Summaries of the 2014 Actuarial Valuation and Reform Options

Section 1 The role of actuarial valuations of the National Pension and Employees' Pension Insurance

1. Functions and structure of Japan's social security pension system

(1) The significance of social security pensions

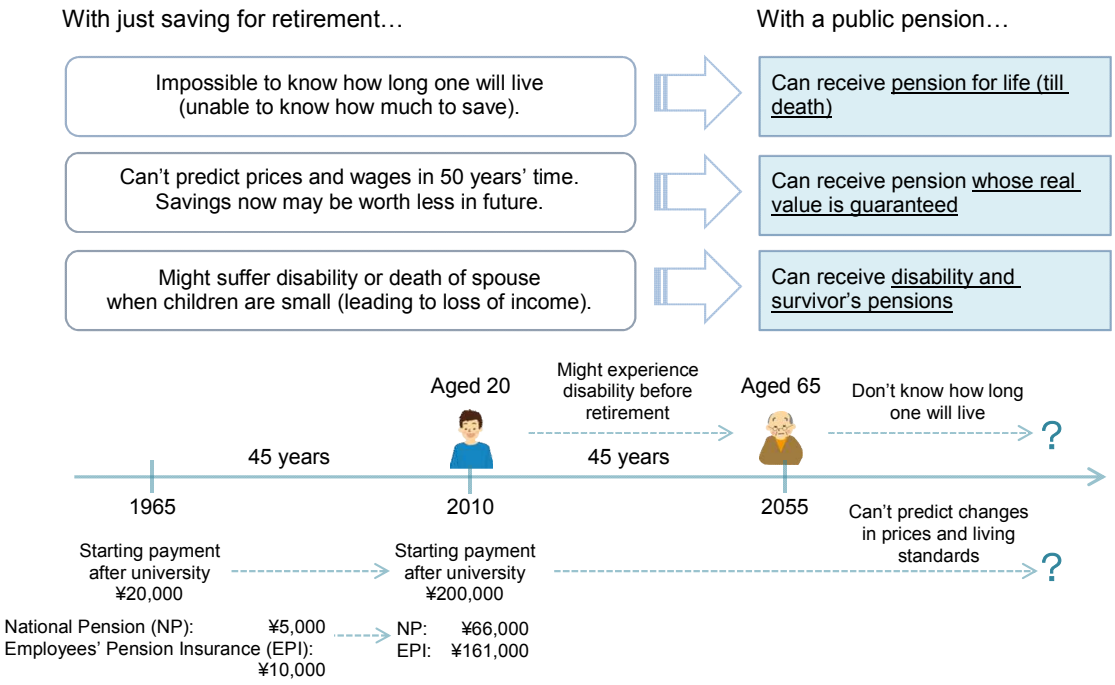
1) Provision against various risks during life

Social security pensions offer protection against the various risks encountered during life. While one needs to prepare for life post-retirement while still working, it is impossible to know how long one will live or what prices and living standards will be like after retirement several decades in the future. The social security pension system provides a life-long pension that allows individuals to receive a pension for as long as they live. By index-linking benefits to prices and wages, the system also ensures that pensions retain their real value even if prices and wages change.

The social security pension system also provides disability and survivor's pensions in case people experience disability or death while they still have young children to support.

The social security pension system thus offers insurance functions that savings alone cannot provide. By serving as a system of mutual support by society as a whole, the social security pension system protects society's members against the various risks that they face as individuals during the life course.

Figure 1-1 Significance of social security pensions (1)

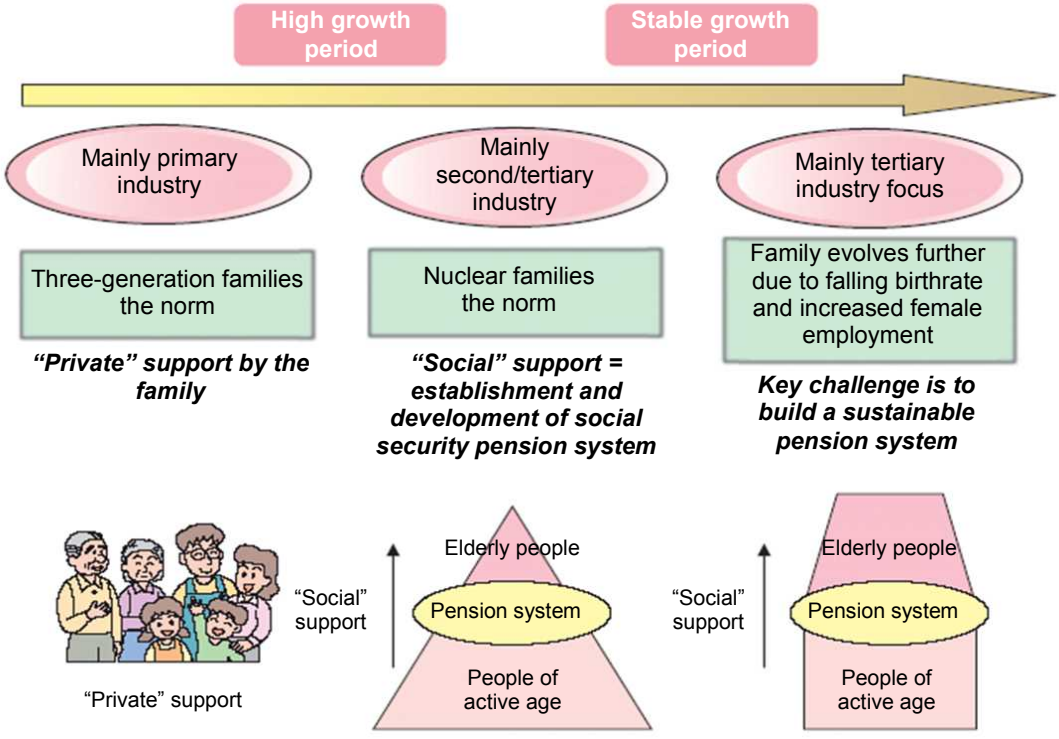


2) Social support for elderly people by society as a whole

Japan's social security pension system dates back to the establishment in 1942 of the Workers' Pension Insurance scheme, the forerunner of today's Employees' Pension Insurance (EPI). Universal pension coverage was achieved in 1961 with the establishment of the National Pension (NP), a contributory scheme. Benefits were subsequently improved as the economy developed to create a more substantial pension system.

Before the social security pension system was established and while it was still maturing, supporting elderly parents was primarily the responsibility of the family. However, Japan's changing industrial structure, growing urbanization, and nuclearization of the family made it unfeasible for people to rely on "private" support from their children and families in old age as in the past, and "social" support provided by society as a whole for its older members became essential. The social security pension system provides such a system of social support for older people.

Figure 1-2 Significance of social security pensions (2)



3) Equalizing the burden of support for the elderly

Social support serves to equalize the burden of support for elderly people among people of active age. With life expectancy at birth increasing, it is no longer unusual for retired parents to live to see their own children retire and become pensioners. When the only recourse in such cases is to private support, grandchildren end up having to support not only their parents but also their grandparents, and the burden would be particularly onerous in the case of an only child. Conversely, elderly people who have sadly been predeceased by their children face difficult circumstances if their primary recourse is to private support.

With private support, the burden of supporting elderly people thus does not fall evenly on everyone's shoulders, and there exist risks such as the absence of someone to look after an elderly person. By providing a system of social support, social security pensions serve as a means by which society as a whole can provide mutual support for its members and guard against the weaknesses of private support.

(2) Functions of social security pensions

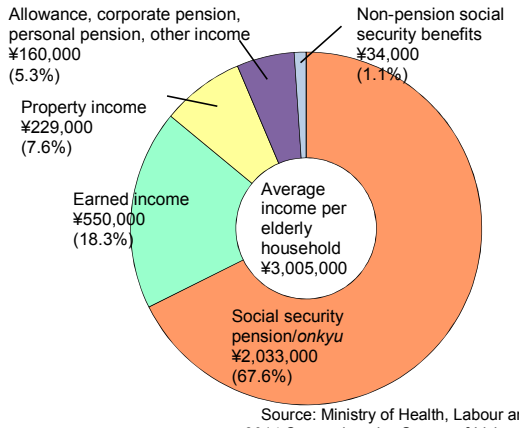
At present, social security and *onkyu* pension benefits account for 70% of the income of elderly households, and these benefits are the sole source of income for 60% of elderly households. Additionally, 60% of people of active age expect social security pensions to be their main source of income in old age. Here *onkyu* means the non-contributory superannuation system for civil servants and military persons, which used to exist until 1959. Its retirement and survivor beneficiaries still exist though the number is decreasing.

The social security pension system thus plays a very major role in financing old age, and knowing that they will be able to receive a social security pension allows people of active age, too, to live their lives secure in the knowledge that they will not have to support their parents financially.

As pensions make up 20% of household consumption in some regions, social security pensions also play a major role in sustaining the Japanese economy.

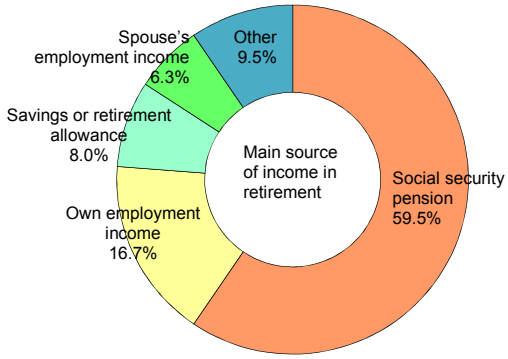
Figure 1-3　Functions of social security pensions

(1) Pensions account for about 70% of elderly household income



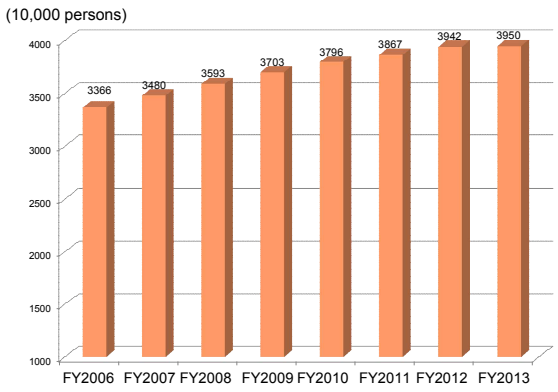
Source: Ministry of Health, Labour and Welfare, *2014 Comprehensive Survey of Living Conditions.*

(2) 60% rely most on pension to finance retirement



Source: Ministry of Health, Labour and Welfare, *2012 Survey of Opinion on Social Security in Old Age.*

(3) One in four citizens is a pensioner



Sources: Ministry of Health, Labour and Welfare, *Annual Report* (Social Insurance Agency, *Annual Report* up to FY2007).

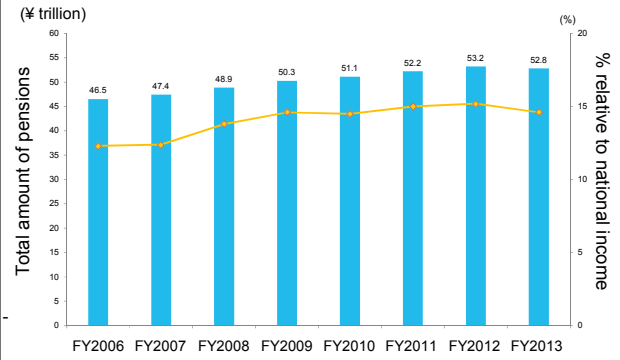
(4) Role in supporting local economies (pensions account for 20% of household consumption in some regions)

(7 prefectures with highest ratios relative to prefectural income)

Prefecture (aging rate)	% relative to prefectural income	% relative to household final consumption expenditure
Shimane (30.9%)	18.0%	24.9%
Tottori (28.2%)	17.5%	20.7%
Kochi (31.1%)	17.4%	19.2%
Akita (31.6%)	16.4%	18.5%
Yamaguchi (30.2%)	16.0%	22.0%
Nara (26.7%)	15.9%	20.8%
Yamagata (29.1%)	15.5%	19.4%

Sources: Aging rates are from Ministry of Internal Affairs and Communications, *Population Estimates* (2013).
Total amounts of pensions by prefecture are calculated from Ministry of Health, Labour and Welfare Pension Bureau, *Employees Pension Insurance and National Pension Annual Report* (FY2011) (total amount of pensions received by recipients of EPI, NP, and welfare pension benefits).
Prefectural income and household final consumption expenditure are from Cabinet Office, *Report on Prefectural Accounts* (FY2011).

(5) Total amount of pensions comes to ¥52.8 trillion, equivalent to 14.6% of national income.

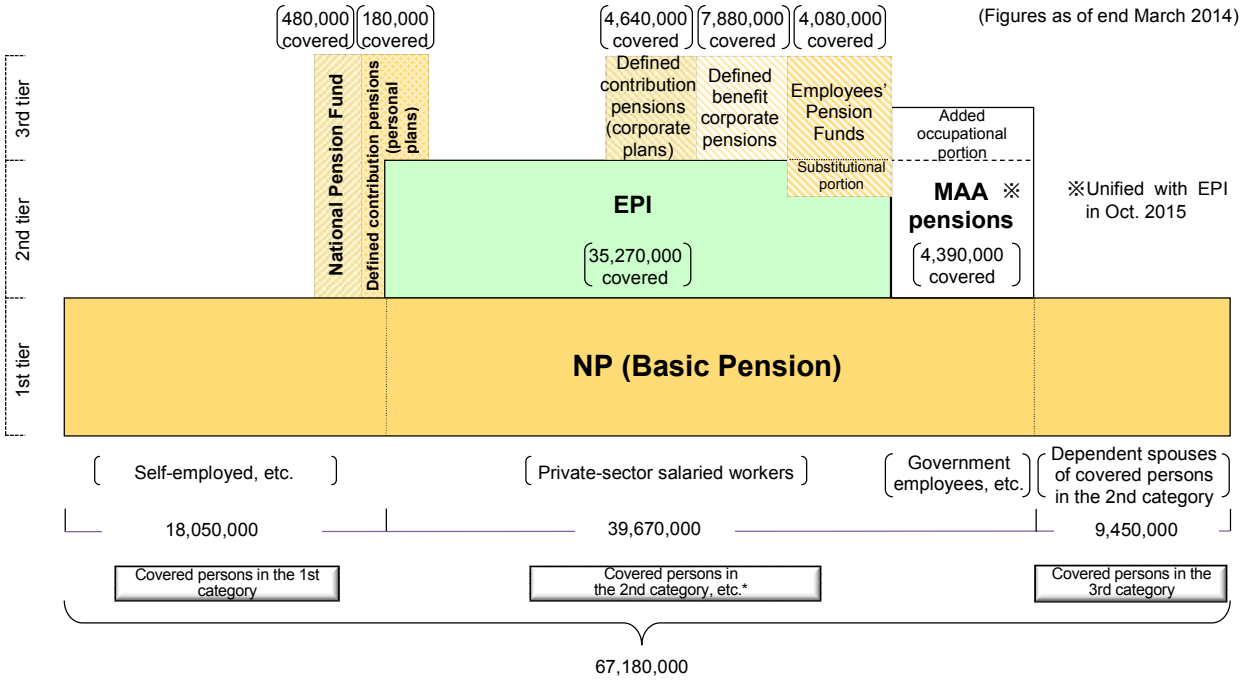


Sources: Ministry of Health, Labour and Welfare, *Annual Report* (Social Insurance Agency, *Annual Report* up to FY2007).

(3) How the social security pension system is structured

Under Japan's social security pension system, all people of active age are covered under NP and receive a basic pension in old age. Private-sector and government employees are in addition enrolled in EPI or a mutual aid association (MAA) plan and receive an earnings-related pension on top of the Basic Pension. Individuals and corporation can also choose to enroll themselves or their employees in a private pension plan, such as a corporate pension. It should be noted that the MAA plans in which government employees are enrolled were unified with EPI in October 2015, and the present actuarial valuation is of NP and the unified EPI.

Figure 1-4 Organization of pension plans



Notes:

1. Members of Employees' Pension Fund, a defined benefit corporate plan, or the Mutual Aid Association for Private School Personnel plan may also join a defined contribution corporate plan.
2. Members of the National Pension Fund may also join a defined contribution personal plan.
3. "Covered persons in the 2nd category, etc." consists of covered persons in the EPI or in one of the MAA plans. (Note that in addition to covered persons in the 2nd category, this includes beneficiaries of old-age pension benefits who are aged 65 or older, still working and covered in the EPI or in one of the MAA plans.)
4. MAA pensions were unified with EPI in October 2015, and the added occupational portion was simultaneously discontinued as a part of the social security pension.

2. Social and economic conditions surrounding pension plans

(1) Birthrate decline and population aging

Japan's total fertility rate had been in long-term decline since falling below 2.0 in 1975. After bottoming out at 1.26 in 2005, however, it began to rise again and reached 1.42 in 2014. However, it remains far lower than required to maintain the population in the long term.

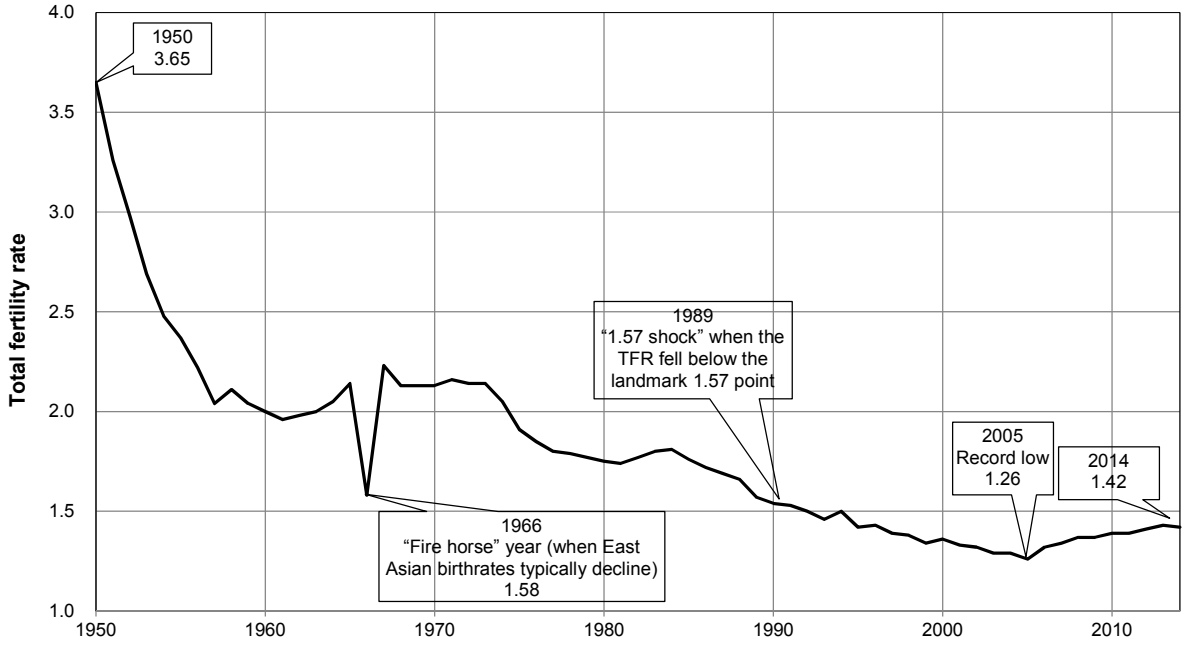
Life expectancy at birth, on the other hand, has followed an upward trend since World War II thanks to improvements in public health and medical care, and stood at 80.50 for men and 86.83 for women in 2014.

Owing to the long-term low fertility rate and rise in life expectancy at birth, there has been a rapid decline in the number of children and rise in the proportion of elderly in Japan, and the proportion of the population aged 65 or older (i.e., the aging rate) was the highest in the world at 23.0% in 2010.

The projections in the present actuarial valuation were calculated based on the "Population Projections for Japan" published in January 2012, which are the latest population projections produced based on the results of the 2010 Population Census. According to the medium projection (based on medium fertility and medium mortality projections), Japan's demographic structure, which is already the world's most aged, is projected to age still further, with the proportion of the population aged 65 or older (i.e., the aging rate) projected to reach 36.1% in 2040 (when the second-generation baby boomers reach 65) and then climb still further to 39.9% in 2060.

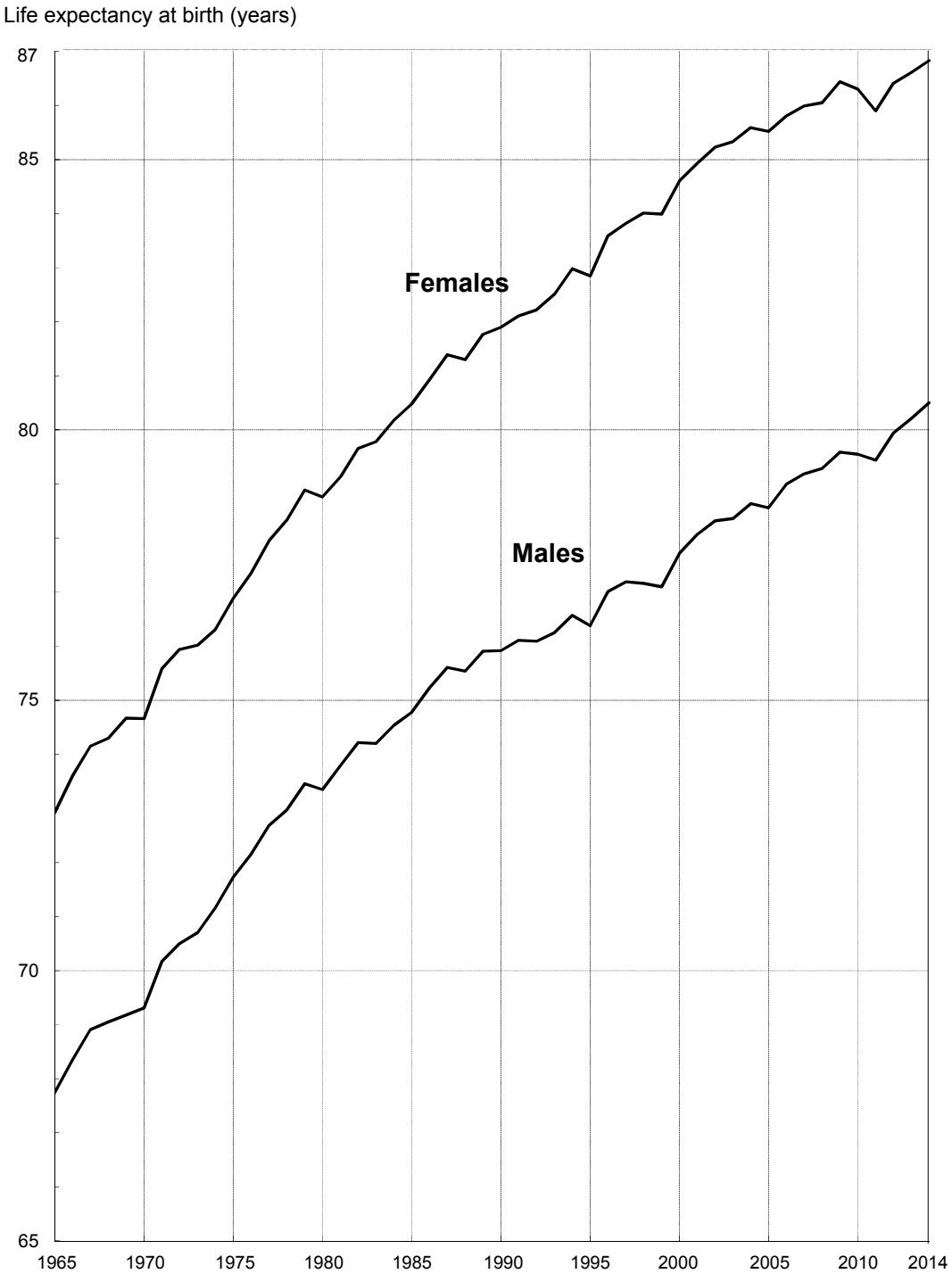
Actuarial valuations of social security pension finances estimate revenues and expenditures over a period of around 100 years based on these changes in demographic structure.

Figure 1-5 Changes in total fertility rate



Source: Ministry of Health, Labour and Welfare, *2014 Vital Statistics*.

