

**MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
AND SUBSIDIARIES**

INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of March 31, 2025 and December 31, 2024 and
for the three months ended March 31, 2025 and 2024

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MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
INTERIM CONSOLIDATED STATUTORY STATEMENTS OF FINANCIAL POSITION
(UNAUDITED)

	March 31, 2025	December 31, 2024
	(In Millions)	
Assets:		
Bonds	\$ 167,356	\$ 166,513
Preferred stocks	1,091	1,030
Common stocks – subsidiaries and affiliates	24,388	24,147
Common stocks – unaffiliated	1,168	1,209
Mortgage loans	24,466	24,363
Policy loans	18,279	17,907
Real estate	317	323
Partnerships and limited liability companies	15,466	14,908
Derivatives	22,756	24,889
Cash, cash equivalents and short-term investments	5,629	6,288
Other invested assets	4,073	3,770
Total invested assets	<u>284,989</u>	<u>285,347</u>
Investment income due and accrued	4,610	5,436
Federal income taxes	639	581
Net deferred income taxes	1,907	1,881
Other than invested assets	6,457	6,485
Total assets excluding separate accounts	<u>298,602</u>	<u>299,730</u>
Separate account assets	53,088	55,935
Total assets	<u><u>\$ 351,690</u></u>	<u><u>\$ 355,665</u></u>
Liabilities and Surplus:		
Policyholders' reserves	\$ 182,101	\$ 181,225
Liabilities for deposit-type contracts	21,410	21,288
Contract claims and other benefits	791	624
Policyholders' dividends	2,559	2,533
General expenses due or accrued	872	921
Asset valuation reserve	6,159	6,038
Repurchase agreements	3,455	3,408
Debt	250	250
Collateral	1,956	1,986
Derivatives	15,827	17,125
Funds held under coinsurance	29,730	29,625
Other liabilities	5,715	6,969
Total liabilities excluding separate accounts	<u>270,825</u>	<u>271,992</u>
Separate account liabilities	52,940	55,791
Total liabilities	<u>323,765</u>	<u>327,783</u>
Surplus	27,925	27,882
Total liabilities and surplus	<u><u>\$ 351,690</u></u>	<u><u>\$ 355,665</u></u>

See accompanying notes to interim consolidated statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
INTERIM CONSOLIDATED STATUTORY STATEMENTS OF OPERATIONS
(UNAUDITED)

	Three Months Ended March 31,	
	2025	2024
	(In Millions)	
Revenue:		
Premium income	\$ 3,884	\$ 4,274
Net investment income	2,868	2,555
Fees and other income	247	277
Total revenue	6,999	7,106
Benefits, expenses and other deductions:		
Policyholders' benefits	4,361	4,138
Change in policyholders' reserves	637	1,105
General insurance expenses	615	680
Commissions	290	300
State taxes, licenses and fees	91	95
Other deductions	360	203
Total benefits and expenses	6,354	6,521
Net gain from operations before dividends and federal income taxes	645	585
Dividends to policyholders	562	487
Net gain from operations before federal income taxes	83	98
Federal income tax expense	25	95
Net gain from operations	58	3
Net realized capital gains (losses)	145	(237)
Net income (loss)	\$ 203	\$ (234)

See accompanying notes to interim consolidated statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
INTERIM CONSOLIDATED STATUTORY STATEMENTS OF CHANGE IN SURPLUS
(UNAUDITED)

	Three Months Ended March 31,	
	2025	2024
	(In Millions)	
Surplus, beginning of year	\$ 27,882	28,877
Net increase (decrease) due to:		
Net income (loss)	203	(234)
Change in net unrealized capital (losses) gains, net of tax	(167)	146
Change in net unrealized foreign exchange capital gains (losses), net of tax	243	(160)
Change in other net deferred income taxes	(51)	195
Change in nonadmitted assets	21	83
Change in asset valuation reserve	(121)	(301)
Change in surplus notes	—	(50)
Change in minimum pension liability	—	2
Prior period adjustments	(30)	(109)
Other	(55)	(114)
Net increase (decrease)	43	(542)
Surplus, end of period	\$ 27,925	28,335

See accompanying notes to interim consolidated statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
INTERIM CONSOLIDATED STATUTORY STATEMENTS OF CASH FLOWS
(UNAUDITED)

	Three Months Ended March 31,	
	2025	2024
	(In Millions)	
Cash from operations:		
Premium and other income collected	\$ 4,362	\$ 4,728
Net investment income	3,582	3,804
Benefit payments	(4,386)	(4,306)
Net transfers from separate accounts	230	637
Commissions and other expenses	(1,445)	(1,369)
Dividends paid to policyholders	(540)	(463)
Federal and foreign income taxes (received) paid	(6)	30
Net cash from operations	<u>1,797</u>	<u>3,061</u>
Cash from investments:		
Proceeds from investments sold, matured or repaid:		
Bonds	10,033	8,588
Preferred and common stocks – unaffiliated	(20)	37
Common stocks – affiliated	5	—
Mortgage loans	757	508
Real estate	(1)	—
Partnerships and limited liability companies	490	199
Derivatives	184	(157)
Other	(338)	(694)
Total investment proceeds	<u>11,110</u>	<u>8,481</u>
Cost of investments acquired:		
Bonds	(10,261)	(15,390)
Preferred and common stocks – unaffiliated	(77)	(276)
Common stocks – affiliated	(18)	(163)
Mortgage loans	(1,077)	(647)
Real estate	(1)	—
Partnerships and limited liability companies	(745)	(565)
Derivatives	100	(40)
Other	(239)	808
Total investments acquired	<u>(12,318)</u>	<u>(16,273)</u>
Net increase in policy loans	(373)	(353)
Net cash used in investing activities	<u>(1,581)</u>	<u>(8,145)</u>
Cash from financing and miscellaneous sources:		
Net deposits on deposit-type contracts	(96)	794
Change in surplus notes	—	(50)
Change in repurchase agreements	(166)	246
Change in collateral	(29)	(221)
Other cash (used) provided	(583)	79
Net cash (used in) from financing and miscellaneous sources	<u>(874)</u>	<u>848</u>
Net change in cash, cash equivalents and short-term investments	<u>(658)</u>	<u>(4,236)</u>
Cash, cash equivalents and short-term investments:		
Beginning of year	6,287	11,941
End of period	<u>\$ 5,629</u>	<u>\$ 7,705</u>

See accompanying notes to interim consolidated statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS
(UNAUDITED)

1. *Nature of operations*

Massachusetts Mutual Life Insurance Company (MassMutual), a mutual life insurance company domiciled in the Commonwealth of Massachusetts, and its domestic life insurance subsidiaries domiciled in the State of Connecticut (collectively, the Company), provide individual and group life insurance, disability income insurance (DI), individual and group annuities and guaranteed interest contracts (GIC) to individual and institutional customers in all 50 states of the United States of America (U.S.), the District of Columbia and Puerto Rico. Products and services are offered primarily through the Company's affiliated distribution channel, MassMutual Strategic Distributors (MMSD), Institutional Solutions (IS) and Worksite distribution channels.

The affiliated distribution channel is a sales force of financial professionals that operate in the U.S. The affiliated distribution channel sells life insurance, annuities, hybrid life and long term care insurance (LTC) and DI. The Company's MMSD channel sells life insurance, DI, annuity, and hybrid life and LTC solutions through a network of third-party distribution partners. The Company's IS distribution channel places group annuities, life insurance and GIC primarily through retirement advisory firms, actuarial consulting firms, investment banks, insurance benefit advisors and investment management companies. The Company's Worksite channel works with advisors and employers across the country to provide American workers with voluntary and executive benefits such as group whole life insurance, group critical illness insurance, group accident insurance and DI, through the workplace.

