

# Effects of Proposals for Basic Pension Reform on the Income Distribution of the Elderly in Japan

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## Abstract

The aging of the population in Japan is a serious problem, and the reform of the public pension system is a major political issue. Although the 2004 pension reform was enforced in Japan to ensure a sustainable pension system in such an aging society, people remain quite apprehensive about the pension system. They believe that the current situation wherein a considerable number of people are not entitled to pension benefits or entitled to very low benefits is not expected to improve in the future. Moreover, they have a mistrust of the pension system that is caused by many mismanaged pension records. Consequently, various sectors have created new proposals for pension reform to overcome these problems, and it has become a recent policy debate. The objective of this article is to prepare projections for the income distribution of households containing elderly people using the Japanese microsimulation model, INAHSIM (Integrated Analytical Model for Household Simulation), and evaluate the effect of the proposals on the living standards of the elderly. According to the simulation results, the problem of very low benefits for the elderly does not appear to be growing. However, changes in co-resident families of the elderly, such as the increase in the number of people living alone, may cause a decline in their standard of living. The author points out the problems of the proposed plans and proposes a new alternative to pension reform based on this perspective.

## 1. Introduction

The advent of a super-aged society unparalleled in the world is forecast for Japan in the near future due to the rapid progress of a declining fertility rate and an aging population. According to an estimate of the National Institute of Population and Social Security Research (Kaneko et al., 2008 and IPSS, 2008), the number of elderly people aged 65 years or older will increase from 25,760,000 (20.2%) in 2005 to 36,670,000 people (31.8%) in 2030. It is projected that there will be a great change to the co-resident of families of elderly people such as those living alone (excluding those institutionalized), which is expected to increase from 3,870,000 people to 7,170,000 people.

The public pension system in Japan is depicted in Figure 1. It is a two-tier system that consists of a flat-rate benefit called “the basic pension” and an earnings-related benefit for regular employees. Since the public pension scheme in Japan is based on a social insurance system, and there exist a considerable number of persons who do not pay their premiums, we are concerned about the growing number of the elderly with low pension amounts. Moreover, the number of elderly people living alone, who can expect little private support from their children, will increase significantly.

At the same time, there are significant problems such as mismanaged pension records within the public pension scheme, which contain the main support for the living of those elderly people, resulting in a mistrust and causing a national debate of various issues such as changes in the financing method of the basic pension from a social insurance system to a total taxation system. The report of the Pension Committee of the Social Security Council (2008) held on September 29, 2008 "Viewpoints of the investigation of problems remaining after the revision in 2004" shows 7 viewpoints and the first of these raises the issue of the "revision of pension benefits for the elderly with low pensions and low incomes." There were differences of opinion of whether or not to use a financing method of the basic pension of either a

social insurance system or a total taxation system, but there was no disagreement as to the importance of the first point regardless of each disputant's position on the solution.

Next, what is the current status of elderly people with low pensions and low incomes and will the number of these elderly people increase in the future? Unfortunately, few results of simulations published by the government remain on the several model cases of family finances presently or at a matured stage, and they do not show the results on future estimates such as the distribution of pension amounts. Regarding this point, the interim report of the National Council for Social Security (2008a) points out that "it is difficult to conceive of a great increase in the number of people without pension benefits in the future; rather if the current rate of non-payments for the National Pension continues, a certain proportion (about 2%) of elderly people will be continually without a pension."

The objective of this study is to prepare projections for the income distribution of households containing elderly people using the Japanese microsimulation model, INAHSIM (Integrated Analytical Model for Household Simulation), and evaluate the effect of the proposals on the living standards of the elderly. Section 2 mainly describes its simulation cycle and the key life events used in the simulation for the income distribution of the elderly. Section 3 first focuses on elderly women living alone and considers their families and the distribution of their pension amounts in the future. Next, expanding the range to all elderly people, by showing quantitatively prospects of the elderly in the year 2030—their families and household, and the distribution of their pension amounts and equivalent income—this section will make clear the problems. Section 4 analyzes the effects on the income distribution for the elderly by the public pension reform plans previously proposed and evaluates these effects from the viewpoint of elderly people receiving pensions. Furthermore, based on these quantitative evaluations, we propose a new reform plan. Section 5 provides a summary and points out issues and prospects for the microsimulation model.

## 2. Simulation cycle and key life events of INAHSIM

The simulation cycle of INAHSIM is shown in Figure 2. The life events are assumed to occur in annual cycles. The life events incorporated in this model are marriage, birth, death, divorce, international migration, change in health status, change in employment status, estimating earnings, determining pensions, young people leaving home, living with elderly parents, entering an institution, and payment of pension premium.

