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IFRS Convergence in Japan:

**The Past and Present Impact for
Values in the Stock Market and
Forward Looking Thoughts**

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1. Research Motivation

■ The US experience

- High level disclosure of Retirement Benefit Obligation (RBO) Information and Pension plan/asset details. Participants in the Stock Market care about those information. (Bulow et al. 1987, Coronado and Sharpe 2003 and others)



- Retirement Benefit Obligation Information Matters in terms of company Market Value.
- Announcement of changing a Defined Benefit pension plan (DB) to a Defined Contribution pension plan (DC) had impact for company Stock Price. (Milevsky et al 2008)

■ Japan ?

- Accounting Big Bang in 2000 made some impact in the Stock Market. (Nakajima and Sasaki, 2010; Hoshino and Hayashi, 2002)

IFRS Convergence is 2 steps in Japan. Those accounting rule change is Significant and coming soon.

What is happening and what will happen by those?

- Changes of DB to DC is in a slow pace in Japan

How much market impact by the announcement?

2. Accounting Rules for Retirement Benefit Obligations in Japan

<Current (Accounting Big Bang) to Future (ASBJ rules, IFRS convergence)>

	Financial Statements	Expected effects for the stock market
Current rules in Japan	<ul style="list-style-type: none"> Only consolidated financial statements show RBO information. Some items are still off-balanced. Mainly RBO information is in end notes. 	<ul style="list-style-type: none"> Limited RBO information. Those could be lower profile information for stock market participants.
ASBJ new rules	<ul style="list-style-type: none"> Also apply to non-consolidated financial statements. Off-balanced items so far, become shown in Other Comprehensive Income and this leads to decrease of the current shareholder capital Still allow smoothing of cost of unrecognized items for the profit/loss statement. 	<ul style="list-style-type: none"> RBO information like unrecognized items could become higher profile information.
IFRS rules	<ul style="list-style-type: none"> Planning to stop smoothing of some of unrecognized items and could be shown on a balance sheet and profit/loss statement immediately. 	<ul style="list-style-type: none"> RBO information, especially deficit, causes effects for the profit/loss statement more directly and more significantly. The stock market participants become to see those as higher profile.

* Some US listed companies are currently disclosing more than above based on US GAAP.

3. Research Design

(1) Hypnosis

<Analysis A>

- (A-1) : Unfunded RBO is the most important information for the Stock Market.
- (A-2) : RBO information is public in June and company Market Value incorporate the information at most in June.
- (A-3) : Company Size Effect
- (A-4) : Recent Stock Market reaction for RBO is the most.
(After Accounting Big Bang in 2000, gradually Stock Market reacted.
Recent IFRS convergence plan made the Stock Market more sensitive.)

<Analysis B>

- (B) : There is an Impact in the Market Price by the announcement of changing DB to DC.

3. Research Design

(2) Data 1

<Data for Analysis A >

Raw Data	cf. Floating base MV														%	cf. Valuation Interest Rate	
	Foat MV	MV	Net	U-RBO	Adj U-RBO	Reserve	Unrecognized	RBO	RB Cost	Benefit	Liability	Book	Earnings	Growth		Beta	Discount Rate
Average	103,718	174,908	9,358	17,880	90,094	16,180	8,523	53,022	4,872	4,119	887,197	197,568	13,215	0.39	1.00	2.03	
Standard Deviation	10,034	16,385	1,722	2,494	52,240	2,465	1,261	7,232	528	421	197,365	20,866	1,493	0.05	0.01	0.01	
Skewness	9.90	10.63	10.07	11.34	30.64	11.79	10.74	13.50	9.28	8.33	19.32	10.42	9.63	16.83	0.15	3.26	
Kurtosis	152.94	170.85	173.91	157.85	965.59	165.89	136.30	230.66	106.42	82.65	415.53	134.17	114.86	363.73	-0.18	49.66	
Max	6,371,899	10,619,832	1,086,268	1,447,747	53,060,429	1,447,781	671,651	4,818,810	266,222	173,110	150,416,512	10,930,443	715,939	39.00	2.22	7.20	
Min	923	2,360	-450,895	-135,902	-366,373	-66	-18,555	39	-4,650	-6,434	573	-4,740	-9,698	-0.70	0.19	0.49	
Sample Number	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	

