MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES

CONDENSED CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of June 30, 2019 and December 31, 2018 and for the six months ended
June 30, 2019 and 2018

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

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

	June 30, 2019	December 31, 2018	$ Change	% Change
	($ In Millions)			
Assets:				
Bonds	$ 105,757	$ 101,504	$ 4,253	4 %
Preferred stocks	773	770	3	-
Common stocks – subsidiaries and affiliates	14,186	10,701	3,485	33
Common stocks – unaffiliated	1,223	503	720	143
Mortgage loans	25,216	24,548	668	3
Policy loans	14,340	14,119	221	2
Real estate	410	488	(78)	(16)
Partnerships and limited liability companies	9,056	8,767	289	3
Derivatives	12,590	9,076	3,514	39
Cash, cash equivalents and short-term investments	2,705	4,733	(2,028)	(43)
Other invested assets	1,603	1,153	450	39
Total invested assets	187,859	176,362	11,497	7
Investment income due and accrued	3,489	3,118	371	12
Federal income taxes	303	627	(324)	(52)
Deferred income taxes	1,020	1,006	14	1
Other than invested assets	3,310	3,297	13	-
Total assets excluding separate accounts	195,981	184,410	11,571	6
Separate account assets	75,593	70,431	5,162	7
Total assets	$ 271,574	$ 254,841	$ 16,733	7 %
Liabilities and Surplus:				
Policyholders' reserves	$ 129,137	$ 126,099	$ 3,038	2 %
Liabilities for deposit-type contracts	14,781	14,475	306	2
Contract claims and other benefits	481	499	(18)	(4)
Policyholders' dividends	1,747	1,713	34	2
General expenses due or accrued	976	1,095	(119)	(11)
Asset valuation reserve	4,773	3,413	1,360	40
Repurchase agreements	4,654	5,001	(347)	(7)
Commercial paper	250	250	-	-
Collateral	2,891	3,018	(127)	(4)
Derivatives	8,962	5,296	3,666	69
Funds held under coinsurance	4,160	4,099	61	1
Other liabilities	4,708	3,842	866	23
Total liabilities excluding separate accounts	177,520	168,800	8,720	5
Separate account liabilities	75,593	70,431	5,162	7
Total liabilities	253,113	239,231	13,882	6
Surplus	18,461	15,610	2,851	18
Total liabilities and surplus	$ 271,574	$ 254,841	$ 16,733	7 %

See accompanying notes to condensed consolidated statutory financial statements

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

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018	$ Change	% Change
	($ In Millions)			
Revenue:				
Premium income	$ 10,515	$ 11,073	$ (558)	(5) %
Net investment income	3,832	3,834	(2)	-
Fees and other income	718	491	227	46
Total revenue	15,065	15,398	(333)	(2)
Benefits and expenses:				
Policyholders' benefits	13,452	10,895	2,557	23
Change in policyholders' reserves	(767)	2,375	(3,142)	(132)
Change in group annuity reserves assumed	(596)	(709)	113	16
General insurance expenses	1,209	1,225	(16)	(1)
Commissions	540	535	5	1
State taxes, licenses and fees	150	139	11	8
Total benefits and expenses	13,988	14,460	(472)	(3)
Net gain from operations before dividends and federal income taxes	1,077	938	139	15
Dividends to policyholders	814	751	63	8
Net gain from operations before federal income taxes	263	187	76	41
Federal income tax expense	17	35	(18)	(51)
Net gain from operations	246	152	94	62
Net realized capital losses	(89)	(1,438)	1,349	94
Net income (loss)	$ 157	$ (1,286)	$ 1,443	112 %

See accompanying notes to condensed consolidated statutory financial statements

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

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018	$ Change	% Change
	($ In Millions)			
Surplus, beginning of year	$ 15,610	$ 15,705	$ (95)	(1) %
Decrease due to:				
Net income (loss)	157	(1,286)	1,443	112
Change in net unrealized capital gains (losses), net of tax	3,834	258	3,576	NM
Change in net unrealized foreign exchange capital (losses) gains, net of tax	(237)	(321)	84	26
Change in other net deferred income taxes	-	295	(295)	(100)
Change in nonadmitted assets	487	(356)	843	237
Change in asset valuation reserve	(1,360)	792	(2,152)	(272)
Prior period adjustments	(19)	(47)	28	60
Other	(11)	(12)	1	8
Net increase (decrease)	2,851	(677)	3,528	521
Surplus, end of period	$ 18,461	$ 15,028	$ 3,433	23 %