The key life events used in the simulation for the income distribution of the elderly are “Living with elderly parents,” “Estimating earnings,” and “Determining pensions.”

The first event is “Living with elderly parents.” When elderly people, who do not live with their children, become very old and need care, many children move in with their elderly parents to take care of them. This is an important life event to secure the life of the elderly in Japan.

The second event is “Estimating earnings.” Earnings are assumed to conform to a log-normal distribution by sex, age group, and employment status. The z-score of the earnings-distribution for each person is given in advance, and person’s earnings are estimated.

The third event is “Determining pensions.” The pension amount is estimated on the basis of a pensioner’s z-score and subscription category assuming the distribution of the newly awarded pension amounts. Early and deferred pensions are not considered.

The initial population of this model is scaled down to 1/1000th of the population of Japan, and the size is 127,782 persons and 49,307 private households. As mentioned in Inagaki (2010), an average of 100 simulation runs is taken for the results to reduce the stochastic error. Therefore, the substantial size of the initial population is very large, and the stochastic error derived from using the Monte Carlo method is negligible.

### 3. Simulation results and consideration

#### 3.1. Trends of the family and the income of elderly women in the future

In discussions at the National Council for Social Security, elderly women living alone are considered to be low-pension and low-income persons. For that reason, for elderly women 65 years and older, we will discuss the future trends in the marital status, the co-resident families of elderly, and the distribution of their pension amounts.

Table 1 shows the future trends in the elderly female population by marital status until the year 2030. It is expected that the elderly female population will grow 46.3% from 14,435,000 in 2004 to 21,124,000 in 2030. Also, it is expected that the ratio of those married women will decline from 48.0% to 44.7% while the ratio of never-married and divorced will increase, and in 2030, more than 10 million elderly women will be without a husband.

The increasing rates of both never-marrying and divorcing at a mature age are the main contributing factors to the reduction in the married ratio of elderly women. The increasing rate of never-marrying is a phenomenon that has been recently pointed out and, after the year 2020, when those of this generation become elderly, the ratio of never-married will gradually increase. On the other hand, since widows were married when their husbands died, the decline in the ratio of widowed will be a little delayed behind the decline in the married ratio. In other words, if we look at the trends in the elderly female population by marital status until the year 2030, it is expected that the ratio of never-married and divorced will increase while the ratio of married and widowed will decrease.

Elderly women without a husband are not always living alone. Widows often live with their children. Table 2 shows the future trends in co-resident families of these women. The elderly female population without a husband will increase by 55.6% from 7,507,000 in the year 2004 to 11,683,000 in the year 2030, but significantly, the

increase in those living alone or in an institution will almost double from 3,391,000 to 6,396,000. The reason for this significant increase seems to be the effect of a trend toward nuclear families after high economic growth in the 1960s. The increase in the ratio of never-married and the divorced have also contributed to the trend.

Furthermore, among these elderly women without husbands living alone or in an institution, those women who do not have any children (alone in the world, or only have siblings, nephews or nieces) are expected to total 2,575,000 (22.0%) in the year 2030. Their source of incomes will be their own pensions and property income if any because they seldom expect financial support from their families or relatives.

Table 3 shows the distribution of the public pension amounts to elderly women without husbands. We have the impression that the number of those with low pensions or no pension will increase, but it is expected that that ratio will actually decrease. These results presume that the fruits of the pension reforms so far, in which reforms were targeted at pensions of all citizens in addition to women's pension rights, will appear. Another reason why the number of those with low pensions will decrease is the increase in the number of widows entitled to survivors' pensions for their husbands who were employees. As previously described, however, since the increase in the number of people living alone or in an institution is significant, this does not always mean that the living standard of elderly women without a husband will be improved.

Today's debates about revising the public pension scheme arose from the problem of delinquency in the National Pension premiums, and subsequently, the problem of low pensions and no pension were focused on. Actually, however, if we look at the future trends related to the distribution of pension amounts for elderly women, we can see that this problem does not appear to be growing. Furthermore, it is expected that the ratio of people with low pensions or no pension will decline not only for elderly women but also, as will be described later, will equally apply to all elderly people. Conversely, higher pension amounts will be reduced more appropriately, and disparity in pension benefits will be less serious. In terms of the distribution of the pension

amounts, we can consider the public pension scheme as being sufficiently reformed.

The problem of low-income as typified by elderly women will arise because of significant changes in the family type of the elderly women rather than in their pension amounts. The level of pension amounts will certainly be improved, but that improvement does not resolve the problem because the number of elderly living alone or in an institution will increase considerably. This is a problem not only for women, but also for all elderly.

