Evaluating the Effect of Recent Reforms to the Employees' Pension System

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1. Introduction

Due to structural changes in the economy and the continued decline in birthrates, if the Employees' Pension System (*kosei nenkin seido*) — whose most recent recalculation was conducted in 1994 — is left as is, the final premium rate is expected to rise to 34% of monthly income. When social security premiums and other taxes are taken into account, the public's burden increases to over 50% of income. Not only is this burden large, but it increases for later generations, creating the problem of inter-generational inequity. The 1999 reform and recalculation aims primarily to reduce the final premium rate, minimize inter-generational inequities, and bring about a stable and sustainable pension system.

The present Employees' Pension System has various transitional measures to assure fairness, making it rather complex. Since it is basically a pay-as-you-go system that funds benefits out of premium income in the same year, the only way to keep premiums from skyrocketing is to either reduce benefits or slow their growth.

The latest reform contains measures to either curtail the growth of or reduce benefits. To better grasp the significance of these reforms and the size of their impact, we conducted simulations using NLI Research Institute's Simulation Model for the Employees' Pension System. We hope the results provide a more accurate grasp of conditions and contribute to further quantitative analyses toward the next revision in the future.[1]

2. Curtailing/Reversing the Growth of Benefits

Prior to the reform, benefits were expected to expand from 19 trillion yen in fiscal 2000 to 41 trillion yen in 2025, and 77 trillion yen in 2050, while the final premium rate would reach 34.5% of monthly income from fiscal 2024.

Under the reform, benefits are curtailed as shown in Figure 1, and the final premium rate is held at 25.2%. Below we examine the effects of each aspect of the reform.

Figure 1 Reduction Rate of Benefits

	Before reform		After reform		Decrease in benefits
	Premium rate	Benefit	Premium rate	Benefit	
FY 2000	19.35%	¥ 19 tril.	17.35%	¥ 19 tril.	1%
FY 2025	34.50%	¥ 41 tril.	25.20%	¥ 30 tril.	26%
FY 2050	34.50%	¥ 77 tril.	25.20%	¥ 55 tril.	29%

Note: Assumes that the government finances 50% of the basic pension from fiscal 2004.
Source: Calculated by NLI Research Institute.

(1) Freeze on Sliding Wage Adjustments for Starting Benefits

In the past, starting benefits have been adjusted annually to the inflation rate, while adjustments to the wage growth rate are made in the periodic five-year recalculations. As a result, benefit adjustments have closely tracked the annual wage growth rate.

In the future, wage adjustments will be frozen so that benefits are adjusted only for inflation. The freeze was chosen over its outright removal to leave policymakers the option of resuming wage adjustments in case benefits diverge too far from the wage growth rate in the future.

The freeze, which takes effect at the next recalculation in fiscal 2004, will have the largest effect in curtailing benefits of any of the reform measures. The cumulative benefit savings from fiscal 2000 to 2050 is estimated at approximately 150 trillion yen, or 6.6% (Figure 2).

Figure 2 Effect of Individual Reform Measures

(Unit: ¥ trillion, %)