NM = not meaningful

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

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018	$ Change	% Change
	($ In Millions)			
Cash from operations:				
Premium and other income collected	$ 11,016	$ 11,627	$ (611)	(5)%
Net investment income	3,885	3,002	883	29
Benefit payments	(13,434)	(10,793)	(2,641)	(24)
Net transfers from separate accounts	3,774	780	2,994	384
Net receipts from group annuity reserves assumed	596	681	(85)	(12)
Commissions and other expenses	(1,968)	(1,992)	24	1
Dividends paid to policyholders	(780)	(740)	(40)	(5)
Federal and foreign income taxes recovered	313	215	98	46
Net cash from operations	3,402	2,780	622	22
Cash from investments:				
Proceeds from investments sold, matured or repaid:				
Bonds	10,399	10,290	109	1
Preferred and common stocks – unaffiliated	397	351	46	13
Common stocks – affiliated	3	860	(857)	(100)
Mortgage loans	1,387	1,240	147	12
Real estate	56	273	(217)	(79)
Partnerships and limited liability companies	472	1,288	(816)	(63)
Derivatives	570	(388)	958	247
Other	(448)	(155)	(293)	(189)
Total investment proceeds	12,836	13,759	(923)	(7)
Cost of investments acquired:				
Bonds	(14,463)	(13,226)	(1,237)	(9)
Preferred and common stocks – unaffiliated	(987)	(159)	(828)	(521)
Common stocks – affiliated	2	(340)	342	101
Mortgage loans	(2,125)	(1,874)	(251)	(13)
Real estate	(44)	10	(54)	(540)
Partnerships and limited liability companies	(560)	(824)	264	32
Derivatives	(177)	(309)	132	43
Other	196	770	(574)	(75)
Total investments acquired	(18,158)	(15,952)	(2,206)	(14)
Net increase in policy loans	(222)	(325)	103	32
Net cash from investing activities	(5,544)	(2,518)	(3,026)	(120)
Cash from financing and miscellaneous sources:				
Net deposits on deposit-type contracts	360	614	(254)	(41)
Change in repurchase agreements	(347)	(108)	(239)	(221)
Change in collateral	(87)	(42)	(45)	(107)
Other cash provided	188	258	(70)	(27)
Net cash from financing and miscellaneous sources	114	722	(608)	(84)
Net change in cash, cash equivalents and short-term investments	(2,028)	984	(3,012)	(306)
Cash, cash equivalents and short-term investments:				
Beginning of year	4,733	3,939	794	20
End of period	$ 2,705	$ 4,923	$ (2,218)	(45)%

NM = Not Meaningful

See accompanying notes to condensed 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, 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), Direct to Consumer (DTC), Institutional Solutions (IS) and Workplace Solutions (WS) distribution channels.

MMFA is a sales force that includes financial advisors that operate in the U.S. MMFA sells individual life, individual annuities and disability insurance. The Company's DTC 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 WS distribution channel sells group life insurance and annuity products as well as individual life insurance, critical illness and long term care products distributed through investment advisors.

2. *Summary of significant accounting policies*

a. Basis of presentation

These condensed 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 condensed 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 (the Division); and for the wholly-owned U.S. domiciled life insurance subsidiaries, the State of Connecticut Insurance Department.

The condensed consolidated statutory financial statements and notes as of June 30, 2019 and December 31, 2018 and for the six months ended June 30, 2019 and 2018 are unaudited. These condensed 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 condensed 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 2018 audited yearend financial statements as these condensed consolidated statutory financial statements disclose only significant changes from yearend 2018. The results of operations for the interim periods should not be considered indicative of results to be expected for the full year. The Condensed Consolidated Statutory Statements of Financial Position as of December 31, 2018 have 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.

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 2018 audited consolidated yearend financial statements.

b. Common stocks - subsidiaries and affiliates

Common stocks of unconsolidated subsidiaries, primarily MassMutual Holding LLC (MMHLLC), 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, adjusted by a portion of its noncontrolling interests (NCI) after consideration of MMHLLC's fair value and the Company's capital levels. The Division has affirmed the statutory recognition of the Company's application of the NCI guidelines in MMHLLC's statutory carrying value. However, the Company has limited this recognition to $3,002 million as of June 30, 2019 and $2,749 million as of December 31, 2018. Operating results, less dividends declared, for MMHLLC are reflected as net unrealized capital gains (losses) in the Consolidated Statutory Statements of Changes in Surplus. Dividends declared from MMHLLC are recorded in net investment income when declared and are limited to MMHLLC'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.

MassMutual International LLC (MMI) was classified as common stocks – subsidiaries and affiliates as of December 31, 2017 and as partnerships and LLCs as of December 31, 2018. MMI was accounted for using the statutory equity method in both years. Prior to December 31, 2018, the Company accounted for the value of MMI at its underlying U.S. GAAP equity value adjusted to remove certain nonadmitted and intangible assets. Beginning on December 31, 2018, the value of MMI is recorded at its underlying U.S. GAAP equity value. The change in the value of MMI is reflected as net unrealized capital gains (losses) in the Consolidated Statutory Statements of Changes in Surplus.