Correlation	Foat MV	MV	Net	U-RBO	Adj U-RBO	Reserve	Unrecognized	RBO	RB Cost	Benefit	Liability	Book	Earnings	Growth	Beta	Discount Rate
Foat MV	1.00	0.97	0.41	0.58	0.24	0.63	0.60	0.64	0.72	0.72	0.46	0.90	0.88	-0.01	-0.01	0.19
MV	0.97	1.00	0.42	0.57	0.24	0.61	0.55	0.61	0.67	0.67	0.38	0.89	0.91	-0.01	-0.02	0.19
Net	0.41	0.42	1.00	0.88	0.26	0.86	0.38	0.64	0.59	0.59	-0.17	0.46	0.42	0.00	-0.07	0.15
U-RBO	0.58	0.57	0.88	1.00	0.50	0.99	0.77	0.89	0.86	0.85	0.09	0.67	0.57	0.00	0.01	0.29
Adj U-RBO	0.24	0.24	0.26	0.50	1.00	0.51	0.64	0.72	0.59	0.50	0.11	0.42	0.16	0.00	0.04	0.50
Reserve	0.63	0.61	0.86	0.99	0.51	1.00	0.78	0.91	0.88	0.86	0.14	0.71	0.61	0.00	-0.00	0.29
Unrecognized	0.60	0.55	0.38	0.77	0.64	0.78	1.00	0.89	0.90	0.87	0.42	0.69	0.55	-0.00	0.11	0.37
RBO	0.64	0.61	0.64	0.89	0.72	0.91	0.89	1.00	0.95	0.91	0.32	0.80	0.61	-0.00	0.04	0.41
RB Cost	0.72	0.67	0.59	0.86	0.59	0.88	0.90	0.95	1.00	0.99	0.46	0.81	0.65	-0.00	0.06	0.36
Benefit	0.72	0.67	0.59	0.85	0.50	0.86	0.87	0.91	0.99	1.00	0.48	0.79	0.65	-0.00	0.06	0.32
Liability	0.46	0.38	-0.17	0.09	0.11	0.14	0.42	0.32	0.46	0.48	1.00	0.56	0.42	-0.01	0.05	0.07
Book	0.90	0.89	0.46	0.67	0.42	0.71	0.69	0.80	0.67	0.79	0.56	1.00	0.90	-0.01	0.01	0.27
Earnings	0.88	0.91	0.42	0.57	0.16	0.61	0.55	0.61	0.65	0.65	0.42	0.90	1.00	-0.03	0.01	0.14
Growth	-0.01	-0.01	0.00	0.00	0.00	0.00	-0.00	-0.00	-0.00	-0.00	-0.01	-0.01	-0.03	1.00	0.11	0.01
Beta	-0.01	-0.02	-0.07	0.01	0.04	-0.00	0.11	0.04	0.06	0.06	0.05	0.01	0.01	0.11	1.00	0.09
Discount Rate	0.19	0.19	0.15	0.29	0.50	0.29	0.37	0.41	0.36	0.32	0.07	0.27	0.14	0.01	0.09	1.00

Divided by Total Asset ← Ergodic Stationary, To exclude Co-integration, use these.

Raw Data	cf. Floating base MV														%	cf. Valuation Interest Rate	
	Foat MV	MV	Net	U-RBO	Adj U-RBO	Reserve	Unrecognized	RBO	RB Cost	Benefit	Liability	Book	Earnings	Growth		Beta	Discount Rate
Average	0.21	0.41	0.03	0.04	0.09	0.03	0.02	0.10	0.01	-0.01	0.54	0.46	0.06	0.03	0.39	2.03	
Standard Deviation	0.01	0.01	0.00	0.00	0.01	0.00	0.00	0.00	0.00	0.00	0.01	0.01	0.00	0.00	0.05	0.01	
Skewness	2.15	1.78	2.33	2.62	3.86	2.77	2.17	2.23	1.91	-1.87	0.06	-0.06	0.96	1.42	16.83	3.26	
Kurtosis	6.77	4.77	13.43	15.54	55.09	15.25	7.02	11.91	8.04	7.74	-0.77	-0.77	2.13	3.07	363.73	49.66	
Max	1.39	2.25	-0.13	-0.11	-2.55	-0.00	-0.06	0.00	-0.02	-0.08	0.03	0.97	0.26	0.17	39.00	7.20	
Min	0.01	0.01	0.43	0.56	4.74	0.43	0.16	0.95	0.08	0.02	1.23	-0.23	-0.11	-0.04	-0.70	0.49	
Sample Number	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	1,032	

