

May 20, 2020

Sompo Himawari Life Insurance, Inc.

Disclosure of Market Consistent Embedded Value as at March 31, 2020

Sompo Himawari Life Insurance, Inc. (“Himawari Life”, President: Yasuhiro Ooba) herein reports its market consistent embedded value (“MCEV”) with respect to its life insurance business, prepared and disclosed in compliance with the European Insurance CFO Forum Market Consistent Embedded Value Principles¹ (“MCEV Principles”) as at March 31, 2020.

Highlights

The MCEV of Himawari Life as at March 31, 2020 is 809.7 billion Yen, down by 4.7 billion Yen compared with the MCEV at March 31, 2019.

(in Billions of Yen)

	As at March 31, 2020	As at March 31, 2019	Change
MCEV	809.7	814.4	(4.7)
Adjusted net worth	417.7	439.0	(21.3)
Value of in-force	391.9	375.3	16.5
New business value	23.8	36.8	(12.9)

Note: In this disclosure, yen amounts are rounded down to the nearest 100 million yen.

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1. Introduction

1.1. About MCEV

Embedded values have been widely used in Europe and Canada as a measure of the value and performance of life insurance companies. Embedded values serve to supplement the financial information available from statutory accounting statements; they are particularly useful due to the nature of the life insurance business, where there is generally a time lag from the acquisition of new policies to the realization of profits arising from those policies.

MCEV represents a present value of current and future distributable earnings to shareholders generated from assets allocated to the covered business after allowance for the aggregate risks in the covered business. MCEV can be expressed as the EV evaluated using methods consistent with the market valuation of financial products traded in the financial markets and consists of the “corporate net asset value” and the “present value of future profits from existing business”.

Insurance companies have widely disclosed EV in compliance with EEV Principles since the CFO Forum formed by the Chief Financial Officers (CFO) of major insurance companies in Europe issued the EEV Principles in May 2004. The CFO Forum released the MCEV Principles in June 2008, defining market consistent valuation methods to further enhance the consistency of valuation standards. The MCEV Principles were amended in May 2016 and now include guidance that allows the use of EU Solvency II methodologies with certain conditions. MCEV Principles have been positioned by the CFO Forum as an important standard and format for embedded value reporting.

Himawari Life has been disclosing its EV in compliance with the MCEV Principles beginning at the end of March 2010 in order to facilitate understanding of the status of Himawari Life, as EV disclosure in compliance with the EEV Principles or the MCEV Principles has been promoted in Japan.

1.2. Covered business

The business covered in this report is the life insurance business written by Himawari Life. Results in this report do not reflect life insurance business or non-life insurance business written by other insurance companies in the SOMPO Holdings Group.

1.3. Statement of directors

The Board of Directors of Himawari Life states that the MCEV results presented here were prepared in compliance with the MCEV Principles except for points of special notice. Please refer to “1.5. Compliance with MCEV Principles” for areas of non-compliance with the individual Principles and Guidelines defined in the MCEV Principles.

1.4. Opinion of outside specialist

Himawari 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 Milliman, Inc. Please refer to “5. Opinion of Outside Specialist” for details.

1.5. Compliance with MCEV Principles

MCEV results were calculated in accordance with the calculation methodologies and assumptions prescribed in the MCEV Principles. Areas of non-compliance with individual Principles and Guidance in the MCEV Principles are as follows:

- MCEV results were derived by using Japanese Government Bond (JGB) yields as reference rates for risk free rates rather than swap rates as stipulated in the MCEV Principles.
- MCEV results in this report are solely for the life insurance business written by Himawari Life, and they are not the consolidated results of the SOMPO Holdings Group. The MCEV results do not reflect the life or non-life insurance business written by any other insurance companies within the SOMPO Holdings Group.
- Group MCEV, as prescribed in the MCEV Principles, is not considered in this report, as the report is for Himawari Life on a standalone basis.

1.6. Use of JGB yields as reference rates for risk free rates

MCEV Principles stipulate that swap rates should be reference rates as a proxy for risk free rates, but a more appropriate alternative such as government bond yields can be used if swap rate availability is limited.

We considered ideal attributes of reference rates discussed for EU Solvency II (no credit risk, reliability, liquidity, and others) and concluded that it is more appropriate to use JGB yields.

2. MCEV Results

2.1. MCEV results

The MCEV of Himawari Life as at March 31, 2020, is 809.7 billion Yen, down by 4.7 billion Yen compared with the MCEV at March 31, 2019.

(in Billions of Yen)

	As at March 31, 2020	As at March 31, 2019	Change
MCEV	809.7	814.4	(4.7)
Adjusted net worth	417.7	439.0	(21.3)
Value of in-force	391.9	375.3	16.5
New business value	23.8	36.8	(12.9)

2.2. Adjusted net worth

The adjusted net worth is defined as the market value of assets allocated to the covered business in excess of statutory policy reserves and other liabilities as at the valuation date. More specifically, the adjusted net worth is the net assets on the statutory balance sheet plus the price fluctuation reserve, contingency reserves, general provision for loan losses, unallocated amount within policyholder dividend reserves, unrealized gains or losses on held-to-maturity bonds, unrealized gains or losses on policy-reserve-matching bonds, and unrealized gains or losses on derivatives, minus intangible fixed assets and tax adjustments on these eight items. Its breakdown is shown below.

Please refer to section 4.4 for the method of calculation of required capital.

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Adjusted net worth	417.7	439.0	(21.3)
Total net assets	147.6	157.8	(10.2)
Reserve for price fluctuations	8.2	7.4	0.7
Contingency reserves	32.4	31.6	0.8
General allowance for possible credit losses	0.0	0.0	0.0
Unallocated amount within policyholder dividend reserves	0.1	0.3	(0.1)
Unrealized gains or losses on held-to-maturity securities	294.1	311.2	(17.1)
Unrealized gains or losses on policy-reserve-matching bonds	40.1	39.8	0.3
Unrealized gains or losses on derivatives	-	-	-
Intangible fixed assets	-	-	-
Tax effect related to above eight items	(105.0)	(109.3)	4.3

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Adjusted net worth	417.7	439.0	(21.3)
Free surplus	328.6	362.8	(34.2)
Required capital	89.1	76.2	12.9

2.3. Value of in-force

The value of in-force reflects the value of distributable earnings to shareholders generated in the future from the existing business, expressed as a present value as at the valuation date (March 31, 2020), which is the certainty equivalent present value of future profits net of the time value of options and guarantees, the frictional costs and the cost of non-hedgeable risks, broken down as below. Please refer to “4. Calculation method of MCEV” for details of each component.

