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INDEX FRONTIER® 5 ANNUITY
PROSPECTUS DATED MAY 1, 2025

The Index Frontier® 5 annuity is an Individual Index-linked Modified Single Premium Deferred Annuity (the "Contract") issued by MassMutual Ascend Life Insurance Company® ("MassMutual Ascend Life" or the "Company"). It provides that we will pay Annuity Payout Benefit payments to you in exchange for your Purchase Payments. The Contract is not available for new sales, and has not been offered for new sales since 2024. No additional Purchase Payments can be made. This prospectus describes the features, benefits and risks applicable to existing Contract owners.

The Contract is a modified single premium deferred annuity. You could only make Purchase Payments during the first two months after your Contract Effective Date.

A glossary of defined terms used herein can be found in the Special Terms section starting on page 4 of this prospectus.

The Contract is a complex investment and involves risk, including potential loss of principal and prior earnings. The Contract offers you the opportunity to allocate funds to Indexed Strategies for 1-year periods (a "Term") and a Declared Rate Strategy (together with the Indexed Strategies, the "Crediting Strategies"). Indexed Strategies provide returns based, in part, on the change in the value of a market Index or the share price of an exchange-traded fund (an "Index"). This Contract does not directly participate in any equity, debt, or other investments. The returns of an Index do not include reinvestment of any dividends.

The Contract currently offers four Conserve Strategies, four Growth Strategies, and one Buffer Strategy.

Each Indexed Strategy provides limited protection from negative Index returns. Any decrease in Index Value during a Term for a Conserve or Growth Strategy is subject to a lower limit called the Maximum Loss, also called a Floor. Any decrease in Index Value during a term for a Buffer strategy is limited to the amount of decrease that exceeds the Buffer.

At the end of a Term:

- **for a Conserve/0% Floor Strategy (a Strategy with a Maximum Loss of 0%), you cannot lose any of your original principal and prior earnings.**
- **for a Growth/-10% Floor Strategy (a Strategy with a Maximum Loss of 10%), you could lose up to 10% of your original principal and prior earnings.**
- **for a Buffer Strategy (a Strategy with a 10% Buffer), you could lose up to 90% of your original principal and prior earnings.**

The Buffer varies depending on the day of the Term. The Buffer at the end of a Term is 10%. Before the end of the Term, the Buffer is calculated daily as a prorated share of the annual 10% Buffer.

Any increase during a Term is subject to an upper limit called the Maximum Gain, also called a Cap, which limits the amount you can earn on an Indexed Strategy. The Maximum Gain can change from one Term to the next, but will never be lower than 1%.

We may stop offering any Indexed Strategy at the end of a Term. One Indexed Strategy will always be available. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%. Unlike a Declared Rate Strategy, no earnings are guaranteed for an Indexed Strategy.

Vested Gain or Loss. Each day of a Term, the value of an Indexed Strategy includes the Vested Gain or Loss, if any, since the start of that Term. Vested Gain or Loss is calculated on the remaining Investment Base for that Term. Before the end of a Term, if you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable, you will lock in an Indexed Strategy's Vested Gain or Loss.

The Vested Gain is the portion of any positive Index Change that we take into account when we calculate the increase in the Strategy value. The Vested Gain is equal to any positive Index Change since the start of the current Term (limited by the Maximum Gain for the Term) multiplied by a Vesting Factor. The Vesting Factor varies depending on the day of the Term. It is 25% for any date within the first half of a Term, 50% for any date within the second half of a Term but before the final Market Day of that Term, and 100% on or after the final Market Day of a Term. Before the final Market Day of a Term, the Vested Gain will always be less than the corresponding positive Index Change and will always be less than the Maximum Gain for a given Indexed Strategy.

The Vested Loss is equal to any negative Index Change since the start of the current Term (after taking into account either the Maximum Loss for each Term or the Buffer, as applicable). You could lose up to 10% of your investment in a Growth/-10% Floor Strategy due to the Vested Loss. Because the 10% Buffer in a Buffer Strategy is prorated, you could lose more than 90% of your investment in a Buffer Strategy. These losses will be greater if you also have to pay an Early Withdrawal Charge, taxes and, if before age 59½, you are subject to a penalty tax. **In extreme circumstances, because the Buffer is prorated over the Term, a Buffer strategy could have practically no value near the start of a Term due to the Vested Loss, meaning that you could lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.**

Declared Rate Strategy. The Declared Rate Strategy earns interest during a Term at a fixed rate we set before that Term begins. The fixed interest rate varies from Term to Term, but will never be less than 1%. Note: The Declared Rate Strategy is not available for Contracts that were issued in Missouri.

See "Appendix A: Investment Options Available Under the Contract" for additional information about each Crediting Strategy.

The Contract is not a short-term investment. The Contract and its Indexed Strategies are not appropriate for investors who plan to take withdrawals (including automated withdrawals and required minimum distributions) during the first five Contract Years or who plan to take withdrawals from Indexed Strategies before the end of a Term. Withdrawals could result in Early Withdrawal Charges and negative Contract adjustments. Withdrawals could result in taxes, and if you are under age 59½, a penalty tax.

If a Contract is purchased as a Tax-Qualified Contract, such as an Individual Retirement Annuity ("IRA"), it does not provide tax deferral benefits beyond those already provided under the Internal Revenue Code. Amounts withdrawn from the Contract may be taxable, and, if you are under age 59½, amounts you withdraw from the Contract may also be subject to a 10% federal tax, in addition to any other state and federal income tax payable. Investors should consult with their tax advisor for more information.

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All guarantees under the Contract are the obligations of MassMutual Ascend Life and are subject to the credit worthiness and claims-paying ability of MassMutual Ascend Life.

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The Contract is not insured by the FDIC (Federal Deposit Insurance Corporation) or the NCUSIF (National Credit Union Share Insurance Fund). Although the Contract may be sold through relationships with banks or other financial institutions, the Contract is not a deposit or obligation of, or guaranteed by, such institutions or any federal regulatory agency.

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NEITHER THE SECURITIES AND EXCHANGE COMMISSION NOR ANY STATE SECURITIES COMMISSION HAS APPROVED OR DISAPPROVED THESE SECURITIES OR PASSED UPON THE ADEQUACY OF THIS PROSPECTUS. ANY REPRESENTATION TO THE CONTRARY IS A CRIMINAL OFFENSE.

Additional Information about certain investment products, including index-linked annuities, has been prepared by the Securities and Exchange Commission and is available at Investor.gov.

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This prospectus is not an offering in any state, country, or jurisdiction in which we are not authorized to sell the Contract.

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SPECIAL TERMS

In this prospectus, the following capitalized terms have the meanings set out below.

ACCOUNT VALUE. The sum of the values of each Crediting Strategy, plus the value of the Purchase Payment Account, if any.

ANNUITANT. The natural person or persons on whose life Annuity Payout Benefit is based.

ANNUITY PAYOUT BENEFIT. A series of periodic payments made under a Payout Option. The terms and conditions are described in the Annuity Payout Benefit section of this prospectus.

ANNUITY PAYOUT INITIATION DATE. The first day of the first payment interval for which payment of an Annuity Payout Benefit is to be made.

BAILOUT RIGHT. A right to withdraw funds from an Indexed Strategy at the end of a Term without an Early Withdrawal Charge because the Maximum Gain set for the next Term is below the Bailout Trigger.

BAILOUT TRIGGER. The Maximum Gain for the next Term of an Indexed Strategy that triggers a waiver of Early Withdrawal Charges under the Bailout Right of an Indexed Strategy.

BENEFICIARY. A person entitled to receive all or part of a Death Benefit that is to be paid under the Contract on account of a death before the Annuity Payout Initiation Date.

BUFFER. The portion of a negative Index Change for a Term that is disregarded when determining a Vested Loss for a Buffer Strategy. The Buffer varies depending on the day of the Term. Once the final Market Day of the Term has been reached, the Buffer is 10%. Before the final Market Day, the Buffer is equal to: 10% x ((365 – N) / 365), where N is equal to the number of days remaining until the final Market Day of the Term.

CONTRACT. The legally binding agreement between you and MassMutual Ascend Life, including applicable endorsements and riders.

CONTRACT ANNIVERSARY. The date in each year that is the annual anniversary of the Contract Effective Date. That date is set out in your Contract Specifications.

CONTRACT EFFECTIVE DATE. The date as of which the initial Purchase Payment is applied to the Contract. That date is set out in your Contract Specifications.

CONTRACT SPECIFICATIONS. The section of your Contract that contains details unique to your Contract.

CONTRACT YEAR. A 12-month period that starts on the Contract Effective Date or on a Contract Anniversary.

CREDITING STRATEGY. A specified method by which interest or gain or loss is calculated for a Term. The Crediting Strategies that are currently available are set out on in **"Appendix A: Investment Options Available Under the Contract."**

DEATH BENEFIT. An amount that becomes payable if you die before the Annuity Payout Initiation Date and before the date that the Contract is Surrendered. The terms and conditions are described in the Death Benefit section of this prospectus.

DECLARED RATE. A fixed interest rate set by us for a Term of the Declared Rate Strategy.

DECLARED RATE STRATEGY. A Crediting Strategy that credits interest at a Declared Rate.

EARLY WITHDRAWAL CHARGE. A charge deducted from the Account Value of your Contract if, during the first five Contract Years, you Surrender your Contract or you take a withdrawal (including systematic withdrawals and required minimum distributions) in excess of the Free Withdrawal Allowance. The Early Withdrawal Charge does not apply to a withdrawal that qualifies for the Free Withdrawal Allowance or the amount, if any, that qualifies for another waiver. The Early Withdrawal Charge does not apply to an Annuity Payout Benefit or Death Benefit.

FREE WITHDRAWAL ALLOWANCE. The total amount that may be taken as a withdrawal or Surrendered during a Contract Year without an Early Withdrawal Charge that would otherwise apply. This amount is described in the Free Withdrawal Allowance section of this prospectus. Like any other withdrawal, an amount withdrawn that is covered by the Free Withdrawal Allowance will reduce the value of an Indexed Strategy on a dollar-for dollar basis, and will proportionally reduce the Investment Base of a Strategy.

INDEX. A stock market index or an exchange-traded fund.

INDEX CHANGE. The increase or decrease, if any, in the applicable Index Value over a Term of an Indexed Strategy.

INDEX VALUE. For Indexed Strategies that use the S&P 500 Index, the Index Value is the closing value of the Index. For Indexed Strategies that use the SPDR Gold Shares ETF, the iShares U.S. Real Estate ETF, or the iShares MSCI EAFE ETF, the Index Value is the fund's closing share price on the NYSE Arca.

INDEXED STRATEGY. A Crediting Strategy that provides a return based, in part, on changes in an Index Value.

INVESTMENT BASE. The amount applied to an Indexed Strategy at the start of a current Term. A withdrawal and any related Early Withdrawal Charge reduces the Investment Base proportionally to the reduction in the value of that Indexed Strategy due to the withdrawal or charge. For example, if a withdrawal reduces the value of an Indexed Strategy by 15%, then it will reduce the Investment Base of that Strategy by 15%.

MARKET CLOSE. The close of the regular or core trading session on the market used to measure a given Indexed Strategy.

MARKET DAY. Each day that all markets that are used to measure available Indexed Strategies are open for regular trading.

MASSMUTUAL ASCEND LIFE ("WE," "US," "OUR," "MMALIC"). MassMutual Ascend Life Insurance Company.

MAXIMUM GAIN. The largest positive Index Change for a Term that is taken into account to determine the Vested Gain for a given Indexed Strategy. We set the Maximum Gain for each Term of an Indexed Strategy before the first day of that Term. For a given Term, we may set a different Maximum Gain for amounts attributable to Purchase Payments received on different dates. The Maximum Gain can also be called a "Cap".

MAXIMUM LOSS. The most negative Index Change for a Term that is taken into account to determine a Vested Loss for a given Conserve Strategy or Growth Strategy. The Maximum Loss for a Growth Strategy is a loss of 10% and will apply to all Terms of that Growth Strategy. The Maximum Loss for a Conserve Strategy is 0% and will apply to all Terms of that Conserve Strategy. The Maximum Loss can also be called a "Floor".

OWNER ("YOU," "YOURS"). The person(s) who possesses the ownership rights under the Contract. If there is more than one Owner, each Owner will be a joint owner of the Contract and each reference to Owner means joint owners.

PAYOUT OPTION. The form in which an Annuity Payout Benefit or Death Benefit may be paid. Standard options are described in the Payout Options section of this prospectus.

PURCHASE PAYMENT. An amount received by us for the Contract. This amount is after the deduction of any fee charged by the person remitting payment and any taxes withheld from the payment.

PURCHASE PAYMENT ACCOUNT. An account where a Purchase Payment is held from the date it is applied to the Contract until the first Strategy Application Date on or after that date.

REQUEST IN GOOD ORDER. Information provided or a request made that is:

- complete and satisfactory to us;
- sent to us on our form or in a manner satisfactory to us, which may, at our discretion, be by telephone or electronic means; and
- received at our administrative office.

Information provided or a request made is complete and satisfactory when we have received: (1) all the information and legal documentation that we require to process the information or the request; and (2) instructions that are sufficiently clear that we do not need to exercise any discretion to process the information or the request. If you have any questions, you should contact us or your registered representative before submitting your request.

STRATEGY APPLICATION DATE. The 6th and 20th days of each month.

SURRENDER. The termination of your Contract in exchange for its Surrender Value.

SURRENDER VALUE. The Account Value minus the Early Withdrawal Charge that would apply on a Surrender of the Contract.

TAX-QUALIFIED CONTRACT. An annuity contract that is intended to qualify for special tax treatment for retirement savings. If your Contract is a Tax-Qualified Contract, the cover page of your Contract includes information about its tax qualification. If your Contract is not a Tax-Qualified Contract, the cover page of your Contract will identify it as a "Nonqualified Annuity."

TERM. The period for which Contract values are allocated to a given Crediting Strategy, and over which interest or gain or loss is calculated. Each Term is one year long, and will start and end on a Strategy Application Date. A new Term will start on the date that the preceding Term ends.

VESTED GAIN. The portion of any positive Index Change for the Term of an Indexed Strategy that is taken into account when determining the value of that Indexed Strategy. For any day of a Term, the Vested Gain is equal to: (1) any positive Index Change for the Term, but not exceeding the Maximum Gain set for that Term; multiplied by (2) the applicable Vesting Factor for that day; and then multiplied by (3) the remaining Investment Base for that Term.

VESTED LOSS. The portion of any negative Index Change for the Term of an Indexed Strategy that is taken into account when determining the value of that Indexed Strategy. For any day of a Term, the Vested Loss is equal to: (1) any negative Index Change for the Term, after taking into account either the Maximum Loss for each Term of that Indexed Strategy or the Buffer; multiplied by (2) the remaining Investment Base for that Term.

VESTING FACTOR. A factor used to determine a Vested Gain and Loss. Vesting Factors are described in the Vested Gains and Losses section of this prospectus.

OVERVIEW OF THE CONTRACT

Purpose

The MassMutual Ascend Life Index Frontier 5 annuity is an individual modified single premium deferred indexed annuity contract that may help you accumulate retirement savings. The Contract is intended for long-term investment purposes. The Contract is a legal agreement between you as the Owner and MassMutual Ascend Life as the issuing insurance company. In the Contract, in exchange for one or more Purchase Payments made to us, we agree to pay the Annuity Payout Benefit to you. If there is an applicable death before the Annuity Payout Initiation Date, we also agree to pay a Death Benefit. The Contract may be appropriate if you have a long-term investment horizon. It is not intended for people who may need to access invested funds within a short-term timeframe or frequently.

Like all deferred annuities, the Contract has two periods. During the **Accumulation Period** (the period prior to the Annuity Payout Initiation Date), the Contract may accumulate earnings on a tax-deferred basis. During the **Annuity Payout Period** that begins on the Annuity Payout Initiation Date, we will make payments under the applicable Payout Option.

The Contract was not available for sale in all states. The Contract may vary based on the state in which it was delivered. See Appendix D for state variations.

Accumulation Period

During the Accumulation Period, the amounts you contribute can be allocated among any of the then available Crediting Strategies, which include Indexed Strategies and the Declared Rate Strategy, and may accumulate earnings on a tax-deferred basis. **Additional information about each Crediting Strategy is available in "Appendix A: Investment Options Available Under the Contract".**

Indexed Strategies

The Company will credit gain or loss at the end of the Term to amounts allocated to an Indexed Strategy based, in part, on the performance of the Index. The Owner bears the risk of any gain or loss on amounts allocated to the Indexed Strategies and could lose a significant amount of money if the Index declines in value.

