Summaries of the 2019 Actuarial Valuation and the Financial Implications of the Reform Options

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

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

(1) The significance of social security pensions

1) Provisions against various risks during life

Social security pensions offer protection against various risks encountered during life (Figure 1-1). One needs to prepare for post-retirement life while working but it is impossible to anticipate how long one will live or what prices and living standards will be like after retirement 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 when they have young children to support.

The social security pension system thus offers insurance functions that personal savings 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 various risks that they may face as individuals during the life course.

**Figure 1-1   Significance of social security pensions (1)**
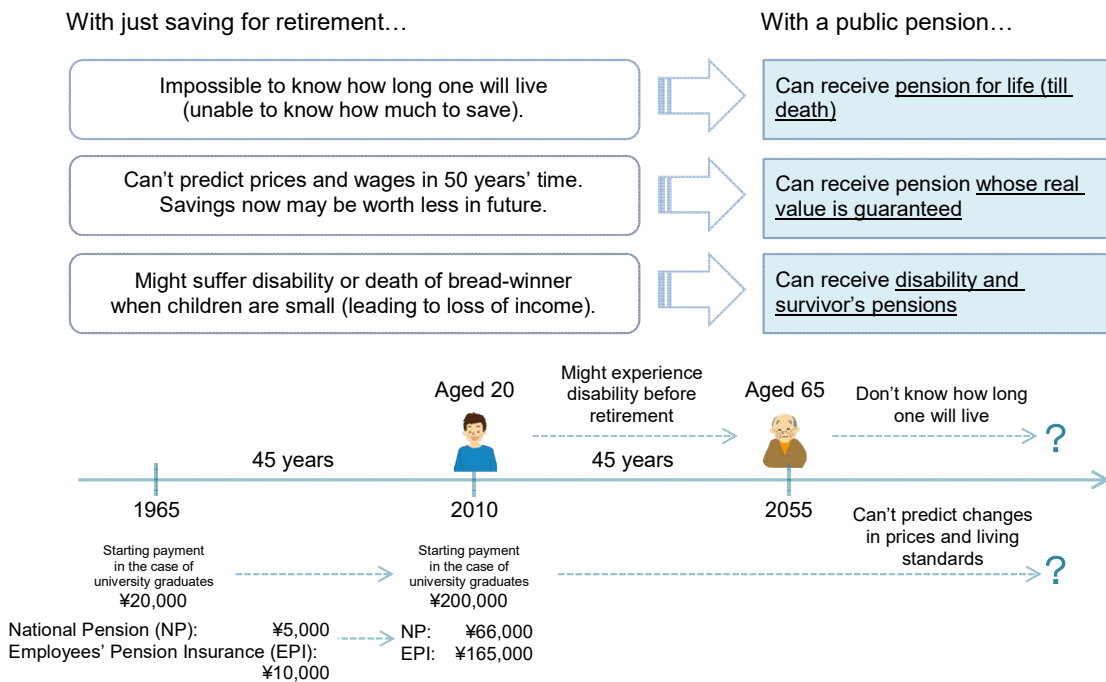
2) Social support for elderly people by society as a whole

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 grew to create an adequate pension system.

Before the social security pension system was established and while it was maturing, supporting elderly parents was primarily the responsibility of the family. However, Japan's changing industrial structure, growing urbanization, and nuclearization of families 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).

Figure 1-2   Significance of social security pensions (2)
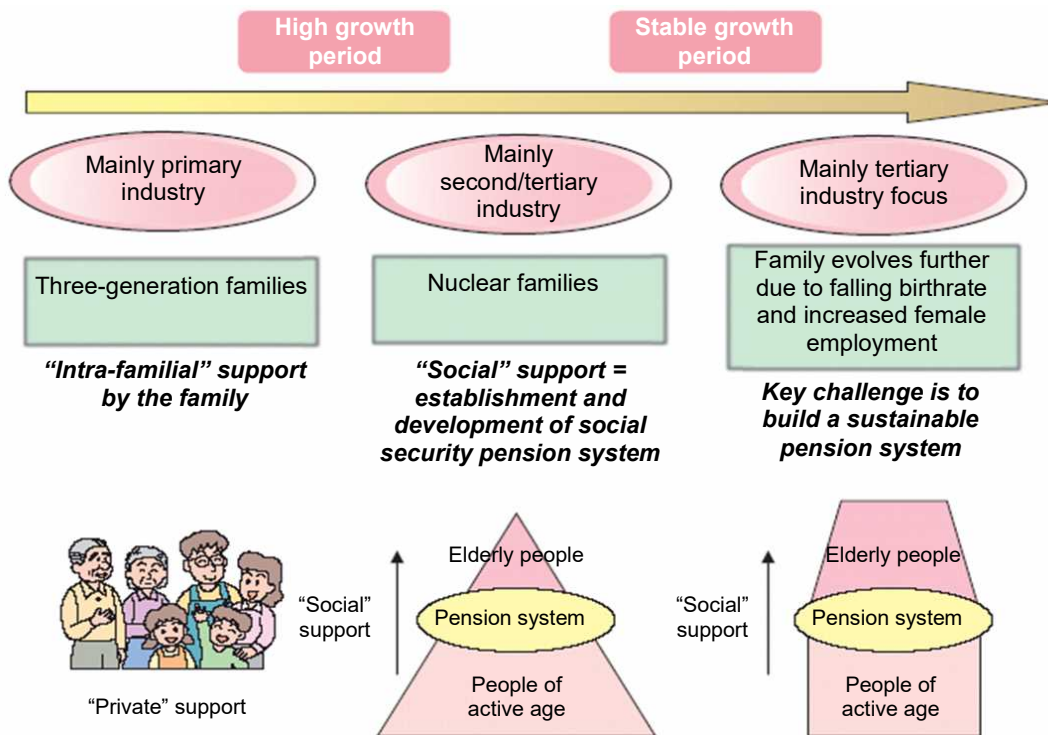
3) Equalizing the burden of support for the elderly

Social support serves to equalize the burden of support for elderly people among people of active age irrespective of their family structure. 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. If the only recourse in such cases were private support, grandchildren would 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 whose children have unfortunately died would face difficult circumstances if their primary recourse were private support.
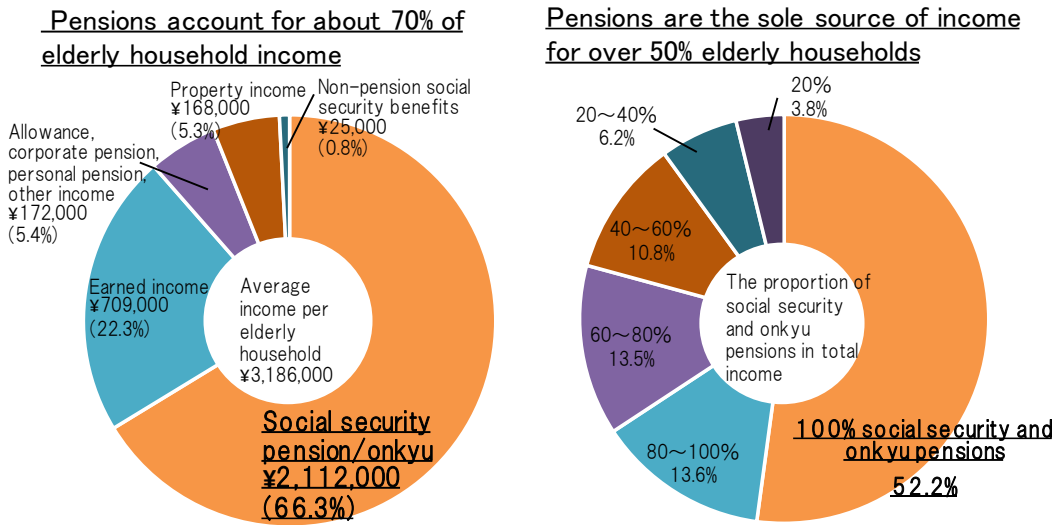
With private support, the burden of supporting elderly people thus does not fall evenly on everyone's shoulders, and there exist risks such as the absence of someone to look after an elderly person. By providing a system of social support, social security pensions serve as a means by which society as 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 50% of elderly households. 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. One third of total Japanese population receive social security pensions and the total amount of pension benefit exceeds 50 trillion yen. This accounts for approximately 14% of national income and pensions make up 20% of household consumption in some regions (Figure 1-3).

The social security pension system thus plays an extremely important role in financing old age, and also sustaining the economy of Japan.

Figure 1-3　Functions of social security pensions

Pensions account for about 70% of elderly household income

Property income ¥168,000 (5.3%)

Non-pension social security benefits ¥25,000 (0.8%)

Allowance, corporate pension, personal pension, other income ¥172,000 (5.4%)

Earned income ¥709,000 (22.3%)

Average income per elderly household ¥3,186,000

Social security pension/onkyu ¥2,112,000 (66.3%)

Pensions are the sole source of income for over 50% elderly households

20% 3.8%

20～40% 6.2%

40～60% 10.8%

60～80% 13.5%

80～100% 13.6%

The proportion of social security and onkyu pensions in total income

100% social security and onkyu pensions 52.2%

Source: Ministry of Health, Labour and Welfare, 2017 Comprehensive Survey of Living Conditions.

Historical data of the number of social security pensions beneficiaries

（10,000 persons）

FY2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
3,593	3,703	3,796	3,867	3,942	3,950	3,991	4,025	4,025	4,077	4,067

Sources: Ministry of Health, Labour and Welfare, Annual Report

Historical data of the total amount of pensions and proportion to national income

（¥ trillion）　　　　　　　　　　　　　　　　　　（%）

FY2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
48.9	50.3	51.1	52.2	53.2	52.8	53.4	54.6	54.8	55.4	55.6
13.4	14.2	14.1	14.6	14.8	14.1	14.1	14.0	14.0	13.8	13.8

Total amount (left axis)　Proportion to national income (right axis)

Sources: Ministry of Health, Labour and Welfare, Annual Report

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 （Ageing rate）	% relative to prefectural income	% relative to household final consumption expenditure
Tottori（31.0%）	18.5%	21.1%
Yamaguchi（33.4%）	17.4%	22.9%
Akita（35.6%）	17.2%	20.0%
Shimane（33.6%）	17.1%	22.7%
Nara（30.3%）	16.6%	18.2%
Ehime（32.1%）	16.6%	20.1%
Kochi（34.2%）	16.2%	19.8%

Sources:Aging rates are from Ministry of Internal Affairs and Communications, Population Estimates (as of Oct 1, 2017).
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 (FY2015) (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 (FY2015).

(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 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 (Figure 1-4). Government and private school employees were previously enrolled in mutual aid association (MAA) plans, but MAA plans were unified with EPI in October 2015.

Figure 1-4   Structure of pension plans in Japan
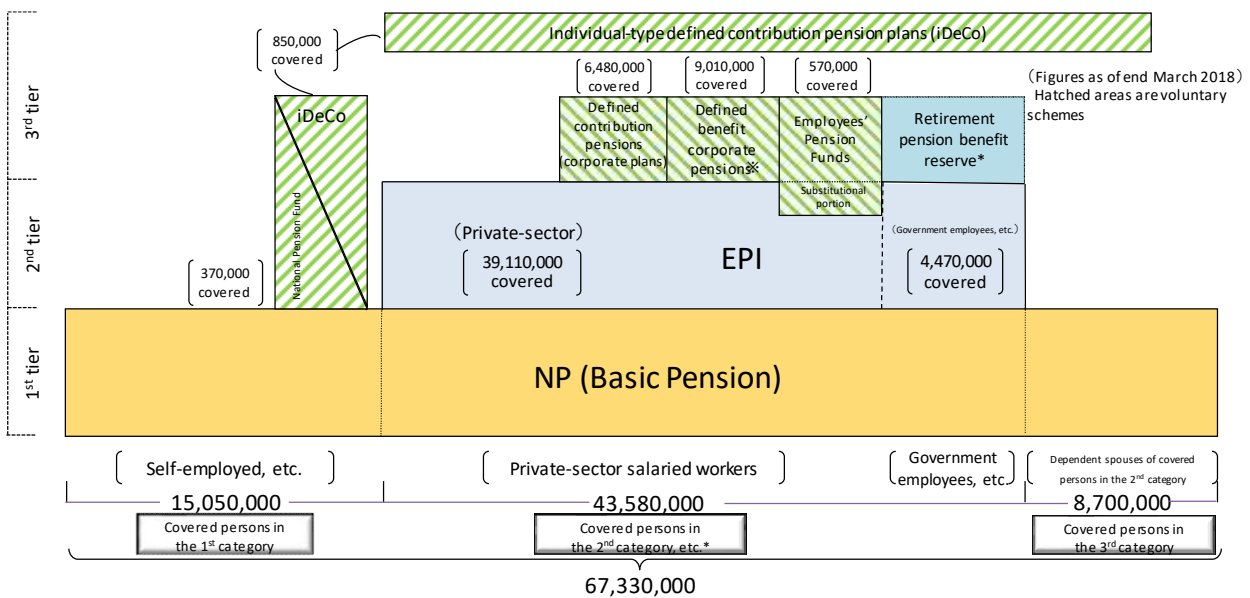
Notes:

1. The unification of MAA pensions with EPI was implemented on 1 October 2015, and government and private school employees came to be covered by EPI. The added occupational portion of MAA pensions was discontinued and new retirement pension plans were established respectively for national government employees, local government employees and private school employees. For the period enrolled in MAA pensions until September 2015, the added occupational portion of MAA pensions corresponding to the period will be paid even after October 2015.

2. "Covered persons in the 2nd category, etc." consists of covered persons in the EPI. (Note that, in addition to covered persons in the 2nd category of NP, covered persons in the EPI include beneficiaries of EPI old-age pension benefits who are aged 65 or older, still working and covered in the EPI. They are not covered by the NP so the number of covered persons in the 2nd category is smaller than the number of covered persons in the EPI. Actually, the number of covered persons in the 2nd category is 406.3 million as of end of March 2018.)

2.   Social and economic conditions surrounding pension plans

(1) Birthrate decline, life expectancy increase 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 in recent years and reached 1.36 in 2019. However, it remains far lower than required to maintain the size of population in the long term (Figure 1-5).

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 81.41 for men and 87.45 for women in 2019 (Figure 1-6).

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 26.6% in 2015.

The projections in the present actuarial valuation were calculated based on the "Population Projections for Japan" published in April 2017, which are the latest population projections produced based on the results of the 2015 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), which is 26.6% in 2015, projected to reach 33.3% in 2036 and then climb still further to 38.4% in 2065 (Figure 1-7).

Actuarial valuations of social security pension systems estimate revenues and expenditures over a period of around 100 years taking account of these changes in demographic structure.

Figure 1-5   Historical data of total fertility rate
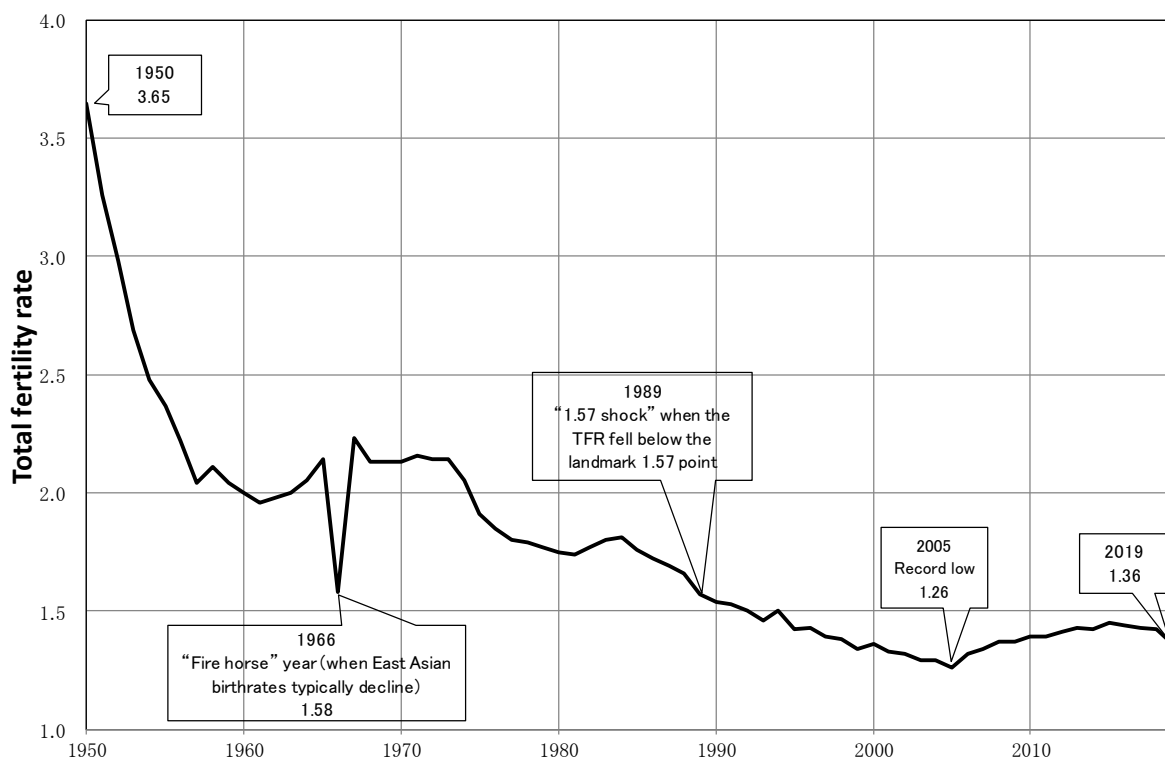
Source: Ministry of Health, Labour and Welfare, *2019 Vital Statistics*.

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Figure 1-6   Historical data of life expectancy at birth

Life expectancy at birth（years）
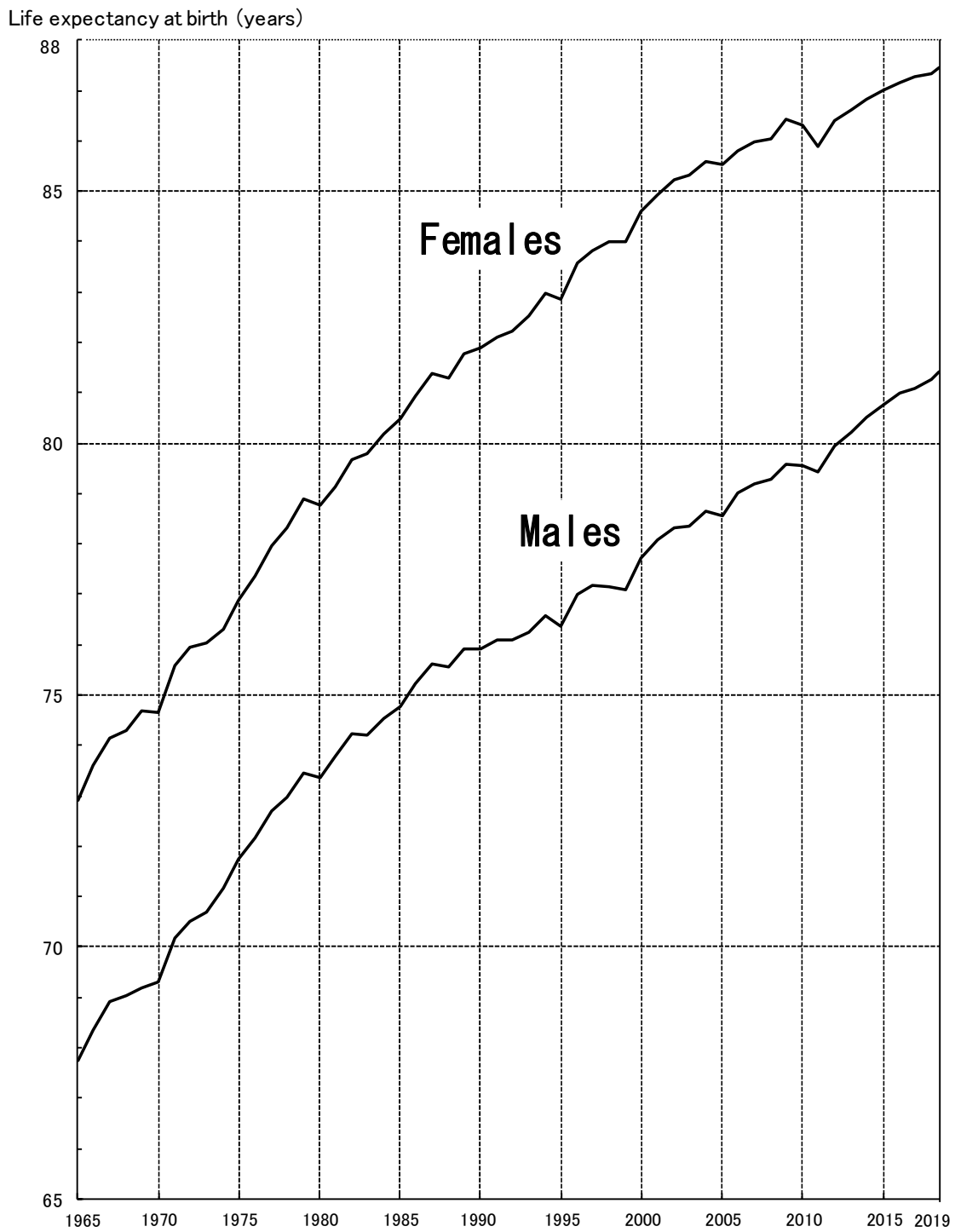
Source: Ministry of Health, Labour and Welfare, *Abridged Life Tables*.

