. Event study for the announcement effect

### 2-3-1. Model

Calculations of abnormal returns in the event study and test statistic follow MacKinlay (1997). The methodology is as follows. First, the model's parameter estimation period, which describes a normal expected return unconditioned on whether the event occurs, is $L_1$ days from $(T_0 + 1)$ to $T_1$.

This period is the estimation window (Figure 2-1). The period for the calculated abnormal return is $L_2$ days from $(T_1 + 1)$ to $T_2$, including the event time $(t = 0)$. This period is the event window. $N$ is the number of event study cases. $N$ return vectors on any day $t$ independently follow a multivariate normal distribution with mean $\boldsymbol{\mu}$ and covariance matrix $\boldsymbol{\Omega}$.

The following model describes a normal market return.[13]

$$\mathbf{R}_i = \mathbf{X}_i\boldsymbol{\theta}_i + \varepsilon_i, i = 1, 2, \ldots, N, \quad (2\text{-}1)$$

where $\mathbf{R}_i$ is an $(L_1 \times 1)$ vector of estimation-window returns and $\mathbf{X}_\mathbf{i}$ is an $(L_1 \times 2)$ matrix with a vector with the value of 1 in the first column. The vector of market return observations in the second column, $\boldsymbol{\theta}_i$ is the $(2 \times 1)$ parameter vector. $\varepsilon_i$ is the $(L_1 \times 1)$ residual error vector.

Abnormal return in the event window is calculated by the following expression using $\widehat{\boldsymbol{\theta}}_i$ and estimated by least squares from expression (2-1).

$$\hat{\varepsilon}_i^* = \mathbf{R}_i^* - \mathbf{X}_i^*\widehat{\boldsymbol{\theta}}_i, i = 1, 2, \ldots, N, \quad (2\text{-}2)$$

where the superscript * indicates the series scale with the event window. $\hat{\varepsilon}_i^*$ is conditioned on the explanatory variable and complies with the following distribution:

$$\hat{\varepsilon}_i^* | \mathbf{X}_i^* \sim N(0, \mathbf{V}_i) \text{ where } \mathbf{V}_i = \mathbf{I}\sigma_{\varepsilon_i}^2 + \mathbf{X}_i^*[\mathbf{X}_i'\mathbf{X}_i]^{-1}\mathbf{X}_i^{*\prime}\sigma_{\varepsilon_i}^2. \quad (2\text{-}3)$$

MacKinlay (1997) builds on this result and considers an aggregation of abnormal returns. $\mathrm{CAR}_i(\tau_1, \tau_2)$ is defined as the CAR for event $i$ from $\tau_1$ to $\tau_2$ where $T_1 + 1 \leq \tau_1 \leq \tau_2 \leq T_2$. $\gamma$ is an $(L_2 \times 1)$ vector with a value of 1 in the positions of $\tau_1 - T_1$ to $\tau_2 - T_1$ and 0 elsewhere. Then, the CAR, $(\mathrm{CAR}_i(\tau_1, \tau_2))$, is expressed as

[13] As MacKinlay (1997) emphasizes, the model selection (e.g., the constant mean return model, capital asset pricing model, and the multifactor model) has no significant effect on the results of the event study, mostly because several event studies are used in the daily data and the estimation period is short.

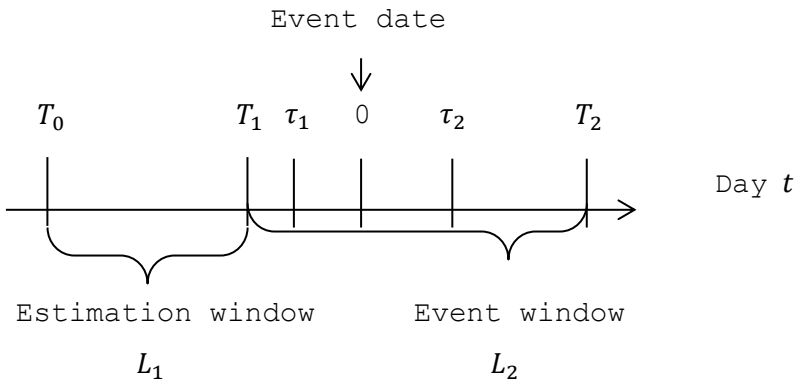


**Figure 2-1. Timeline for an event study**

$$\mathrm{CAR}_i(\tau_1,\tau_2) = \gamma'\hat{\varepsilon}_i^* \sim N(0, \gamma'\mathbf{V}_i\gamma). \quad (2\text{-}4)$$

Furthermore, CAR is aggregated in each event. For the cumulative average abnormal return, I obtain

$$\overline{\mathrm{CAR}}(\tau_1,\tau_2) = \frac{1}{N}\sum_{i=1}^{N}\gamma'\hat{\varepsilon}_i^* \sim N\left(0, \frac{1}{N^2}\sum_{i=1}^{N}\gamma'\mathbf{V}_i\gamma\right). \quad (2\text{-}5)$$

However, it is necessary to assume no correlation between the abnormal returns corresponding to the different events.[14]

### 2-3-2. Hypotheses

This study defines the announcement date ($t = 0$) as instances in which repurchases are announced by 3:00 p.m. Let the null hypothesis be $\overline{CAR}(\tau_1,\tau_2) = 0$ and the alternative hypothesis be $\overline{CAR}(\tau_1,\tau_2) > 0$, where $\overline{CAR}(\tau_1,\tau_2)$ denotes cumulative abnormal return from day $\tau_1$ to day $\tau_2$. According to Manconi *et al.* (2014), the market-timing hypothesis proposes that management repurchases stock because of a belief that the stock is undervalued. It is expected that $\overline{CAR}(\tau_1,\tau_2) < 0$ for $\tau_2 < 0$ and $\overline{CAR}(\tau_1,\tau_2) > 0$

[14] It is necessary to modify this assumption when the event is crowded. As the event in this study has a comparatively wide distribution, this assumption garners a degree of support.

for $\tau_1 \geq 0$ if the market-timing hypothesis holds.

In addition, this study examines different purchasing mechanisms. Given that firms can repurchase shares in the open market and via the ToSTNeT, I confirm the use of the ToSTNeT by the timeline. Corporate boards announce share repurchases and place their bids via the ToSTNeT-3 on the same day. Shareholders decide whether to accept the bid by 8:00 a.m. the next day and submit their sell orders through the ToSTNeT-3. Transactions occur at the closing price determined at 3:15 p.m., and trading information is registered via the TDnet at 3:30 p.m. Transactions are executed according to a predetermined method, and the results are registered on the TDnet at 8:45 a.m. of the following day. Repurchases via the ToSTNeT-3 are concluded before the TSE opens at 9:00 a.m. The ToSTNeT-3 mechanism distributes repurchased shares accounting to allocations prescribed by the TSE at 8:45 a.m. that day.[15]

Because the ToSTNeT-3 has finished repurchasing shares before the market opens, the market impact of the ToSTNeT-3 might be weak. By contrast, while actual repurchasing prices are not announced with OMR, the share prices will increase on the announcement day, because from the market-timing hypothesis, investors expect future prices to rise.[16] That is, the null hypothesis is $CAR_{market} = CAR_{ToSTNeT}$ and the alternate hypothesis is $CAR_{market} > CAR_{ToSTNeT}$.

[15] Repurchases via the ToSTNeT-2 (closing price trading) are infrequent. One difference between the ToSTNeT-3 and ToSTNeT-2 is that the latter does not reserve the buy-side for the repurchasing corporation.
[16] Takahashi and Tokunaga (2015) investigate how managers choose among methods of stock repurchases.

### 2-3-3. Results of empirical analysis

Figure 2-2 indicates cumulative daily abnormal returns for OMR, the ToSTNeT-3, and All for a period of 20 days on either side of the event date. Table 2-4 shows the results. The *CAR* for All on the event date is 2.35% and is statistically significant at 0.1%. This result confirms the market-timing hypothesis. The decline in stock prices seems greater than that for share repurchases examined in earlier studies. The $CAR$ for OMR declined significantly (−2.27%) during the period starting 20 days before the event date, whereas Yamaguchi (2009) reports a maximum −1.3% decline for the period beginning 15 days before the event ($t$ = −15). Using data spanning 1996–2001, Makita (2005) documents statistically significant CARs of −2.47% (−1.36%) for the period 2–20 days (10 days) prior. Depending on the period, however, the data include instances of no negative returns the day before the event date. Nonetheless, Makita (2005) notes there is always a positive abnormal return on the event date and denies that share repurchases signal firms' beliefs that their stocks are undervalued. This study's results support his conclusion. In addition, Hatakeda's (2005) results are not statistically significant, although he shows $CAR$ to be $CAR(-20,-1) < 0$.

Arguably, the effect is not short term, as the $CAR$ for All is 1.74% over the 20 days after the event date. As Figure 2-2 shows, $CAR$ rises at a nearly constant rate over the 20 days following the event date. Given efficient markets, the announcement effect should be immediate on the

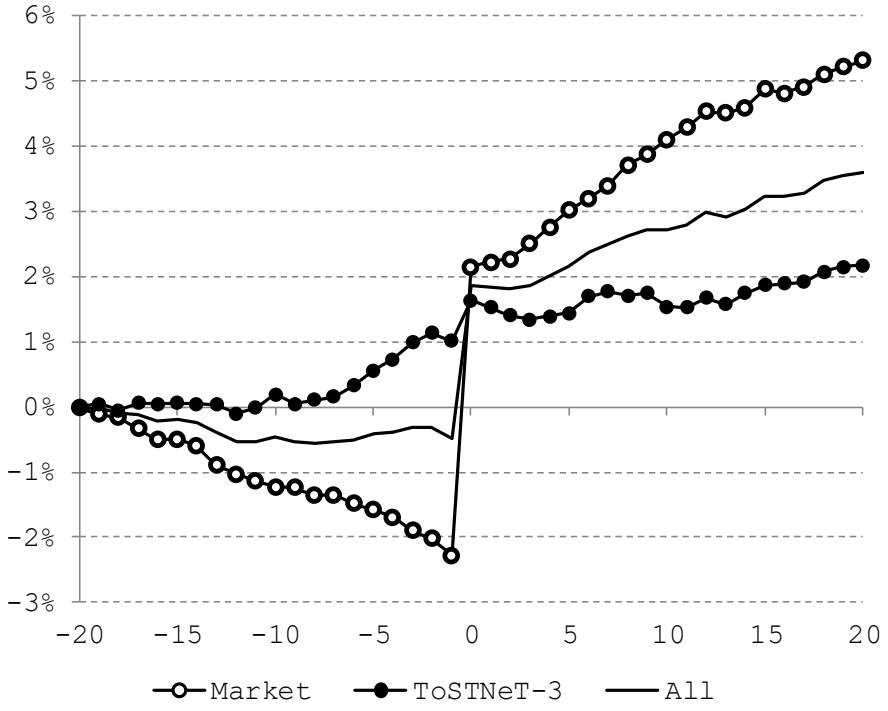


**Figure 2-2. Cumulative abnormal returns for open-market and ToSTNeT-3 repurchases**

**Table 2-4. Cumulative abnormal returns**

| | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) |
|---|---|---|---|---|
| All | 392 | −0.48% | 2.35% | 1.74% |
| | | (−0.94) | (13.70) | (4.30) |
| OMR | 179 | −2.27% | 4.42% | 3.17% |
| | | (−3.04) | (17.24) | (4.73) |
| ToSTNeT-3 | 213 | 1.02% | 0.61% | 0.54% |
| | | (1.46) | (4.10) | (1.14) |
| Difference | | −3.29% | 3.81% | 2.63% |
| | | (−3.21) | (13.30) | (3.28) |

Note: *t*-statistics are shown in parentheses.

event date, and a 20-day rise in *CAR* appears inconsistent with the efficient-market hypothesis.

There is a statistically significant difference of 3.81% in *CAR* on

the announcement day between repurchases in the open market and ToSTNeT-3. *CAR* for OMR drops rapidly over the pre-announcement period, whereas *CAR* for the ToSTNeT-3 rises 7 days prior to the announcement day, albeit insignificantly. For both $CAR(-20,-1)$ and $CAR(1,20)$, the difference between the two repurchase mechanisms is statistically significant. These results indicate market repurchases are consistent with the market-timing hypothesis because $CAR(-20,-1)<0$, $CAR(0,0)>0$, and $CAR(1,20)>0$. However, the results for the ToSTNeT-3 are inconsistent with the market-timing hypothesis in the case of $CAR(-20,-1)>0$, although $CAR(0,0)>0$.

Table 2-5 indicates the results of *CARs* for the 392 samples of each category sorted by the bottom 30% and the top 30% following Fama and French (1996), and thus, *Low* and *High* comprise 117 samples.[17] Higher *Planned Share* ratios are associated with higher abnormal returns on announcement day in three instances, albeit at 10% significance for the ToSTNeT-3. In three instances, smaller $\ln(Market\ Value)$ is associated with greater abnormal returns on the announcement day, which persists after the announcement among firms conducting OMR. In three instances, higher *ROE Planned Share* and *B/M* display greater effects on the announcement day, but the results for *B/M* attain only 10% significance among firms using the ToSTNeT-3. A higher $TO(20)$ is associated with greater effects among firms conducting OMR.

With regard to ownership structure, lower shareholder ratios for *Finance* and *Foreigner* display greater effects for all repurchases and OMR on the announcement day. A higher percentage of individual ownership is

[17] $TO(60)$ is excluded from this analysis because it is similar in result to $TO(20)$ and its explanatory power is relatively lower. *OD* is also excluded because of dummy variable.

## Table 2-5. Cumulative abnormal returns in different categories

| | All | | | | OMR | | | | ToSTNeT-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) |
| Panel A. *TO*(20) | | | | | | | | | | | | |
| 1 (Low) | 117 | −0.46% | 2.45% | 2.28% | 40 | −2.14% | 5.40% | 3.63% | 77 | 0.41% | 0.91% | 1.58% |
| | | (−0.77) | (6.55) | (3.91) | | (−1.90) | (7.32) | (3.11) | | (0.61) | (3.07) | (2.48) |
| 3 (High) | 117 | 0.60% | 2.27% | 0.94% | 68 | −2.82% | 3.67% | 1.44% | 49 | 5.34% | 0.34% | 0.25% |
| | | (0.43) | (7.92) | (1.24) | | (−1.85) | (11.28) | (1.43) | | (2.19) | (0.93) | (0.22) |
| Difference (3-1) | | 1.06% | −0.17% | −1.33% | | −0.68% | −1.73% | −2.18% | | 4.92% | −0.57% | −1.32% |
| | | (0.70) | (−0.36) | (−1.39) | | (−0.31) | (−2.46) | (−1.37) | | (2.32) | (−1.19) | (−1.08) |
| Panel B. ln(*MV*) | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.62% | 2.90% | 3.09% | 44 | −3.14% | 5.99% | 6.31% | 73 | 2.89% | 1.03% | 1.15% |
| | | (0.47) | (7.17) | (3.48) | | (−1.53) | (8.36) | (3.28) | | (1.70) | (3.13) | (1.52) |
| 3 (High) | 117 | −1.63% | 1.85% | 0.89% | 71 | −2.07% | 3.21% | 1.41% | 46 | −0.94% | −0.25% | 0.09% |
| | | (−2.26) | (7.38) | (1.48) | | (−2.10) | (12.43) | (1.86) | | (−0.93) | (−0.85) | (0.09) |
| Difference (3-1) | | −2.25% | −1.05% | −2.20% | | 1.06% | −2.78% | −4.91% | | −3.83% | −1.28% | −1.06% |
| | | (−1.49) | (−2.21) | (−2.05) | | (0.52) | (−4.27) | (−2.74) | | (−1.68) | (−2.69) | (−0.86) |
| Panel C. *B/M* | | | | | | | | | | | | |
| 1 (Low) | 117 | −0.36% | 1.89% | 1.34% | 56 | −2.24% | 3.65% | 2.98% | 61 | 1.36% | 0.28% | −0.16% |
| | | (−0.31) | (6.61) | (1.55) | | (−1.59) | (8.53) | (1.98) | | (0.76) | (1.14) | (−0.18) |
| 3 (High) | 117 | 0.16% | 2.99% | 3.16% | 50 | −1.26% | 5.50% | 5.22% | 67 | 1.22% | 1.12% | 1.63% |
| | | (0.19) | (7.97) | (4.72) | | (−0.83) | (9.66) | (5.13) | | (1.35) | (3.13) | (1.92) |
| Difference (3-1) | | 0.52% | 1.10% | 1.82% | | 0.98% | 1.85% | 2.24% | | −0.14% | 0.84% | 1.78% |
| | | (0.37) | (2.33) | (1.66) | | (0.48) | (2.63) | (1.21) | | (−0.07) | (1.90) | (1.44) |
| Panel D. *Finance* | | | | | | | | | | | | |
| 1 (Low) | 117 | −1.67% | 3.07% | 2.33% | 56 | −4.85% | 5.77% | 4.63% | 61 | 1.25% | 0.60% | 0.22% |
| | | (−1.28) | (7.63) | (2.66) | | (−3.05) | (10.34) | (3.21) | | (0.63) | (1.69) | (0.23) |
| 3 (High) | 117 | 0.52% | 2.04% | 1.81% | 54 | −0.25% | 3.69% | 3.25% | 63 | 1.18% | 0.63% | 0.58% |
| | | (0.78) | (8.42) | (3.26) | | (−0.25) | (10.67) | (4.33) | | (1.32) | (2.91) | (0.74) |
| Difference (3-1) | | 2.19% | −1.03% | −0.52% | | 4.60% | −2.08% | −1.38% | | −0.08% | 0.03% | 0.36% |
| | | (1.50) | (−2.20) | (−0.50) | | (2.44) | (−3.14) | (−0.84) | | (−0.04) | (0.06) | (0.29) |
| Panel E. *Company* | | | | | | | | | | | | |
| 1 (Low) | 117 | −2.08% | 3.19% | 2.22% | 66 | −3.67% | 4.79% | 3.45% | 51 | −0.03% | 1.11% | 0.64% |
| | | (−2.06) | (8.66) | (2.39) | | (−2.44) | (10.11) | (2.48) | | (−0.02) | (2.55) | (0.57) |
| 3 (High) | 117 | 0.06% | 2.25% | 0.92% | 53 | −1.75% | 4.39% | 1.79% | 64 | 1.56% | 0.47% | 0.20% |
| | | (0.07) | (7.65) | (1.34) | | (−1.45) | (11.08) | (1.64) | | (1.37) | (1.75) | (0.23) |
| Difference (3-1) | | 2.14% | −0.94% | −1.30% | | 1.92% | −0.39% | −1.66% | | 1.58% | −0.64% | −0.44% |
| | | (1.63) | (−1.99) | (−1.13) | | (0.96) | (−0.62) | (−0.91) | | (0.94) | (−1.30) | (−0.31) |

Note: *t*−statistics are shown in parentheses.

