

the retirement.

(2) new trend for age and work

This theme has been discussed as one of the biggest problem. Because the pensionable age remains extremely early in France compared with that in the other countries: 60. Many opinion makers mentioned to this theme for a longer period. A difficulty comes from the fact that the pensionable age is closely related with many other factors such like labor market, wage standard, pension finance, etc.

The Council finally concluded the basic idea of the reform. Diversified employment policy must be constructed for the aged persons both in private and public. The workers aged 50 and more have been treated as inutile and surplus in the enterprises and tended to be excluded from the staff. Now, in the process of demographic change, population must change the basic understanding on ageing. The Council recommended following measures in concrete.

1. National campaign to reestimate the capacity of aged persons and to promote their employment.
2. Global action for certain big companies and for specific industries to be good practice as forrunner.
3. Special training program for the aged
4. Other public aids for the active employment in the companies

In addition the Council proposes the following measures in concrete to promote the employment of the aged persons.

1. progressive revision of the regulation to prohibit the cumulation between employment and pension
2. reexamination of the disposition to exempt the job-seeking
3. Revision of the mandatory retirement system in public sector
4. Preparation for the introduction of the regulation to prohibit the age discrimination

(3) financial security

pension amount

As for as the pension in general scheme is concerned, the income replacement ratio by pension

is fixed at 50%. Then the complementary pension shows big differences even in the replacement ratio by occupation, which is to be added on the social security pension. 50% means the amount of full pension, maximum amount of pension in the framework of social security, which can be granted only if one can satisfy with the qualifying insurance period. Those lacking of insurance period receive pension less.

The Council estimates the proportion of pension amount to the average net wage would change from 78% in 2000 to 42% in 2040 to adjust the present financial unbalance (see [Table 4](#)). This income replacement ratio depends on the professional status, accordingly on the income standard. For instance, the normal employees in private sectors show the same change from 84% to 67%, while from 56% to 47% in high management profession. Public employees always keep the same ratios: 78% in normal public employees and 60% in high management public employees.

pensionable age

If the pension standard must be maintained, pensionable age has to be examined to prolong. One way is to encourage to prolong the working period by providing some financial incentives. The other way is to prolong the period of contribution to fulfill the pension right. The Council estimate that the average life expectancy will prolong 6 year up to 2040. To maintain the present standard of pension, they need more 9 years' contribution, that is to say, 3 years shortened the years after retirement.

increase of the pension revenue

It might be necessary to increase the pension revenue in all possible measures. For instance, the Council proposes to enlarge the scope of contribution. Certain remunerations are usually excluded from the calculation of income basis. If all kinds of remunerations are included in income basis to calculate the contribution, the pension funds would be bigger certainly. Another proposal is to raise the maximum limit in the contribution by employers.

Then one of the simple and direct way to increase financial resources is raising the contribution ratio. According to the estimate by the research team, if there will be no reform in pension regulations, the contribution ratio would be 35% increase in 2040. Then if we wish to maintain the same proportion of income replacement ratio, 58% of increase would be required in the

contribution in 2040.

coordination of the measures concerned

As mentioned above, there we imagine different measures to balance the financial situation. Then the coordination among the different measures could be very important. The report estimates the different measures should be effective and complementarily together because the financial difficulty is serious and can never be solved by only single measure. However it seems easier to decrease the future benefit than to increase the contribution.

(4) equality and solidarity between the contributors

The Council makes much of the equality between the contributors. Many cases may be mentioned to as the unequal treatments in pension. The case the Council examined first is hard workers who engage some dangerous and/or heavy works. They are found some typical industries or professions. The qualifications of pension rights seem to be very difficult to satisfy for them. They can not easily work out for 40 years to fulfill the condition of full pension. Because of a longer period of contribution, their pension amounts to lower.

Next, the Council examined different cases in social risks. Unemployment, vocational training, cumulative employment, short-time employment, etc. oblige the workers concerned some disadvantages in pension benefits. Certain periods can not be reflected on the decision of pension amounts.

In addition, the unequal treatments among pension schemes were reexamined. In particular, pension schemes for public servant are still maintained the enriched conditions compared with those in private sector. For instance, full pension right is granted in public sector with 37.5 years' contribution, while raised to 40 years in private sector. The Council wish to equalize the conditions between private and public.