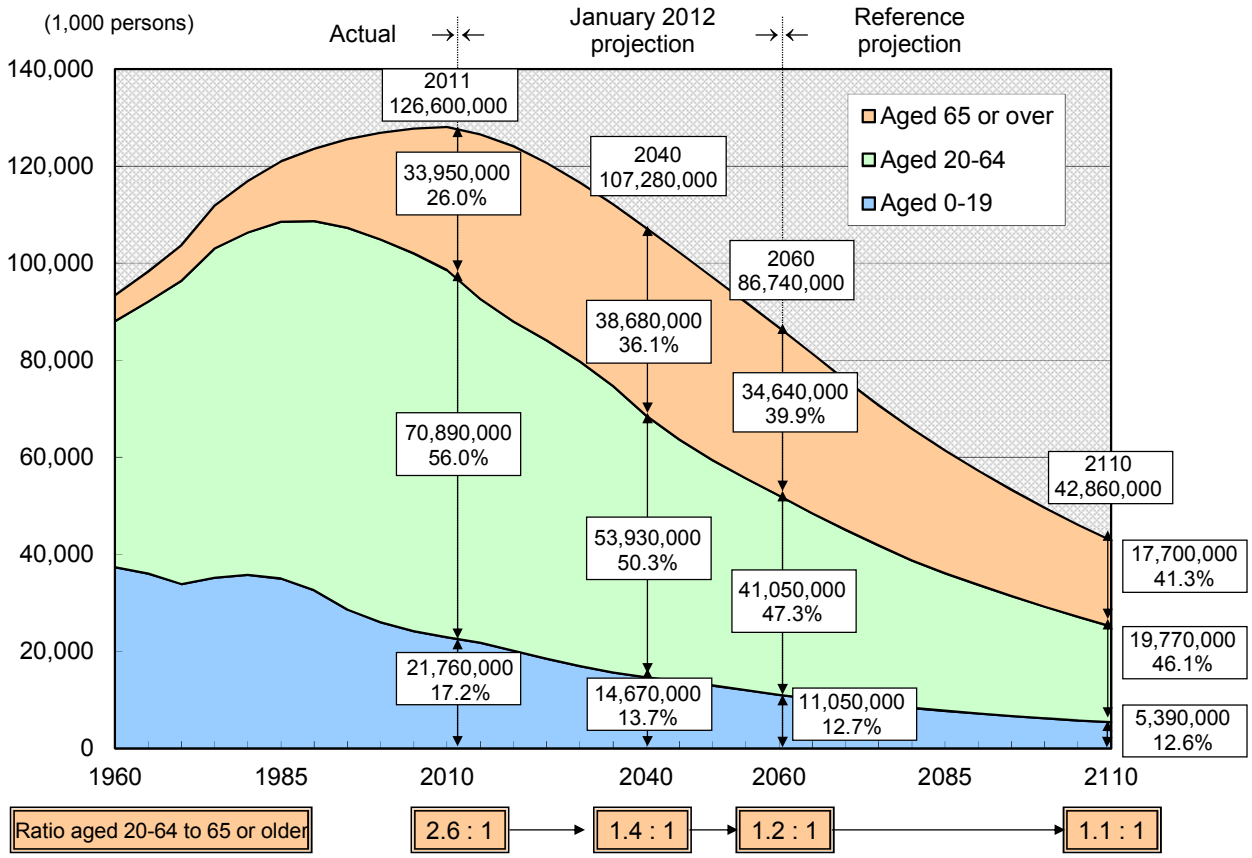
Figure 1-6 Changes in life expectancy at birth



Source: Ministry of Health, Labour and Welfare, *Abridged Life Tables*.

Figure 1-7 Demographic trends by age category

- January 2012 "Population Projection of Japan" medium fertility (medium mortality) -



(2) Economic conditions

The Japanese economy has been in a protracted slump since the collapse of the bubble economy, and both prices and wages have remained flat. As a result, the modified indexation introduced by reforms to the social security pension system in 2004 to adjust benefits and designed to take effect whenever prices or wages rise has never been activated in the 10 years since its introduction. Benefit level adjustments that need to be made to bring pension finances into balance are thus lagging.

Now, however, the Government is concentrating all its efforts on revitalizing the Japanese economy, and with prices trending upward since the second half of 2013 and wages too exhibiting growth in FY2014, encouraging signs are emerging.

On the other hand, pension finances by their nature ought to be managed from a long-term perspective, and the economic assumptions used for actuarial valuations should be determined through a process of objective, expert discussion taking into consideration factors including future declines in the labor force from a long-term perspective. As the economic is uncertain and impossible to forecast with accuracy, moreover, multiple assumptions covering a range of scenarios should be adopted.

To ensure transparency in the process by which the economic assumptions adopted for the present actuarial valuation were determined, a public advisory panel consisting of experts in economics and finance (called the "Expert Committee on the Economic Assumptions and Investment/Management of Reserves in Pension

Finances") was formed, and this met 17 times over a period of two and a half years to discuss technical matters. The panel reported its findings on March 12, 2014, and assumptions were determined based on these findings.

3. Framework of pension finances introduced by the 2004 pension reforms

The framework of NP and EPI pension finances was changed dramatically by pension reforms introduced in 2004.

Before the 2004 reforms, the necessary revisions were made to NP and EPI once every five years by conducting actuarial valuations. These valuations projected the level of contributions needed to maintain current benefit levels assuming various socioeconomic changes (such as the effects of the declining birthrate), and the necessary revisions were accordingly made to plans at such time.

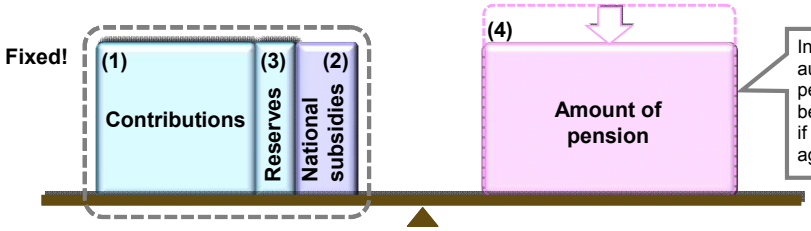
Under this arrangement, the relationship between benefits and contributions was repeatedly revised whenever actuarial valuations were performed as it became apparent that birthrate decline and population aging were expected to advance more rapidly than had been anticipated. As the actuarial valuations went no further than basically indicating that the level of future contributions (contribution rates) would be progressively raised and only the contribution levels for the next five years were provided for by law, this arrangement made it intrinsically essential for legal revisions to be made once every five years.

As the repeated implementation of system reforms meant that no one could tell how future pensions might be affected by future reforms, the 2004 pension reforms introduced a system for automatically balancing benefits and contributions. More specifically, in order to avoid imposing an excessive burden on people of active age in the future, a fixed cap was placed on contributions. Future benefit levels are then automatically adjusted in order to achieve equilibrium between benefits and contributions in the long term within the scope of the financial resources (including use of reserves) imposed by this cap.

The arrangements introduced by the 2004 pension reforms are explained as follows.

Figure 1-8 Financial framework under the 2004 pension reforms (arrangements to balance benefits and contributions)

○ The 2004 pension reforms introduced a framework of pension finances designed to ensure future plan sustainability taking into account further birthrate decline and population aging.
○ The financial framework envisaged by the 2004 reforms was largely put in place by the enactment of legislation on the comprehensive reform of social security and tax in 2012.



(1) Contributions raised after imposing fixed cap

Contribution level fixed from 2017. (Contribution level, including process for increasing, specified by law.)
- EPI: 18.30% (borne equally by employer and employee) (increased by 0.354% annually from October 2004)
- NP: ¥16,900 *FY2004 value (increased by ¥280 annually from April 2005)

*Current contributions:
EPI 17.474% (from Sept. 2014)
NP ¥15,590 (from April 2015)

(2) National subsidy for Basic Pension increased to one half

National subsidy for Basic Pension benefits raised to 50% from FY2009.

Consumption tax secured as revenue source under comprehensive reforms to the social security and tax systems in 2012.

(3) Use of reserves

Reserves are earmarked for future generations' benefits by keeping reserves worth around one year of benefits at the end of the financial equilibrium period as a means of ensuring financial equilibrium over a period of around 100 years.

(4) Introduction of mechanism to automatically adjust benefit level within scope of financial resources (modified indexation)

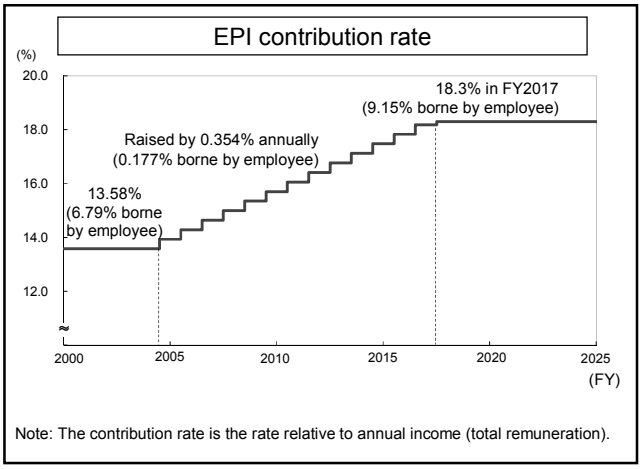
Adjustment of pension benefit level in keeping with decline in population of active age. The standard pension benefit level is to be kept above 50% of the average income of current salaried workers at start of pension receipt even if birthrate decline and population aging continue.

Establishment of prerequisites for modified indexation to function by eliminating (by the 2012 reform) the overpayment of pensions.

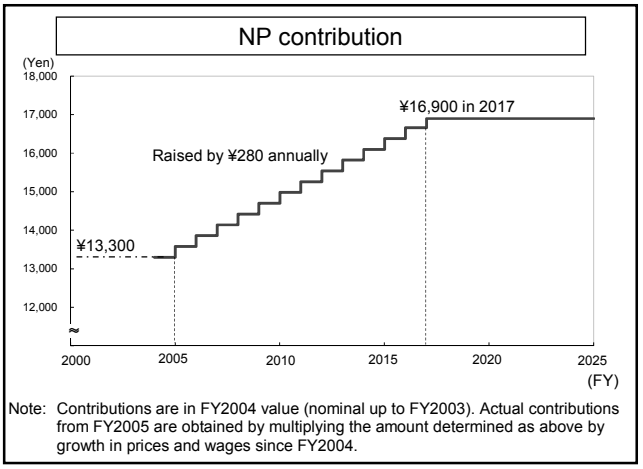
(1) Fixing of contribution (rate) levels

Under the 2004 pension reforms, the schedule and caps for contribution (rate) level increases were laid down by law and arrangements were put in place for adjusting benefits to the extent permitted by these financial resources. The purpose of fixing future contribution (rate) levels by law in this way was to address serious concerns, especially among younger people, about the extent to which the future burden might be increased given the inevitability of higher contributions due to accelerating birthrate decline and population aging.

Figure 1-9 Approach to fixing contribution levels



Note: The contribution rate is the rate relative to annual income (total remuneration).



Note: Contributions are in FY2004 value (nominal up to FY2003). Actual contributions from FY2005 are obtained by multiplying the amount determined as above by growth in prices and wages since FY2004.

(2) Raising of national subsidy for the Basic Pension

A roadmap for raising the national subsidy for the Basic Pension from one third to one half was explicitly laid down by law under the 2004 reforms. The proportion of national subsidies for the Basic Pension was set at one half in the main provisions of the relevant legislation, and the rate began to be increased from one third in FY2004. The rate subsequently reached one half through use of a temporary transfer from special accounts, etc. in FY2009, and the process of raising the proportion of national subsidies and securing permanent revenue sources was completed by the enactment of related bills (including a bill to raise the consumption tax rate) to implement comprehensive reform of social security and tax in 2012.

(3) Level of reserves and equilibrium period for pension finances

The 1999 actuarial valuation adopted what is called the "method adopting the period of financial equilibrium in perpetuity," which aims to achieve financial equilibrium taking into account the entirety of a period stretching from now into the future. However, there was some debate over whether it was necessary to take into consideration a period that stretched into a distant and extremely unpredictable future that was extremely hard to predict, and the continued maintenance of massive reserves.

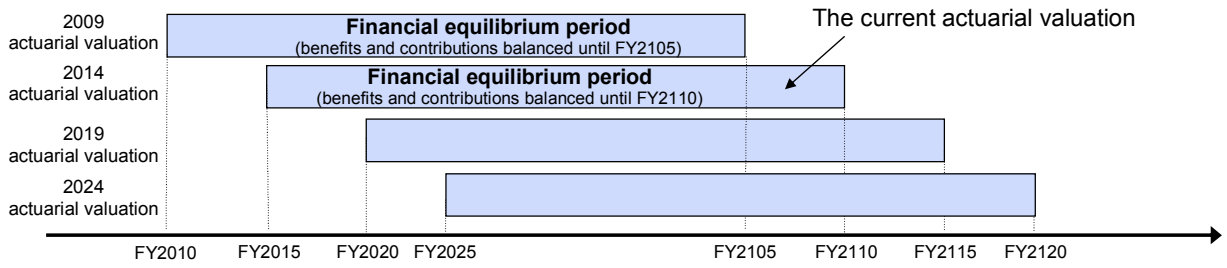
Under the 2004 reforms, therefore, a financial equilibrium period of around 100 years, which covers the period until generations now already born will cease to receive pension benefits, was adopted. The aim is to balance pension finances during this "finite period of financial equilibrium," during which time the investment income and capital of reserves are to be used.

For the present actuarial valuation, the 95-year period up to FY2110 was adopted for the financial equilibrium period. As Figure 1-10 shows, this period shifts each time an actuarial valuation is conducted, which means that the period from FY2111 onward is progressively incorporated into the financial equilibrium period during which benefits and contributions are to be balanced.

Figure 1-10 Overview of method adopting the finite period of financial equilibrium

- Target reserve level set to maintain around one year's worth of benefits in the final year of the financial equilibrium period.
- Financial equilibrium period moves each time an actuarial valuation is periodically conducted (e.g., every five years), and equilibrium between benefits and contributions is always considered for a certain period into the future.

[Movement of financial equilibrium period (if 95 years)]



(4) Introduction of modified indexation as a financial automatic balancing mechanism

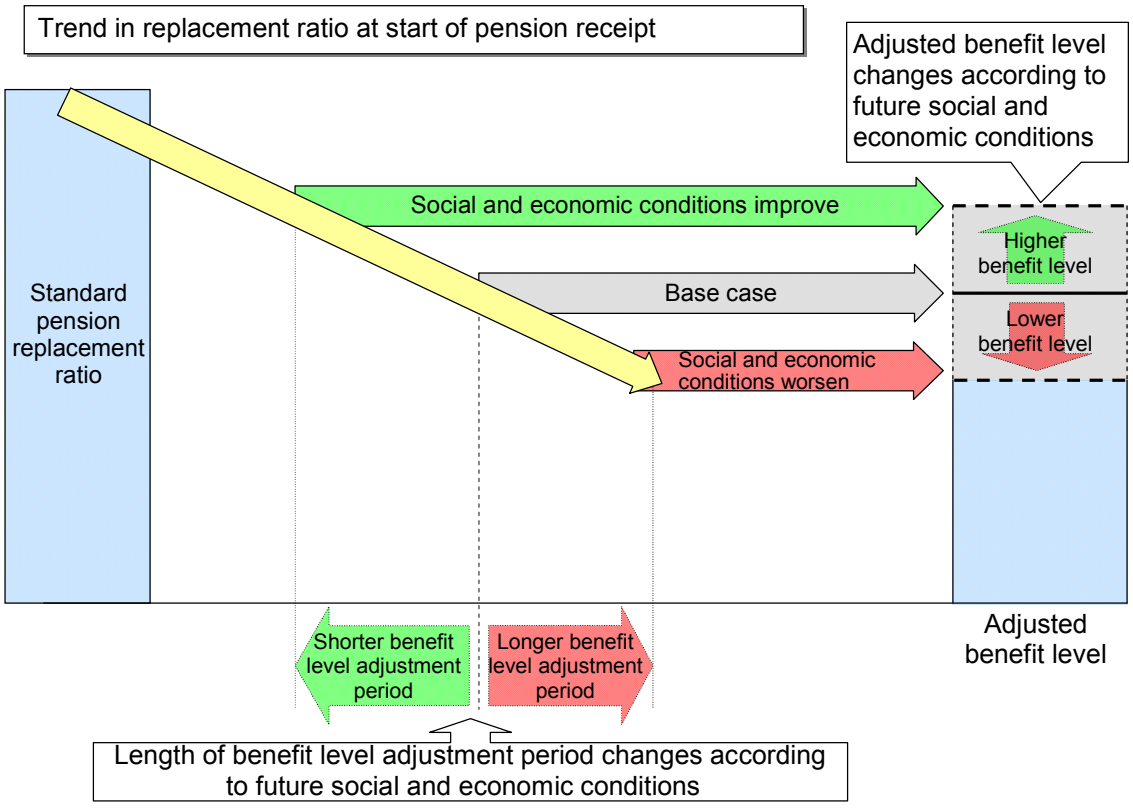
The fixing of contribution levels and national subsidies and adoption of a method of using reserves fixed the financial resources available for funding benefits. As pension benefits cannot exceed these fixed financial resources, benefit levels need to be adjusted in order to keep pension finances in equilibrium. The mechanism adopted to adjust benefit levels is modified indexation, which contains increase of pensions indexed to wages or prices by linking indexation to population aging as well.

A system of performing actuarial valuations at least once every five years was also adopted in order to project the replacement ratio at and after the termination of benefit level adjustments in accordance with changes in social and economic conditions, and to calculate financial projections for them. Under this arrangement, if an actuarial valuation shows benefit level adjustments to be unnecessary, adjustments are concluded at that point.

Note that the final year of benefit level adjustments according to the present actuarial valuation is what is projected on the current actuarial valuation, and on future valuation it should be possible to finish making adjustments and ensure high benefit levels earlier than the final year on the current valuation if socioeconomic conditions pick up. Conversely, if they deteriorate, benefit adjustments will have to be made for longer and benefit levels will be lower than projected.

There is thus now a mechanism in place for automatically balancing pension finances by changing the timing of conclusion of benefit level adjustments according to future changes in socioeconomic conditions, thereby making the social security pension system a sustainable system that does not need to be frequently and repeatedly revised.

Figure 1-11 Mechanism for automatically adjusting benefit levels



(5) Minimum benefit level

While the 2004 pension reforms introduced a mechanism for automatically adjusting benefit levels, benefits cannot simply be endlessly reduced if the social security pension system is to fulfill its expected role. To ensure that benefits do not fall below a certain level, therefore, the replacement ratio of the EPI standard pension is introduced as a measure of benefit levels, and the minimum benefit level has been set at 50% of this rate. Here, the EPI standard pension is the amount of pension benefits received by a household consisting of a husband who works as a salaried worker earning the average wage for 40 years and a wife who is a covered person in the 3rd category for 40 years, and the replacement ratio is the ratio at the start of pension receipt (65 years old) of the EPI standard pension to the average annual net income (including bonuses) of males of active age.

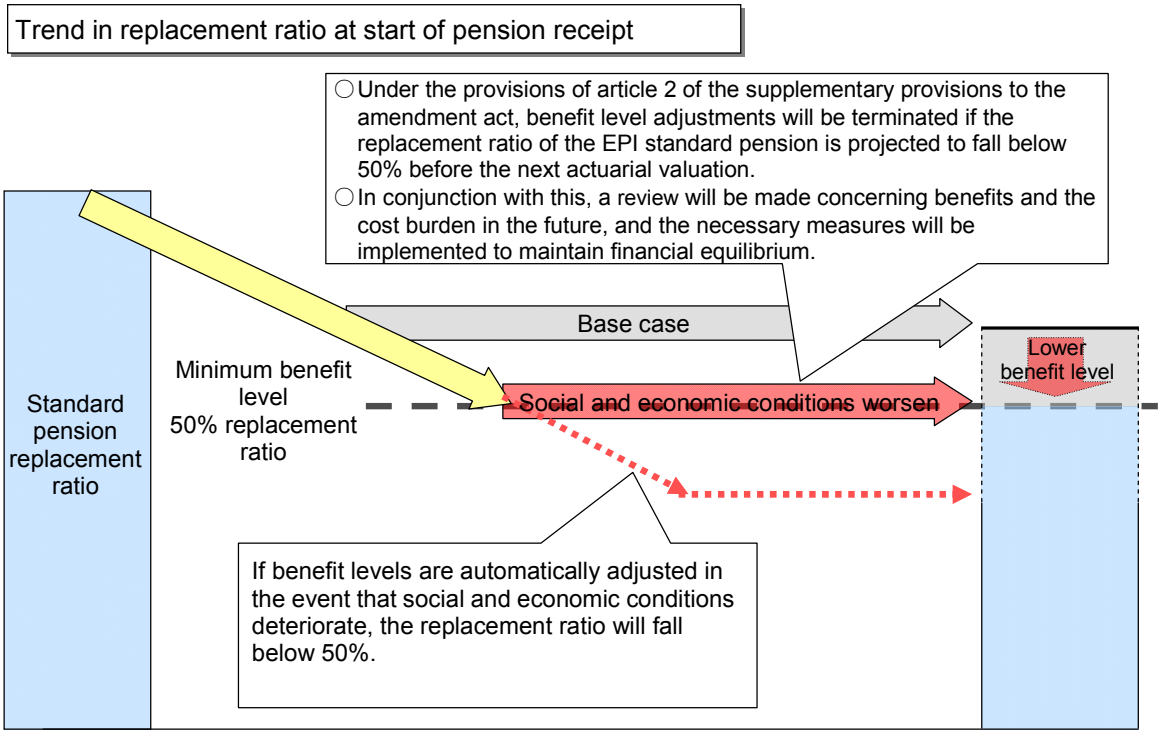
The replacement ratio in FY2014 was 62.7%. However, this will be lowered as a result of the automatic adjustments made by modified indexation, and under the present actuarial valuation, which adopts the medium population scenario projections and assumes that the Japanese economy recovers and achieves a certain degree of growth, the projections show balance of pension finances over an around 100-year period ending in FY2110 while securing a replacement ratio of 50%.

However, if social and economic conditions deteriorate more than anticipated (due, for example, to a greater than expected decline in the birthrate), then assuming that benefit level adjustments continue to be made to keep pension finances in balance, the projected replacement ratio may drop below 50%.

If the replacement ratio is projected to fall below 50% in the next five years according to the actuarial valuation, a review will be made concerning whether to terminate benefit level adjustments at the point. Based on the results of the review, a decision will then be made on whether to end the adjustment period or take other measures. At the same time, the future of benefits and contributions will be reviewed and necessary measures implemented.

As the replacement ratio will not approach 50% due to adjustment of benefit levels until at least 20 years in the future, the above measures are unlikely to be implemented soon even if social and economic conditions deteriorate more than currently anticipated.

