MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES

INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of March 31, 2024 and December 31, 2023 and for the three months ended
March 31, 2024 and 2023

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

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

	March 31, 2024	December 31, 2023
	(In Millions)	
Assets:		
Bonds	$ 153,558	$ 147,300
Preferred stocks	583	451
Common stocks – subsidiaries and affiliates	23,975	23,597
Common stocks – unaffiliated	1,800	1,630
Mortgage loans	24,908	24,825
Policy loans	16,490	16,138
Real estate	322	329
Partnerships and limited liability companies	13,325	13,055
Derivatives	23,073	21,301
Cash, cash equivalents and short-term investments	7,705	11,941
Other invested assets	3,303	2,626
Total invested assets	269,042	263,193
Investment income due and accrued	4,334	5,324
Federal income taxes	208	319
Net deferred income taxes	2,019	1,685
Other than invested assets	5,719	5,806
Total assets excluding separate accounts	281,322	276,327
Separate account assets	60,080	58,997
Total assets	$ 341,402	$ 335,324
Liabilities and Surplus:		
Policyholders' reserves	$ 172,329	$ 170,570
Liabilities for deposit-type contracts	20,540	19,712
Contract claims and other benefits	659	732
Policyholders' dividends	2,178	2,150
General expenses due or accrued	891	1,049
Asset valuation reserve	6,372	6,071
Repurchase agreements	3,464	3,219
Commercial paper	50	50
Collateral	1,841	2,160
Derivatives	15,650	14,013
Funds held under coinsurance	22,642	22,520
Other liabilities	6,510	5,342
Total liabilities excluding separate accounts	253,126	247,588
Separate account liabilities	59,941	58,859
Total liabilities	313,067	306,447
Surplus	28,335	28,877
Total liabilities and surplus	$ 341,402	$ 335,324

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

	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
	(In Millions)	
Revenue:		
Premium income	$ 4,274	$ 5,524
Net investment income	2,555	2,786
Fees and other income	277	258
Total revenue	7,106	8,568
Benefits, expenses and other deductions:		
Policyholders' benefits	4,138	3,739
Change in policyholders' reserves	1,105	2,864
General insurance expenses	680	517
Commissions	300	333
State taxes, licenses and fees	95	90
Other deductions	203	288
Total benefits and expenses	6,521	7,831
Net gain from operations before dividends and federal income taxes	585	737
Dividends to policyholders	487	443
Net gain from operations before federal income taxes	98	294
Federal income tax expense	95	173
Net gain from operations	3	121
Net realized capital losses	(237)	(360)
Net loss	$ (234)	$ (239)

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

	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
	(In Millions)	
Surplus, beginning of year	$ 28,877	$ 27,941
Net decrease due to:		
Net loss	(234)	(239)
Change in net unrealized capital gains (losses), net of tax	146	(550)
Change in net unrealized foreign exchange capital (losses) gains, net of taxes	(160)	133
Change in other net deferred income taxes	195	241
Change in nonadmitted assets	83	(106)
Change in asset valuation reserve	(301)	215
Change in surplus notes	(50)	(25)
Change in minimum pension liability	2	-
Prior period adjustments	(109)	31
Other	(114)	18
Net decrease	(542)	(282)
Surplus, end of period	$ 28,335	$ 27,659

