MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY AND SUBSIDIARIES

CONDENSED CONSOLIDATED STATUTORY FINANCIAL STATEMENTS

As of September 30, 2018 and December 31, 2017 and for the nine months ended September 30, 2018 and 2017

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)

	September 30, 2018	December 31, 2017	$ Change	% Change
	($ In Millions)			
Assets:				
Bonds	$ 101,015	$ 94,870	6,145	6 %
Preferred stocks	779	794	(15)	(2)
Common stocks – subsidiaries and affiliates	11,353	12,868	(1,515)	(12)
Common stocks – unaffiliated	1,034	1,217	(183)	(15)
Mortgage loans	24,246	23,521	725	3
Policy loans	14,296	13,569	727	5
Real estate	765	857	(92)	(11)
Partnerships and limited liability companies	7,961	7,863	98	1
Derivatives	8,854	9,253	(399)	(4)
Cash, cash equivalents and short-term investments	1,732	3,939	(2,207)	(56)
Other invested assets	1,018	424	594	140
Total invested assets	173,053	169,175	3,878	2
Investment income due and accrued	2,526	2,304	222	10
Federal income taxes	326	538	(212)	(39)
Deferred income taxes	1,039	788	251	32
Other than invested assets	3,270	3,465	(195)	(6)
Total assets excluding separate accounts	180,214	176,270	3,944	2
Separate account assets	77,215	75,505	1,710	2
Total assets	$ 257,429	$ 251,775	5,654	2 %
Liabilities and Surplus:				
Policyholders' reserves	$ 123,718	$ 119,905	3,813	3 %
Liabilities for deposit-type contracts	14,250	13,110	1,140	9
Contract claims and other benefits	434	532	(98)	(18)
Policyholders' dividends	1,639	1,601	38	2
General expenses due or accrued	1,051	1,075	(24)	(2)
Asset valuation reserve	2,823	3,308	(485)	(15)
Repurchase agreements	5,065	4,436	629	14
Commercial paper	250	250	-	-
Collateral	2,021	2,729	(708)	(26)
Derivatives	5,849	6,444	(595)	(9)
Funds held under coinsurance	4,072	4,001	71	2
Other liabilities	4,320	3,174	1,146	36
Total liabilities excluding separate accounts	165,492	160,565	4,927	3
Separate account liabilities	77,215	75,505	1,710	2
Total liabilities	242,707	236,070	6,637	3
Surplus	14,722	15,705	(983)	(6)
Total liabilities and surplus	$ 257,429	$ 251,775	5,654	2 %

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

	Nine Months Ended September 30, 2018	Nine Months Ended September 30, 2017	$ Change	% Change
	($ In Millions)			
Revenue:				
Premium income	$ 16,976	$ 15,232	$ 1,744	11 %
Net investment income	5,539	5,265	274	5
Fees and other income	817	1,185	(368)	(31)
Total revenue	23,332	21,682	1,650	8
Benefits and expenses:				
Policyholders' benefits	16,396	16,273	123	1
Change in policyholders' reserves	3,855	1,491	2,364	159
Change in group annuity reserves assumed	(1,007)	(645)	(362)	(56)
General insurance expenses	1,835	1,974	(139)	(7)
Commissions	804	744	60	8
State taxes, licenses and fees	194	162	32	20
Total benefits and expenses	22,077	19,999	2,078	10
Net gain from operations before dividends and federal income taxes	1,255	1,683	(428)	(25)
Dividends to policyholders	1,145	1,151	(6)	(1)
Net gain from operations before federal income taxes	110	532	(422)	(79)
Federal income tax expense (benefit)	37	(148)	185	125
Net gain from operations	73	680	(607)	(89)
Net realized capital losses	(1,288)	(421)	867	206
Net (loss) income	$ (1,215)	$ 259	$ (1,474)	(569) %

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)

	Nine Months Ended September 30, 2018	Nine Months Ended September 30, 2017	$ Change	% Change
	($ In Millions)			
Surplus, beginning of year	$ 15,705	$ 15,423	$ 282	2 %
Decrease due to:				
Net (loss) income	(1,215)	259	(1,474)	(569)
Change in net unrealized capital gains (losses), net of tax	311	8	303	NM
Change in net unrealized foreign exchange capital (losses) gains, net of tax	(400)	666	(1,066)	(160)
Change in other net deferred income taxes	290	20	270	NM
Change in nonadmitted assets	(381)	(143)	(238)	(166)
Change in asset valuation reserve	486	(101)	587	581
Prior period adjustments	(48)	7	(55)	(786)
Other	(26)	13	(39)	(300)
Net (decrease) increase	(983)	729	(1,712)	(235)
Surplus, end of period	$ 14,722	$ 16,152	$ (1,430)	(9) %