(5) development of the individual option

The individual differences become biggest in general through the life long. Therefore the room of option by the aged persons must be biggest and the Government must guarantee the conditions for that. Employers tend to make the aged 60 retired to whom the pension right is fully granted.

In this way the aged persons are discouraged to work any more. Even in the period of high unemployment the possibility to work must be guaranteed for the aged persons.

Public pension schemes regulate a heavy penalty for the early pension and light advantage for deferred pension, which makes narrow the option by the aged workers to choose the retirement age. The Council proposes, therefore, the revision of the treatments concerned to induce the employment of the aged persons. In addition, the Council insists on the development of progressive retirement from working life both in public and private sectors.

5. Contents of Pension Reform in 2003

After the long discussion, the Government has achieved the drastic reform in pension schemes. Law No.2003-775 of 21st August 2003 on the Pension Reforms was enacted and France started the new pension program. First of all, this Law consists of 116 articles concerning many different schemes and tries to integrate different schemes into single and common conditions. Moreover this law includes the future program and may continue the successive legislation.

Now France is still under the big pension reforms after the enactment of the Law of 21.8.2003 on the Pension Reforms. This Law is estimated as one of the biggest reform after the World War and marking the corner stone in the French Social Security history in many means. This short paper shall try to show the outline of the Law(8).

This Law is a long juridical text with 116 articles and the scope of application covers the huge categories. There needed the continuous legal modification in concerned laws. At the same time this Law mentioned the realization of different measures in a rather long period. It's a difficult moment now to illustrate the whole context of this Law.

Basic purpose

As the basic purposes of this Law following two are mentioned.

- achieving a good balance among the different pension schemes toward 2020.
- developing and promoting the chances to work for the aged persons

One of the basic characteristics in French pension schemes is certainly the diversification

according to the occupation branch. Autonomy has been the tradition in French social security system, which caused sometimes the different conditions among the many pension schemes. For instance, the pension for the public employees has kept a good conditions while general pension for salaried employees in private sector accepted losing previous conditions. The Pension Reform of this time took a first step to equalize the conditions of pension benefits.

The raising up the pensionable age has been the center of discussion. The normal pensionable age of 60 is now exceptionally early and the important reason for the financial difficulties. Here existed another influence, active ageing. EU prepares now the employment policy to develop the employment opportunities for the aged persons insisting on the Age Discrimination in Employment Act of US. Under the context of "social exclusion", the aged persons is regarded as one of the excluded categories and should be included in the working society. French Government follows this tendency and makes the working life longer.

keeping pay-as-you-go system and solidarity principle

While once the funding system was supported by the many experts, finally the discussion arrived at the conclusion to keep the pay-as-you-go system in pension finance as for the social security pension. The "solidarity principle" has been the tradition and basic idea in French social security and supported by the most of French population even in the future.

On the other hand, however, the Government introduced two voluntary pension schemes. Both schemes are funding schemes. One is on the individual basis and the other on the enterprise basis. The premiums are exempted from the scope of income tax.

pensionable age

This Law do not modify directly the pensionable age in general. However it introduced some minor changes in certain categories. They can receive pension from age of 60. The normal retirement age of 60 was not changed. However the qualifying period of insurance was prolonged as shown later. Therefore for most of citizens they must work a longer period to achieve their full pension.

Certain professional categories are admitted their specific needs. For instance those started to work at 14 years old can satisfy the qualification for full pension at 54 or later 56 of

their age. In the older regulation they must wait up to 60 for full pension but now they can enjoy the right at an earlier age before 60. The physically handicapped persons also enjoy the full pension at 55 with 30 years of insured period. Certain professions like police, fireman, soldiers, etc. can start their full pension since the age 55 or 50 with 15 years of insured period.

prolong the insured period for full pension

Recent legislation required 160 quarters (40 years) instead of 150 quarters (37.5 years) for full pension in general pension for wage earners of private sector. Now the Law tries to make apply the same qualification in the other pension schemes for the public employees step by step and equalised with other schemes by 2008. Besides the number of insured period is scheduled to increase one quarter for each year since 2009 and will be 164 quarters (41 years) in 2012 and finally 167 quarters (42 years) in 2020 for full pension.

