

The revision of Medium-term Plan

Abstract

- In October 2012, Board of Audit of Japan expressed its opinion that “GPIF should consider reviewing whether their tentative policy asset mix ensures safe, efficient and reliable investment on a regular basis during the Medium-term plan”.
In response to this opinion, Ministry of HLW requested that GPIF should review the policy asset mix on a regular basis, and if necessary, should change it.
- Based on the discussions by the Investment Committee members consisting of experts on economics, finance and/or other relevant fields appointed by the Minister of HLW, GPIF reached a conclusion that we need to change the tentative policy asset mix.

《Before》

	Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
Policy Asset Mix	67%	11%	8%	9%	5%
Permissible range of deviation	±8%	±6%	±5%	±5%	—



《After》

	Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
Policy Asset Mix	<u>60%</u>	<u>12%</u>	<u>11%</u>	<u>12%</u>	5%
Permissible range of deviation	±8%	±6%	±5%	±5%	—

Establishment of the previous policy asset mix

○The previous policy asset mix is as below.

Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
67%	11%	8%	9%	5%

○Having verified the policy asset mix determined in the 1st Medium-term Plan, we decided to maintain the policy asset mix for the 2nd Medium-term Plan.

○The followings are defined in the Mid-term plan as investment objectives;

- 1) To consider that the investment objectives are tentative due to the ongoing review of the entire pension system
- 2) To establish a policy asset mix to the effect that it ensures safe, efficient and reliable investment, and conduct investment management based on the policy asset mix
- 3) To avoid significant impact on the markets

○It is stipulated in the Medium-term objectives that GPIF must consider revision of the policy asset mix as necessary even in the middle of Medium-term plan in the event of sizable changes in market conditions.

○In October 2012, Board of Audit of Japan expressed its opinion that “GPIF should consider reviewing whether their tentative policy asset mix ensures safe, efficient and reliable investment on a regular basis during the Medium-term plan”.

In response to this opinion, Ministry of HLW requested that GPIF should review the policy asset mix on a regular basis, and if necessary, should change it.

In light of these comments, GPIF started to review the policy asset mix this time.

Policy Asset Mix Review

(1) Review of expected return, risk and correlation

- We maintain the expected returns of asset classes upon verifying them with data updated from the previous medium-term plan.
- But we change the risks of asset classes and the correlation between them as we observed a moderate reduction of overall risks using updated data.

(2) Evaluation of previous policy asset mix

- Estimating the efficient frontier with the new figures of risk and correlation coefficient, we identified more efficient portfolios, which have higher expected return with the same risk level as domestic bonds.
- Based on the simulation results of the loss forecast in the next 25 years of the existing policy asset mix as well as candidates of the new policy asset mix, we have reached a conclusion that we need to change the policy asset mix as follows;

Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
60%	12%	11%	12%	5%

- The new policy asset mix ended up being similar to the actual allocation as of the end of December 2012 (approximately 60% domestic bonds, 13% domestic stocks, 10% international bonds, 13% international stocks and 5% short-term assets).

Review of expected return

<Components of Expected return>

<Methodologies>

<Results>

① Domestic bonds(3.0%)
Expected return
= Long-term interest rate
(3.0%)



• Compute forward long-term interest rates implied on the term structure



• The expected return of 3.0% is appropriate with forward long-term interest rates estimated between 2.5% and 3.0% over the long run

② Short-term assets(1.9%)
Expected return
= Long-term interest(3.0%)
– Term spread(1.1%)



• Compute average historical term spreads over various periods



• The expected term premium of 1.1% is appropriate with the historical average of it computed between 0.8% and 1.2%

③ Domestic stocks(4.8%)
Expected return
= Long-term interest rate
(3.0%)
+ Risk premium(1.8%)



• Compute mean, median and variance from the distribution of risk premium (i.e. the excess return against long-term interest rate)



• Although the risk premium fluctuates between 1% and 4%, the expected risk premium of 1.8% is appropriate as it lies in the aforementioned range

④ International bonds(3.2%)
Expected return
= Short-term interest
rate(1.9%)
+ Risk premium(1.3%)



• Compute the risk premium (i.e. term spreads in local currencies) from historical data



