MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES

INTERIM CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of September 30, 2021 and December 31, 2020 and for the nine months ended September 30, 2021 and 2020

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)

	September 30, 2021	December 31, 2020
	(In Millions)	
Assets:		
Bonds	$ 123,460	$ 118,996
Preferred stocks	555	475
Common stocks – subsidiaries and affiliates	22,794	18,176
Common stocks – unaffiliated	1,222	1,197
Mortgage loans	27,843	27,024
Policy loans	16,292	15,843
Real estate	394	362
Partnerships and limited liability companies	12,027	9,698
Derivatives	17,259	22,037
Cash, cash equivalents and short-term investments	7,183	6,176
Other invested assets	1,821	1,868
Total invested assets	230,850	221,852
Investment income due and accrued	3,153	3,977
Net deferred income taxes	670	515
Other than invested assets	4,189	3,996
Total assets excluding separate accounts	238,862	230,340
Separate account assets	82,807	82,797
Total assets	$ 321,669	$ 313,137
Liabilities and Surplus:		
Policyholders' reserves	$ 138,909	$ 129,210
Liabilities for deposit-type contracts	16,969	14,662
Contract claims and other benefits	770	747
Policyholders' dividends	1,785	1,708
General expenses due or accrued	1,355	1,253
Federal income taxes	67	660
Asset valuation reserve	6,263	5,315
Repurchase agreements	2,909	4,006
Commercial paper	1,120	250
Collateral	5,442	5,799
Derivatives	11,982	18,290
Funds held under coinsurance	18,573	17,929
Other liabilities	7,047	6,184
Total liabilities excluding separate accounts	213,191	206,013
Separate account liabilities	82,658	82,797
Total liabilities	295,849	288,810
Surplus	25,820	24,327
Total liabilities and surplus	$ 321,669	$ 313,137

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

	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2020
	(In Millions)	
Revenue:		
Premium income	$ 14,766	$ 20,202
Net investment income	6,161	5,521
Fees and other income	968	1,046
Total revenue	21,895	26,769
Benefits, expenses and other deductions:		
Policyholders' benefits	8,848	17,587
Change in policyholders' reserves	8,429	5,920
General insurance expenses	1,721	1,728
Commissions	895	831
State taxes, licenses and fees	264	209
Other deductions	707	264
Total benefits and expenses	20,864	26,539
Net gain from operations before dividends and federal income taxes	1,031	230
Dividends to policyholders	1,248	1,227
Net loss from operations before federal income taxes	(217)	(997)
Federal income tax benefit	(32)	(230)
Net loss from operations	(185)	(767)
Net realized capital losses	(870)	(398)
Net loss	$ (1,055)	$ (1,165)

See accompanying notes to interim consolidated statutory financial statements

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

	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2020
	(In Millions)	
Surplus, beginning of year	$ 24,327	$ 18,893
Net (decrease)/increase due to:		
Net loss	(1,055)	(1,165)
Change in net unrealized capital gains, net of tax	3,325	3,633
Change in net unrealized foreign exchange capital (losses) gains, net of taxes	(630)	208
Change in other net deferred income taxes	463	(22)
Change in nonadmitted assets	6	108
Change in asset valuation reserve	(948)	(601)
Change in reserve valuation basis	-	18
Change in surplus notes	234	1,537
Prior period adjustments	14	30
Other	84	(26)
Net increase	1,493	3,720
Surplus, end of period	$ 25,820	$ 22,613

See accompanying notes to interim consolidated statutory financial statements

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

	Nine Months Ended September 30, 2021	2020
	($ In Millions)	
Cash from operations:		
Premium and other income collected	$ 15,175	$ 17,871
Net investment income	7,349	5,692
Benefit payments	(8,812)	(17,966)
Net transfers from separate accounts	1,214	1,834
Commissions and other expenses	(3,525)	(2,882)
Dividends paid to policyholders	(1,176)	(1,163)
Federal and foreign income taxes recovered	(636)	91
Net cash from operations	9,589	3,477
Cash from investments:		
Proceeds from investments sold, matured or repaid:		
Bonds	27,555	15,661
Preferred and common stocks – unaffiliated	449	476
Common stocks – affiliated	42	8
Mortgage loans	3,171	2,411
Real estate	75	1
Partnerships and limited liability companies	415	837
Derivatives	(682)	1,970
Other	174	1,040
Total investment proceeds	31,199	22,404
Cost of investments acquired:		
Bonds	(31,674)	(28,793)
Preferred and common stocks – unaffiliated	(361)	(176)
Common stocks – affiliated	(3,753)	(122)
Mortgage loans	(4,024)	(3,447)
Real estate	(150)	(75)
Partnerships and limited liability companies	(2,241)	(1,073)
Derivatives	(51)	(349)
Other	400	704
Total investments acquired	(41,854)	(33,331)
Net increase in policy loans	(449)	(772)
Net cash used in investing activities	(11,104)	(11,699)
Cash from financing and miscellaneous sources:		
Net deposits on deposit-type contracts	2,282	2,649
Change in repurchase agreements	(1,097)	268
Change in collateral	(369)	3,331
Other cash provided	1,706	7,652
Net cash provided from financing and miscellaneous sources	2,522	13,900
Net change in cash, cash equivalents and short-term investments	1,007	5,678
Cash, cash equivalents and short-term investments:		
Beginning of year	6,176	4,317
End of period	$ 7,183	$ 9,995