Correlation	Foat MV	MV	Net	U-RBO	Adj U-RBO	Reserve	Unrecognized	RBO	RB Cost	Benefit	Liability	Book	Earnings	Growth	Beta	Discount Rate
Foat MV	1.00	0.92	-0.02	-0.01	-0.03	-0.00	0.02	0.10	0.10	0.09	-0.56	0.56	0.36	0.68	-0.02	-0.05
MV	0.92	1.00	-0.02	-0.02	-0.02	-0.00	0.00	0.09	0.09	0.08	-0.64	0.64	0.38	0.75	-0.03	-0.05
Net	-0.02	-0.02	1.00	0.91	0.23	0.94	0.20	0.58	0.47	0.51	0.01	-0.01	-0.01	-0.04	0.03	0.02
U-RBO	-0.01	-0.02	0.91	1.00	0.31	0.93	0.59	0.79	0.70	0.71	0.02	-0.02	-0.00	-0.05	0.04	0.08
Adj U-RBO	-0.03	-0.02	0.23	0.31	1.00	0.28	0.27	0.37	0.29	0.27	0.04	-0.04	-0.07	-0.06	0.04	0.72
Reserve	-0.00	-0.00	0.94	0.93	0.28	1.00	0.36	0.71	0.58	0.59	-0.00	0.58	0.00	-0.03	0.03	0.08
Unrecognized	0.02	0.00	0.20	0.59	0.27	0.36	1.00	0.74	0.71	0.68	0.02	-0.02	0.01	-0.04	0.03	0.15
RBO	0.10	0.09	0.58	0.79	0.37	0.71	0.74	1.00	0.84	0.80	-0.11	0.11	-0.01	0.02	0.03	0.20
RB Cost	0.10	0.09	0.47	0.70	0.29	0.58	0.71	0.84	1.00	0.99	-0.10	0.10	-0.00	0.03	0.03	0.15
Benefit	0.09	0.08	0.51	0.71	0.27	0.59	0.68	0.80	0.99	1.00	-0.08	0.08	0.00	0.02	0.02	0.12
Liability	-0.56	-0.64	0.01	0.02	0.04	-0.00	0.02	-0.11	-0.10	-0.08	1.00	-1.00	0.02	-0.50	0.02	0.06
Book	0.56	0.64	-0.01	-0.02	-0.04	-0.00	-0.02	0.11	0.10	0.08	-1.00	1.00	-0.02	0.50	-0.02	-0.06
Earnings	0.36	0.38	-0.01	-0.00	-0.07	0.00	0.01	-0.01	-0.00	0.00	0.02	-0.02	1.00	0.76	-0.14	-0.07
Growth	0.68	0.75	-0.04	-0.05	-0.06	-0.03	-0.04	0.02	0.03	0.02	-0.50	0.50	0.76	1.00	-0.12	-0.10
Beta	-0.02	-0.03	0.03	0.04	0.04	0.03	0.03	0.03	0.03	0.02	0.02	-0.02	-0.14	-0.12	1.00	0.01
Discount Rate	-0.05	-0.05	0.02	0.08	0.72	0.08	0.15	0.20	0.15	0.12	0.06	-0.06	-0.07	-0.10	0.01	1.00

3. Research Design

(2) Data 2

<Data for Analysis B >

Code	Company name	Announcement date
5101	Yokohama Rubber	24 Jan, 2006
6371	Tsubakimoto Chain	24 Mar, 2004
7984	Kokuyo	23 Mar, 2004
8005	Muto	30 Jan, 2009
8179	Royal	5 Jan, 2005
9005	Tokyu Railway	27 Sep, 2004

3. Research Design

(3) Cross-Sectional Regression Analysis

<Model for Analysis A >

$$MV_{time}(i) / Asset_{time}(i) = Intercept_{time}^{BS} + \sum_j Coeff.Item(j)_{time}^{BS} \times Item(j)^{BS}(i)$$

Item(j): See below. All are divided by Total Asset (Asset(i)).

1: Unfunded Retirement Benefit Obligations or others (See the result pages.)