FY	Before reform	Sliding wage freeze			5% benefit cut			Payout at 65			After reform (total)		
			Differ.	%		Differ.	%		Differ.	%		Differ.	%
2000	18.9	18.9	0.0	0.0	18.7	−0.2	−0.9	18.9	0.0	0.0	18.7	−0.2	−0.9
1	19.8	19.8	0.0	0.0	19.6	−0.2	−1.1	19.8	0.0	0.0	19.6	−0.2	−1.1
2	20.8	20.8	0.0	0.0	20.6	−0.3	−1.3	20.8	0.0	0.0	20.6	−0.3	−1.3
3	22.1	22.1	0.0	0.0	21.8	−0.3	−1.4	22.1	0.0	0.0	21.8	−0.3	−1.4
4	23.9	23.2	−0.7	−3.0	23.5	−0.4	−1.6	23.9	0.0	0.0	22.8	−1.1	−4.5
2005	24.6	23.9	−0.7	−2.7	24.2	−0.4	−1.7	24.6	0.0	0.0	23.5	−1.1	−4.4
6	25.2	24.6	−0.6	−2.5	24.8	−0.5	−1.8	25.2	0.0	0.0	24.1	−1.1	−4.3
7	26.0	25.4	−0.6	−2.3	25.4	−0.5	−2.0	26.0	0.0	0.0	24.8	−1.1	−4.3
8	27.1	26.5	−0.6	−2.1	26.5	−0.6	−2.2	27.1	0.0	0.0	25.9	−1.2	−4.3
9	29.1	27.7	−1.4	−4.8	28.4	−0.7	−2.4	29.1	0.0	0.0	27.0	−2.1	−7.1
2010	30.2	28.8	−1.3	−4.4	29.4	−0.8	−2.6	30.2	0.0	0.0	28.1	−2.1	−7.0
11	31.3	30.1	−1.3	−4.1	30.5	−0.9	−2.7	31.3	0.0	0.0	29.2	−2.1	−6.7
12	32.0	30.8	−1.2	−3.8	31.1	−0.9	−2.9	32.0	0.0	0.0	29.9	−2.1	−6.6
13	32.4	31.2	−1.2	−3.6	31.4	−1.0	−3.1	31.6	−0.8	−2.5	29.5	−2.9	−9.0
14	34.2	32.1	−2.1	−6.2	33.1	−1.1	−3.2	33.4	−0.8	−2.4	30.3	−4.0	−11.6
2015	34.7	32.7	−2.0	−5.8	33.6	−1.2	−3.4	33.9	−0.8	−2.4	30.8	−4.0	−11.4
16	35.2	33.3	−1.9	−5.5	34.0	−1.2	−3.5	33.6	−1.7	−4.8	30.5	−4.7	−13.4
17	35.6	33.8	−1.8	−5.2	34.4	−1.3	−3.6	34.0	−1.6	−4.6	31.0	−4.6	−13.0
18	35.7	34.0	−1.7	−4.9	34.4	−1.3	−3.8	33.7	−2.0	−5.6	30.8	−4.9	−13.8
19	37.6	34.8	−2.8	−7.4	36.1	−1.5	−3.9	34.6	−3.0	−8.1	30.6	−7.0	−18.7
2020	38.0	35.4	−2.6	−6.9	36.5	−1.5	−4.0	34.9	−3.1	−8.2	31.0	−7.0	−18.5
21	38.3	35.8	−2.5	−6.5	36.7	−1.6	−4.1	34.8	−3.5	−9.3	31.0	−7.3	−19.2
22	38.6	36.2	−2.3	−6.0	37.0	−1.6	−4.2	34.0	−4.5	−11.7	30.4	−8.2	−21.2
23	38.9	36.7	−2.2	−5.6	37.2	−1.7	−4.3	34.3	−4.6	−11.9	30.7	−8.2	−21.0
24	40.9	37.6	−3.3	−8.0	39.1	−1.8	−4.3	35.4	−5.4	−13.2	30.8	−10.1	−24.6
2025	41.4	38.3	−3.1	−7.4	39.5	−1.8	−4.4	34.7	−6.7	−16.2	30.2	−11.1	−26.9
26	41.5	38.7	−2.9	−6.9	39.7	−1.9	−4.5	34.9	−6.7	−16.1	30.6	−10.9	−26.4
27	42.1	39.5	−2.7	−6.3	40.2	−1.9	−4.5	34.7	−7.5	−17.7	30.6	−11.6	−27.5
28	42.8	40.3	−2.5	−5.8	40.8	−2.0	−4.6	35.0	−7.8	−18.2	31.0	−11.7	−27.5
29	45.6	41.7	−4.0	−8.7	43.5	−2.1	−4.6	37.1	−8.5	−18.6	31.6	−14.0	−30.6
2030	46.4	42.7	−3.7	−8.0	44.3	−2.2	−4.7	37.1	−9.3	−20.1	31.9	−14.6	−31.4
31	47.4	44.0	−3.5	−7.3	45.2	−2.2	−4.7	37.4	−10.1	−21.2	32.3	−15.1	−31.8
32	48.6	45.4	−3.2	−6.6	46.3	−2.3	−4.7	38.1	−10.5	−21.5	33.3	−15.3	−31.5
33	49.9	46.8	−3.0	−6.0	47.5	−2.4	−4.8	38.9	−10.9	−21.9	34.2	−15.6	−31.4
34	53.7	49.0	−4.7	−8.7	51.1	−2.6	−4.8	41.8	−11.9	−22.2	35.3	−18.3	−34.2
2035	55.0	50.6	−4.4	−8.0	52.4	−2.6	−4.8	42.8	−12.2	−22.2	36.6	−18.4	−33.4
36	56.2	52.1	−4.1	−7.3	53.5	−2.7	−4.8	43.9	−12.3	−21.9	37.9	−18.3	−32.6
37	57.4	53.5	−3.8	−6.7	54.6	−2.8	−4.8	45.1	−12.3	−21.4	39.3	−18.0	−31.5
38	58.5	54.9	−3.6	−6.1	55.7	−2.8	−4.8	46.4	−12.1	−20.7	40.8	−17.7	−30.2
39	62.5	57.0	−5.6	−8.9	59.5	−3.0	−4.8	50.1	−12.4	−19.9	42.4	−20.1	−32.1
2040	63.6	58.3	−5.2	−8.2	60.5	−3.1	−4.8	51.3	−12.2	−19.2	43.9	−19.6	−30.9
41	64.3	59.5	−4.9	−7.6	61.2	−3.1	−4.8	52.4	−12.0	−18.6	45.2	−19.1	−29.7
42	65.1	60.6	−4.5	−7.0	62.0	−3.1	−4.8	53.3	−11.8	−18.2	46.4	−18.7	−28.7
43	65.9	61.6	−4.2	−6.4	62.7	−3.2	−4.8	54.1	−11.7	−17.8	47.5	−18.4	−27.9
44	70.0	63.4	−6.6	−9.4	66.6	−3.4	−4.8	57.7	−12.3	−17.6	48.7	−21.3	−30.5
2045	70.7	64.6	−6.2	−8.7	67.3	−3.4	−4.8	58.5	−12.3	−17.3	49.8	−20.9	−29.6
46	71.4	65.6	−5.8	−8.1	68.0	−3.5	−4.8	59.2	−12.2	−17.1	50.8	−20.6	−28.8
47	72.1	66.6	−5.4	−7.5	68.6	−3.5	−4.8	59.9	−12.2	−16.9	51.8	−20.2	−28.1
48	72.7	67.6	−5.1	−7.0	69.2	−3.5	−4.9	60.6	−12.1	−16.6	52.9	−19.8	−27.3
49	76.9	69.2	−7.7	−10.0	73.2	−3.7	−4.9	64.4	−12.5	−16.3	54.0	−22.9	−29.8
2050	77.4	70.2	−7.2	−9.3	73.6	−3.8	−4.9	65.1	−12.3	−15.9	55.1	−22.3	−28.9

Source: Calculated by NLI Research Institute.

