"The investment of Pension Fund in Japan "

(The examination from the risk of the liability)

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Introduction

There are employees' pension fund plans, tax qualified pension plan in the main thing of the pension scheme in Japan. There is a big difference as the system, although the point that is consigning asset management to an outside application institution, like trust bank, life insurance companies, is the defined benefit corporate pension plan. The tax qualified pension plan, while the plan sponsor does the only presentation that determined independently, but the employees' pension fund plan is having also a portion of the old-age benefit of employees' pension insurance scheme(called EPI).
The influence that the result of the asset management gives to the finance situation of these pension plans is a very big thing. Also, the impact that the fluctuation of the pension assets gives is very big even if it corresponds to the retirement presentation liability on business accounting. It is various to the one that inserted the characteristic of the liability fluctuation in a consideration, from the one that is catching as "asset management" purely, although various application theory and, risk control theories are thought regarding the application of the pension assets with the middle like that. As it is pension assets the purpose should maximize of the assets, provided that the liability fluctuation characteristic is considered, because it is to do the presentation of the benefit.
I think that I want to summarize what kind of thought it should be based on when fundamental fluctuation factor etc. on the side of liability and do the asset management of the pension funds, in order that I am going to manage the pension scheme this time.

2 . The characteristic of pension asset management

The characteristic of the pension asset management is that the investment period is for long time and also to accompany cash flow. For instance, it supposes that an employee joins a company at the age of 20 and receives a pension for 20 years from 60 years old after retirement. There is a thing period in 60 years from joining a company to last payment then. Be not the same condition always regarding the 60 years it is classified in 3 pieces of condition largely. On the first period there are only contributions in the pension plan, then next period there are not contributions and payments, the last period there are only payments. This is the condition that is intermingling when it observes it as a whole pension plan, although it is able to distinguish it to 3 periods neatly when it sees it with an individual. If it classifies it into 3 pieces as it is same then that.

. Contributions . payments
. Contributions . payments
. Contributions . payments

The condition of these periods will change by situation of the employment and retirement.
It is possible to decrease the risk substantially by cash flow matching and immunization, if the cash flow is fixed. However, there is no risk free asset that has same duration to the liability, it assumed to wear an interest rate fluctuation risk, a reinvestment risk.
Also, there is regulation in the liability discount rate so the lower liability discount rate is not interlocking completely with the actual interest rate. Therefore, the application in a risk asset becomes needed, because of the plan sponsor can't maintain with only the application by risk free assets. Furthermore it is very general action even if it corresponds to the pension assets to request a high return while taking a risk as the understanding with regard to the investment theory.

3 . The characteristic of the pension plan of Japan

… Tax qualified pension plan

These pension benefits are paid out according to pension rule to be agreed by both employee and plan sponsor. Although this pension plan becomes with that is moved to a new pension plan in 10 years from now by the defined benefit corporate pension plan law, an essential thing will be catching as the pension plan that does not have EPI. Many systems are based on the lump-sum retirement benefit so they have "the seniority system". Also, as for the annuity, there are many cases that even the case that is started right away after retirement is many, and the payment be making the supply period the term. (The supply periods there are many cases in 10 years or 15) Furthermore, the case that selects a selection lump-sum distribution to the change of the supply in an annuity on account of the demand for funds of the participant, is seen a lot, although it is a pension plan. (Accurate account etc. of loan)
Many of the tax qualified pension plans are small, there are few participants, because there are few numbers of participants needed for system establishment.

… The employees' pension fund plan

The big characteristic of this plan is having the EPI. Although it is paid out according to pension rule to be agreed by both employee and plan sponsor and the addition part the benefit level is varied. Also it must have life annuity, which is requested by the establishment authorization standard, but it is possibility terminable annuity even (a part).

There are many cases this all life part is the merit of an annuity selection so the annuity selection rate is higher than that of tax qualified pension plan. (It is certain that it is one reason, although it is not only this reason that the proportion of an annuity selection is high)

This part of EPI in the employees' pension fund plan, there is not the freedom of the system design by an plan sponsor and the life annuity from them is same amount that will be presented from the country. A plan sponsor pays one part of the insurance premium, that we are necessary to place in the country to the employee's pension fund, because EPI is the system that presents to the change of the country. This insurance premium is called the remission insurance premium.

4 . The fluctuation factor of cash flow

There is a fluctuation factor exists in the cash flow in a pension plan. First of all, I think the fluctuation factor in the individual and next attach to the whole pension plan and try to see it. Furthermore, the premise of the system is decided by the length of service, wages in the time that the presentation sum retired, start to pay at the same time as joining a company, retires on optional time to 60 years old (retirement age is this), and the annuity is supplied 20 years from 60 years old.