The Company limits the negative Index Change that is taken into account to determine the Vested Loss for an Indexed Strategy at the end of its Term through the use of a Maximum Loss or a Buffer. The Maximum Loss and Buffer are generally designed to limit the reduction in the value of the Indexed Strategies at the end of a Term.

- The **Maximum Loss** is the maximum percentage decrease in your Strategy value at the end of the Term if there is a negative Index change. The Maximum Loss can also be called a "Floor". An Indexed Strategy with a Maximum Loss of 10% limits the loss from any negative Index change to 10% when determining the Strategy value at the end of the Term. An Indexed Strategy with a Maximum Loss of 0% eliminates all loss from any negative Index change when determining the Strategy value at the end of the Term. For example, if the Index return over the Term is -18% and the Maximum Loss is 10%, the value of an Indexed Strategy with a 10% Maximum Loss will decrease by 10% for the Term (the maximum loss allowed under the Floor).
- A **Buffer** is the negative Index change to be disregarded when determining Strategy value at the end of the Term. An Indexed Strategy with a 10% Buffer means that at the end of a Term, your Strategy value will not be affected by the first 10% of any negative Index change, but your Strategy value will decrease by any negative return in excess of -10%. For example, if the Index return over the Term is -18% the value of an Indexed Strategy with a 10% Buffer will decrease by 8% for the Term (the amount that exceeds the Buffer). Before the end of the Term, the Buffer is calculated daily as a prorated share of the annual 10% Buffer

We may stop offering any Indexed Strategy at the end of a Term; however, we will always offer at least one Indexed Strategy. If the Declared Rate Strategy is no longer available, then we must offer a Conserve/0% Floor Indexed Strategy. Unlike a Declared Rate Strategy, no earnings are guaranteed for an Indexed Strategy.

Maximum Gain. The Company limits the positive Index return used in calculating gain for an Indexed Strategy at the end of its Term with the Maximum Gain. The Maximum Gain for an Indexed Strategy is the largest positive Index Change for a Term that is taken into account to determine the Vested Gain for that Indexed Strategy for that Term. The Maximum Gain can also be called a "Cap". The Maximum Gain is generally designed to limit the increase in the value of the Indexed Strategies at the end of a Term. For example, if the Maximum Gain for a Term is 5% and the Index Change at the end of that Term is positive 8%, then the Vested Gain for that Term is 5%. **For any Indexed Strategy, the Maximum Gain will vary from Term to Term, but will never be less than 1%.**

You may earn less than the Index returns with a Maximum Gain.

Declared Rate Strategy

Amounts held under the Declared Rate Strategy are credited with interest daily throughout a Term at a rate we set before that Term begins. This means the interest rate for the Declared Rate Strategy may change for each Term. Each Term of the Declared Rate Strategy is one year long. A Declared Rate may be as low as 1%, but will never be less than any higher guaranteed minimum interest rate set out in the Declared Rate Strategy endorsement to your Contract. The guaranteed minimum interest rate set out in the endorsement will never be less than the minimum interest rate required for fixed annuity contracts on the Contract Effective Date under the Standard Nonforfeiture Law of the state in which your Contract is issued. At least 10 days before the next Term starts, we will post the Declared Rate that will apply to the Declared Rate Strategy for that next Term on our website (www.massmutualascend.com).

Annuity Payout Period

The Annuity Payout Period begins when you annuitize your Contract effective on the Annuity Payout Initiation Date. When you annuitize your Contract, we promise to pay a stream of Annuity Payout Benefit payments for the duration of the period selected. Once Annuity Payout Benefit payments start, you can no longer Surrender the Contract or take a withdrawal, no Death Benefit will be payable under your Contract, your Beneficiary designations will no longer apply, and the Crediting Strategies will no longer be available. The amount payable after death, if any, is governed by the Payout Option you select.

Contract Features

Annuity Payout Benefit *(see "Annuity Payout Benefit" section on page 42 for more details)*

When the Contract is annuitized, we promise to pay a stream of Annuity Payout Benefit payments for the duration of the period selected.

Death Benefit *(See "Death Benefit" Section on page 44 for more details)*

For no additional cost, the Contract includes a Death Benefit. If you die before the Annuity Payout Initiation Date and before the Contract is Surrendered, we will pay a Death Benefit equal to the greater of (1) the Account Value determined as of the date that the Death Benefit value is determined; or (2) your total Purchase Payment(s) reduced proportionally for all withdrawals, but not including amounts applied to pay Early Withdrawal Charges.

Access to Your Money *(See "Cash Benefit" section on page 41 for more details)*

You may Surrender your Contract or take a withdrawal from your Contract at any time before the earlier of (1) the Annuity Payout Initiation Date; (2) a death for which the Death Benefit is payable; or (3) the Contract is Surrendered. The right to Surrender or take a withdrawal may be restricted if your Contract is purchased under an employer plan subject to IRC Section 401 (pension, profit sharing, and 401(k) plans), IRC Section 403(b) (tax-sheltered annuity plans), or IRC Section 457(b) (governmental deferred compensation plans).

During the first five Contract Years, an Early Withdrawal Charge will apply unless (a) your withdrawal qualifies for the Free Withdrawal Allowance; or (b) the withdrawal qualifies for a waiver (as explained in the "Early Withdrawal Charge – Early Withdrawal Charge Waiver" section); or (c) the withdrawal is taken under the Bailout Right as described below.

The amount paid upon Surrender is the Surrender Value. A withdrawal from an Indexed Strategy will reduce the Account Value by the amount of the withdrawal, including any taxes and any applicable Early Withdrawal Charge. If you Surrender your Contract or take a withdrawal from an Indexed Strategy on a day that is not the end of a Term, the Strategy value will be calculated using the Vested Gain or Vested Loss., which could result in significant loss.

A withdrawal from an Indexed Strategy will reduce the value of that Strategy on a dollar-for-dollar basis. A withdrawal from an Indexed Strategy during a Term will proportionally reduce the Investment Base used to calculate any subsequent Vested Gain or Loss in that Term.

A withdrawal will reduce the amount payable upon Surrender, applied to the Annuity Payout Benefit, or payable as the Death Benefit.
The amount withdrawn or paid on a Surrender is subject to income tax to the extent that it represents Contract earnings or pre-tax contributions. If received before age 59½, the taxable portion of a withdrawal may also be subject to an additional 10% federal penalty tax.

We will withdraw funds from your Account Value as of the date on which we receive your Request in Good Order or any later specified effective date. Unless you instruct us otherwise by a Request in Good Order prior to the date of the withdrawal, a withdrawal will be taken in the following order:

- first proportionally from funds that then qualify for a waiver of the Early Withdrawal Charge pursuant to the Bailout Right; and
- then proportionally from the Declared Rate Strategies having the shortest Term until the Declared Rate Strategies are exhausted; and
- then proportionally from Indexed Strategies having the shortest Term.

Free Withdrawal Allowance *(See "Free Withdrawal Allowance" section on page 24 for more details)*

The Early Withdrawal Charge does not apply to an amount equal to the Free Withdrawal Allowance. For the first Contract Year, the Free Withdrawal Allowance is an amount equal to 10% of the total Purchase Payments received by us. For each subsequent Contract Year, the Free Withdrawal Allowance is equal to 10% of the Account Value as of the most recent Contract Anniversary.

Bailout Right *(See "Early Withdrawal Charge" section on page 23 for more details)*

We will waive the Early Withdrawal Charge on an amount you withdraw if: (1) you withdraw it at the end of a Term from an Indexed Strategy; and (2) either the Maximum Gain for such Indexed Strategy for the next Term is less than the Bailout Trigger for the current Term, or such Indexed Strategy will not be available for the next Term. If the Bailout Right will apply at the end of a Term, we will notify you at least 30 days before the end of that Term.

Automated Withdrawals *(See "Automated Withdrawals" section on page 42 for more details)*

You may elect to withdraw money from your Contract under any automated withdrawal program that we offer. Your Account Value must be at least $10,000 in order to make an automated withdrawal election. The minimum amount of each automated withdrawal payment is $100. Automated withdrawals will be taken from the Purchase Payment Account and Indexed Strategies of your Contract in the same order as any other withdrawal. **The Contract is intended for long-term investment purposes and the Contract and its Indexed Strategies may not be appropriate for investors who plan to take withdrawals (including automated withdrawals and required minimum distributions) during the first five Contract Years because of the assessment of Early Withdrawal Charges, or who plan to take withdrawals during Indexed Strategy Terms because of the application of the Vesting Factor.**

Terminal Illness and Extended Care Waivers *(see "Early Withdrawal Charge Waivers" on page 24 for more details)*
In states where permitted, for no additional charge we will waive the Early Withdrawal Charge for all withdrawals and on Surrender of the Contract if the Annuitant or Owner is diagnosed with a terminal illness, as defined by the waiver, or is confined to a hospital or other long term care facility, and certain other conditions are met. Withdrawals or a Surrender under these waivers are still subject to adjustments for Vested Gain and Loss and taxes, and if before age 59½, a penalty tax.

Tax Treatment *(see "Federal Tax Considerations" section on page 53 for more details)*
Your Purchase Payments accumulate value on a tax-deferred basis. Your earnings are not taxed until money is withdrawn from the Contract, such as when you make a withdrawal or Surrender under your Contract, or receive an annuity payment from the Contract, or a death benefit is paid.

Adjustment for Vested Gain or Loss

Before the final Market Day of a Term, if you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable, you will be subject to a Contract adjustment that locks in an Indexed Strategy's Vested Gain or Loss. You could lose a significant amount of money due to this adjustment if amounts are removed from an Indexed Strategy prior to the end of a Term. You could lose up to 10% of your investment in a Growth/-10% Floor Strategy due to the Vested Loss. Because the 10% Buffer in a Buffer Strategy is prorated daily over the Term, you could lose more than 90% of your investment in a Buffer Strategy. This also means that if losses apply when amounts are removed from a Buffer Strategy, such losses would be higher earlier in the Term when a lower percentage of the prorated Buffer is applicable. These losses will be greater if you also have to pay an Early Withdrawal Charge, taxes and, if before age 59½, you are subject to a penalty tax. **In extreme circumstances, because the Buffer is prorated over the Term, a Buffer strategy could have practically no value near the start of a Term due to the Vested Loss, meaning that you could lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.**

IMPORTANT INFORMATION YOU SHOULD CONSIDER ABOUT THE CONTRACT

	FEES, EXPENSES AND ADJUSTMENTS	Location in Prospectus
Are There Charges or Adjustments for Early Withdrawals?	**Yes.** *Early Withdrawal Charge.* If you withdraw money from or Surrender your Contract within the first 5 Contract Years, you may be assessed an Early Withdrawal Charge of up to 8% of the amount withdrawn or Surrendered. For example, if you make a withdrawal from or Surrender your Contract within the first 5 Contract Years, you could pay an Early Withdrawal Charge of up to $8,000 on a Contract with an Account Value of $100,000.This loss will be greater if there is a Vested Loss, you also have to pay taxes and, if before age 59½, you are subject to a penalty tax. *Contract Adjustment for Vested Gain and Loss.* If before the end of a Term you take a withdrawal from an Indexed Strategy, Surrender or annuitize your Contract, or a Death Benefit becomes payable, you will be subject to an adjustment that locks in the Vested Gain or Loss. Any gain credited to the Strategy to be less than the Maximum Gain for the Strategy and the corresponding positive gain in the Index, and in the event of a Vested Loss, you will not receive the full protection of the Buffer applicable to a Buffer Strategy. This loss will be greater if you also have to pay an Early Withdrawal Charge, taxes and, if before age 59½, you are subject to a penalty tax. **In extreme circumstances, because the Buffer is prorated over the Term, a Buffer strategy could have practically no value near the start of a Term due to the Vested Loss, meaning that you could lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable. For example, if you allocate $100,000 to a Buffer Strategy with a 1-year Term and Surrender the Contract near the start of the Term, you could lose nearly all of your $100,000 investment.**	**FEE TABLE** **CHARGES AND ADJUSTMENTS** **VESTED GAINS AND LOSSES** **PRINCIPAL RISKS OF INVESTING IN THE CONTRACT**
Are There Transaction Charges?	**Yes.** In addition to Early Withdrawal Fees and adjustments for Vested Gain and Loss, we reserve the right to charge up to $30 annually if you elect to receive Automated Withdrawals. We do not currently charge for Automated Withdrawals.	**FEE TABLE** **CHARGES AND ADJUSTMENTS**
Are There Ongoing Fees and Expenses?	**Yes.** **There is an implicit ongoing fee on Indexed Strategies to the extent that your participation in Index gains is limited by the Company through the Maximum Gain set for an Indexed Strategy. This means that your returns may be lower than the Index's returns. In return for accepting this limit on Index gains, you will receive some protection from Index losses.** **There is also an implicit ongoing fee on Indexed Strategies to the extent that Vested Gain before the end of a Term is less than**	**INDEXED STRATEGIES** **APPENDIX A: INVESTMENT OPTIONS AVAILABLE UNDER THE CONTRACT**

100% of any positive Index Change (limited by the Maximum Gain). This means that before the end of the Term your returns will be lower than any positive Index returns. In return for accepting this Vesting Factor, you receive some benefit from positive Index Change before the end of the Term.

	RISKS	Location in Prospectus
Is There a Risk of Loss from Poor Performance?	**Yes.** You can lose money by investing in the Contract including loss of principal and previous earnings. **Under the Indexed Strategies,** t**he maximum amount of loss you may experience due to negative Index performance at the end of a Term would be: 90% loss for a 10% Buffer Strategy; 10% loss for a 10% Maximum Loss Strategy; or 0% loss for a 0% Maximum Loss Strategy. Because the 10% Buffer is prorated over the Term, before the end of the Term the risk of loss is greater than 90% for a 10% Buffer Strategy, and is nearly 100% at the start of the Term. We may discontinue offering Indexed Strategies with a Buffer or Maximum Loss, but one Indexed Strategy will always be available. If the Declared Rate Strategy is no longer available, then we must offer at least one Conserve/0% Floor.**	**PRINCIPAL RISKS OF INVESTING IN THE CONTRACT**
Is this a Short-Term Investment?	**No.** The Contract is not a short-term investment and is not appropriate for an investor who needs ready access to cash. • Amounts withdrawn from the Contract may result in Early Withdrawal Charges and taxes and, if before age 59 ½, may be subject to a penalty tax. • Amounts removed from an Indexed Strategy before the end of a Term before will be subject to an adjustment that locks in the existing Vested Gain or Loss. Due to the Vesting Factors that we use to calculate Vested Gains, increase in the value of an Indexed Strategy before the final Market Day of a Term will be less than the corresponding positive Index Change. Because the Buffer in a Buffer Strategy is prorated daily, in the event of a Vested Loss, you will not receive the full protection of the Buffer and when amounts are removed from an Indexed Strategy, such losses would be higher earlier in the Term when a lower percentage of the prorated Buffer is applicable. **In extreme circumstances a Buffer strategy could have practically no value near the start of a Term due to the Vested Loss, meaning that you could lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.** • Withdrawals from an Indexed Strategy before the end of a Term will proportionally reduce the Investment Base for the Indexed Strategy and this proportional reduction could be larger than the dollar amount of the withdrawal. • At the end of a Term, ending values of the Strategies for that Term will be reallocated according to your instructions. If you do not	**PRINCIPAL RISKS OF INVESTING IN THE CONTRACT** **CHARGES AND ADJUSTMENTS** **STRATEGY RENEWAL AND REALLOCATIONS AT TERM END**

