

**Roles of the Social Security  
Pension Schemes and  
the Minimum Benefit Level under the  
Automatic Balancing Mechanism**

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- I Influence of a Declining Birth Rate and an Aging Society on the Social Security Pension Schemes
- II Roles of the Social Security Pension Schemes
- III Responses to a Declining Birth Rate and Improved Longevity
- IV 2004 Pension Reform
- V Automatic Balancing Mechanisms in Other Countries
- VI Importance of the Minimum Benefit Level Provision
- VII Comprehensive Discussions Needed within a Given Time

The major objective of the social security pension schemes is to prevent people who encounter contingencies that may trigger economic difficulties in life, such as retirement due to old age, being unable to work due to disability and the cessation of income due to the death of the breadwinner, from becoming impoverished. To fulfill this objective, the benefit level must be adequate.

Compared to other countries, the pace at which the Japanese population ages is incomparably much faster. To cope with this environmental change, social security pension reforms have been repeatedly implemented since the 1980s. In particular, in and after the 1985 pension reform, measures requiring increased burdens on the part of individuals have been taken repeatedly such as the reduction of the benefit level. Political battles regularly occurred between the ruling and opposition parties each time that the reform bill was submitted to the Diet.

Under these circumstances, the population projections published in January 2002 indicated further decline in the birth rate and improved longevity, which disrupted the financial equilibrium attained by the 2000 pension reform.

With reference to the ideas adopted for the pension reforms in Sweden in the 1990s, the 2004 pension reform developed a method in which the contribution schedule is first fixed and then, based on such schedule, the benefit level is determined. The benefit level is gradually reduced by keeping the indexation in check until financial balance is attained.

While this framework eliminates anxiety about future increases in the contribution level, anxiety about the benefit level still remains. To deal with this anxiety and to ensure the adequacy of the benefits, which is required for the social security pension schemes as their essential objective, the minimum benefit level was written into the law. In this sense, the provision of the minimum benefit level is very important in that it represents the fundamental role of the social security pension schemes.

## I Influence of a Declining Birth Rate and an Aging Society on the Social Security Pension Schemes

Many OECD (Organization of Economic Cooperation and Development) member countries have experienced the phenomenon of seniors living longer than their projected longevity as well as the phenomenon of a woman bearing fewer children than the projected number. These phenomena result in the accelerating trends towards fewer children and an aging population beyond the anticipated level.

Japan's encounter of these trends accelerating at an incomparably quicker pace even among these member countries has affected various social systems and business activities. In particular, the influence of these trends on the social security pension schemes, which is operated under the concept of intergenerational transfers of income, has become serious. Each time a new population projection is published, we can foresee a situation where the number of beneficiaries of old-age pension benefits will increase beyond the previously anticipated level; the number of active workers will decrease beyond the previously anticipated level. Accordingly, each time such a projection has been announced, the government has had to implement pension reform to ensure financial equilibrium.

Such repeated pension reforms inevitably included harsh measures such as reducing the level of benefits and raising the pensionable age, causing sharply divided opinions between the ruling and opposition parties during Diet deliberations. Each time pension reform was implemented, the situation was repeated with pointed confrontations occurring as if all the Diet's energy were devoted to pension reform. There was never sufficient time to fully discuss the underlying issues of how society should deal with the acceleration of prolonged longevity and fewer children.

Such a political state of affairs has not been unique to Japan. Many OECD member countries have experienced similar situations. Among them, some countries have steered clear of such formidable political confrontations that can only be described as sterile. Instead, they have introduced a framework that incorporates a mechanism of automatically adjusting the level of benefits and recovering financial equilibrium without going through Diet deliberations into the social security pension schemes as measures to address the faster pace of a declining birth rate and aging population than projected. This adjustment system is the so-called "automatic balancing mechanism." Japan has also introduced a similar framework known as modified indexation in its 2004 pension reform.

Because the automatic balancing mechanism automatically adjusts the benefit level in response to the actual

situation of a declining birth rate and aging population, it is likely that the benefit level of the future social security pension schemes will be substantially reduced. On the other hand, however, considering the roles of the social security pension schemes, any scheme that is unable to provide adequate benefits will lose justification for its existence. "Adequate benefits" here means the amount with which those who encountered an incident subject to the payment of insurance benefits (i.e., economic risks in life; explained in Chapter II) will not experience economic difficulties.

In Japan, in consideration of these essential roles of the social security pension schemes, the lower limit of the benefit level has been stipulated in the law. Among the countries that have introduced the automatic balancing mechanism, however, no other countries have provided a minimum benefit level as Japan has done.

This paper provides an overview of the automatic balancing mechanisms that Japan, Sweden and Germany have adopted for their social security pension schemes, and at the same time, confirms the significance of the lower limit of the benefit level set in Japan.

## II Roles of the Social Security Pension Schemes

Before discussing the automatic balancing mechanism, let's turn to the following sections that examine the roles that must be assumed by the social security pension schemes.

When we look at our economic lives, as covered by Table 1, the contingencies or incidents that are likely to cause economic difficulties with no responsibilities on the part of an individual include retirement due to old age, disability making it impossible to work to earn a living, death of the breadwinner, unemployment, payment of medical care expenses for treating diseases and/or injuries and so on. In this paper, these incidents are called the "economic risks in life." The economic risks in life can be broadly divided into two categories: no longer earning an income for reasons such as retirement due to old age and spending an increased amount for medical care expenses, etc.

**Table 1. Economic Risks in Life**

<b>Cessation of income</b>	When retired from working life due to old age When made unable to work due to disability When made unable to work due to sickness When the breadwinner died When a job was lost
<b>Increases in expenditures</b>	When treated for sickness or injury When giving birth When rearing children When in a state requiring nursing care

Social security schemes are designed to address these economic risks. Among these schemes, the social security pension schemes are established so as to cover the three economic risks in life that fall under the category of no longer earning income, i.e., retirement due to old age, disability making it impossible to work to earn a living and death of the breadwinner. The system has the role of preventing people experiencing such incidents from being impoverished by providing old-age pension benefits, disability pension benefits and survivor's pension benefits, respectively.

Since the Industrial Revolution, the phenomena had appeared in many countries in which an increasingly large number of people migrated to cities from agricultural villages to be company employees. Through such moves, the traditional extended family structure had gradually ceased to exist. These phenomena had brought about many cases where those who lost their jobs due to company bankruptcy and those who became sick and spent all of their savings or borrowed money to pay for medical expenses became impoverished because they were not able to receive support from their relatives.

To address such problems of poverty, a variety of attempts were made to resolve the situation such as the encouragement of savings, the popularization of life insurance, the establishment of friendly societies and the enactment of the Poor Law in England and Wales. However, none of them proved to be fully effective solutions.

Being faced with such circumstances, the concept of social insurance had emerged in the 19th century in Germany. Under this framework, people falling under a prescribed range were compulsorily covered by insurance schemes for which contributions were collected from them and, at the same time, benefits were provided to those who encountered economic risks in life, thereby preventing them from becoming impoverished. The underlying concept behind these schemes was that those who encountered economic risks in life were supported by society as a whole. As part of these social insurance schemes, the social security pension scheme has eventually spread into many countries in the early years of the 20th century. In Japan, the Employees' Pension Insurance Scheme was introduced in 1942.