2. *Summary of significant accounting policies*

a. *Basis of presentation*

These interim consolidated statutory financial statements include MassMutual and its wholly-owned U.S. domiciled life insurance subsidiary, C.M. Life Insurance Company (C.M. Life), and C.M. Life's wholly-owned U.S. domiciled life insurance subsidiary, MML Bay State Life Insurance Company. All intercompany transactions and balances for these consolidated entities have been eliminated. Other subsidiaries and affiliates are accounted for under the equity method in accordance with statutory accounting practices. Statutory financial statements filed with regulatory authorities are not presented on a consolidated basis.

The interim consolidated statutory financial statements have been prepared in conformity with the statutory accounting practices of the National Association of Insurance Commissioners (NAIC) and the accounting practices prescribed or permitted by the Commonwealth of Massachusetts Division of Insurance; and for the wholly-owned U.S. domiciled life insurance subsidiaries, the State of Connecticut Insurance Department.

The interim consolidated statutory financial statements and notes as of March 31, 2025 and December 31, 2024 and for three months ended March 31, 2025 and 2024 are unaudited. The interim consolidated Statutory Statement of Financial Position as of December 31, 2024 has been derived from the audited consolidated financial statements at that date, but do not include all of the information and footnotes required by statutory accounting practices for complete financial statements. These interim consolidated statutory financial statements, in the opinion of management, reflect the fair presentation of the financial position, results of operations, changes in surplus and cash flows for the interim periods. These interim consolidated statutory financial statements and notes should be read in conjunction with the consolidated statutory financial statements and notes thereto included in the Company's 2024 audited yearend financial statements as these interim consolidated statutory financial statements disclose only significant changes from yearend 2024. The results of operations for the interim periods should not be considered indicative of results to be expected for the full year.

For the full description of accounting policies, see Note 2. "*Summary of significant accounting policies*" of Notes to Interim Consolidated Statutory Financial Statements included in the Company's 2024 audited consolidated yearend financial statements.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

b. Corrections of errors and reclassifications

For the three months ended March 31, 2025 corrections of prior years' errors were recorded in surplus, net of tax:

	Increase (Decrease) to:		
	Prior Years' Net Income	Current Year Surplus	Asset or Liability Balances
	(In Millions)		
Bonds	\$ (6)	\$ (6)	\$ (6)
Investment income due and accrued	(26)	(26)	(26)
Separate account assets	4	4	4
Other liabilities	2	2	(2)
Separate account liabilities	(4)	(4)	4
Total	<u>\$ (30)</u>	<u>\$ (30)</u>	

c. Common stocks - subsidiaries and affiliates

Common stocks of unconsolidated subsidiaries, primarily MassMutual Holding LLC (MMHLLC), Glidepath Holdings Inc. (Glidepath) and MM Investment Holding (MMIH), are accounted for using the statutory equity method. The Company accounts for the value of MMHLLC at its underlying U.S. generally accepted accounting principals (GAAP) equity value less adjustments for the limited statutory basis of accounting related to foreign insurance subsidiaries and controlled affiliated entities as well as an adjustment of \$519 million as of March 31, 2025 for a portion of its noncontrolling interests. Glidepath is valued on its underlying GAAP equity with adjustment to recognize its investment in MassMutual Ascend Life Insurance Company and other subsidiaries and affiliated entities (MM Ascend) based on MM Ascend's underlying statutory surplus, adjusted for any unamortized goodwill recognized under the statutory purchase method. Operating results, less dividends declared, for MMHLLC, Glidepath and MMIH are reflected as net unrealized capital gains in the Statutory Statements of Changes in Surplus. Dividends declared from MMHLLC, Glidepath and MMIH are recorded in net investment income when declared and are limited to MMHLLC, Glidepath and MMIH's U.S. GAAP retained earnings. The cost basis of common stocks – subsidiaries and affiliates is adjusted for impairments deemed to be other than temporary.

3. New accounting standards

Adoption of new accounting standards

Effective January 1, 2024, the NAIC adopted revisions to avoid allocating realized gains or losses from bond sales to the Interest Maintenance Reserve (IMR) when sold before a rating downgrade. Revisions were also made to avoid allocating realized gains or losses from mortgage loan sales when there is a credit loss allowance, where payments are not 90 days past due. Revisions were also made to update guidance on changes in credit ratings used to allocate credit or interest rate related gains or losses, requiring identification of realized losses from acute credit events to be allocated to asset valuation reserve. The modifications did not have a material effect on the Company's consolidated financial statements.

In March 2024, the NAIC adopted revisions to the requirements of audit and admissibility in SSAP No. 97 – Investments in Subsidiary, Controlled and Affiliated Entities (SCA), effective March 16, 2024, to better align with the guidance on the look-through methodology. The revisions allow for admitting audited investments in entities owned by unaudited downstream noninsurance holding company SCA entity. The modifications did not have a material effect on the Company's interim consolidated financial statements.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

In August 2023, the NAIC adopted revisions to clarify and incorporate a new bond definition within disclosures SSAP No. 26 – Bonds, SSAP No. 43 – Asset-Backed Securities, and other related SSAPs, effective January 1, 2025. The revisions were issued in connection with its principle-based bond definition project, “the Bond Project”.

The Bond Project began in October 2020 through the development of a principle-based bond definition to be used for all securities in determining whether they qualify for reporting on the statutory annual statement Schedule D. Within the new bond definition, bonds are classified as an “issuer credit obligation” or an “asset-backed security.”

An issuer credit obligation is defined as a bond where repayment is supported by the general creditworthiness of an operating entity, and an asset-backed security is defined as a bond issued by an entity created for the primary purpose of raising capital through debt backed by financial assets. The revisions to SSAP No. 26 reflect the principle-based bond definition, and SSAP No. 43 provides accounting and reporting guidance for investments that qualify as asset-backed securities under the new bond definition. Upon adoption, investments that do not qualify as bonds will not be permitted to be reported as bonds on Schedule D, Part 1 thereafter as there will be no grandfathering for existing investments that do not qualify under the revised SSAPs. The Company has adopted this guidance, resulting in \$496 million for all securities reclassified off Schedule D-1, which includes \$302 million that resulted with a change in measurement basis. The adoption resulted in a decrease in change in Surplus of \$47 million for MassMutual on January 1, 2025. Modifications of disclosures by asset categories are prospectively applied to *Note 5a. "Investments – Bonds"*.

In March 2024, the NAIC adopted revisions to SSAP No. 21 - Other Admitted Assets, effective January 1, 2025, clarifying that residuals follow the effective yield approach with a cap and providing an election for the cost recovery method. The Company elected the effective yield method using the allowable earned yield, capped by the amount of cash distributions received. The modifications did not have a material effect on the Company’s interim consolidated financial statements.

Effective January 1, 2025, revisions were made to short-term investments, which include excluding additional investment types from being reported as cash equivalents or short-term investments regardless of maturity date of the investment at the date of acquisition. Investments will be eliminated from being reported as cash equivalents or short-term investments unless they would qualify under SSAP No. 26 – Bonds as an issuer credit obligation. Such investments will then only qualify as a cash equivalent or short-term investment if they have a maturity date within 3-months (cash equivalents) or 12-months (short-term) from the date of acquisition or meet the specifics requirements for money market mutual funds or cash pooling arrangement. The modifications did not have a material effect on the Company’s interim consolidated financial statements.

The NAIC adopted revisions to various SSAPs for investments in tax credits, acquired tax credits and updated annual statement reporting categories for tax credit investment risk-based capital. These revisions include broad criteria to scope in various tax credit programs, including solar programs and state specific programs. This adoption requires proportional amortization as the measurement approach, as with existing low-income housing tax credits, recording amortization of the investment in the partnership through net investment income and the use of the tax credits in the appropriate tax line. The adopted revisions were effective on January 1, 2025. The modifications were prospectively applied and did not have a material effect on the Company’s interim consolidated financial statements.

