Characteristics of Unlisted Companies by Their Choice of Retirement Benefit Plans

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Abstract

The aim of this study is to identify the characteristics of unlisted companies according to the retirement benefit plans they have adopted. Through this analysis, we investigate whether there is an issue with the system due to which companies are unable to adopt certain retirement benefit plans. Specifically, we use information on 167 unlisted companies (excluding financial institutions) whose retirement benefit data are recorded in the Nikkei Economic Electronic Databank System (NEEDS). Based on the retirement benefit plans adopted by a company, we check whether differences may be observed based on features such as the return on asset, company scale, and the pension deficit ratio. The results of the analysis confirmed that there is no difference in terms of finances, company scale, and retirement benefits between unlisted companies that have and have not adopted defined contribution pension plan or cash balance pension plans. Meanwhile, there are differences in terms of company scale and pension deficit between unlisted companies that have and have not adopted defined benefit pension plan. These results show that for unlisted companies, introducing the defined benefit pension plan is more difficult than adopting the defined contribution pension plan.

Keywords: Defined Contribution Pension Plan, Defined Benefit Pension Plan, Unlisted Companies, Retirement Benefit Plans

1．Introduction

Retirement benefit plans in Japan have undergone great changes since 2000. Defined contribution（DC）pension plans were introduced in October 2001 and defined benefit（DB）pension plans were established in April 2002. Furthermore, tax-qualified pension plans were discontinued in March 2012. Since April 2014, the Employee's Pension Fund（EPF）has no longer been approved for renewal. These systemic reforms were undertaken in the broader context of the "Accounting Standards for Retirement Benefits," which was applicable from April 2000, greater pension underfunding due to an aging population and long-term policies of monetary easing by the Bank of Japan, and increased mobility in employment. Many companies revised their corporate pension plans in response to the reforms. As of April 1, 2017, there are 5,349 companies enrolled in DC pension plans, and 13,578 companies in DB pension plans. By March 2016, 18,000 companies were enrolled in the EPF[1].

Amid the development of retirement benefit plan reforms, several studies have been published on the issue of choosing between corporate pension plans and lump-sum retirement allowance plans in Japanese companies. Yoshida（2009）, using data in 2006, indicated that the choice of DC pension plans and cash balance pension plans is influenced by a company scale, pension deficit ratio, and employee age. Yoshida and Horiba（2012）, using data in March 2005, showed that the choice to adopt corporate DC pension plans is influenced by a company scale and the underfunding of its existing DB pension plans. Yanase（2013）focused on lump-sum retirement allowance plans and claimed that companies that adopt only lump-sum retirement allowances are smaller and have low cash-flow profitability. We had also analyzed the characteristics of listed companies that adopted corporate DC pension plans between October 2001 and July 2011, in Nishida and Murakami （2014）. Here, we showed that corporate DC pension plans were initially adopted by large companies, followed by companies with high pension underfunding, and that there tended to be delayed adoption by smaller companies. Many studies with similar results were published in the United States from the late 1980s onwards[2]. However, the research on the choice between company pension plans and retirement allowances primarily analyzed the behavior of listed companies. In this study, we focus on unlisted companies whose data on company finances and retirement benefits are recorded in the Nikkei Economic Electronic Databank System（NEEDS）, and attempt to identify the characteristics of companies based on their

adopted retirement benefit plans. If an unlisted company adopting specific retirement benefit plans has some characteristics, there may be hidden issues with the system. More specifically, there may be factors that it's difficult for certain companies to adopt some plan. This study intends to provide reference material for future discussions on further revisions to retirement benefit plans.

This paper is structured as follows. Section 2 describes the adoption of retirement benefit plans by unlisted companies, including company pension plans and retirement allowances. Section 3 presents the data analysis and its results. Section 4 concludes.

2．Adoption of retirement benefit plans by unlisted companies

The Ministry of Health, Labor & Welfare（MHLW）publishes reports of survey results on retirement benefit plans（lump-sum retirement allowance plans and corporate pension plans）generally once every five years through the "General Survey on Working Conditions." Table 2-1 shows proportions of companies adopting all kind of retirement benefit plans in 2013. While we cannot compare the companies surveyed in 2013 with those in previous surveys, we see that the proportion of companies with retirement benefit plans has decreased each year, and that there are greater proportions of larger companies with retirement benefit plans. Additionally, the proportion of companies that have adopted only lump-sum retirement

