

Asset-Liability Management for Pension Plans in Japan

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Abstract

We introduce to asset-liability management for pension plans in Japan.

And we think of risk management for pension fund that is based on the situation of Japanese pension plans and investment.

1. Background to Asset-Liability Management for Pension Plans in Japan

The employees' pension funds and the tax qualified pension plans introduced about forty years ago have been typical Japanese corporate pension schemes. After the introduction of these systems, the economy grew steadily, and the pension systems developed favorably due to fund management gains that surpassed the expected interest rate. However, in the aftermath of the collapse of the bubble economy, which caused economic and financial environment degradation and changes in the employment situation, the deterioration of pension financing began. Under these circumstances, the Welfare Pension Insurance Law was amended in 1994. This amendment was to deregulate fund management and to obligate employees' pension funds to formulate basic management policies. As a result, increased responsibility was placed on employees' pension funds. With this, asset-liability management (ALM) for pension plans began to be applied principally by employees' pension funds in Japan. The situation of corporate pension plans continued to undergo substantial changes.

Before 1997, the uniform expected rate of interest for all employees' pension funds was set at 5.5%. A change to this resulted in each of the employees' pension funds becoming able to independently determine the expected interest rate. Subsequently, various forms of greater flexibility have been allowed in pension fund financial management. Corporate accounting also experienced a substantial change. While hitherto there had been no unified accounting standards for retirement benefits, newly established standards went into effect for the fiscal years starting on and following April 1, 2000. The financial standing of a pension therefore came to be disclosed in the financial statements (balance sheets and profit and loss statements) of its sponsoring company, causing an increased impact on the management of the sponsoring company. The recording of funding deficits as a result of protracted economic stagnation forced sponsoring companies to direct increased attention to their pension plans. Since the situation has thus changed, pension ALM is currently adopted primarily for defined-benefit corporate pension plans and large-sized tax qualified pension plans, as well as for the employees' pension funds.

2. On Pension ALM in Japan

The following are some pension ALM simulation techniques employed in Japan. Each trustee has distinctive pension ALM techniques. Accordingly, the following are just some examples of them.

(1) Liability analysis

One of the purposes of a corporate pension is to protect the right to receive benefits, or to grant pensions to beneficiaries without fail in the future. From this point of view, it is important to keep track of the liability structure including future benefit amounts. The liability structure is examined and analyzed by predicting what it will become in the future. Preconditions are set for this purpose. It is common that preconditions used for the calculation of premiums are used as the base, and necessary changes are further incorporated as appropriate depending on the actual situation and future outlook. Preconditions thus established are used to forecast the future participant-beneficiary structure, cash flow, pension obligation, maturity, and the like. Liability analyses are conducted from various perspectives using the obtained forecasts.

(2) Maturity analysis

Maturity is frequently used as a means of analyzing liabilities. Of the varied maturity indicators, none of them can be said to be exclusively used. Shown below are commonly used indicators.

- Ratio of beneficiaries to participants
- Ratio of annual sum of benefits to annual sum of premiums
- Ratio of beneficiaries' actuarial reserves to total actuarial reserves

Each indicator is distinctive. In pension ALM, several indicators corresponding with the purpose of performing the liability analysis are normally used in a comprehensive manner. Results of maturity analyses are used as important information for the deliberation of fund management methods. Thus, it is of vital importance to forecast future levels of maturity and the rate of maturation as well as the current level.

(3) Required yield

Employees' pension funds and defined-benefit corporate pension plans

regularly conduct financial recalculations in which renewed basic rates are used for reviewing premiums. In addition to financial recalculation, when balance sheets are annually settled the financial conditions are checked against both going-concern and non-going-concern criteria. If financial conditions fail to pass these verifications, it becomes necessary to review premiums specially. For this reason in pension ALM, several liability standards, such as actuarial reserves and minimum funding standards, are adopted for predicting future conditions and any risks of premium review are assessed for each case. It is thus possible to calculate the required yield based on the forecasts for meeting the standards at a time in the future. The required yield is used as a piece of information for asset mix selection.