2: Total Liability (Liability)

3: CAPM beta (Beta)

3. Research Design

(4) Market Impact Analysis

<Model for Analysis B >

$$TE_t(k) = \frac{PE_t(k)}{e(k)} \quad (\text{Can be measured by the prediction errors in a period following the announcement. T-test for significance.})$$

$$PE_t(k) = \text{Ret}_t(k) - NR_t(k) \quad NR_t(k) = \alpha(k) + \beta(k) \times \text{Ret}_t(BM_k)$$

(*) Calculated by the author Source : Bloomberg, DataStream

Japanese interest rate is very low (almost zero) for ten years and here daily returns for 49 days are used.
So total returns are treated as risk premium.

4. Results <Analysis A>

(1) Cross-Sectional Regression Analysis 1

RBO information impact on the market value

Which Figure affects the most? (Case of All names)									
	<i>Item -1</i>	<i>Net</i>	<i>U-RBO</i>	<i>Adj U-RBO</i>	<i>Reserve</i>	<i>Unrecognized</i>	<i>RBO</i>	<i>RB Cost</i>	<i>Benefit</i>
<u>Coeff.</u>									
Intercept		0.95	0.95	0.95	0.95	0.95	0.94	0.94	0.94
Item -1 (<i>column top above</i>)		-0.07	0.05	0.01	0.04	0.55	0.12	1.62	1.64
Item -2 Liability		-0.88	-0.88	-0.88	-0.88	-0.88	-0.87	-0.87	-0.87
Item -3 Beta		-0.06	-0.07	-0.07	-0.06	-0.07	-0.07	-0.08	-0.07
<u>t-value</u>									
Intercept		32.61	32.58	32.69	32.45	32.72	31.53	31.63	31.78
Item -1 (<i>column top above</i>)		-0.37	0.31	0.35	0.21	1.46	1.26	1.88	1.73
Item -2 Liability		-26.04	-26.03	-26.04	-26.03	-26.05	-25.66	-25.61	-25.68
Item -3 Beta		-2.64	-2.71	-2.73	-2.70	-2.97	-2.90	-3.08	-3.05
Sample		100	100	100	100	100	100	100	100
Adj R2		0.41	0.41	0.41	0.41	0.41	0.41	0.41	0.41
Which Figure affects the most? (Case of Top 100 market value names)									
	<i>Item -1</i>	<i>Net</i>	<i>U-RBO</i>	<i>Adj U-RBO</i>	<i>Reserve</i>	<i>Unrecognized</i>	<i>RBO</i>	<i>RB Cost</i>	<i>Benefit</i>
<u>Coeff.</u>									
Intercept		1.58	1.56	1.53	1.57	1.53	1.56	1.52	1.52
Item -1 (<i>column top above</i>)		-1.25	-0.53	-0.08	-0.83	0.63	-0.16	0.97	0.99
Item -2 Liability		-1.47	-1.47	-1.47	-1.47	-1.46	-1.48	-1.46	-1.46
Item -3 Beta		-0.17	-0.15	-0.13	-0.15	-0.16	-0.15	-0.15	-0.15
<u>t-value</u>									
Intercept		14.51	14.32	14.84	14.43	14.63	13.46	12.93	13.06
Item -1 (<i>column top above</i>)		-1.32	-0.71	-1.60	-1.01	0.51	-0.49	0.26	0.23
Item -2 Liability		-12.04	-11.94	-12.07	-11.99	-11.82	-11.65	-11.44	-11.53
Item -3 Beta		-2.20	-1.99	-1.69	-2.01	-2.04	-1.95	-1.98	-1.98
Sample		100	100	100	100	100	100	100	100
Adj R2		0.59	0.59	0.59	0.59	0.59	0.59	0.58	0.58

Figures of t-value which are larger than 1.96 (All) / 1.99 (Top 100) mean that 5% significance level two tailed test of the null hypothesis is rejected.)

4. Results <Analysis A>

(1) Cross-Sectional Regression Analysis 2

U-RBO impact on market value of different timing

What timing U-RBO affects MV?

	<i>MV time</i>	<i>Mar, 2010</i>	<i>June, 2010</i>	<i>Sep., 2010</i>
<u>Coeff.</u>				
Intercept		1.69	1.56	1.53
Item -1 U-RBO		-0.80	-0.53	-0.76
Item -2 Liability		-1.73	-1.47	-1.45
Item -3 Beta		-0.04	-0.15	-0.13
<u>t-value</u>				
Intercept		14.36	14.32	13.82
Item -1 U-RBO		-1.00	-0.71	-1.02
Item -2 Liability		-12.96	-11.94	-11.58
Item -3 Beta		-0.51	-1.99	-1.72
Sample	100	100	100	
Adj R2	0.62	0.59	0.57	

(Figures of t-value which are larger than 1.99 mean that 5% significance level two tailed test of the null hypothesis is rejected.)

