

Peer Review of the 2019 Actuarial Valuation of Public Pension Plans (Overview)

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Pension Actuarial Subcommittee of Social Security Council

Peer Review of the public pension plan by the Pension Actuarial Subcommittee

Report Chap1-Sec3 (p10)

- ❑ The peer review of the 2019 actuarial valuation of public pension plans, summarized in this report, follows the peer reviews conducted in 2004, 2009 and 2014.
- ❑ The peer review of actuarial valuation of the public pension plan by the Pension Actuarial Subcommittee was in response to the request in the 2001 Cabinet decision concerning the unification of public pensions to ensure the stability and equitableness of employees' pension plans. As financial situation of the Employees' Pension Insurance(EPI※) is affected by the financial situation of the National Pension (NP), we review the 2019 actuarial valuation of all public pension plans including NP.
- ❑ In the peer review at this time, based on the 2019 actuarial valuation, the subcommittee interviewed officials to obtain an overview of the valuation in December2019, received a report on the details from the persons in charge in September 2020 and based on the materials they submitted, verified and evaluated accordingly. This report summarizes the results of this process.

※)Mutual Aid Associations(MAAs), which had covered civil servants in central and local government and so on were integrated into EPI.

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Summary of Chapter 1 (2019 Actuarial Valuation Results)

(Summary of Comparison with previous Actuarial Valuation)

Report Chap1-Sec3 (p79)

- ❑ Comparing the medium fertility variant, medium mortality variant and scenario III of the 2019 actuarial valuation with the medium fertility variant, medium mortality variant and scenario E of the 2014 actuarial valuation, the following characteristics emerged:
 - Assumptions included an improved fertility, increased labor participation, a slight decline in rate of real wage increase (adjusted for price inflation) and a sharp downturn in substantial investment return (adjusted for nominal wage increase) in the 2020s, which is ultimately at the same level.
 - Accordingly, the number of public pension insured persons (total number of insured persons) rises while the ratio of number of EPI insured persons to the total number of insured persons shifted upwards, the ratio of number of NP Categories 1 and 3 insured persons to the total number of insured persons shifts downwards. The contributions income also fluctuates according to the number of insured persons. Conversely, benefit disbursements rise as the number of insured persons changes in future, and in the next 20 years, shifts upwards with the increase in the benefits levels compared with wages. Focusing on the overall balance, the financial situation is improving for both EPI and NP.
 - This results in a slight rise in the replacement ratio (after adjustment of benefit levels), but the period of adjustment of benefit levels through the modified indexation is prolonged.
 - * The results of the past four actuarial valuations were examined in this comparison, but it should be noted that the results compared are not under exactly identical circumstances when the effects of pension system reforms and changes in the projection model settings during this period are considered.

(Note in Uncertainty in Actuarial Valuation results and Sensitivity analysis on Actuarial Valuation)

Report Chap1-Sec4(6) (p94)

- ❑ Considering the impact resulted from differences in assumptions and the results of the sensitivity analysis on the replacement ratio after the adjustment of benefit levels, most of the impact comes from the Basic Pension (BP) portion.
- ❑ Possible reasons include: (1) adjustment of benefit levels is designed to be decided for BP portion first, and the earnings-related portion next and (2) the adjustment of benefit levels of BP portion is projected to continue into the distant future.
- ❑ As for reason (1), even if adjustments of benefit levels are necessary for both BP portion and the earnings-related portion, since their financing is integrated, the financial effect obtained from the adjustment of benefit levels of BP portion is applied to the earnings-related portion of EPI, making the adjustments of benefit levels of the earnings-related portion moderate.
- ❑ Regarding reason (2), since the scale of benefits decreases as the future goes forward, the degree to which benefit levels are adjusted needs to increase to obtain the same financial effect. At the same time, any delay of adjustment of benefit levels results in more reserves being withdrawn until the benefit level is adjusted and the opportunity to manage the reserves is lost. To balance the benefit and premium contribution, the benefit level must be adjusted accordingly.

