MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
AND SUBSIDIARIES

INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of June 30, 2024 and December 31, 2023 and for the six months ended
June 30, 2024 and 2023

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

Table of Contents

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

	June 30, 2024	December 31, 2023
	(In Millions)	
Assets:		
Bonds	$ 161,085	$ 147,300
Preferred stocks	559	451
Common stocks – subsidiaries and affiliates	24,255	23,597
Common stocks – unaffiliated	2,024	1,630
Mortgage loans	25,052	24,825
Policy loans	16,909	16,138
Real estate	315	329
Partnerships and limited liability companies	14,139	13,055
Derivatives	23,491	21,301
Cash, cash equivalents and short-term investments	5,053	11,941
Other invested assets	3,473	2,626
Total invested assets	276,355	263,193
Investment income due and accrued	4,782	5,324
Federal income taxes	253	319
Net deferred income taxes	2,029	1,685
Other than invested assets	5,994	5,806
Total assets excluding separate accounts	289,413	276,327
Separate account assets	57,336	58,997
Total assets	$ 346,749	$ 335,324
Liabilities and Surplus:		
Policyholders' reserves	$ 175,670	$ 170,570
Liabilities for deposit-type contracts	20,283	19,712
Contract claims and other benefits	630	732
Policyholders' dividends	2,212	2,150
General expenses due or accrued	876	1,049
Asset valuation reserve	6,628	6,071
Repurchase agreements	3,434	3,219
Debt	999	50
Collateral	1,823	2,160
Derivatives	16,246	14,013
Funds held under coinsurance	25,477	22,520
Other liabilities	6,816	5,342
Total liabilities excluding separate accounts	261,094	247,588
Separate account liabilities	57,198	58,859
Total liabilities	318,292	306,447
Surplus	28,457	28,877
Total liabilities and surplus	$ 346,749	$ 335,324

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

	Six Months Ended June 30, 2024	Six Months Ended June 30, 2023
	(In Millions)	
Revenue:		
Premium income	$ 9,976	$ 11,010
Net investment income	5,412	4,953
Fees and other income	628	531
Total revenue	16,016	16,494
Benefits, expenses and other deductions:		
Policyholders' benefits	8,370	10,850
Change in policyholders' reserves	3,847	2,264
General insurance expenses	1,204	1,097
Commissions	686	655
State taxes, licenses and fees	176	183
Other deductions	379	550
Total benefits and expenses	14,662	15,599
Net gain from operations before dividends and federal income taxes	1,354	895
Dividends to policyholders	1,012	922
Net gain (loss) from operations before federal income taxes	342	(27)
Federal income tax expense	133	139
Net gain (loss) from operations	209	(166)
Net realized capital losses	(272)	(448)
Net loss	$ (63)	$ (614)

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

	Six Months Ended June 30, 2024	Six Months Ended June 30, 2023
	(In Millions)	
Surplus, beginning of year	$ 28,877	$ 27,941
Net decrease due to:		
Net loss	(63)	(614)
Change in net unrealized capital gains (losses), net of tax	403	(586)
Change in net unrealized foreign exchange capital (losses) gains, net of taxes	(138)	227
Change in other net deferred income taxes	253	264
Change in nonadmitted assets	13	(237)
Change in asset valuation reserve	(557)	4
Change in surplus notes	(50)	(25)
Change in minimum pension liability	3	-
Prior period adjustments	(146)	(52)
Other	(138)	1
Net decrease	(420)	(1,018)
Surplus, end of period	$ 28,457	$ 26,923

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

	Six Months Ended June 30, 2024	Six Months Ended June 30, 2023
	($ In Millions)	
Cash from operations:		
Premium and other income collected	$ 10,821	$ 11,721
Net investment income	6,155	5,805
Benefit payments	(8,340)	(10,843)
Net transfers from separate accounts	1,225	811
Commissions and other expenses	(2,613)	(2,555)
Dividends paid to policyholders	(957)	(860)
Federal and foreign income taxes recovered	19	197
Net cash provided from operations	6,310	4,276
Cash from investments:		
Proceeds from investments sold, matured or repaid:		
Bonds	18,734	11,208
Preferred and common stocks – unaffiliated	94	48
Common stocks – affiliated	111	-
Mortgage loans	1,229	1,512
Real estate	(1)	-
Partnerships and limited liability companies	452	644
Derivatives	(285)	(173)
Other	(864)	(463)
Total investment proceeds	19,470	12,776
Cost of investments acquired:		
Bonds	(32,846)	(14,421)
Preferred and common stocks – unaffiliated	(426)	(162)
Common stocks – affiliated	(183)	(111)
Mortgage loans	(1,822)	(1,057)
Real estate	(1)	(3)
Partnerships and limited liability companies	(1,509)	(1,558)
Derivatives	118	(72)
Other	725	501
Total investments acquired	(35,944)	(16,883)
Net (increase) decrease in policy loans	(772)	2,050
Net cash used in investing activities	(17,246)	(2,057)
Cash from financing and miscellaneous sources:		
Net deposits on deposit-type contracts	395	726
Change in surplus notes	(50)	(25)
Change in repurchase agreements	222	(133)
Change in collateral	(243)	(1,457)
Other cash (used in)	3,724	(1,152)
Net cash (used in) from financing and miscellaneous sources	4,048	(2,041)
Net change in cash, cash equivalents and short-term investments	(6,888)	178
Cash, cash equivalents and short-term investments:		
Beginning of year	11,941	5,737
End of period	$ 5,053	$ 5,915

