

# Reinventing the Risk Sharing Mechanism of Defined Benefit Pension Plans<sup>1</sup>

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## Summary

In this paper, I will introduce several new mechanisms of risk sharing regarding occupational retirement provisions, based on the analysis of present risk sharing between sponsoring employers and plan participants, individual participants and participants as a group, active members and beneficiaries (including deferred members), etc. Among others, I will introduce "Ring-fenced" DB (RfDB) plans, which introduce "share" structure into contributions and reserves, prohibit "lending" from active members to beneficiaries when the plan is in an underfunded status (actuarial deficiency), and allow temporary benefit reductions within prescribed ranges according to the funding level. The risk active members bear will be eased in RfDB plans, and market interest risk sponsoring employers bear will also be eased, because some portion of benefits becomes conditional. RfDB plans allow investments with greater risk tolerance, which may benefit both labor and management from a long-term perspective. It will also be possible to ease funding rules substantially for RfDB plans. It is said that DB plans are on the verge of

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extinction mainly by the threats from accounting standards. Taking this into account, it is necessary to expand the variation of risk sharing mechanisms in occupational retirement provisions.

**Keywords:** “Ring-fenced” DB plan, “Retrospective” DB plan, Sequential plan, Combination plan, Collective DC plan, DC conversion

## 1 Basic Stance

Recently, lot of companies in Europe and North America have closed or frozen their Defined Benefit (DB) plans and/or transferred them to defined contribution (DC) plans, mainly due to concern about the anticipated impact on the financial status of the companies caused by the post retirement accounting standards oriented toward the mark to market principle. Some people say that DB plans are on the verge of extinction.

Traditionally, all risks of providing DB plans are considered to be borne solely by sponsoring employers. However, we are now (in Japan) in the circumstance where employers have an option to establish Personal DC (PDC) plans like 401(k). Under the circumstance, it becomes inevitable that risks involved in post-retirement benefit plans are shared by sponsoring employers and participants<sup>3</sup> appropriately, based on the agreement between labor and management. We should place this recognition on the basis of benefit design considerations. DB plans can realize any pattern of risk sharing between sponsoring employers and participants. As long as risk sharing is concerned, DB plans are intrinsically superior to PDC plans. I believe the function of risk sharing is the very *raison d'être* of DB plans toward the future.

We should make every effort to maintain and enhance the risk sharing function of DB plans. We should avoid such unhappy situations where individual participants are obliged to bear all risks or such unfavorable situations where the occupational pension system as a pillar of old-age income security is twisted around by the logic of accounting standards. Nonetheless, very few efforts have been made for this vital issue so far in Japan. Recently, financial institutions in Japan are introducing enthusiastically the concept of liability driven investment (LDI), which has become popular especially in northern Europe. However, it is too optimistic to consider DB plans can survive by LDI. LDI is most suited for closed DB plans. LDI may be blossoms nurtured by the

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<sup>3</sup> In this paper, “participants” include active members, deferred members and beneficiaries.

last life of DB plans. We should not forget LDI would become meaningless if DB plans were extinguished.

Obviously, simply accusing accounting standards is not enough to maintain the current risk sharing function of DB plans. It is indispensable that DB plans should be adapted to changing circumstances and modified appropriately (in other words, metamorphosis of DB plans).

Keeping these points in mind, and toward the imminent review of the DB Corporate Pension Act and the DC Pension Act of Japan, firstly I analyse the risk sharing mechanisms of typical DB plans (including several hybrid plans) presently available in Japan and/or other countries. The Risk sharing mechanisms will be analysed from various aspects, for instance, risk sharing between sponsoring employers and participants, between individual participants and participants as a group, active participants and beneficiaries (including deferred members). Based on the analysis, I will point out restrictions and drawbacks of present risk sharing mechanisms and issues to be improved in Japan. Secondly, I will propose a kind of “metamorphosis” of DB plans, by introducing “Ring-fenced” DB plans and “Retrospective” DB plans. “Ring-fenced” DB plans will resolve present drawbacks and reduce volatility of pension liabilities. “Retrospective” DB plans will drastically expand available risk sharing arrangements. These proposals might give very a strange impression. However, I believe these new mechanisms will prove the key to the survival of the risk sharing function of DB plans. If various patterns of risk sharing are made possible, it is anticipated that general principles of post-retirement benefit accounting have to be modified accordingly.

## **2 Employers’ Risks and Employees’ Risks Involved in Corporate Pension Plans**

### **2.1 Employers’ Risks Involved in Traditional DB Plans**

In a traditional DB plan, future amounts of benefits are promised in advance. Therefore, the contributions to the traditional DB plan are calculated by considering the future amounts of benefits as a given condition, using several assumptions on the future and based on an appropriate advance funding method. Contributions paid by sponsoring employers are funded and invested. If the future evolves just as anticipated when the assumptions were adopted in the contribution calculations, the terminal value in the year of benefit disbursement of the contributions paid in the past should be exactly the same as the amounts of annual prescribed benefits of the year. In such a case, there is no need for supplemental contributions. The

sponsoring employers' risk of being required to pay supplemental contributions arises due to the possibility that the future evolves differently from the assumptions adopted at the time of the contribution calculation. This might be a trivial matter, but becomes a key point of "Retrospective" DB plans, which I will introduce later.

### **2.1.1 Risk of Mortality Rate Improvement**

This risk is that mortality rates might improve beyond expectation and future benefit payments<sup>4</sup> might be higher than expected. As a result, sponsoring employers might be required to pay supplemental contributions. Here, this risk should be clearly distinguished from the so-called longevity risk that *individual* participants may live longer than average. If pension benefits are to be paid during a limited term, the sponsoring employer can escape from longevity risk. However, under such arrangements (where benefits are paid as a temporary annuity), longevity risk is transferred to individual participants<sup>5</sup>. Although longevity risk is one of the most important risks for individual participants, it is absorbed in the group of participants if longevity risk is pooled among the group of participants, as long as mortality rates do not improve (solidarity within a generation). Hedging longevity risk of individual participants is one of the most basic functions (or *raison d'être*) of occupational pension provisions. However, this function will be lost if benefits are not designed as life annuity.

### **2.1.2 Risk of Earnings Increase**

This risk is that earnings might increase faster than expected and thus that future benefit payments will be higher than expected. As a result, sponsoring employers are required to pay supplemental contributions. This risk becomes larger in final earnings plans. There are several options to mitigate this risk, such as adopting cash balance (CB) plans or career average earnings (CAE) plans. However, we should not forget that the risk that earnings may increase faster than expected is transferred to individual participants<sup>6</sup> if earnings are not revalued (in CAE plans) or the revaluation index (of CB plans) consecutively falls below the consumer price index.

### **2.1.3 Investment Risk**

This risk is that rates of investment return (RORs) might fall below the expected ROR assumed in

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<sup>4</sup> In this paper, we call the cash flow of annual benefits as "future benefit payments".

<sup>5</sup> If we use future actual mortality rates as a basis of annuity conversion (calculating annual amounts of pension from the balance in a CB plan), we can transfer the risk of mortality rate improvement to individual participants (i.e. reduce the annual amounts of pension according to the improvement of mortality rates occurred during the period before retirement). However, such treatment is not permitted at present in Japan.

<sup>6</sup> "The risk that earnings may increase than expected is transferred to individual participants" means that individual participants bear the risk that real value of benefits might decrease.

contribution calculations and the amounts of reserves might become insufficient for benefit disbursement or lead to reduction of expected ROR. Reduction of expected ROR causes actuarial deficiency and as a result, sponsoring employers are required to pay supplemental contributions. In a traditional DB plan, future benefit payments will be decided irrespective of actual RORs. An easy solution to mitigate investment risk is using a low expected ROR and investing reserves conservatively. However, such strategy will hike the cost of the DB plan to prohibitively expensive levels. Another solution is plan conversion to a CB plan or a quasi CB plan. In these plans, investment risk will be mitigated if revaluation indices are linked to market interest rates and actual RORs are strongly correlated to market interest rates. However, we have to patient to make RORs on investments strongly correlated to market interest rates.

#### **2.1.4 Market Interest Rate Risk**

This risk is normally defined as the risk that market interest rates might become lower than expected and the amount of minimum funding requirement (on winding-up approach) and/or the amount of post retirement liabilities (based on accounting standards) might increase, and as a result, sponsoring employers might be required to pay supplemental contributions or to recognize greater liabilities. However, in a traditional DB plan, future benefit expenses are determined by prescribed benefit formulae, number of beneficiaries and their earnings records. If expectation of market interest rates is explicitly used as one of the assumptions for calculating contributions, the fluctuation of market interest rates may be a source of the risk of being required to make supplemental contributions. However, in a traditional DB plan, market interest rates do not affect benefit payments (cash outflow), and therefore we do not explicitly use any assumption on market interest rates for calculating contributions. Trends of market interest rates only affect the so-called "market value" of future benefit payments and do not directly relate to the amount of supplemental contributions to make up the shortfall of capital for future benefit payments.

