

## **Pension Reform in Sweden and Implications for Japan**

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### **Abstract**

Sweden changed its pension system drastically in 1999. The new Swedish pension system is a pay-as-you-go system, but it is a defined contribution pension in principle. This new Swedish pension system is called the Notional Defined Contribution (NDC) pension system. As pension benefits are strongly linked to pension contributions, it is thought that the new Swedish pension system does not lead to intergenerational inequality. Additionally it is thought that the new Swedish 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) system. DB system plays an important role in guaranteed income after retirement, and it is a more favorable system than a defined contribution (DC) system with respect to lifetime net benefits (the ratio between lifetime benefits and burdens) if the sum of the population and the wage growth rate exceeds the market rate of return. Yet almost all developed countries confront a low population growth rate. In this situation, the DB system is an unfavorable 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 negative effects of the DB system on aging, like an intergenerational inequality and damage to the soundness of pension financing, are trivial matter. However, the economic growth rate of developed countries is generally low, and this trend is anticipated to continue in the future.

The rising longevity is a disadvantage for the DB system in addition to low population and economic growth. In this system, it provides determined pension benefits to a retired person in his lifetime. If longevity rises and the average retirement age remains unchanged, it will need additional amounts of pension benefits to finance the

rising longevity. Thus the rising longevity leads to a negative impact on the sustainability of the pension system.

Low population growth, low economic growth and rising longevity are common and difficult problems for pension system of almost all developed countries. Sweden changed its pension system drastically in 1999, while almost all developed countries confronted these common and difficult problems. The characteristics of the new Swedish pension system are that a pension finance method is a pay-as-you-go system, but this system is a defined contribution pension. Therefore it is called the Notional Defined Contribution (NDC) pension system. It is thought that the new Swedish pension system does not lead to intergenerational inequality because pension benefits are strongly linked to pension contributions. Additionally it is believed that the new Swedish pension system has the advantage of sustainability because pension benefits fluctuate with the economic growth rate and longevity. This new system is thought to counteract negative effects of low population growth, low economic growth and rising longevity. Therefore it has established itself at the forefront.

The purpose of this paper is to describe the characteristics of the new Swedish pension system and consider implications for the Japanese pension system. As described later, the new Swedish pension system consists of the NDC and the Financial Defined Contribution (FDC). As the NDC system is highly suggestive in considering the Japanese public pension reform, we focus on this system in this paper. The outline of this paper is as follows. Section 2 provides the background of reform in Sweden. Section 3 describes characteristics of the new Swedish pension system. Implications for the Japanese pension system are addressed in section 4.

### **2. The background of reform**

The new Swedish pension system is a noteworthy system because it is thought that the new system is impervious to low population growth, low economic growth and rising longevity. The reasons for the Swedish pension reform are as follows: The primary reason is that the former Swedish pension system experienced financial

problems. Another reason is that the old Swedish pension system was inequitable. Due to the thirty-years rule and the fifteen-years 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 country. In 2000, the ratio of old people (over 65 years old) to total population was 17.43. In 2020, this ratio will be 23.95. The National Social Insurance Board showed that: "the contribution rate would increase to about 27 percent if the real economic growth rate were 1 percent per year (Palmer, 2002). On the other hand, real growth of 3 percent would be sufficient to maintain a constant contribution rate". However, the 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, the rising longevity presented problems for the prior Swedish pension system. The rising longevity required greater amounts of pension benefits than anticipated. Due to the increased cost of pension payments, the old Swedish pension system lost credibility in terms of sustainability.

In the prior Swedish pension system, the pension benefit formula was based on the 15 years of highest income (fifteen-years rule) and the pension rights required a minimum qualifying period of 30 years (thirty-years rule). Due to the thirty-year rule and the fifteen-year rule, two persons with the same lifetime earnings may receive different pensions, although they have both paid the same amount of contributions. It is inequitable 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 end of their career, like the typical white-collar worker.

Sweden had to reform its old pension system to solve the sustainability and inequity of that system. There are two major principles in Swedish pension reform. First, benefits should be based on contributions from lifetime earnings. Second, annuities should reflect economic conditions and changes in life expectancy. In the 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 most remarkable characteristic is that the new Swedish pension system is an income-related

pension. The prior 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. The fourth is the flexible pensionable age. Another characteristic is the survivor and the widow's pension. We describe the characteristics of the new pension system briefly below.