See accompanying notes to interim consolidated statutory financial statements

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 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 individual life, individual annuities, hybrid life and long term care (LTC) and DI. The Company’s MMSD channel sells life insurance, disability, 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, critical illness, 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 June 30, 2024 and December 31, 2023 and for six months ended June 30, 2024 and 2023 are unaudited. The Interim Consolidated Statutory Statement of Financial Position as of December 31, 2023 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 2023 audited yearend financial statements as these interim consolidated statutory financial statements disclose only significant changes from yearend 2023. 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 Consolidated Statutory Financial Statements included in the Company's 2023 audited consolidated yearend financial statements.

b. Corrections of errors and reclassification

For the six months ended June 30, 2024, corrections of prior years' errors were recorded in surplus, net of tax:

	Six Months Ended June 30, 2024 Increase (Decrease) to:		
	Prior Years' Net Income	Current Year Surplus	Asset or Liability Balances
	(In Millions)		
Investment income due and accrued	$ (90)	$ (90)	(90)
Other Liabilities	(17)	(26)	26
Bonds	(18)	(18)	(18)
Common stocks	(1)	(1)	(1)
Cash, cash equivalents and short-term investments	(2)	(2)	(2)
Policyholders' reserves	(15)	(15)	(15)
Partnerships and limited liability companies	(3)	(3)	(3)
Total	$ (146)	$ (155)	

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 principles (U.S. GAAP) equity value less adjustments for the limited statutory basis of accounting related to foreign insurance subsidiaries and controlled affiliates entities as well as an adjustment of $519 million as of June 30, 2024 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 (formerly known as Great American Life Insurance Company) and other subsidiaries and affiliated entities (MM Ascend) based on MM Ascend's underlying statutory surplus, adjusted for any unamortized goodwill that would have been 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

In August 2023, the NAIC adopted INT 23-01T — Disallowed Interest Maintenance Reserve (IMR) ("INT 23-01T"). INT 23-01T provides optional, limited-term guidance for the assessment of disallowed IMR for up to 10% of adjusted general account capital and surplus. An insurer's capital and surplus must first be adjusted to exclude certain "soft assets" including net positive goodwill, electronic data processing equipment and operating system software, net deferred tax assets and admitted disallowed IMR. An insurer will only be able to admit the negative IMR if the insurer's risk-based capital is over 300% authorized control level after adjusting to remove the assets described above.

As adopted, negative IMR may be admitted first in the insurer's general account and then, if all disallowed IMR in the general account is admitted and the percentage limit is not reached, to the separate account proportionately between insulated and noninsulated accounts. If the insurer can demonstrate historical practice in which acquired gains from derivatives were also reversed to IMR (as liabilities) and amortized, there is no exclusion for derivatives losses. INT 23-01T was adopted by the Company as of September 30, 2023 and will be effective through December 31, 2025. To the extent the Company's IMR balance is a net negative, the effects of INT 23-01T will be reflected in the Company's financial position, results of operations, and financial statement disclosures. The Company has adopted this guidance and the adoption resulted in an admitted disallowed IMR of $1,112 million for MassMutual and $150 million for C.M. Life.

In March 2023, the NAIC adopted modifications to SSAP No. 34 – Investment Income Due and Accrued, effective December 31, 2023. The modifications require additional disclosures and data capture related to gross, non-admitted and admitted amounts for interest income due and accrued, deferred interest, and paid-in-kind (PIK) interest. In August 2023, the NAIC adopted revisions to further clarify the PIK interest disclosure in SSAP No. 34, effective December 31, 2023. The revisions clarify that decreasing amounts to principal balances are first applied to any PIK interest included in the principal balance. The original principal would not be reduced until the PIK interest had been fully eliminated from the balance. The revisions also provide a practical expedient for determining the PIK interest in the cumulative balance by subtracting the original principal/ par value from the current principal/ par value, with the resulting PIK interest not to go less than zero. The modifications did not have a material effect on the Company's financial statements.

In December 2023, the NAIC adopted revisions, effective January 1, 2024, to avoid allocating realized gains or losses from bond sales to the 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 AVR. The modifications did not have a material effect on the Company's 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, 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 financial statements.