In, March 2025, the NAIC adopted revisions to clarify how assets held under modified coinsurance (Modco) or funds withheld (FWH) agreements shall be reflected within the restricted asset disclosure in SSAP No. 1 - Accounting Policies, Risks & Uncertainties, and Other Disclosures and in the corresponding disclosures in Note 5m of the statutory financial statements. It also proposes enhanced disclosures to fully identify the extent of restricted assets reported on balance sheet within a single disclosure as well as identify differences between the restricted asset annual statement disclosure and the amount reported in the annual statement general interrogatories, which is pulled directly into the risk-based capital formulas. The modifications did not have a material effect on the Company’s interim consolidated financial statements.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

Future adoption of new accounting standards

In March 2024, the NAIC proposed expansion of the guidance in SSAP No. 56 - Separate Accounts to further address situations and provide consistent accounting guidelines for when assets are reported at a measurement method other than fair value. This is to address an increase in assets reported at book value within the separate investment account, which have been approved under state prescribed practices and/or interpretations that the reference for fund accumulation contracts captures pension risk transfer or registered indexed-linked annuities and other similar general-account type products. In August 2024, the NAIC exposed further revisions as to treatment of IMR for transfers between general investment account and separate investment account, with the broad concept that such transfers would have offset IMR impacts between the general investment account and the book value separate investment account with a zero net impact to surplus. In February 2025, the NAIC adopted final revisions to SSAP No. 56 - Separate Accounts. The revisions clarify the measurement method guidance as well as prescribe guidance for how transfers to/from the general investment account and separate investment account shall be recognized. The adopted revisions will be effective on January 1, 2026, with early adoption permitted. The Company is assessing the potential impact on the Company's interim consolidated financial statements.

4. Fair value of financial instruments

The following presents a summary of the carrying values and fair values of the Company's financial instruments:

	March 31, 2025				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
Issuer credit obligations	\$ 107,563	\$ 98,966	\$ 759	\$ 51,127	\$ 47,080
Asset-backed securities	59,793	59,160	—	30,874	28,286
Preferred stocks	1,091	1,135	192	3	940
Common stocks - subsidiaries and affiliates	161	161	15	—	146
Common stocks - unaffiliated	1,168	1,168	302	—	866
Mortgage loans	24,466	23,104	—	—	23,104
Derivatives	22,756	16,544	176	16,368	—
Cash, cash equivalents and short-term investments	5,629	5,629	610	5,019	—
Separate account assets	53,088	53,048	34,146	17,070	1,832
Financial liabilities:					
GICs	18,124	15,875	—	—	15,875
Group annuity contracts and other deposits	1,610	1,488	—	—	1,488
Individual annuity contracts	31,273	32,295	—	—	32,295
Supplementary contracts	888	889	—	—	889
Repurchase agreements	3,455	3,497	—	3,497	—
Debt	250	250	—	250	—
Derivatives	15,827	15,884	84	15,800	—

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of \$24,227 million.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

	December 31, 2024				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds	\$ 166,513	\$ 156,522	\$ 756	\$ 80,900	\$ 74,866
Preferred stocks	1,030	1,155	193	3	959
Common stocks - subsidiaries and affiliates	157	157	16	—	141
Common stocks - unaffiliated	1,209	1,209	299	—	910
Mortgage loans	24,363	22,765	—	—	22,765
Derivatives	24,889	18,394	129	18,265	—
Cash, cash equivalents and short-term investments	6,288	6,288	584	5,704	—
Separate account assets	55,935	55,879	36,435	17,621	1,823
Financial liabilities:					
GICs	17,955	17,249	—	—	17,249
Group annuity contracts and other deposits	1,714	1,570	—	—	1,570
Individual annuity contracts	31,439	32,405	—	—	32,405
Supplementary contracts	895	897	—	—	897
Repurchase agreements	3,408	3,420	—	3,420	—
Debt	250	250	—	250	—
Derivatives	17,125	17,592	89	17,503	—

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of \$23,990 million.

The following presents the Company's fair value hierarchy for assets and liabilities that are carried at fair value:

	March 31, 2025			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Issuer credit obligations	\$ 759	\$ 23	\$ 276	\$ 1,058
Asset-backed securities	—	90	—	90
Preferred stocks	43	—	63	106
Common stocks - subsidiaries and affiliates	15	—	146	161
Common stocks - unaffiliated	302	—	866	1,168
Derivatives:				
Interest rate swaps	—	19,238	—	19,238
Options	160	483	—	643
Currency swaps	—	2,741	—	2,741
Forward contracts	—	74	—	74
Credit default swaps	—	2	—	2
Financial Futures	16	—	—	16
Separate account assets	34,146	15,858	1,825	51,829
Total financial assets carried at fair value	\$ 35,441	\$ 38,509	\$ 3,176	\$ 77,126

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

	March 31, 2025			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial liabilities:				
Derivatives:				
Interest rate swaps	\$ —	\$ 14,079	\$ —	\$ 14,079
Options	79	11	—	90
Currency swaps	—	257	—	257
Forward contracts	—	242	—	242
Credit default swaps	—	142	—	142
Financial futures	5	—	—	5
Total financial liabilities carried at fair value	<u>\$ 84</u>	<u>\$ 14,731</u>	<u>\$ —</u>	<u>\$ 14,815</u>

The Company does not have any financial instruments that were carried at net asset value as a practical expedient.

The following presents the Company's fair value hierarchy for assets and liabilities that are carried at fair value:

	December 31, 2024			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	\$ —	\$ 1	\$ —	\$ 1
Industrial and miscellaneous	755	113	272	1,140
Preferred stocks	44	—	51	95
Common stocks - subsidiaries and affiliates	16	—	141	157
Common stocks - unaffiliated	299	—	910	1,209
Derivatives:				
Interest rate swaps	—	21,068	—	21,068
Options	114	481	—	595
Currency swaps	—	2,707	—	2,707
Forward contracts	—	417	—	417
Credit default swaps	—	2	—	2
Financial Futures	15	—	—	15
Separate account assets	36,435	16,433	1,817	54,685
Total financial assets carried at fair value	<u>\$ 37,678</u>	<u>\$ 41,222</u>	<u>\$ 3,191</u>	<u>\$ 82,091</u>

Financial liabilities:				
Derivatives:				
Interest rate swaps	\$ —	\$ 15,984	\$ —	\$ 15,984
Options	63	15	—	78
Currency swaps	—	203	—	203
Forward contracts	—	68	—	68
Credit default swaps	—	175	—	175
Financial futures	26	—	—	26
Total financial liabilities carried at fair value	<u>\$ 89</u>	<u>\$ 16,445</u>	<u>\$ —</u>	<u>\$ 16,534</u>

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
NOTES TO INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS, continued
(UNAUDITED)

The Company reviews the fair value hierarchy classifications each reporting period. Changes in the observability of the valuation attributes and the level of market activity may result in a reclassification of certain financial assets or liabilities between fair value hierarchy classifications. Such reclassifications are reported as transfers between levels in the beginning fair value for the reporting period in which the changes occur.

The following presents changes in the Company's Level 3 assets carried at fair value:

	Balance as of 01/01/25	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers			Balance as of 03/31/25
								In	Out	Other	
(In Millions)											
Financial assets:											
Bonds:											
Issuer credit obligations	\$ 272	\$ (3)	\$ (21)	\$ 63	\$ 41	\$ —	\$ (15)	\$ —	\$ —	\$ (61)	\$ 276
Preferred stocks	51	—	—	10	1	—	—	—	—	1	63
Common Stocks:											
Subsidiaries and affiliates	141	—	(1)	—	5	—	—	—	—	1	146
Unaffiliated	910	—	(66)	27	—	(1)	(5)	1	—	—	866
Separate account assets	1,817	34	—	11	—	(20)	(2)	—	(15)	—	1,825
Total financial assets	<u>\$ 3,191</u>	<u>\$ 31</u>	<u>\$ (88)</u>	<u>\$ 111</u>	<u>\$ 47</u>	<u>\$ (21)</u>	<u>\$ (22)</u>	<u>\$ 1</u>	<u>\$ (15)</u>	<u>\$ (59)</u>	<u>\$ 3,176</u>

	Balance as of 01/01/24	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers			Balance as of 12/31/24
								In	Out	Other	
(In Millions)											
Financial assets:											
Bonds:											
Industrial and miscellaneous	\$ 176	\$ (136)	\$ 9	\$ 7	\$ 3	\$ —	\$ (10)	\$ —	\$ —	\$ 223	\$ 272
Preferred stocks	67	(9)	9	—	—	—	—	—	—	(16)	51
Common Stocks:											
Subsidiaries and affiliates	183	3	3	415	(258)	66	(346)	—	(156)	231	141
Unaffiliated	960	(7)	138	259	222	(13)	(674)	25	—	—	910
Separate account assets	1,914	83	—	22	—	(196)	(6)	—	—	—	1,817
Total financial assets	<u>\$ 3,300</u>	<u>\$ (66)</u>	<u>\$ 159</u>	<u>\$ 703</u>	<u>\$ (33)</u>	<u>\$ (143)</u>	<u>\$ (1,036)</u>	<u>\$ 25</u>	<u>\$ (156)</u>	<u>\$ 438</u>	<u>\$ 3,191</u>

Other transfers include assets that are either no longer carried at fair value or have just begun to be carried at fair value, such as assets with no level changes but a change in the lower of cost or market carrying basis. Industrial and miscellaneous bonds in other contain assets that are now carried at fair value due to ratings changes and assets are no longer carried at fair value where the fair value is now higher than the book value.