Table 2-1　Proportions of companies adopting all kind of retirement benefit plans（2013）　（Unit: %）

number of employees / Year	All companies	Companies with retirement benefit plans				Companies without retirement benefits plans
			Only lump-sum plans	Only corporate pension plans	Both plans	
Total	100.0	75.5 (100.0)	(65.8)	(11.6)	(22.6)	24.5
Over 1,000	100.0	93.6 (100.0)	(23.0)	(28.9)	(48.1)	6.4
300-999	100.0	89.4 (100.0)	(31.5)	(27.2)	(41.3)	10.6
100-299	100.0	82.0 (100.0)	(56.0)	(14.0)	(30.0)	18.0
30-99	100.0	72.0 (100.0)	(74.1)	(8.6)	(17.3)	28.0
For reference						
1993	100.0	92.0 (100.0)	(47.0)	(18.6)	(34.5)	8.0
1997	100.0	88.9 (100.0)	(47.5)	(20.3)	(32.2)	11.1
2003	100.0	86.7 (100.0)	(46.5)	(19.6)	(33.9)	13.3
2008	100.0	85.3 (100.0)	(53.1)	(13.2)	(33.7)	14.7

Source: MHLW "General Survey on Working Conditions"
Note 1: Figures in parentheses are proportional to companies with retirement benefit plans (lump-sum retirement allowance plans or corporate pension plans).
Note 2: The subjects of the 2013 survey were "private companies with over 30 full-time employees." The subjects of preceding surveys in 1993–2008 were "private companies with over 30 regular main-company employees."

Table 2-2 Adoption of retirement benefit plans by unlisted companies（2009–2015） （Unit: %）

	2009	2010	2011	2012	2013	2014	2015
Companies with retirement benefit plans	100.0	100.0	100.0	100.0	100.0	100.0	100.0
Lump-sum retirement allowances	—	—	—	—	66.4	83.7	85.3
Corporate pensions	100.0	100.0	100.0	100.0	84.6	73.1	72.0
DC type pension plan	33.6	42.5	52.2	54.7	45.9	37.6	38.0
DB type pension plan	85.9	78.3	73.6	72.8	62.6	55.2	54.3
Cash balance pension plan	3.9	4.7	4.5	4.7	3.6	2.6	2.2
Tax-qualified pension plan	43.2	26.5	6.5	1.6	0.5	0.5	0.6
Number of companies with retirement benefits data	384	471	402	364	390	417	361
number of employees: Over 1,000 (%)	23.5	24.0	28.2	31.6	29.4	30.4	34.4
300-999 (%)	21.6	24.9	29.2	30.2	32.8	30.1	32.0
100-299 (%)	16.3	16.3	17.4	19.2	20.1	22.3	21.1
30-99 (%)	20.5	18.2	13.6	9.9	10.2	9.8	7.0
Under 29 (%)	12.7	11.8	8.2	5.2	4.5	4.5	2.9
Unknown (%)	5.3	4.8	3.3	3.8	3.0	3.0	2.6

Source: Created by the present authors, using data in 2009–2015 from NEEDS Financial QUEST.
Note 1: The Smaller-Enterprise Retirement Allowance Mutual Aid Scheme has been categorized under lump-sum retirement allowances. Note that the analysis below uses a different method of categorization, since this paper looks for characteristics of companies with retirement benefit plans divided into DC- and DB- type systems.
Note 2: There are companies with tax-qualified pensions after 2012 as a way of acknowledging that there are still cases in which closed qualified pensions (i.e. pensions with retired recipients only, and no employee members) cannot be transferred to corporate pensions for reasons such as absent business owners.

allowances as retirement benefit plans has increased, and this proportion increases as the number of employees decreases.

However, the "General Survey on Working Conditions" does not survey only unlisted companies. Thus, Table 2-2 shows the retirement benefit plans adopted by unlisted companies（excluding financial institutions）whose data on retirement benefit plans are recorded in NEEDS[3]. Though all companies have adopted some variety of retirement benefit plan, the proportion of companies with corporate pension plans has dropped from 2009 onwards. In particular, the proportion of companies with DB type pension plans dropped sharply from 85.9% in 2009 to 54.3% in 2015. Meanwhile, the proportion of companies with lump-sum retirement allowance plans has increased since 2013.

3．Analysis

In this section, we investigate whether there are differences in companies based on features such as the return on asset, company scale, and the pension deficit ratio with respect to the corporate pension plans adopted by unlisted companies. Furthermore, we identify the factors that influence the selection of corporate pension plans.