### 3.2. Changes in co-resident families and in income levels of the elderly (Prospects of the elderly in the year 2030)

To evaluate the income security function of the public pension scheme for elderly people, it is essential to make future estimates not only of the level of the public pension, but also of their socioeconomic situation like the economic support received from their children living together. Here, we are targeting the year 2030 in which the so-called baby-boomer generation is attaining the late-stage of old age and the number of late-stage elderly is reaching a level near a peak. We will examine whether we can expect the current pension scheme to fulfill a sufficient income security function in the future by showing the medium-term prospects of (1) the distribution of public pension amounts received by the elderly (public support), (2) the number of the elderly by family type (private support), and (3) the distribution of equivalent income for the elderly (standard of living) divided into the groups of early-stage elderly (65-74 years old) and late-stage elderly (75 years and older).

Table 4 shows future trends in the distribution of pension amounts to the elderly for the case in which the current pension scheme is maintained. It is expected that by the year 2030 both the ratio and the number of the elderly<sup>1</sup> with low pension amounts

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<sup>1</sup> The pension amounts are presumed to be high because the effects of macroeconomic indexation, which reduces the real value of pension amounts, were not incorporated. Thus, the actual ratio of the elderly with low pensions is expected to be higher than the simulation results.

of less than 0.5 million yen will decline due to the maturity of the public pension and the increase in the rate of subscription to the Employees' Pension Insurance. Another reason for the decline is that a part of the husband's employees' pension was transferred to the wife's name as basic pension for the establishment of women's pension right by the amendment in 1985. In addition, for the late-stage elderly, wives with no pension in their own name or only a small amount of pension will receive a survivors' pension when their husbands die. On the other hand, the ratio of people receiving 2 million yen or more is declining. This decline is thought to be caused by the reduction in the pension level for men due to the pension fairness adjustment and the transfer of a part of husband's employees' pension to the wife's name as basic pension by the amendment in 1985.

Table 5 shows future trends in the co-resident families of the elderly divided into household types of, besides those in an institution, those living alone, couple-only households, those living with married children, those living with unmarried children, and others. The increase in the number of those living alone for both early- and late-stage elderly is significant. Looking at the total of those living alone or in an institution, it is expected that the number of early-stage elderly will increase from 2,128,000 (15.3%) in the year 2004 to 3,388,000 (24.0%) in the year 2030 and the number of late-stage elderly will increase from 2,830,000 (25.4%) in the year 2004 to 7,583,000 (33.3%) in the year 2030. Among those living alone or in an institution, late-stage elderly without children will increase to 3,189,000 (1,034,000 in the year 2004)<sup>2</sup>. This means that there will be a considerable number of late-stage elderly who cannot help living alone or in an institution due to no children.

The number of elderly living with unmarried children is also increasing by a large margin. These "unmarried children" are a future case of today's "parasite singles"<sup>3</sup>. This is a case of both parents becoming elderly while the children cannot become independent of the parental roof because the children do not have sufficient

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<sup>2</sup> estimate by author using INAHSIM

<sup>3</sup> A Japanese-English term for single adults who live with their parents and do not marry until their late twenties or thirties

economic resources due to their unstable employment, and therefore, continue to live with their parents without getting married. Consequently, this family type of the elderly cannot expect sufficient economic support from the unmarried children they are living with.

In this way, changes in the co-resident families of the elderly are significant. Also, when considering the future living standard of the elderly, it is insufficient only to look at the distribution of pension amounts. At this point, we must consider equivalent income, which reduces the total of the public pension of the elderly and the incomes of the family they are living with (including the earnings of the elderly person himself or herself) by the square root of the number of household members.

Table 6 shows future trends in the distribution of that equivalent income. For the early-stage elderly, the ratios for the bracket from 1.5 million yen to 2 million yen are increasing; the ratios for the high-income bracket above 2 million yen are declining, and the ratio of the low-income bracket is not changing much until the year 2030. Even though the public pension level will be increased for those with low pensions or no pension, no great change can be seen in the ratio of the low-income bracket. This may be due to the effect of offset with the reduction in private support from their co-resident families as a result of the increase in the number of early-stage elderly living alone.

