KPMG

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Hartford, CT 06103

# Report of Independent Registered Public Accounting Firm

## The Board of Directors of MML Bay State Life Insurance Company and Policy Owners of MML Bay State Variable Life Separate Account I:

*Opinion on the Financial Statements*

We have audited the accompanying statements of assets and liabilities of MML Bay State Variable Life Separate Account I (comprised of the divisions listed in Appendix A to the opinion) (collectively, "the Separate Account") as of December 31, 2018, the related statements of operations and changes in net assets for each of the years in the two-year period then ended, and the related notes (collectively, the "financial statements") and the financial highlights for each of the years in the five-year period then ended (collectively, the "financial highlights"). In our opinion, the financial statements and financial highlights present fairly, in all material respects, the financial position of the Separate Account as of December 31, 2018, the results of its operations and the changes in its net assets for each of the years in the two-year period then ended, and the financial highlights for each of the years in the five-year period then ended, in conformity with U.S. generally accepted accounting principles.

*Basis for Opinion*

These financial statements and financial highlights are the responsibility of the Separate Account's management. Our responsibility is to express an opinion on these financial statements and financial highlights based on our audits. We are a public accounting firm registered with the Public Company Accounting Oversight Board (United States) (PCAOB) and are required to be independent with respect to the Separate Account in accordance with the U.S. federal securities laws and the applicable rules and regulations of the Securities and Exchange Commission and the PCAOB.

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements and financial highlights are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements and financial highlights, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements and financial highlights. Such procedures also included confirmation of securities owned as of December 31, 2018, by correspondence with the underlying mutual funds or their transfer agent. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements and financial highlights. We believe that our audits provide a reasonable basis for our opinion.

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We have served as the Separate Account's auditor since 2004.

Hartford, Connecticut
March 19, 2019

## Appendix A

MML Bay State Variable Life Separate Account I is comprised of the following divisions and the activities of each division have been included within the accompanying statements of assets and liabilities as of December 31, 2018 and the related statements of operations and changes in net assets for each of the years in the two-year period then ended.

**Divisions**

American Century VP Income & Growth Division
Fidelity® VIP Contrafund® Division
MML Blend Division
MML Equity Division
MML Equity Index Division
MML Managed Bond Division
MML Small Cap Equity Division
MML U.S. Government Money Market Division
Oppenheimer Capital Appreciation Division
Oppenheimer Discovery Mid Cap Growth Division
Oppenheimer Global Division
Oppenheimer Global Strategic Income Division
T. Rowe Price Mid-Cap Growth Division

## *MML Bay State Variable Life Separate Account I*

*STATEMENTS OF ASSETS AND LIABILITIES*
***December 31, 2018***

| | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division |
|---|---|---|---|---|---|---|---|---|
| **ASSETS** | | | | | | | | |
| Investments | | | | | | | | |
| Number of shares | 1,078,286 | 798,934 | 4,221,219 | 9,433,134 | 1,271,297 | 1,137,654 | 845,793 | 4,688,607 |
| Identified cost | $ 8,954,169 | $ 23,451,776 | $ 81,411,895 | $ 222,600,883 | $ 30,789,422 | $ 14,467,429 | $ 7,834,353 | $ 4,687,309 |
| Value | $ 9,726,141 | $ 25,669,741 | $ 85,893,170 | $ 227,923,454 | $ 35,723,440 | $ 13,577,321 | $ 6,907,818 | $ 4,688,607 |
| Receivable from MML Bay State Life Insurance Company | 2 | — | — | 65,074 | — | 384 | — | 2,349 |
| **Total assets** | **9,726,143** | **25,669,741** | **85,893,170** | **227,988,528** | **35,723,440** | **13,577,705** | **6,907,818** | **4,690,956** |
| **LIABILITIES** | | | | | | | | |
| Payable to MML Bay State Life Insurance Company | — | — | 25,467 | — | 4 | — | — | — |
| **NET ASSETS** | **$ 9,726,143** | **$ 25,669,741** | **$ 85,867,703** | **$ 227,988,528** | **$ 35,723,436** | **$ 13,577,705** | **$ 6,907,818** | **$ 4,690,956** |
| **Outstanding units** | | | | | | | | |
| Policy owners | **4,351,780** | **7,909,884** | **15,301,156** | **46,951,238** | **15,835,769** | **3,997,018** | **2,057,011** | **2,888,232** |
| **UNIT VALUE** | | | | | | | | |
| Variable Life (*Note 3G*) | $ — | $ — | $ — | $ — | $ — | $ — | $ — | $ — |
| Variable Life Plus | — | — | 8.60 | 8.65 | 2.14 | 5.34 | — | 2.15 |
| Variable Life Select | 2.23 | 3.25 | 3.93 | 3.68 | 2.30 | 2.85 | 3.36 | 1.45 |

*See Notes to Financial Statements.*

*MML Bay State Variable Life Separate Account I*

*STATEMENTS OF ASSETS AND LIABILITIES (Continued)*
***December 31, 2018***

| | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|---|---|
| **ASSETS** | | | | | |
| Investments | | | | | |
| Number of shares | 1,166,473 | 863,245 | 1,919,216 | 4,612,479 | 1,749,810 |
| Identified cost | $ 55,329,229 | $ 51,938,150 | $ 69,813,956 | $ 23,846,439 | $ 43,625,383 |
| Value | $ 56,573,951 | $ 59,261,794 | $ 72,930,203 | $ 21,494,154 | $ 41,470,495 |
| Receivable from MML Bay State Life Insurance Company | — | — | — | — | — |
| **Total assets** | **56,573,951** | **59,261,794** | **72,930,203** | **21,494,154** | **41,470,495** |
| **LIABILITIES** | | | | | |
| Payable to MML Bay State Life Insurance Company | — | 2 | — | 1 | 4 |
| **NET ASSETS** | **$ 56,573,951** | **$ 59,261,792** | **$ 72,930,203** | **$ 21,494,153** | **$ 41,470,491** |
| **Outstanding units** | | | | | |
| Policy owners | **10,207,827** | **13,535,826** | **13,582,973** | **6,795,368** | **8,446,035** |
| **UNIT VALUE** | | | | | |
| Variable Life (*Note 3G*) | $ — | $ — | $ — | $ — | $ — |
| Variable Life Plus | — | — | 2.55 | — | 4.39 |
| Variable Life Select | 5.54 | 4.38 | 6.82 | 3.16 | 5.46 |

*See Notes to Financial Statements.*

***MML Bay State Variable Life Separate Account I***

*STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS*
***For The Year Ended December 31, 2018***

| | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division |
|---|---|---|---|---|---|---|---|---|
| **Investment Income** | | | | | | | | |
| Dividends | $ 209,737 | $ 205,862 | $ 2,009,158 | $ 4,692,657 | $ 668,450 | $ 492,858 | $ 40,781 | $ 65,414 |
| Interest Income on Policy loans (*Note 3F*) | — | — | 16,602 | 57,226 | — | 9,469 | — | 280 |
| **Total Income** | **209,737** | **205,862** | **2,025,760** | **4,749,883** | **668,450** | **502,327** | **40,781** | **65,694** |
| **Expenses** | | | | | | | | |
| Mortality and expense risk fees | 60,469 | 162,628 | 444,571 | 1,293,063 | 204,703 | 71,472 | 45,739 | 25,128 |
| **Net investment income (loss)** | **149,268** | **43,234** | **1,581,189** | **3,456,820** | **463,747** | **430,855** | **(4,958)** | **40,566** |
| **Net realized and unrealized gain (loss) on investments** | | | | | | | | |
| Realized gain (loss) on sale of fund shares | 336,850 | 1,474,422 | 2,432,527 | 5,393,838 | 7,197,839 | (127,134) | 135,975 | 1,751 |
| Realized gain distribution | 816,989 | 2,533,118 | 6,403,836 | 37,059,542 | 1,414,152 | — | 1,015,657 | — |
| Realized gain (loss) | 1,153,839 | 4,007,540 | 8,836,363 | 42,453,380 | 8,611,991 | (127,134) | 1,151,632 | 1,751 |
| Change in net unrealized appreciation/ depreciation of investments | (2,066,303) | (5,881,310) | (14,629,689) | (72,248,027) | (10,528,288) | (446,573) | (1,944,876) | (1,751) |
| **Net gain (loss) on investments** | **(912,464)** | **(1,873,770)** | **(5,793,326)** | **(29,794,647)** | **(1,916,297)** | **(573,707)** | **(793,244)** | **—** |
| **Net increase (decrease) in net assets resulting from operations** | **(763,196)** | **(1,830,536)** | **(4,212,137)** | **(26,337,827)** | **(1,452,550)** | **(142,852)** | **(798,202)** | **40,566** |
| Capital transactions: | | | | | | | | |
| Transfer of net premiums | 455,443 | 1,186,943 | 4,047,777 | 12,274,259 | 672,434 | 925,232 | 274,203 | 437,677 |
| Transfers due to death benefits | (30,964) | (71,378) | (565,633) | (2,339,954) | (225,812) | (169,080) | (37,325) | (70,893) |
| Transfers due to withdrawal of funds | (362,903) | (1,351,267) | (4,795,353) | (13,050,544) | (855,278) | (784,276) | (383,841) | (1,081,578) |
| Transfers due to policy loans, net of repayments | (75,643) | (288,361) | (1,004,801) | (3,537,065) | (127,666) | 7,412 | (49,319) | (27,926) |
| Transfers due to cost of insurance | — | — | (94,842) | (165,783) | — | (11,303) | — | (10,786) |
| Transfers due to changes for administrative costs | (397,432) | (1,390,056) | (4,473,970) | (12,948,557) | (1,089,885) | (1,004,487) | (293,633) | (415,034) |
| Transfers between divisions and to/from Guaranteed Principal Account | 12,360 | (82,746) | 24,500 | (999,202) | (15,526,242) | (379,649) | (10,828) | 591,103 |
| Net increase (decrease) in net assets resulting from capital transactions | (399,139) | (1,996,865) | (6,862,322) | (20,766,846) | (17,152,449) | (1,416,151) | (500,743) | (577,437) |
| **Total increase (decrease)** | **(1,162,335)** | **(3,827,401)** | **(11,074,459)** | **(47,104,673)** | **(18,604,999)** | **(1,559,003)** | **(1,298,945)** | **(536,871)** |
| **NET ASSETS, at beginning of the year** | **10,888,478** | **29,497,142** | **96,942,162** | **275,093,201** | **54,328,435** | **15,136,708** | **8,206,763** | **5,227,827** |
| **NET ASSETS, at end of the year** | **$ 9,726,143** | **$ 25,669,741** | **$ 85,867,703** | **$ 227,988,528** | **$ 35,723,436** | **$ 13,577,705** | **$ 6,907,818** | **$ 4,690,956** |

*See Notes to Financial Statements.*

*STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)*
***For The Year Ended December 31, 2018***

| | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|---|---|
| **Investment Income** | | | | | |
| Dividends | $ 207,692 | $ — | $ 869,118 | $ 1,115,825 | $ — |
| Interest Income on Policy loans (*Note 3F)* | — | — | — | — | — |
| **Total Income** | **207,692** | **—** | **869,118** | **1,115,825** | **—** |
| **Expenses** | | | | | |
| Mortality and expense risk fees | 358,235 | 382,250 | 464,909 | 122,413 | 224,432 |
| **Net investment income (loss)** | **(150,543)** | **(382,250)** | **404,209** | **993,412** | **(224,432)** |
| **Net realized and unrealized gain (loss) on investments** | | | | | |
| Realized gain (loss) on sale of fund shares | 1,400,185 | 2,489,528 | 2,713,825 | (122,031) | 1,469,880 |
| Realized gain distribution | 4,884,617 | 9,551,873 | 6,144,623 | — | 6,017,693 |
| Realized gain (loss) | 6,284,802 | 12,041,401 | 8,858,448 | (122,031) | 7,487,573 |
| Change in net unrealized appreciation/ depreciation of investments | (9,708,951) | (15,579,454) | (20,764,530) | (2,094,950) | (8,141,772) |
| **Net gain (loss) on investments** | **(3,424,149)** | **(3,538,053)** | **(11,906,082)** | **(2,216,981)** | **(654,199)** |
| **Net increase (decrease) in net assets resulting from operations** | **(3,574,692)** | **(3,920,303)** | **(11,501,873)** | **(1,223,569)** | **(878,631)** |
| Capital transactions: | | | | | |
| Transfer of net premiums | 2,685,123 | 2,862,013 | 3,290,868 | 461,808 | 1,197,871 |
| Transfers due to death benefits | (248,961) | (259,892) | (372,286) | (108,435) | (270,185) |
| Transfers due to withdrawal of funds | (2,500,795) | (3,324,792) | (4,180,233) | (344,401) | (2,042,017) |
| Transfers due to policy loans, net of repayments | (507,612) | (956,139) | (903,181) | (180,585) | (408,570) |
| Transfers due to cost of insurance | — | — | — | — | — |
| Transfers due to changes for administrative costs | (2,643,644) | (2,768,864) | (3,549,637) | (724,488) | (1,586,814) |
| Transfers between divisions and to/from Guaranteed Principal Account | (512,994) | (305,232) | (472,972) | 15,731,438 | (62,043) |
| Net increase (decrease) in net assets resulting from capital transactions | (3,728,883) | (4,752,906) | (6,187,441) | 14,835,337 | (3,171,758) |
| **Total increase (decrease)** | **(7,303,575)** | **(8,673,209)** | **(17,689,314)** | **13,611,768** | **(4,050,389)** |
| **NET ASSETS, at beginning of the year** | **63,877,526** | **67,935,001** | **90,619,517** | **7,882,385** | **45,520,880** |
| **NET ASSETS, at end of the year** | **$ 56,573,951** | **$ 59,261,792** | **$ 72,930,203** | **$ 21,494,153** | **$ 41,470,491** |

*See Notes to Financial Statements.*

## *MML Bay State Variable Life Separate Account I*

*STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS*
***For The Year Ended December 31, 2017***

| | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division |
|---|---|---|---|---|---|---|---|---|
| **Investment Income** | | | | | | | | |
| Dividends | $ 236,684 | $ 281,628 | $ 1,984,036 | $ 4,791,190 | $ 595,296 | $ 470,083 | $ 65,697 | $ 19,477 |
| Interest Income on Policy loans (*Note 3F)* | — | — | 16,829 | 59,297 | — | 9,352 | — | 1,301 |
| **Total Income** | **236,684** | **281,628** | **2,000,865** | **4,850,487** | **595,296** | **479,435** | **65,697** | **20,778** |
| **Expenses** | | | | | | | | |
| Mortality and expense risk fees | 54,457 | 155,868 | 435,702 | 1,275,205 | 260,314 | 72,712 | 42,748 | 27,686 |
| **Net investment income (loss)** | **182,227** | **125,760** | **1,565,163** | **3,575,282** | **334,982** | **406,723** | **22,949** | **(6,908)** |
| **Net realized and unrealized gain (loss) on investments** | | | | | | | | |
| Realized gain (loss) on sale of fund shares | 510,053 | 964,070 | 2,477,454 | 4,024,118 | 1,438,962 | (35,482) | 170,593 | 1,795 |
| Realized gain distribution | 226,225 | 1,499,095 | 3,721,725 | 1,803,147 | 1,347,229 | — | 296,533 | 59 |
| Realized gain (loss) | 736,278 | 2,463,165 | 6,199,179 | 5,827,265 | 2,786,191 | (35,482) | 467,126 | 1,854 |
| Change in net unrealized appreciation/ depreciation of investments | 892,542 | 2,839,069 | 5,144,860 | 28,221,105 | 6,404,743 | 245,896 | 519,906 | (1,844) |
| **Net gain (loss) on investments** | **1,628,820** | **5,302,234** | **11,344,039** | **34,048,370** | **9,190,934** | **210,414** | **987,032** | **10** |
| **Net increase (decrease) in net assets resulting from operations** | **1,811,047** | **5,427,994** | **12,909,202** | **37,623,652** | **9,525,916** | **617,137** | **1,009,981** | **(6,898)** |
| Capital transactions: | | | | | | | | |
| Transfer of net premiums | 514,858 | 1,203,247 | 4,149,493 | 12,943,355 | 744,367 | 952,046 | 279,342 | 452,568 |
| Transfers due to death benefits | (79,597) | (203,653) | (1,085,033) | (2,126,568) | (93,096) | (101,385) | (58,114) | (18,421) |
| Transfers due to withdrawal of funds | (376,131) | (1,687,870) | (4,578,860) | (11,743,943) | (829,101) | (814,033) | (311,660) | (758,998) |
| Transfers due to policy loans, net of repayments | (127,182) | (267,442) | (708,530) | (2,494,630) | (147,906) | (77,715) | (79,009) | (54,822) |
| Transfers due to cost of insurance | — | — | (89,465) | (151,415) | — | (14,298) | — | (10,756) |
| Transfers due to changes for administrative costs | (406,033) | (1,393,666) | (4,686,591) | (13,674,083) | (1,336,366) | (1,071,465) | (298,230) | (462,089) |
| Transfers between divisions and to/from Guaranteed Principal Account | 182,707 | (178,219) | (20,584) | (1,437,376) | (128,111) | 642,706 | 116,099 | 534,117 |
| Net increase (decrease) in net assets resulting from capital transactions | (291,378) | (2,527,603) | (7,019,570) | (18,684,660) | (1,790,213) | (484,144) | (351,572) | (318,401) |
| **Total increase (decrease)** | **1,519,669** | **2,900,391** | **5,889,632** | **18,938,992** | **7,735,703** | **132,993** | **658,409** | **(325,299)** |
| **NET ASSETS, at beginning of the year** | **9,368,809** | **26,596,751** | **91,052,530** | **256,154,209** | **46,592,732** | **15,003,715** | **7,548,354** | **5,553,126** |
| **NET ASSETS, at end of the year** | **$ 10,888,478** | **$ 29,497,142** | **$ 96,942,162** | **$ 275,093,201** | **$ 54,328,435** | **$ 15,136,708** | **$ 8,206,763** | **$ 5,227,827** |