Figure 1-7　Demographic trends by age category

- April 2017 "Population Projection of Japan" medium fertility (medium mortality) -
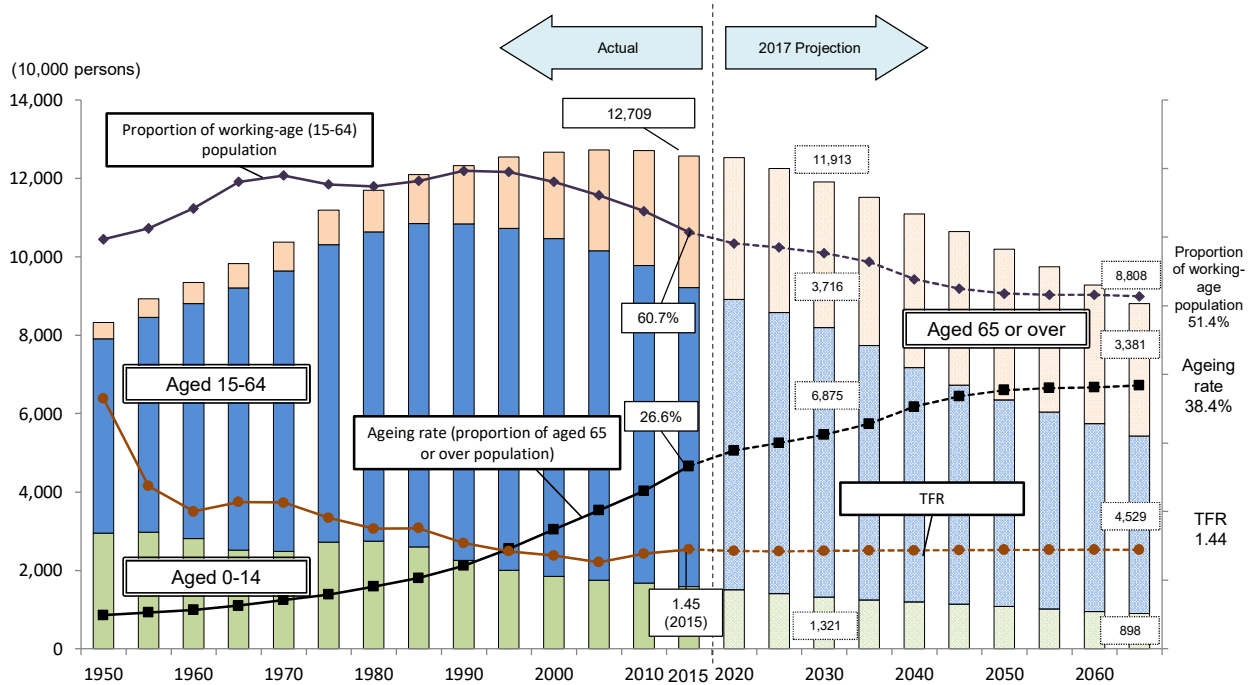
(2) Labor market conditions

Japan's unemployment rate reached the peak in July 2009 and was on the decline trend after that. Since January 2018, it remains at the lowest level for the first time in approximately 26 years. The active job openings-to-applicants ratio reached the bottom in August 2009 and was on the upward trend after that. Since November 2018 up until March 2019, it remains at 1.63, which was the highest level since January 1974 (Figure 1-8).

Regarding the employment situation, in recent years, more of those who have limitations in working time such as females and elderly persons are participating in the labor market.

The projections in the present actuarial valuation are based on "The Estimate of Labor Supply and Demand" published in March 2019, which was estimated on the premise of "Population Projections for Japan (2017, medium fertility and medium mortality)" (Figure 1-9). In the case of "the case in which economic growth and labor participation advance", by the realization of the society where anyone who desires can work regardless of his or her age, males especially in older age band will see an increased labor force rate and females will experience the elimination of "the M-shaped curve" as a result of various factors such as improved working environment.

Figure 1-8 Historical data of employment rate by gender and age categories
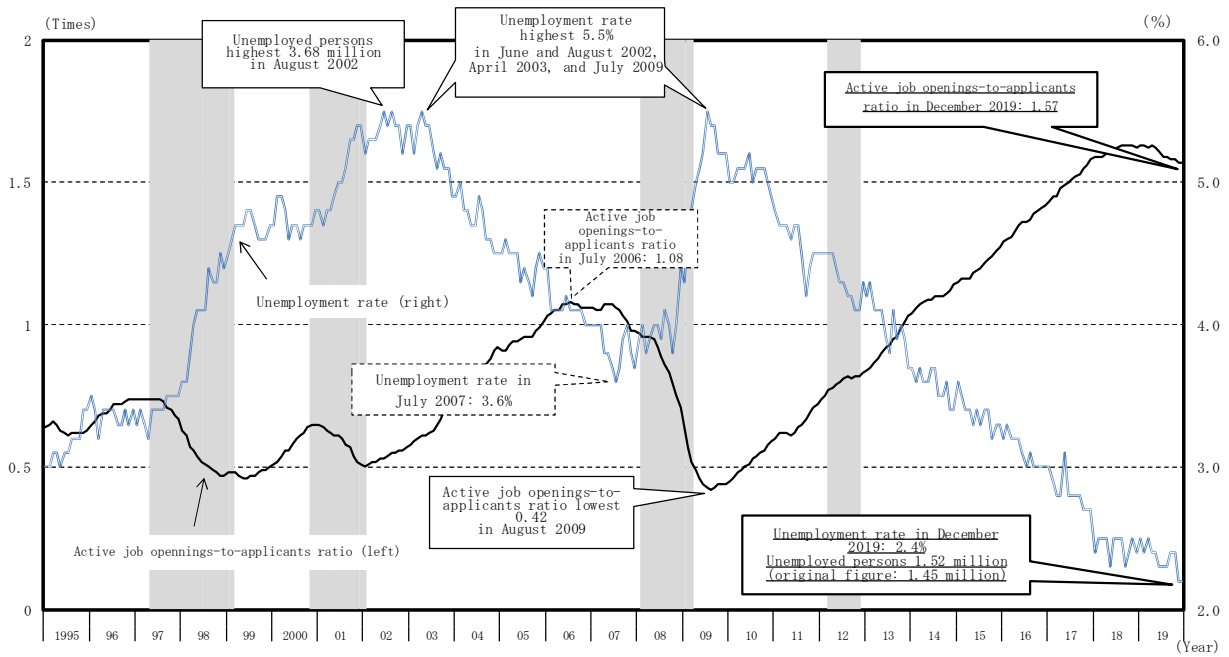
(Note) 1. Sources are ″Labour Force Survey″ (Ministry of Internal Affairs and Communications) and ″Employment Refferals for General Workers″ (Ministry of Health, Labour and Welfare).
2. Unemployment rates between March and August 2015 are complementary estimated values by adding estmated results for Iwate, Miyagi, and Fukushima prefectures and the result for whole Japan excluding these three prefectures.
3. Shaded areas represent periods of economic recession.

Figure 1-9 Changing trends in employment rate by gender and age categories
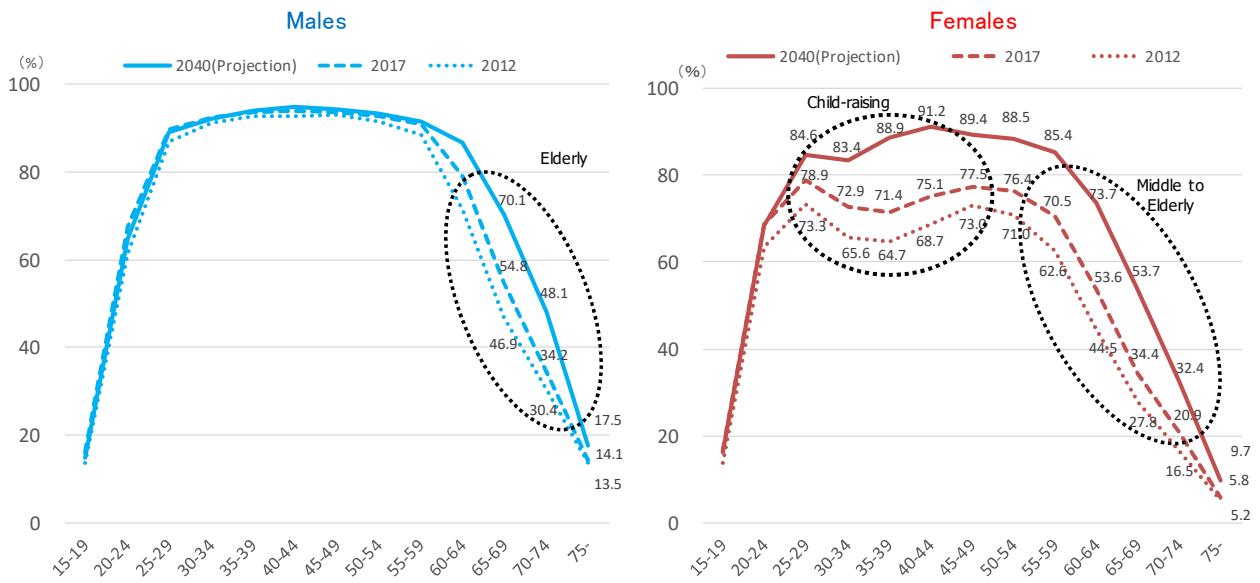
(3) Economic conditions

The Japanese economy has been in a protracted slump since the collapse of the bubble economy, and both prices and wages have been back and forth between flat and declining. However, the recent real GDP growth rate has been on an upward trend for seven consecutive years since 2012. In addition, prices have been generally on upward trend since the second half of 2013 and the Japanese economy looks like overcoming deflation.

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 economy is uncertain and impossible to forecast with accuracy, multiple assumptions covering several varieties of scenarios should be adopted.

To ensure transparency in the process which determined the economic assumptions for the present actuarial valuation, 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 to discuss technical matters. The assumptions were determined based on the findings reported by the panel.

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 proposed with their financial effects.

Under this arrangement, the relationship between benefits and contributions was repeatedly revised whenever actuarial valuations were performed. Tough revisions were especially repeated when the population ageing advanced more rapidly than anticipated. The actuarial valuations basically showed that the level of future contributions (contribution rates) would be progressively raised, but 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 of 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) that are bound to be limited by this cap (Figure 1-10).

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

Figure 1-10   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 has been largely put in place from the aspect of revenue by the completion of raising the contribution rate to the cap along with the increase of the national subsidy rate for Basic Pension to 50%.

Introduction of "modified indexation" to automatically adjust the value of pensions to ensure financial equilibrium between the benefits and the financial resources even if birthrate decline and population aging proceed further.
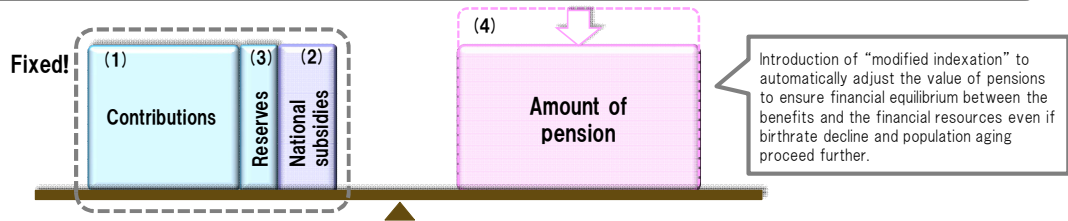
(1) Contributions raised after imposing fixed cap

Contribution level fixed from 2017. (Its raising process until 2017 is specified in the law.)
· EPI: 18.3% (borne equally by employer and employee) (Before 2017 it was annually raised in September by 0.354% from 13.934% of October 2004.)
· NP: ¥16,900 (monthly amount and in FY 2004 value term) (Before 2017 it was annually raised in April by ¥280 from ¥13, 580 of April 2005.)
＊When the contribution exemption provision for the several-week period before and after childbirth was introduced, the fixed contribution rate of NP was raised to ¥17,000 (FY2004 value) in April 2019.   ＊Current NP contributions: ¥16,540 (from April 2020)

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

National subsidy rate for Basic Pension benefits was raised from 1/3 to 1/2 from FY 2009 onward.

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 robustness over a period of around 100 years.

Prerequisites for starting the modified indexation were satisfied at the beginning of FY 2015 by eliminating the overpayment of pensions on the basis of the 2012 reform.

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

Pension benefit level is adjusted to cope with decline of active age population and increase of beneficiaries' life expectancy. An indicator of benefit level is defined in the law and if the indicator threatens to go down below 50% before the next actuarial valuation, the government must drastically review the benefits and contributions. The definition of the indicator is explained in section (5) below.

＊ Standard replacement ratio of EPI: 61.7% (FY 2019) -> 50.8% to 51.9% (FY 2046 to 2047) (2020 Actuarial Valuation Case I to III)

(1) Fixing of contribution (rate) levels

Under the 2004 pension reforms, the schedules to raise the contribution rates and the caps for contribution rates were laid down in the law and arrangements were put in place for adjusting benefits to the extent permitted by these financial resources (Figure 1-11). The purpose of fixing the future contribution rates was to address serious concerns, especially among younger people, that the future burden might endlessly be increased due to accelerating birthrate decline, life expectancy improvement and population aging.

Figure 1-11   Approach to fixing contribution levels
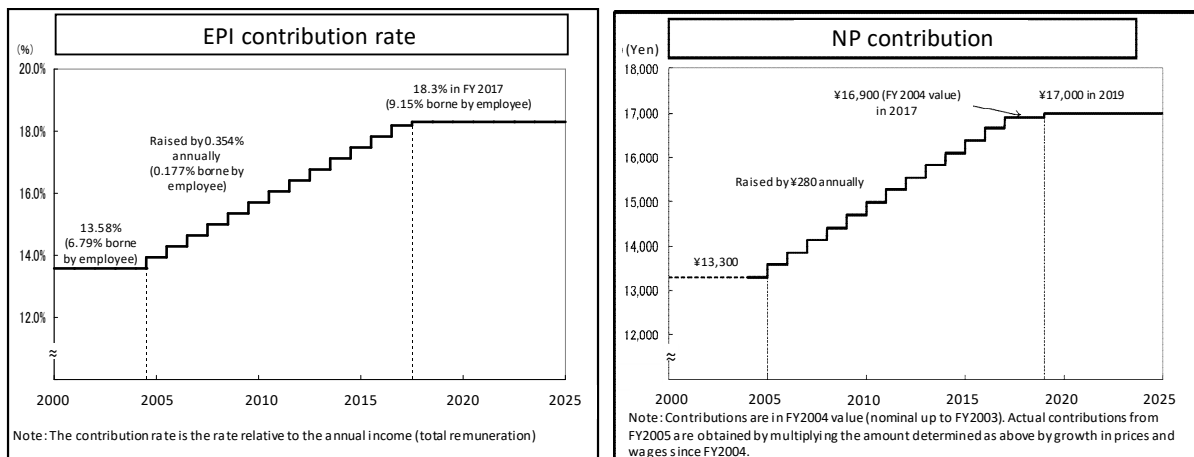
(2) Raising of national subsidy rate for the Basic Pension

A roadmap for raising the national subsidy for the Basic Pension from one third to one half was explicitly laid down in the law under the 2004 reforms. The proportion of national subsidies for the Basic Pension benefits was set at one half in the main provisions of the relevant legislation. As the transitional measure, 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. The process of raising the proportion of national subsidy and of securing permanent revenue sources was completed by the enactment of related bills (including a bill to raise the consumption tax rate) in 2012, which were to implement comprehensive reform of social security and tax system.

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

The 1999 actuarial valuation adopted as the period of financial equilibrium one in perpetuity, which takes into account the entirety of a period stretching from now into the infinite future when we discuss the financial equilibrium of the pension system. However, there was some debate over whether it was appropriate to take into consideration a period that stretched into an infinite future for which we have no data to base on, and the resulting reserve is so massive, 6 or 9 times as much as annual benefit expenditure, for example.

Under the 2004 reforms, therefore, a financial equilibrium period of around 100 years, which covers the period by whose end almost all the 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". It was also decided to keep a reserve fund at the end of the period whose size is as much as one-year expenditure of pension benefits of the last year of this period.

For the present actuarial valuation, the 95-year period up to FY2115 was adopted for the financial equilibrium period. As Figure 1-12 shows, this period rolls over each time an actuarial valuation is conducted, which means that the period from FY2116 onward is progressively incorporated into and the past period is excluded from the financial equilibrium period during which benefits and contributions are to be balanced.

Figure 1-12   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.
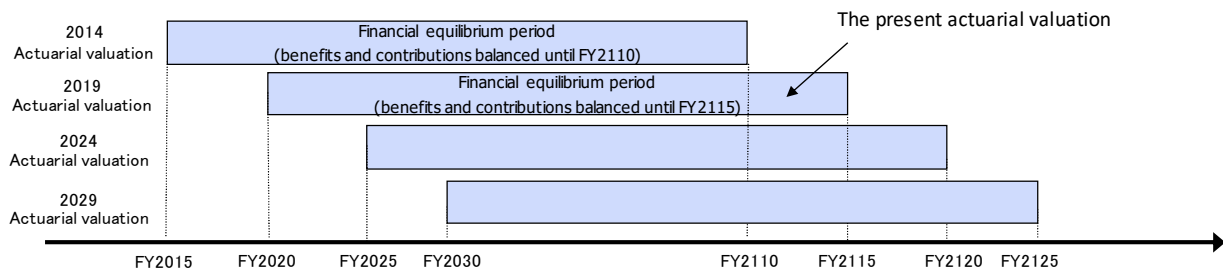
(4) Introduction of modified indexation as a financial automatic balancing mechanism

The fixing of contribution levels and national subsidy rate fixed the financial resources available for funding benefits. Therefore, pension benefits cannot exceed these fixed financial resources. In order to ensure the benefits for younger and future generations, the current level of benefits needs to be adjusted. The mechanism adopted to adjust benefit levels is called modified indexation, which suppresses the increase of pensions within the increase of wages and prices by linking indexation to population aging as well. More concretely, the pension benefits are normally indexed to salary increase before the age of 65 and to prices after the age of 65. However, as long as the financial equilibrium is not attained, the benefits are indexed to the normal indexation minus the sum of the rate of decrease of the number of active participants in the social security pension systems and the rate of increase of life expectancy at the age of 65 (which is fixed at 0.3% to avoid fluctuations).

A system of performing actuarial valuations at least once every five years was also adopted in order to project the replacement ratio (see (5) below) at and after the termination of benefit level adjustments in accordance with changes in social and economic conditions, and to calculate financial projections for the pension system. Under this arrangement, if an actuarial valuation shows benefit level adjustments to be unnecessary, adjustments are terminated at that point. After the termination, the indexation goes back to normal one.

Note that the final year of benefit level adjustments according to the present actuarial valuation may show lower benefit level than that shown by the future actuarial valuation if socioeconomic conditions pick up. Conversely, if they deteriorate, benefit adjustments of the future actuarial valuation will have to be made possibly for longer and benefit levels will be lower than projected in the current valuation.

There is thus now a mechanism in place for automatically balancing pension finances by changing the timing of the termination 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 though we always have to pay attention to the benefit level. Excessively low benefits make the social security pension system meaningless. This is why the minimum benefit level provision has been introduced (see (5) below).

Figure 1-13   Mechanism for automatically adjusting benefit levels
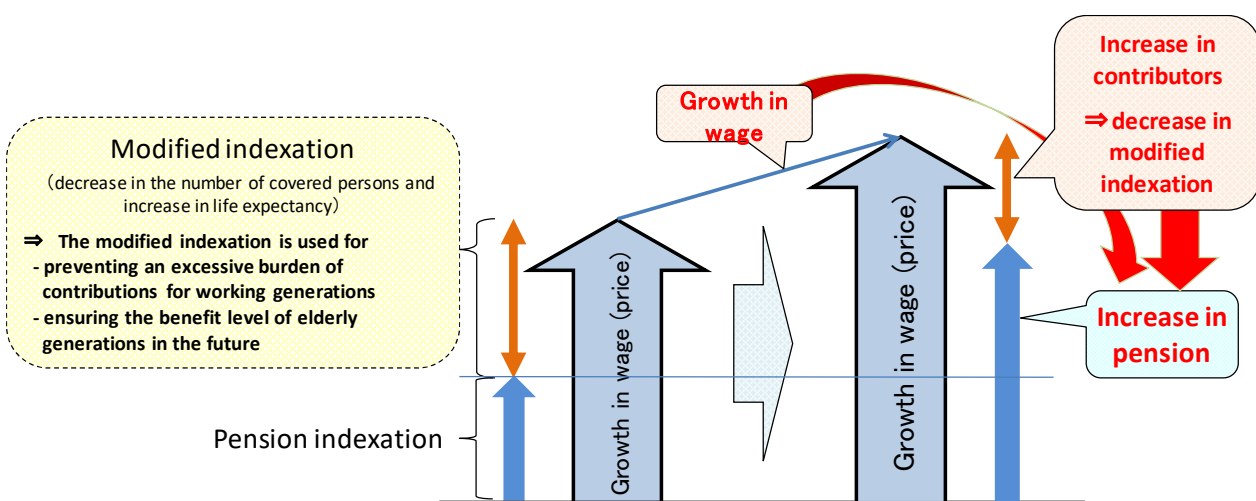
(5) Minimum benefit level

While the 2004 pension reforms introduced a mechanism of automatically adjusting benefit levels, benefits cannot simply be reduced endlessly 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 level, 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 of the same age as her husband and a covered person in the 3rd category for 40 years, and the replacement ratio of a year is the ratio of the EPI standard pension in which the household reaches the age of 65 in the year to the average annual net income (including bonuses) of males of active age of the previous year.