The same trends can be seen in the equivalent income distribution of late-stage elderly as was found in the early-stage elderly. However, since the numbers of the late-stage elderly almost double from 11,132,000 to 22,796,000, the number of people in the low-income bracket will increase greatly. Actually, the number of people in the bracket less than 0.5 million yen will grow from 538,000 to 866,000, and those in the 0.5 to 1 million yen bracket will grow from 1,275,000 to 2,561,000. In the midst of the decline in the Japanese population, the increase in the numbers in the low-income bracket causes concern because it will have a significant effect on Japanese society.

#### 4. Evaluation of public pension reform plans from the viewpoint of the elderly

in 2030

#### 4.1. Evaluation of public pension reform plans

As described previously, simulation results for the case in which the current public pension scheme is maintained show that the numbers of the low-income bracket for the early-stage elderly hardly increase, but there is a large margin increase for late-stage elderly. We tried an evaluation, using the microsimulation model, to see what kind of effects several pension reform plans previously proposed would have on this increase in the low-income bracket.

The pension reform plans<sup>4</sup> in this article are methods to provide a basic pension financed by taxes from the age of 65 with all plans having the same final form. However, there are differences in the treatment of the past premium payments where Plan A has a uniform pension payment that ignores the past premium payments, Plan B reduces pension amounts in accordance with the period of not paying premiums, and Plan C adds on to the pension amounts in accordance with the period of paying premiums. Thus, for current 20-year-old and older subscribers, all of these interim measures, except for Plan A, will remain until all die.

Table 7 is a comparison of the distribution of equivalent income for early- and late-stage elderly in the year 2030. For the current pension scheme, there are 1,317,000 (9.3%) early-stage elderly in the low-income bracket of less than 1 million yen and 3,427,000 (15.0%) late-stage elderly in the low-income bracket. This table shows how much of a decrease there is in this low-income bracket by the year 2030 for the pension reform plans. Since the year 2030 is only about 20 years from now, the differences in the interim measures of each pension reform plan will be largely reflected in the equivalent income distribution of the elderly.

First, looking at the early-stage elderly, the low-income bracket for equivalent income of less than 1 million yen declines for each plan with Plan A having 882,000 people (6.2%), Plan B having 1,195,000 people (8.4%), and Plan C having 256,000

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<sup>4</sup> Plan A, Plan B, and Plan C are shown in interim report of the first subcommittee of the National Council for Social Security (2008b).

people (1.8%), but Plan B stops at a reduction of 0.9 points and the reform has little effect. Plan B regards insurance premiums for the National Pension as all paid after the year 2009, but it is not effective retroactively. This means that its effect of the raise in pension amounts is still small in the year 2030. Since Plan A and Plan C, on the other hand, provide the full amount of basic pension (about 0.8 million yen) to all the elderly 65 years and older, the low pensions or no pension issue is eliminated and the low-income bracket is reduced by a large margin. Notably, Plan C has a large effect on that reduction since it adds the extra benefit in accordance with past payment periods to the full amount of the basic pension.

On the other hand, the number of early-stage elderly with an equivalent income of 2.5 million yen or more do not increase much under Plan A and Plan B, but in Plan C there is a major increase from the 7,766,000 people (54.9%) under the current scheme to 10,418,000 (73.6%). Since Plan C provides the full amount of basic pension in addition to current incomes, this implies that a new high-income bracket will be born. Thus, it can be thought that, in Plan C, there are many unnecessary benefits in terms of being a countermeasure for people with low pensions and low incomes.

Next, if we look at the late-stage elderly, the low-income bracket for the equivalent income of less than 1 million yen declines for each plan with Plan A having 2,257,000 people (9.9%), Plan B having 3,381,000 people (14.8%), and Plan C having 272,000 people (1.2%). However, Plan B stops at a reduction of 0.2 points and the reform has very little effect because the effect of Plan B will be delayed another 10 years after that for the early-stage elderly. Since neither Plan A nor Plan C have a delay like that of Plan B, their reform becomes effective immediately just as for the early-stage elderly.

When these pension reform plans are thought of as countermeasures for people with low pensions and low incomes, Plan B is seen to have very little reform effect by the year 2030. The additional cost for Plan C will be a significant issue because it provides benefits additionally even to the high-income bracket people. On the other

hand, Plan A will be effective as a countermeasure for people with low pensions and low incomes if we only look at the distribution of equivalent income. However, since Plan A ignores the actual past payments of insurance premiums, and both those people who diligently paid their insurance premiums and those who did not pay them will receive the same amounts of pension for the rest of their lives, it is difficult to think of this plan as convincing from the point of view of fairness.

Thus, none of these pension reform plans suffice as countermeasures for people with low pensions and low incomes and cannot be thought to be especially advantageous compared with the current scheme. In other words, any reform plan that simply changes the current basic pension from a social insurance system to a total taxation system are not thought of as very practical even if they use ingenious interim measures.