point scheme in pension amounts

According to the prolongation of insured period for full pension, the point scheme was introduced to fix the pension amounts. Those who did not satisfy the qualifying period have to accept the reduction of pension amount, at present 10 % of reduction for each 1 years of lacking of qualification period. This ratio of reduction shall be moderated phase by phase and finally set at 5 % in 2013. On the other hand, those who continue to work after admission of full pension increase their pension amount at 3% for each 1 year of additional working. This regulation is applied differently in public and private sector and would be equalized in 2015.

minimum pension standards

The minimum pension for all citizens has been the tradition in France. Apart from social assistance the pension guarantee for all the minimum pension. This scheme was financed fully by the tax and the amounts fixed at relatively lower standard: 592 Euro for single and 1037 Euro for couple.

The new pension Law sets up the standard of the pensions: 85% of the net amount of SMIC (Minimum Wage) in 2008, which means considerably higher than former standard. For this goal the minimum pension amount will increased 3% in 2004, 2006 and 2008 respectively.

harmonization of different schemes

French pensions have been divided into many schemes by occupation. In particular there exists still big differences between pensions in private sector and in public sector so that public employees have kept some special treatments in pensions. This Law tries to harmonize the conditions and to meet the equal treatments among the different pension schemes. This might be first and new challenge from the Government to intervene into autonomous administration in social security schemes.

enlarging the option to start pension benefits

As a whole this Law tries to promote the active ageing. However, on the other hand, this Law makes the decision of retirement of us more flexible. Different measures are adopted by age classes.

(Age 55 and more)

There have been established different prepension schemes in France particularly after Oil Crisis. This Law absorbs these prepension schemes and tries to induce employment of this age group. The Government understand those of this age class should continue to work and protect and promote their employment by different measures.

(Age after 60 to 65)

This Law deregulates the cumulation between wage and pension. While one can receive both wage and pension, as long as the total income can not be more than last income from working. If the total income exceeds the last wage, pension benefit must be interrupted and coordinated.

The age at which employers make their employees retired to satisfy the qualification of full pension changed from 60 to 65. That is to say, in reality normal retirement age became 65. If the employers break labor contract with an employee who do not yet meet the insurance period for full pension before age 65, they must be applied the lay-off regulation.

The above means just the principle. This regulation can have a big influence for enterprises in private sector. Therefore the Law accepted the ways to make them retired before 65. First, as long as the labor convention or collective agreement are concluded before

January 1st 2008 they maintain the conditions even on the retirement age. Second, the prepension, which had already been existed before the new Law of August 22nd 2003, will be effective and applicable from now on. In a sense the retirement age will be raised in a long run under the initiative of employers.

[Note]

- (1) This paper principally based on the documents by the Council d'Orientation des Retraites.
- (2) See following text on the basic characteristics of French Pension schemes.
Dupeyroux, J-J., "Droit de la securite sociale", Dalloz, 2002.
- (3) The amount of minimum guarantee of Aged Persons is fixed at 43,854 Ff per year, in which 18,021Ff is for non-contributive benefit wage earners and 25,833Ff is from National Solidarity Fund.
- (4) Quoted from the Enquete complementaire a l'enquete Emploi 1996, INSEE, 2000.
- (5) COR, Retraits: Fiches pour l'information et le debat, 2003, p.24.
- (6) COR, Retraits: Fiches pour l'information et le debat, 2003, p.25.
- (7) Here this paper quoted principally the debate and proposal in COR[4] 2003.
- (8) Quoted from J.O. no.193 du 22 aout 2003.

[Reference]

- [1] Commissariat General du Plan, " *Perspectives a long term des retraites*", La Documentation Francaise, 1995.
- [2] Desmarais, B., " *Guide jridique et pratique de la retraite et de la preretraite*", Editions de Vecchi, 1998.
- [3] Conseil d'Analyse Economique, " *Retraites choisies et progressive*", La Documentation Francaise, 2001.
- [4] Conseil d'Orientation des Retraites, " *Retraites: Fiches pour l'information et le debat*", 2003.
- [5] Vialettes, M., " *L'information des assures sur leurs droit a la retraite*", 2003.
- [6] Boulanger, J-M., " *Cumul employ retraite*", 2003.
- [7] Struillou, Y., " *Penibilite et retraite*", 2003.