(*continued*)

| | All | | | | OMR | | | | ToSTNeT-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) |
| Panel F. *Foreigner* | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.41% | 3.08% | 1.73% | 44 | −2.41% | 6.65% | 3.49% | 73 | 2.11% | 0.93% | 0.67% |
| | | (0.35) | (7.40) | (2.74) | | (−2.07) | (9.69) | (3.01) | | (1.26) | (2.84) | (0.94) |
| 3 (High) | 117 | −1.83% | 2.16% | 1.24% | 67 | −3.23% | 3.46% | 2.64% | 50 | 0.05% | 0.42% | −0.65% |
| | | (−2.37) | (8.58) | (1.92) | | (−2.99) | (11.81) | (3.44) | | (0.05) | (1.41) | (−0.62) |
| Difference (3−1) | | −2.24% | −0.92% | −0.49% | | −0.82% | −3.19% | −0.84% | | −2.06% | −0.51% | −1.32% |
| | | (−1.62) | (−1.90) | (−0.55) | | (−0.50) | (−4.82) | (−0.63) | | (−0.93) | (−1.10) | (−1.08) |
| Panel G. *Individual* | | | | | | | | | | | | |
| 1 (Low) | 117 | −0.23% | 1.81% | 1.21% | 59 | −0.80% | 3.21% | 1.24% | 58 | 0.35% | 0.38% | 1.18% |
| | | (−0.33) | (7.29) | (2.02) | | (−0.79) | (10.40) | (1.51) | | (0.38) | (1.31) | (1.35) |
| 3 (High) | 117 | −0.87% | 3.08% | 2.77% | 49 | −3.63% | 5.96% | 5.24% | 68 | 1.12% | 1.00% | 1.00% |
| | | (−0.66) | (7.85) | (2.87) | | (−1.85) | (9.69) | (2.83) | | (0.65) | (3.04) | (1.06) |
| Difference (3−1) | | −0.64% | 1.27% | 1.57% | | −2.83% | 2.75% | 4.00% | | 0.77% | 0.62% | −0.18% |
| | | (−0.43) | (2.74) | (1.38) | | (−1.34) | (4.20) | (2.09) | | (0.38) | (1.41) | (−0.14) |
| Panel H. *ΔFinance* | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.63% | 2.22% | 1.97% | 51 | 0.84% | 4.40% | 3.70% | 66 | 0.47% | 0.53% | 0.63% |
| | | (0.84) | (7.46) | (2.79) | | (0.64) | (9.93) | (3.44) | | (0.54) | (2.13) | (0.70) |
| 3 (High) | 117 | 0.14% | 2.19% | 2.61% | 55 | −3.14% | 3.88% | 4.34% | 62 | 3.05% | 0.70% | 1.08% |
| | | (0.11) | (7.76) | (3.00) | | (−2.15) | (8.81) | (2.86) | | (1.59) | (2.93) | (1.19) |
| Difference (3−1) | | −0.50% | −0.02% | 0.64% | | −3.98% | −0.52% | 0.64% | | 2.57% | 0.17% | 0.45% |
| | | (−0.34) | (−0.06) | (0.57) | | (−2.01) | (−0.84) | (0.34) | | (1.25) | (0.49) | (0.35) |
| Panel I. *ΔCompany* | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.02% | 1.85% | 0.52% | 39 | −1.05% | 3.78% | 0.00% | 78 | 0.56% | 0.88% | 0.77% |
| | | (0.02) | (6.29) | (0.76) | | (−0.61) | (7.75) | (0.00) | | (0.55) | (2.79) | (0.96) |
| 3 (High) | 117 | 0.14% | 2.51% | 2.93% | 58 | −2.10% | 4.69% | 4.95% | 59 | 2.34% | 0.36% | 0.95% |
| | | (0.13) | (8.08) | (4.33) | | (−1.72) | (10.93) | (4.41) | | (1.30) | (1.72) | (1.39) |
| Difference (3−1) | | 0.12% | 0.66% | 2.41% | | −1.05% | 0.92% | 4.94% | | 1.79% | −0.53% | 0.17% |
| | | (0.08) | (1.54) | (2.51) | | (−0.51) | (1.39) | (2.87) | | (0.92) | (−1.29) | (0.16) |
| Panel J. *ΔForeigner* | | | | | | | | | | | | |
| 1 (Low) | 117 | −3.14% | 3.08% | 2.37% | 69 | −4.44% | 4.75% | 3.71% | 48 | −1.28% | 0.67% | 0.44% |
| | | (−3.85) | (8.27) | (3.32) | | (−3.77) | (10.51) | (3.73) | | (−1.27) | (1.50) | (0.47) |
| 3 (High) | 117 | 1.10% | 1.92% | 1.23% | 47 | 0.52% | 3.46% | 2.71% | 70 | 1.49% | 0.89% | 0.24% |
| | | (1.35) | (7.97) | (1.40) | | (0.35) | (9.35) | (1.56) | | (1.58) | (3.53) | (0.27) |
| Difference (3−1) | | 4.25% | −1.16% | −1.13% | | 4.96% | −1.29% | −0.99% | | 2.77% | 0.22% | −0.20% |
| | | (3.67) | (−2.61) | (−1.00) | | (2.65) | (−2.06) | (−0.53) | | (1.96) | (0.45) | (−0.15) |

Note: *t*−statistics are shown in parentheses.

(*continued*)

| | All | | | | OMR | | | | ToSTNeT-3 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) | N | *CAR*(−20, −1) | *CAR*(0, 0) | *CAR*(1, 20) |
| Panel K. *ΔIndividual* | | | | | | | | | | | | |
| 1 (Low) | 117 | −0.29% | 2.33% | 2.23% | 52 | −3.49% | 4.62% | 3.63% | 65 | 2.27% | 0.50% | 1.12% |
| | | (−0.25) | (7.62) | (2.37) | | (−2.47) | (9.92) | (2.05) | | (1.33) | (2.26) | (1.21) |
| 3 (High) | 117 | −0.04% | 2.70% | 1.53% | 56 | 0.10% | 4.57% | 2.64% | 61 | −0.16% | 0.98% | 0.51% |
| | | (−0.04) | (8.49) | (2.38) | | (0.08) | (11.66) | (3.06) | | (−0.17) | (2.60) | (0.55) |
| Difference (3−1) | | 0.25% | 0.36% | −0.70% | | 3.59% | −0.06% | −0.99% | | −2.44% | 0.48% | −0.60% |
| | | (0.18) | (0.82) | (−0.62) | | (1.87) | (−0.09) | (−0.51) | | (−1.21) | (1.11) | (−0.46) |
| Panel L. *ROE Planned Share* | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.27% | 1.22% | 2.09% | 43 | −2.06% | 3.05% | 2.92% | 74 | 1.62% | 0.15% | 1.60% |
| | | (0.25) | (5.78) | (2.79) | | (−1.56) | (8.80) | (1.86) | | (1.10) | (0.90) | (2.12) |
| 3 (High) | 117 | −1.11% | 3.15% | 1.39% | 63 | −3.38% | 5.01% | 2.75% | 54 | 1.53% | 0.99% | −0.20% |
| | | (−1.07) | (8.73) | (1.63) | | (−2.28) | (11.24) | (2.10) | | (1.11) | (2.31) | (−0.20) |
| Difference (3−1) | | −1.38% | 1.93% | −0.70% | | −1.32% | 1.96% | −0.16% | | −0.10% | 0.83% | −1.80% |
| | | (−0.93) | (4.62) | (−0.61) | | (−0.63) | (3.21) | (−0.08) | | (−0.05) | (2.00) | (−1.46) |
| Panel M. *Planned Share* | | | | | | | | | | | | |
| 1 (Low) | 117 | −0.59% | 1.25% | 1.92% | 44 | −3.31% | 2.83% | 2.18% | 73 | 1.04% | 0.30% | 1.77% |
| | | (−0.53) | (5.99) | (2.34) | | (−2.16) | (8.45) | (1.26) | | (0.69) | (1.52) | (2.16) |
| 3 (High) | 117 | −0.34% | 3.73% | 2.21% | 55 | −2.13% | 6.67% | 4.51% | 62 | 1.25% | 1.13% | 0.16% |
| | | (−0.34) | (8.80) | (2.67) | | (−1.50) | (12.15) | (3.50) | | (0.92) | (2.72) | (0.16) |
| Difference (3−1) | | 0.26% | 2.48% | 0.28% | | 1.18% | 3.84% | 2.33% | | 0.21% | 0.83% | −1.61% |
| | | (0.17) | (5.25) | (0.24) | | (0.56) | (5.62) | (1.10) | | (0.10) | (1.89) | (−1.26) |
| Panel N. *Own Share* | | | | | | | | | | | | |
| 1 (Low) | 117 | 0.73% | 1.73% | 2.63% | 49 | −0.73% | 3.51% | 4.54% | 68 | 1.78% | 0.45% | 1.25% |
| | | (0.63) | (6.51) | (3.69) | | (−0.45) | (8.26) | (3.97) | | (1.11) | (1.86) | (1.42) |
| 3 (High) | 117 | −1.20% | 2.87% | 1.43% | 61 | −2.29% | 5.20% | 3.12% | 56 | −0.01% | 0.34% | −0.40% |
| | | (−1.70) | (8.92) | (1.67) | | (−2.38) | (13.62) | (2.26) | | (−0.01) | (1.38) | (−0.43) |
| Difference (3−1) | | −1.92% | 1.14% | −1.20% | | −1.56% | 1.69% | −1.43% | | −1.79% | −0.11% | −1.65% |
| | | (−1.42) | (2.73) | (−1.07) | | (−0.86) | (2.95) | (−0.77) | | (−0.90) | (−0.31) | (−1.29) |

Note: *t*−statistics are shown in parentheses.

associated with greater effects in three instances on announcement day. Among firms with higher percentages of their own shares, the ratio shows greater effects for OMR on the announcement day.

Table 2-6 presents the results of cross-sectional multiple regressions for market and ToSTNeT-3 repurchases, in which the sample sizes are 179 and 213, respectively. Explained variables are $CAR(-20, -1)$, $CAR(0, 0)$, and $CAR(1, 20)$ for both market and ToSTNeT-3 repurchases. Explanatory variables are based on categories in Table 2-5, and are limited to variables that are explainable for the difference in each CAR of the two repurchasing methods. Four variables—$TO(20)$, $OD$, $\Delta Finance$, and $\Delta Foreigner$—demonstrate a statistically significant correlation with the $CAR(-20, -1)$ for market repurchases. Correlation of $TO(20)$ with market repurchases is negative and significant, whereas for the ToSTNeT-3, it is strongly and positively significant. These results suggest that higher values of $TO(20)$ have lower $CAR(-20, -1)$ for market repurchases and higher $CAR(-20, -1)$ for repurchases via the ToSTNeT-3. *OD* for market repurchases shows a statistically positive and significant correlation, whereas for ToSTNeT-3 repurchases, *OD* is statistically negative. A positive correlation with $TO(20)$ and a negative correlation with $OD$ for the ToSTNeT-3 possibly indicate trading on insider information by firms with weak information security prior to their announcement days.

$CAR(0, 0)$ and $TO(20)$ for market and ToSTNeT-3 repurchases are negatively significant. $\ln(Market\ Value)$ for market and ToSTNeT-3 repurchases is negatively significant and implies a small firm effect. $B/M$ is positively significant only for market repurchases, thereby indicating a value

**Table 2-6. Cross-sectional multiple regressions**

| | OMR | | | ToSTNeT-3 | | |
|---|---|---|---|---|---|---|
| | *CAR* (−20, −1) | *CAR* (0, 0) | *CAR* (1, 20) | *CAR* (−20, −1) | *CAR* (0, 0) | *CAR* (1, 20) |
| Constant | −0.030 | 0.028 | 0.062 | 0.010 | 0.022 | 0.014 |
| | (−0.63) | (2.08) | (1.51) | (0.25) | (2.29) | (0.43) |
| *TO*(20) | −0.029 | −0.015 | −0.043 | 0.511 | −0.039 | −0.033 |
| | (−1.12) | (−2.13) | (−1.97) | (10.53) | (−3.27) | (−0.82) |
| ln(*MV*) | 0.001 | −0.003 | −0.004 | −0.006 | −0.003 | −0.001 |
| | (0.11) | (−1.72) | (−0.95) | (−1.03) | (−2.41) | (−0.22) |
| *B/M* | −0.006 | 0.009 | 0.006 | 0.013 | 0.001 | 0.010 |
| | (−0.58) | (2.94) | (0.65) | (1.51) | (0.39) | (1.41) |
| *OD* | 0.029 | 0.000 | −0.004 | −0.030 | 0.000 | −0.007 |
| | (1.88) | (−0.01) | (−0.27) | (−2.57) | (−0.03) | (−0.73) |
| Δ*Finance* | −0.007 | 0.002 | 0.006 | 0.001 | 0.001 | 0.001 |
| | (−1.91) | (1.65) | (2.16) | (0.68) | (1.18) | (0.43) |
| Δ*Company* | −0.002 | 0.000 | 0.007 | 0.000 | 0.001 | 0.000 |
| | (−0.77) | (0.34) | (3.81) | (0.11) | (2.02) | (−0.04) |
| Δ*Foreigner* | 0.006 | 0.000 | 0.000 | 0.002 | 0.001 | 0.000 |
| | (2.02) | (0.45) | (−0.18) | (0.89) | (1.75) | (0.07) |
| *Planned Share* | −0.107 | 1.073 | 0.299 | 0.022 | 0.210 | −0.196 |
| | (−0.21) | (7.40) | (0.67) | (0.12) | (4.63) | (−1.26) |
| *Own Share* | −0.065 | 0.077 | −0.155 | 0.024 | −0.028 | −0.141 |
| | (−0.43) | (1.81) | (−1.19) | (0.20) | (−0.92) | (−1.37) |
| Adj. $R^2$ | 2.59% | 36.13% | 10.49% | 35.02% | 16.37% | 0.85% |

Note: *t*-statistics are indicated in parentheses.

effect.

The relationship between *TO*(20) and *CAR*(1, 20) for market repurchases is negatively significant, but not for ToSTNeT-3 repurchases. Furthermore, *ΔCompany* has a positively significant relationship to *CAR*(1, 20). The results suggest that these variables have information that differs from the *CAR*.

## 2-4. Conclusion

This part of the study examined the announcement effect of share

repurchases from 2010 to 2013 by analyzing reactions of stock prices among firms listed on the First Section of the TSE to the firms' repurchase announcements broadcast by the TDnet. This study's main contribution is in confirming different announcement effects when firms repurchase shares in the open market and via the ToSTNeT-3. The results demonstrate a significant stock price reaction among all 392 firms sampled and different price reactions for open-market and ToSTNeT-3 repurchases.

Prices for stocks repurchased in the open market significantly increased from the announcement day to 20 days thereafter. Investors might not have reacted immediately owing to being skeptical about whether announced repurchases would occur. This behavior is in telling contrast to dividend announcements. My findings suggest that stock prices likely will under-react on the day a market repurchase is announced but that *CAR* will increase as investors witness market purchases occurring. Repurchases via the ToSTNeT-3 cannot influence this result, because it is an off-auction mechanism.

Evidence from market repurchases supports the market-timing hypothesis, but only weakly for repurchases on the ToSTNeT-3. Specifically, *CAR* in low B/M firms indicates that market repurchases resolve undervaluation problems. *CAR* for the ToSTNeT-3 increases before the announcement day but not significantly. *CAR* for ToSTNeT-3 repurchases is lower than for market repurchases spanning 20 days from the announcement because repurchases via the ToSTNeT-3 are completed on the announcement day.

This study examined stock movements for 20 days around the event day.

Further research needs to investigate longer-term price movements.

## 3. Why do managers adopt Japan-specific off-auction repurchases?

### 3-1. Introduction

Japan has a specific kind of share repurchase system that is not in any foreign stock market. The birth of this system is deeply concerned with the history of the payout policy that Japanese companies had carried out.

Payout policy has not been a topic of discussion in Japanese academia because of Japan's long-term rigid dividend policy and prior ban on share repurchases. Recently, however, there has been gradual acceptance of performance-related dividend policy in Japanese firms. I observe that dividend payment is the primary payout policy because foreign investors request it. On the other hand, share repurchases have increased rapidly after their ban was lifted in 1994 and the Commercial Code was revised in 2001, lifting a ban on treasury stock.

This study examines why the ToSTNeT-3 is chosen by firms and examines characteristics and actual trading conditions of the ToSTNeT-3 to show that it is a unique share repurchase trading system used by the TSE on a global basis.[18]

### 3-2. Background of Japan-specific off-auction repurchases

Share repurchases in Japan can be separated into on-market (prior announcement form) and off-market (tender offers and negotiation

[18] For selecting motivation between dividends and repurchases within payout policy, Grullon and Michaely (2002) find a negative relationship between dividend forecast errors and repurchase level, which supports the substitute hypothesis. In Japan, Yamaguchi (2007) finds no evidence for substitution but Takahashi and Tokunaga (2015) report results supporting substitution.

transactions). Mitsuhide Yamaguchi, the former President and Chief Executive Officer of the TSE, noted on January 19, 1999 that share repurchases are not used efficiently due to excessive attention on market manipulation for market repurchases and restrictions of liquidity and high costs.[19] Then, on-market share repurchases with prior announcement were introduced into the Japanese stock market. On-market share repurchases allow shares to be repurchased flexibly, because firms must pre-announce the repurchase content to address any concerns about insider trading or market manipulation. Therefore, on-market share repurchases with prior announcement allow firms and large shareholders, such as blockholders, to set requirements for selling shares and for repurchasing shares for blockholders. Repurchasing firms reveal the announcement of their repurchases through the TSE's TDnet.

