The Effect of the Termination and Change of Defined Benefit Plans on Financial Statements

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ABSTRACT

The defined benefit liability, which represents the unfunded status of a firm's pension plan(s), is an important issue for companies in managing their assets as they work to reduce risk. Japanese firms can choose among several types of pension plan for their employees, and they will often terminate a plan or switch to a different plan to reduce management risk. This paper aims to investigate: (1) whether firms terminating or changing their defined benefit plan reduce the negative effect of pension components on their financial statements, and (2) whether there is a relationship between a firm's decision to terminate or change a defined benefit plan and its overall financial condition and results. Our findings show that: (1) firms realize a positive effect on their financial statements after a termination or change, and (2) these firms tend to be in worse financial condition.

Keywords: Defined benefit obligations, Defined benefit plans, Past service cost, Extraordinary profit or loss.

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1. INTRODUCTION

A defined benefit liability shows the pension funding status of a firm's defined benefit plans. The defined benefit liability for many Japanese firms is sufficiently significant that it has an important impact on the balance sheet. The average ratio of defined benefit liability to total liabilities is around 10% for Japanese listed firms. There are several factors that increase the amount of defined benefit obligations, including a rise in life expectancy and recent salary increases. The defined benefit liability is a key issue for firms in pension asset management as they work to reduce risk.

The introduction of *Accounting Standard for Retirement Benefits* in Japan in 2001 — which required firms to disclose the funding status of defined benefit plans on the balance sheet — inaugurated new pension plans, including the Defined-Contribution Pension in 2001 and the Defined-Benefit Corporate Pension in 2002. In 2017, the

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risk-allocation type of corporate pension was introduced, and the accounting treatment for defined contribution plans is adopted for this plan. Firms thus have distinct choices when providing a pension plan to their employees.

There are several ways to reduce the amount of defined benefit obligations: termination of the defined benefit plan, changing the defined benefit plan to a defined contribution plan, return of a part of Employees' Pension Fund (one of the Japanese defined benefit plans) to the government, or plan amendments. Firms can reduce the negative impact of defined benefit liabilities on their financial statements by terminating or changing their defined benefit plans. Therefore, the aim of this paper is to reveal whether Japanese firms terminate or change their pension plans, beginning with the adoption of ASBJ Statement No.26: *Accounting Standard for Retirement Benefits* (ASBJ Statement 26) in fiscal 2013 which requires firms to calculate their pension funding status by subtracting plan assets from defined benefit obligations for the latest year for which data are available, i.e., fiscal 2016; the actual effect of the termination or change of the plans on firms' financial statements; and different tendencies in the financial indicators of firms depending on whether or not they terminate or change their defined benefit plans.

Given these aims, this paper makes two main contributions: (1) it extends previous research on the termination or change of defined benefit plans by revealing in detail how, and how many, firms decrease the amount of defined benefit obligations; and (2) it describes how an investigation of firms terminating or changing their plans to determine whether, compared to other firms, they (a) are in worse financial condition and (b) report worse financial results showed only (a) to be true. These findings, against a backdrop of a Japanese social welfare system in which the national pension fund faces future deficits because of Japan's aging population, and many corporate defined benefit plans are underfunded as well, has broad ramifications for consideration of the corporate pension system in Japan.

2. REDUCTION IN DEFINED BENEFIT OBLIGATIONS

Firms with defined benefit plans entail various risks in pension asset management, which is strongly affected by economic conditions. Pension asset management can have a significant impact on financial statements, because Japanese firms tend to invest 25% to 45% of their pension assets in domestic and foreign stocks, and 40% to 45% in domestic and foreign bonds[1]. As stated above, there are several ways to reduce the risk in pension management, including dissolution of the Employees' Pension Fund, return

[1] Pension Fund Association, "Proportion of Pension Asset Structure From Fiscal 1996 to 2016", https://www.pfa.or.jp/activity/tokei/shisanunyo/shisanunyo01.html.

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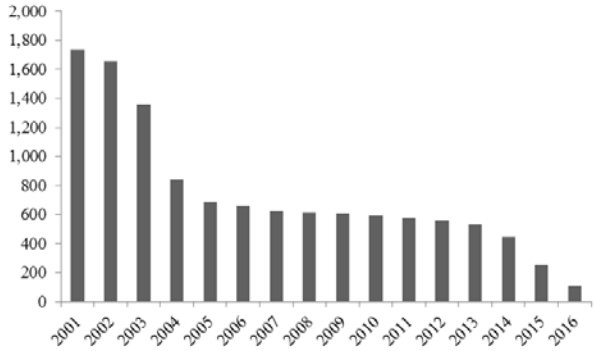
of a part of Employees' Pension Fund to the government, termination of a Defined-Benefit Corporate Pension, a change of the defined benefit plan to a defined contribution plan, plan amendments, and others. The following section describes these methods.

2.1 Dissolution of Employees' Pension Fund

The Employees' Pension Fund is a corporation approved under the *Employees' Pension Insurance Act*. The Ministry of Health, Labour and Welfare issues a permit for a firm to establish this fund. A firm managing this fund enjoys several advantages, including tax benefits and the ability to reduce their funding contribution when they manage pension assets efficiently[2]. However, many firms have frozen these funds because of the unfunded status of their pension plan or to reduce pension asset management risk.

Figure 1 shows the number of funds in the Employees' Pension Fund for fiscal years 2001 to 2016. In two periods the number of funds decreases sharply — from fiscal 2002 to 2004, and from fiscal 2014 to 2016.

Figure 1. **The Number of Funds in Employees' Pension Fund**



Source: Pension Fund Association (2018), *Data of Corporate Pension Plans in December 2017*, Pension Fund Association, p.96. Ministry of Health, Labour and Welfare, "Financial Condition of Employees' Pension Fund", https://www.mhlw.go.jp/file/06-Seisakujouhou-12500000-Nenkinkyoku/0000190682.pdf, p.1.

Figure 2 shows the number of funds dissolved during these periods is higher than in other similar time-spans. During the first period of 2002 to 2004, corresponding to the introduction of the *Defined-Benefit Corporate Pension Act* in April 2002, firms were allowed to transfer their pension assets in the Employees' Pension Fund to a Defined-Benefit Corporate Pension and dissolve the fund. The second period of 2014 to 2016 follows promulgation of Act No.63: *A Revision of a Part of Employees' Pension*

[2] Kasaoka, E. (2014), *The Effect of Defined Benefit Obligations on Firms' Valuations in Japan: Comparison of Japanese GAAP for Retirement Benefits with IAS19*, K.G. Press, pp.13, 14.