• The risk premium of 1.3%, assumed in the previous policy asset mix, is still valid as it has been between 1.2% and 1.6% over the past 20 years

⑤ International stocks(5.0%)
Expected return
= Short-term interest rate
(1.9%)
+ Risk premium(3.1%)



• Compute the risk premium from historical data (i.e. excess returns against short-term interest rates in local currencies) and adjust them owing to the PER change



• The risk premium of 3.1%, assumed in the previous policy asset mix, is still valid as it has been between 1.5% and 4.6% with the 30-year moving average of 2.8%-5.9% subtracted by 1.3% due to the PER change

Estimation of risk and correlation

< Case in FY2009 >

▪ Data from 1973 to 2008 are used

Risk

Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
6.0※	23.27	13.03	22.84	3.59

Correlation coefficient

	Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
Domestic bonds	1.000				
Domestic stocks	0.205	1.000			
International bonds	-0.033	-0.102	1.000		
International stocks	0.026	0.480	0.571	1.000	
Short-term assets	0.466	0.098	-0.005	0.007	1.000

(※) ▪ Although the risk of domestic bonds is computed at 5.09% from historical data, the risk of domestic bonds is set at 6.0% considering the lengthened NOMURA-BPI's duration (6.32 years)

Risk of BPI

$$\approx \sqrt{\text{Variance of income return} + \text{Variance of capital return}}$$

$$\approx \sqrt{\text{Variance of income return} + \text{Duration}^2 \times \text{Variance of yeild change}}$$

$$= 6.0\%$$

< Case in FY2013 >

▪ Data from 1973 to 2012 are used

Risk

Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
6.5※	22.48	12.90	22.48	3.59

Correlation coefficient

	Domestic bonds	Domestic stocks	International bonds	International stocks	Short-term assets
Domestic bonds	1.000				
Domestic stocks	0.199	1.000			
International bonds	-0.025	-0.063	1.000		
International stocks	0.001	0.494	0.577	1.000	
Short-term assets	0.504	0.096	0.009	-0.022	1.000

(※) ▪ The risk of domestic bonds is computed, assuming the duration of NOMURA-BPI is increasing over time to 7.9 years

Risk of BPI

$$\approx \sqrt{\text{Variance of income return} + \text{Variance of capital return}}$$

$$\approx \sqrt{\text{Variance of income return} + \text{Duration}^2 \times \text{Variance of yeild change}}$$