	RISKS	Location in Prospectus
	send us a reallocation request, your current allocations will automatically continue in the new Term as long as the same Indexed Strategies are available. If an amount cannot be applied to a new Term of that same Indexed Strategy because the Strategy will not be available or because the amount is under the minimum or over the maximum for that Strategy, we will reallocate that amount to another Crediting Strategy as described in the Strategy Renewal and Reallocations at Term End section of this prospectus.	
What Are the Risks Associated with the Investment Options?	An investment in the Contract is subject to the risk of poor investment performance and can vary depending on the performance of the Indexed Strategies available under the Contract. Each Indexed Strategy will have its own unique risks. You should review the Indexed Strategies before making an investment decision. The Maximum Gain will limit positive Index returns (e.g., limited upside). **You may earn less than the Index returns with the Maximum Gain.** • The gain for a Term of an Indexed Strategy is limited to the Maximum Gain. For example, if the Index return over the Term is 16% and the Maximum Gain for the Strategy is 10%, the gain for the Term is limited to 10%. The Maximum Loss or Buffer will limit negative Index returns (e.g., limited protection in the case of market decline). • The loss for a Term of an Indexed Strategy with a **Maximum Loss** is limited to the Maximum Loss percentage. For example, if the Index return over the Term is -18% and the Maximum Loss is 10%, the loss for the Term is limited to 10% (the maximum loss). • The loss for a Term of an Indexed Strategy with a **Buffer** is limited to the portion of the loss which exceeds the Buffer. For example, if the Index return over the Term is -18% and the Buffer is 10%, the loss for the Term is limited to 8% (the amount that exceeds the Buffer). If a withdrawal is taken from a Buffer Strategy before the end of the Term, the Buffer is prorated. For example, if the Buffer is 10% and a withdrawal is taken 90 days into the 1-year Term, the Buffer is 10% x (90/365) = 2.46.% Each Index is a "price return index," not a "total return index," and therefore does not reflect the dividends paid on the securities composing the Index. This will reduce the Index return for those Indexes and will cause their Index returns to underperform a direct investment in the securities composing the Index. We set a Declared Rate for each new Term of the Declared Rate Strategy. The Declared Rate may be as low as 1%, but will never be less than any higher minimum set out in the Declared Rate Strategy endorsement to your Contract. You risk the possibility that the Declared Rate for a new Term may be lower than you would find acceptable.	**PRINCIPAL RISKS OF INVESTING IN THE CONTRACT** **INDEXED STRATEGIES** **DECLARED RATE STRATEGY**
What Are the Risks Related to the Insurance Company?	An investment in the Contract is subject to the risks related to the Company. Any obligations (including obligations under the Indexed Strategies), guarantees, or benefits are subject to the claims paying ability of the Company. Additional information about the Company, including its financial strength ratings, is available upon request by calling 1-800-789-6771.	**PRINCIPAL RISKS OF INVESTING IN THE CONTRACT**

	RESTRICTIONS	Location in Prospectus
Are There Limits on the Investment Options?	**Yes.** **Purchase Payments.** • Additional Purchase Payments after the Initial Purchase Payment were only permitted during the Purchase Payment period, which ended two months after the Contract Effective Date. The Purchase Payment period for your Contract has closed, and no additional Purchase Payments are permitted. **Transfers and Reallocations.** • You cannot reallocate your value among Crediting Strategies during a Term. **Our right to change the Indexed Strategies or Indexes** • At the end of a Term, we may stop offering any Indexed Strategy at our discretion. We may limit the availability of a Strategy for a Term that would extend beyond the Annuity Payout Initiation Date. All Strategies may not be available in all states. One Indexed Strategy will always be available. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%. • For each future Term, we may modify the Maximum Gain for any Indexed Strategy. The Maximum Gain for a new Term of an Indexed Strategy may be lower than its Maximum Gain for the current Term and may be as low as 1%. You risk the possibility that the Maximum Gain for a new Term may be lower than you would find acceptable. • Currently, there are no limitations on the amounts that may be applied to a Crediting Strategy. For future Terms, we may impose minimum or maximum allocations on a given Crediting Strategy. • We have the right to replace an Index if it is discontinued or we are no longer able to use it, its calculation changes substantially, or we determine that hedging instruments are difficult to acquire or the cost of hedging becomes excessive. We may do so at the end of a Term or during a Term. If we replace an Index during a Term, we will calculate Vested Gains and Losses using the old Index up until the replacement date. After the replacement date, we will calculate Vested Gains and Losses using the new Index. The performance of the new Index may not be as good as the performance of the old Index. As a result, funds allocated to an Indexed Strategy may earn a return that is lower than the return they would have earned if there had been no replacement.	**PURCHASING THE CONTRACT** **INITIAL STRATEGY SELECTIONS** **STRATEGY RENEWAL AND REALLOCATIONS AT TERM END** **INDEX REPLACEMENT**

	RESTRICTIONS	Location in Prospectus
Are There Restrictions on Contract Benefits?	**Yes.** • A withdrawal must be at least $500 and cannot reduce the Account Value to less than the Minimum Required Value set out in the Contract Specifications section of your Contract. • An annuitization cannot occur before the first Contract Anniversary. An annuitization for a fixed period cannot be for less than the Minimum Fixed Period Payout set out in the Contract Specifications section of your Contract. Payment amounts under any option must be at least $50 or such higher amount as we may set from time to time. • A withdrawal will reduce the amount payable upon Surrender, applied to the Annuity Payout Benefit, or payable as the Death Benefit. In addition, a withdrawal will proportionally reduce the Purchase Payment base used to determine the minimum Death Benefit and this proportional reduction could be larger than the dollar amount of the withdrawal.	**CASH BENEFIT** **ANNUITY PAYOUT BENEFIT** **DEATH BENEFIT**

	TAXES	Location in Prospectus
What Are the Contract's Tax Implications?	You should consult with a tax professional to determine the tax implications of an investment in and Purchase Payments received under the Contract. There is no additional tax benefit to you if the Contract is purchased through a tax-qualified plan or individual retirement account (IRA). Generally, withdrawals will be subject to ordinary income tax, and if before age 59½, may be subject to a penalty tax.	**FEDERAL TAX CONSIDERATIONS**

	CONFLICTS OF INTEREST	Location in Prospectus
How Are Investment Professionals Compensated?	Although the Contracts are no longer offered for new sales, some investment professionals that sold the Contracts may still receive compensation for selling the Contract to you. The compensation is typically paid as a commission calculated as a percentage of the Purchase Payments received for a Contract. These investment professionals may have a financial incentive to offer or recommend the Contract over another investment.	**DISTRIBUTION OF THE CONTRACTS**
Should I Exchange My Contract?	Some investment professionals may have a financial incentive to offer you a new contract in place of the one you already own. You should only exchange your existing contract if you determine, after comparing the features, fees, and risks of both contracts, and any fees or penalties to terminate the existing contract, that it is preferable for you to purchase the new contract rather than continue to own your existing contract.	**DISTRIBUTION OF THE CONTRACTS**

FEE TABLE

The following tables describe the fees, expenses and adjustments that you will pay when you buy, own, Surrender, or take a withdrawal from a Crediting Strategy. Please refer to the Contract Specifications section of your Contract for information about the specific fees you will pay each year based on the options you have elected.

The first table describes the fees and expenses you will pay at the time that you Surrender or make withdrawals from a Crediting Strategy. State premium taxes may also be deducted.

Transaction Expenses	**Maximum**
Automated Withdrawals	$30 annually
Early Withdrawal Charge (as a percentage of amount withdrawn or Surrendered) (1)	8.00%

(1) The Early Withdrawal Charge is calculated as a percentage of the amount withdrawn plus any amount needed to cover the Early Withdrawal Fee. If you Surrender your Contract, the amount subject to the Early Withdrawal Charge is your Account Value. We may waive the Early Withdrawal Charge under certain circumstances. **See the Charges and Adjustments section of this prospectus for more information about the Early Withdrawal Charge and the circumstances in which it may be waived.** The charge decreases to zero after 5 years according to the following schedule:

Contract Year	1	2	3	4	5	6+
Early Withdrawal Charge Rate	8%	7%	6%	5%	4%	0%

The next table describes the adjustments, in addition to any transaction expenses, that apply if all or a portion of the Account Value is removed from an Indexed Strategy before the expiration of Term.

Contract Adjustments (2)	
Adjustment for Vested Gain or Loss Maximum Potential Loss for Conserve Strategy (as a percentage of Strategy value at the start of the Term)…………………………….……..	0%
Adjustment for Vested Gain or Loss Maximum Potential Loss for Growth Strategy (as a percentage of Strategy value at the start of the Term)…………………………….……..	10%
Adjustment for Vested Gain or Loss Maximum Potential Loss for Buffer Strategy (as a percentage of Strategy value at the start of the Term) (3)…………………………..………	100%

(2) An adjustment for Vested Gain or Loss will apply if, before the final Market Day of a Term, you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.

(3) The Buffer in a Buffer Strategy is prorated daily over a Term, and provides almost no protection against loss if, near the start of a Term, you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.

In addition to the charges described above, the Maximum Gain may limit the amount you can earn on the Indexed Strategies. This means your returns may be lower than the Index's returns. In return for accepting this limit on Index gains, you will receive some protection from Index losses.

PRINCIPAL RISKS OF INVESTING IN THE CONTRACT

The Contract involves certain risks that you should understand before purchasing it. You should carefully consider your income needs and risk tolerance to determine whether the Contract or a particular Crediting Strategy is appropriate for you. The level of risk you bear and your potential investment performance will differ depending on the Crediting Strategies you choose.

Market Risk

There is a risk of loss of principal and prior earnings due to negative performance of an Index if you allocate your Account Value to an Indexed Strategy. Such a loss may be significant. **This risk exists for each Growth Strategy because, at the end of a Term, you agree to absorb any loss in the Index during the Term up to the Maximum Loss of 10%. This risk exists for each Buffer Strategy because, at the end of a Term, you agree to absorb any loss in the Index that exceeds the Buffer. This risk of loss does not exist if you allocate your Account Value to the Declared Rate Strategy or to a Conserve/0% Floor Strategy. If you allocate money to a Growth Strategy, you may lose up to 10% at the end of each Term. If you allocate money to a Growth Strategy over multiple Terms, you may lose up to 10% each Term, which may result in a cumulative loss that is greater than 10%. If you allocate money to a Buffer Strategy, you may lose up to 90% at the end of each Term. If**

you allocate money to a Buffer Strategy and withdraw it before the end of the Term, because the Buffer is prorated over the Term, you may lose more than 90% because the Buffer is less than 10% until the end of the Term. If you allocate money to a Buffer Strategy over multiple Terms, you may lose up to 90% at the end of each Term, which may result in a cumulative loss that is greater than 90%.

One Indexed Strategy will always be available. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%. At the end of a Term, we may stop offering any other Indexed Strategy. Consequently, any other Indexed Strategy described in this prospectus may not be available for future Terms. We have the right to replace the Index associated with an Indexed Strategy under certain circumstances.

The risk of loss of principal will be greater if you allocate money to a Strategy with a more negative Maximum Loss, or less of a Buffer If you choose to Surrender the Contract because of changes in the number and/or type of available Indexed Strategies, your Surrender may be subject to Early Withdrawal Charges, adjustments for Vested Gain or Loss, taxes, and if before age 59½, a penalty tax. If you purchase another annuity contract, it may have different features, fees, and risks than this Contract.

Early Withdrawal Risk

Long-Term Nature of Contract

The Contract is a deferred annuity, which means the Annuity Payout Benefit will begin on a future date. The contract is unsuitable as a short-term savings vehicle. We designed the Contract to be a long-term investment that you can use to help build a retirement nest egg and provide income for retirement. The limitations and charges included in the Contract reflect its long-term nature.

The Contract and its Crediting Strategies may not be appropriate for investors who plan to take withdrawals (including automated withdrawals and required minimum distributions) during the first five Contract Years, because of the assessment of Early Withdrawal Charges, or who plan to take withdrawals during Indexed Strategy Terms, because of adjustments for Vested Gain or Loss of an Indexed Strategy. Withdrawals are also subject to the possibility of adverse tax consequences.

Loss of Principal Related to adjustments for Vested Gain or Loss

If, before the end of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable, the Vested Gain or Loss for an Indexed Strategy will be locked in. This will cause any gain credited to the Strategy to be less than both the corresponding positive gain in the Index and the Maximum Gain for the Strategy, and may result in losses in excess of the Buffer applicable to a Buffer Strategy. **In extreme circumstances, a Buffer strategy could have practically no value before the end of a Term due to the Vested Loss, meaning that you would lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.**

Loss of Principal Related to Early Withdrawal Charge

There is also a risk of loss of principal and related earnings if you Surrender your Contract or take a withdrawal during the first five Contract Years and an Early Withdrawal Charge applies. This risk exists for each Strategy because an Early Withdrawal Charge may apply. A withdrawal from any Strategy, including any Conserve/0% Floor Strategy, when an Early Withdrawal Charge applies, will reduce the value of the Strategy. This reduction will occur even if there is a Vested Gain on the date of the withdrawal. An Early Withdrawal Charge may reduce the value of an Indexed Strategy by more than increases in the value of the Indexed Strategy resulting from Vested Gains in the current and prior Terms.

Indexed Strategies Risk

An investment in an Indexed Strategy is not an investment in the Index or in the investments tracked by the Index, and you will not own such investments. Your investment in the Indexed Strategies is subject to the risk of poor performance and can vary depending on the performance of the underlying Indices. Each Indexed Strategy will have its own unique risks, and you should review the available Indexed Strategies carefully before making an investment decision. When you invest in an Indexed Strategy, you will be exposed to certain risks, including the following:

Limits on Positive Index Returns at End of Term

Any increase in the value of an Indexed Strategy over a Term is limited by a Maximum Gain. **The Maximum Gain may result in you earning less than the Index Return.**

Limits on Positive Index Returns Before End of Term

Before the final Market Day of a Term, any increase in the value of an Indexed Strategy is limited not only by the Maximum Gain, but also by the Vesting Factor, which will be less than 100%. The Vesting Factor limits the portion of the positive change in the Index that we take into account when we calculate the increase in the Strategy value. The Vesting Factor varies depending on the day of the Term. It is 25% for any date within the first half of a Term, and 50% for any date within the second half of a Term but before the final Market Day of that Term. It is 100% only on or after the final Market Day of a Term.

Due to the Vesting Factor, the return on money withdrawn from an Indexed Strategy before the final Market Day of a Term will never fully reflect the corresponding positive Index Change to the date of the withdrawal.

Risks Associated with Point-to-Point Methodology

We measure the Index Change by comparing the Index Value on the first day of the Term to the Index Value on the last day of the Term. In the case of a withdrawal, we measure the Index Change by comparing the Index Value on the first day of the Term to the Index Value on the last Market Close before a withdrawal. This means that if the Index Value is lower on the last day of the period, you may experience negative or flat performance even if the Index experienced gains through some, or most, of the period.

Possibility of Losses Despite Limits on Negative Index Returns

An Indexed Strategy with a Buffer only protects you against losses up to the amount of the Buffer. At the end of a Term, you could lose up to 90% of the money allocated to a 10% Buffer Strategy. In extreme circumstances, because the Buffer is prorated over the Term, a Buffer strategy could have practically no value near the start of a Term due to the Vested Loss, meaning that you could lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable.

An Indexed Strategy with a -10% Floor does not protect you from negative Index performance up to that Floor.

At the end of a Term, we may stop offering any Indexed Strategy in our discretion. We will always off at least one Indexed Strategy. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%.

You also bear the risk that continued negative Index returns may result in the loss of Account Value over multiple Terms. Given that the Floor or Buffer (as applicable) applies only to a single Term, if an Indexed Strategy is credited with losses for multiple Terms, the cumulative loss may far exceed any single Term's stated limit of the Buffer or Floor.

Limits on Reallocations

You cannot reallocate money among the Crediting Strategies prior to the end of a Term. If you want to take money out of Strategy during a Term, you must take a withdrawal from that Strategy or Surrender your Contract. If you choose to Surrender your Contract or take a withdrawal, your Surrender or withdrawal will be subject to a Vesting Factor and may be subject to Early Withdrawal Charges, and if before age 59½, a penalty tax. A withdrawal before the end of a Term will proportionally reduce the Investment Base for an Indexed Strategy and the Death Benefit, and this proportional reduction could be larger than the dollar amount of the withdrawal.

Effect of Surrenders

If you Surrender your Contract at any time during the first five Contract Years and an Early Withdrawal Charge applies, the amount payable will reflect a deduction for the charge. All or some portion of a withdrawal may be subject to federal and state income taxes and, if taken before age 59½, may be subject to a 10% federal penalty tax. If you Surrender your Contract at the end of a Term, the amount payable will reflect any rise or fall of the applicable Indexes over the Term, applicable Maximum Gain and Maximum Loss, and any Early Withdrawal Charge. If you Surrender your Contract before the end of a Term, in addition to any Early Withdrawal Charge, the amount payable will reflect the current Vested Gain or Loss, which could significantly reduce the amount you receive upon Surrender.

