

## ■ Sony Life MCEV

# MCEV Results for Sony Life as of March 31, 2020

## 1 MCEV results

Sony Life's MCEV as of March 31, 2020 was virtually unchanged from the previous year. Factors leading to an increase in value such as new business acquired were largely offset by factors such as the decrease in JPY interest rates and dividend payments to shareholders.

As of March 31,	Billions of yen		
	2019	2020	Change
MCEV	1,720.2	<b>1,713.5</b>	(6.7)
Adjusted net worth	2,195.7	<b>2,565.8</b>	370.0
Value of existing business	(475.5)	<b>(852.3)</b>	(376.8)

## 2 Adjusted net worth

The adjusted net worth as of March 31, 2020 increased ¥370.0 billion, primarily because of the increase in unrealized gain on held-to-maturity securities caused by a decrease in interest rates. The breakdown is shown in the table below.

As of March 31,	Billions of yen		
	2019	2020	Change
Adjusted net worth	2,195.7	<b>2,565.8</b>	370.0
Total net assets	513.9	<b>539.5</b>	25.6
Reserve for price fluctuations	50.1	<b>52.7</b>	2.6
Contingency reserve	98.6	<b>107.6</b>	9.0
General reserve for possible loan losses	0.0	<b>0.0</b>	(0.0)
Reinsurance debit for coinsurance-type reinsurance	2.0	<b>2.0</b>	0.0
Unrealized gains or losses on held-to-maturity securities	2,030.8	<b>2,419.3</b>	388.4
Unrealized gains or losses on policy-reserve-matching bonds	83.5	<b>141.9</b>	58.4
Unrealized gains or losses on land and buildings	100.9	<b>119.5</b>	18.6
Unfunded pension liabilities	(1.7)	<b>(1.0)</b>	0.7
Intangible fixed assets	(26.3)	<b>(28.6)</b>	(2.2)
Tax effect equivalent of above nine items	(654.6)	<b>(787.8)</b>	(133.2)
Valuation gain or loss on subsidiaries and affiliated companies	(1.4)	<b>0.4</b>	1.8

As of March 31,	Billions of yen		
	2019	2020	Change
Adjusted net worth	2,195.7	<b>2,565.8</b>	370.0
Free surplus	1,001.4	<b>938.1</b>	(63.3)
Required capital	1,194.3	<b>1,627.7</b>	433.3

Sony Life sets its required capital as the larger of the amount of Japanese regulatory minimum capital requirement at the solvency margin ratio of 200% or the amount of capital to cover risks based on an internal model based on economic value. The required capital as of March 31, 2020 increased primarily because of an increase in the amount of liabilities on an economic basis caused by a fall in interest rates.

## 3 Value of existing business

The value of existing business as of March 31, 2020 decreased ¥376.8 billion, primarily due to a fall in interest rates. The breakdown of the value of existing business is shown in the table below.

As of March 31,	Billions of yen		
	2019	2020	Change
Value of existing business	(475.5)	<b>(852.3)</b>	(376.8)
Present value of certainty-equivalent profit	34.2	<b>(317.8)</b>	(352.1)
Time value of options and guarantees	(140.8)	<b>(125.0)</b>	15.7
Frictional costs	(23.4)	<b>(29.8)</b>	(6.3)
Cost of non-hedgeable risks	(345.4)	<b>(379.5)</b>	(34.0)

## 4 New business value

The new business value for the fiscal year ended March 31, 2020 decreased ¥24.4 billion, primarily because of the decrease in interest rates. The breakdown of new business value is as follows:

For the years ended March 31,	Billions of yen		
	2019	2020	Change
Value of new business	91.3	66.9	(24.4)
Present value of certainty-equivalent profit	120.2	73.2	(46.9)
Time value of options and guarantees	(7.7)	(7.4)	0.2
Frictional costs	(0.1)	(0.1)	0.0
Cost of non-hedgeable risks	(21.6)	(21.3)	0.3
Other profits or losses	0.6	22.6	21.9

## 5 New business margin

The new business margin described below is the ratio of the value of new business to the present value of premium income. The present value of premium income is calculated applying the same assumptions as those for the calculation of new business value, and is based on premiums before the deduction of reinsurance premiums. The new business margin for the fiscal year ended March 31, 2020 decreased primarily because of the decrease in interest rates.

For the years ended March 31,	Billions of yen		
	2019	2020	Change
Value of new business	91.3	66.9	(24.4)
Present value of premium income	1,426.2	1,495.2	68.9
New business margin	6.4%	4.5%	(1.9) points

## 6 Reconciliation analysis from MCEV at the end of the prior year

The table below shows the reconciliation analysis of MCEV as of March 31, 2020, from MCEV as of March 31, 2019.

