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Market Reaction to the Disclosure of Unfunded Pension Benefit Obligation Write-Off Policies in Japan

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Abstract

This paper investigates whether stock prices react to the corporate disclosures of pension cost write-off policy, and if they do, whether the direction and the magnitude of such reaction are associated with the level of unfunded pension benefit obligation and firm profitability in the Japanese context. The results of the analysis partially support the signaling explanation whereby financially affordable firms with large amount of unfunded obligations are expected to be more likely to adopt shorter term based write-offs, which are rewarded with favorable price reactions.

Keywords: unfunded pension benefit obligation, write-off period, policy disclosure, signaling effect, Tokyo stock exchange

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INTRODUCTION

In June 1998 the Business Accounting Council of Japan issued "Statement of Opinions on the Establishment of Accounting Standards for Retirement Benefits," for the purpose of establishing accounting standards for corporate pension plans etc., in order to swiftly clarify the current status of pension assets and liabilities, and apply appropriate accounting treatments to determine the periodical costs of retirement benefits incurred by companies as well as to make them compatible with international standards. The effective date of the standards was the fiscal year commencing on or after April 1, 2000.[1)]

Japanese companies were newly going to have to record unfunded pension liability as an allowance on the balance sheet due to new accounting standards on postretirement cost. However, concerning the newly generated unfunded amount of pension benefit obligations due to the change of the standards, a company may write it off during any period within 15 years. Moreover, if a company writes off the unfunded cost within a short period and the amount written off is considered to be heavy for the size of the company, it could take advantage by recording the cost as an abnormal loss without deteriorating operating income figure.

Theoretically, the inter-period allocation of pension costs does not involve any cash flow effects in calculating periodic accounting income and hence, has no influence on the value of a company. Therefore, the value of a company is not expected to change depending on the number of years over which unfunded

1) However, depending on the extent to which interested parties define the actuarial environment for corporate pensions, some companies might have experienced difficulties in applying the accounting procedures immediately in the fiscal year commencing on or after April 1, 2000. The Council determined that it was appropriate for companies that may face difficulty to account for the items under the Standards for the fiscal year commencing on or after April 1, 2001, taking into consideration situations where interested parties involved in the computation of actuarial retirement benefits under pension plans are not readily prepared for implementation, and to disclose the retirement benefit obligations, the breakdown of the obligations and other vital information pursuant to the Standards in the notes to the financial statements for the fiscal year commencing on or after April 1, 2000.

pension liability is written off, as the length of write-off period only involves differential inter-period cost allocations.

On the other hand, the choice of a cost allocation scheme per se may serve as an indicator of potential profitability or future cash flow prospect of a company and thus, could cause an influence on the expectation of investors. If the choice behavior is constrained by the performance of a firm, such that companies with good performance only can choose a specific method, such choice could signal good performance of the company under consideration. In other words, the information on the choice behavior may have a potential influence on the stock price, even without changing the fundamental construct underlying the value of the company in itself.

Therefore, a company may willingly choose a specific accounting procedure that seemingly deteriorates the accounting income in one period and disclose such information with a view to inducing favorable reactions from market participants. This behavior is referred to as "signaling" in economics.[2] Healy and Palepu (2001) provides a comprehensive review of empirical evidences suggesting that a company with a better performance is more likely to disclose a greater amount of information to attain commensurate stock price by avoiding "adverse selection."[3] In our case, the measure of signaling is not the volume of the information, but the method of allocation itself. Based on the concept of a signaling effect, we predict that a well performing company would tend to adopt a short-term write-off policy to signal its current and future high profitability.

In addition to signaling, Japanese companies reportedly prefer to report higher operating income numbers because Japanese investors generally value operating income as the most important

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2) Signaling takes root in a situation of information asymmetry, whereby inequalities in access to information on quality of goods or services disturb the normal market mechanism. Spence (1973) proposed that two parties could get around the problem of asymmetric information by having one party send a signal that could reveal some piece of relevant information to the other party. The other party would then interpret the signal and adjust his or her purchasing behavior accordingly, usually by offering a higher price relative to when he or she did not receive the signal.

3) Adverse selection refers to a market process in which irrational outcome obtains due to information asymmetries between buyers and sellers. The inferior products or customers (lemons) are more likely to be selected in such market.

performance indicator. Japanese companies also tend to strongly avoid loss reports. Consequently, they would prefer to choose immediate write-off alternatives as far as net income figure does not turn into negative as a result of accelerated write-off policy, ceteris paribus. The probability that net income would turn into negative when a company writes off the unfunded pension cost immediately may depend on the amount of the cost. Therefore, the policy choice also would depend on whether the company's performance is good enough to offset the amount of write-off cost.

Our study is motivated in part by the mixed evidences on the information content of pension disclosures in previous studies and in part by the paucity of similar studies in the Japanese context. We investigate whether price reactions to corporate pension accounting policy disclosures on financial press are related to the relative magnitude of the unfunded pension benefit obligation (UPBO hereafter) and firm profitability as a potential determinant of UPBO write-off policy choices.