Refer to *Note 5b. "Common stocks – subsidiaries and affiliates"* for further information on the valuation of MMHLLC and MMI.

3. New accounting standards

Adoption of new accounting standards

In June 2016, the NAIC adopted modifications to Statements of Statutory Accounting Principles (SSAP) No. 51R, *Life Contracts*, to incorporate references to the Valuation Manual and to facilitate the implementation of principles-based reserving (PBR), which were effective on January 1, 2017. The adoption of PBR only applies to new life insurance policies issued after January 1, 2017, however the Company plans to adopt these revisions to SSAP No. 51R using the 3-year phased in approach by no later than January 1, 2020. The Company currently uses formulas and assumptions to determine reserves as prescribed by state laws and regulations. Under PBR, the Company will be required to hold the higher of (a) the reserve using prescribed factors and (b) the PBR reserve which considers a wide range of future economic conditions, computed using justified company experience factors, such as mortality, policyholder behavior and expenses. The modifications are not expected to have a material effect on the Company's total life reserves and surplus in the consolidated financial statements.

In October 2018, the NAIC issued modifications to SSAP No. 86, *Derivatives,* effective January 1, 2019. This guidance permits the use of the Overnight Index Swap (OIS) rate based on Secured Overnight Financing Rate as a U.S. benchmark interest rate for hedge accounting purposes under ASC Topic 815 in addition to the U.S. Treasury rate, the LIBOR swap rate, the OIS rate based on the Fed Funds Effective Rate, and the SIFMA Municipal Swap Rate. The Company has not elected to apply hedge accounting, therefore adoption of this guidance did not have an impact on the Company's consolidated financial statements.

In November 2018, the NAIC issued SSAP No. 30R, *Unaffiliated Common Stock*, effective January 1, 2019. These clarifications applies to unaffiliated common stock including Securities Exchange Commission registered investment companies, such as closed-end mutual funds and unit investments trusts. The modification also includes public stock warrants, while nonpublic stock warrants would be classified as derivative instruments. The modifications did not have a material effect on the Company's consolidated financial statements.

In April 2019, the NAIC adopted modifications to SSAP No. 16R, *Electronic Data Processing Equipment and Software,* effective January 1, 2020, the Company elected to early adopt effective April 1, 2019. This guidance aligns and clarifies the requirements for capitalizing implementation costs incurred in a hosting arrangement that is a service contract, with the requirement for capitalizing implementation costs incurred to develop or obtain internaluse software. Costs for implementation activities in the application development stage is capitalized, depending on the nature of the costs and would be nonadmitted, while costs incurred during preliminary project or post implementation stages are expensed as incurred. The amendments also require the entity to expense the capitalized implementation costs of a hosting arrangement that is a service contract over the lesser of the expected term of the hosting arrangement or five years. The Company adopted this guidance on a prospective basis and the adoption did not have a significant impact to its financial statements.

Future adoption of new accounting standards

In November 2018, the NAIC adopted modifications to the liquidity risk disclosure requirements of SSAP No. 51R, *Life Contracts*, No. 52, *Deposit-Type Contracts*, and No. 61R, *Life, Deposit-Type and Accident and Health Reinsurance*, effective December 31, 2019. The modifications will require the Company to provide additional liquidity risk information such as current surrender charges, amount of account value, cash value and reserves breakouts by withdrawal characteristics for certain general and separate account products and groups of products. Additionally, a reconciliation of amounts of total reserves disclosed to the applicable annual statement exhibits, and the corresponding financial statement line items will be required. The Company is currently evaluating the impact of the modifications to the liquidity risk disclosures in its financial statements.

In November 2018, the NAIC issued SSAP No. 108, *Derivatives Hedging Variable Annuity Guarantees*, to provide special accounting guidance for limited derivatives hedging variable annuity guarantee benefits that are subject to fluctuations from interest rates, effective January 1, 2020 with early adoption permitted as of January 1, 2019. This modification applies to variable annuity contracts and other contracts involving certain guaranteed benefits that are valued under principles-based reserving. This modification permits an insurer to use macro-hedging by designating as the host contract, an entire book of business or subsection consisting of interest sensitive variable annuity guarantee benefits, in a fair value hedge. The Company is required to record at fair value the interest rate sensitive variable annuity guarantee (that is, the hedged item) and the related derivative hedging instrument. Changes in the fair value of the derivatives attributable to the hedged item are recorded in realized gains and losses to offset the changes in the fair value of the hedged item. The excess or deficiency of the change in fair value of the derivative compared to the change in the fair value of the hedged item should be recorded as an admitted deferred asset or deferred liability, and amortized through realized capital gains and losses over the remaining term of the interest rate sensitive variable annuity, not to exceed 10 years. The Company is also required to record a special surplus allocation of an amount equal to the deferred asset and deferred liability from unassigned surplus. Changes in the fair value of the derivative that is not attributable to the hedge risk should be recorded in unrealized gains and losses. The Company will be required to disclose information about the derivative and related hedged items. The Company is currently evaluating this guidance to determine the potential impact on its financial statements.