	Billions of yen			
	Free surplus	Required capital	Value of existing business	MCEV
Opening MCEV (MCEV as of March 31, 2019)	1,001.4	1,194.3	(475.5)	1,720.2
Opening adjustments	(32.2)	—	—	(32.2)
Adjusted opening MCEV	969.2	1,194.3	(475.5)	1,688.0
New business value	21.2	1.4	44.3	66.9
Expected existing business contribution (risk-free rate)	(1.6)	(2.1)	19.5	15.7
Expected existing business contribution (in excess of risk-free rate)	2.3	3.0	13.6	19.0
Transfers from value of existing business and required capital to free surplus	(0.5)	(43.4)	43.9	—
On new business	(57.2)	—	57.2	—
Experience variances	8.7	(15.3)	(2.3)	(8.9)
Assumption changes	7.1	(7.1)	8.5	8.5
Other operating variance	(2.0)	2.0	(0.0)	(0.0)
Operating MCEV earnings	35.2	(61.6)	127.7	101.3
Economic variances	(66.3)	494.9	(504.5)	(75.8)
Other non-operating variance	—	—	—	—
Total MCEV earnings	(31.1)	433.3	(376.8)	25.4
Closing adjustments	—	—	—	—
Closing MCEV (MCEV as of March 31, 2020)	938.1	1,627.7	(852.3)	1,713.5

## 7 Sensitivity analysis

The impact of changing the underlying assumptions on MCEV is as follows:

Assumption	Change in assumption	Billions of yen		
		MCEV	Change in amount	Rate of change
Base	No change	1,713.5	–	–
Interest rates	50bp decrease	1,675.3	(38.1)	(2%)
	50bp increase	1,723.2	9.7	1%
	Swap rates	1,234.5	(478.9)	(28%)
Stock / Real estate market value	10% decrease	1,687.1	(26.4)	(2%)
Stock / Real estate implied volatility	25% increase	1,682.1	(31.3)	(2%)
Interest swaption implied volatility	25% increase	1,694.5	(19.0)	(1%)
Maintenance expenses	10% decrease	1,742.1	28.6	2%
Lapse and surrender rates	× 0.9	1,661.4	(52.1)	(3%)
Mortality rates	Death protection products × 0.95	1,781.8	68.3	4%
	Third-sector and annuity products × 0.95	1,697.4	(16.0)	(1%)
Morbidity rates	× 0.95	1,786.4	72.8	4%
Required capital	Regulatory minimum	1,740.8	27.2	2%
Foreign exchange rates	10% appreciation of JPY	1,684.2	(29.3)	(2%)

The breakdown of the changes in MCEV into the adjusted net worth and the value of existing business are shown in the table below. Of items not specified in this table, only the value of existing business has been changed while adjusted net worth remains the same.

Assumption	Change in assumption	Billions of yen		
		MCEV	Adjusted net worth	Value of existing business
Interest rates	50bp decrease	(38.1)	1,054.3	(1,092.5)
	50bp increase	9.7	(911.8)	921.6
Stock / Real estate market value	10% decrease	(26.4)	(9.7)	(16.6)
Foreign exchange rates	10% appreciation of JPY	(29.3)	(17.1)	(12.1)

## 8 Primary assumptions

Sony Life has used the JGB yields and U.S. Treasury yields as of March 31, 2020 as reference rates for the certainty-equivalent projections.

Sony Life has not added a liquidity premium on the risk-free rate as there are no products which are considered to have reasonably predictable and illiquid cash flows and would therefore be appropriate to apply a liquidity premium.

Regarding the extrapolation for ultra-long term risk-free rates where there is no market data, an ultimate forward rate was applied. More specifically, the ultimate forward rate was set at 3.5% and the last liquid point was set at 40 years (30 years for USD) and, based on Smith-Wilson methodology, forward rates on or after 41 years (31 years for USD) were extrapolated to converge to the ultimate forward rate over 20 years (30 years for USD). These parameters were set primarily in reference to the discussion on ICS. The reasons for setting the last liquid point at 40 years (30 years for USD) are as follows:

- Government bonds with 40-year maturity (30-year maturity for USD) have high liquidity and observable market data.
- Consistency in valuation between assets and liabilities as Sony Life holds a large amount of government bonds with 30- to 40-year maturity (30-year maturity for USD).

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The risk-free rates used in calculation for key terms (on a par-rate basis) are as follows:

As of March 31, Term (in years)	%			
	Japanese yen		U.S. dollar	
	2019	2020	2019	2020
1	(0.18)	<b>(0.15)</b>	2.39	<b>0.16</b>
5	(0.20)	<b>(0.12)</b>	2.23	<b>0.38</b>
10	(0.08)	<b>0.03</b>	2.41	<b>0.67</b>
20	0.34	<b>0.31</b>	2.63	<b>1.05</b>
30	0.51	<b>0.42</b>	2.82	<b>1.32</b>
40	0.58	<b>0.44</b>	2.87	<b>1.57</b>
50	0.94	<b>0.83</b>	2.93	<b>1.78</b>
60	1.19	<b>1.10</b>	2.96	<b>1.91</b>
70	1.35	<b>1.27</b>	2.98	<b>1.99</b>
80	1.44	<b>1.37</b>	3.00	<b>2.04</b>

(Data: Ministry of Finance Japan for JGB [extrapolated] and Bloomberg for U.S. Treasury [extrapolated])

Assumptions including mortality and morbidity rates, lapse and surrender rates, and operating expense rates were developed based on best estimates by product as of March 31, 2020. Best-estimate assumptions are developed to reflect past and current experiences as well as expected experiences in the future. Expected future changes in assumptions should be reflected only when they are supported by sufficient reasons. Except for a deteriorating trend in morbidity rates, no other expected future changes are assumed in the best-estimate assumptions applied.