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Value of in-force	391.9	375.3	16.5
Certainty equivalent present value of future profits	758.9	817.3	(58.4)
Time value of options and guarantees	(9.9)	(7.4)	(2.4)
Frictional costs	(10.1)	(9.5)	(0.5)
Cost of non-hedgeable risks	(346.8)	(424.9)	78.1

2.4. New business value

New business value shows the value of policies acquired during the Japanese fiscal year starting April 1, 2019 and ending March 31, 2020 (referred to as “the fiscal year” hereinafter), which is consistent with the disclosed financial information. Policies expected to be acquired in the future are not included in the calculation of new business value. The new business value is evaluated as at the valuation date (March 31, 2020) and is calculated under the same assumptions used for the value of in-force. Actual investment income during the fiscal year is reflected, as the value of new business includes profits and losses from issue to the end of March 2020. A breakdown of the new business value is shown below.

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Value of new business	23.8	36.8	(12.9)
Certainty equivalent present value of future profits	48.7	71.9	(23.2)
Time value of options and guarantees	(0.1)	(0.0)	(0.0)
Frictional costs	(0.3)	(0.3)	(0.0)
Cost of non-hedgeable risks	(24.3)	(34.7)	10.3

2.5. New business margin

The new business margin presented below is the ratio of the new business value to the present value of new business premium income².

² The present value of new business premium income is calculated applying the same assumptions as are used for the calculation of new business value, and is based on the premiums before the deduction of reinsurance premiums.

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Value of new business	23.8	36.8	(12.9)
Present value of new business premiums collected	375.3	473.0	(97.7)
Value of new business / Present value of new business premiums collected	6.4%	7.8%	(1.4%)

The major source of the decrease in new business margin is the change in insurance assumptions and lower interest rates compared to the last year.

Relationships between the total annualized amount of regular premiums and the present value of new business premiums collected for the fiscal year are as follows:

(in Billions of Yen)

	March 31, 2020	March 31, 2019	Change
Single premiums from new business	-	-	-
Total annualized amount of regular premiums ³	31.6	42.4	(10.8)
Average annual premium multiplier ⁴	11.9	11.1	0.7

³ The total annualized amount of regular premiums is calculated as the number of premium payments made in a year multiplied by the premium amount per payment. It should be noted that the definition of annualized premiums here is different from that used in disclosures such as the financial results and annual reports.

⁴ The average annual premium multiplier is calculated as (Present value of new business premium income – Single premiums from new business) / Annualized level premiums from new business.

2.6. Reconciliation analysis of MCEV from the end of March 2019 to the end of March 2020

The table below shows the reconciliation analysis of the MCEV as at March 31, 2020, with the MCEV as at March 31, 2019, in the format illustrated by the MCEV Principles.

(in Billions of Yen)

	Free surplus	Required capital	Value of in-force	MCEV
Opening MCEV (MCEV as at March 31, 2019)	362.8	76.2	375.3	814.4
Opening adjustments	-	-	-	-
Adjusted opening MCEV	362.8	76.2	375.3	814.4
New business value	(3.5)	3.5	23.8	23.8
Expected existing business contribution (risk free rate)	(0.6)	(0.1)	20.5	19.8
Expected existing business contribution (in excess of risk free rate)	5.1	1.4	29.9	36.5
Transfers from value of in-force and required capital to free surplus	40.4	(21.5)	(18.8)	-
On in-force at the beginning of the year	71.2	(21.5)	(49.6)	-
On new business	(30.8)	-	30.8	-
Experience variances	(0.0)	(9.2)	(3.4)	(12.8)
Assumption changes	(2.1)	2.1	57.0	57.0
Other operating variance	(20.8)	20.8	(2.6)	(2.6)
Operating MCEV earnings	18.3	(3.0)	106.4	121.8
Economic variances	(44.6)	15.9	(89.8)	(118.5)
Other non operating variance	-	-	-	-
Total MCEV earnings	(26.2)	12.9	16.5	3.2
Closing MCEV (MCEV as at March 31, 2020)	336.6	89.1	391.9	817.7
Closing adjustments	(8.0)	-	-	(8.0)
Adjusted closing MCEV	328.6	89.1	391.9	809.7

(1) Opening adjustments

This reflects such items as capital and foreign exchange variances of acquired/divested business.

(2) New business value

This reflects the value of new business acquired during the fiscal year as at the valuation date (March 31, 2020). With regards to the calculation method of new business value, please refer to section 2.4.

(3) Expected existing business contribution (risk free rate)

This includes the amount of release of the time value of options and guarantees and allowance for non-hedgeable risks as well as investment income at risk free rates expected to earn on assets supporting the adjusted net worth, in addition to the impact of the unwinding of the discount effect in accordance with the elapse of time, as the expected future distributable earnings to shareholders are discounted at the risk free rate.

(4) Expected existing business contribution (in excess of risk free rate)

Future asset investment income is calculated using a risk free rate, as the value of in-force is calculated based on a market consistent valuation method. This item reflects the profits expected in excess of the risk free rate generated by holding ultra-long term government bonds and risky assets such as corporate bonds and foreign securities. The expected yield used to calculate the expected profit in excess of the risk free rate for the fiscal year was 1.34%, which was calculated by reflecting primarily expected interest income based on our annual asset investment plans for the fiscal year where the majority of general account assets are fixed income instruments.

(5) Transfers from value of in-force and required capital to free surplus

This reflects changes in the free surplus arising from the transfer of the profits expected in the fiscal year from the existing business value to the free surplus and from changes in the required capital under the adjusted net worth. The transfer of profits, the first item, includes the transfer of expected profits assumed to be realized during the fiscal year under the MCEV calculation as at March 31, 2019, and the transfer of profits for the fiscal year calculated under the new business value for the fiscal year. The value of MCEV itself does not change as a result of this transfer as the transfer merely constitutes a shift among MCEV components.