(4) Asset analysis

As with liability analyses preconditions are also set for asset analysis. Asset classes are first chosen to make up an asset mix. Then, the rate of expected return and standard deviation of each chosen asset class and correlation coefficients among chosen asset classes are projected and set as prerequisites. Restrictions, if any, to individual pension plans are also taken into account. The efficient frontier and asset mix comprising it are obtained based on these predicted figures and restrictions. Pension plans choose several asset mixes from the efficient frontier, taking risk tolerances and other factors into consideration.

(5) Policy asset mix decision

What future premium rates and pension financing will be is simulated for each asset mix chosen from the efficient frontier. For this purpose, Monte Carlo simulations are performed. Future premium rates and pension financing are projected generally through several hundred to several thousand simulations. Different results are obtained from different asset mixes. By mutually comparing and analyzing the results, it is possible to ascertain what impacts each asset has on the premium rate and pension financing. The manager uses personal discretion to choose the best policy asset mix for a pension plan. Risk tolerances and other individual factors, as well as the magnitude of impact caused by a change in preconditions must be fully taken into account before the final decision is made.

The following section examines risk management while keeping the Japanese pension system situation in mind.

3. On Japanese Pension Systems

(1) Recent trends

The conventional corporate pension systems in Japan have been the employees' pension fund and the tax qualified pension plans. Both are defined-benefit corporate pension plans, with the pension contract specifying the amount of future benefits. The defined-benefit corporate pension plan pays benefits by premiums and management gains. If management gains are less than the expected gains, a deficit occurs. Since Japan has become a slow-growing economy, pension asset management gains are declining due to the low interest rates and an economic downturn. In the case of a defined-benefit corporate pension plan, the company takes fund management risks. This has become a heavy corporate burden with the recent unfavorable fund management situation.

While it was under these circumstances that the Defined-Contribution Pension Law and the Defined-Benefit Corporate Pension Law consecutively became respectively effective in 2001 and 2002, it was also decided that the tax qualified pension plan will be abolished by 2012. Japan is in a transient period of migrating from conventional employees' pension fund corporate pension systems and tax qualified pension plans to defined-contribution pension and defined-benefit corporate pension plans. There are many companies that at the time of migration reduce benefits or introduce a defined-contribution plan. In a defined-contribution pension plan, employees take fund management risks and the company takes reduced fund management risks accordingly.

Whilst giving consideration to the fact that in conventional plans companies fully take fund management risks, it remains unrealistic for companies to pass all the risks to their employees. Consequently, it is reasonable to consider that an increasing number of companies will combine defined-contribution and defined-benefit pension plans. In that case, whereas companies will take lower fund management risks than before, they will still need to perform risk management to some extent specifically because they run defined-benefit corporate pension plans. In addition, the migration in many cases involves radical revisions of plans and review of expected interest rates, resulting in a substantial change in liability

structure. Therefore, risk management in the fund management of defined-benefit corporate pension plans is still an important issue for companies.

(2) ALM for defined-benefit corporate pension plans

Protection of the right to receive benefits is one reason for the enforcement of the Defined-Benefit Corporate Pension Law. Funding standards, the liability of trustees, and information disclosure are stipulated for defined-benefit corporate pension plans. And the pension system was set up so that financial conditions are checked each time the settlement of accounts is performed. While surpluses, if any, from pension plans have not been returned to the company, any deficit exceeding a predetermined level must be covered by increased premiums. While in this respect, employees' pension funds are similar, no such unified standards were put into place for the tax qualified pension plan. Because some approved retirement annuity plans are therefore not adequately funded, some defined-benefit corporate pension plans migrating from approved retirement annuity plans will face the issue of insufficient funding at the time of inauguration. It is generally said that pension plan funding conditions should be taken into account when determining risks to be taken in the fund management of a pension plan. Due care must be taken in this regard for controlling fund management risks of many defined-benefit corporate pension plans since their funding conditions are not sufficient at inauguration.