#### **3.1 An outline of the new pension system**

##### **Basic structure**

The new Swedish pension system 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 income. The contribution rate of the pay-as-you-go or the NDC system is 16 percent of pensionable income, and the rate of the premium pension system or the FDC system is 2.5 percent of pensionable income. Contrary to the NDC system, the FDC system is a fully defined contribution system, and 2.5 percent of pensionable income is to be deposited in the personal account.

##### **The ceiling and the share of contribution**

In the new Swedish pension system, the ceiling of contribution is 7.5 times of income base amounts. A one-income base amount was 38,800 kronor in 2002. In terms of the contribution share, the contribution of the employee is 7 percent and the employer is 10.21 percent. Therefore, an employee's share is about 41 percent and an employer's share is about 59 percent.

##### **Interest rates in pension system**

There are two interest rates in the new system: the average income index and the rate of return to assets in the funds. In the NDC system, the interest rate is the average income or the income index growth rate. In the FDC 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 the rising longevity and the economic fluctuation. Pension benefits are determined by dividing the accumulated pension capital in the NDC 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, resulting in the decline of the level of pension benefits for succeeding generations.

The pension value growth rate is as follows.

*Pension value growth rate = income index growth rate (real term) - 1.6% + Consumer Price Index growth rate*

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

The reduction by 1.6 percent is explained by the fact that the interest rate of 1.6 percent is used when the accumulated pension capital is converted to the annuity. Therefore, retired persons receive the interest income of NDC system early. This mechanism is described as “front-loading”.

#### **Automatic balance mechanism**

The automatic balance mechanism 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 in 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 the new pension system. In the new Swedish pension system, the definition of contribution asset is the contributions multiplied by turnover duration.

According to the Annual Report 2001 on the Swedish Pension System published by the National Social Insurance Board, turnover duration is: “the expected time elapsing from when the 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 a buffer fund is composed of past pensions premiums, it consists of assets of the public fund. Assets of the public fund are defined as follows.

*Assets = contribution assets + buffer fund*

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

*Pension liability =  $PL_w + PL_r$*

$PL_w$  is basically notional pension capital of working people. However it includes pension credit of the old pension system because the new pension system gradually replaces the old one.

As the method to finance the NDC system is pay-as-you-go. Therefore potential sources of financial instability remain in the NDC 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; and (4) impact of changes in life expectancy on pension liability. The automatic balance mechanism has been developed to handle these risk factors. Balance ratio is important in order to understand the automatic balance mechanism. It is defined as follows.

*Balance ratio = (Contribution assets + Buffer fund) / Pension liability*

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 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 pensions 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 pensions 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**

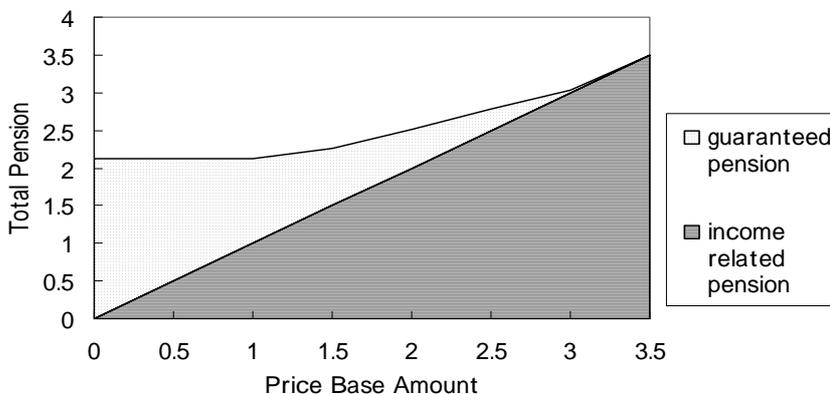
There are two main characteristics in the guaranteed

pension system. First, the guaranteed pension is entirely financed by taxes. Second, if an individual's income-related pension increases, his and her 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 or cohabiting pensioner receives 1.9 price base amounts. One price base amount was 37,900 kronor in 2002.