(6) Experience variances

These variances reflect the impact on MCEV of the differences between actual and expected profits transferred to the adjusted net worth during the fiscal year including the effect of one-off expenses not expected by the opening assumptions, and of the differences between the actual policies in force and the policies expected to be in force as at March 31, 2020 which are projected from the policies in force as at March 31, 2019 and the new business acquired during the fiscal year.

(7) Assumption changes:

This shows the impact of changes in the non-financial assumptions such as mortality and morbidity rates, surrender and lapse rates and operating expense rates. The positive impact on MCEV of 57.0 billion yen is explained mainly by the decrease in certainty equivalent present value of future profits by 13.2 billion yen due to the introduction of mortality improvement as well as mortality, morbidity, surrender and lapse rate assumption updates, offset by a decrease of 72.6 billion yen in cost of non-hedgeable risks mainly due to the following revisions made this year:

- Previously the same risk factors of the EU Solvency II standard model were used for the majority of

insurance underwriting risk factors. They have been revised to reflect our own historical experiences and also to take into account the discussions on and the level of risk factors considered for economic value based solvency regulations in Japan.

- Morbidity risk factors which were already reflected our own historical experience have been also revised to take into account the discussions on economic value based solvency regulations in Japan.

(8) Other operating variance

This reflects the impact of model improvements and updates in calculating MCEV.

(9) Operating MCEV earnings

This reflects the aggregate amount of items (2) through to (8).

(10) Economic variances

This reflects the impact of changes in economic assumptions, such as risk free rates and implied volatilities, to those as at the end of March 2020 and the impact of the difference between actual and expected investment income for the fiscal year, including that in excess of the risk free rate.

Due to the economic variances, both free surplus and the value of in-force contracted. The decrease in free surplus is primarily a result of a decrease in the market value of JPY denominated bonds due to the flattening of JGB yields. The value of in-force contracted significantly due to the decline in long term JGB yields.

(11) Other non operating variance

There are no other non operating variances.

(12) Closing adjustments

This reflects shareholders dividend payment effective at the end of the fiscal year.

2.7. Sensitivity analysis

The impacts of changing various assumptions underlying the MCEV calculation are as follows.

Sensitivity analysis

(in Billions of Yen)

Assumption	Change in Assumption	MCEV	Change in Amount	Rate of Change
Base case	No change	809.7	-	-
Reference rates change	Swap rate	666.3	(143.3)	(18%)
Interest rates level	50bp decrease	709.7	(99.9)	(12%)
	50bp increase	886.3	76.5	9%
Ultimate forward rate	50bp decrease	766.6	(43.1)	(5%)
	50bp increase	849.5	39.7	5%
Stock / Real estate market values	10% decrease	809.6	(0.0)	(0%)
Stock / Real estate implied volatility	25% increase	809.7	-	-
Interest rate swaption implied volatility	25% increase	804.7	(5.0)	(1%)
Maintenance expenses	10% decrease	839.4	29.6	4%
Surrender and lapse rates	x 0.9	817.4	7.7	1%
Mortality rates	Death protection products x 0.95	828.8	19.1	2%
	Third-sector (A&H) products and annuity products x 0.95	797.9	(11.7)	(1%)
Morbidity rates	x 0.95	880.9	71.2	9%
Required capital	Target statutory solvency margin ratio of 200%	817.0	7.3	1%

The change in adjusted net worth under the sensitivities to interest rates level and market values of stock and real estate are shown in the table below. For the other sensitivities only the value of in-force has changed.

(in Billions of Yen)

Interest rates level	50bp decrease	169.1
	50bp increase	(153.2)
Stock / Real estate market value	10% decrease	(0.0)

Sensitivity analysis of new business value

(in Billions of Yen)

Assumption	Change in Assumption	New Business Value	Change in Amount	Rate of Change
Base case	No change	23.8	-	-
Reference rates change	Swap rate	19.3	(4.4)	(19%)
Interest rates level	50bp decrease	19.4	(4.3)	(18%)
	50bp increase	27.2	3.3	14%
Ultimate forward rate	50bp decrease	21.7	(2.0)	(9%)
	50bp increase	25.7	1.8	8%
Stock / Real estate market values	10% decrease	23.8	-	-
Stock / Real estate implied volatility	25% increase	23.8	-	-
Interest rate swaption implied volatility	25% increase	23.7	(0.0)	(0%)
Maintenance expenses	10% decrease	25.6	1.8	8%
Surrender and lapse rates	x 0.9	25.9	2.0	9%
Mortality rates	Death protection products x 0.95	24.8	0.9	4%
	Third sector (A&H) products and annuity products x 0.95	23.0	(0.7)	(3%)
Morbidity rates	x 0.95	28.4	4.6	19%
Required capital	Target statutory solvency margin ratio of 200%	24.0	0.2	1%

(1) Reference rates change

This analysis shows the impact of changing reference rates for risk free rates as at March 31, 2020 from JGB yields to swap rates. The value of in-force changes as the discount rate and the future asset investment yields change. This sensitivity results include the impact on the frictional cost and the cost of non-hedgeable risks. In generating stochastic economic scenarios the volatility parameters of the interest rate model are the same as for the base case parameters. Only the term structure parameters are changed.

(2) Interest rates level

This analysis shows the impact of an immediate parallel shift up or down in all durations by 50bps of reference rates for risk free rates (JGB yields) as at March 31, 2020. The adjusted net worth changes due to the change in market values of bonds and other assets. The value of in-force also changes as the discount rate and the future asset investment yields change. In generating stochastic economic scenarios the volatility parameters of the interest rate model are the same as for the base case parameters. Only the term structure parameters are changed.

Interest rates are extrapolated without shifting the ultimate forward rate and are not floored at zero for the interest rate down sensitivity.

The change of MCEV is larger with lower interest rates than with rising interest rates. This is because the degree of asymmetry is greater on the sensitivity of the value of in-force than that of the adjusted net worth, while the adjusted net worth moves in a different direction so as to offset the change of the value of in-force. The asymmetry in the change in value of in-force is primarily due to the effect of embedded options such as policyholder dividends payment which cannot be negative when interest yields (earned rates) fall below the assumed interest rate.

(3) Ultimate forward rate

This analysis shows the impact of an increase or decrease by 50bps of the ultimate forward rate used to extrapolate risk free rates in the 31st year and thereafter without changing reference rates (JGB yields) as at March 31, 2020. The value of in-force changes as the discount rate and the future investment yields change. In generating stochastic economic scenarios the volatility parameters of the interest rate model are the same as the base case parameters. Only the term structure parameters are changed. Inflation rates are not changed.