#### 4.2. A new pension reform plan

We evaluated the current pension scheme and the previously-proposed pension reform plans of a total taxation system using the projected results of the distribution of the future equivalent income of the elderly provided by the microsimulation model as a foundation from the viewpoint of income security for people with low pensions and low incomes. From this viewpoint, Plan A is preferable. However, since Plan A has problems such that fairness cannot be ensured for the people who diligently pay their insurance premiums, none of the previously-proposed reform plans can be judged to be superior to the current scheme. As mentioned earlier, however, we cannot avoid the problem where the number of elderly with a low-income level will increase due to significant changes in the co-resident families of the elderly despite the future increase in pension levels.

What measures can be appropriately taken for these elderly people with such a low-income level? One position suggests on-going Public Assistance (income assistance for the poor) rather than a pension scheme. The cost of the assistance for the elderly poor through this on-going public assistance scheme will be lower than

that through any pension scheme because Public Assistance is a supplement to the person's best efforts and available resources. Still, various problems with the Public Assistance scheme have been pointed out, such as the problem of stigmas and the increase in administration burdens brought on by the growth of the number of the public assistance beneficiaries.

As pointed out at the beginning of this article, 'the revision of pension benefits for the elderly with low pensions and low incomes' is an important issue and a resolution by means of a pension scheme is being aggressively studied. In the Pension Committee of the Social Security Council, countermeasures at the time of benefits and countermeasures at the time of contributions under the current social insurance system are being proposed, and their problems and effects are summarized.

One countermeasure at the time of benefits is an introduction of a minimum guaranteed pension system. But it is necessary to study whether guaranteeing a certain amount of pension regardless of the non-payment period is appropriate under the social insurance system. Currently, the majority of cases of the elderly with low pensions, excluding older women before the establishment of women's pension rights, have a long period of non-subscription or non-payment. Many of those who are close to the pensionable age are also part of such cases. Furthermore, the Employees' Pension Insurance for the second category subscribers already has a component of a fixed amount of benefit, which is regarded as a minimum guaranteed benefit. This new minimum guaranteed pension system carries a suggestion that provides benefits for non-subscription and non-payment periods.

Another countermeasure at the time of contributions reduces a part of the premium in accordance with the subscriber's income at the time of contribution and the reduced part of the premium is supported by a tax. Pension subscribers of the first category include not only self-employed people, but also many employees. Between these self-employed people and employees there is a strong feeling of unfairness regarding whether information on their incomes is being accurately captured, and that feeling of unfairness is a main reason why pension benefits proportional to incomes

cannot be introduced for the pension subscribers of the first category. Given this kind of situation, it is essential to consider whether a fair system can be introduced in reality.

Thus, the revision of the pension benefits for the elderly with low pensions and low incomes is not an easy task from the viewpoint of fairness and its additional cost. However, according to the simulation results of the microsimulation model, the problem is especially serious for late-stage elderly among all elderly. The previously-proposed reform plans targeted all elderly people 65 years and older, but here we want to propose a revision of the pension benefits for the elderly with low pensions and low incomes implemented only for the late-stage elderly. By narrowing down the targeted people, we intend to resolve simultaneously various problems, for example, (1) interim measures for transitions, (2) fairness based on the actual premium payments, (3) the additional cost, and (4) a shift of the burden from an insurance premium to a tax.

In concrete terms, we want to apply the taxation system of Plan A to the basic pensions of the late-stage elderly while maintaining the framework of the current system for the basic pensions of the early-stage elderly. However, the basic pension for the early-stage elderly<sup>5</sup> is fully financed by an insurance premium (details in Inagaki, 2009). This is a framework that avoids the shift from social insurance premiums to tax burdens by changing the funding system of the early-stage elderly and the late-stage elderly, making implementation immediate, with no interim measures, for the elderly with low pensions and low incomes. Since the social insurance system and the total taxation system under this reform plan are clearly distinguished, this should be an easy-to-understand framework.

First, interim measures are basically unnecessary. From the viewpoint of the beneficiary, the basic pension of the late-stage elderly will merely be revised to the full amount. The changes in financial planning can be accomplished by recalculation in the books, and special interim measures are not necessary.

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<sup>5</sup> Under the current system, the cost of the basic pension is financed by an insurance premium and a tax on halves.

Secondly, the problem of fairness for the actual payments of insurance premiums rarely occurs. This is because the past actual payments are reflected in the basic pension of the early-stage elderly. Actually, the basic pension benefits for 10 years from the age of 65 to 74 are 8 million yen, and that exceeds the total amount of 40 years of insurance premium contributions<sup>6</sup>.