The reduction rate in a guaranteed pension is as follows (see Figure 1);

- Unmarried pensioner
  - 0 ~ 1.26 price base amounts: 100%
  - 1.26 ~ 3.07 price base amounts: 48%
- Married and cohabiting pensioner
  - 0 ~ 1.14 price base amounts: 100%
  - 1.14 ~ 2.72 price base amounts: 48%

Figure 1 Guaranteed Pension of Single Pensioner



"Source Government Office of Sweden (2002) National Strategy Report on the Future of Pension Systems - Sweden"

The guaranteed pension will be payable to pensioners who are 65 years old or over, as a top-up to their income-related pension. The guaranteed pension is payable only to people who are domiciled in Sweden. In order to receive a full guaranteed pension, 40 years of

residence in Sweden will be required in principle, counting from the age of 25. If the beneficiary has 39 years of residence, the guaranteed pension will be computed as 39/40 of the full guaranteed pension.

Table 1 Retirement Age and Pension Level

Retirement Age	Demographic divisor	Pension level in relation to retirement at 65
61	18.2	72%
62	17.6	78%
63	17.1	84%
64	16.5	92%
65	15.9	100%
66	15.3	109%
67	14.7	119%
68	14.2	130%
69	13.6	143%
70	13.0	157%

Source: Scherman, KG(1999) "The Swedish Pension Reform"

In Sweden, there is the maintenance support for elderly persons aside from the guaranteed pension. It is a means-tested allowance intended to guarantee a minimum living level for people who are aged 65 or older and domiciled in Sweden. According to the Government Office of Sweden (2002): "All individuals over the age of 65 will be eligible for maintenance support for the elderly but the majority of those who will receive this benefit are people who have immigrated to Sweden too late in life to have had time to earn an old-age pension in Sweden and who also lack sufficient years of residence to qualify for a guaranteed pension that they can live on".

### **3.5 Flexible pensionable age**

There is no nominal retirement age within the income related system, and everybody will be able to retire and receive an old-age pension from the age of 61. This goes for both the NDC and the FDC system. Pension benefits will increase if he or she decides to retire later and vice versa. In addition, it will decline according to the extension of life expectancy of the cohort which beneficiaries belong.

Both kinds of adjustment are done on an actuarial basis without affecting total life-time pension payments. Therefore, the new pension is neutral to the labor supply or the individual decision of retirement. Table 1 describes the way in which the time of retirement influences individual pension level.

### **3.6 Other characteristics**

Other characteristics are the survivor's and the widow's pension. The survivor's pension has been payable to men and women alike since 1990, in the shape of an adjustment pension. This pension is not included in the new pension system. The adjustment pension is payable to surviving spouses under the age of 65 for a period of ten months. Meanwhile, the widow's pension will be phased out. In general, widows who married before 1990 will be eligible for a widow's pension.

## **4. Implications for the Japanese pension system**

The following issues help us to consider the implications for the Japanese pension reforms:

Intergenerational equality;

Sustainability;

Separation of public assistance from the pension system based on social insurance;

Neutrality for retirement; and

Widow's and survivor's pension.

In the new Swedish pension system, the contribution rate is fixed. The main reason for intergenerational inequality is that the contribution rate rises continually. Now Sweden fixes the contribution rate at 18.5 percent. Moreover, the new Swedish pension system is an income-related pension. While the former Swedish pension system entailed a weak link between the individual's lifetime earnings and pension benefits, those strongly link in the new system. Therefore, the new Swedish pension system has the advantage of intergenerational equality. Moreover, the Swedish guaranteed pension is entirely financed by taxes, and separate public assistance from the pension system based on social insurance.

Pension benefits are adjusted for rising longevity and economic fluctuation in the new Swedish pension system. The automatic balance mechanism activates if pension financing becomes unsound. The automatic balance mechanism and adjustments of pension benefits for rising longevity and economic fluctuation contribute to the sustainability of the pension system.

Now, we compare Japanese pension reform plans with Sweden's new pension system. The public pension reform bill were passed on June 5, 2004. There are two new points in comparison with previous systems. First, the contribution rate will increase gradually but be fixed after 2017 in the new system. Meanwhile contributions and benefits were adjusted every five years previously. The contribution rate of the EPI (Employees' Pension Insurance) will increase at 0.345 points annually by 2017 and will be fixed at 18.30 percent after 2017. In terms of the contribution share, an employee's share is about 41% and an employer's share is about 59% in Sweden, meanwhile those shares are split evenly in Japan.

The second point is that the "Macroeconomic Slide" method is introduced. The earnings-related benefits of the EPI are based on his or her past wages. When those are calculated, the past wages is reevaluated. In the previous system the wage growth rate was used as the indexation of reevaluation. In the Macroeconomic Slide method, the indexation is switched as follows: "The reevaluation index = the wage growth rate - the demographic factor change rate", where "The demographic factor change rate = the declining rate of workers + the longevity rate of increase". Therefore, benefits levels are adjusted according to social and economic conditions, like the wage, the longevity, and the number of workers.