4. Results <Analysis A>

(1) Cross-Sectional Regression Analysis 3

Difference of Company Size – How U-RBO affects MV?

	<i>Universe</i>	<i>All</i>	<i>Top 100</i>	<i>next 100</i>	<i>next next 100</i>
<hr/>					
Coeff					
Intercept		0.95	1.56	1.33	0.98
Item -1 U-RBO		0.05	-0.53	0.84	0.15
Item -2 Liability		-0.88	-1.47	-1.27	-1.07
Item -3 Beta		-0.07	-0.15	-0.12	0.10
<hr/>					
t-value					
Intercept		32.58	14.32	13.36	8.43
Item -1 U-RBO		0.31	-0.71	1.12	0.18
Item -2 Liability		-26.03	-11.94	-10.65	-9.72
Item -3 Beta		-2.71	-1.99	-1.43	1.25
<hr/>					
Sample		1032	100	100	100
Adj R2		0.41	0.59	0.57	0.54

Figures of t-value which are larger than 1.96 (All) / 1.99 (Top 100) mean that 5% significance level two tailed test of the null hypothesis is rejected.)

4. Results <Analysis A>

(1) Cross-Sectional Regression Analysis 4

Regression results for year 2005, 2008 and 2010 cases (Top 100)

What changed regarding U-RB0 affects to MV during 2005 to 2010?

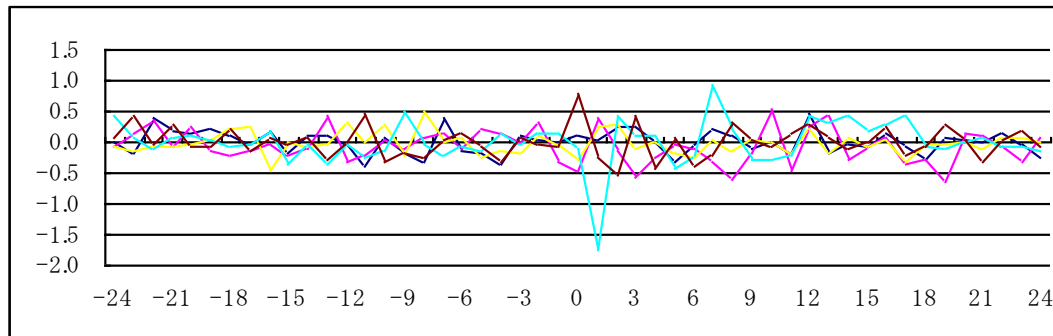
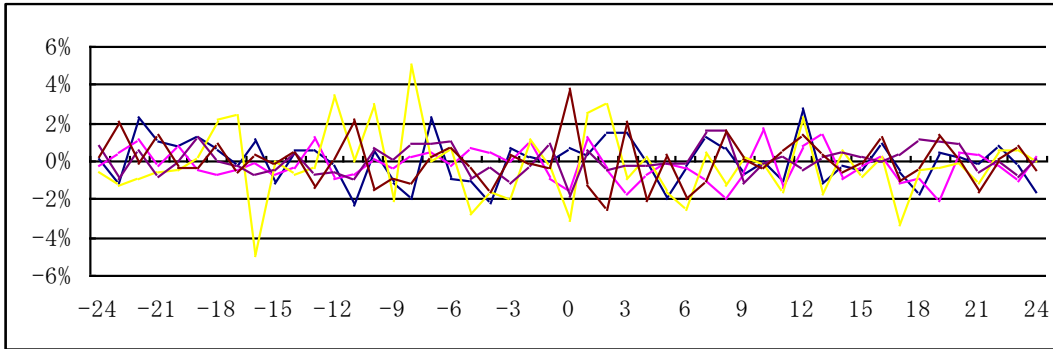
	<i>year</i>	<i>2005</i>	<i>2008</i>	<i>2010</i>
<u>Coeff.</u>				
Intercept		1.66	1.94	1.56
Item -1 U-RB0		-0.46	-1.66	-0.53
Item -2 Liability		-1.81	-1.97	-1.47
Item -3 Beta		0.12	0.01	-0.15
<u>t-value</u>				
Intercept		14.12	17.06	14.32
Item -1 U-RB0		-0.76	-1.79	-0.71
Item -2 Liability		-14.23	-13.43	-11.94
Item -3 Beta		1.38	0.10	-1.99
Sample		100	100	100
Adj R2		0.68	0.65	0.59

(Figures of t-value which are larger than 1.99 (Top 100) mean that 5% significance level two tailed test of the null hypothesis is rejected.)