Figure 1-12 Automatic adjustment of benefit levels and the minimum benefit level

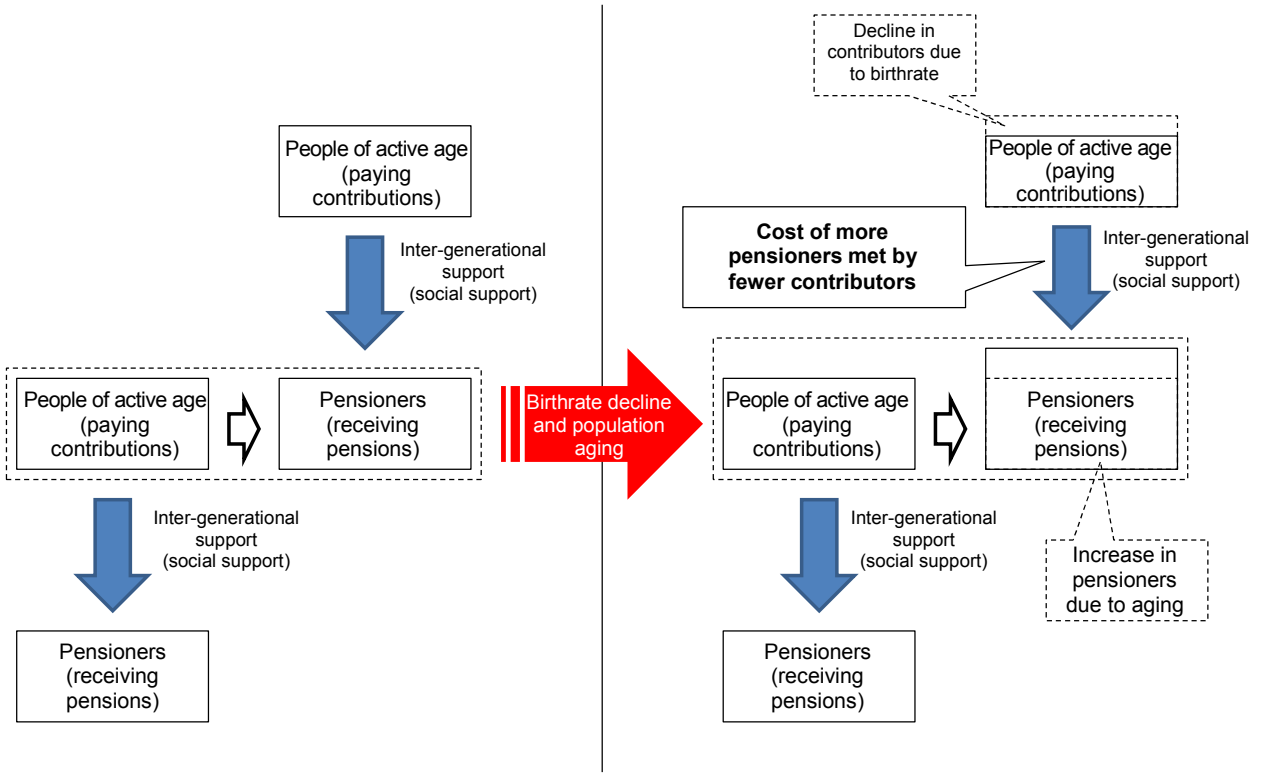


4. Role of actuarial valuations

Japan's social security pension system is basically a pay-as-you-go system (which means that expenditures on pensions for the elderly are paid for by people of active age at that time) that is run by maintaining a certain amount of reserves in order to ensure that future pensioners receive a certain level of pension.

With this financing method, as pension benefits will increase due to the relative increase in the elderly population if birthrate decline and population aging proceed more than initially projected, it will be necessary to either increase the burden on those currently in work or limit the benefits received by pensioners in order to keep pension benefits and contributions in balance.

Figure 1-13 Pay-as-you-go method and birthrate decline/population aging



While modified indexation was thus introduced by the 2004 pension reforms, the degree to which benefit levels have to be adjusted depends on current and future demographic and economic trends, including:

- How far will aging and birthrate decline go?
- To what extent will women and older people enter the labor market and increase the number of contributors to the pension system?
- How much economic growth will be achieved and how much wage growth and investment return from reserves can be expected?

In order to regularly confirm the state of pension finances, therefore, a system of performing "actuarial valuations" at least once every five years was introduced. Under this arrangement, long-term financial revenues and expenditures over a period of around 100 years are projected, and the years in which modified indexation is projected to start and finish are calculated along with benefit levels in order to verify the state of pension finances.

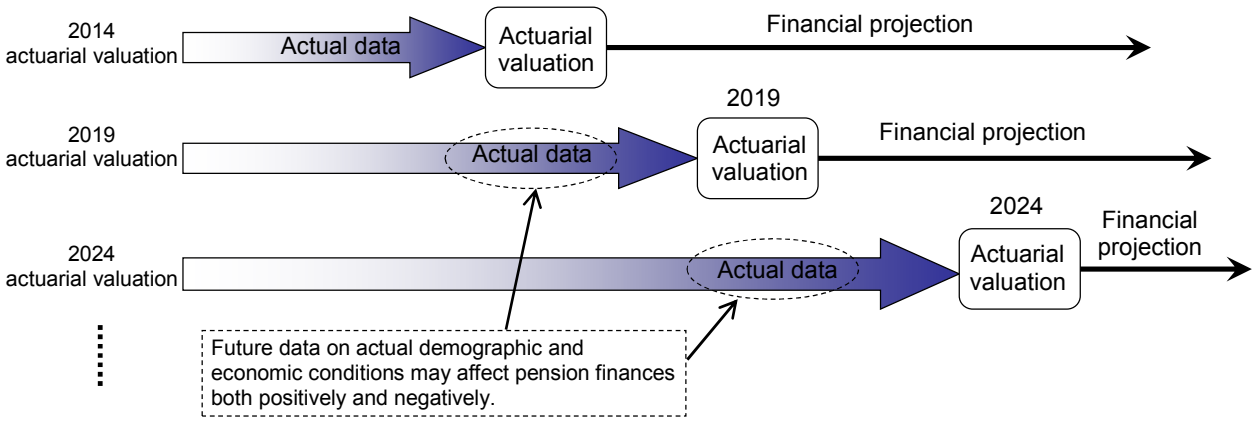
For actuarial valuations, certain assumptions are adopted regarding demographic and economic conditions in the future. The future is uncertain, however, and even when every effort is made to use the best available data when a review is performed, actual and assumed conditions will inevitably diverge.

When actuarial valuations are performed, therefore, these assumptions are revised using fresh data accumulated with the passage of time. Based on these revised assumptions, projections for an around 100-year period are calculated taking as a fresh starting point the actual trajectory. The state of pension finances is simultaneously

reviewed according to future demographic and economic conditions based on a range of assumptions in order to indicate how benefit levels and other factors may evolve in the future.

It should therefore be borne in mind that the results of actuarial valuations are more like "projections" into the future of pension finances based on currently available demographic, economic, and other data, rather than precise forecasts (including demographic and economic forecasts) of conditions in the future.

Figure 1-14 Overview of actuarial valuations



The differences between actuarial valuations since 2009 and actuarial valuations up to 2004

The "actuarial valuations" performed up to 2004 and those performed since 2009 are similar in that they both provide far-reaching projections of social security pension plan revenues and expenditures, but they have served very different functions.

The function of actuarial valuations up to 2004 was to determine the level of future contributions (contribution rates). Thus once every five years, the level of the burden, i.e., the contributions (contribution rates), required in the future to maintain benefit levels at their current level given changes in population estimates, the future economic outlook, and other factors was calculated. If necessary, the relationship between benefits and contributions was then revised each time that an actuarial valuation was performed. In practice, however, benefit levels as well as contribution levels were revised when these actuarial valuations were performed.

The actuarial valuations performed since 2009, on the other hand, have been entirely different in character from those performed up to 2004. As the level of future contributions (contribution rates) was determined by law when the 2004 pension reforms were introduced, contributions (contribution rates) have not been set since 2009. Instead, one of the main purposes of actuarial valuations since 2009 has been to determine or project the year in which to stop adjusting benefit levels by means of modified indexation, and this is done by projecting revenues and expenditures based on the latest data on social and economic conditions. Actuarial valuations since 2009 have thus aimed to project the extent to which future benefit levels will be adjusted by means of the social security pension system's current mechanism for automatically adjusting benefits assuming a fixed level of contributions. If it is projected that revenues and expenditures will remain in equilibrium with benefits maintained at a certain level, the actuarial valuation will conclude that the adjustment mechanism under the social security pension system is presently functioning properly, and no particular revisions will be made to benefits or contributions as a result of the review.

If, however, a review were to find that benefits would be lowered so much that the replacement ratio would fall below 50% within the next five years, then it would be concluded that the mechanism had ceased to function properly and a review would be made concerning whether to terminate benefit level adjustments. Based on the results of such a review, the adjustment period would be terminated, the future shape of benefits and contributions examined, and the necessary measures implemented.

Thus whereas actuarial valuations up to 2004 revised the level of benefits and contributions from now on and determined in particular the level of future contributions (contribution rates) each time that they were performed, actuarial valuations since 2009 have functioned as regular "inspections" to check whether the level of contributions set by the 2004 reforms and the mechanism for adjusting benefits are functioning properly.

Section 2 2014 actuarial valuation

1. Main assumptions of the actuarial valuation

Actuarial valuations are projections of the long-term state of pension finances that project future contribution revenues and benefit expenditures over an around 100-year period, and they require the adoption of certain assumptions regarding future demographic, social, and economic conditions.

Due to uncertainty about the future, however, multiple sets of assumptions covering a range of possible scenarios are adopted. The 2014 actuarial valuation adopts a range of economic assumptions, rather than a single main scenario, in order to estimate the pension situation in the future.

(1) Population projection assumptions (state of birthrate decline and population aging)

The "Population Projections for Japan" published in January 2012 by the National Institute of Population and Social Security Research (IPSS) were used for the demographic assumptions. Three sets of assumptions (medium, high, and low scenarios) were adopted regarding the total fertility rate (TFR) and the mortality rate (Table 2-1).

Table 2-1 TFR and life expectancy at birth

TFR				Life expectancy at birth			
2010 (actual)		2060		2010 (actual)		2060	
1.39	→	High fertility scenario	1.60	Males 79.55 Females 86.30	→	High mortality scenario	Males 83.22 Females 89.96
		Medium fertility scenario	1.35			Medium mortality scenario	Males 84.19 Females 90.93
		Low fertility scenario	1.12			Low mortality scenario	Males 85.14 Females 91.90

(2) Labor force participation rate assumptions

The "increased labor market participation case" and the "unchanged labor market participation case" described in the "Labor Supply and Demand Estimates" published by the Japan Institute for Labour Policy and Training (JILPT) in February 2014 were used for the labor force assumptions. As trends in labor force participation rates are closely related to economic growth, these two cases were paired with particular sets of economic assumptions: the increased labor market participation case was paired with the assumption that the Japanese economy revives and achieves a certain degree of growth, and the unchanged labor market participation case was paired with the assumption of low growth.

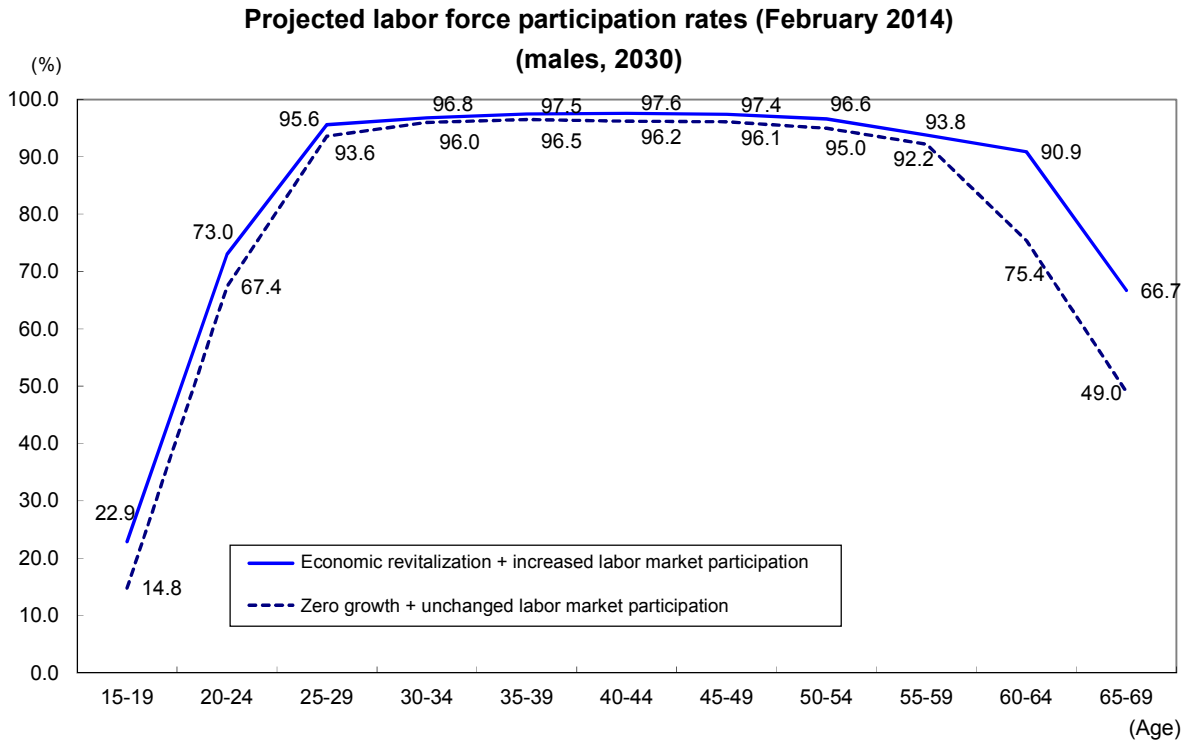
For the increased labor market participation case, it was assumed that labor force participation by women and the elderly would increase considerably in accordance with the Government's "Japan Revitalization Strategy" (adopted by the Cabinet on June 14, 2013), which targets real economic growth of around 2% over the next 10 years. This projects that the labor force participation rate will increase to around 85% among women in their

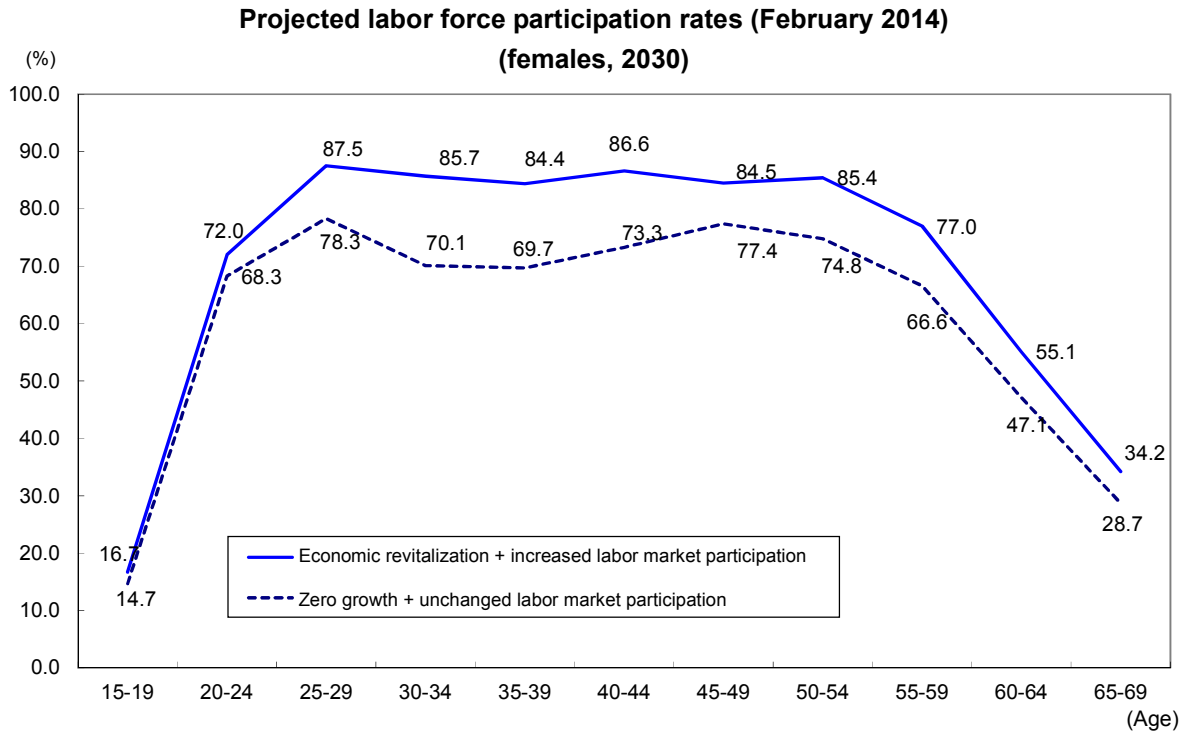
thirties, eliminating the "M curve" that characterizes women's employment in Japan, and that two in three men will continue to work into their late sixties.

In the unchanged labor market participation case, on the other hand, labor participation rates are projected to remain unchanged at their present levels.

As these estimates only extend until 2030, these rates are assumed to remain constant from 2030 onward (Figure 2-2).

Figure 2-2 Labor force participation rate assumptions





(3) Economic assumptions

To ensure transparency in the process by which the economic assumptions were determined, a public advisory panel consisting of experts in economics and finance (called the "Expert Committee on the Economic Assumptions and Investment/Management of Reserves in Pension Finances") was formed and met 17 times over a period of two and a half years for public discussions, and eight wide-ranging cases were adopted based on a report of the panel's findings (published March 12, 2014).

1) Short-term economic assumptions (up to FY2023)

Economic assumptions up to 2023 were established based on the "economic revitalization case" and the "reference case" described in the Cabinet Office's "Economic and Fiscal Projections for Medium to Long Term Analysis" (published on January 20, 2014).

The economic revitalization case assumes that the "three arrows" laid down in the "Japan Revitalization Strategy" for revitalizing the Japanese economy will steadily take effect, and projects in the medium term up to FY2023 that the consumer price index (CPI) will be around 2% and the real economic growth rate will be around 2%. The reference case assumes more moderate growth, and projects in the medium term up to FY2023 that the real economic growth rate will be around 1%.

2) Long-term economic assumptions (from FY2024)

For the long-term economic assumptions from FY2024 onward, eight wide-ranging cases were adopted (Table 2-3) using the medians of the ranges indicated in the report of the advisory panel's findings.

Of these, cases A to E are high-growth scenarios that are extensions of the economic revitalization case in the Cabinet Office's projections, and cases F to H are low-growth scenarios that are extensions of the reference case in the Cabinet Office's projections.

Table 2-3 Long-term economic assumptions

		Assumed future state of the economy		Economic assumptions				(For ref.)
		Labor force participation rate	TFP growth rate	CPI increase rate	Wage growth rate (real adjusted for CPI)	Rate of return on investment		Economic growth (real adjusted for CPI) 20-30 years from FY2024
						Real (adjusted for CPI)	Spread (adjusted for wages)	
Case A	Extension of Cabinet Office's economic revitalization case	Increased labor market participation case	1.8%	2.0%	2.3%	3.4%	1.1%	1.4%
Case B			1.6%	1.8%	2.1%	3.3%	1.2%	1.1%
Case C			1.4%	1.6%	1.8%	3.2%	1.4%	0.9%
Case D			1.2%	1.4%	1.6%	3.1%	1.5%	0.6%
Case E			1.0%	1.2%	1.3%	3.0%	1.7%	0.4%
Case F	Extension of Cabinet Office's reference case	Unchanged labor market participation case	1.0%	1.2%	1.3%	2.8%	1.5%	0.1%
Case G			0.7%	0.9%	1.0%	2.2%	1.2%	-0.2%
Case H			0.5%	0.6%	0.7%	1.7%	1.0%	-0.4%

Regarding the long-term economic assumptions, real economic growth rates and other variables were estimated under eight scenarios based on a framework of macroeconomic projection using a Cobb-Douglas production function.

For each scenario, parameters consistent with the Japanese economy's projected latent growth rate and projected labor supply and demand given past actual performance were adopted based on eight different rates of growth in total factor productivity (TFP), which is taken to be the component of growth attributable to technological innovation and other such factors.

In the Cabinet Office projections on which the short-term assumptions are based, it is assumed that this TFP growth rate, which currently (as of the third quarter of FY2013) stands at 0.5% per year, will rise in FY2023 to 1.8% (the average for 1983-1993) in the economic revitalization case, and to 1.0% (the average for 1983-2009) in the reference case. Based on these rates, it was assumed that the TFP growth rate from FY2024 would range between 1.8% and 1.0% in the cases that are extensions of the economic revitalization case, and between 1.0% and 0.5% in the cases that are extensions of the reference case.

The TFP growth rates at the center of the economic assumptions may, in other words, be regarded as covering a broad range of growth possibilities, extending from high-growth scenarios in which growth remains as high in the long term as during the bubble period in the long term, to low-growth scenarios in which growth remains as weak in the long term as it has been since the collapse of the bubble.

The economic assumptions thus adopted for the 20 to 30 years from FY2024 ensure positive annual real growth of between 1.4% and 0.4% in the economic revitalization cases (cases A to E). In the lower growth cases (cases F to H), growth is projected to be almost zero or negative, ranging between an annual rate of 0.1% and -0.4%.

(4) Other assumptions

In addition to demographic and economic assumptions, the actuarial valuation adopts a number of other assumptions regarding the state of pension plans (such as the beneficiary with survivor ratio, disability pension retirement risk, and the contribution compliance rate) and other factors. These were selected based on, among other things, actual data on covered persons, pensioners, and so on. Regarding the contribution compliance rate for NP contributions of the covered persons in the 1st category, the base assumption was that the rate would rise

to 65% in FY2018 as a result of strengthened action to ensure payment. However, a continued rate of 60% as at present was also adopted as one of the assumptions.

2. Future projections of the replacement ratio

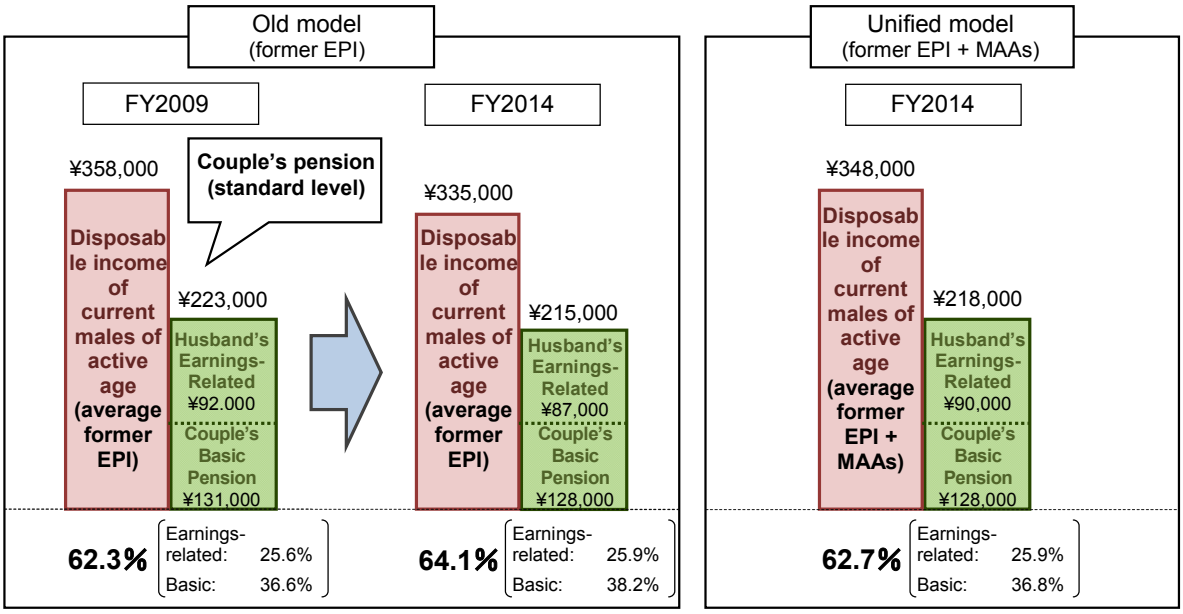
(1) Replacement ratio of the standard pension for measuring EPI benefit levels

In the present actuarial valuation, the replacement ratio of the standard pension used as a benchmark for measuring the benefit level of EPI is expressed by a unified model that assumes the unification of public and private employee pension plans. The benchmark average wage of EPI males is calculated including male members of MAA plans, and the average net wage in FY2014 was ¥348,000. The pension (standard level) of a model household when newly awarded in FY2014 calculated on the basis of this wage level comes to ¥218,000, which breaks down into a ¥128,000 Basic Pension for a couple and a ¥90,000 earnings-related pension. The replacement ratio, which is the ratio of this amount to the disposable income of an individual of active age, is 62.7%. This is the replacement ratio in FY2014, and this is what is used as the current benefit level in the present actuarial valuation.

If benefit levels are not adjusted by modified indexation, the replacement ratio will, in principle, remain unchanged. This is because the amount of a newly awarded pension, which serves as the numerator, is index-linked to the rate of growth in the net wage, which serves as the denominator, which means that the denominator and the numerator grow at the same rate.

When modified indexation is applied, the growth in the pension (the numerator) is kept below growth in the net wage, and so the benefit level is adjusted and the replacement ratio falls. Due to protracted deflation, however, the modified indexation mechanism introduced in 2004 was not applied up to FY2014, as a consequence of which the replacement ratio actually increased. This increase has primarily pertained to the Basic Pension, and has occurred because revisions to a newly awarded Basic Pension during this time have been more limited than the decline in the wage used as the denominator, and this has occurred because the system is set up so that, when the state of the economy is such that wages are falling more than prices, the newly awarded Basic Pension is revised on the basis of prices rather than wages.

Figure 2-4 Replacement ratio of the standard pension



Note: Figures for the unified model were determined based on net annual income taking into account the expansion of coverage to part-time workers (approximately 250,000) as a result of the comprehensive reform of social security and tax.