In April 2019, the NAIC adopted modifications to SSAP Nos. 26R, *Bonds*, 43R, *Loan-Backed and Structured Securities*, and 86, *Derivatives*, reclassifying structured notes as specifically defined that expose the investor to the risk of principal loss as derivative instruments, effective December 31, 2019. These types of structured notes where there is an embedded derivative wrapped by a bond include underlying risks that are not linked to the issuer's credit. Structured notes are currently reported as long-term bonds valued at amortized cost; while as derivative instruments, structured notes would be carried at fair value. The Company is currently evaluating this guidance to determine potential impact on its financial statements, but anticipates minimal impact.

4. *Fair value of financial instruments*

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

	June 30, 2019				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 5,453	$ 5,867	$ -	$ 5,867	$ -
All other governments	1,667	1,796	-	1,727	69
States, territories and possessions	619	648	-	648	-
Political subdivisions	581	618	-	618	-
Special revenue	6,174	6,859	-	6,849	10
Industrial and miscellaneous	84,810	89,336	10	51,189	38,137
Parent, subsidiaries and affiliates	6,990	6,921	-	324	6,597
Preferred stocks	773	798	32	-	766
Common stocks - subsidiaries and affiliates	290	290	173	-	117
Common stocks - unaffiliated	1,223	1,223	983	-	240
Mortgage loans - commercial	23,588	24,756	-	-	24,756
Mortgage loans - residential	1,628	1,604	-	-	1,604
Derivatives:					
Interest rate swaps	10,428	10,910	-	10,910	-
Options	757	757	112	645	-
Currency swaps	1,104	1,104	-	1,104	-
Forward contracts	76	90	-	90	-
Credit default swaps	18	25	-	25	-
Financial futures	207	207	207	-	-
Cash, cash equivalents and short-term investments	2,705	2,705	-	2,705	-
Separate account assets	75,594	75,628	49,267	25,357	1,004
Financial liabilities:					
Guaranteed interest contracts	9,115	9,261	-	-	9,261
Group annuity contracts and other deposits	17,824	17,907	-	-	17,907
Individual annuity contracts	11,225	12,880	-	-	12,880
Supplementary contracts	1,269	1,271	-	-	1,271
Repurchase agreements	4,654	4,654	-	4,654	-
Commercial paper	250	250	-	250	-
Derivatives:					
Interest rate swaps	8,658	9,081	-	9,081	-
Options	6	6	3	3	-
Currency swaps	232	232	-	232	-
Forward contracts	38	59	-	59	-
Credit default swaps	1	1	-	1	-
Financial futures	27	27	27	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $13,896 million.

	December 31, 2018				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 6,167	$ 6,507	$ -	$ 6,507	$ -
All other governments	1,488	1,483	-	1,416	67
States, territories and possessions	643	678	-	678	-
Political subdivisions	565	590	-	590	-
Special revenue	6,045	6,549	-	6,540	9
Industrial and miscellaneous	78,818	78,244	10	44,627	33,607
Parent, subsidiaries and affiliates	7,778	7,827	-	1,202	6,625
Preferred stocks	770	759	29	-	730
Common stocks - subsidiaries and affiliates	409	409	244	-	165
Common stocks - unaffiliated	503	503	195	-	308
Mortgage loans - commercial	23,169	23,623	-	-	23,623
Mortgage loans - residential	1,379	1,316	-	-	1,316
Derivatives:					
Interest rate swaps	6,879	7,108	-	7,108	-
Options	925	925	-	925	-
Currency swaps	879	879	-	879	-
Interest rate caps and floors	18	18	-	18	-
Forward contracts	109	116	-	116	-
Credit default swaps	18	6	-	6	-
Financial futures	248	248	-	248	-
Cash, cash equivalents and short-term investments	4,733	4,733	244	4,489	-
Separate account assets	70,431	70,419	43,868	25,988	563
Financial liabilities:					
Guaranteed interest contracts	8,825	8,729	-	-	8,729
Group annuity contracts and other deposits	17,863	17,951	-	-	17,951
Individual annuity contracts	11,129	12,240	-	-	12,240
Supplementary contracts	1,284	1,286	-	-	1,286
Repurchase agreements	5,001	5,001	-	5,001	-
Commercial paper	250	250	-	250	-
Derivatives:					
Interest rate swaps	5,022	5,486	-	5,486	-
Options	5	5	-	5	-
Currency swaps	239	239	-	239	-
Forward contracts	13	29	-	29	-
Credit default swaps	2	2	-	2	-
Financial futures	15	15	-	15	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $10,292 million.