NM = not meaningful

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

	Nine Months Ended September 30, 2018	2017	$ Change	% Change
	($ In Millions)			
Cash from operations:				
Premium and other income collected	$ 18,130	$ 15,873	$ 2,257	14 %
Net investment income	5,177	5,313	(136)	(3)
Benefit payments	(16,601)	(16,012)	(589)	(4)
Net transfers from separate accounts	1,274	3,127	(1,853)	(59)
Net receipts from group annuity reserves assumed	1,007	645	362	56
Commissions and other expenses	(2,990)	(2,725)	(265)	(10)
Dividends paid to policyholders	(1,112)	(1,096)	(16)	(1)
Federal and foreign income taxes recovered (paid)	196	(87)	283	325
Net cash from operations	5,081	5,038	43	1
Cash from investments:				
Proceeds from investments sold, matured or repaid:				
Bonds	13,708	15,805	(2,097)	(13)
Preferred and common stocks – unaffiliated	495	345	150	43
Common stocks – affiliated	917	120	797	664
Mortgage loans	2,180	2,280	(100)	(4)
Real estate	276	225	51	23
Partnerships and limited liability companies	1,694	1,480	214	14
Derivatives	267	31	236	761
Other	(612)	(372)	(240)	(65)
Total investment proceeds	18,925	19,914	(989)	(5)
Cost of investments acquired:				
Bonds	(20,383)	(20,357)	(26)	-
Preferred and common stocks – unaffiliated	(274)	(754)	480	64
Common stocks – affiliated	(541)	(132)	(409)	(310)
Mortgage loans	(3,040)	(3,350)	310	9
Real estate	(19)	(189)	170	90
Partnerships and limited liability companies	(1,416)	(1,002)	(414)	(41)
Derivatives	(617)	(443)	(174)	(39)
Other	432	57	375	658
Total investments acquired	(25,858)	(26,170)	312	1
Net increase in policy loans	(726)	(679)	(47)	(7)
Net cash from investing activities	(7,659)	(6,935)	(724)	(10)
Cash from financing and miscellaneous sources:				
Net (withdrawals) deposits on deposit-type contracts	(248)	1,357	(1,605)	(118)
Net cash provided by surplus notes	-	36	(36)	(100)
Change in repurchase agreements	629	(490)	1,119	228
Change in collateral	(715)	(205)	(510)	(249)
Other cash provided (used)	705	(183)	888	485
Net cash from financing and miscellaneous sources	371	515	(144)	(28)
Net change in cash, cash equivalents and short-term investments	(2,207)	(1,382)	(825)	(60)
Cash, cash equivalents and short-term investments:				
Beginning of year	3,939	3,950	(11)	-
End of period	$ 1,732	$ 2,568	$ (836)	(33)%

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 (GICs) 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 GICs 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 September 30, 2018 and December 31, 2017 and for the nine months ended September 30, 2018 and 2017 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 2017 audited yearend financial statements as these condensed consolidated statutory financial statements disclose only significant changes from year end 2017. 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, 2017 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 2017 audited consolidated yearend financial statements.

b. Common stocks - subsidiaries and affiliates

Common stocks of unconsolidated subsidiaries, primarily MassMutual Holding LLC (MMHLLC) and MassMutual International LLC (MMI), are accounted for using the statutory equity method. The Company accounts for the value of MMHLLC and MMI at its underlying U.S. generally accepted accounting principles (U.S. GAAP) equity value adjusted to remove certain nonadmitted and intangible assets. MMHLLC's value is also 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 $2.8 billion as of September 30, 2018 and $2.7 billion as of December 31, 2017. 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.

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 substantive revisions 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 Company is currently assessing the impact of these modifications on the Company's financial statements.

In January 2017, the NAIC adopted modifications to SSAP No. 86, *Derivatives*, which were effective January 1, 2018. The modifications maintain gross reporting of derivative variation margin as a separate unit of account, rather than characterizing as a legal settlement with mark-to-market changes recorded in surplus. Regarding exchange traded futures, these modifications further clarified that variation margin and mark-to-market changes should be recorded in the same manner as all other derivative instruments. Starting in 2018, the Company records mark-to-market gains and losses from exchange traded futures as unrealized gains or losses instead of realized gains or losses and grosses up the derivatives and collateral line items on its financial statements. These modifications did not impact total surplus and did not have a material impact on the Company's financial statements.