*See Notes to Financial Statements.*

## *MML Bay State Variable Life Separate Account I*

*STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)*
***For The Year Ended December 31, 2017***

| | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|---|---|
| **Investment Income** | | | | | |
| Dividends | $ 142,453 | $ 19,312 | $ 760,164 | $ 179,761 | $ — |
| Interest Income on Policy loans (*Note 3F)* | — | — | — | — | — |
| **Total Income** | **142,453** | **19,312** | **760,164** | **179,761** | **—** |
| **Expenses** | | | | | |
| Mortality and expense risk fees | 330,374 | 347,434 | 431,406 | 43,217 | 207,120 |
| **Net investment income (loss)** | **(187,921)** | **(328,122)** | **328,758** | **136,544** | **(207,120)** |
| **Net realized and unrealized gain (loss) on investments** | | | | | |
| Realized gain (loss) on sale of fund shares | 1,507,197 | 2,417,616 | 2,590,380 | (9,758) | 1,521,790 |
| Realized gain distribution | 5,423,451 | 6,343,723 | — | — | 5,246,127 |
| Realized gain (loss) | 6,930,648 | 8,761,339 | 2,590,380 | (9,758) | 6,767,917 |
| Change in net unrealized appreciation/ depreciation of investments | 7,031,529 | 7,099,613 | 21,973,930 | 309,005 | 2,683,173 |
| **Net gain (loss) on investments** | **13,962,177** | **15,860,952** | **24,564,310** | **299,247** | **9,451,090** |
| **Net increase (decrease) in net assets resulting from operations** | **13,774,256** | **15,532,830** | **24,893,068** | **435,791** | **9,243,970** |
| Capital transactions: | | | | | |
| Transfer of net premiums | 2,751,994 | 2,956,705 | 3,416,724 | 504,096 | 1,306,331 |
| Transfers due to death benefits | (216,017) | (300,823) | (542,343) | (110,180) | (221,776) |
| Transfers due to withdrawal of funds | (3,168,711) | (3,621,838) | (4,521,755) | (229,780) | (2,430,859) |
| Transfers due to policy loans, net of repayments | (416,935) | (543,131) | (630,924) | (59,323) | (423,865) |
| Transfers due to cost of insurance | — | — | — | — | — |
| Transfers due to changes for administrative costs | (2,652,373) | (2,774,944) | (3,615,429) | (488,922) | (1,609,818) |
| Transfers between divisions and to/from Guaranteed Principal Account | (227,343) | (640,260) | (390,732) | 1,867 | (244,348) |
| Net increase (decrease) in net assets resulting from capital transactions | (3,929,385) | (4,924,291) | (6,284,459) | (382,242) | (3,624,335) |
| **Total increase (decrease)** | **9,844,871** | **10,608,539** | **18,608,609** | **53,549** | **5,619,635** |
| **NET ASSETS, at beginning of the year** | **54,032,655** | **57,326,462** | **72,010,908** | **7,828,836** | **39,901,245** |
| **NET ASSETS, at end of the year** | **$ 63,877,526** | **$ 67,935,001** | **$ 90,619,517** | **$ 7,882,385** | **$ 45,520,880** |

*See Notes to Financial Statements.*

### *1. ORGANIZATION*

MML Bay State Variable Life Separate Account I ("the Separate Account") is a separate investment account of MML Bay State Life Insurance Company ("MML Bay State") established on June 9, 1982. The Separate Account is registered as a unit investment trust under the Investment Company Act of 1940 ("the 1940 Act").

On June 30, 1997, MML Bay State redomesticated from the state of Missouri to the state of Connecticut. MML Bay State is an indirect subsidiary of Massachusetts Mutual Life Insurance Company ("MassMutual").

MML Bay State maintains the following three segments within the Separate Account: Variable Life, Variable Life Plus, and Variable Life Select.

The assets and liabilities of the Separate Account are clearly identified and distinguished from MML Bay State's other assets and liabilities. The Separate Account assets are not chargeable with liabilities arising from any other MML Bay State business.

### *2. INVESTMENT OF THE SEPARATE ACCOUNT'S ASSETS*

As of December 31, 2018, the Separate Account consists of thirteen divisions that invest in the following mutual funds. All of the funds may not be available to all of the three segments of the Separate Account:

| Divisions | The division listed in the first column invests in the fund in this column |
|---|---|
| American Century VP Income & Growth Division | American Century VP Income & Growth Fund(1) |
| Fidelity® VIP Contrafund® Division | Fidelity® VIP Contrafund® Portfolio(2) |
| MML Blend Division | MML Blend Fund(3) |
| MML Equity Division | MML Equity Fund(3) |
| MML Equity Index Division | MML Equity Index Fund(3) |
| MML Managed Bond Division | MML Managed Bond Fund(3) |
| MML Small Cap Equity Division | MML Small Cap Equity Fund(3) |
| MML U.S. Government Money Market Division | MML U.S. Government Money Market Fund(3) |
| Oppenheimer Capital Appreciation Division | Oppenheimer Capital Appreciation Fund/VA(4) |
| Oppenheimer Discovery Mid Cap Growth Division | Oppenheimer Discovery Mid Cap Growth Fund/VA(4) |
| Oppenheimer Global Division | Oppenheimer Global Fund/VA(4) |
| Oppenheimer Global Strategic Income Division | Oppenheimer Global Strategic Income Fund/VA(4) |
| T. Rowe Price Mid-Cap Growth Division | T. Rowe Price Mid-Cap Growth Portfolio(5) |

In addition to the thirteen divisions, some contract owners may also allocate funds to the Guaranteed Principal Account ("GPA"), which is part of MML Bay State's general investment account ("General Account"). Because of exemptive and exclusionary provisions in the securities law, interests in the GPA are not registered under the Securities Act of 1933, and the General Account and the GPA are not registered as an investment company under the 1940 Act.

(1)American Century Investment Management, Inc. is the investment adviser to this Fund.
(2)Fidelity Management & Research Company is the investment adviser to this Portfolio.
(3)MML Investment Advisers, LLC is the investment adviser to this Fund.
(4)OFI Global Asset Management, Inc. is the investment adviser to this Fund.
(5)T. Rowe Price Associates, Inc. is the investment adviser to this Portfolio.

## 3. *SIGNIFICANT ACCOUNTING POLICIES*

The following is a summary of significant accounting policies followed by the Separate Account in preparation of the financial statements in conformity with generally accepted accounting principles. Separate Account MML Bay State Variable Life Separate Account I follows the accounting and reporting guidance in FASB Accounting Standards Codification 946.

### A. Investment Valuation

Investments in the investment divisions are valued at the closing net asset value of each of the respective underlying funds, which value their investment securities at fair value.

### B. Accounting for Investments

Investment transactions are accounted for on a trade-date basis and identified cost is the basis followed in determining the cost of investments sold for financial statement purposes. Dividend income and gains from realized gain distributions are recorded on the ex-distribution date, and are reinvested in the underlying investment divisions.

### C. Federal Income Taxes

MML Bay State is taxed under federal law as a life insurance company under the provisions of the 1986 Internal Revenue Code, as amended. Under existing federal law, no taxes are payable on net investment income and net realized capital gains attributable to policies, which depend on the Separate Account's investment performance. Accordingly, no provision for federal income tax has been made. MML Bay State may, however, make such a charge in the future if an unanticipated change of current law results in a company tax liability attributable to the Separate Account.

### D. Policy Charges

See Note 8B for charges associated with the policies.

### E. Estimates

The preparation of financial statements in conformity with U.S. generally accepted accounting principles requires management to make estimates and assumptions that affect the reported amounts of assets and liabilities and disclosure of contingent assets and liabilities at the date of the financial statements and the reported amounts of revenues and expenses during the reporting period. Actual results could differ from those estimates.

### F. Policy Loans

When a policy loan is made, the Separate Account transfers the amount of the loan to MML Bay State, thereby decreasing both the investments and the net assets of the Separate Account by an equal amount. The policy owner is charged interest on the outstanding policy loan amount generally equal to either a fixed interest rate of 5% to 6% per year or (in all jurisdictions except Arkansas) an adjustable loan rate. The adjustable loan rate is determined each year for the following policy year.

As long as a loan is outstanding, a portion of the policy account value equal to the loan is invested in the GPA. The amount of the loan earns interest at a rate equal to the greater of either a fixed interest rate generally equal to 3% to 4% of the loan or the policy loan rate less the loan interest rate expense charge. The loan interest rate expense charge represents the difference (cost) between the loan interest rate charged and the interest credited on loaned amounts. This amount does not participate in the Separate Account's investment performance.

Interest income presented in the Statement of Operations represents interest credited by MML Bay State to policyholders of the Variable Life product on their outstanding loan balance. This amount is not included in calculation of Investment Income Ratio as it does not impact overall performance of the division.

### G. Policy Owner's Share of Net Assets

The policy owner's share of net assets in the Variable Life Segment is expressed in terms of dollars rather than shares or units of investments. Charges assessed by the Separate Account, for the Variable Life Segment as noted in Note 8B, shown as a reduction in units, or a redemption of units, are a reduction of assets.

### H. Life Reserves

Life reserves are developed by using accepted actuarial methods and are computed using the 1958 CSO or 1980 CSO mortality tables.

## 4. *FAIR VALUE OF FINANCIAL INSTRUMENTS*

The Separate Account defines fair value as the price that would be received to sell an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. In determining fair value, the Separate Account generally uses the market approach as the valuation technique due to the nature of the mutual fund investments offered in the Separate Account. This technique maximizes the use of observable inputs and minimizes the use of unobservable inputs. Investments in mutual funds are valued at the mutual fund's closing net asset value per share on the day of valuation.

**Valuation Inputs:** Various inputs are used to determine the value of the Separate Account's investments. These inputs are summarized in the three broad levels listed below:

- **Level 1** — quoted prices in active markets for identical securities
- **Level 2** — observable inputs other than Level 1 quoted prices (including, but not limited to, quoted prices for similar securities, interest rates, prepayment speeds and credit risk)
- **Level 3** — unobservable inputs

The net assets of the Separate Account are measured at fair value. All the net assets are categorized as Level 1 as of December 31, 2018. There have been no transfers between levels for the year ended December 31, 2018.

## 5. *RELATED PARTY TRANSACTIONS*

### A. Sales Agreements

Pursuant to separate underwriting agreements with MML Bay State, on its own behalf and on behalf of the Separate Account, MML Investors Services, LLC ("MMLIS") serves as principal underwriter of the policies sold by its registered representatives, and MML Strategic Distributors, LLC ("MSD") serves as principal underwriter of the policies sold by registered representatives of other broker-dealers who have entered into distribution agreements with MSD.

Both MMLIS and MSD are registered with the Securities and Exchange Commission (the "SEC") as broker-dealers under the Securities Exchange Act of 1934 and are members of the Financial Industry Regulatory Authority ("FINRA"). Commissions for sales of policies by MMLIS registered representatives are paid on behalf of MMLIS to its registered representatives. Commissions for sales of policies by registered representatives of other broker-dealers are paid on behalf of MSD to those broker-dealers. MMLIS and MSD also receive compensation for their actions as principal underwriters of the policies.

The policies are no longer offered for sale to the public. Policy owners may continue, however, to make premium payments under existing policies.

### B. Receivable from/Payable to MML Bay State

Certain fees such as cost of insurance fees and mortality and expense risk fees are charges paid between the General Account and the Separate Account.

### 6. PURCHASES AND SALES OF INVESTMENTS

The cost of purchases and proceeds from sales investments for the year ended December 31, 2018 were as follows:

| | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division |
|---|---|---|---|---|---|
| Cost of purchases | $ 1,298,709 | $ 3,385,902 | $ 10,391,224 | $ 46,387,765 | $ 2,522,186 |
| Proceeds from sales | (731,593) | (2,806,414) | (9,187,623) | (26,693,493) | (17,796,730) |

| | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division |
|---|---|---|---|---|---|
| Cost of purchases | $ 1,169,213 | $ 1,212,979 | $ 1,195,493 | $ 6,315,537 | $ 10,947,115 |
| Proceeds from sales | (2,145,023) | (703,023) | (1,734,672) | (5,310,343) | (6,530,397) |

| | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|
| Cost of purchases | $ 8,610,631 | $ 17,060,510 | $ 6,728,935 |
| Proceeds from sales | (8,249,238) | (1,231,760) | (4,107,429) |

### 7. NET INCREASE (DECREASE) IN OUTSTANDING UNITS

The changes in outstanding units for the two years ended December 31, 2018 were as follows:

| 2018 | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division |
|---|---|---|---|---|---|
| Units purchased | 190,185 | 365,559 | 758,055 | 2,547,642 | 285,232 |
| Units withdrawn | (361,095) | (908,558) | (1,916,183) | (5,696,308) | (935,068) |
| Units transferred between divisions and to/from GPA | 10,433 | (9,899) | 26,015 | (280,524) | (6,236,236) |
| Net increase (decrease) | (160,477) | (552,898) | (1,132,112) | (3,429,190) | (6,886,073) |

| 2018 (continued) | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division |
|---|---|---|---|---|---|
| Units purchased | 293,208 | 74,190 | 332,951 | 468,743 | 651,500 |
| Units withdrawn | (611,605) | (200,377) | (1,125,376) | (991,949) | (1,588,525) |
| Units transferred between divisions and to/from GPA | (58,625) | 422 | 436,561 | (74,386) | (19,821) |
| Net increase (decrease) | (377,023) | (125,765) | (355,864) | (597,592) | (956,846) |

| 2018 (continued) | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|
| Units purchased | 561,869 | 148,866 | 237,238 |
| Units withdrawn | (1,489,546) | (422,089) | (812,692) |
| Units transferred between divisions and to/from GPA | (46,938) | 4,699,302 | (11,127) |
| Net increase (decrease) | (974,615) | 4,426,079 | (586,581) |

## 7. NET INCREASE (DECREASE) IN OUTSTANDING UNITS *(Continued)*

| 2017 | American Century VP Income & Growth Division | Fidelity® VIP Contrafund® Division | MML Blend Division | MML Equity Division | MML Equity Index Division |
|---|---|---|---|---|---|
| Units purchased | 242,610 | 403,936 | 860,702 | 2,827,074 | 365,329 |
| Units withdrawn | (501,166) | (1,163,218) | (2,135,498) | (6,204,144) | (1,095,917) |
| Units transferred between divisions and to/from GPA | 118,545 | (26,995) | (46,757) | (304,161) | (109,008) |
| Net increase (decrease) | (140,011) | (786,277) | (1,321,553) | (3,681,230) | (839,596) |

| 2017 (continued) | MML Managed Bond Division | MML Small Cap Equity Division | MML U.S. Government Money Market Division | Oppenheimer Capital Appreciation Division | Oppenheimer Discovery Mid Cap Growth Division |
|---|---|---|---|---|---|
| Units purchased | 292,358 | 88,713 | 320,514 | 563,330 | 772,733 |
| Units withdrawn | (675,867) | (211,197) | (840,949) | (1,267,095) | (1,866,252) |
| Units transferred between divisions and to/from GPA | 260,388 | 21,672 | 354,155 | (20,023) | (78,233) |
| Net increase (decrease) | (123,121) | (100,811) | (166,281) | (723,789) | (1,171,753) |

| 2017 (continued) | Oppenheimer Global Division | Oppenheimer Global Strategic Income Division | T. Rowe Price Mid-Cap Growth Division |
|---|---|---|---|
| Units purchased | 670,738 | 173,053 | 297,071 |
| Units withdrawn | (1,729,905) | (294,919) | (1,015,320) |
| Units transferred between divisions and to/from GPA | (95,147) | 4,043 | (75,323) |
| Net increase (decrease) | (1,154,314) | (117,823) | (793,573) |