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 MassMutual Financial Advisors (MMFA), MassMutual Strategic Distributors (MMSD), Digital Direct to Consumer and Business to Business (DTC&B2B), Institutional Solutions (IS) and Worksite distribution channels.

MMFA is a sales force that includes financial professionals that operate in the U.S. MMFA sells individual life, individual annuities, 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 DTC&B2B distribution channel sells individual life and supplemental health insurance primarily through direct response television advertising, digital media, search engine optimization and search engine marketing. The Company's IS distribution channel sells group annuities, group life and GIC primarily through retirement advisory firms, actuarial consulting firms, investment banks, insurance benefit advisors and investment management companies. The Company's Worksite channel partners 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 executive variable life and disability, 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 September 30, 2021 and December 31, 2020 and for the nine months ended September 30, 2021 and 2020 are unaudited. The Interim Consolidated Statutory Statement of Financial Position as of December 31, 2020 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 2020 audited yearend financial statements as these interim consolidated statutory financial statements disclose only significant changes from yearend 2020. 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 2020 audited consolidated yearend financial statements.

b. Common stocks - subsidiaries and affiliates

On May 28, 2021, the Company, through a wholly owned subsidiary, Glidepath Holdings Inc. (Glidepath), acquired Great American Life Insurance Company and other subsidiaries and affiliated entities (GALIC) for $3,560 million in cash. GALIC primarily offers traditional fixed and fixed indexed annuity products.

Common stocks of unconsolidated subsidiaries, primarily MassMutual Holding LLC (MMHLLC), 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 $603 million as of September 30, 2021 for a portion of its noncontrolling interests. Glidepath is valued on it is underlying GAAP equity with adjustment to recognize its investment in GALIC based on GALIC'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 July 2020, the NAIC adopted modifications to Statements of Statutory Accounting Principles (SSAP) No. 26R, *Bonds*, effective January 1, 2021. The modifications apply similar reporting for gains or losses due to a tender offer as previously adopted for calls. The difference between consideration and par is recognized as net investment income, while any difference between book value and par is recognized as realized gain or loss. The modifications did not have a material effect on the Company's consolidated financial statements.

In July 2020, the NAIC adopted modifications to SSAP No. 32, *Preferred Stock*, effective January 1, 2021. The modifications define carrying value of redeemable preferred stock as amortized cost for NAIC 1-3 designations, the lower of amortized cost or fair value for NAIC 4-6 designations, and new fair value measurement for perpetual and mandatorily convertible preferred stock. They clarify when failure to meet certain dividends or redemption payments could trigger an impairment assessment that preferred shares issued by joint ventures are included in the scope of this guidance, and clarifies scope related to sinking fund schedules, mandatory conversions, and various other features. They also clarify fair value would be capped by any currently effective call price. The revisions impacted the Company's current unaffiliated and affiliated perpetual preferred stock investments. The modifications did not have a material effect on the Company's consolidated financial statements.

In March 2021, the NAIC adopted modifications to SSAP No. 26R, *Bonds*, effective January 1, 2021. The modifications expand the called bond disclosures to also include bonds terminated early through a tender offer. The modifications did not have a material effect on the Company's consolidated financial statements.

In March 2021, the NAIC adopted modifications to SSAP No. 26R, *Bonds*, effective January 1, 2021. The modifications clarify that perpetual bonds are within scope. Perpetual bonds shall be reported at fair value regardless of NAIC designation, not to exceed any current effective call price. For perpetual bonds with an effective call option, any applicable premium shall be amortized to the next effective call date. For perpetual bonds purchased at a discount, any applicable discount shall be accreted utilizing the yield-to-worst concept. The modifications did not have a material effect on the Company's consolidated financial statements.