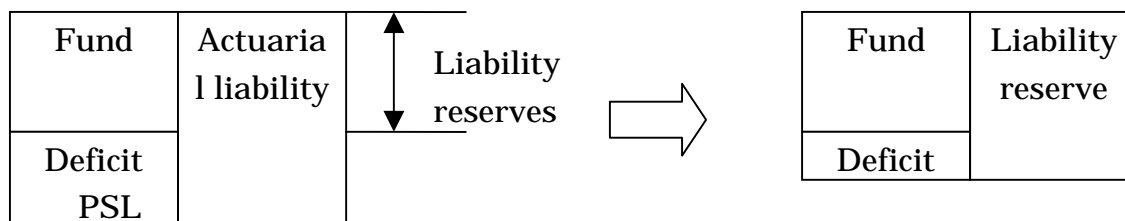
(3) Discussion of required yield

The financial conditions of defined-benefit corporate pension plans are to be verified at every settlement of accounts against both going-concern and non-going-concern criteria. Financial verification on a going-concern basis is intended to cover deficits reaching a predetermined level. Since any deficit at the time of migration to a defined-benefit corporate pension plan is cleared off by the premium setting, deficits generated after migration are to be covered when they reach a predetermined level.

Figure 3-1 Financial Verification against Going-Concern Criteria

At Plan Inauguration

At Settlement of Accounts

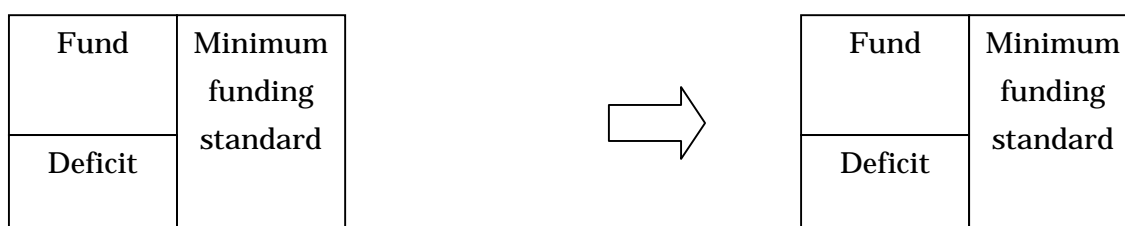


In financial verification against non-going-concern criteria, funding conditions are verified regarding the minimum funding standard, not the liability reserves, as the liability. In the case of liability reserves, liability is contracted by treating the deficit at inauguration of a plan as past service liability (PSL). This is not possible with the minimum funding standards. Accordingly, financial verification is carried out with the funding deficit of the former plan transferred.

Figure 3-2 Financial Verification against Non-Going-Concern Criteria

At Plan Inauguration

At Settlement of Accounts



Consequently, in ALM for a defined-benefit corporate pension plan, the required yield tends to be high against non-going-concern criteria, as reasoned above. The required yield on non-going-concern criteria generally tends to differ depending on whether the actuarial liability or the minimum funding standard is larger.

If the actuarial liability is greater than the minimum funding standard, the

required yield on non-going-concern criteria would probably be moderate. The reason is as follows: Liability simulation is performed for a period of about 20 years in general, while PSL at the start of a plan must be amortized within 20 years. Consequently, if simulations indicate no additional deficit generated after the inauguration of the plan, the actuarial liability will be smaller than the fund. Therefore, the minimum funding standard will be smaller than the fund, logically passing financial verification against non-going-concern criteria. In contrast, if the actuarial liability is smaller than the minimum funding standard, there is no way of knowing whether the minimum funding standard will be smaller than the fund 20 years later even if PSL at the time of the inauguration of the plan is fully amortized.

The difference in actuarial liability and minimum funding standard sizes largely depends on the expected interest rate. Rather than using the expected interest rate specific to a particular plan, the minimum funding standard is calculated using an expected interest rate that is common to all plans and that is based on the risk-free rate (2.20% for 2005). The expected interest rate specific to a particular plan is determined by the company and/or fund on the basis of the expected long-term rate of return for pension assets. Some plans still customarily use 5.5%. If the expected interest rate specific to a particular plan is greater than the expected interest rate with non-going-concern criteria, there is a high possibility that the actuarial liability is smaller than the minimum funding standard, with the required yield with non-going-concern criteria tending to be high.