## 8. FINANCIAL HIGHLIGHTS

**A.** A summary of units outstanding, unit values, net assets, investment income ratios, expense ratios (excluding expenses of the underlying funds) and total return ratios for each of the five years in the period ended December 31, 2018 follows:

| | At December 31, | | | | | For the Years Ended December 31, | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units(4) | Unit Value(3) (Lowest to Highest) | | | Net Assets | Investment Income Ratio(1) | Expense Ratio(2) (Lowest to Highest) | | | Total Return(3) (Lowest to Highest) | | |
| **American Century VP Income & Growth Division** | | | | | | | | | | | | |
| 2018 | 4,351,780 | | | $ 2.23 | $ 9,726,143 | 1.92% | | | 0.55% | | | (7.38)% |
| 2017 | 4,512,257 | | | 2.41 | 10,888,478 | 2.38 | | | 0.55 | | | 19.83 |
| 2016 | 4,652,268 | | | 2.01 | 9,368,809 | 2.38 | | | 0.55 | | | 12.86 |
| 2015 | 4,897,142 | | | 1.78 | 8,738,021 | 2.10 | | | 0.55 | | | (6.14) |
| 2014 | 5,199,333 | | | 1.90 | 9,883,923 | 2.05 | | | 0.55 | | | 11.89 |
| **Fidelity® VIP Contrafund® Division** | | | | | | | | | | | | |
| 2018 | 7,909,884 | | | 3.25 | 25,669,741 | 0.70 | | | 0.55 | | | (6.89) |
| 2017 | 8,462,782 | | | 3.49 | 29,497,142 | 0.99 | | | 0.55 | | | 21.21 |
| 2016 | 9,249,059 | | | 2.88 | 26,596,751 | 0.81 | | | 0.55 | | | 7.41 |
| 2015 | 10,012,131 | | | 2.68 | 26,803,657 | 1.01 | | | 0.55 | | | 0.12 |
| 2014 | 11,108,388 | | | 2.67 | 29,703,149 | 0.95 | | | 0.55 | | | 11.33 |
| **MML Blend Division** | | | | | | | | | | | | |
| 2018 | 15,301,156 | 3.93 | to | 8.60 | 85,867,703 | 2.12 | 0.25 | to | 0.55 | (4.87) | to | (4.58) |
| 2017 | 16,433,268 | 4.13 | to | 9.03 | 96,942,162 | 2.12 | 0.25 | to | 0.55 | 14.62 | to | 14.97 |
| 2016 | 17,754,821 | 3.60 | to | 7.86 | 91,052,530 | 2.14 | 0.25 | to | 0.55 | 8.82 | to | 9.15 |
| 2015 | 19,204,253 | 3.31 | to | 7.22 | 91,061,263 | 2.14 | 0.25 | to | 0.55 | (0.47) | to | (0.17) |
| 2014 | 20,587,465 | 3.33 | to | 7.24 | 97,857,834 | 2.07 | 0.25 | to | 0.55 | 10.38 | to | 10.71 |

## 8. *FINANCIAL HIGHLIGHTS (Continued)*

| | At December 31, | | | | | For the Years Ended December 31, | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units(4) | Unit Value(3) (Lowest to Highest) | | | Net Assets | Investment Income Ratio(1) | Expense Ratio(2) (Lowest to Highest) | | | Total Return(3) (Lowest to Highest) | | |
| **MML Equity Division** | | | | | | | | | | | | |
| 2018 | 46,951,238 | $ 3.68 | to | $ 8.65 | $ 227,988,528 | 1.77% | 0.25% | to | 0.55% | (10.49)% | to | (10.22)% |
| 2017 | 50,380,428 | 4.11 | to | 9.65 | 275,093,201 | 1.82 | 0.25 | to | 0.55 | 15.16 | to | 15.50 |
| 2016 | 54,061,658 | 3.57 | to | 8.37 | 256,154,209 | 1.75 | 0.25 | to | 0.55 | 11.98 | to | 12.31 |
| 2015 | 57,921,176 | 3.19 | to | 7.46 | 246,277,473 | 2.09 | 0.25 | to | 0.55 | (3.96) | to | (3.67) |
| 2014 | 61,771,895 | 3.32 | to | 7.76 | 273,001,202 | 1.56 | 0.25 | to | 0.55 | 10.95 | to | 11.29 |
| **MML Equity Index Division** | | | | | | | | | | | | |
| 2018 | 15,835,769 | 2.14 | to | 2.30 | 35,723,436 | 1.68 | 0.40 | to | 0.55 | (5.16) | to | (5.01) |
| 2017 | 22,721,842 | 2.25 | to | 2.43 | 54,328,435 | 1.19 | 0.40 | to | 0.55 | 20.83 | to | 21.01 |
| 2016 | 23,561,438 | 1.86 | to | 2.01 | 46,592,732 | 1.87 | 0.40 | to | 0.55 | 11.01 | to | 11.17 |
| 2015 | 24,393,646 | 1.67 | to | 1.81 | 43,413,628 | 1.48 | 0.40 | to | 0.55 | 0.61 | to | 0.76 |
| 2014 | 15,281,555 | 1.66 | to | 1.80 | 26,698,318 | 1.53 | 0.40 | to | 0.55 | 12.73 | to | 12.90 |
| **MML Managed Bond Division** | | | | | | | | | | | | |
| 2018 | 3,997,018 | 2.85 | to | 5.34 | 13,577,705 | 3.45 | 0.25 | to | 0.55 | (0.99) | to | (0.69) |
| 2017 | 4,374,040 | 2.87 | to | 5.39 | 15,136,708 | 3.18 | 0.25 | to | 0.55 | 4.12 | to | 4.43 |
| 2016 | 4,497,161 | 2.76 | to | 5.17 | 15,003,715 | 2.82 | 0.25 | to | 0.55 | 2.19 | to | 2.49 |
| 2015 | 4,916,403 | 2.70 | to | 5.05 | 15,918,444 | 2.83 | 0.25 | to | 0.55 | (1.29) | to | (1.00) |
| 2014 | 5,113,576 | 2.74 | to | 5.11 | 16,949,410 | 3.23 | 0.25 | to | 0.55 | 5.87 | to | 6.19 |
| **MML Small Cap Equity Division** | | | | | | | | | | | | |
| 2018 | 2,057,011 | | | 3.36 | 6,907,818 | 0.49 | | | 0.55 | | | (10.68) |
| 2017 | 2,182,776 | | | 3.76 | 8,206,763 | 0.84 | | | 0.55 | | | 13.74 |
| 2016 | 2,283,587 | | | 3.31 | 7,548,354 | 1.07 | | | 0.55 | | | 17.57 |
| 2015 | 2,443,224 | | | 2.81 | 6,869,223 | 0.84 | | | 0.55 | | | (6.15) |
| 2014 | 2,633,670 | | | 3.00 | 7,889,956 | 0.98 | | | 0.55 | | | 11.54 |
| **MML U.S. Government Money Market Division** | | | | | | | | | | | | |
| 2018 | 2,888,232 | 1.45 | to | 2.15 | 4,690,956 | 1.33 | 0.25 | to | 0.55 | 0.78 | to | 1.08 |
| 2017 | 3,244,096 | 1.44 | to | 2.13 | 5,227,827 | 0.36 | 0.25 | to | 0.55 | (0.19) | to | 0.11 |
| 2016 | 3,410,377 | 1.44 | to | 2.13 | 5,553,126 | — | 0.25 | to | 0.55 | (0.44) | to | (0.14) |
| 2015 | 3,785,792 | 1.45 | to | 2.13 | 6,163,413 | 0.01 | 0.25 | to | 0.55 | (0.55) | to | (0.25) |
| 2014 | 4,028,279 | 1.45 | to | 2.14 | 6,596,354 | — | 0.25 | to | 0.55 | (0.55) | to | (0.25) |
| **Oppenheimer Capital Appreciation Division** | | | | | | | | | | | | |
| 2018 | 10,207,827 | | | 5.54 | 56,573,951 | 0.32 | | | 0.55 | | | (6.25) |
| 2017 | 10,805,419 | | | 5.91 | 63,877,526 | 0.24 | | | 0.55 | | | 26.14 |
| 2016 | 11,529,208 | | | 4.69 | 54,032,655 | 0.41 | | | 0.55 | | | (2.74) |
| 2015 | 12,403,431 | | | 4.82 | 59,765,853 | 0.09 | | | 0.55 | | | 2.98 |
| 2014 | 13,212,256 | | | 4.68 | 61,823,595 | 0.44 | | | 0.55 | | | 14.78 |
| **Oppenheimer Discovery Mid Cap Growth Division** | | | | | | | | | | | | |
| 2018 | 13,535,826 | | | 4.38 | 59,261,792 | — | | | 0.55 | | | (6.60) |
| 2017 | 14,492,672 | | | 4.69 | 67,935,001 | 0.03 | | | 0.55 | | | 28.09 |
| 2016 | 15,664,425 | | | 3.66 | 57,326,462 | — | | | 0.55 | | | 1.77 |
| 2015 | 16,726,085 | | | 3.60 | 60,144,502 | — | | | 0.55 | | | 6.02 |
| 2014 | 18,030,621 | | | 3.39 | 61,153,155 | — | | | 0.55 | | | 5.20 |
| **Oppenheimer Global Division** | | | | | | | | | | | | |
| 2018 | 13,582,973 | 2.55 | to | 6.82 | 72,930,203 | 0.99 | 0.40 | to | 0.55 | (13.66) | to | (13.53) |
| 2017 | 14,557,589 | 2.94 | to | 7.90 | 90,619,517 | 0.92 | 0.40 | to | 0.55 | 35.92 | to | 36.12 |
| 2016 | 15,711,903 | 2.16 | to | 5.81 | 72,010,908 | 1.07 | 0.40 | to | 0.55 | (0.47) | to | (0.32) |
| 2015 | 17,002,926 | 2.17 | to | 5.84 | 78,201,464 | 1.34 | 0.40 | to | 0.55 | 3.37 | to | 3.53 |
| 2014 | 21,203,327 | 2.10 | to | 5.65 | 98,203,986 | 1.10 | 0.40 | to | 0.55 | 1.73 | to | 1.88 |

## 8. FINANCIAL HIGHLIGHTS *(Continued)*

| | At December 31, | | | | | For the Years Ended December 31, | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Units(4) | Unit Value(3) (Lowest to Highest) | | | Net Assets | Investment Income Ratio(1) | Expense Ratio(2) (Lowest to Highest) | | | Total Return(3) (Lowest to Highest) | | |
| **Oppenheimer Global Strategic Income Division** | | | | | | | | | | | | |
| 2018 | 6,795,368 | | | $ 3.16 | $ 21,494,153 | 5.00% | | | 0.55% | | | (4.92)% |
| 2017 | 2,369,289 | | | 3.33 | 7,882,385 | 2.28 | | | 0.55 | | | 5.69 |
| 2016 | 2,487,112 | | | 3.15 | 7,828,836 | 4.98 | | | 0.55 | | | 5.95 |
| 2015 | 2,692,268 | | | 2.97 | 7,998,685 | 5.86 | | | 0.55 | | | (2.80) |
| 2014 | 2,868,868 | | | 3.06 | 8,768,569 | 4.24 | | | 0.55 | | | 2.27 |
| **T. Rowe Price Mid-Cap Growth Division** | | | | | | | | | | | | |
| 2018 | 8,446,035 | 4.39 | to | 5.46 | 41,470,491 | — | 0.40 | to | 0.55 | (2.57) | to | (2.42) |
| 2017 | 9,032,616 | 4.50 | to | 5.60 | 45,520,880 | — | 0.40 | to | 0.55 | 24.09 | to | 24.28 |
| 2016 | 9,826,189 | 3.62 | to | 4.51 | 39,901,245 | — | 0.40 | to | 0.55 | 5.68 | to | 5.83 |
| 2015 | 10,704,253 | 3.42 | to | 4.27 | 41,097,548 | — | 0.40 | to | 0.55 | 5.98 | to | 6.14 |
| 2014 | 11,503,689 | 3.22 | to | 4.03 | 41,666,694 | — | 0.40 | to | 0.55 | 12.50 | to | 12.66 |

(1)The investment income ratios represent the dividends, excluding distributions of capital gains, received by the division from the underlying mutual fund, net of management fees assessed by the fund manager, divided by the average net assets. These ratios exclude those expenses, such as mortality and expense charges, that are assessed against policy owners accounts either through reductions in the unit values or the redemption of units. The recognition of investment income by the division is affected by the timing of the declaration of dividends by the underlying fund in which the division invests.
(2)The expense ratios represent the annualized policy expenses of the Separate Account, consisting primarily of mortality and expense charges, for each period indicated. The ratios include only those expenses that result in a direct reduction in unit values. Charges made directly to policy owner accounts through the redemption of units and expenses of the underlying fund have been excluded.
(3)The total returns are for the periods indicated, including changes in the value of the underlying fund, and the expenses assessed through the reduction in unit values. These ratios do not include any expenses assessed through the redemption of units. Investment options with a date notation indicate the effective date of that investment option in the variable account. The total return is calculated for each period indicated or from the effective date through the end of the reporting period. As the total return table is presented as a range of minimum to maximum values, based on the product grouping representing the minimum and maximum expense ratio amounts, some individual policy total returns and unit values are not within the ranges presented.
(4)See note 3G with respect to Variable Life.

**B.** The Separate Account assesses "current" charges associated with each policy. These charges are either assessed as a direct reduction in unit values or through the redemption of units for all policies contained within the Separate Account (see note 3G). Charges shown below state charges assessed at a monthly rate unless otherwise specified.

| | |
|---|---|
| **Administrative Charge**<br><br>This charge is assessed through the redemption of units. | $2.50 to $6.00 per month |
| **Mortality and Expense Risk Charge**<br><br>This charge is assessed through reduction of unit values. | Effective annual rate of 0.25% to 0.55% of the policy's average daily net assets in the Separate Account. |
| **Mortality Charge**<br><br>This charge is assessed through the redemption of units. | $0.01688 to $63.89 per $1,000 of insurance risk |
| **Additional Mortality Fees**<br><br>This charge is assessed through the redemption of units. | $0.0042 to $83.33 per $1,000 of insurance risk<br>$0.08 to $83.33 per $1,000 of face amount |
| **Loan Interest Rate Expense Charge**<br><br>This charge is assessed through the redemption of units. | Effective annual rate of 0.90% to 1.00% of the loan mount |

## *8. **FINANCIAL HIGHLIGHTS*** *(Continued)*

**Rider Charges:**

The rider charges do not apply to all segments within the Separate Account. These charges are assessed through the redemption of units.

| | |
|---|---|
| **A. Accidental Death Benefit** | $0.06591 to $1.42 per $1,000 of coverage |
| **B. Death Benefit Guarantee** | $0.01 per $1,000 of face amount |
| **C. Insurability Protection** | $0.043 to $0.179 per $1,000 of coverage |
| **D. Children's Term** | $5.00 per $1,000 of insurance risk |
| **E. Disability Benefit** | $0.041 to $0.266 per $1 of monthly deductions<br>$0.009 to $0.149 per $1 of specified premium |
| **F. Renewal Term** | $1.53 to $39.37 per $1,000 of insurance risk |
| **G. Waiver of Monthly Charges** | $0.036 to $0.349 per $1 of monthly deductions |
| **H. Waiver of Premium** | $0.11 to $3.51 per $1,000 of insurance risk |

## 9. ***SUBSEQUENT EVENTS***

The Separate Account's management has reviewed events occurring through March 19, 2019, the date the financial statements were issued, and no subsequent events occurred requiring accrual or disclosure.

# MML BAY STATE LIFE INSURANCE COMPANY

STATUTORY FINANCIAL STATEMENTS

As of December 31, 2018 and 2017 and
for the years ended December 31, 2018, 2017 and 2016

MML BAY STATE LIFE INSURANCE COMPANY
STATUTORY FINANCIAL STATEMENTS

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KPMG LLP
One Financial Plaza
755 Main Street
Hartford, CT 06103

# Independent Auditors' Report

The Board of Directors and Shareholder of
MML Bay State Life Insurance Company:

We have audited the accompanying financial statements of MML Bay State Life Insurance Company (the Company), which comprise the statutory statements of financial position as of December 31, 2018 and 2017, and the related statutory statements of operations, changes in shareholder's equity, and cash flows for the three-year period ended December 31, 2018, and the related notes to the statutory financial statements.

*Management's Responsibility for the Financial Statements*

Management is responsible for the preparation and fair presentation of these financial statements in accordance with statutory accounting practices prescribed or permitted by the State of Connecticut Insurance Department. Management is also responsible for the design, implementation, and maintenance of internal control relevant to the preparation and fair presentation of financial statements that are free from material misstatement, whether due to fraud or error.

*Auditors' Responsibility*

Our responsibility is to express an opinion on these financial statements based on our audits. We conducted our audits in accordance with auditing standards generally accepted in the United States of America. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free from material misstatement.

An audit involves performing procedures to obtain audit evidence about the amounts and disclosures in the financial statements. The procedures selected depend on the auditors' judgment, including the assessment of the risks of material misstatement of the financial statements, whether due to fraud or error. In making those risk assessments, the auditor considers internal control relevant to the entity's preparation and fair presentation of the financial statements in order to design audit procedures that are appropriate in the circumstances, but not for the purpose of expressing an opinion on the effectiveness of the entity's internal control. Accordingly, we express no such opinion. An audit also includes evaluating the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluating the overall presentation of the financial statements.

We believe that the audit evidence we have obtained is sufficient and appropriate to provide a basis for our audit opinions.

*Basis for Adverse Opinion on U.S. Generally Accepted Accounting Principles*

As described in Note 2 to the financial statements, the financial statements are prepared by the Company using statutory accounting practices prescribed or permitted by the State of Connecticut Insurance Department, which is a basis of accounting other than U.S. generally accepted accounting principles. Accordingly, the financial statements are not intended to be presented in accordance with U.S. generally accepted accounting principles.

The effects on the financial statements of the variances between the statutory accounting practices described in Note 2 and U.S. generally accepted accounting principles, although not reasonably determinable, are presumed to be material.

*Adverse Opinion on U.S. Generally Accepted Accounting Principles*

In our opinion, because of the significance of the variances between statutory accounting practices and U.S. generally accepted accounting principles discussed in the Basis for Adverse Opinion on U.S. Generally Accepted Accounting Principles paragraph, the financial statements referred to above do not present fairly, in accordance with U.S. generally accepted accounting principles, the financial position of the Company as of December 31, 2018 and 2017, or the results of its operations or its cash flows for the three-year period ended December 31, 2018.