In May 2021, the NAIC adopted modifications to SSAP No. 2R, *Cash, Cash Equivalents, Drafts and Short-Term Investments*, effective May 20, 2021. The modifications clarify that cryptocurrencies do not meet the definition of cash, cash equivalents and short-term investments and therefore should be non-admitted assets if held directly by an insurer. The modifications did not have a material effect 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:

	September 30, 2021				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 4,183	$ 4,822	$ -	$ 4,822	$ -
All other governments	1,741	1,876	-	1,780	96
States, territories and possessions	341	400	-	400	-
Political subdivisions	458	526	-	526	-
Special revenue	4,881	5,754	-	5,744	10
Industrial and miscellaneous	105,049	111,913	514	57,982	53,417
Parent, subsidiaries and affiliates	6,807	6,876	-	-	6,876
Preferred stocks	555	661	5	-	656
Common stocks - subsidiaries and affiliates	383	383	160	-	223
Common stocks - unaffiliated	1,222	1,222	567	-	655
Mortgage loans - commercial	22,829	23,741	-	-	23,741
Mortgage loans - residential	5,014	5,057	-	-	5,057
Derivatives:					
Interest rate swaps	15,829	16,733	-	16,733	-
Options	378	378	17	361	-
Currency swaps	899	899	-	899	-
Forward contracts	136	136	-	136	-
Credit default swaps	-	1	-	1	-
Financial futures	17	17	17	-	-
Cash, cash equivalents and short-term investments	7,183	7,183	971	6,212	-
Separate account assets	82,807	82,847	55,012	25,805	2,030
Financial liabilities:					
GICs	13,737	13,792	-	-	13,792
Group annuity contracts and other deposits	1,745	1,824	-	-	1,824
Individual annuity contracts	14,509	17,451	-	-	17,451
Supplementary contracts	1,235	1,237	-	-	1,237
Repurchase agreements	2,909	2,909	-	2,909	-
Commercial paper	1,120	1,120	-	1,120	-
Derivatives:					
Interest rate swaps	11,547	12,657	-	12,657	-
Options	7	7	-	7	-
Currency swaps	256	256	-	256	-
Forward contracts	10	10	-	10	-
Credit default swaps	1	2	-	2	-
Financial futures	161	161	161	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $22,411 million.

	December 31, 2020				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 4,446	$ 5,359	$ -	$ 5,359	$ -
All other governments	1,848	2,123	-	2,036	87
States, territories and possessions	445	523	-	523	-
Political subdivisions	447	526	-	526	-
Special revenue	6,349	7,386	-	7,376	10
Industrial and miscellaneous	98,982	107,986	110	60,431	47,445
Parent, subsidiaries and affiliates	6,479	6,583	-	-	6,583
Preferred stocks	475	524	1	-	523
Common stocks - subsidiaries and affiliates	381	381	188	-	193
Common stocks - unaffiliated	1,197	1,197	779	-	418
Mortgage loans - commercial	23,004	23,978	-	-	23,978
Mortgage loans - residential	4,020	4,043	-	-	4,043
Derivatives:					
Interest rate swaps	20,985	23,495	-	23,495	-
Options	450	450	64	386	-
Currency swaps	535	535	-	535	-
Forward contracts	62	62	-	62	-
Credit default swaps	-	2	-	2	-
Financial futures	5	5	5	-	-
Cash, cash equivalents and short-term investments	6,176	6,176	324	5,852	-
Separate account assets	82,797	82,867	54,447	26,575	1,845
Financial liabilities:					
GICs	11,464	11,807	-	-	11,807
Group annuity contracts and other deposits	1,736	1,892	-	-	1,892
Individual annuity contracts	12,771	16,223	-	-	16,223
Supplementary contracts	1,204	1,206	-	-	1,206
Repurchase agreements	4,006	4,006	-	4,006	-
Commercial paper	250	250	-	250	-
Derivatives:					
Interest rate swaps	17,024	17,733	-	17,733	-
Options	20	20	8	12	-
Currency swaps	887	887	-	887	-
Forward contracts	285	285	-	285	-
Credit default swaps	1	1	-	1	-
Financial futures	73	73	73	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $17,795 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:

	September 30, 2021			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 2	$ -	$ 2
Industrial and miscellaneous	512	212	175	899
Preferred stocks	5	-	25	30
Common stocks - subsidiaries and affiliates	160	-	223	383
Common stocks - unaffiliated	567	-	655	1,222
Derivatives:				
Interest rate swaps	-	15,829	-	15,829
Options	17	361	-	378
Currency swaps	-	899	-	899
Forward contracts	-	136	-	136
Financial futures	17	-	-	17
Separate account assets	55,011	24,585	2,020	81,616
Total financial assets carried at fair value	$ 56,289	$ 42,024	$ 3,098	$ 101,411
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 11,547	$ -	$ 11,547
Options	-	7	-	7
Currency swaps	-	256	-	256
Forward contracts	-	10	-	10
Credit default swaps	-	1	-	1
Financial futures	161	-	-	161
Total financial liabilities carried at fair value	$ 161	$ 11,821	$ -	$ 11,982