Effect of All Withdrawals

If you take a withdrawal at any time, we will reduce your Account Value by an amount equal to that withdrawal. If you take a withdrawal during the first five Contract Years and an Early Withdrawal Charge applies, we will also reduce your Account Value by the amount of the Early Withdrawal Charge. A reduction in the Account Value will reduce the amount payable upon Surrender, applied to the Annuity Payout Benefit, or payable as the Death Benefit. In addition, a withdrawal will proportionally reduce the Purchase Payment base used to determine the minimum Death Benefit and this proportional reduction could be larger than the dollar amount of the withdrawal.

Each withdrawal from an Indexed Strategy, including withdrawals available under the Free Withdrawal Allowance, withdrawals that qualify for a waiver of the Early Withdrawal Charge, withdrawals taken under the Bailout Right, withdrawals under an automated withdrawal program and withdrawals to satisfy a required distribution, will reduce the Strategy value by the dollar amount of the withdrawal and any related Early Withdrawal Charge. A withdrawal or Surrender before the end of the Term will mean that any positive Index Change will be subject to the Vesting Factor, that may reduce Strategy value below what would be available at the end of the Term. Because the Buffer is prorated over the Term, a withdrawal or Surrender before the end of the Term from a Buffer Strategy will also mean that any negative Index Change will not get the full protection of the -10% Buffer.

The Investment Base used to calculate the Strategy value through the end of that Term will be reduced in proportion to the reduction in the Strategy value. This means the dollar amount of the proportional reduction in the Investment Base will be more, maybe significantly more, than the dollar amount of the withdrawal and the Early Withdrawal Charge if the Strategy value immediately before the withdrawal is less than the Investment Base. A reduction in the Investment Base will limit the effect of any rise or fall in the Index for the remainder of the Term.

All or some portion of a withdrawal may be subject to federal and state income taxes and, if taken before age 59½, may be subject to a 10% federal penalty tax. For a further discussion of the tax treatment of a Surrender or withdrawal, please see the Federal Tax Considerations section on page 53.

Early Withdrawal Charges will reduce Indexed Strategy values and may result in losses that exceed the Maximum Loss or reduce the protection of the Buffer.

Timing of Withdrawals, Surrender, Annuity Payout Initiation Date, or Death Benefit Claim

You should take into consideration the dates on which the Term(s) of your Indexed Strategies end relative to the timing of a withdrawal or Surrender, the Annuity Payout Initiation Date, or the submission of a Death Benefit claim.

- A withdrawal from an Indexed Strategy before the end of a Term, the Surrender or annuitization of the Contract, or the determination of the Death Benefit value of the Contract will lock in the existing Vested Gain or Loss, and, due to the Vesting Factors that we use to calculate Vested Gains, any increase in the value of an Indexed Strategy before the final Market Day of a Term will be less than the corresponding positive Index Change.
- If you take a withdrawal from an Indexed Strategy before the end of a Term, we will immediately reduce the Investment Base for that Indexed Strategy. The reduction will be proportional to the reduction in the Strategy value, which means that the proportional reduction in the Investment Base could be larger than the dollar amount of the withdrawal. Reductions to the Investment Base will have a negative effect on any increases in the Indexed Strategy value for the remainder of that Term, but will reduce any decreases in the Indexed Strategy value for the remainder of that Term. Once the Investment Base for an Indexed Strategy is reduced due to a withdrawal before the end of a Term, it will not increase at any time during the remainder of that Term.

Each withdrawal from an Indexed Strategy before the end of a Term, including withdrawals available under the Free Withdrawal Allowance, withdrawals that qualify for a waiver of the Early Withdrawal Charge, withdrawals taken under the Bailout Right, withdrawals under an automated withdrawal program and withdrawals to satisfy a required distribution, will proportionally reduce the Investment Base.

In order for you to maximize the Vested Gain of an Indexed Strategy, you need to schedule withdrawals, Surrender or annuitize the Contract, or submit a Death Claim to coincide with Term end dates. The Contract is intended for long-term investment purposes and the Contract and its Crediting Strategies may not be appropriate for investors who plan to take withdrawals (including automated withdrawals and required minimum distributions) during the first five Contract Years, because of the assessment of Early Withdrawal Charges, or who plan to take withdrawals during Indexed Strategy Terms, because of adjustments for Vested Gain or Loss of an Indexed Strategy and because of the proration of a Buffer over the Term.

No Ability to Determine Strategy Values in Advance

We will process any withdrawal request at the first Market Close after receipt of your Request in Good Order. This means you will not be able to determine in advance the amount of the proportional reduction in the Investment Base due to the withdrawal. Likewise, you will not be able to determine in advance the amount payable upon Surrender, to be applied to the Annuity Payout Benefit or payable as the Death Benefit.

Changes in Maximum Gain

We set a Maximum Gain for each new Term of an Indexed Strategy. The Maximum Gain for a new Term of an Indexed Strategy may be lower than its Maximum Gain for the current Term and may be as low as 1%. You risk the possibility that the Maximum Gain for a new Term may be lower than you would find acceptable.

Unavailable Indexed Strategies

While we will always offer at least one Indexed Strategy, at the end of a Term we may stop offering any Indexed Strategy and, consequently, an Indexed Strategy you selected may not be available after the end of a Term. An Indexed Strategy you selected also may not be available after the end of a Term due to minimums and maximums that we set. In that case, if you do not withdraw the funds pursuant to your Bailout Right or reallocate them to another Crediting Strategy, then we will reallocate the applicable funds to a default Strategy. The funds allocated to a default Strategy may earn a return that is lower than the return they would have earned if there had been no reallocation, but will not increase the risk of loss of principal and any prior earnings.

Replacement of an Index

We reserve the right to replace an Index if it stops being published, or if an investment fund terminate or stops being traded on a specified market. We reserve the right to replace or adjust an Index if its publication schedule changes, its calculation changes significantly, or there is a significant change in the investment objectives, strategies, or operations of an investment fund. We reserve the right to replace a specified market if it declines in importance.

No Direct Investment in S&P 500 Index

When you allocate money to an Indexed Strategy that uses the S&P 500 Index, you will not be investing in that Index, or in any stock included in that Index. The S&P 500 Index is calculated without taking into account dividends paid on stocks that make up the S&P 500 Index. In addition, because the performance of an S&P 500 Indexed Strategy is linked to the performance of the S&P 500 Index and not the performance of the stocks included in the Index, your return may be less than that of a direct investment in such stocks. In addition, due to the same limitations, your return may be less than that of a direct investment in a fund that tracks the S&P 500 Index.

No Direct Investment in SPDR Gold Shares ETF

When you allocate money to an Indexed Strategy that uses the SPDR Gold Shares ETF, you will not be investing in that exchange-traded fund or in gold. In addition, because the performance of the SPDR Gold Shares ETF is linked to the performance of the share price of the ETF, which is determined by trading on the exchange, and not the performance of its investment portfolio, its underlying index or the components of that index, your return may be less than that of a direct investment in the securities or other assets held by the fund or a direct investment in the components of the fund's underlying index. In addition, due to the same limitations, your return may be less than that of a direct investment in the fund.

No Direct Investment in an iShares ETF

When you allocate money to an Indexed Strategy that uses the iShares MSCI EAFE ETF or iShares U.S. Real Estate ETF, you will not be investing in that exchange-traded fund, the securities or other assets held by the fund, in any underlying index tracked by the fund, or in the securities or other assets held by such underlying index. In addition, because the performance of an iShares ETF is linked to the performance of the share price of the ETF, which is determined by trading on the exchange, and not the performance of its investment portfolio, its underlying index or the components of that index, your return may be less than that of a direct investment in the securities or other assets held by the fund or a direct investment in the components of the fund's underlying index. In addition, due to the same limitations, your return may be less than that of a direct investment in the fund.

Divergence of Performance

Because changes in the value of an Indexed Strategy are subject to Maximum Gains and either Maximum Losses or a Buffer, as applicable, and may be subject to a Vesting Factor, the performance of an Indexed Strategy may diverge from the performance of the Index.

Market Risk Related Indexes

Money allocated to an Indexed Strategy that uses the S&P 500 Index is subject to the risk that the market value of the underlying securities that comprise the Index may decline over a Term. Likewise, money allocated to an Indexed Strategy that uses the iShares MSCI EAFE ETF, the iShares U.S. Real Estate ETF, or the SPDR Gold Shares ETF is subject to the risk that the fund's share price may decline over a Term. The level of the S&P 500 Index and the share prices of the SPDR Gold Shares ETF, iShares MSCI EAFE ETF and the iShares U.S. Real Estate ETF may be volatile. Any such market loss in an amount up to the Maximum Loss or in excess of the Buffer will be reflected in the Indexed Strategy value. For a Growth Strategy, you will absorb any such market loss up to the amount of the Maximum Loss of 10%. For a Buffer Strategy, you will absorb any such market loss to the extent it exceeds the Buffer. This risk applies even if you do not take a withdrawal before the end of a Term.

Geopolitical conflicts could also create economic disruption, including increased market volatility, and presents economic uncertainty. The full impact and duration of these events are difficult to determine in advance. Any such impact could adversely affect the performance of the securities that comprise the Indexes and may lead to losses on your investment in the Indexed Strategies.

The historical performance of an Index does not guarantee future results.

S&P 500 Index. The S&P 500® Index is designed to reflect the large-cap sector of the U.S. equity market and, due to its composition, it also represents the U.S. equity market in general. Any positive change in the S&P 500 Index over a Term will be lower than the total return on an investment in the stocks that comprise the S&P 500 Index because such total return will reflect dividend payments on those stocks and the S&P 500 Index will not reflect those dividend payments. More information about the S&P 500 Index is set out in the Indexes section of this prospectus.

The S&P 500 Index is subject to multiple principal investment risks, such as those related to its investments in large-capitalization companies. The S&P 500 Index tracks a subset of the U.S. stock market, which could cause the S&P 500 Index to perform differently from the overall stock market. In general, large-capitalization companies may be unable to respond quickly to new competitive challenges and may not be able to attain the high growth rate of successful smaller companies. In addition, the S&P 500 Index may, at times, become focused in stocks of a particular market sector, which would subject the S&P 500 Index to proportionately higher exposure to the risks of that sector.

SPDR Gold Shares ETF. The SPDR Gold Shares ETF represents units of beneficial interest in, and ownership of, the SPDR Gold Trust, an exchange traded fund that holds gold bullion. The investment objective of the trust is for the shares to reflect the performance of the price of gold bullion, less the trust's expenses. The shares are designed to mirror as closely as possible the price of gold, and the value of the shares relates directly to the value of the gold held by the trust, less its liabilities. The price of gold has fluctuated widely over the past several years and the shares have experienced significant price fluctuations. The value of the gold held by the trust is determined using the London Bullion Market Association (LBMA) Gold Price PM. The Gold Shares trade on the NYSE Arca under the symbol GLD. For more information, visit www.spdrgoldshares.com.

The fund is subject to several principal investment risks related to the price of gold. The price of gold has fluctuated widely over the past several years and the shares have experienced significant price fluctuations. Several factors may affect the price of gold, including:

- Global gold supply and demand, which is influenced by such factors as gold's uses in jewelry, technology, and industrial applications, purchases made by investors in the form of bars, coins, and other gold products, forward selling by gold producers, purchases made by gold producers to unwind gold hedge positions, central bank purchases and sales, and production and cost levels in major gold producing countries such as China, the United States and Australia;
- Global or regional political, economic, or financial events and situations, especially those unexpected in nature;

- Investors' expectations with respect to the rate of inflation;
- Currency exchange rates;
- Interest rates;
- Investment and trading activities of hedge funds and commodity funds; and
- Other economic variables such as income growth, economic output, and monetary policies.

The principal investment risks of the fund are described in the fund's prospectus, including the following risks: price risk, passive investment risk, trading market risk, risk of loss, damage, theft, or restriction on access, and risks related to the fund's ETF structure.

iShares U.S. Real Estate ETF. The iShares U.S. Real Estate ETF is an exchange traded fund that seeks to track the investment results of an index composed of U.S. equities in the real estate sector (Dow Jones U.S. Real Estate Index). This underlying index may include large-, mid- or small-capitalization companies. A significant portion of the underlying index is represented by real estate investment trusts (REITs), but the components are likely to change over time. The share price of the iShares U.S. Real Estate ETF is tied to the performance of the real estate sector. The share price may not replicate the performance of the fund, its underlying index, or the components of that index. More information about the iShares U.S. Real Estate ETF is set out in the Indexes section of this prospectus. To learn more about the iShares U.S. Real Estate ETF, visit iShares.com and search ticker symbol IYR.

The fund is subject to several principal investment risks, such as those related to its investments in large-, mid- and small-capitalization U.S. companies in the real estate sector. In general, large-capitalization companies may be unable to respond quickly to new competitive challenges, and may not be able to attain the high growth rate of successful smaller companies. Generally, the securities of smaller companies (including mid- and small-capitalization companies) may be more volatile and may involve more risk than the securities of larger companies. Smaller companies are also more likely to fail than larger companies. Companies that invest in real estate are highly sensitive to the risks of owning real estate, to general and local economic conditions and developments in the real estate market, and to changes in interest rates. Many companies that invest in real estate utilize leverage (and some may be highly leveraged), which increases investment risk, and could potentially magnify the fund's losses. Because the fund is an ETF, it is also exposed to the risks associated with the operation of any ETF. The value of its shares, which are valued based on their trading prices in the secondary market, may change rapidly and unpredictably and may trade at premiums or discounts to the fund's net asset value.

The principal investment risks of the fund are described in the fund's prospectus, including the following risks: asset class risk, authorized participant concentration risk, concentration risk, cybersecurity risk, dividend risk, equity securities risk, index-related risk, issuer risk, large-capitalization companies risk, management risk, market risk, market trading risk, mid-capitalization companies risk, operational risk, passive investment risk, real estate investment risk, risk of investing in the United States, securities lending risk and tracking error risk.

iShares MSCI EAFE ETF. The iShares MSCI EAFE ETF is an exchange traded fund that seeks to track the investment results of an index composed of large- and mid-capitalization developed market equities, excluding the U.S. and Canada (MSCI EAFE Index). This underlying index includes stocks from Europe, Australasia, and the Far East. It may include large- or mid-capitalization companies. The share price of the iShares MSCI EAFE ETF is tied to the performance of large- and mid-capitalization developed market equites, excluding the U.S. and Canada. The share price may not replicate the performance of the fund, its underlying index, or the components of that index. More information about the iShares MSCI EAFE ETF is set out in the Indexes section of this prospectus. To learn more about the iShares MSCI EAFE ETF, visit iShares.com and search ticker symbol EFA.

The fund is subject to several principal investment risks, such as those related to its investments in large-capitalization and mid-capitalization foreign companies. In general, large-capitalization companies may be unable to respond quickly to new competitive challenges, and may not be able to attain the high growth rate of successful smaller companies. Generally, the securities of mid-capitalization companies may be more volatile and may involve more risk than the securities of larger companies. Mid-capitalization companies are also more likely to fail than larger companies. Securities issued by non-U.S. companies are subject to the risks related to investments in foreign markets (e.g., increased price volatility; changing currency exchange rates; and greater political, regulatory, and economic uncertainty). Because the fund is an ETF, it is also exposed to the risks associated with the operation of any ETF. The value of its shares, which are valued based on their trading prices in the secondary market, may change rapidly and unpredictably and may trade at premiums or discounts to the fund's net asset value.

The principal investment risks of the fund are described in the fund's prospectus, including the following risks: asset class risk, authorized participant concentration risk, concentration risk, currency risk, cybersecurity risk, equity securities risk, financials sector risk, geographic risk, index-related risk, issuer risk, large-capitalization companies risk, management risk, market risk, market trading risk, mid-capitalization companies risk, national closed market trading risk, non-U.S. securities risk, operational risk, passive investment risk, reliance on trading partners risk, risk of investing in developed countries, risk of investing in Japan, securities lending risk, structural risk, tracking error risk and valuation risk.

Changes in Declared Rates

We set a Declared Rate for each new Term of the Declared Rate Strategy. The Declared Rate may be as low as 1%, but will never be less than any higher minimum set out in the Declared Rate Strategy endorsement to your Contract. You risk the possibility that the Declared Rate for a new Term may be lower than you would find acceptable.

Unavailable Declared Rate Strategy

At the end of a Term, we may stop offering the Declared Rate Strategy and, consequently, only Indexed Strategies, which may earn 0% for any Term, will be available after the end of the Term. **In this case, we will offer at least one Indexed Strategy with a Maximum Loss of 0%.** Unlike a Declared Rate Strategy, no earnings are guaranteed for an Indexed Strategy.