Level 3 transfers in are assets that are consistently carried at fair value but have had a level change. Common stocks unaffiliated assets were transferred from Level 2 to Level 3 due to a change in the observability of pricing inputs, at the beginning fair value for the reporting period.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES
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5. Investments

The Company maintains a diversified investment portfolio. Investment policies limit concentration in any asset class, geographic region, industry group, economic characteristic, investment quality or individual investment.

a. Bonds

The carrying value and fair value of bonds were as follows:

	March 31, 2025			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
Issuer credit obligations:				
Corporate bonds	\$ 81,830	\$ 484	\$ 8,001	\$ 74,313
Bank loans	8,829	73	130	8,772
U.S. government obligation	4,927	33	548	4,412
Bond issued from SEC registered BDC/CEF/REIT	2,253	23	66	2,210
Municipal bonds	2,192	29	132	2,089
Single entity backed bonds	2,047	19	61	2,005
Other U.S. government securities	1,731	56	20	1,767
Non-U.S. sovereign jurisdiction securities	1,538	9	322	1,225
SVO - identified bond funds	759	—	—	759
Mortgages loans that qualify as SVO - identified credit tenant loans	731	—	—	731
Project finance bonds issued by operating entities	331	3	29	305
Other issuer credit obligations	395	10	27	378
Total issuer credit obligations	107,563	739	9,336	98,966
Asset-back securities:				
Non-agency - CLOs/CBOs/CDOs	17,350	45	29	17,366
Equity-backed securities	9,124	1	172	8,953
Non-agency residential mortgage-backed securities	4,043	75	31	4,087
Non-agency commercial mortgage-backed securities	2,856	15	275	2,596
Lease-backed securities	1,310	12	47	1,275
Agency residential mortgage-backed securities	222	—	4	218
Agency commercial mortgage-backed securities	28	—	1	27
Other financial asset-backed securities	24,860	90	312	24,638
Total asset-backed securities	59,793	238	871	59,160
Total bonds	\$ 167,356	\$ 977	\$ 10,207	\$ 158,126

The March 31, 2025 gross unrealized losses exclude \$204 million of losses included in the carrying value. These losses include \$202 million from NAIC Class 6 bonds and \$2 million from RMBS and CMBS whose ratings were obtained from third-party modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

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	December 31, 2024			
	Carrying	Gross	Gross	Fair
	Value	Unrealized	Unrealized	Value
		Gains	Losses	
	(In Millions)			
U.S. government and agencies	\$ 5,611	\$ 22	\$ 658	\$ 4,975
All other governments	979	6	176	809
States, territories and possessions	164	—	11	153
Political subdivisions	288	5	15	278
Special revenue	3,456	39	119	3,376
Industrial and miscellaneous	141,875	750	9,460	133,165
Hybrid securities	1,027	44	22	1,049
Parent, subsidiaries and affiliates	13,113	29	425	12,717
Total	\$ 166,513	\$ 895	\$ 10,886	\$ 156,522

The December 31, 2024 gross unrealized losses exclude \$188 million of losses included in the carrying value. These losses include \$185 million from NAIC Class 6 bonds and \$3 million from RMBS and CMBS whose ratings were obtained from third-party modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

As of March 31, 2025, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of \$16,893 million. Securities in an unrealized loss position for less than 12 months had a fair value of \$9,780 million and unrealized losses of \$49 million. Securities in an unrealized loss position for greater than 12 months had a fair value of \$7,113 million and unrealized losses of \$839 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2024, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of \$11,478 million. Securities in an unrealized loss position for less than 12 months had a fair value of \$4,270 million and unrealized losses of \$42 million. Securities in an unrealized loss position for greater than 12 months had a fair value of \$7,207 million and unrealized losses of \$910 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

In the course of the Company's investment management activities, securities may be sold and reacquired within 30 days to enhance the Company's yield on its investment portfolio. The Company did not sell any securities with the NAIC Designation 3 or below for the three months ended March 31, 2025 or 2024 that were reacquired within 30 days of the sale date.

Residential mortgage-backed exposure

Residential mortgage-backed securities (RMBS) are included in the U.S. government and agencies, special revenue and industrial and miscellaneous bond categories. The Alt-a category includes option adjustable-rate mortgages and the subprime category includes 'scratch and dent' or reperforming pools, high loan-to-value pools and pools where the borrowers have very impaired credit but the average loan-to-value is low, typically 70% or below. In identifying Alt-A and subprime exposure, management used a combination of qualitative and quantitative factors, including FICO scores and loan-to-value ratios.

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As of March 31, 2025, RMBS had a total carrying value of \$3,664 million and a fair value of \$3,700 million of which approximately 2%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of \$2,138 million and a fair value of \$2,167 million. As of December 31, 2024, RMBS had a total carrying value of \$3,917 million and a fair value of \$3,937 million of which approximately 2%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of \$2,270 million and a fair value of \$2,291 million.

b. 5GI Securities

Securities owned by the Company with an NAIC designation of 5GI securities:

	March 31, 2025			December 31, 2024		
	Number of 5GI Securities	Carrying Value	Fair Value	Number of 5GI Securities	Carrying Value	Fair Value
(In Millions)						
Investments:						
Bonds - amortized cost	258	\$ 1,067	\$ 1,053	258	\$ 1,004	\$ 990
Preferred stock - fair value	3	1	1	3	1	1
Total	261	\$ 1,068	\$ 1,054	261	\$ 1,005	\$ 991

c. Preferred stocks

No significant changes.

d. Common stocks – subsidiaries and affiliates

MMHLLC paid \$570 million in dividends to MassMutual for the three months ended March 31, 2025, which were declared in 2024, and paid \$630 million in dividends to MassMutual for the three months ended March 31, 2024, \$630 million which was declared in 2023.

MassMutual contributed capital of \$20 million to MMHLLC for the three months ended March 31, 2025, and \$56 million for the three months ended March 31, 2024.

On March 14, 2025, Barings LLC, a downstream wholly-owned subsidiary of MMHLLC, acquired Artemis Real Estate Partners, a U.S.-based real estate debt and equity investment manager with gross assets under management of approximately \$11 billion. The total purchase price included an upfront payment of \$396 million and a final payment of \$255 million to be paid in 2030. The acquisition is expected to bolster Barings LLC's position as a key player in the real estate asset management sector.

Subsidiaries of MMHLLC are involved in litigation and investigations arising in the ordinary course of their business, which seek compensatory damages, punitive damages and equitable remedies. Although the Company is not aware of any actions or allegations that reasonably could give rise to a material adverse impact to the Company's financial position or liquidity, the outcome of litigation cannot be foreseen with certainty. It is the opinion of management that the ultimate resolution of these matters will not materially impact the Company's financial position or liquidity. However, the outcome of a particular proceeding may be material to the Company's Interim Consolidated Statutory Statements of Changes in Surplus for a particular period depending upon, among other factors, the size of the loss and the level of the Company's changes in surplus for the period.

e. Common stocks – unaffiliated

No significant changes.