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, 2024	Three Months Ended March 31, 2023
	($ In Millions)	
Cash from operations:		
Premium and other income collected	$ 4,728	$ 6,048
Net investment income	3,804	3,005
Benefit payments	(4,306)	(3,712)
Net transfers from separate accounts	637	298
Commissions and other expenses	(1,369)	(1,454)
Dividends paid to policyholders	(463)	(418)
Federal and foreign income taxes recovered	30	206
Net cash provided from operations	3,061	3,973
Cash from investments:		
Proceeds from investments sold, matured or repaid:		
Bonds	8,588	4,845
Preferred and common stocks – unaffiliated	37	21
Mortgage loans	508	884
Partnerships and limited liability companies	199	79
Derivatives	(157)	(63)
Other	(694)	(109)
Total investment proceeds	8,481	5,657
Cost of investments acquired:		
Bonds	(15,390)	(6,935)
Preferred and common stocks – unaffiliated	(276)	(71)
Common stocks – affiliated	(163)	(190)
Mortgage loans	(647)	(658)
Real estate	-	(1)
Partnerships and limited liability companies	(565)	(550)
Derivatives	(40)	(26)
Other	808	488
Total investments acquired	(16,273)	(7,943)
Net increase in policy loans	(353)	(352)
Net cash used in investing activities	(8,145)	(2,638)
Cash from financing and miscellaneous sources:		
Net deposits on deposit-type contracts	794	595
Change in surplus notes	(50)	(25)
Change in repurchase agreements	246	(240)
Change in collateral	(221)	(1,469)
Other cash (used in)	79	(25)
Net cash (used in)from financing and miscellaneous sources	848	(1,164)
Net change in cash, cash equivalents and short-term investments	(4,236)	171
Cash, cash equivalents and short-term investments:		
Beginning of year	11,941	5,737
End of period	$ 7,705	$ 5,908

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 March 31, 2024 and December 31, 2023 and for the three months ended March 31, 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 reclassifications

For the three months ended March 31, 2024, corrections of prior years' errors were recorded in surplus, net of tax:

	Three Months Ended March 31, 2024 Increase (Decrease) to:		
	Prior Years' Net Income	Current Year Surplus	Asset or Liability Balances
	(In Millions)		
Investment income due and accrued	(82)	(82)	(82)
Other liabilities	(12)	(21)	(21)
Bonds	(12)	(12)	(12)
Common stocks	(1)	(1)	(1)
Cash, cash equivalents and short-term investments	(2)	(2)	(2)
Total	$ (109)	$ (118)	

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 March 31, 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 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 adoption and 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 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, but 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.

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 LIHTC, 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:

	March 31, 2024				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 5,511	$ 5,045	$ -	$ 5,045	$ -
All other governments	1,199	1,033	-	1,033	-
States, territories and possessions	218	210	-	210	-
Political subdivisions	370	360	-	360	-
Special revenue	4,269	4,205	-	4,159	46
Industrial and miscellaneous	132,144	123,389	745	58,162	64,482
Parent, subsidiaries and affiliates	9,847	9,401	-	1,450	7,951
Preferred stocks	583	612	221	8	383
Common stocks - subsidiaries and affiliates	492	492	331	-	161
Common stocks - unaffiliated	1,800	1,800	728	100	971
Mortgage loans - commercial	19,798	18,251	-	-	18,251
Mortgage loans - residential	5,110	4,862	-	-	4,862
Derivatives:					
Interest rate swaps	19,606	13,750	-	13,750	-
Options	561	561	50	511	-
Currency swaps	2,821	2,807	-	2,807	-
Forward contracts	74	74	-	74	-
Credit default swaps	1	1	-	1	-
Financial futures	10	10	10	-	-
Cash, cash equivalents and short-term investments	7,705	7,705	817	6,888	-
Separate account assets	60,080	60,018	39,634	18,491	1,893

	March 31, 2024				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial liabilities:					
GICs	17,025	16,299	-	-	16,299
Group annuity contracts and other deposits	1,960	1,811	-	-	1,811
Individual annuity contracts	28,763	29,429	-	-	29,429
Supplementary contracts	986	987	-	-	987
Repurchase agreements	3,464	3,464	-	3,464	-
Commercial paper	50	50	-	50	-
Derivatives:					
Interest rate swaps	14,353	14,836	-	14,836	-
Options	55	55	28	27	-
Currency swaps	1,047	1,084	-	1,084	-
Forward contracts	11	11	-	11	-
Credit default swaps	178	178	-	178	-
Financial futures	6	6	6	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $23,483 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

	December 31, 2023				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
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	-
Commercial paper	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:

	March 31, 2024			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	-	1	-	1
Industrial and miscellaneous	745	95	146	986
Preferred stocks	25	-	62	87
Common stocks - subsidiaries and affiliates	331	-	161	492
Common stocks - unaffiliated	729	100	971	1,800
Cash equivalents and				
Derivatives:				
Interest rate swaps	-	19,601	-	19,601
Options	50	511	-	561
Currency swaps	-	2,806	-	2,806
Forward contracts	-	74	-	74
Financial futures	10	-	-	10
Separate account assets	39,636	17,325	1,886	58,847
Total financial assets carried at fair value	$ 41,526	$ 40,513	$ 3,226	$ 85,265

	March 31, 2024			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 14,353	$ -	$ 14,353
Options	28	27	-	55
Currency swaps	-	192	-	192
Forward contracts	-	11	-	11
Credit default swaps	-	178	-	178
Financial futures	6	-	-	6
Total financial liabilities carried at fair value	$ 34	$ 14,761	$ -	$ 14,795

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 03/31/24
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 176	$ (9)	$ (3)	$ 2	$ -	$ -	$ (1)	$ -	$ -	$ (19)	$ 146
Preferred stocks	67	-	1	-	-	-	-	-	-	(6)	62
Common stocks - subsidiaries and affiliates	183	-	(102)	-	5	-	-	-	(156)	231	161
Common stocks - unaffiliated	960	10	(39)	23	15	(13)	(10)	25	-	-	971
Separate account assets	1,914	(5)	-	28	-	(50)	(2)	-	-	1	1,886
Total financial assets	$ 3,300	$ (4)	$ (143)	$ 53	$ 20	$ (63)	$ (13)	$ 25	$ (156)	$ 207	$ 3,226

	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
Common stocks - 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. *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, 2024			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	$ 5,512	$ 26	$ 492	$ 5,046
All other governments	1,199	9	175	1,033
States, territories and possessions	218	1	9	210
Political subdivisions	370	8	18	360
Special revenue	4,269	72	135	4,206
Industrial and miscellaneous	132,143	791	9,545	123,390
Parent, subsidiaries and affiliates	9,847	22	468	9,401
Total	$ 153,558	$ 929	$ 10,842	$ 143,646

The March 31, 2024 gross unrealized losses exclude $147 million of losses included in the carrying value. These losses include $143 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 March 31, 2024, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $13,360 million. Securities in an unrealized loss position for less than 12 months had a fair value of $2,614 million and unrealized losses of $21 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $10,747 million and unrealized losses of $1,120 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, which 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 than 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 three months ended March 31, 2024 or 2023 that were reacquired within 30 days of the sale date.

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 March 31, 2024, RMBS had a total carrying value of $3,407 million and a fair value of $3,415 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 $1,607 million and a fair value of $1,622 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. *Common stocks – subsidiaries and affiliates*

MMHLLC paid $630 million in dividends to MassMutual for the three months ended March 31, 2024, which were declared in 2023, and paid $450 million in dividends to MassMutual for the three months ended March 31, 2023, which were declared in 2022.

MassMutual contributed capital of $56 million to MMHLLC for the three months ended March 31, 2024 and $44 million for the three months ended March 31, 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.

c. *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:

	March 31, 2024		December 31, 2023	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	$ 19,650	$ 18,125	$ 19,799	$ 18,361
Mezzanine loans	148	126	142	125
Total commercial mortgage loans	19,798	18,251	19,941	18,486
Residential mortgage loans:				
FHA insured and VA guaranteed	1,944	1,805	1,962	1,818
Other residential loans	3,166	3,057	2,922	2,778
Total residential mortgage loans	5,110	4,862	4,884	4,596
Total mortgage loans	$ 24,908	$ 23,113	$ 24,825	$ 23,082

As of March 31, 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 March 31, 2024 and as of December 31, 2023:

	March 31, 2024				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 474	$ 478	$ 647	$ (167)	$ 2
Total	474	478	647	(167)	2
Total impaired commercial mortgage loans	$ 474	$ 478	$ 647	$ (167)	$ 2