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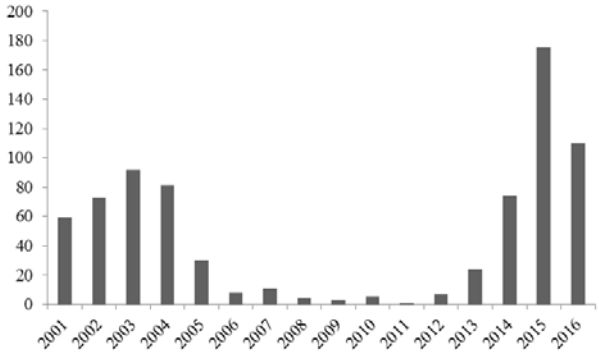
Insurance Act in Order to Ensure the Health and Reliability of the Public Pension System (Act 63) in 2013. The Act states as follows:

(a) Firms are not allowed to establish a new Employees' Pension Fund on or after April 1, 2014 (Act 63, Reason); and

(b) The Minister of Health, Labour and Welfare can order firms to dissolve funds that do not meet criteria for sound asset management (Act 63, par.33).

Therefore, this Act orders a de facto freeze of the Employees' Pension Fund. At the end of fiscal 2017, there are only 36 such funds left[3].

Figure 2. **Number of Funds Dissolved**



Source: Pension Fund Association (2018), *Data of Corporate Pension Plans in December 2017*, Pension Fund Association, p.96. Ministry of Health, Labour and Welfare, "The Number of Employees' Pension Fund Dissolved and Returning a Substitutional Portion to the Government", https://www.mhlw.go.jp/file/06-Seisakujouhou-12500000-Nenkinkyoku/0000115730.pdf.

When a firm dissolves its Employees' Pension Fund, it recognizes a profit or loss based on the following calculations stated in ASBJ Guidance No.1: *Accounting Procedure for Transition between Retirement Benefit Plans* (ASBJ Guidance 1) (ASBJ Guidance 1, par.10):

(a) At the time of dissolution, the firm assesses the difference between defined benefit obligations based on estimates of these obligations before and after dissolution. This amount is compared with the payment for defined benefit obligations, and the difference is recognized as profit or loss;

(b) Unrecognized past service cost and unrecognized actuarial gain or loss corresponding to the dissolution portion are recognized as profit or loss; and

[3] Pension Fund Association, "Statistical Data of Employees' Pension Fund", https://www.pfa.or.jp/activity/tokei/nenkin/suii/suii01.html.

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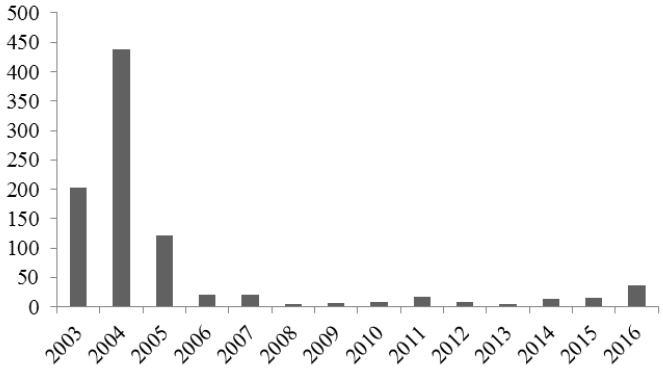
(c) The amounts of profit or loss recognized above are presented in extraordinary profit or loss on the financial statements.

When a firm (1) abolishes the retirement payment requirement; (2) reduces the benefit payment of Defined-Benefit Corporate Pension and allots the plan assets to the employees; (3) transfers all or part of plan assets in the Defined-Benefit Corporate Pension or retirement lump sum grants to the Defined-Contribution Pension; or (4) implements mass retirements[4], it follows the same accounting treatment as that for the dissolution of Employees' Pension Fund (ASBJ Guidance 1, par.11).

2.2 Return of a Part of Employees' Pension Fund to the Government

The pension benefit paid by the Employees' Pension Fund consists of (1) the substitutional portion and (2) added benefits. The substitutional portion is part of the government pension, i.e., the Employees' Pension System (the Old-Age Employees' Pension System), and it can be managed either by the government or the firm. Following the promulgation of the *Defined-Benefit Corporate Pension Act* in 2002, a firm with an Employees' Pension Fund could transit the plan to a Defined-Benefit Corporate Pension and return a substitutional portion to the government. Figure 3 shows the number of funds with an Employees' Pension Fund returning a substitutional portion to the government from 2003 to 2016.

***Figure 3*. The Number of Firms Returning a Substitutional Portion to the Government**



Source: Pension Fund Association (2018), *Data of Corporate Pension Plans in December 2017*, Pension Fund Association, p.96. Ministry of Health, Labour and Welfare, "The Number of Employees' Pension Fund Dissolved and Returning a Substitutional Portion to the Government", https://www.mhlw.go.jp/file/06-Seisaku jouhou-12500000-Nenkinkyoku/0000115730.pdf.

[4] Mass retirement indicates that as a result of an early retirement of employees due to a plant closing or business suspension, an appreciable amount of defined benefit obligations is decreased (ASBJ Guidance No.1, par.8).

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A downturn in pension asset management, population aging, or a change in industrial structures prompts an increase of pensioners more than participants in the plan. Several firms have had difficulty making contributions to the fund owing to the deteriorating business environment[5]. Therefore, there are always firms returning a substitutional portion to the government every year. When a firm transfers its fund to the Defined-Benefit Corporate Pension, it has no obligation to make pension payments on the substitutional portion to the employees. It pays the amount of minimum actuarial liability to the government.

ASBJ Guidance No.25: *Guidance on Accounting Standard for Retirement Benefits* (ASBJ Guidance 25) states that when a firm returns a substitutional portion to the government, there are three instances that require accounting treatment: (1) the firm receives approval to return the substitutional portion related to future benefits (after approval) to the government, (2) the firm receives approval to return the accumulated fund in the past (the amount of minimum actuarial liability) to the government, and (3) the firm actually returns the accumulated fund to the government (ASBJ Guidance 25, par.46).