In April 2017, the NAIC adopted modifications to SSAP No. 69, *Statement of Cash Flows*, to adopt Accounting Standards Update (ASU) No. 2016-15, *Classification of Certain Cash Receipts and Cash Payments*, in its entirety, effective January 1, 2018 on a retrospective basis. In June 2017, the NAIC adopted additional modifications to SSAP No. 69 to incorporate portions of ASU No. 2016-18, *Restricted Cash*, effective December 31, 2019 with early adoption permitted. The initial modifications address the classification and disclosure of certain items within the statements of cash flows. Upon adoption, proceeds from the settlement of the Company's corporate owned life insurance policies were classified as investing activities instead of operating activities. Additionally, the Company elected to apply the nature of distribution approach to subsidiary, controlled or affiliated equity method investments and the cumulative earnings approach to all other equity method investments in determining whether distributions received from equity method investees are returns on investment, recorded as operating activities, or returns of investment, recorded as investing activities. Effective January 1, 2018, the Company early adopted on a retrospective basis the second modification by adding restricted cash, cash equivalents and short-term investments to the existing statutory disclosure requirements, which are defined in SSAP No. 1, *Accounting Policies, Risks & Uncertainties and Other Disclosures*. Although the adoption of these modifications required reclassification between investing and operating cash flows, they did not have a material impact on the Company's financial statements.

In October 2017, the NAIC adopted revisions to SSAP No. 68, *Business Combinations and Goodwill*, to include information about impairment triggering events that previously existed in SSAP No. 90, *Impairment or Disposal of Real Estate Investments*, to ensure that the impairment process is discussed in its entirety within SSAP No. 68. Specifically the NAIC modified paragraph 8 of SSAP No. 68 to include information about impairment triggering events affecting long-lived assets which include; a) a significant decrease in its fair value, b) a significant adverse change in the extent or manner in which the asset is being utilized, c) a significant adverse change in legal factors or in the business climate that could potentially affect its value, d) an accumulation of costs that significantly exceed the amount originally anticipated for acquisition or construction, e) a current period operating or cash flow loss combined with a history of operating or cash flow losses, or a projection or forecast demonstrating continuous loss associated with its use, and f) a current expectation that, more likely than not, the asset will be sold or disposed of before the end of its estimated useful life. The Company continues to assess goodwill impairment in accordance with the revisions to SSAP No. 68. The adoption of the revisions did not have a material effect on the Company's financial statements.

In November 2017, the NAIC adopted modifications to SSAP No. 100R, *Fair Value*, allowing net asset value (NAV) per share as a practical expedient to fair value, either when specifically named in a SSAP or when the investee qualifies as an investment company, which were effective January 1, 2018. These modifications adopted, with modification, applicable U.S. GAAP, allowing greater consistency with Financial Accounting Standards Board's allowable use of NAV. These modifications also included the U.S. GAAP requirement to report instruments measured at NAV as a practical expedient outside of the fair value hierarchy disclosure as a separate item, along with a description of the terms and conditions of redemption features, amounts of unfunded commitments, restrictions to sell, and various other items. As a result of these modifications, the NAIC issued SSAP No. 100R, *Fair Value*. The adoption of these modifications did not have an impact on the Company's financial statements.

In November 2017, the NAIC adopted modifications to SSAP No. 97, *Investments in Subsidiary, Controlled and Affiliated Entities*, for Subsidiary and Controlled Affiliate (SCA) loss tracking and filing deadlines, which are effective December 31, 2018. The modifications add a loss-tracking disclosure for inclusion in year-end financials, which will track the losses beginning when the SCA's equity value falls below zero and will remain as long as the SCA's equity value remains in a deficit position and through the first year in which the equity position becomes positive. The modifications further clarify the SCA filing deadlines that have extended the Sub-1 filings from a 30-day to a 90-day timeframe and the Sub 2 from a June 30th deadline to an August 31st deadline. For SCA filings that regularly occur after the August 31st deadline, the filing is due one month after the audit date. The Company has adopted these modifications and currently has very few SCA's in a loss position.

In February 2018, the NAIC adopted modifications to SSAP No. 9, *Subsequent Events*, and SSAP No. 101, *Income Taxes*, to temporarily allow any revised tax calculations resulting from the Tax Cuts and Job Act (the Act) that occurred after statutory filing, to be classified as changes in estimate, thus avoiding classification as Type 1 subsequent events. Under SSAP No. 9, reporting entities are generally required to amend their filed statutory financial statements in their domestic state to ensure that the statutory financial statements and the audited financial statements are consistent if a Type 1 event is identified after the statutory financial statements are filed, but before the audited financial statements are issued. The adoption of this modification did not materially impact the Company's financial statements.

In February 2018, the NAIC adopted modifications to SSAP No. 92, *Pensions,* and SSAP No. 102, *Postretirement Benefits Other Than Pension*, to eliminate the reconciliation of level 3 pension plan assets from the Company's financial statement disclosures, which were effective March 24, 2018. This guidance further clarifies that detailed information regarding the reconciliation of the level 3 fair value categories of these assets is no longer required for statutory reporting purposes as the plan assets are not reported in the balance sheet of insurance entities. The Company has adopted these modifications.