… In the case that "an individual"

. Age at the time of joining a company

At the time of joining a company age has an effect on 2 factor. First of all, it decides the period from the start of the contribution to the start of the annuity. Next, it decide how long payment period. They have an effect on how long period that they can save the pension assets.

. Change of the pay level in the continued service period

The change of the pay level decides whether the original principal is going to be saved with what kind of pace by this. The period that the contribution is paid is such a period that the participant retires after join a company, exert an influence on the change of the pension assets in the case that the change of the wages differs, even if it supposes that the total amount of the wages is same.

.Retirement age (retirement time)

At the time of retirement age has an effect on 3 factor. First, the payment period becomes how long period. Next, it decides a period from the time of retirement to the beginning of annuity (from retirement age to 60 years old). Furthermore it decides how much annuity paid (how much pay level at the retirement age, how much length of service period). They decide cash flow with combination the pay level and the time of joining a company.

.Supply period of the annuity

In the case of the life annuity, the period that receives differs every an individual, if it was decided the annuity from 60 years old point. Also, it assumed to pay the present value in the case that a selection lump-sum distribution is selected while even if it is making annuity payment on the premise at the beginning.

...In the case that “whole the pension plan”

.Factor based on the fluctuation of the participants

Also, the total amount of the wages fluctuates, in order that the personnel setup of the participant of the pension plan changes, in addition to that the change of the wages fluctuates with the individual.
The retirement time receives the influence of the personnel setup for the reason that retirement age exists, in addition to that the retirement age of the individual fluctuates.

.Factor by the fluctuation of a contribution

The contribution of the pension plan is requested with the method that the prediction of the revenue of contributions balance on future benefits, on the basis of the precondition. The one that is used mainly as this precondition is a retirement rate, increase in pay rate, death rate and the discount rate. These preconditions are fixed and are not carried out the prediction for the future fluctuation. These preconditions do reconsideration every fixed period (for example, it is 5 years) and are revising the difference with the achievement. It becomes the fluctuation factor of cash flow, that the contribution is fluctuated by the action that reconsiders them. Also, the contribution burden receives the influence to the ability of the payment of the plan sponsor, for the reason that the plan sponsor of the pension plan is an enterprise.

.Fluctuation of the contribution (total amount) based on the fluctuation of the amount of the liability

Although the amount of the liability that is recognized on finance is calculated on the basis of the precondition, and it is fluctuated by reconsideration the precondition as similarly in case of contribution. Also, by the change of the accounting standard, the unfunded project benefit obligation of the pension plan has come to be appropriated to the balance sheet. The discount rate is calculated on the basis of the yield to subscribers of the long term JGB, which is used in the liability evaluation. Because of this the fluctuation of the discount rate occurs and the unfunded project benefit obligation fluctuates by this fluctuation. This unfunded project benefit obligation receives the influence from the asset management result.

5 . Risk in the pension plan

What is the risk for a defined benefit pension plan? Although that the biggest risk on a pension plan is that they can't fulfill the duty, because it has the duty that does annuity presentation and also lump-sum distribution presentation. The contribution and the returns on pension asset are capitals of the duty. There is not the necessity of the asset management, if it pays all from contributions without expecting the returns on pension asset and be good if it is holding cash. A plan sponsor does the application that used risk free assets or presses down the assets fluctuation risk to the minimum. And then it is good the plan sponsor to pay an annuity directly to participants, if he doesn't need to do the equality of cash flow furthermore.

On the occasion that a plan sponsor manages pension plan generally have the expectation to the low fluctuation of contribution level and the returns on pension asset, and furthermore he hopes to decrease such a contribution burden. So he invests to the risk assets when they apply the pension assets.

Plan sponsors must recognize what the risk is, from the contribution taxable capacity of cash flow fluctuation and changing the returns on pension asset, when they have an investment risk. I try to think about the contents that should catch as the risk on the basis of several cases, here. Furthermore, the risk means the factor what is going to manage the pension plan.

… Risk is contribution fluctuation itself

In the case that the plan is single employer plan the decision making and correspondence to the contribution fluctuation are comparatively easy. If he has sufficient remaining power to the change of the contribution burden, the fluctuation is not a big problem. On the other hand, multiemployer plan (especially the plan sponsors without capital relation) is requiring the long time to the decision making to contribution fluctuation and the correspondence is difficult, because there is a difference in contribution taxable capacity. In the case of the pension plan like latter, we need to catch that contribution fluctuation itself is a risk.