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f. Mortgage loans

Mortgage loans are comprised of commercial mortgage loans and residential mortgage loans. The Company's commercial mortgage loans primarily finance various types of real estate properties throughout the U.S., the United Kingdom and Canada. The Company holds commercial mortgage loans for which it is the primary lender or a participant or co-lender in a mortgage loan agreement and mezzanine loans that are subordinate to senior secured first liens. Residential mortgage loans are primarily seasoned pools of homogeneous residential mortgage loans, some of which are backed by Federal Housing Administration (FHA) and Veterans Administration (VA) guarantee.

The carrying value and fair value of the Company's mortgage loans were as follows:

	March 31, 2025		December 31, 2024	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	\$ 16,956	\$ 15,734	\$ 17,379	\$ 15,962
Mezzanine loans	116	108	113	104
Total commercial mortgage loans	17,072	15,842	17,492	16,066
Residential mortgage loans:				
FHA insured and VA guaranteed	1,643	1,536	1,711	1,590
Other residential loans	5,751	5,726	5,160	5,109
Total residential mortgage loans	7,394	7,262	6,871	6,699
Total mortgage loans	\$ 24,466	\$ 23,104	\$ 24,363	\$ 22,765

The following presents a summary of the Company's impaired mortgage loans as of March 31, 2025 and December 31, 2024:

	March 31, 2025				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	\$ 15	\$ 16	\$ 18	\$ (4)	\$ —
Total	15	16	18	(4)	—
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	279	284	438	—	1
Total	279	284	438	—	1
Total impaired commercial mortgage loans	\$ 294	\$ 300	\$ 456	\$ (4)	\$ 1

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	December 31, 2024				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	\$ 97	\$ 112	\$ 138	\$ (39)	\$ 4
Total	97	112	138	(39)	4
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	407	411	562	—	3
Total	407	411	562	—	3
Total impaired commercial mortgage loans	\$ 504	\$ 523	\$ 700	\$ (39)	\$ 7

Allowance for credit losses:

	March 31, 2025	December 31, 2024
Balance at the beginning of year	\$ (39)	\$ (161)
Additions charged to operations	(5)	(97)
Direct write-downs charged against the allowances	(58)	—
Recoveries of amounts previously charged off	39	219
Balance at the end of the period	\$ (63)	\$ (39)

g. Real estate

No significant changes.

h. Partnerships and limited liability companies

No significant changes.

i. Derivatives

The Company uses derivative financial instruments in the normal course of business to manage risks, primarily to reduce currency, interest rate and duration imbalances determined in asset/liability analyses. The Company also uses a combination of derivatives and fixed income investments to create replicated synthetic investments. These replicated synthetic investments are created when they are economically more attractive than the actual instrument or when similar instruments are unavailable. Replicated synthetic investments are created either to hedge and reduce the Company's credit exposure or to create an investment in a particular asset. The Company held replicated synthetic investments with a notional amount of \$36,077 million as of March 31, 2025 and \$34,282 million as of December 31, 2024, as defined under statutory accounting practices as the result of pairing of a long derivative contract with cash instruments.

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The Company's derivative strategy employs a variety of derivative financial instruments, including: interest rate, currency, equity, bond, and credit default swaps; options; forward contracts and financial futures. Investment risk is assessed on a portfolio basis and individual derivative financial instruments are not generally designated in hedging relationships; therefore, as allowed by statutory accounting practices, the Company intentionally has not applied hedge accounting.

Interest rate swaps are primarily used to more closely match the cash flows of assets and liabilities. Interest rate swaps are also used to mitigate changes in the value of assets anticipated to be purchased and other anticipated transactions and commitments. The Company uses currency swaps for the purpose of managing currency exchange risks in its assets and liabilities.

The Company's principal derivative exposures to market risk are interest rate risk, which includes inflation and credit risk. Interest rate risk pertains to the change in fair value of the derivative instruments as a result of changes in market interest rates. The Company is exposed to credit-related losses in the event of nonperformance by counterparties to derivative financial instruments. The Company regularly monitors counterparty credit ratings, derivative positions, valuations and the value of collateral posted to ensure counterparties are credit-worthy and the concentration of exposure is minimized and monitors its derivative credit exposure as part of its overall risk management program.

The Company enters derivative transactions through bilateral derivative agreements with counterparties, or through over the counter cleared derivatives with a counterparty and the use of a clearinghouse. To minimize credit risk for bilateral transactions, the Company and its counterparties generally enter into master netting agreements based on agreed upon requirements that outline the framework for how collateral is to be posted in the amount owed under each transaction, subject to certain minimums. For over the counter cleared derivative transactions between the Company and a counterparty, the parties enter into a series of master netting and other agreements that govern, among other things, clearing and collateral requirements. These transactions are cleared through a clearinghouse and each derivative counterparty is only exposed to the default risk of the clearinghouse. Certain interest rate swaps and credit default swaps are considered cleared transactions. These cleared transactions require initial and daily variation margin collateral postings. These agreements allow for contracts in a positive position, in which amounts are due to the Company, to be offset by contracts in a negative position. This right of offset, combined with collateral obtained from counterparties, reduces the Company's credit exposure.

Net collateral pledged to the counterparties was \$1,192 million as of March 31, 2025, and net collateral pledged by the counterparties was \$548 million as of December 31, 2024. In the event of default, the full market value exposure at risk, net of offsets and collateral, was \$229 million and \$161 million as of March 31, 2025 and December 31, 2024, respectively. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was \$5,152 million and \$5,484 million as of March 31, 2025 and December 31, 2024, respectively.

As of March 31, 2025, the company had the right to rehypothecate or repledge securities totaling \$1,250 million, pledged by the counterparties, of the \$1,192 million of the net collateral pledged to counterparties. As of December 31, 2024, the company had the right to rehypothecate or repledge securities totaling \$1,523 million, pledged by the counterparties, of the \$548 million of the net collateral pledged to counterparties. There were no securities rehypothecated to other counterparties as of March 31, 2025 or December 31, 2024.

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The following summarizes the carrying values and notional amounts of the Company's derivative financial instruments:

	March 31, 2025				December 31, 2024			
	Assets		Liabilities		Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)							
Interest rate swaps	\$ 19,243	\$ 188,621	\$ 14,080	\$ 162,027	\$ 21,073	\$ 178,171	\$ 15,984	\$ 170,306
Options	643	12,390	90	1,643	595	11,399	78	626
Currency swaps	2,778	31,269	1,268	17,129	2,787	31,652	794	15,483
Forward contracts	74	8,792	242	8,550	417	12,679	68	5,561
Credit default swaps	2	140	142	7,924	2	162	175	7,903
Financial futures	16	1,175	5	349	15	567	26	956
Total	<u>\$ 22,756</u>	<u>\$ 242,387</u>	<u>\$ 15,827</u>	<u>\$ 197,622</u>	<u>\$ 24,889</u>	<u>\$ 234,630</u>	<u>\$ 17,125</u>	<u>\$ 200,835</u>

The average fair value of outstanding derivative assets was \$23,490 and \$22,934 million for the three months ended March 31, 2025 and 2024, respectively. The average fair value of outstanding derivative liabilities was \$16,159 and \$15,411 million for the three months ended March 31, 2025 and 2024, respectively.