*Opinion on Statutory Basis of Accounting*

In our opinion, the financial statements referred to above present fairly, in all material respects, the financial position of the Company as of December 31, 2018 and 2017, and the results of its operations and its cash flows for the three-year period ended December 31, 2018, in accordance with statutory accounting practices prescribed or permitted by the State of Connecticut Insurance Department described in Note 2.

KPMG LLP

Hartford, Connecticut
February 23, 2019

MML BAY STATE LIFE INSURANCE COMPANY
STATUTORY STATEMENTS OF FINANCIAL POSITION

| | Years Ended December 31, 2018 | 2017 |
|---|---|---|
| | ($ In Millions Except for Par Value) | |
| **Assets:** | | |
| Bonds | $ 356 | $ 312 |
| Mortgage loans | 3 | 3 |
| Policy loans | 97 | 95 |
| Cash, cash equivalents and short-term investments | 24 | 55 |
| Total invested assets | 480 | 465 |
| Investment income due and accrued | 5 | 5 |
| Insurance amounts receivable | 15 | 21 |
| Federal income taxes | 4 | 3 |
| Deferred income taxes | - | 2 |
| Total assets excluding separate accounts | 504 | 496 |
| Separate account assets | 4,356 | 4,465 |
| Total assets | $ 4,860 | $ 4,961 |
| **Liabilities:** | | |
| Policyholders' reserves | $ 144 | $ 141 |
| Liabilities for deposit-type contracts | 15 | 13 |
| Contract claims and other benefits | 21 | 16 |
| Transfers due to separate accounts | 8 | 15 |
| Payable to affiliates | 3 | 1 |
| Asset valuation reserve | 6 | 5 |
| Other liabilities | (3) | 10 |
| Total liabilities excluding separate accounts | 194 | 201 |
| Separate account liabilities | 4,356 | 4,465 |
| Total liabilities | 4,550 | 4,666 |
| **Shareholder's equity:** | | |
| Common stock, $200 par value<br>50,000 shares authorized<br>12,501 shares issued and outstanding | 2 | 2 |
| Paid-in and contributed surplus | 144 | 144 |
| Surplus | 164 | 149 |
| Total shareholder's equity | 310 | 295 |
| Total liabilities and shareholder's equity | $ 4,860 | $ 4,961 |

See notes to statutory financial statements

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| **Revenue:** | | | |
| Premium income | $ 1 | $ 2 | $ (106) |
| Net investment income | 17 | 18 | 14 |
| Reserve adjustments on reinsurance ceded | (72) | (70) | 113 |
| Fees and other income | 78 | 74 | 132 |
| Total revenue | 24 | 24 | 153 |
| **Benefits and expenses:** | | | |
| Policyholders' benefits | 46 | 42 | 129 |
| Change in policyholders' reserves | 3 | 2 | 2 |
| Net transfers from separate accounts | (59) | (44) | (36) |
| General insurance expenses | 10 | 8 | 8 |
| Commissions | 2 | 3 | 3 |
| State taxes, licenses and fees | 1 | 1 | 1 |
| Total benefits and expenses | 3 | 12 | 107 |
| Net gain from operations before federal income taxes | 21 | 12 | 46 |
| Federal income tax expense and (benefit) | 3 | (3) | 26 |
| Net income | $ 18 | $ 15 | $ 20 |

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| Shareholder's equity, beginning of year | $ 295 | $ 288 | $ 231 |
| Increase (decrease) due to: | | | |
| Net income | 18 | 15 | 20 |
| Change in other net deferred income taxes | (7) | (10) | 12 |
| Change in nonadmitted assets | 6 | 5 | (10) |
| Change in asset valuation reserve | (1) | - | - |
| Prior period adjustments | 1 | - | - |
| Other | (2) | (3) | 35 |
| Net increase | 15 | 7 | 57 |
| Shareholder's equity, end of year | $ 310 | $ 295 | $ 288 |

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| **Cash from operations:** | | | |
| Premium collected net of reinsurance | $ 1 | $ 2 | $ (102) |
| Net investment income | 17 | 17 | 14 |
| Miscellaneous income | 6 | 20 | 243 |
| Benefit payments | (44) | (51) | (95) |
| Net transfers from separate accounts | 52 | 36 | 35 |
| Commissions and other expenses | (12) | (13) | (12) |
| Federal and foreign income taxes paid | (2) | (19) | (4) |
| Net cash from operations | 18 | (8) | 79 |
| **Cash from investments:** | | | |
| Proceeds from investments sold, matured or repaid: | | | |
| Bonds | 35 | 23 | 48 |
| Mortgage loans | - | 1 | 2 |
| Total investment proceeds | 35 | 24 | 50 |
| Cost of investments acquired: | | | |
| Bonds | (79) | (26) | (135) |
| Total investments acquired | (79) | (26) | (135) |
| Net (increase) decrease in policy loans | (1) | 1 | - |
| Net cash from investing activities | (45) | (1) | (85) |
| **Cash from financing and miscellaneous sources:** | | | |
| Net deposits (withdrawals) on deposit-type contracts | 1 | 1 | 1 |
| Other cash provided (used) | (5) | - | 7 |
| Net cash from financing and miscellaneous sources | (4) | 1 | 8 |
| Net change in cash, cash equivalents and short-term investments | (31) | (8) | 2 |
| Cash, cash equivalents and short-term investments, beginning of year | 55 | 63 | 61 |
| Cash, cash equivalents and short-term investments, end of year | $ 24 | $ 55 | $ 63 |

## *1. Nature of operations*

These statutory financial statements include MML Bay State Life Insurance Company (the Company), a wholly owned stock life insurance subsidiary of C.M. Life Insurance Company (C.M. Life). C.M. Life is a wholly owned stock life insurance subsidiary of Massachusetts Mutual Life Insurance Company (MassMutual). The Company is domiciled in the State of Connecticut. It provides life insurance and annuities to individuals and group life insurance to institutions.

MassMutual is a mutual life insurance company domiciled in the Commonwealth of Massachusetts. MassMutual and its subsidiaries 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, Institutional Solutions and Workplace Solutions distribution channels.

MMFA is a sales force that includes financial advisors that operate in the U.S. MMFA sells individual life and individual annuities.

## *2. Summary of significant accounting policies*

### *a. Basis of presentation*

The 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 State of Connecticut Insurance Department (the Department).

Statutory accounting practices are different in some respects from financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP). The more significant differences between statutory accounting principles and U.S. GAAP are as follows: (a) bonds are generally carried at amortized cost, whereas U.S. GAAP reports bonds at fair value for bonds available for sale and trading or at amortized cost for bonds held to maturity; (b) changes in the fair value of derivative financial instruments are recorded as changes in shareholder's equity, whereas U.S. GAAP generally reports these changes as revenue unless deemed an effective hedge; (c) embedded derivatives are recorded as part of the underlying contract, whereas U.S. GAAP would identify and bifurcate certain embedded derivatives from the underlying contract or security and account for them separately at fair value; (d) changes in the balances of deferred income taxes, which provide for book versus tax temporary differences, are subject to limitation and are recorded in shareholder's equity, whereas U.S. GAAP would generally include the change in deferred taxes in net income; (e) assets are reported at admitted asset value and assets designated as nonadmitted are excluded through a charge against shareholder's equity, whereas U.S. GAAP recognizes all assets, net of any valuation allowances; (f) statutory policy reserves are based upon prescribed methods, such as the Commissioners' Reserve Valuation Method, Commissioners' Annuity Reserve Valuation Method (CARVM) or net level premium method, and prescribed statutory mortality, morbidity and interest assumptions at the time of issuance, whereas U.S. GAAP policy reserves would generally be based upon the net level premium method or the estimated gross margin method with estimates, at time of issuance, of future mortality, morbidity, persistency and interest; (g) liabilities for policyholder reserves, unearned premium, and unpaid claims are presented net of reinsurance ceded, whereas U.S. GAAP would present the liabilities on a direct basis and report an asset for the amounts due from reinsurers for the amounts ceded; (h) an asset valuation reserve (AVR) is reported as a contingency reserve to stabilize shareholder's equity against fluctuations in credit-related changes in the value of bonds, mortgage loans and certain derivatives, whereas U.S. GAAP does not record this reserve; (i) after-tax realized capital gains (losses) that result from changes in the overall level of interest rates for all types of fixed-income investments and interest-related hedging activities are deferred into the interest maintenance reserve (IMR) and amortized into revenue, whereas U.S. GAAP reports these gains and losses as revenue; (j) changes to the mortgage loan valuation allowance are recognized in net unrealized capital gains (losses), net of tax, in the Statutory Statements of Changes in Shareholder's Equity, whereas U.S. GAAP reports these changes in net realized capital gains (losses); (k) payments received for universal and variable life insurance products and certain variable and fixed deferred annuities are reported as premium income and corresponding change in reserves, whereas U.S. GAAP would treat these payments as deposits to policyholders' account balances; (l) certain acquisition costs, such as commissions and other variable costs, directly related to successfully acquiring new business are charged to current operations as incurred, whereas U.S. GAAP would generally capitalize these expenses and amortize them based on profit emergence over the expected life of the policies or over the premium payment period; (m) Statutory Statements of Changes in Shareholder's Equity includes net income, change in net unrealized capital gains (losses), change in net unrealized foreign exchange capital gains (losses), change in other net deferred income taxes, change in nonadmitted assets, change in AVR and prior period adjustments, whereas U.S. GAAP presents net income as retained earnings and net unrealized capital gains (losses), change in net unrealized foreign exchange capital gains (losses), as other comprehensive income; and (n) the change in the fair value for unaffiliated common stock is recorded in surplus, whereas the change in the fair value for ownership interests in an entity not accounted for under the equity method or consolidated are recorded in revenue for U.S. GAAP.

The preparation of financial statements requires management to make estimates and assumptions that impact the reported amounts of assets and liabilities, the disclosure of assets and liabilities as of the date of the statutory financial statements and the reported amounts of revenues and expenses during the reporting periods. The most significant estimates include those used in determining the carrying values of investments including the amount of mortgage loan investment valuation reserves, other-than-temporary impairment(s) (OTTI), the liabilities for policyholders' reserves, the determination of admissible deferred tax assets (DTA), the liability for taxes and the liability for litigation or other contingencies. Future events including, but not limited to, changes in the level of mortality, morbidity, interest rates, persistency, asset valuations and defaults could cause results to differ from the estimates used in the statutory financial statements. Although some variability is inherent in these estimates, management believes the amounts presented are appropriate.

Certain prior year amounts within these financial statements have been reclassified to conform to the current year presentation.

***b. Bonds***

Bonds are generally valued at amortized cost using the constant yield interest method with the exception of NAIC Category 6 bonds, which are in or near default, and certain residential mortgage-backed securities (RMBS) and commercial mortgage-backed securities (CMBS), which are rated by outside modelers, which are carried at the lower of amortized cost or fair value. NAIC ratings are applied to bonds and other securities. Categories 1 and 2 are considered investment grade, while Categories 3 through 6 are considered below investment grade. Bonds are recorded on a trade date basis, except for private placement bonds, which are recorded on the funding date.

For loan-backed and structured securities, such as asset-backed securities (ABS), mortgage-backed securities (MBS), including RMBS and CMBS, and structured securities, including collateralized debt obligations (CDOs), amortization or accretion is revalued quarterly based on the current estimated cash flows, using either the prospective or retrospective adjustment methodologies.

Certain fixed income securities, with the highest ratings from a rating agency follow the retrospective method of accounting. Under the retrospective method, the recalculated effective yield equates the present value of the actual and anticipated cash flows, including new prepayment assumptions, to the original cost of the investment. Prepayment assumptions are based on borrower constraints and economic incentives such as the original term, age and coupon of the loan as affected by the interest rate environment. The current carrying value is then increased or decreased to the amount that would have resulted had the revised yield been applied since inception, and investment income is correspondingly decreased or increased.

All other fixed income securities, such as floating rate bonds and interest only securities, including those that have been impaired, follow the prospective method of accounting. Under the prospective method, the recalculated future effective yield equates the carrying value of the investment to the present value of the anticipated future cash flows.

The fair value of bonds is based on quoted market prices when available. If quoted market prices are not available, values provided by other third-party organizations are used. If values provided by other third-party organizations are unavailable, fair value is estimated using internal models by discounting expected future cash flows using observable current market rates applicable to yield, credit quality and maturity of the investment or using quoted market values for comparable investments. Internal inputs used in the determination of fair value include estimated prepayment speeds, default rates, discount rates and collateral values, among others. Structure characteristics and cash flow priority are also considered. Fair values resulting from internal models are those expected to be received in an orderly transaction between willing market participants.

Refer to *Note 2s. "Realized capital gains (losses) including other-than-temporary impairments and unrealized capital gains (losses)"* for information on the Company's policy for determining OTTI.

***c. Mortgage loans***

Mortgage loans are valued at the unpaid principal balance of the loan, net of unamortized premium, discount, mortgage origination fees and valuation allowances.

***d. Policy loans***

Policy loans are carried at the outstanding loan balance less amounts unsecured by the cash surrender value of the policy. At issuance, policy loans are fully secured by the cash surrender value of the policy. Unsecured amounts can occur when subsequent charges are incurred on the underlying policy without the receipt of additional premium. If the premium is not paid during the contractual grace period, the policy will lapse. As of December 31, 2018 and 2017, there were no unsecured nonadmitted amounts. Policy loans earn interest calculated based upon either a fixed or a variable interest rate. Accrued investment income on policy loans more than 90 days past due is included in the unpaid balance of the policy loan to the extent it does not exceed the cash surrender value of the underlying contract.

***e. Cash, cash equivalents and short-term investments***

Cash and cash equivalents, which are carried at amortized cost, consist of all highly liquid investments purchased with original maturities of three months or less.

Short-term investments, which are carried at amortized cost, consist of short-term bonds and all highly liquid investments purchased with maturities of greater than three months and less than or equal to 12 months.

The carrying value reported in the Statutory Statements of Financial Position for cash, cash equivalents and short-term investment instruments approximates the fair value.

***f. Investment income due and accrued***

Accrued investment income consists primarily of interest, which is recognized on an accrual basis.

***g. Insurance amounts receivable***

Insurance amounts receivable primarily includes reinsurance recoverables and other receivables, including deferred and uncollected premium.

***h. Federal income taxes***

Total federal income taxes are based upon the Company's best estimate of its current and deferred tax assets or liabilities. Current tax expense (benefit) is reported in the Statutory Statements of Operations as federal income tax expense (benefit) if resulting from operations and within net realized capital gains (losses) if resulting from invested asset transactions. Changes in the balances of deferred taxes, which provide for book-to-tax temporary differences, are subject to limitations and are reported within various lines within surplus. Accordingly, the reporting of book-to-tax temporary differences, such as reserves and policy acquisition costs, and of book-to-tax permanent differences, such as tax-exempt interest and tax credits, results in effective tax rates in the Statutory Statements of Operations that differ from the federal statutory tax rate.

### *i. Nonadmitted assets*

Assets designated as nonadmitted by the NAIC primarily include the amount of DTAs (subject to certain limitations) that will not be realized by the end of the third calendar year following the current year end. These assets are designated as nonadmitted and are excluded from Statutory Statements of Financial Position through a charge against surplus.

### *j. Separate accounts*

Separate accounts and sub-accounts are segregated funds administered and invested by the Company, the performance of which primarily benefits the policyholders/contract holders with an interest in the separate accounts. Group and individual variable annuity, variable life and other insurance policyholders/contract holders select from among the separate accounts and sub-accounts made available by the Company. The separate accounts and sub-accounts are offered as investment options under certain insurance contracts or policies. The returns produced by separate account assets increase or decrease separate account reserves. Separate account assets consist principally of marketable securities reported at fair value. Except for the Company's seed money, and certain book value separate accounts, separate account assets can only be used to satisfy separate account liabilities and are not available to satisfy the general obligations of the Company. Separate account administrative and investment advisory fees are included in fees and other income.

Assets may be transferred from the general investments of the Company to seed the separate accounts. When assets are transferred to separate accounts, they are transferred at fair market value. Gains related to the transfer are deferred to the extent that the Company maintains a proportionate interest in the separate account. The deferred gain is recognized as the Company's ownership decreases or when the separate account sells the underlying asset during the normal course of business. Losses associated with these transfers are recognized immediately.

Separate accounts reflect two categories of risk assumption: nonguaranteed separate accounts for which the policyholder/contract holder assumes the investment risk and guaranteed separate accounts for which the Company contractually guarantees a minimum return, a minimum account value, or both to the policyholder/contract holder.

Premium income, benefits and expenses of the separate accounts are included in the Statutory Statements of Operations with the offset recorded in the change in policyholders' reserves. Investment income, realized capital gains (losses) and unrealized capital gains (losses) on the assets of separate accounts, other than seed money, accrue to policyholders/contract holders and are not recorded in the Statutory Statements of Operations.

### *k. Policyholders' reserves*

Policyholders' reserves provide for the present value of estimated future obligations in excess of estimated future premium on policies in force.

Reserves for life insurance contracts are developed using accepted actuarial methods computed principally on the net level premium or CARVM bases using the 1958 or 1980 Commissioners' Standard Ordinary mortality tables with assumed interest rates. Reserves for disability riders associated with life contracts are calculated using morbidity rates from the 1952 Period 2 Intercompany Disability Table, modified to reflect the Company's experience.

The Company charges a higher premium on certain contracts that cover substandard mortality risk. For these policies, the reserve calculations are based on a substandard mortality rate, which is a multiple of the standard mortality tables.

Reserves for individual payout annuities are developed using accepted actuarial methods computed principally under Commissioners' Annuity Reserve Valuation Method using applicable interest rates and mortality tables, primarily the 1983 Individual Annuity Mortality and Annuity 2000 tables.