Future adoption of new accounting standards

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, which will become 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 is currently assessing the impacts of the adopted SSAP No. 26, SSAP No. 43 and other related SSAPs in relation to the financial statements.

In March 2024, the NAIC adopted revisions to SSAP No. 21R - 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 modifications are not expected to have a material effect on the Company’s consolidated financial statements. The Company is assessing the potential impact on the Company’s consolidated financial statements.

Effective January 1, 2025, revisions will be 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. 26R—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 Company is assessing the potential impact on the Company’s consolidated financial statements.

The NAIC adopted revisions to various SSAPs at the Spring National Meeting for investments in tax credits and acquired tax credits in response to the comments received, as well as updated annual statement reporting categories for tax credit investment risk-based capital. These revisions are in addition to the previous ones, which include broad criteria to scope in various tax credit programs, including solar programs and state specific programs. Proportional amortization will be the measurement approach as with existing low-income housing tax credits, which means recording amortization of the investment in the partnership through net investment income and use of the tax credits in the appropriate tax line. The adopted revisions will be effective on January 1, 2025. The Company is assessing the potential impact on the Company’s 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:

	June 30, 2024				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 5,443	$ 4,906	$ -	$ 4,906	$ -
All other governments	1,081	904	1	903	-
States, territories and possessions	173	163	-	163	-
Political subdivisions	334	326	-	326	-
Special revenue	3,909	3,822	-	3,786	36
Industrial and miscellaneous	139,781	130,567	748	66,294	63,525
Parent, subsidiaries and affiliates	10,364	9,916	-	1,474	8,442
Preferred stocks	559	578	154	38	386
Common stocks - subsidiaries and affiliates	522	522	249	-	273
Common stocks - unaffiliated	2,024	2,024	792	225	1,007
Mortgage loans - commercial	19,259	17,892	-	-	17,892
Mortgage loans - residential	5,793	5,529	-	-	5,529
Derivatives:					
Interest rate swaps	20,099	14,062	-	14,062	-
Options	552	552	51	501	-
Currency swaps	2,789	2,777	-	2,777	-
Forward contracts	37	37	-	37	-
Credit default swaps	1	1	-	1	-
Financial futures	13	13	13	-	-
Cash, cash equivalents and short-term investments	5,053	5,053	728	4,325	-
Separate account assets	57,336	57,273	37,276	18,106	1,891
Financial liabilities:					
GICs	16,811	16,075	-	-	16,075
Group annuity contracts and other deposits	1,882	1,720	-	-	1,720
Individual annuity contracts	29,880	29,902	-	-	29,902
Supplementary contracts	944	945	-	-	945
Repurchase agreements	3,434	3,434	-	3,434	-
Debt	999	999	-	999	-
Derivatives:					
Interest rate swaps	14,994	15,423	-	15,423	-
Options	51	51	28	23	-
Currency swaps	989	863	-	863	-
Forward contracts	47	47	-	47	-
Credit default swaps	161	161	-	161	-
Financial futures	4	4	4	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $23,733 million.

	December 31, 2023				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 5,067	$ 4,752	$ -	$ 4,752	$ -
All other governments	1,242	1,092	-	1,062	30
States, territories and possessions	242	240	-	240	-
Political subdivisions	377	367	-	367	-
Special revenue	5,081	5,071	-	5,034	37
Industrial and miscellaneous	125,196	116,839	66	51,891	64,881
Parent, subsidiaries and affiliates	10,095	9,659	-	1,442	8,217
Preferred stocks	451	475	96	-	379
Common stocks - subsidiaries and affiliates	436	436	253	-	183
Common stocks - unaffiliated	1,630	1,630	666	-	964
Mortgage loans - commercial	19,941	18,486	-	-	18,486
Mortgage loans - residential	4,884	4,596	-	-	4,596
Derivatives:					
Interest rate swaps	17,712	12,458	-	12,458	-
Options	575	575	68	507	-
Currency swaps	2,893	2,893	-	2,893	-
Forward contracts	15	15	-	15	-
Credit default swaps	1	1	-	1	-
Financial futures	105	105	105	-	-
Cash, cash equivalents and short-term investments	11,941	11,941	818	11,123	-
Separate account assets	58,997	58,944	37,886	19,138	1,920
Financial liabilities:					
GICs	16,207	15,550	-	-	15,550
Group annuity contracts and other deposits	2,053	1,841	-	-	1,841
Individual annuity contracts	28,236	26,803	-	-	26,803
Supplementary contracts	1,001	1,003	-	-	1,003
Repurchase agreements	3,219	3,219	-	3,219	-
Debt	50	50	-	50	-
Derivatives:					
Interest rate swaps	12,178	12,544	-	12,544	-
Options	50	50	35	15	-
Currency swaps	1,298	1,313	-	1,313	-
Forward contracts	305	307	-	307	-
Credit default swaps	153	152	-	152	-
Financial futures	29	29	29	-	-
					-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $23,161 million.