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, 2018				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 6,207	$ 6,456	$ -	$ 6,455	$ 1
All other governments	1,388	1,398	-	1,331	67
States, territories and possessions	633	668	-	668	-
Political subdivisions	563	580	-	580	-
Special revenue	6,134	6,549	-	6,540	9
Industrial and miscellaneous	79,318	79,487	10	45,454	34,023
Parent, subsidiaries and affiliates	6,772	6,775	-	1,061	5,714
Preferred stocks	779	769	30	-	739
Common stocks - subsidiaries and affiliates	418	418	295	-	123
Common stocks - unaffiliated	1,034	1,034	728	1	305
Mortgage loans - commercial	22,704	22,717	-	-	22,717
Mortgage loans - residential	1,542	1,460	-	-	1,460
Derivatives:					
Interest rate swaps	7,435	7,474	-	7,474	-
Options	807	807	-	807	-
Currency swaps	508	508	-	508	-
Forward contracts	70	70	-	70	-
Credit default swaps	18	19	-	19	-
Interest rate caps and floors	10	10	-	10	-
Financial futures	6	6	-	6	-
Cash, cash equivalents and short-term investments	1,732	1,732	192	1,540	-
Separate account assets	77,215	77,196	49,928	26,642	626
Financial liabilities:					
Guaranteed interest contracts	8,890	8,440	-	-	8,440
Group annuity contracts and other deposits	18,080	18,600	-	-	18,600
Individual annuity contracts	9,461	11,506	-	-	11,506
Supplementary contracts	1,239	1,241	-	-	1,241
Repurchase agreements	5,065	5,065	-	5,065	-
Commercial paper	250	290	-	290	-
Derivatives:					
Interest rate swaps	5,184	5,777	-	5,777	-
Options	4	4	-	4	-
Currency swaps	465	465	-	465	-
Forward contracts	39	39	-	39	-
Credit default swaps	2	2	-	2	-
Financial futures	155	155	-	155	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $10,935 million.

	December 31, 2017				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	$ 7,462	$ 8,017	$ -	$ 8,016	$ 1
All other governments	1,182	1,271	-	1,201	70
States, territories and possessions	626	684	-	684	-
Political subdivisions	548	595	-	595	-
Special revenue	5,934	6,651	-	6,640	11
Industrial and miscellaneous	71,818	75,215	-	43,386	31,829
Parent, subsidiaries and affiliates	7,300	7,417	-	1,148	6,269
Preferred stocks	794	814	54	-	760
Common stocks - subsidiaries and affiliates	471	471	362	-	109
Common stocks - unaffiliated	1,217	1,217	903	-	314
Mortgage loans - commercial	21,583	22,129	-	-	22,129
Mortgage loans - residential	1,938	1,891	-	-	1,891
Derivatives:					
Interest rate swaps	8,041	8,626	-	8,626	-
Options	765	765	-	765	-
Currency swaps	405	405	-	404	1
Forward contracts	13	22	-	22	-
Credit default swaps	29	36	-	36	-
Cash, cash equivalents and short-term investments	3,939	3,939	227	3,712	-
Separate account assets	75,505	75,517	48,927	25,866	724
Financial liabilities:					
Guaranteed interest contracts	8,834	8,549	-	-	8,549
Group annuity contracts and other deposits	18,132	18,505	-	-	18,505
Individual annuity contracts	9,612	11,902	-	-	11,902
Supplementary contracts	1,248	1,250	-	-	1,250
Repurchase agreements	4,436	4,436	-	4,436	-
Commercial paper	250	250	-	250	-
Derivatives:					
Interest rate swaps	5,754	5,812	-	5,812	-
Options	7	7	-	7	-
Currency swaps	590	590	-	582	8
Forward contracts	92	92	-	92	-
Credit default swaps	1	1	-	1	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of $12,397 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, 2018			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Industrial and miscellaneous	$ 10	$ 39	$ 122	$ 171
Parent, subsidiaries and affiliates	-	68	65	133
Preferred stocks	-	-	1	1
Common stocks - subsidiaries and affiliates	295	-	123	418
Common stocks - unaffiliated	729	-	305	1,034
Derivatives:				
Interest rate swaps	-	7,434	-	7,434
Options	-	807	-	807
Currency swaps	-	508	-	508
Forward contracts	-	70	-	70
Interest rate caps and floors	-	10	-	10
Financial futures	-	6	-	6
Separate account assets	49,929	25,561	613	76,103
Total financial assets carried at fair value	$ 50,963	$ 34,503	$ 1,229	$ 86,695
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 5,184	$ -	$ 5,184
Options	-	4	-	4
Currency swaps	-	465	-	465
Forward contracts	-	39	-	39
Financial futures	-	156	-	156
Total financial liabilities carried at fair value	$ -	$ 5,848	$ -	$ 5,848