When comparing the replacement ratios given in the present and previous actuarial valuations, it is important to note that the ratio appears to decline due to the change in the model with the unification of employee pension plans.

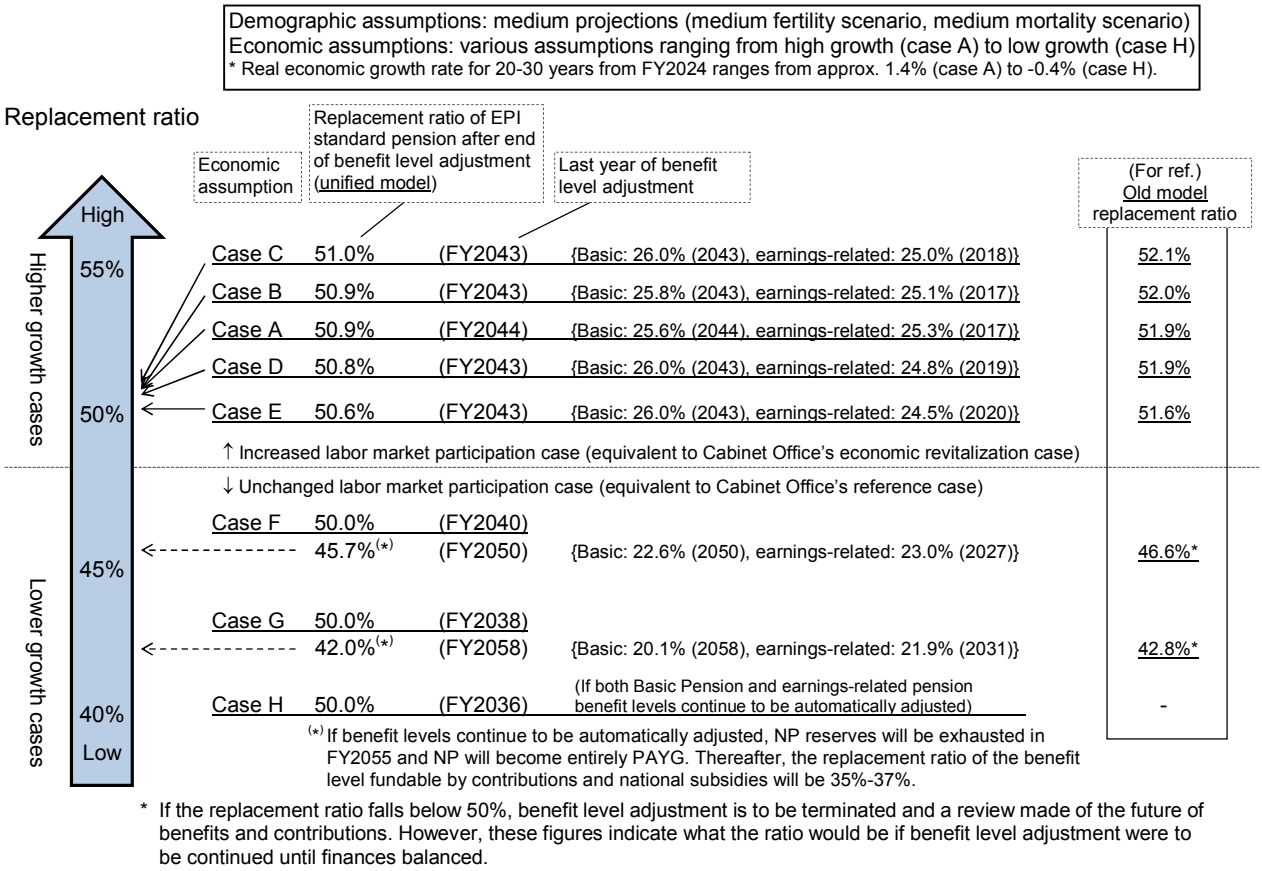
The replacement ratio in FY2009, contemporaneous with the previous actuarial valuation, was 62.3%. However, this is the figure arrived at by the old model, which was calculated based on the average wage of former EPI males excluding MAA members. The replacement ratio under the old model in FY2014 is 64.1%, an increase of 1.8%, and this represents the increase in the real benefit level.

When the unified model is substituted for the old model, the benchmark wage level changes from that for former EPI males to EPI males including MAA members, as a result of which the average net wage increases ¥13,000 and the replacement ratio appears to decline 1.4%.

(2) Projected replacement ratios based on a wide range of economic assumptions

Benefit level adjustment by modified indexation is designed to terminate when pension finances balance over an around 100-year period. However, the replacement ratio at and after termination varies according to future demographic and economic trends. Figure 2-5 below shows what the replacement ratio will be at and after termination of modified indexation under a range of economic assumptions when medium projections are used for the future population. After termination, the amount of a newly awarded pension (the numerator) is index-linked to the wage growth rate (the denominator), and so the replacement ratio is maintained.

Figure 2-5 Projected replacement ratios under wide-ranging assumptions



Of the eight sets of economic assumptions, it was found that the replacement ratio will not fall below 50% in the cases where female and elderly labor market participation increases and the Japanese economy revives (cases A to E).

However, in the low growth cases where female and elderly labor market participation does not increase (cases F to H), benefit level adjustment will be required beyond the minimum benefit level (50% replacement ratio) if financial equilibrium is to be achieved.

In the lowest growth case in particular (case H), it was found that modified indexation will not function sufficiently due to low rates of price increase and wage growth, and NP reserves will be exhausted in FY2055 midway through the process of benefit level adjustment, causing the plan to become entirely pay-as-you-go (PAYG). In the event that NP becomes entirely PAYG, the replacement ratio of the benefit level that can be covered by contributions and national subsidies will be 35%-37%, and the benefit level under the severest economic assumptions will fall to this level.

While the supplementary provisions of the 2004 reform act state that "if the replacement ratio is projected to fall below 50% before preparation of the next review of current and projected financial statues, benefit level adjustment shall be terminated or other measures implemented, and the future shape of benefits and the cost burden shall be examined and necessary measures implemented," the present actuarial valuation does not project the level to fall below 50% before the next actuarial valuation (in FY2019), and so this requirement does not apply.

In all cases, the Basic Pension is adjusted for longer than the earnings-related pension, and the level of the Basic Pension falls more. Although the previous actuarial valuation revealed a similar trend, the difference was greater this time. A comparison of the previous review's reference case with case E, which adopts similar assumptions, reveals that while adjustment ends later due to the lag in application of modified indexation, the difference is just one year in the case of the earnings-related pension compared with five years in the case of the Basic Pension.

This is because the deterioration of NP finances due to the rise in the benefit level of the Basic Pension when measured in terms of the FY2014 replacement ratio (the current ratio used for the present actuarial valuation) makes it necessary to lower future benefit levels more.

In the case of EPI, a decline in the portion of the fixed contribution rate allocated to the Basic Pension when the benefit level of the Basic Pension falls means that greater financial resources can be allocated instead to the earnings-related pension. Under this arrangement, the earnings-related pension benefit level is consequently adjusted less, and the replacement ratio after adjustment increases.

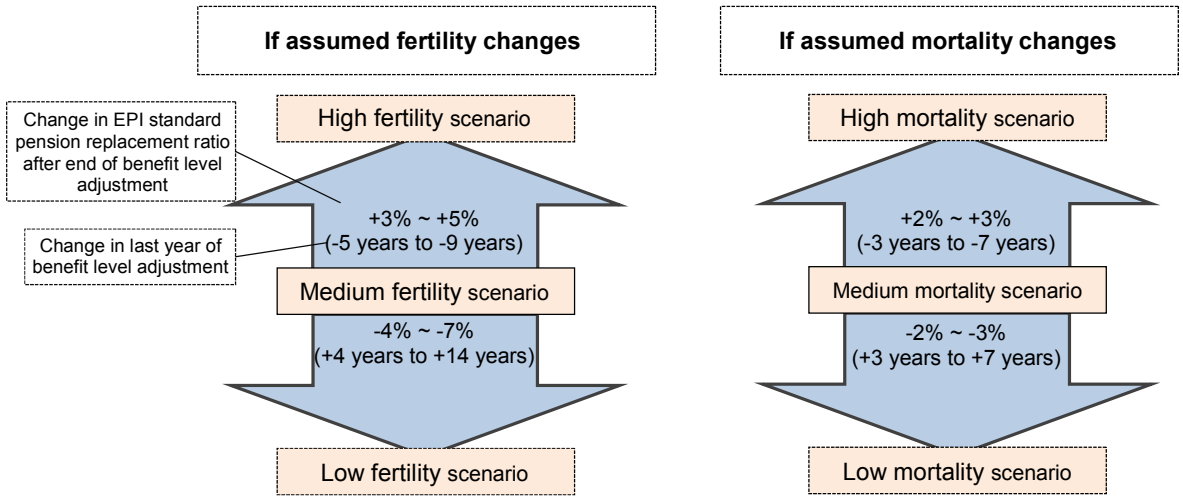
(3) Projected replacement ratios when demographic and other assumptions are changed

The impact of future trends in fertility and mortality on the replacement ratio is shown in Figure 2-6.

When the fertility assumptions are changed from the medium scenario to the high scenario, the adjustment period shrinks by between 5 and 9 years and the replacement ratio rises by 3% to 5%. When the low scenario is used, the adjustment period lengthens by between 4 and 14 years, and the replacement ratio decreases by 4% to 7%. Assumed fertility in 2060 is 1.60 according to the high scenario, 1.35 according to the medium scenario, and 1.12 according to the low scenario, all of which are considerably lower than required to maintain the population. It is thus evident that fertility trends exert a major impact on PAYG-based social security pensions.

When the mortality assumptions are changed to the high and low scenarios, the adjustment period changes by between 3 and 7 years and the replacement ratio changes by between 2% and 3%. The high and low scenarios assume that lifespans will vary by approximately one year, and the lengthening or shortening of the pension period causes the benefit level to fall or rise.

Figure 2-6 Impact of changes to demographic assumptions on replacement ratio



Note: Effects where cases C, E, and G are used for the economic assumptions.

Actuarial valuations also estimate the impact on the replacement ratio of changing the NP contribution compliance rate. Regarding the assumed contribution compliance rate for NP, it is basically assumed that more rigorous action in the future to encourage payment will raise this rate from around 60% at present to 65% in FY2018. However, even if the rate is assumed to remain at 60%, the impact on the replacement ratio will range between +0.1% and -0.1% points, which is negligible. This is so not only because the fact that unpaid NP contributions do not translate into future benefits limits the impact on pension finances, but also because the Basic Pension is supported by everyone who is covered, including those covered under employee pension plans as well, which means that, viewed as a whole, non-payers are limited in number. Naturally, however, non-payment leads to a lower or non-existent pension in the future, and so it is important that measures continue to be strengthened to encourage payment of contributions.

3. Future projections of pension amounts

As the replacement ratio indicates the level of a pension relative to the net wages of people of active age, the real value of a pension will rise when the real value of the wages of people of active age rises (i.e., when wage purchasing power increases and the standard of living rises) even if the replacement ratio remains the same, and pension purchasing power will increase.

Although the replacement ratio indicating the value of a pension relative to the net wages of people of active age is projected to decline as a result of modified indexation (assuming that there is sufficient real wage growth in the economy), then the real value of a pension in terms of purchasing power will not necessarily decline.

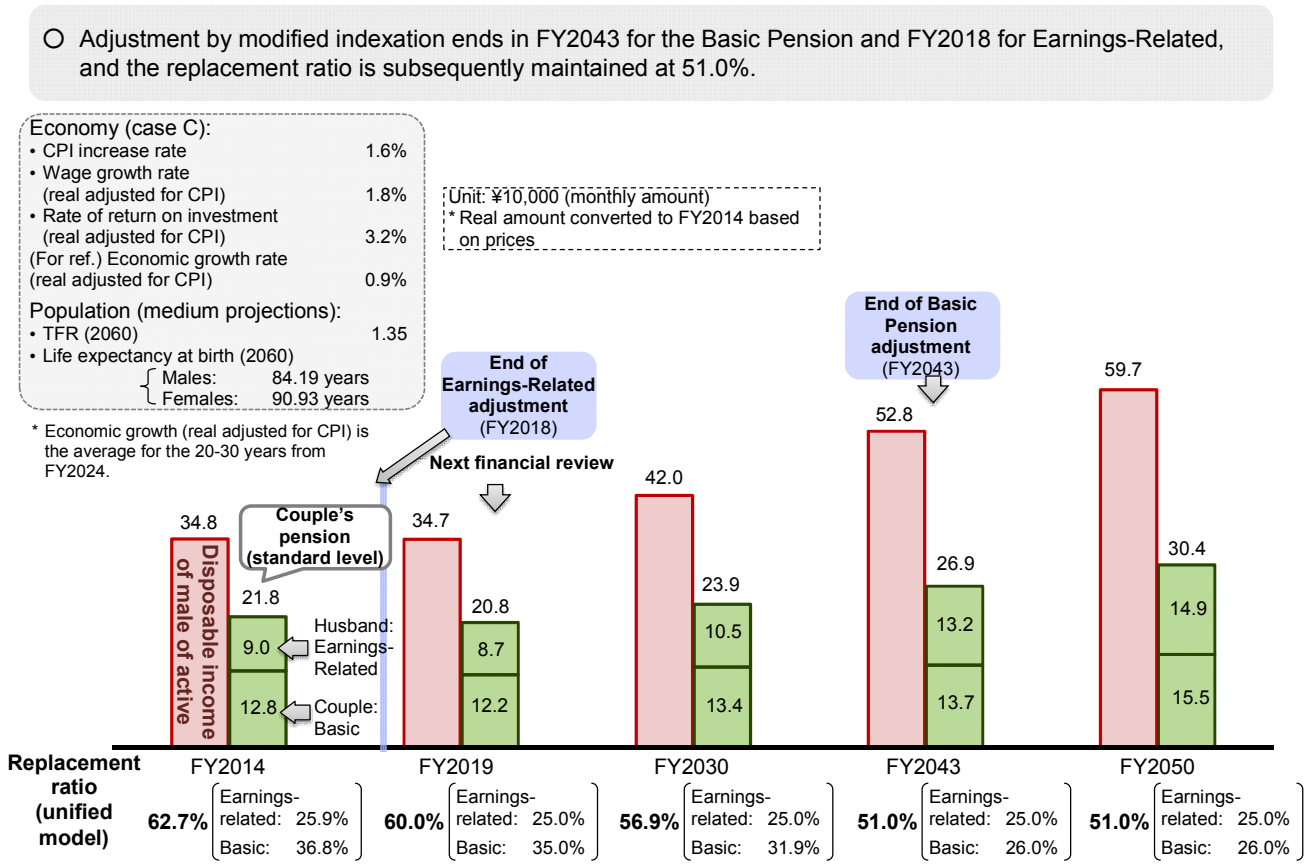
In assessing the level of future pension benefits, therefore, it is important to consider what will happen to the real value of a pension in terms of purchasing power in conjunction with the replacement ratio.

The projected real value in terms of purchasing power of a newly awarded standard pension is shown under three sets of economic assumptions, namely cases C, E, and G, in Figures 2-7, 2-8, and 2-9.

The future real value of a pension is calculated by converting the future nominal pension amount to present value based on the CPI increase rate.

Figure 2-7 Projected pension amounts (2014 actuarial valuation)

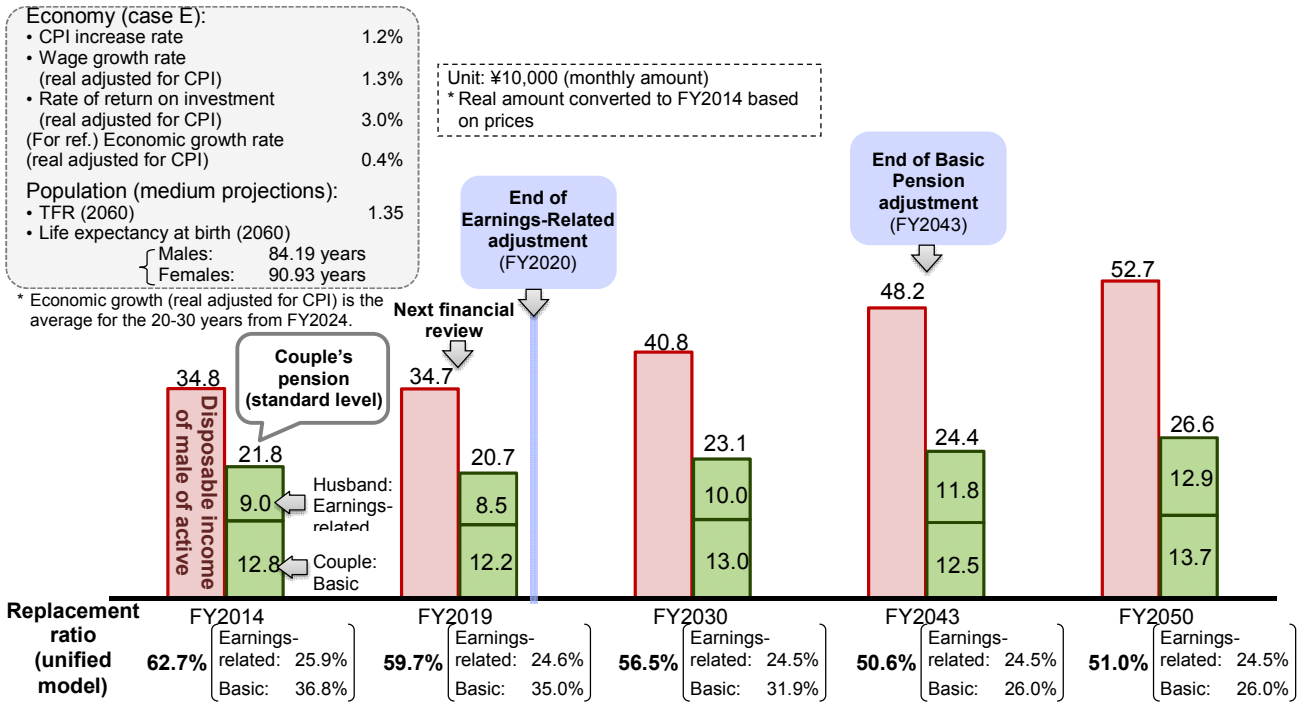
Population: medium fertility scenario / medium mortality scenario, economy: case C (no fluctuation)



* The amount of an already awarded pension is revised based on prices. Normally, however, as the CPI increase rate is lower than the wage growth rate, the ratio relative to the income of individuals of active age at such time decreases.

Figure 2-8 Projected pension amounts (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case E (no fluctuation)

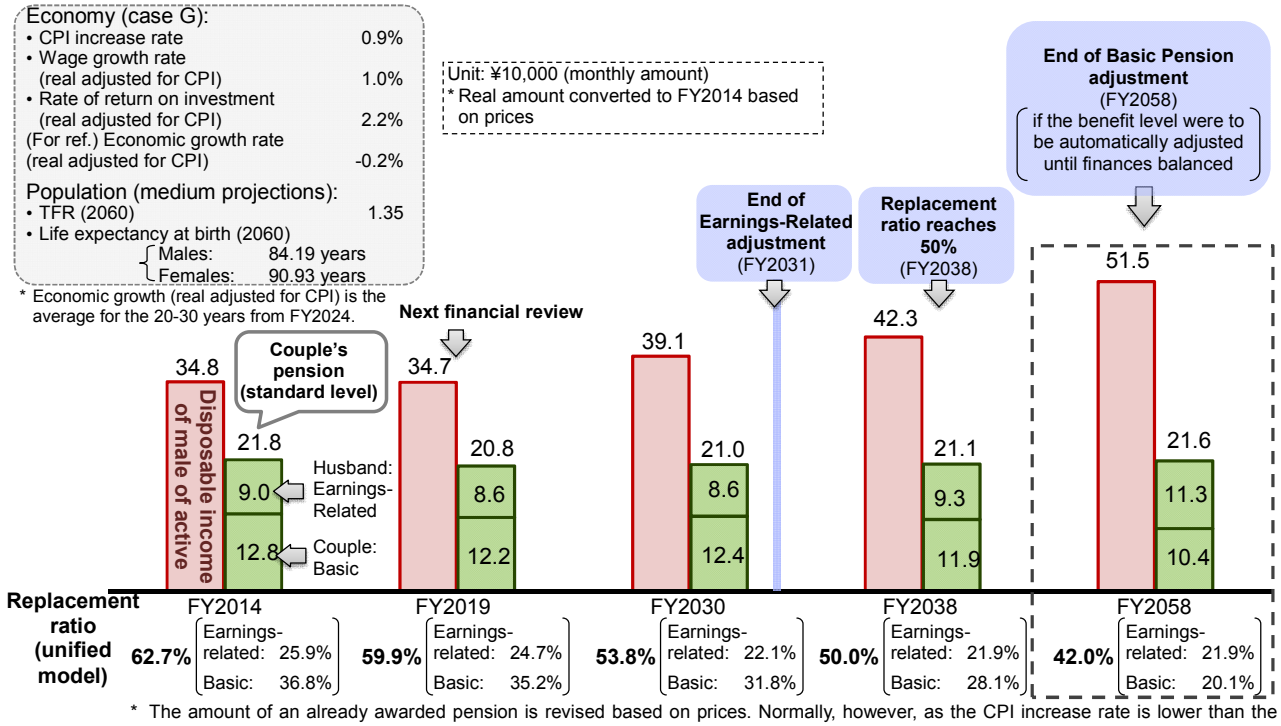
○ Adjustment by modified indexation ends in FY2043 for the Basic Pension and FY2020 for Earnings-Related, and the replacement ratio is subsequently maintained at 50.6%.



* The amount of an already awarded pension is revised based on prices. Normally, however, as the CPI increase rate is lower than the wage growth rate, the ratio relative to the income of individuals of active age at such time decreases.

Figure 2-9 Projected pension amounts (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case G (no fluctuation)

○ The replacement ratio reaches 50% in 2038 due to modified indexation. If modified indexation were to continue to be automatically applied and finances balanced, adjustment would end in FY2058 for the Basic Pension and FY2031 for Earnings-Related, and the replacement ratio then maintained at 42.0%.



* The amount of an already awarded pension is revised based on prices. Normally, however, as the CPI increase rate is lower than the wage growth rate, the ratio relative to the income of individuals of active age at such time decreases.

A comparison of the net wages of individuals of active age in each case shows that the ¥348,000 net wage of individuals of active age in FY2014 is projected to increase in real value in all cases, but that large differences in real future value arise due to differences in the real wage growth rate. In FY2050, for example, real value grows to ¥597, 000 in case C and ¥527,000 in case E, and growth is slower in case G.

Under each set of economic conditions, the ¥218,000 model pension in FY2014 (the amount of a newly awarded pension for a model household) increases in real value in case C and case E, reaching ¥304,000 in case C and ¥266,000 in case E in FY2050. In case G, however, real value stays flat and is projected to amount to ¥216,000 in FY2058 when benefit level adjustment ends. While the benefit level is adjusted by modified indexation as the standard of living of people of active age rises due to real economic growth, pension purchasing power increases in case C and case E, and even in case G remains largely flat.

However, an examination of the purchasing power of the Basic Pension shows that although a higher purchasing power is attained in FY2050 than in FY2014 in cases C and E, the ¥128,000 Basic Pension for a couple in FY2014 falls to ¥104,000 in FY2058 in case G, when benefit level adjustment ends. The decline of Basic Pension purchasing power thus presents a problem in low-growth scenarios.

In cases C and E, the real wage growth rate is projected to be, respectively, 1.8% and 1.3%. As modified indexation, even when fully applied, will average 1.2% per year up 2040, pension revision by wage indexation will exceed the indexation adjustment rate and the real value of a pension will increase. In case G, however, the real wage growth rate is projected to be 1.0%, which is below the indexation adjustment rate, and so the real value of a pension will decline.

On the other hand, although the system is designed so that the purchasing power of a pension from the first year of receipt (of an already awarded pension) is, as a rule, maintained by price indexation using the CPI, the period of benefit level adjustment by modified indexation serves to limit price indexation, and so pension purchasing power declines under all the economic assumptions.

4. Projected replacement ratios and pension amounts according to wage level

Whereas EPI contributions combine first-tier and second-tier and are proportional to wages, the Basic Pension of the first-tier is a flat-rate benefit. Under this arrangement, EPI is inherently income redistributive in effect, and works to the benefit of low-income earners who consequently receive a proportionately higher pension relative to the contributions that they paid in.