The higher ultimate forward rate results in an increase in the value of in-force, primarily due to higher investment income and a larger discounting effect on insurance claims in the ultra-long term. Because this sensitivity applies only in the ultra-long term, the impact is less asymmetric than in the case of the interest rate level sensitivity.

(4) Stock and real estate market value

This analysis shows the impact of an immediate 10% drop in market values of stocks and real estate as at March 31, 2020. The adjusted net worth decreases as the market values of stocks and real estate decrease.

(5) Implied volatility of stocks and real estate

This analysis shows the impact of changes in the implied volatilities of stocks and real estate used in calculating the time value of options and guarantees. The impact is set to zero because there are no assets, such as derivatives, which would be sensitive to the implied volatilities of stocks and real estate.

(6) Interest rate swaption implied volatility

This analysis shows the impact of an increase in the implied volatility of interest rate swaptions used in calculating the time value of options and guarantees. The impact was calculated only on the time value of options and guarantees, as there are no assets sensitive to the implied volatilities of interest rate swaptions.

(7) Maintenance expenses

This analysis shows the amount of increase in the value of in-force due to a 10% decrease in maintenance expenses. It should be noted that maintenance expenses subject to this sensitivity do not include agents' commissions payable to the in-force policies in future periods.

(8) Surrender and lapse rates

This analysis shows the amount of change in the value of in-force due to a 10% decrease in surrender and lapse

rates. If the persistency rates were increased, the value of business in force would generally increase as future profits would increase. However, the negative spread business due to the interest rates drop would show decrease in the value of business in force. These effects offset each other, resulting an increase in the total value of business in force.

(9) Mortality rates

This analysis shows the amount of change in the value of in-force due to a 5% decrease in mortality rates. The sensitivity results are shown separately for death protection products and A&H insurance and annuity products, as they are expected to behave in a different direction under this sensitivity. A&H insurance and annuity product segment includes base policies and riders of which the primary benefits are accidental death, sickness and various medical risks such as cancer, and individual annuities. Regarding group life policies, it is assumed that changes in death benefits are entirely reflected in changes in policyholder dividends. Other management actions were not reflected in the calculations.

(10) Morbidity rates

This analysis shows the amount of change in the value of in-force due to a 5% decrease in the morbidity rates of A&H products. No management actions were reflected in the calculations.

(11) Statutory minimum required capital

This analysis shows the amount of change in the value of in-force (frictional cost) if the required capital were the minimum statutory level which is to keep a solvency margin ratio of 200%.

(12) Other

Other items to note are as follows:

- The frictional costs and the cost of non-hedgeable risks remain unchanged under the sensitivity analyses except for the reference rates and required capital sensitivity analyses.
- The impact of changing market value and implied volatilities of stocks & real estate is not quantified for variable life, as its impact is very small⁵.
- Each of the sensitivity analyses above show only the impact of changing one assumption. The impact of changing multiple assumptions at a time would not be equal to the sum of the impacts for each assumption.

⁵ The composition of variable life in terms of policy reserves as at the end of March 2020 is less than 1%.

3. Assumptions

3.1. Economic assumptions

(1) Risk free rates

The reference rates for risk free rates, used for the investment yields and discount rates for the calculation of the certainty equivalent present value of future profits are set to JGB yields as at the end of March, 2020.

Considering liquidity in ultra-long term rates, forward rates in the 31st year and thereafter are extrapolated using the Smith-Wilson method to converge to the ultimate forward rate in 40 years. These are determined by referring to the discussions for EU Solvency II. The ultimate forward rate is set at 3.50% as in the previous year to be consistent with Solvency II.

Negative interest rates are not floored at zero. The JGB yields data were obtained from information vendors quotes. The JGB yields (spot rates) for major terms are shown below.

Term (in years)	As at the end of March, 2020	As at the end of March, 2019
1	(0.16%)	(0.18%)
2	(0.15%)	(0.18%)
3	(0.13%)	(0.20%)
4	(0.11%)	(0.21%)
5	(0.12%)	(0.21%)
10	0.03%	(0.07%)
15	0.28%	0.16%
20	0.32%	0.36%
25	0.32%	0.42%
30	0.43%	0.54%
35	0.67%	0.77%
40	0.93%	1.03%
50	1.39%	1.46%
60	1.72%	1.79%

The reference rates sensitivity results described in 2.7 (1) used swap rates. The spot yields (spot rates) of swap rates for major terms are shown below. As with the case for JGB yields, forward rates in the 31st year and thereafter are extrapolated using the Smith-Wilson method to converge to the ultimate forward rate in 40 years, and negative swap rates are not floored at zero.

Term (in years)	As at the end of March, 2020
1	(0.02%)
2	(0.04%)
3	(0.05%)
4	(0.05%)
5	(0.05%)
10	0.03%
15	0.10%
20	0.14%
25	0.18%
30	0.20%
35	0.42%
40	0.69%
50	1.18%
60	1.55%

Any liquidity premium is not reflected, as the definitions in the MCEV Principles regarding the method for its derivation and the eligible insurance liabilities are not completely clear, and generally accepted actuarial practice has not yet been established.

(2) Future asset allocation

In order to calculate interest dividends of participating products, future asset earned rates are projected for each segment in which policyholder dividend rates are specified in a manner consistent with the method used in the actual practice. As no equities and few foreign assets are held in the asset segment for participating individual life and annuity business to which the policyholder dividend is calculated, it is assumed that assets are all invested in JPY denominated bonds. The number of years to maturity of the bonds to be purchased is set based on our recent purchase activities considering our liability portfolio characteristics.

With regard to the calculation of the time value of options and guarantees for minimum guaranteed death benefits on variable life business, the asset allocation of separate account assets for variable life business is set in accordance with the asset mix as at the end of March 31, 2020, and it is assumed to be unchanged in the future.

(3) Interest-rate model

The Heath-Jarrow-Morton interest rate model was used and calibrated to the market at the valuation date. Parameters are estimated from the swap curve and the implied volatilities (from the Bachelier (normal) model) of interest rate swaptions with different terms, where the interest rate is not floored at zero. The time value of options and guarantees were calculated using 1,000 scenarios generated with this interest rate model. We

generated the scenarios.