That is to say, in a traditional DB plan, market interest rate risk is not intrinsic, because it is only caused by accounting standards and minimum funding requirements based on winding-up approach. Of course, in other plans such as CB plans where interest rates are incorporated into benefit formulae, market interest rate risk directly relates to the volatility of future benefit (cash outflow). As another example, let us consider a plan where deferred annuities are purchased from life insurance companies every time contributions are paid. In this plan, when the market interest rate decreases, additional contributions may be needed to secure the prescribed amount of annuity. That is because a decrease in market interest rates raises the price of deferred annuities (market interest rate risk of annuitisation). If amounts of benefits are prescribed so as

to be connected to market interest rates as in many CB plans, market interest risk will be mitigated. However, market interest rate risk in annuity conversion is then transferred from sponsoring employers to individual plan participants.

### **2.1.5 Risks Associated to Other Assumed Rates such as Withdrawal Rates**

There are other assumptions besides expected ROR and expected mortality rates used for calculating contributions of DB plans. The risks associated with other assumed rates means that actual rates may become different from the assumed rates and future benefit payments may increase, and as a result, supplemental contributions may be required. These risks are also important for managing DB plans.

## **2.2 Risks of Individual Participants**

From the aspect of individual participants, there are risks involved in corporate pension plans other than those listed in section 2.1.

### **2.2.1 Longevity Risk**

Longevity risk means that individual participants may live longer than the average of plan participants. Longevity risk always exists irrespective of whether the mortality rates of the group of participants may improve. Why does living longer become risk? Needless to say, it is because financial capital to maintain livelihood in old age will increase. No individual can estimate accurately how long he/she lives. If a pension plan does not provide the function of covering longevity risk, and the market does not provide the function at a reasonable price, *individual* employees have to save by themselves much more capital than needed in average for livelihood after retirement. Namely, a fairly large additional cost is needed to cope with longevity risk by the efforts of individual participants.

It is pointed out that the utility of the retired will increase by 25% – 45% if he/she purchases a life annuity when he/she retires at an actuarially fair price. However, generally speaking, life annuities provided by life insurance companies are expensive. One reason may be that if life insurance companies provide life annuity products, the price has to include administration costs, marketing costs and among others, capital cost for funding a large risk buffer. In addition, the possibility of adverse-selection should be taken into account. Here, adverse-selection means those with greater possibility of long life may purchase life annuity products more than those with shorter life expectancy. It is said that the prices of life annuity products are 10 – 20% higher

than the actuarially fair prices<sup>7</sup>.

Life annuity products are not widespread in private insurance markets<sup>8</sup>. It is a common practice among many countries in Europe to make it a legal obligation to annuitise a certain portion of the balance of personal accounts of DC plans. The main purpose of DC plans should be securing stable income in old age<sup>9</sup>, which is absolutely the same as that of DB plans. It is indispensable to enlarge and strengthen the market of life annuity products as a social policy. In my mind, the realistic solution for the time being in Japan should be strengthening the annuitisation function of both the Pension Fund Association (PFA) and the National Pension Fund Association (NPFA).

### **2.2.2 Insolvency Risk of Sponsoring Companies**

Insolvency risk of sponsoring companies means that sponsoring companies of a DB plan become insolvent and the DB plan is forced to be terminated or dissolved. As a result, the rights of participants to receive benefits are partially or completely lost. Preparing for insolvency risk is the main reason why corporate pension plans should be externally funded and appropriate funding levels should be maintained in DB plans.

Insolvency risk of sponsoring companies does not normally become realised in a single night. Therefore, with regard to the risk sharing of a DB plan, we should pay much more attention to the probability that insolvency risk becomes realised. Referring to past cases, we can find many examples where prescribed amounts of benefits continued to be disbursed while the sponsoring companies' ability to pay (supplemental) contributions was gradually lost and the funding deficiencies deteriorated. In extreme cases in the United States, benefits were improved in such circumstances and the problem of underfunding was exacerbated.

Under present regulations on DB plans, amounts of benefits will never be cut down as long as the plan is alive, even if the financial condition of sponsoring companies deteriorated and their ability to make up the funding deficiencies were lost substantially. There are no one-to-one relationship between reserves and individual participants' (vested) rights of claim for future

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<sup>7</sup> The arguments above are based on OECD [2005-1], "The Impact of Ageing on Demand, Factor Markets and Growth", Economics Working Papers No.420. According to an official of a large pension fund in the Netherlands, costs of life insurance companies to provide life annuities are ten times higher than those of pension plans, although it may include some exaggeration.

<sup>8</sup> The question why life annuity products have not been spread although life annuity has many utilities is called as "annuity puzzle". Concerning the "annuity puzzle", see for example the following paper: Department of Work and Pensions (DWP) of the United Kingdom [2006], "Survey of Annuity Pricing", Research Report No. 318

<sup>9</sup> See article 1 of the Defined Contribution Pension Act of Japan.

benefits, because individual participants' shares of the reserves are not specified<sup>10</sup>. Besides, as long as the plan is alive, rights (interests) of beneficiaries are given unconditional priority over the interests of active members.

Certainly, this might be understood as a kind of "solidarity" between active members and beneficiaries. Here, "solidarity" means DB plans' important function of pooling the risk of temporary shortage of capital for benefit disbursement. However, in corporate pension plans, solidarity among generations stands on the precondition that funding shortfalls will be made up in the future. In my consideration, if sponsoring companies lack the ability of making up the funding shortfall, it is very problematic that prescribed benefits continue to be paid out without any reduction. I believe that there should be some mechanism for restricting the function of solidarity among generations to ensure fair risk sharing between active members and beneficiaries as much as possible, especially in such cases where serious doubts are acknowledged about the ability of sponsoring companies to make up the funding deficiencies. Later, I will introduce "Ring-fenced" DB plans to address this drawback of present DB plans.

### **2.2.3 Inflation Risk**

Inflation risk means that the real value of benefits may be reduced due to inflation. Inflation risk becomes large in such cases where amounts of benefits are proportionate to one's career average earnings and past earnings are not revalued. Indexing amounts of benefits to consumer price index might be difficult if taking into account the present economic situation of Japan. However, there are many examples in foreign countries where conditional indexation is incorporated into the benefit design.

### **2.2.4 Redundancy Risk and Job-change Risk**

Job-change risk means that amounts of one's benefits become smaller only by the reason that he/she changed the employer. This risk relates to so-called "back-loading" of benefit formulae and availability of the mechanism to ensure portability. Besides, in Japan, it is allowed to restrict or forfeit one's right to claim benefits in certain cases such as absence from work without notice. Although I do not argue this issue here, it may become one of the focal points of the forthcoming review of the Defined Benefit Corporate Pension Act of Japan, because the issue relates to the legal status of an active member's rights to receive benefits.

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<sup>10</sup> Nominal personal accounts are set up in CB plans. However, such accounts are nominal as they are and do not specify individual participants' shares on the reserves and do not limit the amounts of capital that can be withdrawn each year from the reserves.



### **3 How Accounting Standards and Funding Standards Should Deal with the Volatility of Market Interest Rates**

#### **3.1 Accounting Standards**

In Shimizu [2006], I concentrated on revisiting the risk sharing mechanism of DB plans. In this section, I consider how accounting standards should cope with market interest rate risk. This issue is one of the major backgrounds where I revisited the risk sharing mechanism of DB plans.

Regarding the accounting standards, there is an apparent international trend to evaluate the funded status of a DB plan from a very short-term perspective using market interest rates as of the fiscal year-end and immediately to reflect the effects in the financial statements of sponsoring companies. For instance, new FASB statement No.158 requires evaluation of the "fair value" of both the liabilities and the assets, and the complete and immediate recognition of the difference on the balance sheets of sponsoring companies. Consequently, fluctuations of market interest rates immediately affect equities of sponsoring companies. Under such accounting standards, the equity of a sponsoring company may be dealt a fatal blow especially by fluctuation of the "fair value" of postretirement benefit obligations (liabilities) caused by a decline in market interest rates, if the DB plan does not have reserves whose amounts well surpass the amount of postretirement liabilities by a wide margin. Therefore, it is difficult to expect investment management from a long-term perspective. DB investment policy will be degraded to very a short-term plan, and the costs of running a DB plan will increase substantially.

On the other hand, pension funds, including social security funds, are already incorporated into the financial markets and have been playing important roles. If many pension funds adopted procyclical investment strategies, quickly responding to short-term fluctuations of financial markets, the stability of financial markets would be affected to a certain extent. Until recently, pension funds have invested reserves from a long-term perspective and have not so much been influenced by short-term market fluctuations. Consequently, pension funds have contributed to stability of financial markets. However, we may not be able to expect this situation to continue in the future.

The International Monetary Fund (IMF) expressed concern about the present situation from the viewpoint of financial market stability. Arguments of the IMF are as follows (IMF [2005])<sup>11</sup>.

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<sup>11</sup> IMF[2005], "The Global Financial Stability Report 2005"

1. The current “mixed attributes” model of accounting and financial reporting has attempted to recognize different investment periods. The banking industry illustrates requirements for using different reporting frameworks even within a single institution. Trading activities by banks are assessed by fair-value accounting and loans hold-to-maturity are assessed by amortized cost accounting.
2. Liability measures are broadly viewed as more problematic than asset values, so standard setters continue to struggle with a variety of “mixed” measurement frameworks.
3. Fair value approaches require the existence of active and liquid markets, or some reasonable proxy, that can readily provide observed “value-in-exchange” prices.
4. Markets may sometimes be imperfect, at least in the short run. Shifting to fair value accounting, with frequent adjustment to earnings, may reinforce incentives to engage in short term, procyclical activities and inject further volatility into market and prices. Extreme volatility or liquidity “black hole” can create disorderly markets and lead to financial instability.
5. In an imperfect world, policymakers need to consider whether proposed accounting reforms may not diminish the diversity of investment behavior and the long-term orientation of important institutional investors, such as pension funds. Traditionally patient behavior of pension funds, stemming in part from their long-term liability structure, has enhanced financial stability.
6. As standard setters and other policymakers reassess accounting and reporting standards, they should consider the broader financial stability issues, and the benefits from risk dispersion and investor diversity.