	December 31, 2023				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 481	$ 555	$ 644	$ (161)	$ 25
Total	481	555	644	(161)	25
Total impaired commercial mortgage loans	$ 481	$ 555	$ 644	$ (161)	$ 25

d. Partnerships and limited liability companies

No significant changes.

e. 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 $32,910 million as of March 31, 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 $644 million as of March 31, 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 $219 million as of March 31, 2024, and $318 million as of December 31, 2023. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was $5,528 million as of March 31, 2024, and $5,293 million as of December 31, 2023.

As of March 31, 2024, the company had the right to rehypothecate or repledge securities totaling $1,431 million, pledged by the counterparties, of the $644 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 by counterparties. There were no securities rehypothecated to other counterparties as of March 31, 2024 or December 31, 2023.

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

	March 31, 2024			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 19,606	$ 166,438	$ 14,353	$ 155,792
Options	561	12,137	55	640
Currency swaps	2,821	31,725	1,047	15,458
Forward contracts	74	8,398	11	2,738
Credit default swaps	1	101	178	7,882
Financial futures	10	956	6	257
Total	$ 23,073	$ 219,755	$ 15,650	$ 182,767

	December 31, 2023			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 17,713	$ 181,119	$ 12,178	$ 133,793
Options	575	12,133	51	641
Currency swaps	2,893	29,187	1,298	14,742
Forward contracts	14	1,031	305	9,335
Credit default swaps	1	81	153	7,902
Financial futures	104	1,124	29	257
Total	$ 21,300	$ 224,675	$ 14,014	$ 166,670

The average fair value of outstanding derivative assets was $22,934 million for the three months ended March 31, 2024 and $20,909 million for the three months ended March 31, 2023. The average fair value of outstanding derivative liabilities was $15,411 million for the three months ended March 31, 2024 and $12,903 million for the three months ended March 31, 2023.

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

	March 31, 2024	December 31, 2023
	(In Millions)	
Due after one year through five years	$ 5,923	$ 7,983
Due after five years through ten years	2,060	-
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:

	Three Months Ended March 31,			
	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	$ (6)	$ (282)	$ (13)	$ (432)
Currency swaps	16	(81)	37	(82)
Options	(5)	(20)	-	(56)
Credit default swaps	(16)	(9)	(18)	12
Forward contracts	(123)	354	(243)	245
Financial futures	8	(71)	(6)	107
Total	$ (126)	$ (109)	$ (243)	$ (206)

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

	March 31, 2024			December 31, 2023		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	$ 23,073	$ 15,649	$ 7,424	$ 21,301	$ 14,013	$ 7,288
Due and accrued	1,208	2,797	(1,589)	1,396	2,532	(1,137)
Gross amounts offset	(21,328)	(21,328)	-	(19,524)	(19,524)	-
Net asset	2,953	(2,882)	5,835	3,173	(2,978)	6,151
Collateral posted	(3,265)	(3,908)	643	(3,557)	(3,223)	(334)
Net	$ (312)	$ (6,790)	$ 6,478	$ (384)	$ (6,202)	$ 5,817

f. Net investment income

Net investment income, including interest maintenance reserve (IMR) amortization, comprised the following:

	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
	(In Millions)	
Bonds	$ 1,976	$ 1,837
Preferred stocks	5	7
Common stocks - subsidiaries and affiliates	-	280
Common stocks - unaffiliated	23	28
Mortgage loans	274	265
Policy loans	250	310
Real estate	17	18
Partnerships and limited liability companies	188	95
Derivatives	(138)	95
Cash, cash equivalents and short-term investments	136	78
Other	92	43
Subtotal investment income	2,823	3,056
Amortization of the IMR	(20)	(8)
Investment expenses	(248)	(262)
Net investment income	$ 2,555	$ 2,786