As such, the major role of the social security pension schemes is to provide benefits to prevent people from becoming impoverished<sup>1</sup> in the face of the three economic risks described above. The important point here is that the social security pension schemes are required to "provide benefits so as to prevent people from becoming impoverished."

With the exception of periods during which the economy is in a state of disorder and the production of goods and services is considerably deteriorated, when the economy is in a normal state, the social security pension schemes ought to assume the role of preventing people from becoming impoverished through the compulsory transfer of income.

While the social security pension schemes must naturally avoid providing more than adequate benefits, the system must ensure that benefits that are adequate enough to prevent people from becoming impoverished are provided.

Accordingly, we cannot adopt a concept that permits some shortfalls in the level of benefits under normal economic conditions in order to ensure financial equilibrium. If the public pension system cannot prevent such impoverishment under normal economic conditions, the system itself would lose its reason for existence.

### III Responses to a Declining Birth Rate and Improved Longevity

#### 1 1985 Pension Reform

This chapter briefly outlines how the social security pension schemes consisting of the Employees' Pension Insurance Scheme and other programs dealt with the issues of fewer children and improved longevity up until the 2004 pension reform.

In the 1960s and 1970s, Japan experienced high economic growth. In keeping pace with such high growth, the level of social security pension benefits was also improved.

In 1973, the indexation of benefits to the increase of wages or the Consumer Price Index (CPI) was introduced to automatically maintain the actual value of benefits at the same level. The indexation was principally based on the wage increase but, between the two actuarial valuations, it was based on the CPI increase. However, the level of benefits was extremely high.

Before the provision of indexation was introduced, each time actuarial valuations were carried out, the benefit calculation formula was revised in consideration of the levels of wages and commodity prices in order to increase the level of benefits. However, this calculation formula was not changed when the provision of indexation was introduced. Accordingly, such a high benefit level was set due to partially overlapping measures for benefit improvement that should have been replaced with indexation<sup>2</sup>.

However, because the coverage period of many people was still short at that time, benefits were not excessively high in terms of monetary amount.

Nevertheless, people concerned started to become aware of the influence of prolonged longevity on pension finance in the latter half of the 1970s because in Japan the life expectancy of people aged 65 had grown continually since the latter half of the 1960s, as shown in Table 2. In response, raising the pensionable age was proposed as one topic during the 1980 pension reform discussions. However, this topic was not included in the

relevant bill partly due to the opposition of the ruling party.

The results of the actuarial valuation in 1980 indicated that if the benefit level were left as it was, the rate of future contributions would have to be raised to the middle of the 30-percent level of the monthly pensionable remuneration. To ensure a sustainable system, measures to facilitate financial stabilization were necessary such as changing the benefit level to be more appropriate.

To deal with this objective, a “reduction of the benefit level” was proposed<sup>3</sup> during the 1985 pension reform discussions. This proposal was intended to introduce measures to restrain any increase in benefit amounts even though the periods covered would become longer in the future. The then Socialist Party strongly opposed this reduction of the benefit level. Although the bill passed the Diet by a vote, the conflict over the pension issue between the ruling and opposition parties lingered on even after passage of the reform bill.

While this 1985 reform is known for the introduction of the basic pension and the establishment of women’s rights to pensions (the compulsory coverage of housewives), the reduction of benefits was also implemented during this reform. Such moves can be referred to as the first steps towards a series of reforms that addressed prolonged longevity<sup>4</sup>.

As shown in Table 2, around 1980, the total fertility rate (the average number of children a woman gives birth to during her lifetime) had already shown a tendency to decline. However, at that time, few people accepted this tendency as ongoing, and were aware of the problem of a declining birth rate. Rather, people at that time were more aware of the issue of how to prepare for an increase in population partly because it was only about ten years after the population explosion was discussed in the 1970s.

**Table 2. Life Expectancy and Total Fertility Rate**

Year	Life Expectancy (Unit: Year)				Total Fertility Rate
	Males		Females		
	Age 0	Age 65	Age 0	Age 65	
1947	50.06	10.16	53.96	12.22	4.54
1950 – 52	59.57	11.35	62.97	13.36	3.65
1955	63.60	11.82	67.75	14.13	2.37
1960	65.32	11.62	70.19	14.10	2.00
1965	67.74	11.88	72.92	14.56	2.14
1970	69.31	12.50	74.66	15.34	2.13
1975	71.73	13.72	76.89	16.56	1.91
1980	73.35	14.56	78.76	17.68	1.75
1985	74.78	15.52	80.48	18.94	1.76
1990	75.92	16.22	81.90	20.03	1.54
1995	76.38	16.48	82.85	20.94	1.42
2000	77.72	17.54	84.60	22.42	1.36
2005	78.56	18.13	85.52	23.19	1.26

Note: Total fertility rate refers to the average number of children a woman gives birth to during her lifetime.

Source: Compiled based on material published by the Ministry of Health, Labour and Welfare.

## 2 1994 Pension Reform

It was since the 1994 pension reform that people started to recognize the country’s tendency toward fewer children as well as improved longevity.

The National Institute of Population (at that time)<sup>5</sup> had been reviewing and announcing the population projection every five years on the basis of the results of the national census and vital statistics. Reflecting the tendency of the declining birth rate at that time, the 1992 projection indicated for the first time that the total fertility rate was dropping below 2.0 and would reach 1.8.

In response, the Ministry of Health and Welfare (at that time) prepared a reform bill that primarily consisted of raising the pensionable age and revaluing wages<sup>6</sup> based on the level of disposable income in order to establish a level of contributions that would be sustainable in the future. However, the trade unions strongly opposed any raise in the pensionable age.

To deal with this situation, the government had taken measures<sup>7</sup> in connection with its employment policy to establish an employment environment in preparation for raising the pensionable age. These measures included the amendment of applicable laws in which employers were prohibited from setting the retirement age at less than 60, and requirements were imposed on businesses to make efforts to extend the retirement age to 65 and to reemploy retirees. At the same time, continued employment benefits for senior workers were introduced in the employment insurance system. A decision was also made on limiting the raising of the pensionable age only for the flat-rate part of the benefits.

Because of these efforts, the bill passed the Diet. The period from the preparation of this bill until its passage coincided with the period when the active realignment of political parties took place, giving rise to the Hosokawa Cabinet and the Murayama Cabinet. Because opposition parties took over the reins of government, they were not permitted to insist on their opposition-party-like approaches. It can be said that this situation partly contributed to the passage of the bill.

## 3 2000 Pension Reform

Nevertheless, the pace at which the birth rate declined and longevity improved continued to surpass the pace that had been projected. The population projection announced in 1997, five years after 1992, indicated further declines in the birth and mortality rates. The rate of senior longevity had improved beyond the projected rate, and the ultimate total fertility rate was projected to be 1.61 by reflecting the unceasing declines in the birth rate.

In response to these projections, the Ministry of Health and Welfare again proposed a reform bill to develop a stable financial base by establishing a sustainable contribution level. The core measures constituting this

bill included: (1) raising the pensionable age for benefits to 65 both for the flat-rate part and the earnings-related part, (2) changing the indexation basis for pensioners aged 65 and over from disposable income to the Consumer Price Index, (3) lowering the benefit level of the earnings-related part by 5 percent and (4) extending the coverage of the Employees' Pension Insurance Scheme to employees aged between 65 and 69.