Seemingly, the IMF pointed out these issues from its interest in maintaining stability of financial markets. However, as the IMF insists, sticking to pursuing only the logic of accounting is not always appropriate in an imperfect world. It is considered a matter of course that we should give sufficient consideration to the issue of “error of synthesis” caused by shifting to extreme fair-value accounting.

While in Japan, such one-sided opinions are circulated that (i) actuarial gains or losses should be recognized immediately in the profit and loss statements of sponsoring companies, (ii) delayed recognition of actuarial gains or losses is completely outdated in the context of international trends and (iii) any kind of smoothing the “fair value” of postretirement benefit obligations is evil under any circumstance. However, in my opinion, issues of prior US standards on employers’ accounting for DB plans (FASB Statements No.87, etc) which became apparent in the case of Enron do not have their roots in the smoothing of the amounts of assets and liabilities. One important reason may be enlarging the possibility of manipulating financial statements by introducing the “expected return on plan assets.”

In the USA, there was also a drawback in the regulation on the “funding standard account”. Prior funding rules permitted employers to use credit balances in their funding standard account to reduce their contributions, irrespective of the funded status of their DB plans. This treatment may have exacerbated the poor funded status of many DB plans in the US. Although funding rules are not the same issue as accounting standards, we should not jump to the conclusion that there is a cause-and-effect relationship between smoothing and the problem of Enron.

By the way, are there any concerns in the accounting standards that the projected benefit obligation (PBO) measured by market interest rates really represents the “fair value” of the liabilities? Standard asset pricing theory teaches us that expectation (before change of measure) of a variable with drift parameters and Brownian motion does not give us its true “fair value”. If we take into account reinvestment risk and the risk of future mortality rate improvement, the fair value of the postretirement benefit obligation could be much higher than the amounts assessed by present accounting standards. In addition, as the concept of the PBO includes the effect of future salary increase, the PBO does not exactly correspond to the obligation that a sponsoring employer has owed as of the fiscal year-end through its DB plan.

In Japan, the Pension Fund Association (PFA) has a scheme for annuitising the distribution of residual assets at the time of plan termination, complying with the requests of individual plan participants. The annuity conversion rates are based on the 5-year average of 30-year government bond rates (yields to subscribers). Therefore, it may be a natural consequence in Japan that the fair value of postretirement benefit obligations should be the amount measured by the 5-year average of 30-year government bond rates. There is no need in Japan to reflect short-term fluctuations of market interest rates immediately in the assessment of postretirement benefit obligations.

## **3.2 Funding Standards**

### **3.2.1 Basic Characteristics of DB Plans**

If the target funding level based on the on-going approach is substantially higher than the postretirement liabilities assessed by accounting standards, and therefore the amount of assets should normally be substantially greater than these postretirement liabilities, the accounting standards will not cause serious problems to the equity of sponsoring companies. However, making the funding rules stricter than those at present may lead to increasing the costs of DB plans. As one example, there is a move in countries in northern Europe of obliging DB plans to accumulate certain levels of buffer funds. How should we understand this move?

Here, an important understanding is the basic characteristics of a DB plan. Firstly, the question is who bears the risks involved in running DB plans. There are two types of DB plans. In one type the risks are borne by sponsoring employers, and in another type the risks are borne by the plans themselves.

In Japan, the DB plans themselves do not bear the risks. Sponsoring employers bear the risks. Pension funds in US, UK, Canada, Germany (Unterstützungskasse, Pensionsfonds) also do not guarantee the benefit obligations by themselves. If risk-based funding rules are to be introduced for these plans where sponsoring employers bear the risks, as a natural consequence, the funding rules should inevitably take into account the financial strength of sponsoring companies. For instance, recently scheme-specific funding rules have been introduced in the UK, and the Pensions Regulator, the supervisory organization of pension plans in UK, clearly states in the Regulator's Statement that it takes into account "the strength of the employer and its ability to pay off the shortfall". In short, a pension fund is never equivalent to a life insurance company in these countries.

On the other hand, pension funds in Denmark, Sweden (except company pension funds), Germany (Pensionskasse) and Netherlands guarantee the benefit obligation by themselves. In these countries, funding rules, such as the "Traffic Light Model" of Sweden and the "FTK" of Netherlands, are a proxy of the solvency rules for life insurance companies. In Japan, some consulting companies have eagerly presented risk management of pension funds in these countries as sophisticated examples. However, presentation on funding rules and examples of risk management in foreign countries should include the basic remarks that the subject of bearing risks is different by country. I believe that simply introducing the superficial funding rules and

examples of risk management and omitting or intentionally neglecting these basic remarks cannot be said as fair.

Of course, individual DB plans should be free to accumulate a risk buffer and implement “sophisticated” risk management. Funding rules and tax regulations should be flexible enough to make such funding strategies possible. This is because funding rules should be countercyclical, as the “OECD Guidelines” (OECD [2006])<sup>12</sup> points out in section 3.6 and annotation 21. However, whether to oblige employers to accumulate a certain level of risk buffers is a completely different question. Both the “OECD Core Principles” (OECD [2004])<sup>13</sup> and the OECD Guidelines draw a clear distinction on funding rules between the case where risks are borne by sponsoring employers and the case where risks are borne by pension funds.

In Japan, such regulations obliging DB plans to accumulate substantial risk buffers irrespective of the financial strength of sponsoring employers will be never introduced, as risks of DB plans are borne by sponsoring employers. As I pointed out above, a DB plan in Japan is not equivalent to a life insurance company. I believe this understanding should be placed as one of the bases of funding rules of DB plans in Japan.

The second important point regarding the basic characteristics of DB plans is whether employers are legally or effectively obliged to set up occupational pension provisions. In France, Sweden and Switzerland, occupational pension provisions are mandatory for employers. In these countries, employers are required to affiliate to industry or nation-wide pension plans; otherwise, employers have to set up their own pension plans. In the Netherlands, occupational pension plan provision is not mandatory, but employers in many sectors where industry-wide plans have been established by collective bargaining are required to participate in such plans. On the other hand, in the USA, UK, Canada and Japan, occupational pension provision by employers is voluntary. In these countries, occupational pension plans are usually set up by individual employers, rather than collectively.

When occupational pension provision is voluntary, employers tend to avoid DB plans and select DC plans if stringent funding rules are imposed on DB plans. In traditional DB plans, investment risk and longevity risk are borne by employers, while stringent funding rules for the purpose of benefit security of DB plans may result in transferring these risks to individual participants.

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<sup>12</sup> OECD [2006], “OECD Guidelines on Funding and Benefit Security”, public consultation paper, OECD home page

<sup>13</sup> OECD [2004], “OECD Recommendation on Core Principles of Occupational Pension Regulation”, OECD home page

Therefore, we have to maintain an appropriate balance between benefit security and the encouragement of DB plans.

### **3.2.2 The OECD Core Principles on Funding Rules**

When considering future funding rules of DB plans in Japan, we should take into account the Core Principle 3 of the OECD Core Principles. Firstly, the Core Principle 3 states that “DB plans should be subject to minimum funding rules or other mechanisms to ensure adequate funding of pension liabilities. Rules based on winding-up approach may be promoted as a minimum level to complement the on-going approach.” In other words, winding-up approach should play a complementary role in funding rules. The Core Principle 3 is formulated on the precondition that DB plans themselves do not guarantee the benefit obligations.

Regarding the winding-up approach, the criteria of full-funding should be the costs of purchasing actuarially equivalent annuity products from providers such as life insurance companies (we call it a “full buy out basis”). However, there may be no instance that DB plans are required to secure funding based on full buy out basis when sponsoring employers bear the risks of DB plans. As I mentioned before, recognition of liabilities in accounting standards can be substantially lower than the full buy out basis liabilities, although the accounting standards advocate fair value assessment of postretirement benefit obligations. We cannot understand the gap between the full buy out basis liabilities and normal minimum funding level in any other way than “investment of a DB plan to its sponsoring company” or “borrowing of a sponsoring company from its DB plan”. In short, it is an excessive demand to require absolutely safe funding level at all times. As Colin Pugh [2006] points out, the legislation on minimum funding in many countries became much stricter before we were aware of it (over-regulation).

Secondly, the Core Principle 3 states that “flexibility can be allowed for temporary limited under-funding under restricted circumstances”. As Colin Pugh [2006] argues, forcing or encouraging plan sponsors to take dramatic corrective actions based on this single market value can be very counterproductive. If we want continuance of DB plans in the future, such rules as requiring immediate making up of funding shortfalls should never be implemented.