Specifically, this study addresses three research questions. First, we investigate if the market reacts to the UPBO write-off policy disclosures on the financial press such as Nikkeikinyu and Nikkei Newspapers,[4] and if it does, we examine if the market would exhibit differential reactions depending on the pattern of policies between short vis-?-vis longer-term based write-off policies. Second, we also delve into the potential motivators behind varying write-off policy choice behaviors among Japanese firms. We focus on the relations between profitability and the length of the write-off periods. We conjecture that financially affordable firms would tend to adopt short-term write-off of the UPBO, which signals good news to the market. Third, we further analyze if the market would react favorably to the disclosure of short-term write-off policy, even after controlling for financial performance.

The remainder of the paper is organized as follows. Next

4) Nikkeikinyu Newspaper is mainly read by institutional investors in Japan. In the year of 2006, of the 46,300 circulation, 72.9% of the readers were business entities and 35.5% were securities companies and financial institutions, which implies potential significant influence in the stock market despite the relative small circulation. On the contrary, Nikkei Newspaper features heavy general readership, with 67.1% of the readers representing general households.

chapter develops testable hypotheses. We then explain data selection procedure and specify research models. Chapter 3 presents the results of empirical tests accompanied with discussions. Chapter 4 concludes the paper.

PREDICTION AND HYPOTHESES

A number of studies have investigated whether a firm's unfunded pension benefits are interpreted as liabilities. If they are, stock prices should be lower in the presence of unfunded benefits since they would lessen the value of residual stockholder claims. Several studies have reported that this was the case.[5)] If unfunded pension benefits are interpreted as liabilities, then their presence should also affect corporate bond ratings and bond interest rates. There is evidence that bond ratings are lower and interest rates are higher in the presence of unfunded benefits, which is consistent with the market acting as if they are liabilities (Reiter, 1985).

Beidleman (1973) reported evidence that pension expense was used to smooth yearly income, and Hagerman and Zmijewski (1979) found that the choice of amortization periods of unfunded prior service cost was associated with an income-increasing strategy for firms with high leverage levels and an income-decreasing strategy for large sized firms. These findings are supportive of economic consequences vis-à-vis debt contracting and political costs. Also, Francis and Reiter (1987) found that long-term pension expense policy, not just the portion of expense pertaining to prior service cost, was associated with the hypothesized income-increasing and income-decreasing incentives of debt and political costs, respectively.

Unlike these and other earlier studies, our main focus is given to the stock price movements over fairly narrow windows around the disclosure of unfunded pension obligation write-off policies. At least three articulated contexts are subject to empirical considerations. Firstly, under the newly adopted Japanese pension accounting standards, individual Japanese firms face the burden of unfunded pension benefit obligations, which are

5) See Daley (1984), Dhaliwal (1986), Feldstein and Seligman (1981), Kemp (1988), Landsman (1986), and Stone (1982) for a review of earlier studies.

mandated to be written off over a period of firms' own choices within 15 years. When a firm releases its policy decision in financial press other than and normally earlier than year end earnings announcement, stock market would impound the information to cause price reactions. Providing that the Japanese stock market behaves efficiently, market adjusted returns over the short windows surrounding the policy disclosures would be statistically different from zero. The first hypothesis predicts the presence of abnormal price reactions around the release of write-off decisions in the newspaper as follows.

> **H1:** Market responses around the release of the UPBO write-off policy on the financial press are not equal to zero.

When investors are informed of a specific policy decision of a firm, they would interpret its implications under the context of current profitability and possible future wealth redistributions, and would thus discriminate good news from bad news on the basis of available information. Hence, market returns during appropriate windows around the disclosure of write-off policy would differ for the short-term write-off decisions relative to long term counterparts. This is because the choice of different policy type conveys differential signal with respect to current financial health and/or future wealth redistributions among stakeholders. The second hypothesis extends the first by incorporating differential signaling implications between the short and long-term based write-offs of unfunded obligations as follows.

> **H2:** Market returns around the release of the UPBO write-off policy would be different between short term and long term policy adopters.

The second context to be considered concerns the relationship between the policy choice behavior and firm characteristics. Firm characteristics as represented by financial performance and the relative magnitude of unfunded obligations are expected to serve as motivating factors for the choice of specific write-off policy. In general, firms characterized by good performance are better capable of accommodating early write-off of unfunded obligations. Also, the firms with smaller unfunded obligations

would find it easier to write them off over shorter period. Therefore, early writing-off of the UPBO is likely to be interpreted as good news and induce favorable economic consequences from the current and potential stockholders' point of view. The third hypothesis predicts that profitable firms are more likely to write off the UPBO over shorter period. Likewise, firms with smaller UPBO are more likely to choose shorter write off period as articulated in the fourth hypothesis.

> **H3:** Other things being equal, firms with higher profitability are more likely to adopt shorter UPBO write off policies.
>
> **H4:** Other things being equal, firms with smaller UPBO are more likely to adopt shorter UPBO write off policies.