(2) 5% Across-the-Board Benefit Cut

In determining old-age pension amounts for new recipients, a 5% reduction in the benefit multiplier from 7.5 per 1000 to 7.125 per 1000 will supposedly reduce pension amounts by 5% across the board. But according to our model, which omits transitional measures, the effect will appear from fiscal 2000, but will initially be smaller than with the other measures, and eventually reach 4.9% in fiscal 2050.

The cumulative savings from this measure from fiscal 2000 to 2050 is approximately 96 trillion yen, or 4.2% (Figure 2).

(3) Postponement of Earnings-Related Benefits to Age 65

The starting age for the earnings-related portion of the old-age pension will be gradually raised from age 60 to 65 between fiscal 2013 and 2025 for men, and 2018 and 2030 for women. The impact of this measure will first appear in 2013 and peak in 2030, but subsequently continue to have a relatively large restraining effect.

The cumulative savings from fiscal 2000 to 2050 is estimated at 371 trillion yen, or 13.8%, making this the most impactful of the reforms (Figure 2).

(4) Expanding the Working Old-Age Pension to Age 69

The working old-age pension, which at present applies to persons age 60 to 64 (by reducing the earnings related portion of benefits in correlation with the person's wage income) will be expanded to include ages 65 to 69. The measure's effect will occur from fiscal 2002. While our model was unable to estimate this effect, we believe it is smaller than for any of the other reform measures.

Taken together, the above reforms will increasingly slow down or reverse the growth of benefits until around fiscal 2030, after which annual savings will remain at approximately 30% compared to the case without reform (Figure 3).

The total cumulative savings from fiscal 2000 to 2050 is estimated at 540 trillion yen, or 24% (Figure 4).

The annual savings derived the first three reform measures are shown in Figure 5. Curve 1 shows the growth projection for benefits without any reforms; curve 2 applies the sliding wage freeze; curve 3 applies the sliding wage freeze combined with the 5% across-the-board cut; and curve 4 applies the above plus delay of benefits to age 65.

Figure 3 Benefit Savings by Decade

	Before reform	After reform		
FY	Benefits	Benefits	Decrease	% decrease
2000 – 2010	¥ 268 tril.	¥ 257 tril.	¥ 11 tril.	4.0%
2011 – 2020	¥ 347 tril.	¥ 304 tril.	¥ 43 tril.	12.5%
2021 – 2030	¥ 417 tril.	¥ 309 tril.	¥ 108 tril.	25.9%
2031 – 2040	¥ 553 tril.	¥ 376 tril.	¥ 177 tril.	31.9%
2041 – 2050	¥ 707 tril.	¥ 502 tril.	¥ 204 tril.	28.9%

Source: Calculated by NLI Research Institute.

Figure 4 Cumulative Benefit Savings

	Before reform	After reform		
FY	Benefits	Benefits	Decrease	% decrease
FY 2000 – 2025	¥ 813 tril.	¥ 714 tril.	¥ 99 tril.	12.2%
FY 2000 – 2050	¥ 2290 tril.	¥ 1748 tril.	¥ 543 tril.	23.7%

Source: Calculated by NLI Research Institute.

Figure 5 Annual Benefit Savings of Combined Measures
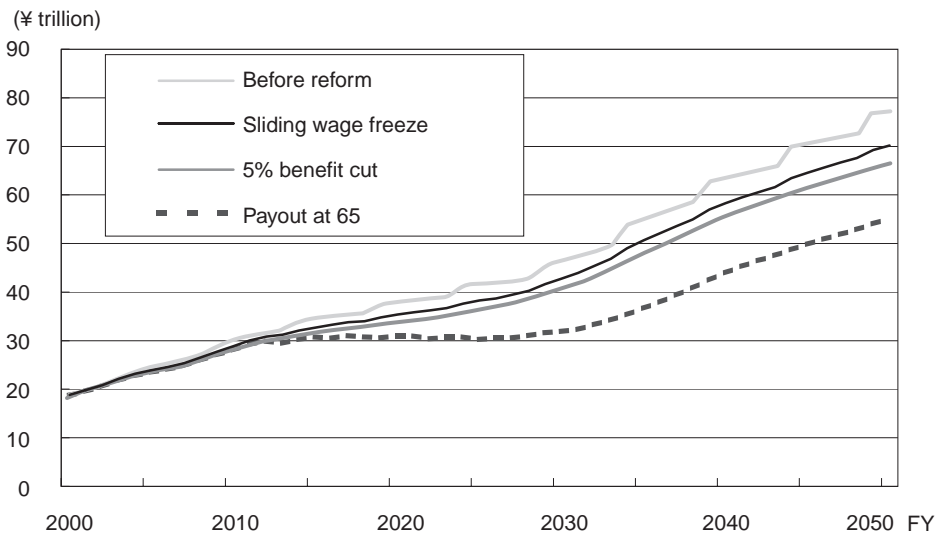
Source: Calculated by NLI Research Institute.