On these principles, the Core Principles state that “consideration should be given to the development of adequate but flexible requirements for minimum capital/guarantee in pension funds, taking account of the long term nature of their liabilities. Appropriate calculation methods for asset valuation and liabilities funding, including actuarial techniques and amortisation rules

must be set up and based on transparent and comparable standards.” The essence of funding rules lies in how to take into account the long term nature of liabilities. As the Core Principles state, “legal provisions should set out flexible methods of correcting a situation of underfunding, with appropriate distinctions concerning the source of underfunding.”

### **3.2.3 The “OECD Guidelines on Funding and Benefit Security”**

As I explained before, the OECD Guidelines are prepared as details of part of the OECD Core Principles. The Guidelines also clearly distinguish DB plans where risks are borne by sponsoring employers from DB plans where risks are borne by plans themselves. The Guidelines state in section 3.7 that “where the pension fund itself underwrites the pension liability without any guarantee from plan sponsor or members, it should be required to hold additional assets on a plan termination basis”.

One of the essential points of the Guidelines is the argument that funding methods aimed at preventing short term volatility in contributions should not be prohibited. In section 3.4, the Guidelines state that “the legal provisions should not prevent funding methods that seek to dampen the short term volatility in contributions. Under ongoing funding methods, prudent amortisation might help achieve a smoother contribution schedule. Funding rules may grant some reprieve on contribution obligations only under restricted circumstances and within defined limits. Temporary reductions of contribution obligations may be considered with a clear waiver procedure”. To take such flexible measures on contribution obligations, the supervisory organization is required to be equipped with sufficient power and resources. In other words, the role of the supervisory authority becomes extremely important for benefit security of DB plans.

Another essential point of the Guidelines is the thought that funding rules should be countercyclical. In section 3.6 and annotation 21, the Guidelines state that “funding rules should aim to be countercyclical. They should also take asset price and discount rate volatility into account when limiting contributions”.

In addition, the Guidelines mention how to deal with the funding shortfall at the time of plan termination. In section 4.2, the Guidelines state that “whenever plan benefits are guaranteed by sponsoring employers, the creditor rights of plan members and beneficiaries should be recognized in the case of bankruptcy of the plan sponsor. Priority rights should be required for at least due and unpaid contributions”. In Japan, any funding shortfall at the time of plan termination should be eliminated by lump sum payments from sponsoring employers. In other

words, funding shortfalls are given a status of debts of sponsoring employers to be paid in a lump sum as contributions to the plan. But unfortunately, the creditor rights regarding the debts are not given the status of preferential creditor rights. I will introduce the “Ring-fenced” DB plans later, where capital shortage for benefit payments are treated annually as preferential creditor rights of beneficiaries against the sponsoring employers.

### **3.2.4 The IORP Directive of EU Commission (2003/41/EC)**

Regarding future funding rules of DB plans in Japan, we should pay attention to the IORP Directive of the EU Commission (2003/41/EC), from the viewpoint of making reference to the international standards on funding rules. The IORP Directive regulates funding rules with a clear distinction between the situation where sponsoring employers bear risks and the situation where the institutions themselves underwrite liabilities. In article 17-1, the IORP Directive states that “the home Member State (MS) shall ensure that institutions, where the institution itself underwrites the liability to cover against biometric risk, or guarantees a given investment performance or a given level of benefits, hold on a permanent basis additional assets above the Technical Provisions (TPs). The amount thereof shall reflect the type of risk and asset base in respect of the total range of schemes operated”. For instance, the “Traffic Light System” I mentioned before was introduced to comply with this article.

On DB plans where sponsoring employers bear risks, the IORP Directive regulates as follows:

(1) The home MS shall ensure that institutions, where they provide cover against biometric risks and/or guarantee either an investment performance or a given level of benefits, establish sufficient technical provisions (TPs). (§15-2)

(2) The minimum amount of the TPs shall be calculated by a sufficiently prudent actuarial valuation. It must be sufficient both for pensions and benefits already in payment to continue to be paid, and to reflect the commitments which arise out of members' accrued pension rights. (§15-4(a))

(3) The maximum rates of interest used shall be chosen prudently and determined in accordance with any relevant rules of the home MS. These prudent rates of interest shall be determined by taking into account  
the yield on the corresponding assets held by the institution and the future investment returns and/or



the market yields of high-quality or government bonds; (§15-4(b))

(4) TPs should be calculated on the basis of recognised actuarial methods and certified by qualified persons. (preamble 21)

As stated above, the IORP Directive has a regulation on the interest rate used for calculating technical provisions. We should pay attention to the fact that the market yield of high-quality corporate bonds is not the only interest rate benchmark. For instance, the UK Pensions Regulator made public the “Code of Practice 03” in February 2006 (Pensions Regulator [2006-2]). The Code says that “prudent assumptions could allow for some degree of out-performance of scheme assets relative to bonds depending on the specific circumstances of the scheme. In particular, the trustees should consider the scheme’s investment policy and the ability of the employer to cope with the financial consequences of assumptions not being borne out by experience.”

Anyway, stricter funding rules will be accompanied by much more serious side effects. Then, the question in connection with the accounting standards is, how to enhance funding levels of DB plans without making funding rules stricter than at present. I believe the “Ring-fenced” DB plans I introduce in section 5 of this paper may give an answer to the question.

## **4 The Risk Sharing Mechanism of Present DB Plans and their Structural Drawbacks**

We can find many kinds of corporate pension plans around the world. In section 4, I will revisit risk sharing mechanisms of major existing pension plans, including plans which should be introduced in Japan. I revisited risk sharing mechanisms from the viewpoint of making this analysis the logical basis for creating new risk sharing mechanisms.

### **4.1 Usual Analysis**

Table 1 is an extract from the research report published by the Department of Work and Pensions (DWP) of the United Kingdom<sup>14</sup>. This table is superior in giving a brief overview of risk sharing patterns by type of benefit design. However, this table does not represent the function of risk sharing or “solidarity” among plan participants. Therefore, it might be difficult to obtain from

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<sup>14</sup> Department of Work and Pensions (UK) [2005], “Risk sharing and hybrid pension plans”, Research Report 270

this table some inspiration about the idea of “Ring-fenced” DB plans or “Retrospective” DB plans.

**Table 1: Risk Attribution in Pension Plans**

Risk Feature	Investment	Annuity Conversion	Salary Inflation
Final Salary Pension	Sponsor	Sponsor	Sponsor
Final Salary Lump Sum	Sponsor	Member	Sponsor
Career Average/CARE	Sponsor	Sponsor	Member
Sequential Hybrid	Both	Both	Both
Combination Hybrid	Both	Both	Both
Final Salary Underpin	Sponsor	Sponsor	Sponsor
DC Underpin	Member	Member	Member
Cash Balance	Sponsor	Member	Member
Self annuitising DC	Member	Sponsor	Member
Defined Contribution	Member	Member	Member

Source: Department for Work and Pensions (UK) [2005], “Risk sharing and hybrid pension plans”, Research Report 270

## 4.2 Analysis in this Paper

In this paper, I will consider who bear the risks listed in section 2, such as the risk of mortality rate improvement, with the distinction of the risks in pre-retirement periods from those in post-retirement periods. This consideration is based on the recognition that the usual analysis on risk sharing does not give a clear understanding on the risk sharing structure of DB plans. If participants bear some risk, then we should pay attention to whether the function of pooling the said risk (the function of “solidarity” among generations and “solidarity” within a generation) exists in the DB plan. Here, “solidarity” among generations means temporary lending of capital from shares of active members to shares of beneficiaries. I explicitly express the existence of the “solidarity” function in the following tables.

### 4.2.1 Traditional final salary DB plans

Present Personal DC (PDC) plans and final salary DB plans are both extremes regarding risk sharing in corporate pension plans. In PDC plans, (a) the risk of mortality rate improvement, (b) the risk of salary increase and (c) investment risk are borne by plan participants. Therefore, there is no market interest rate risk relevant to accounting standards. There is also no function of pooling longevity risk. Participants have to purchase products covering longevity risk from the market if they want. As a result, the market interest rate risk at the time of annuitisation is also borne by individual participants. Even if the shares (i.e. balance of personal accounts in PDC plans) of beneficiaries were short of the expected present value of benefits, no lending would

occur from the accounts of active members.

In contrast, in traditional final salary DB plans, all of these risks are borne by sponsoring employers. Longevity risk is pooled and individual participants do not bear longevity risk. However, reserves of present DB plans are not ring-fenced. As long as the plan is alive, the plan has to continue paying out prescribed amounts of benefits irrespective of its funded status. Paying out prescribed amounts of benefits can mean some kind of lending of capital from the shares of active members (i.e. the amounts which should be distributed to active members if the plan is terminated and dissolved at that time) to the shares of beneficiaries. If the shortage of capital (amounts lent) is supplemented by contributions of sponsoring employers or by investment income in the future, temporary lending of capital from the shares of active members to the shares of beneficiaries when the plan is in underfunded status will not cause problems. However, if the assumption were not met, the risk of funding deficiencies would be realized as a reduction of benefits or a decrease of distributable amounts at the time of plan termination.

#### **4.2.2 Interest Rate-tied Cash Balance Plans**

Originally, a cash balance (CB) plan was introduced for the benefit of bank employees who tend to change employers occasionally, where amounts of benefits are indexed after leaving the sponsoring employer. However, employers can substantially mitigate the risk of bearing supplemental contributions by introducing CB plans where interest credits are linked to market interest rates and amounts of benefits after annuity conversion are also linked to market interest rates. Of course, as long as the function of solidarity among generations is concerned, there is no difference from traditional DB plans, because there is no restriction on the “solidarity” among generations in CB plans.