In general, a high expected interest rate leads to high expected management gains (required yield on a going-concern basis), but necessitates an additionally high interest rate with non-going-concern criteria. This arises from the need for management gains to fund non-going-concern funding deficits that cannot be funded by going-concern premiums. Accordingly, although a plan based on a high expected interest rate necessitates a policy asset mix with a high proportion of risk assets, the expected interest rate is usually set somewhat high because of the pension sponsor's needs for low premiums. Pension management emphasizes the importance of loss-free management or construction of a policy asset mix less prone to losses.

With this in mind, it is not really good for a pension sponsor who has difficulties in paying additional premiums to increase the proportion of risk assets. Where an impracticable yield is pursued as a result of benefits out of proportion to the pension sponsor's premium paying capacity, it is dangerous to apply the result of pension ALM thoughtlessly. The first thing to do is probably to lower the expected interest rate to an appropriate level.

4. The Japanese Population Composition

(1) The falling birthrate and aging population

At present in Japan, corporate pension systems are in an era of reform and the age structure of the population is undergoing a substantial change. As a result of mortality reduction and the falling birthrate, Japanese society is aging rapidly. Accordingly, corporate pension plans are gaining in maturity at a rapid pace. In general, asset management should be conducted more prudently when corporate pension plans have gained in maturity, as the asset size increases.

Table 4-1 Population Projections for Japan

(Unit: thousand)

Year	Total	Over 65	Percent over 65
2000	126,926	22,041	17.4%
2010	127,473	28,735	22.5%
2020	124,107	34,559	27.8%
2030	117,580	34,770	29.6%
2040	109,338	36,332	33.2%
2050	100,593	35,863	35.7%

Source: Population Projections for Japan, National Institute of Population and Social Security Research (2002, medium variant projection)

(2) Discussion of maturity analysis

In Japan, baby boomers will soon reach their retirement age. As a result, the number of pension beneficiaries will increase year by year, with corporate pension plans further gaining in maturity. This is, however, based on an assumption that retired employees will choose pensions. If they choose to receive lump-sum benefits, different simulations should be