Involuntary Termination of Contract

If your Account Value falls below the minimum value of $5,000 for any reason, we may terminate your Contract. For example, we may terminate your Contract if a loss on a Growth/-10% Floor Strategy or a 10% Buffer Strategy causes your Account Value to fall below $5,000.

Regulatory Risk

MassMutual Ascend Life is not an investment company. Neither MassMutual Ascend Life nor the separate account that we established in connection with the Contracts is registered as an investment company under the Investment Company Act of 1940. The protections provided to investors by that Act are not applicable to the Contract.

Insurance Company Risk

No company other than MassMutual Ascend Life has any legal responsibility to pay amounts owed under the Contract. You should look to the financial strength of MassMutual Ascend Life for its claims-paying ability.

Our general account assets fund the guarantees provided in the Contracts. The assets are subject to our general business operation liabilities and claims of our creditors and may lose value. We established a non-unitized separate account for the purpose of supporting our obligation to adjust the Indexed Strategy value for Vested Gains and Losses associated with the Indexed Strategies. The assets in the non-unitized separate account are not chargeable with liabilities arising out of any other business that we conduct but may lose value. The non-unitized separate account differs from the unitized separate accounts that support our variable annuity contracts. As a result, unlike the owner of a traditional variable annuity who has a beneficial interest in, and participates in the performance of, the assets of the related unitized separate account, you do not have any interest in or claim on the assets in the non-unitized separate account and you will not participate in any way in the performance of assets held in that account.

Business Disruption and Cybersecurity Risks

We rely heavily on technology, including interconnected computer systems and data storage networks and digital communications, to conduct our business. Because our business is highly dependent upon the effective operation of our computer systems and those of our service providers and other business partners, our business is vulnerable to disruptions from utility outages, and susceptible to operational and information security risks resulting from information systems failure (e.g., hardware and software malfunctions), and cyberattacks. Cyberattacks may be systemic (e.g., affecting the internet, cloud services, or other infrastructure) or targeted (e.g., failures in or breach of our systems or those of third parties on whom we rely, including ransomware and malware attacks). Cybersecurity risks include, among other things, the loss, theft, misuse, corruption, and destruction of data maintained online or digitally, interference with or denial of service, attacks on our websites (or the websites of third parties on whom we rely), other operational disruption and unauthorized release, use or abuse of confidential customer information. The risk of cyberattacks may be higher during periods of geopolitical turmoil. Due to the increasing sophistication of cyberattacks, a cybersecurity breach could occur and persist for an extended period of time without detection. Systems failures and cyberattacks, as well as, any other catastrophic event, including natural and manmade disasters, public health emergencies, pandemic diseases, terrorist attacks, floods or severe storms affecting us, any third-party administrator, intermediaries, and other affiliated or third-party service providers may adversely affect us, our business operations and your Account Value and interfere with our ability to process contract transactions and calculate Account Values. Systems failures and cyberattacks may also interfere with our processing of contract transactions, including the processing of orders from our website, impact our ability to calculate Account Values, cause the release or possible destruction of confidential customer and/or business information, impede order processing or cause other operational issues, subject us and/or our service providers and intermediaries to regulatory fines, litigation and financial losses and/or cause reputational damage. Cybersecurity risks may also impact the issuers of securities of which the Indices are comprised, which may cause the Indices to lose value. The preventative actions we take to reduce the frequency and severity of cybersecurity incidents and protect our computer systems may be insufficient to prevent a cybersecurity breach from impacting our operations or your Account Value. There can be no assurance that we or our service providers and intermediaries will be able to avoid cybersecurity breaches affecting your Contract.

In addition, we are also exposed to risks related to natural and man-made disasters, including, but not limited to, storms, fires, floods, earthquakes, public health crises, malicious acts, and terrorist acts, or any other event, which could adversely affect our ability to conduct business. A natural or man-made disaster, including a pandemic such as COVID-19, could result in our workforce, and/or employees of service providers and/or third-party administrators, being compromised and unable or unwilling to fully perform their responsibilities, which could likewise result in interruptions in our service. This could interfere with our processing of contract transactions, including processing orders from owners, impact our ability to calculate Account Value, or have other adverse impacts on our operations. These events may also negatively affect our service providers and intermediaries, and issuers of securities of which the Indices are comprised, which may cause the Indices to lose value. There can be no assurance that we or our service providers and intermediaries will be able to avoid negative impacts associated with natural and man-made disasters.

BENEFITS AVAILABLE UNDER THE CONTRACT

The following table summarizes the information about the benefits available under the Contract.

Standard Benefits				
Name of Benefit	Purpose	Current Charge	Maximum Charge	Brief Description of Restrictions / Limitations
Death Benefit	Pays a Death Benefit Amount of the greater of (1) the Account Value on the date that the Death Benefit Value is determined or (2) the Purchase Payment(s), reduced proportionately for all withdrawals, but not including amounts applied to pay Early Withdrawal Charges.	No charge	N/A	• Only available during Accumulation Period • Withdrawals may result in a reduction of the minimum Death Benefit that is greater than the amount of the withdrawal • If the Death Benefit Value becomes payable before the end of a Term, it will lock in the existing Vested Gain or Loss.
Free Withdrawal Allowance	Allows owner to withdraw some money from the Contract without an Early Withdrawal Charge	No charge	N/A	• Only available during Accumulation Period • During the first Contract Year, the Free Withdrawal Allowance is 10% of the total Purchase Payments • After the first Contract Year, the Free Withdrawal Allowance is 10% of the Account Value as of the most recent Contract Anniversary • Withdrawals will reduce the Contract Value and Death Benefit, perhaps significantly • Withdrawals from an Indexed Strategy will lock in the existing Vested Gain or Loss • Withdrawals may be subject to taxes, and if before age 59½, may be subject to a 10% federal penalty tax
Bailout Right	Allows owner to withdraw money from an Indexed Strategy at the end of a Term without an Early Withdrawal Charge if the Maximum Gain for the next Term of that Strategy is less than its Bailout Trigger for the current Term or if that Strategy will not be available for the next Term.	No charge	N/A	• Only available during the Accumulation Period • Each current Term of an Indexed Strategy has its own Bailout Trigger, even if no funds are held under the Indexed Strategy for that Term. The initial Bailout Trigger for each Indexed Strategy is set out in the Contract Specifications. The Bailout Trigger for subsequent Terms is the lesser of the Bailout Trigger for the prior Term or the Maximum Gain set for the current Term • The Bailout Right only applies to the amount held under the Indexed Strategy for the Term that is ending. It will not apply to amounts held under a different Strategy, or to amounts held under the same Strategy for a Term ending on a different date • To exercise a Bailout Right, we must receive your Request in Good Order for a Bailout Right withdrawal before the end of the applicable Term • A withdrawal that qualifies for a waiver under the Bailout Right will reduce the Free Withdrawal Allowance for the current Contract Year • Withdrawals may be subject to taxes, and if before age 59½, may be subject to a 10% federal penalty tax
Extended Care Waiver	Surrender or withdrawal may be made without an Early Withdrawal Charge if the Owner is confined to a qualifying licensed hospital or long-term care facility for at least 90 days	No charge	N/A	• Only available during the Accumulation Period • First day of confinement must be on or after the first Contract Anniversary • The confinement must continue for at least 90 consecutive days • Surrender or withdrawal must be on or after first Contract Anniversary • Not available in all states
Terminal Illness Waiver	Surrender or withdrawal may be made without an Early Withdrawal Charge or if the	No charge	N/A	• Only available during the Accumulation Period • The diagnosis must be rendered on or after the first Contract Anniversary

Standard Benefits				
Name of Benefit	**Purpose**	**Current Charge**	**Maximum Charge**	**Brief Description of Restrictions / Limitations**
	Owner is diagnosed with a terminal illness by a physician			• Surrender or withdrawal must be on or after first Contract Anniversary • The Owner's life expectancy must be less than 12 months from the date of diagnosis • Not available in all states
Automated Withdrawals	Permits automated withdrawals from the Contract	No charge	$30 annually	• Only available during the Accumulation Period • Automated withdrawals during the first five Contract Years may be subject to an Early Withdrawal Charge • Automated withdrawals taken before the end of a Term will lock in the existing Vested Gain or Loss. • Automated withdrawals will reduce the amount available under the Free Withdrawal Allowance • Automated withdrawals could result in significant loss due to taxes and reduce your ability to take full advantage of any positive Index performance at the end of a Term • We may discontinue automated withdrawals at any time

CHARGES AND ADJUSTMENTS

Early Withdrawal Charge

We impose an Early Withdrawal Charge to reimburse us for contract sales expenses, including commissions and other distribution, promotion, and acquisition expenses, and to allow us to support higher Declared Rate Strategy interest rates and Indexed Strategy Maximum Gains by investing assets for a longer duration.

The Early Withdrawal Charge applies if, during the first five Contract Years, you take a withdrawal from your Contract or Surrender it. After that, the Early Withdrawal Charge does not apply.

During the first five Contract Years, unless a waiver applies or a withdrawal is made under the Bailout Right, the Early Withdrawal Charge applies to each withdrawal, including withdrawals under an automated withdrawal program and withdrawals taken to satisfy a required distribution. The Early Withdrawal Charge does not apply to Death Benefit payments or Annuity Payout Benefit payments.

An Early Withdrawal Charge reduces your Account Value.

The Early Withdrawal Charge is equal to the amount that is subject to the charge multiplied by the Early Withdrawal Charge rate.

- **If you take a withdrawal from your Contract, the amount subject to the charge is the amount you withdraw which includes any amount needed to pay the Early Withdrawal Charge.** This means that at your direction either we will subtract the Early Withdrawal Charge from amount paid to you or we will increase the amount withdrawn as needed to cover the charge.
- If you Surrender your Contract, the amount subject to the charge is your Account Value.
- The amount subject to the charge will not include: (1) the Free Withdrawal Allowance; (2) the amount, if any, that qualifies under the Bailout Right; or (3) the amount, if any, that qualifies for another waiver as described below.

The Early Withdrawal Charge rate depends on how long you own your Contract. The rate schedule is set out below.

Contract Year	1	2	3	4	5	6+
Early Withdrawal Charge Rate	8%	7%	6%	5%	4%	0%

Example for Surrender. You Surrender your annuity in Contract Year 5 when your Account Value is $100,000. You have already used your Free Withdrawal Allowance for the year and no other exception applies. We take an Early Withdrawal Charge of $4,000 ($100,000 x 0.04) and you receive $96,000.

Example for Withdrawal. You take a $10,000 withdrawal from your annuity in Contract Year 5 when your Account Value is $100,000. You have already used your Free Withdrawal Allowance for the year and no other exception applies. We take an Early Withdrawal Charge of $400 ($10,000 x 0.04) and you receive $9,600.

Similarly, if you instead request that you receive a net amount of $10,000 from your account in the same circumstances, we will treat the Early Withdrawal Charge amount as an additional requested withdrawal subject to an Early Withdrawal Charge. This means that we will "gross up" your requested withdrawal to cover applicable Early Withdrawal Charges (and any income tax withholding). If we assume that no income tax withholding applies, the withdrawal would be grossed up to $10,417, calculated by dividing the net amount requested by 1 minus the Early Withdrawal Charge rate ($10,000 / (1 – 0.04)). The Early Withdrawal Charge would be $417 (4% of the $10,417 withdrawal), and you would receive $10,000 ($10,417-$417).

An Early Withdrawal Charge may apply if you take a withdrawal during the first five Contract Years. That charge will reduce Strategy values, including the value of a Conserve/0% Floor Strategy

Free Withdrawal Allowance

The Free Withdrawal Allowance lets you withdraw some money from your Contract without the imposition of the Early Withdrawal Charge. For the first Contract Year, the Free Withdrawal Allowance is an amount equal to 10% of the total Purchase Payments received by us. For each subsequent Contract Year, the Free Withdrawal Allowance is equal to 10% of the Account Value as of the most recent Contract Anniversary. The Free Withdrawal Allowance is non-cumulative and you may not carry over any unused portion to other Contract Years.

For qualified annuities, the Free Withdrawal Allowance will be large enough to cover your required minimum distribution to age 93. However, if you have used your Free Withdrawal Allowance to facilitate a transfer or rollover, then an Early Withdrawal Charge may apply to a required minimum distribution.

Example. Your Account Value as of the end of Contract Year 3 is $200,000. Your Free Withdrawal Allowance for Contract Year 4 is $20,000 ($200,000 x 0.10). If you take a withdrawal of $50,000 at the beginning of Contract Year 4, the Early Withdrawal Charge will not apply to the first $20,000 of the withdrawal, but will apply to the remaining $30,000 plus the amount needed to pay the Early Withdrawal Charge. If you take another withdrawal later in Contract Year 4, the Early Withdrawal Charge applies to the entire withdrawal plus the amount needed to pay the Early Withdrawal Charge.

Early Withdrawal Charge Waivers

Bailout Right. We will waive the Early Withdrawal Charge on amounts that you withdraw from this Contract at the end of a current Term if the amounts are held under an Indexed Strategy for that Term and either:

- the Maximum Gain for the next Term of that Strategy is less than its Bailout Trigger for the current Term; or
- that Strategy will not be available for the next Term.

Each current Term of an Indexed Strategy has its own Bailout Trigger, even if no funds are held under the Indexed Strategy for that Term. If your Contract has multiple Purchase Payments, the Bailout Trigger for one current Term of an Indexed Strategy may be different from the Bailout Trigger for another current Term of the same Indexed Strategy that started on a different date.

The initial Bailout Trigger for each Indexed Strategy is set out in the Contract Specifications. It is less than the Maximum Gain that was set for the initial Term of that Indexed Strategy.

For each subsequent Term, the Bailout Trigger is the lesser of:

- the Bailout Trigger for the Term that ended on the date the current Term began; or
- the Maximum Gain set for the current Term.

This means that:

- if the Maximum Gain is never set below the Bailout Trigger, then the Bailout Trigger will not change; and
- if the Maximum Gain is ever set below the Bailout Trigger, then the Bailout Trigger will be reduced for the new Term and for each Term that starts on an anniversary of that Term start date.

The Bailout Trigger will never increase from one Term to the next.

Example. The Bailout Trigger for the initial Term of an Indexed Strategy was 6.5%.

- If we set the Maximum Gain for the next Term of that Indexed Strategy at 7.5%, then you will not qualify for a waiver of the Early Withdrawal Charge at the end of the current Term and the Bailout Trigger for that next Term will continue to be 6.5%.
- If we set the Maximum Gain for the next Term of that Indexed Strategy at 5.5%, then you will qualify for a waiver of the Early Withdrawal Charge at the end of the current Term and the Bailout Trigger for that next Term will change to 5.5%.

If this waiver will apply to an Indexed Strategy at the end of a Term, we will notify you in writing at least 30 days before that Term ends. You may elect a withdrawal under the Bailout Right by a Request in Good Order. We must receive your request before the end of the applicable Term.

This waiver will only apply to the amount held under the Indexed Strategy for the Term that is ending. It will not apply to amounts then held under a different Strategy, or to amounts held under the same Strategy for a Term ending on a different date. You may not carry over any unused part of the waiver from one Term to the next.

If you withdraw funds that qualify for a waiver under the Bailout Right, the withdrawal will reduce the Free Withdrawal Allowance for the applicable Contract Year. For example, if the amount you withdraw that qualifies for a waiver under the Bailout Right in Contract Year 4 is more than 10% of your Account Value as of the most recent Contract Anniversary, then no Free Withdrawal Allowance will be available for subsequent withdrawals in Contract Year 4.

Instead of withdrawing amounts that qualify for a waiver under the Bailout Right, you may wish to reallocate those amounts to a different Strategy. A Request in Good Order to reallocate funds must be received by us before the end of the applicable Term.

Extended Care Waiver. (Rider form R1462316NW-Waiver of Early Withdrawal Charges for Extended Care Rider). We will waive the Early Withdrawal Charge that would otherwise apply if you make a Request in Good Order and:

- your Contract is modified by the Extended Care Waiver Rider;
- you are confined in a long-term care facility or hospital and the confinement is prescribed by a physician and is medically necessary;
- the first day of the confinement is at least one year after the Contract Effective Date; and
- the confinement has continued for a period of at least 90 consecutive days.