The following summarizes the notional amounts of the Company's credit default swaps by contractual maturity:

	March 31, 2025	December 31, 2024
	(In Millions)	
Due after one year through five years	\$ 120	\$ 8,065
Due after five years through ten years	7,944	—
Total	<u>\$ 8,064</u>	<u>\$ 8,065</u>

The following summarizes the Company's net realized (losses) gains on closed contracts and change in net unrealized (losses) gains related to market fluctuations on open contracts by derivative type:

	Three Months Ended March 31,			
	2025		2024	
	Net Realized Gains (Losses) on Closed Contracts	Change in Net Unrealized (Losses) Gains on Open Contracts	Net Realized (Losses) Gains on Closed Contracts	Change in Net Unrealized (Losses) Gains on Open Contracts
	(In Millions)			
Interest rate swaps	\$ 21	\$ 74	\$ (6)	\$ (282)
Currency swaps	4	(21)	16	(81)
Options	(8)	11	(5)	(20)
Credit default swaps	27	(1)	(16)	(9)
Forward contracts	264	(517)	(123)	354
Financial futures	15	20	8	(71)
Total	<u>\$ 323</u>	<u>\$ (434)</u>	<u>\$ (126)</u>	<u>\$ (109)</u>

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The following summarizes gross and net information of derivative assets and liabilities, along with collateral posted in connection with master netting agreements:

	March 31, 2025			December 31, 2024		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	\$ 22,756	\$ 15,827	\$ 6,929	\$ 24,889	\$ 17,125	\$ 7,764
Due and accrued	1,125	2,694	(1,569)	1,449	2,671	(1,222)
Gross amounts offset	(20,857)	(20,857)	—	(22,845)	(22,845)	—
Net asset	3,024	(2,336)	5,360	3,493	(3,049)	6,542
Collateral posted	(3,156)	(4,348)	1,192	(3,471)	(4,019)	548
Net	\$ (132)	\$ (6,684)	\$ 6,552	\$ 22	\$ (7,068)	\$ 7,090

j. Repurchase agreements

The Company has entered into repurchase agreements whereby the Company sells securities and simultaneously agrees to repurchase the same or substantially the same securities. These repurchase agreements are accounted for as collateralized borrowings with the proceeds from the sale of the securities recorded as a liability and the underlying securities continue to be recorded as an investment by the Company. Earnings on these investments are recorded as investment income and the difference between the proceeds and the amount at which the securities will be subsequently reacquired is amortized as interest expense. Repurchase agreements are used as a tool for overall portfolio management to help ensure the Company maintains adequate assets in order to provide yield, spread and duration to support liabilities and other corporate needs.

The Company provides collateral, as dictated by the repurchase agreements, to the counterparty in exchange for a loan. If the fair value of the securities sold becomes less than the loan, the counterparty may require additional collateral.

The carrying value, which is at cost, reported in the Company's liabilities as repurchase agreements approximates the fair value.

The following table provides contractual maturity, maximum balance during the year, and ending balance for bilateral repurchase agreements:

	March 31,			
	2025		2024	
	Maximum Balance	Ending Balance	Maximum Balance	Ending Balance
	(In Millions)			
Greater than 1 Month to 3 Months	\$ 3,455	\$ 3,455	\$ 2,383	\$ 1,141
Greater than 3 Months to 1 Year	630	—	2,325	2,325
Total	\$ 4,085	\$ 3,455	\$ 4,708	\$ 3,466

The company did not have any repurchase agreements where securities sold and/or acquired resulted in default as of March 31, 2025 and December 31, 2024.

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The following table presents the fair value and amortized cost of securities sold under bilateral repurchase agreement transactions, which were all NAIC rating of 1, for the three months ended March 31, 2025 and 2024:

	Maximum Balance		Ending Balance	
	(In Millions)			
March 31, 2025				
Fair Value	\$	(3,524)	\$	(3,497)
Carrying Value	\$	—	\$	(3,838)
March 31, 2024				
Fair Value	\$	4,473	\$	3,466
Carrying Value	\$	—	\$	3,466

The following table presents the cash collateral and the fair value of security collateral, which were all NAIC rating of 1, received in the bilateral repurchase agreement transactions for the three months ended March 31, 2025 and 2024:

	Maximum Balance		Ending Balance	
	Cash	Securities	Cash	Securities
	(In Millions)			
March 31, 2025	\$ 3,358	\$ 10	\$ 3,426	\$ 5
March 31, 2024	\$ 96	\$ 3,530	\$ 16	\$ 3,487

The following table presents collateral received, aggregate allocation of the collateral by the remaining contractual maturity of the repurchase agreements for the three months ended March 31, 2025 and 2024:

	Overnight and Continuous	30 Days or Less	31 to 90 Days	> 90days
	(In Millions)			
Maximum Balance				
March 31, 2025	\$ —	\$ —	\$ 3,252	\$ 145
March 31, 2024	\$ —	\$ —	\$ 1,626	\$ 1,880
Ending Balance				
March 31, 2025	\$ —	\$ —	\$ 3,252	\$ 145
March 31, 2024	\$ —	\$ —	\$ 1,626	\$ 1,880

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The following table presents cash collateral received that has been reinvested, the total reinvested cash and the aggregate amortized cost and fair value of the invest asset acquired with the cash collateral for the three months ended March 31, 2025 and 2024:

	1 to 2 Years		2 to 3 Years		> 3 Years	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Maximum Balance						
March 31, 2025	\$ —	\$ —	\$ 1,163	\$ 1,192	\$ 2,260	\$ 1,947
March 31, 2024	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —
Ending Balance						
March 31, 2025	\$ —	\$ —	\$ 1,163	\$ 1,192	\$ 2,260	\$ 1,947
March 31, 2024	\$ —	\$ —	\$ —	\$ —	\$ —	\$ —

To help manage the mismatch of maturity dates between the security lending transactions and the related reinvestment of the collateral received, the Company invests in highly liquid assets.

The following table presents liability recognized to return cash collateral, and the liability recognized to return securities received as collateral as required pursuant to the terms of the secured borrowing transactions for the three months ended March 31, 2025 and 2024:

	Maximum Balance		Ending Balance	
	Cash	Securities	Cash	Securities
	(In Millions)			
March 31, 2025	\$ 3,358	\$ 10	\$ 3,426	\$ 5
March 31, 2024	\$ 96	\$ 3,530	\$ 16	\$ 3,487

The company did not have any reverse repurchase transactions accounted for as secured borrowings as of March 31, 2025 and December 31, 2024.

The Company did not have any repurchase agreements or reverse repurchase agreements transactions accounted for as a sale as of March 31, 2025 and December 31, 2024.

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k. Net investment income

Net investment income, including IMR amortization, comprised the following:

	Three Months Ended	
	March 31,	
	2025	2024
	(In Millions)	
Bonds	\$ 2,269	\$ 1,976
Preferred stocks	6	5
Common stocks - subsidiaries and affiliates	1	—
Common stocks - unaffiliated	20	23
Mortgage loans	313	274
Policy loans	279	250
Real estate	19	17
Partnerships and limited liability companies	203	188
Derivatives	(16)	(138)
Cash, cash equivalents and short-term investments	69	136
Other	31	92
Subtotal investment income	3,194	2,823
Amortization of the IMR	(45)	(20)
Net gains from separate accounts	2	—
Investment expenses	(283)	(248)
Net investment income	\$ 2,868	\$ 2,555

l. Net realized capital gains (losses)

Net realized capital gains (losses), which include other-than-temporary impairments (OTTI) and are net of deferral to the IMR, comprised the following:

	Three Months Ended	
	March 31,	
	2025	2024
	(In Millions)	
Bonds	\$ (39)	\$ (51)
Preferred stocks	(34)	—
Common stocks - subsidiaries and affiliates	(1)	—
Common stocks - unaffiliated	(5)	11
Mortgage loans	(82)	(8)
Partnerships and limited liability companies	(117)	(32)
Derivatives	323	(126)
Other	18	6
Net realized capital gains (losses) before federal and state taxes and deferral to the IMR	63	(200)
Net federal and state tax benefit (expense)	65	(14)
Net realized capital gains (losses) before deferral to the IMR	128	(214)
Net after tax capital gains (losses) deferred to the IMR	17	(23)
Net realized capital gains (losses)	\$ 145	\$ (237)

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OTTI, included in the net realized capital gains (losses), consisted of the following:

	Three Months Ended March 31,	
	2025	2024
	(In Millions)	
Bonds	\$ (34)	\$ (24)
Common stocks - subsidiaries and affiliates	(1)	—
Mortgage loans	(58)	—
Partnerships and limited liability companies	(38)	(27)
Total OTTI	<u>\$ (131)</u>	<u>\$ (51)</u>

The Company recognized OTTI of \$12 million and \$3 million for the three months ended March 31, 2025 and 2024, respectively, on structured and loan-backed securities, which are included in bonds, primarily due to the present value of expected cash flows being less than the amortized cost.