Thirdly, an enormous amount of additional burden is not necessary. Of course, some degree of additional burden is needed when supporting the full amount of basic pensions for the late-stage elderly, but that is much smaller than the scale needed when implementing Plan A.

Fourthly, for the time being, the problem of shifting the burden from social insurance premiums to taxes will not likely happen. The current tax burden is one-half of the basic pension benefit expense, but since the population of the early-stage elderly and the late-stage elderly is more or less half and half<sup>7</sup>, there is no great change in the proportion of tax burden by this transfer of funding.

Finally, in this new reform plan the problem remains that no measures are taken for the low-pension and low-income people in the early-stage elderly. However, uniform benefits for the early-stage elderly are not always appropriate since there will be large individual differences until the age of about 75, such as one's health status or savings from one's working years. If uniform benefits financed by taxes are introduced to the early-stage elderly such as under Plan A, income tests and means tests are not avoided, and such tests will become a complicated system administratively. In addition, because it is difficult to figure out accurate incomes of self-employed people for the tests, it is not easy to devise a fair system. The current pension scheme based on the social insurance system seems to be more appropriate. Of course, there is the Public Assistance as a final safety net and, even if we look at the simulation results, the number of people does not increase in the low-income

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<sup>6</sup> The National Pension premium in fiscal year 2009 is 14,660 yen a month, and in this case the total amount of the insurance premiums for 40 years will be about 7.04 million yen. Furthermore, since the insurance premiums in the past were lower than this, the total amount of past insurance premiums actually paid is less.

<sup>7</sup> Since the number of late-stage elderly greatly exceeds the number of early-stage elderly in the future, the ratio of the tax burden will rise gradually, but no rapid shift will occur.

bracket of the early-stage elderly.

## 5. Problems and future directions

The Japanese society cannot avoid rapid changes such as aging and a shift toward a depopulating society. In the midst of the increase in the elderly, the need for social security is increasing, and how to efficiently distribute into social security benefits the revenue pie that is feared to be shrinking, is an important policy issue. Still, macro future estimates such as the population projections or the actuarial review of pension schemes are prepared by the government while micro future estimates such as the income distribution are not prepared even though their importance is recognized.

The microsimulation model is a tool to make future estimates at a micro level. In section 3, under the current pension scheme, we drew prospects of the elderly in the future—the form of their families and households, the distribution of pension benefits, and the distribution of equivalent income—by using the Japanese microsimulation model INAHSIM. The simulation results show that the number of late-stage elderly with a low equivalent income will increase by a large margin because of the changes in their families such as the increase in the number of elderly living alone although the level of their pension will be raised. Japan has already become a depopulating society, and we cannot avoid the rapid increase in the rate of a low-income population.

In section 4, simulations are performed for each of the previously proposed pension reform plans. The simulation results show that the plans are not always practical as a countermeasure for low-pension and low-income people. Furthermore, focusing on the serious problem of the late-stage elderly in their living standard, section 4 proposes an alternative reform plan that limits to the late-stage elderly a countermeasure for low-pension and low-income people, and then confirms the effectiveness of this alternative.

In this article, policy simulations related to pension reform plans in Japan were

performed, and we evaluated the effect of proposals of pension reform on future income distributions. Problems left for INAHSIM include considering the disposable income covering savings, property income, and social security and tax burdens, and economic growth like the wage increase rate and inflation rate. Hereafter, with the cooperation of experts in each field, this model can be improved and can be widely used. Using the improved microsimulation model and its simulation results, policy makers can enhance their function as policy workers and propose more suitable reform plans towards the depopulation and super-aging society of Japan.

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## Tables & Figures

Table 1: Trends in the elderly female population by marital status (in thousands)

Year	Total	Married	Never-married	Divorced	Widowed
2004	14,435	6,928	513	579	6,415
	100.0%	48.0%	3.6%	4.0%	44.4%
2020	20,466	9,917	947	1,507	8,095
	100.0%	48.5%	4.6%	7.4%	39.6%
2030	21,124	9,441	1,412	1,959	8,311
	100.0%	44.7%	6.7%	9.3%	39.3%

Note: estimate by author using INAHSIM.