You must provide us with satisfactory proof that you meet these conditions before the date of the withdrawal or Surrender. There is no charge for this rider, but it may not be available in all states.

Terminal Illness Waiver. (Rider form R1462416NW-Waiver of Early Withdrawal Charges Upon Terminal Illness Rider). We will waive the Early Withdrawal Charge that would otherwise apply if you make a Request in Good Order and:

- your Contract is modified by the Waiver of Early Withdrawal Charges upon Terminal Illness Rider;
- you are diagnosed with a terminal illness by a physician and, as a result of the terminal illness, you have a life expectancy of less than 12 months from the date of diagnosis; and
- the diagnosis is rendered by a physician more than one year after the Contract Effective Date.

You must provide us with satisfactory proof that you meet these conditions before the date of the withdrawal or Surrender. There is no charge for this rider, but it may not be available in all states. You do not need to take any action to add this waiver rider.

State Limitations. In some states, our ability to waive fees or charges may be limited by applicable laws, regulations or administrative positions. **See "Appendix D: State Variations" for information about availability in your state.**

Required Minimum Distributions. No special waiver of Early Withdrawal Charges exists for required minimum distributions except as may be offered from time to time under an automated payment program.

Automated Withdrawal Program Charges

Currently, we do not charge a fee to participate in an automated withdrawal program. However, we reserve the right to impose an annual fee in such amount as we may then determine to be reasonable for participation in the automated withdrawal program. If imposed, the fee will not exceed $30 annually.

State Limitations. In some states, our ability to waive fees or charges may be limited by applicable laws, regulations, or administrative positions. **See "Appendix D: State Variations" for information about availability in your state.**

Premium and Other Taxes

We reserve the right to deduct from the Purchase Payment or Account Value any taxes relating to the Contract paid by us to any government entity (including, but not limited to, premium taxes, additional taxes, and maintenance taxes on insurers, Federal, state and local withholding of income, estate, inheritance, or other taxes required by law from annuity Purchase Payments, and any new or increased taxes on insurers or annuity Purchase Payments that may be enacted into law).

Currently some state governments impose premium taxes, additional taxes, and maintenance taxes on insurers based on annuity Purchase Payments received or applied to an Annuity Payout Benefit. These taxes currently range from zero to 3.5% depending upon the jurisdiction and the tax qualification of the Contract. A federal premium tax has been proposed but not enacted. We may deduct any such premium or other taxes from the Purchase Payments or the Account Value at the time that the tax is imposed. We may also deduct any such tax not previously deducted from the Annuity Payout Value or Death Benefit Value.

We reserve the right to deduct from the Contract for any income taxes that we incur because of the Contract. At the present time, however, we are not incurring any such income tax or making any such deductions.

Adjustment for Vested Gain or Loss

Before the end of a Term, if you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable, you will be subject to a Contract adjustment that locks in an Indexed Strategy's Vested Gain or Loss. The purpose of this calculation is to shift any potential investment loss on the Company's general account assets that support the indexed option guarantees from the Company to you when amounts are removed prematurely from an Indexed Strategy. Each day of a Term, the value of an Indexed Strategy includes the Vested Gain or Loss, if any, since the start of that Term. Vested Gain or Loss is calculated on the remaining Investment Base for that Term.

The Vested Gain equals any positive Index Change since the start of the current Term (but not exceeding the Maximum Gain set for the Term) times the applicable Vesting Factor for that day times the remaining Investment Base for the current Term. The Vesting Factor varies depending on the day of the Term. It is 25% for any date within the first half of a Term, 50% for any date within the second half of a Term but before the final Market Day of that Term, and 100% on or after the final Market Day of a Term. Before the final Market Day of a Term, the Vested Gain will always be less than the corresponding positive Index Change, and will always be less than the Maximum Gain for a given Indexed Strategy.

The Vested Loss equals any negative Index Change since the start of the current Term (after taking into account either the Maximum Loss for each Term or the Buffer, as applicable) times the remaining Investment Base for the current Term. You could lose up to 10% of your investment in a Growth/-10% Floor Strategy due to the Vested Loss. Because the 10% Buffer in a Buffer Strategy is prorated over the Term, you could lose more than 90% of your investment in a Buffer Strategy. This also means that if losses apply when amounts are removed from an Indexed Strategy, such losses would be higher earlier in the Term when a lower percentage of the prorated Buffer is applicable. This loss will be greater if you also have to pay an Early Withdrawal Charge, taxes and, if before age 59½, you are subject to a penalty tax. **In extreme circumstances, a Buffer strategy could have practically no value before the end of a Term due to the Vested Loss, meaning that you would lose nearly 100% of your principal and prior earnings in that Strategy if, near the start of the Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable**. **For example, if you allocate $100,000 to an investment option with a 1-year Term and Surrender the Contract near the start of the Term, you could lose up to $100,000 of your investment.**

You may access Vested Gain or Loss information for the Indexed Strategies as of the previous day's Market Close by calling 1-800-789-6771 or by accessing your account online at www.massmutualascend.com. This value can fluctuate daily, and the current value quoted may differ from the actual value calculated at the time of any transaction.

See "Contract Adjustments" in the Statement of Additional Information for more details, including examples illustrating the operation of the adjustment for Vested Gain or Loss.

PURCHASING THE CONTRACT

You purchased your Contract through a registered representative of a broker-dealer that has a selling agreement with our affiliated underwriter, MM Ascend Life Investor Services, LLC.

Any Owner or Annuitant must have been age 80 or younger on the Contract Effective Date. To determine eligibility, we used the person's age on his/her last birthday. We made any exceptions with respect to the maximum issue age in our discretion.

The Contract was not available in all states. Your broker-dealer may have imposed conditions on the purchase of the Contract, such as a lower maximum issue age, than we or other selling firms impose. In addition, Selling Broker-Dealers may not have made certain Indexed Strategies available. If you have any questions, you should contact your Selling Agent or his or her Selling Broker Dealer.

Purchase Payments

The Contract is a modified single premium annuity contract. You could only make Purchase Payments during the first two months after the Contract Effective Date.

Each Purchase Payment was held in the Purchase Payment Account until it was applied to a Crediting Strategy on a Strategy Application Date. It was credited with interest daily at the annual effective rate set out in your Contract. The Purchase Payment Account was reduced by each withdrawal and related Early Withdrawal Charge taken from the Purchase Payment Account. On each Strategy Application Date, we applied the then current balance of the Purchase Payment Account to the Crediting Strategies you selected.

Unforeseen Processing Delays

We are exposed to risks related to natural and man-made disasters and catastrophes, such as (but not limited to) storms, fires, floods, earthquakes, public health crises, malicious acts, and terrorist acts, any of which could adversely affect our ability to conduct business. A natural or man-made disaster or catastrophe, including a pandemic (such as the COVID-19 pandemic), could affect the ability or willingness of our employees or the employees of our service providers to perform their job responsibilities. While many of our employees and the employees of our service providers are able to work remotely, those remote work arrangements may result in our business operations being less efficient than under normal circumstances and could lead to delays in our processing of contract-related transactions, including orders from contract owners. Catastrophic events may negatively affect the computer and other systems on which we rely, impact our ability to calculate values under your Contract, or have other possible negative impacts. There can be no assurance that our service providers will be able to successfully avoid negative impacts associated with natural and man-made disasters and catastrophes.

A processing delay will not affect the effective date as of which we process transactions, including orders from contract owners, the date that a Term begins or ends, or the values used to process the transaction.

Right to Cancel (Free Look)

You had a limited period after the Contract Effective Date to cancel your Contract without an Early Withdrawal Charge. That period was generally 20 to 30 days after the date you received it. This is known as a "free look." The right to cancel period may have been longer in some states.

INITIAL STRATEGY SELECTIONS

You made your initial selection of Crediting Strategies in your purchase application. Your initial selection is set out in your Contract Specifications. It applied to your initial Purchase Payment. It also applied to each subsequent Purchase Payment unless you made a Request in Good Order to change your selection before the Strategy Application Date that applies to that Purchase Payment.

STRATEGY RENEWAL AND REALLOCATIONS AT TERM END

Renewals

At the end of each Term of a given Crediting Strategy, we will apply the ending value of that Strategy to a new Term of that same Strategy. The amount applied to a new Term of the same Strategy will not include any amount that is moved to a different Strategy as part of a reallocation at the Term end.

Reallocations

At the end of a Term, you may reallocate the ending values of the Crediting Strategies for that Term among the available Strategies. You can only reallocate amounts from one Crediting Strategy to another at the end of the Term for which such amount is being held. You cannot make a reallocation at any other time.

We will send you written notice at least 30 days before the end of a Term to provide you with the opportunity to make a reallocation. We must receive your Request in Good Order for a reallocation on or before the last Market Close of the Term. For example, if the end of a Term falls on a weekend, we must receive your request on or before the last Market Close before that weekend.

Reallocations must be in whole percentages that total 100%. We reserve the right to round amounts up or down to make whole percentages, and to reduce or increase amounts proportionally in order to total 100%.

Any renewal or reallocation will be subject to Strategy availability, minimums and maximums. Currently there are no limitations on the amounts that may be applied to a Crediting Strategy. We may establish minimum and maximum amounts or percentages that may be applied to a given Crediting Strategy for any future Term in our discretion. We will notify you of any such minimum or maximum.

The new Term of each Strategy is subject to the Declared Rate or Maximum Gain in effect for that Strategy for that new Term. For example, the Declared Rate for a new Term of the Declared Rate Strategy may be different than the Declared Rate for the Term that is ending. Likewise, the Maximum Gain for an Indexed Strategy for a new Term may be different than the Maximum Gain for that Indexed Strategy for the Term that is ending.

Availability of Strategies

At the end of a Term, we may eliminate a particular Strategy in our discretion. We will send you a written notice at least 30 days before the end of each Term with information about the Strategies that will be available for the next Term. At least 10 days before the next Term starts, we will post the Declared Rate and the Maximum Gains that will apply for that next Term on our website (https://www.massmutualascend.com/index-frontier-5). The Previous Notice Methods section of this prospectus describes a different process used to provide notice of the Declared Rate and the Maximum Gains that will apply to contracts issued prior to May 1, 2019.

We are not obligated to offer the Declared Rate Strategy or any one particular Indexed Strategy. At the end of a Term, we can add or stop offering any Strategy at our discretion. For example, we could stop offering Growth/-10% Floor Strategies after the first five Contract Years. We may limit the availability of a Strategy for a Term that would extend beyond the Annuity Payout Initiation Date. All Strategies may not be available in all states.

One Indexed Strategy will always be available. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%. Unlike a Declared Rate Strategy, no earnings are guaranteed for an Indexed Strategy.

If we add or stop offering a Strategy at the end of a Term, we will send you a notification. If funds are held in a Strategy that will no longer be available after the end of a Term, the funds will remain in that Strategy until the end of that Term.

If you have allocated money to an Indexed Strategy and that Indexed Strategy will not be available for the next Term, then the Bailout Right will apply. In this case, you may withdraw money from that Indexed Strategy at the end of the current Term without incurring an Early Withdrawal Charge, or you may reallocate amounts to another Strategy. If you have allocated money to the Declared Rate Strategy and it will not be available for the next Term, the Bailout Right will not apply.

Reallocations to Default Strategies

At the end of a Term, to the extent any amount cannot be applied to a given Crediting Strategy for the next Term because that Strategy is no longer available or the amount is under the minimum or over the maximum for that Strategy for the new Term, if you do not withdraw the funds pursuant to your Bailout Right or reallocate them to another Index Strategy, then we will reallocate the amount to a default Strategy.

Here are the rules that will apply to reallocations to a default Strategy.

- We will reallocate to the Declared Rate Strategy.
- If no Declared Rate Strategy is available, then we will designate an Indexed Strategy that has a Maximum Loss of 0% and we will reallocate to that designated Strategy.

If the amount to be applied exceeds the maximum, then the default reallocation rules will apply only to the excess amount. For example, if the maximum amount for a Crediting Strategy is $50,000 and the amount to be applied is $54,000, then the default reallocation rules will apply only to the excess $4,000.

Surrender or Withdrawal at Term End

At the end of a Term, you may choose to Surrender your Contract or to take a withdrawal from your Contract. You may do so for any reason, including dissatisfaction with the available Indexed Strategies. An Early Withdrawal Charge may apply. In addition, there may be tax consequences if you Surrender your Contract or take a withdrawal. You should seek advice on tax questions based on your particular circumstances from a tax advisor.

Contract values calculated at the end of a Term will reflect the applicable Strategy values and any Early Withdrawal Charge that applies upon Surrender or to your withdrawal.

DECLARED RATE STRATEGY

Note: The Declared Rate Strategy is not available for Contracts issued in Missouri.

The Declared Rate Strategy is credited with interest daily that results in an effective yield equal to the Declared Rate with annual compounding.

Information regarding the features of the Declared Rate Strategy, including its term and its minimum guaranteed interest rate, is available in an appendix to the prospectus. See "Appendix A: Investment Options Available Under the Contract".

Declared Rates

We will set the Declared Rate for a Term before that Term starts. It is guaranteed for the entire Term. Each Term of the Declared Rate Strategy may have a different Declared Rate. For a Term, different rates may apply with respect to amounts attributable to Purchase Payments received on different dates.

At least 10 days before the next Term starts, we will post the Declared Rate that will apply to the Declared Rate Strategy for that next Term on our website (https://www.massmutualascend.com/index-frontier-5). You should consider this renewal information before finalizing your renewal or reallocation decision. The Previous Notice Methods section of this prospectus describes a different process used to provide notice of the Declared Rate that will apply to Contracts issued prior to May 1, 2019.

In any event, the Declared Rate for a Term will never be less than the guaranteed minimum interest rate from 1.0% to 3.0% set out in the Declared Rate Strategy endorsement included in your Contract.

Term

Each Term of the Declared Rate Strategy is one year long and will start and end on a Strategy Application Date. A new Term will start at the end of the preceding Term.

If you made only one Purchase Payment or you made all of your Purchase Payments before the initial Strategy Application Date, then each Term of the Declared Rate Strategy will end on the same date in any given year. If you made a Purchase Payment after the initial Strategy Application Date, then your Purchase Payments will be applied to the Crediting Strategies on different Strategy Application Dates. In this case, the Declared Rate Strategy will have Terms that end on different dates in any given year.

Examples. These examples show how a Contract with multiple Purchase Payments may have Terms that end on different dates.

- You made your initial Purchase Payment on March 10, 2024, and another Purchase Payment on March 17, 2024. You allocated both payments to the Declared Rate Strategy and both payments were applied on March 20, 2024. Each Term of the Declared Rate Strategy will start and end on March 20.
- You made your initial Purchase Payment on May 2, 2024, and another Purchase Payment on June 14, 2024. You allocated both payments to the Declared Rate Strategy. Your initial Purchase Payment was applied on May 6, 2024, and the other Purchase Payment was applied on June 20, 2024. The Declared Rate Strategy will have Terms that start and end on May 6 and other Terms that start and end on June 20.

Declared Rate Strategy Value

The value of the Declared Rate Strategy is equal to:

- the amounts applied to the Strategy at the start of the current Term; minus
- each withdrawal and related Early Withdrawal Charge taken from the Strategy during the current Term; plus
- interest that we have credited on the balances in the Strategy for the current Term.

The rise or fall of an Index does not affect the value of the Declared Rate Strategy. A withdrawal from the Declared Rate Strategy reduces the Declared Rate Strategy value by an amount equal to the withdrawal.

INDEXED STRATEGIES

The Indexed Strategies provide positive or negative returns that are based, in part, upon changes in the value of an Index. The Indexed Strategies do not earn interest, but the value of each Indexed Strategy is adjusted for gains or losses based on the performance of the Index. An investment in an Indexed Strategy is not an investment in the Index or in any Index fund. **You could lose a significant amount of money if the Index declines in value. If amounts are removed from an Indexed Strategy before the end of the Term, you could lose a significant amount of money due to adjustments for Vested Gain or Loss.**

Each Indexed Strategy has a Maximum Gain for each Term. We will set a new Maximum Gain for each Indexed Strategy prior to the start of each Term. In general, the Maximum Gain for a Growth Strategy will be higher than the Maximum Gain for a Conserve Strategy using the same Index, and the Maximum Gain for a Buffer Strategy will be higher than the Maximum Gain for a Growth Strategy using the same Index. **The Maximum Gain for an Indexed Strategy will never be lower than 1%.**

Each Conserve Strategy and Growth Strategy has a Maximum Loss for each Term.