When a firm receives approval to return the substitutional portion related to future benefits to the government, the difference between (1) the amount of defined benefit obligations just before approval, and (2) the amount of defined benefit obligations because of the exemption of pension payments in the future, is recognized as past service cost. The firm also calculates a defined benefit cost based on the defined benefit obligations after approval.

When a firm receives approval to return the accumulated fund in the past to the government, the difference between the substitutional portion of defined benefit obligations just before approval and minimum actuarial liability is recognized in profit or loss. The amounts of unrecognized past service cost and unrecognized actuarial gain or loss related to the substitutional portion on the approval day is calculated in a rational way and recognized in extraordinary profit or loss.

On the day the firm actually returns the accumulated fund to the government, when there is a difference between the amount of defined benefit obligations recalculated after the government approves returning the accumulated fund to the government and the actual amount returned, it is recognized in profit or loss (ASBJ Guidance 25, par.46).

2.3 Termination or a Change of the Defined Benefit Plan to a Defined Contribution Plan

[5] PricewaterhouseCoopers Aarata LLC (2016), *Practical Manual for Accounting Standard for Retirement Benefits –Basic, Advanced, and IFRS-*, ChuoKeizai-Sha, p.246.

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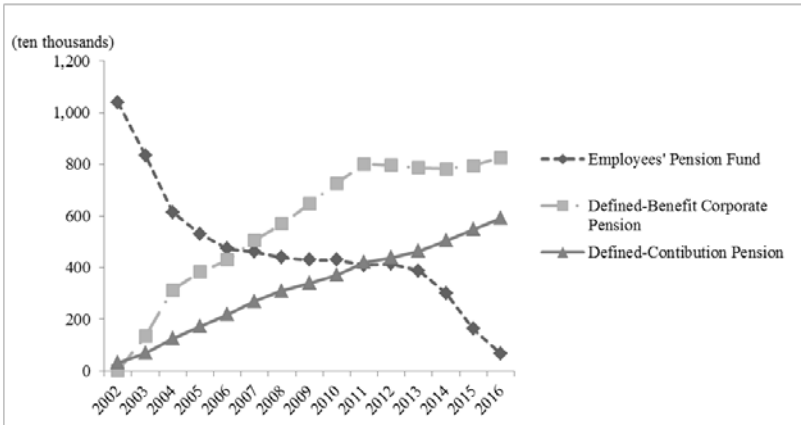
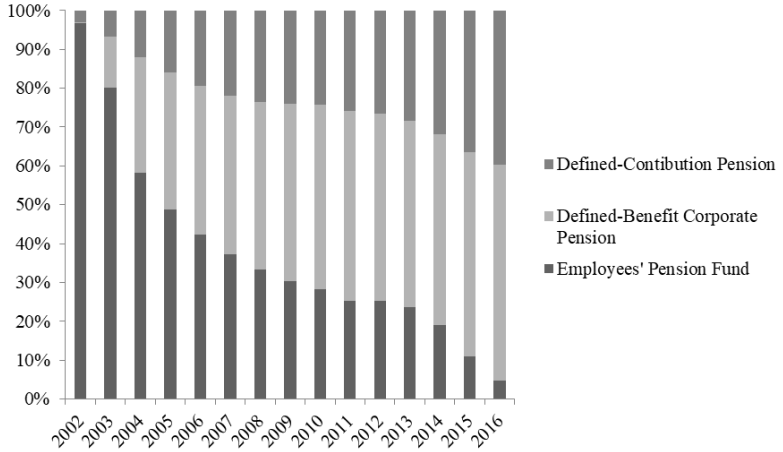
Firms with defined benefit plans are required to disclose on their financial statements defined benefit obligations, plan assets, a defined benefit liability (asset), and defined benefit cost.

Figure 4. **The Number of Participants in Pension Plans**



Source: Pension Fund Association (2018), *Data of Corporate Pension Plans in December 2017*, Pension Fund Association, pp.96, 163, 215. Ministry of Health, Labour and Welfare, "Current Status of Corporate Pension Plans", https://www.mhlw.go.jp/file/05-Shingikai-12601000-Seisakutoukatsukan-Sanjikanshitsu_Shakaihoshoutantou/0000169636.pdf, p.2. Pension Fund Association, "Statistical Data of Employees' Pension Fund", https://www.pfa.or.jp/activity/tokei/nenkin/suii/suii01.html.

Figure 5. **The Ratio of Participants in Employees' Pension Fund, Defined-Benefit Corporate Pension, and Defined-Contribution Pension**



Source: Pension Fund Association (2018), *Data of Corporate Pension Plans in December 2017*, Pension Fund Association, pp.96, 163, 215. Ministry of Health, Labour and Welfare, "Current Status of Corporate Pension Plans", https://www.mhlw.go.jp/file/05-Shingikai-12601000-Seisakutoukatsukan-Sanjikanshitsu_Shakaihoshoutantou/0000169636.pdf, p.3. Pension Fund Association, "Statistical Data of Employees' Pension Fund," https://www.pfa.or.jp/activity/tokei/nenkin/suii/suii01.html.

A firm with a defined contribution plan recognizes the contribution amount as defined benefit cost on its income statement (ASBJ Statement 26, par.31). Many firms

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have switched their pension plans to defined contribution plans, because the defined contribution plans contain no risk for pension asset management. Figure 4 shows that the number of participants in defined contribution plans increases every year. Figure 5 similarly shows that the ratio of participants in defined contribution plans to all plans increases every year.

When a firm transfers all or part of pension assets of a Defined-Benefit Corporate Pension to a Defined-Contribution Pension, it follows the same accounting treatment as when a firm dissolves the Employees' Pension Fund explained in Section 2.1.

2.4 Introduction of Point System for the Attribution Method of Defined Benefit Obligations

The point system is one of the attribution methods used when firms attribute the present value of defined benefit obligations to the estimated employees' service periods as current service cost. Attribution methods include straight-line basis, salary amount basis, benefit multiplier basis, and point system. Under the point system, points are granted monthly or annually. They are accumulated depending on employees' service periods, job grade, title, qualification acquisition, and so on[6]. These accumulated points acquired by each employee are multiplied by the unit price that determines the employee pension to calculate the terminal benefits.