This study focuses on share repurchases with prior announcement from among the three repurchase methods allowed on the TSE currently. The three types are 1) repurchases on the auction market, 2) closing price transactions, and 3) off-auction own-share repurchase transactions (ToSTNeT-3).

First, repurchases on the auction market comprise a method in which the maximum number of shares, the price, and the repurchase period are previously announced. Adopting firms are able to repurchase shares flexibly by considering the firms' stock price movements and managing status within the period. Therefore, firms are able to abandon share repurchases when faced with unexpected problems in their stock price

[19] See the TSE's web site.

movements and managing status.

The second type, closing price transactions (ToSTNeT-2), was introduced on August 7, 1998 and enabled the announcement of the maximum number of shares, the price, and the day of repurchase. Adopting firms can repurchase shares at the price of the day before closing.

The third type, off-auction own share repurchase transactions (ToSTNeT-3), was introduced on January 15, 2008.[20] This method is almost identical to the ToSTNeT-2 but differs in the range of share buyers; in other words, the ToSTNeT-2 was not limited to share repurchases by the issuing firm, and thus, investors other than repurchasing firms could participate in the ToSTNeT-2 to buy the firm's shares. By contrast, in the ToSTNeT-3, repurchases are limited to the issuing firm.[21]

In general, the ToSTNeT-2 and ToSTNeT-3 have superior instant repurchasing methods because they are adopted through resolutions by boards of directors; repurchase information is announced via the TDnet at 3:00 p.m. and the repurchase is completed the next day at 8:45 a.m. Incidentally, since the ToSTNeT-3 was introduced, the ToSTNeT-2 hardly seems to be used for share repurchases. Based on the abovementioned Japanese repurchase situation, this study examines what factors affect the choice between auction market repurchases and ToSTNeT-3 repurchases when a firm decides to repurchase shares.

Researchers have studied the motivation of management's choices for ASR in the United States (Akyol *et al*. 2014; Bargeron *et al*. 2011; Michel

[20] "Negotiation transaction through ToSTNeT" described by Hoda and Uno (2011) is not exact apart from ex-post outcome.
[21] The ToSTNeT-2 has a time priority basis and the ToSTNeT-3 has an allotment basis. For sellers, the ToSTNeT-3 contracts to repurchase minimum trading units.

*et al*. 2010). ASR has similar characteristics to the ToSTNeT-3 because both systems allow for immediate repurchase. However, in the ToSTNeT-3, share repurchases are traded at a fixed price, whereas in ASR in the United States, there is a risk of stock price movement. Thus, there is a major difference between the ToSTNeT-3 and ASR. As ASR firms usually contract with an investment bank that provides the shares, although firms might conduct repurchasing shares at set stock prices, ASR firms must absorb the costs borne by the investment bank for any difference in prices generated by the repurchases.

### 3-3. Related Literature

Bargeron *et al*. (2011) focus on the differences in flexibility, credibility, and immediacy between OMR and ASR, and investigate what types of firms choose ASR. The flexibility hypothesis predicts that OMR firms can adjust repurchase cost and timing. Firms with higher stock-price volatility and lower stock liquidity are less likely to choose ASR, because firms exert an early flexibility option. The authors find that the choice of ASR has a negative relationship to stock price volatility and a positive relationship to liquidity, which supports the flexibility hypothesis. On the other hand, the credibility and immediacy hypothesis predicts that firms choose ASR to conduct repurchasing quickly and certainly for specific objectives, including conveying information to investors and altering capital structure. The authors find that choosing ASR is related to conveying undervaluation and manipulating EPS, which supports the credibility and immediacy hypothesis. Akyol *et al*. (2014) find that for

firms choosing ASR, management entrenchment is greater and the book-to-market value is lower than for firms choosing OMR, because ASR firms are exposed to takeover rumors. Akyol *et al*. (2014) report that choosing ASR decreases the latent takeover probability. Their findings are consistent with the credibility and immediacy hypothesis of Bargeron *et al*. (2011).

This study develops hypotheses about the motivation for choosing a method of share repurchases, based on particular Japanese conditions, and uses share repurchase data to test the hypotheses. When I apply ASR versus OMR in the United States to ToSTNeT-3 versus OMR in Japan, the ToSTNeT-3 in Japan does not have uncertainty in the repurchase cost in ASR. Therefore, I develop a new certainty and immediacy hypothesis associated with stock liquidity using examples from the U.S. hypothesis. Moreover, I decide whether the blockholder or management plays a leading role in choosing the ToSTNeT-3 (blockholder requirement type or management requirement type). If I can obtain evidence relating to the selling share requirements of blockholders, it would not be necessary to analyze these in either testing hypotheses. However, because I cannot obtain such data, I test these hypotheses from the available data.

Hachiya and Teng (2011) and Hoda and Uno (2011) examine how firms decide to repurchase shares. Hachiya and Teng (2011) investigate the relationship between the structure of a stock owner and repurchase size, and find that firms facing stronger external pressure are more active and larger in share repurchases. Hoda and Uno (2011) find that higher liquidity firms are more active in OMR and have a higher proportion of

repurchases to total payouts. The present study's distinction lies in its focus on share repurchases via the ToSTNeT-3, which has been excluded by most previous research on Japanese share repurchases. Takahashi (2016) compares different market reactions to share repurchase announcements between OMR and the ToSTNeT-3 and finds that (1) OMR firms have a significantly larger abnormal return than ToSTNeT-3 firms do, although both methods experience a positive announcement effect on the event day and (2) ToSTNeT-3 firms experience an increase in stock prices for some days around the event day; by contrast, OMR firms experience a decrease in stock prices.

The remainder of this chapter is organized as follows. Section 3-3 describes the characteristics of the various methods of Japanese share repurchases. Section 3-4 shows ownership and repurchases. Section 3-5 develops hypotheses based on these characteristics. Section 3-6 explains the firm feature data used to test these hypotheses and utilizes a logit model to present the empirical findings on management's motivation for using the ToSTNeT-3. Section 3-7 presents a concluding discussion.

## 3-4. Characteristics of Japanese Share Repurchases

This study examines share repurchases by firms listed on the First Section of the TSE from February 2010 to February 2013. I use data from the TDnet that shows repurchase announcement days and the contents of announcements (number of shares, prices, objectives, and repurchase periods or days) as well as data from the Nikkei's FinancialQUEST about firm features and stock price.

Table 3-1 shows characteristics of the 1,257 repurchases in the period of study. These characteristics are classified in terms of the methods chosen by firms when repurchasing. I define the method as based on "Notification of Completion" announced after the shares are actually repurchased rather than the firm's announcement through the TDnet. The method "*OMR*" indicates auction market share repurchases with prior announcement. The method "*TN3*" is off-auction market, limited to share repurchases with prior announcement, including TSE's ToSTNeT-3 and Nagoya stock exchange's N-NET. The method "*Mix*" comprises share repurchases incorporating OMR and TN3. On another front, for off-market share repurchases, the method "*TOB*" comprises tender offers while the method "*Neg*" refers to negotiation transactions. Beyond that, the method "*Off*" refers to off-auction market repurchases except TN3 (i.e., ToSTNeT-2 and J-NET) while the method "*NA*" is an unclear repurchase method.

From the results in Panel A of Table 3-1, "*OMR*" accounts for about 56% of the total and thus, is a majority. By contrast, "*TN3*" covers approximately 32% of the total and off-auction share repurchase, and seems to be widely used when combined with "*Mix*." Panel B shows repurchase methods announced previously through the TDnet. Like "*TN3*," firms directly use off-auction market repurchases, but many firms do not disclose the methods at the time of announcement ("*NA*" exceeds 50%). However, 80% of "*NA*" subsequently becomes "*OMR*." Panel C shows the results sorted by industry. Samples are sorted into nine industries because mining is zero. The relationship between repurchase methods and industries does not appear to be biased.

**Table 3-1. Characteristics of the 1,257 repurchases in the period of study**

| | Methods chosen by firms when repurchasing | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | *OMR* | *TN3* | *Mix* | *TOB* | *Neg* | *Off* | *NA* | Total |
| Panel A. Repurchase methods | | | | | | | | |
| | 706 | 397 | 65 | 15 | 12 | 13 | 49 | 1,257 |
| Panel B. Methods announced previously through the TDnet | | | | | | | | |
| *OMR* | 146 | 3 | 7 | | | | 2 | 158 |
| *TN3* | | 339 | | | | | | 339 |
| *Mix* | 1 | 4 | 14 | | | 3 | | 22 |
| *TOB* | | | | 15 | | | | 15 |
| *Neg* | | | | | 11 | | 2 | 13 |
| *Off* | | | | | | 9 | | 9 |
| *NA* | 559 | 51 | 44 | | 1 | 1 | 45 | 701 |
| Panel C. Industries | | | | | | | | |
| *Services* | 39 | 38 | 5 | 2 | 1 | 1 | 1 | 87 |
| *Transportation, Information, & Communication* | 79 | 40 | 6 | 2 | 2 | | 5 | 134 |
| *Finance & Insurance* | 99 | 46 | 12 | 1 | 1 | 4 | 4 | 167 |
| *Construction* | 42 | 14 | 4 | | | 1 | | 61 |
| *Trade* | 151 | 76 | 11 | 3 | 3 | 1 | 4 | 249 |
| *Fishery, Agriculture, & Forestry* | 3 | | | | | | | 3 |
| *Manufacturing* | 278 | 179 | 24 | 7 | 5 | 6 | 32 | 531 |
| *Electric Power & Gas* | 7 | 2 | 2 | | | | 2 | 13 |
| *Real Estate* | 8 | 2 | 1 | | | | 1 | 12 |

I demonstrate here which firms choose "*OMR*" or "*TN3*" when repurchasing shares under certain circumstances. I focus on "*OMR*" and "*TN3*" among the seven types sorted in Panel A of Table 3-1. However, I cannot directly use the sample in Panel A, since the hypothesis testing later uses financial data as a firm feature. Because data on securities reports are updated annually, corresponding data on securities reports have the same

**Table 3-2. Number of aggregated firms sorted by financial year**

| | Whole year | 2009 | 2010 | 2011 | 2012 | 2013 |
|---|---|---|---|---|---|---|
| Panel A. TN3 | | | | | | |
| | 255 | 13 | 51 | 75 | 64 | 52 |
| Without | 226 | 11 | 45 | 69 | 57 | 44 |
| With | 29 | 2 | 6 | 6 | 7 | 8 |
| Panel B. OMR | | | | | | |
| | 526 | 24 | 142 | 142 | 145 | 73 |
| Without | 447 | 23 | 122 | 117 | 121 | 64 |
| With | 79 | 1 | 20 | 25 | 24 | 9 |
| Panel C. All | | | | | | |
| | 781 | 37 | 193 | 217 | 209 | 125 |
| Without | 673 | 34 | 167 | 186 | 178 | 108 |
| With | 108 | 3 | 26 | 31 | 31 | 17 |

Note: The sample includes 2 firms aggregated in 3 of the 5 years, 18 firms aggregated in 2 of the 5 years, and 66 firms aggregated in 1 of the 5 years.

value when firms conduct multiple repurchases in the same fiscal year. Therefore, I aggregate the data of multiple repurchases in a fiscal year into one repurchase. I exclude "*OMR*" and "*TN3*" in a financial year from the analysis. Therefore, the difference in the choice motivation of management's repurchase method between "*OMR*" and "*TN3*" becomes clear, although the number of samples decreases. As shown in Table 3-2, there are 781 samples, of which 255 are TN3 and 526 are OMR.

As shown in Panel C of Table 3-2, 108 samples are aggregated within 781 samples (about 14% of the total). Included in the 108 samples are 2 firms aggregated in 3 of the 5 years and 18 firms aggregated in 2 of

the 5 years. This suggests that some firms frequently repurchase shares over multiple years. Panels A and B show that aggregated samples do not place a disproportionate emphasis on particular methods, since aggregated *TN3* is about 11% and aggregated OMR is about 15% through a whole year.

### 3-4-1. Ownership and repurchases

Table 3-3 shows the relationship between stockholding ratios of a stock owner and repurchase methods. Stockholding ratios classified with a stockowner come from annual securities reports. "*Gov*" refers to state and local government, "*Fin*" refers to finance institutions, "*Sec*" refers to a financial instrument business operator, "*Cor*" refers to an industrial corporation, "*For*" refers to a foreign corporation or individual, and "*Ind*" refers to an individual person and other. Table 3-3a shows the results of stockholding ratios classified with an owner of stock in the financial year of the share repurchase announcement day. Table 3-3b shows the results of the change in stockholding ratios from the beginning to the end of the period.

Tables 3-3a and 3-3b indicate the *TN3* and *OMR* mean values of each stockholding ratio classified by a stockowner and the *t*-values for the difference, respectively. For stockholding ratios in the beginning period, *TN3* firms have significantly higher "*Cor*" and "*Ind*" than do *OMR* firms. By contrast, *OMR* firms have significantly higher "*For*" than do *TN3* firms.

For difference in stockholdings, *TN3* firms have significantly declined "*Cor*" than do *OMR* firms. Specifically, "*Cor*" is the main seller in share repurchases via the ToSTNeT-3; thus, the industrial corporation is

**Table 3-3a. Levels of ownership at the beginning of fiscal years when share repurchases occurred, and repurchase methods**

| | *Gov* | *Fin* | *Sec* | *Cor* | *For* | *Ind* |
|---|---|---|---|---|---|---|
| Panel A. Mean | | | | | | |
| *TN3* | 0.10% | 25.90% | 1.08% | 25.31% | 9.14% | 38.01% |
| *OMR* | 0.26% | 26.55% | 1.32% | 21.19% | 16.53% | 33.55% |
| Difference | −0.15% | −0.65% | −0.24% | 4.12% | −7.38% | 4.47% |
| (*t*−value) | (−0.78) | (−0.72) | (−2.34) | (3.77) | (−8.00) | (3.45) |
| Panel B. Correlations | | | | | | |
| *Gov* | 1 | | | | | |
| *Fin* | −0.06 | 1 | | | | |
| *Sec* | −0.03 | 0.08 | 1 | | | |
| *Cor* | −0.09 | −0.31 | −0.17 | 1 | | |
| *For* | 0.06 | 0.10 | 0.20 | −0.38 | 1 | |
| *Ind* | −0.07 | −0.49 | −0.13 | −0.31 | −0.50 | 1 |

**Table 3-3b. Changes of ownership between the beginning and end of fiscal year when share repurchases occurred, and repurchase methods**

| | *ΔGov* | *ΔFin* | *ΔSec* | *ΔCor* | *ΔFor* | *ΔInd* |
|---|---|---|---|---|---|---|
| Panel A. Means | | | | | | |
| *TN3* | −0.01% | −1.08% | 0.05% | −0.69% | 0.90% | 0.47% |
| *OMR* | 0.00% | −1.07% | 0.04% | 0.48% | 0.47% | 0.34% |
| Difference | −0.01% | −0.02% | 0.01% | −1.17% | 0.43% | 0.13% |
| (*t*−value) | (−1.31) | (−0.06) | (0.21) | (−3.91) | (1.98) | (0.32) |
| Panel B. Correlations | | | | | | |
| *ΔGov* | 1 | | | | | |
| *ΔFin* | 0.00 | 1 | | | | |
| *ΔSec* | 0.00 | −0.06 | 1 | | | |
| *ΔCor* | 0.03 | −0.10 | −0.04 | 1 | | |
| *ΔFor* | 0.04 | −0.12 | −0.19 | −0.11 | 1 | |
| *ΔInd* | −0.07 | −0.23 | 0.08 | −0.32 | −0.26 | 1 |

expected to sell substantial shares for unraveling cross-shareholdings.

Table 3-4 shows the relationship between three measures of ownership

**Table 3-4. Three measures of ownership concentration and repurchase methods**

| | *A5* | *A10* | *H10* | *ΔA5* | *ΔA10* | *ΔH10* |
|---|---|---|---|---|---|---|
| *TN3* | 33.60% | 44.94% | 452.23%$^2$ | −0.28% | −0.53% | −4.19%$^2$ |
| *OMR* | 34.39% | 45.16% | 534.05%$^2$ | 0.25% | 0.13% | 15.56%$^2$ |
| Difference | −0.79% | −0.22% | −81.82%$^2$ | −0.53% | −0.66% | −19.75%$^2$ |
| (*t*−value) | (−0.60) | (−0.22) | (−0.49) | (−2.12) | (−2.67) | (−1.74) |

Note: *t*−values are calculated for differences after applying a logistic transformation to these variables.

concentration and share repurchase methods. For the three measures, I define the percentage of a firm's outstanding stock held by the 5 largest shareholders (*H5*), the percentage of a firm's outstanding stock held by the 10 largest shareholders (*H10*), and an approximation of the Herfindahl measure of ownership concentration (*AH*) according to Demsetz and Lehn (1985). Table 3-4 indicates that there is no statistically significant difference in the ownership concentration between *TN3* and *OMR* before share repurchases. On the other hand, after the share repurchases, ownership concentration for *TN3* decreases statistically significantly in comparison with ownership concentration for *OMR*. These results imply that *TN3* targets the blockholder. In a later section, I consider whether repurchasing firms or shareholders that hold substantial shares have a leading role in the selling of substantial shares.

## 3-5. Hypotheses

As discussed in chapter 2, I address the question of whether firms choose *OMR* or *TN3* for share repurchases with prior announcement within a market. For *OMR*, although firms announce the period, price, and number

of shares, the repurchasing timing within the period and its cost per share are previously unclear. There is uncertainty about repurchasing cost and number of repurchased shares because of the influences of external factors while there is uncertainty about market impact for *OMR* because of auction market repurchases.

On the one hand, *TN3* firms are able to repurchase shares in a planned way because there is no market impact or uncertainty of repurchasing cost, and the buyer is limited to only the repurchasing firm. Even very low liquidity firms can repurchase shares through *TN3*. In recent years especially, because cross-shareholdings are likely to be unraveled via the firms' bank, low liquidity firms would find it prohibitively difficult to unravel cross-shareholdings under stock market regulations if not for the ToSTNeT market. Therefore, *TN3* firms need to complete share repurchases when these firms receive a request for selling shares from blockholders, such as clients, founder families, or supporters. Similarly, firms request share repurchases by blockholders when they want to adjust their capital structure immediately.