Summary of Chapter 2 (Stability of the Public Pension Plans)

(Perspectives to evaluate stability of public pension plans)

Report Chap2-Sec1 (p95)

□ The stability of the public pension plans is reviewed and evaluated from the following perspectives:

- The stability of the public pension plans is defined as “both the sustainability and the adequacy of pension benefits are to be maintained in the future.”
- First, the sustainability is evaluated through comprehensively considering the reserve level, actuarial indices and the ratio of revenues and expenditures to GDP.
- In relation to the sustainability, the scope of the review includes the ability to execute expenditures such as benefit disbursements and contributions by each implementing organization of EPI on time.
- Moreover, the adequacy of benefits is evaluated based on the replacement ratio (including a division into earnings-related portion and BP portion) and the benefit level for the relevant wage level per household member.
- The stability of the public pension plans is evaluated with future uncertainties in mind and with reference to the above-mentioned “Comparison with previous Actuarial Valuation” and “Uncertainty in Actuarial Valuation results and Sensitivity analysis on Actuarial Valuation.”

(Results of evaluation of stability of public pension plans)

Report Chap2-Sec2(5) (p107), Sec3(4) (p119)

- The sustainability of the public pension plans is affected by population and economic trends and if the economic environment is significantly sluggish, as in Scenario VI, the situation is serious to ensure financial equilibrium.
- With regard to the adequacy of benefits amounts, although the benefit level amid a sluggish economy is improved by the pension system reform in 2016, it may depend on the future socioeconomic situations based on the replacement ratio of 50%.
- The greater the weight of the BP portion, i.e., the lower the income, the greater the adjustment degree of future pension benefit amounts is expected to be and the less the income redistribution effect of the EPI will be. These raise concerns about the sufficiency of benefits amounts for low-income groups in the future.

Summary of Chapter 3 (Process of Projection)

(1) Evaluation of sufficiency and reliability of data

(Perspectives for evaluation)

Report Chap3-Sec2 (p127), Sec3 (pp129-132)

□ The sufficiency and reliability of data used in the actuarial valuation are reviewed and evaluated by noting the following:

- Is the data timely and appropriately gathered from relevant data sources and accurately representing the actual condition of public pensions?
- Is the data appropriate for use in actuarial calculations? In particular, is it appropriately processed, corrected or complemented, etc. in line with applicable standards for input data used in actuarial calculations?
- Is there hindrance to the work of the actuarial valuation or shortage of the product of the actuarial valuation due to insufficient data used?

(Evaluation results)

□ To the extent reported from the persons in charge, the data was timely and appropriately gathered from relevant data sources, was accurately representing the actual condition of public pensions and was appropriately processed, corrected and complemented, etc. in line with applicable standards for input data for actuarial calculations. No significant inconsistencies emerged with respect to requirements for data gathering, etc. Although the data used for actuarial calculations had some aspects that were occasionally unclear regarding completeness to the extent reported from the persons in charge, the management of data, such as confirming consistency and rationality, was considered appropriate.

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(2) Evaluation of the appropriateness of assumptions

(Perspectives for evaluation)

Report Chap3-Sec2 (p127), Sec4 (pp133-147)

□ The assumptions set in the actuarial valuation include the actuarial assumptions, demographic assumptions, assumptions on labor participation and economic assumptions and are reviewed and evaluated by noting the following:

- Are the assumptions set not to significantly underestimate or overestimate the future projection of the public pension plans in light of the current socioeconomic situations and expected future trends? Do they reflect the period for which the projection is prepared?
- Are there any significant inconsistencies between the assumptions set on different elements? If dependencies are considered to exist between different elements, are they incorporated appropriately?
- If multiple assumptions are set, is there any bias in combination?

(Evaluation results)

- The assumptions have taken into account the current socioeconomic situation and trends over the period for which the future projection is prepared and no significant inconsistencies have emerged. There may, however, have been room to consider future changes in the total force of decrement and the force of mortality decrement.
- Since the current economic assumptions are based on Cabinet Office's projections, there is a dissociation between the assumptions and actual results in terms of the rate of real wage increase. There may have been grounds to consider a scenario with low current rate of real wage increase.
- The investment results by Government Pension Investment Fund (GPIF) are used setting the long-term investment return, but there may have been room to consider the difference between the policy asset mix at that time and going forward, instead of using the investment results by GPIF as they are.
- There is a need to include certain dependencies between different elements that have been academically confirmed and discussed. In such dependencies, the relationships between “population structure and total factor productivity (TFP) growth rate,” “labor force population or age composition of labor force population and TFP growth rate,” and “economic growth and the fertility,” etc. can be assumed. With this in mind, it is considered that as much consideration as possible has been made for the 2019 actuarial valuation.
- Of a total of 30 assumptions for the 2019 actuarial valuation, there is currently no evidence or fact that would support the evaluation that they are improbable and nothing to approve a significant underestimation or overestimation of the projections.