The use of different assumptions or valuation methodologies may have a material impact on the estimated fair value amounts.

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

	June 30, 2024			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 1	$ -	$ 1
Industrial and miscellaneous	748	110	289	1,147
Preferred stocks	6	-	62	68
Common stocks - subsidiaries and affiliates	249	-	273	522
Common stocks - unaffiliated	792	225	1,007	2,024
Derivatives:				
Interest rate swaps	-	20,094	-	20,094
Options	51	501	-	552
Currency swaps	-	2,770	-	2,770
Forward contracts	-	37	-	37
Financial futures	13	-	-	13
Separate account assets	37,276	16,944	1,884	56,104
Total financial assets carried at fair value	$ 39,135	$ 40,682	$ 3,515	$ 83,332
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 14,994	$ -	$ 14,994
Options	28	23	-	51
Currency swaps	-	149	-	149
Forward contracts	-	47	-	47
Credit default swaps	-	161	-	161
Financial futures	4	-	-	4
Total financial liabilities carried at fair value	$ 32	$ 15,374	$ -	$ 15,406

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, 2023			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 2	$ -	$ 2
Industrial and miscellaneous	66	109	176	351
Preferred stocks	24	-	67	91
Common stocks - subsidiaries and affiliates	253	-	183	436
Common stocks - unaffiliated	670	1	960	1,631
Derivatives:				
Interest rate swaps	-	17,708	-	17,708
Options	68	507	-	575
Currency swaps	-	2,893	-	2,893
Forward contracts	-	15	-	15
Financial futures	105	-	-	105
Separate account assets	37,886	17,964	1,914	57,764
Total financial assets carried at fair value	$ 39,072	$ 39,199	$ 3,300	$ 81,571
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 12,178	$ -	$ 12,178
Options	35	16	-	51
Currency swaps	-	196	-	196
Forward contracts	-	305	-	305
Credit default swaps	-	153	-	153
Financial futures	29	-	-	29
Total financial liabilities carried at fair value	$ 64	$ 12,848	$ -	$ 12,912

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 1/1/24	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 06/30/24
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 176	$ (53)	$ (16)	$ 1	$ 1	$ -	$ (2)	$ 11	$ -	$ 171	$ 289
Preferred stocks	67	-	2	-	-	-	-	-	-	(7)	62
Common Stocks:											
Subsidiaries and affiliates	183	-	31	-	5	-	-	-	(156)	210	273
Unaffiliated	960	11	(17)	32	23	(12)	(15)	25	-	-	1,007
Separate account assets	1,914	7	-	36	-	(71)	(2)	-	-	-	1,884
Total financial assets	$ 3,300	$ (35)	$ -	$ 69	$ 29	$ (83)	$ (19)	$ 36	$ (156)	$ 374	$ 3,515

	Balance as of 1/1/23	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 12/31/23
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 230	$ (4)	$ (10)	$ 37	$ 1	$ (2)	$ (13)	$ -	$ -	$ (62)	$ 176
Preferred stocks	51	-	11	3	-	-	-	-	-	2	67
Common Stocks:											
Subsidiaries and affiliates	355	7	(189)	21	(6)	(47)	-	48	-	(6)	183
Unaffiliated	971	24	(54)	60	28	(29)	(38)	-	-	(2)	960
Separate account assets	1,693	271	-	134	-	(182)	(2)	-	-	-	1,914
Total financial assets	$ 3,300	$ 297	$ (242)	$ 255	$ 23	$ (260)	$ (53)	$ 48	$ -	$ (68)	$ 3,300

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.

5. *Investment*

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:

	June 30, 2024			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	$ 5,443	$ 16	$ 553	$ 4,906
All other governments	1,081	7	184	904
States, territories and possessions	173	-	10	163
Political subdivisions	334	7	15	326
Special revenue	3,909	59	146	3,822
Industrial and miscellaneous	139,781	671	9,884	130,567
Parent, subsidiaries and affiliates	10,364	25	473	9,916
Total	$ 161,085	$ 785	$ 11,265	$ 150,604

The June 30, 2024 gross unrealized losses exclude $164 million of losses included in the carrying value. These losses include $160 million from NAIC Class 6 bonds and $4 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.