The implied volatilities of the interest rate swaptions used in our estimation of parameters are the average of implied volatilities quoted by multiple brokers and other bodies shown below:

As at the end of March, 2020

(bp)

Term of swap (in years)	Term of option (in years)	JPY	USD	EUR	UKL
1	1	16.06	38.23	24.82	29.56
5	1	21.14	61.82	43.38	52.11
5	5	21.68	63.92	54.89	58.94
5	7	22.47	63.86	56.98	60.53
5	10	24.05	63.12	59.04	61.60
5	15	25.99	60.79	57.65	62.09
5	20	27.24	58.17	56.83	61.09
10	1	23.99	75.72	62.06	67.00
10	5	23.82	66.72	59.92	63.13
10	7	24.93	65.35	59.66	63.00
10	10	26.82	63.19	59.55	62.66
10	15	28.33	61.18	57.66	61.66
10	20	29.16	58.42	55.72	61.25
15	1	26.96	77.74	68.10	69.23
15	5	26.20	65.49	59.96	63.46
15	7	27.22	64.23	58.88	62.63
15	10	28.70	62.13	57.64	61.87
15	15	29.89	60.25	55.06	60.52
15	20	30.59	57.08	52.73	59.90
20	1	32.36	79.84	73.46	71.40
20	5	30.27	65.14	60.35	63.81
20	7	30.53	63.70	58.46	62.58
20	10	30.92	61.55	56.60	61.29
20	15	31.33	59.19	53.21	59.50
20	20	31.44	57.94	50.58	58.65

<Reference> As at the end of March, 2019

(bp)

Term of swap (in years)	Term of option (in years)	JPY	USD	EUR	UKL
1	1	11.49	60.57	17.62	39.49
5	1	13.60	62.93	32.69	55.62
5	5	20.74	68.79	48.24	64.39
5	7	23.84	69.49	51.89	64.89
5	10	27.28	69.78	54.76	64.86
5	15	30.41	67.09	53.88	62.58
5	20	32.95	65.96	52.17	60.42
10	1	16.66	60.39	39.13	59.57
10	5	23.62	66.53	48.99	62.00
10	7	26.11	67.09	51.61	62.17
10	10	29.16	67.76	54.08	61.94
10	15	31.60	66.30	53.17	59.42
10	20	33.81	65.64	51.11	57.38
15	1	18.58	59.06	39.67	58.94
15	5	25.05	64.44	46.57	60.45
15	7	27.37	65.04	49.13	60.40
15	10	30.02	65.64	51.11	60.04
15	15	32.56	65.59	49.96	58.15
15	20	34.60	65.26	48.20	55.55
20	1	21.81	57.92	40.62	58.09
20	5	27.39	63.43	46.10	58.99
20	7	29.24	64.07	48.02	58.94
20	10	31.38	65.26	49.71	58.32
20	15	33.66	64.91	48.40	56.60
20	20	35.54	66.21	46.04	53.70

(4) Implied volatilities of foreign exchange and stocks

Spot implied volatilities (at the money) calculated from options with different terms are used. The data source is the implied volatilities quoted by multiple banks and securities firms.

As options with terms greater than 10 years are illiquid for both foreign exchange rates and equity indices, the forward implied volatilities for the 10th year were extended for the terms greater than 10.

The following table shows the implied volatilities used in estimating the parameters which are the average of implied volatilities quoted by multiple banks, securities firms, and other bodies.

As at the end of March, 2020

Term (in years)	Foreign exchange			Equity				
	USD /JPY	EUR /JPY	UKL /JPY	Japan TOPIX	US S&P	Euro SX5E	UK FTSE	Japan Nikkei average
1	9.27%	9.59%	12.02%	23.10%	29.81%	26.45%	25.62%	25.41%
5	7.92%	8.71%	11.68%	18.15%	23.20%	20.74%	18.83%	19.96%
7	7.85%	9.03%	12.35%	17.87%	23.60%	20.60%	17.97%	19.66%
10	8.87%	9.87%	12.80%	17.74%	24.53%	21.10%	17.67%	19.51%

<Reference> As at the end of March, 2019

Term (in years)	Foreign exchange			Equity				
	USD /JPY	EUR /JPY	UKL /JPY	Japan TOPIX	US S&P	Euro SX5E	UK FTSE	Japan Nikkei average
1	7.14%	8.25%	10.67%	15.46%	14.93%	14.15%	13.81%	17.01%
5	8.35%	9.52%	11.31%	16.30%	18.19%	16.08%	14.77%	17.93%
7	9.28%	10.18%	11.90%	16.43%	19.63%	16.27%	14.83%	18.07%
10	10.65%	11.43%	12.58%	16.66%	21.57%	17.00%	15.51%	18.33%

(5) Correlation factor

As there is no market consistent data for correlation factors, correlation factors were derived from the monthly return of each index during the past 5 years between April 2015 and the end of March 2020.

As at the end of March, 2020

	JPY 1-year interest	USD 1-year interest	EUR 1-year interest	UKL 1-year interest	USD /JPY	EUR /JPY	UKL /JPY	TOPIX	S&P	SX5E	FTSE
JPY 1-year interest	1.00	0.18	0.24	0.09	0.47	0.51	0.48	0.33	0.09	0.08	(0.06)
USD 1-year interest	0.18	1.00	0.16	0.41	0.38	0.33	0.45	0.57	0.53	0.55	0.46
EUR 1-year interest	0.24	0.16	1.00	0.16	0.03	0.30	0.27	0.25	0.12	0.13	0.05
UKL 1-year interest	0.09	0.41	0.16	1.00	0.18	0.31	0.41	0.34	0.27	0.40	0.14
USD /JPY	0.47	0.38	0.03	0.18	1.00	0.69	0.75	0.58	0.22	0.35	0.12
EUR /JPY	0.51	0.33	0.30	0.31	0.69	1.00	0.82	0.60	0.28	0.27	0.08
UKL /JPY	0.48	0.45	0.27	0.41	0.75	0.82	1.00	0.71	0.44	0.50	0.11
TOPIX	0.33	0.57	0.25	0.34	0.58	0.60	0.71	1.00	0.76	0.76	0.57
S&P	0.09	0.53	0.12	0.27	0.22	0.28	0.44	0.76	1.00	0.80	0.72
SX5E	0.08	0.55	0.13	0.40	0.35	0.27	0.50	0.76	0.80	1.00	0.77
FTSE	(0.06)	0.46	0.05	0.14	0.12	0.08	0.11	0.57	0.72	0.77	1.00