The Company utilized internally-developed models to determine less than 1% of the \$34 million of bond OTTI for the three months ended March 31, 2025 and 1% of the \$24 million of bond OTTI for the three months ended March 31, 2024. The remaining OTTI amounts were determined using external inputs such as publicly observable fair values and credit ratings. Refer to *Note 2dd. "Net realized capital gains (losses) including other-than-temporary impairments and unrealized capital gains (losses)"* for more information on assumptions and inputs used in the Company's OTTI models.

m. Restricted assets

No significant changes.

6. Federal income taxes

No significant changes.

7. Other than invested assets

a. Admitted negative (disallowed) IMR

As of March 31, 2025, the Company had \$1,539 million of disallowed IMR in aggregate and in the general account.

As of March 31, 2025, the calculated adjusted general capital and surplus was \$25,860 million.

As of March 31, 2025, the percentage of adjusted general capital and surplus for which the admitted disallowed IMR represents was 6%.

The following represents allocated gains (losses) to IMR from derivatives:

	March 31, 2025
	(In Millions)
Unamortized fair value derivative gain	\$ 3,078
Unamortized fair value derivative losses	(4,381)
Total allocated net losses to IMR from derivatives	<u>\$ (1,303)</u>

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When the Company sells bonds and recognizes losses due to interest-rate related factors, and the realized losses are transferred to the IMR, the sales proceeds are generally used for reinvestment as governed by prudent asset liability management (ALM) policies and procedures. Such sales of bonds are intermittently used to meet liquidity needs and managed within the ALM framework.

IMR losses for fixed income related derivatives were in accordance with documented risk management procedures, as well as the Company's derivative use plans, and reflect the same historical treatment of derivative gains reversed to IMR and amortized rather than immediately recognized as realized gain upon termination.

As of March 31, 2025, the IMR asset admitted under the currently adopted statutory accounting interpretation includes approximately \$123 million, net of tax, related to various FWH reinsurance treaties. Included in the FWH assets are reimbursements of capital losses on the invested assets to back the ceded reinsurance liabilities and are recorded as an adjustment to the income statement. Both the IMR and FWH assets are admitted under statutory accounting guidance.

8. Policyholders' liabilities

a. Liabilities for deposit-type contracts

On January 10, 2025, MassMutual issued a \$600 million funding agreement with a 4.95% fixed rate and a 5-year maturity.

On March 27, 2025, MassMutual issued a \$600 million funding agreement with a 4.45% fixed rate and a 3-year maturity.

b. Additional liability for annuity contracts

Certain variable annuity contracts include additional death or other insurance benefit features, such as guaranteed minimum death benefits (GMDB), guaranteed minimum income benefits (GMIB), guaranteed minimum accumulation benefits (GMAB) and guaranteed lifetime withdrawal benefits (GLWB). In general, living benefit guarantees require the contract holder or policyholder to adhere to a company approved asset allocation strategy. Election of these benefit guarantees is generally only available at contract issue.

The following shows the changes in the liabilities for GMDB, GMIB, GMAB and GLWB (in millions):

Liability as of January 1, 2024	\$	74
Incurred guarantee benefits		2
Paid guarantee benefits		(9)
Liability as of December 31, 2024		67
Incurred guarantee benefits		24
Paid guarantee benefits		(2)
Liability as of March 31, 2025	\$	89

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The following summarizes the account values, net amount at risk and weighted average attained age for variable annuity contracts with GMDB, GMIB, GMAB and GLWB classified as policyholders' reserves and separate account liabilities. The net amount at risk is defined as the minimum guarantee less the account value calculated on a policy-by-policy basis, but not less than zero.

	March 31, 2025			December 31, 2024		
	Account Value	Net Amount at Risk	Weighted Average Attained Age	Account Value	Net Amount at Risk	Weighted Average Attained Age
	(\$ In Millions)					
GMDB	\$ 9,019	\$ 112	68	\$ 9,496	\$ 94	68
GMIB Basic	375	3	74	412	3	73
GMIB Plus	1,160	455	70	1,200	429	69
GMAB	1,001	5	64	1,089	4	64
GLWB	74	13	76	82	13	76

As of March 31, 2025, the GMDB account value above consists of \$1,025 million within the general account and \$7,994 million within separate accounts that includes \$3,561 million of Modco assumed. As of December 31, 2024, the GMDB account value above consists of \$1,039 million within the general account and \$8,457 million within separate accounts that includes \$3,807 million of Modco assumed.

9. Reinsurance

No significant changes.

10. Withdrawal characteristics

No significant changes.

11. Debt

No significant changes.

12. Employee benefit plans

The Company sponsors multiple employee benefit plans, providing retirement, life, health and other benefits to employees, certain employees of unconsolidated subsidiaries, agents, general agents and retirees who meet plan eligibility requirements.

a-f. No significant changes.

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g. Net periodic cost

The net periodic cost represents the annual accounting income or expense recognized by the Company and is included in general insurance expenses in the Interim Consolidated Statutory Statements of Operations. The net periodic cost recognized is as follows:

	Three Months Ended March 31,			
	2025	2024	2025	2024
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	\$ 2	\$ 24	\$ 2	\$ 2
Interest cost	34	31	4	4
Expected return on plan assets	(42)	(43)	—	—
Amortization of unrecognized losses (gains)	4	5	(2)	(2)
Amortization of unrecognized prior service benefit	—	—	(1)	(2)
Total net periodic (benefit) expense	<u>\$ (2)</u>	<u>\$ 17</u>	<u>\$ 3</u>	<u>\$ 2</u>

13. Employee compensation plans

No significant changes.

14. Surplus notes

No significant changes.

15. Presentation of the Interim Consolidated Statutory Statements of Cash Flows

The following table presents those transactions that have affected the Company's recognized assets or liabilities but have not resulted in cash receipts or payments during the three months ended March 31, 2025 and 2024. Accordingly, the Company has excluded these non-cash activities from the Consolidated Statutory Statements of Cash Flows for the three months ended March 31, 2025 and 2024.

	Three Months Ended March 31,	
	2025	2024
	(In Millions)	
Transfer of mortgage loans to partnerships and limited liability companies	\$ 250	\$ —
Bond conversions and refinancing	211	130
Transfer of bonds to partnerships and limited liability companies	152	—
Change in market value of corporate owned life insurance asset	20	62
Stock conversions	12	11
Net investment income payment-in-kind bonds	7	4

16. Business risks, commitments and contingencies

a. Risks and uncertainties

The Company operates in a business environment subject to various risks and uncertainties. The principal risks include insurance and underwriting risks, investment and interest rate risks, currency exchange risk and credit risk. The combined impact of these risks could have a material, adverse effect on the Company's financial statements or result in operating losses in future periods. The Company employs the use of reinsurance, portfolio diversification, asset/liability management processes and other risk management techniques to mitigate the impact of these risks. The interim risks and uncertainties disclosure should be read in conjunction with the statutory disclosure in the Company's 2024 audited year-end financial statements.

Insurance and underwriting risks

The Company prices its products based on estimated benefit payments reflecting assumptions with respect to mortality, morbidity, longevity, persistency, interest rates and other factors. If actual policy experience emerges that is significantly and adversely different from assumptions used in product pricing, the effect could be material to the profitability of the Company. For participating whole life products, the Company's dividends to policyholders primarily reflect the difference between actual investment, mortality, expense and persistency experience and the experience embedded in the whole life premiums and guaranteed elements. The Company also reinsures certain life insurance and other LTC insurance policies to mitigate the impact of its underwriting risk.