$$= 6.5\%$$

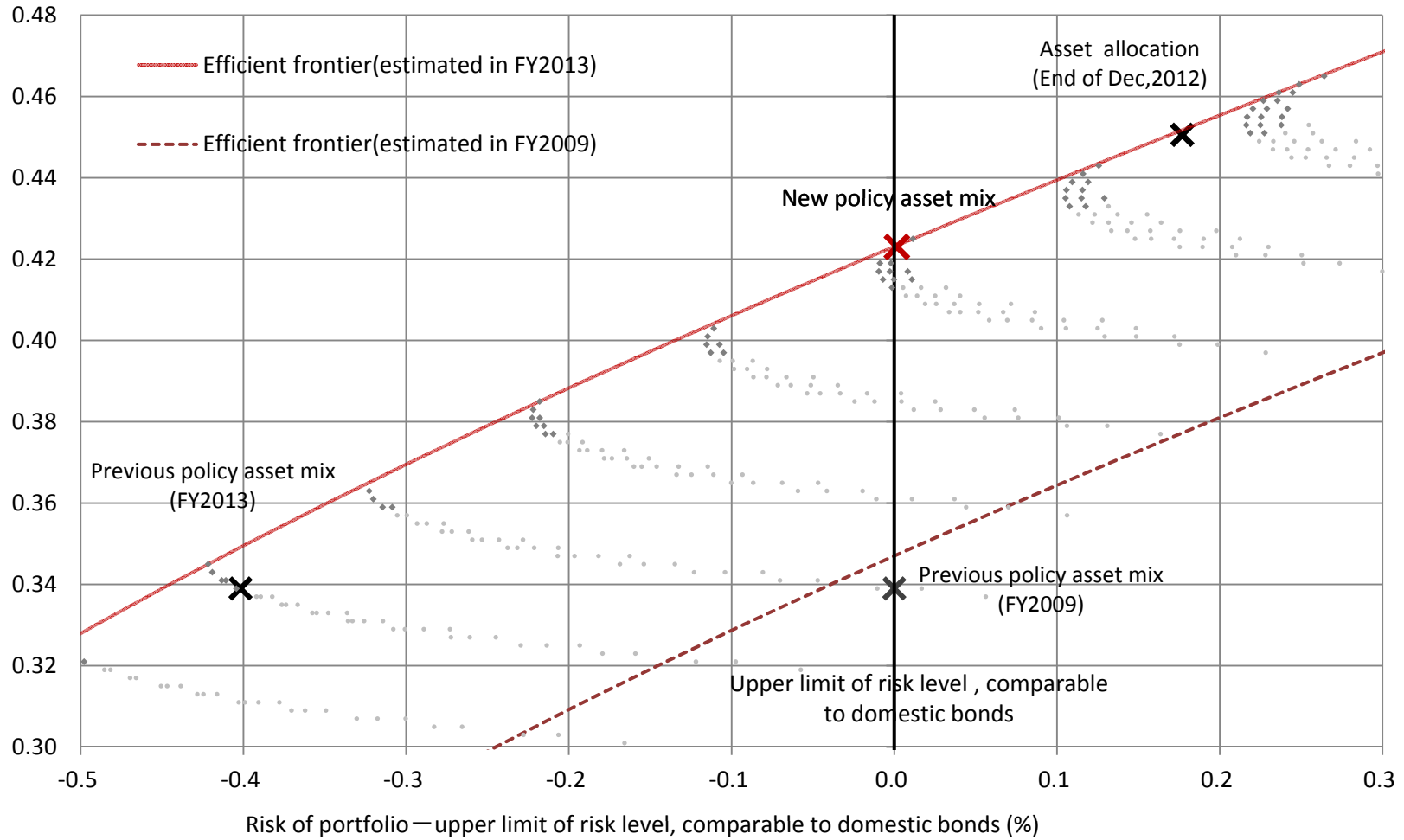
< Results >

▪ The risks of domestic stocks, international bonds and international stocks decrease modestly by adding data for 4 years after the GFC

▪ Risk of domestic bonds increase because of duration lengthening

Efficient frontier

Diversification effect(%)



Estimation of impact on pension finance

▪ Results of simulation (10,000 Trials)

【Employees' Pension Insurance : Policy asset mix and Projected reserve】

		New policy asset mix	Previous policy asset mix
Policy asset mix(%)	Short-term assets	5	5
	Domestic bonds	60	67
	Domestic stocks	12	11
	International bonds	11	8
	International stocks	12	9
Projected reserve of the 2009 Actuarial Valuation (as of FY2038(¥trillion), in FY2009 prices)		205.9	205.9

		New policy asset mix	Previous policy asset mix	
① Long-term interest rate : Remain at 3% (Baseline scenario)	Quartile values of simulation at the end of FY2038	25%tile	201.1	194.3
		50%tile	276.4	261.0
		75%tile	388.5	352.3
	Difference between expected reserve and projected reserve in the 2009 Actuarial Valuation when the former falls below the latter (CVaR)		12.3	13.4
② Long-term interest rate : Rise toward 3% in 10 years	Quartile values of simulation at the end of FY2038	25%tile	174.8	167.5
		50%tile	239.8	224.5
		75%tile	335.7	302.0
	Difference between expected reserve and projected reserve in the 2009 Actuarial Valuation when the former falls below the latter (CVaR)		19.2	21.6
③ Long-term interest rate : Rise toward 3% in 5 years	Quartile values of simulation at the end of FY2038	25%tile	180.9	174.3
		50%tile	248.3	236.3
		75%tile	347.8	320.0
	Difference between expected reserve and projected reserve in the 2009 Actuarial Valuation when the former falls below the latter (CVaR)		17.3	19.5

○ Each quartile values of the expected reserve of FY2038, estimated with the new policy asset mix, is larger than the previous policy asset mix

○ CVaR estimated with the new policy asset mix is smaller than the previous policy asset mix