

The Actuarial Profession
making financial sense of the future

Pensions, benefits and social security colloquium 2011
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The role of actuaries in defined contribution

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Table of contents

Contents	
1	Introduction
2	DC plans in Japan
3	The role of actuaries in DB plans in Japan
4	The estimation of DC plan's future provision
5	Conclusion

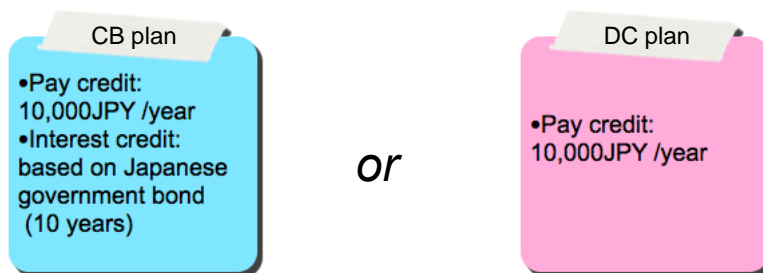
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2

1-1. Introduction

~The session's question (1)~

If you can choose DB plan or DC plan for your retirement benefit, which plan do you choose?



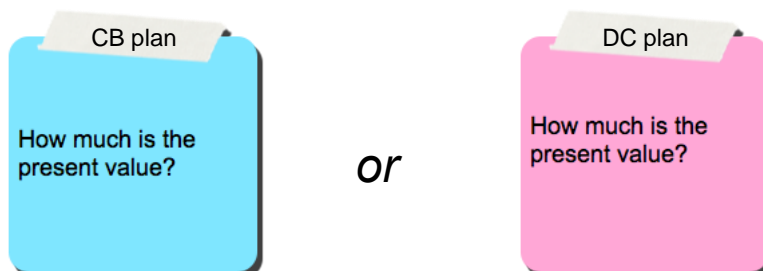
Which plan is better for you?

3

1-2. Introduction

~The session's question (2)~

In order to compare two plans,
Actuaries may calculate the present value of these plans.
How do I calculate the present value?



Which plan's present value is higher?

4

2-1. DC plans in Japan

~How were DC plans introduced in Japan?~

- Many Japanese company's retirement benefit plans consist of some plans combination.
 - DB plan (including CB plan)
 - DC plan
 - Lump sum
- Some DC plans are originally from DB or Lump sum.

Example

Before DC

Retirement benefit (100%)	
DB plan (50%)	Lump sum (50%)



After DC

Retirement benefit (100%)		
DB plan (40%)	DC plan (40%)	Lump sum (30%)

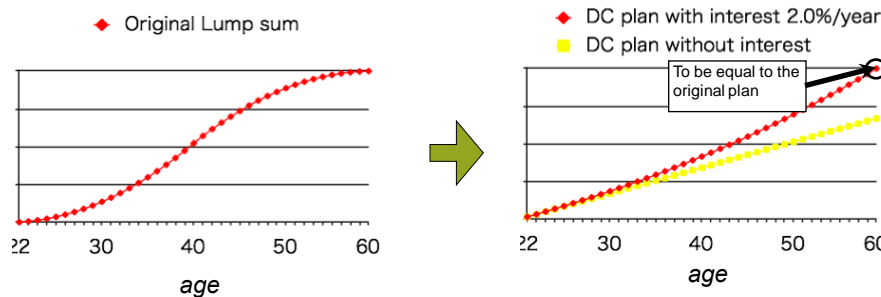
5

2-2. DC plans in Japan

~A example of introducing DC plan~

For example, a DC plan in Japan is designed as below.

- The estimated provision at retirement age 60 will be equal to the original lump-sum under assumed interest rate.
- The assumed interest rate is 2.0%/year



6

2-3. DC plans in Japan.

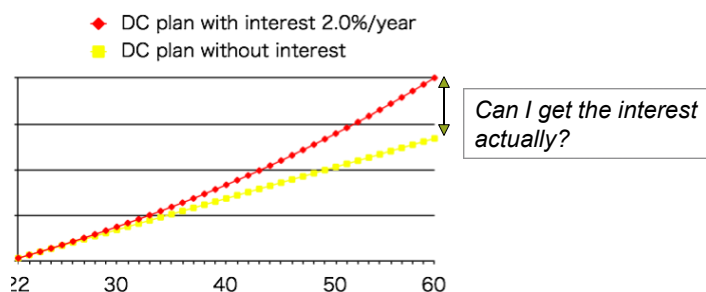
~The issue of introducing DC plan~

The method of the example has an issue.

The assumed interest rate is not objective.