	December 31, 2023			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	$ 5,067	$ 70	$ 385	$ 4,752
All other governments	1,242	13	163	1,092
States, territories and possessions	242	4	6	240
Political subdivisions	377	8	18	367
Special revenue	5,081	117	127	5,071
Industrial and miscellaneous	125,196	849	9,207	116,839
Parent, subsidiaries and affiliates	10,095	20	455	9,659
Total	$ 147,300	$ 1,081	$ 10,361	$ 138,020

The December 31, 2023 gross unrealized losses exclude $128 million of losses included in the carrying value. These losses include $127 million from NAIC Class 6 bonds and $1 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 June 30, 2024, investments in structured and loan-backed securities that had unrealized losses, where were not recognized in earnings, had a fair value of $86,580 million. Securities in an unrealized loss position for less than 12 months had a fair value of $15,600 million and unrealized losses of $311 million. Securities in an unrealized loss position for greater that 12 months had a fair value of $70,979 million and unrealized losses of $11,119 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2023, investments in structured and loan-backed securities that had unrealized losses, where were not recognized in earnings, had a fair value of $17,621 million. Securities in an unrealized loss position for less than 12 months had a fair value of $2,169 million and unrealized losses of $49 million. Securities in an unrealized loss position for greater that 12 months had a fair value of $15,452 million and unrealized losses of $1,298 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 six months ended June 30, 2024 or 2023 that were reacquired within 30 days of the sale date.

On April 24, 2024, the Company announced it became a minority equity owner in ATLAS SP Partners (ATLAS) and a capital partner to the ATLAS platform. As part of the multi-billion-dollar commitment, the Company also agreed to invest $500 million in Apollo's Asset Backed Finance, which was finalized in May 2024.

Residential mortgage-backed exposure

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.

As of June 30, 2024, RMBS had a total carrying value of $3,658 million and a fair value of $3,677 million of which approximately 3%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $2,051 million and a fair value of $2,067 million. As of December 31, 2023, RMBS had a total carrying value of $3,831 million and a fair value of $3,809 million of which approximately 4%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $1,351 million and a fair value of $1,334 million.

b. Preferred stocks

No significant changes.

c. Common stocks – subsidiaries and affiliates

MMHLLC paid $785 million in dividends to MassMutual for the six months ended June 30, 2024, $630 million of which were declared in 2023, and paid $730 million in dividends to MassMutual for the six months ended June 30, 2023, $450 million of which were declared in 2022.

MassMutual contributed capital of $53 million in dividends to MMHLLC for the six months ended June 30, 2023.

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.

d. Common stocks – unaffiliated

No significant changes.

e. 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 substantially backed by Federal Housing Administration (FHA) and Veterans Administration (VA) guarantees.

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

	June 30, 2024		December 31, 2023	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	$ 19,142	$ 17,792	$ 19,799	$ 18,361
Mezzanine loans	117	100	142	125
Total commercial mortgage loans	19,259	17,892	19,941	18,486
Residential mortgage loans:				
FHA insured and VA guaranteed	1,884	1,736	1,962	1,818
Other residential loans	3,909	3,793	2,922	2,778
Total residential mortgage loans	5,793	5,529	4,884	4,596
Total mortgage loans	$ 25,052	$ 23,421	$ 24,825	$ 23,082

As of June 30, 2024, the Company had impaired mortgage loans with or without a valuation allowance or mortgage loans derecognized as a result of foreclosure, including mortgage loans subject to a participant or co-lender mortgage loan agreement with a unilateral mortgage loan foreclosure restriction or mortgage loan derecognized as a result of a foreclosure.

The following presents a summary of the Company's impaired mortgage loans as of June 30, 2024 and December 31, 2023:

	June 30, 2024				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 535	$ 574	$ 780	$ (238)	$ 7
Total impaired commercial mortgage loans	$ 535	$ 574	$ 780	$ (238)	$ 7

	December 31, 2023				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 481	$ 555	$ 644	$ (161)	$ 25
Total impaired commercial mortgage loans	$ 481	$ 555	$ 644	$ (161)	$ 25

f. Real estate

No significant changes.

g. Partnerships and limited liability companies

No significant changes.

h. 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 $32,807 million as of June 30, 2024 and $32,507 million as of December 31, 2023, as defined under statutory accounting practices as the result of pairing of a long derivative contract with cash instruments.

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 $497 million as of June 30, 2024, and net collateral pledged by the counterparties was $334 million as of December 31, 2023. In the event of default, the full market value exposure at risk in a net gain position, net of offsets and collateral, was $110 million as of June 30, 2024, and $319 million as of December 31, 2023. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was $5,408 million as of June 30, 2024, and $5,292 million as of December 31, 2023.

As of June 30, 2024, the company had the right to rehypothecate or repledge securities totaling $1,770 million, pledged by the counterparties, of the $497 million of the net collateral pledged to counterparties. As of December 31, 2023, the company had the right to rehypothecate or repledge securities totaling $1,476 million, pledged by the counterparties, of the $334 million of the net collateral pledged to counterparties. There were no securities rehypothecated to other counterparties as of June 30, 2024 or December 31, 2023.