Certain individual variable annuity products issued by the Company offer guaranteed minimum death benefits (GMDBs). The liability for GMDBs is included in policyholders' reserves and the related change in this liability is included in change in policyholders' reserves.

Variable annuity GMDBs provide a death benefit in excess of the contract value if the contract value is less than the guaranteed minimum amount. Some contracts provide that guarantee upon the contract owner's death and others provide it upon the annuitant's death. This amount may be based on a return of premium (the premium paid generally adjusted for withdrawals), a roll-up (an accumulation of premium at a specified interest rate adjusted for withdrawals), a reset (the contract value on a specified anniversary date adjusted for subsequent withdrawals, which is allowed to decrease when reset) or a ratchet (the contract value on a specified anniversary date adjusted for subsequent withdrawals, which is never allowed to decrease when reset). For a variable annuity contract, a decline in the stock or bond markets causing the contract value to fall below the guaranteed specified amount will increase the net amount at risk, which is the amount of the GMDBs in excess of the contract value.

Reserves for individual variable deferred annuities are developed using accepted actuarial methods computed principally under Commissioners' Annuity Reserve Valuation Method for variable annuities using applicable interest rates and mortality tables. Individual variable deferred annuities primarily use the 1994 Minimum Guaranteed Death Benefit or Annuity 2000 tables. The liability is evaluated under both a standard scenario and stochastic scenarios. The Company holds the reserve liability valuation at the higher of the standard or stochastic scenario values.

The standard scenario is a prescriptive reserve with minimal company discretion. The primary driver of the standard scenario result is the composition of the in force policies, with the key factor being the extent to which the product guarantees are "in the money." The value of the reserve guarantees under the standard scenario is driven primarily by equity markets.

For the stochastic scenarios, the Company uses the American Academy of Actuaries' scenarios. Prudent estimate assumptions are used for mortality, expenses and commissions, investment management fees taxes and policyholder behavior including lapses, partial withdrawals, annuitization and additional premium. These assumptions are consistent with those used for asset adequacy testing and are based on Company experience. Stochastic reserves are driven by the degree that the variable annuity benefits are "in the money" at projected interest rates and equity market levels, expenses, discount rates, net derivative values and policyholder behavior.

Tabular interest, tabular reserves less actual reserves released, and tabular cost for all life and annuity contracts and supplementary contracts involving life contingencies are determined in accordance with NAIC Annual Statement instructions. For tabular interest, variable life uses a formula that applies a weighted average interest rate determined from a seriatim valuation file to the mean average reserves. Variable universal life, group life, annuity and supplemental contracts use a formula that applies a weighted average credited rate to the mean account value. For contracts without an account value a weighted average statutory valuation rate is applied to the mean statutory reserve or accepted actuarial methods using applicable interest rates are applied.

All policyholders' reserves and accruals are presented net of reinsurance. Management believes that these liabilities and accruals represent management's best estimate and will be sufficient, in conjunction with future revenues, to meet future anticipated obligations of policies and contracts in force.

***l. Liabilities for deposit-type contracts***

Liabilities for investment-type contracts such as supplementary contracts not involving life contingencies are based on account value or accepted actuarial methods using applicable interest rates.

***m. Transfers due to separate accounts***

Transfers due to separate accounts represent a net payable to the Company's separate accounts.

***n. Asset valuation reserve***

The Company maintains an AVR that is a contingency reserve to stabilize shareholder's equity against credit-related changes in the value of bonds and mortgage loans. The AVR is reported as a liability and the change in AVR, net of tax, is reported in shareholder's equity.

***o. Interest maintenance reserve***

The Company maintains an IMR that is used to stabilize net income against fluctuations in interest rates. After-tax realized capital gains (losses), which result from changes in interest rates for all types of fixed-income investments, are deferred into the IMR and amortized into net investment income using the grouped amortization method. In the grouped amortization method, assets are grouped based on years of maturity. IMR is reduced by the amount ceded to reinsurers when entering into in force coinsurance ceding agreements. The IMR is included in other liabilities, or if negative, is recorded as a nonadmitted asset.

***p. Other liabilities***

Other liabilities primarily consist of due and accrued separate account transfers, remittances and items not allocated, affiliated payables and accounts payable.

***q. Reinsurance***

The Company enters into reinsurance agreements with affiliated and unaffiliated insurers in the normal course of business to limit its insurance risk.

Premium income, benefits to policyholders (including unpaid claims) and policyholders' reserves are reported net of reinsurance. Premium, benefits and reserves related to reinsured business are accounted for on bases consistent with those used in accounting for the original policies issued and the terms of the reinsurance contracts. The Company records a receivable for reinsured benefits paid, but not yet reimbursed by the reinsurer and reduces policyholders' reserves for the portion of insurance liabilities that are reinsured. Commissions and expense allowances on reinsurance ceded and modified coinsurance (Modco) reserve adjustments on reinsurance ceded are recorded as revenue.

***r. Premium and related expense recognition***

Life insurance premium revenue is generally recognized annually on the anniversary date of the policy. However, premium for flexible products, primarily variable universal life contracts, is recognized as revenue when received. Annuity premium is recognized as revenue when received.

Premium revenue is adjusted by the related deferred premium adjustment. Deferred premium adjusts for the overstatement created in the calculation of reserves as the reserve computation assumes the entire year's net premium is collected annually at the beginning of the policy year and does not take into account installment or modal payments. Commissions and other costs related to issuance of new policies and policy maintenance and settlement costs are charged to current operations when incurred. Surrender fee charges on certain life and annuity products are recorded as a reduction of benefits and expenses.

***s. Realized capital gains (losses) including other-than-temporary impairments and unrealized capital gains (losses)***

Realized capital gains (losses), net of taxes, exclude gains (losses) deferred into the IMR and gains (losses) of the separate accounts. Realized capital gains (losses), including OTTI, are recognized in net income and are determined using the specific identification method.

*Bonds - general*

The Company employs a systematic methodology to evaluate OTTI by conducting a quarterly analysis of bonds. OTTI is evaluated in a manner consistent with market participant assumptions. The Company considers the following factors, where applicable depending on the type of securities, in the evaluation of whether a decline in value is other than temporary: (a) the likelihood that the Company will be able to collect all amounts due according to the contractual terms of the debt security; (b) the present value of the expected future cash flows of the security; (c) the characteristics, quality and value of the underlying collateral or issuer securing the position; (d) collateral structure; (e) the length of time and extent to which the fair value has been below amortized cost; (f) the financial condition and near-term prospects of the issuer; (g) adverse conditions related to the security or industry; (h) the rating of the security; (i) the Company's ability and intent to hold the investment for a period of time sufficient to allow for an anticipated recovery to amortized cost; and (j) other qualitative and quantitative factors in determining the existence of OTTI including, but not limited to, unrealized loss trend analysis and significant short-term changes in value.

In addition, if the Company has the intent to sell, or the inability, or lack of intent to retain the investment for a period sufficient to recover the amortized cost basis, an OTTI is recognized as a realized loss equal to the entire difference between the investment's amortized cost basis and its fair value at the balance sheet date.

When a bond is other-than-temporarily impaired, a new cost basis is established.

*Bonds - corporate*

For corporate securities, if it is determined that a decline in the fair value of a bond is other than temporary, OTTI is recognized as a realized loss equal to the difference between the investment's amortized cost basis and, generally, its fair value at the balance sheet date.

*Bonds - loan-backed and structured securities*

For loan-backed and structured securities, if the present value of cash flows expected to be collected is less than the amortized cost basis of the security, an OTTI is recognized as a realized loss equal to the difference between the investment's amortized cost basis and the present value of cash flows expected to be collected. The expected cash flows are discounted at the security's effective interest rate. Internal inputs used in determining the amount of the OTTI on structured securities include collateral performance, prepayment speeds, default rates, and loss severity based on borrower and loan characteristics, as well as deal structure including subordination, over-collateralization and cash flow priority.

ABS and MBS are evaluated for OTTI using scenarios and assumptions based on the specifics of each security including collateral type, loan type, vintage and subordination level in the structure. Cash flow estimates are based on these assumptions and inputs obtained from external industry sources along with internal analysis and actual experience. Where applicable, assumptions include prepayment speeds, default rates and loss severity, weighted average maturity and changes in the underlying collateral values.

The Company has a review process for determining if CDOs are at risk for OTTI. For the senior, mezzanine and junior debt tranches, cash flows are modeled using multiple scenarios based on the current ratings and values of the underlying corporate credit risks and incorporating prepayment and default assumptions that vary according to collateral attributes of each CDO. The prepayment and default assumptions are varied within each model based upon rating (base case), historical expectations (default), rating change improvement (optimistic), rating change downgrade (pessimistic) and fair value (market). The default rates produced by these multiple scenarios are assigned an expectation weight according to current market and economic conditions and fed into a final scenario. OTTI is recorded if this final scenario results in the loss of any principal or interest payments due.

For the most subordinated junior CDO tranches, the present value of the projected cash flows in the final scenario is measured using an effective yield. If the current book value of the security is greater than the present value measured using an effective yield, an OTTI is taken in an amount sufficient to produce its effective yield. Certain CDOs cannot be modeled using all of the scenarios because of limitations on the data needed for all scenarios. The cash flows for these CDOs, including foreign currency denominated CDOs, are projected using a customized scenario management believes is reasonable for the applicable collateral pool.

For loan-backed and structured securities, any difference between the new amortized cost basis and any increased present value of future cash flows expected to be collected is accreted into net investment income over the expected remaining life of the bond.

*Unrealized capital gains (losses)*

Unrealized capital gains (losses) include changes in the fair value of bonds held at fair value and are recorded as a change in shareholder's equity net of tax.

## 3. New accounting standards

### a. 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 modifications are not expected to have a material effect on the Company's total life reserves and surplus in the 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. These 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. 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. 100R, *Fair Value*, allowing 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 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 November 2018, the NAIC adopted modifications to SSAP No. 15, *Debt and Holding Company Obligations*, and SSAP No. 25, *Affiliates and Other Related Parties*, to clarify that (1) forgiveness of a reporting entity obligation should be recognized as contributed capital; (2) forgiveness of an amount owed to the reporting entity should be recognized as a dividend; and (3) waivers or modifications to 'amounts charged' in transactions involving services provided between related parties should be reassessed to determine that the fair and reasonable standards requirement continues to be met. These modifications also clarify that if the transaction is with a parent or other stockholder and the charge for services has been fully waived the guidance in SSAP No. 72, *Surplus and Quasi-Reorganization*, for recognition as contributed capital (forgiveness of a reporting entity obligation) or as a dividend (forgiveness of amount owed to the reporting entity) should be applied. The Company has adopted these modifications.

***b. 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.

## 4. *Fair value of financial instruments*

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

| | December 31, 2018 | | | | |
|---|---|---|---|---|---|
| | Carrying Value | Fair Value | Level 1 | Level 2 | Level 3 |
| | (In Millions) | | | | |
| Financial assets: | | | | | |
| Bonds: | | | | | |
| U. S. government and agencies | $ 39 | $ 39 | $ - | $ 39 | $ - |
| Industrial and miscellaneous | 311 | 307 | - | 306 | 1 |
| Parent, subsidiaries and affiliates | 6 | 6 | - | 6 | - |
| Mortgage loans - residential | 3 | 3 | - | - | 3 |
| Cash, cash equivalents and short-term investments | 24 | 24 | (1) | 25 | - |
| Separate account assets | 4,356 | 4,344 | 913 | 3,419 | 12 |
| Financial liabilities: | | | | | |
| Individual annuity contracts | 3 | 2 | - | - | 2 |
| Supplementary contracts | 15 | 15 | - | - | 15 |

| | December 31, 2017 | | | | |
|---|---|---|---|---|---|
| | Carrying Value | Fair Value | Level 1 | Level 2 | Level 3 |
| | (In Millions) | | | | |
| Financial assets: | | | | | |
| Bonds: | | | | | |
| U. S. government and agencies | $ 40 | $ 40 | $ - | $ 40 | $ - |
| Industrial and miscellaneous | 265 | 269 | - | 268 | 1 |
| Parent, subsidiaries and affiliates | 7 | 7 | - | 7 | - |
| Mortgage loans - residential | 3 | 3 | - | - | 3 |
| Cash, cash equivalents and short-term investments | 55 | 55 | (3) | 58 | - |
| Separate account assets | 4,465 | 4,477 | 1,044 | 3,419 | 14 |
| Financial liabilities: | | | | | |
| Individual annuity contracts | 3 | 2 | - | - | 2 |
| Supplementary contracts | 13 | 13 | - | - | 13 |

Fair value is defined as the price that would be received from selling an asset or paid to transfer a liability in an orderly transaction between market participants at the measurement date. The authoritative guidance for fair value establishes a measurement framework that includes a hierarchy used to classify the inputs used in measuring fair value. The hierarchy prioritizes the inputs to valuation techniques into three levels. Each level reflects a unique description of the inputs that are significant to the fair value measurements. The levels of the fair value hierarchy are as follows:

Level 1 – Observable inputs in the form of quoted prices for identical instruments in active markets.

Level 2 – Observable inputs other than Level 1 prices, such as quoted prices for similar assets or liabilities, quoted prices in markets that are not active or other inputs that are observable or can be derived from observable market data for substantially the full term of the assets or liabilities.

Level 3 – One or more unobservable inputs that are supported by little or no market activity and are significant to the fair value of the assets or liabilities. Level 3 assets and liabilities include financial instruments whose value is determined using internal models, as well as instruments for which the determination of fair value requires significant management judgment or estimation.

When available, the Company generally uses unadjusted quoted market prices from independent sources to determine the fair value of investments and classifies such items within Level 1 of the fair value hierarchy. If quoted prices are not available, prices are derived from observable market data for similar assets in an active market or obtained directly from brokers for identical assets traded in inactive markets. Investments that are priced using these inputs are classified within Level 2 of the fair value hierarchy. When some of the necessary observable inputs are unavailable, fair value is based upon internally developed models. These models use inputs not directly observable or correlated with observable market data. Typical inputs, which are integrated in the Company's internal discounted cash flow models and discounted earnings models include, but are not limited to, issuer spreads derived from internal credit ratings and benchmark yields such as London Inter-Bank Offered Rate (LIBOR), cash flow estimates and earnings before interest, taxes, depreciation and amortization estimates. Investments that are priced with such unobservable inputs are classified within Level 3 of the fair value hierarchy.

The Company has established and maintains policies and guidelines that govern its valuation methodologies and their consistent application. These policies and guidelines address the use of inputs, price source hierarchies and provide controls around the valuation processes. These controls include appropriate review and analysis of prices against market activity or indicators for reasonableness, approval of price source changes, price overrides, methodology changes and classification of fair value hierarchy levels. The valuation policies and guidelines are reviewed and updated as appropriate.

Annually, the Company reviews the primary pricing vendor to validate that the inputs used in that vendor's pricing process are deemed to be market observable as defined above. While the Company was not provided access to proprietary models of the vendor, the reviews have included on-site walk-throughs of the pricing process, methodologies and control procedures for each asset class and level for which prices are provided. The review also included an examination of the underlying inputs and assumptions for a sample of individual securities across asset classes. In addition, the Company and its pricing vendors have an established challenge process in place for all security valuations, which facilitates identification and resolution of prices that fall outside expected ranges. The Company believes that the prices received from the pricing vendors are representative of prices that would be received to sell the assets at the applicable measurement date (exit prices) and are classified appropriately in the hierarchy.

The Company reviews the fair value hierarchy classifications at each reporting period. Overall, reclassifications between levels occur when there are changes in the observability of inputs and market activity used in the valuation of a financial asset or liability. Such reclassifications are reported as transfers between levels at the beginning fair value for the reporting period in which the changes occur. Given the types of assets classified as Level 1, transfers between Level 1 and Level 2 measurement categories are expected to be infrequent.

The fair value of individual annuity and supplementary contracts is determined using one of several methods based on the specific contract type. For short-term contracts, generally less than 30 days, the fair value is assumed to be the book value. For investment-type contracts, the fair value is determined by calculating the present value of future cash flows discounted at current market interest rates, the risk-free rate or a current pricing yield curve based on pricing assumptions using assets of a comparable corporate bond quality. Annuities are valued using cash flow projections from the Company's asset-liability management analysis.

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: | | | | |
| Separate account assets | $ 913 | $ 2,321 | $ - | $ 3,234 |

$1,122 million of book value separate account assets are not carried at fair value and therefore, are not included in this table.

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

| | December 31, 2017 | | | |
|---|---|---|---|---|
| | Level 1 | Level 2 | Level 3 | Total |
| | (In Millions) | | | |
| Financial assets: | | | | |
| Separate account assets | $ 1,044 | $ 2,312 | $ - | $ 3,356 |

$1,109 million of book value separate account assets are not carried at fair value and, therefore, are not included in this table.

For the year ended December 31, 2017, there were no significant transfers between Level 1 and Level 2.

*Valuation Techniques and Inputs*

The Company determines the fair value of its investments using primarily the market approach or the income approach. The use of quoted prices for identical assets and matrix pricing or other similar techniques are examples of market approaches, while the use of discounted cash flow methodologies is an example of the income approach. The Company attempts to maximize the use of observable inputs and minimize the use of unobservable inputs in selecting whether the market or the income approach is used.