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, 2020			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 2	$ -	$ 2
Industrial and miscellaneous	110	224	122	456
Preferred stocks	-	-	19	19
Common stocks - subsidiaries and affiliates	188	-	193	381
Common stocks - unaffiliated	780	-	417	1,197
Derivatives:				
Interest rate swaps	-	20,985	-	20,985
Options	64	386	-	450
Currency swaps	-	535	-	535
Forward contracts	-	62	-	62
Financial futures	5	-	-	5
Separate account assets	54,448	25,332	1,834	81,614
Total financial assets carried at fair value	$ 55,595	$ 47,526	$ 2,585	$ 105,706
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 17,024	$ -	$ 17,024
Options	8	12	-	20
Currency swaps	-	887	-	887
Forward contracts	-	285	-	285
Credit default swaps	-	1	-	1
Financial futures	73	-	-	73
Total financial liabilities carried at fair value	$ 81	$ 18,209	$ -	$ 18,290

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 1/1/21	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 09/30/21
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 122	$ (20)	$ 15	$ 2	$ 2	$ (5)	$ (2)	$ -	$ (1)	$ 62	$ 175
Preferred stocks	19	-	3	-	-	-	-	-	-	3	25
Common stocks - subsidiaries and affiliates	193	-	(159)	15	177	-	(3)	-	-		223
Common stocks - unaffiliated	417	1	79	166	-	(5)	(3)	-	-	-	655
Separate account assets	1,834	18	-	274	-	(106)	-	-	-	-	2,020
Total financial assets	$ 2,585	$ (4)	$ (67)	$ 467	$ 179	$ (116)	$ (8)	$ 24	$ (27)	$ 65	$ 3,098

	Balance as of 1/1/20	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 12/31/20
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 120	$ (2)	$ (17)	$ 5	$ 12	$ -	$ (3)	$ 2	$ (28)	$ 33	$ 122
Preferred stocks	13	-	(12)	7	2	-	-	-	-	9	19
Common stocks - subsidiaries and affiliates	120	-	49	43	15	-	(4)	-	-	(30)	193
Common stocks - unaffiliated	272	20	16	119	33	(6)	(39)	2	-	-	417
Separate account assets	967	49	-	837	-	(19)	-	-	-	-	1,834
Total financial assets	$ 1,492	$ 67	$ 36	$ 1,011	$ 62	$ (25)	$ (46)	$ 4	$ (28)	$ 12	$ 2,585

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:

	September 30, 2021			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	$ 4,183	$ 647	$ 8	$ 4,822
All other governments	1,741	149	14	1,876
States, territories and possessions	341	59	-	400
Political subdivisions	458	68	-	526
Special revenue	4,881	876	3	5,754
Industrial and miscellaneous	105,049	7,404	540	111,913
Parent, subsidiaries and affiliates	6,807	76	7	6,876
Total	$ 123,460	$ 9,279	$ 572	$ 132,167

The September 30, 2021 gross unrealized losses exclude $69 million of losses included in the carrying value. These losses include $61 million from NAIC Class 6 bonds and $8 million from residential mortgage-backed securities (RMBS) and commercial mortgage-backed securities (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, 2020			
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	$ 4,446	$ 914	$ 1	$ 5,359
All other governments	1,848	276	1	2,123
States, territories and possessions	445	78	-	523
Political subdivisions	447	79	-	526
Special revenue	6,349	1,041	4	7,386
Industrial and miscellaneous	98,982	9,574	570	107,986
Parent, subsidiaries and affiliates	6,479	104	-	6,583
Total	$ 118,996	$ 12,066	$ 576	$ 130,486

The December 31, 2020 gross unrealized losses exclude $76 million of losses included in the carrying value. These losses include $74 million from NAIC Class 6 bonds and $2 million from RMBS and CMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

As of September 30, 2021, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $3,664 million. Securities in an unrealized loss position for less than 12 months had a fair value of $1,891 million and unrealized losses of $42 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $1,772 million and unrealized losses of $110 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2020, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $7,258 million. Securities in an unrealized loss position for less than 12 months had a fair value of $4,132 million and unrealized losses of $212 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $3,125 million and unrealized losses of $89 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 nine months ended September 30, 2021 or 2020 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 September 30, 2021, RMBS had a total carrying value of $2,010 million and a fair value of $2,116 million, of which approximately 15%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $934 million and a fair value of $990 million. As of December 31, 2020, RMBS had a total carrying value of $2,599 million and a fair value of $2,712 million, of which approximately 12%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $1,026 million and a fair value of $1,084 million.

b. Common stocks – subsidiaries and affiliates

MMHLLC paid $1,200 million in dividends to MassMutual for the nine months ended September 30, 2021, $1,000 million of which were declared in 2020. MMHLLC paid $200 million in dividends for the nine months ended September 30, 2020, which were declared in 2019.