The replacement ratio in FY2019 was 61.7%. However, this will be lowered as a result of the automatic adjustments made by modified indexation, and under the present actuarial valuation, the projections which assume the medium population scenario and a progress in economic growth show balance of pension finances over an around 100-year period ending in FY2115 while securing the replacement ratios above 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 by neglecting the minimum benefit level provision , 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 go back to the normal indexation by ending the modified indexation or take other measures. At the same time, the future of benefits and contributions must be reviewed and necessary measures implemented.

As the replacement ratio will not approach 50% due to adjustment of benefit levels in 20 years' time, the above measures are unlikely to be implemented soon even if social and economic conditions deteriorate more than currently anticipated. However, we had better be prepared for the coming crucial time and we have to keep the ultimate benefit level after the benefit level adjustment period as high as possible for the future generations. This is why we have already started the discussion based on the 2013 report by the National Council on Social Security Reform. Some results of the discussion have already been legislated though there is still a long way to go.

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 (Figure 1-14).

With this financing method, as pension benefits will increase due to the relative increase in the elderly population if birthrate decline and life expectancy increase 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 1-14   Pay-as-you-go method and birthrate decline/life expectancy increase
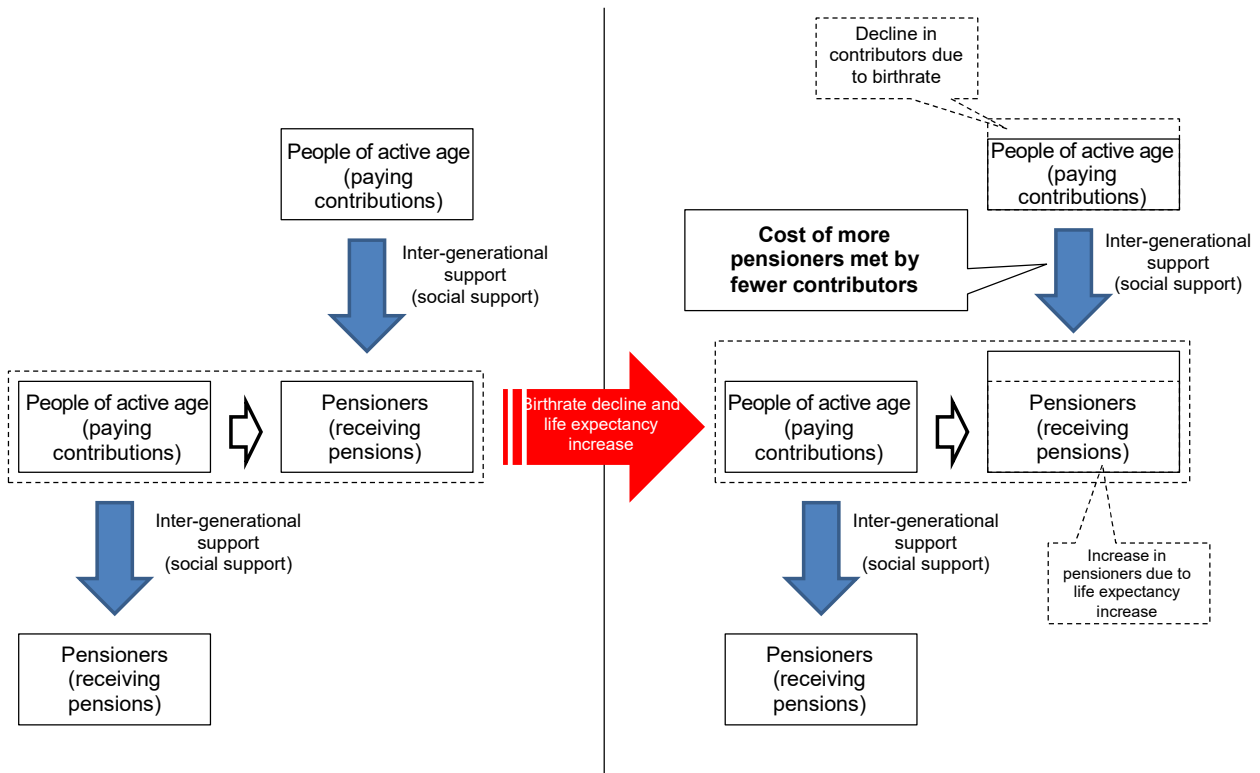
While modified indexation was thus introduced by the 2004 pension reforms, the degree to which benefit levels have to be adjusted depends on current and future demographic and economic trends, including:

- 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 (Figure 1-15). 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. Thus, it is important that the results are broadly interpreted and the way forward is understood.

Figure 1-15   Overview of actuarial valuations
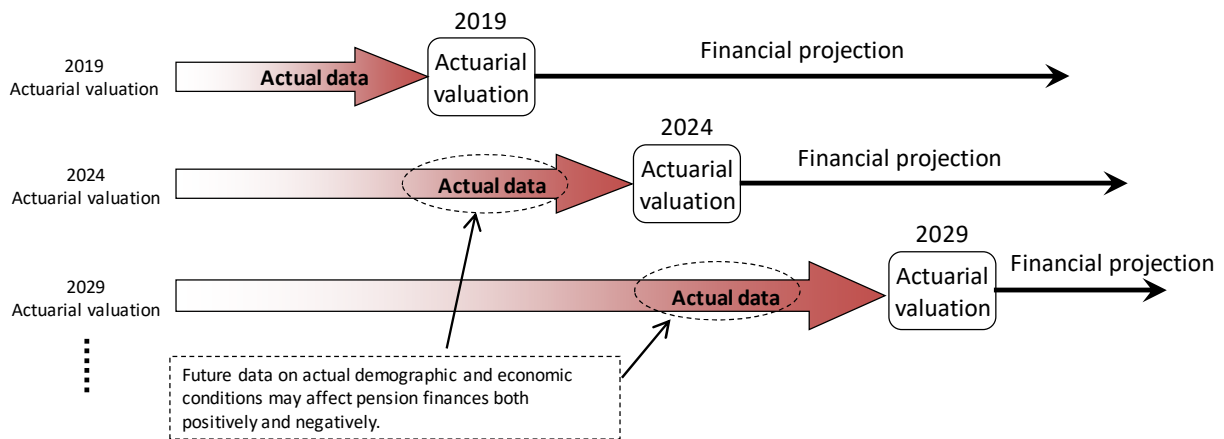
The differences between actuarial valuations since 2009 and actuarial valuations up to 2004

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 fixed by law as a result of the 2004 pension reforms, contributions (contribution rates) have not been set since 2009. Instead, one of the main purposes of actuarial valuations since 2009 has been to 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 would be terminated, the future level 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	2019 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 2019 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 life expectancy increase)

The "Population Projections for Japan" published in April 2017 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	
2015 (actual)	2065	2015 (actual)	2065
1. 45 →	High fertility scenario 1. 65	Males 80. 75 → Females 86.99	High mortality scenario (Small increase in life expectancy) Males 83.83 / Females 90.21
	Medium fertility scenario 1.44		Medium mortality scenario Males 84.95 / Females 91.35
	Low fertility scenario 1. 25		Low mortality scenario (Large increase in life expectancy) Males 86.05 / Females 92.48

(2) Labor force participation rate assumptions

The "case in which economic growth and labor participation advance," the "case in which economic growth and labor participation advance to a certain degree," and the "case in which economic growth and labor participation do not advance" described in the "Labor Supply and Demand Estimates" published by the Japan Institute for Labour Policy and Training (JILPT) in March 2019 were used for the labor force assumptions.

The "case in which economic growth and labor participation advance" assumes that labor force participation by women and the elderly would increase considerably in accordance with the "Economic and Fiscal Projections for Medium to Long Term Analysis" (the growth realization case)

by the Council on Economic and Fiscal Policy, which expects to see real economic growth of around 2% over the next 10 years. It is projected that the labor force participation rate will increase above 85% among women in their 30s, eliminating the "M curve" that used to characterize women's employment in Japan. It is also projected that the labor force participation rate for men is expected to exceed 70% even in their late 60s.

For the "case in which economic growth and labor participation advance to a certain degree," it is projected that the labor force participation rate will increase up to around 85% among women in their 30s, as the dip in the M curve is expected to become shallower, based on the "Economic and Fiscal Projections for Medium to Long Term Analysis" (the baseline case) by the Council on Economic and Fiscal Policy, which expects to see real economic growth of around 1% per year.

In the "case in which economic growth and labor participation do not advance," on the other hand, labor participation rates are projected to remain unchanged at their present levels (2017).

As these estimates only extend until 2040, these rates are assumed to remain constant from 2040 onward (Figure 2-2).

Figure 2-2 Labor force participation rate assumptions
Projected labor force participation rates
<Males, 2040>

<Females, 2040>
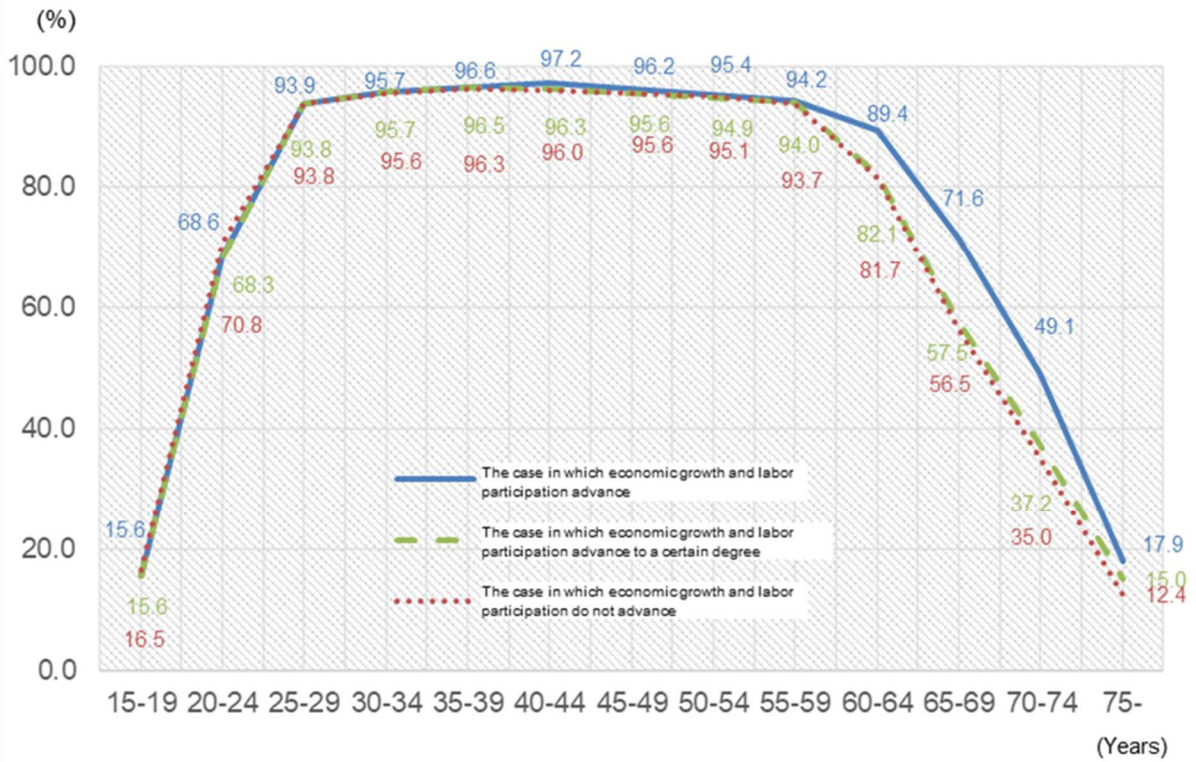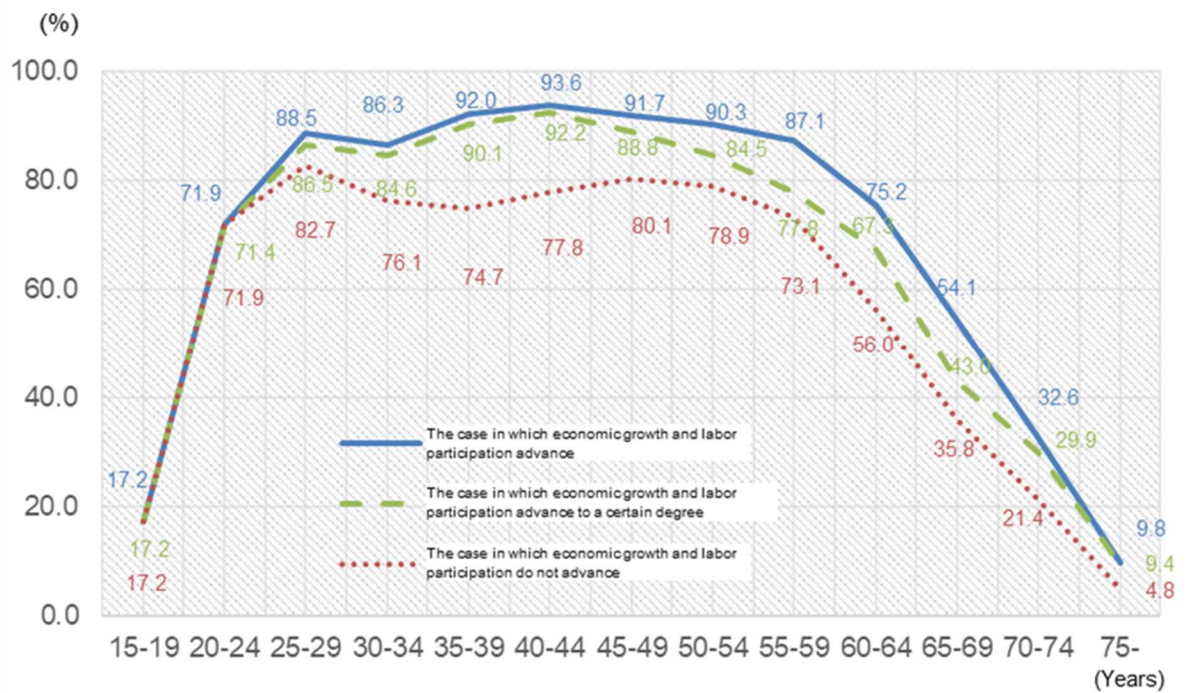
(3) Economic assumptions

To ensure transparency of 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 in Pension Finances") was formed and met 10 times over a period of one and a half years for public discussions. The government decided to select six wide-ranging cases as the long-term economic assumptions based on a report of the panel's findings (published March 13, 2019).

1) Short-term economic assumptions (up to FY2028)

Economic assumptions up to FY2028 were established based on the "growth realization case" and the "baseline case" described in the Cabinet Office's Report "Economic and Fiscal Projections for Medium to Long Term Analysis" (July 2019).

The growth realization case estimates how policy effects will manifest themselves at a pace that takes into account past results toward the goals of Abenomics, namely overcoming deflation and revitalizing the economy. It is estimated that the growth rate will increase to around 2% in real terms and over 3% in nominal terms in the first half of the 2020s along with an increase in the potential growth rate, and that the CPI increase rate will reach around 2% after FY2023.

The baseline case projects how the economy will continue to grow at the same rate as the current potential growth rate in the future, estimating that the economic growth rate will be around 1% in real terms and mid-1% in nominal terms over the medium to long term. Also, the CPI increase rate is estimated to remain at around 0.8%.

2) Long-term economic assumptions (from FY2029)

For the long-term economic assumptions from FY2029 onward, six wide-ranging cases indicated in the report of the advisory panel's findings were adopted (Table 2-3).

Of these, cases I to III are high-growth scenarios that are extensions of the growth realization case in the Cabinet Office's projections, and cases IV to VI are low-growth scenarios that are extensions of the baseline 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)	ROI		Economic growth rate (real) 20-30 years from FY2029
						Real (adjusted for CPI)	Spread (adjusted for wages)	
Case I	Extension of Cabinet Office's growth realization case	The case in which economic growth and labor participation advance	1.3%	2.0%	1.6%	3.0%	1.4%	0.9%
Case II			1.1%	1.6%	1.4%	2.9%	1.5%	0.6%
Case III			0.9%	1.2%	1.1%	2.8%	1.7%	0.4%
Case IV	Extension of Cabinet Office's baseline case	The case in which economic growth and labor participation advance to a certain degree	0.8%	1.1%	1.0%	2.1%	1.1%	0.2%
Case V			0.6%	0.8%	0.8%	2.0%	1.2%	0.0%
Case VI		The case in which economic growth and labor participation do not advance	0.3%	0.5%	0.4%	0.8%	0.4%	-0.5%

Regarding the long-term economic assumptions, real economic growth rates and other variables were estimated under six 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 six 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 the TFP growth rate, which is the key and currently stands at 0.3% per year, will rise to 1.2% at the same pace and extent of increase as actually experienced before the Japanese economy entered deflation (an increase of around 0.9% over the five-year period from FY1982 to FY1987) in the growth realization case, and will rise to 0.8%, which is the average rate since January 2002 (the 14th cycle), in the baseline case.

Looking at the TFP growth rate over the past years, it was at a level of 1.5% or higher before 1990, but has generally remained between 0.3% and 1.2% since the bursting of the bubble economy in the late 1990s. The average for the past 10 to 30 years has been between 0.7% and 1.2% (Figure 2-4).

Figure 2-4 Historical data of the TFP growth rate (FY1981-FY2017)
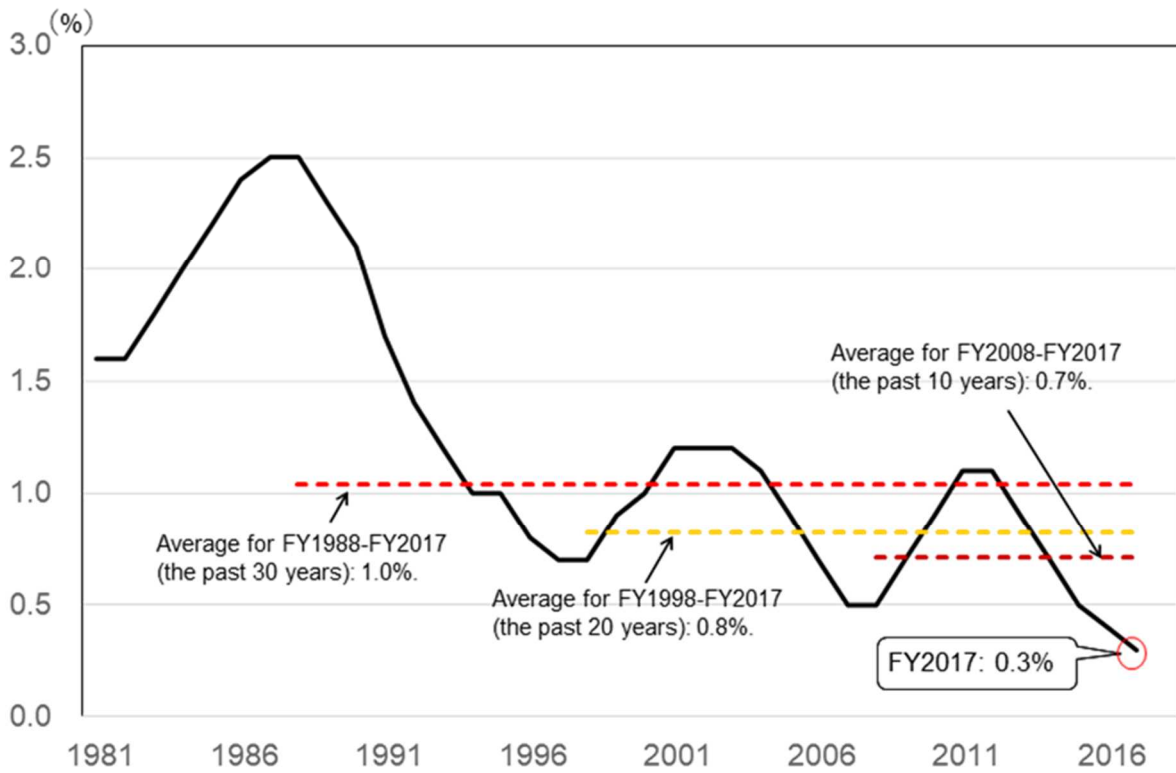
Source: Monthly Economic Report (Cabinet Office), October-December 2018 Quarterly GDP

Preliminary Report (First preliminary figures)

Looking at the distribution of TFP growth rates over the past 30 years (FY1988-FY2017), Case I (1.3% or more) accounted for 17%, Case II (1.1% or more) 40%, Case III (0.9% or more) 63%, Case IV (0.8% or more) 67%, Case V (0.6% or more) 83%, and Case VI (0.3% or more) 100% (Figure 2-5) of our past experiences.