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

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

	June 30, 2019			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 1	$ -	$ 1
Industrial and miscellaneous	$ 10	$ 203	$ 84	$ 297
Preferred stocks	-	-	10	10
Common stocks - subsidiaries and affiliates	173	-	117	290
Common stocks - unaffiliated	983	-	240	1,223
Derivatives:				
Interest rate swaps	-	10,428	-	10,428
Options	112	645	-	757
Currency swaps	-	1,104	-	1,104
Forward contracts	-	76	-	76
Financial futures	207	-	-	207
Separate account assets	49,267	24,202	992	74,461
Total financial assets carried at fair value	$ 50,752	$ 36,659	$ 1,443	$ 88,854
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 8,658	$ -	$ 8,658
Options	3	3	-	6
Currency swaps	-	232	-	232
Forward contracts	-	38	-	38
Financial futures	27	-	-	27
Total financial liabilities carried at fair value	$ 30	$ 8,931	$ -	$ 8,961

For the six months ended June 30, 2019, there were transfers in derivatives between Level 2 and Level 1 for listed options and futures as the prices used are observable market quotes. The Company does not have any financial instruments that were carried at NAV 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, 2018			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 1	$ -	$ 1
Industrial and miscellaneous	10	30	68	108
Parent, subsidiaries and affiliates	-	84	72	156
Common stocks - subsidiaries and affiliates	244	-	165	409
Common stocks - unaffiliated	195	-	308	503
Derivatives:				
Interest rate swaps	-	6,879	-	6,879
Options	-	925	-	925
Currency swaps	-	879	-	879
Interest rate caps and floors	-	18	-	18
Forward contracts	-	109	-	109
Financial futures	-	248	-	248
Separate account assets	43,868	24,890	551	69,309
Total financial assets carried at fair value	$ 44,317	$ 34,063	$ 1,164	$ 79,544
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 5,022	$ -	$ 5,022
Options	-	5	-	5
Currency swaps	-	239	-	239
Forward contracts	-	13	-	13
Financial futures	-	15	-	15
Total financial liabilities carried at fair value	$ -	$ 5,294	$ -	$ 5,294

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. There were no significant transfers between Level 2 and Level 1 for the year ended December 31, 2018.

	Balance as of 1/1/19	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 6/30/19
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 68	$ (20)	$ -	$ -	$ 1	$ -	$ -	$ 5	$ -	$ 30	$ 84
Parent, subsidiaries, and affiliates	72	-	1	(1)	-	-	-	-	(8)	(64)	-
Preferred stocks	-	-	-	-	-	-	-	-	-	10	10
Common stocks - subsidiaries and affiliates	165	1	(45)	-	-	-	(4)	-	-	-	117
Common stocks - unaffiliated	308	11	(21)	4	-	(60)	(2)	-	-	-	240
Separate account assets	551	17	-	779	-	(355)	-	-	-	-	992
Total financial assets	$ 1,164	$ 9	$ (65)	$ 782	$ 1	$ (415)	$ (6)	$ 5	$ (8)	$ (24)	$ 1,443
Financial liabilities											
Derivatives:											

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.

	Balance as of 1/1/18	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 12/31/18
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 57	$ (4)	$ (6)	$ -	$ 1	$ -	$ (10)	$ -	$ -	$ 30	$ 68
Parent, subsidiaries, and affiliates	67	4	(7)	9	-	-	(6)	5	-	-	72
Preferred stocks	2	-	(1)	-	1	-	-	-	-	(2)	-
Common stocks - subsidiaries and affiliates	109	-	43	5	6	-	(11)	9	-	4	165
Common stocks - unaffiliated	314	7	12	17	4	-	(46)	-	-	-	308
Derivatives:											
Currency swaps	1	-	-	-	-	-	-	-	(1)	-	-
Separate account assets	710	7	-	112	-	(278)	-	-	-	-	551
Total financial assets	$ 1,260	$ 14	$ 41	$ 143	$ 12	$ (278)	$ (73)	$ 14	$ (1)	$ 32	$ 1,164
Financial liabilities											
Derivatives:											
Currency swaps	$ 8	-	-	-	-	-	-	-	(8)	-	$ -

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

As of June 30, 2019, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $7,790 million. Securities in an unrealized loss position for less than 12 months had a fair value of $4,482 million and unrealized losses of $44 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $3,308 million and unrealized losses of $73 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2018, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $10,528 million. Securities in an unrealized loss position for less than 12 months had a fair value of $8,248 million and unrealized losses of $148 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $2,280 million and unrealized losses of $84 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

In the course of the Company’s investment management activities, securities may be sold and reacquired within 30 days to enhance the Company’s yield on its investment portfolio. The Company did not sell any securities with the NAIC Designation 3 or below for the six months ended June 30, 2019 or 2018, that were reacquired within 30 days of the sale date.