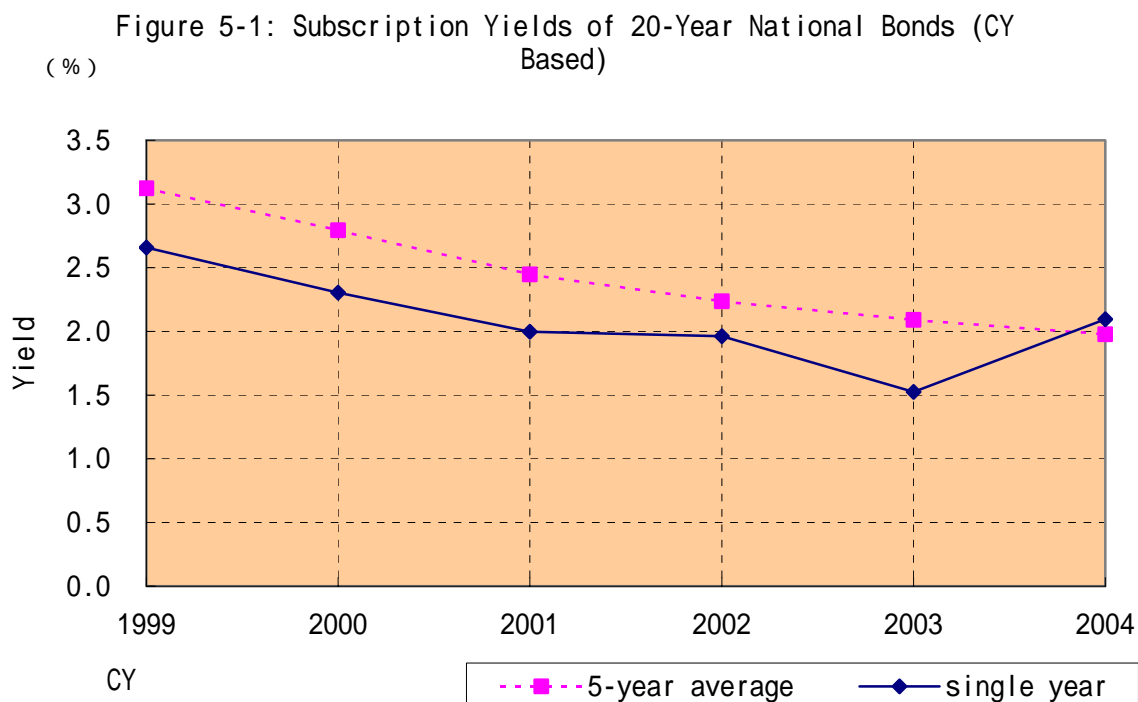
performed. Many of approved retirement annuity plans have migrated from retirement benefit systems. Some approved retirement annuity plans grant benefits only at the time of retirement. Consequently, the ratio of beneficiaries choosing pension is not necessarily high. With some plans, it is the case that all beneficiaries choose lump-sum benefits. Furthermore, many defined-benefit corporate pension plans adopt certain annuities since it is not mandatory to provide lifelong annuities. In addition, due to the low-interest policy in recent years beneficiary yields are in many cases set at a lower level than previously. With this in mind, not a few beneficiaries of defined-benefit corporate pension plans will probably choose lump-sum benefits. Simulations incorporating a high ratio of beneficiaries choosing lump-sum benefits should present different trends from those indicated by simulations simply assuming the choice of pensions, because a significant amount of payment is incurred when baby boomers retire. The asset size may possibly decrease and pension plans not necessarily gain in maturity. In many cases, drastic revisions are made to plans at the time of migration from an approved annuity system or employees' pension fund to a defined-benefit corporate pension plan. So there is a possibility that no significant statistic data will be obtained to determine the ratio of beneficiaries choosing lump-sum benefits. However, due consideration must be given to this ratio for maturity analysis in pension ALM, since it has substantial effects on analysis results.

5. The Fund Management Environment in Japan

(1) An age of historically low interest rates and difficult fund management

In the wake of the bubble economy collapse, stock and land prices fell in the 1990s and Japan's economy experienced stagnation. Financial system insecurity produced an additional blow. The Bank of Japan reduced its official discount rate gradually to a historically low level. Long-term interest rates also decreased. The age of historically low interest rates currently continues.

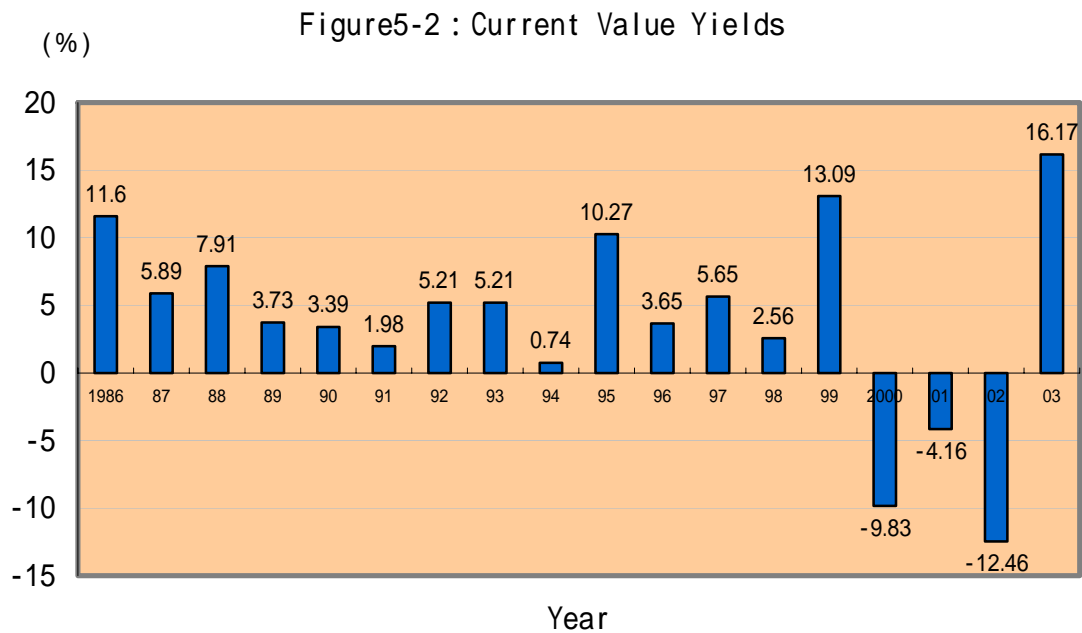
Figure 5-1 shows the subscription yield of 20-year national bonds, which continued to decrease until it upturned at last in 2004, the average yield of the most recent five years being below 2%.