We finally examine market responses in conjunction with specific policy choice behaviors conditional upon firm characteristics. When investors in the market are informed of a firm's choice of a specific write-off policy under the context of current profitability and potential future wealth redistributions, they would discriminate good news from bad news based upon the available information. Market reacts to the disclosure of UPBO write-off policies partly because individual policy choice conveys information on the capacity of the company to accommodate chosen policy. Profitable firms tend to adopt shorter term based write-offs because they can afford funding for the pension benefit obligations overdue. As such, the type of policy adopted by a company could serve as a proxy for the performance of the firm. Consequently, the information hinted by the type of write-off policy and that provided by performance indicators may overlap to a certain extent. If the adoption of a certain write-off policy in itself conveys incremental information content over profitability effect, market would exhibit incremental responses corresponding to the policy disclosures even after controlling for the firm profitability, which may suggest the potential cash consequences pursuant to the policy choice other than current profitability differences.

> **H5:** Market returns over short windows surrounding UPBO write off policy are associated with the length of write-off periods after controlling for firm profitability and the level of

UPBO.

We next proceed to empirical analyses to confirm the validity of afore-mentioned hypotheses.

RESEARCH DESIGN

The Data

The sample consists of 372 cases of disclosures of unfunded pension benefit obligation write-off policies made in Nikkeikinyu and Nikkei Newspapers by over 400 Japanese companies during the period from 1999 to 2001. The sample firms are chosen from the set of companies listed in the Tokyo Stock Exchange as of 2006, whose daily stock prices are available from Bloomberg database. The Bloomberg database was also used to obtain the information on normal income, net income, earnings per share and book values per share, etc. as well. Consequently, the sources of data for empirical analyses are threefold: Nikkeikiny and Nikkei Newspapers are used to obtain information on the disclosure date, length of write-off periods chosen by individual firms and the amount of UPBO.[6] The Bloomberg financial database is used to retrieve accounting based performance measures at the end of accounting periods. The Bloomberg market database is used for daily stock prices of individual sample firms as well as closing daily TOPIX indexes on the dates within window periods. In order to be included in the sample, firms had to meet the following additional criteria:

First, firms should experience no merger and/or acquisition,

6) The data on the specific disclosure dates, the periods of write-off of UPBO, the amounts of UPBO of sample firms are hand-collected by searching microfiche database of Nikkeikinyu and Nikkei Newspapers on article by article basis. The Nikkeikinyu observations outnumber Nikkei counterparts with the proportion of 342 versus 30. The unbalance in sample composition may limit the external validity of the conclusions derived from this study. The disclosure dates precede the balance sheet dates for all sample firms. As of the event dates, financial data for the same year is not yet known to the market, which enables the test of signaling effect. Since market responses at the disclosure dates are measured before the disclosures of financial reports, the sample structure inherently enables the tests of association between price changes and future rather than current profitability.

litigation, or other major events that could cause significant impact on the stock prices over the period under study. There should have been no stock splits or stock dividends during the 2 weeks surrounding the disclosure date. These criteria are expected to eliminate the potentially confounding market reactions caused by unusual events.

Second, banking and service industries were deliberately excluded from the sample in order to maintain the homogeneity of the firms under study. These firms are known to have capital and revenue structures significantly different from those of most other industries, and their operating performances are also relatively more sensitive to government policies.

Variable Definitions and Models

This study investigates market reaction to the UPBO write-off policy disclosures made on the Nikkeikinyu and Nikkei Newspapers and therefore utilizes event study methodology with disclosure dates on the press being used as event dates. The window extends from the 7 days before through 7 days after the event date, and cumulative market adjusted returns are measured over varying intervals within the maximum of 14 days window period centering around the event date. Cumulative market adjusted returns (CMAR hereafter) over a specific sub-window period are defined as follows:

$$CMAR(t_1, t_2) = \sum_{t=t1}^{t2} (R_{i,t} - M_{i,t})$$

Where, $R_{i,t} = (P_{i,t} - P_{i,t-1}) / P_{i,t}$

$M_{i,t} = (TOPIX_{i,t} - TOPIX_{i,t-1}) / TOPIX_{i,t-1}$

$P_{i,t}$ = closing price of firm i on day t, $t = -7$ to $+ 7$

$OPIX_{i,t}$= closing Tokyo Stock Exchange Price Index on day t,

t = -7 to + 7

UPBO write-off policies are captured by a dichotomous categorical variable POL, whereby immediate write-off policy is distinguished from long-term based alternatives. The variable POL is defined as follows,[7)]

7) The distribution of the length of write-off periods exhibit a dramatically

$POL_{i,t}$ = 1, if write-off period of firm i in year t is 1 year or shorter,
= 0, otherwise.