3.1 Data

We analyzed 167 unlisted companies（excluding financial institutions）whose data on retirement benefit plans and their accounting in 2015 are recorded in NEEDS.

（1）Retirement benefit plans

NEEDS divides retirement benefit plans adopted by companies into nine categories: lump-sum retirement allowance, defined benefit type plans, Employee's Pension Fund（EPF）, defined benefit（DB）corporate pension plans, cash balance pension plans, tax-qualified pension plan, defined contribution type plans, defined contribution（DC）pension plans, and Smaller-Enterprise Retirement Allowance Mutual Aid Scheme（SERAMAS）. Note that there was not the company which adopted tax-qualified pension plans in 2015.

The 167 companies targeted in this study have all adopted either one or several of these retirement benefit plans. We categorized these companies according to the particulars of their retirement benefit plans. Without distinguishing between internal and external funding, we can categorize lump-sum retirement allowance plans, defined benefit type, EPF, and DB corporate pensions as defined benefit type pension plans, and defined contribution type plans, DC pension plans, and SERAMAS as defined contribution type pension plans. We consider cash balance plans to have both defined benefit type pension plans and defined contribution type pension plans properties.

In the light of the above, we categorized the circumstances of the adoption of retirement benefit plans thus: ① Adoption/non-adoption of defined contribution type pension plans; ② Adoption/non-adoption of defined benefit type pension plans; ③ Adoption/non-adoption of cash balance plans; ④ Adoption/non-adoption of both defined benefit type and defined contribution type pension plans together; ⑤ Only（internally funded）lump-sum retirement allowance plans; ⑥ Only defined contribution type pension plans. Categories ① to ③ are intended for comparing the retirement benefits plans that companies have adopted. Based on the premise that companies with both defined benefit type and defined contribution type retirement benefit plans have a very generous range of plans, Category ④ is intended for verifying whether there is a difference between companies that fit into this category and those that do not. Meanwhile, since companies that fall under Categories ⑤ and ⑥ have only adopted lump-sum retirement allowance plans or only defined contribution type retirement benefit plans, we consider these companies inferior in terms of retirement benefit plan adoption. Based on this categorization, we investigate whether there are differences between companies that have adopted certain systems and those that have not.

Table 3-1　Number of companies per retirement benefit plans category　　(Unit: Number（%）)

Category	Adopted		Not adopted		Total
Defined contribution type pension plans	77	(46.1%)	90	(53.9%)	
Defined benefit type pension plans	161	(96.4%)	6	(3.6%)	
Cash balance pension plans	6	(3.6%)	161	(96.4%)	167
Both defined benefit type and defined contribution type pension plans	62	(37.1%)	105	(62.9%)	(100%)
Only lump-sum retirement allowances	5	(3.0%)	162	(97.0%)	
Only defined contribution type pension plans	4	(2.4%)	163	(97.6%)	

Table 3-1 shows the number of companies according to their adopted retirement benefit plans, and the corresponding proportions. Almost half（46.1%）of the total have adopted defined contribution type pension plans. Of the companies, 37.1% have adopted both defined benefit type and defined contribution type pension plans; these companies may be considered to have a very generous range of retirement benefit plans. It is clear that there are extreme imbalances in the number of companies that have and have not adopted plans fitting the other categories, i.e. defined benefit type pension plans and cash balance plans.

（2）Differences by retirement benefit plans

We investigate whether there are differences between companies that have and have not adopted a particular category of retirement benefit plans, in terms of finances, company scale, and retirement benefits. The indicators we used included the pension deficit ratio （underfunded pension liability）（%）, return on asset （%）, company scale, cash flow profitability （%）, and cash holding ratio （%）. Each variable was derived as follows. The pension deficit ratio variable is the pension deficit, i.e. projected benefit obligation （PBO） minus pension funds, divided by PBO. The return on asset is the value of the current profit, divided by total assets. We use number of employees at end of period （herein, number of employees） as a substitute variable for company scale. Cash flow profitability is the value of operating cash flow, divided by total assets at beginning of period. Cash holding ratio is the value of cash and deposits, divided by total assets.