The opposition parties aggressively resisted the bill, and the Japanese Trade Union Confederation (Rengo) organized a campaign against the bill around the Diet. Nevertheless, the bill was steamrolled through the Diet and it passed.

## IV 2004 Pension Reform

### 1 Further Graying of the Population

As described above, since the 1980s, measures had been repeatedly taken to adapt the social security pension schemes to the structural changes consisting of improved longevity and declining birth rates and to attain financial stability.

In spite of these efforts, declines in birth and mortality rates that surpassed the projected rates continued to persist. The population projection announced in 2002 showed further graying of the population due to projected declines in birth and mortality rates. Specifically, as shown in Table 3, while the 1997 projection showed an ultimate life expectancy of 79.43 years for men and 86.47 years for women, the 2002 projection indicated 80.95 years and 89.22 years, respectively, which meant that men would live longer by about 1.5 years and women by about 2.8 years.

With respect to the ultimate total fertility rate, while the 1997 projection indicated a drop to 1.61, the 2002 projection showed a further decline to 1.39.

### 2 Two Options Available for the System Reform Process

The 2002 population projection destroyed the assumptions adopted for the demographic structure in the 2000 reform, and required new measures to attain financial balance on the assumption of further declines in birth and mortality rates.

**Table 3. Comparison of the 2002 Projection with the 1997 Projection**

		2002 projection	2002 projection
Ultimate life expectancy (Unit: number of years)	Men	80.95	79.43
	Women	89.22	86.47
Ultimate total fertility rate		1.39	1.61

Source: Compiled based on material published by the National Institute of Population and Social Security Research.

However, because of repeated measures taken to attain financial balance, the government faced an extremely difficult political situation. Specifically, because pension reforms that required increased burdens of people had been repeated, the reforms were ridiculed by the mass media as "mirage-like pensions." In addition, there was an ample possibility that the public might develop an allergic reaction of "What? Not again!" to similar measures.

Accordingly, it was very doubtful that people would consent to what had become the conventional process of implementing another pension reform by presenting the contribution schedule after reviewing the benefit level and the pensionable age, as was done in the past.

The conventional process has a major advantage in that the framework of benefits is clearly defined. For the 2004 reform, however, it was highly likely that the public would not accept a repeat of such a process.

Accordingly, the government sought an alternative process, and considered the reform implemented in Sweden in the 1990s.

One of the features of the pension reform in Sweden in the 1990s, which is outlined in Chapter V, was the introduction of a mechanism in which the contribution rate is fixed first, and the benefit level is then automatically adjusted under prescribed rules to maintain financial equilibrium<sup>8</sup>. This is the so-called "automatic balancing mechanism." The government took notice of this mechanism.

One source of anxiety that people have against the social security pension schemes is that the contribution rate could be infinitely increased in the future. The Swedish method of reform provided a solution to this issue by clarifying future contribution levels. Specifically, the contribution level is fixed first, and benefits are provided within that level of contributions.

Another source of anxiety that people have against the social security pension schemes is that the benefit level would continually be reduced. The Swedish method of reform did not fully address this point. Because each time the automatic balancing mechanism is put into operation, the benefit level is reduced; to what extent the benefit level would be adjusted is not clear.

Nevertheless, this method has a major advantage of avoiding repeated political confrontations because there is no need to implement a new pension reform each time a population projection indicating the further graying of the population is announced.

As discussed in Chapter II, if the social security pension schemes are unable to provide an adequate level of benefits, they would lose their reason for existence. Accordingly, the anxiety regarding the endless reduction in the benefit level must be fully addressed. In order to apply the Swedish framework, therefore, it was necessary to develop a new framework that could avoid political confrontations while eliminating such anxiety.

Through these discussions for the 2004 reform, it was decided not to follow the conventional reform process

but to introduce a framework of first fixing the contribution schedule, and then automatically adjusting the benefit level in the event of further graying to restore the financial equilibrium. In addition, it was decided to consider the provision of the minimum benefit level that is discussed in Section 6 as the measure to address the anxiety that the reduction of the benefit level might be endless.

### 3 Contribution Schedule Stipulated in Law

As explained in Section 2, the 2004 pension reform required first fixing the contribution schedule, and the fixed schedule was stipulated in the law<sup>9</sup>. As shown in Figure 1, the fixed contribution schedule of the Employees' Pension Insurance Scheme is to raise the contribution rate from 13.58 percent to 13.934 percent in October 2004. Every year thereafter in September, it is to be raised by 0.354 percent until 2017. After 2017, it is to be fixed at 18.3 percent.

The fixed contribution schedule of the National Pension Scheme for the self-employed is to raise the monthly contribution rate of JPY 13,300 to JPY 13,580 in April 2005. Every year thereafter in April, it is to be raised by JPY 280 until 2017. After 2017, it is to be fixed at JPY 16,900. These contributions are expressed in terms of fiscal 2004 monetary values and they are indexed to the rate of increase of the per-capita gross earnings of active workers.

### 4 Raising the Rate of the National Subsidy to the Basic Pension Benefits

While not directly related to the automatic balancing mechanism in the 2004 reform, one of the important factors that support the framework of pension financing revision in the reform is raising the rate of the national subsidy to the basic pension benefits.

The mechanism employed to finance the basic pension benefits is that in which each scheme transfers the designated amount of money for the expenditure of the basic pension benefits calculated proportionately to the number of covered people aged between 20 and 60 plus the number of their dependent spouses to the Basic Pension Sub-account of the National Pension Special Account.

This designated amount is called the transfer for basic pension benefits. Prior to the 2004 reform, when each scheme transferred the designated amount, an amount equivalent to one third of the designated amount was subsidized. It was in the 2004 reform that it was decided to raise the rate of national subsidy. While such increase had been discussed since around the 1994 reform, it was decided in the 2004 reform that after securing the necessary financial resources, this rate is to be raised gradually to one half by the year 2009.

As of FY 2007, the rate of the national subsidy was raised to "1/3 + 32/1000"<sup>10</sup>. In order to raise it to 1/2, further financial resources must be secured. As we move towards fiscal 2009, heated discussions on financing the

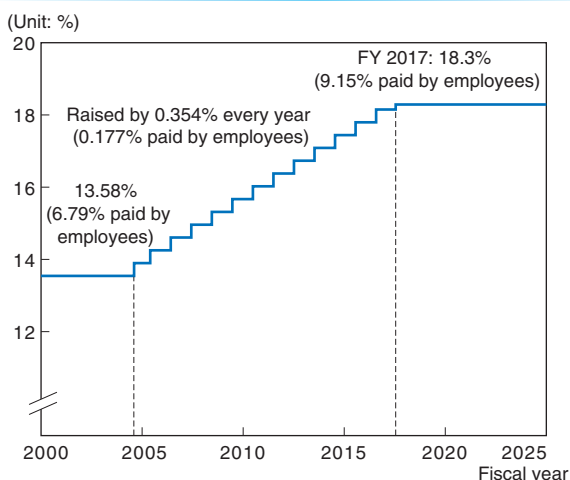
**Figure 1. Contributions (Rates) Stipulated by Law for Employees' Pension Insurance and National Pension Schemes**