ASBJ Statement 26 states that defined benefit obligations should be estimated with consideration of reasonably expected variable factors including future salary increases (ASBJ Statement 26, par.18 and footnote 5). However, unlike other attribution methods that are calculated based on employees' salary, under the point method the benefit amount is calculated based on unit prices. Therefore, the salary increase does not affect the amount of the employees' retirement benefits directly, and firms can control the benefit amount by changing the unit price. The system also motivates employees, giving them points for their contribution to the firm.

The introduction of a point system can be considered as a change from one defined benefit plan to another defined benefit plan. Therefore, the accounting treatment for an increase or decrease in defined benefit obligations is adopted. The amount of an increase or decrease in defined benefit obligations is recognized as past service cost (ASBJ Guidance 1, par.9). It can be recognized as a cost over several years within the average remaining service lives of the firm's employees (ASBJ Statement 26, par.25).

2.5 Plan Amendments

The amendment of retirement allowance stipulations, including a revision of

[6] Kasaoka, E. (2014), *op. cit.*, p.41.

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retirement benefit levels, can decrease defined benefit obligations. The decline in defined benefit obligations is recognized as past service cost (ASBJ Guidance 1, par.32). It can be recognized over several years as explained in Section 2.4 (ASBJ Statement 26, par.25). It can also be recognized immediately as profit or loss when the reduction of defined benefit obligations is part of a firm's extensive management improvement project, and other profit or loss related to the project is recognized in the same period (ASBJ Guidance 1, par.32).

2.6 Other

The other ways a firm's defined benefit obligations may decrease are as follows:

- deconsolidation;
- recognition of actuarial gain;
- effecting mass or early retirement;
- retirement benefit payment exceeding other defined benefit cost components; and
- a revision of accounting standards for retirement benefits.

However, in this list, only deconsolidation and mass or early retirement are controllable by the firm for reducing defined benefit obligations.

3. PRIOR RESEARCH

There are several papers discussing the effect of pension components on firms' stock prices. Barth et al. (1993), Coronado and Sharpe (2003), and Picconi (2006) explore whether investors and analysts determine stock prices with consideration of disclosures on defined benefit plans in financial statements. Their studies indicate that defined benefit obligations have a negative impact on firms' future returns. Hann et al. (2007) employ price association regressions and examine the value relevance of defined benefit obligations and firms' stock prices. They adopt stock price rather than returns on stock price as a dependent variable based on prior researches which indicate stock price is economically better specified (Landsman (1986), Barth (1991), and Barth et al. (1992)). Their results also show that the independent variable of defined benefit obligations is negatively significant. Yu (2013) and Kasaoka (2014) examine whether off- and on-balance-sheet defined benefit liabilities under previous accounting standards[7] are recognized by institutional ownership and analysts. They both recognize the value relevance of off- and on-balance-sheet defined benefit liabilities with stock

[7] Under the previous accounting standards, a defined benefit liability is calculated as follows: defined benefit obligations – plan assets – unrecognized obligations. Therefore, the amount of unrecognized obligations was off-balance-sheet.

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prices.

Carroll and Niehaus (1998) study the relationship between firms' funding status of defined benefit plans and corporate debt ratings. Their results indicate that a decrease in firms' debt ratings caused by the unfunded status of defined benefit plans (defined benefit liability) is greater than an increase in debt ratings caused by an equivalent amount of overfunded status of defined benefit plans (defined benefit asset).

Several papers study whether firms tend to adopt higher discount rates to reduce the risks on pension asset management. Okumura (2005) examines the relationship between a firm's determination of discount rate for defined benefit obligations, and the unfunded pension status and leverage. His results indicate that firms with higher unfunded status in their pension plans and higher leverage tend to have higher discount rates to reduce their amounts of defined benefit obligations. The study also examines the value relevance of defined benefit obligations and market capitalization, and concludes that defined benefit obligations have a negative impact on market capitalization.

Ghicas (1990) indicates that firms tend to adopt higher interest rates and switch their actuarial cost method for calculating the amount of defined benefit cost accrued in the period when their pension funding status becomes exacerbated. Houmes and Boylan (2010) also reveal that firms tend to adopt higher discount rates to reduce the negative effect of the accounting change on the amount of their defined benefit liabilities after the enactment of the new accounting standard, Statement of Financial Accounting Standard No.158: *Employers' Accounting for Defined Benefit Pension and Other Postretirement Plans—an amendment of FASB Statements No. 87, 88, 106, and 132(R)* in 2006.

These studies show that firms whose performance is significantly affected by defined benefit plans are motivated to reduce their defined benefit obligations. In Japan, the ratio of defined benefit liability to total liabilities is around 10% on average. A decrease in the amount of defined benefit obligations improves firms' financial condition owing to the reduction in uncertainties on pension management. Therefore, firms tend to seek a way to reduce the amount of defined benefit obligations and defined benefit liability.

The termination of a defined benefit plan is one way to reduce the amount of defined benefit obligations and future uncertainties, and improve firms' financial condition. There are several papers examining the relationship between termination of defined benefit plans and firms' valuations. Alderson and Chen (1986) and Mitchell and Mulherin (1989) find that termination of overfunded defined benefit plans occasions positive abnormal return to shareholders. VanDerhei (1987), Haw et al. (1988), Alderson and VanDerhei (1992), and Mittelstaedt and Regier (1993) discuss the

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relationship between the termination of overfunded defined benefit plans and the market response. All these studies suggest that the termination of defined benefit plans leads to a positive market reaction. In addition to these researches, Hsieh et al. (1990) segment their sample firms into solvent and financially distressed to examine the relationship between the termination of defined benefit plans and market reaction. They conclude that there is a positive relationship between the termination of defined benefit plans for firms financially distressed and abnormal stock returns.