... Risk is that the correspondence to the contribution fluctuation is difficult

The single employer plan, the decision making for the contribution fluctuation is easy. However, the situation that they are equivalent to that fluctuation actuary, it depends on the contribution taxable capacity in the time. Also, there is such a fact that all of the plan sponsors do not necessarily take rational action and be not able to correspond inevitably. For example, it becomes difficult that the contribution increases when the business results are slumping, easy to bear to increase when the business results are good conversely. When the business results are slumping, become needed to cover with the returns on pension asset, if the business results are good conversely.

... Risk is that the total amount of the contribution increases

If there is abundant free cash flow and the addition burden is possible anytime, and the plan sponsor wants to minimize the total amount of the contribution finally, there is no necessary to consider regarding the fluctuation of the contribution. It only does that the return is maximized with a purpose. Yet, in this case the real returns that occur with the pension plan, need to exceed the rate of return of in the case that that made retained profit.

6 . Countermeasure to each risk

It is able to tidy it in the following manner to each case, in the case that it is good if we consider only the risk that expressed before.

… Risk is contribution fluctuation itself

The fluctuation risk of asset management needs to be reduced to control the fluctuation of the contribution. It needs to reduce the risk by to restrain the installation rate of the risk assets and diversification investment to restrain the fluctuation of asset management. On the other hand, by reducing the risk of asset management the expectation rate of return of the pension assets to become low, then becomes high the contribution.

… Risk is that the difficulty to the contribution fluctuation

It become needed to do application by using the assets that have the correlation of negative with corporate performance, to require high returns when the business results of the enterprise are not good. Yet, as for actual pension returns, it is receives a big influence to the rate of return of the whole market.

...Risk is that the total amount of the contribution increases

In this case, first of all the expectation rate of return by the pension asset and that of by retained profit are compared. Worth is born to the pension plan introduction for the plan sponsor, only in the case that the expectation rate of return from the market exceeds retained profit. Plan sponsor does the investment to the risk assets in exchange for the fluctuation of the pension assets, to increase the return from pension asset as much as possible. At this time, the return does not necessarily become biggest as the result just to invest to the risk assets only, to be necessary to minimize the loss that occurs from the fluctuation of cash flow.

7 . Examination with regard to the pension scheme

What kind of factor it should examine in an actual pension plan, although limit the risk and tried to think the correspondence to it? I try to think about the representative pension plan of Japan that I gave first.

… Tax qualified pension plan
(DB style pension scheme that does not have EPI)

It supposes that it is the retirement benefits of the enterprise the system as an annuity. As for the enterprise, they must pay whether the retirement benefits or annuity, and they do not matter to have the pension plan or not. There is only the difference that the enterprise pays directly as the retirement benefit and pays from pension assets.
Generally as for the pension plan, the contribution is decided the certain discount rate to the premise. There are many cases that the discount rate was fixed in system operation, although it is desirable that the discount rate is equal to the expectation rate of return of the pension assets. Necessity that the enterprise shares the addition contribution that was hypothesized at the beginning to the installment is

increasing, without being impossible the to give the returns over the discount rate that settled in recent low interest rate environment.

About the addition burden that occurred from the difference in this discount rate and actual returns, the enterprise must renew the thought. The returns that were anticipating first of all (the discount rate) was a proper level or not. Also, the difference in the discount rate and actual returns is applying only the difference in the prospect and reality. The plan sponsor takes the merit of asset management, in the case that the returns that occurred from the asset management in the pension fund are higher than that by the internal reserves, whether the level of excess returns are high or low, because the plan sponsor must give payment to the subscriber in any case. If it is impossible to maintain the pension plan, it means that the retirement benefit is not able to pay.

When it tidies like this the restriction condition on the asset management becomes clear. First of all, the expectation rate of return in asset management needs to do not fall below the rate of return by the internal reserves. While minimizing the risk that has fallen below it, we need to construct the portfolio that raises the expectation rate of return.

Also, at present the tax qualified pension plan has the immunity of some extent to current price fluctuation, because it is not reflecting current price evaluation on the balance sheet.

… The employees' pension fund plan (DB style pension scheme that has EPI)

The existence of EPI has a big meaning in the case of this system. Because this EPI is equal presentation to the social security, that the cost does not exceed the remission insurance premium is a big point. There is not the worth that holds EPI if the contribution over the remission insurance premium is necessary, and be good the plan sponsor making the pension scheme of only original presentation. In this case, there are needs to minimize the risk the cost over the remission insurance premium.