Table 3-2 shows the descriptive statistics for each indicator by category of retirement benefits plans. We show the means and standard deviations of these indices for the companies that have and have not adopted each category. In addition, we examine by independent t-test differences between the companies that have and have not adopted. Note that though Table 3-2 displays results only for categories without extreme imbalances in their respective number of companies, i.e. for adoption/non-adoption of defined contribution

Table 3-2 Descriptive Statistics

(1) Adoption/non-adoption of defined contribution type pension plans

	Adopted			Not adopted			Total			t-value	
	n	mean	standard deviation	n	mean	standard deviation	n	mean	standard deviation	t-statistics	p-value
Pension deficit ratio	77	43.354	40.889	90	37.259	37.094	167	40.070	38.890	1.002	0.316
Return on Asset		3.122	3.950		3.684	3.962		3.425	3.954	0.916	0.360
Company scale		3283.636	8382.714		2055.111	4647.319		2621.557	6642.926	1.144	0.252
Cash flow profitability		4.776	7.680		4.765	5.403		4.770	6.531	0.011	0.991
Cash holding ratio		13.971	10.205		15.083	12.332		14.571	11.381	0.638	0.524

(2) Adoption/non-adoption of both defined benefit type and defined contribution type pension plans

	Adopted			Not adopted			Total			t-value	
	n	mean	standard deviation	n	mean	standard deviation	n	mean	standard deviation	t-statistics	p-value
Pension deficit ratio	62	36.481	41.420	105	42.188	37.358	167	40.070	38.890	0.892	0.373
Return on Asset		3.374	3.590		3.455	4.171		3.425	3.954	0.134	0.894
Company scale		4189.935	9266.689		1695.467	4211.479		2621.557	6642.926	2.001	0.045 *
Cash flow profitability		4.568	8.244		4.889	5.309		4.770	6.531	0.275	0.783
Cash holding ratio		13.267	9.047		15.340	12.534		14.571	11.381	1.236	0.217

Notes: The t-value represents the culculated t-statistics on the defference between the means for companies with between companies that have and have not adopted a particular category of retirement benefit plans.***, ** and* indicate the 1%, 5% and 10% levels of significance, respectively.

type pension plans, and for adoption/non-adoption of both defined benefit type and defined contribution type pension plans together, we did undertake similar testing for all of the entries categorized in Table 3-1.

The analysis revealed no difference between companies that have adopted defined contribution type pension plans and those that have not, for all of the indicators. Meanwhile, results revealed a difference with a level of 5% statistical significance in company scale with respect to whether or not a company uses both defined benefit type and defined contribution type retirement benefit plans. With respect to the other categories whose results are not shown in Table 3-2, no difference was observed in any of the indicators for adoption/non-adoption of cash balance plans. However, statistical differences were observed in three variables (pension deficit ratio, return on asset, company scale) for defined benefit type pension plans, in two variables (pension deficit ratio, company scale) for lump-sum retirement allowance plans only, and in three variables (pension deficit ratio, company scale, cash holding ratio) for defined contribution type pension plans only.

There is no difference in terms of finances, company scale, and retirement benefits between companies that have and have not adopted defined contribution type pension plans and cash balance plans. Meanwhile, there are differences in terms of company scale and pension deficit ratio between companies that have and have not adopted defined benefit type pension plans. A defined contribution type pension plan is system that pension benefits payable in the future to participants is not predetermined. Conversery, a defined benefit type pension plan is a system that pension benefits payable are predetermined. Therefore these results mean that while companies that have adopted defined benefit type pension plans will have certain fixed characteristics, defined contribution type pension plans have been widely adopted by a variety of unlisted companies.

3.2 Analysis

We investigated the indicators that influence the adoption of retirement benefit plans. Drawing on the preceding results, we estimated a qualitative choice logit model that takes the adoption/non-adoption of a retirement benefit plan as its explained variable, and the pension deficit ratio, return on asset, company scale, cash flow profitability, cash holding ratio as explanatory variables. Since the maximum number of employees is very large and skewed distribution, we used the log of number of employees as company scale. We conducted the analysis using the two categories with little imbalances in the number of

companies that had adopted the plans involved: (1) adoption/non-adoption of defined contribution type pension plans, and (2) adoption/non-adoption of both defined benefit type and defined contribution type pension plans. Specifically, we estimated a model as shown below.

Adoption or non-adoption of a given retirement benefit plan
$= \beta_1 + \beta_2 \cdot$ Pension deficit ratio $+ \beta_3 \cdot$ Return on asset $+ \beta_4 \cdot$ Company scale
$+ \beta_5 \cdot$ Cash flow profitability $+ \beta_6 \cdot$ Cash holding ratio

The results of the analysis are shown in Table 3-3. For adoption/non-adoption of defined contribution type pension plans, there is a greater tendency for companies to adopt both plans insofar as they have larger company scale. This is also true for adoption/non-adoption of both defined benefit type and defined contribution type pension plans. These results show company scale has an influence on the adoption of retirement benefit plans.