Stone (1987), Mittelstaedt (1989), Thomas (1989), and Stone (1991) investigate whether firms' financial condition and results affect the termination or change of defined benefit plans. Stone (1987) examines if firms might terminate their overfunded defined benefit plans for financing purposes. The study concludes that the firm might have incentives to avoid additional debt financing, since among the independent variables in the model, leverage is negative and significant as expected. Mittelstaedt (1989) also analyzes the relationship between firms' financial indicators and the termination of defined benefit plans. The paper includes debt to equity ratio, ROA, working capital, and others in the model, and explains that firms that are financially weakening tend to terminate their defined benefit plans. Stone (1991) examines if firms shifting their defined benefit plans to defined contribution plans are more financially stressed than those continuing their defined benefit plans. This paper employs Ohlson's (1980) bankruptcy prediction model to assess the effect of firms' financial stress on the continuation of pension plans in 1984-1985. The results are that firms which are smaller, more highly leveraged, less solvent, and less profitable tend to switch their defined benefit plans to defined contribution plans to reduce the negative impact on their financial statements. However, the difference is statistically significant for only firm size.

4. HYPOTHESIS DEVELOPMENT

The defined benefit plans of most Japanese firms are unfunded. Therefore, firms terminate or change their defined benefit plans to reduce risk in pension management. The aim of this study is to investigate whether firms terminating or changing their defined benefit plans (1) enjoy a positive effect on financial statements, and (2) show different tendencies in their financial indicators from those not terminating or changing their plans.

Termination and change in defined benefit plans are ways to reduce the negative impact of defined benefit obligations and defined benefit cost on financial statements. By terminating or changing defined benefit plans, firms can reduce the uncertainty in pension management. As explained in Section 2, the dissolution of Employees' Pension

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Fund, return of a part of Employees' Pension Fund to the government, termination or a change of defined benefit plans to defined contribution plan, or plan amendments are ways to reduce the amount of defined benefit obligations and defined benefit cost. These terminations and changes decrease the amount of total liabilities on the balance sheet, and increase the amount of operating income on the income statement. The first hypothesis of this study proposes that:

H1: Firms terminating or changing their defined benefit plans show positive effects on their balance sheet and income statement.

The ratios of (1) defined benefit obligations to total liabilities, (2) defined benefit liability to total liabilities, and (3) defined benefit cost to operating income before and after the termination or change in defined benefit plans are compared. It is expected that the effect of pension components on financial statements are reduced after terminating or changing defined benefit plans.

As for the effect on firms' financial indicators upon their decision to terminate or change in defined benefit plans, the following hypothesis is proposed:

H2: Firms terminating or changing their defined benefit plans have worse financial conditions and results than those that are not terminating or changing their plans.

Stone (1991) uses Mann-Whitney U statistics to compare the average ratios of firms continuing their defined benefit plans with those of firms switching to defined contribution plans. This study employs firm size, debt ratio, current ratio, ROA, and others as independent variables in the model. The results show the independent variable for only firm size is statistically significant. Firms changing their defined benefit plans to defined contribution plans tend to be smaller, and the result is consistent with Kotlikoff and Smith's (1983) research. The paper also shows the probability of bankruptcy within 1 year and 2 years. The mean probability of bankruptcy for firms switching to defined contribution plans in all models is higher than firms continuing defined benefit plans.

Mittelstaedt (1989) compares financial indicators for firms terminating defined benefit plans with those that are not. The study uses Wilcoxon rank sum test and reports that terminating companies are financially weak. We also use Wilcoxon rank sum test and employ the debt to equity ratio, current ratio, working capital, retained earnings, ROE, profit margin, ratio of operating income to operating capital, sales growth, and firm size (assets and sales) to see the effect of firms' financial condition and results on

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the termination or change of defined benefit plans. The average ratios for firms terminating or changing their defined benefit plans and those that are not are compared to examine if the former are financially stressed.

5. SAMPLE SELECTION

This empirical analysis is based on four years of annual report data. The time period of this study is from fiscal 2013, a year in which use of the current accounting standard on retirement benefits, ASBJ Statement 26, was required, through fiscal 2016, the latest year for which data are available. The introduction of ASBJ Statement 26 requires firms to disclose the breakdown of changes in defined benefit obligations between the beginning and end of the period.

Table 1. **Sample Selection**

	2013	2014	2015	2016	Total
Number of Firms Listed on the Japanese Stock Exchanges	2,791	2,911	2,973	2,972	11,647
Excluding Firms:					
- with Less-Than-12-Month Accounting Periods	15	21	19	15	70
- not Disclosing Defined Benefit Obligations	467	514	562	552	2,095
Total	2,309	2,376	2,392	2,405	9,482

Table 2. **Firms Decreasing Defined Benefit Obligations, and/or Disclosing Negative Past Service Cost and/or Profit or Loss on Retirement Benefits in Extraordinary Profit or Loss**

	2013	2014	2015	2016	Total
Number of Firms Decreasing the Amount of Defined Benefit Obligations	799	757	640	805	3,001
including Firms Disclosing:					
-Negative Past Service Cost	(46)	(25)	(30)	(53)	(154)
-Profit or Loss on Retirement Benefits in Extraordinary Profit or Loss	(125)	(113)	(94)	(114)	(446)
Number of Firms Disclosing Negative Past Service Cost	40	45	48	30	163
including Firms Disclosing Profit or Loss on Retirement Benefits in Extraordinary Profit or Loss	(3)	(7)	(9)	(3)	(22)
Number of Firms Disclosing Profit or Loss on Retirement Benefits in Extraordinary Profit or Loss	137	123	156	123	539
Total	976	925	844	958	3,703

Firms that are treated in this research design are shown in Table 1. Firms listed on

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Japanese stock exchanges excluding banks and insurance firms are selected. Firms with less than 12-month accounting periods and not disclosing defined benefit obligations are excluded. A sample of 9,482 firms for four years is identified. Financial data used in this study were collected from Nikkei Economic Electronic Databank System (2017), which is provided by the Nikkei Digital Media.

As explained in Section 2, when a firm terminates or changes its defined benefit plan, it recognizes past service cost and/or profit or loss on retirement benefits in extraordinary profit or loss. Therefore, this research focuses on those firms disclosing past service cost or profit or loss on retirement benefits in extraordinary profit or loss. Table 2 indicates those firms reducing the amount of defined benefit obligations, and/or recognizing negative past service cost and/or profit or loss on retirement benefits in extraordinary profit or loss.

The table shows that there are 3,001 firms reducing the amount of defined benefit obligations. Some 154 firms of the 3,001 recognize negative past service cost, which means they return a part of Employees' Pension Fund to the government or amend their pension plans to reduce the amount of defined benefit obligations. Some 446 firms recognize profit or loss on retirement benefits in extraordinary profit or loss. The amount is recognized when firms terminate their Employees' Pension Fund or Defined-Benefit Corporate Pension, return a substitutional portion of Employees' Pension Fund to the government, change defined benefit plans to defined contribution plans, amend their pension plans, or take some other actions.