I set the following hypotheses from the abovementioned consideration. Specifically, I focus on whether low liquidity firms chooses *TN3* due to the need to repurchase a certain number of shares, which is called the certainty and immediacy hypothesis. Furthermore, I focus on whether blockholders (blockholder requirement type) or firms (management requirement type) hold the leading position in the choice of *TN3*.

For the blockholder requirement type, when blockholders sell their own substantial shares, they might require firms to repurchase a certain

number of shares. In particular, a firm's management is less likely to use *"for shareholders"* terms for the announcement of the start of the share repurchase through the TDnet because of the requirement by several shareholders. In fact, such share repurchases are not for strategic firm value improvement and payout strategy. In addition, firms are likely to be unwilling to repurchase shares in the past, as they are required to repurchase shares.

By contrast, for the management requirement type, when firms certainly and immediately adjust their capital structure, they might require the blockholders to repurchase shares. In particular, when firms desire to improve important management indicators immediately, such as ROE or book-to-market value related to the evaluation of company value, a decrease in the book value of net assets that occurs with share repurchases increases ROE and decreases the book-to-market value. An increase in ROE enhances the appeal of a firm from the perspective of external investors, and a decrease in book-to-market value reduces the appeal of the firms from the perspective of investors with takeover aspirations. These effects might be due to management's entrenchment.

## 3-6. Results

### 3-6-1. Proxies for hypotheses and univariate analysis

To test the hypotheses set in the last section, I use the following five variables as proxies for the hypotheses. First, for the certainty and immediacy hypothesis, to test the effect of stock liquidity on choice of repurchasing method, as a measure of liquidity, I use stock *turnover*

(ratio of the sum of daily trade volume from the day before the announcement to 60 days before the announcement to outstanding shares, X1). To test whether choosing *TN3* benefits a firm's entire shareholder group, I set the dummy variable (X5) equal to 1 if "*for shareholder*" is described as the reason for repurchase in the repurchase announcement through the TDnet; otherwise, it is 0. To test whether choosing *TN3* firms at the request of blockholders for strategic share repurchases, I use the *treasury stock* ratio (ratio of treasury stock to outstanding shares, X2) as a measure of repurchase achievements. By contrast, to test whether choosing *TN3* firms at the request of management is concerned with the adjustment of capital structure, I use the *ROE effect*, that is, the ROE upward effect (change in net worth book value when making the assumption that expending all upper limits of amount repurchase cost, X3) and the *book-to-market* ratio (ratio of net worth book value to equity market value, X4). Beyond that, I use firm *size* (equity market value, X6) as an instrumental variable for the logit modeling estimate in the next section.

Table 3-5 shows the relationship between repurchase methods and six-firm feature variables, as explained earlier in this section. Panel A indicates the sign condition for *TN3* estimated from the hypotheses in the preceding section. Firm *size* (X6) does not have a sign condition because it is an instrumental variable. Panel B shows statistics for the mean values of variables for each firm choosing *TN3* and *OMR*, the difference in mean value of variables for each firm, and the null hypothesis that the difference is zero. In this regard, repurchase reason (X5) is a dummy variable, indicating the statistics of the ratio to the total sample,

**Table 3-5. Repurchase methods and six firm feature variables**

| | [X1] *Turnover* (%) | [X2] *Treasury stock* (%) | [X3] *ROE effect* (%) | [X4] *B/M* (times) | [X5] *Reason* (%) | [X6] *Size* (billion yen) |
|---|---|---|---|---|---|---|
| Panel A. Sign condition | | | | | | |
| | − | − | + | + | − | Control variable |
| Panel B. Means | | | | | | |
| *TN3* | 15.17% | 3.83% | 2.74% | 1.392 | 17.65% | 873 |
| *OMR* | 22.15% | 4.64% | 2.48% | 1.366 | 42.21% | 3,002 |
| Difference | −6.98% | −0.81% | 0.26% | 0.026 | −24.56% | −2,130 |
| (*t*−value) | (−2.47) | (−2.30) | (0.32) | (0.47) | (−6.78) | (−4.05) |
| Panel C. Correlations | | | | | | |
| [X1] | 1 | | | | | |
| [X2] | −0.05 | 1 | | | | |
| [X3] | 0.21 | 0.04 | 1 | | | |
| [X4] | −0.23 | −0.08 | −0.36 | 1 | | |
| [X5] | 0.06 | 0.00 | 0.04 | −0.25 | 1 | |
| [X6] | 0.05 | −0.08 | 0.08 | −0.08 | 0.07 | 1 |

the difference, and the null hypothesis that the difference in the ratio is zero. For the sign condition in Panel A and the test of the difference in Panel B, *turnover* (X1), *treasury stock* (X2), and repurchase *reason* (X5) are statistically significant and consistent with the sign condition. On the other hand, *ROE effect* (X3) and *book-to-market* (X4) are consistent with the sign condition but not statistically significant. For equity market value (X6), the difference in the mean value is negatively significant and suggests that *TN3* firms are smaller than *OMR* firms are.

Results for the single variable above imply that the certainty and immediacy hypothesis is supported by the findings. Furthermore, choosing

*TN3* implies a stronger request from blockholders than from management. In the next section, I test the hypotheses with a consideration of the size effect indicating significance of the each difference and with relation between variables. Panel C shows the correlation coefficient between the variables. Variables have no strong relation.

### 3-6-2. Results of logit model

Table 3-6 shows the estimated results by logit model using the six variables, as explained in Section 3-6-2. M1–M6 are estimated results by univariate logit model, M7 is the result by the 6-variable logit model, and M8 is the result by the 10-variable logit model, which added stockholding ratios at the beginning of the period, as shown in Table 3-3, to model M7. The explained variable is a dummy variable that equals 1 if firms choose *TN3* and 0 if firms choose *OMR*. I standardize the six variables by sample standard deviation expecting the repurchase *reason* (X5).

The result of M7 is consistent with both results of testing for the difference and the univariate logit model. Thus, even after controlling for the effects of other variables, this result supports the certainty and immediacy hypothesis; moreover, it suggests that choosing *TN3* is more strongly affected by blockholders than by management. The result of M8 weakens support for the certainty and immediacy hypothesis compared with M7. However, the result that choosing *TN3* is more strongly affected by blockholders is still supported.

**Table 3-6. Estimated results by logit model**

| | M1 | M2 | M3 | M4 | M5 | M6 | M7 | M8 |
|---|---|---|---|---|---|---|---|---|
| Intercept | −0.564 | −0.553 | −0.772 | −0.791 | −0.370 | −0.519 | 0.395 | 1.537 |
| | (−5.77) | (−5.27) | (−8.34) | (−4.86) | (−4.12) | (−5.96) | (1.48) | (2.43) |
| *Turnover* | −0.336 | | | | | | −0.329 | −0.168 |
| | (−2.38) | | | | | | (−2.28) | (−1.38) |
| *Treasury stock* | | −0.188 | | | | | −0.291 | −0.277 |
| | | (−2.29) | | | | | (−3.31) | (−3.00) |
| *ROE effect* | | | 0.068 | | | | 0.116 | 0.129 |
| | | | (0.92) | | | | (1.38) | (1.44) |
| *B/M* | | | | 0.036 | | | −0.143 | −0.230 |
| | | | | (0.47) | | | (−1.56) | (−2.36) |
| *Reason* | | | | | −1.226 | | −1.170 | −1.123 |
| | | | | | (−6.58) | | (−6.04) | (−5.70) |
| *Size* | | | | | | −1.016 | −0.779 | −0.260 |
| | | | | | | (−3.58) | (−2.95) | (−1.39) |
| *Sec* (level of ownership) | | | | | | | | −0.030 |
| | | | | | | | | (−0.31) |
| *Cor* (level of ownership) | | | | | | | | −0.060 |
| | | | | | | | | (−0.52) |
| *For* (level of ownership) | | | | | | | | −0.794 |
| | | | | | | | | (−4.71) |
| *Ind* (level of ownership) | | | | | | | | −0.141 |
| | | | | | | | | (−1.04) |
| AIC | 982.15 | 985.16 | 989.84 | 990.46 | 941.47 | 960.32 | 910.50 | 880.80 |

Note: *z*-values are indicated in parentheses.

## 3-7. Conclusion

This chapter discussed market share repurchases with prior announcement from the viewpoint of firms' management between February 2010 and December 2013. I find that of about 781 share repurchases for firms listed on the First Section of the TSE, lower liquidity firms are

likely to use the ToSTNeT-3.

This result supports the certainty and immediacy hypothesis. Furthermore, I analyzed the motivations of both share sellers and share buyers, and found evidence that the ToSTNeT-3 is chosen by firms accepting requests from blockholders (mainly general corporations other than financial institutions).

My future research will examine further the motivation for choosing a repurchase method by looking at a firm's repurchase of shares from blockholders. In particular, I will use data from the top 30 largest shareholders to investigate changes in blockholders' equity ownership. In addition, with reference to Takahashi's (2016) results, it is necessary to examine the relationship between movement of stock prices and the timing of share repurchases. It would be interesting to examine the movement of undervalued stock prices. Furthermore, in this chapter, the study excluded from the analysis samples in which shares are repurchased through both OMR and TN3 in the same financial year. It is necessary to discuss the robustness of the results by analyzing variables using proportions of OMR and TN3.

## 4. Did the Introduction of ToSTNeT-3 Affect Substitution between Dividends and Share Repurchases?

### 4-1. Introduction

Management decides whether to hold cash or to distribute it. In case of the latter, they also decide between paying dividends or repurchasing shares. In the perfect capital markets of Modigliani and Miller (1961), managers need not ponder over these alternatives, but in the real world of imperfect markets, managers must consider this choice. In addition, investors interpret managers' decisions. For example, according to the dividend-signaling hypothesis, dividend reductions or increases are associated with forward-looking statements about performance. In addition, share repurchases might imply that a stock is undervalued.

In Japan, more than half of listed firms retain stable dividends despite the expansion and recession around Japan's bubble period. This rigid dividend policy is common among Japanese firms. Furthermore, because Japan lifted the ban on share repurchases in the late 1990s, discussions about payout policy in Japan were not necessarily active. According to the Life Insurance Association of Japan (Nikkei newspaper 15 article December 20, 2003), 71% of investors then preferred dividends tied to operating performance, whereas 75% of firms preferred stable dividends. In other words, corporate managers paid little attention to payout policies about 15 year ago.

Recent studies have produced demonstration results regarding payout policies. Using data spanning 1998 to 2006 after the ban on repurchases was lifted, Sasaki and Hanaeda (2010) find that Japanese firms did not

cut dividends because they repurchased shares. This finding is inconsistent with the substitution effect documented in the United States. Sasaki (2013) reports that investors prefer constant payout policies although there seems to have been a significant change in payout policies after the global financial crisis.

Table 4-1 shows dividend and repurchase data for sampled Japanese firms spanning 2008–2012. To align my dataset with that of Sasaki and Hanaeda (2010), the table reports net repurchases (repurchases minus dispositions) for non-financial firms listed on the First Section of the TSE from Financial Quest.[22] For example, entries for 2008 reflect aggregated repurchases by sampled firms from January to December 2008.

Panel A of Table 4-1 indicates sampled firms' yearly dividends and repurchases in yen between 2008 and 2012. Totals for repurchases differ from TSE data because Financial Quest data include share repurchases not specifically authorized by boards of directors or shareholders. During 2008–2010, firms reduced dividends by 24% and share repurchases by 77%. However, dividends increased 20% in the subsequent year and 80% in the year thereafter. This suggests that firms tailored repurchases to Japan's economy.

Panel B of Table 4-1 shows dividends and repurchases. In 2008, immediately before the global financial crisis, firms paid dividends and repurchased shares at more than 70% of the total sample. This percentage is significant because it was about 50% in Sasaki and Hanaeda's (2010)

[22] Information about share repurchases from this database includes repurchases indicated in statements of shareholders' equity of securities filings. Thus, the information includes repurchases not sanctioned by directors or shareholders (e.g., broken lots).

**Table 4-1. Dividends and repurchases**

Panel A. Time-series data of payout (million yen)

| Year | Dividends | Repurchases |
|---|---|---|
| 2008 | 6,071,047 | 3,510,093 |
| 2009 | 6,483,341 | 3,055,005 |
| 2010 | 4,599,770 | 801,100 |
| 2011 | 5,069,345 | 1,271,967 |
| 2012 | 5,507,415 | 1,435,012 |

Panel B. Implementation status of payout

| Year | Both non-conducting | Only dividends | Only repurchases | Both conducting |
|---|---|---|---|---|
| 2008 | 5.6% | 19.3% | 3.0% | 72.1% |
| 2009 | 5.1% | 23.3% | 3.5% | 68.2% |
| 2010 | 8.3% | 31.5% | 6.2% | 54.1% |
| 2011 | 7.9% | 34.2% | 4.3% | 53.7% |
| 2012 | 7.3% | 39.6% | 2.5% | 50.7% |

Panel C. Per-firm average payout (million yen)

| | Dividend amount | | Net repurchases | |
|---|---|---|---|---|
| | Only dividends | Both conducting | Only repurchases | Both conducting |
| 2008 | 1,367 | 4,656 | 441 | 2,643 |
| 2009 | 1,363 | 5,199 | 12 | 2,402 |
| 2010 | 1,132 | 4,416 | −224 | 418 |
| 2011 | 1,109 | 4,916 | −309 | 902 |
| 2012 | 1,636 | 5,224 | 386 | 789 |

Panel D. Relationship between changes in dividend and repurchase amounts (year on year)

| | One increases, the other decreases | Both increase or decrease |
|---|---|---|
| 2009 | 29.4% | 38.1% |
| 2010 | 22.6% | 41.5% |
| 2011 | 21.8% | 27.5% |
| 2012 | 24.3% | 26.6% |

Notes: The target sample comprises firms listed on the First Section of the TSE (except financial business). Year refers to the calendar year. Dividends are sourced from earned surplus and include special dividends and commemorative dividends. Repurchases include non-resolutions of board of directors and annual general meetings. Net repurchases are calculated by subtracting dispositions from acquisitions.

results for the early 2000s before the introduction of the ToSTNet-3 in 2008. However, this value decreased by 50% post-crisis. As Panel B shows, firms that had paid dividends and repurchased stock before the crisis chose to pay dividends but not repurchase stock afterward.

Panel C suggests that firms paying higher dividends repurchased shares, a finding that is consistent with Sasaki and Hanaeda (2010), indicating the subsequently continuing tendency of the early 2000s. In particular, during the 2 years after the crisis for only repurchasing firms that did not pay dividends (non-dividend), average net repurchase value is negative. In other words, dispositions exceed repurchases. The net value of repurchases falls sharply among firms that paid dividends and repurchased shares. In other words, as Panel A reveals, firms paid stable dividends to the extent possible (dividend smoothing) and repurchased shares opportunely in line with Japan's economy and their operating performance.

Although not indicated in Table 4-1, approximately 30% of repurchases from 2009 to 2011 involved the ToSTNet-3 (calculated from TSE data), thereby attracting attention to the ToSTNeT-3, as overall repurchases fell dramatically during the crisis.

Note the values in Panel D of Table 4-1 indicating substitutability between dividends and repurchases. Although Sasaki and Hanaeda (2010) deny substitutability, about 20% of firms increased (decreased) dividends while decreasing (increasing) repurchases. Although the percentage is not significant, neither is it negligible, and this motivates further examination.

The rest of this chapter proceeds as follows. Section 4-2 describes the sample and descriptive statistics based on data from securities filings used in the first half of this chapter. Section 4-3 tests for substitutability between dividends and repurchases using these data. Section 4-4 concludes.

## 4-2. Data sources

Share repurchases expanded after Japan revised its Commercial Code in 1994, diminished significantly during the global financial crisis, and resumed gradually after 2010. According to the Nikkei evening newspaper (June 7, 2011), repurchases in FY2010 reached 1.28 trillion yen, about one-fourth of the level of FY2007. In a follow-up article (Nikkei evening newspaper 5 February 26, 2013), journalist Kengo Nishiyama reported that, even by FY2012, repurchase volumes were moderate, attributing the result to the dissolution of cross-shareholdings.

The ToSTNeT-3 was introduced on the TSE on January 15, 2008 exclusively for share repurchases. Only corporations that issued shares are able to purchase them. The number and price of shares repurchased are announced before early trading commences on the TSE the following day (generally, the price is the closing price in late-day trading).[23] As per the traditional approach, it is of interest to compare method setting for a certain period of time, specifically repurchasing shares through the auction market within a timeframe to this new method. Share repurchases

[23] The United States offers ASR and OMR. ASR resembles Japan's ToSTNeT-3 in that repurchases are announced publicly beforehand and information about repurchases is immediately available. ASR differs from the ToSTNeT-3 in that the repurchase price is not fixed. For empirical studies of ASR, see Akyol *et al*. (2014) and Bargeron *et al*. (2011).

via the ToSTNeT-3 in FY2010 were 165.37 billion yen, or about 13% of the 1.28 trillion yen in total repurchases by domestic listed companies.

This study examines payout activities since 2008. Because Sasaki and Hanaeda (2010) and Yamaguchi (2007) examine Japanese payouts until 2005, it is instructive to compare their results with post-2008 results after the ToSTNeT-3 was introduced.

Table 4-2 shows features of payout activities from 2008 to 2013 under the conditions of these previous studies. Repurchase totals are from consolidated statements of changes in net assets in securities filings.[24] Market value ($MV$) is computed by multiplying the number of common shares outstanding (excluding treasury shares) by yearly stock prices at the yearly close of accounts on March 31. $CASH$ includes cash, deposits, and cash equivalents adjusted by total assets. $ROA$ ($NOPER$) denotes operating profit (non-operating profit) adjusted by total assets. $\sigma(ROA)$ denotes standard deviations for the previous 3 years (Grullon and Michaely, 2002; Yamaguchi, 2007).