Figure 2-5 Comparison of "assumed" and "actual" TFP growth rates
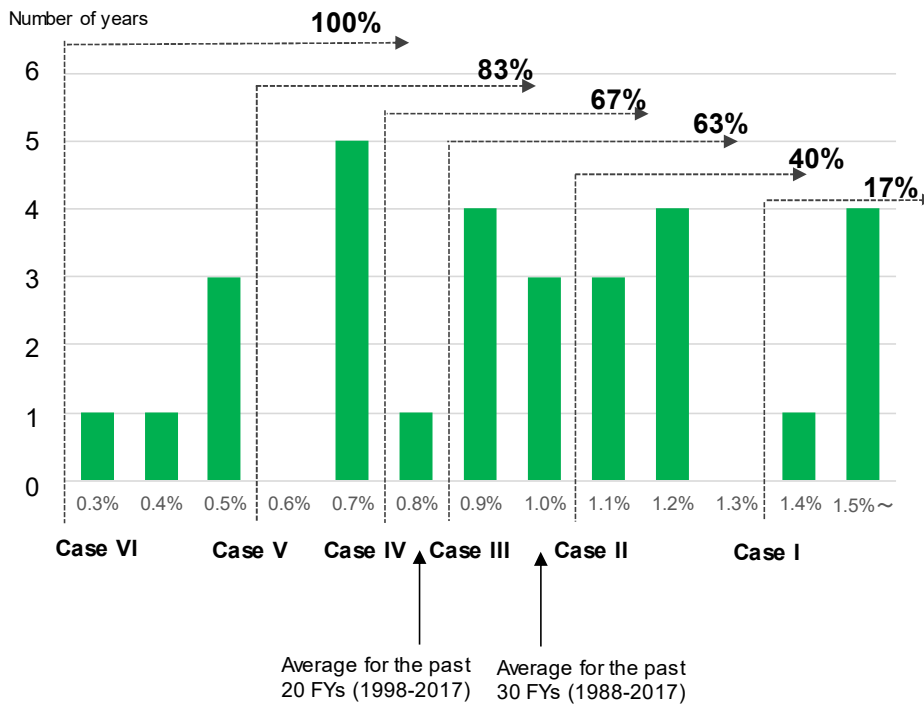
Source: Monthly Economic Report (Cabinet Office), October - December 2018 Quarterly GDP Preliminary Report (First preliminary figures)

TFP growth rates were set based on the settings of the Cabinet Office calculations, the range of actual results since the late 1990s after the bursting of the bubble economy, and the distribution of actual results over the past 30 years, with six different settings from Case I to Case VI ranging from 1.3-0.3%. This roughly corresponds to 1.2-0.3%, the range of TFP growth rates since the bursting of the bubble economy in the late 1990s.

The economic assumptions thus adopted for the 20 to 30 years from FY2029 ensure positive annual real growth of between 0.9% and 0.4% in Cases I to III. In Cases IV to VI, growth is projected to be almost zero or negative, ranging between an annual rate of 0.2% and -0.5%.

(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 of covered persons, pensioners, and so on. Regarding the contribution compliance rate for NP contributions of the covered persons in the first category, the base assumption was that the rate of compliance for the contributions due that would be paid in the same fiscal year would rise to 70% in FY2023 and that the final contribution compliance rate, which takes into account contributions paid in and after the fiscal year, would rise to 75% in FY2021.

2. Future projections of the replacement ratio

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

The replacement ratio of social security pensions of a fiscal year used as a benchmark for measuring the benefit level of EPI of the fiscal year is expressed by the ratio of standard EPI pension amount to the average net income of males of active age of the previous fiscal year. The average wage of EPI males, which is used as the denominator, is calculated including male members of MAA plans, and the average net wage as denominator was ¥357,000. The amount of the standard EPI pension amount calculated on the basis of this wage level comes to ¥220,000, which breaks down into two ¥130,000 Basic Pension for the 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 61.7%. This is the replacement ratio of FY2019, 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 primarily occurred to the Basic Pension because indexations for a newly awarded Basic Pension during this period have been larger than the increase rate of 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 indexed to price rather than wage.

Meanwhile, based on the discussions in the Pension Subcommittee of the Social Security Council that is an advisory organ for the Minister of Health, Labour and Welfare, the Act Partially Amending the National Pension Act, etc. for the Purpose of Improving the Sustainability of the Social Security Pension System was enacted in 2016 to address the structural problems of the Basic Pension confirmed by the results of the 2014 actuarial valuation. This law reviewed the rules for indexing pension amounts, and introduced a scheme for adjusting modified indexation to add the unadjusted rate of the modifier of the previous year to the modifier this year. Here the modifier means the rate by which modified indexation is to reduce the rate of normal indexation, while maintaining the measure to keep the nominal amount of pensions on par with or above that of the previous year, thereby strengthening the function of modified indexation. In addition, the law has changed the normal indexation rule. If the rate of change of disposable income is smaller than the rate of change of price, the new rule indexes the pension benefits to the rate of change of disposable income. It is because the burden-bearing capacity of the working-age population would be harmed and the balance between the benefits of beneficiaries and the disposable income of active workers would be destroyed if we were to index the pension benefits to the price or to keep the benefit amount the same as that of the previous year, which used to be the normal indexation rule before the 2016 reform (Figure 2-6).

Figure 2-6 Revision of rules for revising pension amounts

(1)Revision of the rules of adjustment by modified indexation (Responding to long-term structural changes, e.g., declining birthrates, increasing average life expectancy)

Quickly eliminating a carry-over during the economic recovery phase (while maintaining the lower nominal limit for pensions for the elderly)

I Economic expansion phase

II Recession phase
Maintaining the lower nominal limit for pensions
(Consideration for the current elderly generation)

III Economic recovery phase
Eliminating a carry-over

Wage (price) — Full adjustment — Pension amount revision rate

Wage (price) — Partial adjustment — Pension amount not revised

Wage (price) — Full adjustment + Elimination of the unadjusted portion — Pension amount revision rate

The unadjusted portion to be carried over

(2)Revision of wage/price indexation (Responding to short-term changes in economic trends, e.g., wage and price trends)

Since pensions are intergenerational transfers, they are revised in line with wage fluctuations when the working-age population's burden-bearing capacity is declining.

Price > Wage > 0
Already awarded
Newly awarded
(No change this time)

0 > Price > Wage
Newly awarded
Already awarded

Price > 0 > Wage
Already awarded
Newly awarded

is reflected in pension amount revision
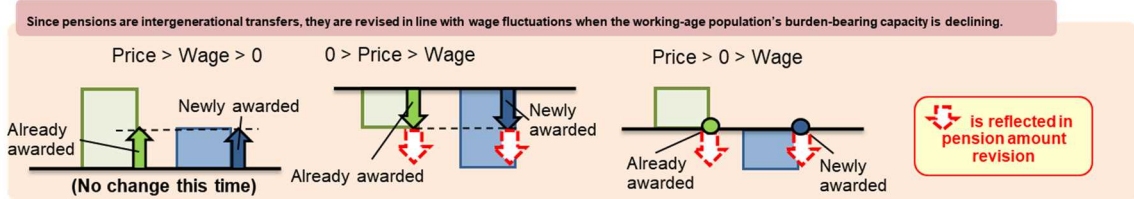
(2) Projected replacement ratios based on a wide range of economic assumptions

Benefit level adjustment by modified indexation is to be terminated 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 2-7 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 the termination of benefit level adjustment, the amount of a newly awarded pension (the numerator) is index-linked to the wage growth rate (the denominator), and so the replacement ratio remains the same.

Figure 2-7 Projections of the ending years of benefit level adjustment and the ultimate replacement ratios

*Replacement ratio … An indicator of the level of social security pension benefits It is expressed by the ratio of pension amounts to the average net income of males of active age.

Replacement ratio = (Basic Pension of a married couple + EPI of the husband) / Average net income of males of active age
FY2019: 61.7%   130,000 yen   90,000 yen   357,000 yen

Replacement ratio

Economic assumptions	EPI standard pension replacement ratio after end of benefit level adjustment / Last year of benefit level adjustment	Economic growth rate (real) 20-30 years from FY2029
Case I	51.9% (FY2046) {Basic: 26.7% (2046), earnings-related: 25.3% (no adjustment)}	0.9%
Case II	51.6% (FY2046) {Basic: 26.6% (2046), earnings-related: 25.0% (2023)}	0.6%
Case III	50.8% (FY2047) {Basic: 26.2% (2047), earnings-related: 24.6% (2025)}	0.4%
Case IV	(50.0%) (FY2044) (Note) 46.5% (FY2053) {Basic: 23.4% (2053), earnings-related: 23.1% (2030}	0.2%
Case V	(50.0%) (FY2043) (Note) 44.5% (FY2058) {Basic: 21.9% (2058), earnings-related: 22.6% (2032)}	0.0%
Case VI	(50.0%) (FY2043) (if benefit levels of both Basic and earnings-related continue to be automatically adjusted)	-0.5%

The case in which economic growth and labor participation advance
Extension of Cabinet Office's growth realization case

The case in which economic growth and labor participation advance to a certain degree
Extension of Cabinet Office's baseline case

The case in which economic growth and labor participation do not advance
Extension of Cabinet Office's baseline case

(*) If benefit levels continue to be automatically adjusted, NP reserves will be exhausted in FY2052, causing the plan to become entirely pay-as-you-go (PAYG). After that, the replacement ratio of the benefit level that can be covered by contributions and national subsidies will be around 36%-38%.

Note: If the replacement ratio falls below 50%, the benefit level adjustment is supposed to be terminated at 50%, and the nature of benefits and burdens is to be examined. The data presented here are based on cases in which the benefit level were to be automatically adjusted until finances reach balance.

Of the six sets of economic assumptions, it was found that the replacement ratio would not fall below 50% in the future in the cases where female and elderly labor market participation increases and the Japanese economy grows (Cases I to III).

However, in the cases in which female and elderly labor market participation advances to a certain degree (Cases IV and V) or does not advance (Case VI), benefit level adjustment will be required beyond the minimum benefit level (50% replacement ratio) if financial equilibrium is to be achieved.

In the negative growth case (Case VI), it was found that modified indexation will not function sufficiently due to low rates of price increase and wage growth, and NP reserve will be exhausted in FY2052 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 36%-38%, 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 projects the replacement ratio for FY2024 (five years from now) to be above 50.0% (60.0%-609%), 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,

this time there were positive factors for pension finances, such as an increase in the number of people covered under EPI and an increase in investment income, which stopped the decline in the future replacement ratio for the Basic Pension portion as seen in the past.

However, compared to the assumption at the time of the 2004 reform, there is no change in the fact that modified indexation has been prolonged and the Basic Pension level has been declining. 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 FY2019 replacement ratio (the current ratio used for the present actuarial valuation) compared to the 2004 projection makes it necessary to lower future benefit levels more (Figure 2-8).

In the case of EPI, 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 its replacement ratio after adjustment increases.

Figure 2-8 Change of the replacement ratio projection from the previous actuarial valuation

(The case in which economic growth and labor participation advance)

○ The current replacement ratio has declined primarily because the modified indexation adjustment was applied after the previous valuation (cumulative total: 1.4%).

○ On the other hand, the replacement ratio after the end of benefit level adjustment rises slightly due to the improvement in the birthrate and advance in labor participation, etc., according to the comparison between Cases I-III, in which economic growth and labor participation advance, and Cases A-E (economic revitalization cases, in which labor market participation advances) in the previous actuarial valuation.

○ The replacement ratio of 50% can be secured in the future if economic growth and labor participation advance to a certain degree, but the fact that the period of the Basic Pension benefit level adjustment is longer than that of the earnings-related pension remains the same as in the previous actuarial valuation.

<<Replacement Ratio>>

2004 Standard Case of Actuarial Valuation	59.3% → (19 years) → 50.2%
2014 Actuarial Valuation Cases A-E	62.7% → (29-30 years) → 51.0~50.6%
2019 Actuarial Valuation Cases I-III	61.7% → (27-28 years) → 51.9~50.8%

<<EPI (Earnings-Related Portion)>>

2004 Standard Case of Actuarial Valuation	25.7% → (19 years) → 21.8%
2014 Actuarial Valuation Cases A-E	25.9% → (3-6 years) → 25.3~24.5%
2019 Actuarial Valuation Cases I-III	25.3% → (0-6 years) → 25.3~24.6%

<< Basic Pension (for 2 People)>>

2004 Standard Case of Actuarial Valuation	33.7% → (19 years) → 28.4%
2014 Actuarial Valuation Cases A-E	36.8% → (29-30 years) → 26.0~25.6%
2019 Actuarial Valuation Cases I-III	36.4% → (27-28 years) → 26.7~26.2%

2004 2009 2014 2019 2024 2029 2034 2039 2044 2049

28

(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 2-9.

When the fertility assumptions are changed from the medium scenario to the high scenario, the adjustment period shrinks by between 4 and 7 years and the replacement ratio rises by 2-4%. When the low scenario is used, the adjustment period lengthens by between 3 and 11 years, and the replacement ratio decreases by 3-5%. Assumed fertility in 2060 is 1.65 according to the high scenario, 1.44 according to the medium scenario, and 1.25 according to the low scenario, all of which are considerably lower than required to maintain the size of population. It is thus evident that fertility trends exert a major impact on PAYG-based social security pensions.

When the mortality assumptions are changed from the medium scenario to the high scenario, the adjustment period shrinks by between 4 and 7 years and the replacement ratio rises by 2-3%. When changed to the low scenario, the adjustment period lengthens by between 3 and 10 years, and the replacement ratio decreases by 2-3%. 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 2-9 Impact of changes to demographic assumptions on replacement ratio

Note: Effects where Cases I, III, and V are used for the economic assumptions.

TFR		Life expectancy at birth	
2015 (actual)	2065	2015 (actual)	2065
1. 45→	High fertility scenario 1.65	High mortality scenario (Small increase in life expectancy)	Males 83.83 / Females 90.21
	Medium fertility scenario 1.44	Males 80.75 / Females 86.99 → Medium mortality scenario	Males 84.95 / Females 91.35
	Low fertility scenario 1.25	Low mortality scenario (Large increase in life expectancy)	Males 86.05 / Females 92.48

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 pension is shown under three sets of economic assumptions, namely Cases I, III, and V, in Figures 2-10, 2-11, and 2-12.

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 2-10 Projected pension amounts (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case I (no fluctuation)

○ Adjustment by modified indexation ends in FY2046 for the Basic Pension, and the replacement ratio is subsequently maintained at 51.9% There is no adjustment for the EPI.
○ On the other hand, in the modified indexation adjustment period, the amount of a newly awarded pension increases in the case of model pensions due to wage increases, even after discounted by price.

Economy (Case I):
- CPI increase rat ... 2.0%
- Wage growth rate (real adjusted for CPI) ... 1.6%
- Rate of return on investment (real adjusted for CPI) 3.0%
- (For ref.) Economic growth rate (real) ... 0.9%

Population (medium projections):
- TFR (2065) ... 1.44
- Life expectancy at birth (2065) Males ... 84.95 years / Females ... 91.35 years

Labor force:
The case in which economic growth and labor participation advance

*Economic growth rate (real) is the average for the 20-30 years from FY 2029.

Unit: ¥10,000 (monthly amount)
*Pension amounts are in real terms, discounted back to FY2019 at the CPI increase rate.

	FY2019	FY2024	FY2040	FY2046	FY2060
Disposable income of male of active age	35.7	36.7	46.1	50.6	62.9
Couple's pension total	22.0	22.3	25.0	26.3	32.7
Husband: Earnings-Related	9.0	9.3	11.6	12.8	15.9
Couple: Basic	13.0	13.1	13.4	13.5	16.8

Next actuarial valuation

End of Basic Pension adjustment FY2046

Replacement ratio	FY2019	FY2024	FY2040	FY2046	FY2060
	61.7%	60.9%	54.3%	51.9%	51.9%
Earnings-related	25.3%	25.3%	25.3%	25.3%	25.3%
Basic	36.4%	35.6%	29.0%	26.7%	26.7%

*The chart above shows amounts of newly awarded pensions.
The amount of an already awarded pension is revised based on prices. Because of this, if the CPI increase rate is lower than the nominal wage growth rate, the ratio relative to the income of individuals of active age at such time decreases.

30

Figure 2-11 Projected pension amounts (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case III (no fluctuation)

○ Adjustment by modified indexation ends in FY2047 for the Basic Pension and FY2025 for EPI, and the replacement ratio is subsequently maintained at 50.8%
○ On the other hand, in the modified indexation adjustment period, the amount of a newly awarded pension increases in the case of model pensions due to wage increases, even after discounted by price.

Economy (Case III):
- CPI increase rate 1.2%
- Wage growth rate (real adjusted for CPI) 1.1%
- Rate of return on investment (real adjusted for CPI) 2.8%
- (For ref.) Economic growth rate (real) 0.4%

Population (medium projections):
- TFR (2065) 1.44
- Life expectancy at birth (2065) Males 84.95 years / Females 91.35 years

Labor force:
The case in which economic growth and labor participation advance

*Economic growth rate (real) is the average for the 20-30 years from FY2029.

Unit: ¥10,000 (monthly amount)
*Pension amounts are in real terms, discounted back to FY2019 at the CPI increase rate.

End of Earnings-Related adjustment FY2025

End of Basic Pension adjustment FY2047

Next actuarial valuation

Couple's pension

Disposable income of male of active age

	FY2019	FY2024	FY2040	FY2047	FY2060
Total	35.7	36.7	43.7	47.2	54.3
Husband: Earnings-Related	22.0 (9.0)	22.1 (9.0)	23.4 (10.8)	24.0 (11.6)	27.6 (13.4)
Couple: Basic	13.0	13.1	12.7	12.4	14.2

Replacement ratio

	FY2019	FY2024	FY2040	FY2047	FY2060
	61.7%	60.2%	53.6%	50.8%	50.8%
Earnings-related	25.3%	24.6%	24.6%	24.6%	24.6%
Basic	36.4%	35.6%	29.0%	26.2%	26.2%

*The chart above shows amounts of newly awarded pensions.
The amount of an already awarded pension is revised based on prices. Because of this, if the CPI increase rate is lower than the nominal wage growth rate, the ratio relative to the income of individuals of active age at such time decreases.

Figure 2-12 Projected pension amounts (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case V (no fluctuation)

○ Due to adjustment through modified indexation, the replacement ratio will reach 50% in FY2043. ○ If modified indexation continues to be applied automatically afterward and fiscal balance has been achieved, adjustment by modified indexation ends in FY2058 for the Basic Pension and FY2032 for EPI, and the replacement ratio comes down to 44.5%.
○ On the other hand, the amount of a newly awarded pension up to FY2043, when the replacement ratio reaches 50%, declines slightly in the case of model pensions in spite of the wage increase. The amount is the value after discounted by price.

Economy (Case V):
- CPI increase rate 0.8%
- Wage growth rate (real adjusted for CPI) 0.8%
- Rate of return on investment (real adjusted for CPI) 2.0%
- (For ref.) Economic growth rate (real) 0.0%

Population (medium projections):
- TFR (2065) 1.44
- Life expectancy at birth (2065) Males 84.95 years / Females 91.35 years

Labor force:
The case in which economic growth and labor participation advance

*Economic growth rate (real) is the average for the 20-30 years from FY2029.

Unit: ¥10,000 (monthly amount)
*Pension amounts are in real terms, discounted back to FY2019 at the CPI increase rate.

End of Basic Pension adjustment FY2058
(if the benefit level were to be automatically adjusted until finances balanced)

End of Earnings-Related adjustment FY2032

Replacement ratio reaches 50% FY2043

Next actuarial valuation

Couple's pension

Disposable income of male of active age

	FY2019	FY2024	FY2040	FY2043	FY2058
Total	35.7	36.1	40.5	41.5	46.7
Husband: Earnings-Related	22.0 (9.0)	21.7 (8.9)	20.8 (9.2)	20.7 (9.4)	20.8 (10.6)
Couple: Basic	13.0	12.8	11.6	11.4	10.2

Replacement ratio

	FY2019	FY2024	FY2040	FY2043	FY2058
	61.7%	60.1%	51.3%	50.0%	44.5%
Earnings-related	25.3%	24.6%	22.6%	22.6%	22.6%
Basic	36.4%	35.5%	28.7%	27.4%	21.9%

*The chart above shows amounts of newly awarded pensions.
The amount of an already awarded pension is revised based on prices. Because of this, if the CPI increase rate is lower than the nominal 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 ¥357,000 net wage of individuals of active age in FY2019 is projected to increase in real value in all cases, but that differences in real future value arise due to differences in the real wage growth rate. In FY2040, for example, real value grows to ¥461,000 in Case I and ¥437,000 in Case III, and ¥405,000 in Case V.

Under each set of economic conditions, the ¥220,000 model pension in FY2019 increases in real value in Case I and Case III, reaching ¥250,000 in Case I and ¥234,000 in Case III in FY2040, while Case V sees a slight decline in real value. While the benefit level is adjusted by modified indexation, pension purchasing power increases in Case I and Case III due to the rise of wage. In Case V, however, pension purchasing power slightly decreases in spite of the rise of wage.

However, an examination of the purchasing power of the Basic Pension shows that although a higher purchasing power is attained in FY2040 than in FY2019 in Case I, the ¥130,000 Basic Pension for a couple in FY2019 falls slightly to ¥127,000 in FY2040 in Case III and declines more to ¥116,000 in Case V. The decline of Basic Pension purchasing power thus presents a problem especially in low-growth scenarios.

In Case I, the real wage growth rate is projected to be 1.6%. As modified indexation, even when fully applied, will average 1.2% per year up to 2040, pension revision by wage indexation will exceed the indexation adjustment rate and the real value of a pension will increase. In Cases III and V, however, the real wage growth rate is projected to be 1.1% and 0.8% respectively, which could be below the indexation adjustment rate depending on the year, and so the real value of a pension will decline.

On the other hand, the pension benefits after the age of 65 is indexed to CPI, and modified indexation serves to reduce indexation, so pension purchasing power declines after the age of 65 under all the economic assumptions as long as indexation is modified.

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 likewise be the same (Figure 2-13).

Therefore, if the period of coverage is the same, the pension amount and replacement ratio will, assuming the wage level per member of the household is the same, be the same in terms of the amount per member of the household regardless of household structure. There will be no difference due to household type.