The objective interest rate is necessary.

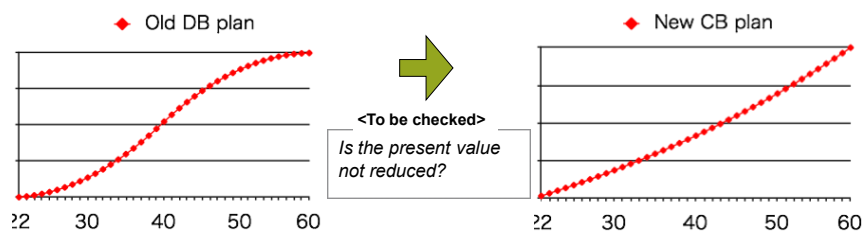


7

3-1. The role of actuaries in DB plans in Japan(1)

If a DB plan is amended to new plan, Japanese law requires it to be checked by certified pension actuaries that ...

1. The design of the new plan is at law.
2. The new plan's present value of provision is not reduced from the former plan's provision. (If reduced, the plan sponsor must get agreement of participants.)

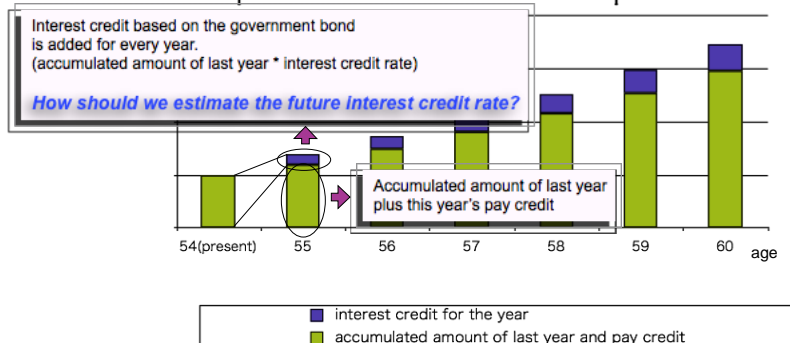


8

3-2. The role of actuaries in DB plans in Japan(2)

For estimating CB plan's future provision, we have to estimate the future interest credit rate.

CB plan's estimated future provision.



9

3-3. The role of actuaries in DB plans in Japan(3)

How should we estimate the future interest credit rate?

- At the request of the Japanese law, we have to use the average rate of past 5 years interest rate.

Example

Cash balance interest rate =
the Japanese government
bond's yield of 10 years

2006	1.4%
2007	1.5%
2008	1.6%
2009	1.5%
2010	1.5%

The average of
past 5 years



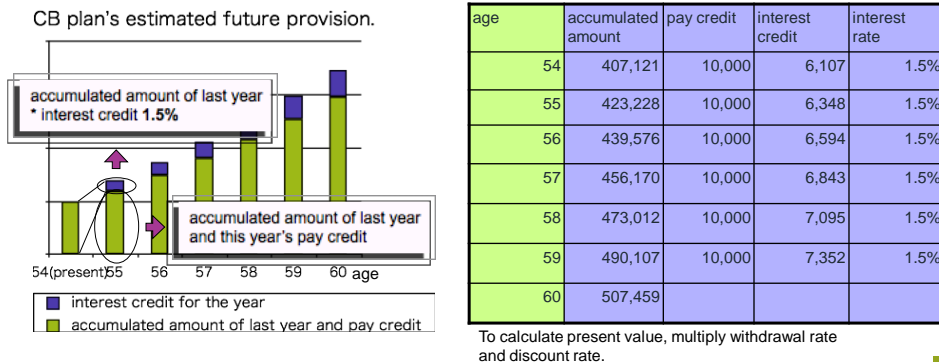
average	1.5%
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*We have to use 1.5% for future
estimated interest credit rate.*

10

3-4. The role of actuaries in DB plans in Japan(4)

A example of CB plan's future provision estimation.

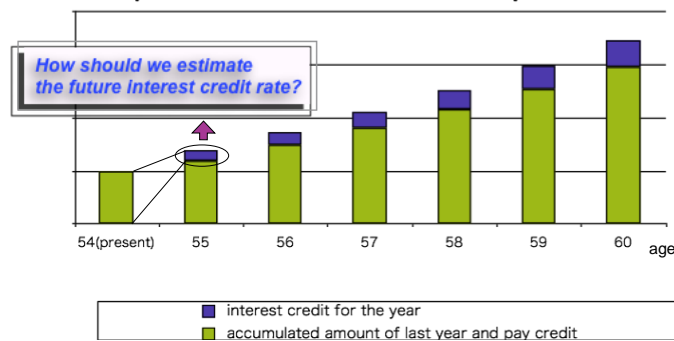


11

4-1. Estimation of DC plan's future provision (1)

For estimating DC plan's future provision, there is a similar issue to CB plan.