MassMutual contributed capital of $167 million to MMHLLC for the nine months ended September 30, 2021 and $64 million for the nine months ended September 30, 2020.

MassMutual contributed capital of $1,948 million to MMHLLC for the year ended December 31, 2020, of which $1,884 million was used for the Rothesay additional investment. On December 1, 2020, MassMutual purchased, through an indirect, wholly owned subsidiary, an additional investment in Rothesay Holdco UK Limited (RHUK) for $1,875 million. RHUK wholly owns Rothesay Life. The purchase increased MassMutual's indirect ownership in Rothesay Life from 24.9% to 48.9%.

In December 2020, MassMutual contributed its ownership in MMAF and MML Management LLC, wholly owned subsidiaries with a combined carrying value of $1,602 million, to MMIH, a wholly owned subsidiary, in an affiliated transaction and therefore no gain or loss was recognized on the transaction. There was no impact to surplus.

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:

	September 30, 2021		December 31, 2020	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	$ 22,710	$ 23,620	$ 22,905	$ 23,876
Mezzanine loans	119	121	99	102
Total commercial mortgage loans	22,829	23,741	23,004	23,978
Residential mortgage loans:				
FHA insured and VA guaranteed	4,445	4,479	3,258	3,290
Other residential loans	569	578	762	753
Total residential mortgage loans	5,014	5,057	4,020	4,043
Total mortgage loans	$ 27,843	$ 28,798	$ 27,024	$ 28,021

As of September 30, 2021 and December 31, 2020, the loan-to-value ratios of 99% of the Company's commercial mortgage loans were less than 81%.

As of September 30, 2021, 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 September 30, 2021 and as of December 31, 2020:

	September 30, 2021				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 31	$ 33	$ 37	$ (4)	$ 1
Total	31	33	37	(4)	1
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 62	$ 60	$ 113	$ -	$ -
Total	62	60	113	-	-
Total impaired commercial mortgage loans	$ 93	$ 93	$ 150	$ (4)	$ 1

	December 31, 2020				
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
	(In Millions)				
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	$ 68	$ 88	$ 110	$ -	$ 2
Total	68	88	110	-	2
Total impaired commercial mortgage loans	$ 68	$ 88	$ 110	$ -	$ 2

d. Partnerships and limited liability companies

On February 1, 2021, the Company completed the acquisition of Flourish, a fintech platform for registered investment advisors (RIAs), from Stone Ridge Asset Management for a purchase price of $6 million. Flourish provides digitally enabled products and services to RIAs through various modules, including an established cash management offering, Flourish Cash. Flourish Cash is offered through Stone Ridge Securities LLC, Stone Ridge's registered broker-dealer, which the Company acquired. MML CM LLC, a wholly owned subsidiary of MassMutual, owns Flourish.

In September 2021, the Company recognized a $411 million other-than-temporary-impairment (OTTI) from one investment.

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 $23,265 million as of September 30, 2021 and $15,989 million as of December 31, 2020, 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 by the counterparties was $3,999 million as of September 30, 2021 and $4,792 million as of December 31, 2020. In the event of default, the full market value exposure at risk in a net gain position, net of offsets and collateral, was $130 million as of September 30, 2021 and $198 million as of December 31, 2020. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was $943 million as of September 30, 2021 and $330 million as of December 31, 2020.

The Company had the right to rehypothecate or repledge securities totaling $288 million of the $3,999 million as of September 30, 2021 and $829 million of the $4,792 million as of December 31, 2020 of net collateral pledged by counterparties. There were no securities rehypothecated to other counterparties as of September 30, 2021 or December 31, 2020.