The amount of UPBO of a sample firm is deflated by beginning total asset to control for size differences. The standardized amount is denoted as SUPBO,

$SUPBO_{i,t} = UPBO_{i,t} / TA_{i,t-1}$
where $UPBO_{i,t}$ = the amount of unfunded pension benefit obligation of firm i in year t
$TA_{i,t-1}$ = total asset of firm i at the beginning of year t

The relationship between corporate financial performance and the policy choice behavior is one of the major issues to be investigated in this paper. We use diverse measures of profitability which include the followings,

$SNOI_{i,t} = NOI_{i,t} / TA_{i,t-1}$
$SEBT_{i,t} = EBT_{i,t} / TA_{i,t-1}$
$SNI_{i,t} = NI_{i,t} / TA_{i,t-1}$
where $NOI_{i,t}$/ = normal income of firm i in year t
$EBT_{i,t}$ = earnings before tax of firm i in year t
$NI_{i,t}$ = net income of firm i in year t

The above profitability measures are collectively referred to as PROFIT for brevity. To reiterate research problems, we first test the null hypothesis of zero abnormal returns around the event date, which conforms to a typical event study tradition. We next regress policy variable on SUPBO and PROFIT to determine motivating factors underlying policy decisions. We finally regress CMAR measured over varying intervals within the maximum window period of 14 days around the event date on policy dummy variable, SUPBO and PROFIT. The last two tests are conducted using following regression models.

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positive skewness, with more than half of the sample firms opting for 1 year or less, and most other firms opting for longer than 10 years. As such, the variable designed to capture the length of write-off policy is transformed into a categorical variable, to facilitate comparisons among groups with different write-off periods.

$$POL_{i,t} = \beta_0 + \beta_1 SUPBO_{i,t} + \beta_2 PROFIT_{i,t} + \varepsilon_{i,t} \quad (1)$$
$$CMAR_{(t_1,t_2)} = \beta_0 + \beta_1 POL_{i,t} + \beta_2 SUPBO_{i,t} + \beta_3 PROFIT_{i,t} + \varepsilon_{i,t} \quad (2)$$

Regression model (2) is designed to test the information content of the policy choice per se, after controlling for motivating variables. Provided that the choice of a specific write-off option conveys good or bad news in its own right aside from signals associated with the level of unfunded obligations and financial performance, market is expected to exhibit incremental responses to the policy choice above motivator effects. If the choice of early write-off policy involves favorable future cash flow consequences despite lower current earnings figure for example, the investors will reward with higher than market returns to such decisions. This scenario would predict positive sign of the POL coefficient. If the choice of early write-off is likely to involve unfavorable future consequences on the other hand, the opposite would be true. As the future wealth redistribution effect of the policy choice is unclear, we simply test the non-directional null hypothesis with regard to the slope coefficient of POL variable.

EMPIRICAL TESTS AND RESULTS

Market Responses around Event Date

We first investigate market response to the disclosure of corporate UPBO write off policy. Abnormal returns as measured by daily market adjusted returns over the entire window of 14 days from days -6 through + 7 are tested against the null hypothesis of population mean of zero. Abnormal returns accumulated over selected sub-period windows are also calculated. The results of parametric t-tests and nonparametric Wilcoxon rank sum tests for daily abnormal returns are shown in Panel A of table 1. The test results of selected cumulative abnormal returns are presented in Panel B of the same table.

It is obvious from the table that market responds favorably to the disclosure of pension related information in the Nikkeikinyu and Nikkei Newspapers. A noteworthy observation is the positive abnormal return on the event date, which is significant at 0.05 level for both parametric and nonparametric tests. Although

Table 1. Market Adjusted Returns Surrounding Disclosure Date

Date	N	Mean	t-stat(p-value)	Median (p-value)	Signed rank
Panel A: Daily Abnormal Returns					
-6	294	0.0040	2.2696(0.0240)**	0.0024	2325.0(0.1112)
-5	294	0.0005	0.3394(0.7346)	-0.0013	-477.5(0.7441)
-4	293	-0.0011	-0.6916(0.4897)	-0.0007	-1226.0(0.3992)
-3	292	0.0023	1.4065(0.1606)	0.0004	1319.0(0.3619)
-2	293	0.0032	2.1224(0.0346)**	0.0016	2289.0(0.1150)
-1	294	0.0017	1.0889(0.2771)	0.0002	739.5(0.6131)
0	294	0.0041	2.4078(0.0167)**	0.0040	3330.5(0.0222)**
+1	294	0.0003	0.1835(0.8545)	0.0023	537.5(0.7132)
+2	294	0.0022	1.5592(0.1200)	0.0016	2246.0(0.1220)
+3	293	-0.0002	-0.1142(0.9092)	-0.0027	-1347.0(0.3543)
+4	292	-0.0006	-0.3388(0.7300)	0.0002	-651.5(0.6527)
+5	293	-0.0005	-0.2997(0.7646)	-0.0010	-815.5(0.5751)
+6	293	0.0017	1.0973(0.2734)	0.0002	933.5(0.5211)
+7	293	0.0002	0.1196(0.9049)	0.0006	-45.5(0.9751)
Panel B: Selected Cumulative Abnormal Returns					
(-6, 7)	290	0.0178	3.4106(0.0007)***	0.0108	4292.0(0.0025)***
(-3, 3)	291	0.0136	3.8182(0.0002)***	0.0115	5076.5(0.0004)***
(-2, 2)	293	0.0114	3.5570(0.0004)***	0.0109	5116.0(0.0004)***
(-1, 1)	294	0.0060	2.4300(0.0157)**	0.0083	3530.0(0.0153)**

***, **, * denote statistical significance at 0.01, 0.05, 0.1 levels respectively.

parametric t-test also provides statistically significant positive responses on days -6 and -2, the magnitude of market response observed on the event date exceeds those of other dates. Non-parametric test result unfalteringly indicates positive market responses from days -3 to +2.