Residential mortgage-backed exposure

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

As of June 30, 2019, RMBS had a total carrying value of $1,224 million and a fair value of $1,335 million, of which approximately 23%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $488 million and a fair value of $554 million. As of December 31, 2018, RMBS had a total carrying value of $1,338 million and a fair value of $1,451 million, of which approximately 21%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $499 million and a fair value of $583 million.

b. Common stocks – subsidiaries and affiliates

MMHLLC paid $650 million in dividends to MassMutual for the period ended June 30, 2019, which were declared in December 2018, declared $300 million of dividends in June 2019 to be paid to MassMutual subsequent to June 30, 2019 and declared $250 million in dividends for the period ended June 30, 2018.

MassMutual contributed additional capital of $50 million to MMHLLC for the period ended June 30, 2019 and $144 million for the period ended June 30, 2018.

On May 24, 2019, an indirectly wholly owned subsidiary of MassMutual, MM Asset Management Holding LLC (MMAMH) executed the sale of its retail asset management affiliate, OppenheimerFunds, Inc. (OFI), to Invesco Ltd (Invesco), a global asset manager. Under the terms of the sale, MMAMH and OFI employee shareholders received 81.8 million of Invesco common shares and $4.0 billion in perpetual, non-cumulative preference shares with a fixed cash dividend rate of 5.9%. MMAMH is a directly wholly owned subsidiary of MMHLLC. In turn, MMAMH received a 15.7% common equity interest in post transaction Invesco and MMAMH entered into a shareholder agreement pursuant to which MMAMH has customary minority shareholder rights, including the appointment of a director to Invesco's board of directors. MassMutual's investment in MMHLLC was increased from the impact of this sale through change in unrealized capital gains of $3,331 million, with an approximate net increase to surplus of $2,500 million.

c. *Mortgage loans*

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

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

	June 30, 2019		December 31, 2018	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	$ 23,588	$ 24,756	$ 23,094	$ 23,547
Mezzanine loans	-	-	75	76
Total commercial mortgage loans	23,588	24,756	23,169	23,623
Residential mortgage loans:				
FHA insured and VA guaranteed	1,328	1,305	1,374	1,311
Other residential loans	300	299	5	5
Total residential mortgage loans	1,628	1,604	1,379	1,316
Total mortgage loans	$ 25,216	$ 26,360	$ 24,548	$ 24,939

As of June 30, 2019 and December 31, 2018, the loan-to-value ratios of 99% of the Company's commercial mortgage loans were less than 81%.

As of June 30, 2019 and December 31, 2018, the Company had no 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.

As of and for the six months ended June 30, 2019 and 2018, the Company had no valuation allowance recorded for commercial mortgage loans.

d. 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 synthetic investments. These synthetic investments are created when they are economically more attractive than the actual instrument or when similar instruments are unavailable. Synthetic investments are created either to hedge and reduce the Company's credit and foreign currency exposure or to create an investment in a particular asset. The Company held synthetic investments with a notional amount of $15,414 million as of June 30, 2019 and $15,582 million as of December 31, 2018. These notional amounts included replicated asset transaction values of $13,414 million as of June 30, 2019 and $13,582 million as of December 31, 2018, 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 $2,991 million as of June 30, 2019 and $2,377 million as of December 31, 2018. In the event of default, the full market value exposure at risk in a net gain position, net of offsets and collateral, was $84 million as of June 30, 2019 and $152 million as of December 31, 2018. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was $636 million as of June 30, 2019 and $701 million as of December 31, 2018.

The Company had the right to rehypothecate or repledge securities totaling $1,960 million of the $2,991 million as of June 30, 2019 and $709 million of the $2,377 million as of December 31, 2018 of net collateral pledged by counterparties. There were no securities rehypothecated to other counterparties as of June 30, 2019 or December 31, 2018.

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

	June 30, 2019			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 10,428	$ 92,154	$ 8,658	$ 106,379
Options	757	20,041	6	205
Currency swaps	1,104	10,503	232	4,151
Forward contracts	76	6,114	38	4,562
Credit default swaps	18	1,115	1	105
Financial futures	207	3,437	27	291
Total	$ 12,590	$ 133,364	$ 8,962	$ 115,693

	December 31, 2018			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 6,879	$ 94,813	$ 5,022	$ 91,272
Options	925	19,932	5	128
Currency swaps	879	9,314	239	4,152
Interest rate caps and floors	18	8,465	-	-
Forward contracts	109	6,905	13	3,738
Credit default swaps	18	1,135	2	105
Financial futures	248	3,486	15	291
Total	$ 9,076	$ 144,050	$ 5,296	$ 99,686

The average fair value of outstanding derivative assets was $9,952 million for the six months ended June 30, 2019 and $8,812 million for the six months ended June 30, 2018. The average fair value of outstanding derivative liabilities was $6,626 million for the six months ended June 30, 2019 and $6,040 million for the six months ended June 30, 2018.