Next, we considered whether companies have the tendency to switch to defined contribution type retirement benefit plans following changes in corporate accounting standards. New accounting standards for retirement benefits were introduced in March 2014, meaning that companies adopting defined benefit type retirement benefit plans must now include an immediate acknowledgement on their balance sheets of any unforeseen changes in retirement benefit debt and externally accumulated pension funds. This means that companies using defined benefit type retirement benefit plans must now make allocations for the difference between retirement benefit debt and pension funds as debt on company balance sheets. Meanwhile, with corporate defined contribution type retirement benefit plans, companies need only treat premiums as costs, and need not shoulder such financial risk. This indicates the possibility of a further shift from DB corporate pensions to corporate DC pensions.

We considered companies that have and have not adopted defined contribution type retirement pension plans following the new accounting standards for retirement benefits, and investigated whether certain financial indicator(s) influenced the shift. Note that the number of companies that adopted defined contribution type pension plans in 2012 or 2013 through 2015 is 23 (13.8%), while the companies that did not numbered 144 (86.2%).

Table3-4 (1) shows the descriptive statistics for each indicator between companies that have and have not adopted defined contribution type retirement benefit plans in 2012 or 2013

Table 3-3　The results of Logit analysis（Difference in adopted pension plans）

(1) Adoption/non-adoption of defined contribution type pension plans

Explanatory variables	Coefficient estimates	t-value	p-value	Marginal effects
Constant	-1.1350	-1.676	0.094 *	
Pension deficit ratio	0.0034	0.809	0.418	0.001
Return on Asset	-0.0578	-1.165	0.244	-0.014
Company scale	0.1549	1.688	0.091 *	0.037
Cash flow profitability	0.0120	0.418	0.676	0.003
Cash holding ratio	-0.0005	-0.034	0.973	0.000
Log-likelihood	-112.6904			
McFadden Pseudo R^2	0.0222			
AIC	1.4214			
SBIC	1.5335			
Number of Samples	167			

Conformity rate of Logit

	Predicted Y=0	Predicted Y=1	Total
Observed Y=0	65	25	90
Observed Y=1	45	32	77
Total	110	57	167
Overall conformity rate	50.898%		

(2) Adoption/non-adoption of both defined benefit type and defined contribution type pension plans

Explanatory variables	Coefficient estimates	t-value	p-value	Marginal effects
Constant	-2.6849	-3.423	0.001 ***	
Pension deficit ratio	-0.0057	-1.304	0.192	-0.001
Return on Asset	-0.0222	-0.416	0.677	-0.005
Company scale	0.4112	3.798	0.000 ***	0.085
Cash flow profitability	-0.0193	-0.643	0.520	-0.004
Cash holding ratio	-0.0092	-0.549	0.583	-0.002
Log-likelihood	-100.4467			
McFadden Pseudo R^2	0.0881			
AIC	1.2748			
SBIC	1.3868			
Number of Samples	167			

Conformity rate of Logit

	Predicted Y=0	Predicted Y=1	Total
Observed Y=0	91	14	105
Observed Y=1	43	19	62
Total	134	33	167
Overall conformity rate	58.084%		

Notes:　The table shows the parameter estimates, t-value, p-value and the marginal effects from the logit regression.***,
　　　　** and * indicate the 1%，5% and 10% levels of significance, respectively. It is similar in Table 3-4(2).

through 2015. In addition, Table3-4 (2) shows the results of performing logit analysis using whether a company adopted defined contribution type retirement benefit plans in 2012 or 2013 through 2015 as an explained variable, and pension deficit in place of pension deficit ratio, return on asset, company scale, cash flow profitability, and cash holding rate, as explanatory variables. Pension deficit (in million yen) is PBO minus pension funds.