The tests based upon cumulative abnormal returns in panel *B* further corroborate our conclusion of favorable market responses to the policy disclosure events. Market adjusted return accumulated over the 14 days from -6 to 7 exhibits statistical significance at 0.01 level for both t and rank sum test. The statistical significance increases as window period narrows to 7 days from -3 to +3 or 5 days from -2 to +2, which constitutes further evidence supporting that positive market responses are

concentrated over relatively short interval surrounding the event date.

Favorable market reaction might imply that market interprets the disclosure of UPBO write-off policy information on the newspaper as a positive signaling behavior either because disclosing firms are relatively better prepared to deal with UPBO burdens or because the signals conveyed through the disclosures may contain good news about future prospect of wealth redistributions among stakeholders.

We subsequently partition the whole sample into short versus long-term based write-off sub-samples. The rationale is that the firms opting for immediate write-off could systematically differ from slow actors, in terms of their capacity to cope with the unfunded status of pension obligations. Short term based policy advocates are assumed to represent the group capable of affording immediate expensing of the UPBO, because the magnitude of the UPBO is relatively small and/or they are financially healthier. If market effectively discriminates such differences in firm characteristics, one might expect differential reactions to the disclosures by different groups. We expect more positive market responses in favor of short term write-off firms relative to long term counterparts. The results of comparative analyses between the two groups of firms opting to write off within 1 year and those choosing longer periods are provided in table 2.

The results shown in the table suggests contrasting market responses between long term write-off group (POL=0) and their short term counterpart (POL=1). Abnormal returns around the disclosure date of short term write-off group are positive and statistically significant as shown in Panel A. Not only is the price reaction on the event date significant but those observed on days -6, -2 and +2 are also significantly positive. The market responses measured by cumulative abnormal returns shown in panel B reconfirms positive responses to the policy disclosures. Notably, the significance of the market reaction during the 5 day interval from -2 to +2 is the highest among 4 selected intervals considered, which clearly indicates that the favorable market responses are concentrated on fairly narrow interval surrounding the disclosure date. These results strongly support our prediction that short term write-off of UPBO is interpreted as

Table 2. Differential Market Adjusted Returns Between Short Term versus Long Term Write-off Groups

Date	POL=1 group			POL=0 group		
	N	mean	t-stat(p-value)	n	Mean	t-stat(p-value)
Panel A: Daily Abnormal Returns						
-6	151	0.00645	2.4357(0.0160)	122	0.00162	0.60407(0.5469)
-5	151	0.00061	0.2653(0.7912)	122	0.00131	0.50246(0.6163)
-4	150	-0.00046	-0.2181(0.8277)	122	-0.00323	-1.1585(0.2489)
-3	149	0.00201	0.9346(0.3515)	122	0.00316	1.14228(0.2556)
-2	150	0.00446	2.2058(0.0289)	122	0.00297	1.14074(0.2562)
-1	151	0.00145	0.6796(0.4978)	122	0.00344	1.37762(0.1709)
0	151	0.00421	1.9423(0.0540)	122	0.00385	1.26691(0.2076)
+1	151	0.00239	1.1750(0.2418)	122	-0.00234	-0.8855(0.3777)
+2	151	0.00529	2.6786(0.0082)	122	-0.00169	-0.7070(0.4810)
+3	150	-0.00073	-0.3398(0.7345)	122	0.00088	0.3635(0.7169)
+4	149	0.00208	0.9151(0.3616)	122	-0.00489	-1.8629(0.0649)
+5	150	-0.00090	-0.4612(0.6425)	122	-0.00146	-0.4663(0.6418)
+6	151	-0.00070	-0.3815(0.7034)	121	0.00525	1.8599(0.0653)*
+7	151	0.00196	1.0408(0.2996)	121	-0.00265	-0.9030(0.3683)
Panel B: Cumulative Abnormal Returns						
(-6, 7)	148	0.02833	3.7672(0.0002)	121	0.00590	0.7116(0.4781)
(-3, 3)	148	0.01919	3.6276(0.0004)	122	0.01027	1.9492(0.0536)
(-2, 2)	150	0.01771	4.0114(0.0000)	122	0.00624	1.1823(0.2394)
(-1, 1)	151	0.00804	2.5758(0.0110)	122	0.00495	1.11951(0.2651)

good news among the market participants, contrary to the long term write-offs. The underlying reason may have to do with relatively good performance or with favorable cash flow prospects for potential stockholders.