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(3) Evaluation of the appropriateness of projection method (actuarial model)

(Perspectives for evaluation)

Report Chap3-Sec2 (p128), Sec5 (pp148-156)

□ The appropriateness of the projection method (actuarial model) is reviewed and evaluated from the following perspectives:

- Is the projection method used for actuarial valuation in accordance with objectives of actuarial valuation and legal requirements?
- Do the relational equations for the elements used in the projection appropriately reflect the causal relationship of each element?
- Is the difference between the results of multiple projections reasonably and sufficiently explained?
- Is the amount of reserves set as the initial value for the actuarial valuation appropriate as the basis for long-term projection?

(Evaluation results)

- The projection method used in actuarial valuation is deemed to be in accordance with the objectives of the actuarial valuation and the legal requirements. In addition, there is no particular difference in the results of multiple projections that cannot be reasonably explained and the projection method is considered appropriate to the extent reported from the persons in charge.
- It should, however, be noted that the setting of the initial value of reserves for actuarial valuation can be a disturbing factor (noise) in evaluating the financial situation from a long-term perspective.
- There is a need to clarify what kind of validation is being made on the changes in the projection method.

Summary of Chapter 4 (Appropriateness of Information Disclosure)

(Perspectives to evaluate appropriateness of information disclosure)

Report Chap4 (pp157-161)

- ❑ The appropriateness of information disclosure such as the materials published for actuarial valuation is reviewed and evaluated from the following perspectives:

1. whether they contain sufficient information in light of their objectives and whether they are reproducible, e.g. verifiable by a third party.
For this purpose, the presence of at least the following explanations is also reviewed:
 - Details of the methods, assumptions and data used in actuarial calculations (including a clear statement of the methods and assumptions specified by law).
 - How the information was used in the actuarial calculations if it was created by a third party.
 - The validation status of the sufficiency and reliability of data used in actuarial calculations and the implementation status of processes such as complement and correction.
 - Limitations of methods, assumptions and data used in actuarial calculations in line with perspectives on whether the actuarial model provides a more precise description of possible future events.
 - All of the actuarial calculation results and other information requested for actuarial valuation .
 - Detailed revenue and expenditure projections by fiscal year.
2. whether they include descriptions of the major risks of public pension finances in a way that shows the nature and magnitude of their impact and whether the nature and extent of the uncertainty of the information contained in the published materials are also reviewed and evaluated.
3. whether they are written in a manner that can be understood by expected users, with unambiguous expressions.

(Results of evaluation of the appropriateness of information disclosure)

- ❑ The materials published for actuarial valuation have contents in accordance with the objectives of the actuarial valuation and include descriptions of the major risks and uncertainties of public pension finances. The description of risks and uncertainties is hardly enough at present and is required constant effort to improve.
- ❑ In terms of ease of understanding, room remains to carefully explain the meaning of relevant indicators and the relationship between them, regarding the fact that the amount of pension benefit payment discounted by the rate of wage increase is projected to decline, but the one discounted by the rate of inflation is projected to remain relatively unchanged.
- ❑ Projecting the distribution of the amount of pension benefit payment and disclosing the results is considered useful and important to see the effect of policy even if the projections are made only about 20 years from now under the prospect that the replacement ratio is projected to decline.
- ❑ There is no description of "Limitations of methods, assumptions and data used in actuarial calculations in line with perspectives on whether the actuarial model provides a more precise description of possible future events," but this must be included in future.

Summary of Chapter 5 (Toward Future Actuarial Valuation)

(Recommendations for future actuarial valuation)

Report Chap5-Sec1 (pp163-165)

(1) Appropriate measures for the prolonged period of adjustment of benefit levels of BP