**[Increase in Contributions (Rates)]**

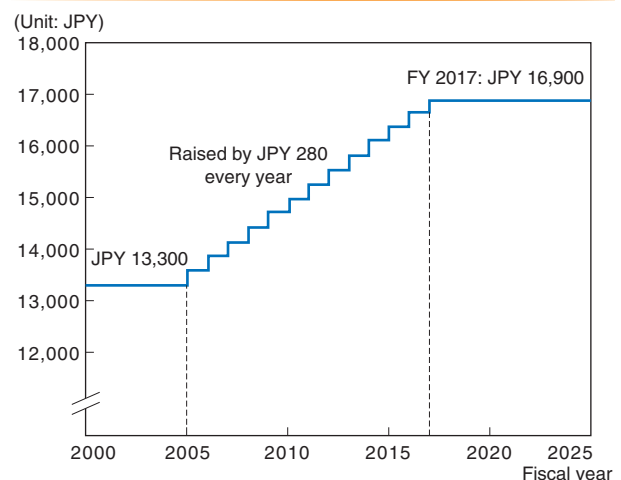
Employees' Pension Insurance Scheme: Raised by 0.354% (0.177% paid by employees and 0.177% paid by the employer) every year starting in October 2004

National Pension Scheme: Raised by ¥280 (in terms of FY 2004 monetary values) every year starting in April 2005

**Contribution Rate of Employees' Pension Insurance Scheme**



**Contribution Rate of National Pension Scheme**



**Notes:**

The contribution rate of the Employees' Pension Insurance scheme is the rate of annual income (total pensionable remunerations).

The contributions of the National Pension scheme are in terms of the FY 2004 monetary values (nominal amounts until FY 2003). The actual contributions in and after FY 2005 are calculated by multiplying the amount specified above by wage increases in and after FY 2004.

Source: Material published by the Ministry of Health, Labour and Welfare.

raised rate of the national subsidy will occur, including measures such as increasing the rate of the consumption tax.

## 5 Modified Indexation

As described in Section 2, Chapter IV, the 2004 reform considered the introduction of a framework in which the contribution schedule is first fixed, and then the benefit level is automatically adjusted to restore financial equilibrium. Prior to this reform, in December 2002, the Ministry of Health, Labour and Welfare published a green paper<sup>11</sup> (a consultation document) entitled “Consultative Proposal and Issues for the Pension Reform.”

This paper was based on the concept that because pension benefits are supported by the total remunerations of active workers (covered people), the benefit level should be indexed to the rate of increase of these total remunerations, and proposed changing the indexation basis from the rate of increase of per-capita disposable income to the rate of increase of total disposable income. This method is generally known as “modified indexation.”

Specifically, because the total disposable income is obtained by multiplying the average per-capita disposable income by the number of covered people, the rate of increase of the total disposable income can be obtained by multiplying the rate of increase of per-capita disposable income by the rate of increase/decrease of the number of covered people.

In other words, if we consider the decrease in the number of active workers due to further declines in the birth rate, the rate of increase of total disposable income is obtained by deducting the rate of decrease of the number of active workers from the rate of increase of per-capita disposable income.

We call this rate of decrease of the number of active workers (covered people) the “modifier.” The green paper proposed use of the modifier for the basis of indexation and application of the modified indexation until financial equilibrium is attained.

Since the green paper was made public, many people expressed their opinions. Among them, an important opinion on the basic concept was expressed during the deliberations at the Pension Subcommittee of the Social Security Council, which was, “in addition to the total remunerations of the active covered people, the modification should also take account of the improvement in life expectancy because benefits increase if life expectancy is improved.”

Taking these opinions into account, the Ministry of Health, Labour and Welfare changed the method for modifying indexation. Specifically, the modifier was changed to the rate obtained by combining the rate of decrease of the total number of people covered by social security pension schemes and the rate of increase of the life expectancy of people aged 65. The ministry decided

to use the changed modifier to automatically attain financial equilibrium.

While some considered that life expectancy at age 65 should be based on the actual experiences of life expectancy in the abridged life table, the figure was fixed at 0.3 percent based on the population projection in order to avoid fluctuations due to epidemics such as influenza, etc.

The modified indexation gradually reduces the level of benefits until financial equilibrium is attained. After financial equilibrium is attained, the indexation is to revert to normal indexation. In this sense, the modified indexation is a transitional framework.

## 6 Minimum Benefit Level

The modified indexation gradually lowers the benefit level to make both ends meet. However, as described in Chapter II, the social security pension schemes will lose the reason for their existence if they become unable to provide adequate benefits. Accordingly, the changing benefit levels must be monitored.

As a yardstick for measuring the benefit level, the concept of the “replacement rate” was first introduced. While this measurement had also been used in the past, the 2004 reform stipulated it in the law in light of the importance of monitoring the benefit levels.

The replacement rate means the following ratio. Let’s assume the following couple: the husband has been covered by the Employees’ Pension Insurance Scheme for 40 years, from age 20 to age 59, and earned average wages; the wife, who is the same age as her husband, has been a dependent spouse from age 20 to age 59. The replacement rate is the ratio of the total annual amount of the old-age benefits the couple is to receive at age 65 to the amount of average annual disposable income of active workers at the time the couple receives the benefits. This measurement method is to express the level of social security pension benefits that a household that earned the average income for about 40 years is to receive in comparison with the disposable income of active workers.