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

	June 30, 2024			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 20,099	$ 169,027	$ 14,994	$ 162,195
Options	552	11,416	51	643
Currency swaps	2,789	32,322	989	15,171
Forward contracts	37	5,610	47	5,484
Credit default swaps	1	101	161	7,882
Financial futures	13	1,080	4	453
Total	$ 23,491	$ 219,556	$ 16,246	$ 191,828

	December 31, 2023			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 17,712	$ 181,119	$ 12,178	$ 133,793
Options	575	12,132	50	641
Currency swaps	2,893	29,187	1,298	14,742
Forward contracts	15	1,032	305	9,335
Credit default swaps	1	81	153	7,902
Financial futures	105	1,124	29	257
Total	$ 21,301	$ 224,675	$ 14,013	$ 166,670

The average fair value of outstanding derivative assets was $24,056 million for the six months ended June 30, 2024 and $20,764 million for the six months ended June 30, 2023. The average fair value of outstanding derivative liabilities was $16,683 million for the six months ended June 30, 2024 and $12,941 million for the six months ended June 30, 2023.

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

	June 30, 2024	December 31, 2023
	(In Millions)	
Due after one year through five years	$ 7,983	$ 7,983
Total	$ 7,983	$ 7,983

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:

	Six Months Ended June 30,			
	2024		2023	
	Net Realized (Losses) Gains 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	$ (125)	$ (430)	$ 25	$ (357)
Currency swaps	28	(75)	54	(193)
Options	3	1	(14)	(119)
Credit default swaps	(64)	54	(21)	(1)
Forward contracts	(60)	281	(240)	200
Financial futures	(20)	(67)	(26)	(29)
Total	$ (238)	$ (236)	$ (222)	$ (499)

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

	June 30, 2024			December 31, 2023		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	$ 23,491	$ 16,246	$ 7,245	$ 21,301	$ 14,013	$ 7,288
Due and accrued	1,313	2,825	(1,512)	1,396	2,532	(1,137)
Gross amounts offset	(21,802)	(21,802)	-	(19,524)	(19,524)	-
Net asset	3,002	(2,731)	5,733	3,173	(2,978)	6,151
Collateral posted	(3,563)	(4,060)	497	(3,557)	(3,223)	(334)
Net	$ (561)	$ (6,791)	$ 6,230	$ (384)	$ (6,202)	$ 5,817

i. 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:

	June 30,			
	2024		2023	
	Maximum Balance	Ending Balance	Maximum Balance	Ending Balance
	(In Millions)			
From 1 Week to 1 Month	$ 178	$ 178	$ 596	$ -
Greater than 1 Month to 3 Months	$ 2,711	$ 2,537	$ 3,615	$ 2,910
Greater than 3 Months to 1 Year	$ 2,712	$ 722	$ -	$ -

The company did not have any repurchase agreements where securities sold and/or acquired resulted in default as of June 30, 2024 and December 31, 2023.

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 periods ending June 30, 2024 and 2023:

	Maximum Balance	Ending Balance
	(In Millions)	
March 31, 2024		
Fair Value	$ 4,473	$ 3,466
BACV	$ 0	$ 3,466
June 30, 2024		
Fair Value	$ 3,532	$ 3,449
BACV	$ 0	$ 3,799
March 31, 2023		
Fair Value	$ 3,054	$ 3,019
BACV	$ 0	$ 3,019
June 30, 2023		
Fair Value	$ 3,615	$ 2,910
BACV	$ 0	$ 2,910

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 periods ending June 30, 2024 and 2023:

	Maximum Balance		Ending Balance	
	Cash	Securities	Cash	Securities
	(In Millions)			
March 31, 2024	$ 96	$ 3,530	$ 16	$ 3,487
June 30, 2024	$ 3,741	$ 14	$ 3,431	$ -
March 31, 2023	$ 130	$ 3,066	$ 19	$ 3,022
June 30, 2023	$ 89	$ 3,031	$ 4	$ 2,918

The following table presents collateral received, aggregate allocation of the collateral by the remaining contractual maturity of the repurchase agreements for the periods ending June 30, 2024 and 2023:

	Overnight and Continuous	30 Days or Less	31 to 90 Days	>90days
	(In Millions)			
Maximum Balance				
March 31, 2024	$ -	$ -	$ 1,626	$ 1,880
June 30, 2024	$ -	$ 14	$ 1,551	$ 1,927
March 31, 2023	$ -	$ 259	$ 2,787	$ -
June 30, 2023	$ -	$ 92	$ 2,925	$ -
Ending Balance				
March 31, 2024	$ -	$ -	$ 1,626	$ 1,880
June 30, 2024	$ -	$ 14	$ 1,551	$ 1,927
March 31, 2023	$ -	$ 259	$ 2,787	$ -
June 30, 2023	$ -	$ 92	$ 2,925	$ -

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 periods ending June 30, 2024 and 2023:

	1 to 2 Years		2 to 3 Years		> 3 Years	
	Amortized Cost	Fair Value	Amortized Cost	Fair Value	Amortized Cost	Fair Value
Maximum Balance						
June 30, 2024	$ -	$ -	$ 1,125	$ 1,139	$ 2,674	$ 2,310
Ending Balance						
June 30, 2024	$ -	$ -	$ 1,125	$ 1,139	$ 2,674	$ 2,310

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 periods ending June 30, 2024 and 2023:

	Maximum Balance		Ending Balance	
	Cash	Securities	Cash	Securities
	(In Millions)			
March 31, 2024	$ 96	$ 3,530	$ 16	$ 3,487
June 30, 2024	$ 3,741	$ 14	$ 3,431	$ -
March 31, 2023	$ 130	$ 3,066	$ 19	$ 3,022
June 30, 2023	$ 89	$ 3,031	$ 4	$ 2,918

The company did not have any reverse repurchase transactions accounted for as secured borrowings as of June 30, 2024 and December 31, 2023.