3. Revision of Insurance Premium Rates and Other Matters

In line with curtailing or reversing the growth of benefits, it is possible to reduce required premium revenues and the premium rate. The minimum premium revenue necessary for the system's operation must satisfy three guidelines of the MHW: (1) in principle, avoid a negative balance in any single given year, and (2) maintain reserves at fiscal yearend at approximately three times that required for paying the following year's benefits, and (3) raise the premium rate by approximately 2.5 percentage points at each five-year recalculation until fiscal 2024, when the final premium rate is reached.

Below we examine reforms affecting premium rates in order of their impact.

(1) Temporary Freeze on the Premium Rate

Prior to the reforms, a 2.15 percentage-point increase was planned for the premium rate, raising it from 17.35% to 19.50%, followed by a 2.5 percentage-point increase every five years. However, in light of the persistent economic recession, the premium rate was frozen at 17.35%.

This freeze will have a large impact, and will be effective until the next recalculation in fiscal 2004. Indeed, if the benefit reforms were not being implemented, the planned premium rate hikes of 2.5 percentage points every five years from fiscal 2004 would violate the first two budgetary conditions mentioned above. In fact, the premium rate would need to be raised 3 percentage points at a time, resulting in a final premium rate of 36% in fiscal 2024.

Figure 6 compares this premium rate freeze case to the planned premium rate increases prior to the reform. Clearly, the freeze transfers more of the burden to future generations and thus aggravates inter-generational inequities.

Figure 6 Impact of the Premium Rate Freeze
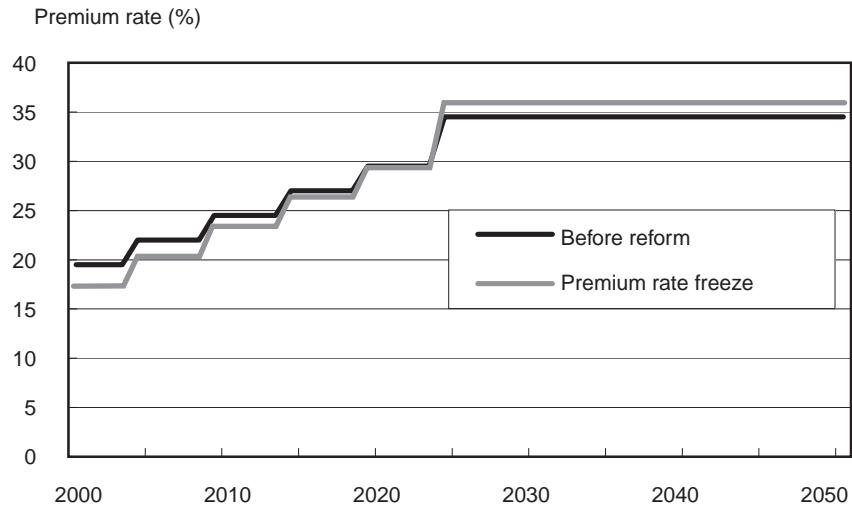
Premium rate (%)

Source: Calculated by NLI Research Institute.

(2) Sliding Wage Freeze

If the premium rate freeze is accompanied on the benefit side only by a sliding wage freeze, we assume that while the original premium rate hike schedule (2.5 percentage points every five years) would be implemented from fiscal 2004, the final premium rate of 34.5% would be reached five years late in fiscal 2029.

(3) 5% Benefit Cut

When a 5% across-the-board cut in benefits is added to the above case, the premium rate would be raised 2.5 percentage points at a time, reaching the final premium rate of 33% in 2024.

(4) Postponement of Benefits to Age 65

The further addition of a measure to postpone benefits until age 65 reduces the final premium rate, reached in fiscal 2024, to 27.6%.

Using these numbers, which are official figures released by the Ministry of Health and Welfare, the single year balance becomes negative sometime around fiscal 2050. According to ministry's estimates, the deficit will be temporary and disappear around fiscal 2060. However, since our model extends only to 2050, we cannot confirm this statement.

Compared to the case without reforms, premiums are reduced by approximately 20% (Figure 7).

Figure 7 Reduction in Premium Rates and Premium Revenue

Year	Before reform		After reform (1/3 govt. financing)			After refrom (1/2 govt. financing)		
	Premium rate	Amount (A)	Premium rate	Amount (B)	(B-A)/A	Premium rate	Amount (C)	(C-B)/B
2000	19.5%	￥24.3 tril.	17.35%	￥22.9 tril.	− 5.8%	17.35%	￥22.9 tril.	0.0%
2010	24.5%	￥40.0 tril.	22.35%	￥36.5 tril.	− 8.8%	20.95%	￥34.2 tril.	− 6.3%
2020	29.5%	￥57.8 tril.	27.35%	￥53.6 tril.	− 7.3%	25.20%	￥49.4 tril.	− 7.8%
2030	34.5%	￥81.5 tril.	27.60%	￥65.2 tril.	− 20.0%	25.20%	￥59.5 tril.	− 8.7%
2040	34.5%	￥94.5 tril.	27.60%	￥75.6 tril.	− 20.0%	25.20%	￥69.0 tril.	− 8.7%
2050	34.5%	￥109.1 tril.	27.60%	￥87.3 tril.	− 20.0%	25.20%	￥79.7 tril.	− 8.7%

Source: Calculated by NLI Research Institute.