For the nine months ended September 30, 2018, there were no significant transfers between Level 1 and Level 2 and 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, 2017			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
Special revenue	$ -	$ 7	$ -	$ 7
Industrial and miscellaneous	-	11	57	68
Parent, subsidiaries and affiliates	-	18	67	85
Preferred stocks	3	-	2	5
Common stocks - subsidiaries and affiliates	362	-	109	471
Common stocks - unaffiliated	903	-	314	1,217
Derivatives:				
Interest rate swaps	-	8,041	-	8,041
Options	-	765	-	765
Currency swaps	-	404	1	405
Forward contracts	-	13	-	13
Separate account assets	48,927	24,759	710	74,396
Total financial assets carried at fair value	$ 50,195	$ 34,018	$ 1,260	$ 85,473
Financial liabilities:				
Derivatives:				
Interest rate swaps	$ -	$ 5,754	$ -	$ 5,754
Options	-	7	-	7
Currency swaps	-	582	8	590
Forward contracts	-	92	-	92
Total financial liabilities carried at fair value	$ -	$ 6,435	$ 8	$ 6,443

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 at the beginning fair value for the reporting period in which the changes occur. For the year ended December 31, 2017, $298 million of unaffiliated common stock were transferred from Level 2 to Level 1.

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

	Balance as of 1/1/18	Gains (Losses) in Net Income	Gains (Losses) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 9/30/18
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 57	$ (26)	$ (5)	$ -	$ 4	$ -	$ (2)	$ -	$ -	$ 94	$ 122
Parent, subsidiaries, and affiliates	67	-	(2)	-	-	-	-	-	-	-	65
Preferred stocks	2	-	-	-	1	-	-	-	-	(2)	1
Common stocks - subsidiaries and affiliates	109	-	4	-	-	-	2	9	-	(1)	123
Common stocks - unaffiliated	314	3	-	16	2	-	(30)	-	-	-	305
Derivatives:											
Currency swaps	1		-					(1)	-	-	-
Separate account assets	710	38	-	92	-	(227)	-	-	-	-	613
Total financial assets	$ 1,260	$ 15	$ (3)	$ 108	$ 7	$ (227)	$ (30)	$ 8	$ -	$ 91	$ 1,229
Financial liabilities											
Derivatives:											
Currency swaps	$ 8	$ -	$ -	$ -	$ -	$ -	$ -	$ (8)	$ -	$ -	$ -

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 transfers are assets that are no longer carried at fair value.

	Balance as of 1/1/17	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers In	Transfers Out	Other	Balance as of 12/31/17
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	$ 58	$ 1	$ (4)	$ -	$ -	$ -	$ (5)	$ -	$ (8)	$ 15	$ 57
Parent, subsidiaries, and affiliates	58	-	9	-	-	-	-	-	-	-	67
Preferred stocks	3	-	-	1	-	-	-	-	-	(2)	2
Common stocks - subsidiaries and affiliates	63	-	12	-	46	-	(11)	-	-	(1)	109
Common stocks - unaffiliated	191	(6)	31	38	-	(8)	(3)	75	(6)	2	314
Derivatives:											
Currency swaps	-	-	(5)	-	-	-	-	6	-	-	1
Separate account assets	738	56	-	72	-	(150)	(1)	-	(5)	-	710
Total financial assets	$ 1,111	$ 51	$ 43	$ 111	$ 46	$ (158)	$ (20)	$ 81	$ (19)	$ 14	$ 1,260
Currency swaps	$ -	-	4	-	-	-	-	4	-	-	$ 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 September 30, 2018, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $8.0 billion. Securities in an unrealized loss position for less than 12 months had a fair value of $6.5 billion and unrealized losses of $69 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $1.5 billion and unrealized losses of $60 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2017, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of $3.3 billion. Securities in an unrealized loss position for less than 12 months had a fair value of $1.6 billion and unrealized losses of $19 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $1.8 billion and unrealized losses of $51 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, 2018 or for the year ended December 31, 2017, 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 September 30, 2018, RMBS had a total carrying value of $1.5 billion and a fair value of $1.6 billion, of which approximately 19%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $520 million and a fair value of $621 million. As of December 31, 2017, RMBS had a total carrying value of $1.5 billion and a fair value of $1.7 billion, of which approximately 21%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $599 million and a fair value of $726 million.

b. Common stocks – subsidiaries and affiliates

In August 2017, MMI entered into an agreement to sell MassMutual Asia Limited (MM Asia) to Yunfeng Financial Group (Yunfeng FG). The sale is expected to close in 2018, subject to regulatory approval and customary closing conditions. Under the terms of the agreement, MMI will receive cash of $1.0 billion and Yunfeng FG shares valued at approximately $384 million as of September 30, 2018. On the closing date, the agreement also requires MM Asia to have a Solvency Margin Ratio at a certain level. MMI has made a capital contribution to MM Asia in order to meet this capital level.

In March, 2018, MassMutual and MMI entered into an agreement to sell 85.1% of MassMutual Life Insurance Company in Japan (MM Japan), a wholly-owned life insurance and wealth management subsidiary of MMI, to Nippon Life. MMI estimated the fair value of the retained portion of MM Japan based upon the agreed selling price of the sold portion of MM Japan with the buyer. The sale of MM Japan closed in May 2018. MMI received $960 million in cash proceeds from the sale.