The Company did not have any repurchase agreements transactions accounted for as a sale as of June 30, 2024 and December 31, 2023.

The Company did not have any reverse repurchase agreements transactions accounted for as a sale as of June 30, 2024 and December 31, 2023.

j. Net investment income

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

	Six Months Ended June 30,	
	2024	2023
	(In Millions)	
Bonds	$ 4,047	$ 3,466
Preferred stocks	12	15
Common stocks - subsidiaries and affiliates	155	280
Common stocks - unaffiliated	57	69
Mortgage loans	588	545
Policy loans	506	570
Real estate	39	36
Partnerships and limited liability companies	477	217
Derivatives	(258)	22
Cash, cash equivalents and short-term investments	214	163
Other	170	120
Subtotal investment income	6,007	5,503
Amortization of the IMR	(58)	(26)
Investment expenses	(537)	(524)
Net investment income	$ 5,412	$ 4,953

k. Net realized capital losses

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

	Six Months Ended June 30, 2024	Six Months Ended June 30, 2023
	(In Millions)	
Bonds	$ (253)	$ (441)
Preferred stocks	(7)	-
Common stocks - subsidiaries and affiliates	21	-
Common stocks - unaffiliated	20	11
Mortgage loans	(40)	(36)
Partnerships and limited liability companies	(49)	(134)
Derivatives	(238)	(222)
Other	6	(17)
Net realized capital losses before federal and state taxes and deferral to the IMR	(540)	(839)
Net federal and state tax benefit	46	156
Net realized capital losses before deferral to the IMR	(494)	(683)
Net after tax capital losses deferred to the IMR	222	235
Net realized capital losses	$ (272)	$ (448)

OTTI, included in the realized capital losses, consisted of the following:

	Six Months Ended June 30, 2024	Six Months Ended June 30, 2023
	(In Millions)	
Bonds	$ (103)	$ (101)
Mortgage loans	-	(13)
Partnerships and limited liability companies	(46)	(134)
Total OTTI	$ (149)	$ (248)

The Company recognized OTTI of $9 million for the six months ended June 30, 2024 and $14 million for the six months ended June 30, 2023 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.

6. Federal income taxes

No significant changes.

7. Other than invested assets

As of June 30, 2024, the Company had $1,426 million of disallowed IMR in aggregate and in the general account.

As of June 30, 2024, the Company had $1,426 million of disallowed IMR admitted in the general account.

As of June 30, 2024, the calculated adjusted general capital and surplus was $24,677 million.

As of June 30, 2024, the percentage of adjusted general capital and surplus for which the admitted disallowed IMR represents was 5%.

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

	June 30, 2024
	(In Millions)
Unamortized fair value derivative gain	$ 3,195
Unamortized fair value derivaitve losses	(4,373)
Total allocated gains (losses) to IMR from derivatives	$ (1,178)

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 the period ended June 30, 2024, the IMR asset admitted under the currently adopted statutory accounting interpretation includes approximately $134 million, net of tax, related to various Funds Withheld (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 17, 2024, MassMutual issued a $650 million funding agreement with a 4.85% fixed rate and a 5-year maturity.

On January 29, 2024, MassMutual issued a $300 million funding agreement with a floating rate based on the Secured Overnight Financing Rate (SOFR) and a 3-year maturity.

On April 9, 2024, MassMutual issued a $1.2 billion funding agreement of which $850 million has a 5.10% fixed rate and a 3-year maturity and $350 million has a floating rate based on the SOFR plus the spread and a 3-year maturity.

On May 30, 2024, MassMutual issued a $500 million funding agreement with a 5.15% fixed rate and a 5-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, 2023	$	56
Incurred guarantee benefits		27
Paid guarantee benefits		(9)
Liability as of December 31, 2023		74
Incurred guarantee benefits		(42)
Paid guarantee benefits		(3)
Liability as of June 30, 2024	$	29

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.