A description of the significant valuation techniques and inputs to the determination of estimated fair value for the more significant asset and liability classes measured at fair value on a recurring basis and categorized within Level 2 and Level 3 of the fair value hierarchy is as follows:

*Separate account assets* - These assets primarily include bonds (industrial and miscellaneous; U.S. government and agencies) and derivatives. Their fair values are determined as follows:

> *Bonds (Industrial and miscellaneous)* - These securities are principally valued using the market or the income approaches. Level 2 valuations are based primarily on quoted prices in markets that are not active, broker quotes, matrix pricing or other similar techniques that use standard market observable inputs such as benchmark yields, spreads versus benchmark yields, new issuances, issuer ratings, duration, and trades of identical or comparable securities. Privately placed securities are valued using discounted cash flow models using standard market observable inputs, and inputs derived from, or corroborated by, market observable data including market yield curve, duration, call provisions, observable prices and spreads for similar publicly traded or privately traded issues that incorporate the credit quality and industry sector of the issuer. This level also includes securities priced by independent pricing services that use observable inputs. Valuations based on matrix pricing or other similar techniques that utilize significant unobservable inputs or inputs that cannot be derived principally from, or corroborated by, observable market data, including adjustments for illiquidity, delta spread adjustments or spreads to reflect industry trends or specific credit−related issues are classified as Level 3. In addition, inputs including quoted prices for identical or similar securities that are less liquid and based on lower levels of trading activity than securities classified in Level 2 are classified as Level 3.
>
> *Bonds (U.S. government and agencies)* - These securities are principally valued using the market approach. Level 2 valuations are based primarily on quoted prices in markets that are not active, or using matrix pricing or other similar techniques using standard market observable inputs such as the benchmark U.S. Treasury yield curve, the spreads versus the U.S. Treasury yield curve for the identical security and comparable securities that are actively traded.
>
> *Derivative assets and liabilities* - These financial instruments are primarily valued using the market approach. The estimated fair value of derivatives is based primarily on quotations obtained from counterparties and independent sources, such as quoted market values received from brokers. These quotations are compared to internally derived prices and a price challenge is lodged with the counterparties and an independent source when a significant difference cannot be explained by appropriate adjustments to the internal model. When quoted market values are not reliable or available, the value is based upon an internal valuation process using market observable inputs that other market participants would use. Significant inputs to the valuation of derivative financial instruments include overnight index swaps and LIBOR basis curves, interest rate volatility, swap yield curve, currency spot rates, cross currency basis curves and dividend yields. Due to the observability of the significant inputs to these fair value measurements, they are classified as Level 2.

The use of different assumptions or valuation methodologies may have a material impact on the estimated fair value amounts. For the periods presented, there were no significant changes to the Company's valuation techniques.

## 5. *Investments*

The Company maintains a diversified investment portfolio. Investment policies limit concentration in any asset class, geographic region, industry group, economic characteristic, investment quality or individual investment.

### *a. Bonds*

The carrying value and fair value of bonds were as follows:

| | December 31, 2018 | | | |
|---|---|---|---|---|
| | Carrying Value | Gross Unrealized Gains | Gross Unrealized Losses | Fair Value |
| | (In Millions) | | | |
| U.S. government and agencies | $ 39 | $ - | $ - | $ 39 |
| Industrial and miscellaneous | 311 | 2 | 6 | 307 |
| Parent, subsidiaries and affiliates | 6 | - | - | 6 |
| Total | $ 356 | $ 2 | $ 6 | $ 352 |

| | December 31, 2017 | | | |
|---|---|---|---|---|
| | Carrying Value | Gross Unrealized Gains | Gross Unrealized Losses | Fair Value |
| | (In Millions) | | | |
| U.S. government and agencies | $ 40 | $ - | $ - | $ 40 |
| Industrial and miscellaneous | 265 | 6 | 2 | 269 |
| Parent, subsidiaries and affiliates | 7 | - | - | 7 |
| Total | $ 312 | $ 6 | $ 2 | $ 316 |

The quality of the bond portfolio is determined by the use of SVO ratings and the equivalent rating agency designations, except for RMBS and CMBS that use outside modelers. The following sets forth the NAIC class ratings for the bond portfolio including RMBS and CMBS:

| | | December 31, | | | |
|---|---|---|---|---|---|
| | | 2018 | | 2017 | |
| NAIC Class | Equivalent Rating Agency Designation | Carrying Value | % of Total | Carrying Value | % of Total |
| | | ($ In Millions) | | | |
| 1 | Aaa/ Aa/ A | $ 246 | 69 % | $ 226 | 72 % |
| 2 | Baa | 106 | 30 | 81 | 26 |
| 3 | Ba | 1 | - | 2 | 1 |
| 4 | B | 3 | 1 | 3 | 1 |
| 5 | Caa and lower | - | - | - | - |
| 6 | In or near default | - | - | - | - |
| | Total | $ 356 | 100 % | $ 312 | 100 % |

The following summarizes NAIC ratings for RMBS and CMBS subject to NAIC modeling:

| | December 31, | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 2018 | | | | 2017 | | | |
| | RMBS | | CMBS | | RMBS | | CMBS | |
| NAIC Class | Carrying Value | % of Total | Carrying Value | % of Total | Carrying Value | % of Total | Carrying Value | % of Total |
| | ($ In Millions) | | | | | | | |
| 1 | $ 2 | 100 % | $ 92 | 98 % | $ 3 | 100 % | $ 95 | 100 % |
| 2 | - | - | 2 | 2 | - | - | - | - |
| | $ 2 | 100 % | $ 94 | 100 % | $ 3 | 100 % | $ 95 | 100 % |

The following is a summary of the carrying value and fair value of bonds as of December 31, 2018 by contractual maturity. Expected maturities may differ from contractual maturities because issuers may have the right to call or prepay obligations with or without prepayment penalties. Securities with more than one maturity date are included in the table using the final maturity date.

| | Carrying Value | Fair Value |
|---|---|---|
| | (In Millions) | |
| Due in one year or less | $ 7 | $ 7 |
| Due after one year through five years | 73 | 73 |
| Due after five years through ten years | 154 | 152 |
| Due after ten years | 122 | 120 |
| Total | $ 356 | $ 352 |

Sales proceeds and related gross realized capital gains (losses) from bonds were as follows:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| Proceeds from sales | $ 5 | $ 5 | $ 24 |

Gross realized capital gains (losses) from sales were less than $1 million for the years ended December 31, 2018, 2017 and 2016.

The following is a summary of the fair values and gross unrealized losses aggregated by bond category and length of time that the securities were in a continuous unrealized loss position:

| | December 31, 2018 | | | | | |
|---|---|---|---|---|---|---|
| | Less Than 12 Months | | | 12 Months or Longer | | |
| | Fair Value | Unrealized Losses | Number of Issuers | Fair Value | Unrealized Losses | Number of Issuers |
| | ($ In Millions) | | | | | |
| Industrial and miscellaneous | $ 103 | $ 2 | 143 | $ 99 | $ 4 | 107 |

| | December 31, 2017 | | | | | |
|---|---|---|---|---|---|---|
| | Less Than 12 Months | | | 12 Months or Longer | | |
| | Fair Value | Unrealized Losses | Number of Issuers | Fair Value | Unrealized Losses | Number of Issuers |
| | ($ In Millions) | | | | | |
| Industrial and miscellaneous | $ 46 | $ 1 | 48 | $ 35 | $ 1 | 48 |

As of December 31, 2018 and 2017, management has not deemed these unrealized losses to be other than temporary because the investment's carrying value is expected to be realized and the Company has the ability and intent not to sell these investments until recovery, which may be at maturity.

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 $97 million. Securities in an unrealized loss position for less than 12 months had a fair value of $31 million and unrealized losses of less than $1 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $66 million and unrealized losses of $3 million. These securities were categorized as industrial and miscellaneous.

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 $65 million. Securities in an unrealized loss position for less than 12 months had a fair value of $37 million and unrealized losses of less than $1 million. Securities in an unrealized loss position for greater than 12 months had a fair value of $28 million and unrealized losses of $1 million. These securities were categorized as industrial and miscellaneous.

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 years ended December 31, 2018 or 2017, that were reacquired within 30 days of the sale date.

The Company had assets on deposit with government authorities or trustees, as required by law, in the amount of $4 million as of December 31, 2018 and 2017.

*Residential mortgage-backed exposure*

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

As of December 31, 2018, RMBS had a total carrying value of $2 million and a fair value of $3 million, of which approximately 37%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $2 million and a fair value of $2 million. As of December 31, 2017, RMBS had a total carrying value of $3 million and a fair value of $3 million, of which approximately 39%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of $3 million and a fair value of $3 million.

During the year ended December 31, 2018, there were no significant credit downgrades for the securities held by the Company that were backed by residential mortgage pools.

*Leveraged loan exposure*

Leveraged loans are loans extended to companies that already have considerable amounts of debt. The Company reports leveraged loans as bonds. These leveraged loans have interest rates higher than typical loans, reflecting the additional risk of default from issuers with high debt-to-equity ratios.

As of December 31, 2018, total leveraged loans and leveraged loan CDOs had a carrying value of $18 million and a fair value of $18 million, all of which were domestic leveraged loans and CDOs. As of December 31, 2017, total leveraged loans and leveraged loan CDOs had a carrying value of $39 million and a fair value of $40 million, all of which were domestic leveraged loans and CDOs.

*Commercial mortgage-backed exposure*

The Company holds bonds backed by pools of commercial mortgages. The mortgages in these pools have varying risk characteristics related to underlying collateral type, borrower's risk profile and ability to refinance and the return provided to the borrower from the underlying collateral. These investments had a carrying value of $94 million and fair value of $92 million as of December 31, 2018 and a carrying value of $95 million and fair value of $95 million as of December 31, 2017.

***b. Mortgage loans***

Mortgage loans comprised primarily seasoned pools of homogeneous residential mortgage loans substantially backed by Federal Housing Administration (FHA) and Veterans Administration (VA) guarantees. As of December 31, 2018 and 2017, the Company did not have any direct subprime exposure through the purchases of unsecuritized whole-loan pools.

Geographical concentration is considered prior to the purchase of residential mortgage loan pools. The mortgage loan portfolio is diverse with no significant collateral concentrations in any particular geographic region as of December 31, 2018 or 2017.

The carrying and fair values of the Company’s residential mortgage loans were $3 million as of December 31, 2018 and $3 million as of December 31, 2017.

The Company uses an internal rating system as its primary method of monitoring credit quality. The residential mortgage loan portfolio translated into the equivalent rating agency designation of AAA/AA/A and had carrying values of $3 million as of December 31, 2018 and $3 million as of December 31, 2017.

Interest rates, including fixed and variable, on the Company's portfolio of mortgage loans were:

| | December 31, | | | |
|---|---|---|---|---|
| | 2018 | | 2017 | |
| | Low | High | Low | High |
| Residential mortgage loans | 3.0 % | 6.5 % | 3.9 % | 7.0 % |

The Company did not purchase any residential mortgage loans during the years ended December 31, 2018 and 2017.

The Company did not hold any impaired residential mortgage loans and had no valuation allowances recorded as of December 31, 2018, 2017 or 2016. The Company did not hold any restructured residential mortgage loans or residential mortgage loans with principal or interest past due as of December 31, 2018 or 2017.

### *c. Net investment income*

Net investment income comprised the following:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| Bonds | $ 13 | $ 12 | $ 9 |
| Policy loans | 5 | 5 | 5 |
| Cash, cash equivalents and short-term investments | 1 | 1 | - |
| Other | (1) | - | - |
| Subtotal investment income | 18 | 18 | 14 |
| Investment expenses | (1) | - | - |
| Net investment income | $ 17 | $ 18 | $ 14 |

### *d. Net realized capital gains (losses)*

Net realized capital gains after tax and transfer to the IMR were less than $1 million for the years ended December 31, 2018, 2017 and 2016.

The IMR liability balance was less than $1 million as of December 31, 2018 and 2017 and was included in other liabilities on the Statutory Statements of Financial Position. Refer to *Note 2o. "Interest maintenance reserve"* for information on the Company's policy for IMR.

For the years ended December 31, 2018, 2017 and 2016, the Company recognized less than $1 million for each year, of OTTI on structured and loan-backed securities, primarily due to the present value of expected cash flows being less than the amortized cost.

The remaining OTTI amounts were determined using external inputs such as publicly observable fair values and credit ratings. Refer *to Note 2s. "Realized capital gains (losses) including other-than-temporary impairments and unrealized capital gains (losses)"* for more information on assumptions and inputs used in the Company's OTTI models.

Refer to *Note 17. "Impairment listing for loan-backed and structured securities"* for a CUSIP level list of impaired structured securities where the present value of cash flows expected to be collected is less than the amortized cost basis.

## 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. The Act contains several key provisions that have significant financial statement effects in both the current and prior reporting periods. Effective January 1, 2018, the Act reduces the corporate tax rate to 21 percent, eliminates the corporate alternative minimum tax, increases the capitalization rates for determining deferred acquisitions costs and extends the amortization period, modifies the life company proration rules, reduces the dividends received deduction applicable to corporate shareholders, and modifies the net operating loss deduction applicable to corporate taxpayers. The Act also changed the method for computing deductions for life insurance reserves in 2017.

As a result of the reduction of the corporate tax rate to 21 percent, the Company remeasured its net admitted deferred taxes as of the enactment date and recognized a decrease in surplus of $1 million in 2017. Of the $1 million net decrease, $7 million was reflected in the change in other deferred income taxes, offset by an increase of $6 million reflected in change in nonadmitted assets.

Effective January 1, 2018, the Act increased the capitalization rates for determining specified policy acquisition expenses. The provision increases the capitalization rate for annuity contracts from 1.75 percent to 2.09 percent, the rate for group life insurance contracts from 2.05 percent to 2.45 percent, and the rate for all other specified insurance contracts from 7.7 percent to 9.2 percent. This provision extends the amortization period for capitalized deferred acquisition costs (DAC) to 180 months from 120 months. A transition rule allows capitalized DAC as of December 31, 2017 to continue to be amortized over 10-years.

Effective January 1, 2018, the Act modified the life company proration rules by defining the company’s share as 70 percent and the policyholders’ share as 30 percent for purposes of the dividends received deduction and tax-exempt interest income.

Effective January 1, 2018, the Act reduced the dividends received deduction applicable to corporate shareholders for the 70 percent deductions to 50 percent, and for the 80 percent deduction to 65 percent. The 100 percent dividends received deduction remains in effect for dividends from affiliate group members.

The Act modifies the deduction for NOLs and imposes the general corporate regime on life insurers. Under prior law, NOLs generally had a carry back period of two years (three years in the case of a life insurance company) and a carryforward period of 20 years (15 years in the case of a life insurance company). The Act eliminates the carry back period and makes the carryforward period indefinite. The amount of the NOL deduction allowed is limited to 80 percent of taxable income computed without regard to the NOL deduction. This provision applies to NOLs arising in taxable years beginning after December 31, 2017.

The Act revised the computation of life insurance tax reserves to be the greater of the net surrender value of a contract and 92.81 percent of statutory reserves. The revised reserve computation is effective for taxable years beginning after December 31, 2017. A transition rule requires life insurers to spread the difference between the prior year end reserves computed on the old basis and those computed on the new basis over eight years as either income or a deduction. For the year ended December 31, 2017, the Company recorded an estimated provision for this change by recognizing a net $1 million decrease in its DTA associated with the increase in tax reserves, offset by a corresponding increase to a new DTA which represents future tax deductions that will be amortized over the eight year transition period. The Company adjusted this provisional amount for year ended December 31, 2018 by recognizing a deminimis increase in its DTA, offset by a corresponding decrease in the new DTA. This new DTA of less than $1 million will be amortized over eight years. In addition, the Company recognized a deminimis tax benefit included in the tax expense reported on the Statutory Statement of Operations to reflect the first year’s amortization of the eight-year transition rule.

The Company provides for DTAs in accordance with statutory accounting practices, and has met the required threshold to utilize the three-year reversal period and 15% of surplus limitation.