Table 4-2 is comparable to Table II in Grullon and Michaely (2002). However, my classification is only by the presence or absence of dividends, because repurchases exert little influence on the results. In addition, Grullon and Michaely (2002) classify firms as dividend payers if they had paid dividends at least once every 4 years whereas I classify dividend payers as firms that pay dividends each financial year. Although my approach differs, my results are consistent with theirs.

[24] I use only "acquisition of own shares"—that is, gross amounts—like Grullon and Michaely (2002). Sasaki and Hanaeda (2010) use net amounts calculated by subtracting income arising from dispositions from expenditure on acquisitions.

**Table 4-2. Characteristics of payout policy (2008—2013)**

| | Non-dividend firms | | Dividend firms | |
|---|---|---|---|---|
| No. (ratio) | 451 (11.3%) | | 3,545 (88.7%) | |
| | Mean | Median | Mean | Median |
| *DIV* (million yen) | 0 | 0 | 5,250 | 1,168 |
| *SRA* (million yen) | 149 | 1 | 1,628 | 13 |
| *MV* (million yen) | 71,845 | 12,581 | 255,050 | 57,127 |
| *ASSETS* (BV; million yen) | 369,053 | 57,756 | 564,149 | 157,211 |
| *M/B ratio* | 1.06 | 1.02 | 0.99 | 0.94 |
| *CASH* (million yen) | 13.0% | 11.4% | 10.9% | 9.2% |
| *ROA* (%) | 0.5% | 1.2% | 4.2% | 3.7% |
| $\sigma$(*ROA*) (%) | 2.8% | 2.1% | 1.8% | 1.2% |
| *NOPER* (%) | 0.8% | 0.7% | 1.0% | 0.7% |
| *REPO*/total (%) | 8.4% | 7.1% | 91.6% | 92.9% |

Notes: The target sample is firms with a March year-end listed on the First Section of the TSE (except financial business). *SRA* refers to the acquisition of own shares, that is, gross amount. *MV* is computed by multiplying the number of common shares outstanding, except the firm's own shares, by stock price at the annual closing of accounts date (the end of March). *Cash* includes cash, deposits, and cash equivalents adjusted by total assets. Operating profit ratio (*ROA*) denotes operating profit adjusted by total assets and non-operating profit ratio denotes non-operating profit adjusted by total assets. $\sigma$(*ROA*) is the standard deviation for the past 3 years.

Compared to firms that pay no dividends, dividend-paying firms have larger market values and book values, their ratios of operating profit to total assets are higher, and their ROA varies less. Conversely, firms that pay no dividends have lower profit ratios and unstable time series. In addition, repurchases by dividend-paying firms account for about 90% of the total amount of repurchases (88% in the United States).

## 4-3. Substitution hypothesis: Dividends and share repurchases

Using Lintner's (1956) model, Grullon and Michaely (2002) examine

whether firms use dividends and share repurchases as substitute distributions to shareholders. The authors find negative relationships between share repurchases and errors in dividend forecasts (actual vs. expected payments) suggested by Lintner's (1956) model and find support for the substitution hypothesis.

Adopting the same methodology, Yamaguchi (2007) examines substitution between dividends and repurchases in Japan, but reports positive relationships between dividend forecast errors and repurchases, indicating no support for the substitution hypothesis. Yamaguchi (2007) estimates parameters in Lintner's (1956) model using decadal data until 2001 and tests the substitution hypothesis using data spanning 2002 to 2005. I estimate parameters using data from 1994, after the ban on repurchases was lifted, to 2007 and test the substitution hypothesis using data spanning 2008 to 2013. In accordance with the preceding study, I limit my sample to firms that paid dividends each year during the estimation window. I estimate parameters $\{a_i,\ b_i,$ and $c_i\}$ in Lintner's model for each firm in groups ($i$ = 1, …, $N$ ) as follows:

$$DIV_{i,t} - DIV_{i,t-1} = a_i + b_i\, EARN_{i,t} + c_i\, DIV_{i,t-1} + e_{i,t},\ \ t = 1, \ldots, T\,. \qquad (4\text{-}1)$$

$DIV_{i,t}$ and $EARN_{i,t}$ denote total dividends paid by firm $i$ during FY $t$ and its after-tax earnings during FY $t$, respectively. Ordinary least square results indicate the mean is 48.3% for the coefficient of determination, 0.040 for $\hat{b}_i$, and −0.257 for $\hat{c}_i$. These findings are consistent with Yamaguchi (2007) and Sasaki and Hanaeda (2010).

To show the effectiveness of Lintner's (1956) model, I discuss the estimated results of equation (4-1) in detail.[25] Table 4-3 summarizes the

[25] In testing the substitution hypothesis, I give preference to Grullon and Michaely's (2002) original scholarship over Yamaguchi (2007) and adopt both methods when scaling

**Table 4-3. Estimated results of Lintner's (1956) model**

| | Negative | | | | Positive | | | |
|---|---|---|---|---|---|---|---|---|
| | Significance | | | | | Significance | | |
| | 1% level | 5% level | 10% level | | | 10% level | 5% level | 1% level |
| Net income | 0.23% | 0.47% | 1.17% | 8.41% | 38.79% | 51.64% | 44.86% | 26.40% |
| Dividends (-1) | 14.29% | 30.91% | 39.58% | 38.64% | 15.46% | 6.32% | 4.92% | 3.04% |
| | 0-10% | 10-20% | 20-30% | 30-40% | 40-50% | 50-60% | 60-70% | 70%- |
| $R^2$ | 3.74% | 10.75% | 12.62% | 11.92% | 14.49% | 12.38% | 13.08% | 21.03% |

Notes: Ratios of significance at 10% level ＋insignificance = 100%.

distributions of *t* values for individual coefficients and the coefficient of determination from equation (4-1). The coefficient for net earnings is significantly positive at 10% among nearly half of the sampled firms. This finding implies that more profitable firms increase dividends. Coefficients for approximately one in four firms are significantly positive at 1% and ratios of negative significance even at 10% level are only 1% of the whole. Even after including statistically insignificant firms, coefficients are negative for about 10% of firms. Although Japanese firms have been described as implementing stable dividend policies, dividends clearly are positively correlated to earnings since the 1994 ban on repurchases was lifted.

The trend in coefficients for dividends paid the previous year is negative. This finding suggests that firms that paid higher dividends the previous financial year reduced them in the current financial year. This trend is moderately strong: coefficients for about 40% (30%) of firms are statistically significant at 10% (5%). With statistically

error terms. However, it remains for future studies to determine whether Lintner's (1956) model in equation (4-1) is adapted to measure dividend forecast errors. I thank Miyagawa and two referees for raising this issue.

insignificant cases included, about 80% of firms display negative coefficients; coefficients are positive and significant for 6% of firms at 10%.

Given the explanatory power of entire models, coefficients of determination for 4 out of 10 models exceed 50%. Lintner's (1956) model is more likely to exhibit high explanatory power. I follow the original analytical method of Grullon and Michaely (2002) to prioritize the comparison with Yamaguchi (2007) in order to test the substitution hypothesis. Further discussion is required to adapt Lintner's (1956) model to measure dividend forecast error. However, the results in Table 4-3 indicate that the model's explanatory power is sufficiently high.

Next, I scale the error term ( $\hat{e}_{i,t} = DIV_{i,t} - DIV_{i,t-1} - \hat{a}_i - \hat{b}_i\, EARN_{i,t} - \hat{c}_i\, DIV_{i,t-1}$ ) in equation (4-1) to total market value at the start of each financial year, as per Grullon and Michaely (2002), and average total assets (book value) at the end of preceding financial year and current financial year, as per Yamaguchi (2007). I perform the calculations using both methods and indicate the scaled error term as ERROR and scaled repurchases as REPO. A negative (positive) value for ERROR denotes that dividends paid fall below (exceed) forecasts.[26]

Table 4-4 shows an average ERROR for five groups categorized by REPO. In addition, I set the quantile for $REPO$ at 1% instead of by quintile because $REPO$ is not distributed uniformly. Therefore, the groups' sample sizes differ. In general, values for ERROR are negative, because parameters were estimated pre- and post-financial crisis, after unprecedented numbers of firms cut dividends.

[26] I exclude absolute values of scaled error terms exceeding 5%. Only five samples scaled to total assets and seven samples scaled to market value are excluded.

**Table 4-4. Relationship between ERROR and repurchases (2008—2013)**

| | | Grouping by repurchases | | | | | |
|---|---|---|---|---|---|---|---|
| | Total | G1(low) | G2 | G3 | G4 | G5(high) | G5-G1 |
| | | 0-1% | 1-2% | 2-3% | 3-4% | 4%- | |
| Panel A. Total assets | | | | | | | |
| No. | 2,563 | 2,300 | 131 | 60 | 42 | 30 | |
| *REPO* | 0.36% | 0.08% | 1.40% | 2.44% | 3.67% | 8.42% | 8.35% |
| (*t*-value) | (14.30) | (19.13) | (54.41) | (66.64) | (44.28) | (7.95) | (67.20) |
| *ERROR* | -0.05% | -0.04% | -0.04% | 0.03% | -0.22% | -0.29% | -0.25% |
| (*t*-value) | (-5.17) | (-4.70) | (-0.84) | (0.39) | (-1.78) | (-2.21) | (-3.00) |
| Panel B. Total market value | | | | | | | |
| No. | 2,551 | 2,131 | 185 | 103 | 56 | 76 | |
| *REPO* | 0.56% | 0.07% | 1.44% | 2.46% | 3.43% | 7.47% | 7.40% |
| (*t*-value) | (16.32) | (18.27) | (69.73) | (90.06) | (95.07) | (11.34) | (59.03) |
| *ERROR* | -0.08% | -0.09% | -0.11% | -0.08% | -0.06% | -0.04% | 0.05% |
| (*t*-value) | (-5.39) | (-4.86) | (-2.17) | (-1.14) | (-0.52) | (-0.54) | (0.49) |

Panel A of Table 4-4 shows the results of scaling to total assets (book value), as per Yamaguchi (2007). The difference in ERROR between the group with the highest repurchases (G5) and the lowest repurchases (G1) is significantly negative. This finding supports the substitution hypothesis. However, *ERROR* does not necessarily decrease monotonically over G1 to G5, and *ERROR* diminishes dramatically between G4 and G5. As Panel B of Table 4-4 shows, no such trend is clear for the total market.

To confirm these results I consider the impact of other variables using multiple regression following Grullon and Michaely (2002) and Yamaguchi (2007). In particular, I regress *ERROR* on six variables, including *REPO*.

Scaled forecast error of firm *i's* dividend ($ERROR_i$)

$= a + b_1 \times$ scaled repurchases by firm $i$ ($REPO_i$)

$+ b_2 \times$ logarithmic total market value of firm $i + b_3 \times$ ROA of firm $i$

$+ b_4 \times$ standard deviation of ROA for firm $i$ in the previous 3 years

$(\sigma(\mathrm{ROA})_i)$

$+ b_5 \times$ ratio of non-operating profit for firm $i$

$+ b_6 \times$ debt ratio for firm $i$

+ error term $(u_i)$.

Table 4-5 shows the model's estimated results.

Because the coefficients for dividend forecast error ($ERROR$) to repurchases ($REPO$) are negative but not significant after applying both scaling tools, no clear evidence supports the substitution hypothesis for Japan, unlike the United States. However, compared to Yamaguchi (2007), whose data span 2002 to 2005, the results of Tables 4-4 and 4-5 involving post-2008 data resemble the U.S. results. When arranged by year, for 6 years after 2008 before 2013, negative coefficient values appear in four periods when scaled to assets and in three periods when scaled to market value. That finding might demonstrate the effect of introducing the ToSTNeT-3 in 2008. Therefore, I develop a more detailed analysis after assuming as follows.

> Although the ToSTNeT-2 (closing price transaction) existed in 2008, there were both repurchases as payout policy for shareholders and non-payouts (e.g., dissolution of mutual shareholdings) among share repurchases using on-auction (open market). That is, the substitution hypothesis might be less likely to have support, since share repurchases have weak relationships with payout policy for shareholders conducted via on-auction. However, with the introduction of the ToSTNeT-3 in 2008, payout policy became dominant in use for OMR, and

**Table 4-5. Results of cross-sectional regressions (2008—2013)**

| | Whole | | Year | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2008 | | 2009 | | 2010 | | 2011 | | 2012 | | 2013 | |
| Panel A. Total assets | | | | | | | | | | | | | | |
| Constant | −0.001 | (−1.33) | −0.001 | (−0.66) | 0.002 | (0.79) | −0.001 | (−0.53) | −0.005 | (−3.08) | 0.001 | (0.48) | −0.001 | (−0.41) |
| *REPO* | −0.023 | (−1.82) | −0.021 | (−0.90) | −0.071 | (−2.50) | 0.075 | (1.83) | −0.085 | (−2.39) | −0.024 | (−0.60) | 0.060 | (1.90) |
| ln(*MV*) | 0.000 | (1.21) | 0.001 | (2.51) | 0.000 | (0.10) | 0.000 | (−0.35) | 0.001 | (2.56) | 0.000 | (−0.38) | 0.000 | (0.10) |
| *ROA* | 0.008 | (2.56) | −0.008 | (−1.24) | −0.013 | (−1.57) | 0.011 | (1.35) | 0.010 | (1.47) | 0.008 | (1.00) | 0.008 | (1.03) |
| $\sigma$(*ROA*) | −0.031 | (−5.44) | −0.006 | (−0.30) | −0.050 | (−3.16) | −0.039 | (−2.86) | 0.021 | (1.83) | −0.055 | (−3.88) | −0.025 | (−1.32) |
| *NOPER* | −0.036 | (−2.90) | −0.051 | (−1.91) | −0.067 | (−1.99) | −0.072 | (−1.97) | 0.016 | (0.55) | −0.036 | (−1.13) | −0.034 | (−1.37) |
| *Debt ratio* | 0.001 | (1.28) | −0.003 | (−2.65) | 0.000 | (−0.31) | 0.003 | (2.26) | 0.000 | (0.40) | 0.001 | (0.67) | 0.001 | (0.81) |
| Panel B. Total market value | | | | | | | | | | | | | | |
| Constant | −0.003 | (−2.21) | 0.000 | (0.22) | −0.001 | (−0.24) | 0.002 | (0.47) | −0.010 | (−3.30) | −0.006 | (−1.82) | −0.003 | (−0.97) |
| *REPO* | −0.010 | (−0.68) | −0.036 | (−2.05) | −0.044 | (−1.34) | 0.007 | (0.14) | −0.040 | (−1.12) | 0.012 | (0.28) | 0.043 | (1.09) |
| ln(*MV*) | 0.001 | (2.60) | 0.001 | (2.24) | 0.001 | (1.32) | −0.001 | (−0.70) | 0.002 | (3.04) | 0.002 | (2.51) | 0.001 | (0.92) |
| *ROA* | 0.022 | (4.30) | −0.008 | (−1.47) | −0.013 | (−0.97) | 0.053 | (3.04) | 0.019 | (1.45) | −0.007 | (−0.51) | 0.044 | (2.98) |
| $\sigma$(*ROA*) | −0.069 | (−6.89) | 0.008 | (0.46) | −0.064 | (−2.55) | −0.140 | (−4.67) | −0.015 | (−0.71) | −0.025 | (−1.01) | −0.069 | (−1.84) |
| *NOPER* | −0.065 | (−3.00) | −0.050 | (−2.19) | −0.107 | (−2.04) | −0.154 | (−1.87) | 0.002 | (0.04) | −0.116 | (−2.08) | −0.051 | (−1.01) |
| *Debt ratio* | −0.001 | (−0.62) | −0.004 | (−3.75) | −0.003 | (−1.16) | 0.001 | (0.33) | 0.001 | (0.32) | −0.001 | (−0.44) | −0.002 | (−0.68) |

Note: *t*-statistics are indicated in parentheses.

Repurchasing firms began to use the ToSTNeT-3 with the objective of, for example, dissolution of mutual shareholdings.

I change data sources for the more detailed analysis. The amounts for repurchases taken from shareholders' equity reported in securities filings are totals for a financial year. Thus, the breakdown is unclear. Hereafter, announced market repurchases (on-auction and ToSTNeT) include negotiated transactions and repurchases without resolutions from boards and stockholders. Odd lots are included. Therefore, there are divergent objectives for repurchases as well as transaction mechanisms.

By contrast, obtaining repurchase information from the TDnet facilitates characterizing repurchase objectives and mechanisms.[27] Since repurchases announced through the TDnet are endorsed by directors and stockholders, I can isolate repurchases that are large enough to influence a firm's capital structure. In turn, I can determine whether shares were repurchased on-auction or via the ToSTNeT.

Table 4-6 indicates the results of analysis using the TDnet. Sample 1 corresponds to regression analyses in Table 4-5. However, the results in Table 4-6 identified as Sample 2 are limited to 2011 and 2012. Since there is little difference between Samples 1 and 2, TDnet data are nearly identical to securities filings. In addition, data concerning tiny repurchases (odd lots) do not affect outcomes.

Sample 3 shows the estimated results divided between equation ("*Market*(1)"), which excluded ToSTNeT-3 repurchases in the analysis, and

[27] Because TDnet data are available only on paper, I hand-collected data. Thus, the periods analyzed are only 2011 and 2012.