Figure 2-13 Structure of social security pension contributions and benefits (relationship to household type)

Illustration of social security pension contributions 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.
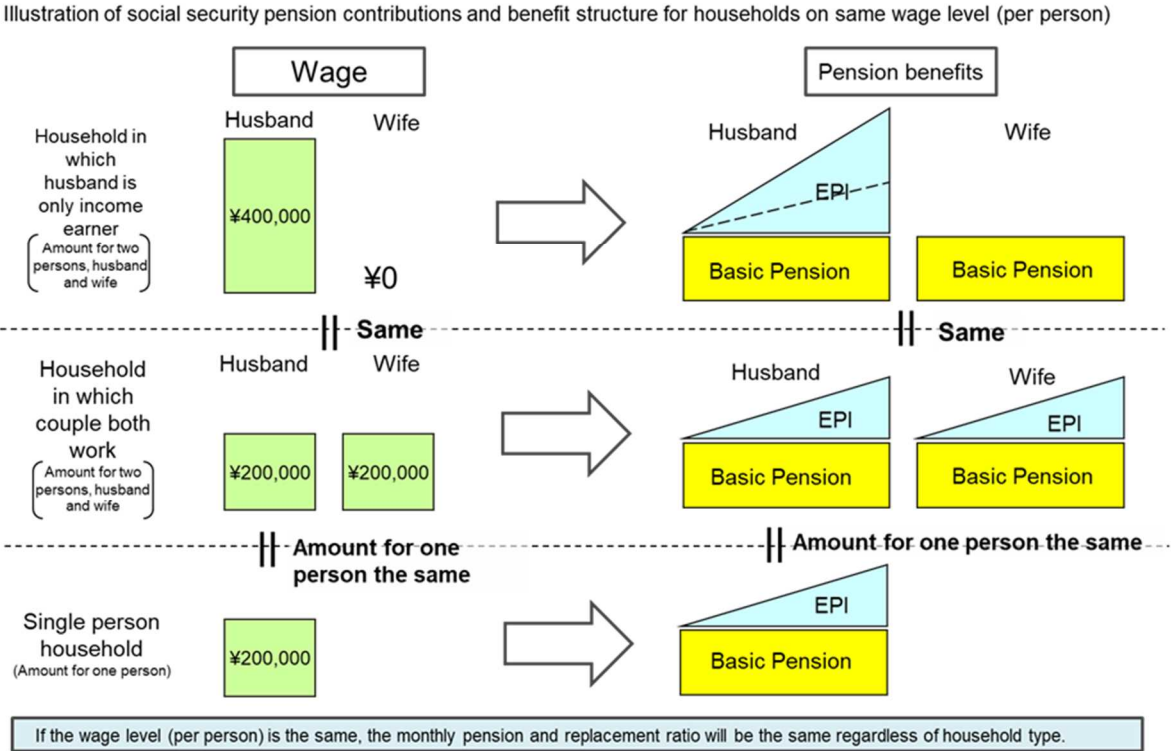
Thus when considering an employee household covered by EPI, the amount of a pension and the replacement ratio assuming coverage for 40 years are determined by the wage level. Projections of how the amount of a pension and the replacement ratio will change according to household wage level are shown in Figures 2-14 and 2-17.

Figure 2-14 Monthly pension and its ratio to career average wage by wage level (per person) <Current fiscal year (2019)>

○ The monthly pension and the replacement ratio for EPI are determined by the wage level (per person) of the household, regardless of the type of household. Based on this, the chart shows what the monthly pension and replacement ratio would be for wages of 0.5 times, 0.75 times, 1 time, 1.25 times and 1.75 times as much as the model pension wage.
○ Since social security pensions have an income redistribution function, the higher the wage level of a household, the higher the monthly pension and the lower the replacement ratio.
○ The differences in the replacement ratio and monthly pensions are due to differences in wage levels, not household types, so it is important to focus on wage levels.
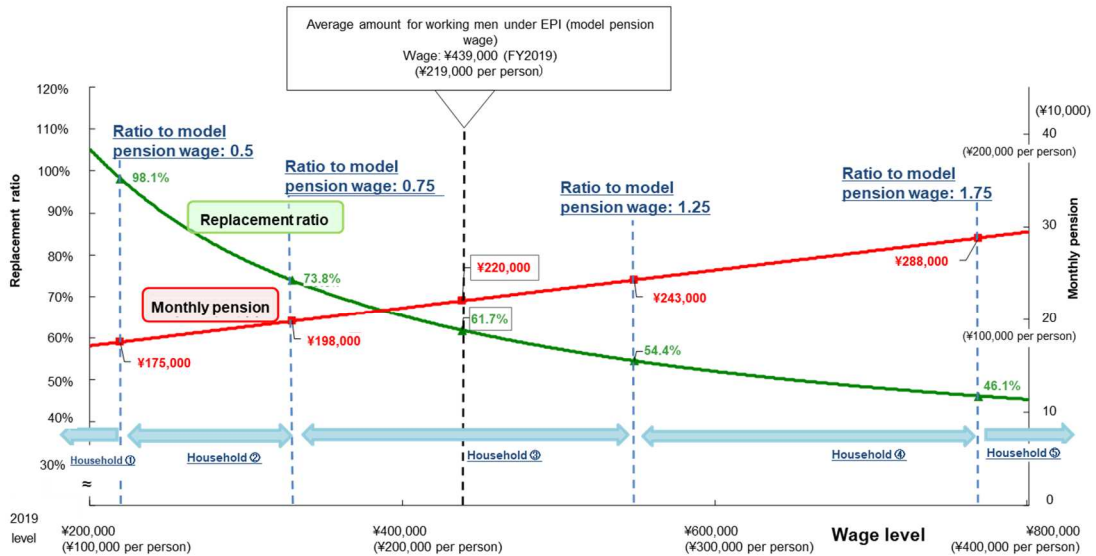
Notes: 1. Monthly pensions are amounts of newly awarded pensions.
2. For all household types, the replacement ratio is calculated using a disposable income ratio of 0.814.
3. Household composition is based on the composition at one point in time in the 2016 Comprehensive Survey of Living Conditions (January to December 2015 for income), so it does not show the distribution of average lifetime wages. Therefore, it should be noted that it does not indicate the future replacement ratio or distribution of pension amounts.

Figure 2-15 Monthly pension and its ratio to career average wage by wage level (per person) <Case I, FY2046, population (medium projections)>
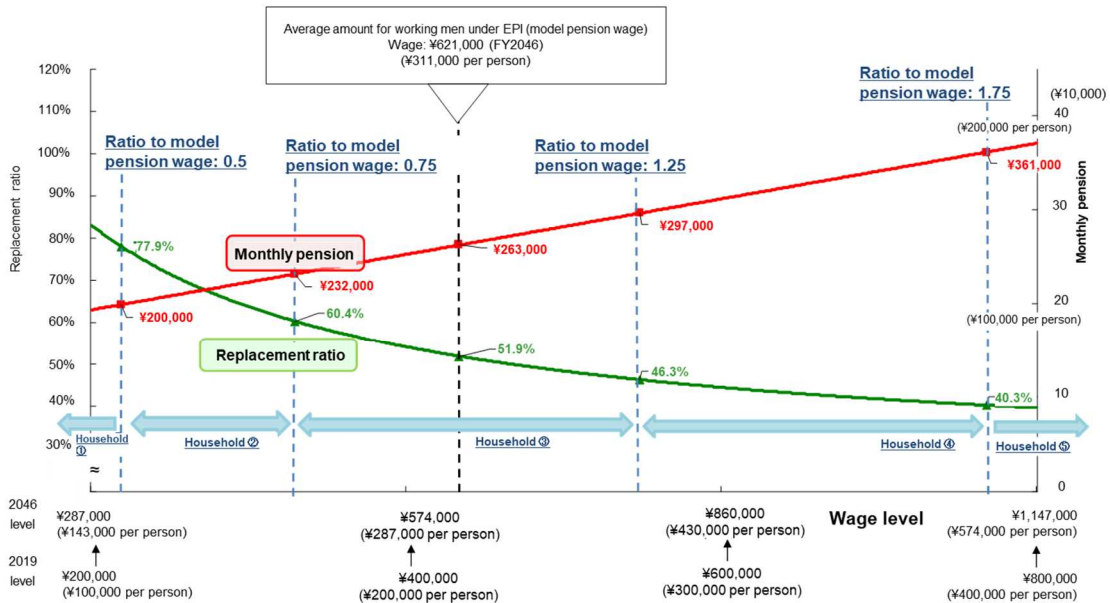
Notes: 1. Monthly pensions are amounts of newly awarded pensions.
2. For all household types, the replacement ratio is calculated using a disposable income ratio of 0.814.
3. Monthly pensions and wages at the 2046 level are in real terms, discounted back to FY2019 at the CPI increase rate.

Figure 2-16 Monthly pension and its ratio to career average wage by wage level (per person) <Case III, FY2047>

Notes: 1. Monthly pensions are amounts of newly awarded pensions.
2. For all household types, the replacement ratio is calculated using a disposable income ratio of 0.814.
3. Monthly pensions and wages at the 2047 level are in real terms, discounted back to FY2019 at the CPI increase rate.
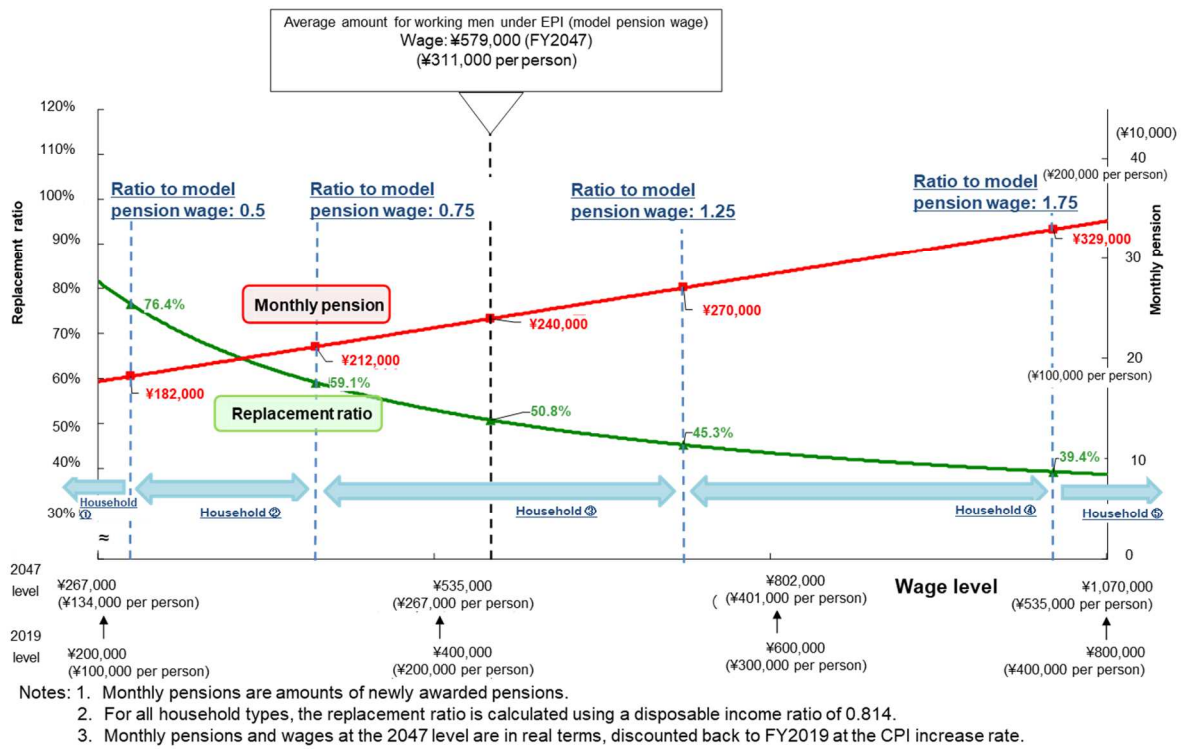
Figure 2-17 Monthly pension and its ratio to career average wage by wage level (per person) <Case V, FY2058>

Notes: 1. Monthly pensions are amounts of newly awarded pensions.
2. For all household types, the replacement ratio is calculated using a disposable income ratio of 0.814.
3. Monthly pensions and wages at the 2058 level are in real terms, discounted back to FY2019 at the CPI increase rate.
4. With regard to FY2058, if the replacement ratio is expected to fall below 50% before the next actuarial valuation, the benefit level adjustment is supposed to be terminated, and the nature of benefits and burdens is to be examined. The data presented here are based on cases in which the benefit level were to be automatically adjusted until finances balanced.

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

(1) Projected number of covered persons

The projected number of covered persons is 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 number of covered persons in the 1st category and the 3rd category is calculated taking into account factors such as the proportion of female covered persons in the 3rd category.

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

Number of covered persons is calculated respectively for each of the underlying population projections and projections of labor force participation rates. The projected number of covered persons of each category under social security pension plans with the medium case of demographic assumptions are shown in Tables 2-18 through 2-20.

The number of covered persons under social security pension plans, when medium projections are used for demographic assumptions and participation in the labor market increases, comes to 67,300,000 in FY2019. It is then projected to continue to decline as the working-age population decreases, falling below 60,000,000 to hit 59,600,000 in FY2033. Then, 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 decrease to 47,800,000 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 the rate of 0.3% which is supposed to be 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 decrease rate of the 3-year average of covered persons of the period from three years ago till a year ago to the period from four years ago till two years ago).

Table 2-18 Projected number of covered persons under social security pension plans (2019 actuarial valuation)

Population: medium fertility scenario / medium mortality scenario, labor: the case in which labor participation advances

FY	Total	1st category	EPI			3rd category			Decrease rate of total (1)	(1) + 0.3% (2)
			Subtotal	Type 1 EPI	Type 2-4 EPI	Subtotal	Type 1 EPI	Type 2-4 EPI		
	millions	millions	millions	millions	millions	millions	millions	millions	%	%
2019	67.3	14.6	44.3	(39.9)	(4.5)	8.3	(7.5)	(0.9)	0.1	-0.2
2020 (2)	66.9	14.4	44.4	(39.9)	(4.5)	8.1	(7.3)	(0.9)	0.1	-0.2
2021 (3)	66.5	14.2	44.4	(39.9)	(4.4)	8.0	(7.1)	(0.8)	0.0	-0.3
2022 (4)	66.1	14.0	44.3	(39.9)	(4.4)	7.8	(7.0)	(0.8)	-0.2	-0.5
2023 (5)	65.7	13.8	44.2	(39.8)	(4.4)	7.6	(6.8)	(0.8)	-0.4	-0.7
2024 (6)	65.2	13.6	44.2	(39.8)	(4.4)	7.4	(6.7)	(0.8)	-0.6	-0.9
2025 (7)	64.7	13.3	44.1	(39.7)	(4.4)	7.3	(6.5)	(0.8)	-0.6	-0.9
2030 (12)	61.9	12.1	43.4	(39.2)	(4.2)	6.3	(5.7)	(0.7)	-0.8	-1.1
2035 (17)	57.9	10.7	41.6	(37.5)	(4.1)	5.6	(5.0)	(0.6)	-1.3	-1.6
2040 (22)	54.2	9.9	39.2	(35.3)	(3.9)	5.1	(4.6)	(0.6)	-1.3	-1.6
2050 (32)	47.8	8.8	34.4	(30.8)	(3.6)	4.6	(4.1)	(0.5)	-1.2	-1.5
2060 (42)	43.2	8.0	31.1	(27.8)	(3.3)	4.1	(3.6)	(0.5)	-1.0	-1.3
2070 (52)	38.7	7.1	27.9	(25.0)	(2.9)	3.7	(3.3)	(0.4)	-1.1	-1.4
2080 (62)	34.5	6.3	24.9	(22.3)	(2.6)	3.3	(2.9)	(0.4)	-1.2	-1.5
2090 (72)	31.0	5.7	22.3	(19.9)	(2.3)	3.0	(2.6)	(0.3)	-1.1	-1.4
2100 (82)	27.8	5.1	20.0	(17.9)	(2.1)	2.6	(2.3)	(0.3)	-1.1	-1.4
2110 (92)	24.8	4.6	17.9	(16.0)	(1.9)	2.4	(2.1)	(0.3)	-1.1	-1.4
2115 (97)	23.4	4.3	16.9	(15.1)	(1.8)	2.2	(2.0)	(0.3)	-1.1	-1.4

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).

Table 2-19 Projected number of covered persons under social security pension plans (2019 actuarial valuation)

Population: medium fertility scenario / medium mortality scenario, labor: the case in which labor participation advances to a certain degree

FY	Total	1st category	EPI			3rd category			Decrease rate of total (1)	(1) + 0.3% (2)
			Subtotal	Type 1 EPI	Type 2-4 EPI	Subtotal	Type 1 EPI	Type 2-4 EPI		
	millions	millions	millions	millions	millions	millions	millions	millions	%	%
2019	67.2	14.6	44.3	(39.8)	(4.5)	8.4	(7.5)	(0.9)	0.1	-0.2
2020 (2)	66.8	14.5	44.2	(39.7)	(4.5)	8.2	(7.3)	(0.9)	0.1	-0.2
2021 (3)	66.4	14.4	44.0	(39.6)	(4.4)	8.1	(7.2)	(0.8)	0.0	-0.3
2022 (4)	66.0	14.3	43.8	(39.3)	(4.4)	7.9	(7.1)	(0.8)	-0.2	-0.5
2023 (5)	65.5	14.1	43.5	(39.1)	(4.4)	7.8	(7.0)	(0.8)	-0.5	-0.8
2024 (6)	64.9	14.0	43.3	(38.9)	(4.4)	7.7	(6.9)	(0.8)	-0.6	-0.9
2025 (7)	64.4	13.8	43.0	(38.6)	(4.4)	7.5	(6.8)	(0.8)	-0.7	-1.0
2030 (12)	61.2	12.9	41.4	(37.2)	(4.2)	6.8	(6.1)	(0.7)	-0.9	-1.2
2035 (17)	57.1	11.5	39.5	(35.4)	(4.1)	6.0	(5.4)	(0.7)	-1.3	-1.6
2040 (22)	53.3	10.5	37.3	(33.4)	(3.9)	5.5	(4.8)	(0.6)	-1.4	-1.7
2050 (32)	47.1	9.3	32.8	(29.2)	(3.6)	4.9	(4.3)	(0.6)	-1.2	-1.5
2060 (42)	42.6	8.5	29.7	(26.4)	(3.3)	4.4	(3.8)	(0.5)	-1.0	-1.3
2070 (52)	38.1	7.6	26.6	(23.7)	(2.9)	3.9	(3.4)	(0.5)	-1.1	-1.4
2080 (62)	34.0	6.7	23.8	(21.1)	(2.6)	3.5	(3.1)	(0.4)	-1.2	-1.5
2090 (72)	30.5	6.1	21.3	(18.9)	(2.3)	3.1	(2.8)	(0.4)	-1.1	-1.4
2100 (82)	27.4	5.4	19.1	(17.0)	(2.1)	2.8	(2.5)	(0.3)	-1.1	-1.4
2110 (92)	24.4	4.8	17.1	(15.2)	(1.9)	2.5	(2.2)	(0.3)	-1.1	-1.4
2115 (97)	23.1	4.6	16.1	(14.3)	(1.8)	2.4	(2.1)	(0.3)	-1.1	-1.4

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).

Table 2-20 Projected number of covered persons under social security pension plans (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario,
labor: the case in which labor participation does not advance

FY	Total	1st category	EPI			3rd category			Decrease rate of total (1)	(1) + 0.3% (2)
			Subtotal	Type 1 EPI	Type 2-4 EPI	Subtotal	Type 1 EPI	Type 2-4 EPI		
	millions	millions	millions	millions	millions	millions	millions	millions	%	%
2019	67.2	14.7	44.1	(39.7)	(4.5)	8.4	(7.5)	(0.9)	0.1	-0.2
2020 (2)	66.8	14.6	43.9	(39.4)	(4.5)	8.3	(7.5)	(0.9)	0.1	-0.2
2021 (3)	66.3	14.6	43.5	(39.1)	(4.4)	8.2	(7.4)	(0.9)	0.0	-0.3
2022 (4)	65.9	14.6	43.1	(38.7)	(4.4)	8.1	(7.3)	(0.9)	-0.3	-0.6
2023 (5)	65.3	14.6	42.8	(38.3)	(4.4)	8.0	(7.2)	(0.8)	-0.5	-0.8
2024 (6)	64.8	14.5	42.4	(38.0)	(4.4)	7.9	(7.1)	(0.8)	-0.7	-1.0
2025 (7)	64.2	14.4	42.0	(37.6)	(4.4)	7.8	(7.0)	(0.8)	-0.7	-1.0
2030 (12)	61.0	13.6	40.2	(35.9)	(4.2)	7.2	(6.4)	(0.8)	-0.9	-1.2
2035 (17)	56.8	12.1	38.2	(34.1)	(4.1)	6.5	(5.8)	(0.7)	-1.4	-1.7
2040 (22)	52.9	11.1	35.8	(31.8)	(3.9)	6.1	(5.4)	(0.7)	-1.4	-1.7
2050 (32)	46.8	9.9	31.5	(27.9)	(3.6)	5.4	(4.8)	(0.6)	-1.2	-1.5
2060 (42)	42.3	9.0	28.5	(25.2)	(3.3)	4.9	(4.3)	(0.6)	-1.0	-1.3
2070 (52)	37.9	8.0	25.5	(22.6)	(2.9)	4.3	(3.8)	(0.5)	-1.1	-1.4
2080 (62)	33.8	7.1	22.8	(20.1)	(2.6)	3.9	(3.4)	(0.5)	-1.2	-1.5
2090 (72)	30.3	6.4	20.4	(18.1)	(2.3)	3.5	(3.1)	(0.4)	-1.1	-1.4
2100 (82)	27.2	5.8	18.3	(16.2)	(2.1)	3.1	(2.7)	(0.4)	-1.1	-1.4
2110 (92)	24.3	5.1	16.3	(14.5)	(1.9)	2.8	(2.5)	(0.3)	-1.1	-1.4
2115 (97)	22.9	4.9	15.4	(13.7)	(1.8)	2.6	(2.3)	(0.3)	-1.1	-1.4

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).