- The way how to respond to future declines in the benefit levels of BP due to the prolonged period of adjustment of benefit levels of BP should be considered continuously.
- A simple list of factors to consider for raising the benefit levels of BP going forward may include “the scope of coverage for NP and EPI insured persons” “the maximum period of contributions to BP” and “How the contributions to BP should be borne,” apart from “the contribution levels of NP” and “the current level of BP benefit payment amount.”
- For “the scope of coverage for NP and EPI insured persons” and “the maximum period of contributions to BP” among these factors, projected results are presented in the financial effect of reform option in the 2019 actuarial valuation.
- Furthermore, additional projections were reported for the case in which the mechanism of contributions to BP was reformed to ensure balance between the benefit levels of BP portion and earnings-related portion and to synchronize the end year of adjustment of benefit levels of BP portion with the that of earnings-related portion in the process of this peer review.
- Efforts should be made to maintain the sustainability and adequacy of benefits in public pension plans through presenting wide-ranging projections that are considered useful in examining the ideal system and building a consensus for institutional reform.
- In presenting such projections, a detailed analysis of changes in pension benefits and contributions resulting from institutional reforms, including what kind of effect affects what kind of persons, should be indicated, while the increasing diversity of households and employment, such as the growing number of single-person households and dual-earner households, should be considered.

(2) Projection of distribution statistics by gender, by generation and by amount of pension benefit payments

- With the prospect that the benefit levels in public pension plans is projected to decline in the future, projecting the distribution of future amount of pension benefit payments is immediately needed to examine future income security policies and confirm the effect of the policies implemented
- Regarding the projection method to be used, a relatively simple method should be considered, such as extracting a portion of the pension enrollment data reserved by the Japan Pension Service by generation and projecting the pension benefit payments amounts assuming that the current enrollment status will continue. It is useful projection not only for the next 100 years but also for the next 20 years.
- In setting the actuarial assumptions in this case, more elaborate settings than the current actuarial valuation, such as setting the mortality rate by the class of pension benefit payments should be considered.

(3) Further study and consideration on setting economic assumptions

- Although wide-ranging economic assumptions from Scenario I to VI have been set in the 2019 actuarial valuation, given the dissociation between actual rate of wage increase(real to CPI) and assumptions in recent actuarial valuations and the resulting dissociation in the projection of benefit disbursements, additional assumptions of even lower rate of real wage increase should be considered.
- With regard to the actual results of the GPIF used to set the long-term investment return, it should be considered that correcting the difference between the policy asset mix at that time and going forward rather than using the actual results as they are.
- With regard to TFP growth rate settings, the possibility of a decline going forward due to aging, etc. was pointed out at the Expert Committee on the Economic Assumptions in Pension Financing by the Pension Subcommittee of the Social Security Council, suggesting the potential to further consider the need to focus on future progress while the current downward trends are taken into account.
- Further study and consideration of economic assumptions including these points are desirable.

(4) Method to set the initial value of reserves

- The amount of reserves set as the initial value in actuarial valuations refers to the actual results at a single point in time based on market prices, which makes it susceptible to changes in financial and economic conditions. To prevent this causing a disturbing factor (noise) in evaluating finances from a long-term perspective, device of valuation method including an actuarial valuation (a valuation method that smoothes the market value over a certain period in the past) that is appropriate to decide the end year of adjustment of benefit levels must be developed.
- In devising this method, for example, it may be possible to use a leveled valuation only in case deviation exceeding a certain level compared to the average of the quarters during the relevant fiscal year or the average of the past three years.

(5) Consideration of improvements in projection methods

- Although the prevailing policy is that the projection method should remain unchanged unless a particular obstacle is highlighted, consideration as to how to refine the actuarial model is necessary. For example, this includes the possibility of deferred benefits, which are currently omitted and changes in the proportion of part-time workers relative to EPI insured persons due to wage increases.

(6) Stochastic projection

- Previous peer reviews had recommended the consideration of a stochastic projection. In response, those in charge of implementing the 2019 actuarial valuation expressed their view that many issues should be addressed in order to implement it. In light of this background, Subcommittee examined the stochastic projection in detail, again.
- Since there is no practical way to make stochastic changes in future trends and it is difficult to evaluate or judge the validity of the results, Subcommittee have reached at last the following conclusion: Continuing to make recommendations based on the assumption that the stochastic projection will be prepared and published in the actuarial valuation under current technology is needed to be reconsidered.
- On the other hand, ongoing investigation and study of trends in other countries and fields is necessary with potential future technological progress in stochastic model technology in mind.
- Projections in cases where assumptions are randomly shifted can be useful in peer-reviewing of actuarial valuations, as they may help determine the degree of uncertainty going forward in the projection for public pension plans.
- In the 2019 actuarial valuation, efforts are made to show the past frequency of occurrence of the TFP growth rates, used as the basis for setting six economic scenarios. It is also important to extend these efforts and accumulate information that helps estimate the likelihood of future events.