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

	June 30, 2019	December 31, 2018
	(In Millions)	
Due in one year or less	$ 10	$ 20
Due after one year through five years	1,210	1,220
Total	$ 1,220	$ 1,240

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

	Six Months Ended June 30,			
	2019		2018	
	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(In Millions)			
Interest rate swaps	$ (37)	$ (83)	$ (53)	$ (42)
Currency swaps	17	234	1	237
Options	(75)	(130)	(85)	36
Credit default swaps	5	-	6	2
Interest rate caps and floors	-	(6)	1	(2)
Forward contracts	154	(58)	(117)	264
Financial futures	325	(53)	(379)	165
Total	$ 389	$ (96)	$ (626)	$ 660

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

	June 30, 2019			December 31, 2018		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	$ 12,590	$ 8,962	$ 3,628	$ 9,076	$ 5,296	$ 3,780
Due and accrued	942	2,098	(1,156)	872	1,997	(1,125)
Gross amounts offset	(9,265)	(9,265)	-	(6,378)	(6,378)	-
Net asset	4,267	1,795	2,472	3,570	915	2,655
Collateral posted	(4,809)	(1,818)	(2,991)	(3,733)	(1,356)	(2,377)
Net	$ (542)	$ (23)	$ (519)	$ (163)	$ (441)	$ 278

e. Net investment income

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

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018
	(In Millions)	
Bonds	$ 2,306	$ 2,084
Preferred stocks	11	6
Common stocks - subsidiaries and affiliates	300	255
Common stocks - unaffiliated	18	20
Mortgage loans	547	513
Policy loans	455	420
Real estate	75	58
Partnerships and LLCs	240	572
Derivatives	188	169
Cash, cash equivalents and short-term investments	45	43
Other	30	5
Subtotal investment income	4,215	4,145
Amortization of the IMR	15	44
Investment expenses	(398)	(355)
Net investment income	$ 3,832	$ 3,834

f. Net realized capital (losses) gains

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

The IMR liability balance was $52 million as of June 30, 2019 and less than $1 million as of December 31, 2018 and was included in other liabilities on the Condensed Consolidated Statutory Statements of Financial Position.

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018
	(In Millions)	
Bonds	$ (39)	$ (50)
Common stocks - subsidiaries and affiliates	1	(1,257)
Common stocks - unaffiliated	8	70
Mortgage loans	1	(2)
Real estate	(20)	168
Partnerships and LLCs	(30)	(27)
Derivatives	389	(627)
Other	(9)	(5)
Net realized capital gains (losses) before federal and state taxes and deferral to the IMR	301	(1,730)
Net federal and state tax benefit (expense)	3	(24)
Net realized capital gains (losses) before deferral to the IMR	304	(1,754)
Net after tax (gains) losses deferred to the IMR	(393)	316
Net realized capital losses	$ (89)	$ (1,438)

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

	Six Months Ended June 30, 2019	Six Months Ended June 30, 2018
	(In Millions)	
Bonds	$ (67)	$ (43)
Common stocks - subsidiaries and affiliates	-	(1,258)
Common stocks - unaffiliated	(8)	-
Partnerships and LLCs	(35)	(34)
Total OTTI	$ (110)	$ (1,335)

The Company recognized OTTI of $1 million for the six months ended June 30, 2019 and $9 million for the six months ended June 30, 2018 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 March 8, 2019, MassMutual issued a $650 million funding agreement, which supports a series of medium-term notes with 3.4% fixed rate coupons and 7-year maturities.

On March 13, 2019, MassMutual issued a $200 million funding agreement, which supports a series of medium-term notes with 2.7% rate coupons and 2-year maturities.

On June 26, 2019, MassMutual issued a $500 million funding agreement, which supports a series of medium-term notes with 2.25% rate coupons and 3-year maturities.

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 minimum withdrawal benefits (GMWB). 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 GMWB (in millions):

Liability as of January 1, 2018	$	515
Incurred guarantee benefits		252
Paid guarantee benefits		(7)
Liability as of December 31, 2018		760
Incurred guarantee benefits		(49)
Paid guarantee benefits		(4)
Liability as of June 30, 2019	$	707

The Company held reserves in accordance with the stochastic and standard scenarios as of June 30, 2019 and December 31, 2018. As of June 30, 2019 and December 31, 2018, the Company held additional reserves above those indicated based on the stochastic scenarios in order to maintain a prudent level of reserve adequacy.