There is no problem the plan is managed with the remission insurance premium and it is desirable that excess returns occur, when take out only EPI and think about this. Because EPI is the supply of a simple life annuity and there is not survivor annuity, the change of death rate exerts a big influence on the fluctuation of the liability/contribution. After the fluctuation factor of this liability is considered we need to manage the pension plan.

Although it is similar as tax qualified pension plan about the addition part that EPI and addition part exist in the employees' pension fund plan in all of both is a big point.

For instance, the correspondence for the risk assumed that it is possible, if construct optimal portfolio with each part and do discretion control. However, considering about this as a whole the plan it must not make the optimal portfolio. It assumed to guide the action of the profit contradiction, if independent action is taken, although it should be sufficient to do not do it anything as a whole, when it needs to take the action that contradicts with each part.

The thought will change about whether to make the loss with regard to the part of EPI to the minimum or it requests the efficiency of a whole plan. Also, there is the inspection called the minimum standard in the employees' pension fund plan. This inspection requires the current price assets balance over the regular level of the liability assessed amount by a certain standard. If it does not cause to fills this standard, the plan sponsor must pay such the addition burden over a regular level the product stand 7 years later.

The grasp of the fluctuation risk of the current price assets to restrain contribution fluctuation from this standard, and the minimization the addition burden to the remission insurance premium from that there is EPI are becoming big points.

8 . Considerable point in asset management

We have observed it about the risk factor that the liability of the pension plan has heretofore. I try to think about the point that should examine it to do asset management, after these risk factors are considered.

… The biggest risk in the pension plan is defined clearly

What is the biggest risk in the pension plan, needs to be defined clearly. It makes clear the problem what must avoid and must do.

...Defining asset management policy that avoids the risk

For example, such a fact that does the investment to the assets that has the negative correlation of the returns of the internal reserves. Also, as the risk of the down side, to do the comparison with the internal reserves and the comparison the burden comparison with the remission insurance premium is necessary.

...The application to ALM analysis

The liability evaluation of the pension plan is calculated on the basis of the premise of a certain calculation as it expressed before. Especially the discount rate is constant although the occurrence time of the cash flow differs. Because of this there is the risk that the duration of the assets differ

largely from that of the liability, even if it causes to agree the expectation rate of return and the discount rate. It is a general case to decide assets allocation by ALM analysis to prevent such a mismatch and also, to do efficient asset management. It needs to anticipate the fluctuation factor of the cash flow in simulation style ALM analysis that depends on the method that the fluctuation of the future of liability and assets are estimated and expressed. Many analysis are applying the expected value about cash flow, so there is necessity to consider the assumptions. That even, the various fluctuation factor of the cash flow is not that it breaks out completely by chance.
For example, the level of interest rate in the time naturally will exert the influence about the incidence of the selection lump-sum distribution. (There is a profit to receive with annuity when the interest rate is low.) The change of employment environment exerts the influence about the occurrence time of the retirement.
As for the change of the pay level, the level of interest rate/price level etc. in the time will exert the influence. There is the possibility that is able to construct the model that predicts those fluctuation by the application with Monte Carlo simulation methods, with the interest rate model, if it is able to express as the model the level of interest rate is the 1st parameter. Yet, about this method there is many numbers of a parameter, as the same as many period optimization etc. and parameter estimation be difficult expected be.

9 . Conclusion

The present condition of pension asset management as, the return in each year attention is gathered to high or such a low point. Also, the evaluation of the pension liability is carried out by using flat yield and is recognizing excess and deficiency by the contrast of the pension liability and assets. Because of this, it is not considered that there is the possibility that the loss becomes big that by means to do the rebalance and to cash the investment assets for the cash flow that occurs from pension benefits, even if it is bringing forth a high return now. Although the simulation style ALM analysis proposes the assets allocation that minimize the loss like that, the optimal value in the long time that even the future included needs to recognize that there is the possibility that makes the present return the sacrifice sufficiently. Furthermore, the same definitions as all the plan sponsors are not applicable, although the definition called the risk permission degree is used well in pension asset management.
For each plan sponsor, the risk is defined clearly and must do asset management on the basis of the risk permission degree.
Also, the change is necessary regarding the approach from the liability side. Even that we will consider the term structure of pension liability. Also, even that adopts such an index that grasps the interest rate sensitivity factor of liability may be necessary. It is an inevitable case even for the plan

sponsor now to have the instrument to catch the impact/effect from various fluctuations.