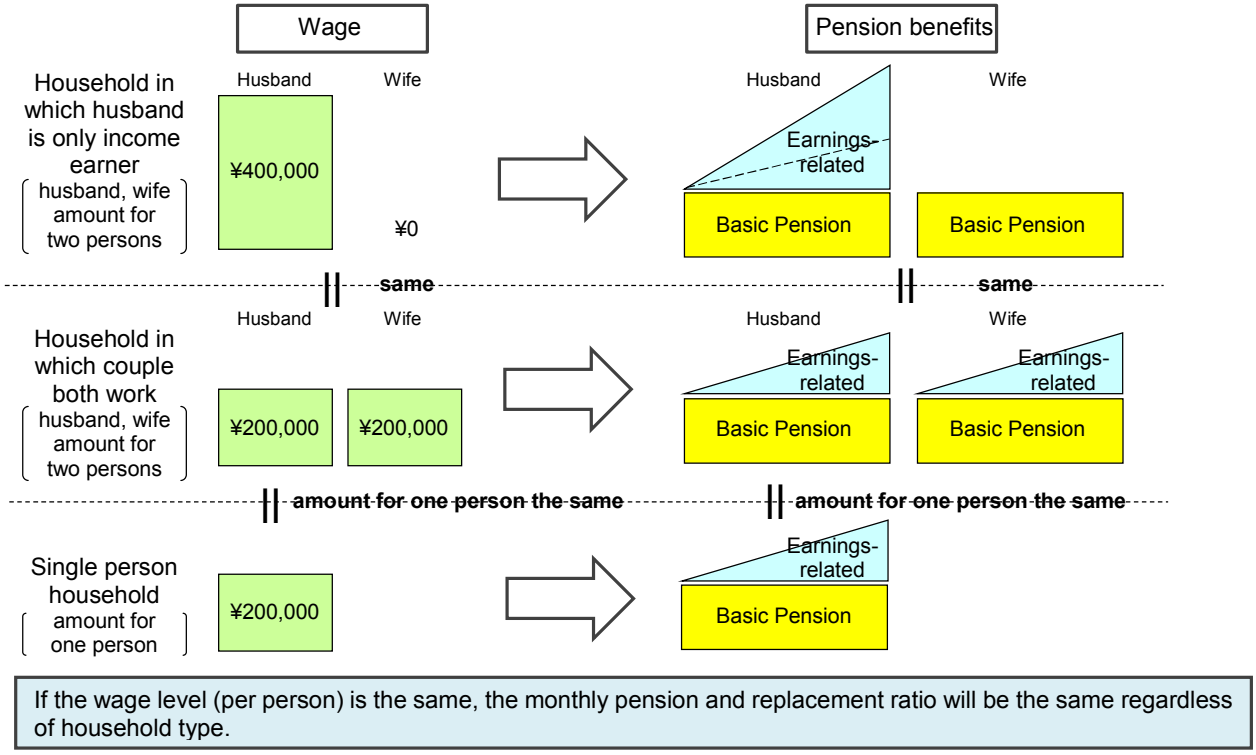
Thus although those on a lower wage receive a lower pension, the replacement ratio, which is relative to wage level, is higher for low-income earners.

Comparing next single-income and dual-income employee households, if the two couples have the same total wage, each couple will have the same Basic Pension and their earnings-related pensions for the same wage. As each couple thus receives the same total pension, their replacement ratios will also be the same. Even when comparison is made with a single-person household, moreover, if the wage per member of the couple is the same as the wage of the single person, the pension for one person and the replacement ratio will similarly be the same (Figure 2-10).

What this means is that if the periods of coverage are the same, the pension amounts and replacement ratios will, assuming the wage levels are the same, be the same in terms of the amount per member of a household regardless of household structure. There thus occur no differences due to household type.

Figure 2-10 Structure of social security pension contributions and benefits (relationship to household type)

Illustration of social security pension contribution and benefit structure for households on same wage level (per person)

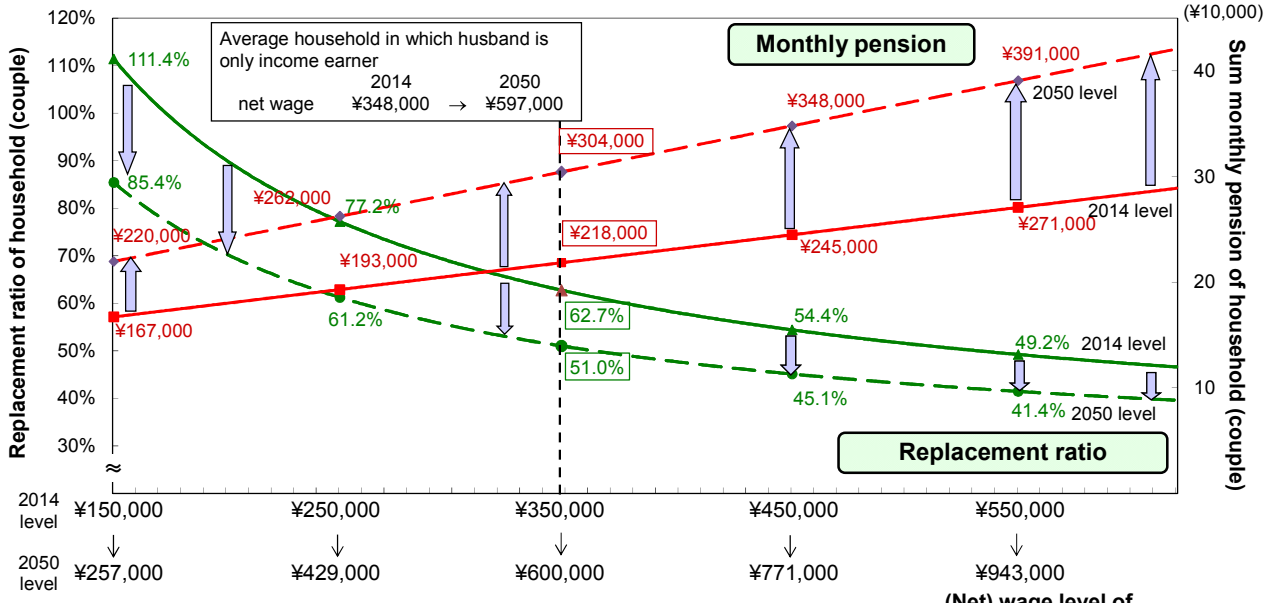


If the wage level (per person) is the same, the monthly pension and replacement ratio will be the same regardless of household type.

Thus when considering an employee household covered by EPI, the amount of a pension and the replacement ratio assuming coverage for 40 years are determined by the wage level. Projections of how the amount of a pension and the replacement ratio will change according to household wage level are shown in Figures 2-11 and 2-12.

Figure 2-11 Monthly pension and replacement ratio by wage level (case C)

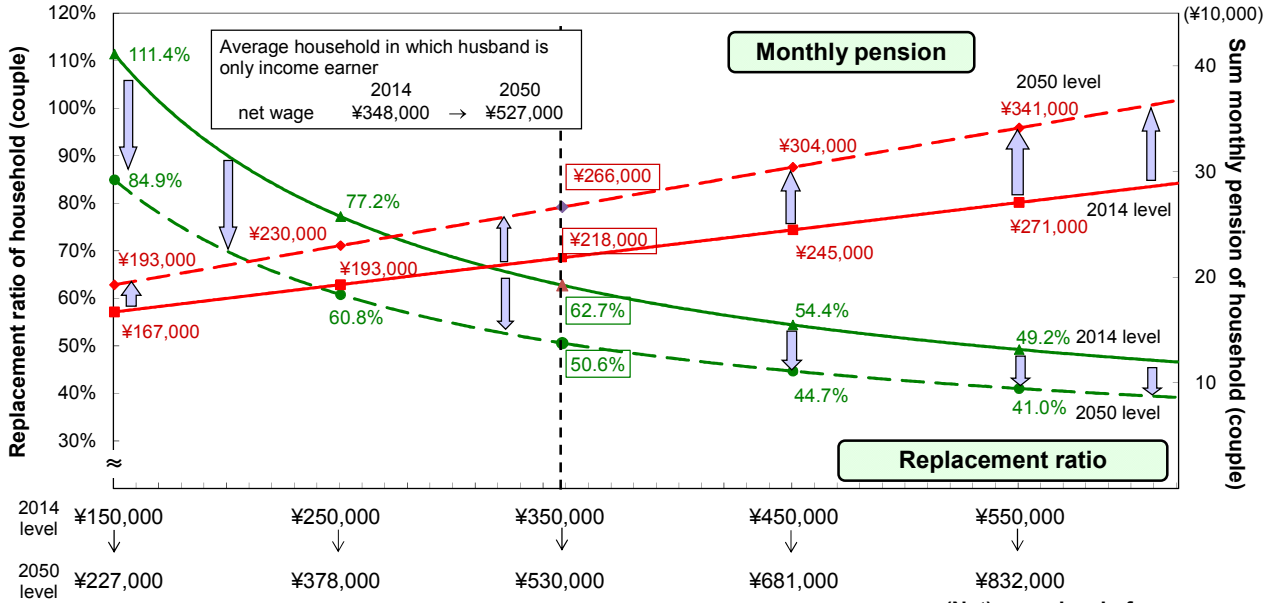
- If households' (couples') wage levels are the same, their monthly pensions and replacement ratios assuming 40 years' coverage will be the same.
- Although the monthly pension will increase as wage level rises, the replacement ratio will decrease.



Notes: 1. The monthly pension is the standard level for a newly awarded beneficiary.
2. The monthly pension and net wage at the 2050 level are the values obtained by converting to 2014 values based on prices.

Figure 2-12 Monthly pension and replacement ratio by wage level (case E)

- If households' (couples') wage levels are the same, their monthly pensions and replacement ratios assuming 40 years' coverage will be the same.
- Although the monthly pension will increase as wage level rises, the replacement ratio will decrease.



Notes: 1. The monthly pension is the standard level for a newly awarded beneficiary.
2. The monthly pension and net wage at the 2050 level are the values obtained by converting to 2014 values based on prices.

A comparison of levels now (in 2014) and in 2050 shows that while benefit level adjustment by modified indexation causes the replacement ratio to decline, the amount of a pension calculated by converting to present value based on the CPI increase rate in cases C and E increases due to real wage growth. This change occurs uniformly if the differences in pension amount and replacement ratio due to wage level are kept as they are.

5. Future projections of pension finances (demographic assumptions: medium fertility scenario / medium mortality scenario)

(1) Projected numbers of covered persons

The projected numbers of covered persons are calculated as follows. Based on the population projections and projected labor force participation rates, the number of covered persons under EPI is calculated taking into account factors including changes in the proportion of employees among persons in work and changes in the distribution of working hours of part-time workers, and the numbers of covered persons in the 1st category and the 3rd category are calculated taking into account factors such as the proportion of female covered persons in the 3rd category.

Projections of the numbers of covered persons are used as a basis for calculating contribution revenues and future pension benefits, and are important for projecting pension finances.

Numbers of covered persons are calculated respectively for each of the underlying population projections and projections of labor force participation rates. The projected numbers of covered persons under social security pension plans when medium projections are used for the population projections are shown in Tables 2-13 and 2-14.

The number of covered persons under social security pension plans when the medium population projection is used and it is assumed that participation in the labor market increases comes to 66,400,000 in FY2014. It is then projected to continue to decline as the working-age population decreases, falling below 60,000,000 to hit 59,400,000 in FY2030. The pace of decline will accelerate as the second-generation baby boomers reach 65 and older in around 2040, and the number of covered persons is projected to be 44,300,000 in FY2050.

The benefit level is adjusted by modified indexation based on the rate (rate (2) shown in the far right column in the table below) obtained by adding a certain rate (0.3%) determined taking into consideration factors such as the rate of the increase in life expectancy at the age of 65 to the rate of decrease in the number of covered persons under social security pension plans (the annual average decrease from a year earlier of three years from four years previously to two years previously).

Table 2-13 Projected numbers of covered persons under social security pension plans (2014 actuarial valuation) Population: medium fertility scenario / medium mortality scenario, labor: increased labor market participation case

FY	Total	1st category	Employees in EPI & MAAs			3rd category			Decrease rate of total (1)	(1) + 0.3% (2)
			Subtotal	EPI	MAAs	Subtotal	EPI	MAAs		
	millions	millions	millions	millions	millions	millions	millions	millions	%	%
2014	66.4	17.7	39.2	34.8	4.4	9.4	8.3	1.1		
2015	65.9	17.4	39.2	34.9	4.4	9.3	8.2	1.1	−0.8	−1.1
2016	65.6	17.1	39.4	(35.0)	(4.4)	9.1	(8.0)	(1.1)	−0.8	−1.1
2017	65.2	16.7	39.6	(35.2)	(4.4)	8.9	(7.9)	(1.0)	−0.8	−1.1
2018	64.8	16.5	39.6	(35.3)	(4.4)	8.7	(7.7)	(1.0)	−0.7	−1.0
2019	64.4	16.2	39.7	(35.3)	(4.4)	8.6	(7.6)	(1.0)	−0.6	−0.9
2020	64.1	16.0	39.7	(35.4)	(4.3)	8.4	(7.5)	(1.0)	−0.6	−0.9
2025	62.0	14.8	39.6	(35.3)	(4.2)	7.6	(6.8)	(0.9)	−0.6	−0.9
2030	59.4	13.5	39.0	(34.9)	(4.1)	6.8	(6.0)	(0.8)	−0.8	−1.1
2040	51.1	11.1	34.3	(30.6)	(3.7)	5.7	(5.0)	(0.7)	−1.6	−1.9
2050	44.3	9.6	29.6	(26.3)	(3.4)	5.0	(4.4)	(0.6)	−1.4	−1.7
2060	39.0	8.5	26.1	(23.1)	(3.0)	4.3	(3.8)	(0.6)	−1.3	−1.6
2070	33.7	7.3	22.6	(20.0)	(2.6)	3.7	(3.2)	(0.5)	−1.5	−1.8
2080	28.9	6.3	19.4	(17.1)	(2.3)	3.2	(2.8)	(0.4)	−1.5	−1.8
2090	25.2	5.5	16.9	(14.9)	(2.0)	2.8	(2.4)	(0.4)	−1.3	−1.6
2100	21.8	4.7	14.7	(13.0)	(1.7)	2.4	(2.1)	(0.3)	−1.4	−1.7
2110	18.8	4.1	12.6	(11.1)	(1.5)	2.1	(1.8)	(0.3)	−1.5	−1.8

Notes: 1. Numbers of covered persons are fiscal year averages.

2. Decrease rate of total (1) is the (annual) average rate of decline from the previous year of three years between four fiscal years previously and two fiscal years previously. Benefit levels are adjusted by modified indexation based on rate (2).

3. The figures in parentheses ( ) break the number of covered persons into covered under former EPI and MAA following the unification of employee pension plans.

Table 2-14 Projected numbers of covered persons under social security pension plans (2014 actuarial valuation) Population: medium fertility scenario / medium mortality scenario, labor: unchanged labor market participation case

FY	Total	1st category	Employees in EPI & MAAs			3rd category			Decrease rate of total (1)	(1) + 0.3% (2)
			Subtotal	EPI	MAAs	Subtotal	EPI	MAAs		
	millions	millions	millions	millions	millions	millions	millions	millions	%	%
2014	66.2	18.0	38.7	34.3	4.4	9.5	8.4	1.1		
2015	65.7	17.8	38.5	34.1	4.4	9.4	8.3	1.1	−0.8	−1.1
2016	65.3	17.6	38.4	(34.0)	(4.4)	9.3	(8.2)	(1.1)	−0.9	−1.2
2017	64.9	17.5	38.3	(33.9)	(4.4)	9.1	(8.0)	(1.1)	−0.9	−1.2
2018	64.4	17.4	38.1	(33.7)	(4.4)	9.0	(7.9)	(1.0)	−0.8	−1.1
2019	64.0	17.2	37.9	(33.5)	(4.4)	8.9	(7.8)	(1.0)	−0.7	−1.0
2020	63.6	17.1	37.7	(33.3)	(4.3)	8.8	(7.8)	(1.0)	−0.7	−1.0
2025	61.3	16.6	36.5	(32.3)	(4.2)	8.2	(7.2)	(0.9)	−0.7	−1.0
2030	58.3	15.9	34.9	(30.8)	(4.1)	7.5	(6.6)	(0.9)	−0.9	−1.2
2040	50.0	13.1	30.5	(26.8)	(3.7)	6.3	(5.5)	(0.8)	−1.6	−1.9
2050	43.4	11.4	26.5	(23.1)	(3.4)	5.6	(4.8)	(0.7)	−1.3	−1.6
2060	38.2	10.1	23.3	(20.3)	(3.0)	4.8	(4.2)	(0.6)	−1.3	−1.6
2070	33.0	8.7	20.2	(17.6)	(2.6)	4.1	(3.6)	(0.6)	−1.5	−1.8
2080	28.3	7.4	17.3	(15.0)	(2.3)	3.6	(3.1)	(0.5)	−1.5	−1.8
2090	24.7	6.5	15.1	(13.1)	(2.0)	3.1	(2.7)	(0.4)	−1.3	−1.6
2100	21.4	5.6	13.1	(11.4)	(1.7)	2.7	(2.3)	(0.4)	−1.5	−1.8
2110	18.4	4.8	11.2	(9.8)	(1.5)	2.3	(2.0)	(0.3)	−1.5	−1.8

Notes: 1. Numbers of covered persons are fiscal year averages.

2. Decrease rate of total (1) is the (annual) average rate of decline from the previous year of three years between four fiscal years previously and two fiscal years previously. Benefit levels are adjusted by modified indexation based on rate (2).

3. The figures in parentheses ( ) break the number of covered persons into covered under former EPI and MAA following the unification of employee pension plans.

(2) Projections of EPI and NP finances

The present financial projections estimate the state of revenues, expenditures, and reserves each fiscal year over a financial equilibrium period of around 100 years that, in this review, runs until FY2110. These projections are calculated for the financial equilibrium period after adjusting benefit levels by modified indexation so that reserves at the beginning of FY2110 equal one year's expenditures in FY2110.

Projected EPI and NP revenues, expenditures, and reserves when medium projections are adopted for the demographic assumptions and cases C, E, and G are adopted for the economic assumptions are shown in Tables 2-15 through 2-20. Case G represents the scenario in which benefit levels are automatically adjusted beyond the minimum. The balance of revenues and expenditures obtained by deducting expenditures from revenues was negative for both EPI and NP in FY2014, which means that expenditures exceeded revenues. Owing to revenue growth due to contribution (rate) increases and the curbing of expenditures by raising the pensionable age, and adjustment by modified indexation, however, the balance is projected to enter positive territory in all cases by FY2025. The balance is projected to then become negative again, at which time pension benefits in an aging society with fewer children and a rapidly diminishing population of active age will be maintained at a certain level by drawing on the principal of reserves.

The reserve ratio, which expresses how many years' worth of reserves are held relative to expenditures, is, with the exception of NP in case G, highest between around FY2040 and FY2050.

Japan already has the world's oldest population and lowest birthrate, and while the number of people aged 65 or older is expected to increase until the 2040s, the working-age population is projected to continue to shrink. As a result, the aging rate, which indicates the proportion of the population aged 65 or older, will continue to rise and, despite slowing from the 2050s, will remain high as Japan becomes what is known as a "super-aged society."

The fact that the reserve ratio will be highest between around FY2040 and 2050 means that reserves will be built up during this period to ensure a certain level of benefits from the 2050s, when birthrate decline and population aging will be most advanced.

Regarding NP in case G, on the other hand, the reserve ratio will continue to fall. This is because benefits cannot be lowered to the level required to balance finances before the advent of a super-aged society due to continued benefit level adjustment of the Basic Pension until FY2058, making it impossible to raise the reserve ratio in readiness for a super-aged society. As a result, the NP reserve ratio in case G will be 1.1 in FY2060. As NP will consequently be run on an almost entirely PAYG basis and use of reserves will be limited when society becomes super-aged from 2060 onward, the Basic Pension benefit level is projected to sink to an extremely low level.

Table 2-15 Financial projections for EPI (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case C (no fluctuation)

FY	Contribution rate against annual income	Total income (1)				Total expenditure (2)		Balance ((1) − (2))	Reserve at the end of the year (F)	(F) in FY2004 value	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings-related
	%	JPY in trillion										%	%	%
2014	17.474	42.5 (36.5)	30.5 (25.9)	2.3 (2.0)	9.5 (8.5)	46.6 (39.9)	18.0 (15.9)	−4.1 (−3.4)	172.5 (145.9)	172.5 (145.9)	3.8 (3.7)	62.7	36.8	25.9
2015	17.828	45.1 (38.7)	31.7 (27.0)	3.2 (2.7)	9.9 (8.8)	48.0 (41.1)	18.8 (16.6)	−2.9 (−2.4)	169.6 (143.6)	168.7 (142.8)	3.6 (3.6)	62.0	36.4	25.6
2016	18.182	47.3	33.2	3.6	10.2	49.2	19.4	−1.8	167.8	162.8	3.5	61.4	36.0	25.4
2017	18.300	49.8	34.8	4.3	10.4	50.1	19.9	−0.3	167.5	159.3	3.4	60.7	35.6	25.1
2018	18.300	52.3	36.3	5.1	10.6	50.9	20.3	1.4	168.9	157.5	3.3	60.3	35.3	25.0
2019	18.300	54.8	37.8	5.9	10.8	51.8	20.8	3.0	171.9	157.9	3.3	60.0	35.0	25.0
2020	18.300	57.3	39.3	6.7	11.0	52.8	21.2	4.5	176.4	158.4	3.3	59.7	34.8	25.0
2025	18.300	69.3	47.1	10.1	12.0	58.4	23.6	10.8	219.1	164.4	3.6	58.4	33.4	25.0
2030	18.300	80.8	54.5	13.2	13.0	64.4	25.8	16.3	290.7	183.5	4.3	56.9	31.9	25.0
2040	18.300	104.8	66.7	21.6	16.5	87.4	32.8	17.4	470.2	212.5	5.2	52.2	27.2	25.0
2050	18.300	132.6	81.4	29.7	21.5	115.6	43.0	17.1	642.7	207.9	5.4	51.0	26.0	25.0
2060	18.300	165.1	99.9	37.7	27.6	148.9	55.1	16.2	812.1	188.0	5.3	51.0	26.0	25.0
2070	18.300	199.6	120.8	44.3	34.6	188.0	69.1	11.7	950.4	157.5	5.0	51.0	26.0	25.0
2080	18.300	236.0	145.4	48.0	42.7	232.9	85.3	3.1	1025.3	121.6	4.4	51.0	26.0	25.0
2090	18.300	275.4	176.7	47.1	51.6	282.8	103.2	−7.3	1001.1	85.0	3.6	51.0	26.0	25.0
2100	18.300	315.5	213.6	39.4	62.5	343.7	125.1	−28.1	826.3	50.2	2.5	51.0	26.0	25.0
2110	18.300	351.3	257.3	18.0	76.0	417.4	151.9	−66.1	351.3	15.3	1.0	51.0	26.0	25.0

Long-term economic assumptions		
CPI increase rate		1.6%
Wage growth rate (real adjusted for CPI)		1.8%
ROI	Real (adjusted for CPI)	3.2%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		0.9%

	Replacement ratio (after end of benefit level adjustment	Last year of benefit level adjustment
Unified model	51.0%	2043
Earnings-related	25.0%	2018
Basic	26.0%	2043
(Old model)	(52.1%)	

Notes: 1. Financial projections for EPI as a whole after unification of employee pension plans, including the substitutional part of Employees' Pension Funds and MAAs.

2. Figures up to FY2015 include MAA revenues and expenditures corresponding to EPI before employee pension plan unification (up to September 2015). However, figures in parentheses ( ) are for former EPI revenues and expenditures. The schedule for contribution rate increases is for the former EPI.

3. The "reserve ratio" is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.

4. "FY2014 value" was calculated by converting to prices in FY2014 by the wage growth rate.