## 9 Opinion of Outside Specialist

Sony Life requested Milliman, Inc., an external actuarial consulting firm with expert knowledge in the area of MCEV valuations, to review the methodology, assumptions and calculations, and obtained an opinion from this firm. Please refer to Sony Life's press release "Disclosure of Market Consistent Embedded Value as of March 31, 2020" ([https://www.sonyfh.co.jp/en/news/article/200609\\_01.pdf](https://www.sonyfh.co.jp/en/news/article/200609_01.pdf)) for details.

## 10 Risk Amount Based on Economic Value (After Tax)

Sony Life has been disclosing the risk amount based on economic value since the end of March 2012 in an effort to provide a clearer picture of its financial soundness based on economic value. The risk amount based on economic value refers to the total amount of Sony Life's risks, comprehensively examined by a market consistent approach, including insurance risk, market-related risk and others. Sony Life's risk amount based on economic value as of March 31, 2020 was ¥805.2 billion, an increase of ¥62.8 billion year on year, primarily due to an increase in insurance risk arising from a drop in interest rates. The breakdown of the risk amount is as follows:

As of March 31,	Billions of yen		
	2019	2020	Change
Insurance risk	547.3	<b>607.6</b>	60.2
Market-related risk	332.5	<b>334.9</b>	2.3
<i>Interest rate risk</i>	202.1	<b>178.5</b>	(23.5)
Operational risk	33.4	<b>40.3</b>	6.9
Counterparty risk	3.0	<b>3.8</b>	0.7
Variance effect	(174.0)	<b>(181.5)</b>	(7.5)
Risk amount based on economic value	742.3	<b>805.2</b>	62.8

Notes: 1. The risk amount based on economic value is calibrated at VaR [99.5%] over one year and based on the internal model.  
2. Interest rate risk excludes the variance effect within market-related risk.

## 11 Glossary of MCEV-related Terminology (in Alphabetical Order)

### B

#### Best-estimate assumption

The assumption that is most likely to occur in the future.

### C

#### Cost of non-hedgeable risk

The present value of the cost to hold required capital to cover future non-hedgeable risks. As risks regarding the asymmetric nature of cash flows not reflected in the present value of certainty-equivalent profit are fully reflected in the time value of options and guarantees, Sony Life has reflected the following in this cost: allowance for uncertainty of non-economic assumptions and the portion of economic assumptions considered non-hedgeable with respect to the cost of non-hedgeable risks.

### F

#### Free surplus

The portion of adjusted net worth other than the required capital.

#### Frictional costs

The present value of investment costs and taxes on assets backing the required capital at each point of time in the future.

### I

#### ICS (Insurance Capital Standard)

The capital standard for internationally active insurance groups (IAGs) being developed by the International Association of Insurance Supervisors (IAIS).

#### Implied volatility

The expected rate of future variability embedded in current market option prices.

### N

#### Non-hedgeable non-financial risk

A non-financial risk such that deep and liquid capital markets do not exist to hedge such risk.

#### Non-hedgeable risk

Non-hedgeable risk is composed of non-hedgeable financial risk and non-hedgeable non-financial risk.

### O

#### Options and guarantees

The following are some features of options and guarantees:

- Policy cash flow would be changed by exercising options granted to the policyholder. An example of such features is the exercise of the surrender option.
- It includes guarantee of benefits or policyholder values. An example is guaranteed minimum death benefits for variable life insurance.

### P

#### Present value of certainty-equivalent profit

Present value of certainty-equivalent profit is the present value of profit based on the future cash flows generated from the covered business.

### R

#### Required capital

The MCEV Principles define required capital as the capital that is needed in excess of statutory policy reserves (excluding contingency reserves). It is determined as the larger of the solvency capital to meet the statutory required minimum level or the capital necessary to meet internal objectives or to achieve the company's targeted credit rating.

The required capital of Sony Life is set as the larger of the amount of capital corresponding to the solvency margin ratio of 200% or the amount of capital to cover risks based on the internal model on an economic value basis.

#### Risk-free rate

The reference rate defined in the MCEV Principles. The MCEV Principles state that it should be the swap rate of the currency of cash flows.

### U

#### Ultimate forward rate

The level of forward rate to which future forward rates are assumed to ultimately converge. It is generally determined in a macroeconomic approach.