(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 FY2115. These projections are calculated for the financial equilibrium period after adjusting benefit levels by modified indexation so that reserves at the beginning of FY2115 equal one year's expenditures in FY2115.

Projected EPI and NP revenues, expenditures, and reserves when medium projections are adopted for the demographic assumptions and Cases I, III, and V are adopted for the economic assumptions are shown in Tables 2-21 through 2-26. Case V represents the scenario in which benefit levels are automatically adjusted beyond the minimum benefit level.

The balance of revenues and expenditures obtained by deducting expenditures from revenues is projected to increase in case of EPI as expenditures will be reduced by the raising of the pensionable age and modified indexation adjustment. Then, the balance is projected to fall. It should, however, be pointed out that, in spite of this fall, pension benefits will be maintained at a certain level. It is realized by drawing on the principal of the reserves.

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

Japan already has the world's oldest population and very low 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 onward, when birthrate decline and population aging will be most advanced.

NP, on the other hand, differs from EPI in that the reserve ratio continues to decline. It is clear that even if the benefit level of the Basic Pension is adjusted, expenditures will exceed revenues from contributions and the national subsidy, so the reserve will not increase, and the reserve ratio will gradually decrease from the current relatively high level as the reserves will be utilized over a long period of time.

Table 2-21 Financial projections for EPI (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case I (no fluctuation)

(For ref.)

FY	Total income (1)				Total expenditure (2)		Balance ((1)-(2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
		Contributions	Investment return	National subsidy		Transfer to the basic pension							
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	51.7	37.2	3.4	10.8	49.8	20.9	1.9	201.9	201.9	4.0	61.7	36.4	25.3
2020 (2)	52.3	37.7	3.4	11.0	50.5	21.2	1.8	203.7	202.1	4.0	61.6	36.3	25.3
2021 (3)	52.9	38.2	3.4	11.1	51.4	21.5	1.5	205.2	202.3	4.0	61.5	36.2	25.3
2022 (4)	53.7	38.8	3.5	11.2	52.2	21.8	1.5	206.7	202.1	3.9	61.4	36.1	25.3
2023 (5)	54.8	39.7	3.6	11.3	52.8	22.1	2.0	208.8	201.6	3.9	61.1	35.9	25.3
2024 (6)	56.1	40.9	3.6	11.5	53.7	22.4	2.4	211.2	200.2	3.9	60.9	35.6	25.3
2025 (7)	57.9	42.1	4.1	11.6	54.6	22.8	3.2	214.4	198.9	3.9	60.6	35.3	25.3
2030 (12)	73.3	48.6	12.1	12.6	60.7	25.0	12.6	254.7	202.1	4.0	58.9	33.7	25.3
2035 (17)	84.3	54.9	15.6	13.8	69.1	27.6	15.2	326.8	218.5	4.5	56.8	31.5	25.3
2040 (22)	96.5	61.6	19.4	15.6	80.8	31.1	15.7	405.3	227.1	4.8	54.3	29.0	25.3
2050 (32)	124.9	77.7	27.1	20.0	109.2	40.1	15.7	563.2	221.6	5.0	51.9	26.7	25.3
2060 (42)	161.3	100.0	34.9	26.4	145.0	52.8	16.3	724.4	200.1	4.9	51.9	26.7	25.3
2070 (52)	204.2	127.6	42.4	34.2	189.9	68.5	14.3	875.4	169.8	4.5	51.9	26.7	25.3
2080 (62)	254.9	162.2	49.0	43.7	242.9	87.3	11.9	1009.6	137.5	4.1	51.9	26.7	25.3
2090 (72)	316.3	207.3	53.1	55.8	311.3	111.7	5.0	1091.7	104.4	3.5	51.9	26.7	25.3
2100 (82)	388.6	264.6	52.7	71.2	397.5	142.4	-8.9	1075.7	72.2	2.7	51.9	26.7	25.3
2110 (92)	469.5	336.5	41.9	91.1	508.1	182.1	-38.6	838.6	39.5	1.7	51.9	26.7	25.3
2115 (97)	512.6	379.9	29.8	102.9	573.8	205.7	-61.3	580.0	22.9	1.1	51.9	26.7	25.3

Long-term economic assumptions

CPI increase rate		2.0%
Wage growth rate (real adjusted for CPI)		1.6%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real) 20-30 years from FY2029		0.9%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	51.9%	2046
Basic	25.3%	No adjustment
Earnings-related	26.7%	2046

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. Financial projections for EPI as a whole including the substitutional part of surviving Employees' Pension Funds
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

Table 2-22 Financial projections for NP (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case I (no fluctuation)

(For ref.)

FY	Total income (1)				Total expenditure (2)		Balance ((1)-(2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
		Contributions	Investment return	National subsidy		Transfer to the basic pension							
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	3.4	1.3	0.2	1.9	3.4	3.3	-0.1	11.4	11.4	3.3	61.7	36.4	25.3
2020 (2)	3.4	1.3	0.2	1.9	3.5	3.3	-0.1	11.4	11.3	3.3	61.6	36.3	25.3
2021 (3)	3.4	1.3	0.2	1.9	3.5	3.3	-0.1	11.3	11.1	3.3	61.5	36.2	25.3
2022 (4)	3.4	1.3	0.2	1.9	3.5	3.4	-0.1	11.1	10.9	3.2	61.4	36.1	25.3
2023 (5)	3.4	1.3	0.2	1.9	3.5	3.4	-0.1	11.0	10.6	3.1	61.1	35.9	25.3
2024 (6)	3.4	1.3	0.2	2.0	3.6	3.4	-0.1	10.9	10.3	3.1	60.9	35.6	25.3
2025 (7)	3.5	1.3	0.2	2.0	3.6	3.5	-0.1	10.8	10.0	3.0	60.6	35.3	25.3
2030 (12)	4.0	1.3	0.5	2.2	3.8	3.7	0.2	11.0	8.7	2.8	58.9	33.7	25.3
2035 (17)	4.4	1.4	0.6	2.4	4.1	4.0	0.3	12.3	8.2	2.9	56.8	31.5	25.3
2040 (22)	4.9	1.5	0.7	2.8	4.6	4.5	0.3	13.7	7.7	2.9	54.3	29.0	25.3
2050 (32)	6.5	1.9	0.9	3.7	6.1	6.0	0.4	17.6	6.9	2.8	51.9	26.7	25.3
2060 (42)	8.7	2.5	1.1	5.1	8.3	8.2	0.4	22.0	6.1	2.6	51.9	26.7	25.3
2070 (52)	11.2	3.2	1.3	6.7	10.7	10.7	0.4	26.3	5.1	2.4	51.9	26.7	25.3
2080 (62)	14.0	4.0	1.5	8.6	13.6	13.6	0.4	30.7	4.2	2.2	51.9	26.7	25.3
2090 (72)	17.8	5.2	1.7	10.9	17.4	17.4	0.3	34.5	3.3	2.0	51.9	26.7	25.3
2100 (82)	22.3	6.6	1.8	13.9	22.2	22.2	0.1	36.8	2.5	1.7	51.9	26.7	25.3
2110 (92)	27.8	8.3	1.7	17.8	28.3	28.3	-0.5	34.8	1.6	1.2	51.9	26.7	25.3
2115 (97)	31.0	9.4	1.5	20.1	32.0	31.9	-0.9	31.0	1.2	1.0	51.9	26.7	25.3

Long-term economic assumptions

CPI increase rate		2.0%
Wage growth rate (real adjusted for CPI)		1.6%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real) 20-30 years from FY2029		0.9%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	51.9%	2046
Basic	25.3%	No adjustment
Earnings-related	26.7%	2046

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. 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 FY2019 was ¥16,410 per month.
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

Table 2-23 Financial projections for EPI (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case III (no fluctuation)

(For ref.)

FY	Total income (1)	contributions	Investment return	National subsidy	Total expenditure (2)	Transfer to the basic pension	Balance ((1) - (2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	51.7	37.2	3.4	10.8	49.8	20.9	1.9	201.9	201.9	4.0	61.7	36.4	25.3
2020 (2)	52.3	37.7	3.4	11.0	50.4	21.2	1.9	203.8	202.1	4.0	61.5	36.3	25.2
2021 (3)	52.9	38.2	3.4	11.1	51.3	21.5	1.6	205.4	202.4	4.0	61.4	36.2	25.2
2022 (4)	53.7	38.8	3.5	11.2	51.9	21.8	1.7	207.1	202.4	4.0	61.1	36.1	25.0
2023 (5)	54.8	39.7	3.6	11.3	52.4	22.1	2.5	209.5	202.3	4.0	60.7	35.9	24.8
2024 (6)	56.1	40.9	3.6	11.5	53.1	22.4	3.0	212.6	201.6	3.9	60.2	35.6	24.6
2025 (7)	57.9	42.1	4.1	11.6	53.9	22.8	4.0	216.5	200.9	3.9	59.9	35.3	24.6
2030 (12)	70.0	47.6	9.8	12.5	59.5	24.8	10.5	255.5	202.7	4.1	58.3	33.7	24.6
2035 (17)	75.7	50.5	12.0	13.2	65.0	26.4	10.8	310.2	218.9	4.6	56.1	31.5	24.6
2040 (22)	81.5	53.3	13.9	14.3	72.6	28.6	8.9	358.8	226.0	4.8	53.6	29.0	24.6
2050 (32)	92.2	59.2	16.9	16.1	85.9	32.2	6.3	434.1	217.7	5.0	50.8	26.2	24.6
2060 (42)	104.7	67.2	19.1	18.4	99.8	36.8	4.8	489.0	195.4	4.8	50.8	26.2	24.6
2070 (52)	116.7	75.5	20.4	20.8	114.5	41.6	2.2	521.7	166.1	4.5	50.8	26.2	24.6
2080 (62)	128.8	84.6	20.9	23.3	129.1	46.7	-0.3	531.9	134.9	4.1	50.8	26.2	24.6
2090 (72)	141.6	95.3	20.0	26.3	145.8	52.6	-4.2	506.7	102.4	3.5	50.8	26.2	24.6
2100 (82)	154.1	107.3	17.3	29.5	164.0	59.1	-9.9	436.2	70.2	2.7	50.8	26.2	24.6
2110 (92)	165.2	120.2	11.6	33.3	184.8	66.6	-19.6	287.0	36.8	1.7	50.8	26.2	24.6
2115 (97)	169.9	127.4	7.2	35.3	196.0	70.6	-26.1	169.9	19.4	1.0	50.8	26.2	24.6

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.1%
ROI	Real (adjusted for CPI)	2.8%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real) 20-30 years from FY2029		0.4%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	50.8%	2047
Basic	24.6%	2025
Earnings-related	26.2%	2047

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. Financial projections for EPI as a whole including the substitutional part of surviving Employees' Pension Funds
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

Table 2-24 Financial projections for NP (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case III (no fluctuation)

(For ref.)

FY	Total income (1)	contributions	Investment return	National subsidy	Total expenditure (2)	Transfer to the basic pension	Balance ((1) - (2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	3.4	1.3	0.2	1.9	3.4	3.3	-0.1	11.4	11.4	3.3	61.7	36.4	25.3
2020 (2)	3.4	1.3	0.2	1.9	3.5	3.3	-0.1	11.4	11.3	3.3	61.5	36.3	25.2
2021 (3)	3.4	1.3	0.2	1.9	3.5	3.3	-0.1	11.3	11.1	3.3	61.4	36.2	25.2
2022 (4)	3.4	1.3	0.2	1.9	3.5	3.4	-0.1	11.1	10.9	3.2	61.1	36.1	25.0
2023 (5)	3.4	1.3	0.2	1.9	3.5	3.4	-0.1	11.0	10.6	3.1	60.7	35.9	24.8
2024 (6)	3.4	1.3	0.2	2.0	3.6	3.4	-0.1	10.9	10.3	3.1	60.2	35.6	24.6
2025 (7)	3.5	1.3	0.2	2.0	3.6	3.5	-0.1	10.8	10.0	3.0	59.9	35.3	24.6
2030 (12)	3.9	1.3	0.4	2.1	3.8	3.7	0.1	10.8	8.6	2.8	58.3	33.7	24.6
2035 (17)	4.1	1.3	0.4	2.3	3.9	3.8	0.1	11.5	8.1	2.9	56.1	31.5	24.6
2040 (22)	4.3	1.4	0.5	2.5	4.3	4.2	0.1	12.0	7.5	2.8	53.6	29.0	24.6
2050 (32)	5.0	1.5	0.5	3.0	4.9	4.8	0.1	13.1	6.6	2.7	50.8	26.2	24.6
2060 (42)	5.9	1.7	0.6	3.6	5.8	5.7	0.1	14.2	5.7	2.4	50.8	26.2	24.6
2070 (52)	6.6	1.9	0.6	4.1	6.5	6.5	0.1	14.9	4.8	2.3	50.8	26.2	24.6
2080 (62)	7.3	2.2	0.6	4.6	7.3	7.2	0.0	15.5	3.9	2.1	50.8	26.2	24.6
2090 (72)	8.2	2.4	0.6	5.1	8.2	8.2	-0.0	15.4	3.1	1.9	50.8	26.2	24.6
2100 (82)	9.1	2.7	0.6	5.8	9.2	9.2	-0.1	14.7	2.4	1.6	50.8	26.2	24.6
2110 (92)	10.1	3.1	0.5	6.5	10.4	10.3	-0.3	12.5	1.6	1.2	50.8	26.2	24.6
2115 (97)	10.6	3.3	0.4	6.9	11.0	11.0	-0.4	10.6	1.2	1.0	50.8	26.2	24.6

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.1%
ROI	Real (adjusted for CPI)	2.8%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real) 20-30 years from FY2029		0.4%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	50.8%	2047
Basic	24.6%	2025
Earnings-related	26.2%	2047

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. 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 FY2019 was ¥16,410 per month.
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

Table 2-25 Financial projections for EPI (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case V (no fluctuation)
(if benefit levels continue to be automatically adjusted)

(For ref.)

FY	Total income (1)	contributions	Investment return	National subsidy	Total expenditure (2)	Transfer to the basic pension	Balance ((1)-(2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	51.6	37.2	3.4	10.8	49.8	20.9	1.8	201.9	201.9	4.0	61.7	36.4	25.3
2020 (2)	52.2	37.6	3.4	10.9	50.4	21.2	1.7	203.6	201.9	4.0	61.5	36.3	25.2
2021 (3)	52.5	37.8	3.4	11.0	51.3	21.4	1.2	204.8	201.9	4.0	61.4	36.2	25.2
2022 (4)	52.8	38.0	3.5	11.1	51.8	21.7	1.0	205.8	201.2	4.0	61.1	36.1	25.0
2023 (5)	52.7	38.2	3.1	11.2	51.8	21.8	0.9	206.7	200.1	4.0	60.7	35.8	24.8
2024 (6)	52.8	38.5	2.9	11.2	52.1	21.9	0.7	207.4	198.9	4.0	60.1	35.5	24.6
2025 (7)	53.2	38.9	3.1	11.2	52.1	22.0	1.2	208.6	197.8	4.0	59.6	35.2	24.3
2030 (12)	57.7	40.2	6.1	11.4	53.0	22.6	4.7	223.6	198.2	4.1	56.4	33.4	23.0
2035 (17)	59.7	41.1	6.8	11.8	55.6	23.5	4.0	246.7	202.4	4.4	53.7	31.1	22.6
2040 (22)	61.5	41.9	7.2	12.4	59.8	24.8	1.6	259.9	196.9	4.3	51.3	28.7	22.6
2050 (32)	63.4	43.6	7.3	12.5	63.6	25.0	-0.3	262.7	169.9	4.1	47.1	24.5	22.6
2060 (42)	65.4	46.2	7.2	11.9	65.4	23.9	-0.1	261.8	144.4	4.0	44.5	21.9	22.6
2070 (52)	67.6	48.5	7.0	12.1	68.8	24.2	-1.1	254.1	119.6	3.7	44.5	21.9	22.6
2080 (62)	69.8	50.7	6.6	12.4	71.7	24.8	-1.9	239.5	96.2	3.4	44.5	21.9	22.6
2090 (72)	72.3	53.4	5.9	13.0	75.4	26.0	-3.1	213.1	73.0	2.9	44.5	21.9	22.6
2100 (82)	74.5	56.0	4.9	13.6	79.2	27.2	-4.6	174.5	51.0	2.3	44.5	21.9	22.6
2110 (92)	76.3	58.6	3.3	14.3	83.2	28.7	-7.0	115.9	28.9	1.5	44.5	21.9	22.6
2115 (97)	77.0	60.0	2.2	14.7	85.3	29.4	-8.3	77.0	17.7	1.0	44.5	21.9	22.6

Long-term economic assumptions

CPI increase rate		0.8%
Wage growth rate (real adjusted for CPI)		0.8%
ROI	Real (adjusted for CPI)	2.0%
	Spread (adjusted for wages)	1.2%
Economic growth rate (real) 20-30 years from FY2029		0.0%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	44.5%	2058
Basic	22.6%	2032
Earnings-related	21.9%	2058

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. Financial projections for EPI as a whole including the substitutional part of surviving Employees' Pension Funds
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

Table 2-26 Financial projections for NP (2019 actuarial valuation)
Population: medium fertility scenario / medium mortality scenario, economy: Case V (no fluctuation)
(if benefit levels continue to be automatically adjusted)

(For ref.)

FY	Total income (1)	contributions	Investment return	National subsidy	Total expenditure (2)	Transfer to the basic pension	Balance ((1)-(2))	Reserve at the end of the year (F)	(F) in FY2019 value	Reserve ratio	Replacement r	Basic	Earnings-related
	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion	JPY in trillion		%	%	%
2019	3.4	1.3	0.2	1.9	3.4	3.3	-0.1	11.4	11.4	3.3	61.7	36.4	25.3
2020 (2)	3.4	1.3	0.2	1.9	3.5	3.3	-0.1	11.3	11.3	3.3	61.5	36.3	25.2
2021 (3)	3.4	1.3	0.2	1.9	3.5	3.4	-0.1	11.2	11.1	3.2	61.4	36.2	25.2
2022 (4)	3.5	1.3	0.2	1.9	3.6	3.4	-0.1	11.1	10.9	3.1	61.1	36.1	25.0
2023 (5)	3.5	1.3	0.2	2.0	3.6	3.5	-0.1	11.0	10.6	3.1	60.7	35.8	24.8
2024 (6)	3.5	1.3	0.2	2.0	3.6	3.5	-0.2	10.8	10.4	3.0	60.1	35.5	24.6
2025 (7)	3.5	1.3	0.2	2.0	3.6	3.5	-0.2	10.6	10.1	3.0	59.6	35.2	24.3
2030 (12)	3.7	1.3	0.3	2.1	3.7	3.6	-0.1	10.0	8.9	2.7	56.4	33.4	23.0
2035 (17)	3.7	1.2	0.3	2.2	3.8	3.7	-0.1	9.5	7.8	2.5	53.7	31.1	22.6
2040 (22)	3.8	1.2	0.2	2.3	4.0	3.9	-0.2	8.7	6.6	2.2	51.3	28.7	22.6
2050 (32)	3.9	1.3	0.2	2.5	4.1	4.0	-0.2	6.7	4.3	1.7	47.1	24.5	22.6
2060 (42)	4.0	1.3	0.2	2.5	4.0	4.0	-0.1	5.6	3.1	1.4	44.5	21.9	22.6
2070 (52)	4.1	1.4	0.1	2.5	4.1	4.1	-0.0	5.1	2.4	1.2	44.5	21.9	22.6
2080 (62)	4.2	1.5	0.1	2.6	4.2	4.2	-0.0	4.9	2.0	1.2	44.5	21.9	22.6
2090 (72)	4.4	1.6	0.1	2.7	4.4	4.4	0.0	4.9	1.7	1.1	44.5	21.9	22.6
2100 (82)	4.6	1.6	0.1	2.9	4.6	4.6	0.0	5.0	1.5	1.1	44.5	21.9	22.6
2110 (92)	4.8	1.7	0.1	3.0	4.8	4.8	-0.0	5.0	1.2	1.0	44.5	21.9	22.6
2115 (97)	5.0	1.7	0.1	3.1	5.0	4.9	-0.0	5.0	1.1	1.0	44.5	21.9	22.6

Long-term economic assumptions

CPI increase rate		0.8%
Wage growth rate (real adjusted for CPI)		0.8%
ROI	Real (adjusted for CPI)	2.0%
	Spread (adjusted for wages)	1.2%
Economic growth rate (real) 20-30 years from FY2029		0.0%

	Replacement ratio (after end of benefit level adjustment)	Last year of benefit level adjustment
Replacement ratio	44.5%	2058
Basic	22.6%	2032
Earnings-related	21.9%	2058

Contribution rate for EPI	18.3%
Monthly contribution rate for NP (FY2004 value)	¥17,000

Notes: 1. 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 FY2019 was ¥16,410 per month.
2. "FY2019 value" was calculated by converting to prices in FY2019 by the wage growth rate.
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.

(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 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 subsidy. Here the reference people means the people aged 20-59 covered under the EPI (after unification), the dependent spouses aged 20-59 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 number 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 I, III, and V are used for the economic assumptions are shown in Tables 2-27 through 2-29. Case V represents the scenario in which benefit levels are automatically adjusted beyond the minimum benefit level.