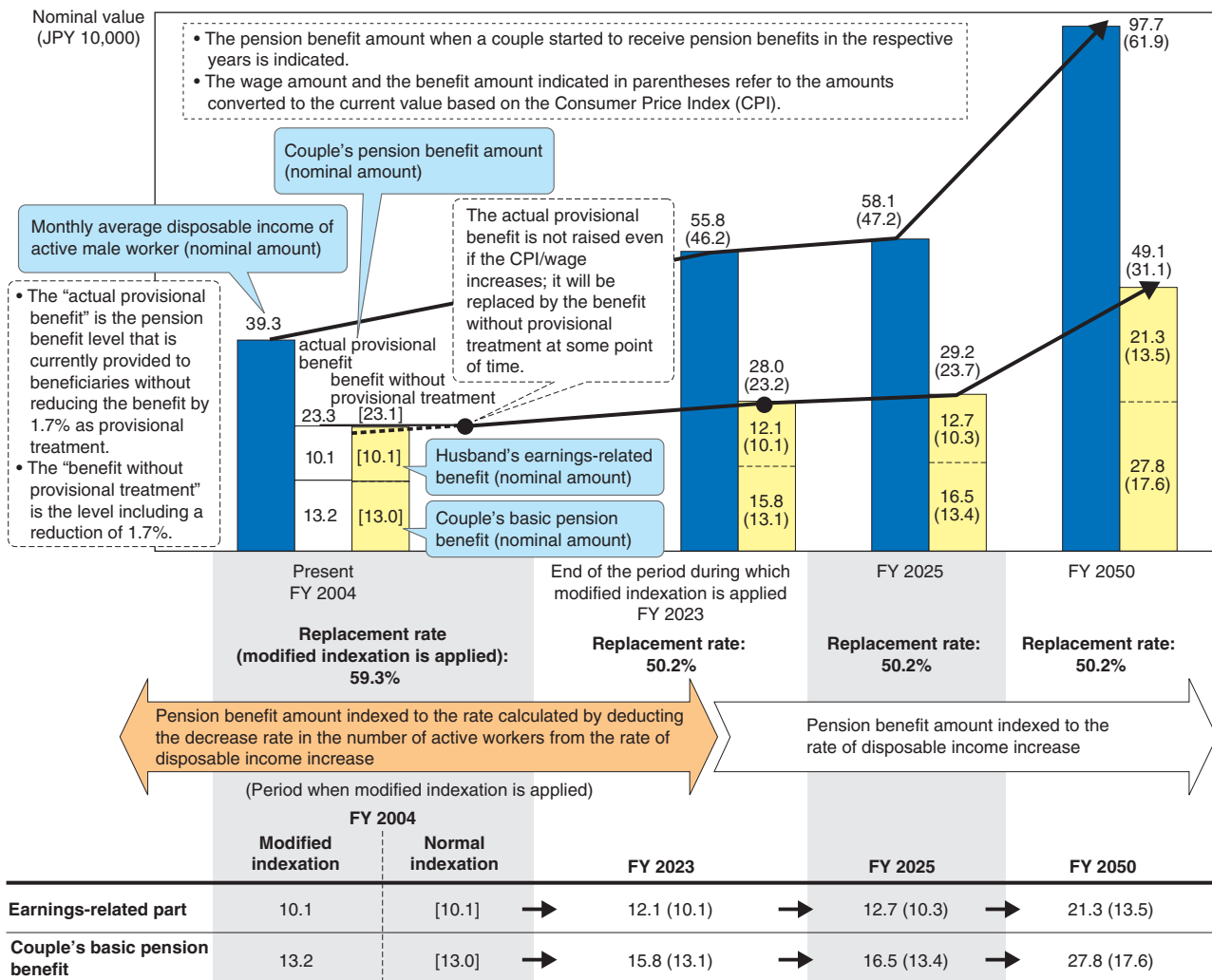
As shown in Figure 2, the results of the actuarial valuation implemented at the time of the 2004 reform indicated that the replacement rate is projected to gradually decrease on the basis of the modified indexation from 59.3 percent in 2004 to 50.2 percent in 2023. After financial equilibrium is restored in 2023, it will remain at 50.2 percent because indexation will revert to the normal rate.

While the actuarial valuation indicated these results, of course, we cannot foresee what will actually occur. If the birth rate and the mortality rate decline further and assumptions other than those for the population remain unchanged, the ultimate replacement rate will be lower than 50.2 percent.

Actually, the population projection published in December 2006 assumes further declines in the birth

**Figure 2. Projections for Benefit Levels as Determined by Modified Indexation (Results of the Actuarial Valuation in 2004)**

**[Ultimate contribution rate of the Employees' Pension Insurance Scheme: 18.3% (9.15% paid by employees and 9.15% paid by employers)]**  
 National subsidy: To be raised to 1/2 in fiscal 2009  
 During the period between fiscal 2005 and 2008, "1/3 + 11/1000" is to be subsidized.  
 (For FY 2004, "1/3 + JPY 27.2 billion" was subsidized.)



• The amounts indicated in parentheses refer to values converted to the current values based on the CPI.

Source: The Ministry of Health, Labour and Welfare

rate and the mortality rate below those assumed in the population projection published in January 2002, based on which the actuarial valuation was carried out in 2004. In response, the Ministry of Health, Labour and Welfare announced provisional valuations in February 2007. According to these provisional valuations, if economic assumptions remain the same as those adopted for the actuarial valuation in 2004, the replacement rate will drop below 50 percent in FY 2027, and if modified indexation continues to be applied until FY 2035, the replacement rate will ultimately drop to as low as 46.9 percent.

In order to prevent the benefit level from becoming too low, the law stipulates a provision of the minimum benefit level. As described in Section 2, Chapter IV, the 2004 reform was also expected to remove the anxiety that the benefit level might decrease indefinitely. The

provision of the lower limit of the benefit level was stipulated for this purpose. At the same time, the lower limit was set so that the public pension system could fulfill its essential roles, i.e., preventing people encountering economic risks in life from becoming impoverished.

The specific content of the provision of the minimum benefit level is as follows: if the replacement rate threatens to fall below 50 percent before implementation of the next actuarial review<sup>12</sup>, modified indexation is to cease to be applied, and the scheme is to be given a drastic review.

The measures to be taken through the drastic review of the schemes would include raising the pensionable age, reviewing the ultimate contribution rate currently fixed at 18.3 percent in the case of the Employees' Pension Insurance Scheme or reviewing the minimum benefit level if there is some leeway to reduce the level.

If we consider that as life expectancy improves, it is not sound to rely entirely on pension benefits for financing the prolonged portion of life, raising the pensionable age would be one option. If labor productivity increases as well as the real income level, active workers would be able to afford to pay more in contributions, paving the way towards increasing the ultimate contribution rate. Furthermore, if Japan’s overall real income level further increases, modifying the minimum benefit level downward to some degree may not lose the adequacy of the benefits.

If the replacement rate threatens to fall below 50 percent in the future, the provision of the minimum benefit level requires a drastic review of the scheme in consideration of the situations described above and in connection with the employment policy. At the same time, this provision also serves as measures to ensure the adequacy of the benefits, to relieve anxiety and to justify the existence of the social security pension schemes.

Finally, the following section provides a little more explanation of the adequacy of the benefit level. While it is difficult to concretely define this concept, the benefits that enable beneficiaries to live a basic life must be provided by monitoring the status of actual lives such as that revealed through the National Survey of Family Income and Expenditure conducted by the Ministry of Internal Affairs and Communications every five years. Furthermore, the average social security pension benefits must be able to cover most of the average expenditures of the senior households revealed through this survey.

The replacement rate of 50 percent that serves as the minimum benefit level must also be reviewed in comparison with actual expenditures to see if this level is adequate enough to prevent people who are experiencing economic risks in life from becoming impoverished.

## V Automatic Balancing Mechanisms in Other Countries

### 1 Sweden

Thus far, we have examined the automatic balancing mechanism based on modified indexation, which is the core element of the 2004 pension reform in Japan. We will next focus on similar mechanisms in other countries.

First, we look at the reform in Sweden. As described in Chapter IV, the Swedish pension reform in the 1990s provided many suggestions in working out modified indexation.

Core elements of the Swedish reform are explained in the following section.

The public pension scheme was first restructured into a system that provides only old-age pension benefits.

Benefits for the disability and survivor’s pension schemes came to be provided from the general account. After this change was made, the benefit calculation formula for old-age pension benefits was revised to a system called the notional defined contribution (NDC) pension system.

Under the NDC system, contributions paid by covered workers are recorded, and the paid contributions plus interest are accumulated. The interest rate used here is the same as the wage increase rate<sup>13</sup>. When a covered worker reaches pensionable age, the sum of the principal and interest is divided by the present value of benefits that reflects the latest mortality rate to obtain the pension benefit amount<sup>14</sup>.