The net DTA or deferred tax liability (DTL) recognized in the Company's assets, liabilities and surplus is as follows:

| | December 31, 2018 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Gross DTAs | $ 5 | $ - | $ 5 |
| Statutory valuation allowance adjustment | - | - | - |
| Adjusted gross DTAs | 5 | - | 5 |
| DTAs nonadmitted | (3) | - | (3) |
| Subtotal net admitted DTA | 2 | - | 2 |
| Total gross DTLs | - | (2) | (2) |
| Net admitted DTA(L) | $ 2 | $ (2) | $ - |

| | December 31, 2017 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Gross DTAs | $ 12 | $ - | $ 12 |
| Statutory valuation allowance adjustment | - | - | - |
| Adjusted gross DTAs | 12 | - | 12 |
| DTAs nonadmitted | (8) | - | (8) |
| Subtotal net admitted DTA | 4 | - | 4 |
| Total gross DTLs | (1) | (1) | (2) |
| Net admitted DTA(L) | $ 3 | $ (1) | $ 2 |

| | Change | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Gross DTAs | $ (7) | $ - | $ (7) |
| Statutory valuation allowance adjustment | - | - | - |
| Adjusted gross DTAs | (7) | - | (7) |
| DTAs nonadmitted | 5 | - | 5 |
| Subtotal net admitted DTA | (2) | - | (2) |
| Total gross DTLs | 1 | (1) | - |
| Net admitted DTA(L) | $ (1) | $ (1) | $ (2) |

| | December 31, 2018 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Admitted DTA 3 years: | | | |
| Federal income taxes that can be recovered | $ - | $ - | $ - |
| Remaining adjusted gross DTAs expected to be realized within 3 years (lesser of 1 or 2): | | | |
| 1. Adjusted gross DTA to be realized | - | - | - |
| 2. Adjusted gross DTA allowed per limitation threshold | 46 | - | 46 |
| Lesser of lines 1 or 2 | - | - | - |
| Adjusted gross DTAs offset by existing DTLs | 2 | - | 2 |
| Total admitted DTA realized within 3 years | $ 2 | $ - | $ 2 |

| | December 31, 2017 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Admitted DTA 3 years: | | | |
| Federal income taxes that can be recovered | $ - | $ - | $ - |
| Remaining adjusted gross DTAs expected to be realized within 3 years | | | |
| 1. Adjusted gross DTA to be realized | 2 | - | 2 |
| 2. Adjusted gross DTA allowed per limitation threshold | 43 | - | 43 |
| Lesser of lines 1 or 2 | 2 | - | 2 |
| Adjusted gross DTAs offset by existing DTLs | 2 | - | 2 |
| Total admitted DTA realized within 3 years | $ 4 | $ - | $ 4 |

| | Change | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (In Millions) | | |
| Admitted DTA 3 years: | | | |
| Federal income taxes that can be recovered | $ - | $ - | $ - |
| Remaining adjusted gross DTAs expected to be realized within 3 years | | | |
| 1. Adjusted gross DTA to be realized | (2) | - | (2) |
| 2. Adjusted gross DTA allowed per limitation threshold | 3 | - | 3 |
| Lesser of lines 1 or 2 | (2) | - | (2) |
| Adjusted gross DTAs offset by existing DTLs | - | - | - |
| Total admitted DTA realized within 3 years | $ (2) | $ - | $ (2) |

Effective January 1, 2018, the Act eliminates the ability to carryback net operating losses, therefore the amount of adjusted gross DTA admitted based on recoverable federal taxes is limited only to capital DTAs.

The Company's total realization threshold limitations are as follows:

| | December 31, 2018 | December 31, 2017 |
|---|---|---|
| | ($ In Millions) | |
| Ratio percentage used to determine recovery period and threshold limitation | 12,234% | 11,571% |
| Amount of adjusted capital and surplus used to determine recovery period and threshold limitation above | $ 306 | $ 291 |

The ultimate realization of DTAs depends on the generation of future taxable income during the periods in which the temporary differences are deductible. Management considers the scheduled reversal of DTLs, including the impact of available carryback and carryforward periods, projected taxable income and tax-planning strategies in making this assessment. The impact of tax-planning strategies is as follows:

| | December 31, 2018 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (Percent) | | |
| Impact of tax planning strategies: | | | |
| Adjusted gross DTAs (% of total adjusted gross DTAs) | - % | - % | - % |
| Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs) | 100 % | - % | 100 % |

| | December 31, 2017 | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (Percent) | | |
| Impact of tax planning strategies: | | | |
| Adjusted gross DTAs (% of total adjusted gross DTAs) | - % | - % | - % |
| Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs) | 22 % | - % | 22 % |

| | Change | | |
|---|---|---|---|
| | Ordinary | Capital | Total |
| | (Percent) | | |
| Impact of tax planning strategies: | | | |
| Adjusted gross DTAs (% of total adjusted gross DTAs) | - % | - % | - % |
| Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs) | 78 % | - % | 78 % |

There are no reinsurance strategies included in the Company's tax-planning.

The provision for current tax expense on earnings is as follows:

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| Federal income tax expense (benefit) on operating earnings | $ 3 | $ (3) | $ 26 |
| Foreign income tax expense on operating earnings | - | - | - |
| Total federal and foreign income tax expense (benefit) on operating earnings | 3 | (3) | 26 |
| Federal income tax expense on net realized capital gains (losses) | - | - | - |
| Total federal and foreign income tax expense (benefit) | $ 3 | $ (3) | $ 26 |

The tax effects of temporary differences that give rise to significant portions of the DTAs and DTLs are as follows:

| | December 31, 2018 | 2017 | Change |
|---|---|---|---|
| | (In Millions) | | |
| DTAs: | | | |
| Ordinary | | | |
| Policy acquisition costs | $ 4 | $ 4 | $ - |
| Reserve items | 1 | 1 | - |
| Other | - | 7 | (7) |
| Total ordinary DTAs | 5 | 12 | (7) |
| Nonadmitted DTAs | (3) | (8) | 5 |
| Admitted ordinary DTAs | 2 | 4 | (2) |
| Capital | | | |
| Admitted DTAs | 2 | 4 | (2) |
| DTLs: | | | |
| Capital | | | |
| Investment items | 2 | 2 | - |
| Total capital DTLs | 2 | 2 | - |
| Total DTLs | 2 | 2 | - |
| Net admitted DTA | $ - | $ 2 | $ (2) |

The change in net deferred income taxes comprised the following:

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| Net DTA(L) | $ (7) | $ (10) | $ 12 |
| Less: Items not recorded in the change in net deferred income taxes: | | | |
| Change in net deferred income taxes | $ (7) | $ (10) | $ 12 |

The change in net deferred income taxes in 2017 includes a decrease of $7 million due to the remeasurement of net DTA(L).

As of December 31, 2018, the Company had no net operating or capital loss carryforwards to include in deferred income taxes. The Company has no tax credit carryforwards included in deferred taxes.

The components of federal and foreign income tax are recorded in the Statutory Statements of Operations and the Statutory Statements of Changes in Shareholder's Equity and are different from those which would be obtained by applying the prevailing federal income tax rate to net gain from operations before federal income taxes. The significant items causing this difference are as follows:

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| | 21% | 35% | 35% |
| Provision computed at statutory rate | $ 4 | $ 4 | $ 16 |
| Investment items | (1) | (4) | (2) |
| Corporate rate reduction | - | 7 | - |
| Change in tax treatment of a prior year reinsurance transaction | 7 | - | - |
| Total statutory income tax expense | $ 10 | $ 7 | $ 14 |
| | | | |
| Federal and foreign income tax expense (benefit) | $ 3 | $ (3) | $ 26 |
| Change in net deferred income taxes | 7 | 10 | (12) |
| Total statutory income tax expense | $ 10 | $ 7 | $ 14 |

The Company paid federal income taxes of $3 million in 2018, $19 million in 2017 and $4 million in 2016.

The Company is included in a consolidated U.S. federal income tax return with its parent, MassMutual, a mutual life insurance company domiciled in the Commonwealth of Massachusetts, and MassMutual's eligible U.S. subsidiaries. The Company also files income tax returns in various states and foreign jurisdictions. The Company, MassMutual and MassMutual's eligible subsidiaries and certain affiliates (the Parties) have executed and are subject to a written tax allocation agreement (the Agreement). The Agreement sets forth the manner in which the total combined federal income tax is allocated among the Parties. The Agreement provides the Company with the enforceable right to recoup federal income taxes paid in prior years in the event of future net capital losses, which it may incur. Further, the Agreement provides the Company with the enforceable right to utilize its net losses carried forward as an offset to future net income subject to federal income taxes.

Companies are generally required to disclose unrecognized tax benefits, which are the tax effect of positions taken on their tax returns that may be challenged by various taxing authorities, in order to provide users of financial statements more information regarding potential liabilities. The Company recognizes tax benefits and related reserves in accordance with existing statutory accounting practices for liabilities, contingencies and impairments of assets. As of December 31, 2018, the Company had no liabilities for unrecognized tax benefits.

The Internal Revenue Service (IRS) has completed its examination of the tax returns filed for years 2013 and prior. The IRS commenced its exam of years 2014-2016 in September 2017. The adjustments resulting from these examinations are not expected to materially affect the financial position or liquidity of the Company.

As of December 31, 2018 and 2017, the Company did not recognize any protective deposits as admitted assets.

## 7. *Deferred and uncollected life insurance premium*

Deferred and uncollected life insurance premium, net of loading and reinsurance, are included in insurance amounts receivable in the Company's Statutory Statements of Financial Position.

The Company had \$2.5 million of ordinary renewal as of December 31, 2018 and had \$2.7 million as of December 31, 2017. As of December 31, 2018 and 2017, the Company had less than \$1 million of group life, on both a gross and net of loading and reinsurance basis, for deferred and uncollected life insurance premium and annuity considerations.

Deferred premium is the portion of the annual premium not earned at the reporting date. Loading on deferred premium is an amount obtained by subtracting the valuation net deferred premium from the gross deferred premium and generally includes allowances for acquisition costs and other expenses. Refer to *Note 2k. "Policyholders' reserves"* for information on the Company's accounting policies regarding gross premium and net premium.

Uncollected premium is gross premium net of reinsurance that is due and unpaid as of the reporting date, net of loading. Net premium is the amount used in the calculation of reserves. The change in deferred and uncollected life insurance premium is included in premium income. The change in loading is included as an expense and is not shown as a reduction to premium income.

Ordinary new business and ordinary renewal business consist of the basic amount of premium required on the underlying life insurance policies.

## 8. *Policyholders' liabilities*

### a. *Policyholders' reserves*

The Company had life insurance in force of \$11,534 million as of December 31, 2018 and \$11,926 million as of December 31, 2017.

The following summarizes policyholders' reserves, net of reinsurance, and the range of interest rates by type of product:

| | December 31, | | | |
|---|---|---|---|---|
| | 2018 | | 2017 | |
| | Amount | Interest Rates | Amount | Interest Rates |
| | ($ In Millions) | | | |
| Variable life | $ 140 | 4.0% - 5.5% | $ 137 | 3.0% - 5.5% |
| Individual annuities | 4 | 5.0% - 7.3% | 4 | 5.0% - 7.3% |
| Total | $ 144 | | $ 141 | |

***b. Liabilities for deposit-type contracts***

Supplementary contracts not involving life contingencies of $15 million as of December 31, 2018 and $13 million as of December 31, 2017 were included in liabilities for deposit-type contracts. The interest rates on supplementary contracts ranged from 0.3% to 3.0% as of December 31, 2018 and 2017.

***c. Additional liability for annuity contracts***

Certain variable annuity contracts include additional death benefit features. Election of these benefits is generally only available at contract issue.

The following shows the liabilities for GMDBs (in millions):

| | | |
|---|---|---|
| Liability as of January 1, 2017 | $ | 1 |
| Incurred guarantee benefits | | - |
| Paid guarantee benefits | | - |
| Liability as of December 31, 2017 | | 1 |
| Incurred guarantee benefits | | - |
| Paid guarantee benefits | | - |
| Liability as of December 31, 2018 | $ | 1 |

The Company held reserves in accordance with the standard scenario as of December 31, 2018 and 2017.

The following summarizes the account values, net amount at risk and weighted average attained age for variable annuity contracts with GMDBs 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.

| | December 31, 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 | $ 35 | $ 6 | 72 | $ 44 | $ 6 | 72 |

Account values of variable annuity contracts with GMDBs are summarized below:

| | December 31, 2018 | December 31, 2017 |
|---|---|---|
| | (In Millions) | |
| Separate account | $ 33 | $ 42 |
| General account | 2 | 2 |
| Total | $ 35 | $ 44 |

## *9. Reinsurance*

The Company enters into reinsurance agreements with affiliated and unaffiliated insurers in the normal course of business in order to mitigate the impact of underwriting mortality and morbidity risks. Such transfers do not relieve the Company of its primary liability to its customers and, as such, failure of reinsurers to honor their obligations could result in credit losses that could arise if a reinsurer defaults. The Company reduces reinsurance default risk by evaluating the financial condition of reinsurers and monitoring for possible concentrations within the Company's reinsurers and using trust structures, when appropriate. The Company reinsures a portion of its mortality risk in its life business under either a first dollar quota-share arrangement or an in excess of the retention limit arrangement with reinsurers. The amounts reinsured are on a yearly renewable term or Modco basis. The Company's highest retention limit for new issues of life policies ranges from $15 million to $25 million.

Refer to *Note 14. "Related party transactions"* for information about the Company's affiliated ceded reinsurance transactions.

The Company did not reinsure any policies with a company chartered in a country other than the U.S., excluding U.S. branches of these companies, which was owned in excess of 10% or controlled directly or indirectly by an insured, a beneficiary, a creditor or any other person not primarily engaged in the insurance business. There are no reinsurance agreements in effect under which the reinsurer may unilaterally cancel any reinsurance for reasons other than for nonpayment of premium or other similar credits. The Company has no reinsurance agreements in effect such that the amount of losses paid or accrued through the statement date may result in a payment to the reinsurer of amounts which, in aggregate and allowing for offset of mutual credits from other reinsurance agreements with the same reinsurer, exceed the total direct premium collected under the reinsured policies.

If all reinsurance agreements were terminated by either party as of December 31, 2018, the resulting reduction in surplus due to loss of reinsurance reserve credits, net of unearned premium, would be approximately $11 million assuming no return of the assets backing these reserves from the reinsurer to the Company.

Reinsurance amounts included in the Statutory Statements of Operations were as follows:

| | Years Ended December 31, 2018 | 2017 | 2016 |
|---|---|---|---|
| | (In Millions) | | |
| Direct premium | $ 30 | $ 38 | $ 34 |
| Premium ceded | (29) | (36) | (140) |
| Total net premium | $ 1 | $ 2 | $ (106) |
| Ceded reinsurance recoveries | $ 37 | $ 42 | $ 25 |

Reinsurance amounts included in the Statutory Statements of Financial Position were as follows:

| | December 31, 2018 | 2017 |
|---|---|---|
| | (In Millions) | |
| Reinsurance reserves ceded | $ (21) | $ (22) |
| Ceded amounts recoverable | 11 | 19 |

Effective December 31, 2016, the Company entered into a reinsurance agreement with an authorized third-party to reinsure approximately 100% of certain of the Company's inforce variable life policies. Under the terms of the agreement, the Company received approximately $56 million of consideration from the reinsurer. The variable life policies are reinsured on a Modco basis. Under the terms of the agreement, the Company will maintain responsibility for servicing the policies. The Company ceded premium of $122 million and recorded a $36 million increase in the Statutory Statements of Changes in Surplus in conjunction with this agreement.

As of December 31, 2018, one reinsurer accounted for 50% of the outstanding balance of the unaffiliated reinsurance recoverable and the next largest reinsurer had 24%. Overall, the Company believes that each of these exposures to a single reinsurer does not create an undue concentration of risk and the Company's business is not substantially dependent upon any single reinsurer.

## *10. Withdrawal characteristics*

### *a. Annuity actuarial reserves and liabilities for deposit-type contracts*

The withdrawal characteristics of the Company's annuity actuarial reserves and deposit-type contracts as of December 31, 2018 are illustrated below.

| | General Account | Separate Account w/ Guarantees | Separate Account Nonguaranteed | Total | % of Total |
|---|---|---|---|---|---|
| | ($ In Millions) | | | | |
| Subject to discretionary withdrawal: | | | | | |
| With fair value adjustment | $ 2 | $ - | $ - | $ 2 | 4 % |
| At fair value | - | - | 33 | 33 | 65 |
| Subtotal | $ 2 | $ - | $ 33 | $ 35 | 69 % |
| Subject to discretionary withdrawal: | | | | | |
| At book value without fair value adjustment | 15 | - | - | 15 | 30 |
| Not subject to discretionary withdrawal | 1 | - | - | 1 | 1 |
| Total | $ 18 | $ - | $ 33 | $ 51 | 100 % |

The following is a summary of total annuity actuarial reserves and liabilities for deposit-type contracts as of December 31, 2018 (in millions):

| | |
|---|---|
| Statutory Statements of Financial Position: | |
| Policyholders' reserves – individual annuities | $ 3 |
| Liabilities for deposit-type contracts | 15 |
| Subtotal | 18 |
| Separate Account Annual Statement: | |
| Annuities | 33 |
| Total | $ 51 |

### *b. Separate accounts*

The Company has guaranteed separate accounts classified as nonindexed to fund a long-term interest guarantee in excess of a year that does not exceed 4% rate of return. The Company has nonguaranteed separate accounts which are variable accounts where the benefit is determined by the performance and/or market value of the investments held in the separate account with incidental risk, notional expense and minimum death benefit guarantees.

Information regarding the separate accounts of the Company as of and for the year ended December 31, 2018 is as follows:

| | Guaranteed Nonindexed Less Than/ Equal to 4% | Non Guaranteed | Total |
|---|---|---|---|
| | (In Millions) | | |
| Net premium, considerations or deposits for the year ended December 31, 2018 | $ - | $ 31 | $ 31 |
| Reserves at December 31, 2018: | | | |
| For accounts with assets at: | | | |
| Fair value | $ - | $ 3,213 | $ 3,213 |
| Amortized cost/book value | 1,129 | - | 1,129 |
| Subtotal | 1,129 | 3,213 | 4,342 |
| Non policy liabilities | 2 | 12 | 14 |
| Total | $ 1,131 | $ 3,225 | $ 4,356 |
| Reserves by withdrawal characteristics: | | | |
| Subject to discretionary withdrawal: | | | |
| At fair value | $ - | $ 3,213 | $ 3,213 |
| At book value without market value adjustment and current surrender charge of less than 5% | 1,129 | - | 1,129 |
| Subtotal | 1,129 | 3,213 | 4,342 |
| Non policy liabilities | 2 | 12 | 14 |
| Total | $ 1,131 | $ 3,225 | $ 4,356 |

The Company does not have any reserves in separate accounts for asset default risk in lieu of AVR. The Company has a general account AVR of $6 million for book value separate accounts.