Table 2: Trends in the elderly female population without a husband by family type (in thousands)

Year	Total	Single / institution		Living with married children	Living with unmarried children	Others
			no children			
2004	7,507	3,391	1,270	2,357	1,387	372
	100.0%	45.2%	16.9%	31.4%	18.5%	5.0%
2020	10,549	5,677	2,130	2,008	2,306	557
	100.0%	53.8%	20.2%	19.0%	21.9%	5.3%
2030	11,683	6,396	2,575	1,908	2,738	641
	100.0%	54.7%	22.0%	16.3%	23.4%	5.5%

Note: estimate by author using INAHSIM. "Single or institution" are those women living alone or in an institution.

Table 3: Trends in the distribution of pension amounts to elderly women without a husband (in thousands)

Year	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 and over (million yen)
2004	7,507	1,560	2,353	1,593	1,139	862
	100.0%	20.8%	31.3%	21.2%	15.2%	11.5%
2020	10,549	1,222	2,808	2,574	2,191	1,754
	100.0%	11.6%	26.6%	24.4%	20.8%	16.6%
2030	11,683	1,218	2,844	3,327	2,975	1,320
	100.0%	10.4%	24.3%	28.5%	25.5%	11.3%

Note: estimate by author using INAHSIM.

Table 4: Trends in the distribution of pension amounts to early- and late-stage elderly (in thousands)

(1) Early-stage elderly (65-74 years old)

年次	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 and over
2004	13,901	2,153	4,240	2,470	1,475	3,563
	100.0%	15.5%	30.5%	17.8%	10.6%	25.6%
2020	17,132	1,860	5,827	2,885	4,029	2,532
	100.0%	10.9%	34.0%	16.8%	23.5%	14.8%
2030	14,146	1,852	4,622	2,370	3,385	1,917
	100.0%	13.1%	32.7%	16.8%	23.9%	13.6%

(2) Late-stage elderly (75 years and older)

年次	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 and over
2004	11,132	2,562	3,151	1,793	1,305	2,321
	100.0%	23.0%	28.3%	16.1%	11.7%	20.8%
2020	18,906	2,753	5,025	3,291	3,103	4,734
	100.0%	14.6%	26.6%	17.4%	16.4%	25.0%
2030	22,796	2,434	6,393	4,315	5,448	4,206
	100.0%	10.7%	28.0%	18.9%	23.9%	18.5%

Note: estimate by author using INAHSIM

Table 5: Trends in the number of early- and late-stage elderly by family type (in thousands)

(1) Early-stage elderly (65-74 years old)

Year	Total	single	couple only	married children	unmarried children	others	institution
2004年	13,901	1,875	5,552	2,254	3,355	612	253
	100.0%	13.5%	39.9%	16.2%	24.1%	4.4%	1.8%
2020年	17,132	3,152	5,681	1,416	5,100	1,339	444
	100.0%	18.4%	33.2%	8.3%	29.8%	7.8%	2.6%
2030年	14,146	2,962	3,833	1,015	4,470	1,440	426
	100.0%	20.9%	27.1%	7.2%	31.6%	10.2%	3.0%

(2) Late-stage elderly (75 years and older)

Year	Total	single	couple only	married children	unmarried children	others	institution
2004年	11,132	1,871	2,535	3,615	1,822	330	959
	100.0%	16.8%	22.8%	32.5%	16.4%	3.0%	8.6%
2020年	18,906	3,892	5,206	3,222	4,171	560	1,856
	100.0%	20.6%	27.5%	17.0%	22.1%	3.0%	9.8%
2030年	22,796	5,182	5,663	3,216	5,601	733	2,401
	100.0%	22.7%	24.8%	14.1%	24.6%	3.2%	10.5%

Note: estimate by author using INAHSIM. "Married children" are the elderly living with married children, and "unmarried children" are the elderly living with unmarried children.

Table 6: Trends in the distribution of equivalent income of early- and late-stage elderly (in thousands)

(1) Early-stage elderly (65-74 years old)

Year	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 - 2.5 (million yen)	2.5 and over (million yen)
2004年	13,901	416	875	1,319	1,521	2,049	7,721
	100.0%	3.0%	6.3%	9.5%	10.9%	14.7%	55.5%
2020年	17,132	287	1,108	1,612	2,711	2,317	9,096
	100.0%	1.7%	6.5%	9.4%	15.8%	13.5%	53.1%
2030年	14,146	398	919	1,289	2,088	1,686	7,766
	100.0%	2.8%	6.5%	9.1%	14.8%	11.9%	54.9%

(2) Late-stage elderly (75 years and older)