- [8] Ministère de la sante, de la famille et des personnes handicapées, *Commission des comptes de la securite sociale: Presentation des grandes lignes du PLFSS 2004*, 2003.
- [9] Legislation sociale No8411, Reforme des retraites, Liaisons Sociales, 12 septembre 2003.
- [10] Droit Social numero special, La reforme des retraites: Loi du 21 aout 2003, No11, 2003.

Table 1. Life Expectancy in France

		life expectancy at birth	Life expectancy at age 60
Men	1932	55	14
	1990	73	19
	difference	+18	+5
Women	1932	60	16
	1990	81	24
	difference	+21	+8

(Source) INSEE, COR calculation, 2001.

Table 2. Contribution ratios by professional category (1)

	Premium ratio by Employee %	Premium ratio by Employer %
Normal employee	10.35	15.50
Management employee	9.75	15.54
Non regular public employee	8.80	13.18
Local public employee	7.85	26.5
National public employee	7.85	48.75 (2)
Craftsman	22.35	
Merchant	20.30	
Free profession	depends on profession	

(1) This includes both contributions of social security pension and of conventional pension.

(2) This figure is simulation calculated by COR.

[Source] COR [2003], p.16.

Table 3. Financial Balance Prospect in Major Pension Scheme (billion Euro)

Pension Scheme	2000	2010	2020	2040
CNAV 1 (1)	1.5	0.8	-10.9	-39.7
CNAV 2 (1)	1.5	-0.5	-15.2	-49.6
AGIRC	0.3	1.4	-1.6	-3.8
ARRCO	3.9	6.5	0.0	-13.2
National Employee	0.0	-9.5	-20.2	-36.8
CNRACL	2.7	-0.6	-7.5	-20.5
CANCAVA	-0.7	-1.0	-1.2	-1.8
Agriculture Managers	-6.4	-5.8	-4.6	-3.4

(1) CNAV is general pension for employees in private sector and here shows two different projections.

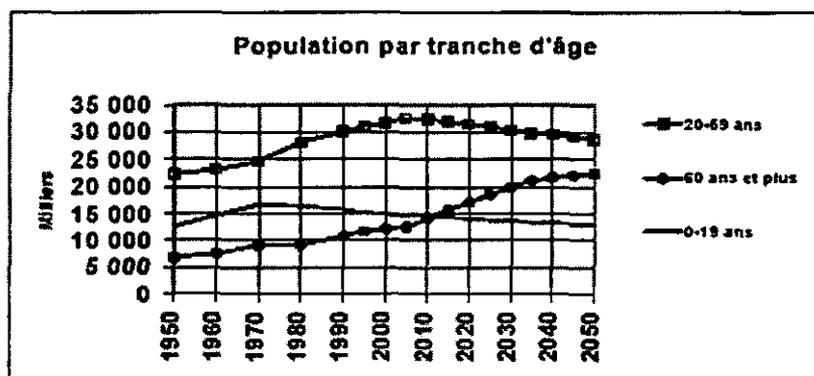
(Source) COR, 2001.

Table 4. Income Replacement Ratios by Social Class

	2000	2020	2040
Normal employees of average wage	84%	71%	67%
Management employees of average wage	75%	62%	58%
Upper management employees	56%	50%	47%
Normal public employees	78%	78%	78%
Upper management public employees	60%	60%	60%

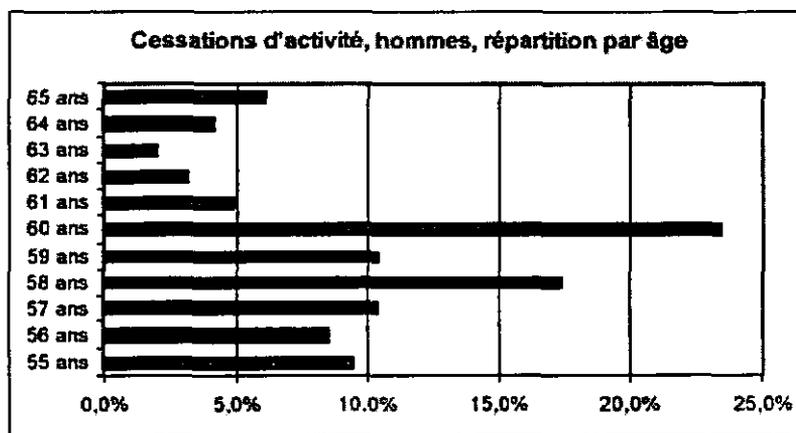
[Source] COR [2003] p. 30.