Adoption or non-adoption to defined contribution type retirement benefit plans in 2012 or 2013 through 2015

$= \beta_1 + \beta_2 \cdot$ Return on asset $+ \beta_3 \cdot$ Company scale $+ \beta_4 \cdot$ Cash flow profitability

$\quad + \beta_5 \cdot$ Cash holding ratio $+ \beta_6 \cdot$ Pension deficit

The results of the analysis show that there is a greater tendency for companies to shift defined contribution type retirement benefit plans insofar as they have greater values for pension deficit. In Nishida and Murakami (2014), it was confirmed that listed companies with high pension deficit ratio adopted DC pension plans when the accounting standards for retirement benefits had undergone review; we have confirmed the same trend in unlisted companies. We may conclude that the change in the accounting system has the potential to change a company's behavior, regardless of whether the company is listed or unlisted. The marginal effects are extremely small, and at this stage have little influence. Since the cause is thought to be something shortly after the introduction of the new accounting standards for retirement benefits, there is a need for continued observation of influences here.

Table 3-4　The characteristics of adoption/non-adoption of defined contribution type retirement benefit plans in 2012 or 2013 through 2015

(1) Descriptive Statistics

	Adopted			Not adopted			Total			t-value	
	n	mean	standard deviation	n	mean	standard deviation	n	mean	standard deviation	t-statistics	p-value
Return on Asset	23	2.917	3.274	144	3.506	4.056	167	3.425	3.954	0.774	0.439
Company scale		4106.565	9181.374		2384.368	6151.898		2621.557	6642.926	0.869	0.385
Cash flow profitability		4.681	4.749		4.784	6.786		4.770	6.531	0.090	0.928
Cash holding ratio		12.657	8.197		14.876	11.804		14.571	11.381	1.126	0.260
Pension deficit		24090.609	50626.479		5061.424	16180.456		7682.210	24667.280	1.788	0.074 *

(2) The result of Logit analysis

Explanatory variables	Coefficient estimates	t-value	p-value	Marginal effects
Constant	-1.7519	-1.719	0.086 *	
Return on Asset	-0.0543	-0.761	0.447	-0.006
Company scale	-0.0089	-0.059	0.953	-0.001
Cash flow profitability	0.0157	0.406	0.685	0.002
Cash holding ratio	-0.0113	-0.480	0.631	-0.001
Pension deficit	0.0000	2.260	0.024 **	0.000
Log-likelihood	-62.4455			
McFadden Pseudo R^2	0.0671			
AIC	0.8197			
SBIC	0.9317			
Number of Samples	167			

Conformity rate of Logit

	Predicted Y=0	Predicted Y=1	Total
Observed Y=0	142	2	144
Observed Y=1	21	2	23
Total	163	4	167
Overall conformity rate	77.246%		

4．Concluding remarks

Following reforms in the retirement benefits system developed from 2000 onwards, Japanese companies have been faced with the issue of choosing between retirement benefit plans. During this period, there was growing research on the choice of retirement benefit plans by Japanese companies, but the focus of all of the research has been listed companies. Thus, in this study, we used data on Japanese unlisted companies, and looked for the characteristics of unlisted companies that have adopted each type of retirement benefit plans. We examined 167 unlisted companies（excluding financial institutions）whose data on retirement benefit plans are recorded in NEEDS for the fiscal year 2015, and confirmed that in terms of finances or retirement benefits, there is no difference between companies that have and have not adopted defined contribution type retirement benefit plans. Meanwhile, differences were observed in terms of company scale and pension deficit ratio between companies that have and have not adopted defined benefit type retirement benefit plans. These results differ from those of previous studies that have conducted the same analysis on listed companies, suggesting that listed and unlisted companies may not have the same criteria for selecting retirement benefit plans. If the corporate pension plan reforms have a different impact on behavior in listed and unlisted companies, further discussion of system reforms will be required.

Finally, we detail a few topics left out of this study. First, we should increase the indicators used for observing the difference between companies that have and have not adopted each pension plan. Second, we also need to increase the volume of unlisted company data used in analysis. These points require detailed investigation and will thus be addressed in future research.

Endnotes

1） These data are obtained from the Ministry of Health, Labor & Welfare（MHLW）"List of Key Companies with Defined-Contribution Corporate Pension Stipulations" for DC pension plans, from the MHLW "List of Key Defined-Benefit Corporate Pension Offices" for DB pension plans, and from the Pension Fund Association（PFA）"Present State of Corporate

Pensions" for the EPF.

2)　See Dorsey（1987）, Stone（1987）, Stone（1991）, Gustman and Steinmeier（1992）, Ippolito （1995）, Mitchell and Dykes（2003）.

3)　In this section, we checked the adoption of retirement benefit plans using data on unlisted companies that had details on their retirement benefit plans in their annual securities reports. For this reason, we use data of comparatively large companies that have adopted both lump-sum retirement allowances and corporation pensions.

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