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

	June 30, 2019			December 31, 2018		
	Account Value	Net Amount at Risk	Weighted Average Attained Age	Account Value	Net Amount at Risk	Weighted Average Attained Age
	($ In Millions)					
GMDB	$ 20,159	$ 62	65	$ 18,919	$ 175	64
GMIB Basic	735	42	69	700	97	69
GMIB Plus	2,887	574	67	2,687	813	67
GMAB	2,625	3	60	2,573	74	60
GMWB	160	14	71	160	23	70

As of June 30, 2019, the GMDB account value above consists of $4,230 million within the general account and $15,929 million within separate accounts that includes $4,291 million of modified coinsurance assumed. As of December 31, 2018, the GMDB account value above consists of $4,278 million within the general account and $14,642 million within separate accounts that includes $3,836 million of modified coinsurance 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 Condensed Consolidated Statutory Statements of Operations. The net periodic cost recognized is as follows:

	Six Months Ended June 30,			
	2019	2018	2019	2018
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	$ 56	$ 56	$ 7	$ 7
Interest cost	59	54	7	6
Expected return on plan assets	(80)	(86)	-	-
Amortization of unrecognized net actuarial and other losses	28	27	-	1
Amortization of unrecognized prior service cost	-	2	(3)	(3)
Total net periodic cost	$ 63	$ 53	$ 11	$ 11

13. Employee compensation plans

No significant changes.

14. Surplus notes

No significant changes.

15. *Presentation of the Condensed Consolidated Statutory Statements of Cash Flows*

The following table presents those transactions that have affected the Company's recognized assets or liabilities but have not resulted in cash receipts or payments during the six months ended June 30, 2019 and 2018. Accordingly, the Company has excluded these non-cash activities from the Condensed Consolidated Statutory Statements of Cash Flows for the six months ended June 30, 2019 and 2018.

	Six Months Ended June 30,	
	2019	2018
	(In Millions)	
Bond conversions and refinancing	$ 697	$ 272
Premium income recognized for group annuity contracts	223	-
Change in market value of COLI	105	17
Transfer of mortgage loans to partnerships and LLCs	91	81
Stock conversion	54	31
Transfer of bonds to EM Opportunities LLC	-	73
Dividend declared from Insurance Road LLC	-	52
Other	4	8

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. This condensed risks and uncertainties disclosure should be read in conjunction with the consolidated statutory disclosure in the Company's 2018 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 long term care 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 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 utilize the mitigating actions described above to attempt to 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 and any related insurance recoveries, if any. An accrual is subject to subsequent adjustment as a result of additional information and other developments. The resolution of matters are 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.

c. Commitments

In March 2019, MassMutual entered into a Contingent Capital Facility Agreement (the Facility) with an unaffiliated entity (the Trust). Under the Facility, subject to regulatory approval in certain circumstances, MassMutual has the right, and upon the occurrence of certain events has an obligation, to issue up to $800 million of surplus notes to the Trust in exchange for all or a pro rata portion of certain principal and interest strips of U.S. Treasury Securities held by the Trust. MassMutual is required to pay a facility fee of approximately 2.00% per year to the Trust on the undrawn portion of the Facility, totaling approximately $16 million per year if the Facility remains undrawn, and certain additional administrative fees and expenses.

17. Related party transactions

No significant changes.

18. Subsequent events

Management of the Company has evaluated subsequent events through August 12, 2019, 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 Statements of Financial Position and before the date of evaluation that would require disclosure.

Glossary of Terms

Term	Description
C.M. Life	C.M. Life Insurance Company
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
GMWB	Guaranteed minimum withdrawal benefits
IMR	Interest maintenance reserve
Invesco	Invesco Ltd
IS	Institutional Solutions
MassMutual	Massachusetts Mutual Life Insurance Company
MM Asia	MassMutual Asia Limited
MM Japan	MassMutual Life Insurance Company in Japan
MMFA	MassMutual Financial Advisors
MMHLLC	MassMutual Holding LLC
MMI	MassMutual International LLC
NAIC	National Association of Insurance Commissioners
NAV	Net asset value
NCI	Noncontrolling interests
OFI	Oppenheimer Funds
OIS	Overnight Index Swap
OTTI	Other-than-temporary impairment(s)
PBR	Principles-based reserving
RMBS	Residential mortgage-backed securities
SCA	Subsidiary and controlled affiliate
SSAP	Statements of Statutory Accounting Principles
the Act	Tax Cuts and Job Act
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
the Division	Commonwealth of Massachusetts Division of Insurance
the Facility	Contingent Capital Facility Agreement
the Trust	Harborwalk Funding Trust
U.S	United States of America
U.S. GAAP	U.S. generally accepted accounting principles
VA	Veterans Administration
WS	Workplace Solutions