In contrast, market reaction to long term write-off disclosure is hardly significant throughout the 14 days window, except for the day +6. The directions of price movement are inconsistent as evidenced by negative signs on day +4. Daily abnormal return on the event date is positive, but insignificant. Cumulative abnormal returns measured over alternative intervals with varying lengths are largely insignificant except for the interval from days -3 to +3, which is significant at 0.05 level.[8)]

8) In table 2, significant market reaction is observed on days -2 and 0 for POL=1

Taken together, above results suggest that the favorable market reaction to the disclosure of UPBO write-off policy disclosures reported in Table 1 was largely led by short term rather than long term write-offs. Market apparently discriminates different write-off policies, in the sense that early write-off decisions are rewarded by above average stock returns whereas long term policy disclosure does not involve noteworthy responses. This in turn, raises a research question regarding the underlying cause of discrimination. What makes the market respond favorably to the short term write-off of UPBO? We suggest financial performance as one of the key motivators behind the write off policy decision. Other things being equal, profitable firms are more likely to opt for short term write-offs as they can afford immediate expensing of unfunded obligations. Market might be hinted on the differences in financial health between different policy choosers through policy disclosures. Or, if short term write-off is expected to be accompanied by favorable cash flow consequences from investors' point of view after having quickly removed of the unfunded obligations, market prices may reflect such prospects in advance according to the signals implied by the length of write-off period. Next section delves into this question more in detail.

Determinants of Write-Off Policy Choice

We compare firm characteristics of short term versus long term write-off groups, with a focus placed upon the relative magnitude of UPBO and various profitability measures.[9] Tests are conducted in two steps. We first employ univariate comparisons both in parametric t-test and non-parametric Wilcoxon rank sum

group, which is not the case with POL=0 counterpart. This result is not inconsistent with the results of table 1, and suggests that the results of table 1 is largely led by POL=1 group. We also observe a positive reaction on day +2 for POL=1, and a negative reaction for POL=0. We interpret the lack of significant reaction on day +2 for a combined sample reported in table 1 as owing to the offsetting reactions between the two groups.

9) The level of UPBO is obtained from the Nikkeikinyu and Nikkei Newspaper disclosures, whereas the profitability measures are available from annual financial reports at the end of accounting period. Because the disclosure of write-off policy precedes the financial reporting, the relationship between policy type and the profitability might imply advance signaling of near-future performance by means of early policy disclosures.

Table 3. Comparisons of Firm Characteristics between Different Policy Groups

Variables		Inter Group Comparisons			Wilcoxon Z-stat (p-value)	T-stat (p-value)
		POL=1		POL=0		
	n	Mean (Mean Score)	N	Mean (Mean Score)		
SUPBO	156	0.0006 (127.30)	124	0.0008 (157.11)	-2.47 (0.0145)	-2.06 (0.0022)
SNOI	156	0.0491 (153.52)	124	0.0365 (124.12)	2.48 (0.0138)	3.02 (0.0026)
SEBT	156	0.0226 (150.38)	124	0.0056 (128.07)	2.29 (0.0227)	2.29 (0.0221)
SNI	156	0.0125 (152.31)	124	-0.001 (125.64)	2.71 (0.0073)	2.74 (0.0062)

test. Firm characteristics to be considered include standardized UPBO as well as various measures of profitability. Two sample comparisons are then extended to three group comparisons employing Kruskal-Wallis test to determine whether the relationship between the length of write-off period and the levels of UPBO and/or profitability could be described as linear. The next step employs multivariate logistic regression analysis, with the dichotomous policy variable being used as regressand. Table 3 presents the results of univariate two sample tests.

According to the results shown in the table, the differences in characteristic variables between the short term write-off (POL=1) and long term write-off (POL=0) groups are statistically significant with the directions consistent with predictions in all cases. The standardized level of UPBO is significantly less for short term group relative to long term group, at 0.01 level. Therefore, we may conclude that the firms with lower level of UPBO are more likely to choose early write-off policies. With regard to the profitability dimension, summary performance measures all indicate significantly higher profitability for short term write-off group compared to long term counterpart. For example, normal income per 1 yen of beginning total asset for short term group amounts approximately to 0.049 yen on

average, whereas that of long term group amounts to only 0.036, and the difference is significant both by parametric and nonparametric criteria. Similar results are observed for earnings before tax as well as net income.

Taken as a whole, above results suggest that the firms opting to write-off their unfunded pension obligations immediately are characterized by smaller unfunded obligations and higher financial performances, which are in line with expectations. That is, firms with smaller burden of unfunded obligations are more willingly disposed to write them off. Also, the firms with better performances are more likely to expense the unfunded obligations over shorter interval, as they can afford to absorb the shocks with less negative impact on their income figures.

The total sample is further partitioned into three groups depending on the length of the write-off periods. If the relationship between SUPBO and the length of write-off is linearly positive such that larger obligations tend to induce longer write-off decisions, we would observe monotonically increasing SUPBO as the write off policy extends over longer period. Likewise, if the relationship between profitability and the length of write-off period is linear, we would observe monotonically decreasing profitability measurements as the write-off policy involves longer period. Policy variable is thus trisected by redefining policy variable as follows:

POL1 = 1, if the write-off period is 1 year or shorter,
= 2, if the write-off period is longer than 1 year and shorter than 10 years,
= 3, if the write-off period extends beyond 10 years.