<Reference> As at the end of March, 2019

	JPY 1-year interest	USD 1-year interest	EUR 1-year interest	UKL 1-year interest	USD /JPY	EUR /JPY	UKL /JPY	TOPIX	S&P	SX5E	FTSE
JPY 1-year interest	1.00	0.19	0.09	0.19	0.45	0.36	0.45	0.31	0.07	0.24	(0.07)
USD 1-year interest	0.19	1.00	0.09	0.21	0.40	0.40	0.54	0.49	0.30	0.25	(0.03)
EUR 1-year interest	0.09	0.09	1.00	0.07	(0.07)	0.27	0.19	0.06	0.04	0.02	(0.06)
UKL 1-year interest	0.19	0.21	0.07	1.00	0.13	0.19	0.29	0.22	0.02	0.23	(0.14)
USD /JPY	0.45	0.40	(0.07)	0.13	1.00	0.66	0.77	0.60	0.21	0.35	0.05
EUR /JPY	0.36	0.40	0.27	0.19	0.66	1.00	0.79	0.51	0.30	0.14	(0.00)
UKL /JPY	0.45	0.54	0.19	0.29	0.77	0.79	1.00	0.68	0.42	0.43	(0.02)
TOPIX	0.31	0.49	0.06	0.22	0.60	0.51	0.68	1.00	0.69	0.72	0.43
S&P	0.07	0.30	0.04	0.02	0.21	0.30	0.42	0.69	1.00	0.62	0.54
SX5E	0.24	0.25	0.02	0.23	0.35	0.14	0.43	0.72	0.62	1.00	0.64
FTSE	(0.07)	(0.03)	(0.06)	(0.14)	0.05	(0.00)	(0.02)	0.43	0.54	0.64	1.00

(6) Foreign exchange

Assets denominated in foreign currencies are converted to Japanese yen using the TTM (telegraphic transfer middle exchange rate) as at the end of March, 2020. Exchange rates of major currencies are shown below.

Currency	Exchange rate (JPY)
US dollar	108.83
Euro	119.55
Australian dollar	66.09
Swedish krona	10.81
Canadian dollar	76.60

3.2. Other assumptions

Assumptions including mortality and morbidity rates, surrender and lapse rates, and operating expense rates were developed based on best estimates as at March 31, 2020. Best-estimate assumptions are developed to reflect past and current experience as well as expected experience in the future.

(1) Mortality and morbidity rates

Developed based on experience over the most recent three to six years. The mortality improvement trend observed up to the most recent observation period is assumed to continue for the future five years based on an analysis of internal and other mortality data.

(2) Surrender and lapse rates

Surrender and lapse rates were developed based on experience over the most recent three years.

Dynamic surrender and lapse rates were applied depending on the level of interest rates for the saving products such as whole life insurance and individual annuity.

(3) Flexible premium policies

No assumptions were developed as Himawari Life does not have flexible premium policies.

(4) Renewal rates

Renewal rates were developed based on the experience of the most recent three years.

(5) Operating expense rates

Unit costs were developed for maintenance expenses incurred to maintain and administer insurance policies and to process claims payment based on the actual operating expenses in the most recent year.

It is assumed that Himawari Life's holding company incurs no expenses in respect of the business defined in "1.2 Covered business".

In addition, unit costs for policy maintenance expenses were developed based on the actual operating expenses of a standalone Himawari Life, since all the operating expenses of the covered business are recorded as operating expenses of Himawari Life. The look-through effect has not been considered with regards to other companies in the SOMPO Holdings Group.

One-off costs which are not expected to be incurred regularly in the future were not reflected in the unit cost assumptions. The one-off cost removed was 2.6 billion yen.

(6) Tax rate

Effective tax rates are set to 28.0%.

Consumption tax rates are set to 8% until September 2019, and 10% thereafter.

(7) Inflation

Inflation is set to 0% which is based on the break-even inflation rate derived from the most recently issued Inflation-Indexed Bonds. In order to maintain consistency with the interest rate extrapolation method, inflation

rates in the 31st year and thereafter are linearly extrapolated to converge in 40 years to the expected inflation rate (1.97%) assumed as part of the ultimate forward rate.

(8) Policyholder dividends

The interest dividend rate is set to the average yield to maturity of bonds less the assumed interest rate in each future year for each of the following segments: participating individual life insurance and participating individual annuity. With respect to group life policies, it is assumed that the most recent level of dividend payouts will continue in the future.

(9) Reinsurance

As the mortality risk of part of death protection insurance is ceded, the projection includes reinsurance premiums as expenses and reinsurance claims as income. The level of reinsurance premiums and reinsurance claims were developed based on the experience of the most recent three years.

4. Calculation method of MCEV

4.1. Covered business

The business covered on this report is life insurance business operated by Himawari Life. Results in this report do not reflect life insurance business or non-life insurance business operated by other insurance companies in the SOMPO Holdings Group.

4.2. MCEV

MCEV represents the present value of current and future distributable earnings to shareholders generated from assets allocated to the covered business after allowance for the aggregate risks in the covered business. MCEV can be expressed as the EV evaluated in a method consistent with valuation of prices of financial products traded in the financial markets and consists of "corporate net asset value" and "present value of future profit from existing business".

4.3. Adjusted net worth

The adjusted net worth is defined as the market value of assets allocated to the covered business in excess of statutory policy reserves and other liabilities as at the valuation date. More specifically, the adjusted net worth is the net assets on the statutory balance sheet plus the price fluctuation reserve, contingency reserves, general provision for loan losses, unallocated amount within policyholder dividend reserves, unrealized gains or losses on held-to-maturity bonds, unrealized gains or losses on policy-reserve-matching bonds, and unrealized gains or losses on derivatives, minus intangible fixed assets and tax adjustments on these eight items.

It is made up of the required capital and free surplus.