Table 2 Risk Sharing in Interest Rate-linked CB Plans where both interest credits and amounts of annuities are linked to market interest rates

<b>Interest Rate-linked Cash Balance Plans</b>	<b>Active Period</b>	<b>Beneficiary Period</b>	<b>Solidarity among Generations</b>
<b>Mortality Risk</b>	<b>Sponsor</b>	<b>Sponsor</b>	<b>Unconditional Solidarity</b>
<b>Salary Inflation Risk<sup>15</sup></b>	<b>Active Members (in the main)<sup>16</sup></b>	<b>Beneficiaries<sup>17</sup></b>	<b>Not Applicable</b>
<b>Investment Risk</b>	<b>Sponsor</b>	<b>Sponsor</b>	<b>Unconditional Solidarity</b>
<b>Interest Risk at the time of Annuitisation</b>	<b>Active Members &amp; Beneficiaries</b>		<b>None</b>
<b>Longevity Risk</b>	<b>Pooled among Same Generations</b>		<b>None (in general)</b>

Those risks which may become roots of supplemental contributions are listed in the row on the far left and those who bear the corresponding risk are shown with distinction between pre-retirement periods and post-retirement periods. The row on the far right (“solidarity” among generations) shows the existence of temporary lending of capital from the shares of active members to the shares of beneficiaries when the risk of supplemental contributions is realized. As shown on the penultimate line, “Interest (Rate) Risk at the time of Annuitisation” is borne by plan participants, because in an interest rate-linked CB plan, the discount rate, which is the basis of annuity conversion rates, is linked to market interest rates and therefore market interest rates affect actual cash outflow. The function of pooling longevity risk is one of the conditions under which favorable tax treatments are given to corporate pension plans, such as Exemption from the Special Corporate Tax. In my opinion, corporate pension plans without any risk-pooling functions should be given limited favorable tax treatments.

Table 2 is significantly different from Table 1. Although the analysis described above may not be a novel one, I believe a frontier which has not been recognized clearly so far might be brought to the surface by devising such a table format.

<sup>15</sup> There are two kinds of “Salary Inflation Risk”: (a) general price and/or wage inflation and (b) personal wage inflation that is higher than the general indices. In this table and the tables hereafter, I would like to focus on the first risk. However, we should not forget that, under a Career Average Revalued Earnings (CARE) or CB plan, the active member bears the risk related to his/her salary increases being higher than the general indexing provided by the plan.

<sup>16</sup> Under an interest rate-linked CB plan, the plan promises a form of indexing that correlates amounts of benefits with the actual trends of market interest rates. If general wage inflation rates were higher than expected and the actual market interest rates were lower than the general wage inflation rates, active members would bear the risk that the amounts of benefits do not follow the general wage inflation (standard of living). In addition, sponsors may be required to bear supplemental contributions because future benefit payments become greater than expected due to unexpected rise in the general wage inflation.

<sup>17</sup> The “Salary Inflation Risk” in the Beneficiary Period means that amounts of benefits do not follow the general wage inflation and beneficiaries’ standard of living may not be maintained.

### **4.3 Structural Deficiency of Present DB Plans**

As I have explained, DB plans, including CB plans, are equipped with the function of unconditional “solidarity” among generations. Unconditional “solidarity” among generations means that, as long as the plan is alive, the rights (interests) of beneficiaries are given priority over the rights (interests) of active members, irrespective of the funded status of the plan. Amounts of benefits are never cut down. This function may give sponsoring employers some kind of flexibility in financing a DB plan. However, the expectation that funding shortfall shall be made up in the future, which is a rightful precondition of the “solidarity” among generations, is not always met. When employers are in financial difficulties, this “solidarity” poses risks to active members. This can be considered as a “structural drawback” of DB plans. One background where the Pension Benefit Guarantee Corporation of the USA has suffered huge loss might be this unconditional “solidarity” among generations.

I believe there should be some mechanism of restricting the function of “solidarity” among generations to ensure fair risk sharing between active members and beneficiaries. I devised the idea of “Ring-fenced” DB plans to address the issue.

## **5 “Ring-fenced” DB (RfDB) Plans**

### **5.1 Mechanism of “Ring-fenced” DB Plans**

I devise the idea of “Ring-fenced” DB plans to address the structural drawback of present DB plans which I explained in section 4.3. The gist of the “Ring-fenced” DB plans lies in introducing share structure into contributions and reserves, and suspending the function of “solidarity” among generations regarding funding shortfalls.

#### **5.1.1 Specification of the “Share” of Individual Participants on Reserves**

The benefit design of a RfDB plan is the same as general DB plans. There is no need to modify the benefit design. The essence of RfDB plans is dividing the annual contribution into portions designated to individual participants, and calculating their terminal amounts retrospectively based on actual RORs on investments and actual amounts of benefits paid. The share of a participant is the terminal amount obtained by the retrospective calculation based on the portions of contributions designated to him/her and benefits paid to him/her. The shares of individual participants are traced year by year using the retrospective calculation. Please note that the share structure of reserves is introduced for the purpose of suspending the “solidarity” function of

DB plans in certain circumstances and does not mean that reserves are actually partitioned into pieces whose ownership belongs to individual participants.

### **5.1.2 Distribution of Remainders in Shares when Decease or Withdrawal Occurs**

If an active member or a beneficiary has deceased and there is some remainder in his/her "share" after all the prescribed benefits are paid out, the remainder is distributed to the shares of other active members or beneficiaries (belonging to same generation) according to the manner of risk pooling prescribed in the terms of the plan. If an active member has withdrawn from the plan and there is some remainder in his/her share after all prescribed benefits are paid out, the remainder is distributed in the same way. One of the fundamental characteristics of RfDB plans, in comparison to Personal DC plans, is that the function of pooling risks is specified by the terms of the plan and incorporated into the plan.

### **5.1.3 Financing of Annual Benefit Disbursement**

If the amount of a beneficiary's "share" is greater than the present value of his/her expected future benefits (which means the funded status of his/her "share" is more than 100%), then money equal to his/her annual benefits for the year is withdrawn from his/her "share" and the money is allocated to benefit disbursements to him/her. However, if the amount of the beneficiary's "share" is less than the present value of his/her expected future benefits (let us put the funded status of his/her share at  $Y\%$  [ $Y < 100$ ]), an amount equal to  $Y\%$  of his/her annual benefits for the year is withdrawn from his/her "share" and the amount is allocated to benefit disbursements to him/her. The rest ( $[100 - Y]\%$  of his/her annual benefits) may be financed through allocating the surplus in the shares of other participants (if any), according to the terms of the plan on risk pooling. Shortage of capital (if any) should be immediately financed by supplemental contributions of sponsoring employers. The key point of the mechanism is that the concrete manner of pooling risk ("solidarity" within a generation and among generations) is prescribed in the terms of the plan. In general, risk pooling among the beneficiaries shall be given priority order. If all shares of the beneficiaries are underfunded but shares of active members have surplus, then all or part of the surplus may be used to supplement the shortage of capital for benefit disbursements of the year. If all shares within the range of risk pooling are underfunded, sponsoring employers have to make supplemental contributions to make up the shortage of capital for benefit disbursements of the year.

It is supposed that the capital for benefit disbursements in future years is ring-fenced by year and cannot be withdrawn to supplement the shortage of capital for the current year's benefit

disbursement. Specifically, this treatment has the following meaning. The amount of contribution which is paid in a particular year and designated to a particular participant is the sum of the amounts of benefits which will be paid out in each year in the future to him/her. In other words, a contribution designated to the particular participant has some kind of term structure. As his/her share is the accumulation of the contributions paid in each year, term structure is also naturally introduced to individual shares on the reserves. It can be specified how much capital in one's share is designated for benefit disbursement in each year in the future. Here, the term structure introduced in this way is annulled, and then total amounts of the share are redistributed to each year in the future according to the present value of benefits in each year. In this way, a modified term structure is reintroduced to individual shares and each piece in individual shares is ring-fenced regarding years of benefit disbursement.

#### **5.1.4 If There Are Any Funding Shortfalls (Basic Mechanism)**

If shares of beneficiaries are underfunded in total, then the shortage of capital for benefit disbursement in the following year should be immediately supplemented by sponsoring employers. The shortage of capital for benefit disbursement in the subsequent years may be amortised within certain years. If employers cannot meet the former requirement, the annual amount of benefits of the following year shall be cut down correspondingly. In this case, the beneficiaries concerned shall be given privileged rights of claim against sponsoring employers.

A funding shortfall at the time of plan termination is given the status of credits on unpaid contributions by the Defined Benefit Corporate Pension Act. From the viewpoint of protecting the rights of participants, individual participants should be given priority claim rights against sponsoring employers. In RfDB plans, beneficiaries are given priority claim rights on the amounts of capital shortage regarding benefits to be paid in the year and not supplemented by sponsoring employers, assuming the ring-fencing of reserves regarding the years of benefit disbursement. By doing so, RfDB plans aim at preventing deterioration of funded status and clarifying the responsibility of sponsoring employers.