(5) Increase the Government's Financing Burden for the Basic Pension to 50%

At present, a fixed portion of premiums in the Employees' Pension System is transferred to the Basic Pension account to fund basic pension benefits for participants in the Employees' Pension and dependents. One-third of the transferred amount is repaid by the national treasury. If budgeting issues can be resolved, it is possible that the government's burden will be raised to 50% in October 2004.

From the viewpoint of the Employees' Pension System, while the amount financed by the government is treated as income, it can also be viewed as a de facto decrease in premium transfers and thus a decrease in expenditure.

Under the 50% scenario, the government-financed amount will reach a cumulative total of approximately 70 trillion yen by 2025, equivalent to 70% of the 99 trillion yen in cumulative benefit savings up to fiscal 2025. Moreover, through fiscal 2050, the government financing reaches a cumulative total of 220 trillion yen, or approximately 40% of the 543 trillion yen in cumulative benefit savings under the reforms.

In this case, our simulation shows that the premium rate can be raised 2.5 percentage points every five years, reaching the final premium rate of 24.85% ten years early in fiscal 2014.

However, in the MHW's official estimates, the premium rate hikes are milder, starting with 1.3 percentage points in fiscal 2004, followed by 2.3, 2.3, and 1.95 percentage points, and reaching the final premium rate of 25.2% in fiscal 2019. As a result, premiums end up being 8.7% lower than the case with 1/3 government financing.

(6) Assessing Premiums Based on Total Income

In the past, premiums have been calculated by applying a fixed rate to standard monthly earned income, leaving bonuses out of consideration. To correct the inequity caused by differences in size of bonus, from fiscal 1995, 1% of the bonus was collected as a premium. The latest reforms go further by applying the same premium rate to both the standard monthly income and bonus.

However, since the intention is not to increase revenue, the premium rate has been reduced so that total premium revenue remains unchanged.

Specifically, the average bonus is assumed to equal 30% of total monthly standard earned income (that is, 3.6 months), and the premium rate is set at 13.58% so that the present total premium ([Monthly earned income x 17.35%] + [Bonus x 1%]) remains unchanged.

$$\frac{([17.35\% \times 12 \text{ months}] + [1\% \times 3.6 \text{ months}])}{(12 \text{ months} + 3.6 \text{ months})} = 13.58\%$$

While this reform is neutral in financial terms, it alleviates inequities arising from the size of bonuses, and also clarifies the annual premium rate. The maximum applicable bonus is set at 1.5 million yen.

4. Impact on the Privatization Debate

Prior to the implementation of the pension reforms, an argument had circulated for the privatization of the Employees' Pension System (calling for its de facto abolition). However, due in part to the speed with which the reforms were carried out, the privatization argument was never fully explored. The main issue in privatization concerns the massive "double burden" problem. Even if privatization were justifiable, there remain doubts as to whether it is practicable, and whether the theoretical and technical obstacles to the double burden problem can be cleared.

Suppose that the present system is privatized by transferring its management to another entity, or by dismantling it entirely. The new system would need funds to continue paying benefits to present beneficiaries, as well as to pay future benefits to participants based on their paid in premiums.

Let us call these funds "required reserves." Since the present pension system is a pay-as-you-go system, we need to calculate how much reserves would have accumulated if the system were fully funded.

The size of required reserves is almost entirely determined by the system of benefits. Below we exam-

ine how the recent reforms will affect the size of required reserves.[2]

Briefly, our simulation model shows that as of the end of fiscal 2000, without the benefit reforms, the required reserves amount to 190 trillion yen for present participants, and 260 trillion yen for present beneficiaries, for a total of 450 trillion yen. Subtracting the system's present reserves of 177 trillion yen, the reserve shortage amounts to 273 trillion yen.

(1) Required Reserves for Participants

In contrast to benefit savings, which incur a time lag before benefit payments actually decrease, required reserves are theoretically calculated and begin decreasing immediately from the first year.

Compared to the pre-reform level, the recent reforms reduce the reserves required for present participants by 17% in fiscal 2000, a rate that subsequently grows to almost 34% by fiscal 2020 and later.

Looking at the reforms by the size of impact, the sliding wage freeze contributes approximately 7% throughout the period, and the 5% benefit cut about 4-5%. In contrast, the postponement of benefits to age 65 contributes 6% initially, but grows to become the biggest contributor at 23% (Figure 8).