The amount of the proceeds from the sale of MM Japan and anticipated proceeds from the sale of MM Asia is expected to be less than MMI's book value. As such, MMI's book value was reduced to an estimated fair value of $2.7 billion and an impairment of $1.3 billion was recorded in net realized capital gains (losses). The impairment reduced MassMutual's asset valuation reserve by approximately $900 million, resulting in approximately a $300 million net decrease to surplus, net of a tax benefit of $103 million. Any additional gain or loss on disposal will be realized when the MM Asia sale is finalized.

MassMutual contributed additional capital of $204 million to MMI during the nine months ended September 30, 2018 and contributed additional capital of $20 million during the nine months ended September 30, 2017.

During the nine months ended September 30, 2018, MassMutual received $858 million as a return of capital from MMI.

MMHLLC paid $250 million in dividends during the nine months ended September 30, 2018 and $424 million during the nine months ended September 30, 2017.

MassMutual contributed additional capital of $371 million to MMHLLC during the nine months ended September 30, 2018 and $135 million during the nine months ended September 30, 2017.

Subsidiaries of MMHLLC and MMI 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 Condensed 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 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:

	September 30, 2018		December 31, 2017	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	$ 22,630	$ 22,643	$ 21,533	$ 22,078
Mezzanine loans	74	74	50	51
Total commercial mortgage loans	22,704	22,717	21,583	22,129
Residential mortgage loans:				
FHA insured and VA guaranteed	1,537	1,454	1,932	1,885
Other residential loans	5	5	6	6
Total residential mortgage loans	1,542	1,459	1,938	1,891
Total mortgage loans	$ 24,246	$ 24,176	$ 23,521	$ 24,020

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

As of September 30, 2018 and 2017, 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.

The following presents changes in the valuation allowance recorded for the Company's commercial mortgage loans:

	Nine Months Ended September 30,	
	2018	2017
	Primary Lender	
	(In Millions)	
Beginning balance	$ -	$ (3)
Decreases	-	3
Ending balance	$ -	$ -

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 $13.4 billion as of September 30, 2018 and $13.2 billion as of December 31, 2017. These notional amounts included replicated asset transaction values of $11.4 billion as of September 30, 2018 and $11.5 billion as of December 31, 2017, 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 $1.0 billion as of September 30, 2018 and $2.4 billion as of December 31, 2017. In the event of default, the full market value exposure at risk in a net gain position, net of offsets and collateral, was $215 million as of September 30, 2018 and $119 million as of December 31, 2017. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was $811 million as of September 30, 2018 and $609 million as of December 31, 2017.

The Company had the right to rehypothecate or repledge securities totaling $407 million of the $1.0 billion as of September 30, 2018 and $640 million of the $2.4 billion as of December 31, 2017 of net collateral pledged by counterparties. There were no securities rehypothecated to other counterparties as of September 30, 2018 or December 31, 2017.

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

	September 30, 2018			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 7,435	$ 98,341	$ 5,184	$ 83,486
Options	807	17,678	4	100
Currency swaps	508	6,589	465	6,134
Interest rate caps and floors	10	8,465	-	-
Forward contracts	70	4,881	39	5,631
Credit default swaps	18	1,035	2	100
Financial futures	6	291	155	(2,440)
Total	$ 8,854	$ 137,280	$ 5,849	$ 93,011

	December 31, 2017			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	$ 8,041	$ 84,861	$ 5,754	$ 91,151
Options	765	10,771	7	446
Currency swaps	405	4,538	590	6,661
Forward contracts	13	1,432	92	6,969
Credit default swaps	29	1,503	1	65
Financial futures	-	3,738	-	-
Total	$ 9,253	$ 106,843	$ 6,444	$ 105,292

The average fair value of outstanding derivative assets was $8.9 billion for the nine months ended September 30, 2018 and $9.9 billion for the nine months ended September 30, 2017. The average fair value of outstanding derivative liabilities was $6.0 billion for the nine months ended September 30, 2018 and $6.4 billion for the nine months ended September 30, 2017.

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

	September 30, 2018	December 31, 2017
	(In Millions)	
Due in one year or less	$ 20	$ -
Due after one year through five years	10	1,568
Due after five years through ten years	1,105	-
Total	$ 1,135	$ 1,568

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:

	Nine Months Ended September 30,			
	2018		2017	
	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	$ (91)	$ (39)	$ (192)	$ 22
Currency swaps	23	228	72	(743)
Options	(121)	12	(127)	(97)
Credit default swaps	12	2	22	1
Interest rate caps and floors	(3)	(2)	-	-
Forward contracts	91	110	(164)	(45)
Financial futures	(227)	(150)	113	-
Total	$ (316)	$ 161	$ (276)	$ (862)