The number of firms disclosing negative past service cost and profit or loss on retirement benefits in extraordinary profit or loss indicates the number of firms terminating or changing their pension plans but at the same time experiencing increasing defined benefit obligations, and disclosing these accounts. Table 3 represents the breakdown of the reasons why these firms decrease the amount of defined benefit obligations, and/or recognize negative past service cost and/or profit or loss on retirement benefits in extraordinary profit or loss. For several firms, there is not a single reason. In this case, the reasons that are explained in Section 2 are preferentially selected; as for the other reasons, the reason which has the most significant effect on financial statements is selected in this table.

The number of firms dissolving Employees' Pension Funds includes those with Multi-Employer Plans, a corporate pension plan established and managed by several employers. ASBJ Statement 26 states that firms with Multi-Employer Plans in principle adopt the same accounting treatment as those for defined benefit plans (ASBJ Statement 26, par.33.(1)). However, when firms cannot estimate the amount of plan assets corresponding to their contributions in a rational way, they use the accounting treatment

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for defined contribution plans (ASBJ Statement 26, par.33.(2)). Most firms adopt the accounting treatment for defined contribution plans for their Multi-Employer Plans, which does not disclose a firm's funding status on the balance sheet. However, they actually reduce their risks in pension management owing to the dissolution of the plan.

Table 3. **Breakdown of Reduction in Defined Benefit Obligations, and/or Recognition of Negative Past Service Cost and/or Profit or Loss on Retirement Benefits in Extraordinary Profit or Loss**

	2013	2014	2015	2016	Total
Dissolution of Employees' Pension Fund	34	48	57	62	201
including Dissolution of Multi-Employer Plans of Employees' Pension Fund	(34)	(47)	(57)	(59)	(197)
Return of a Part of Employees' Pension Fund to the Government	6	10	17	13	46
including Return of a Part of Multi-Employer Plans of Employees' Pension Fund	(2)	(2)	(9)	(6)	(19)
Termination or a Change of the Defined Benefit Plan to a Defined Contribution Plan	69	70	70	74	283
Changing Employees' Pension Fund to Defined-Benefit Corporate Pension	0	2	4	0	6
Plan Amendments	72	47	63	71	253
Others					
- Deconsolidation	14	8	20	22	64
- Recognition of Actuarial Gain	127	63	70	227	487
- Retirement Benefit Payment Exceeding Other Defined Benefit Cost Components	407	239	313	393	1,352
- Special Retirement Expenses or Early Extra Retirement Expenses	56	47	44	30	177
- Retiement Bonuses for Directors	30	19	15	15	79
- Others	18	11	20	10	59
A Revision of Accounting Standards	0	327	119	0	446
Unknown	143	34	32	41	250
Total	976	925	844	958	3,703

Some 46 firms return a substitutional part of their Employees' Pension Fund to the government, and 283 firms terminate or change their defined benefit plans to defined contribution plans which, as noted, decrease the amount of defined benefit obligations. Some 253 firms amend their defined benefit plans, and these firms must recognize negative past service cost, as shown in Table 2. Firms introducing point system for the attribution method are included in "Plan Amendments". This paper focuses on firms decreasing the amount of defined benefit obligations in a fundamental way. Therefore, (1) dissolution of Employees' Pension Fund, (2) return of a part of Employees' Pension Fund to the government, (3) termination or a change of the defined benefit plan to defined contribution plan, (4) plan amendments, and (5) deconsolidation decrease the

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risks of pension asset management and the amount of defined benefit obligations continually. This paper will compare the effect of termination or a change in pension plans on financial statements of the 847 firms with other firms not terminating or changing their plans.

6. EMPIRICAL RESULTS

6.1. The Effect of the Termination and Change of Defined Benefit Plans on Financial Statements

A primary reason a firm terminates or changes its defined benefit plan is to reduce the amount of pension components, which in turn decreases their negative impact on financial statements. Figures 6, 7, and 8 show, respectively, the effect of defined benefit obligations, defined benefit liability, and defined benefit cost on financial statements before and after firms' termination or change of defined benefit plans.

Figure 6. **Ratio of DBO to Total Liabilities**

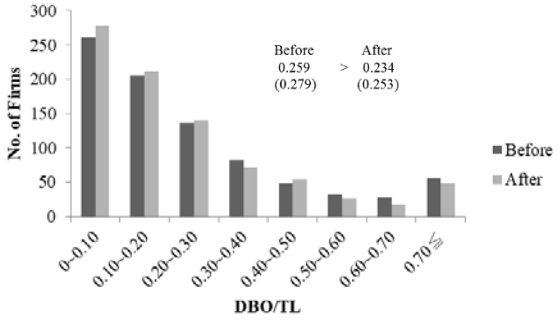
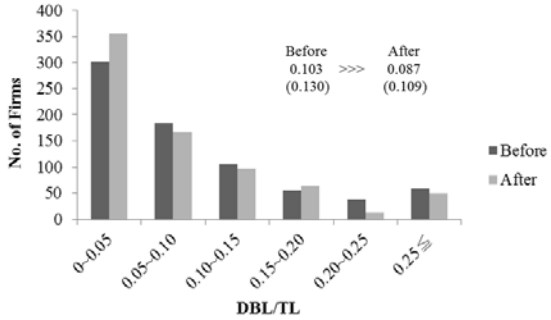
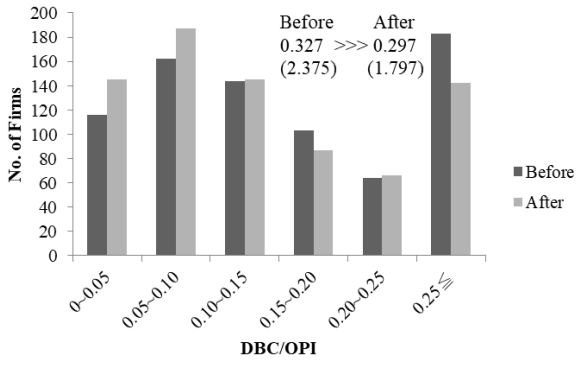


Figure 7. **Ratio of DBL to Total Liabilities**



DBO = defined benefit obligations, DBL = defined benefit liability, TL = total liabilities
Notes: The numbers in the figure show the mean, with the standard deviation shown below in parentheses; significance level: <<</>>> 1%, <</>> 5%, </> 10%.