In Cases I and III, the unit transfer payment (FY2004 value), which is the transfer payment per covered people on which calculation of transfer payments is based, increases from FY2019 to around FY2025 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. Then, the unit transfer payment is projected to level off or slightly decrease toward 2030. This is temporary 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 portion of the unit transfer payment (FY2004 value) financed by the contributions ultimately climbs to the ¥21,000 level in Cases I and III, which is considerably higher than the ¥17,000 ceiling on NP contributions. This difference represents the portion of the NP expenditure largely secured by using the reserve, and it indicates that the reserve is making a significant contribution to maintaining the benefit level. In Case V, on the other hand, the unit transfer payment after termination of benefit level adjustment is around ¥18,000, which is close to ¥17,000 when compared to the economic growth case. This indicates NP is being financed in a manner similar to a PAYG system.

Case V indicates that the reserve that can be used in the future when population aging is most advanced will be relatively small as some amount of the reserve is used before the peak of a super-aged society (after the second-generation baby boomers have entered old age) due primarily to the delayed termination year of benefit level adjustment.

Table 2-27 Financial projections for Basic Pension (2019 actuarial valuation)

○Population: medium fertility scenario / medium mortality scenario, economy: Case I

Long-term economic assumptions		
CPI increase rate		2.0%
Wage growth rate (real adjusted for CPI)		1.6%
ROI	Real (adjusted for CPI)	3.0%
	Spread (adjusted for wages)	1.4%
Economic growth rate (real) 20-30 years from FY2029		0.9%

Replacement ratio		Basic	Earnings-related
Replacement ratio (after end of benefit level adjustment)	51.9%	26.7%	25.3%
Last year of benefit level adjustment	2046	2046	No adjustment

FY	① Basic Pension benefits (JPY in trillion)	② Basic Pension national subsidies (JPY in trillion)	③ Amount of transfer to the Basic Pension (JPY in trillion) (FY2004 value)	④ Number of reference people (millions)	⑤ Unit transfer payment (monthly amount) (③÷④)÷12 (FY2004 value) (JPY)	⑥ Contribution equivalent (monthly amount) ⑤÷(1-national subsidy rate) (FY2004 value) (JPY)	FY	Total (millions)	1st category (millions)	Employees in EPI & MAAs 2nd category (millions)	Employees in EPI & MAAs 3rd category (millions)	EPI 2nd category (millions)	EPI 3rd category (millions)	MAAs 2nd category (millions)	MAAs 3rd category (millions)
2019	24.2	12.3	23.8 (24.7)	54.4	(37,785)	(18,893)	2019	54.4	6.6	39.4	8.3	35.2	7.5	4.2	0.9
2020 (2)	24.5	12.5	24.1 (24.8)	54.2	(38,151)	(19,075)	2020 (2)	54.2	6.5	39.5	8.1	35.3	7.3	4.2	0.9
2021 (3)	24.8	12.6	24.4 (24.9)	53.9	(38,576)	(19,288)	2021 (3)	53.9	6.5	39.5	8.0	35.3	7.1	4.2	0.8
2022 (4)	25.2	12.8	24.7 (25.1)	53.5	(39,017)	(19,508)	2022 (4)	53.5	6.4	39.4	7.8	35.2	7.0	4.2	0.8
2023 (5)	25.5	13.0	25.0 (25.1)	53.2	(39,274)	(19,637)	2023 (5)	53.2	6.3	39.2	7.6	35.1	6.8	4.1	0.8
2024 (6)	25.9	13.2	25.4 (25.0)	52.7	(39,469)	(19,735)	2024 (6)	52.7	6.2	39.1	7.4	34.9	6.7	4.1	0.8
2025 (7)	26.3	13.4	25.8 (24.8)	52.2	(39,598)	(19,799)	2025 (7)	52.2	6.1	38.9	7.3	34.7	6.5	4.1	0.8
2030 (12)	28.6	14.6	28.1 (23.1)	49.1	(39,107)	(19,553)	2030 (12)	49.1	5.4	37.4	6.3	33.4	5.7	4.0	0.7
2035 (17)	31.6	16.2	30.8 (21.4)	45.1	(39,509)	(19,755)	2035 (17)	45.1	4.8	34.6	5.6	30.8	5.0	3.8	0.6
2040 (22)	35.6	18.3	34.7 (20.1)	42.1	(39,843)	(19,922)	2040 (22)	42.1	4.4	32.6	5.1	28.9	4.6	3.7	0.6
2050 (32)	46.1	23.8	44.7 (18.2)	37.7	(40,209)	(20,105)	2050 (32)	37.7	3.9	29.2	4.6	25.9	4.1	3.4	0.5
2060 (42)	61.0	31.5	58.9 (16.9)	34.0	(41,353)	(20,677)	2060 (42)	34.0	3.5	26.3	4.1	23.3	3.6	3.1	0.5
2070 (52)	79.2	41.0	76.4 (15.4)	30.4	(42,060)	(21,030)	2070 (52)	30.4	3.2	23.6	3.7	20.8	3.3	2.7	0.4
2080 (62)	100.9	52.2	97.4 (13.7)	27.1	(42,224)	(21,112)	2080 (62)	27.1	2.8	21.0	3.3	18.6	2.9	2.4	0.4
2090 (72)	129.1	66.8	124.6 (12.3)	24.4	(42,150)	(21,075)	2090 (72)	24.4	2.5	18.9	3.0	16.7	2.6	2.2	0.3
2100 (82)	164.6	85.2	158.9 (11.1)	21.8	(42,209)	(21,105)	2100 (82)	21.8	2.3	16.9	2.6	15.0	2.3	2.0	0.3
2110 (92)	210.4	108.8	203.1 (9.9)	19.5	(42,440)	(21,220)	2110 (92)	19.5	2.0	15.1	2.4	13.3	2.1	1.8	0.3
2115 (97)	237.7	122.9	229.5 (9.4)	18.4	(42,435)	(21,218)	2115 (97)	18.4	1.9	14.3	2.2	12.6	2.0	1.7	0.3

Notes: 1. The amount of national subsidy ② includes the local government subsidy for the Basic Pension transfer payment.
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 ( ). In addition, the contribution exemption system for the period before and after childbirth for the first category of covered persons came into effect in April 2019, so the contribution equivalent will increase by 100 yen in FY2004 value from FY2019. For this reason, in FY2019 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥17,000 per month in FY2004 value, and the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥16,410 per month.

Table 2-28   Financial projections for Basic Pension (2019 actuarial valuation)

○Population: medium fertility scenario / medium mortality scenario, economy: Case III

Long-term economic assumptions		
CPI increase rate		1.2%
Wage growth rate (real adjusted for CPI)		1.1%
ROI	Real (adjusted for CPI)	2.8%
	Spread (adjusted for wages)	1.7%
Economic growth rate (real) 20-30 years from FY2029		0.4%

Replacement ratio		Basic	Earnings-related
Replacement ratio (after end of benefit level adjustment)	50.8%	26.2%	24.6%
Last year of benefit level adjustment	2047	2047	2025

FY	① Basic Pension benefits (JPY in trillion)	② Basic Pension national subsidies (JPY in trillion)	③ Amount of transfer to the Basic Pension (JPY in trillion) (FY2004 value)	④ Number of reference people (millions)	⑤ Unit transfer payment (monthly amount) (③÷④)÷12 (FY2004 value) (JPY)	⑥ Contribution equivalent (monthly amount) ⑤÷(1-national subsidy rate) (FY2004 value) (JPY)	FY	Total (millions)	1st category (millions)	Employees in EPI & MAAs 2nd category (millions)	Employees in EPI & MAAs 3rd category (millions)	EPI 2nd category (millions)	EPI 3rd category (millions)	MAAs 2nd category (millions)	MAAs 3rd category (millions)
2019	24.2	12.3	23.8 (24.7)	54.4	(37,785)	(18,893)	2019	54.4	6.6	39.4	8.3	35.2	7.5	4.2	0.9
2020 (2)	24.5	12.5	24.1 (24.8)	54.2	(38,151)	(19,075)	2020 (2)	54.2	6.5	39.5	8.1	35.3	7.3	4.2	0.9
2021 (3)	24.8	12.6	24.4 (24.9)	53.9	(38,576)	(19,288)	2021 (3)	53.9	6.5	39.5	8.0	35.3	7.1	4.2	0.8
2022 (4)	25.2	12.8	24.7 (25.1)	53.5	(39,017)	(19,508)	2022 (4)	53.5	6.4	39.4	7.8	35.2	7.0	4.2	0.8
2023 (5)	25.5	13.0	25.0 (25.1)	53.2	(39,274)	(19,637)	2023 (5)	53.2	6.3	39.2	7.6	35.1	6.8	4.1	0.8
2024 (6)	25.9	13.2	25.4 (25.0)	52.7	(39,469)	(19,735)	2024 (6)	52.7	6.2	39.1	7.4	34.9	6.7	4.1	0.8
2025 (7)	26.3	13.4	25.8 (24.8)	52.2	(39,598)	(19,799)	2025 (7)	52.2	6.1	38.9	7.3	34.7	6.5	4.1	0.8
2030 (12)	28.5	14.5	27.9 (22.9)	49.1	(38,851)	(19,425)	2030 (12)	49.1	5.4	37.4	6.3	33.4	5.7	4.0	0.7
2035 (17)	30.2	15.5	29.5 (21.6)	45.1	(39,892)	(19,946)	2035 (17)	45.1	4.8	34.6	5.6	30.8	5.0	3.8	0.6
2040 (22)	32.8	16.8	31.9 (20.8)	42.1	(41,271)	(20,636)	2040 (22)	42.1	4.4	32.6	5.1	28.9	4.6	3.7	0.6
2050 (32)	37.0	19.1	35.9 (18.6)	37.7	(41,191)	(20,596)	2050 (32)	37.7	3.9	29.2	4.6	25.9	4.1	3.4	0.5
2060 (42)	42.5	22.0	41.1 (17.0)	34.0	(41,715)	(20,858)	2060 (42)	34.0	3.5	26.3	4.1	23.3	3.6	3.1	0.5
2070 (52)	48.1	24.9	46.4 (15.3)	30.4	(41,940)	(20,970)	2070 (52)	30.4	3.2	23.6	3.7	20.8	3.3	2.7	0.4
2080 (62)	53.9	27.9	52.0 (13.7)	27.1	(42,021)	(21,011)	2080 (62)	27.1	2.8	21.0	3.3	18.6	2.9	2.4	0.4
2090 (72)	60.8	31.4	58.7 (12.3)	24.4	(41,938)	(20,969)	2090 (72)	24.4	2.5	18.9	3.0	16.7	2.6	2.2	0.3
2100 (82)	68.3	35.3	65.9 (11.0)	21.8	(41,978)	(20,989)	2100 (82)	21.8	2.3	16.9	2.6	15.0	2.3	2.0	0.3
2110 (92)	76.9	39.8	74.3 (9.9)	19.5	(42,213)	(21,106)	2110 (92)	19.5	2.0	15.1	2.4	13.3	2.1	1.8	0.3
2115 (97)	81.6	42.2	78.8 (9.3)	18.4	(42,217)	(21,108)	2115 (97)	18.4	1.9	14.3	2.2	12.6	2.0	1.7	0.3

Notes: 1. The amount of national subsidy ② includes the local government subsidy for the Basic Pension transfer payment.
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 ( ). In addition, the contribution exemption system for the period before and after childbirth for the first category of covered persons came into effect in April 2019, so the contribution equivalent will increase by 100 yen in FY2004 value from FY2019. For this reason, in FY2019 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥17,000 per month in FY2004 value, and the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥16,410 per month.

Table 2-29 Financial projections for Basic Pension (2019 actuarial valuation)

○Population: medium fertility scenario / medium mortality scenario, economy: Case V
(if benefit levels continue to be automatically adjusted)

Long-term economic assumptions	
CPI increase rate	0.8%
Wage growth rate (real adjusted for CPI)	0.8%
ROI — Real (adjusted for CPI)	2.0%
ROI — Spread (adjusted for wages)	1.2%
Economic growth rate (real) 20-30 years from FY2029	0.0%

		Basic	Earnings-related
	Replacement ratio		
Replacement ratio (after end of benefit level adjustment)	44.5%	21.9%	22.6%
Last year of benefit level adjustment	2058	2058	2032

FY	① Basic Pension benefits	② Basic Pension national subsidies	③ Amount of transfer to the Basic Pension (FY2004 value)	④ Number of reference people	⑤ Unit transfer payment (monthly amount) (③÷④÷12) (FY2004 value)	⑥ Contribution equivalent (monthly amount) (⑤×(1-national subsidy rate)) (FY2004 value)	FY	Total	1st category	Employees in EPI & MAAs 2nd category	Employees in EPI & MAAs 3rd category	EPI 2nd category	EPI 3rd category	MAAs 2nd category	MAAs 3rd category
	JPY in trillion	JPY in trillion	JPY in trillion	millions	JPY	JPY		millions	millions	millions	millions	millions	millions	millions	millions
2019	24.2	12.3	23.8 (24.7)	54.4	(37,790)	(18,895)	2019	54.4	6.6	39.4	8.4	35.2	7.5	4.2	0.9
2020 (2)	24.5	12.5	24.1 (24.8)	54.1	(38,172)	(19,086)	2020 (2)	54.1	6.6	39.4	8.2	35.2	7.3	4.2	0.9
2021 (3)	24.8	12.6	24.4 (24.9)	53.8	(38,616)	(19,308)	2021 (3)	53.8	6.5	39.2	8.1	35.0	7.2	4.2	0.8
2022 (4)	25.1	12.8	24.7 (25.0)	53.4	(38,978)	(19,489)	2022 (4)	53.4	6.5	39.0	7.9	34.8	7.1	4.2	0.8
2023 (5)	25.2	12.8	24.8 (24.9)	53.0	(39,133)	(19,566)	2023 (5)	53.0	6.5	38.7	7.8	34.6	7.0	4.1	0.8
2024 (6)	25.4	12.9	25.0 (24.8)	52.5	(39,333)	(19,666)	2024 (6)	52.5	6.4	38.4	7.7	34.3	6.9	4.1	0.8
2025 (7)	25.5	13.0	25.1 (24.6)	52.0	(39,492)	(19,746)	2025 (7)	52.0	6.3	38.1	7.5	34.0	6.8	4.1	0.8
2030 (12)	26.2	13.4	25.7 (23.6)	48.8	(40,267)	(20,134)	2030 (12)	48.8	5.9	36.0	6.8	32.1	6.1	4.0	0.7
2035 (17)	27.2	13.9	26.5 (22.6)	44.7	(42,034)	(21,017)	2035 (17)	44.7	5.2	33.5	6.0	29.7	5.4	3.8	0.7
2040 (22)	28.7	14.7	27.9 (21.9)	41.8	(43,702)	(21,851)	2040 (22)	41.8	4.7	31.7	5.5	28.0	4.8	3.7	0.6
2050 (32)	29.0	14.9	28.1 (18.8)	37.5	(41,834)	(20,917)	2050 (32)	37.5	4.2	28.4	4.9	25.1	4.3	3.4	0.6
2060 (42)	27.9	14.4	26.9 (15.4)	33.8	(37,966)	(18,983)	2060 (42)	33.8	3.8	25.6	4.4	22.5	3.8	3.1	0.5
2070 (52)	28.3	14.7	27.3 (13.3)	30.2	(36,730)	(18,365)	2070 (52)	30.2	3.4	22.9	3.9	20.2	3.4	2.7	0.5
2080 (62)	29.0	15.0	28.0 (11.6)	26.9	(36,010)	(18,005)	2080 (62)	26.9	3.0	20.4	3.5	18.0	3.1	2.4	0.4
2090 (72)	30.4	15.7	29.3 (10.4)	24.2	(35,738)	(17,869)	2090 (72)	24.2	2.7	18.4	3.1	16.2	2.8	2.2	0.4
2100 (82)	31.8	16.5	30.7 (9.3)	21.7	(35,745)	(17,872)	2100 (82)	21.7	2.4	16.4	2.8	14.5	2.5	2.0	0.3
2110 (92)	33.5	17.3	32.3 (8.3)	19.4	(35,937)	(17,968)	2110 (92)	19.4	2.2	14.7	2.5	12.9	2.2	1.8	0.3
2115 (97)	34.3	17.8	33.1 (7.9)	18.3	(35,947)	(17,974)	2115 (97)	18.3	2.1	13.9	2.4	12.2	2.1	1.7	0.3

Notes: 1. The amount of national subsidy ② includes the local government subsidy for the Basic Pension transfer payment.

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 ( ). In addition, the contribution exemption system for the period before and after childbirth for the first category of covered persons came into effect in April 2019, so the contribution equivalent will increase by 100 yen in FY2004 value from FY2019. For this reason, in FY2019 the NP contribution provided for in Article 87, paragraph 3 of the National Pension Act was ¥17,000 per month in FY2004 value, and the actual contribution was revised in accordance with the CPI increase rate and wage growth following the 2004 reforms, and so came to ¥16,410 per month.

Section 3	Financial Implications of the Reform Options

On the 2014 actuarial valuation, in addition to the financial projections of the then- current social security pension systems, financial effects of reform options were shown. It was requested by the National Council of the Social Security Reform in 2013. Many members of the Parliament, scholars and people concerned with pension systems found the results very useful for their discussions.

On the 2019 actuarial valuation, the Pension Subcommittee of the Social Security Council which is an advisory organ to the Minister of Health, Labour and Welfare, asked the government to show financial effects of reform options in addition to the primary estimates based on the current system, knowing that they were informative to the reform discussion on the basis of the 2014 experience.

In the 2019 actuarial valuation, estimation was performed with two specific reform options and also with one subject for reference, as follows, to find when the modified indexation would end and what the ultimate benefit levels would be.

○Option A: Further expansion of employee pension plan coverage to the non-regular workers

○Option B: Extension of contribution payment period of the covered persons in the 1st category and increase of delaying choice of when to start receiving benefits

○Referential estimation: Effect of the pension amount revision rules under the Pension Reform Act of 2016

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

1. Option A: Further expansion of employee pension plan coverage

(1) Estimation assumptions

With regard to the employee pension insurance, the coverage has been expanded to part-time workers in October 2016 and April 2017, and the number of those covered by this expansion was 435,000 at the end of FY2018.

Coverage has been expanded to part-time workers who meet the following requirements since October 2016: i) 20 or more working hours per week, ii) monthly wage of 88,000 yen or more, iii) expected period of service of one year or more, iv) non-students, and v) companies with 501 or more employees (applicable to the national and local governments regardless of the size), and in addition, since April 2017, companies with 500 or fewer employees have been able to extend the coverage to

part-time workers on a company-by-company basis based on labor-management agreement.

Option A assumes that coverage would be expanded further, and estimates were calculated for the following three expansion scenarios (Figure 3-1).

Coverage expansion (1) (of 1.25 million): the case where the current company size requirement is abolished

・Assuming that coverage is expanded to 1.25 million part-time workers with 20 or more regular working hours per week and income above a certain level (88,000 yen per month), and that the ratio of those covered among part-time workers remains constant thereafter.

Coverage expansion (2) (of 3.25 million): the case where the current wage and company size requirements are abolished

・Coverage is expanded to all part-time workers with 20 or more regular working hours, except for the following: Students, people who have worked for less than one year, and employees of workplaces not covered by social insurance

Coverage expansion (3) (of 10.50 million): the case where coverage is expanded to all employees with income above a certain level (58,000 yen per month)

・Coverage is expanded to students, people who have worked for less than one year, and employees of workplaces not covered by social insurance as well. (Only employees who earn less than 58,000 yen per month are not covered.)

Figure 3-1 Number of people additionally covered with Option A (further expansion of employee insurance coverage) (as of FY2018)

[Addition to the number of covered people (in 10,000s)]

	Total	The 1st category to the 2nd category	The 3rd category to the 2nd category	Non-covered to covered person in the 2nd category
Coverage expansion (1)	125	45	40	40
Coverage expansion (2)	325	90	155	80
Coverage expansion (3)	1,050	400	350	300

All employees: 57,000,000
*aged under 70

Full-time 47,000,000

Covered under EPI 44,000,000 (full-time)

Full-time 3,000,000

Covered under EPI (part-time)

20-30 hours Approx. 4,000,000

(3) 10,500,000

Three quarters (30 hours/week)

20-30 hours

Not full-time 4,500,000

400,000
· 501 or more employees
· At least ¥88,000/month

(1) 1,250,000
· 500 or fewer employees
· At least ¥88,000/month

(2) 3,250,000

Students 200,000

Employment contract for less than 1 year (Note 1) 300,000

Not full-time 10,000,000

Under 20 hours 5,500,000

Less than 58,000 yen per month 2,000,000

Workplaces covered by social insurance

Workplaces not covered by social insurance

Notes: 1. Excludes those who are under a less than one year employment contract but have been employed for one year or more at the same workplace through renewal, etc.
2. Estimated using the "2018 average from Labor Force Survey," "2016 Survey on Public Pension Enrollment," and special summaries of the "2017 Employment Status Survey."

(2) Estimation results

Estimates of how much sooner benefit level adjustment would be concluded and to what extent future benefit levels would rise in the event of the further expansion of employee insurance coverage are shown in Figure 3-2.

The estimates were calculated based on medium projections (medium fertility scenario and medium mortality scenario) for the demographic assumptions, and three scenarios (Cases I, III, and V) for the economic assumptions.

Figure 3-2 Estimation results with Option A (further expansion of employee pension plan coverage)

(1)The case in which the company size requirement for employee insurance coverage is abolished (coverage expansion of 1.25 million)
   Assuming that coverage is expanded to 1.25 million part-time workers with 20 or more regular working hours per week and income above a certain level (88,000 yen per month), and that the ratio of those covered among part-time workers remains constant thereafter.
(2)The case in which the wage and company size requirements for employee insurance coverage are abolished (coverage expansion of 3.25 million)
   Coverage is expanded to all part-time workers with 20 or more regular working hours unless otherwise specified.
(3)The case in which coverage is expanded to all employees with an income above a certain level (coverage expansion of 10.50 million)
   Coverage is expanded to all part-time workers with 20 or more regular working hours unless otherwise specified.
*For the sake of convenience, estimates are calculated based on the assumption that further expansion of coverage is implemented in April 2024. In addition, further expansion of coverage is not expected to bring about changes in employment.