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

	September 30, 2021			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 15,829	$ 121,707	$ 11,547	$ 129,133
Options	378	16,110	7	315
Currency swaps	899	11,718	256	5,567
Forward contracts	136	7,079	10	1,513
Credit default swaps	-	60	1	35
Financial futures	17	291	161	3,035
Total	$ 17,259	$ 156,965	$ 11,982	$ 139,598

	December 31, 2020			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$20,985	$ 117,186	$ 17,024	$ 111,420
Options	450	17,615	20	306
Currency swaps	535	6,368	887	10,931
Forward contracts	62	4,869	285	9,214
Credit default swaps	-	5	1	95
Financial futures	5	373	73	3,045
Total	$22,037	$ 146,416	$ 18,290	$ 135,011

The average fair value of outstanding derivative assets was $17,609 million for the nine months ended September 30, 2021 and $27,994 million for the nine months ended September 30, 2020. The average fair value of outstanding derivative liabilities was $13,448 million for the nine months ended September 30, 2021 and $20,964 million for the nine months ended September 30, 2020.

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

	September 30, 2021	December 31, 2020
	(In Millions)	
Due after one year through five years	$ 95	$ 100
Total	$ 95	$ 100

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:

	Nine Months Ended September 30,			
	2021		2020	
	Net Realized (Losses) Gains on Closed Contracts	Change In Net Unrealized (Losses) Gains on Open Contracts	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(In Millions)			
Interest rate swaps	$ (313)	$ 322	$ 320	$ 2,970
Currency swaps	(30)	994	147	585
Options	(122)	98	499	(54)
Credit default swaps	2	-	8	-
Forward contracts	(66)	350	(103)	145
Financial futures	(285)	(76)	657	84
Total	$ (814)	$ 1,688	$ 1,528	$ 3,730

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

	September 30, 2021			December 31, 2020		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	$ 17,259	$ 11,982	$ 5,277	$ 22,037	$ 18,290	$ 3,747
Due and accrued	950	1,902	(952)	1,077	1,733	(656)
Gross amounts offset	(12,320)	(12,320)	-	(18,089)	(18,089)	-
Net asset	5,889	1,564	4,325	5,025	1,934	3,091
Collateral posted	(5,732)	(1,733)	(3,999)	(6,630)	(1,837)	(4,793)
Net	$ 157	$ (169)	$ 326	$ (1,605)	$ 97	$ (1,702)

f. Net investment income

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

	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2020
	(In Millions)	
Bonds	$ 3,424	$ 3,438
Preferred stocks	14	14
Common stocks - subsidiaries and affiliates	200	65
Common stocks - unaffiliated	16	30
Mortgage loans	847	940
Policy loans	824	719
Real estate	115	65
Partnerships and limited liability companies	757	251
Derivatives	352	368
Cash, cash equivalents and short-term investments	14	94
Other	9	31
Subtotal investment income	6,572	6,015
Amortization of the IMR	118	43
Investment expenses	(529)	(537)
Net investment income	$ 6,161	$ 5,521

g. Net realized capital (losses) gains

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

	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2020
	(In Millions)	
Bonds	$ 215	$ (51)
Preferred stocks	(2)	(20)
Common stocks - subsidiaries and affiliates	9	1
Common stocks - unaffiliated	111	(113)
Mortgage loans	-	(62)
Real estate	24	(30)
Partnerships and limited liability companies	(556)	(74)
Derivatives	(814)	1,528
Other	8	35
Net realized capital (losses) gains before federal and state taxes and deferral to the IMR	(1,005)	1,214
Net federal and state tax expense	(84)	(181)
Net realized capital (losses) gains before deferral to the IMR	(1,089)	1,033
Net after tax losses (gains) deferred to the IMR	219	(1,431)
Net realized capital losses	$ (870)	$ (398)

The IMR liability balance was $1,960 million as of September 30, 2021 and $2,298 million as of December 31, 2020 and was included in other liabilities on the Interim Consolidated Statutory Statements of Financial Position.

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

	Nine Months Ended September 30, 2021	Nine Months Ended September 30, 2020
	(In Millions)	
Bonds	$ (52)	$ (126)
Common stocks - unaffiliated	(11)	(82)
Preferred stocks	(1)	-
Mortgage loans	(8)	(13)
Partnerships and limited liability companies	(457)	(80)
Total OTTI	$ (529)	$ (301)

The Company recognized OTTI of $7 million for the nine months ended September 30, 2021 and $9 million for the nine months ended September 30, 2020 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

No significant changes.

8. Policyholders' liabilities

a. Liabilities for deposit-type contracts

On February 25, 2021, MassMutual issued a $420 million funding agreement with a 1.45% fixed rate and a 7-year maturity.

On March 9, 2021, MassMutual issued a $500 million funding agreement with a 2.15% fixed rate and a 10-year maturity.

On April 13, 2021, MassMutual issued a $400 million funding agreement with a 0.60% fixed-rate and a 3-year maturity.