## **5.2 What Ring-fencing Is**

The concept of ring-fencing was introduced by the Directive 2003/41/EC (IORP Directive). According to Simon Arnot [2004]<sup>18</sup>, ring-fencing means “any of a range of techniques for distinguishing, segregating or separating one set of asset class, liabilities, activities or operations

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<sup>18</sup> Simon Arnot [2004], “Directive 2003/41/EC on the Activities of Institutions for Occupational Retirement Provision”, European Federation for Retirement Provision

from another, including methods for ensuring that particular assets and liabilities can be identified and traced with ease, as well as techniques protecting one set of assets from the economic fate of another, such as providing them with a privileged status in the case of bankruptcy.”

The IORP Directive states that, in the event of cross-border activity as referred to in Article 20, the technical provisions shall at all times be fully funded in respect of the total range of pension schemes operated (the IORP Directive §16-3). If these conditions are not met, the competent authorities of the home Member State shall intervene in accordance with Article 14. To comply with this requirement the home Member State may require ring-fencing of the assets and liabilities (the IORP Directive §16-3).

When credit risk of sponsoring employers deteriorates and the DB plan is substantially underfunded, it is indispensable for pension supervisors to anticipate the risk and take appropriate pro-active measures. I believe these measures should include not only freezing of future benefit accruals but ring-fencing of reserves. Ring-fencing of reserves means specifying shares of individual participants and ring-fencing the shares regarding years of benefit disbursement, no matter whether the plan is engaging in cross-border activity or not.

### **5.3 If There Are Any Funding Shortfalls (Modified RfDB Plan)**

Even if sponsoring employers could not make contributions corresponding to the immediate supplement of capital shortage concerning benefit disbursements of the year, the share of a particular participant shall never be lent to shares of other beneficiaries as long as the plan is in an underfunded status. In addition, the contribution designated to each active member is added to his/her share without any reduction. Therefore, as far as funding target amounts is concerned, RfDB plans are not inferior to Personal DC (PDC) plans. On the contrary, RfDB plans are superior to PDC plans in the sense that funding shortfalls in a RfDB plan may be made up by sponsoring employers in the future. In other words, even if temporary benefit reduction is allowed within certain prescribed ranges when the plan is in an underfunded status, RfDB plans are superior to PDC plans as a funding vehicle.

In Modified RfDB plans, for example, amounts up to 90% of the prescribed benefits are guaranteed as the rights of participants and treated as described above. The remaining 10% is not treated as rights, and shall be paid out according to the funded status of the plan. That is, if the funding shortfall is greater than 10%, benefits of the next year shall be cut down by 10%. Employers are required to make supplemental contributions of the amounts equal to the sum of



(A) contributions to immediately make up the capital shortage of the portion of the shares of beneficiaries which are allocated to benefit disbursement of the next year, in comparison to the first 90% of prescribed benefits of the next year, and (B) contributions to raise the funded status from 90% to 100% within the next 10 years. If the funding shortfall is less or equal to 10% (let us put the percentage as X), then the annual benefits in the next year is cut down by [X]<sup>19</sup>%. Sponsoring employers are required to make supplemental contribution to raise the funded status to 100% within the next [X] years. In both cases, normal contributions are calculated corresponding to 100% of the prescribed amounts of benefits. In Modified RfDB plans, it is essential to reach an agreement between labor and management regarding the mechanism of sharing risks, and incorporate the agreement into the terms of the plan<sup>20</sup>.

#### **5.4 Favorable Points of Modified RfDB Plans**

Firstly, as easily understood from the description above, a RfDB plan places restrictions on the manner of raising capital for benefit disbursement irrespective of the benefit design of the plan. Therefore, there is no need to modify the benefit design of the ordinary DB plan, although the mechanism of temporary benefit reduction may be incorporated. The mechanism of RfDB plans can be applied to any kind of DB plans. It is possible to transfer a CB plan to a RfDB plan (RfCB!). As described above, a RfDB plan introduces share structure into contributions and reserves and restricts the function of "solidarity" among generations regarding funding shortfalls. Therefore, funding rules on RfDB plans may be relaxed substantially.

Secondly, as the variable portion (last 10%) of benefits becomes conditional in Modified RfDB plans, liabilities to be recognized in post-retirement benefit accounting should be decreased correspondingly. Investment with higher risk tolerance may become possible. Taking this factor into consideration, Modified RfDB plans will be beneficial to both sponsoring employees and participants. If recognition of liabilities is limited to the 90% portion of the prescribed benefits, the variable portion of benefits (last 10%) functions as a virtual risk buffer and drastically diminishes the influence that market interest rate fluctuations exert on the equity of sponsoring companies. In this regard, Modified DB plans are completely different from the simple combination of a normal DB (the 90% portion of prescribed benefits) and a DC (last 10% portion of prescribed benefits).

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<sup>19</sup> [X] means an integer obtained by cutting of the decimal fraction of X.

<sup>20</sup> It may also possible that the annual amounts of benefits vary corresponding to the funded status of the share within the range from 90% to 110% of prescribed amounts, guaranteeing 90% of the prescribed amounts as the rights of participants. However, in this case, supplemental contributions of employers shall be limited to those corresponding to 90% of the prescribed amounts.

Thirdly, Modified RfDB plans prevent cost hikes due to funding the risk buffer needed to mitigate investment risk and market interest rate risk, by allocating the virtual risk buffer to benefit disbursement as variable portions of benefits. Considerable size of risk buffer is needed to prevent the post-retirement benefit accounting from having a fatal effect on the equity of sponsoring companies. However, if the risk buffer is not allocated to capital for benefit disbursement, the cost of providing DB plans will become prohibitively expensive. Modified RfDB plans provide a solution to this problem.

Fourthly, in multi-employer plans, ring-fencing of reserves by employer (when the plan is in an underfunded status) makes it possible to insulate the adverse financial influence affected by withdrawal of member employers from the plan. At present, such kind of treatment is not permitted in Japan. However, we cannot look away from the truth that “you cannot make something out of nothing.” If we refer to the regulation stated on the later part of the section 16.3 of the IORP Directive, I believe it has already become a universal idea to allow such treatment as an option for multi-employers plans. In single-employer plans, the idea of RfDB plans may be an effective countermeasure against beneficiaries’ selecting lump-sum benefits in anticipation of immediate plan termination.

## **6 “Retrospective” DB Plan**

### **6.1 Idea of “Retrospective” DB Plan**

In a “Retrospective” DB plan, amounts of benefits are calculated as (a function of) the terminal value of the amounts of actual contributions paid. At the same time, “Retrospective” DB plans maintain the basic characteristic of DB plans, namely, the promise of paying prescribed benefits determined by prescribed benefit formulae. By introducing “Retrospective” DB plans, the range of options of sharing investment risk and longevity risk between sponsoring employers and plan participants will be extended considerably.

As I have explained in section 2.1, if we divide past contributions into portions designated to each participant and each year of disbursement and calculate retrospectively the terminal value at a particular point in time of the amounts of portions designated to particular participant and particular year, using the assumed rates adopted at the time of calculating contributions, the terminal value should be exactly same as the prescribed amount of annual benefits of the

particular year<sup>21</sup>. In a “Retrospective” DB plan, we replace the assumed rates with those that partially or completely reflect the actual experience and calculate retrospectively the terminal value in the same way. The amounts of benefits of a “Retrospective” DB plan are the terminal values thus obtained. There are countless variations within “Retrospective” DB plans depending on which rates are to be replaced and how the rates are to be replaced.

Replacing rates reflect actual rates partially or completely. The risk involved (in setting up assumptions in contribution calculations) can be shared among employers and employees exactly in the manner as planned, depending on how much the actual rates are to be reflected into the replacing rates. For instance, if the assumed mortality rates are to be replaced by the average of the assumed mortality rates and the actual mortality rates (of the national life tables) when the latter rates are improved beyond the assumed rates, sponsoring employers and participants evenly share the risk of mortality rate improvement. Of course, the terms of the plan should explicitly prescribe in advance which rates are to be replaced and how they are to be replaced.

## **6.2 Replacing Assumed Rate of Return (ROR) by Assumed RORs Used in Subsequent Actuarial Valuations**

In this plan, the expected ROR used in calculating contributions is to be replaced by the expected RORs used in the subsequent (periodical) actuarial valuations<sup>22</sup>. Then, the reduction of expected RORs in subsequent actuarial valuations after the year when the contributions are paid does not create a funding shortfall (of course, subsequent normal contributions will increase). Conversely, raising expected RORs does not create a funding surplus (of course, subsequent normal contributions will decrease). Sponsoring employers bear investment risk corresponding to the difference between the actual ROR of the year and the expected ROR used in the actuarial valuation concerning the year. In this way, the basic characteristic of DB plans is maintained, while investment risk borne by sponsoring employers is constrained in the funding shortfall corresponding to the discrepancy between the actual RORs and the expected RORs adopted in subsequent actuarial valuations. If some mechanism of automatic reduction of benefits when national mortality rates become lower than expected is also incorporated in the plan<sup>23</sup>, sponsoring

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<sup>21</sup> For convenience, it is assumed that normal contributions are calculated using the (projected) unit cost method.

<sup>22</sup> To put it in concrete, firstly we divide normal contributions into portions designated to individual participants and individual years of disbursement. The annual amount of pension of a particular participant in the n-th year is the terminal value of the portions of contributions designated to him/her and the n-th year, taking into account mortality rates, etc. Expected RORs adopted in subsequent actuarial valuations are used as the interest rates for calculating the terminal value.