The stock market slump and low interest rates dealt a blow to the asset management of corporate pension plans, aggravating their financial conditions in an unprecedented manner.

The Pension Fund Association has surveyed the status of asset management for employees' pension funds, which are representative of corporate pension plans in Japan. Figure 5-2 shows the survey results. Many corporate pension plans in Japan, with a greater part of their expected interest rates set to 5.5%, performed below their expected interest rates, although current value yields were favorable in some years. Management results for three years beginning in 2000 were notably poor, recording successive deficits. This was a major cause of the financial deterioration of pension plans.

Decreases in long-term interest rates accelerated funding deficits by reduced expected interest rates with non-going-concern criteria. In addition, the decreases in long-term interest rates caused accounting deficits by reduced discount rates of retirement benefits accounting. These factors alerted sponsoring companies to the need for reviewing their corporate pension plans. The enforcement of the Defined-Contribution Pension Law and the Defined-Benefit Corporate Pension Law has encouraged some companies to relinquish the substitutional portion of their employees' pension funds and to migrate to defined-benefit corporate pension plans or to abolish tax qualified pension plans and adopt defined-contribution pension plans. Furthermore, sponsoring companies are showing greater concern than before for the asset management of corporate pension funds.



(Source: 2003 Asset Management Survey of Employees' Pension Funds and Other Plans, Pension Fund Association)

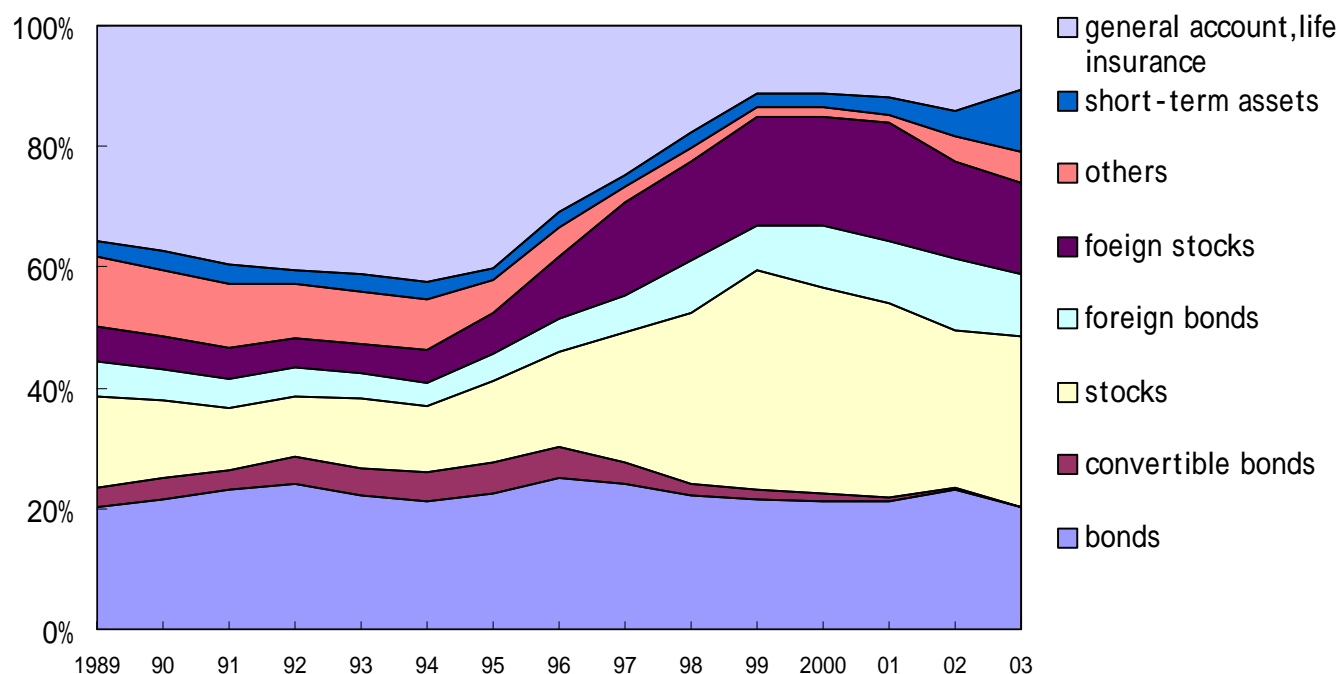
(2) Asset mixes for corporate pension plans