Investment and interest rate risks

The fair value, cash flows and earnings of investments can be influenced by a variety of factors including changes in interest rates, credit spreads, equity markets, portfolio asset allocation and general economic conditions. The Company employs a rigorous asset/liability management process to help mitigate the economic impacts of various investment risks, in particular, interest rate risk. By effectively matching the market sensitivity of assets with the liabilities they support, the impact of interest rate changes is addressed, on an economic basis, as the change in the value of the asset is offset by a corresponding change in the value of the supported liability. The Company uses derivatives, such as interest rate swaps and swaptions, as well as synthetic assets to reduce interest rate and duration imbalances determined in asset/liability analyses.

The levels of U.S. interest rates are influenced by U.S. monetary policies and by the relative attractiveness of U.S. markets to investors versus other global markets. As interest rates increase, certain debt securities may experience amortization or prepayment speeds that are slower than those assumed at purchase, impacting the expected maturity of these securities and the ability to reinvest the proceeds at the higher yields. Rising interest rates may also result in a decrease in the fair value of the investment portfolio. As interest rates decline, certain debt securities may experience accelerated amortization and prepayment speeds than what was assumed at purchase. During such periods, the Company is at risk of lower net investment income as it may not be able to reinvest the proceeds at comparable yields. Declining interest rates may also increase the fair value of the investment portfolio.

Interest rates also have an impact on the Company's products with guaranteed minimum payouts and on interest credited to account holders. As interest rates decrease, investment spreads may contract as crediting rates approach minimum guarantees, resulting in an increased liability.

In periods of increasing interest rates, policy loans, surrenders and withdrawals may increase as policyholders seek investments with higher perceived returns. This could result in cash outflows requiring the Company to sell invested assets at a time when the prices of those assets are adversely affected by the increase in market interest rates, which could cause the Company to realize investment losses.

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Currency exchange risk

The Company has currency risk due to its non-U.S. dollar denominated investments and medium-term notes along with its indirect international operations. The Company mitigates a portion of its currency risk through the use of cross-currency swaps and forward contracts. Cross-currency swaps are used to minimize currency risk for certain non-U.S. dollar assets and liabilities through a pre-specified exchange of interest and principal. Forward contracts are used to hedge movements in exchange rates.

Credit and other market risks

The Company manages its investments to limit credit and other market risks by diversifying its portfolio among various security types and industry sectors as well as purchasing credit default swaps to transfer some of the risk.

Stressed conditions, volatility and disruptions in global capital markets or in particular markets or financial asset classes can have an adverse effect on the Company, in part because the Company has a large investment portfolio and assets supporting the Company's insurance liabilities are sensitive to changing market factors. Global market factors, including interest rates, credit spread, equity prices, real estate markets, foreign currency exchange rates, consumer spending, business investment, government spending, the volatility and strength of the capital markets, deflation and inflation, all affect the business and economic environment and, ultimately, the profitability of the Company's business. Disruptions in one market or asset class can also spread to other markets or asset classes. Upheavals in the financial markets can also affect the Company's business through their effects on general levels of economic activity, employment and customer behavior.

Asset-based fees calculated as a percentage of the separate account assets are a source of revenue to the Company. Gains and losses in the investment markets may result in corresponding increases and decreases in the Company's separate account assets and related revenue.

Political Uncertainties

Political events, domestically or internationally, may directly or indirectly trigger or exacerbate risks related to product offerings, profitability, or any of the risk factors described above. Whether those underlying risk factors are driven by geopolitics or not, the Company's dynamic approach to managing risks enables management to identify risks, internally and externally, develop mitigation plans, and respond to risks in an attempt to proactively reduce the potential impact of each underlying risk factor on the Company.

b. *Litigation and regulatory matters*

In the normal course of business, the Company is involved in disputes, litigation and governmental or regulatory inquiries, administrative proceedings, examinations and investigations, both pending and threatened. These matters, if resolved adversely against the Company or settled, may result in monetary damages, fines and penalties or require changes in the Company's business practices. The resolution or settlement of these matters is inherently difficult to predict. Based upon the Company's assessment of these pending matters, the Company does not believe that the amount of any judgment, settlement or other action arising from any pending matter is likely to have a material adverse effect on the consolidated statement of financial position. However, an adverse outcome in certain matters could have a material adverse effect on the interim consolidated results of operations for the period in which such matter is resolved, or an accrual is determined to be required, on the interim consolidated financial statement financial position, or on our reputation.

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The Company evaluates the need for accruals of loss contingencies for each matter. When a liability for a matter is probable and can be estimated, the Company accrues an estimate of the loss offset by related insurance recoveries or other contributions, if any. An accrual may be subject to subsequent adjustment as a result of additional information and other developments. The resolution of matters is inherently difficult to predict, especially in the early stages of matter. Even if a loss is probable, due to many complex factors, such as speed of discovery and the timing of court decisions or rulings, a loss or range of loss may not be reasonably estimated until the later stages of the matter. For matters where a loss is material and it is either probable or reasonably possible then it is disclosed. For matters where a loss may be reasonably possible, but not probable, or is probable but not reasonably estimated, no accrual is established, but the matter, if material, is disclosed.

17. Related party transactions

Capital Contributions from MassMutual

- \$28 million to Counterpointe MM Mortgage Lending in March 2025
- \$26 million to ITPS Holding LLC in March 2025

Return of Capital to MassMutual

- ITPS Holding LLC paid \$25 million (non-cash) in March 2025

Dividends paid to MassMutual

- MMLIA paid \$10 million in March 2025

18. Subsequent events

Management of the Company has evaluated subsequent events through May 15, 2025, the date the financial statements were available to be issued to state regulators and subsequently on the Company's website. No events have occurred subsequent to the date of the financial statements, except for:

MassMutual and Invesco Ltd (Invesco) announced that Invesco will repurchase approximately \$1 billion of its \$4 billion of outstanding MassMutual's preferred shares in May 2025, providing MassMutual with a 15% premium payout. This transaction will enhance MassMutual's financial flexibility and is expected to be earnings accretive for Invesco. MassMutual will retain approximately 18.2% ownership of Invesco's common shares.

Additionally, Invesco and Barings LLC, MassMutual's subsidiary, have formed a strategic partnership for U.S. Wealth channels. MassMutual plans to invest up to \$650 million in seed capital to support new private credit products. This partnership aims to expand Barings' product and distribution opportunities.

On May 7, 2025, MassMutual issued a \$800 million funding agreement with a 4.55% fixed rate and a 5-year maturity.

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Glossary of Terms

<u>Term</u>	<u>Description</u>
ALM	Asset liability management
BDC	Business development corporations
CBO	Collateralized bond obligations
CDO	Collateralized debt obligations
CEF	Closed ends funds
CLO	Collateralized loan obligation
C.M. Life	C.M. Life Insurance Company
DI	Disability Insurance
FHA	Federal Housing Administration
FWH	Funding Withheld
GIC	Guaranteed interest contracts
GMAB	Guaranteed minimum accumulation benefits
GMDB	Guaranteed minimum death benefits
GMIB	Guaranteed minimum income benefits
Glidepath	Glidepath Holdings Inc.
GLWB	Guaranteed lifetime withdrawal benefits
Invesco	Invesco Ltd
IMR	Interest maintenance reserve
IS	Institutional Solutions
LLC	Limited liability companies
LTC	Long-term Care
MassMutual	Massachusetts Mutual Life Insurance Company
MMHLLC	MassMutual Holding LLC
MMIH	MM Investment Holding
MMSD	MassMutual Strategic Distributors
Modco	Modified coinsurance
NAIC	National Association of Insurance Commissioners
OTTI	Other-than-temporary impairment(s)
RMBS	Residential mortgage-backed securities
SCA	Subsidiary, Controlled and Affiliated Entities
SSAP	Statements of Statutory Accounting Principles
SVO	Securities valuation office
The Company	Massachusetts Mutual Life Insurance Company, a mutual life insurance company domiciled in the Commonwealth of Massachusetts, and its domestic life insurance subsidiaries domiciled in the State of Connecticut
U.S.	United States of America
U.S. GAAP	U.S. Generally Accepted Accounting Principles
VA	Veterans Administration