<sup>23</sup> If the pension is designed as an annuity certain and the amounts of pension during the guaranteed period cannot be changed, pensions paid after the guaranteed period will be reduced.

employers partially escape from bearing the risk of mortality rate improvement<sup>24</sup>.

This type of “Retrospective” DB plan is the same as a CB plan where contribution credits are equal to the amounts of normal contributions, and revaluation indices are equal to the expected RORs used in subsequent actuarial valuations. Here, revaluation indices are the basis of revaluation credits. The range of sponsoring employers’ discretion on the revaluation credits is enlarged by introducing this type of “Retrospective” DB plans. Of course, sponsoring employers should not forget the effects on the subsequent contribution credits (normal contributions).

Table 3 Risk Sharing in a “Retrospective” DB Plan where Assumed Rate of Return (ROR) is Replaced by Assumed RORs Used in Subsequent Actuarial Valuations (example)

<b>“Retrospective” DB Plans – I (example)</b>	<b>Active Period</b>	<b>Beneficiary Period</b>	<b>Solidarity among Generations</b>
<b>Mortality Risk</b>	<b>Active Members</b>	<b>Beneficiaries</b>	<b>None</b>
<b>Salary Inflation Risk</b>	<b>Active Members (in the main)</b>	<b>Beneficiaries</b>	<b>Not Applicable</b>
<b>Investment Risk</b>	<b>Sponsor (partially)</b>	<b>Sponsor (partially)</b>	<b>Unconditional Solidarity</b>
<b>Interest Risk at the Time of Annuitisation</b>	<b>Active Members &amp; Beneficiaries</b>		<b>None</b>
<b>Longevity Risk</b>	<b>Pooled among Same Generations</b>		<b>None</b>

### 6.3 Replacing Assumed Rate of Return (ROR) by Actual RORs of Subsequent Years

In this type of “Retrospective” DB plan, the assumed ROR is replaced by the actual RORs of subsequent years. However, amounts of annual benefits are constrained within the prescribed maximum and minimum. For instance, the maximum may be  $[100+X]\%$  and the minimum may be  $[100-X]\%$  of the prescribed amounts. Then the formula for calculating the amounts of annual benefits becomes as follows:

$$\text{Amount of Pension} = \text{Min} [(100+X)\%, \text{Max}\{(100-X)\%, \text{Terminal Value based on actual RORs}\}]$$

<sup>24</sup> As I have explained before, it is supposed that assumed mortality rates are to be replaced by actual mortality rates listed on the national life tables when actual mortality rates improve. Employers have to bear the risk that participants of the plan may live longer than the average of the national total population.

Sponsoring employers bear investment risk corresponding to paying benefits up to  $[100-X]\%$  of the prescribed amounts, but escape from bearing risk corresponding to the portion over  $[100-X]\%$  <sup>25</sup>. The above formula does not completely fix the amount of benefits in advance. However, benefits are confined in a certain prescribed range and not left as they are along with the actual RORs. Therefore, this type of “Retrospective” plan is surely within the category of DB plans.

This type of “Retrospective” plan is the same as a CB plan where contribution credits are equal to normal contributions and revaluation indices are equal to the actual RORs of subsequent years. It may be nearly equal to a Collective DC plan guaranteeing lowest ROR.

In this type of “Retrospective” plan, it is desirable to prescribe the methodology (formula) for setting assumptions on expected ROR in subsequent actuarial valuations from the actual RORs in the past, based on the agreement between labour and management.

#### **6.4 Other Types of “Retrospective” DB Plans**

In a “Retrospective” DB plan, replacement of assumed rates which has some characteristics of derivatives may also be possible. For instance, replacing the assumed ROR by actual RORs of the year only if the actual ROR of the year has differed from the assumed ROR beyond a prescribed margin. If the actual ROR is within the margin from the assumed ROR, the assumed ROR is not replaced by actual ROR. By this kind of replacement, we can confine sponsoring employers’ risk in a certain affordable range, taking into account the financial strength of sponsoring employers.

In a “Retrospective” DB plan where plan participants partially bear investment risk, it is indispensable for plan participants (including beneficiaries) to take part in decision making on investment. In addition, participants should be treated as one of the owners of the surplus.

## **7 Collective DC, Sequential or Combination Hybrid and Issues on the Present Frame of Plan Conversion in Japan**

### **7.1 Collective DC Plan**

If we use actual RORs as revaluation indices, discount rate for annuity conversion and “indices for

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<sup>25</sup> For another option, it is also possible to replace assumed ROR by the average of assumed ROR and actual RORs every year. In this case, sponsoring employers and plan participants evenly share investment risk.

revising benefits<sup>26</sup> in a CB plan, the CB plan becomes a kind of Collective DC plan. Table 4 shows the risk sharing in this plan. In Collective DC plans, a life-time annuity can be provided without assuming supplemental contributions paid by sponsoring employers or the function of “solidarity” among generations. However, the shield of separating reserves into balances of personal accounts (or ring fencing reserves) should be removed after the owner of the personal account (a participant) starts receiving pension benefits.

Collective DC plans are introduced in Netherlands, Denmark, Switzerland and other countries in Europe. Collective DC plans and Personal DC plans like 401(k) of the USA are poles apart regarding the risk sharing among participants. In Collective DC plans, individual participants need not bear longevity risk. In addition, there is no need of requiring aged beneficiaries to making decisions on investments.

Table 4 Risk Sharing in Certain Collective DC Plans (example)

<b>Collective DC Plans (example)</b>	<b>Active Period</b>	<b>Beneficiary Period</b>	<b>Solidarity among Generations</b>
<b>Mortality Risk</b>	<b>Active Members</b>	<b>Beneficiaries</b>	<b>None</b>
<b>Salary Inflation Risk</b>	<b>Active Members</b>	<b>Beneficiaries</b>	<b>Not Applicable</b>
<b>Investment Risk</b>	<b>Active Members</b>	<b>Beneficiaries</b>	<b>None</b>
<b>Interest Risk at the Time of Annuitisation</b>	<b>Active Members &amp; Beneficiaries</b>		<b>None</b>
<b>Longevity Risk</b>	<b>May Be Pooled among Same Generations</b>		<b>None</b>

In my opinion, there is no rational reason for prohibiting Collective DC plans while introducing Personal DC plans. I also believe that the decision on whether to introduce Collective DC plans relates to the issue of how much the society of Japan should be weighted toward individualism. We perceive that economic disparity in the society of Japan has been gradually widening. We may accept it as unavoidable. As a conclusion, disparity of contribution among participants may also be unavoidable. In such a society, there may be some advantages in Personal DC plans not equipped with the function of risk pooling among participants. However, do people in Japan

<sup>26</sup> In Japan, it is allowed to revise the amount of annual pensions annually using market interest rates. An example of revising annual amount of pension is as follows: The annuity conversion rate is revised annually based on the market long-term interest rate of the preceding year. The amount of one's annual pension of the year is obtained by multiplying the “revised annuity conversion rate” to the balance of his/her nominal account at the time of annuity conversion.

really want such a system that all kinds of risk pooling among participants are rejected?

## 7.2 “Sequential” Plan (Nursery Plan)

According to the classification of the Organisation for Economic Co-operation and Development (OECD), there is another type of DB plans called “Mixed” plans<sup>27</sup>. One example of a “Mixed” plan is a “Sequential” plan, which connects a DC plan and a DB plan in series. Let us consider the Nursery plan, where individual participants transfer from DC component to DB component at specified age (for instance, 35 years old, normal retirement age, etc). Here, transfer from the DC component to the DB component means purchasing benefits or credited service by the balance of the personal account of the DC component.

If a participant transfers to the DB component at normal retirement age, investment risk in the phase of benefit withdrawal is borne by sponsoring employers, while investment risk in the phase of accumulating contributions is borne by the participant. Market interest risk at the time of annuity conversion may be partially borne by individual participants if market interest rates are reflected in the annuity conversion rate. In Nursery plans, administrative and investment costs during the phase of benefit withdrawal are borne by sponsoring employers. Longevity risk may be pooled among the same generation. For aged beneficiaries, there is no need to be worried about how to make decisions on investments. As shown in Table 5, the essence of the Nursery plans is shutting down the “solidarity” between active members and beneficiaries. As the risk rooted to unconditional solidarity among generations is mitigated, the Nursery plans may be felt safe by active members.

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<sup>27</sup> OECD classifies DB plans into three categories, “Traditional” DB plan, “Hybrid” DB plan and “Mixed” DB plan. “Mixed” plan is a plan that has two separate DB and DC components but which are treated as part of the same plan. CB plan is classified as one kind of “Hybrid” DB plan. See OECD [2005-1].