Figure 8 Impact of Benefit Reforms on Required Reserves

FY	For participants									For beneficiaries								
	Pre-reform	Slid. wage freeze		5% benefit cut		Payout at 65		After reform		Pre-reform	Slid. wage freeze		5% benefit cut		Payout at 65		After reform	
	¥ tril.	¥ tril.	% dif.	¥ tril.	% dif.	¥ tril.	% dif.	¥ tril.	% dif	¥ tril.	¥ tril.	% dif.	¥ tril.	% dif.	¥ tril.	% dif.	¥ tril.	% dif.
2000	191	178	−6.7	182	−4.3	179	−6.1	159	−16.6	260	245	−6.0	257	−1.4	260	0.0	241	−7.3
2005	208	194	−7.0	199	−4.6	187	−10.1	165	−20.8	320	295	−7.8	312	−2.5	320	0.0	288	−10.1
2010	218	202	−7.1	208	−4.7	184	−15.7	160	−26.4	389	354	−9.0	376	−3.4	389	0.0	342	−12.1
2015	244	227	−7.1	233	−4.7	193	−20.8	168	−31.2	433	389	−10.1	415	−4.1	431	−0.4	372	−14.1
2020	283	262	−7.1	269	−4.7	217	−23.1	188	−33.4	464	413	−11.0	443	−4.5	456	−1.7	387	−16.6
2030	340	315	−7.1	324	−4.7	260	−23.5	225	−33.8	592	521	−12.0	563	−4.9	563	−4.8	469	−20.8
2040	366	340	−7.1	348	−4.7	280	−23.4	242	−33.7	814	714	−12.3	774	−4.9	779	−4.3	646	−20.7
2050	434	403	−7.1	414	−4.7	332	−23.4	288	−33.7	941	818	−13.1	895	−4.9	906	−3.7	745	−20.9

Source: Calculated by NLI Research Institute.

(2) Reserves Required for Beneficiaries

Similarly, compared to pre-reform levels, the reserves required for beneficiaries after the reforms decline by 7% in fiscal 2000, growing to 21% by fiscal 2025 and beyond. The biggest contributor is the sliding wage freeze (Figure 8).

The above calculations indicate that compared to the pre-reform case, the total required reserves decline by approximately 25% to 160 trillion yen for participants and 240 trillion yen for beneficiaries, for a total of 400 trillion yen. Subtracting the present reserves, the reserve shortage shrinks to 223 trillion yen.

(3) Premium Rates That Will Erase the Reserve Shortfall

The elimination of this reserve shortfall is a necessary condition to conclude and privatize the Employees' Pension System. A key point in assessing the privatization argument is whether this condition can rationally and realistically be achieved. In addition, we must also consider the crucial issue of who will bear the cost of financing the reserve shortfall.

To grasp the magnitude of the necessary funding, let us suppose that additional premiums are to be collected from fiscal 2004 to erase the shortfall. To complete the task in 20 years, the required additional rate is approximately 6.1%; in the case of 30 years, it is 3.7%. Alternatively, direct infusions to pay down the shortfall would require 10.2 trillion yen per year for 20 years, or 6.7 trillion yen per year for 30 years.

The complete results of our simulation model are shown in Figure 9.