Table 2-16 Financial projections for NP (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case C (no fluctuation)

FY	Monthly contrivution rate	Total income (1)				Total expenditure (2)		Balance ((1) − (2))	Reserve at the end of the year (F)	(F) (in FY2004 value)	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings -related
	JPY	JPY in trillion										%	%	%
2014	16,100	3.8	1.6	0.1	2.1	4.0	3.8	−0.2	10.8	10.8	2.8	62.7	36.8	25.9
2015	16,380	3.9	1.6	0.2	2.1	4.0	3.9	−0.1	10.7	10.6	2.7	62.0	36.4	25.6
2016	16,660	4.0	1.6	0.2	2.2	4.1	3.9	−0.1	10.6	10.3	2.6	61.4	36.0	25.4
2017	16,900	4.1	1.6	0.3	2.2	4.1	4.0	−0.0	10.6	10.0	2.6	60.7	35.6	25.1
2018	16,900	4.2	1.6	0.3	2.2	4.2	4.0	0.0	10.6	9.9	2.5	60.3	35.3	25.0
2019	16,900	4.3	1.6	0.4	2.3	4.3	4.1	0.1	10.6	9.8	2.5	60.0	35.0	25.0
2020	16,900	4.4	1.7	0.4	2.3	4.3	4.1	0.1	10.7	9.6	2.5	59.7	34.8	25.0
2025	16,900	4.9	1.8	0.6	2.5	4.6	4.5	0.3	11.9	8.9	2.5	58.4	33.4	25.0
2030	16,900	5.4	2.0	0.6	2.7	4.9	4.8	0.5	13.9	8.7	2.7	56.9	31.9	25.0
2040	16,900	6.7	2.3	0.9	3.6	6.2	6.0	0.6	19.1	8.6	3.0	52.2	27.2	25.0
2050	16,900	8.7	2.8	1.2	4.8	8.1	8.0	0.6	25.2	8.1	3.0	51.0	26.0	25.0
2060	16,900	11.2	3.4	1.4	6.3	10.6	10.5	0.6	31.1	7.2	2.9	51.0	26.0	25.0
2070	16,900	13.7	4.1	1.7	7.9	13.2	13.2	0.4	36.1	6.0	2.7	51.0	26.0	25.0
2080	16,900	16.4	4.9	1.8	9.6	16.1	16.1	0.2	39.5	4.7	2.4	51.0	26.0	25.0
2090	16,900	19.6	6.0	1.9	11.7	19.6	19.6	−0.0	40.5	3.4	2.1	51.0	26.0	25.0
2100	16,900	23.2	7.2	1.8	14.1	23.7	23.7	−0.6	37.8	2.3	1.6	51.0	26.0	25.0
2110	16,900	27.1	8.7	1.3	17.1	28.6	28.6	−1.6	27.1	1.2	1.0	51.0	26.0	25.0

Long-term economic assumptions		
CPI increase rate		1.6%
Wage growth rate (real adjusted for CPI)		1.8%
ROI	Real (adjusted for CPI)	3.2%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		0.9%

Assumed contribution compliance rate	
From FY2018	65%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Unified model	51.0%	2043
Earnings-related	25.0%	2018
Basic	26.0%	2043
(Old model)	(52.1%)	

Notes: 1. The monthly contribution rate indicates the amount of the contribution (FY2004 value) provided for by Article 87, paragraph 3 of the National Pension Act.
The actual amount of contributions is revised based on the CPI increase rate and wage growth following the 2004 pension reforms, and the contribution in FY2014 was ¥15,250 per month.

2. The “reserve ratio” is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.

3. “FY2014 value” was calculated by converting to prices in FY2014 by the wage growth rate.

Table 2-17 Financial projections for EPI (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case E (no fluctuation)

FY	Contribution rate against annual income	Total income (1)				Total expenditure (2)		Balance ((1) − (2))	Reserve at the end of the year (F)	(F) in FY2004 value	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings-related
	%	JPY in trillion										%	%	%
2014	17.474	42.5 (36.5)	30.5 (25.9)	2.3 (2.0)	9.5 (8.5)	46.6 (39.9)	18.0 (15.9)	−4.1 (−3.4)	172.5 (145.9)	172.5 (145.9)	3.8 (3.7)	62.7	36.8	25.9
2015	17.828	45.1 (38.7)	31.7 (27.0)	3.2 (2.7)	9.9 (8.8)	48.0 (41.1)	18.8 (16.6)	−2.9 (−2.4)	169.6 (143.6)	168.7 (142.8)	3.6 (3.6)	62.0	36.4	25.6
2016	18.182	47.3	33.2	3.6	10.2	49.2	19.4	−1.8	167.8	162.8	3.5	61.4	36.0	25.4
2017	18.300	49.8	34.8	4.3	10.4	50.1	19.9	−0.3	167.5	159.3	3.4	60.7	35.6	25.1
2018	18.300	52.3	36.3	5.1	10.6	50.7	20.3	1.5	169.0	157.6	3.3	60.1	35.3	24.8
2019	18.300	54.8	37.8	6.0	10.8	51.4	20.8	3.4	172.4	158.3	3.3	59.7	35.0	24.6
2020	18.300	57.3	39.3	6.8	11.0	52.3	21.2	5.0	177.3	159.2	3.3	59.3	34.8	24.5
2025	18.300	67.9	46.5	9.4	12.0	57.7	23.5	10.2	220.8	165.7	3.6	58.0	33.4	24.5
2030	18.300	75.5	51.4	11.3	12.7	62.2	25.1	13.3	281.9	184.1	4.3	56.5	31.9	24.5
2040	18.300	89.5	57.7	16.9	14.9	77.8	29.8	11.7	416.1	212.3	5.2	51.8	27.2	24.5
2050	18.300	103.6	64.6	21.1	17.9	94.5	35.8	9.1	518.3	206.6	5.4	50.6	26.0	24.5
2060	18.300	117.9	72.6	24.5	20.8	110.9	41.7	7.0	599.5	186.7	5.3	50.6	26.0	24.5
2070	18.300	130.7	80.4	26.5	23.8	128.0	47.6	2.8	646.2	157.2	5.0	50.6	26.0	24.5
2080	18.300	142.1	88.7	26.5	26.9	145.4	53.8	−3.2	643.1	122.2	4.4	50.6	26.0	24.5
2090	18.300	152.6	98.8	24.0	29.8	161.7	59.6	−9.1	578.8	85.9	3.6	50.6	26.0	24.5
2100	18.300	160.9	109.4	18.5	33.1	179.9	66.1	−19.0	439.0	50.9	2.5	50.6	26.0	24.5
2110	18.300	165.1	120.8	7.5	36.8	200.3	73.6	−35.2	165.1	15.0	1.0	50.6	26.0	24.5

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.3%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		0.4%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Unified model	50.6%	2043
Earnings-related	24.5%	2020
Basic	26.0%	2043
(Old model)	(51.6%)	

Notes: 1. Financial projections for EPI as a whole after unification of employee pension plans, including the substitutional part of Employees' Pension Funds and MAAs.

2. Figures up to FY2015 include MAA revenues and expenditures corresponding to EPI before employee pension plan unification (up to September 2015). However, figures in parentheses ( ) are for former EPI revenues and expenditures. The schedule for contribution rate increases is for the former EPI.

3. The "reserve ratio" is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.

4. "FY2014 value" was calculated by converting to prices in FY2014 by the wage growth rate.

Table 2-18 Financial projections for NP (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case E (no fluctuation)

FY	Monthly contrivution rate	Total income (1)				Total expenditure (2)		Balance ((1) − (2))	Reserve at the end of the year (F)	(F) (in FY2004 value)	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings -related
	JPY	JPY in trillion										%	%	%
2014	16,100	3.8	1.6	0.1	2.1	4.0	3.8	−0.2	10.8	10.8	2.8	62.7	36.8	25.9
2015	16,380	3.9	1.6	0.2	2.1	4.0	3.9	−0.1	10.7	10.6	2.7	62.0	36.4	25.6
2016	16,660	4.0	1.6	0.2	2.2	4.1	3.9	−0.1	10.6	10.3	2.6	61.4	36.0	25.4
2017	16,900	4.1	1.6	0.3	2.2	4.1	4.0	−0.0	10.6	10.0	2.6	60.7	35.6	25.1
2018	16,900	4.2	1.6	0.3	2.2	4.2	4.0	0.0	10.6	9.9	2.5	60.1	35.3	24.8
2019	16,900	4.3	1.6	0.4	2.3	4.3	4.1	0.1	10.6	9.8	2.5	59.7	35.0	24.6
2020	16,900	4.4	1.7	0.4	2.3	4.3	4.1	0.1	10.7	9.6	2.5	59.3	34.8	24.5
2025	16,900	4.9	1.8	0.5	2.5	4.6	4.4	0.3	11.8	8.8	2.5	58.0	33.4	24.5
2030	16,900	5.1	1.9	0.5	2.7	4.8	4.6	0.4	13.4	8.8	2.7	56.5	31.9	24.5
2040	16,900	5.9	2.0	0.7	3.2	5.6	5.5	0.3	17.0	8.7	3.0	51.8	27.2	24.5
2050	16,900	7.1	2.2	0.8	4.0	6.8	6.7	0.3	20.3	8.1	3.0	50.6	26.0	24.5
2060	16,900	8.2	2.5	0.9	4.8	8.0	8.0	0.2	22.8	7.1	2.8	50.6	26.0	24.5
2070	16,900	9.2	2.8	1.0	5.4	9.1	9.0	0.1	24.3	5.9	2.7	50.6	26.0	24.5
2080	16,900	10.1	3.1	1.0	6.1	10.2	10.1	−0.1	24.5	4.7	2.4	50.6	26.0	24.5
2090	16,900	11.2	3.4	1.0	6.8	11.4	11.3	−0.2	23.1	3.4	2.1	50.6	26.0	24.5
2100	16,900	12.1	3.8	0.8	7.5	12.6	12.5	−0.5	19.9	2.3	1.6	50.6	26.0	24.5
2110	16,900	13.0	4.2	0.6	8.3	13.9	13.9	−0.9	13.0	1.2	1.0	50.6	26.0	24.5

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.3%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		0.4%

Assumed contribution compliance rate	
From FY2018	65%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Unified model	50.6%	2043
Earnings-related	24.5%	2020
Basic	26.0%	2043
(Old model)	(51.6%)	

Notes: 1. The monthly contribution rate indicates the amount of the contribution (FY2004 value) provided for by Article 87, paragraph 3 of the National Pension Act.
The actual amount of contributions is revised based on the CPI increase rate and wage growth following the 2004 pension reforms, and the contribution in FY2014 was ¥15,250 per month.

2. The “reserve ratio” is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.

3. “FY2014 value” was calculated by converting to prices in FY2014 by the wage growth rate.

Table 2-19 Financial projections for EPI (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case G (no fluctuation)
(if benefit levels continue to be automatically adjusted)

FY	Contribution rate against annual income	Total income (1)				Total expenditure (2)		Balance ((1) – (2))	Reserve at the end of the year (F)	(F) in FY2004 value	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings-related
	%	JPY in trillion										%	%	%
2014	17.474	42.2 (36.1)	30.1 (25.6)	2.3 (2.0)	9.5 (8.4)	46.6 (39.9)	18.0 (15.8)	−4.4 (−3.7)	172.0 (145.4)	172.0 (145.4)	3.8 (3.7)	62.7	36.8	25.9
2015	17.828	43.9 (37.6)	31.0 (26.3)	2.7 (2.3)	9.8 (8.7)	48.0 (41.0)	18.7 (16.4)	−4.1 (−3.4)	168.0 (142.0)	167.1 (141.3)	3.6 (3.5)	62.0	36.4	25.6
2016	18.182	45.7	32.2	3.1	10.1	48.9	19.2	−3.2	164.7	159.8	3.4	61.3	36.0	25.3
2017	18.300	47.3	33.4	3.4	10.2	49.4	19.6	−2.1	162.6	155.3	3.3	60.7	35.7	25.1
2018	18.300	48.8	34.4	3.9	10.3	49.9	19.8	−1.1	161.5	152.5	3.3	60.5	35.5	25.0
2019	18.300	50.2	35.2	4.3	10.4	50.1	20.0	0.1	161.6	151.4	3.2	59.9	35.2	24.7
2020	18.300	51.4	36.0	4.7	10.5	50.4	20.3	1.0	162.6	150.1	3.2	59.4	34.9	24.5
2025	18.300	55.8	39.3	5.5	10.9	51.8	21.3	4.0	177.8	144.5	3.4	56.7	33.4	23.3
2030	18.300	58.6	41.2	6.1	11.2	52.9	22.1	5.7	203.6	149.4	3.7	53.8	31.8	22.1
2040	18.300	63.5	43.5	7.6	12.5	61.0	24.9	2.5	248.8	151.2	4.0	48.8	26.9	21.9
2050	18.300	66.7	46.0	8.0	12.7	65.9	25.4	0.8	261.2	131.5	4.0	44.3	22.4	21.9
2060	18.300	69.4	48.7	8.2	12.4	68.7	24.9	0.6	270.1	112.7	3.9	42.0	20.1	21.9
2070	18.300	71.9	50.9	8.2	12.8	72.8	25.7	−1.0	267.2	92.3	3.7	42.0	20.1	21.9
2080	18.300	73.9	52.9	7.6	13.3	76.8	26.7	−2.9	247.3	70.8	3.3	42.0	20.1	21.9
2090	18.300	76.0	55.6	6.5	13.8	80.0	27.6	−4.0	211.6	50.2	2.7	42.0	20.1	21.9
2100	18.300	77.4	58.0	5.0	14.4	83.8	28.8	−6.3	160.1	31.5	2.0	42.0	20.1	21.9
2110	18.300	78.1	60.4	2.5	15.1	87.9	30.3	−9.8	78.1	12.7	1.0	42.0	20.1	21.9

Long-term economic assumptions		
CPI increase rate		0.9%
Wage growth rate (real adjusted for CPI)		1.0%
ROI	Real (adjusted for CPI)	2.2%
	Spread (adjusted for wages)	1.2%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		−0.2%

	Replacement ratio after end of benefit level adjustment	Last year of benefit level adjustment
Unified model	42.0%	2058
Earnings-related	21.9%	2031
Basic	20.1%	2058
(Old model)	(42.8%)	

Year in which replacement ratio reaches 50%	2038

Notes: 1. Financial projections for EPI as a whole after unification of employee pension plans, including the substitutional part of Employees' Pension Funds and MAAs.

2. Figures up to FY2015 include MAA revenues and expenditures corresponding to EPI before employee pension plan unification (up to September 2015). However, figures in parentheses ( ) are for former EPI revenues and expenditures. The schedule for contribution rate increases is for the former EPI.

3. The "reserve ratio" is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.

4. "FY2014 value" was calculated by converting to prices in FY2014 by the wage growth rate.

Table 2-20 Financial projections for NP (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case G (no fluctuation)
(if benefit levels continue to be automatically adjusted)

FY	Monthly contrivution rate	Total income (1)				Total expenditure (2)		Balance ((1) – (2))	Reserve at the end of the year (F)	(F) (in FY2004 value)	Reserve ratio	(For ref.) Replacement ratio		
			contri-butions	Investment retern	National subsidy		Transfer to the basic pension						Basic	Earnings-related
	JPY	JPY in trillion										%	%	%
2014	16,100	3.9	1.6	0.1	2.1	4.0	3.8	−0.2	10.8	10.8	2.7	62.7	36.8	25.9
2015	16,380	4.0	1.6	0.2	2.2	4.1	4.0	−0.2	10.6	10.6	2.6	62.0	36.4	25.6
2016	16,660	4.1	1.6	0.2	2.2	4.2	4.0	−0.1	10.5	10.2	2.5	61.3	36.0	25.3
2017	16,900	4.2	1.7	0.2	2.3	4.3	4.1	−0.1	10.4	9.9	2.4	60.7	35.7	25.1
2018	16,900	4.3	1.7	0.2	2.3	4.4	4.2	−0.1	10.3	9.7	2.4	60.5	35.5	25.0
2019	16,900	4.4	1.7	0.3	2.4	4.4	4.3	−0.1	10.3	9.6	2.3	59.9	35.2	24.7
2020	16,900	4.4	1.7	0.3	2.4	4.5	4.3	−0.1	10.2	9.4	2.3	59.4	34.9	24.5
2025	16,900	4.8	1.9	0.3	2.6	4.8	4.6	0.0	10.2	8.3	2.1	56.7	33.4	23.3
2030	16,900	5.1	2.0	0.3	2.8	5.1	5.0	0.0	10.3	7.5	2.0	53.8	31.8	22.1
2040	16,900	5.5	2.0	0.3	3.2	5.7	5.6	−0.2	9.3	5.6	1.7	48.8	26.9	21.9
2050	16,900	5.7	2.1	0.2	3.4	5.9	5.8	−0.2	7.2	3.6	1.3	44.3	22.4	21.9
2060	16,900	5.9	2.3	0.2	3.4	5.9	5.8	−0.0	6.4	2.7	1.1	42.0	20.1	21.9
2070	16,900	6.1	2.3	0.2	3.6	6.1	6.0	−0.0	6.2	2.1	1.0	42.0	20.1	21.9
2080	16,900	6.3	2.4	0.2	3.7	6.3	6.2	−0.0	6.1	1.7	1.0	42.0	20.1	21.9
2090	16,900	6.6	2.6	0.2	3.9	6.6	6.5	0.0	6.3	1.5	0.9	42.0	20.1	21.9
2100	16,900	6.9	2.7	0.2	4.0	6.9	6.8	0.1	6.7	1.3	1.0	42.0	20.1	21.9
2110	16,900	7.2	2.7	0.2	4.2	7.2	7.1	0.0	7.2	1.2	1.0	42.0	20.1	21.9

Long-term economic assumptions		
CPI increase rate		0.9%
Wage growth rate (real adjusted for CPI)		1.0%
ROI	Real (adjusted for CPI)	2.2%
	Spread (adjusted for wages)	1.2%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		−0.2%

Assumed contribution compliance rate	
From FY2018	65%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Unified model	42.0%	2058
Earnings-related	21.9%	2031
Basic	20.1%	2058
(Old model)	(42.8%)	

Year in which replacement ratio reaches 50%	2038

Notes: 1. The monthly contribution rate indicates the amount of the contribution (FY2014 value) provided for by Article 87, paragraph 3 of the National Pension Act.
The actual amount of contributions is revised based on the CPI increase rate and wage growth following the 2004 pension reforms, and the contribution in FY2014 was ¥15,250 per month.
2. The “reserve ratio” is the ratio of the reserve at the end of the preceding fiscal year to total expenditure in the current fiscal year.
3. “FY2014 value” was calculated by converting to prices in FY2014 by the wage growth rate.

(3) Projected finances for the Basic Pension

Basic Pension benefits are financed by transfer payments from NP and EPI each fiscal year. These transfer payments are allocated proportionately according to the ratio of the number of reference people on which calculation of transfer payments to the Basic Pension is based, and as a rule half is funded by national subsidies. Here the reference people means the people aged 20-60 covered under the EPI (after unification), the dependent spouses aged 20-60 of the covered people aged below 65 under the EPI and the people covered under the NP in the first category.

Projections of Basic Pension finances and future projections of the numbers of reference people on which calculation of transfer payments to the Basic Pension is based when medium projections are used for the demographic assumptions and cases C, E, and G are used for the economic assumptions are shown in Tables 2-21 through 2-23. In case G, it is assumed that benefit levels continue to be automatically adjusted beyond the minimum.

In all cases, the unit transfer payment (FY2004 value), which is the transfer payment per covered people on which calculation of transfer payments is based, increases from FY2014 to around FY2020 as the number of covered people continues to decline due to the decline in the population aged 20-59, while benefits rise due to the growth in Basic Pension pensioners. Toward FY2030, however, it is then projected to briefly decline due to the continued adjustment of benefit levels by modified indexation at a time when, from FY2020, the increase in the number of elderly people is slowing. Thereafter, the decrease in the number of reference people on which calculation of transfer payments to the Basic Pension is based accelerates and benefit level adjustment by modified indexation ends, causing the unit transfer payment to begin to rise again.

The contribution equivalent of the unit transfer payment (FY2004 value) ultimately climbs to the ¥22,000 level in cases C and E, which is considerably higher than the ¥16,900 ceiling on NP contributions. This difference represents the portion of the NP benefit largely secured by using reserves, and it indicates that reserves are making a significant contribution to maintaining the benefit level. In case G, on the other hand, the unit transfer payment after termination of benefit level adjustment is between ¥17,000 and ¥18,000, which is close to ¥16,900. This indicates NP is being financed almost entirely on a PAYG basis.

This means that, as in case G the bulk of reserves are used up before the advent of a super-aged society (after the second-generation baby boomers have entered old age) due primarily to the lag in benefit level adjustment, it ceases to be possible to use reserves in the future when population aging are most advanced.

Table 2-21 Financial projections for Basic Pension (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case C (no fluctuation)

Long-term economic assumptions		
CPI increase rate		1.6%
Wage growth rate (real adjusted for CPI)		1.8%
ROI	Real (adjusted for CPI)	3.2%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real adjusted for CPI) 20–30 years from FY2024		0.9%

	Unified model			Old model
		Basic	Earnings-related	
Replacement ratio (after end of benefit level adjustment)	51.0%	26.0%	25.0%	(52.1%)
Last year of benefit level adjustment	2043	2043	2018	

FY	(1) Basic Pension benefits	(2) Basic Pension national subsidies	(3) Amount of transfer to the Basic Pesnsion		(4) Number of reference people	(5) Unit transfer payment ((3) / (4)) / 12	(6) Contribution equivalent (monthly amount) (5) × (1 − national subsidy rate)
				(FY2004 value)		(FY2004 value)	(FY2004 value)
	JPY in trillion				millions	JPY	
2014	21.8	11.1	21.5	(22.7)	53.3	(35,471)	(17,736)
2015	22.6	11.5	22.3	(23.4)	53.0	(36,782)	(18,391)
2016	23.3	11.9	23.0	(23.5)	52.7	(37,184)	(18,592)
2017	23.9	12.2	23.5	(23.6)	52.6	(37,423)	(18,711)
2018	24.3	12.4	23.9	(23.6)	52.5	(37,387)	(18,694)
2019	24.8	12.6	24.4	(23.7)	52.2	(37,775)	(18,887)
2020	25.4	12.9	24.9	(23.6)	52.0	(37,883)	(18,941)
2025	28.0	14.3	27.5	(21.8)	50.3	(36,094)	(18,047)
2030	30.6	15.6	29.9	(19.9)	47.6	(34,873)	(17,436)
2040	38.9	20.0	37.8	(18.1)	40.6	(37,067)	(18,534)
2050	51.0	26.2	49.4	(16.9)	35.5	(39,619)	(19,810)
2060	65.7	33.9	63.6	(15.5)	31.1	(41,706)	(20,853)
2070	82.3	42.4	79.6	(13.9)	26.8	(43,358)	(21,679)
2080	101.4	52.3	98.2	(12.3)	23.0	(44,527)	(22,263)
2090	122.8	63.3	119.0	(10.7)	20.1	(44,188)	(22,094)
2100	148.7	76.7	144.1	(9.2)	17.4	(44,403)	(22,201)
2110	180.5	93.0	174.9	(8.0)	15.0	(44,776)	(22,388)

FY	Number of covered people on which calculation of transfer payments to the Basic Pension is based							
	Total	1st category	Employee in EPI & MAAs		EPI		MAAs	
			2nd category	3rd category	2nd category	3rd category	2nd category	3rd category
	millions							
2014	53.3	8.5	35.3	9.4	31.1	8.3	4.2	1.1
2015	53.0	8.3	35.4	9.3	31.2	8.2	4.2	1.1
2016	52.7	8.1	35.5	9.1	(31.4)	(8.0)	(4.2)	(1.1)
2017	52.6	8.0	35.7	8.9	(31.6)	(7.9)	(4.2)	(1.0)
2018	52.5	8.0	35.8	8.7	(31.6)	(7.7)	(4.2)	(1.0)
2019	52.2	7.8	35.8	8.6	(31.7)	(7.6)	(4.2)	(1.0)
2020	52.0	7.7	35.9	8.4	(31.7)	(7.5)	(4.2)	(1.0)
2025	50.3	7.2	35.5	7.6	(31.4)	(6.8)	(4.1)	(0.9)
2030	47.6	6.5	34.3	6.8	(30.4)	(6.0)	(3.9)	(0.8)
2040	40.6	5.4	29.5	5.7	(26.0)	(5.0)	(3.6)	(0.7)
2050	35.5	4.7	25.8	5.0	(22.6)	(4.4)	(3.2)	(0.6)
2060	31.1	4.1	22.6	4.3	(19.7)	(3.8)	(2.8)	(0.6)
2070	26.8	3.5	19.5	3.7	(17.0)	(3.2)	(2.5)	(0.5)
2080	23.0	3.0	16.8	3.2	(14.6)	(2.8)	(2.2)	(0.4)
2090	20.1	2.7	14.6	2.8	(12.8)	(2.4)	(1.9)	(0.4)
2100	17.4	2.3	12.6	2.4	(11.0)	(2.1)	(1.6)	(0.3)
2110	15.0	2.0	10.9	2.1	(9.5)	(1.8)	(1.4)	(0.3)

Notes: 1. The amount of national subsidy (2) includes the local government subsidy, etc. for the Basic Pension transfer payment from the Local Public Service Personnel Mutual Aid Association before unification with the former EPI.