Figure 1. French Population in transition by Age Group



[Source] COR [2003], p. 22.

Figure 2. Retirement Age in France



Source: enquêtes emploi de 1996 à 2000 de l'INSEE, Calculs COR, 2002

2.5 Pension Reform in Sweden

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Abstract

Sweden changed its pension system drastically in 1999, while almost all developed countries confronted common hard problems to which aging lead. The new Swedish pension system is called the Notional Defined Contribution (NDC) pension system. The new Swedish pension system is a pay-as-you-go system, but pension benefits are strongly linked to pension contributions. Therefore the new Swedish pension system is called NDC pension system. It is thought that the new Swedish pension system do not lead to intergenerational inequality because pension benefits are strongly linked to pension contributions. Additionally it is thought that Swedish new pension system has the advantage of sustainability because pension benefits fluctuate according to economic growth rate and longevity. The purpose of this paper is to describe the characteristics of the new Swedish pension system and consider its implications for the Japanese pension system.

1. Introduction

In almost all developed countries, the public pension system is a defined benefit (DB) system¹. DB system plays an important role in guaranteed income after retirement, and it is a profitable pension system with respect to lifetime net benefits (the ratio between lifetime benefits and burdens) if the growth rate of young people exceeds that of aged people. But almost all developed countries confront an aging society in which the growth rate of aged people exceeds that of young people. IN this case, the DB system is an unprofitable pension system with respect to lifetime net benefits. If the economic growth rate is always high, heavy burdens of young generations will be absorbed by high economic growth and the financial resources of the pension system will be stable. In high economic growth, negative effects of the DB system on aging, like an intergenerational inequality and unsustainability, are trivial. But the economic growth rate of developed countries is generally low. Actually that of most developed countries in the 1990's was low. In addition, it is said that the economic growth rate of most developed countries will move low or moderate in the future. Due to aging and low economic growth rate, the DB systems of most developed countries are unprofitable systems.

Aging and low economic growth are factors which make the DB system unprofitable. In addition, rising longevity makes the DB system unprofitable. In the DB system, pension funds give determined pension benefits to a retired person in his lifetime. If longevity rises and the average retirement age is unchanged, pension funds will need additional amounts of pension benefits to finance rising longevity. In the DB system, pension funds cannot change determined pension benefits in principle; thus rising longevity leads to a serious impact on the sustainability of the pension system.

Aging, low economic growth and rising longevity are common hard problems for almost all developed countries. What they should solve is the intergenerational inequality and the unsustainability of the pension system to which aging, low economic growth and rising longevity lead. Sweden changed its pension system drastically in 1999, while almost all developed countries confronted common hard problems. The new Swedish pension system is called the Notional Defined Contribution (NDC) pension system. The new Swedish pension system is a pay-as-you-go system, but pension benefits are strongly linked to pension contributions. Therefore the new Swedish pension system is called the NDC pension system. It is thought that the new Swedish pension system do not lead to intergenerational inequality because pension benefits are

¹ In most case, a defined benefit system is a pay-as-you-go system.

strongly linked to pension contributions. Additionally it is thought that the new Swedish pension system has the advantage of sustainability because pension benefits fluctuate with the economic growth rate and longevity. The new Swedish pension system comes to the front because it is thought that the new Swedish pension system counteracts negative effects of aging, low economic growth and rising longevity.

The purpose of this paper is to describe the characteristics of the new Swedish pension system and consider implications for the Japanese pension system.

2. Background of reform

The new Swedish pension system is a noteworthy system because it is said that the new Swedish system is impervious to aging, low economic growth and rising longevity. The reasons for the Swedish pension reform are as follows: The main reason is that the old Swedish pension system had financial troubles. Another reason is that the old Swedish pension system was unfair. Due to the thirty-year rule and the fifteen-year rule, the old Swedish pension system favored persons with higher lifetime income over persons with lower lifetime income.