	June 30, 2024			December 31, 2023		
	Account Value	Net Amount at Risk	Weighted Average Attained Age	Account Value	Net Amount at Risk	Weighted Average Attained Age
	($ In Millions)					
GMDB	$ 9,787	$ 96	66	$ 9,935	$ 45	66
GMIB Basic	435	4	73	449	7	73
GMIB Plus	1,238	427	69	1,240	448	69
GMAB	1,246	7	63	1,400	20	63
GLWB	86	13	75	94	15	75

As of June 30, 2024, the GMDB account value above consists of $1,336 million within the general account and $8,451 million within separate accounts that includes $3,786 million of modified coinsurance (Modco) assumed. As of December 31, 2023, the GMDB account value above consists of $1,405 million within the general account and $8,530 million within separate accounts that includes $3,712 million of Modco assumed.

9. Reinsurance

No significant changes.

10. Withdrawal characteristics

No significant changes.

11. Debt

MassMutual issues commercial paper in the form of Notes in minimum denominations of $250 thousand up to a total aggregation of $1,000 million with maturity dates up to a maximum of 270 days from the date of issuance. Noninterest bearing Notes are sold at par less a discount representing an interest factor. Interest bearing Notes are sold at par. The Notes are not redeemable or subject to voluntary prepayments by MassMutual. The Notes have a carrying value and face amount of $499 million as of June 30, 2024 and $50 million as of December 31, 2023. Notes issued in 2024 had interest rates ranging from 5.35% to 5.41% with maturity dates ranging from 1 to 58 days. Interest expense for commercial paper was $7 million for the quarter ended June 30, 2024 and $5 million for the quarter ended June 30, 2023.

In June 2024, the Company borrowed $500 million from Federal Home Loan Bank of Boston with a 5.53% fixed rate, which matures on July 26, 2024.

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. Pension plans

The Company sponsors funded and unfunded noncontributory defined benefit pension plans for its eligible employees, agents and retirees.

The funded qualified defined benefit plan generally provides benefits under a cash balance formula based on age, service and salary during the participants' careers. Certain eligible participants may be entitled to benefits under a legacy defined benefit formula. The Company's policy is to fund the qualified pension plan in accordance with the Employee Retirement Income Security Act of 1974. There were no contributions in 2024 and 2023.

The Company has announced there will be no new benefit accruals under the plan after Dec. 31, 2025.

b-f. No significant changes.

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 Statutory Statements of Operations. The net periodic cost recognized is as follows:

	Six Months Ended June 30,			
	2024	2023	2024	2023
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	$ 49	$ 43	$ 4	$ 4
Interest cost	61	62	7	8
Expected return on plan assets	(85)	(84)	-	-
Amortization of unrecognized losses and (gains)	10	13	(4)	(4)
Amortization of unrecognized prior service benefit	-	-	(2)	(3)
Total net periodic expense	$ 35	$ 34	$ 5	$ 5

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 six months ended June 30, 2024 and 2023. Accordingly, the Company has excluded these non-cash activities from the Statutory Statements of Cash Flows for the six months ended June 30, 2024 and 2023.

	Six Months Ended June 30,	
	2024	2023
	(In Millions)	
Stock conversions	$ 4,099	$ 173
Bond conversions and refinancing	392	208
Transfer of mortgage loans to partnerships and limited liability companies	140	-
Change in market value of corporate owned life insurance asset	111	99
Transfer of mortgage loans to bonds	85	3
Transfer of partnerships and limited liability companies to partnerships and limited liability companies	76	-
Transfer of mortgage loans to mortgage loans	17	-
Net investment income payment-in-kind bonds	16	8
Transfer of bonds to partnerships and limited liability companies	-	122

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 2023 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.

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 statement of financial position. However, an adverse outcome in certain matters could have a material adverse effect on the results of operations for the period in which such matter is resolved, or an accrual is determined to be required, on the financial statement financial position, or on our reputation.

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

In June 2024, MM/Barings Multifamily paid MassMutual $22 million in dividends and $10 million return of capital, Insurance Road LLC paid MassMutual $99 million in dividends, and MMIA paid MassMutual $11 million in dividends.

In May 2024, MassMutual made capital contributions of $20 million to ITPS Holdings LLC.

In April 2024, MassMutual made capital contributions of $300 million to DPI Ares Mortgage Lending LLC.

In February 2024, MassMutual made capital contributions of $30 million to ITPS Holdings LLC.

18. Subsequent events

Management of the Company has evaluated subsequent events through August 15, 2024, 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.

Glossary of Terms

Term	Description
ALM	Asset liability management
ATLAS	ATLAS SP Partners
CMBS	Commercial mortgage-backed securities
C.M. Life	C.M. Life Insurance Company
DI	Disability Insurance
FHA	Federal Housing Administration
MM Ascend	MassMutual Ascend Life Insurance Company and other subsidiaries and affiliated entities
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
IMR	Interest maintenance reserve
IS	Institutional Solutions
LLC	Limited liability companies
LTC	Long-term care
MassMutual	Massachusetts Mutual Life Insurance Company
MMFA	MassMutual Financial Advisors
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
SOFR	Secured Overnight Financing Rate
SSAP	Statements of Statutory Accounting Principles
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