Year	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 - 2.5 (million yen)	2.5 and over (million yen)
2004年	11,132	561	1,275	1,271	1,277	1,228	5,520
	100.0%	5.0%	11.5%	11.4%	11.5%	11.0%	49.6%
2020年	18,906	807	1,975	2,284	2,760	2,739	8,341
	100.0%	4.3%	10.4%	12.1%	14.6%	14.5%	44.1%
2030年	22,796	866	2,561	3,025	4,461	3,210	8,674
	100.0%	3.8%	11.2%	13.3%	19.6%	14.1%	38.1%

Note: estimate by author using INAHSIM

Table 7: Distribution of equivalent income of early- and late-stage elderly by the pension reform plan in the year 2030 (in thousands)

(1) Early-stage elderly (65-74 years old)

	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 - 2.5 (million yen)	2.5 and over (million yen)
Current scheme	14,146	398	919	1,289	2,088	1,686	7,766
	100.0%	2.8%	6.5%	9.1%	14.8%	11.9%	54.9%
Plan A	14,146	7	875	991	1,913	2,001	8,360
	100.0%	0.0%	6.2%	7.0%	13.5%	14.1%	59.1%
Plan B	14,146	265	930	1,211	2,082	1,751	7,906
	100.0%	1.9%	6.6%	8.6%	14.7%	12.4%	55.9%
Plan C	14,146	1	255	804	1,052	1,617	10,418
	100.0%	0.0%	1.8%	5.7%	7.4%	11.4%	73.6%

(2) Late-stage elderly (75 years and older)

	Total	0 - 0.5 (million yen)	0.5 - 1.0 (million yen)	1.0 - 1.5 (million yen)	1.5 - 2.0 (million yen)	2.0 - 2.5 (million yen)	2.5 and over (million yen)
Current scheme	22,796	866	2,561	3,025	4,461	3,210	8,674
	100.0%	3.8%	11.2%	13.3%	19.6%	14.1%	38.1%
Plan A	22,796	10	2,247	2,571	4,254	4,052	9,662
	100.0%	0.0%	9.9%	11.3%	18.7%	17.8%	42.4%
Plan B	22,796	825	2,556	2,989	4,468	3,236	8,722
	100.0%	3.6%	11.2%	13.1%	19.6%	14.2%	38.3%
Plan C	22,796	1	271	1,527	2,263	3,376	15,357
	100.0%	0.0%	1.2%	6.7%	9.9%	14.8%	67.4%

Note: estimate by author using INAHSIM.

Figure 1: Public pension system in Japan

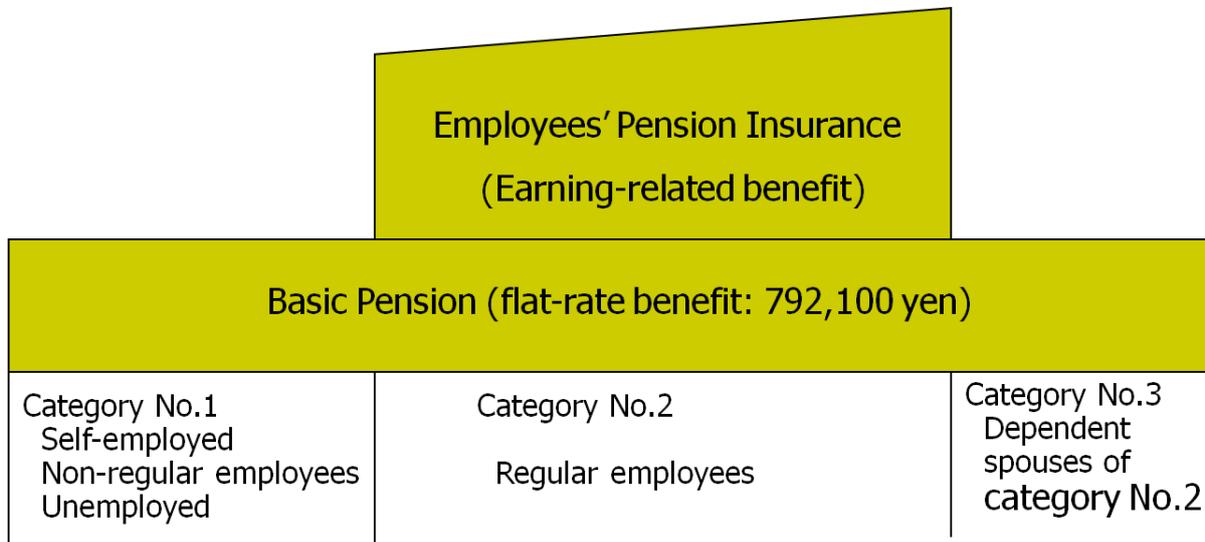


Figure 2: Simulation cycle of INAHSIM