Table 4. Comparisons among 3 Different Policy Groups

Variables	POL1=1		POL1=2		POL1=3		X-square (p-value)
	n	Mean Score	N	Mean Score	N	Mean Score	
SUPBO	156	127.30	59	140.23	65	172.43	14.26(0.0008)
SNOI	156	153.52	59	146.64	65	103.68	17.82(0.0001)
SEBT	156	150.38	59	142.92	65	114.60	9.02(0.0110)
SNI	156	152.31	59	144.00	65	108.97	13.29(0.0013)

Table 5. Results of Logistic Regression Analyses Using Policy as Dependent Variable

Model: $POL_{i,t} = \beta_0 + \beta_1 SUPBO_{i,t} + \beta_2 PROFIT_{i,t} + \varepsilon_{i,t}$

SUPBO		SNOI		SEBT		SNI		Log Likelihood
β_1	χ^2	β_2	χ^2	β_2	χ^2	β_2	χ^2	χ^2
-557.4	4.48**	5.89	3.45*					12.03***
	(0.03)		(0.06)					(0.00)
-573.8	4.81**			3.90	3.28*			11.80***
	(0.03)				(0.07)			(0.00)
-544.4	4.38**				7.67		4.95**	13.91***
	(0.04)						(0.03)	(0.00)
-672.1	6.68**							8.50**
	(0.01)							(0.01)

***, **, * denote statistical significance at 0.01, 0.05, and 0.1 levels respectively.

The results of Kruskal-Wallis test are presented in table 4.

The evidence supports overall linearity relationship between the lengths of write-off periods and SUPBO as well as profitability measures. As policy period extends over longer period, standardized UPBO monotonically increases whereas profitability measures monotonically decrease. The linearity relationship reinforces our belief that the magnitude of unfunded obligation and financial performance serve as major motivators for the policy choice decisions.

We next estimate logistic regression models whereby dichotomous policy variable POL is regressed on SUPBO and alternative profitability measures. Table 5 presents the results when alternative profitability variables are included as independent variables alternately along with SUPBO. The signs of regression coefficients are consistent with predictions and are statistically significant in most cases. The regression coefficient of SUPBO is significantly negative indicating that longer write-off period is associated with larger obligation after controlling for the effect of profitability. Similarly, significantly positive coefficients of profitability variables indicate that more profitable firms are disposed to choose shorter write-off period after controlling for the differences in the level of UPBO.

The logistic regression results provide evidences confirming

predicted relationships under multivariate context. Two alleged motivators behind policy decisions including the level of unfunded obligations and profitability are all consistent with the foregoing discussions in their relationships with the direction of policy choices even when both constructs are considered concurrently. The four models reported in table 5 are also possessed of statistically significant goodness of fit at 0.01 level in all cases.

Association between Market Returns and Policy Choice

We triangulate the relationships among market response, write-off policy choice and the motivator variables by including policy as well as motivators as explanatory variables in the OLS regression models in which market returns are used as dependent variables. Such regression models enable the tests for the relationships between market response and the policy variable after controlling for motivating variables of SUPBO and future profitability under multivariate setting. By including the dichotomous policy variable as a main explanatory variable for market returns, we expect to test signaling effect of policy choice per se, after controlling for the effects of SUPBO and PROFIT. We conjecture if market captures any additional information content from the policy choice behavior itself aside from information on the level of UPBO and profitability, consequent market responses would reflect potential cash flow effects pursuant to specific write-offs of unfunded obligations. Supposing that shorter term based write-off policy results in favorable future wealth redistribution effects from investors' viewpoint by quickly mitigating the burdens of unfunded obligations, market returns would be positively associated with the policy choice after controlling for UPBO and PROFIT.[10] The results of multivariate OLS regression analyses are provided in table 6.

Regressions are run for various intervals within the overall estimation window of -6 through +7. Statistical significance of the relationships between cumulative abnormal returns and

10) If market interprets lower level of unfunded obligation and higher expected future profitability as good news, the abnormal returns accumulated around the disclosure date would be negatively related with the level of UPBO and positively associated with measures of profitability.

Table 6. Results of OLS Regression Analyses Using Market Return as Dependent Variable

Model: $CMAR(t_1, t_2) = \beta_0 + \beta_1 POL_{i,t} + \beta_2 SUPBO_{i,t} + \beta_3 PROFIT_{i,t} + \varepsilon_{i,t}$

CMAR	β_1 (POL)	β_2 (SUPBO)	β_3 (SNOI)	β_3 (SEBT)	β_3 (SNI)	F-stat	*Adj.* R^2
(-6,+7)	1.66*	-1.92*	0.04			2.62*	0.0178
	(0.09)	(0.05)	(0.97)				(0.05)
(-6, +7)	1.70*	-1.98*		-0.33		2.66*	0.0182
	(0.09)	(0.05)		(0.74)		(0.05)	
(-6, +7)	1.71*	-1.98*			-0.35	2.66*	0.0182
	(0.08)	(0.05)			(0.73)	(0.05)	
(-6, +7)	1.69*	-1.96*				2.89**	0.0208
	(0.09)	(0.05)				(0.03)	
(-3, +3)	0.67	-2.03**	1.22			2.66**	0.0182
	(0.50)	(0.04)	(0.22)			(0.05)	
(-3, +3)	0.61	-2.01**		1.88*		3.36**	0.0256
	(0.54)	(0.04)		(0.06)		(0.02)	
(-3, +3)	0.53	-2.00**			2.02**	3.54**	0.0275
	(0.60)	(0.05)			(0.04)	(0.01)	
(-3,+3)	0.83	-2.24**				2.15*	0.0127
	(0.41)	(0.03)			(0.09)		