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

	September 30, 2018			December 31, 2017		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	$ 8,854	$ 5,849	$ 3,005	$ 9,253	$ 6,444	$ 2,809
Due and accrued	787	2,070	(1,283)	909	1,879	(970)
Gross amounts offset	(6,742)	(6,742)	-	(7,361)	(7,361)	-
Net asset	2,899	1,177	1,722	2,801	962	1,839
Collateral posted	(2,419)	(1,374)	(1,045)	(3,366)	(992)	(2,374)
Net	$ 480	$ (197)	$ 677	$ (565)	$ (30)	$ (535)

e. Net investment income

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

	Nine Months Ended September 30,	
	2018	2017
	(In Millions)	
Bonds	$ 3,174	$ 2,883
Preferred stocks	29	10
Common stocks - subsidiaries and affiliates	258	436
Common stocks - unaffiliated	33	31
Mortgage loans	774	732
Policy loans	641	599
Real estate	81	129
Partnerships and LLCs	709	551
Derivatives	255	249
Cash, cash equivalents and short-term investments	59	30
Other	5	6
Subtotal investment income	6,018	5,656
Amortization of the IMR	66	98
Investment expenses	(545)	(489)
Net investment income	$ 5,539	$ 5,265

f. Net realized capital (losses) gains

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

	Nine Months Ended September 30, 2018	Nine Months Ended September 30, 2017
	(In Millions)	
Bonds	$ (110)	$ (73)
Common stocks - subsidiaries and affiliates	(1,259)	9
Common stocks - unaffiliated	73	(21)
Mortgage loans	(3)	(13)
Real estate	168	87
Partnerships and LLCs	(42)	(80)
Derivatives	(316)	(276)
Other	(25)	(177)
Net realized capital (losses) before federal and state taxes and deferral to the IMR	(1,514)	(544)
Net federal and state tax benefit	3	130
Net realized capital (losses) before deferral to the IMR	(1,511)	(414)
Net after tax losses (gains) deferred to the IMR	223	(7)
Net realized capital losses	$ (1,288)	$ (421)

The IMR liability balance was $23 million as of September 30, 2018 and $57 million as of December 31, 2017 and is included in other liabilities on the Condensed Consolidated Statutory Statements of Financial Position. Refer to *Note 14. "Surplus notes"* for information on the Other realized capital loss.

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

	Nine Months Ended September 30, 2018	Nine Months Ended September 30, 2017
	(In Millions)	
Bonds	$ (103)	$ (38)
Common stocks - subsidiaries and affiliates	(1,270)	-
Common stocks - unaffiliated	(12)	(59)
Partnerships and LLCs	(58)	(47)
Total OTTI	$ (1,443)	$ (144)

The Company recognized OTTI of less than $1 million for the nine months ended September 30, 2018 and $1 million for the nine months ended September 30, 2017 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*

On December 22, 2017, the president signed into law H.R. 1/Public Law 115-97, commonly known as the Act. As of December 31, 2017, the Company recorded provisional tax amounts with respect to mandatory deemed repatriation of previously untaxed foreign earnings and the impact of a change in the method for computing deductions for life insurance reserves. As of September 30, 2018, the Company recorded an additional tax benefit of $1 million in the Condensed Consolidated Statutory Statements of Operations related to mandatory deemed repatriation. Additionally, the Company revised its life insurance reserve transition adjustment. The Company initially recorded an increase of $479 million in its deferred tax asset as of 12/31/17 which was reduced by $33 million for the period. These amounts were fully offset by corresponding changes to the deferred tax liability related to the future taxable income to be spread over 8 years.

7. *Other than invested assets*

No significant changes.

8. *Policyholders' liabilities*

a. Liabilities for deposit-type contracts

On January 11, 2018, MassMutual issued a $500 million funding agreement with a 2.95% fixed rate and a 7-year maturity.

The Company evaluated the accounting for payout annuities and determined that certain contracts did not contain mortality risk, and therefore, should have been classified as a deposit-type contract rather than policyholder reserves. As a result, approximately $1.3 billion classified as policyholders' reserves as of December 31, 2017 were classified as liabilities for deposit-type contracts in 2018. Additionally, the related impacts within the Company's Statements of Operations and the Statements of Cash Flows reflect this classification. There were no corresponding differences in valuation, and as a result, there were no impacts to surplus or net income.

b. Additional liability for annuity contracts

Certain variable annuity contracts include additional death or other insurance benefit features, such as guaranteed minimum death benefits (GMDBs), guaranteed minimum income benefits (GMIBs), guaranteed minimum accumulation benefits (GMABs) and guaranteed minimum withdrawal benefits (GMWBs). 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 GMDBs, GMIBs, GMABs and GMWBs (in millions):

Liability as of January 1, 2017	$ 654
Incurred guarantee benefits	(130)
Paid guarantee benefits	(9)
Liability as of December 31, 2017	515
Incurred guarantee benefits	(137)
Paid guarantee benefits	(4)
Liability as of September 30, 2018	$ 374