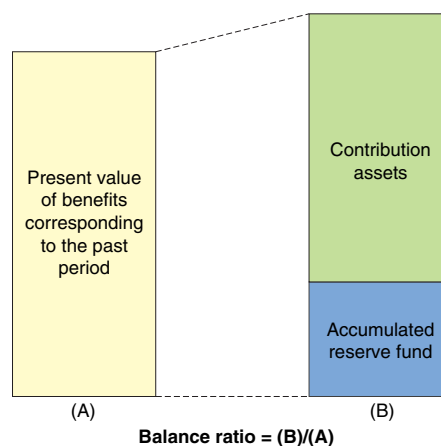
Because the NDC does not include the flat-rate part like the basic pension benefits in Japan’s scheme, the pension benefit amount is also low for those who received low wages while they were working. In order to support these people, the minimum guaranteed pension benefits are provided and financed by using tax revenues.

After revising the method of benefit calculation to the NDC system, as described above, the Swedish reform established an automatic balancing mechanism.

As shown in Figure 3, this mechanism works in such a way that the present value of benefits corresponding to the past period of pensioners, terminated participants and active participants is calculated each year at the time of account settlement, and whether the assets are sufficient to cover such value is examined. In this case, the assets refer to the sum of the accumulated reserve fund and the “contribution assets.”

Contribution assets refer to the amount that is obtained by multiplying the yearly contribution income by the “turnover duration.” The turnover duration refers to the difference between the average age of pensioners and the average age of active participants. In calculating the average age, it is weighed respectively by the pension amount and the salary amount. Based on the actual results, the turnover duration is about 32 years. The contribution assets are, in a sense, the projected contribution

Figure 3. Concept of Financial Equilibrium in Sweden



income in the future that is necessary to finance the benefit expenditure corresponding to the past period.

The automatic balancing mechanism in Sweden is activated when the ratio of the sum of the accumulated reserve fund and contribution assets to the present value of the benefits corresponding to the past period (this ratio is called the “balance ratio”) falls below 1. The way this mechanism works for pensioners is that the increase in the benefit level is restrained by multiplying the rate of increase for the next year by the balance ratio that is below 1 in order to restore financial equilibrium. For active participants, the interest rate is multiplied by the balance ratio when the total of the principal and interest is calculated under the NDC system in the next fiscal year to restrain any increase in the benefit amount in the future, thereby restoring financial equilibrium<sup>15</sup>.

It must be noted here that this Swedish concept of financial equilibrium is not the same as the conventional concept of financial equilibrium<sup>16</sup>.

The conventional concept of financial equilibrium is that the total projected benefit amount for the prescribed period<sup>17</sup> must be equal to the sum of the total projected contribution income and the accumulated reserve fund. Can financial equilibrium be attained under the new Swedish definition? Verification is needed to see if the conventional meaning of financial equilibrium can be attained. Actually, Sweden conducted verification testing in implementing this reform, in which they confirmed that on the assumptions that the total fertility rate is 1.80 and there are some immigrants, the conventional meaning of financial equilibrium can be attained.

However, it is difficult to apply the Swedish concept of financial equilibrium to Japan’s situation for two reasons: one is the matter of the benefit design and the other is that population aging is projected to be much faster in Japan than in Sweden.

As for the first issue, Japan has the Employees’ Pension Insurance Scheme, which brings about the effect of ample income redistribution. Whether this benefit design should be changed to the NDC system that provides an effect of only limited redistribution is open to discussion.

Second, as compared to that of Sweden, Japan’s population is projected to age more rapidly. In this sense, even if the Swedish automatic balancing mechanism is introduced, we may not be able to attain the conventional meaning of financial equilibrium.

For these reasons, Japan did not apply the Swedish mechanism although it did provide some ideas.

In all probability, Sweden may also review the NDC system and its automatic balancing mechanism if the country faces a situation in which the birth rate further declines, longevity further improves, and the number of immigrants does not increase at the anticipated pace. In such a case, even if financial balance is attained based on the Swedish method, the conventional meaning of financial equilibrium might not be achieved.

## 2 Germany

Germany is also one of the countries that implemented a variety of measures to cope with an aging population. In the reform implemented in 2004, Germany adopted an automatic balancing mechanism based on the modification of indexation, which is surprisingly similar to our method of modified indexation. It is a remarkable coincidence that Germany introduced a similar method at the same time as Japan did.

Germany also introduced a method to gradually lower the benefit level based on modified indexation to maintain financial balance. The attribute that Germany used for modification of indexation is the sustainability factor.

The sustainability factor uses the adjustment of the “maturity degree” increase rate of the pension scheme<sup>18</sup> for modification of indexation. The maturity degree here refers to the rate of the number of pensioners to the number of active participants. Germany decided to use this factor for modifying the indexation, but not the whole of the increase rate.

More specifically, a certain percentage of the “maturity degree” increase rate is deducted from normal indexation, and this modifier is called the sustainability factor. In the 2004 reform, this factor was set at 1/4 of the “maturity degree increase. This means that the maturity degree increase rate was not fully reflected, but only one-fourth was reflected.

The use of the maturity degree increase rate as the modifier is based on a clearly logical reason. The use of such a factor represents an attempt to maintain the power to sustain benefits at a constant level. The German reform is quite similar to ours to such an extent as that the “benefit sustaining power” is taken into account.

When the expenditure necessary to provide benefits is expressed by the contribution rate, the benefit expenditure is divided by the total remuneration. The result is the so-called “pay-as-you-go contribution rate.” The Actuarial Subcommittee of the Social Security Council in Japan calls this rate the “cost rate.”

The benefit expenditure is obtained by multiplying the average pension amount by the number of pensioners. The total remuneration is obtained by multiplying the average wage by the number of covered active workers. In other words, the cost rate can be obtained by multiplying the ratio of the average pension amount to the average wage by the maturity degree. Accordingly, when the pension amount is indexed to the wage increase, the cost rate is proportionate to the maturity degree.

Accordingly, to keep the cost rate constant, we should restrain the indexation only by the increased portion of the maturity degree under wage indexation. In this way, the concept of the sustainable factor was introduced.

The increase rate of the maturity degree is calculated by combining the increase rate of pensioners and the decrease rate of active workers. The increase rate of

pensioners is calculated by combining the growth rate of life expectancy at the pensionable age and the increase rate of the number of newly awarded pensioners. Therefore, the increase rate of the maturity degree is ultimately equal to the combination of the decrease rate of the number of covered active workers, the growth rate of life expectancy at the pensionable age and the growth rate of the number of newly awarded pensioners.

Because the modifier of the modified indexation system adopted in Japan is a combination of the decrease rate of the number of covered active workers and the growth rate of life expectancy, there is a close resemblance between Germany's sustainability factor and Japan's modifier of modified indexation.

This is a very interesting coincidence. It should also be noted that while Germany adopted a deductive approach to derive the sustainability factor by combining all necessary and sufficient conditions, Japan adopted an inductive approach to derive the modifier of modified indexation in such a way that specific examples are reflected to enhance the basic concept of the benefit sustaining power. This is another interesting point in that we can have a glimpse of the difference between traditional Japanese mathematics and western mathematics.

## VI Importance of the Minimum Benefit Level Provision

The automatic balancing mechanism for the social security pension schemes has been adopted in several countries. Comparisons have so far been made between the Swedish and German systems and the Japanese system chiefly in terms of modified indexation. These countries have currently no provisions for a minimum benefit level. Recently, however, some people in Sweden have started to feel anxious about the benefit level. In Germany as well, it appears that worries about the future benefit level were fervently expressed in the process of discussing the bill.