DC plan's estimated future provision.



12

4-2. Estimation of DC plan's future provision (2)

- Like a CB plan, using past 5 years average rate is reasonable for estimating future interest rate.
- But in DC plan, participants can choose several investment fund. Which one should we choose?

Example of investment fund

The Japanese government bond.
High quality corporate bonds in Japan.
Japanese stocks related fund.
Foreign bond related fund.
Foreign stocks related fund.
etc...

[The issue]

Which one is good for estimating future interest credit rate?

In this paper, I choose the Japanese government bond. (It may be regarded as risk free rate...)

13

4-3. Estimation of DC plan's future provision (3)

- In DC plan, each participants invest to the funds until retirement.
 - They can invest to the government bond corresponding to their remaining year until provision.
 - Therefore, the interest rate corresponds to their remaining year.
- (Mitsubishi UFJ pension report, July 2011)*

Example

age	Remaining years until provision	Interest rate (forward rate)
54	6	0.86%
55	5	0.68%
56	4	0.52%
57	3	0.41%
58	2	0.20%
59	1	0.16%

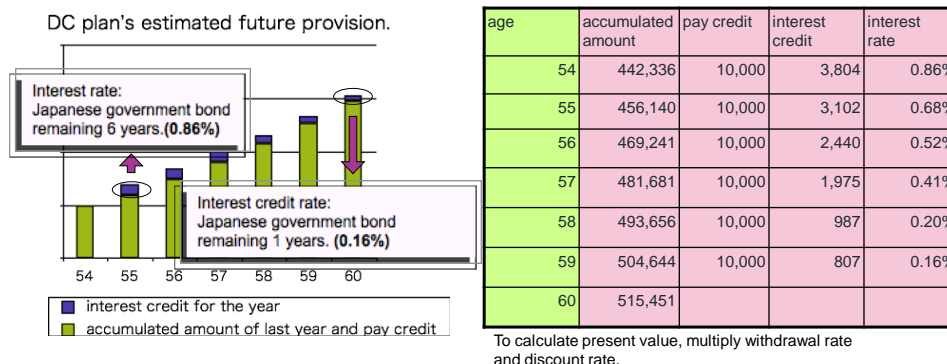
At age 54, they can invest to the government bond remaining 6 years.

*The interest rate must be the average of past 5 years.
(The example rate is not actual rate.)*

14

4-4. Estimation of DC plan's future provision (4)

A example of DC plan's future provision estimation.



15

4-5. Estimation of DC plan's future provision (5)

Simulation of future provision ~comparison of DC plan and CB plan~

age	remaining year	DC plan				DB plan			
		interest rate	accumulated amount	pay credit	interest credit	interest rate	accumulated amount	pay credit	interest credit
22	38	2.83%	0	10,000	283	1.5%	0	10,000	150
23	37	2.80%	10,283	10,000	288	1.5%	10,150	10,000	152
24	36	2.77%	20,571	10,000	570	1.5%	20,302	10,000	305
25	35	2.74%	31,141	10,000	853	1.5%	30,607	10,000	459
26	34	2.71%	41,994	10,000	1,138	1.5%	41,066	10,000	616
27	33	2.68%	53,132	10,000	1,424	1.5%	51,682	10,000	775
28	32	2.65%	64,556	10,000	1,711	1.5%	62,457	10,000	937
~	~	~	~	~	~	~	~	~	~
55	5	0.68%	456,140	10,000	3,102	1.5%	423,228	10,000	6,348
56	4	0.52%	469,241	10,000	2,440	1.5%	439,576	10,000	6,594
57	3	0.41%	481,681	10,000	1,975	1.5%	456,170	10,000	6,843
58	2	0.20%	493,656	10,000	987	1.5%	473,012	10,000	7,095
59	1	0.16%	504,644	10,000	807	1.5%	490,107	10,000	7,352

Under this assumption, at age 60, the DC plan's estimated provision is higher than DB plan's.

16

5. Conclusion

The new role of actuaries.

When a DB plan is amended to a DC plan, the actuaries...

- 1. Estimate the new DC plan's future provision.*
- 2. Calculate both of the DC plan's present value and former plan's.*
- 3. Let the participants know the two plan's present value.*



** The participants can judge which one is better.*

17

Questions or comments?

Any Question?

~contact detail~

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18