## Table 4-6. Results of cross-sectional regressions with TDnet data (2011—2012)

| | Sample 1 | Sample 2 | Sample 3 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Market*(1) | | | *Market*(2) | | | *Off-auction*(1) | | | *Off-auction*(2) | | |
| | | | Whole | 2011 | 2012 | Whole | 2011 | 2012 | Whole | 2011 | 2012 | Whole | 2011 | 2012 |
| Panel A. Total assets | | | | | | | | | | | | | | |
| No. | 826 | 826 | 759 | 377 | 382 | 76 | 38 | 38 | 724 | 359 | 365 | 41 | 20 | 21 |
| Constant | −0.002 | −0.002 | −0.002 | −0.005 | 0.001 | 0.002 | −0.010 | 0.008 | −0.003 | −0.005 | 0.000 | −0.002 | 0.007 | −0.004 |
| | (−1.80) | (−1.81) | (−1.73) | (−3.05) | (0.60) | (0.42) | (−1.84) | (1.15) | (−1.97) | (−2.67) | (0.10) | (−0.33) | (0.70) | (−0.84) |
| *REPO* | −0.072 | −0.056 | −0.107 | −0.109 | −0.085 | −0.105 | −0.036 | −0.157 | 0.078 | −0.017 | 0.101 | 0.146 | −0.130 | 0.121 |
| | (−2.51) | (−2.08) | (−2.68) | (−2.08) | (−1.42) | (−1.55) | (−0.39) | (−1.45) | (1.39) | (−0.14) | (1.58) | (2.45) | (−0.64) | (2.76) |
| ln(*MV*) | 0.000 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | 0.001 | 0.000 | 0.000 | −0.002 | 0.002 |
| | (1.40) | (1.39) | (1.20) | (2.52) | (−0.66) | (−0.03) | (1.25) | (−0.23) | (1.35) | (2.25) | (−0.33) | (0.31) | (−0.99) | (1.91) |
| *ROA* | 0.011 | 0.011 | 0.015 | 0.012 | 0.013 | 0.010 | 0.003 | 0.018 | 0.013 | 0.011 | 0.010 | −0.056 | −0.019 | −0.094 |
| | (2.14) | (2.12) | (2.74) | (1.64) | (1.61) | (0.57) | (0.10) | (0.66) | (2.30) | (1.42) | (1.28) | (−2.90) | (−0.51) | (−5.71) |
| *σ*(*ROA*) | −0.013 | −0.012 | −0.016 | 0.018 | −0.057 | −0.080 | −0.012 | −0.164 | −0.009 | 0.022 | −0.050 | 0.003 | 0.038 | −0.030 |
| | (−1.39) | (−1.36) | (−1.65) | (1.44) | (−3.84) | (−1.98) | (−0.25) | (−2.35) | (−0.97) | (1.80) | (−3.35) | (0.11) | (0.88) | (−0.60) |
| *NOPER* | −0.009 | −0.008 | −0.009 | 0.014 | −0.032 | −0.024 | 0.223 | −0.037 | −0.005 | 0.007 | −0.021 | 0.167 | 0.157 | 0.168 |
| | (−0.39) | (−0.36) | (−0.40) | (0.45) | (−0.94) | (−0.36) | (1.86) | (−0.38) | (−0.20) | (0.21) | (−0.59) | (1.88) | (0.84) | (2.45) |
| *Debt* | 0.001 | 0.001 | 0.001 | 0.000 | 0.001 | −0.001 | 0.003 | −0.007 | 0.001 | 0.000 | 0.001 | 0.001 | 0.002 | −0.002 |
| | (0.85) | (0.91) | (0.90) | (0.35) | (0.71) | (−0.34) | (0.79) | (−1.46) | (1.05) | (0.23) | (0.97) | (0.40) | (0.46) | (−0.82) |

Note: *t*-statistics are indicated in parentheses.

(*Continued*)

| | Sample 1 | Sample 2 | Sample 3 | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | *Market*(1) | | | *Market*(2) | | | *Off-auction*(1) | | | *Off-auction*(2) | | |
| | | | Whole | 2011 | 2012 | Whole | 2011 | 2012 | Whole | 2011 | 2012 | Whole | 2011 | 2012 |
| Panel B. Total market value | | | | | | | | | | | | | | |
| No. | 825 | 825 | 758 | 377 | 381 | 76 | 38 | 38 | 723 | 360 | 363 | 41 | 21 | 20 |
| Constant | −0.008 | −0.008 | −0.009 | −0.011 | −0.006 | −0.007 | −0.020 | 0.003 | −0.008 | −0.010 | −0.006 | 0.016 | 0.010 | 0.013 |
| | (−3.66) | (−3.69) | (−3.85) | (−3.41) | (−1.92) | (−1.12) | (−2.06) | (0.28) | (−3.46) | (−2.97) | (−1.71) | (1.50) | (0.55) | (0.84) |
| *REPO* | −0.032 | −0.016 | −0.046 | −0.079 | −0.015 | 0.006 | 0.008 | 0.024 | 0.047 | 0.010 | 0.088 | −0.030 | −0.081 | 0.055 |
| | (−1.09) | (−0.58) | (−1.14) | (−1.40) | (−0.25) | (0.11) | (0.09) | (0.29) | (0.79) | (0.13) | (0.94) | (−0.39) | (−0.61) | (0.55) |
| ln(*MV*) | 0.002 | 0.002 | 0.002 | 0.002 | 0.002 | 0.000 | 0.003 | −0.002 | 0.002 | 0.002 | 0.002 | −0.004 | −0.004 | −0.001 |
| | (3.99) | (3.99) | (4.17) | (3.27) | (2.52) | (0.30) | (1.48) | (−0.91) | (3.91) | (2.87) | (2.53) | (−1.70) | (−1.05) | (−0.39) |
| *ROA* | 0.007 | 0.006 | 0.011 | 0.022 | 0.000 | 0.028 | 0.012 | 0.050 | 0.008 | 0.021 | −0.006 | −0.019 | 0.003 | −0.090 |
| | (0.73) | (0.68) | (1.14) | (1.57) | (0.01) | (1.04) | (0.28) | (1.25) | (0.82) | (1.47) | (−0.42) | (−0.51) | (0.05) | (−1.57) |
| $\sigma$(*ROA*) | −0.018 | −0.017 | −0.024 | −0.022 | −0.031 | −0.087 | −0.053 | −0.074 | −0.020 | −0.017 | −0.031 | −0.001 | 0.030 | −0.058 |
| | (−1.15) | (−1.10) | (−1.46) | (−1.04) | (−1.20) | (−1.46) | (−0.61) | (−0.75) | (−1.17) | (−0.76) | (−1.17) | (−0.02) | (0.33) | (−0.40) |
| *NOPER* | −0.055 | −0.054 | −0.063 | −0.013 | −0.116 | 0.146 | 0.368 | 0.143 | −0.073 | −0.021 | −0.133 | 0.180 | 0.325 | 0.103 |
| | (−1.44) | (−1.42) | (−1.57) | (−0.24) | (−2.00) | (1.38) | (1.72) | (0.96) | (−1.73) | (−0.37) | (−2.13) | (1.02) | (0.87) | (0.52) |
| *Debt* | 0.000 | 0.000 | 0.000 | 0.000 | −0.001 | 0.006 | 0.005 | 0.007 | −0.001 | 0.000 | −0.002 | 0.005 | 0.011 | −0.005 |
| | (−0.11) | (−0.06) | (−0.30) | (0.06) | (−0.49) | (1.44) | (0.85) | (0.94) | (−0.47) | (0.03) | (−0.78) | (0.82) | (1.16) | (−0.64) |

Note: *t*−statistics are indicated in parentheses.

equation ("*Off-auction* (1)"), which excluded OMR in the analysis. The estimation in equation ("*Market* (2)") is limited to OMR and that in equation ("*Off-auction* (2)") is limited to ToSTNeT-3 repurchases. Panel A of Table 4-6 shows the estimated results for the model, in which ERROR is scaled to total assets. The coefficients of *REPO* in Samples 1 and 2 are significantly negative and support the substitution hypothesis. Furthermore, for equation market (1) in which Sample 3 excludes ToSTNet-3 purchases, the coefficients for REPO are strongly negative and significant. When arranged by year, their significance declines but remains negative for both years.

By contrast, the results for "*Off-auction* (1)" in Sample 3 exclude OMR for the whole period. The coefficient of *REPO* is positive but insignificant. These results support the hypothesis. That is, shares repurchased via the ToSTNeT-3 might indicate the existence of a concerted payout policy, whereas OMR reflects substitutability with dividends. However, since the coefficient for REPO is insignificant, the results in Panel B of Table 4-6 offer no additional statistical support for these results.

## 4-4. Conclusion

Examining the period 2008 to 2012, this chapter tested the hypothesis of a substitution effect between dividends and share repurchases among non-financial firms listed on the TSE. Studies using pre-2008 data provide no Japanese evidence supporting the substitution hypothesis documented in the United States. However, I adopted the Lintner (1956) model from

earlier studies and found weak support for the substitution hypothesis in Japan for the period examined.

Furthermore, after distinguishing ToSTNeT-3 repurchases from the TDnet, I found strong evidence of substitutability only for OMR. This finding implies that the ToSTNeT-3 plays a role in current day repurchases. Specifically, when the ToSTNeT-2 operated in 2008, OMR might have included both repurchases conforming to payout policy and dissolution of cross-shareholdings. Since the introduction of the ToSTNeT-3, repurchases reflecting policy have begun have been executed there, and OMR have been opportunistic. Analysis of OMR suggests support for the substitution hypothesis.

Japanese corporations decide whether to repurchase shares in the open market or on the ToSTNeT-3. Future research needs to determine how Japanese firms make this decision and to clarify their incentives of whether to repurchase shares. Numerous hypotheses speculate whether repurchases affect equity markets (Isagawa *et al*. 2008; Ota, 2009). The task of applying this study's results to other hypotheses remains for future scholars using enhanced data.

# 5. Dividend policy of family firms

## 5-1. Introduction

In this chapter, the aim of the study is to investigate how payout policy, specifically dividend policy, of family firms differs from that of non-family firms. Family firms account for a relatively high proportion of listed firms across countries and play a significant role in each country's economy. However, while studies focusing on family firms have accumulated rapidly overseas, studies on Japanese family firms are limited because of data availability issues. This study explores family firms' dividend policies using data spanning more than 10 years for listed firms. Family firms are typically characterized by two conditions: (1) ownership of the founding family and (2) presence of the founding family on boards of directors. Therefore, family firms might be included in managerial ownership, which has been investigated actively. I argue there is a need to understand the similarities and differences in dividend policies between family and non-family firms in the Japanese context.

I begin by defining family firms and explore previous research on managerial ownership, dividend policy and, specifically, family firms' dividend policies (Section 5-2). Next, I posit a relevant hypothesis and introduce my research design (Section 5-3) before presenting the results (Section 5-4) and offering a discussion and summary (Section 5-5).

## 5-2. Existing literature

### 5-2-1. Definition of family firms

Family firms are typically defined from three viewpoints: (1)

ownership of the founding family, (2) presence of the founding family on the board of directors, and (3) control of the company (chairperson) by the founding family. For example, Anderson and Reeb (2003) define family firms as those in which the founding family meets at least one of the following conditions: (1) owns the firm's shares and (2) sits on the board of the firm. On this basis, 35% of Anderson and Reeb's (2003) sample comprise family firms.[28] Numerous other studies (e.g., Ali *et al*. 2007; Chen *et al*. 2008; Villalonga and Amit, 2006) adopt similar definitions. Saito (2008) conducts research on Japanese firms and defines family firms as those meeting at least one of the following conditions: (1) the founding family is the largest shareholder and (2) a founding family member serves as the chief executive officer or chairperson. Furthermore, Shim (2009) defines family firms as those meeting at least one of the following conditions: the founding family (blood relatives, relatives by marriage, or adoptees) (1) owns their firm's shares or (2) controls the firm as the chief executive officer.

In this way, preceding studies have defined family firms as those meeting at least one of the first three conditions mentioned above as typical definitions. However, as indicated by Iriyama and Yamanoi (2014) and Saito (2008), in Japan founding family members tend to serve on the board as directors (condition 2) in the majority of firms with ownership by the founding family (condition 1). Therefore, a characteristic of Japanese family firms might come from a match of ownership and management

[28] Ebihara *et al*. (2013) explore family firms in Japan and define them as firms meeting conditions whereby the founding family (1) holds control of a company and (2) owns more than 10% of shares. On this basis, the authors' results suggest that 31.3% of all listed firms (from 9,859 firm-years) for the fiscal years 2006–2008 are family firms.

by the founding family. In other words, in Japan, it is considered appropriate to define family firms as those concurrently meeting the two conditions of (1) ownership by the founding family and (2) presence of founding family members on boards of directors.[29]

### 5-2-2. Dividend policy and managerial ownership

As noted in section 5-2-1, family firms are characterized by (1) ownership by the founding family and (2) presence of founding family members on the board of directors. Therefore, family firms might be regarded as a form of managerial ownership. Before considering dividend policies of family firms, I provide an overview of the extant literature that focuses on the relationship between managerial ownership and dividend policy.

These preceding studies have addressed two conflicting hypotheses: (1) an outcome hypothesis and (2) a substitute hypothesis. Outcome hypothesis positions dividends as a result of effective corporate governance and implies that more effective corporate governance leads to larger dividends paid by firms. As Jensen (1986) shows, agency cost declines by decreasing free cash flow through dividend payments and by decreasing managerial inefficiencies. Consequently, the efficiency of corporate governance and the size of dividend payout might exhibit a positive relationship.[30] By comparison, the substitute hypothesis regards

[29] In my sample (33,350 firm-years), firms with family board directors comprise 16,296 firm-years (48.9%). Observations in which these family board directors own no firm shares total 1,965 firm-years. Therefore, there are a total 14,331 firm years (43%) of observations that concurrently meet both conditions of (1) ownership by the founding family and (2) presence of the founding family members on the board of directors.

[30] Adjaoud and Ben-Amir (2010) measure the efficiency of corporate governance using Globe

dividends as a substitute governance mechanism. As Easterbrook (1984) illustrates, paying high dividends increases firms' opportunity to raise funds in capital markets. Thus, agency cost declines by investment banks' monitoring of management. Firms with effective corporate governance by other means need not decrease agency cost via dividend payments and, consequently, pay lower dividends.

In general, in cases in which management hold no shares, that is, in situations of complete separation of ownership and management, conflicts between the interests of management and those of shareholders can generate agency costs. As Jensen and Meckling (1976) show, managerial ownership aligns the economic interests of managers and shareholders (alignment effect) and decreases agency cost. However, excessive ownership by management generates conflicts of interest between managers and minority shareholders (entrenchment effect) and increases agency cost (Morck *et al*. 1988). Therefore, a degree of ownership by management might facilitate effective corporate governance. When considering the relationship between managerial ownership and efficiency of corporate governance with respect to previously described hypotheses, managerial ownership and dividend might exhibit an inverted U-shaped relationship according to the outcome hypothesis and a U-shaped relationship according to the substitute hypothesis.

Support for the substitute hypothesis has been documented in previous studies. For example, Schooley and Barney (1994) find that the higher

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and Mail annual corporate governance data, and investigate the relationship with the dividend payout ratio. The study's results indicate that firms exhibiting stronger corporate governance are associated with higher dividend payout ratios.

is the shareholding ratio of chief executive officers, the lower is the dividend yield; in addition, when chief executive officers' shareholding ratio exceeds 14.9%, higher shareholding ratios are associated with higher dividend yields. Furthermore, Farinha (2003) finds that the shareholding ratio of managers and their families increases with reductions in the dividend payout ratio, However, the authors note that when the ratio exceeds 25% (in FY1996) and 32% (in FY1991), increases in the shareholding ratio are associated with increases in the dividend payout ratio. By contrast, Aoki (2014) separates firms with chief executives or board directors as the largest shareholders (MO firms) and firms with other corporates as the largest shareholders (CO firms) in order to explore whether the outcome or substitute hypotheses are supported in Japan. Interestingly, his findings are support the outcome hypothesis for MO firms and the substitute hypothesis for CO firms.

## 5-3. Research design

### 5-3-1. Hypothesis

As discussed in section 5-2, family firms not only are characterized in terms of ownership and management by founding families but also are regarded as a form of managerial ownership. However, preceding studies on dividend policy for family firms have focused solely on the relationship between founding families' shareholdings and dividends and thus, provide little comparison of the relationship between dividends and shareholdings by management, except for founding families (hereafter, non-family management). Furthermore, few studies have separated ownership of the

founding family into ownership of the founding family who are active in management (family management) and founding family non-management (family non-management).

This study attempts to test for differences in the effects of ownership, considering family and non-family management, on dividend policy rather than testing the outcome and substitute hypotheses to explain dividend policy of family firms. This study assumes that different incentives in businesses with family versus non-family management structures generate differences in dividend policies.

Socioemotional wealth theory (SEW theory) is relevant to the characterization of family firms and for understanding incentive effects in that context (Gomez-Mejia *et al*. 2011). Central to Socioemotional wealth theory is the idea of pursuing and prioritizing non-financial value obtained through business, that is, socioemotional wealth for the benefit of founding families, rather than financial value. Socioemotional wealth is classified roughly into (1) powerful and emotional bonds with the firm, (2) family continuity in the business, and (3) altruism within the founding family.[31] In accordance with this theory, family management structures have strong incentives to (1) continue to own and manage their firm because of powerful and emotional bonds with the firm, (2) leave the business to their descendants in the hope of family continuity in the business.

These incentives could significantly affect dividend policy. Dividends generate outflows of cash and reduce the viability of firms

[31] Iriyama and Yamanoi (2014) delineate three categories of socioemotional wealth, as presented in Gomez-Mejia *et al*. (2011). This study adheres to that categorization.

through declining equity, current, and quick ratios. Unviability is likely to impact negatively on (1) continuing to own and manage the family firm and (2) business succession. Furthermore, continuous and high dividends are expected to drive up the stock price. In terms of business succession, large cash outflows could have significant tax implications when shares are inherited. Therefore, even if profitability were high, firms with family management ownership structures would be expected to inhibit dividends more than firms with non-family management ownership structures are. This study posits the following hypothesis.

Hypothesis: Ceteris paribus, firms with family management ownership structures inhibit dividends more than do firms with non-family management ownership structures.