Figure 5-3 shows asset mixes of employees' pension funds. The proportion of risk assets (stocks, foreign bonds, and foreign stocks) increased rapidly in the late 1990s. As a result of the investment deregulation in 1997, the risk asset ratio has exceeded 50% since 1998. The management of pension funds has become subject to substantial influences of the stock market and other factors due to the increased ratio of risk assets. This contributes to great fluctuations in annual management results.

The enforcement of the Defined-Benefit Corporate Pension Law allowed employees' pension funds to make "daiko henjo" transfers beginning in October of 2003. In order to return to the national government their substitutional portion of pension assets (daiko henjo), some pension funds hastened to prepare the return amount through encashment to avoid noticeably fluctuating assets.

Since 2000, in part due to the influence of aforementioned management deficits, the trends in pension fund asset mixes have indicated reduced ratios of domestic and foreign stocks and increased ratios of short-term assets. Note that in 2003 the ratio of risk assets increased as a result of substantial management surpluses. Thus, after recent drastic reformation of pension schemes and fund management results, asset mixes in not a few cases do not correspond with the risk tolerance of each given pension plan.

Figure5-3 : Asset Mix of Employees' Pension Funds



(Source: 2003 Asset Management Survey of Employees' Pension Funds and Other Plans, Pension Fund Association)

6. Conclusion

It is emphasized that asset fluctuation largely depends on asset mix and that the most important thing in risk management is to determine a policy asset mix. Policy asset mixes should be determined according to maturity, required yields, and risk tolerances. However, the risk tolerance of a

pension plan is, needless to say, not solely determined by maturity. Hence, decision should be made in a comprehensive manner taking into consideration the pension sponsor's additional premium paying capacity and other factors.

What the most important risk is differs from pension plan to pension plan. In recent years, some fund risk asset and short-term asset ratios do not necessarily appear appropriate for them due to the influence of substantially fluctuating fund management results and the impact of radical changes in pension systems, such as employees' pension fund "daiko henjo" and the introduction of cash balance plans.

As a result of migration from employees' pension funds and tax qualified pension plans to defined-benefit corporate pension plans, financial management methods of some pension plans have changed substantially, and asset mixes of some of our clients have noticeably changed by returning to the national government the substitutional portion of their pension assets. Therefore, it is of vital importance to verify whether or not new plan asset mixes are appropriate from a risk management point of view. Changes in the expected interest rate and changes to cash balance plans can lead to changes in liability characteristics and required yield. Additional asset mix verification is needed even if in the past a policy asset mix was formulated.

Pension ALM analyses are commonly performed in Japan to formulate a policy asset mix. After the introduction of retirement benefits accounting, the management of corporate pension plans has changed from a personnel issue to an important business management issue. Pension ALM has become increasingly widely applied, incorporating simulation of projected benefit obligation and other measures as well as financial forecasts for pension plans. Determining the best asset mix, based on the precise recognition of the liability characteristics for each given pension plan and on whatever is considered to be a major risk for its sponsoring company, as well as making use of pension ALM and the like, is critically important in risk management.