2. Contribution equivalent (6) corresponds to the contribution that would be required if Basic Pension benefits (excluding the amount corresponding to the national subsidy) were to be financed on an entirely PAYG basis.

3. In the case of NP, the contribution level from FY2017 is fixed at ¥16,900 (FY2004 value) and financial equilibrium is achieved over an around 100-year period based on a PAYG approach incorporating the maintenance and use of reserves. The contribution equivalent, etc. is therefore shown in FY2004 value in parentheses ( ). Although in FY2014 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥16,100 per month in FY2004 value, the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥15,250 per month.

4. The projected numbers of people on which calculation of transfer payments to the Basic Pension is based shown in parentheses ( ) break the numbers down into the numbers for the former EPI and MAAs following the unification of employee pension plans.

Table 2-22 Financial projections for Basic Pension (2014 actuarial valuation)

Population: medium fertility scenario / medium mortality scenario, economy: case E (no fluctuation)

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.3%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real adjusted for CPI) 20-30 years from FY2024		0.4%

	Unified model			Old model
		Basic	Earnings-related	
Replacement ratio (after end of benefit level adjustment)	50.6%	26.0%	24.5%	(51.6%)
Last year of benefit level adjustment	2043	2043	2020	

FY	(1) Basic Pension benefits	(2) Basic Pension national subsidies	(3) Amount of transfer to the Basic Pesnsion		(4) Number of reference people	(5) Unit transfer payment ((3) / (4)) / 12	(6) Contribution equivalent (monthly amount) (5) × (1 − national subsidy rate)
			(FY2004 value)			(FY2004 value)	(FY2004 value)
	JPY in trillion				millions	JPY	
26 (2014)	21.8	11.1	21.5	(22.7)	53.3	(35,471)	(17,736)
27 (2015)	22.6	11.5	22.3	(23.4)	53.0	(36,782)	(18,391)
28 (2016)	23.3	11.9	23.0	(23.5)	52.7	(37,184)	(18,592)
29 (2017)	23.9	12.2	23.5	(23.6)	52.6	(37,423)	(18,711)
30 (2018)	24.3	12.4	23.9	(23.6)	52.5	(37,387)	(18,694)
31 (2019)	24.8	12.6	24.4	(23.7)	52.2	(37,775)	(18,887)
32 (2020)	25.4	12.9	24.9	(23.6)	52.0	(37,883)	(18,941)
37 (2025)	27.9	14.2	27.4	(21.7)	50.3	(35,976)	(17,988)
42 (2030)	29.7	15.2	29.1	(20.1)	47.6	(35,108)	(17,554)
52 (2040)	35.3	18.1	34.4	(18.5)	40.6	(38,012)	(19,006)
62 (2050)	42.5	21.9	41.2	(17.3)	35.5	(40,685)	(20,343)
72 (2060)	49.6	25.6	48.0	(15.8)	31.1	(42,377)	(21,189)
82 (2070)	56.6	29.2	54.8	(14.1)	26.8	(43,795)	(21,897)
92 (2080)	63.9	33.0	61.9	(12.4)	23.0	(44,959)	(22,479)
102 (2090)	70.9	36.6	68.7	(10.8)	20.1	(44,618)	(22,309)
112 (2100)	78.6	40.5	76.2	(9.3)	17.4	(44,791)	(22,396)
122 (2110)	87.5	45.1	84.8	(8.1)	15.0	(45,195)	(22,597)

FY	Number of covered people on which calculation of transfer payments to the Basic Pension is based							
	Total	1st category	Employee in EPI & MAAs		EPI		MAAs	
			2nd category	3rd category	2nd category	3rd category	2nd category	3rd category
	millions							
26 (2014)	53.3	8.5	35.3	9.4	31.1	8.3	4.2	1.1
27 (2015)	53.0	8.3	35.4	9.3	31.2	8.2	4.2	1.1
28 (2016)	52.7	8.1	35.5	9.1	(31.4)	(8.0)	(4.2)	(1.1)
29 (2017)	52.6	8.0	35.7	8.9	(31.6)	(7.9)	(4.2)	(1.0)
30 (2018)	52.5	8.0	35.8	8.7	(31.6)	(7.7)	(4.2)	(1.0)
31 (2019)	52.2	7.8	35.8	8.6	(31.7)	(7.6)	(4.2)	(1.0)
32 (2020)	52.0	7.7	35.9	8.4	(31.7)	(7.5)	(4.2)	(1.0)
37 (2025)	50.3	7.2	35.5	7.6	(31.4)	(6.8)	(4.1)	(0.9)
42 (2030)	47.6	6.5	34.3	6.8	(30.4)	(6.0)	(3.9)	(0.8)
52 (2040)	40.6	5.4	29.5	5.7	(26.0)	(5.0)	(3.6)	(0.7)
62 (2050)	35.5	4.7	25.8	5.0	(22.6)	(4.4)	(3.2)	(0.6)
72 (2060)	31.1	4.1	22.6	4.3	(19.7)	(3.8)	(2.8)	(0.6)
82 (2070)	26.8	3.5	19.5	3.7	(17.0)	(3.2)	(2.5)	(0.5)
92 (2080)	23.0	3.0	16.8	3.2	(14.6)	(2.8)	(2.2)	(0.4)
102 (2090)	20.1	2.7	14.6	2.8	(12.8)	(2.4)	(1.9)	(0.4)
112 (2100)	17.4	2.3	12.6	2.4	(11.0)	(2.1)	(1.6)	(0.3)
122 (2110)	15.0	2.0	10.9	2.1	(9.5)	(1.8)	(1.4)	(0.3)

Notes:
1. The amount of national subsidy (2) includes the local government subsidy, etc. for the Basic Pension transfer payment from the Local Public Service Personnel Mutual Aid Association before unification with the former EPI.
2. Contribution equivalent (6) corresponds to the contribution that would be required if Basic Pension benefits (excluding the amount corresponding to the national subsidy) were to be financed on an entirely PAYG basis.
3. In the case of NP, the contribution level from FY2017 is fixed at ¥16,900 (FY2004 value) and financial equilibrium is achieved over an around 100-year period based on a PAYG approach incorporating the maintenance and use of reserves. The contribution equivalent, etc. is therefore shown in FY2004 value in parentheses ( ). Although in FY2014 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥16,100 per month in FY2004 value, the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥15,250 per month.
4. The projected numbers of people on which calculation of transfer payments to the Basic Pension is based shown in parentheses ( ) break the numbers down into the numbers for the former EPI and MAAs following the unification of employee pension plans.

Table 2-23 Financial projections for Basic Pension (2014 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: case G (no fluctuation)
(if benefit levels continue to be automatically adjusted)

Long-term economic assumptions		
CPI increase rate		0.9%
Wage growth rate (real adjusted for CPI)		1.0%
ROI	Real (adjusted for CPI)	2.2%
	Spread (adjusted for wages)	1.2%
Economic growth rate (real adjusted for CPI) 20–30 years from FY2024		−0.2%

Year in which replacement ratio reaches 50%				2038
	Unified model			Old model
		Basic	Earnings-related	
Replacement ratio (after end of benefit level adjustment)	42.0%	20.1%	21.9%	(42.8%)
Last year of benefit level adjustment	2058	2058	2031	

FY	(1) Basic Pension benefits	(2) Basic Pension national subsidies	(3) Amount of transfer to the Basic Pesnsion		(4) Number of reference people	(5) Unit transfer payment ((3)/(4))/12	(6) Contribution equivalent (monthly amount) (5)×(1−national subsidy rate)
			(FY2004 value)			(FY2004 value)	(FY2004 value)
	JPY in trillion				millions	JPY	
2014	21.8	11.1	21.5	(22.7)	53.1	(35,571)	(17,786)
2015	22.6	11.5	22.3	(23.4)	52.7	(36,933)	(18,466)
2016	23.2	11.8	22.9	(23.4)	52.4	(37,248)	(18,624)
2017	23.7	12.0	23.3	(23.5)	52.2	(37,451)	(18,726)
2018	24.0	12.2	23.6	(23.5)	52.1	(37,648)	(18,824)
2019	24.3	12.4	23.9	(23.6)	51.7	(38,098)	(19,049)
2020	24.6	12.5	24.2	(23.6)	51.4	(38,220)	(19,110)
2025	26.0	13.2	25.5	(21.9)	49.3	(36,908)	(18,454)
2030	27.1	13.8	26.5	(20.5)	46.4	(36,848)	(18,424)
2040	30.5	15.7	29.7	(19.1)	39.6	(40,156)	(20,078)
2050	31.2	16.1	30.3	(16.1)	34.6	(38,729)	(19,365)
2060	30.7	15.9	29.6	(13.1)	30.3	(35,944)	(17,972)
2070	31.7	16.4	30.6	(11.2)	26.1	(35,608)	(17,804)
2080	32.9	17.0	31.7	(9.6)	22.4	(35,609)	(17,805)
2090	34.2	17.7	32.9	(8.2)	19.6	(35,052)	(17,526)
2100	35.6	18.5	34.4	(7.1)	16.9	(35,111)	(17,556)
2110	37.4	19.4	36.0	(6.2)	14.6	(35,417)	(17,709)

FY	Number of covered people on which calculation of transfer payments to the Basic Pension is based							
	Total	1st category	Employee in EPI & MAAs		EPI		MAAs	
			2nd category	3rd category	2nd category	3rd category	2nd category	3rd category
	millions							
2014	53.1	8.6	35.0	9.5	30.8	8.4	4.2	1.1
2015	52.7	8.5	34.8	9.4	30.6	8.3	4.2	1.1
2016	52.4	8.3	34.8	9.3	(30.6)	(8.2)	(4.2)	(1.1)
2017	52.2	8.4	34.8	9.1	(30.6)	(8.0)	(4.2)	(1.1)
2018	52.1	8.4	34.7	9.0	(30.5)	(7.9)	(4.2)	(1.0)
2019	51.7	8.3	34.5	8.9	(30.3)	(7.8)	(4.2)	(1.0)
2020	51.4	8.3	34.3	8.8	(30.2)	(7.8)	(4.2)	(1.0)
2025	49.3	8.0	33.2	8.2	(29.1)	(7.2)	(4.1)	(0.9)
2030	46.4	7.7	31.3	7.5	(27.3)	(6.6)	(3.9)	(0.9)
2040	39.6	6.4	26.9	6.3	(23.3)	(5.5)	(3.6)	(0.8)
2050	34.6	5.5	23.5	5.6	(20.3)	(4.8)	(3.2)	(0.7)
2060	30.3	4.9	20.6	4.8	(17.7)	(4.2)	(2.8)	(0.6)
2070	26.1	4.2	17.8	4.1	(15.3)	(3.6)	(2.5)	(0.6)
2080	22.4	3.6	15.3	3.6	(13.1)	(3.1)	(2.2)	(0.5)
2090	19.6	3.2	13.3	3.1	(11.5)	(2.7)	(1.9)	(0.4)
2100	16.9	2.7	11.5	2.7	(9.9)	(2.3)	(1.6)	(0.4)
2110	14.6	2.3	9.9	2.3	(8.5)	(2.0)	(1.4)	(0.3)

Notes:
1. The amount of national subsidy (2) includes the local government subsidy, etc. for the Basic Pension transfer payment from the Local Public Service Personnel Mutual Aid Association before unification with the former EPI.
2. Contribution equivalent (6) corresponds to the contribution that would be required if Basic Pension benefits (excluding the amount corresponding to the national subsidy) were to be financed on an entirely PAYG basis.
3. In the case of NP, the contribution level from FY2017 is fixed at ¥16,900 (FY2004 value) and financial equilibrium is achieved over an around 100-year period based on a PAYG approach incorporating the maintenance and use of reserves. The contribution equivalent, etc. is therefore shown in FY2004 value in parentheses ( ). Although in FY2014 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥16,100 per month in FY2004 value, the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥15,250 per month.
4. The projected numbers of people on which calculation of transfer payments to the Basic Pension is based shown in parentheses ( ) break the numbers down into the numbers for the former EPI and MAAs following the unification of employee pension plans.

Section 3 Financial effects of reform options

Financial effects of reform options are estimates that are calculated assuming that certain changes are made to the pension system, and their purpose is to contribute to future consideration of the issues with the pension system identified in the report of the National Council on Social Security System Reform (published August 2013) and the Act on Promotion of Reform to Establish a Sustainable Social Security System (Act No. 112 of 2013), which was enacted in response to this report. They are performed in addition to the actuarial valuations based on the current system required by law. Estimates are calculated for three specific options in order to estimate benefit levels and other factors at and following termination of modified indexation. The three options are as follows:

1) full application of modified indexation even when price and wage growth is low
2) further widening of employee pension plan coverage
3) lengthening of the contribution payment period and deferral of the age at which one starts to receive social security pensions

Financial effects of reform options are intended to provide underlying data for varied discussion of issues concerning the pension system, and it is not assumed that details of the present estimates would be incorporated into the system as they are.

1. Option I: Revision of the modified indexation mechanism

(1) Estimation assumptions

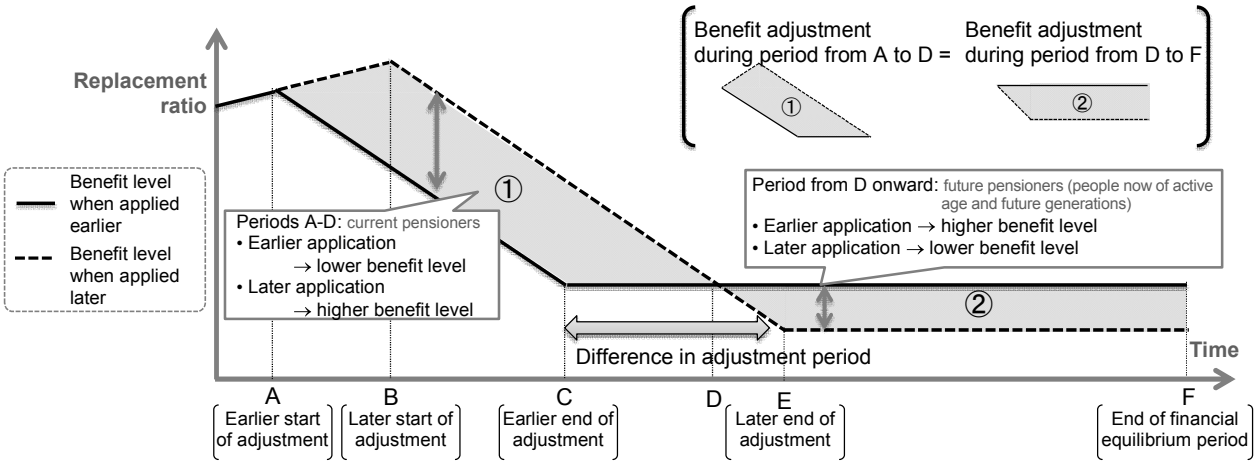
The current mechanism of adjusting benefit levels by modified indexation is a method of adjusting benefit levels by limiting wage indexation and price indexation of pensions when wages and prices are rising. When prices and wages are falling, therefore, no modified indexation at all occurs. Even when prices and wages are not falling, moreover, modified indexation is not fully applied if growth is low.

As total benefits are fixed in the long term due to the fixing of financial resources by the 2004 pension reforms, any lag in adjusting benefit levels will make it necessary to prolong adjustment by modified indexation and lowering of future benefit levels to make up for the deterioration in finances due to the lag (Figure 3-1).

What this means is that if benefit level adjustment lags, future pensioners' benefits will need to be lower than anticipated because the current pensioners' benefits, which are higher than anticipated due to the lag, are to be paid out of the fixed financial resources, posing an issue that ought to be debated from the point of view of intergenerational balance.

The purpose of this option is therefore to estimate the degree to which future benefit levels will rise if modified indexation is fully applied regardless of the state of the economy.

Figure 3-1 Impact on final replacement ratio of differences in timing of application of modified indexation

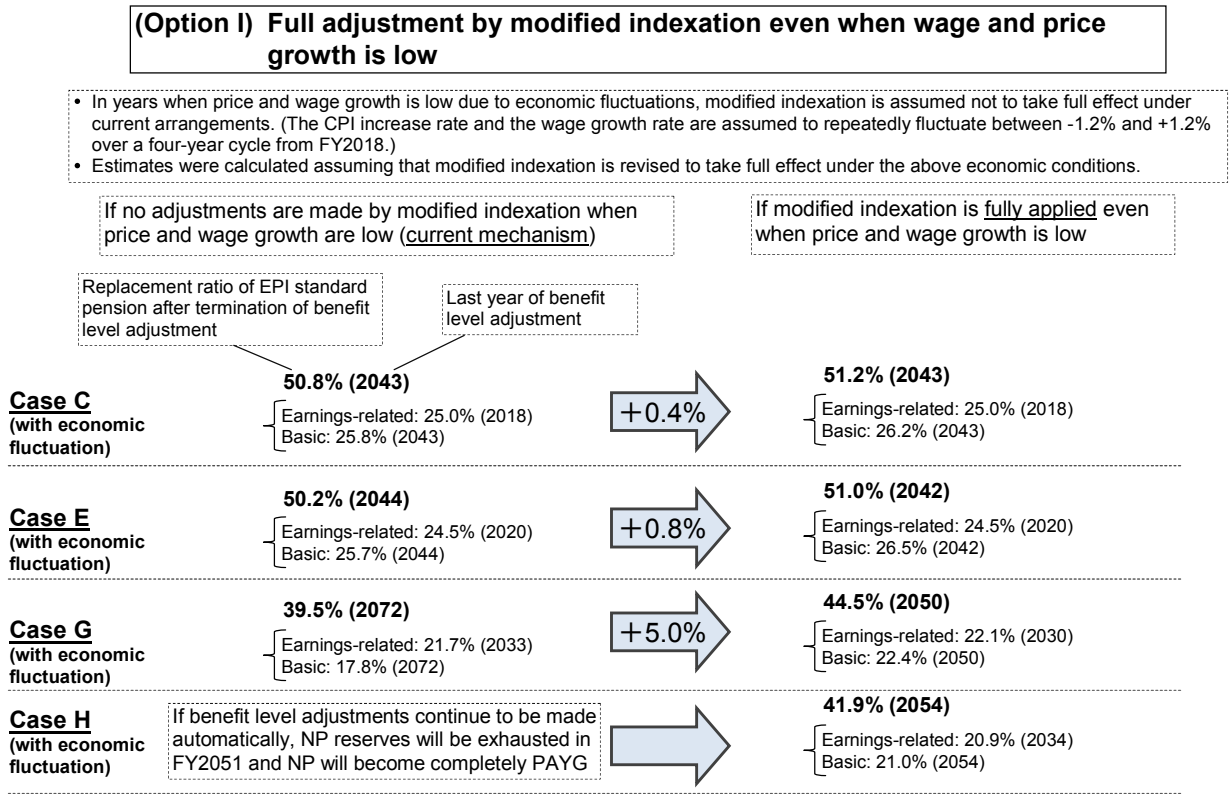


(2) Estimation results

Figure 3-2 shows how much earlier benefit level adjustment is estimated to end, and how much future benefit levels, i.e., the replacement ratio of the EPI standard pension, are estimated to rise after the termination of benefit level adjustment when modified indexation is fully applied in the case that the medium projections (medium fertility scenario and medium mortality scenario) are adopted for the demographic assumptions and four scenarios (cases C, E, G, and H) are adopted for the economic assumptions.

Based on the assumption that the state of the economy will fluctuate, the economic assumptions assume that prices and wages will repeatedly fluctuate up to ±1.2% in a four-year cycle due to the business cycle from FY2018 onward. Under these economic assumptions, modified indexation as currently designed will not fully occur when price and wage growth is low at the bottom of the business cycle, and adjustment will lag more.

Figure 3-2 Option I estimation results
(revision of modified indexation mechanism)



Demographic assumptions: medium projections (medium fertility scenario, medium mortality scenario)

The estimation results show that while in every case benefit levels will improve after termination of benefit level adjustment, the margin of improvement will be greater in low-growth case G than in cases C and E, which assume a certain amount of growth. In case G, it is projected that adjustment of the Basic Pension benefit level, which had been projected to continue until FY2072, would end in FY2050, and that the replacement ratio would improve by a considerable 5.0% points. This is because benefit level adjustment would lag much more in low-growth scenarios under current arrangements, and adjustment would consequently finish much earlier if modified indexation were to be fully applied.

In case H, which is the lowest growth scenario, NP reserves would be exhausted and NP would shift to a completely pay-as-you-go (PAYG) approach under current arrangements. If modified indexation were to be fully applied, however, benefit level adjustments could be made without exhausting reserves. If benefit levels were to continue to be automatically adjusted by modified indexation, then although benefits would fall below the minimum 50% replacement ratio, adjustment would conclude in FY2054 on a replacement ratio of 41.9% and pension finances could be balanced in the long term.

2. Option II: Further expansion of employee pension plan coverage

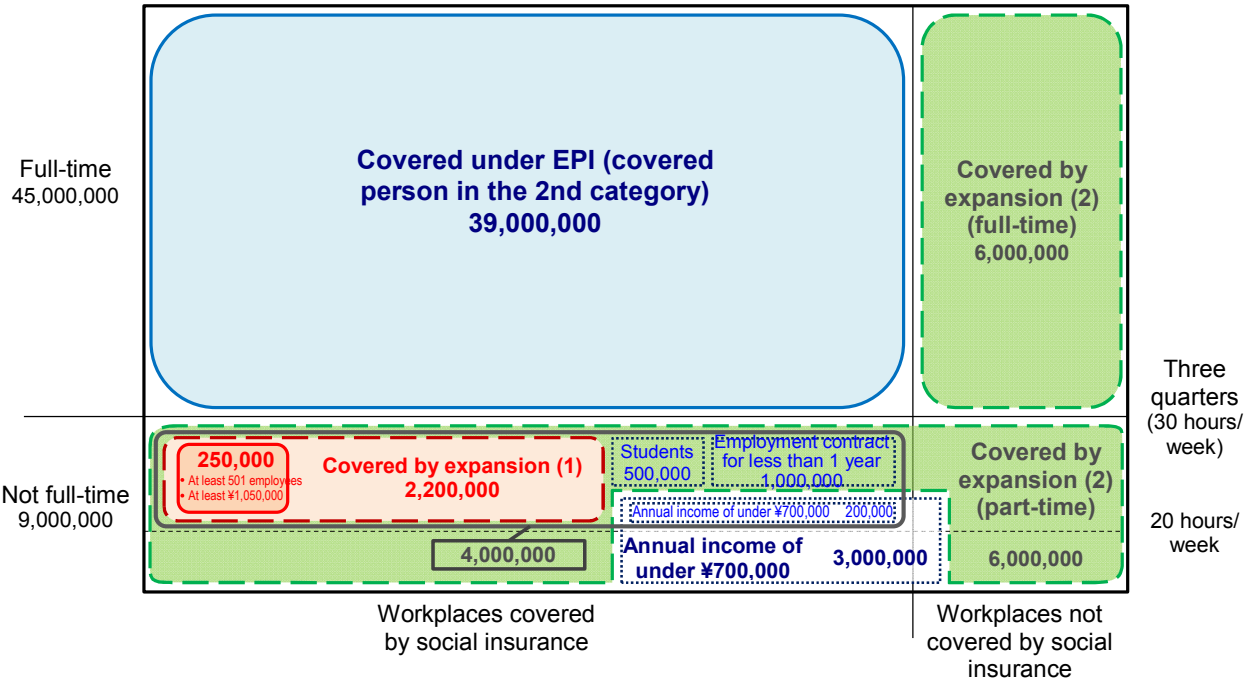
(1) Estimation assumptions

The decision was made to expand employee insurance coverage in October 2016 by approximately 250,000 individuals as part of the process of comprehensive reform of social security and tax. Option II assumes that coverage will be expanded further, and estimates were calculated for two expansion scenarios.