Sweden confronts aging as much as any other developed countries. In 2000, the ratio of old people (over 65 years old people) to total people was 17.43. In 2020, this ratio will be 23.95². In Palmer (2002), it is said that the contribution rate would increase to about 27 percent if real economic growth rate were 1 percent per year. On the other hand, real growth of 3 percent would be sufficient to maintain a constant contribution rate³. Real economic growth rate of most developed countries is generally low. It is difficult to assume real growth of 3 percent in Sweden because what most often occurred was a growth rate of around 2 percent. In addition to a low economic growth rate, rising longevity was troubles for the old Swedish pension system. It was Defined Benefits (DB) system and a pay-as-you-go system. Therefore, rising longevity meant that the pension fund needed additional amounts of pension benefits to finance it. Due to low economic growth and the increased cost of pension payments due to aging and rising longevity, the old Swedish pension system lost credibility in terms of sustainability. Then Sweden had to reform its old pension system.

The thirty-years rule and the fifteen-years rule were as follows. In the old Swedish pension system, the pension benefit formula was based on the 15 years of highest income and the pension rights required a minimum qualifying period of 30 years. Due to

² Resource: United Nations, The Sex and Age Distribution of World Population: 2000.

³ Total contribution rate was about 20 percent before reform.

the thirty-years rule and the fifteen-years rule in the old Swedish pension system, two people with the same lifetime earnings may receive different pensions, although they have both paid in the same amount in contributions. It is unfair that those who work all their lives and have a flat earnings profile, like the typical blue collar worker, should receive less pension benefits than those who have a short career but a good earnings profile toward the ends of their career, like the typical white-collar worker.

Sweden had to reform its old pension system to solve the sustainability and unfairness of that system. There are three major principles in Swedish pension reform. First, benefits should be based on contributions from lifetime earnings. Second, indexation should be based on the growth of the contribution wage base. Third, annuities should reflect changes in life expectancy. In next section, we describe characteristics of the new Swedish pension system, which was developed to achieve these principles.

3. Characteristics of the new pension system

The first and the most remarkable characteristic is that the new Swedish pension system is an income-related pension. The old Swedish pension system entailed a weak link between the individual's lifetime earnings and pension benefits. The second is that rising longevity and economic growth fluctuations are considered in the new Swedish pension system. The third is that the guaranteed pension is financed by taxes. Other characteristics are pensionable amounts, and a survivors pension. We describe the characteristics of the new pension system briefly below.