Figure 9 The NLI Research Institute Employees' Pension System Simulation Model

Basic rates							Financial forecast																Reserve required			
FY	Inflation rate %	Wage growth rate %	Wage + inflat. %	Change in benefit %	Invest. return %	Partici pants millions	Std. earn ings 1000	Premium rate %	Total income ¥tril	Prem. ¥tril	Invest. fin. ¥tril	Govt. fin. ¥tril	Other ¥tril	Total exp. ¥tril	Benefit ¥tril	Transfer ¥tril	Other ¥tril	Bal ance ¥tril	Res. at yearend ¥tril	Same, FY99 deflator ¥tril	Res. multi ple	For participants ¥tril	For bene ficiaries ¥tril	Total ¥tril	Res. shortfall ¥tril
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2000	1.5	2.5	2.3	1.5	2.3	34.30	320.7	17.35	33.1	22.9	6.2	3.2	0.8	28.1	18.7	9.6	-0.2	5.0	177.2	177.0	6.1	159	241	400	223
1	1.5	2.5	2.3	1.5	3.6	34.40	326.7	17.35	33.9	23.4	6.2	3.4	0.9	29.8	19.6	10.2	0.0	4.1	181.3	178.4	5.9	158	253	410	229
2	1.5	2.5	2.3	1.5	3.5	35.00	334.8	17.35	35.1	24.4	6.3	3.6	0.8	31.5	20.6	10.8	0.1	3.6	184.9	179.3	5.8	160	264	423	238
3	1.5	2.5	2.3	1.5	3.5	34.91	339.0	17.35	35.7	24.6	6.4	3.8	0.9	33.3	21.8	11.3	0.2	2.4	187.3	179.0	5.6	158	273	431	243
4	1.5	2.5	2.3	1.5	3.6	34.80	342.8	17.35	38.4	25.8	6.6	5.0	1.0	35.1	22.8	11.9	0.4	3.3	190.6	179.6	5.3	164	283	447	256
2005	1.5	2.5	2.5	1.5	3.8	34.81	355.9	18.65	41.9	27.7	6.6	6.3	1.0	36.9	23.5	12.5	0.9	5.0	195.6	176.2	5.2	165	288	453	257
6	1.5	2.5	2.5	1.5	4.0	34.95	364.8	18.65	43.7	28.5	6.6	6.6	0.8	38.9	24.1	13.2	1.6	4.8	200.4	178.8	5.0	166	291	457	256
7	1.5	2.5	2.5	1.5	4.0	34.68	373.9	18.65	44.7	29.0	7.0	7.0	0.8	41.0	24.8	13.9	2.3	3.7	204.1	178.4	4.9	162	303	466	262
8	1.5	2.5	2.5	1.5	4.0	34.36	383.3	18.65	45.7	29.5	7.9	7.3	0.8	43.2	25.9	14.6	2.7	2.4	206.5	177.9	4.7	159	317	475	269
9	1.5	2.5	2.5	1.5	4.0	34.09	392.8	18.65	48.5	29.5	7.0	7.3	0.8	45.3	27.0	15.3	3.0	3.2	209.7	177.9	4.6	163	331	494	284
2010	1.5	2.5	2.5	1.5	4.0	33.80	402.7	20.95	51.3	34.2	8.0	8.0	0.8	47.5	28.1	16.0	3.4	3.8	213.5	177.1	4.4	160	342	502	289
11	1.5	2.5	2.5	1.5	4.0	33.48	412.7	20.95	52.5	34.7	8.4	8.4	0.9	49.5	29.2	17.7	3.5	3.0	216.4	171.4	4.3	159	351	510	293
12	1.5	2.5	2.5	1.5	4.0	33.21	423.1	20.95	53.6	35.3	8.5	8.9	0.9	51.6	29.9	17.7	4.0	2.0	218.4	170.4	4.2	158	358	516	297
13	1.5	2.5	2.5	1.5	4.0	32.96	433.6	20.95	54.7	35.9	8.6	9.3	0.9	53.6	29.5	18.5	5.6	1.2	219.5	168.7	4.1	158	362	521	301
14	1.5	2.5	2.5	1.5	4.0	32.77	444.5	20.95	58.0	38.6	8.7	9.7	1.0	55.7	30.3	19.4	6.0	2.3	221.9	168.7	3.9	167	367	534	312
2015	1.5	2.5	2.5	1.5	4.0	32.59	455.6	23.25	61.4	41.4	8.8	10.1	1.1	57.7	30.8	20.2	6.7	3.7	225.6	161.6	3.8	168	372	539	314
16	1.5	2.5	2.5	1.5	4.0	32.38	467.0	23.25	62.5	42.2	8.9	10.4	1.1	59.0	30.5	20.8	7.7	3.5	229.1	161.8	3.8	169	375	544	315
17	1.5	2.5	2.5	1.5	4.0	32.21	478.6	23.25	63.8	43.0	9.0	10.8	1.0	60.4	31.0	21.5	7.9	3.4	232.5	161.9	3.8	172	377	549	316
18	1.5	2.5	2.5	1.5	4.0	32.04	490.6	23.25	65.1	43.9	9.2	11.1	1.0	61.7	30.8	22.1	8.8	3.4	235.8	161.8	3.8	174	379	553	317
19	1.5	2.5	2.5	1.5	4.0	31.86	502.9	23.25	68.5	46.6	9.4	11.4	1.1	63.1	30.6	22.8	9.7	5.4	241.2	161.8	3.7	185	383	568	326
2020	1.5	2.5	2.5	1.5	4.0	31.70	515.4	25.20	72.0	49.4	9.9	11.7	1.3	64.7	31.0	23.4	10.3	7.3	248.5	159.1	3.7	191	387	575	327
21	1.5	2.5	2.5	1.5	4.0	31.56	528.3	25.20	73.6	50.4	10.5	12.0	1.2	65.7	31.0	23.9	10.8	7.9	256.5	159.1	3.8	193	392	580	324
22	1.5	2.5	2.5	1.5	4.0	31.41	541.5	25.20	75.1	51.4	10.2	12.4	1.3	66.9	30.7	24.4	11.7	8.2	264.7	164.5	3.9	196	397	586	321
23	1.5	2.5	2.5	1.5	4.0	31.24	555.1	25.20	76.6	52.4	10.5	12.7	1.3	68.2	30.8	24.8	12.7	8.4	273.1	167.2	3.9	207	404	593	329
24	1.5	2.5	2.5	1.5	4.0	31.06	569.0	25.20	78.2	53.4	11.2	12.9	1.3	69.4	30.8	25.3	13.3	8.8	281.8	167.2	3.9	207	404	611	329
2025	1.5	2.5	2.5	1.5	4.0	30.85	583.2	25.20	79.8	54.4	11.2	12.9	1.3	70.8	30.2	25.8	14.8	9.0	290.8	166.2	4.0	209	412	622	331
26	1.5	2.5	2.5	1.5	4.0	30.65	597.8	25.20	81.3	55.6	11.6	13.2	0.9	71.7	30.2	26.3	14.8	9.6	300.4	169.1	4.0	212	417	629	331
27	1.5	2.5	2.5	1.5	4.0	30.55	612.7	25.20	82.8	56.6	12.0	13.4	0.8	73.1	30.6	26.8	15.7	9.7	310.1	172.0	4.1	213	428	641	331