In Sweden, as shown in Table 4, the actual balance ratio published each year in the annual report barely exceeded 1. Because the ratio is very close to 1, people started to have some anxiety that the benefit level might continue to decrease. Accordingly, opinions were expressed that the automatic balancing mechanism should be abolished and that the benefits and contribu-

**Table 4. Changes in the Balance Ratio in Sweden**

Year	Balance ratio
2002	1.0105
2003	1.0097
2004	1.0014
2005	1.0044
2006	1.0149

Source: Swedish Social Insurance Agency "ORANGE REPORT: Annual Report of the Swedish Pension System 2006"

tions should be determined in accordance with socioeconomic conditions as was done in the past. This situation confirms the importance of the minimum benefit level provided in the law in Japan.

Originally, the automatic balancing mechanism in Sweden was adopted under the assumption that this mechanism would not be activated except in extremely abnormal situations. This positioning of the balancing mechanism is different from that in Japan and Germany. Under these assumptions, the idea of establishing the lower limit would not have been considered. Mr. Bo Könberg, a Parliament member who played a major role in this pension reform, declared that as long as the situation remains normal, balancing would not be activated. Recently, however, opinions calling for the review of this proposition have started to emerge (No. 22 of the bibliography).

In Germany, simulations were made during the process of deliberating the bill and it was decided to introduce the sustainability factor after analyzing many cases to see to what extent the benefit level might drop in the future (No. 19 of the bibliography). "It was the toughest political process," said Professor Axel Börsch-Supan of the University of Mannheim, who played a major role in preparing the reform proposals. One of the officials of the Ministry of Labor and Social Affairs who was engaged in the pension reform noted that "the future moves of the benefit level are important and must be constantly monitored."

While the German case considered the issue of the benefit level, the reform was implemented based on the projections of the benefit level that were obtained through the simulations. The system is almost entirely operated by the pay-as-you-go method and the contribution rate has reached nearly 20 percent. This would be the reason why no provision was stipulated on the establishment of the lower limit of benefits, while the focus of the reform was placed on avoiding further increases in the contribution level. In the reform proposals, raising the pensionable age from 65 to 67 was also proposed, which would alleviate the decrease in the benefit level. However, this proposal was not included in the 2004 reform law. Nevertheless, the pensionable age was raised in October 2006 under the Merkel coalition government.

In any case, the provision of the minimum benefit level in the Japanese law is designed to ensure the adequacy of the benefit level under the social security pension schemes, and is an important framework element introduced ahead of other countries.

## VII Comprehensive Discussions Needed within a Given Time

Since the passage of the reform bill in 2004, three years have passed. As described in Chapter IV, during this

period, a new population projection was published, and the provisional valuations based on such projection were announced.

As was anticipated to some extent, the new population projection published in December 2006 indicated a further decline in the birth rate and more improvement in longevity. As mentioned in Section 6, Chapter IV, according to the provisional valuations in February 2007 by the Ministry of Health, Labour and Welfare, the benefit level may fall below the minimum level in fiscal 2027 if economic recovery is not considered. The provision of the minimum benefit level requires a far-reaching review of the system at the time of the verification of financial projections around 2024.

Some people consider that doing nothing until 2024 in the face of worsening conditions will constitute a sin of the failure to act, and that a study of system reform must be started immediately without waiting for the time when a drop below the minimum level approaches. This is a sober and righteous opinion. All the reforms to cope with the aging population in the past were undertaken under the concept of initiating remedial measures immediately. If the political situation allows, this concept must be applied now as well.

However, while it is extremely unfortunate, we can expect no change in the political situation since the 2004 reform. If a bill is presented, similar political battles are likely to be repeated. Honestly speaking, we may end up in waging empty battles to such an extent that we may even destroy a good system for the sake of attaining political power.

As stated in Chapter IV, one of the objectives behind the introduction of modified indexation in the 2004 reform was to avoid a repeat of fruitless political battles.

If this situation remains unchanged, we may repeat the situation wherein all political energies are used up only for discussing the pension issue, wasting the time needed to engage in more fundamental discussions on how society should deal with the issues of a declining birth rate and improved longevity that Japan now faces. The approach we should take in this situation would be to realize that we are given only a limited amount of time to discuss the issues and that we must discuss more fundamental policies before the window of opportunity is closed, and such policies should be implemented.

#### Notes:

- (1) Several decades have passed since Japan achieved high economic growth in the 1960s and 1970s. During that period, the social security system was firmly in place. Therefore, young generations may not be able to understand the meaning of “poverty” as part of their experiences. Nevertheless, economic risks in life definitely exist even under the situation of current society.
- (2) The earnings-related part of the Employees’ Pension Insurance Scheme at that time was calculated by the following formula: (average pensionable remuneration)  $\times$  (10/1000)  $\times$  (the number of covered months). The factor was increased from 6/1000 to 10/1000 in the 1965 reform.
- (3) The factor used in the formula of calculating the earnings-related part was dropped from 10/1000 to 7.5/1000 together with the transitional measures in the 1985 reform. The flat-rate part was restructured as the basic pension, and was divided between the couple.
- (4) Strictly speaking, the 1954 reform that raised the pensionable age in the Employees’ Pension Insurance Scheme for men from 55 to 60 can be regarded as the first reform that addressed improved longevity. In the sense of the reform that addressed improved longevity after the benefit level reached an adequate level, the 1985 reform is the first reform that dealt with an aging population.
- (5) The current name is the National Institute of Population and Social Security Research.
- (6) In the past, under the Employees’ Pension Insurance scheme, the rate of increase of the gross average wage was used to revalue the pensionable remunerations. The basis was changed to the rate of growth of the average disposable income in the 1994 reform. Disposable income refers to the amount of gross income minus taxes and social security contributions. With the graying population, the taxes and social security contributions naturally expand beyond the rate of increase of gross wages. The rate of increase of gross wages, therefore, becomes greater than the rate of growth of disposable income. This means that the use of the rate of increase of gross wages for revaluing pensionable remunerations would favor pensioners who pay less in taxes and social security contributions and treat active workers unfairly in actual terms. This was the background for changing the indexation to one based on the increase of per-capita disposable income of active workers.
- (7) The measure has also been implemented so that if a senior gets a job, the income consisting of wages and pension benefits is certain to be greater than the pension alone by revising the method of income testing of the old-age pension benefits to seniors who have jobs.
- (8) As explained in Chapter V, the Swedish reform introduced the automatic balancing mechanism as an “emergency brake” for exceptional situations.
- (9) In the past, contributions (rates) until the next actuarial valuation were to be determined.
- (10) Major financial resources for such increase of the national subsidy were made up of the reduction in the deductible amount from social security pension benefits in calculating taxes and the abolition of fixed-rate tax reductions that were introduced as a provisional measure to boost consumption in 1999.
- (11) The ministry invited public opinions by showing the consultation document that it had prepared. Then, based on the comments and opinions that were submitted, the ministry prepared the final reform proposal. This consultation document is called the “green paper” by following the practice of the UK.
- (12) For the social security pension schemes, the law requires that the financial conditions be examined regularly. This provision was called the actuarial valuation of the

schemes. However, because the actuarial valuation connotes a review of contributions (rates), the term “the actuarial valuation” can no longer be used because the 2004 reform set the contribution schedule. Therefore, since the 2004 reform, the periodic examination of financial conditions has been termed the actuarial review.