4.4. Required capital

The required capital is the portion of assets held in excess of statutory liabilities whose distribution to shareholders is restricted in order to meet insurance obligations. MCEV Principles state that the level of required capital should be the larger of the solvency capital to meet the statutory minimum required level and the capital required to meet internal objectives. The internal target level is a statutory solvency margin ratio of 600% and an economic solvency ratio of 100%.

The required capital to meet the economic solvency ratio of 100% as at the end of March 2020 corresponds to 343% of the regulatory minimum required capital

The economic value based risk volume has been calculated using an internal model assuming a confidence level of 99.5% value at risk over a 1 year time horizon. The internal model has been developed taking account of the trends in discussions on EU Solvency II and on economic value based solvency regulations in Japan. We will continue to make changes in line with the market and environment change as well as updates in industry standards and supervisory regulations.

The measurement methods of major risks covered by the internal model are as follows.

(1) Market risk

Asset and liability value changes due to market fluctuations such as interest rates and exchange rates are measured by stochastic simulation based on historical data.

(2) Insurance underwriting risk

The amount of risk is calculated as the change in insurance liability based on economic value due to changes in insurance assumptions such as deterioration or improvement of mortality rates, deterioration of morbidity rates, changes in surrender and lapse rates, etc. In order to reflect our own risk characteristics to the internal model, each of the insurance underwriting risk factors are set based on the confidence level derived from our own past experience, also taking into account the discussions on and the level of risk factors considered for economic value based solvency regulations in Japan.

(3) Operational risk

Follow the standard method of EU Solvency II.

4.5. Free surplus

The free surplus is calculated as the adjusted net worth minus the required capital.

4.6. Value of in-force

The value of in-force is the value of distributable earnings to shareholders generated in the future from the existing business as at the valuation date (March 31, 2020) converted to a present value as at the valuation date, which is the certainty equivalent present value of future profits reduced by the time value of options and guarantees, the frictional costs and the cost of non-hedgeable risks. The new business value is also calculated using the same method.

4.7. Certainty equivalent present value of future profits

The certainty equivalent present value of future profits is the present value of future profits under a single scenario, reflecting future cash flows arising from the covered business. Risk free rates are used for the investment yield assumptions and the discount rates. The intrinsic value of options and guarantees is included in the certainty equivalent present value of future profits.

4.8. Time value of options and guarantees

The time value of options and guarantees was calculated using 1,000 risk-neutral scenarios. The time value of options and guarantees is calculated as the difference between the average present value of future profits based on the future cash flows under each scenario and the certainty equivalent present value of future profits.

The time value of options and guarantees reflects the following components:

- 5-year interest dividends

In the case where the investment return exceeds the credited interest rate, the outperforming portion is paid to policyholders as interest dividends, while interest losses would all be attributable to shareholders. This represents a policyholder option. The cost of such options was evaluated by changing the interest dividend rate under each of the multiple scenarios.

- **Dynamic Surrenders**

The cost of policyholders exercising the right to surrender in the event of interest rates rise was taken into account for saving products such as whole life insurance and individual annuities, since policyholders of savings type insurance products are considered to be interest rate sensitive and surrender rates could change in line with movements in market interest rates. It is also generally considered that distributable earnings for shareholders may decrease compared with the assumption of no dynamic surrenders.

- **Annuity selections**

For individual annuities, policyholders have an option to select either annuity payments or a lump-sum payment at the time of annuitization. As it is anticipated that rational policyholder behavior would reduce the distributable earnings for shareholders, the cost is reflected.

- **Minimum guaranteed death benefits on Variable Life**

An excess of account value over the scheduled policy reserves would be attributable to policyholders. However, the cost of guaranteed minimum death benefits for variable life insurance incurred when the account value is less than the scheduled policy reserve is attributable to shareholders. This is similar to a policyholder option. The time value of options and guarantees for the minimum guarantee cost of death benefit was taken into account.

4.9. Frictional costs

The frictional costs are set to the present value of investment costs and taxes on assets backing the required capital.

4.10. Cost of non-hedgeable risks

The cost of non-hedgeable risks allow for the uncertainty of non-economic assumptions as well as the uncertainty of non-hedgeable economic assumptions.

The cost is derived by cost of capital approach applying to the internal model risk amounts.

Insurance risk, market risk related to interest rate risk in the extrapolated period, and operational risk are taken into consideration.

The following points are major differences from the methods applied by Solvency II:

- Counterparty default risk is not considered in the non-hedgeable risks as its impact is immaterial.
- Each of the insurance underwriting risk factors are set based on the confidence level derived from our own past experience, also taking into account the discussions on and the level of risk factors considered for

economic value based solvency regulations in Japan.

- Ultra long term interest rate risk considered to be non-hedgeable is reflected. The volatility of interest rates in the extrapolated period is determined so that ultimate forward rate volatility is within a specified range to be consistent with our approach to the extrapolation of ultra long term interest rates.
- Each risk was calculated based on cash flows after taking into account of loss absorption by policyholder dividends without any adjustments, while Solvency II requires an adjustment in order to keep the risk mitigation effect, which is defined as the difference between the cases with and without taking into account of loss absorption by policyholder dividends, to be less than the present value of policyholder dividends.

4.11. Cost of capital rate

EU Solvency II stipulates 6% as the cost of capital rate which is used for the risk margin calculation under the cost of capital method. On the other hand, the CRO (Chief Risk Officers') Forum, in which CROs from major insurance companies in Europe participate, suggested that 2.5% to 4.5% is the appropriate level for the cost of capital rate. .

In this report, the rate is set at 6%, as it is employed by Solvency II, since there is no standardized method for determining the cost of capital rate. We may revise the cost of capital rate in the future as adequate, considering trends in MCEV disclosures in Japan and abroad.

5. Opinion of Outside Specialist

We requested a review of the reasonableness of calculation methods, assumptions, and calculated results from a third-party with actuarial expertise, Milliman, Inc., and received the following opinion.

Milliman, Inc. (“Milliman”) has been engaged to review the methodology, assumptions and calculations used by Sompo Himawari Life Insurance, Inc. (“Himawari Life”) to determine the Market Consistent Embedded Value (“MCEV”) as at March 31, 2020. Specifically, the scope of our review included the embedded value as at 31 March 2020, the sensitivities, the new business value and the movement analysis from the MCEV as at 31 March 2019.