Figure 8. **Ratio of DBC to Operating Income**



DBC = defined benefit cost, OPI = operating income
Notes: The numbers in the figure show the mean, with the standard deviation shown below in parentheses; significance level: <<</>>> 1%, <</>> 5%, </> 10%.

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Figure 6 indicates that the average ratio of defined benefit obligations to total liabilities after the termination or change of defined benefit plans is reduced, and it is statistically significant at 10% level. In Figure 7, 103 firms recognizing defined benefit assets are excluded. Similar to the decline in Figure 6, the result shows that the ratio of defined benefit liability to total liabilities declines after the termination or change. The figure also indicates that the number of firms with higher ratios decreases, and the number of firms with the ratio between 0 and 5% is higher.

Figure 8 indicates the effect of defined benefit cost on the income statement. The defined benefit cost is in principle recognized in cost of sales or selling, general and administrative expenses, which in turn affects operating income. Therefore, the figure calculates the ratio of defined benefit cost to operating income.

Some 75 firms recognizing operating loss are excluded in Figure 8. The average ratio of defined benefit cost to operating income after termination or change is lower than that before, and is significant at the 1% level. The termination or change reduces the effect of pension components on the income statement. The number of firms whose ratio is over 25% is much less than before, and the dispersion becomes lower.

As reference, we also examine the change in several financial indicators before and after the termination or change of defined benefit plan. These indicators include the debt to equity ratio, ROE, profit margin, and the ratio of operating income to operating capital. Only profit margin and the ratio of operating income to operating capital are statistically significant. Their average ratios after termination or change are higher than those before, because termination or change affects the amount of total liabilities only 1% to 2 % on average.

6.2. The Effect of Firms' Financial Indicators on the Determination of Pension Plan Termination or Change

As noted, firms tend to terminate or change their defined benefit plans to reduce pension management risk. Firms with defined benefit plans have to disclose their funding status on their balance sheet, and several papers discussed in Section 3 show that firms' funding status affects their evaluations. The firm's pension management is significantly affected by economic conditions, which include many uncertainties. Therefore, firms terminating or changing their defined benefit plans might have worse financial conditions and results than those that are not.

Debt to equity ratio, current ratio, working capital, and retained earnings are employed to measure the effect of firms' financial conditions on the determination of termination or change of defined benefit plans. ROE, profit margin, ratio of operating income to operating capital, and sales growth are used to explore the effect on firms'

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financial results. Firm size based on assets and sales are also included. Table 4 shows descriptive statistics for these financial indicators. We employ Wilcoxon rank sum test, and compare the averages of these financial indicators for firms terminating or changing their defined benefit plans and those that are not.

***Table 4.* Descriptive Statistics**

	Average	Std. Dev.	25th Percentile	Median	75th Percentile
Debt to Equity ratio	1.408	1.756	0.502	0.934	1.712
Current ratio	2.187	1.617	1.268	1.767	2.603
Working Capital	0.179	0.128	0.095	0.177	0.256
Retained Earnings	0.303	0.275	0.160	0.302	0.457
ROE	0.111	0.140	0.060	0.106	0.159
Profit Margin	0.058	0.079	0.024	0.049	0.085
Ratio of OPI to OC	0.095	0.183	0.039	0.070	0.119
Sales Growth	1.051	0.176	0.984	1.032	1.090
Firm Size (Assets)	4.755	0.715	4.269	4.670	5.161
Firm Size (Sales)	4.748	0.708	4.269	4.666	5.189

OPI = operating income, OC = operating capital

***Table 5.* The Effect of Firms' Financial Indicators on a Determination of Pension Plan Termination or Change**

	Firms Terminating or Changing Pension Plans		Firms not Terminating or Changing Pension Plans		Wilcoxon Rank Sum Test	
	Mean	Std. Dev.	Mean	Std. Dev.	p-value	
Debt to Equity ratio	1.569	2.005	1.392	1.728	0.000	***
Current ratio	1.936	1.369	2.211	1.638	0.000	***
Working Capital	0.169	0.119	0.180	0.129	0.004	***
Retained Earnings	0.298	0.236	0.304	0.278	0.096	†
ROE	0.118	0.143	0.110	0.140	0.006	***
Profit Margin	0.058	0.072	0.058	0.079	0.693	
Ratio of OPI to OC	0.092	0.122	0.095	0.188	0.930	
Sales Growth	1.040	0.134	1.052	0.180	0.019	*
Firm Size (Assets)	5.153	0.819	4.716	0.691	0.000	***
Firm Size (Sales)	5.158	0.793	4.708	0.685	0.000	***

OPI = operating income, OC = operating capital

Debt to Equity ratio = (total liabilities - defined benefit liability) / (net assets + unrecognized obligations), Current ratio = current assets / current liabilities, Working Capital = {(trade receivables + inventories + other current assets) - (trade payables + other current liabilities)} / (total assets - defined benefit asset), Retained Earnings = retained earnings / (total assets - defined benefit asset), ROE = (net income before taxes + defined benefit cost) / (net assets + unrecognized obligations), Profit Margin = (net income before taxes + defined benefit cost) / sales, Ratio of OPI to OC = (operating income + defined benefit cost) / (total assets - defined benefit assets - cash deposit - maeketable securities - short-term borrowings - investments and other assets - construction in process), Sales Growth = $Sales_t$ / $Sales_{t-1}$, Firm Size (Assets) = natural logarithm of total assets, Firm Size (Sales) = natural logarithm of sales.

***, **, * , † denotes that the p-value is statistically significant at the 0.1%, 1%, 5%, and 10% levels, respectively.

Table 5 shows the effect of firms' financial condition and results from the determination of termination or change of defined benefit plans in the year of

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termination or change. It reveals that debt to equity ratio, current ratio, working capital, and retained earnings — which depict the firm's financial condition — are significant. The average ratio of debt to equity for firms terminating or changing their pension plans is higher than for other firms, and the current ratio, working capital, and retained earnings are lower. This means that firms with worse financial conditions tend to terminate or change their defined benefit plans to improve their financial structure.