- (13) In Japan, the system to revalue the pensionable remuneration by the rate of wage increase is applied to the earnings-related part of the Employees’ Pension Insurance Scheme. The interest rate under the NDC system corresponds to the rate under this revaluing formula.
- (14) Because of this, longevity improvement until the time when individual pensioners reach age 65 can be reflected in the benefit amount.
- (15) If the demographic structure of the pension scheme is stationary, the present value of the benefits corresponding to the past period is equal to the contribution assets under the NDC benefit design (No. 21 of the bibliography). The Swedish automatic balancing mechanism is based on this concept. However, as described in Section 1, Chapter V, whether this concept is consistent with the conventional concept of financial equilibrium is subject to verification. The result will differ depending on the socio-economic situation of each country.
- (16) One of the background factors behind the change of the concept of financial equilibrium was that the government’s intention was a serene discussion based on objective achievements because previous discussions based on future projections had escalated into political discussions with no reasonable resolution.
- (17) This prescribed period could be perpetual, or could be a finite period such as 100 or 75 years. The former is called the infinite balance method and the latter is called the finite balance method. However, when the finite balance method is adopted, a condition of accumulating a certain amount of a reserve fund at the completion of such period is often added. The 2004 reform in Japan also adopted the finite balance method with the period of financial equilibrium being 95 years. A one-year accumulated reserve fund is required at the end of the period.
- (18) Specifically, the sustainability factor is defined as follows:  

$$(\text{Sustainability factor}) = 1 + \alpha \{1 - (\text{maturity degree a year ago}) / (\text{maturity degree 2 years ago})\}$$
 In this formula,  $\alpha$  is a positive number not greater than 1, and is to play the role of expressing to what extent the change in the maturity degree is reflected in the modification of indexation. If 100 percent of the increase rate of the maturity degree is to be reflected,  $\alpha = 1$ ; if only 50 percent is to be reflected,  $\alpha = 0.5$ . Actually,  $\alpha$  was set at 1/4, and only 25 percent of the increase rate of the maturity degree is to be reflected.

#### Bibliography:

1. “Commentary on the 2004 Reform” by the Social Insurance Research Institute (Shakai Hoken Kenkyusho), October 2004
2. “Report of the 2004 Actuarial Valuation on Employees’ Pension Insurance Scheme and National Pension Scheme in Japan” by the Actuarial Affairs Division, Pension Bureau, Ministry of Health, Labour and Welfare, March 2005
3. “Consultative Proposal and Issues for Pension Reform (Consultation Document)” by the Pension Bureau, Ministry of Health, Labour and Welfare, December 2002
4. “50-Year History of the Employees’ Pension Insurance Scheme” by the Employees’ Pension Insurance Public Relations Corporation; edited by the Pension Bureau of the Ministry of Health and Welfare and the Administration Department of the Social Insurance Agency, 1993
5. “2006 Population Projections in Japan” by the National Institute of Population and Social Security Research, December 2006
6. “Influence of Population Changes, Etc. on Pension Finance (Provisional Valuations)” by the Pension Bureau, Ministry of Health, Labour and Welfare, February 2007
7. Yoshikazu Kenjo, *Nenkin kaikaku to sekkyokuteki shakai hoshō seisaku - Saibunpai seisaku no seijikeizaigaku* (Pension Reform and Proactive Social Security Policy - Political Economy of the Redistribution Policy) Vol. 2, Keio University Press, 2004
8. Harunobu Onagi, *Shakai hoshō no genryū - Doitsu shakai hoshō no keisei katei* (Origin of Social Security - Process of Developing the Social Security System in Germany), Chobunsha, June 2004
9. *Shakai hoshō tokuhon: shinpan* (Commentary on Social Security: New Edition), edited by Shigemi Jinushi, Toyo Keizai, 1983
10. Yasuo Otani, *Millenium nenkin kaikaku - 2000 nen nenkin kaiseiho no zenyo to kaisetsu* (Millenium Pension Reform - Commentary on the 2000 Pension Reform Law), Kokusei Jyoho Center, 2000
11. Kenji Yoshihara, *Waga kuni no koteki nenkin seido - sono oitachi to ayumi* (Social Security Pension Schemes in Japan - Its History), Chuohoki Publishers, 2004
12. Kenji Yoshihara, *Shin nenkinho - 61 nenkin kaikaku: kaisetsu to shiryō* (New Pension Law - Commentary on the 1986 Pension Reform), Zensharen, 1987
13. Junichi Sakamoto, “Shakai hoshō no kyūfu to futan no kanten kara mita heisei 16 nen nenkinhou kaisei (The Meaning of the 2004 Pension Reform in the Context of Cost of Social Security),” *Nenkin to Keizai* (Pension and Economy), No. 3, Vol. 23, November 2004
14. Junichi Sakamoto, “Shin jinko suikei to nenkin seido (The Updated Population Projection and the Social Security Pension Schemes),” *Nenkin to Keizai* (Pension and Economy), No. 2, Vol. 26, July 2007
15. Junichi Sakamoto, “Doitsu no 2004 nen nenkin kaisei ni okeru jizokukano keisu to wagakuni no makuro keizai suraido ni tsuite (Sustainability Factor in the 2004 Pension Reform in Germany and the Modified Indexation in Japan),” *Actuary Journal*, Vol. 58, November 2005
16. Junichi Sakamoto, “Suri no me (Actuarial Perspectives)” series in *Nenkin Jidai*, Shakai Hoken Kenkyusho (Social Insurance Research Center).
  - Wasan to Yosan (Traditional Japanese Mathematics and Western Mathematics), July 2007
  - Zaisei wo kenzen ni tamotsu niwa (To Ensure Financial Soundness), August 2007
  - Kyūfu suijun no kagen (The Minimum Benefit Level), October 2007
17. Junichi Sakamoto, Monthly Periodical, “Nomura Pension Consulting” published by Nomura Pension Management Research Group

- 2004 nen doitsu nenkin kaikaku to makuro keizai suraido (2004 Pension Reform in Germany and the Modified Indexation in Japan), November 2004
  - Sweden koteiki nenkin no 2004 nen nenji hokokusho to zaisei no jido kinko sochi (2004 Annual Report of the Swedish Social Security Pension and Automatic Balancing Mechanism), November 2005
18. International Labour Office, "Introduction to Social Security," 1976
  19. Axel H. Börsch-Supan and Christina B. Wilke, "Reforming the German Public Pension System," August 2004
  20. Edward Palmer, "The Swedish Pension Reform Model; Framework and Issues," June 2000, The World Bank
  21. Ole Settergren and Boguslaw D. Miklula, "The rate of return of pay-as-you-go pension systems: a more exact consumption-loan model of interest," November 2001, The Swedish Social Insurance Agency
  22. Jan Hagberg, "Shifting the Burden of Risk with NDC: The Swedish Example," May 2006, 28th International Congress of Actuaries
  23. Junichi Sakamoto, "Japan's Pension Reform," December 2005, The World Bank Pension Reform Primer Series (<http://siteresources.worldbank.org/SOCIALPROTECTION/Resources/SP-Discussion-papers/Pensions-DP/0541.pdf>)

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