The board of directors made a statement in its News Release Form dated May 20, 2020 that the methodology, assumptions and calculations have been made in accordance with the MCEV Principles⁶, with the following exceptions:

- MCEV results were derived by using Japanese Government Bond (JGB) yields as risk free rates rather than swap rates as stipulated in the MCEV Principles.
- MCEV results in this report are solely for the life insurance business written by Himawari Life, and they are not the consolidated results of the SOMPO Holdings Group. The MCEV results do not reflect the life or non-life insurance business written by any other insurance companies within the SOMPO Holdings Group.
- Group MCEV, as prescribed in the MCEV Principles, is not considered in this report, as the report is for Himawari Life on a standalone basis.

Milliman has concluded that the methodology and assumptions used comply with the MCEV Principles except for the points described in the above paragraph. In particular:

- The non economic assumptions have been set with regard to past, current and expected future experience;
- The economic assumptions used in the calculations are internally consistent and consistent with observable market data as per the valuation date;
- Himawari Life’s market consistent embedded value methodology makes allowance for aggregate risks in the covered business. The primary methodologies employed are:
 - a stochastic allowance for the cost of financial options and guarantees
 - a deduction for the cost of non-hedgeable risks
 - a deduction for the frictional costs of the required capital

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- For participating insurance contracts, the assumptions and scenarios used in the projections are consistent with actual practice regarding the allocation of profits between policyholders and shareholders, the setting of policyholder dividend rates, and other management actions.

Milliman has reviewed the MCEV methodology, assumptions, calculations and analysis prepared by Himawari Life, but this does not mean that Milliman has conducted a detailed review in all aspects. During its review Milliman identified and discussed various MCEV calculation and definition issues with Himawari Life staff. Based upon those discussions and follow-up actions Milliman is not aware of any issues that would materially impact the disclosed market consistent embedded values, new business values, sensitivities or movement analysis from the prior period. In arriving at this conclusion, Milliman has relied on data and information provided by Himawari Life.

The calculation of MCEV is based on numerous assumptions with respect to economic conditions, operating conditions, taxes and other matters, many of which are beyond the control of Himawari Life. Although the methodology and assumptions used comply with the MCEV Principles, deviations between projection assumptions and actual experience in the future are to be expected. Also, Himawari Life's internal model approach to quantifying various risks and calibrating risk factors, instrumental to quantifying the internal required capital target and the cost of residual non-hedgeable risk, is in the process of ongoing update, and will likely continue to evolve over the next several years to reflect market or environmental changes, as well as emerging industry and regulatory standard practices. Such deviations and internal model updates can be expected to impact the values calculated, possibly materially.

This opinion is made solely to Himawari Life in accordance with the engagement letter between Himawari Life and Milliman. Milliman does not accept or assume any responsibility, duty of care or liability to anyone other than Himawari Life for or in connection with its review work, the opinion Milliman has formed or for any statements set forth in this opinion, to the fullest extent permitted by applicable law.

6. Glossary

Term	Definition	
B	Best estimate assumption	As defined by the CFO Forum, it is the “mean estimate (probability weighted average)” of a particular variable as at the valuation date. Actual experience, the current situation and future expectations are considered. Margins for adverse deviation are not considered in the assumption.
C	Calibration	In this report this means the process whereby economic scenarios used for stochastic valuations are made consistent with the actual financial markets’ relevant parameters.
	Cost of capital approach	One of the approaches to assess the risk that the actual value will diverge from the best estimate value. The allowance for the risk is set as the present value of the cost of holding capital until the risk is released.
	Cost of non-hedgeable risks	Allowance for risks not reflected in the time value of options and guarantees or in the certainty equivalent present value of future profits. It reflects the risk that future experience will diverge from non-economic assumptions such as mortality and morbidity rates, or surrender and lapse rates, as well as economic assumptions which are unobservable in the capital markets such as extra-long term interest rates.
E	EU Solvency II	An integrated new solvency framework on an economic value basis among EU countries.
F	Free surplus	The portion of assets held in excess of statutory liabilities that it is not required to retain.
	Frictional costs	Allowance for investment costs and taxes due to investment in required capital, compared with direct investment in the capital markets.
I	Implied volatility	Theoretical volatility of option prices derived from the current market prices of the options, based on option pricing models.
L	Look through basis	A basis on which the impact of an action on an entire business group is considered, rather than only on a particular part of the group.
O	Options and guarantees	Policyholders are eligible for various options embedded in insurance policies, and the cost of providing such options is deducted from the MCEV. The intrinsic plus time value is the value of options and guarantees, and the value changes asymmetrically in response to changes in the observable capital markets.
P	Present value of certainty equivalent future profits	The present value of profits under a single scenario, reflecting future cash flows arising from the covered business. Risk free rates are used for the investment yield assumptions and the discount rates. The intrinsic value of options and guarantees is included in the certainty equivalent present value of future profits.

Term		Definition
R	Required capital	The portion of assets held in excess of statutory liabilities whose distribution to shareholders is restricted.
	Risk free rate	In this report, the risk free rate means the reference rate prescribed in the MCEV Principles. The reference rate differs depending on currency, term and liquidity. Unless future cash flow is reasonably predictable the interest swap rate should be used. Where swap curves do not provide a robust basis for producing reference rates, a more appropriate alternative, such as the government bond yield curve, may be used. If future cash flow is reasonably predictable a liquidity premium is added to the interest swap rate where appropriate.
	Risk margin	In the context of Solvency II, the risk margin is the cost of retaining capital for non-hedgeable risks reflected in the evaluation of insurance liabilities on an economic value basis.
	Risk neutral scenario	Risk neutrality means that market participants are indifferent to risk, being neither risk averse nor risk seeking. Risk neutral scenarios are those generated assuming risk neutrality.
T	Time value and intrinsic value	An option value can be thought of consisting of two parts, time value and intrinsic value. The intrinsic value of an option is the option pay-off that would be realized if the option was settled on the valuation date. The time value corresponds to the possibility of the option value increasing up to expiry.
U	Ultimate forward rate	Ultimate forward rate is the level of interest rate to which forward rate is expected to converge in the long run. The most important components are the long-term expected inflation and expected short-term real interest rates which are generally set based on macro-economic analyses. EU Solvency II uses ultimate forward rate to extrapolate risk free rates.
Y	Yield to maturity	Yield to maturity of existing bonds means the yield that will be achieved when the bonds are held from the purchase to maturity.