g. Net realized capital losses

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

	Three Months Ended March 31, 2024	Three Months Ended March 31, 2023
	(In Millions)	
Bonds	$ (51)	$ (151)
Common stocks - unaffiliated	11	6
Mortgage loans	(8)	(37)
Partnerships and limited liability companies	(32)	(74)
Derivatives	(126)	(243)
Other	6	5
Net realized capital losses before federal and state taxes and deferral to the IMR	(200)	(494)
Net federal and state tax benefit	(14)	35
Net realized capital losses before deferral to the IMR	(214)	(459)
Net after tax losses deferred to the IMR	(23)	99
Net realized capital losses	$ (237)	$ (360)

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

	Three Months Ended March 31,			
	2024		2023	
	(In Millions)			
Bonds	$	(24)	$	(42)
Partnerships and limited liability companies		(27)		(75)
Total OTTI	$	(51)	$	(117)

The Company recognized OTTI of $3 million for the three months ended March 31, 2024 and $14 million for the three months ended March 31, 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*

a. Admitted disallowed IMR

As of March 31, 2024, the Company had $1,219 million of disallowed IMR in aggregate and in the general account.

As of March 31, 2024, the Company had $1,219 million of negative IMR admitted in the general account.

As of March 31, 2024, the calculated adjusted general capital and surplus was $25,526 million.

As of March 31, 2024, the percentage of adjusted general capital and surplus for which the admitted disallowed IMR represents was 4%.

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

	March 31, 2024	
	(In Millions)	
Realized capital gains		3,212
Realized capital losses		(4,274)
Total allocated gains (losses) to IMR from derivatives	$	(1,062)

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.

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 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, 2023	$ 56
Incurred guarantee benefits	27
Paid guarantee benefits	(9)
Liability as of December 31, 2023	74
Incurred guarantee benefits	(48)
Paid guarantee benefits	(1)
Liability as of December 31, 2024	$ 25

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, 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	$ 10,128	$ 94	66	$ 9,935	$ 45	66
GMIB Basic	457	4	73	449	7	73
GMIB Plus	1,272	406	69	1,240	448	69
GMAB	1,347	6	63	1,400	20	63
GLWB	91	13	75	94	15	75

As of March 31, 2024, the GMDB account value above consists of $1,363 million within the general account and $8,766 million within separate accounts that includes $3,825 million of 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

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.

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,			
	2024	2023	2024	2023
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	$ 24	$ 22	$ 2	$ 2
Interest cost	31	31	4	3
Expected return on plan assets	(43)	(42)	-	-
Amortization of unrecognized net actuarial and other losses	5	7	(2)	(2)
Amortization of unrecognized prior service cost	-	-	(2)	(1)
Total net periodic cost	$ 17	$ 18	$ 2	$ 2

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, 2024 and 2023. Accordingly, the Company has excluded these non-cash activities from the Interim Consolidated Statutory Statements of Cash Flows for the three months ended March 31, 2024 and 2023.

	Three Months Ended March 31,	
	2024	2023
	(In Millions)	
Bond conversions and refinancing	$ 130	$ 68
Change in market value of corporate owned life insurance asset	62	38
Stock conversions	11	168
Net investment income payment-in-kind bonds	4	3
Transfer of bonds to partnerships and limited liability companies	-	64

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 consolidated 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 consolidated statement of financial position. However, an adverse outcome in certain matters could have a material adverse effect on the consolidated results of operations for the period in which such matter is resolved, or an accrual is determined to be required, on the consolidated 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 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 May 13, 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, except for:

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 Secured Overnight Financing Rate plus the spread and a 3-year maturity.

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 is scheduled to be finalized in May 2024.

Glossary of Terms

Term	Description
CMBS	Commercial mortgage-backed securities
C.M. Life	C.M. Life Insurance Company
CP	Commercial Paper
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
NAV	Net asset value
NAIC	National Association of Insurance Commissioners
OTTI	Other-than-temporary impairment(s)
RBC	Risk-based capital
RMBS	Residential mortgage-backed securities
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