Figure 3-3 Number of people affected by further expansion of employee insurance coverage

Number affected by expansion of coverage (10,000 individuals)

	Total	The 1st category to the 2nd category	The 3rd category to the 2nd category	Non-covered to covered person in the 2nd category
Expansion (1)	220	80	100	40
Expansion (2)	1,200	600	250	350



Note: Estimated slightly roughly using Labor Force Survey data and special summaries of the "2010 Survey of Social Security Pension Enrolment" and "2011 Survey of Part-Time Workers."

According to the Labor Force Survey, there are approximately 54 million employees younger than 70 who are of an age covered by EPI. Of this number, around 39 million are actually covered under EPI, leaving a remainder of around 15 million.

Of these 15 million individuals, 4 million are part-time workers who work at least 20 hours per week at workplaces covered by EPI. These are part-time workers to whom extension of coverage had to date been considered as part of the comprehensive reform of social security and tax.

It is assumed that extension scenario (1) would cover an additional 2.2 million based on these 4 million, excluding students, workers on employment contracts of less than one year, and people with an annual income of less than ¥700,000.

Extension scenario (2) was assumed to extend coverage further. Under this scenario, the range of workplaces covered by EPI would be expanded to include workplaces in industries not presently covered and sole proprietorships without legal entity qualifications engaging fewer than five persons. It was assumed that working hour requirements and other conditions would also be removed, and that coverage would newly cover all 12 million employees except those with an annual income of less than ¥700,000. Under expansion scenario (2), expanding coverage to include workplaces not currently covered was assumed to expand coverage to full-time as well as part-time workers.

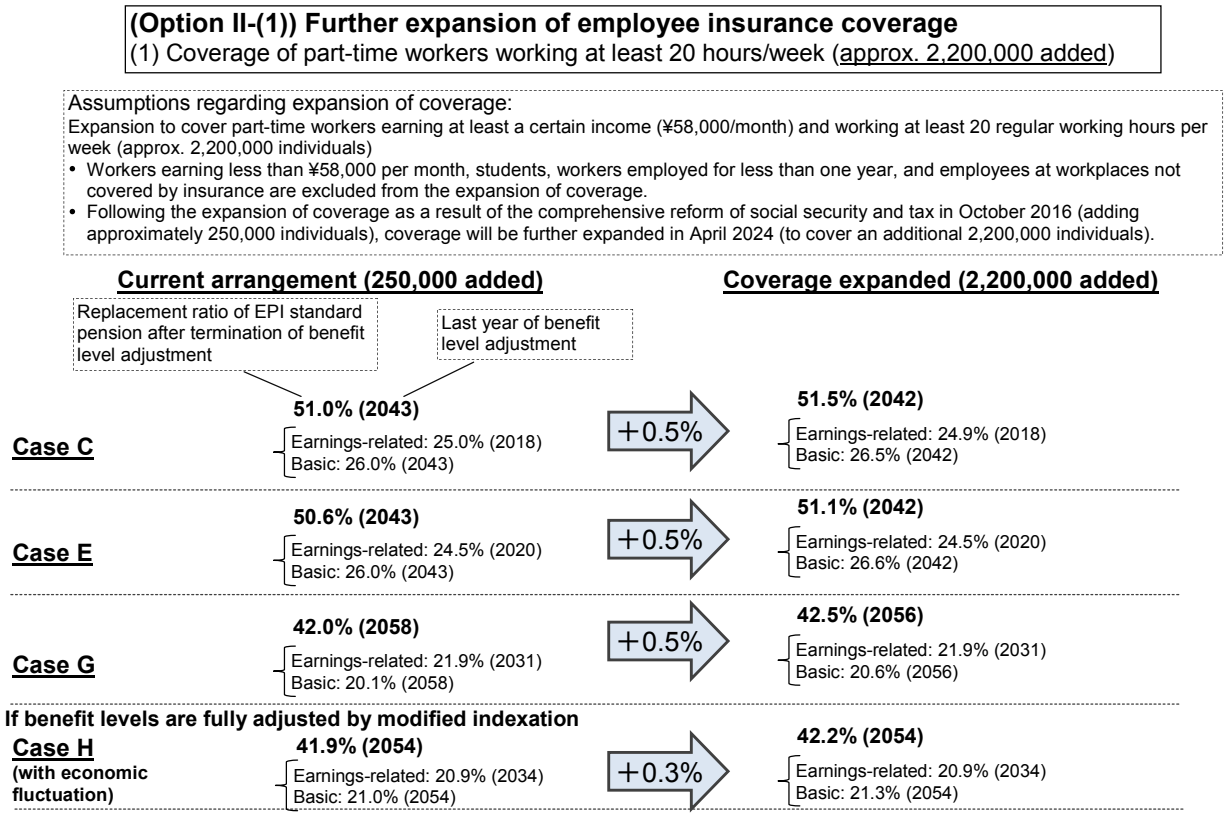
(2) Estimation results

Estimates of how much sooner benefit level adjustment would be concluded and to what extent future benefit levels, i.e., the replacement ratio of the EPI standard pension after termination of benefit level adjustment, would rise in the event of the further expansion of employee insurance coverage are shown in the following two figures. Figure 3-4 shows the estimates for expansion scenario (1) (covering an additional 2.2 million individuals), and Figure 3-5 shows the estimates for expansion scenario (2) (covering an additional 12 million individuals).

The estimates were calculated based on medium projections (medium fertility scenario and medium mortality scenario) for the demographic assumptions, and four scenarios (cases C, E, G, and H) for the economic assumptions.

Case H incorporates the system reforms and economic fluctuations assumed for option I, and additionally assumes expansion of employee insurance coverage assuming full adjustment of benefit levels by modified indexation.

Figure 3-4 Option II estimation results: expansion scenario (1) (further expansion of employee insurance coverage)

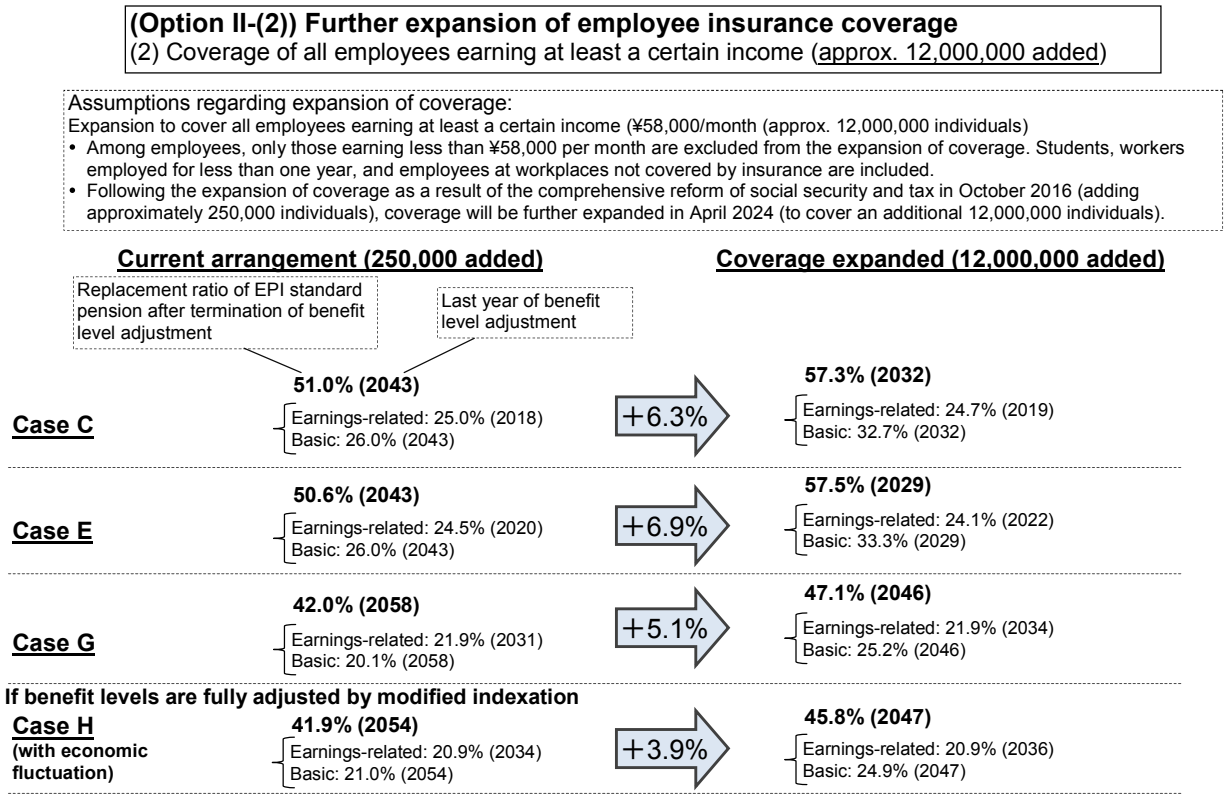


* Demographic assumptions: medium projections (medium fertility scenario, medium mortality scenario)

Notes: 1. "Current arrangement" reflects the expansion of coverage for part-time workers (adding approximately 250,000 individuals) as a result of the comprehensive reform of social security and tax.

2. The NP contribution compliance rate is assumed to increase by around 0.3% due to the extension of EPI coverage to part-time workers, among whom the contribution compliance rate is low.

Figure 3-5 Option II estimation results: expansion scenario (2)
(further expansion of employee insurance coverage)



* Demographic assumptions: medium projections (medium fertility scenario, medium mortality scenario)

Notes: 1. "Current arrangement" reflects the expansion of coverage for part-time workers (adding approximately 250,000 individuals) as a result of the comprehensive reform of social security and tax.

2. The NP contribution compliance rate is assumed to increase by around 3.3% due to the extension of EPI coverage to part-time workers, among whom the contribution compliance rate is low.

The estimation results show that, in all cases, the replacement ratio improves following the termination of adjustment by modified indexation. The margin of improvement is around 0.5% for expansion scenario (1) and between 4% and 7% points for expansion scenario (2), depending on the economic assumptions adopted. A much greater improvement is thus observable in the case of expansion scenario (2), which assumes that coverage is expanded to cover an additional 12 million individuals.

Also in all cases, the level of Basic Pension benefits improves while the earnings-related pension stays flat or decreases slightly, and the 1st tier and 2nd tier adjustment periods become better balanced.

A major reason for the improvement in the level of Basic Pension benefits is the contribution of reserves to sustaining benefits, which occurs because NP reserves per covered person in the 1st category increase due to the decline in the number of covered persons in the 1st category.

Regarding the earnings-related portion, on the other hand, the share of EPI contributions (fixed at 18.3%) allocated to the Basic Pension increases and the share allocated to the earnings-related portion decreases when the level of Basic Pension benefits rises, causing the benefit level of the earnings-related portion to decline.

However, the benefit level of the earnings-related portion stays flat or declines only slightly due to the impact of the following factors:

- 6 million, or half, of those newly covered under expansion scenario (2) are full-time workers who can pay a certain level of contributions.
- Individuals who used to be covered persons in the 3rd category begin to pay contributions as a result of being covered by employee insurance.

As a result, the replacement ratio of the EPI standard pension when the Basic Pension and earnings-related portion are added together improves considerably.

3. Option III: Choice of contribution payment period and starting age to receive pension

(1) Estimation assumptions

The Basic Pension is set up so that contributions are paid for 40 years from the age of 20 to the age of 60, and receipt of a pension begins at the age of 65. Contributions thus cannot be paid for more than 40 years.

The results of the actuarial valuation based on the current system revealed that even if the Japanese economy revives, modified indexation of the Basic Pension will last around 30 years and the decline in the level of the Basic Pension will become an issue.

The review also showed that if benefits are to be maintained at a certain level in the face of birthrate decline and population aging under the present PAYG-based pension system, it is important that more women and elderly people enter the labor force and that a certain degree of economic growth be achieved.

For option III, therefore, the Basic Pension was modified to allow contributions to be paid for up to 45 years and to increase the Basic Pension in line with the lengthening of the contribution period in order to ensure that the value of a pension better reflects contribution payments in old age and so encourage people to work and pay contributions for longer as life spans increase.

It was also assumed that income testing for the old-age pension for active employees aged 65 or older would be abolished in order to ensure that pension deferral would lead to an increase in the value of a pension in the case that a person working beyond the age of 65 chooses to defer receipt of his or her pension.

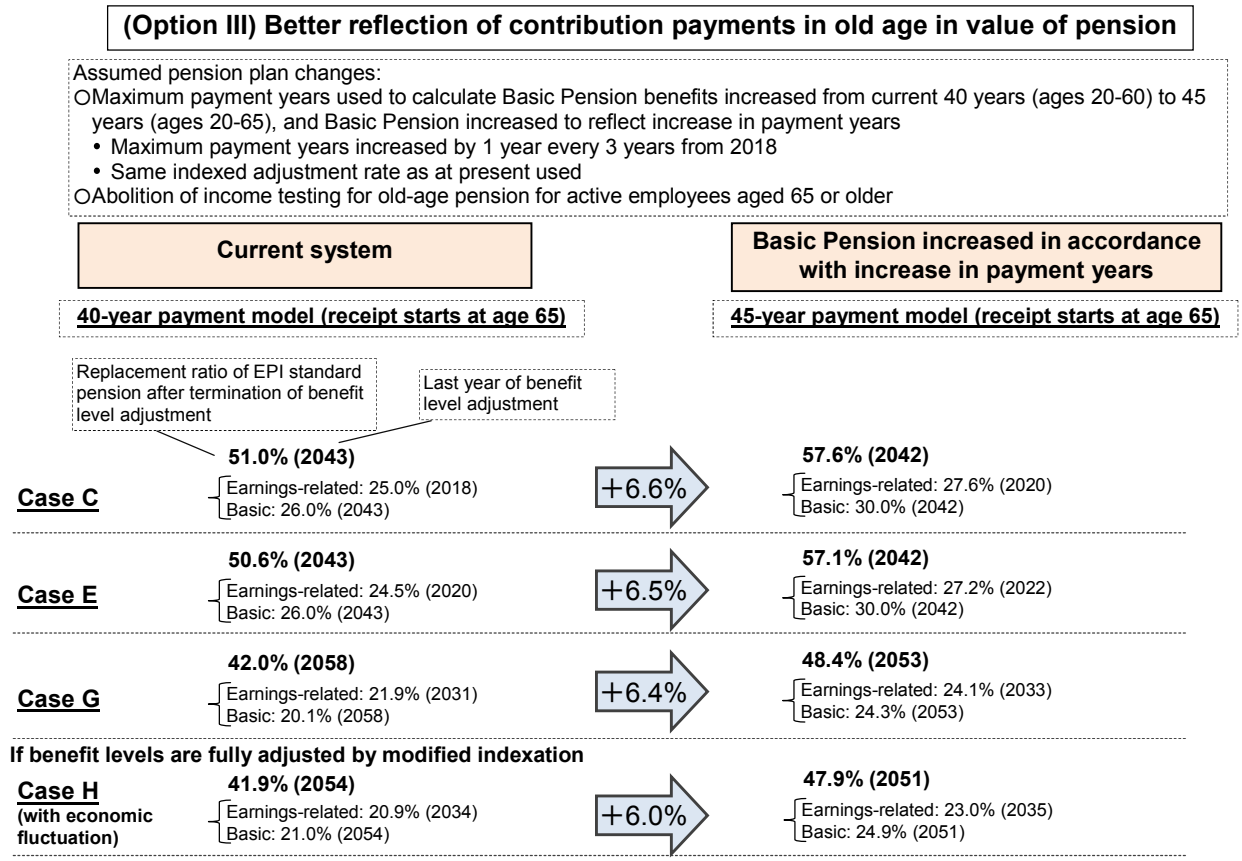
The benefit level that could be secured if the above system changes were to be made and an individual were to choose to continue working beyond the age of 65 and defer his or her start to receive pension accordingly was also estimated.

(2) Estimation results

Figure 3-6 shows how much sooner benefit level adjustment would be concluded and to what extent the replacement ratio of the EPI standard pension would increase after termination of benefit level adjustment if the contribution payment period were to be increased from 40 years to 45 years assuming the above system changes (including lengthening of the contribution payment period for the Basic Pension).

The estimates were calculated adopting the medium projections (medium fertility scenario and medium mortality scenario) for the demographic assumptions, and four scenarios (cases C, E, G, and H) for the economic assumptions. Case H also incorporated the system changes and economic fluctuations assumed for Option I.

Figure 3-6 Option III estimation results (1)
(old-age contribution payments better reflected in value of pension)



* Demographic assumptions: medium projections (medium fertility scenario, medium mortality scenario)

The estimation results show that 45/40 benefit levels generally rise due to the effects of raising contribution payments five years from 40 years to 45 years. As a result, benefit levels of between 45% and 49% are projected to be achievable even in low-growth scenarios such as cases G and H.

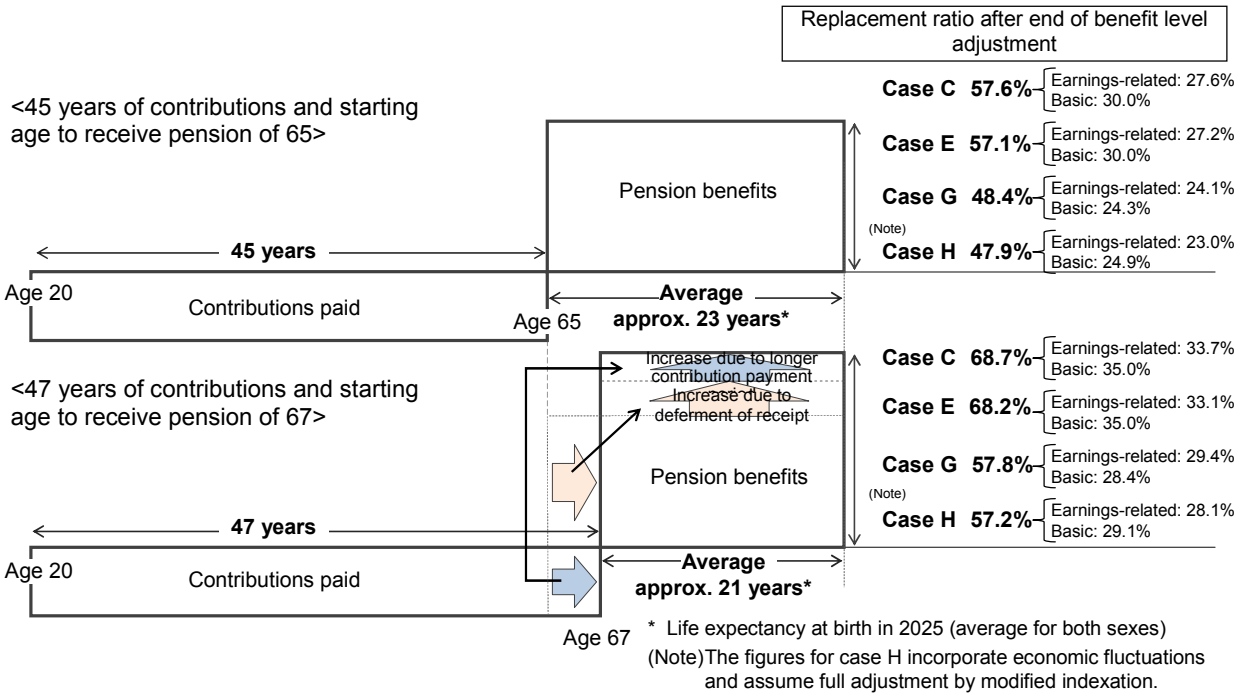
In addition, an examination of the effects on the Basic Pension and earnings-related pension shows that while modified indexation ends sooner and the replacement ratio increases more than the lengthening of contribution payment (45/40) in the case of the Basic Pension, modified indexation ends later and the margin of increase in benefits is smaller than the lengthening of the payment period (45/40) in the case of the earnings-related pension.

The reason for the greater increase in the Basic Pension benefit level is that the increase in benefits lags behind the increase in contributors to the Basic Pension that occurs when the contribution payment period is lengthened, and so the transfer payment to the Basic Pension per reference people (unit transfer payment) declines and NP finances improve. In the case of the earnings-related pension, the margin of increase in the replacement ratio is suppressed by a combination of the decline in EPI contributions allocated to the earnings-related pension due to the improvement of the Basic Pension, and the assumed abolition of the income testing for the old-age pension for active employees aged 65 or older.

Figure 3-7 Option III estimation results (2)-1
(increase in benefit levels when retirement age and starting age to receive pension are 65 or older)

(Option III) Increase in benefit levels when retirement age and starting age to receive pension are 65 or older

○As more people are expected to work beyond the age of 65, the increases in benefit levels when people working beyond 65 are covered by EPI and choose to defer their starting ages to receive pension accordingly were estimated.
○The following system changes were assumed to be made to better reflect contribution payments by individuals working in old age:
- Maximum payment years used to calculate Basic Pension benefits increased from current 40 years (ages 20-60) to 45 years (ages 20-65), and Basic Pension increased to reflect increase in payment years
- Abolition of income testing for old-age pension for active employees aged 65 or older



* Life expectancy at birth in 2025 (average for both sexes)
(Note) The figures for case H incorporate economic fluctuations and assume full adjustment by modified indexation.

Figure 3-8 Option III estimation results (2)-2
(increase in benefit levels when retirement age and starting age to receive pension are 65 or older)

(Option III) Change in benefit levels when retirement age and starting age to receive pension are 65-70

Retirement age and starting age to receive pension	Contribution payment period	Case C		Case E		Case G		Case H (with economic fluctuation)[2]	
		Replacement ratio after end of benefit level adjustment	Increase	Replacement ratio after end of benefit level adjustment	Increase	Replacement ratio after end of benefit level adjustment	Increase	Replacement ratio after end of benefit level adjustment	Increase
Age 65	45 years	57.6%	-	57.1%	-	48.4%	-	47.9%	-
Age 66	46 years	63.1%	+5.5% Contribution payment period increase: +0.7% Deferment increase: +4.8%	62.6%	+5.5% Contribution payment period increase: +0.7% Deferment increase: +4.8%	53.1%	+4.6% Contribution payment period increase: +0.6% Deferment increase: +4.1%	52.5%	+4.6% Contribution payment period increase: +0.6% Deferment increase: +4.0%
Age 67	47 years	68.7%	+11.1% Contribution payment period increase: +1.4% Deferment increase: +9.7%	68.2%	+11.0% Contribution payment period increase: +1.4% Deferment increase: +9.6%	57.8%	+9.4% Contribution payment period increase: +1.3% Deferment increase: +8.1%	57.2%	+9.3% Contribution payment period increase: +1.2% Deferment increase: +8.1%
Age 68	48 years	74.4%	+16.8% Contribution payment period increase: +2.3% Deferment increase: +14.5%	73.8%	+16.7% Contribution payment period increase: +2.3% Deferment increase: +14.4%	62.6%	+14.2% Contribution payment period increase: +2.0% Deferment increase: +12.2%	61.9%	+14.0% Contribution payment period increase: +1.9% Deferment increase: +12.1%
Age 69	49 years	80.2%	+22.6% Contribution payment period increase: +3.3% Deferment increase: +19.4%	79.6%	+22.4% Contribution payment period increase: +3.2% Deferment increase: +19.2%	67.6%	+19.1% Contribution payment period increase: +2.9% Deferment increase: +16.3%	66.8%	+18.8% Contribution payment period increase: +2.7% Deferment increase: +16.1%
Age 70	50 years	86.2%	+28.6% Contribution payment period increase: +4.4% Deferment increase: +24.2%	85.4%	+28.3% Contribution payment period increase: +4.3% Deferment increase: +24.0%	72.6%	+24.1% Contribution payment period increase: +3.8% Deferment increase: +20.3%	71.7%	+23.8% Contribution payment period increase: +3.6% Deferment increase: +20.1%

Notes: 1. The figures in parentheses in the increase column decompose the increase into the effect of the increase in the payment period and the effect of pension deferral.
2. The figures for case H assume full adjustment by modified indexation.

Figures 3-7 and 3-8 show the estimated benefit levels that can be secured when, assuming the above system changes are made, an individual chooses to work beyond the age of 65 and defers his or her starting age to receive pension correspondingly. The lengthening of the contribution payment period and deferral of the starting age to receive pension (shortening of the period of receipt) have the effect of raising the benefit level. As a result, even in the lowest growth case (case H) it is projected that, assuming that the pension system is modified to allow full modified indexation, it will be possible to ensure an replacement ratio of 50% when contributions are paid until the age of 66 and the starting age to receive pension is deferred to the age of 66.