- The Maximum Loss for each Term of a Conserve Strategy is 0%.
- The Maximum Loss for each Term of a Growth Strategy is a loss of 10%.

Each Buffer Strategy has a Buffer for each Term.

- The Buffer at the end of each Term is 10%. Before the end of each Term, the Buffer is calculated daily as a prorated share of the annual 10% Buffer.

Changes in the value of an Indexed Strategy reflect the change in the applicable Index Value since the start of the applicable Term, the Maximum Gain we set for that Indexed Strategy for that Term, the applicable Vesting Factor, and the applicable Buffer or Maximum Loss for that Indexed Strategy. **If you select a Growth Strategy or a Buffer Strategy, then each Term it is possible for you to lose a portion of your Purchase Payment(s) and any earnings allocated to that Indexed Strategy.**

See "Vested Gains and Losses" section below for additional details.

The Indexed Strategies that are currently available are listed below. You may allocate your funds to any of the Indexed Strategies, subject to the procedures disclosed in this prospectus.

Conserve/0% Floor Strategies	**Index**	**Maximum Loss/Floor of 0%**
S&P 500 0% Floor	S&P 500® Index	If you allocate money at the start of a Term to a Conserve Strategy, you cannot lose that money during the Term due to a negative change in the Index.
SPDR Gold Shares 0% Floor	SPDR® Gold Shares ETF	
iShares U.S. Real Estate 0% Floor	iShares U.S. Real Estate ETF	
iShares MSCI EAFE 0% Floor	iShares MSCI EAFE ETF	
Growth/-10% Floor Strategies	**Index**	**Maximum Loss/Floor of 10%**
S&P 500 -10% Floor	S&P 500® Index	If you allocate money at the start of a Term to a Growth Strategy, you can lose up to 10% of that
SPDR Gold Shares -10% Floor	SPDR® Gold Shares ETF	

iShares U.S. Real Estate -10% Floor	iShares U.S. Real Estate ETF	money during the Term due to a negative change in the Index.
iShares MSCI EAFE -10% Floor	iShares MSCI EAFE ETF	
10% Buffer Strategy	**Index**	**End of Term Buffer of 10%**
S&P 500 10% Buffer	S&P 500® Index	If you allocate money at the start of a Term to a Buffer Strategy, at the end of the Term you can lose up to 90% of that money due to a negative change in the Index. At the end of the Term, 10% of the money you allocated is protected from loss. You can lose more than 90% of that money if you withdraw it before the end of the Term.

Note: The S&P 500 Buffer strategy is not available for Contracts issued prior to May 2020.

An Early Withdrawal Charge may apply if you take a withdrawal during the first five Contract Years. That charge will reduce Strategy values, including the value of a Conserve/0% Floor Strategy.

Information regarding the features of each currently offered Indexed Strategy, including (i) its name, (ii) its type, (iii) its Term, (iv) its current Maximum Loss or Buffer, and (v) its minimum Maximum Gain, is available in an appendix to the prospectus. **See "Appendix A: Investment Options Available Under the Contract".**

T**he following examples illustrate how we calculate Strategy values under each Index crediting methodology assuming hypothetical Index returns and hypothetical limits on Index gains and losses. The examples assume no withdraw**als.

Conserve / 0% Floor Strategy

Here are the formulas that we use to calculate the Strategy value at the end of a Term of a Conserve / 0% Floor Strategy.

- Strategy value at end of Term = remaining Investment Base + Vested Gain or Loss
- Vested Gain or Loss = remaining Investment Base x Vested Gain or Loss Percentage
- Vested Gain Percentage = Index Change limited by Maximum Gain (Cap) x Vesting Factor
- Vested Loss Percentage = Index Change limited by Maximum Loss (Floor)

Example. At the beginning of a Term, you allocate $100,000 to a -10% Floor with Cap Strategy and the Maximum Gain / Cap for the Term is 9%. You do not take any withdrawals during that Term, which means that your Investment Base at the end of that Term is $100,000. Because it is the end of a Term, the Vesting Factor is 100%.

	At Final Market Close of Term	**At Final Market Close of Term**
Assumed Index Change	+16%	-16%
Index Change Limited by Cap or Floor	+9% (16% > 9% Cap)	0% (-16% < 0%)
Vesting Factor at Term End	100%	n/a
Vested Gain or Loss as a Percentage	+9% (100% of +9%)	0%
Remaining Investment Base	$100,000	$100,000
Vested Gain or Loss in Dollars	+$9,000	$0
Strategy Value at Term End	$109,000	$100,000

Growth / -10% Floor Strategy

Here are the formulas that we use to calculate the Strategy value at the end of a Term of a Growth / -10% Floor Strategy.

- Strategy value at end of Term = remaining Investment Base + Vested Gain or Loss
- Vested Gain or Loss = remaining Investment Base x Vested Gain or Loss Percentage
- Vested Gain Percentage = Index Change limited by Maximum Gain (Cap) x Vesting Factor
- Vested Loss Percentage = Index Change limited by Maximum Loss (Floor)

Example. At the beginning of a Term, you allocate $100,000 to a -10% Floor with Cap Strategy and the Maximum Gain for the Term is 14%. You do not take any withdrawals during that Term, which means that your Investment Base at the end of that Term is $100,000. Because it is the end of a Term, the Vesting Factor is 100%.

	At Final Market Close of Term	At Final Market Close of Term
Assumed Index Change	+16%	-16%
Index Change Limited by Cap or Floor	+14% (16% > 14% Cap)	-10% (-16% < -10%)
Vesting Factor at Term End	100%	n/a
Vested Gain or Loss as a Percentage	+14% (100% of +14%)	-10%
Remaining Investment Base	$100,000	$100,000
Vested Gain or Loss in Dollars	+$14,000	-$10,000
Strategy Value at Term End	$114,000	$90,000

10% Buffer Strategy

Here are the formulas that we use to calculate the Strategy value at the end of a Buffer Strategy

- Strategy value at end of Term = remaining Investment Base + Vested Gain or Loss
- Vested Gain or Loss = remaining Investment Base x Vested Gain or Loss Percentage
- Vested Gain Percentage = Index Change limited by Maximum Gain (Cap) x Vesting Factor
- Vested Loss Percentage = Index Change that exceeds the Buffer

Example. At the beginning of a Term, you allocate $100,000 to a Buffer Strategy and the Maximum Gain for the Term is 20%. You do not take any withdrawals during that Term, which means that your Investment Base at the end of that Term is $100,000. Because it is the end of a Term, the Vesting Factor is 100% and the Buffer is 10%.

	At Final Market Close of Term	At Final Market Close of Term
Assumed Index Change	+16%	-16%
Index Change Limited by Cap or Buffer	+16% (16% < 20% Cap)	-6% (-16% - -10%)
Vesting Factor at Term End	100%	n/a
Vested Gain or Loss as a Percentage	+16% (100% of +16%)	-6%
Remaining Investment Base	$100,000	$100,000
Vested Gain or Loss in Dollars	+$16,000	-$6,000
Strategy Value at Term End	$116,000	$94,000

For more information on how we calculate Indexed Strategy values, see "Indexed Strategy Value" below.

Term

Each Term of an Indexed Strategy is one year long and will start and end on a Strategy Application Date. A new Term will start at the end of the preceding Term. **An adjustment will be made based on the Vested Gain or Loss of an Indexed Strategy if, before the final Market Close of a Term, you were to take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable. See "Indexed Strategy Value" and "Vested Gains and Losses" below.**

If you made only one Purchase Payment or you made all of your Purchase Payments before the initial Strategy Application Date, then each Term of each Indexed Strategy will end on the same date in any given year. If you made a Purchase Payment after the initial Strategy Application Date, then your Purchase Payments were applied to the Crediting Strategies on different Strategy Application Dates. In this case, an Indexed Strategy may have Terms that end on different dates in any given year.

Examples. These examples show how a Contract with multiple Purchase Payments may have Terms that end on different dates.

- You made your initial Purchase Payment on March 10, 2024, and another Purchase Payment on March 17, 2024. You allocated both payments to the same Indexed Strategy and both payments were applied on March 20, 2024. Each Term of that Indexed Strategy will start and end on March 20.
- You made your initial Purchase Payment on May 2, 2024, and another Purchase Payment on June 14, 2024. You allocated both payments to the same Indexed Strategy. Your initial Purchase Payment was applied on May 6, 2024, and the other Purchase Payment was applied on June 20, 2024. That Indexed Strategy will have Terms that start and end on May 6 and other Terms that start and end on June 20.

Indexed Strategy Value

The value of an Indexed Strategy is equal to:

- the Investment Base for that Term, which is the amount applied to the Strategy at the start of the current Term; minus
- the portion of that Investment Base that is taken from the Strategy to pay for each withdrawal and related Early Withdrawal Charge during the current Term; and plus or minus
- the Vested Gain or Loss for that Term on the remaining portion of the Investment Base.

The portion of the Investment Base that is taken from an Indexed Strategy to pay for a withdrawal and any related Early Withdrawal Charge is proportional to the reduction in the value of the Indexed Strategy for the withdrawal and any related charge. This means that we calculate the percentage of Strategy value that is being withdrawn and we reduce the Investment Base by the same percentage.

- A withdrawal and any related charge will reduce the value of an Indexed Strategy by an amount equal to the withdrawal and any charge.
- But the reduction in the Investment Base to pay for a withdrawal and any related charge is proportional to the reduction in the value of the Indexed Strategy. For example, if the withdrawal and any related charge reduces the value of an Indexed Strategy by 15%, then it will reduce the Investment Base by 15%.
- If there is a Vested Gain, then the portion of the Investment Base taken will be less than the withdrawal and any related charge. With a Vested Gain, the Indexed Strategy value will be higher than the Investment Base. For example, a 15% reduction in the Investment Base will be less than a 15% reduction in the Strategy value.
- **If there is a Vested Loss, then the portion of the Investment Base taken will be greater than the withdrawal and any related charge.** With a Vested Loss, the Investment Base will be higher than Indexed Strategy value. For example, a 15% reduction in the Investment Base will be greater than a 15% reduction in the Strategy value.

Here are the formulas that we use to calculate a proportional reduction in the Investment Base for a withdrawal and the remaining Investment Base.

Percentage reduction in Strategy value = withdrawal plus any related Early Withdrawal Charge / Strategy value immediately before the withdrawal

Proportionate reduction in Investment Base = Investment Base immediately before the withdrawal x percentage reduction in Strategy value

Remaining Investment Base = Investment Base immediately before the withdrawal - reduction in Investment Base

Examples. You allocate $5,000 to an Indexed Strategy at the start of a Term. This means the Investment Base for the Term is $5,000. You take a $1,000 withdrawal and that amount includes the amount needed to pay any related Early Withdrawal Charge that applies to the withdrawal.

Assume at the time of your withdrawal that you have a Vested Gain of 5%.

- The Vested Gain is equal to $250 ($5,000 x 0.05).
- The Strategy value on the withdrawal date is $5,250 ($5,000 + $250).
- The withdrawal (including any related Early Withdrawal Charge) reduces the Strategy value by $1,000.
- The Strategy value after the withdrawal is $4,250 ($5,250 - $1,000).
- The percentage reduction in the Strategy value is 19.05% ($1,000 / $5,250).
- The proportionate reduction in the Investment Base is $952 ($5,000 x 0.1905).
- The remaining Investment Base is $4,048 ($5,000 - $952).
- Due to the Vested Gain, the proportionate reduction in the Investment Base ($952) is less than the withdrawal and related charge ($1,000). This means, after the withdrawal, the Investment Base is $4,048 rather than $4,000.

Assume at the time of your withdrawal that you have a Vested Loss of 10%.

- The Vested Loss is equal to $500 ($5,000 x 0.10).
- The Strategy value on the withdrawal date is $4,500 ($5,000 - $500).
- The withdrawal (including any related Early Withdrawal Charge) reduces the Strategy value by $1,000.
- The Strategy value after the withdrawal is $3,500 ($4,500 - $1,000).

- The percentage reduction in the Strategy value is 22.22% ($1,000 / $4,500).
- The proportionate reduction in the Investment Base is $1,111 ($5,000 x 0.2222).
- The remaining Investment Base is $3,889 ($5,000 - $1,111).
- Due to the Vested Loss, the proportionate reduction in the Investment Base ($1,111) is greater than the withdrawal and related charge ($1,000). This means, after the withdrawal, the Investment Base is $3,889 rather than $4,000.

Vested Gains and Losses

Overview

Each day of a Term, the value of an Indexed Strategy includes the Vested Gain or Loss, if any, since the start of that Term. Vested Gain or Loss is calculated on the remaining Investment Base for that Term.

Here is the formula that we use to calculate the amount of the Vested Gain or Loss.

Amount of Vested Gain or Loss = remaining Investment Base x Vested Gain or Loss percentage

Example. At the beginning of a Term in Contract Year 10, your entire Account Value of $100,000 is allocated to a Growth/-10% Floor Strategy. You do not take any withdrawals during that Term. You Surrender your Contract at the end of that Term. No Early Withdrawal Charge applies to a Surrender in Contract Year 10.

- If the Vested Gain is 4%, then the Strategy value includes a $4,000 Vested Gain ($100,000 x 0.04). The amount payable upon Surrender will be $104,000 ($100,000 + $4,000).
- If the Vested Loss is 3%, then the Strategy value includes a $3,000 Vested Loss ($100,000 x 0.03). The amount payable upon Surrender will be $97,000 ($100,000 - $3,000).

If in this example your Surrender occurs in Contract Year 4 instead, when a 5% Early Withdrawal Charge applies, the amount payable upon Surrender is reduced by applicable Early Withdrawal Charges. For this example, we assume that the Account Value was $100,000 on the most recent Contract Anniversary.

- If the Vested Gain is 4%, then the amount payable is reduced by Early Withdrawal Charges of $4,700, calculated as 5% of the Strategy Value minus the Free Withdrawal Allowance (5% x ($104,000 – ($100,000 x 10%))). The amount payable upon Surrender will be $99,300 ($104,000 - $4,700).
- If the Vested Loss is 3%, then the amount payable is reduced by Early Withdrawal Charges of $4,350, calculated as 5% of the Strategy Value minus the Free Withdrawal Allowance (5% x ($97,000 – ($100,000 x 10%))). The amount payable upon Surrender will be $92,650 ($97,000 - $4,350).

Index Change. Before we can calculate the Vested Gain or Loss since the start of a Term, we must determine the Index Change since the start of that Term. The Index Change is the increase or decrease in the applicable Index Value. This increase or decrease is expressed as a percentage of the applicable Index Value at the start of that Term. It is measured from the Index Value at the start of that Term to the Index Value at the last Market Close on or before the date the Index Change is determined.

Example. The Index Value was 1000 at the start of a Term.

- If the Index Value at the applicable Market Close is 1065, then there is a positive Index Change of 6.5% ((1065 - 1000) / 1000).
- If the Index Value at the applicable Market Close is 925, then there is a negative Index Change of 7.5% ((925 - 1000) / 1000).

Index Values. Index Values are determined at each Market Close. An Index Value at the start of a Term is its value at the last Market Close on or before the first day of that Term. An Index Value at the end of a Term is its value at the Market Close on the last Market Day of that Term. We will use consistent sources to obtain the closing values of an Index. We currently obtain the closing values for the S&P 500 Index and the SPDR Gold Shares ETF from S&P Dow Jones Indices LLC and the closing values for the iShares MSCI EAFE ETF and the iShares U.S. Real Estate ETF from BlackRock, Inc. If those sources are no longer available, we will select an alternative published source(s) to obtain such values.

Market Close. A Market Close is the close of the regular or core trading session on the market used to measure an Index Change for a given Indexed Strategy.

Market Day. A Market Day is each day that all markets that are used to measure Index Changes for available Indexed Strategies are open for regular trading.

Vested Gain

The Vested Gain is the portion of any positive Index Change that is taken into account when determining the value of an Indexed Strategy. Here is the formula that we use to calculate a Vested Gain for any day of a Term.

> Vested Gain = any positive Index Change since the start of the current Term (but not exceeding the Maximum Gain set for the Term) x applicable Vesting Factor for that day x remaining Investment Base for the current Term

Maximum Gain. The Maximum Gain for an Indexed Strategy is the largest positive Index Change for a Term that is taken into account to determine the Vested Gain for that Indexed Strategy for that Term. For example, if the Maximum Gain for a Term is 5% and the Index Change at the end of that Term is positive 8%, then the Vested Gain for that Term is 5%.