### 5-3-2. Analytical model

I first consider proxy variables of a firm's dividend levels. Many studies use the dividend payout ratio to represent the dividend level. However, the dividend payout ratio is very sensitive to the firm's profitability and is known to vary widely. Reason that dividend payout ratio is very sensitive to the firm's profitability is likely to be characterized by dividend stability. Ishikawa (2007) provides characteristics of dividends of Japanese firms, suggesting that firms are less likely to change dividend policy frequently owing to concern over maintaining dividend levels (in the case of dividend increases) and market penalties (in the case of dividend decreases). In fact, dividends

**Table 5-1. Inferential variables**

| | Definitions |
|---|---|
| $DOE_{it}$ | Dividend on equity for firm $i$ in period $t$ : $DOE_{it} = Div_t / BV_{it}$<br>$Div_{it}$ : amount of dividend from capital surplus and retained earnings<br>$BV_{it}$ : end-of-period equity capital (net asset - warrant) |
| $ROE_{it}$ | Return on equity measured by end-of-period equity capital for firm $i$ in period $t$ : $ROE_{it} = Netinc_{it} / BV_{it}$<br>$Netinc_{it}$ : current net income after tax attributable to parent company |
| $FamExOwn_{it}$ | Shareholding ratio of family management for firm $i$ in period $t$ |
| $NonFamExOwn_{it}$ | Shareholding ratio of non-family management for firm $i$ in period $t$ |
| $Foreign_{it}$ | Shareholding ratio of foreign investor for firm $i$ in period $t$ |
| $Institute_{it}$ | Shareholding ratio of financial institution for firm $i$ in period $t$ |
| $Leverage_{it}$ | Financial leverage: total debt/total assets |
| $Retained_{it}$ | Retained earnings for firm $i$ in period $t$: retained earnings / $BV_{it}$ |
| $FCF_{it}$ | Free cash flows for firm $i$ in period $t$ :<br>(operating cash flow+investing cash flow) / $BV_{it}$ |

have "binding power" and, owing to strong incentives to avoid decreasing dividends, they also have "downward rigidity." In this way, when dividends are relatively stable, the larger current is net income after tax of the denominator. In other words, the higher is profitability, the lower is the dividend payout ratio. Hence, there is a strong inverse relationship between these variables. Although preceding studies have attempted to control for profitability by including it as an independent variable in regression contexts, the question of whether to be well-controlled remains.

In addition, to mitigate the impact that dividend payout ratio varies widely, preceding studies apply measures that use 5-year averages of the dividend payout ratio (e.g., Farinha, 2003), uniform 100% dividend payout ratio if it is negative and exceeds 100% (e.g., Isakov and Weisskopf, 2015), and deflating dividend by total assets or market value instead of current net income after tax (Aoki, 2014). The dividend payout ratio

might be the optimal way to approach to dividend levels but measures adopted in preceding studies are likely to skew results.

To resolve these concerns about the dividend payout ratio, this study indirectly develops the dividend payout ratio from the relationship between dividends and earnings rather than using the dividend payout ratio as the dependent variable. This study seeks to test its hypothesis using an approach that differs from preceding studies. As I have previously discussed, a firm's dividend payout ratio ($\pi = Div_{it} / Netinc_{it}$) exhibits a negative relationship with profitability, that is, current net income after tax ($Netinc_{it}$). Here, $Div_{it}$ shows the amount of dividend for firm $i$ in period $t$. I assume it is possible to describe the negative relationship between the two variables by expressing $\pi$ in linear terms, such as expression (5-1) for $Netinc_{it}$.[32] Here, $\alpha_2 < 0$ in $Netinc_{it} > 0$. In addition, because $Div_{it}$ is non-negative and $\pi$ is also non-negative if $Netinc_{it} > 0$, $\alpha_1 > 0$ in $Netinc_{it} > 0$. The signs of $\alpha_1$ and $\alpha_2$ in $Netinc_{it} < 0$ are unknown.

$$\pi = \frac{Div_{it}}{Netinc_{it}} = \alpha_1 + \alpha_2 Netinc_{it} \qquad (5\text{-}1)$$

Next, the relationship of $Div_{it}$ and $Netinc_{it}$ is expressed in quadratic form for $Netinc_{it}$ by multiplying $Netinc_{it}$ on both sides of expression (5-1).

$$Div_{it} = \alpha_1 Netinc_{it} + \alpha_2 Netinc_{it}^2 \qquad (5\text{-}2)$$

I consider expression (5-2) as my base model indicating the relationship between dividends and current net income after tax (profitability). To

[32] If $Div_{it}$ is reasonably constant regardless of profitability, $\pi = \alpha_2 / Netinc_{it}$ holds. Here, $Div_{it} = \alpha_2$ and $\alpha_2$ yields a constant dividend regardless of profitability. However, the dividend exhibits binding power and has downward rigidity, because expectations for temporary dividends increase with the special dividend for increased profitability, and the dividend might be non-constant relative to profitability. Thus, $\pi$ is expressed in linear form of $Netinc_{it}$.

estimate expression (5-2), $Div_{it}$ and $Netinc_{it}$ are scaled by end-of-period equity at book value ($BV_{it}$) to mitigate against heteroscedasticity. Since the left-hand side $Div_{it}$ / $BV_{it}$ is the dividend on equity ($DOE_{it}$) and the right-hand side $Netinc_{it}$ / $BV_{it}$ is the ROE ($ROE_{it}$) measured by only end-of-period equity at book value, expression (5-2) can be expanded as expression (5-3). An idiosyncratic error term ($\varepsilon_{it}$) is added in expression (5-3).

$$DOE_{it} = \alpha_1 ROE_{it} + \alpha_2 ROE_{it}^2 + \varepsilon_{it} \quad (5\text{-}3)$$

At this time, a firm's dividend payout ratio ($\pi$) can be evaluated, such as in expression (5-4), by dividing $ROE_{it}$ on both sides of expression (5-3). In expression (5-4), the error term is 0.

$$\frac{DOE_{it}}{ROE_{it}} = \frac{Div_{it}}{BV_{it}} \times \frac{BV_{it}}{Netinc_{it}} = \pi = \alpha_1 + \alpha_2 ROE_{it} \quad (5\text{-}4)$$

$DOE_{it}$ is non-negative except for firms with asset deficiency, and $\alpha_1 > 0$ and $\alpha_2 < 0$ in $ROE_{it} > 0$, as with expression (5-1). Likewise, the signs of $\alpha_1$ and $\alpha_2$ are unknown in $ROE_{it} < 0$.

Expression (5-3) indicates the relationship of $DOE_{it}$ and $ROE_{it}$ in $ROE_{it} > 0$ but some firms pay dividends in deficit, that is, in the setting of $ROE_{it} < 0$. This study applies analysis to a sample that includes loss-making firms in order to avoid sampling bias.[33] The deficit impact is controlled by including cross-terms of first-order and second-order terms of $ROE_{it}$ with the deficit dummy variable ($Loss_{it}$), which equals 1 if $ROE_{it} < 0$, in expression (5-3).

$$DOE_{it} = \alpha_1 ROE_{it} + \alpha_{12} ROE_{it} \times Loss_{it} + \alpha_2 ROE_{it}^2 + \alpha_{22} ROE_{it}^2 \times Loss_{it} + \varepsilon_{it} \quad (5\text{-}5)$$

[33] Among my overall sample of 33,350 firm-years, deficit observations constitute 6,106 firm-years. When estimated expression (5-6) has only surplus observations, except the cross-term with the deficit dummy variable, the results generally stay unchanged.

To measure differences in impacts of ownership ratios of family management ($FamExOwn_{it}$) and non-family management ($NonFamExOwn_{it}$) on dividend payout ratio, the cross-terms of both variables with each term on the right-hand side of expression (5-5), except the error term, are introduced. In addition, cross-terms with ownership ratios of foreign investors ($Foreign_{it}$), financial institutions ($Institute_{it}$), financial leverage ($Leverage_{it}$), retained earnings ($Retained_{it}$), and free cash flow ($FCF_{it}$) are introduced as control variables. Based on this, expression (5-5) can be expanded in the following expression (5-6).

$$
\begin{aligned}
DOE_{it} = {} & \alpha_1 ROE_{it} + \alpha_{12} ROE_{it} \times Loss_{it} + \alpha_2 ROE_{it}^2 + \alpha_{22} ROE_{it}^2 \times Loss_{it} \\
& + \alpha_3 ROE_{it} \times FamExOwn_{it} + \alpha_{32} ROE_{it} \times FamExOwn_{it} \times Loss_{it} \\
& + \alpha_4 ROE_{it}^2 \times FamExOwn_{it} + \alpha_{42} ROE_{it}^2 \times FamExOwn_{it} \times Loss_{it} \\
& + \alpha_5 ROE_{it} \times NonFamExOwn_{it} + \alpha_{52} ROE_{it} \times NonFamExOwn_{it} \times Loss_{it} \\
& + \alpha_6 ROE_{it}^2 \times NonFamExOwn_{it} + \alpha_{62} ROE_{it}^2 \times NonFamExOwn_{it} \times Loss_{it} \\
& + \alpha_7 ROE_{it} \times Foreign_{it} + \alpha_{72} ROE_{it} \times Foreign_{it} \times Loss_{it} \\
& + \alpha_8 ROE_{it}^2 \times Foreign_{it} + \alpha_{82} ROE_{it}^2 \times Foreign_{it} \times Loss_{it} \\
& + \alpha_9 ROE_{it} \times Institute_{it} + \alpha_{92} ROE_{it} \times Institute_{it} \times Loss_{it} \\
& + \alpha_{10} ROE_{it}^2 \times Institute_{it} + \alpha_{102} ROE_{it}^2 \times Institute_{it} \times Loss_{it} \\
& + \alpha_{11} ROE_{it} \times Leverage_{it} + \alpha_{112} ROE_{it} \times Leverage_{it} \times Loss_{it} \\
& + \alpha_{12} ROE_{it}^2 \times Leverage_{it} + \alpha_{122} ROE_{it}^2 \times Leverage_{it} \times Loss_{it} \\
& + \alpha_{13} ROE_{it} \times Retained_{it} + \alpha_{132} ROE_{it} \times Retained_{it} \times Loss_{it} \\
& + \alpha_{14} ROE_{it}^2 \times Retained_{it} + \alpha_{142} ROE_{it}^2 \times Retained_{it} \times Loss_{it} \\
& + \alpha_{15} ROE_{it} \times FCF_{it} + \alpha_{152} ROE_{it} \times FCF_{it} \times Loss_{it} \\
& + \alpha_{16} ROE_{it}^2 \times FCF_{it} + \alpha_{162} ROE_{it}^2 \times FCF_{it} \times Loss_{it} + \varepsilon_{it}
\end{aligned}
\qquad (5\text{-}6)
$$

Except in asset-deficient firms, $DOE_{it}$ is non-negative and reflects normal and censored data. Therefore, this study estimates expression (5-6) using the Tobit model.

As with expression (5-4), the dividend payout ratio is obtained by dividing both sides of expression (5-6) by $ROE_{it}$. Ceteris paribus, the

coefficients of each term represent the change in the dividend payout ratio for one-unit increases in the factors that influence dividend policy and, thus, show the marginal effect on dividend policy. The marginal effects of ownership ratios of family management and non-family management on dividend payout ratio ($\Delta\pi_{Fam}$、$\Delta\pi_{NonFam}$) can be expressed in the following expressions (5-7) and (5-8). This study absolutely confines $ROE_{it} < 0$, that is, deficit to analytic control and thus, interprets the result and tests hypothesis only for $ROE_{it} > 0$, that is, surplus. Hence, the cross-term with the deficit dummy variable is exempted from expressions (5-7) and (5-8).

$$\Delta\pi_{Fam} = \alpha_3 \times FamExOwn_{it} + \alpha_4 \times ROE_{it} \times FamExOwn_{it} \quad (5\text{-}7)$$

$$\Delta\pi_{NonFam} = \alpha_5 \times NonFamExOwn_{it} + \alpha_6 \times ROE_{it} \times NonFamExOwn_{it} \quad (5\text{-}8)$$

The hypothesis in this study is supported if the difference between expressions (5-7) and (5-8) indicated in the following expression (5-9) is negative in the area of $ROE_{it} > 0$. Because the hypothesis in this study is associated with the effect on the dividend payout ratio in the situation in which $FamExOwn_{it}$ equals $NonFamExOwn_{it}$, both variables are offset in expression (5-9).

$$\Delta\pi_{Fam} - \Delta\pi_{NonFam} = \alpha_3 - \alpha_5 + (\alpha_4 - \alpha_6) \times ROE_{it} \quad (5\text{-}9)$$

### 5-3-3. Data

Our sample consists of limited firms with (1) a description of "Major Shareholder" and "Profile of Directors" in TOYO KEIZAI data services and (2) reporting financial statements by Japanese accounting standards for

all listed firms over fiscal years from January 2003 to July 2012. First, to identify founding family members across all directors and the 30 largest shareholders, I specify founders in each firm. Founders are specified by tracing company history using *Nihon Kaisyashi Souran* of TOYO Keizai. For firms without a listing in the *Souran* and firms with an unidentified founder in the *Souran*, I locate this information by researching company history using multiple data sources, such as firms' corporate development sections of securities reports, web pages, and newspaper and magazine articles.

Next, I use founders' family names to identify founding family members among large shareholders and directors. Since a relative by affinity with a different family name is recorded, I identify these individuals from firms' securities reports and large shareholding reports. For an elaboration on the detailed procedure for identification of founding family members, see Ebihara *et al*. (2013).

After identification of founding families across target firms, I exclude the following firm-year outliers from my sample: (1) banking, insurance, and securities companies, (2) incomputable dependent and independent variable, (3) asset deficiency, (4) incomputable ownership ratio of non-family management, and (5) $DOE_{it}$, $ROE_{it}$, $Leverage_{it}$, $Retained_{it}$, and $FCF_{it}$ above or below 0.5%. The final sample size equates to 33,350 firm-years. I use consolidated financial statement data as financial information. Table 5-2 illustrates the process of sample selection.

Table 5-3 presents descriptive statistics associated with my inferential variables. Average $DOE_{it}$ is 0.016 and thus, dividends are

**Table 5-2. Sample selection**

| | |
|---|---|
| "Major Shareholder" and "Profile of Directors" of TOYO Keizai data services firm-years | 36,107 |
| −) Banking, insurance, and securities companies firm-years | (1,234) |
| −) Incomputable dependent variable and independent variable firm-years | (268) |
| −) Asset deficiency firm-years | (128) |
| −) Incomputable ownership ratio of non-family management firm-years | (5) |
| −) Above or below 0.5% of $DOE_{it}$, $ROE_{it}$, $Leverage_{it}$, $Retained_{it}$, and $FCF_{it}$ as outliers | (1,122) |
| Sample | 33,350 |

Notes: This sample excludes firm-years for unlisted management shareholding ratio in "Major Shareholder" database, and firm-years in which the family management shareholding ratio exceeds the management shareholding ratio and thus, the non-family management shareholding ratio is negative by influence of class share.

**Table 5-3. Descriptive statistics (N=33,350)**

| | Mean | SD | Q1 | Median | Q3 |
|---|---|---|---|---|---|
| $DOE_{it}$ | 0.016 | 0.014 | 0.008 | 0.014 | 0.022 |
| $ROE_{it}$ | 0.019 | 0.217 | 0.014 | 0.048 | 0.091 |
| $FamExOwn_{it}$ | 0.076 | 0.132 | 0.000 | 0.000 | 0.105 |
| $NonFamExOwn_{it}$ | 0.024 | 0.054 | 0.003 | 0.007 | 0.022 |
| $Foreign_{it}$ | 0.078 | 0.108 | 0.004 | 0.032 | 0.110 |
| $Institute_{it}$ | 0.039 | 0.048 | 0.000 | 0.021 | 0.066 |
| $Leverage_{it}$ | 0.515 | 0.209 | 0.352 | 0.524 | 0.678 |
| $Retained_{it}$ | 0.398 | 0.632 | 0.280 | 0.523 | 0.701 |
| $FCF_{it}$ | 0.029 | 0.273 | -0.041 | 0.039 | 0.121 |

approximately 1.6% of equity capital on average. Mean value and median value of $ROE_{it}$ are 0.012 and 0.047, respectively, and both exhibit wide variability. Since deficit observations are contained in my samples, ROE of firms running a loss on the verge of asset deficiency might be related to this difference. Mean values and median values of $FamExOwn_{it}$ and $NonFamExOwn_{it}$ are 0.076 and 0.024, respectively, and also 0.000 and 0.007, respectively. Mean values of $Foreign_{it}$ and $Institute_{it}$ are 0.078 and 0.039,

**Table 5-4. Correlation among variables (N=33,350)**

| | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | $DOE_{it}$ | | 0.308 ** | 0.079 ** | 0.065 ** | 0.153 ** | 0.198 ** | -0.068 ** | 0.303 ** | 0.032 ** |
| 2 | $ROE_{it}$ | 0.491 ** | | 0.039 ** | 0.027 ** | 0.072 ** | 0.159 ** | -0.112 ** | 0.530 ** | 0.170 ** |
| 3 | $FamExOwn_{it}$ | 0.051 ** | 0.062 ** | | 0.031 ** | -0.148 ** | -0.109 ** | -0.083 ** | 0.033 ** | -0.082 ** |
| 4 | $NonFamExOwn_{it}$ | 0.042 ** | 0.042 ** | 0.253 ** | | -0.124 ** | -0.117 ** | -0.006 | -0.001 | -0.068 ** |
| 5 | $Foreign_{it}$ | 0.186 ** | 0.193 ** | -0.159 ** | -0.345 ** | | 0.479 ** | -0.139 ** | 0.080 ** | -0.020 ** |
| 6 | $Institute_{it}$ | 0.267 ** | 0.241 ** | -0.131 ** | -0.308 ** | 0.678 ** | | -0.097 ** | 0.164 ** | -0.003 |
| 7 | $Leverage_{it}$ | -0.070** | 0.006 | -0.107 ** | -0.074 ** | -0.190 ** | -0.110 ** | | -0.210 ** | 0.035 ** |
| 8 | $Retained_{it}$ | 0.365 ** | 0.260 ** | 0.052 ** | 0.060 ** | 0.164 ** | 0.191 ** | -0.316 ** | | 0.057 ** |
| 9 | $FCF_{it}$ | 0.080 ** | 0.214 ** | -0.060 ** | -0.048 ** | -0.033 ** | 0.005 | 0.079 ** | 0.026 ** | |

Notes: Up refers to Pearson's product-moment correlation coefficient. Down refers to Spearman's rank-correlation coefficient. ** represents significance at the 1% level.

respectively, and their median values are 0.032 and 0.021, respectively; thus, they converge toward a level of $FamExOwn_{it}$. Accordingly, the effects of these ownership ratios should be controlled in the subsequent analysis.

Table 5-4 shows the correlation matrix between my inferential variables. Pearson's product-moment correlation coefficient among $DOE_{it}$ and $ROE_{it}$ is 0.308, indicating a statistically significant positive correlation. In addition, variables of all ownership ratios are significantly and positively correlated with $DOE_{it}$ as well as $ROE_{it}$. Only in the context of univariate analyses, higher ownership ratios of managers

(family and non-family), foreign investors, and finance institutions are associated with higher profitability and dividends.