Table 6. **The Effect of Firms' Financial Indicators on a Determination of Pension Plan Termination or Change in the Previous Year, 3 Years, and 5-Years Before**

		Firms Terminating or Changing Pension Plans		Firms not Terminating or Changing Pension Plans		Wilcoxon Rank Sum Test	
		Mean	Std. Dev.	Mean	Std. Dev.	p-value	
Previous Year of Termination or Change	Debt to Equity ratio	1.623	1.602	1.517	3.341	0.000	***
	Current ratio	1.911	1.277	2.174	1.611	0.000	***
	Working Capital	0.170	0.121	0.180	0.129	0.011	*
	Retained Earnings	0.285	0.221	0.291	0.334	0.041	*
	ROE	0.105	0.130	0.103	0.433	0.157	
	Profit Margin	0.052	0.063	0.054	0.096	0.035	*
	Ratio of OPI to OC	0.086	0.142	0.090	0.195	0.504	
	Sales Growth	1.049	0.139	1.064	0.346	0.619	
3-year Average before Termination or Change	Debt to Equity ratio	1.616	1.550	1.469	2.555	0.000	***
	Current ratio	1.851	1.290	2.116	1.478	0.000	***
	Working Capital	0.168	0.118	0.180	0.127	0.003	**
	Retained Earnings	0.278	0.222	0.287	0.324	0.051	†
	ROE	0.103	0.120	0.106	0.166	0.180	
	Profit Margin	0.047	0.053	0.049	0.072	0.281	
	Ratio of OPI to OC	0.084	0.162	0.091	0.176	0.287	
	Sales Growth	1.090	0.197	1.082	0.256	0.016	*
5-year Average before Termination or Change	Debt to Equity ratio	1.677	1.701	1.509	8.766	0.000	***
	Current ratio	1.820	1.180	2.045	1.421	0.000	***
	Working Capital	0.168	0.115	0.180	0.125	0.002	**
	Retained Earnings	0.275	0.221	0.280	0.294	0.113	
	ROE	0.094	0.120	0.122	2.819	0.209	
	Profit Margin	0.044	0.052	0.049	0.065	0.253	
	Ratio of OPI to OC	0.078	0.144	0.084	0.162	0.278	
	Sales Growth	1.076	0.203	1.066	0.238	0.000	***

OPI = operating income, OC = operating capital

Debt to Equity ratio = (total liabilities - defined benefit liability) / (net assets + unrecognized obligations), Current ratio = current assets / current liabilities, Working Capital = {(trade receivables + inventories + other current assets) - (trade payables + other current liabilities)} / (total assets - defined benefit asset), Retained Earnings = retained earnings / (total assets - defined benefit asset), ROE = (net income before taxes + defined benefit cost) / (net assets + unrecognized obligations), Profit Margin = (net income before taxes + defined benefit cost) / sales, Ratio of OPI to OC = (operating income + defined benefit cost) / (total assets - defined benefit assets - cash deposit - maeketable securities - short-term borrowings - investments and other assets - construction in process), Sales Growth = $Sales_t$ / $Sales_{t-1}$.

***, **, * , † denotes that the p-value is statistically significant at the 0.1%, 1%, 5%, and 10% levels, respectively.

In Table 6, financial indicators for 1-year, 3-year, and 5-year weighted average ratios before the termination or change of defined benefit plans for firms terminating or

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changing their defined benefit plans are compared with those of other firms. The result shows that debt to equity ratio, current ratio, and working capital are statistically significant. Other factors — retained earnings, ROE, profit margin, ratio of operating income to operating capital, and sales growth — are not always significant in Tables 5 and 6.

In Table 5, both measures of firm size — assets and sales — are significant at the 0.1% level, indicating that firms terminating or changing defined benefit plans tend to be larger than those that are not. Larger firms have more employees and thus recognize more defined benefit obligations — and, in turn, pay more attention to pension funding and pension asset management.

The return on pension assets varies every year. Table 7 shows the adjusted total return ratio on pension asset management from fiscal 2001 to 2016. The adjusted total return in 2007 and 2008 is highly negative, reflecting the economic downturn triggered by the bankruptcy of Lehman Brothers. As noted earlier, 25% to 45% of pension assets are invested in domestic and foreign stocks. In addition to reducing the negative effect on financial statements, firms terminate or change their defined benefit plan to reduce the volatility in pension asset management.

***Table 7.* Adjusted Total Return Ratio on Pension Asset Management**

	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Adjusted Total Return Ratio	-4.16	-12.46	16.17	4.59	19.16	4.50	-10.58	-17.80	14.29	-0.54	1.82	11.17	8.80	11.06	-0.92	3.52

Source: Pension Fund Association (2019), *The Result of the Field Survey on Corporate Pension in Fiscal 2017*, https://www.pfa.or.jp/activity/tokei/j-chosa/files/jittaichosa_gaiyou_2017.pdf, p.6.

7. SUMMARY AND CONCLUSION

Pension asset management is one of the important issues for firms to consider owing to the significant impact it has on their financial statements. After the introduction of *Accounting Standard for Retirement Benefits* in 2001, several new pension plans — including Defined-Benefit Corporate Pension and Defined-Contribution Pension — are introduced, giving firms more choices in the pension plan they provide to employees.

Many firms have now terminated or changed their defined benefit plans to reduce the negative impact on their financial condition. This paper investigated how firms reduce their defined benefit obligations. Among its findings is 183 to 242 of about 2,300 to 2,400 firms between fiscal 2013 and 2016 were either dissolving their Employees' Pension Fund, returning a part of Employees' Pension Fund to the government, terminating or changing their defined benefit plans, amending their plans, or

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deconsolidating. These firms experienced less impact from pension components on their financial statements after the termination or change of defined benefit plans.

The impact of the decision to terminate or change defined benefit plans on financial ratios representing firms' financial condition are statistically significant. Firms terminating or changing their defined benefit plans tend to be financially stressed. The average ratio of defined benefit cost to operating income is also significant; however, firms tend to consider their financial condition rather than financial results. The reduction of defined benefit liability on the balance sheet decreases defined benefit cost. Firms must have a long-term perspective in pension management, because employees' service lives are long. Therefore, firms in worse financial condition tend to terminate or change their defined benefit plans.

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