3.1. An outline of the new pension

Basic Structure

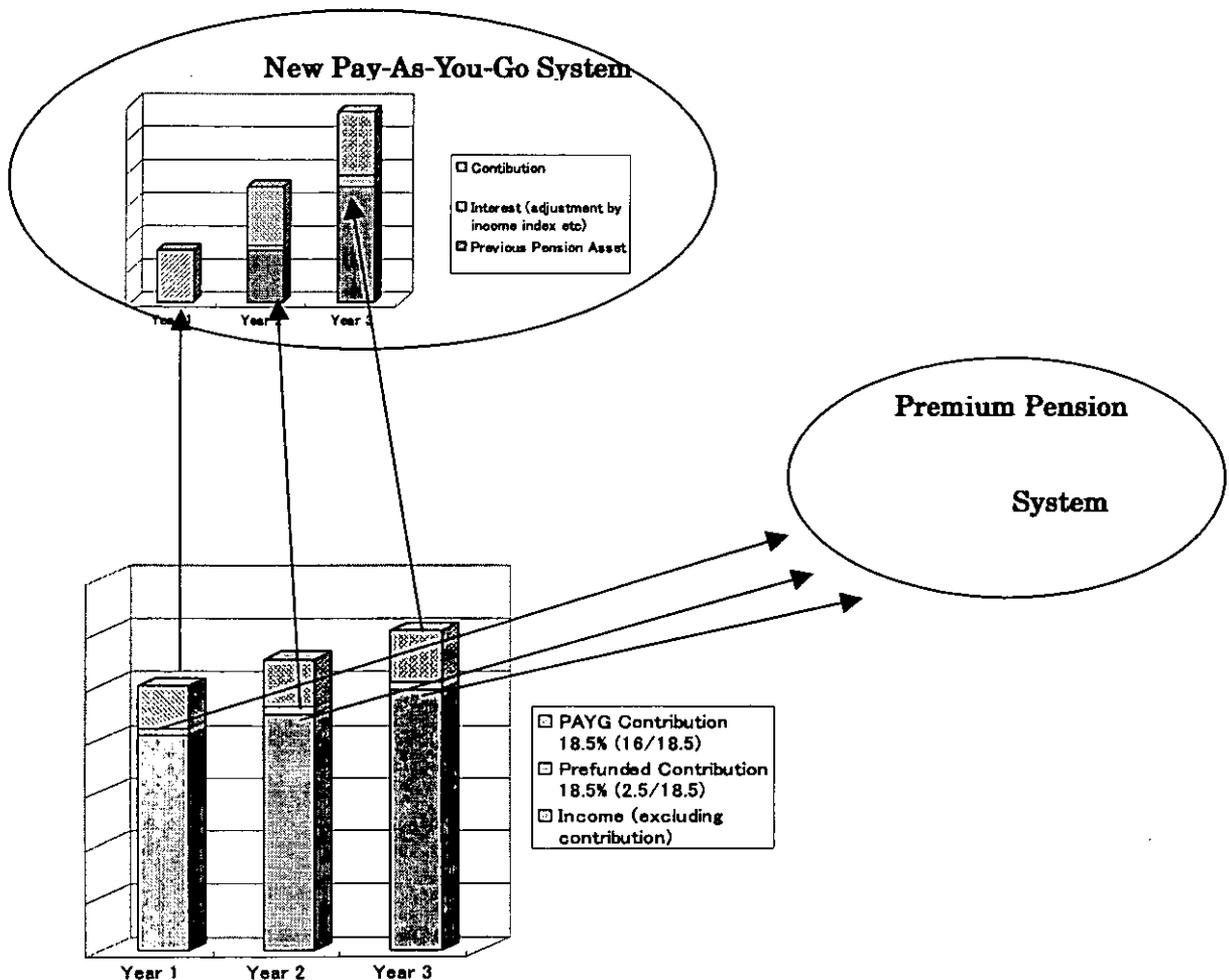
The new Swedish pension system⁴ consists of two parts, a pay-as-you-go pension system and a premium pension system. The total contribution rate is 18.5 percent of pensionable incomes. The contribution rate of the pay-as-you-go or Notional Defined Pension system is 16 percent of pensionable incomes. On the other hand, the contribution rate of the premium pension system is 2.5 percent of pensionable incomes.

Figure 1 shows the image of the new Swedish pension system. 16 percent of pensionable incomes are recorded in the Notional Defined Contribution system. But the Notional Defined Contribution System is principally a pay-as-you-go system. Therefore,

⁴ Kimura (1999) also describe an outline of Swedish new pension system.

large amounts of contributions in the Notional Defined Contribution system are transferred to retired persons. On the other hand, 2.5 percent of pensionable incomes are deposited in the Premium Pension system. The Premium Pension system is a fully defined contribution system.

Figure 1 Basic structures



Source: Government Offices of Sweden (1998) The Pension Reform – in Sweden

The ceiling and the share of contribution

In the new Swedish pension system, the ceiling of contribution is seven point five income base amounts. One income base amounts is 38,800 kronor in 2002. Here, 8.07 percent is the ceiling of contribution before the deduction. The deduction rate is 7

percent. Therefore, 7 percent is equal to 8.07 percent multiplied by 0.93.

On the one hand, the contribution rate paid by the employee is 7 percent. On the other hand, the contribution rate paid by the employer is 10.21 percent. It is said that the total contribution rate of the new system is 18.5 percent. 18.5 percent is nearly equal to 17.21 over 0.93.

Interest rates in pension system

There are two interest rates in new system, the average income and the rate of return to capital in the funds. In the pay-as-you-go system, the interest rate is the average income or the income index. In the premium pension system, the interest rate is the rate of return to capital in the funds.

3.2. Rising longevity and economic fluctuation

In the new Swedish pension system, the pension benefits are affected by rising longevity and economic fluctuation. Pension benefits are determined to divide the accumulated pension capital in the Notional Defined pension system by the annuitization divisor.

$$\text{Pension benefits} = \frac{\text{the notional pension capital}}{\text{annuitization divisor}} \quad (1)$$

The annuitization divisor reflects the average life expectancy. If the average life expectancy rises, the annuitization divisor will increase. Therefore, if the average life expectancy rises, the pension benefits will decline.