Table 5 Risk Sharing in Certain “Sequential” Plans (example)

<b>Sequential Hybrid Plans (example)</b>	<b>Active Period</b>	<b>Beneficiary Period</b>	<b>Solidarity among Generations</b>
<b>Mortality Risk</b>	<b>Active Members</b>	<b>Sponsor</b>	<b>Only among Beneficiaries</b>
<b>Salary Inflation Risk</b>	<b>Active Members (in the main)</b>	<b>Beneficiaries</b>	<b>Not Applicable</b>
<b>Investment Risk</b>	<b>Active Members</b>	<b>Sponsor</b>	<b>Only among Beneficiaries</b>
<b>Interest Risk at the Time of Annuitisation</b>	<b>Active Members &amp; Beneficiaries</b>		<b>None</b>
<b>Longevity Risk</b>	<b>Pooled among Same Generations</b>		<b>Only among Beneficiaries</b>

### 7.3 “Combination” Plan

Another type of “Mixed” plan is a “Combination” plan. In a “Combination” plan, the DB component and the DC component stand in parallel and can be tied systematically. As one example, Table 6 shows the risk sharing of the plan actually adopted by multi-employer schemes (MES) in the UK<sup>28</sup>. Attention should be paid to this type of plan because it imposes certain restrictions on the function of “solidarity” among generations.

Table 6 Risk Sharing in Certain “Combination” Plan (example)

<b>Combination Hybrid Plans (example)</b>	<b>Active Period</b>	<b>Beneficiary Period</b>	<b>Solidarity among Generations</b>
<b>Mortality Risk</b>	<b>Sponsor</b>	<b>Sponsor</b>	<b>Limited Solidarity</b>
<b>Salary Inflation Risk</b>	<b>Active Members (in the main)</b>	<b>Beneficiaries</b>	<b>Not Applicable</b>
<b>Investment Risk</b>	<b>Sponsor</b>	<b>Sponsor</b>	<b>Limited Solidarity</b>
<b>Interest Risk at the Time of Annuitisation</b>	<b>Sponsor</b>		<b>Limited Solidarity</b>
<b>Longevity Risk</b>	<b>Pooled among Same Generations</b>		<b>None (in general)</b>

<sup>28</sup> The plan I mentioned above was introduced by Richard Stroud in his article “Multiple Choice Question” appeared in the *International Pension and Europe, February 2005*. He introduced the plan as a mechanism with very rare possibility of supplemental contributions, not as a new mechanism of risk sharing. However, I paid attention to the point that this plan imposes certain restriction on the function of “solidarity” within a generation and among generations and introduced the plan as an example of “Combination” plan with the risk sharing pattern different from other DB plans.



In the “Combination” DB plan adopted by MES in the UK, a DB component which provides benefits proportionate to career average revalued earnings (CARE) is managed very conservatively with a low expected ROR. If expected ROR is set at low level, costs of the component become expensive, while the possibility of supplemental contributions is small. As a natural conclusion, prescribed benefits have to be set at low level compared to the financial capability of employers. However, investment strategy of the plan aims at achieving higher ROR than assumed, whilst accepting tolerable downside risk. The surplus produced is distributed to individual participants as contributions to a DC component, except the amounts which should be reserved as a risk buffer of the DB component. (Here, surplus of the DB component is ring-fenced through distribution to personal accounts of the DC component.)

There may be three reasons why the surplus is distributed upon being generated. Firstly, if surplus is accumulated within the DB component, the pressure from participants to improve benefits will gradually increase. However, (improved) higher benefits of DB components will impose greater risk on sponsoring employers. The pressure of improving benefits will be averted by distributing surplus as contributions to the DC component. At the same time, it may be relatively easy to reach an agreement between labour and management about the benefit design, as participants can expect higher benefits in total. Secondly, as I mentioned in the above paragraph, distributed surplus cannot be used for making up the funding shortfalls which may occur in the future. Thirdly, distributed surplus cannot be lent within the same generation. The second and third points can be understood as blocking the “solidarity” function.

As I explained above, in the “Combination” plan adopted in MES in the UK, a certain restriction is imposed on the function of “solidarity” within a generation and among generations by cutting off surplus from the DB component. In this regard, the MES-type “Combination” plan is different from a CB plan. In a CB plan, there is no restriction on the function of “solidarity” among generations. The MES-type “Combination” plan is also different from a Personal DC plan. In a Personal DC plan, reserves are shielded by the participant and there is no portion which can be allocated to risk pooling. The MES-type “Combination” plan maintains the function of risk pooling regarding the basic portion of benefits.

## **7.4 Issues to be Improved on Present Regulations on Plan Conversion**

### **7.4.1 DB Conversion from DC**

In the present frame of plan conversion in Japan, DC plans are treated as a kind of “black hole”. Once a plan is converted to a (Personal) DC plan, it is permanently impossible to recover from the

DC plan as far as the accrued rights (accumulated contributions) are concerned. In Japan, a new mechanism of ensuring portability was introduced by the 2004 Pension Reform. When an active participant changes an employer before fulfilling the minimum membership period required for his/her entitlement to receive an annuity, it became possible that he/she can transfer the lump-sum amounts paid from the plan of the previous employer to the DB plan of the new employer and annuitise the lump-sum. This transfer is regarded as purchasing some membership periods in the DB plan of new employer by lump-sum amounts paid from the DB plan of the previous employer. The principle of the frame of portability is just the same as that of the Nursery plan which I described in section 7.2.

In Japan, pension laws have been formulated on the principle of placing DC plans on the same level with DB plans as alternatives for post-retirement occupational pension provision. I believe both DB conversion through a "Sequential" plan and plan conversion from a DC plan to a DB plan should be allowed, as a natural conclusion of the principle.

#### **7.4.2 Lump-sum settlement due to DC Conversion**

Generally speaking, a person aged 60 or over is not allowed to be an active member of a DC plan. Therefore, participants (including beneficiaries) aged 60 or over of a DB plan cannot become active members of the DC plan converted from the DB plan. In this case, active members and beneficiaries aged 60 or over are paid lump sum allowance calculated as if the plan is terminated just before the DC conversion. This treatment means that employers are allowed to break their promises to DB plan participants of paying a prescribed annuity, as inevitable settlements accompanying DC conversion. However, the amount of lump-sum allowance is not always enough to ensure pension benefits prescribed in the DB plan. Therefore, allowing lump-sum settlements in a DC conversion is considered very problematic.

In Japan, the Pension Fund Association provides the function of annuitising lump sums paid to members withdrawn from DB plans, participants of dissolved DB plans and participants (including beneficiaries) aged 60 or over in DC conversions. The interest rate used in calculating the annuity conversion rate had been 0.5% since October 2005. In October 2006, the interest rate was amended so that the five year average of the 30-year Government Bond rates is the basis of the rate. However, the PFA subtracts administration costs from the amount transferred to the PFA before annuity conversion. Therefore, if the amounts of the administration costs are not borne by the sponsoring employers, annuities of participants aged 60 or over will be decreased correspondingly by the DC conversion. I think that present treatments on DC conversions should

be improved as soon as possible. One possible measure is obliging sponsoring employers to protect the interests of participants by (for example) paying the PFA the amounts corresponding to the administration costs.

## **8 Concluding Remarks**

DB plans are intrinsically superior to Personal DC plans with regard to risk sharing mechanisms. DB plans can realize any pattern of risk sharing. However, present DB plans are equipped with the function of “solidarity” among generations. This function poses risks to participants when sponsoring employers are in financial difficulties, while this function gives sponsoring employers flexibility in plan management. To address the issue, I introduced “Ring-fenced” DB (RfDB) plans and “Retrospective” DB plans, which will modify the risk sharing mechanism of present DB plans.

RfDB plan is an innovative mechanism of suspending the function of “solidarity” among generations when the plan is in an underfunded status irrespective of its original benefit design, through introducing share structure into contributions and reserves. There is no need to modify the benefit design to transfer the original DB plan to a RfDB plan. In a RfDB plan, it is possible to allow temporary benefit reductions within a certain prescribed range corresponding to the funding level of the plan. In this case, as portions of benefits become conditional, the liabilities to be recognized for accounting purpose are expected to be decreased. As a result, the influence of market interest rate volatility to the balance sheet of sponsoring companies will be mitigated and investment with greater risk tolerance will become possible. Therefore, RfDB plans are beneficial for both labour and management. Funding rules of RfDB plans can be relaxed substantially. The idea of RfDB plans has wide application as a mechanism of shutting down the adverse financial influence caused by withdrawal of member companies in a multi-employer plan.

A “Retrospective” DB plan is a mechanism whereby amounts of benefits are determined as a function of the terminal value of actual normal contributions, while maintaining the basic characteristic of DB plans, that is, the promise of paying benefits whose amounts are determined by the prescribed benefit formulae. We can extend the range of available options of sharing risk among sponsoring employers and participants substantially by introducing “Retrospective” DB plans.

In addition, a "Sequential" DB plan which connects DC and DB in series and a "Combination" plan where surplus of the DB component is distributed to participants as contributions to the DC component are beneficial as mechanisms of imposing restrictions to the function of "solidarity" among generations, while maintaining the function of pooling longevity risk. A Collective DC plan has merits, in that there is no need to require aged beneficiaries to make decisions on investments and individual participants need not bear longevity risk.

Under the circumstance where pressure to DB plans from accounting standards has been mounting, we should increase options of sharing risks considerably by introducing these plans. It is also necessary to enlarge and deepen the annuity market as a social policy, when we take into account the proliferation of Personal DC plans. In addition, the annuitisation function of the Pension Fund Association and the National Pension Fund Association should be strengthened. The present treatment of DC conversions whereby the rights of beneficiaries are settled as lump sums is very problematic and should be improved as soon as possible. Plan conversions from DC to DB should also be permitted.

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