On April 13, 2021, MassMutual issued a $600 million funding agreement with a floating rate based on the Secured Overnight Financing Rate (SOFR) plus 0.36% and a 3-year maturity.

On June 8, 2021, MassMutual issued a $400 million funding agreement with a floating rate based on SOFR plus 0.22% and a 2-year maturity.

On July 16, 2021, MassMutual issued a $600 million funding agreement with a 1.20% 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, 2020	$ 588
Incurred guarantee benefits	(368)
Paid guarantee benefits	(8)
Liability as of December 31, 2020	212
Incurred guarantee benefits	(172)
Paid guarantee benefits	(2)
Liability as of September 30, 2021	$ 38

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.

	September 30, 2021			December 31, 2020		
	Account Value	Net Amount at Risk	Weighted Average Attained Age	Account Value	Net Amount at Risk	Weighted Average Attained Age
	($ In Millions)					
GMDB	$ 13,004	$ 64	66	$ 13,131	$ 57	65
GMIB Basic	677	7	71	705	11	70
GMIB Plus	1,528	163	67	1,494	185	67
GMAB	2,248	4	61	2,415	1	61
GLWB	138	7	73	146	7	72

As of September 30, 2021, the GMDB account value above consists of $1,620 million within the general account and $11,384 million within separate accounts. As of December 31, 2020, the GMDB account value above consists of $1,650 million within the general account and $11,481 million within separate accounts.

9. *Reinsurance*

For the nine months ended September 30, 2021, the Company increased its gross LTC policyholders' reserve by $2,370 million through a combination of various assumption changes to reflect the risk inherent in the cash flows of this business, totaling $2,751 million, offset by a prior year error correction of $381 million. The majority of the risk is ceded to an unaffiliated reinsurer resulting in the ceded policyholders' reserves increasing by an additional $2,140 million. The total net impact of the change is $230 million, which was recorded as an increase to policyholders' liabilities on the Interim Consolidated Statutory Statements of Financial Position and an increase to change in policyholders' reserves on the Interim Consolidated Statutory Statements of Operations.

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 had a carrying value and face amount of $650 million as of September 30, 2021 and $250 million as of December 31, 2020. The additional $400 million of commercial paper was issued for the partial funding of the GALIC acquisition. Notes issued in 2021 had interest rates ranging from 0.08% to 0.15% with maturity dates ranging from 28 to 183 days. Interest expense for commercial paper was $0.4 million for the nine months ended September 30, 2021 and $1.5 million for the nine months ended September 30, 2020.

Refer to *Note 17. "Related party transactions"* for intercompany loan information.

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:

	Nine Months Ended September 30,			
	2021	2020	2021	2020
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	$ 82	$ 86	$ 8	$ 11
Interest cost	58	73	7	8
Expected return on plan assets	(137)	(132)	-	-
Amortization of unrecognized net actuarial and other losses	29	39	1	2
Amortization of unrecognized prior service cost	-	-	(4)	(4)
Total net periodic cost	$ 32	$ 66	$ 12	$ 17

13. Employee compensation plans

No significant changes.

14. Surplus notes

On June 26, 2020, MassMutual executed a drawdown of $600 million from its pre-capitalized surplus notes (P-Caps) facility and received $837 million in market value proceeds, and on March 1, 2021, MassMutual executed the remaining capacity of $200 million from its P-Caps facility and received $233 million in market value proceeds, at a fixed 5.077% coupon rate, maturing in 2069 and callable beginning in 2049.

On April 16, 2020, MassMutual issued $700 million of surplus notes at a fixed 3.375% coupon rate maturing in 2050.

The following table summarizes the surplus notes issued and outstanding as of September 30, 2021:

Issue Date	Face Amount	Carrying Value	Interest Rate	Maturity Date	Scheduled Interest Payment Dates
	($ In Millions)				
11/15/1993	$ 250	$ 250	7.625%	11/15/2023	May 15 & Nov 15
03/01/1994	100	100	7.500%	03/01/2024	Mar 1 & Sept 1
05/12/2003	193	193	5.625%	05/15/2033	May 15 & Nov 15
06/01/2009	130	128	8.875%	06/01/2039	Jun 1 & Dec 1
01/17/2012	263	263	5.375%	12/01/2041	Jun 1 & Dec 1
04/15/2015	258	254	4.500%	04/15/2065	Apr 15 & Oct 15
03/23/2017	475	471	4.900%	04/01/2077	Apr 1 & Oct 1
10/11/2019	838	587	3.729%	10/15/2070	Apr 15 & Oct 15
04/16/2020	700	697	3.375%	04/15/2050	Apr 15 & Oct 15
06/26/2020	600	830	5.077%	02/15/2069	Feb 15 & Aug 15
03/01/2021	200	233	5.077%	02/15/2069	Feb 15 & Aug 15
Total	$ 4,007	$ 4,006			

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 nine months ended September 30, 2021 and 2020. Accordingly, the Company has excluded these non-cash activities from the Interim Consolidated Statutory Statements of Cash Flows for the nine months ended September 30, 2021 and 2020.