Table 2 summarizes the comparison of the New EPI and Swedish Pension. In terms of fixing a contribution rate, both systems impose it. Its level is 18.30 percent in Japan and 18.5 percent in Sweden. One half of the Japanese basic pension will be financed by the tax (or state subsidy) while the entire guaranteed pension in Sweden is financed by the tax. Therefore, it is not clear which contribution level is high when it includes tax

burdens.

In terms of automatically adjusted pension benefits, both systems contain this device. On the one hand, the automatic balance mechanism in Sweden will act whenever the balance ratio falls to one; while on the other hand, in Japan such periods will be determined by the macroeconomic slide method. It is expected to be engaged by about 2032.

**Table 2 Comparison of New Employee's Pension Insurance and Swedish Pension**

	Japan	Sweden
Contribution is fixed	No (2004-2017) Yes (2017-)	Yes
Adjustment of pension benefit to the declining number of workers	Yes	Yes
Guaranteed pension paid by the tax only	No	Yes
Neutrality for retirement	Weak	Strong
Widow's pension	goes on	phases out

Next are the guaranteed pension and the basic pension. The new Swedish pension system has a clear distinction between the role of taxes and pension contribution because the Swedish guaranteed pension is entirely financed by taxes. The new Japanese EPI does not contain this because taxes will finance one half of the Japanese basic pension.

As described in section 3.5, the new Swedish system is neutral in terms of retirement. Pension benefits are adjusted along with the retirement age and the average life expectancy of their cohorts. Although there is an adjustment of pension benefits in Japan, it is biased for retirement age. In addition, it does not reflect the extension of life expectancy. Therefore, the neutrality of retirement in Japan is weaker than that of Sweden.

The widow's pension will be abolished in the new Swedish system. Meanwhile this category of pension in

Japan will remain after the 2004 reform. In terms of the survivor's pension, entitlement periods of the survivor's pension are 10 month in Sweden, while in Japan there is no restriction on its periods in general, such as ten months.

In terms of the adjustment on pension benefits, the guaranteed pension in Sweden is based on the price index adjustment, whereas the income related pensions grow along with the income index growth rate. In Japan, pension benefits are based on the income index adjustment generally.

To summarize, the new Japanese public pension has in common with the new Swedish system the upper bound of the contribution rate and the automatic adjustment for benefits. However, there are differences in the strength of the link between contributions and benefits, the period of adjusting benefits, the separation between taxes and

contributions, and the neutrality for retirement. Therefore essential differences remain between the Japanese and the Swedish system. Of course, it is difficult to answer the question which system is more desirable because each citizen has a different preference to the social security or the pension system. However, Japan still has some points to learn from the Swedish system in order to improve the intergenerational equality, the sustainability of pension financing and the neutrality of retirement.

## Notes

<sup>1</sup> In most cases, a defined benefit system is a pay-as-you-go system.

<sup>2</sup> Samuelson (1958) established the well-known result that the return on the pay-as-you-go system in a steady state is equal to the real rate of growth of the social security tax base, i.e., the sum of the growth rates of labor force and real wages.

<sup>3</sup> Resource: United Nations, *The Sex and Age Distribution of World Population: 2000*.

<sup>4</sup> Total contribution rate was about 20 percent before the reform.

<sup>5</sup> Kimura (1999) also describes an outline of the new Swedish pension system.

<sup>6</sup> There are two base amounts: the income base amount and the price base amount. The former is used for calculating the ceiling of contributions, the latter for the guaranteed pension.

<sup>7</sup> After deduction, the contribution rates of the employee and the employer nearly equal to 7.5 (  $7/0.93$ ) and 11 (  $10.21/0.93$ ) because the deduction rate is 7 percent. Total contribution rates is equal to 18.5 (  $17.21/0.93$ ).

<sup>8</sup> In Settergren (2002) the automatic balance mechanism is explained more in detail.

<sup>9</sup> Ono (2003) proves that contribution assets equal to pension liability in a steady state.

<sup>10</sup> Takayama (2004) describes and analyzes the new Japanese pension system in detail in comparing other countries.

<sup>11</sup> Ono (2003) states that the new public pension system in Japan has the possibility of losing the discipline of its reserves. He points out that the Swedish automatic balance mechanism is effective under the fixed pension premium.

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