4. Results <Analysis B>

(2) Market Impact Analysis

Market Impact by announcement (Day t=0) of changing DB to DC



Day t	PEt(k) average	TEt(k) average	Day t	PEt(k) average	TEt(k) average
			0	-0.52%	-0.08
-24	0.73%	0.10	1	-2.13%	-0.20
-23	-0.03%	0.02	2	0.84%	0.03
-22	0.35%	0.12	3	0.25%	0.01
-21	0.23%	0.03	4	-0.33%	-0.10
-20	0.30%	0.06	5	-1.24%	-0.15
-19	0.39%	0.07	6	-1.18%	-0.17
-18	0.44%	0.04	7	1.62%	0.18
-17	0.11%	-0.03	8	0.44%	0.06
-16	-0.43%	-0.04	9	-0.75%	-0.14
-15	-0.94%	-0.15	10	-0.27%	0.02
-14	0.03%	0.02	11	-0.86%	-0.13
-13	-0.63%	-0.06	12	1.76%	0.25
-12	0.25%	-0.03	13	0.35%	0.09
-11	-0.69%	-0.11	14	0.55%	0.03
-10	0.26%	0.02	15	0.04%	-0.00
-9	0.06%	-0.02	16	0.84%	0.13
-8	0.49%	0.04	17	-0.30%	-0.08
-7	0.33%	0.10	18	-0.50%	-0.08
-6	0.09%	0.03	19	-0.10%	-0.03
-5	-0.96%	-0.12	20	0.28%	0.08
-4	-0.67%	-0.11	21	-0.42%	-0.08
-3	-0.40%	-0.06	22	0.07%	0.01
-2	0.56%	0.09	23	-0.21%	-0.07
-1	0.14%	0.00	24	-0.56%	-0.07

5. Thought for Results

Items which start to affect profit/loss figures or balance sheet figures become more important for evaluation of the stock price.

For example, in case Unrecognized is generated and it affects profit/loss figures, Unrecognized items may be treated more importantly and as a higher profile.

6. Remarks for Current Analysis and Further Research

How to set the model structure, how MV is decided by what kind of independent (explanatory) variables, is an open question.

<Summary of the current issues and future challenging>

- a. **Premise and Structure of the model**
 - **Dependence on Stock Market Efficiency**
 - **Stock market participants' model may be different.**
- b. **Dependence of Company Characteristics**
 - **How to extract RBO related information effect only and how to hide the other effects is not easy thing.**
 - **Characteristics of the companies may matter.**
 - **Pension plan asset allocation may matter.**
- c. **Corporate actions**
 - **Effects by public offering and capital increase.**
- d. **Effect of the market conditions and legislation conditions**

Appendices

Appendix A:

Summary of technical terms

Item	Abbreviation in this paper
Retirement Benefit Obligations	RBO
Unfunded Retirement Benefit Obligations	U-RBO
Sum of ①~③	Unrecognized
① Unrecognized Accumulated Effect of Change in Accounting Standards and Others	
② Unrecognized Actuarial Loss	
③ Unrecognized Prior Service Cost	
Net Pension Liability Recognized in the Balance Sheet	Net
Prepaid Pension and Severance Cost	
Retirement Benefit Reserve	Reserve
Sum of ①~⑤	RB-Cost
① Service Cost	
② Interest Cost	
③ Amortization of Accumulated Effect of Change in Accounting Standards and Others	
④ Amortization of Actuarial Loss	
⑤ Amortization of Prior Service Cost	
Retirement Benefit Cost	Benefit

Appendix B:

Accounting Rules

In a consolidated balance sheet statement, below Reserve shows up as a liability.

$RBO - \text{pension plan assets} = U-RBO$

$U-RBO \text{ without Unrecognized} = \text{Net}$

$\text{Net} + \text{Prepaid Pension and Severance Cost} = \text{Reserve}$

In a consolidated profit/loss statement, below calculation results shows up as a cost.

$RB \text{ Cost} - \text{Expected return on plan assets}$

Discount rate is decided by the company itself using a long term high rated credit bond yield.

Thank you for your attention.

* This paper is describing an individual opinion and is not expressing a belonging company's opinion.