	Nine Months Ended September 30,	
	2021	2020
	(In Millions)	
Premium income recognized for group annuity contracts	$ 721	$ 924
Bonds received as consideration for group annuity contracts	(720)	(924)
Bond conversions and refinancing	524	601
Surplus notes issued in exchange for bonds	233	837
Bonds received as consideration for surplus notes	(233)	(837)
Change in market value of corporate owned life insurance asset	214	40
Stock conversion	62	64
Exchange of mortgage loans for other assets	18	-
Net investment income payment-in-kind bonds	15	8
Transfer of mortgage loans to partnerships and limited liability companies	11	353
Transfer of stocks to partnerships	4	-
Common stock received as consideration for group annuity contracts	(4)	-
Stock transferred in exchange for premium ceded	3	-
Premium income recognized for individual annuity contracts	-	3,736
Bonds received as consideration for individual annuity contracts	-	(3,720)
Assets received in-kind for bond maturity	-	63
Partnerships and LLCs received as consideration for individual annuity contracts	-	(15)
Preferred stock received as consideration for individual annuity contracts	-	(1)

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 2020 audited yearend 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.

The spread of the coronavirus, causing increased cases of COVID-19, around the world in 2020 has caused significant volatility in U.S. and international markets. There is significant uncertainty around the breadth and duration of business disruptions related to COVID-19, as well as its impact on the U.S. and international economies. At this time, the Company is not able to reliably estimate the length and severity of the COVID-19 public health crises and, as such, cannot quantify its impact on the financial results, liquidity and capital resources and its operations in future periods.

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 politics 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.

In connection with the May 24, 2019 sale of Oppenheimer Acquisition Corp. (OAC) to Invesco Ltd (Invesco), Invesco identified an accounting matter related to four Master Limited Partnership funds managed by a subsidiary of OAC prior to the sale that Invesco has stated may result in an indemnification claim against MassMutual under the terms of the acquisition agreement. Under the terms of the agreement, MassMutual may be liable to Invesco under the acquisition agreement for a portion of any actual losses incurred by Invesco in excess of $173 million and up to a cap of $575 million. There are currently considerable uncertainties as to the nature, scope and amount of the potential losses for which Invesco may seek indemnity. In addition to the $173 million deductible, it is uncertain whether the indemnification obligations set forth in the acquisition agreement would apply to this situation and MassMutual believes it has a number of defenses available that may mitigate or eliminate its exposure to any losses claimed by Invesco should such obligations apply. However, the outcome of any indemnification dispute (including any resulting litigation), should Invesco assert such a claim, and its potential impact on MassMutual's financial position cannot be foreseen with certainty at this time.

17. Related party transactions

In June 2021, Insurance Road LLC declared $100 million in dividends to MassMutual for the six months ended June 30, 2021, which was paid in September 2021.

In May 2021, MassMutual entered into an intercompany loan agreement with its indirectly owned subsidiary Fern Street LLC, whereby MassMutual borrowed $470 million with a rate of 0.2% and a 6-month maturity, for the partial funding of the GALIC acquisition.

18. Subsequent events

Management of the Company has evaluated subsequent events through November 12, 2021, 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 October 21, 2021, MassMutual issued a $500 million funding agreement with a floating rate based on SOFR plus 0.27% and a 3-year maturity.

Glossary of Terms

Term	Description
B2B	Business to Business
CMBS	Commercial mortgage-backed securities
C.M. Life	C.M. Life Insurance Company
DI	Disability Insurance
DTC	Direct to Consumer
FHA	Federal Housing Administration
GIC	Guaranteed interest contracts
GMAB	Guaranteed minimum accumulation benefits
GMDB	Guaranteed minimum death benefits
GMIB	Guaranteed minimum income benefits
GLWB	Guaranteed lifetime withdrawal benefits
IMR	Interest maintenance reserve
Invesco	Invesco Ltd
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
OAC	Oppenheimer Acquisition Corporation
OTTI	Other-than-temporary impairment(s)
P-Caps	Pre-capitalized surplus notes
RHUK	Rothesay Holdco UK Limited
RIAs	Registered investment advisors
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