The Company held reserves in accordance with the stochastic scenarios as of September 30, 2018 and December 31, 2017. As of September 30, 2018 and December 31, 2017, 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 GMDBs, GMIBs, GMABs and GMWBs 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, 2018			December 31, 2017		
	Account Value	Net Amount at Risk	Weighted Average Attained Age	Account Value	Net Amount at Risk	Weighted Average Attained Age
	($ In Millions)					
GMDB	$ 21,103	$ 57	64	$ 21,887	$ 54	64
GMIB Basic	835	36	68	910	37	68
GMIB Plus	3,035	467	67	3,210	416	66
GMAB	2,954	4	59	3,233	1	59
GMWB	184	12	70	204	7	69

As of September 30, 2018, the GMDB account value above consists of $4.3 billion within the general account and $16.8 billion within separate accounts that includes $4.5 billion of modified coinsurance assumed. As of December 31, 2017, the GMDB account value above consists of $4.4 billion within the general account and $17.4 billion within separate accounts that includes $4.7 billion of modified coinsurance assumed.

9. Reinsurance

A $41 million net loss was recorded for the recapture of certain yearly renewable term life reinsurance treaties, with $20 million recorded in premium income and $61 million recorded in policyholders' benefits.

10. Withdrawal characteristics

Refer to *Note 8. "Policyholders' liabilities"* for more information.

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:

	Nine Months Ended September 30,			
	2018	2017	2018	2017
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Service cost	$ 85	$ 75	$ 10	$ 9
Interest cost	81	84	9	9
Expected return on plan assets	(129)	(110)	-	-
Amortization of unrecognized net actuarial and other losses	41	50	2	1
Amortization of unrecognized prior service cost	2	2	(4)	(4)
Total net periodic cost	$ 80	$ 101	$ 17	$ 15

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 nine months ended September 30, 2018 and 2017. Accordingly, the Company has excluded these non-cash activities from the Condensed Consolidated Statutory Statements of Cash Flows for the nine months ended September 30, 2018 and 2017.

	Nine Months Ended September 30, 2018	Nine Months Ended September 30, 2017
	(In Millions)	
Bond conversions and refinancing	$ 425	$ 430
Transfer of bonds to other invested assets	200	-
Partnerships and LLCs contributed to Insurance Road	188	663
Premium recognized for group annuity contracts	117	271
Transfer of mortgage loans to partnerships and LLCs	81	-
Bonds and common stock contributed to EM Opportunities LLC	74	-
Stock conversion	63	93
Transfer of partnerships and LLCs to real estate	58	-
Dividend declared from Insurance Road LLC	40	-
Transfer of real estate to partnerships and LLCs	-	138
Transfer of affiliated common stock	-	103
Other invested assets to bonds	-	94
Bonds received as consideration for a group annuity contracts	(117)	(271)
Other	124	143

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 2017 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 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. The Company estimates that as of September 30, 2018, the aggregate range of reasonably possible losses is not material.

17. Related party transactions

Insurance Road LLC declared $151 million in dividends through the nine months ended September 30, 2018 and declared no dividends through the nine months ended September 30, 2017.

MassMutual received $300 million from Insurance Road LLC as return of capital as of September 30, 2018.

MassMutual contributed $100 million of capital to EM Opportunities LLC as of September 30, 2018.

18. Business combinations and goodwill

No significant changes.

19. Subsequent events

Management of the Company has evaluated subsequent events through November 12, 2018, the date the financial statements were available to be issued.

On October 18, 2018, MassMutual announced a strategic transaction in which Invesco Ltd. (Invesco), a global asset manager, will acquire MassMutual's retail asset management affiliate, OppenheimerFunds, Inc (OFI). In turn, MassMutual is expected to receive an approximate 15.5% common equity interest in the combined company, becoming Invesco's largest shareholder. Under the terms of the agreement, MassMutual and OFI employee shareholders will receive 81.9 million shares of Invesco common equity and $4.0 billion in preferred shares with a fixed dividend rate of 5.9%. As part of this transaction, Invesco and MassMutual will enter into a shareholder agreement in which MassMutual will have customary minority shareholder rights, including appointment of a director to Invesco's board of directors. Pending regulatory and other customary approvals, the transaction is expected to close in the second quarter of 2019.

No other 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
ASU	Accounting standard update
C.M. Life	C.M. Life Insurance Company
DTC	Direct to Consumer
FHA	Federal Housing Administration
GICs	Guaranteed interest contracts
GMABs	Guaranteed minimum accumulation benefits
GMDBs	Guaranteed minimum death benefits
GMIBs	Guaranteed minimum income benefits
GMWBs	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	OppenheimerFunds, Inc
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
U.S.	United States of America
U.S. GAAP	U.S. generally accepted accounting principles
VA	Veterans Administration
WS	Workplace Solutions
Yunfeng FG	Yunfeng Financial Group