Note: First column depicts the intervals over which CMARs are measured. Numbers in each cell under β_1 through β_3 columns represent t-statistics and corresponding probability values shown in brackets. F-stat column presents F statistics with corresponding probability values. ***, **, * denote statistical significances at 0.01, 0.05, and 0.1 levels respectively.

explanatory variables differ depending on the length of the windows. Presented in the table are the results for the windows of -6 to +7 and -3 to +3. Albeit not reported in the paper, as window period narrows further, statistical significance disappears, suggesting that meaningful relationship between write-off policy variables and market response obtains only over fairly wide intervals. The results in the table do not provide a strong support for the hypothesized relationships between market returns and policy choices. When market returns are measured over the entire window, the immediate write-off policy is accompanied with higher market return relative to longer term based policy choice after controlling for UPBO at the significance

level of 0.1. When measured over -3 to +3 however, the differential coefficient between the two policy groups is no longer observed.

The coefficients of policy dummy and profitability variables are not significant simultaneously in all cases, which suggest information overlap between the two variables. These observations lead to a cautious conclusion that market does not appear to discriminate between the two policy types aside from performance features. The results reported in Table 6 suggest that UPBO write-off policies have limited information content about firm value incremental to near-future performances. It is also possible that stock market is efficient enough to recognize that there is no change in firm value with UPBO write-off disclosures aside from near-future performance signaling. If market fully understands the economic substance of what the UPBO write-off disclosure denotes, it might exhibit no incremental response to the disclosure of policies.

SUMMARY AND CONCLUSION

This paper investigated three research questions raised in Japanese stock market context. The first question concerns whether the seemingly cosmetic write-off policy disclosures cause significant stock price responses around the disclosure dates. Market adjusted abnormal returns are significantly positive, largely led by early write-off policy adopters. The differential response in favor of immediate write-offs is interpreted as reflecting signaling effect, in the sense that early write-off policy choice signals financial affordability and quick removal of obligations, despite the negative impact on accounting earnings. We next examine the differences in firm characteristics between early and long term based write-off policy groups. The early write-off group was characterized by lower level of unfunded pension benefit obligations and higher profitability relative to long term group. This observation corroborates the conjecture that financially healthier firms are more likely to choose immediate write-off options. The last test was conducted on the association between market responses and policy choice types after controlling for the level of obligation and profitability. The

results are not strong enough to support the presence of extra signals possibly associated with potential wealth redistribution pursuant to the removal of unfunded obligations. Therefore, we interpret that the favorable market response to the disclosure of immediate write-off of unfunded pension benefit obligation is driven by its signaling of near future financial health.

Our paper is not without its own limitations. First of all, our conclusion is restricted to the disclosures of write-off policy in Nikkeikinyu and Nikkei Newspapers, which is largely dominated by Nikkeikinyu observations.[11] The sample composition is heavily oriented toward Nikkeikinyu population which may restrict the external validity of the conclusions of this study. Secondly, the market responses, proxied by cumulative abnormal returns, reflect information content of UPBO write-off policies, which may differ with whether a firm writes it off immediately or not. It may also be the case that stock market responds only to the disclosure itself, whatever the information content is. Our research is conducted on discloser sample only, so that it is probable that the observed stock price changes are mainly driven by the disclosure itself, not by what is contained in the disclosure. To the extent that the current empirical design cannot distinguish the impact of disclosure and that of contents, the results are subject to joint hypotheses.[12] Thirdly, the empirical model suffers from correlated-omitted variable problem. Especially regarding the policy choice model, prior

11) In a related research work based on data obtained exclusively from Nikkei Newspaper which we do not report here, it was not possible to find comparable results. The results of replicated tests turned out to be statistically insignificant in most cases. We conjecture that the discrepancy between the two results to stem from the difference in the structure of audience who are the potential investors. Nikkeikinyu readership largely represents institutional investors, who are more likely to impound and see through the signals conveyed by the disclosures. Nikkei, on the other hand, enjoys considerable circulation, a great majority of which stems from general households. The readers have much less potential to affect stock prices, because they are not possessed of the expertise to interpret the relevant signals or are not engaged in stock investments as much as Nikkeikinyu readers. In this sense, it is hard to generalize our results beyond the Nikkeikinyu and a careful caution needs to be exercised in interpreting the results.

12) Firms without any disclosure about UPBO write-off policies need to be considered in future studies. We thank an anonymous reviewer for reminding us of this point.

studies report several control variables that are correlated with stock returns. Market beta, firm size, and market-to-book ratio are possible candidates. Without them, the reported coefficients may not capture the economic impact of UPBO write-off policies. Finally, our study did not elaborate on the potential wealth 6redistribution effects pursuant to the settlement of unfunded obligations, which may entail further signaling effects. These and other questions are left for future studies.

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