(7) Method of determining the end year of adjustment of benefit levels through modified indexation

- In the last peer review, concern was highlighted over the fact that the end year of adjustment of benefit levels through modified indexation may not be determined due to treatment of multiple scenarios in parallel while results based on wide-ranging assumptions were highly appreciated and evaluated in light of the necessity of reviewing future directions from various possibilities and contributing to discussion on plan revisions. Issues regarding how the end year of adjustment of benefit levels is determined remain going forward and a conclusion needs to be reached before the decision can be made.

(8) Method of information disclosure and how to make the contents easier to understand

- It is not always easy for the general public to understand that the replacement ratio is projected to decline but the amount of pension benefit payment discounted by the rate of inflation is projected to remain relatively unchanged. All these indicators have inherent information value and it is important to carefully explain what each indicator signifies and the interrelationships between them when multiple indicators are used.
- The replacement ratio is an indicator for the amount of pension benefit payment relative to the wage level of the active generation and the amount of pension benefit payment discounted by the rate of inflation is an indicator for the purchasing power of pension benefit payments. The amount of pension benefit payment discounted by the rate of inflation does not decline despite the decline in the replacement ratio. This is because the purchasing power with wages of the active generation is projected to increase going forward.
- Given the very long view taken for the projection of public pension plans, the socioeconomic environment differs significantly between the present and future. In comparing figures between different points in time, it is important to express them realistically and the published contents should be made easier to understand.

(9) Explanation of the characteristics of closed-period-balancing method

- It was pointed out that an accurate public understanding of the characteristics of the closed-period-balancing method should be promoted in the previous peer review. Regarding this issue, the actuarial report indicates that the closed-period-balancing method is considered appropriate given the limitation of taking any projection beyond 100 years ahead into account.
In the previous peer review, it was assumed that the characteristics of closed-period-balancing method are following:
 - The ratio of fund to expenditure including the amount of pension benefit payment and the contribution to BP is needed to be higher due to five-year prolonged new financial equilibrium periods that were not initially included previous period. The period of financial equilibrium is shifted forward by five years at every actuarial valuation.
 - This demands more cut of pension benefit payment amount and leads to the result in decline of the income replacement ratio.
 - As a result of repetitions, this method will produce results closer to those of whole-future-balancing method in the long run.
- Analyses in this report show, for example, that the project for benefit disbursements rises with a time difference of more than 60 years due to such changes in demographic assumptions as the fertility rate in the 2019 actuarial valuation. Conversely, contribution income linked to the number of insured persons is expected to rise after 20 years and given that the effect of changes in demographic assumptions to the number of insured persons will increase in the distant future, changes in contribution income due to changes in the fertility rate are not considered to correspond to changes in benefit disbursements in the closed-period-balancing method. Including these issues, the characteristics of the closed-period-balancing method should be explained.

(10) Analysis of variation factors from the last actuarial valuation

- With regard to the variation factors that have been changed since the last actuarial valuation regarding the future income replacement ratio and the period for the adjustment of benefit levels, the positive and negative impacts are indicated for each element. It is extremely crucial and desirable to specifically show the quantitative impact of each element in every actuarial valuation. This may serve as the response to the "Explanation of the characteristics of closed-period-balancing method" in the previous section.

(11) Development of actuarial valuation implementing scheme

- Needless to say that including securing the number of staff in charge and improving their qualifications, actuarial valuation implementing scheme is required to be available for not only conducting what has been done so far but also capable of realizing aforementioned recommendations. Furthermore, the scheme should be developed to continuously survey academic discussions, for example, in order to study the correlation between multiple factors in setting assumptions for actuarial valuation.

(12) Others

- In addition to those mentioned above, several other issues were pointed out in Chapter 3, for which responses are also required.
- First, it was pointed out that the contents of the following do not always remain clear: the completeness of the data used in actuarial calculations (Section3(2)), the process of examining assumptions except demographic assumptions, assumptions on labor participation and economic assumptions (Section 4(6)) and what kind of validation is being made on the changes in the projection method (Section 5(4)). Efforts should be continued to address these issues.
- With regard to the fertility rate, a decline in actual results was found in 2019 and attention is needed for the results going forward to determine the long-term level (Section 4(2)).
- It was pointed out that there may have been room to consider future changes in the total force of decrement and force of mortality decrement (Section 4(7)). Further examination is also desired on this matter going forward.