	Current system		(1)Coverage expansion of 1.25 million	(2)Coverage expansion of 3.25 million	(3)Coverage expansion of 10.50 million
	EPI standard pension replacement ratio after end of benefit level adjustment	Last year of benefit level adjustment			
Case I	51.9% (2046) Earnings-related: 25.3% (no adjustment) Basic: 26.7% (2046)		52.4% (2045) Earnings-related: 25.2% (2021) Basic: 27.2% (2045) <<+0.5%>>	52.8% (2045) Earnings-related: 25.1% (2022) Basic: 27.8% (2045) <<+0.9%>>	56.2% (2039) Earnings-related: 24.6% (2025) Basic: 31.6% (2039) <<+4.3%>>
Case III	50.8% (2047) Earnings-related: 24.6% (2025) Basic: 26.2% (2047)		51.4% (2046) Earnings-related: 24.5% (2025) Basic: 26.8% (2046) <<+0.5%>>	51.9% (2045) Earnings-related: 24.4% (2026) Basic: 27.6% (2045) <<+1.1%>>	55.7% (2039) Earnings-related: 23.7% (2031) Basic: 31.9% (2039) <<+4.8%>>
Case V	44.5% (2058) Earnings-related: 22.6% (2032) Basic: 21.9% (2058)		45.0% (2057) Earnings-related: 22.5% (2032) Basic: 22.4% (2057) <<+0.4%>>	45.4% (2056) Earnings-related: 22.4% (2033) Basic: 22.9% (2056) <<+0.8%>>	49.0% (2047) Earnings-related: 21.7% (2037) Basic: 27.2% (2047) <<+4.5%>>

Notes: 1. Demographic assumptions based on medium projections (medium fertility scenario, medium mortality scenario)
2. The NP contribution compliance rate is assumed to increase by around 0.2% in (1), 0.4% in (2), and 2.4% in (3) due to the expansion of EPI coverage to part-time workers, among whom the contribution compliance rate is low.

Compared to the current system, the replacement ratio will improve by 0.4-0.5% in the case of Coverage expansion (1), by 0.8-1.1% in the case of Coverage expansion (2), and by 4.3-4.8% in the case of Coverage expansion (3). Indexation adjustment ends early, especially in the case of Coverage expansion (3), 7 to 11 years earlier. Looking at the breakdown, it can be seen that the Basic Pension portion improved in each case, while the earnings-related portion remained flat or declined slightly.

2. Option B: Extension of contribution payment period and of delaying choice of when to start receiving benefits

(1) Estimation assumptions

The results of the actuarial valuation based on the current system have revealed that, even in the "case in which economic growth and labor participation advance" described in the "Labor Supply and Demand Estimates" (published in March 2019), 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.

Therefore, estimation with Option B aims to examine how to ensure and enhance the level of pensions by extending the working period, based on the basic idea of "incorporating changes in employment, which is becoming longer and more diverse, in the pension system and enhancing the economic foundation for extended senior years."

In estimation with Option B, the following four system reforms are assumed, and estimates are also made for the case where all of these system reforms are together implemented (Figure 3-3).

Option B-(1): The case in which the Basic Pension enrollment period is extended from the current period of ages 20-59 to ages 20-64

Option B-(2): The case in which benefit reduction of old-age pension for beneficiaries still working aged 65 or older are relaxed or abolished.

Option B-(3): The case in which the upper age limit for EPI enrollment is extended from the current 70 to 75

Option B-(4): The case in which individuals choose to defer benefits or extend the working period. This does not affect the financial conditions of the EPI

Figure 3-3 The overview of Option B (Extension of contribution payment period and choice of when to start receiving benefits)

Current system → Option B assumptions

	Age 20-59	Age 60-64	Age 65-69	Age 70-74	Age 75 -
Population	62 million	8 million	10 million	7.5 million	17.5 million
Number of workers	51 million	5 million	4.5 million	2 million	1.5 million
Number of employees	**47.5 million**	**4.5 million**	**3.5 million**	**1.5 million**	**0.7 million**
Number of employees covered under EPI	38.5 million	3 million	1.5 million	(Note 2) 0.6 million	0.3 million

(1) People under NP — Option B-(1) Extended to age 65

Option B-(5): The case in which (1) to (4) are all implemented

(2) People under EPI (Note 3) — Option B-(3) Extended to age 75

(3) A choice of when to start receiving benefits — Move forward | Push back — Option B-(4) Extended to age 75

(4) Old-age pension for active employees — ¥280,000 criteria — ¥470,000 criteria — Option B-(2) Relaxing or abolishing criteria

Notes: 1. Population, number of workers, and number of employees are figures from the 2017 Labor Force Survey; number of employees covered under EPI are figures from the end of FY2017.
2. Number of employees covered under EPI is up to the age 69. For the age 70 or older, the figures show the number of employees entitled to receive old-age pension, which is provided by Japan Pension Service, including the number of those whose old-age pension is fully suspended.
3. Persons under age 20 are also covered if they are employed at workplaces covered by social insurance.

(2) Estimation results

Based on the above assumptions, the following are the results of estimating the year when modified indexation adjustment will end and the extent to which the benefit level (replacement ratio) will change (Figures 3-4 through 3-6). Here, Cases I, III, and V are used for the economic assumptions.

As for Option B-(1), in all the cases, the replacement ratio increases by about 6-7%, resulting in a significant improvement in the benefit level. This is due to the extension of the contribution period from 40 years to 45 years, which resulted in pension amounts that are 45/40 times higher, and therefore benefit levels that are also roughly 45/40 times higher. As a result, benefit levels of more than 50% are projected to be achievable even in Case V, a low-growth scenario. However, the impact of the increase in contributions and future benefit increases has resulted in no significant change in the year in which the benefit adjustment ends.

For reference, benefit levels with 45 years of contributions under the current system (namely the contribution period of the NP remains 40years) are also shown. (see B-(3) in Figure 3-4) The result is that benefit levels of the earnings related portion increase 45/40 times.

As for Option B-(2), the results show if the old-age pension benefit reduction for beneficiaries still working aged 65 and over is relaxed or abolished, the replacement ratio will decrease by about 0.2% or about 0.3-0.4%, respectively.

Since the suspension of benefits under the old-age pension system for active employees affects the voluntary benefits under EPI, only the earnings-related portion is affected.

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As for Option B-(3), the case in which the upper age limit for EPI enrollment is extended from the current 70 to 75, the replacement ratio is not affected in Case I, and increases by 0.3% in Case III and by 0.2% in Case V. The increase in the number of employees covered under EPI will increase contribution revenues, but the corresponding future benefits (earnings-related portion) will also increase. However, benefits increase gradually, and investment income is generated from the funds accumulated between the time of contribution payment and the time of benefit payment, and the period of receiving pension benefits for contributions made after the age of 70 is shorter than the period of receiving benefits from the age of 65. Therefore, the results show an improvement in EPI's finances and an increase in the replacement ratio of EPI (earnings-related portion). Since the period between age 70 and 74 is not counted toward Basic Pension, there will be no effect on the level of Basic Pension benefits.

In Case I, the replacement ratio is not affected and does not change. This is because even if the upper age limit for enrollment is extended and as a result, EPI's finances are improved, this will not change the fact that there is no need for modified indexation adjustment for earnings-related portions under the current system.

Figure 3-4 Estimation results with Option B-(1)-(3) (Extension of contribution payment period and review of old-age pension system for active employees)

(1)Extension of contribution payment period for the Basic Pension
The case in which the maximum number of years of contribution payment at the time of calculation of Basic Pension benefits is extended from the current 40 years (ages 20-60) to 45 years (ages 20-65), and the system is changed to increase the Basic Pension in proportion to the increase in the number of years of contribution
(2)Review of old-age pension for active employees aged 65 or older
The case in which old-age pension for active employees is relaxed or abolished; (1) increasing the benefit reduction threshold of pensionable remuneration (470,000 yen --> 620,000 yen equivalent), (2) abolishing the benefit adjustment system
(3)The case in which the upper age limit for EPI enrollment is extended
The case in which the upper age limit for EPI enrollment is extended from the current 70 to 75
* For the sake of convenience, estimates are calculated based on the assumption that the review is implemented from FY2026 (the maximum number of years of contribution payment is extended by one year every three years starting from FY2026) The same indexation adjustment rate is used as in the current system. Review of old-age pension for active employees is not expected to bring about changes in employment.

Note: Demographic assumptions based on medium projections (medium fertility scenario, medium mortality scenario)

The results of Option B-(4) are shown in Figure 3-5. It shows micro-level estimation of how the benefit level will change if an individual chooses to defer benefits or extend the working period, so unlike estimation with other options, there will be no macro-level financial effects such as change in the benefit level adjustment period.

In addition, since the model pension wage (the average wage of working men) is assumed for work after age 65, part of the pension amount will be suspended by the old-age pension system for active employees (about 30% of the earnings-related portion of the model pension will be suspended).

The estimation results show that deferring benefits and extending the working period are effective options to secure the benefit level as the benefit level is lowered by modified indexation. For example, in Case III, the replacement ratio after the end of benefit adjustment by modified indexation is shown to be 95.2%.
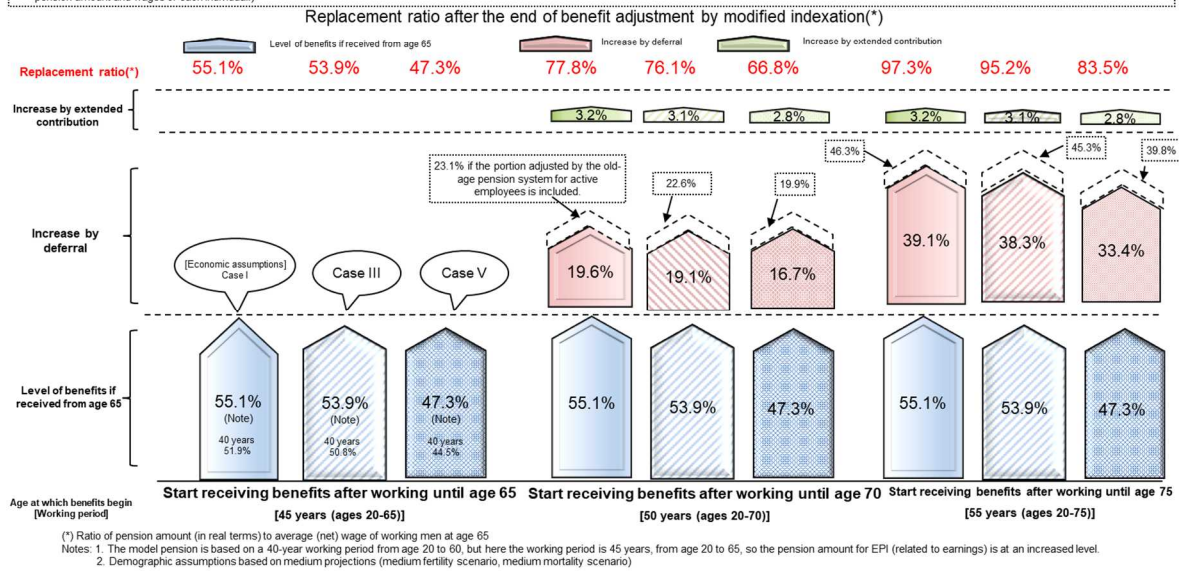
Since the current upper age limit for EPI enrollment is 70, there is no increase in the portion commensurate with a contribution payment period after the age of 70 while the portion commensurate with benefit deferral increases.

Figure 3-5 Estimation results with Option B-(4)
(Increase in benefit levels when retirement age and starting age to receive pension are 65, 70, or 75)

Option B-(4): Expanding options for extending work and when to start receiving benefits
(Increase in benefit levels when retirement age and starting age to receive pension are 65, 70, or 75)

○ Estimates of how much the level of benefits will increase if those who work beyond age 65 until age 70 or 75 choose to defer the start of receiving benefits, in the case where the upper age limit for starting to receive benefits is extended from the current age of 70 to 75. (For the estimates, the rate of increase by deferral after age 70 was automatically set at 0.7% (per month), the same as the current rate until age 70.)

* The estimation is based on the current system, and the following should be noted:
· Since the contribution period for the Basic Pension is 40 years (ages 20-60), working beyond the age of 60 will not increase the Basic Pension. On the other hand, since the EPI contribution period is under age 70, the earnings-related pension increases with the increase in the contribution period until age 70, but even if employees work after age 70, they make no contribution payments, so the earnings-related pension does not increase.
· If employees continue to work after the age of 65, assuming the pension amount and wages of the model pension, about 30% of the earnings-related portion of the model pension will be suspended by the old-age pension system for active employees. If they choose to receive deferred benefits, the earnings-related portion increased by deferral will be adjusted to reflect the amount equivalent to such suspension. (The actual percentage of suspension varies depending on the pension amount and wages of each individual.)

Replacement ratio after the end of benefit adjustment by modified indexation(*)

(*) Ratio of pension amount (in real terms) to average (net) wage of working men at age 65
Notes: 1. The model pension is based on a 40-year working period from age 20 to 60, but here the working period is 45 years, from age 20 to 65, so the pension amount for EPI (related to earnings) is at an increased level.
2. Demographic assumptions based on medium projections (medium fertility scenario, medium mortality scenario)

With regard to Option B-(5), the results show benefit levels are higher than with Option B-(4) because the Basic Pension enrollment period is extended to 45 years and all pension benefits (including those that would have been suspended for active beneficiaries under the current system) are subject to deferral and thus increase by 0.7% per month of deferral, based on the assumption that the old-age pension for active employees is abolished.

Figure 3-6 Estimation results with Option B-(5) (Option B-(4) plus system revisions with (1) through (3))

Option B-(5): Option B-(4) plus system revisions with (1) through (3)
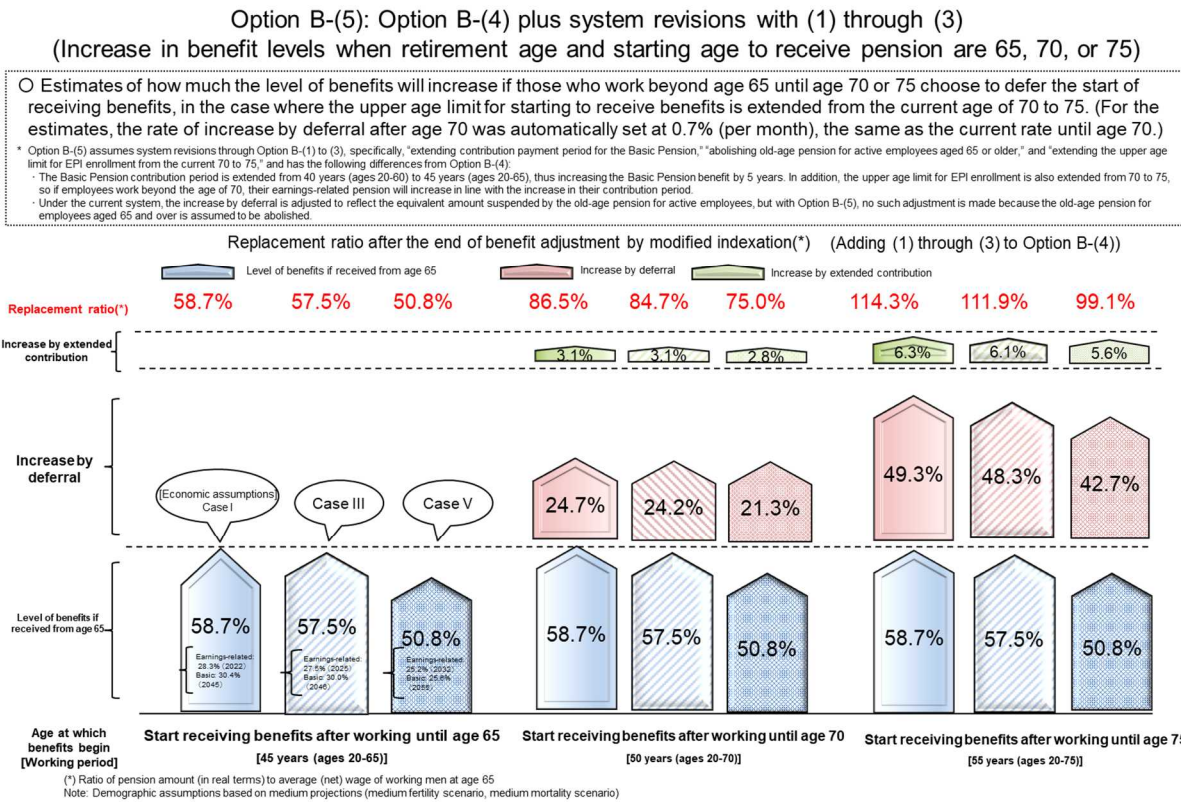(Increase in benefit levels when retirement age and starting age to receive pension are 65, 70, or 75)

○ Estimates of how much the level of benefits will increase if those who work beyond age 65 until age 70 or 75 choose to defer the start of receiving benefits, in the case where the upper age limit for starting to receive benefits is extended from the current age of 70 to 75. (For the estimates, the rate of increase by deferral after age 70 was automatically set at 0.7% (per month), the same as the current rate until age 70.)

* Option B-(5) assumes system revisions through Option B-(1) to (3), specifically, "extending contribution payment period for the Basic Pension," "abolishing old-age pension for active employees aged 65 or older," and "extending the upper age limit for EPI enrollment from the current 70 to 75," and has the following differences from Option B-(4):
· The Basic Pension contribution period is extended from 40 years (ages 20-60) to 45 years (ages 20-65), thus increasing the Basic Pension benefit by 5 years. In addition, the upper age limit for EPI enrollment is also extended from 70 to 75, so if employees work beyond the age of 70, their earnings-related pension will increase in line with the increase in their contribution period.
· Under the current system, the increase by deferral is adjusted to reflect the equivalent amount suspended by the old-age pension for active employees, but with Option B-(5), no such adjustment is made because the old-age pension for employees aged 65 and over is assumed to be abolished.

Replacement ratio after the end of benefit adjustment by modified indexation(*)   (Adding (1) through (3) to Option B-(4))

(*) Ratio of pension amount (in real terms) to average (net) wage of working men at age 65
Note: Demographic assumptions based on medium projections (medium fertility scenario, medium mortality scenario)

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3. Estimation with Options A and B combined

In this actuarial valuation, estimation was also made in the following two cases: the "case in which Option A-(2) and all the system revisions through Option B-(1) to (3) are implemented" and the "case in which Option A-(3) and all the system revisions through Option B-(1) to (3) are implemented."

The estimation results are as shown in Figure 3-7. The replacement ratio will increase by around 7-8% in the "case in which Option A-(2) and all the system revisions through Option B-(1) to (3) are implemented" and by around 10-11% in the "case in which Option A-(3) and all the system revisions through Option B-(1) to (3) are implemented." These results roughly correspond to the combined impact of Options A and B.

Figure 3-7 Cases in which Option A and system revisions through Option B-(1) to (3) are implemented

(1)The case in which all the system revisions through Option B-(1) to (3) are implemented in addition to Option A-(2) <the wage and company size requirements are abolished (coverage expansion of 3.25 million)>
(2)The case in which all the system revisions through Option B-(1) to (3) are implemented in addition to Option A-(3) <coverage is expanded to all employees with an income above a certain level (58,000 yen per month) (coverage expansion of 10.50 million)>
*It assumes system revisions through Option B-(1) to (3), specifically, "extending contribution payment period for the Basic Pension," "abolishing old-age pension for active employees aged 65 or older," and "extending the upper age limit for EPI enrollment from the current 70 to 75."

40-year (ages 20-60) contribution model (Benefits start at 65)		45-year (ages 20-65) contribution model (Benefits start at 65)	
	Current system	(1)The case where in addition to expanded coverage (3.25 million), system revisions are made including extension of contribution payment period. ○45-year contributions for Basic Pension ○45-year contributions for EPI	(2)The case where in addition to expanded coverage (10.50 million), system revisions are made including extension of contribution payment period. ○45-year contributions for Basic Pension ○45-year contributions for EPI
EPI standard pension replacement ratio after end of benefit level adjustment	Last year of benefit level adjustment		
Case I	51.9% (2046) Earnings-related: 25.3% (no adjustment) Basic: 26.7% (2046)	59.6% (2044) Earnings-related: 28.0% (2023) Basic: 31.6% (2044) <<+7.7%>>	63.0% (2039) Earnings-related: 27.4% (2029) Basic: 35.5% (2039) <<+11.1%>>
Case III	50.8% (2047) Earnings-related: 24.6%(2025) Basic: 26.2% (2047)	58.6% (2045) Earnings-related: 27.2% (2027) Basic: 31.4% (2045) <<+7.8%>>	62.4% (2039) Earnings-related: 26.5% (2032) Basic: 35.9% (2039) <<+11.5%>>
Case V	44.5% (2058) Earnings-related: 22.6% (2032) Basic: 21.9% (2058)	51.6% (2054) Earnings-related: 25.0% (2034) Basic: 26.5% (2054) <<+7.1%>>	54.9% (2047) Earnings-related: 24.3% (2038) Basic: 30.6% (2047) <<+10.4%>>

Notes: 1. Demographic assumptions based on medium projections (medium fertility scenario, medium mortality scenario)
2. The NP contribution compliance rate is assumed to increase by around 0.2% in (1), 0.4% in (2), and 2.4% in (3) due to the expansion of EPI coverage to part-time workers, among whom the contribution compliance rate is low.

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