## 5-4. Results

Table 5-5 presents results from operationalizing expression (5-6), delineated across Models 1 to 6 based on independent variables and the presence or absence of control variables. As expected, the coefficients $\alpha_1$ of $ROE_{it}$ are statistically significant and positive. Meanwhile, coefficients $\alpha_2$ of the second-order term $ROE_{it}$ are statistically significant and negative across all models at the 1% level. That is, there is a significant inverse relationship, on average, between firms' profitability and dividend payout ratios. In addition, with an interpretation using the estimated parameter in model 1, $DOE_{it}$ increases with $ROE_{it}$, $DOE_{it}$ takes a maximum 3.08% around 20.6% of $ROE_{it}$, and then $DOE_{it}$ declines as $ROE_{it}$ increases.

Next, the coefficients $\alpha_3$ of the cross-term $ROE_{it}$ with $FamExOwn_{it}$ are significantly negative across all models and coefficients $\alpha_4$ of the cross-term of squared $ROE_{it}$ with $FamExOwn_{it}$ are significantly positive for all models at the 1% level. The coefficients $\alpha_5$ of the cross-term of $ROE_{it}$ with $NonFamExOwn_{it}$ are negative for all models; the coefficients $\alpha_6$ of the cross-term of squared $ROE_{it}$ with $NonFamExOwn_{it}$ are positive but $\alpha_5$ only indicates a significant value at the 5% level in model 6. $\alpha_6$ is significant at the 5% level in model 5 and is significant at the 1% level in other models. Therefore, model 6, in which $\alpha_6$ is significant, is used in hypothesis testing.

**Table 5-5. Estimated results from expression (5-6)**

| Variables | | | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|---|
| | | | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient |
| | | | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value |
| $ROE_{it}$ | $\alpha_1$ | + | 0.300 | 0.259 | 0.309 | 0.304 | 0.268 | 0.285 |
| | | | 153.169** | 34.547** | 127.450** | 90.844** | 35.165** | 35.071** |
| $ROE_{it}\times Loss_{it}$ | $\alpha_{12}$ | ? | -0.289 | -0.251 | -0.295 | -0.276 | -0.254 | -0.259 |
| | | | -126.08** | -29.097** | -100.919** | -72.968** | -28.773** | -27.204** |
| $ROE_{it}^2$ | $\alpha_2$ | − | -0.732 | -0.792 | -0.793 | -0.883 | -0.810 | -0.971 |
| | | | -74.215** | -20.342** | -64.208** | -52.950** | -20.574** | -22.991** |
| $ROE_{it}^2\times Loss_{it}$ | $\alpha_{21}$ | ? | 0.733 | 0.764 | 0.794 | 0.889 | 0.784 | 0.945 |
| | | | 74.000** | 19.556** | 63.852** | 53.215** | 19.824** | 22.209** |
| $ROE_{it}\times FamExOwn_{it}$ | $\alpha_3$ | ? | | | -0.064 | -0.055 | -0.077 | -0.087 |
| | | | | | -4.892** | -4.158** | -6.141** | -6.852** |
| $ROE_{it}\times FamExOwn_{it}\times Loss_{it}$ | $\alpha_{31}$ | ? | | | 0.039 | 0.013 | 0.047 | 0.041 |
| | | | | | 2.522* | 0.829 | 3.167** | 2.712** |
| $ROE_{it}^2\times FamExOwn_{it}$ | $\alpha_4$ | ? | | | 0.364 | 0.403 | 0.236 | 0.341 |
| | | | | | 6.335** | 6.950** | 4.237** | 5.993** |
| $ROE_{it}^2\times FamExOwn_{it}\times Loss_{it}$ | $\alpha_{41}$ | ? | | | -0.365 | -0.410 | -0.240 | -0.350 |
| | | | | | -6.316** | -7.057** | -4.290** | -6.137** |
| $ROE_{it}\times NonFamExOwn_{it}$ | $\alpha_5$ | ? | | | -0.043 | -0.028 | -0.048 | -0.063 |
| | | | | | -1.509 | -0.987 | -1.764 | -2.271* |
| $ROE_{it}\times NonFamExOwn_{it}\times Loss_{it}$ | $\alpha_{51}$ | ? | | | -0.003 | -0.041 | -0.014 | -0.020 |
| | | | | | -0.074 | -1.079 | -0.413 | -0.605 |
| $ROE_{it}^2\times NonFamExOwn_{it}$ | $\alpha_6$ | ? | | | 0.407 | 0.479 | 0.241 | 0.382 |
| | | | | | 3.616** | 4.230** | 2.186* | 3.437** |

*(continued)*

| Variables | | | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|---|
| | | | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient |
| | | | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value |
| $ROE_{it}^2 \times NonFamExOwn_{it} \times Loss_{it}$ | $\alpha_{61}$ | ? | | | -0.441 | -0.523 | -0.254 | -0.399 |
| | | | | | -3.826** | -4.507** | -2.296* | -3.584** |
| $ROE_{it} \times Foreign_{it}$ | $\alpha_7$ | ? | | | | 0.066 | | -0.015 |
| | | | | | | 3.620** | | -0.868 |
| $ROE_{it} \times Foreign_{it} \times Loss_{it}$ | $\alpha_{71}$ | ? | | | | -0.081 | | -0.014 |
| | | | | | | -3.977** | | -0.661 |
| $ROE_{it}^2 \times Foreign_{it}$ | $\alpha_8$ | ? | | | | 0.136 | | 0.260 |
| | | | | | | 1.669 | | 3.141** |
| $ROE_{it}^2 \times Foreign_{it} \times Loss_{it}$ | $\alpha_{81}$ | ? | | | | -0.139 | | -0.265 |
| | | | | | | -1.710 | | -3.192** |
| $ROE_{it} \times Institute_{it}$ | $\alpha_9$ | ? | | | | -0.116 | | -0.218 |
| | | | | | | -2.678** | | -5.185** |
| $ROE_{it} \times Institute_{it} \times Loss_{it}$ | $\alpha_{91}$ | ? | | | | -0.592 | | -0.221 |
| | | | | | | -9.585** | | -3.608** |
| $ROE_{it}^2 \times Institute_{it}$ | $\alpha_{10}$ | ? | | | | 1.819 | | 1.727 |
| | | | | | | 8.263** | | 7.952** |
| $ROE_{it}^2 \times Institute_{it} \times Loss_{it}$ | $\alpha_{101}$ | ? | | | | -2.263 | | -1.954 |
| | | | | | | -10.074** | | -8.804** |
| $ROE_{it} \times Leverage_{it}$ | $\alpha_{11}$ | ? | | -0.103 | | | -0.106 | -0.117 |
| | | | | -10.754** | | | -11.070** | -12.108** |
| $ROE_{it} \times Leverage_{it} \times Loss_{it}$ | $\alpha_{111}$ | ? | | 0.085 | | | 0.084 | 0.095 |
| | | | | 7.529** | | | 7.433** | 8.196** |

*(continued)*

| Variables | | | Model 1 | Model 2 | Model 3 | Model 4 | Model 5 | Model 6 |
|---|---|---|---|---|---|---|---|---|
| | | | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient | Coefficient |
| | | | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value | *t*-value |
| $ROE_{it}^2 \times Leverage_{it}$ | $\alpha_{12}$ | ? | | 0.307 | | | 0.304 | 0.414 |
| | | | | 6.382** | | | 6.297** | 8.430** |
| $ROE_{it}^2 \times Leverage_{it} \times Loss_{it}$ | $\alpha_{121}$ | ? | | -0.284 | | | -0.283 | -0.390 |
| | | | | -5.870** | | | -5.833** | -7.870** |
| $ROE_{it} \times Retained_{it}$ | $\alpha_{13}$ | ? | | 0.170 | | | 0.170 | 0.175 |
| | | | | 23.490** | | | 23.571** | 24.310** |
| $ROE_{it} \times Retained_{it} \times Loss_{it}$ | $\alpha_{131}$ | ? | | -0.229 | | | -0.231 | -0.234 |
| | | | | -30.146** | | | -30.334** | -30.712** |
| $ROE_{it}^2 \times Retained_{it}$ | $\alpha_{14}$ | ? | | -0.087 | | | -0.095 | -0.143 |
| | | | | -2.441* | | | -2.639** | -4.024** |
| $ROE_{it}^2 \times Retained_{it} \times Loss_{it}$ | $\alpha_{141}$ | ? | | 0.070 | | | 0.077 | 0.126 |
| | | | | 1.946 | | | 2.134* | 3.525** |
| $ROE_{it} \times FCF_{it}$ | $\alpha_{15}$ | ? | | -0.028 | | | -0.032 | -0.035 |
| | | | | -4.291** | | | -4.800** | -5.265** |
| $ROE_{it} \times FCF_{it} \times Loss_{it}$ | $\alpha_{151}$ | ? | | 0.032 | | | 0.033 | 0.034 |
| | | | | 4.666** | | | 4.700** | 4.904** |
| $ROE_{it}^2 \times FCF_{it}$ | $\alpha_{16}$ | ? | | 0.104 | | | 0.111 | 0.136 |
| | | | | 3.894** | | | 4.119** | 5.072** |
| $ROE_{it}^2 \times FCF_{it} \times Loss_{it}$ | $\alpha_{161}$ | ? | | -0.108 | | | -0.116 | -0.142 |
| | | | | -4.020** | | | -4.297** | -5.272** |
| *Sigma* | | | 0.015 | 0.014 | 0.015 | 0.014 | 0.014 | 0.014 |
| | | | 231.307** | 232.365** | 231.281** | 231.443** | 232.384** | 232.389** |
| *Log likelihood* | | | 74,692 | 77,061 | 74,749 | 75,161 | 77,106 | 77,266 |
| N | | | 33,350 | 33,350 | 33,350 | 33,350 | 33,350 | 33,350 |

Note: ** and * represent significance at the 1% and 5% levels, respectively.

Inserting estimated parameters for expressions (5-7) and (5-8) yields the following. Marginal effect $\Delta\pi_{Fam}$ of $FamExOwn_{it}$ on the dividend payout ratio and marginal effect $\Delta\pi_{NonFam}$ of $NonFamExOwn_{it}$ on the dividend payout ratio both take negative values at low $ROE_{it}$ and change to positive values after changes in $ROE_{it}$ beyond a certain level. Specifically, these points are owned by management, and they play a role in inhibiting the dividend payout ratio circa 25.5% in expression (5-7) and 16.5% in expression (5-8),[34] that is, when firms are at general $ROE_{it}$ levels. In addition, the marginal effect of managerial ownership on the dividend payout ratio increases with the ownership ratio. This can be appreciated by multiplying $FamExOwn_{it}$ and $NonFamExOwn_{it}$ by each right-hand side term in expressions (5-7) and (5-8), respectively.

$$\Delta\pi_{Fam} = -0.087 \times FamExOwn_{it} + 0.341 \times ROE_{it} \times FamExOwn_{it} \quad (5\text{-}7)$$

$$\Delta\pi_{NonFam} = -0.063 \times NonFamExOwn_{it} + 0.382 \times ROE_{it} \times NonFamExOwn_{it} \quad (5\text{-}8)$$

Next, to test my hypothesis, I insert the estimated parameter in expression (5-9), which yields the following.

$$\begin{aligned} \Delta\pi_{Fam} - \Delta\pi_{NonFam} &= -0.087 + 0.063 + (0.341 - 0.382) \times ROE_{it} \\ &= -0.024 - 0.041 \times ROE_{it} \end{aligned} \quad (5\text{-}9)$$

From expression (5-9), $\Delta\pi_{Fam} - \Delta\pi_{NonFam}$ is consistently negative when $ROE_{it}$ is positive. That is, when the family management ownership ratio equals the ownership ratio of non-family management, ownership of family management inhibits dividends more than does ownership of non-family management, and thus, this study's hypothesis is supported.

[34] In my sample observations of more than 25.5% and 16.5%, $ROE_{it}$ consists of 560 firm-years (1.68%) and 2,387 firm-years (7.16%), respectively.

## 5-5. Conclusion

This chapter investigated how family firms' payout policy, specifically dividend policy, is different from that of non-family firms. Because family firms represent a form of managerial ownership, I tested for an effect on dividend policy by comparing family firms with firms with non-family ownership structures. This study developed a hypothesis that firms with family ownership structures inhibit dividends more than firms with non-family management structures do. This is because family management is associated with preferential pursuit of socioemotional wealth rather than financial gain, based on socioemotional wealth theory. Next, I tested this hypothesis using different models from existing research, which indirectly represent the dividend payout ratio using the relationship between dividends and profitability. The results of my analysis supported this hypothesis. I clarified that family management structures with shareholding characteristics inhibit dividends more than firms with non-family management ownership structures do, in favor of pursuing non-market benefits captured by the umbrella term "socioemotional wealth." In addition, I confirmed that managerial ownership inhibits the dividend payout ratio in general ROE levels while the marginal effect of managerial ownership on the dividend payout ratio increases with the ownership ratio.

In common with the majority of applied research, there are limitations to this study. First, the functional form of the relationship between the dividend payout ratio and profitability indicated in expression (5-1) might be problematic. However, this study expressed the dividend payout

ratio and profitability in terms of first-order linear relationships because the amount of dividend is stable approaching profitability, and the relationship between the dividend payout ratio and profitability might be more convex in shape with respect to the origin. Therefore, in the future, it is necessary to analyze this by expressing a functional form as per expression (5-1) to approximate reality better. Second, I shared observations about the examination of the outcome and substitute hypotheses. This study constructed an analytical model to test differences in the effects of ownership (family versus non-family management) on dividend policy. However, for the dividend policy of Japanese family firms, I did not test whether the outcome or substitute hypotheses were supported overall. Future research needs to use existing models from previous studies to test both hypotheses. Finally, this study treated only the ownership ratio of family management as a factor that influences dividend policy. However, as per previous research, other factors that might influence dividend policy warrant attention, such as founder versus descendants in family management, proportion of family on the board of directors, and presence or absence of a family director's right to represent the company.

## 6. Conclusion and future research

Why has payout policy, which has been used for many years in Europe, the United States, and Japan, had no impact on firm value? How does payout affect firm value in the first place? Are dividends and share repurchases indifferent, and are they substitutes for the payout method? This study answered these questions and explained the dividend decision mechanism by focusing on the relationship between dividends and profitability.

In chapter 2, this study tested the announcement effect of share repurchases on Japanese stock prices from 2010 to 2013. The chapter documented an average abnormal return of 2.35% on the announcement day among 392 firms listed on the First Section of the TSE and that repurchased shares. Abnormal returns appeared over 20 trading days following, but not preceding, the announcement. Higher abnormal returns were associated with a larger number of shares to be repurchased and with firms having smaller market capitalization. Although these results endorsed those of earlier studies, this study's original contribution is that it empirically confirmed different announcement effects for shares repurchased in the open market and via off-floor trading; that is, through the ToSTNeT. The announcement effect was lower among the 54% of sampled firms that repurchased shares via the ToSTNeT, although positive abnormal returns were evident.

In chapter 3, this study discussed stock market share repurchases with prior announcement from the viewpoint of firm management between February 2010 and December 2013. I found that of about 781 share repurchases for firms listed on the First Section of the TSE, lower liquidity firms were

likely to use the ToSTNeT-3. This result supported the certainty and immediacy hypothesis. Furthermore, by focusing on the motivations of both the share seller and buyer, I found evidence that management chooses the ToSTNeT-3 by accepting requests from blockholders (mainly general corporations other than financial institutions).

In chapter 4, this study examined the substitution of share repurchases for dividends among Japanese non-financial corporations since 2008. Earlier Japanese studies have provided no support for this hypothesis, but my results supported it weakly, coinciding with findings that support the hypothesis in U.S. markets. Furthermore, I found stronger substitution effects only among firms repurchasing shares on the open market by examining firms that repurchased shares on Japan's ToSTNeT-3, as reported by the TDnet. The results suggested that introducing the ToSTNeT-3 in 2008 stimulated a substitution effect.

In chapter 5, this study investigated how family firms' payout policy, specifically dividend policy, is different from that of non-family firms. Because family firms represent a form of managerial ownership, I tested for an effect on dividend policy by comparing family firms to firms with non-family ownership structures. This study developed a hypothesis that firms with family ownership structures inhibit dividends more than firms with non-family management structures do. The results of my analysis support this hypothesis. I clarified that family management structures with shareholding characteristics inhibit dividends more than do firms with non-family management ownership structures, in favor of pursuing non-market benefits captured by the umbrella term "socioemotional wealth."

In addition, I confirmed that managerial ownership inhibits the dividend payout ratio in general ROE levels while the marginal effect of managerial ownership on the dividend payout ratio increases with the ownership ratio.

In chapter 2, this study examined stock movements for 20 days around the event day. Further research needs to investigate longer-term price movements.

In order to extend chapter 3, it is necessary to examine the relationship between movement of stock price and the timing of share repurchases. It would be interesting to examine the movement of undervalued stock prices. In addition, as this study excluded from the analysis samples in which shares are repurchased through both OMR and TN3 in the same financial year, it is necessary to discuss the robustness of the results by analyzing variables using proportions of OMR and TN3.

In order to extend chapter 4, future research needs to determine how management makes decisions to repurchase shares and clarify their incentives for whether to repurchase shares. Numerous hypotheses speculate whether repurchases affect equity markets (Isagawa *et al*. 2008; Ota, 2009). The task of applying this study's results to other hypotheses remains for future scholars using enhanced data.

In order to extend chapter 5, it is necessary to express a functional form as per expression (5-1) in order to approximate reality better. A second extension is related to my observations about the examination of the outcome and substitute hypotheses. This study constructed an analytical model to test differences in the effects of ownership (family vs. non-family management) on dividend policy. However, for dividend

policy of Japanese family firms, I did not test whether the outcome or substitute hypotheses were supported overall. Future research needs to use existing models from previous studies to test both hypotheses. Finally, this study treated only the ownership ratio of family management as a factor that influences dividend policy. However, as previous research shows, other factors that might influence dividend policy warrant attention, such as founders versus descendants in family management, proportion of family on the board of directors, and the presence or absence of a family director's right to represent the company.

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