The pension value growth rate is as follows.

$$\begin{aligned} \text{Pension value growth rate} &= \text{income index growth rate (real term)} \\ &\quad - 1.6\% + \text{Consumer Price Index growth rate} \end{aligned} \quad (2)$$

Income index growth rate is affected by the economic fluctuation. Therefore, pension benefits are affected by the economic fluctuation because the pension value growth rate depends on the economic fluctuation.

To be briefly summarized, pension benefits are affected by rising longevity through annuitization divisor, and pension benefits are also affected by the economic fluctuation through income index growth rate.

3.3 Automatic balance mechanism

The automatic balance mechanism⁵ is the adjustment method of the pension benefits to maintain the soundness of pension financing. The obvious way to secure financial stability is to make sure that its liabilities cannot exceed its assets. The main problem with applying this principle to a pay-as-you-go pension system has been the difficulty to value its assets, especially its assumed perpetual flow of contributions. The automatic-balance mechanism incorporates a method for valuing contributions to a pay-as-you-go system. Therefore it makes it possible to compare assets and liabilities of new pension system.

In the new Swedish pension system, the definition of contribution asset is that contributions are multiplied by turnover duration.

$$\text{Contribution asset} = \text{contribution} \times \text{turnover duration} \quad (3)$$

According to Annual Report 2001 on The Swedish Pension System published by the National Social Insurance Board, turnover duration is “the expected time elapsing from pension credit has been earned until the pension is paid out in the pay-as-you-go system”. Turnover duration depends on income, labor-force participation and mortality etc. Turnover duration consists of pay-in duration and pay-out duration.

Sweden has a buffer fund for public pensions. The buffer fund is similar to the reserve fund for public pensions in Japan. Because buffer fund is composed of past pensions premiums, it consists of assets of the public fund. Assets of public fund are defined as follows.

$$\text{Assets} = \text{contribution asset} + \text{buffer fund} \quad (4)$$

On the other hand, the pension liability consists of two parts, the liability to those who have not yet started to draw their pension (PL_w) and the liability to those who are already receiving pension (PL_r).

$$\text{Pension liability} = PL_w + PL_r \quad (5)$$

PL_w is basically notional pension capital of working people. It, however, includes pension credit of the old pension system because the new pension system replaces the

⁵ In Settergren [2002] the automatic balance mechanism is explained more in detail.

old one.

Although the new Swedish pension system is called the Notional Defined Contribution pension system, a way to finance this system is pay-as-you-go. Therefore potential sources of financial instability remain even in the Notional Defined Contribution pension system. Financial instability risk factors are (1) growth of the contribution base, (2) change in income and mortality patterns, (3) return on the buffer fund, (4) impact of changes in life expectancy on pension liability. The automatic balance mechanism has been developed to handle these risk factors. Balance ratio⁶ is important in order to understand the automatic balance mechanism. It is defined as follows.

$$\text{Balance ratio} = (\text{Contribution asset} + \text{Buffer fund}) / \text{Pension liability} \quad (6)$$

When the balance ratio exceeds 1, the pension liability is less than the assets of the system, and then the net present value of the system is positive. On the other hand, if the balance ratio is less than 1, the system is in a state of financial imbalance, and then the net present value of the system is negative. If the balance ratio falls below 1, the automatic balance mechanism activates.

When the balance ratio falls below 1, indexation of pension switches to a new index, called a balance index. The balance index is established by multiplying the income index by the balance ratio. If the balance ratio is below 1, pensions and notional capital grow more slowly than average income. If the balance ratio exceeds 1 during the automatic balance mechanism activation, the index of pension and notional pension capital will continue at the rate of growth in average income multiplied by the balance ratio. No further calculation of the balance index will be made after the balance index reaches the same level as the income index.

3.4 Guaranteed pension

There are two main characteristics in the guaranteed pension system. First, the guaranteed pension is entirely financed by taxes. Second, if an individual's income-related pension increases, his guaranteed pension declines. In other words, there are reduction rates in the Swedish guaranteed pension system. If the income-related pension is zero, an unmarried pensioner receives 2.13 price base amounts. A married and cohabiting pensioner receives 1.9 price base amounts. One

⁶ Ono [2003] proves that public pension assets equal to pension liability in a steady state.