28	1.5	2.5	2.5	1.5	4.0	30.33	628.0	25.20	84.5	57.6	12.4	13.7	0.8	74.4	31.0	27.4	16.0	10.1	320.2	175.0	4.2	214	439	653	333
29	1.5	2.5	2.5	1.5	4.0	30.09	643.7	25.20	86.1	58.6	13.7	14.0	0.8	75.8	31.6	27.9	16.3	10.2	330.4	169.4	4.2	225	454	678	348
2030	1.5	2.5	2.5	1.5	4.0	29.83	659.8	25.20	87.7	59.5	13.1	14.2	0.8	78.0	31.9	28.4	17.7	9.7	340.1	171.8	4.2	225	469	693	353
31	1.5	2.5	2.5	1.5	4.0	29.53	676.3	25.20	88.9	60.4	13.5	14.7	0.3	79.1	32.3	29.4	17.4	9.8	349.9	174.1	4.3	224	485	710	360
32	1.5	2.5	2.5	1.5	4.0	29.25	693.2	25.20	90.6	61.3	13.9	15.2	0.3	81.3	33.3	30.3	17.7	9.4	359.3	176.1	4.3	224	504	727	368
33	1.5	2.5	2.5	1.5	4.0	28.90	710.6	25.20	92.2	62.1	14.3	15.7	0.2	83.5	34.2	31.3	18.0	8.7	368.0	177.7	4.3	222	523	746	378
34	1.5	2.5	2.5	1.5	4.0	28.60	728.3	25.20	93.9	63.0	14.6	16.1	0.2	85.8	35.3	32.2	18.3	8.0	376.0	170.4	4.3	232	545	777	401
2035	1.5	2.5	2.5	1.5	4.0	28.28	746.5	25.20	95.5	63.8	14.9	16.6	0.2	88.1	36.6	33.2	18.3	7.3	383.4	171.6	4.3	231	565	795	412
36	1.5	2.5	2.5	1.5	4.0	28.01	765.2	25.20	97.1	64.8	15.2	17.1	0.1	90.3	37.9	34.1	18.3	6.8	390.2	171.6	4.2	230	583	813	423
37	1.5	2.5	2.5	1.5	4.0	27.73	784.3	25.20	98.8	65.8	15.7	17.6	0.1	92.6	39.3	35.1	18.3	6.2	396.4	171.8	4.2	230	600	830	434
38	1.5	2.5	2.5	1.5	4.0	27.50	803.9	25.20	100.5	66.8	16.1	18.0	0.2	94.9	40.8	36.0	18.1	5.6	402.0	171.6	4.2	230	616	846	444
39	1.5	2.5	2.5	1.5	4.0	27.24	824.0	25.20	102.2	67.9	16.6	18.5	0.0	97.2	42.4	37.0	17.8	5.0	407.1	163.0	4.1	242	632	873	466
2040	1.5	2.5	2.5	1.5	4.0	27.03	844.6	25.20	103.3	69.0	16.0	19.0	-0.7	101.0	43.9	37.9	19.2	2.2	409.3	161.5	4.0	242	646	888	479
41	1.5	2.5	2.5	1.5	4.0	26.71	865.7	25.20	104.9	69.9	16.2	19.4	-0.5	103.0	45.2	38.8	19.0	1.8	411.1	159.8	4.0	243	658	902	490
42	1.5	2.5	2.5	1.5	4.0	26.42	887.4	25.20	106.4	70.9	16.2	19.9	-0.5	105.0	46.4	39.7	18.9	1.4	412.5	158.0	3.9	244	670	914	502
43	1.5	2.5	2.5	1.5	4.0	26.10	909.6	25.20	107.7	71.8	16.2	20.3	-0.5	107.0	47.5	40.5	19.0	0.7	413.2	155.9	3.9	245	681	927	513
44	1.5	2.5	2.5	1.5	4.0	25.82	932.3	25.20	109.2	72.8	16.2	20.7	-0.5	109.0	48.7	41.4	18.9	0.2	413.5	146.4	3.8	259	694	953	539
2045	1.5	2.5	2.5	1.5	4.0	25.52	955.6	25.20	110.6	73.8	16.2	21.2	-0.5	111.0	49.8	42.3	19.0	-0.4	413.1	146.1	3.7	260	705	965	552
46	1.5	2.5	2.5	1.5	4.0	25.28	979.5	25.20	112.2	74.9	16.2	21.6	-0.5	113.0	50.8	43.2	19.0	-0.9	412.2	141.6	3.7	262	714	977	565
47	1.5	2.5	2.5	1.5	4.0	25.01	1004.0	25.20	113.6	75.9	16.1	22.1	-0.5	115.0	51.8	44.1	19.1	-1.4	410.8	139.1	3.6	265	723	988	577
48	1.5	2.5	2.5	1.5	4.0	24.80	1029.1	25.20	115.2	77.2	16.1	22.5	-0.5	117.0	52.9	44.9	19.2	-1.7	409.1	136.4	3.5	267	730	998	589
49	1.5	2.5	2.5	1.5	4.0	24.57	1054.8	25.20	116.6	78.4	16.0	22.9	-0.7	119.0	54.0	45.8	19.2	-2.4	406.6	127.2	3.4	284	738	1022	615
2050	1.5	2.5	2.5	1.5	4.0	24.38	1081.2	25.20	119.0	79.7	15.9	23.4	0.0	121.0	55.1	46.7	19.2	-2.0	404.7	124.7	3.4	288	745	1032	627

Notes: For FY 2000-05, investment returns are calculated backward from MHW data. For income & expenditure, other includes minor adjustments.

Source: NLI Research Institute

Notes

1. NLI Research Institute's Simulation Model for the Employees' Pension System was first released in October 1998. It has been revised to accommodate the recent reforms and recalculation. Due to differences in approach, not all values coincide with those released by the MHW. As such, our model is best used to discern trends and make rough estimates rather than to seek absolute values.

2. When we first released our model in 1998, we imposed the condition that the required reserve estimates coincide with the MHW figures. Because data compilation methods since then have not been specified by the ministry, the size of discrepancies between our fiscal 2000 numbers and future data releases is uncertain. Thus our simulation numbers should be understood as reflecting the latest available data to the extent possible, and using the same logic as when the model was first released.