The following is a reconciliation of amounts reported as transfers (from) to separate accounts in the Summary of Operations of the Company’s NAIC Separate Account Annual Statement to the amounts reported as net transfers (from) to separate accounts in change in policyholders’ reserves in the accompanying Statutory Statements of Operations:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| From the Separate Account Annual Statement: | | | |
| Transfers to separate accounts | $ 31 | $ 32 | $ 34 |
| Transfers from separate accounts | (90) | (76) | (70) |
| Net transfers from separate accounts | $ (59) | $ (44) | $ (36) |

## *11. Shareholder's equity*

MassMutual has authorized the contribution of funds to the Company sufficient to meet the capital requirements of each state in the U.S. in which the Company is licensed to do business. Substantially all of the statutory shareholder’s equity is subject to dividend restrictions. Dividend restrictions, imposed by state regulations, limit the payment of dividends to the shareholder without prior approval from the Department. Under these regulations, $31 million of shareholder’s equity is available for distribution to the shareholder in 2019 without prior regulatory approval. The Company did not pay a dividend to C.M. Life in 2018, 2017 or 2016.

## *12. Presentation of the 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 years ended December 31, 2018, 2017 and 2016. Accordingly, the Company has excluded these non-cash activities from the Statutory Statement of Cash Flows for the years ended December 31, 2018, 2017 and 2016.

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| Bond conversions and refinancing | $ 1 | $ 2 | $ 1 |

## *13. 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 and credit risk.

*Insurance and underwriting risks*

The Company prices its products based on estimated benefit payments reflecting assumptions with respect to mortality, 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. The Company reinsures certain life 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 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.

*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 capital 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. Market factors, including interest rates, credit spread, equity prices, 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.

The CMBS, RMBS and leveraged loan sectors are sensitive to evolving conditions that can impair the cash flows realized by investors and is subject to uncertainty. Management's judgment regarding OTTI and estimated fair value depends upon the evolving investment sector and economic conditions. It can also be affected by the market liquidity, a lack of which can make it difficult to obtain accurate market prices for RMBS and other investments, including CMBS and leveraged loans. Any deterioration in economic fundamentals, especially related to the housing sector could affect management's judgment regarding OTTI.

The Company has investments in structured products exposed primarily to the credit risk of corporate bank loans, corporate bonds or credit default swap contracts referencing corporate credit risk. Most of these structured investments are backed by corporate loans and are commonly known as collateralized loan obligations that are classified as CDO. The portfolios backing these investments are actively managed and diversified by industry and individual issuer concentrations. Due to the complex nature of CDO and the reduced level of transparency to the underlying collateral pools for many market participants, the recovery in CDO valuations generally lags the overall recovery in the underlying assets. Management believes its scenario analysis approach, based primarily on actual collateral data and forward looking assumptions, does capture the credit and most other risks in each pool. However, in a rapidly changing economic environment, the credit and other risks in each collateral pool will be more volatile and actual credit performance of CDO may differ from the Company's assumptions.

The Company continuously monitors its investments and assesses their liquidity and financial viability; however, the existence of the factors described above, as well as other market factors, could negatively impact the market value of the Company's investments. If the Company sells its investments prior to maturity or market recovery, these investments may yield a return that is less than the Company otherwise would have been able to realize.

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, such as the ongoing volatility with respect to the European Union, may 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. Guaranty funds*

The Company is subject to state insurance guaranty fund laws. These laws assess insurance companies amounts to be used to pay benefits to policyholders and policy claimants of insolvent insurance companies. Many states allow these assessments to be credited against future premium taxes. The Company believes such assessments in excess of amounts accrued will not materially impact its financial position, results of operations or liquidity.

### *c. Litigation and regulatory matters*

In the normal course of business, the Company is involved in disputes, litigation and governmental or regulatory inquiries, administrative proceedings, examinations and investigations, both pending and threatened. These matters, if resolved adversely against the Company or settled, may result in monetary damages, fines and penalties or require changes in the Company's business practices. The resolution or settlement of these matters is inherently difficult to predict. Based upon the Company's assessment of these pending matters, the Company does not believe that the amount of any judgment, settlement or other action arising from any pending matter is likely to have a material adverse effect on the statement of financial position. However, an adverse outcome in certain matters could have a material adverse effect on the results of operations for the period in which such matter is resolved, or an accrual is determined to be required, on the financial statement financial position, or on our reputation.

The Company evaluates the need for accruals of loss contingencies for each matter. When a liability for a matter is probable and can be estimated, the Company accrues an estimate of the loss 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 December 31, 2018, the aggregate range of reasonably possible losses is not material.

## *14. Related party transactions*

Pursuant to a management agreement, MassMutual, for a fee, furnishes the Company, as required, operating facilities, human resources, computer software development and managerial services. Investment and administrative services are also provided to the Company pursuant to a management services agreement with MassMutual. While management believes that these fees are calculated on a reasonable basis, these fees may not necessarily be indicative of the costs that would have been incurred on a stand-alone basis.

The following table summarizes the transactions between the Company and the related parties:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| Fee income: | | | |
| Recordkeeping and other services | $ 1 | $ 1 | $ 1 |
| Investment advisory income | 2 | 2 | 2 |
| Fee expense: | | | |
| Management and service contracts and cost-sharing arrangements | 11 | 9 | 9 |

The Company reported less than $1 million as amounts due from affiliates as of December 31, 2018 and 2017. The Company reported 3 million as amounts due to affiliates as of December 31, 2018 and $1 million as of December 31, 2017. Terms generally require settlement of these amounts within 30 to 90 days.

The Company has a Modco quota-share reinsurance agreement with MassMutual where the Company cedes 100% of the premium on certain bank-owned life insurance policies. In return, MassMutual pays the Company a stipulated expense allowance, death and surrender benefits. The Company retains the assets and related reserves for payment of future benefits on the ceded policies. The Modco adjustment is the mechanism by which MassMutual funds the reserve on the reinsured portion of the risk. It is needed to adjust for the financial effect of the Company holding the reserves on the ceded coverage rather than MassMutual.

The Company also has a stop-loss agreement with MassMutual under which the Company cedes claims which, in aggregate, exceed 1.24% of the covered volume for any year, with maximum coverage of $25 million above the aggregate limit. The aggregate limit was $27 million in 2018, 2017 and 2016, and it was not exceeded in any of the years.

The Company has a quota-share reinsurance agreement with MassMutual in which MassMutual assumes specific plans of insurance on a yearly renewable term basis.

As of December 31, 2018, the net amounts due from MassMutual for the various reinsurance agreements were $16 million and as of December 31, 2017, the net amounts due from MassMutual were $23 million. These outstanding balances are due and payable with terms ranging from monthly to annually, depending on the agreement in effect.

The following summarizes the related party reinsurance transactions between the Company and MassMutual:

| | Years Ended December 31, | | |
|---|---|---|---|
| | 2018 | 2017 | 2016 |
| | (In Millions) | | |
| Premium expense ceded, related to: | | | |
| Quota-share reinsurance agreements | (5) | (6) | (7) |
| Modco adjustments ceded, | | | |
| included in fees and other expense | (12) | (14) | (9) |
| Expenses allowances on reinsurance ceded, | | | |
| included in fees and other expense, related to: | | | |
| Modco agreements | 6 | 6 | 6 |
| Policyholders' benefits ceded, related to: | | | |
| Modco agreements | 6 | 14 | 8 |
| Quota-share reinsurance agreements | 5 | 3 | 5 |
| Experience refunds (paid) received, related to: | | | |
| Modco agreements | 3 | (1) | - |

## *15. Subsequent events*

Management of the Company has evaluated subsequent events through February 23, 2019, the date the financial statements were available to be issued. No events have occurred subsequent to the date of the Statements of Financial Position and before the date of evaluation that would require disclosure.

## *16. Subsidiaries and affiliated companies*

A summary of ownership and relationship of MassMutual and its subsidiaries and affiliated companies as of December 31, 2018 is illustrated below. Subsidiaries are wholly owned, except as noted.

Subsidiaries of Massachusetts Mutual Life Insurance Company
C.M. Life Insurance Company
MML Mezzanine Investor L, LLC
Berkshire Way LLC
MML Special Situations Investor LLC
Timberland Forest Holding LLC
WP – SC, LLC – 81% (remaining 19% owned by C.M. Life Insurance Company)
MSP – SC, LLC
Country Club Office Plaza LLC – 88% (remaining 12% owned by C.M. Life Insurance Company)
Insurance Road LLC
MM Copper Hill Road LLC
Jefferies Finance LLC– 50% (remaining 50% owned by Jefferies Group, Inc.)
MassMutual Retirement Services, LLC
MML Distributors LLC – 99% (remaining 1% owned by MassMutual Holding LLC)
MML Investment Advisers, LLC
MML Mezzanine Investor, LLC
MML Strategic Distributors, LLC
The MassMutual Trust Company, FSB
MassMutual Asset Finance LLC
MassMutual Mortgage Lending LLC
MML Private Placement Investment Company I, LLC
MML Private Equity Fund Investor LLC
MM Private Equity Intercontinental LLC
MassMutual Holding LLC
MassMutual International, LLC
MML Management Corporation
MML Mezzanine Investor II, LLC
MML Mezzanine Investor III, LLC
MassMutual External Benefits Group LLC
EM Opportunities LLC

Subsidiaries of C.M. Life Insurance Company
MML Bay State Life Insurance Company
CML Mezzanine Investor, LLC
CML Mezzanine Investor L, LLC
CML Mezzanine Investor III, LLC
CML Special Situations Investor LLC

Subsidiaries of MML Bay State Life Insurance Company
(No subsidiaries)

## *17. Impairment listing for loan-backed and structured securities*

The following are the total cumulative adjustments and impairments for loan-backed and structured securities since July 1, 2009:

| Period Ended | Amortized Cost before Cumulative Adjustment | Cumulative Adjustment | Amortized Cost before OTTI | Projected Cash Flow | Recognized OTTI | Amortized Cost after OTTI | Fair Value |
|---|---|---|---|---|---|---|---|
| December 31, 2018 | $ 18,632 | $ - | $ 18,632 | $ 1,599 | $ (17,033) | $ 1,599 | $ 1,903 |
| December 31, 2017 | - | - | - | - | - | - | - |
| September 30, 2017 | - | - | - | - | - | - | - |
| June 30, 2017 | 342 | - | 342 | 267 | (76) | 267 | 2,967 |
| March 31, 2017 | 94,424 | - | 94,424 | 53,149 | (41,274) | 53,149 | 89,279 |
| December 31, 2016 | 110,964 | - | 110,964 | 109,147 | (1,816) | 109,147 | 104,908 |
| September 30, 2016 | 118,384 | - | 118,384 | 117,539 | (845) | 117,539 | 112,771 |
| June 30, 2016 | 76,837 | - | 76,837 | 70,385 | (6,452) | 70,385 | 72,517 |
| March 31, 2016 | - | - | - | - | - | - | - |
| December 31, 2015 | - | - | - | - | - | - | - |
| September 30, 2015 | 79,533 | - | 79,533 | 77,197 | (2,337) | 77,197 | 76,961 |
| June 30, 2015 | - | - | - | - | - | - | - |
| March 31, 2015 | - | - | - | - | - | - | - |
| December 31, 2014 | 7,387 | - | 7,387 | 5,752 | (1,635) | 5,752 | 24,010 |
| September 30, 2014 | - | - | - | - | - | - | - |
| June 30, 2014 | - | - | - | - | - | - | - |
| March 31, 2014 | 11,682 | - | 11,686 | 11,342 | (340) | 11,342 | 13,573 |
| December 31, 2013 | 8,955 | - | 8,955 | 7,967 | (989) | 7,967 | 11,477 |
| September 30, 2013 | 5,947 | - | 5,947 | 5,842 | (104) | 5,842 | 5,478 |
| June 30, 2013 | 456,120 | - | 456,120 | 445,397 | (10,723) | 445,397 | 340,977 |
| March 31, 2013 | - | - | - | - | - | - | - |
| December 31, 2012 | 1,242,596 | - | 1,242,596 | 1,144,981 | (97,615) | 1,144,981 | 1,195,405 |
| September 30, 2012 | 2,265,156 | - | 2,265,156 | 2,103,073 | (162,083) | 2,103,073 | 2,115,759 |
| June 30, 2012 | 1,884,018 | - | 1,884,018 | 1,845,692 | (38,325) | 1,845,692 | 1,521,643 |
| March 31, 2012 | 3,900,635 | - | 3,900,635 | 3,788,244 | (112,391) | 3,788,244 | 3,066,813 |
| December 31, 2011 | 3,900,658 | - | 3,900,658 | 3,740,566 | (160,092) | 3,740,566 | 3,217,415 |
| September 30, 2011 | 2,070,737 | - | 2,070,737 | 2,014,121 | (56,616) | 2,014,121 | 1,664,099 |
| June 30, 2011 | 4,933,708 | - | 4,933,708 | 4,626,546 | (307,162) | 4,626,546 | 3,860,445 |
| March 31, 2011 | 3,031,095 | - | 3,031,095 | 2,949,182 | (81,913) | 2,949,182 | 2,370,633 |
| December 31, 2010 | 2,843,613 | - | 2,843,613 | 2,795,486 | (48,127) | 2,795,486 | 2,189,661 |
| September 30, 2010 | 3,666,523 | - | 3,666,523 | 3,544,040 | (122,482) | 3,544,040 | 2,935,440 |
| June 30,2010 | 2,331,449 | - | 2,331,449 | 2,200,016 | (131,433) | 2,200,016 | 1,658,548 |
| March 31, 2010 | 3,606,733 | - | 3,606,733 | 3,269,444 | (337,290) | 3,269,444 | 2,259,717 |
| December 31, 2009 | 4,888,306 | - | 4,888,306 | 4,101,773 | (786,533) | 4,101,773 | 2,994,613 |
| September 30, 2009 | 10,338,099 | 207,960 | 10,546,059 | 9,768,287 | (777,772) | 9,768,287 | 6,661,983 |
| Totals | | $ 207,960 | | | $ (3,303,457) | | |

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2018:

| CUSIP | Amortized Cost before Cumulative Adjustment | Cumulative Adjustment | Amortized Cost before OTTI | Projected Cash Flow | Recognized OTTI | Amortized Cost after OTTI | Fair Value |
|---|---|---|---|---|---|---|---|
| 65106FAG7 | $ 18,632.20 | $ - | $ 18,632.20 | $ 1,598.92 | $ (17,033.28) | $ 1,598.92 | $ 1,903.22 |

There were no impairments on loan-backed or structured securities for the three months ended September 30, 2018.

There were no impairments on loan-backed or structured securities for the three months ended June 30, 2018.

There were no impairments on loan-backed or structured securities for the three months ended March 31, 2018.

There were no impairments on loan-backed or structured securities for the three months ended December 31, 2017.

There were no impairments on loan-backed or structured securities for the three months ended September 30, 2017.

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2017:

| CUSIP | Amortized Cost before Cumulative Adjustment | Cumulative Adjustment | Amortized Cost before OTTI | Projected Cash Flow | Recognized OTTI | Amortized Cost after OTTI | Fair Value |
|---|---|---|---|---|---|---|---|
| 86358RLG0 | $ 342.38 | $ - | $ 342.38 | $ 266.85 | $ (75.53) | $ 266.85 | $ 2,967.48 |

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2017:

| CUSIP | Amortized Cost before Cumulative Adjustment | Cumulative Adjustment | Amortized Cost before OTTI | Projected Cash Flow | Recognized OTTI | Amortized Cost after OTTI | Fair Value |
|---|---|---|---|---|---|---|---|
| 22541QJR4 | $ 7,034.17 | $ - | $ 7,034.17 | $ 33.78 | $ (7,000.39) | $ 33.78 | $ 4,334.02 |
| 86358RA23 | 87,389.56 | - | 87,389.56 | 53,115.66 | (34,273.90) | 53,115.66 | 84,944.86 |
| Totals | $ 94,423.73 | $ - | $ 94,423.73 | $ 53,149.44 | $ (41,274.29) | $ 53,149.44 | $ 89,278.88 |

## *18. Structured Notes*

A structured note is a direct debt issuance by a corporation, municipality, or government entity, ranking pari-passu with the issuer's other debt issuance of equal seniority where either: (a) the coupon and/or principal payments are linked, in whole or in part, to prices or payment streams from index or indices, or assets deriving their value from other than the issuer's credit quality, or (b) the coupon and/or principal payments are leveraged by a formula that is different from either a fixed coupon, or a non-leveraged floating rate coupon linked to an interest rate index, including but not limited to LIBOR or the prime rate. As structured notes are issuer obligations without a trust, they are within the scope of SSAP No. 26R, *Bonds*. Structured notes are different than the asset backed structured securities, which are accounted for under SSAP No. 43R, *Loan-Backed and Structured Securities*, as they lack either a trust or assets backing them. The disclosure below allows regulators to assess the volume of activity in structured notes and to determine whether additional accounting or reporting revisions, such as valuation and risk-based capital, are needed. To satisfy this request, the Company is required to separately identify structured notes, on a CUSIP basis and provide information by CUSIP for actual cost, fair value, book/adjusted carrying value, and whether the structured note is a mortgage-referenced security. The following sets forth the actual cost, fair value and carrying value of structured notes as of December 31, 2018:

| CUSIP Identification | Actual Cost | Fair Value | Book / Adjusted Carrying Value | Mortgage-Referenced Security (YES/NO) |
|---|---|---|---|---|
| 391164AF7 | $ 526,870 | $ 495,294 | $ 511,285 | NO |
| Total | $ 526,870 | $ 495,294 | $ 511,285 | XXX |