- **The Maximum Gain will vary between Indexed Strategies.**
- **The Maximum Gain for a given Indexed Strategy will vary between Terms.**
- **We guarantee that the Maximum Gain for a Term of an Indexed Strategy will never be less than 1%.**
- **For each Term, your return on an Indexed Strategy may be less than any positive Index Change over that Term.**
- **For each Term, your return on an Indexed Strategy may be less than the Maximum Gain.**

We set the Maximum Gain for each Indexed Strategy based on the cost of hedging, interest rates, and other market factors, and the Purchase Payments received for a Contract. In general, the Maximum Gain we set for a Growth/-10% Floor Strategy will be higher than the Maximum Gain we set for the corresponding Conserve/0% Floor Strategy, and the Maximum Gain for a 10% Buffer Strategy will be higher than the Maximum Gain for the corresponding Growth Strategy. Likewise, we may set Maximum Gains for Contracts with larger Purchase Payments that are higher than Maximum Gains for Contracts with smaller Purchase Payments.

We will send you a written notice at least 30 days before the end of each Term with information about the Indexed Strategies that will be available for the next Term.

Maximum Gain for Terms. **At least 10 days before the next Term starts, we will post the Maximum Gain that will apply to an Indexed Strategy for that next Term on our website (https://www.massmutualascend.com/index-frontier-5). The Previous Notice Methods section of this prospectus describes a different process used to provide notice of the Maximum Gain for each Indexed Strategy that will apply to Contracts issued prior to May 1, 2019.**

Because we can change the Maximum Gain that applies to an Indexed Strategy, the Contract has a Bailout Right that allows you to take a withdrawal without incurring an Early Withdrawal Charge under certain circumstances. See the Bailout Right discussion in the Early Withdrawal Charge section below.

Vesting Factor. The Vesting Factor varies depending on the day of the Term for which the Vested Gain is calculated. A Vesting Factor limits the portion of a positive Index Change that is taken into account when calculating the Vested Gain for a given Indexed Strategy for a given Term.

	Vesting Factor
Dates within first six months of a Term	25%
Dates within the final six months of a Term but before the final Market Day of that Term	50%
On the final Market Day of a Term	100%

A Market Day is each day that all markets that are used to measure Index Changes for available Indexes Strategies are open for regular trading.

Months are measured from the first day of the Term. For example, if a Term starts on January 20, the final six months of that Term will begin on July 20.

If any date in a Term is after the final Market Day of that Term, then a 100% Vesting Factor applies on that date when Vested Gain for that Term is calculated. For example, if a Term ends on a Monday when the markets are closed due to a holiday, then the final Market Day of that Term is the Friday before that holiday. If an automated transaction is scheduled for Saturday, then the 100% Vesting Factor applies to that transaction.

Example. On the date of Surrender, your entire Account Value of $100,000 is allocated to the S&P 500 Growth/-10% Floor Strategy, which has a 12% Maximum Gain for the Term. You Surrender your Contract in month 9 of that Term, which means a Vesting Factor of 50% applies. For this example, we assume that you did not take any withdrawals before you Surrender your Contract. Assume there is a positive Index Change of 15% at the date on which you Surrender your Contract. Because the Index Change exceeds the Maximum Gain, the Maximum Gain applies and limits the Index Change to 12%. As a result, the Vested Gain is 6% (12% x 0.50). The Investment Base on the date of Surrender is $100,000. The Vested Gain that applies upon Surrender will be $6,000 ($100,000 x 0.06) and the amount payable will be $106,000 minus any related Early Withdrawal Charge.

Vested Loss

The Vested Loss is the portion of any negative Index Change that is taken into account when determining the value of an Indexed Strategy. Here is the formula that we use to calculate a Vested Loss for any day of a Term.

> Vested Loss = any negative Index Change since the start of the current Term (after taking into account either the Maximum Loss for each Term or the Buffer, as applicable) x remaining Investment Base for the current Term

Maximum Loss*.* The Maximum Loss for a Conserve/0% Floor Strategy or a Growth/-10% Floor Strategy is the most negative Index Change for a Term that is taken into account to determine the Vested Loss for that Indexed Strategy for that Term. For example, if the Maximum Loss for a Term is 10% and the negative Index Change at the end of that Term is 14%, then the Vested Loss for that Term is 10%.

- The Maximum Loss for each Term of a Conserve Strategy is 0%. This means that the value of a Conserve Strategy will not decrease due to a negative Index Change.
- The Maximum Loss for each Term of a Growth Strategy is a loss of 10%. This means that the value of a Growth Strategy will not decrease by more than 10% during a Term due to a negative Index Change.
- The Maximum Loss will not vary depending on the day of the Term. This means that for a Growth Strategy, the Maximum Loss throughout the Term is 10%.

Buffer*.* The Buffer is the portion of a negative Index Change for a Term that is disregarded when determining a Vested Loss for a 10% Buffer Strategy. The Buffer varies depending on the day of the Term. The Buffer at the end of a Term is 10%. Before the end of the Term, the Buffer is calculated daily as a prorated share of the annual 10% Buffer. For example, when 40% of a Term has elapsed, the Buffer on that day equals 40% of the Buffer that would apply at the end of the Term. When 80% of a Term has elapsed, the Buffer on that day equals 80% of the Buffer that would apply at the end of the Term. As a result, a negative Index Change of 15% would produce different Vested Losses at the following junctures:

- Day 146 of Term:
  Days Remaining to last Market Day of Term: 219
  Buffer: 10% x (365-219)/365 = 4%
  Vested Loss: 15% - 4% = 11%
- Day 292 of Term:
  Days Remaining to last Market Day of Term: 73
  Buffer: 10% x (365-73)/365 = 8%
  Vested Loss: 15% - 8% = 7%
- End of Term:
  Buffer: 10%

  Vested Loss: 15% -10% = 5%

We set the Maximum Loss or Buffer for each Indexed Strategy we offer at our sole discretion. We consider various factors in determining the limit on Index losses, including the cost of our risk management techniques, sales commissions, administrative expenses, regulatory and tax requirements, general economic trends, and competitive factors.

No Vesting Factor*.* A Vesting Factor does not apply when the Vested Loss is calculated. This means that all of the negative Index Change is taken into account when calculating the Vested Loss for a given Indexed Strategy for a given Term.

Example. On the date of Surrender, your entire Account Value of $100,000 is allocated to the S&P 500 Growth Strategy, which has a 10% Maximum Loss. You Surrender your Contract before the end of that Term. For this example, we assume that you did not take any withdrawals before you Surrender your Contract. Assume there is a negative Index Change of 12.5% on the day that you Surrender your Contract. Because the Index Change exceeds the Maximum Loss, the Maximum Loss applies and limits the Index Change to 10%. As a result, the Vested Loss is 10%. The Investment Base on the date of Surrender is $100,000. The Vested Loss that applies upon Surrender will be $10,000 ($100,000 x 0.10 = $10,000) and the amount payable will be $90,000 minus any related Early Withdrawal Charge.

Effect of Vested Gains and Losses

Here is a summary of the effect of Vested Gains and Losses in various situations.

Vested Gain	A Vested Gain increases the Indexed Strategy value.	If you take a withdrawal, the Investment Base will be reduced by less than the actual amount of the withdrawal and any related Early Withdrawal Charge because of the Vested Gain.
Vested Loss	A Vested Loss reduces the Indexed Strategy value.	If you take a withdrawal, the Investment Base will be reduced by more than the actual amount of the withdrawal and any related Early Withdrawal Charge because of the Vested Loss.
Additional Information	Any change in an Indexed Strategy value will affect the Account Value, which is used to determine the Surrender Value, the Annuity Payout Value and the Death Benefit value.	If you take a withdrawal, you will receive the amount you requested and the Indexed Strategy value will be reduced by the amount of the withdrawal and any related Early Withdrawal Charge.

Asymmetrical Impact of Index Changes on Growth and Buffer Strategies Using the Same Index

A Growth/-10% Floor Strategy and a 10% Buffer Strategy that use the same Index will often perform differently over identical time periods. These divergent results are produced by variations in the methods used to calculate Vested Gains and Vested Losses for Growth Strategies and Buffer Strategies. You should consider these variations if you are choosing between a Growth Strategy and a Buffer Strategy, and whether either is consistent with your income needs and risk tolerance. Currently, the only Index used by both a Growth Strategy and a Buffer Strategy is the S&P 500 Index.

Vested Gain Variations

Vested Gains for Growth Strategies and Buffer Strategies are calculated using the same formula, but that formula can produce different results when different Maximum Gains are applied. The Maximum Gain for a Buffer Strategy generally will be higher than the Maximum Gain for a Growth Strategy that uses the same Index. This is because the maximum amount of money you can lose is larger for a Buffer Strategy than a Growth Strategy.

For example, if we set a 12% Maximum Gain for the S&P 500 Growth Strategy and a 14% Maximum Gain for the S&P 500 Buffer Strategy, then the Vested Gains for identical investments in these two strategies would be the same over any period that the Index Value increased up to 12%, but would diverge over any period that the Index Value increased by more than 12%. During any such period, the Vested Gains for the Growth Strategy would be capped at 12%, while the Vested Gains for the Buffer Strategy may reach as high as 14%. As a result, it is possible for the Buffer Strategy to increase in value to a greater extent than the Growth Strategy.

Vested Loss Variations

The formulas used to calculate Vested Losses for Growth Strategies and Buffer Strategies are similar, except Vested Losses for a Growth Strategy are limited by a Maximum Loss, while Vested Losses for a Buffer Strategy are limited by a Buffer. The 10% Maximum Loss for a Growth Strategy does not change throughout the Term, which means that any negative Index Change between 0% and -10% is taken into account whenever Vested Loss is calculated. The amount of the Buffer for a Buffer Strategy increases each day during the course of each Term, culminating with a 10% Buffer at the end of each Term. This means that any a negative Index Change from 0 to -10% is disregarded when calculating Vested Loss at the end of the Term, but a smaller portion of a negative Index Change is disregarded when measuring a Vested Loss before the end of the Term.

The differences in the impact of negative Index Changes on a Growth Strategy and a Buffer Strategy using the same Index over the same Term depends on two variables: the size of the negative Index Change and the size of the Buffer on the date that the Vested Losses are measured.

The following chart illustrates how changes to these two variables impact Vested Losses for a Growth Strategy and a Buffer Strategy using the same Index over the same Term:

Impact of Negative Index Changes on Growth and Buffer Strategy Values Throughout Term

	Vested Loss on:									
	Day 73 (20% of Term Elapsed)		Day 146 (40% of Term Elapsed)		Day 219 (60% of Term Elapsed)		Day 292 (80% of Term Elapsed)		End of Term (100% of Term Elapsed)	
Index Change	Growth Strategy	Buffer Strategy	Growth Strategy	Buffer Strategy	Growth Strategy	Buffer Strategy	Growth Strategy	Buffer Strategy	Growth Strategy	Buffer Strategy

		2% Buffer		4% Buffer		6% Buffer		8% Buffer		10% Buffer
0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
-2%	-2%	0%	-2%	0%	-2%	0%	-2%	0%	-2%	0%
-4%	-4%	-2%	-4%	0%	-4%	0%	-4%	0%	-4%	0%
-6%	-6%	-4%	-6%	-2%	-6%	0%	-6%	0%	-6%	0%
-8%	-8%	-6%	-8%	-4%	-8%	-2%	-8%	0%	-8%	0%
-10%	-10%	-8%	-10%	-6%	-10%	-4%	-10%	-2%	-10%	0%
-12%	-10%	-10%	-10%	-8%	-10%	-6%	-10%	-4%	-10%	-2%
-14%	-10%	-12%	-10%	-10%	-10%	-8%	-10%	-6%	-10%	-4%
-16%	-10%	-14%	-10%	-12%	-10%	-10%	-10%	-8%	-10%	-6%
-18%	-10%	-16%	-10%	-14%	-10%	-12%	-10%	-10%	-10%	-8%
-20%	-10%	-18%	-10%	-16%	-10%	-14%	-10%	-12%	-10%	-10%
-22%	-10%	-20%	-10%	-18%	-10%	-16%	-10%	-14%	-10%	-12%

In general, Growth Strategies are designed to protect against larger negative Index Changes, while Buffer Strategies are designed to protect against smaller negative Index Changes. When identical investments are made in a Growth Strategy and a Buffer Strategy using the same Index over the same Term, a negative change in the Index produces the following results:

- a negative Index Change between 0% and -10%, measured on any day, would have a greater negative impact on the Growth Strategy
- a negative Index Change between -10% and -20% could have a greater negative impact on either strategy, depending on the Index Change and the size of the Buffer on the day the Index Change is measured
- a negative Index Change below -20%, measured on any day, would have a greater negative impact on the Buffer Strategy

See Appendix B: Examples - Impact of Withdrawals on Contract Values and Amounts Realized section below for examples that illustrate these concepts.

INDEXES

Any allocation to an Indexed Strategy does not represent an investment in an Index or in any securities or other assets included in an Index.

S&P 500 Index

The S&P 500® Index is designed to reflect the large-cap sector of the U.S. equity market and, due to its composition, it also represents the U.S. equity market in general. It includes 500 leading companies and captures approximately 80% coverage of available market capitalization. The S&P 500 Index does not include dividends declared by any of the companies in this index. Consequently, any positive change in the Index over a Term will be lower than the total return on a direct investment in the stocks that comprise the S&P 500 Index. The S&P 500 Index is a "price return index," not a "total return index," and therefore does not reflect dividends paid on the securities composing the Index. This will reduce the Index return and cause the Index to underperform a direct investment in the securities composing the Index.

The S&P 500 Index is a product of S&P Dow Jones Indices LLC or its affiliates ("SPDJI"), and has been licensed for use by MassMutual Ascend Life. Standard & Poor's®, S&P®, S&P 500®, US 500, The 500, iBoxx®, iTraxx® and CDX® are trademarks of S&P Global, Inc. or its affiliates ("S&P"); Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC ("Dow Jones"). MassMutual Ascend Life products are not sponsored, endorsed, sold or promoted by SPDJI, Dow Jones, S&P or their respective affiliates, and none of such parties makes any representation regarding the advisability of investing in such products nor do they have any liability for any errors, omissions, or interruption of the S&P 500 Index.

For more information, visit www.US.SPIndices.com.

SPDR Gold Shares ETF

The SPDR Gold Shares ETF represent units of beneficial interest in, and ownership of, the SPDR Gold Trust, an exchange traded fund that holds gold bullion. The investment objective of the trust is for the shares to reflect the performance of the price of gold bullion, less the trust's expenses. The shares are designed to mirror as closely as possible the price of gold, and the value of the shares relates directly to the value of the gold held by the trust, less its liabilities. The value of the gold held by the trust is determined using the London Bullion Market Association (LBMA) Gold Price PM. The SPDR Gold Shares ETF Index deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the Index to underperform a direct investment in gold bullion. The Gold Shares trade on the NYSE Arca under the symbol GLD. For more information, visit www.spdrgoldshares.com.

iShares MSCI EAFE ETF

The iShares MSCI EAFE ETF is an exchange traded fund that seeks to track the investment results of an index composed of large- and mid-capitalization developed market equities, excluding the U.S. and Canada (MSCI EAFE Index). This underlying index includes stocks from Europe, Australasia, and the Far East. It may include large- or mid-capitalization companies. The components of the underlying index, and the degree to which these components represent certain industries and/or countries, are likely to change over time. The fund's adviser uses an indexing strategy that involves investing in a representative sample of securities that collectively has an investment profile similar to that of the underlying index. The iShares MSCI EAFE ETF Index deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the ETF to underperform a direct investment in the securities composing the ETF.

The fund's shares trade on the NYSE Arca under the symbol EFA.

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iShares U.S. Real Estate ETF

The iShares U.S. Real Estate ETF is an exchange traded fund that seeks to track the investment results of an index composed of U.S. equities in the real estate sector (Dow Jones U.S. Real Estate Index). This underlying index may include large-, mid- or small-capitalization companies. A significant portion of the underlying index is represented by real estate investment trusts (REITs), but the components are likely to change over time. The fund's adviser uses an indexing strategy that involves investing in a representative sample of securities that collectively has an investment profile similar to that of the underlying index. The iShares U.S. Real Estate ETF Index deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the ETF to underperform a direct investment in the securities composing the ETF.

The fund's shares trade on the NYSE Arca under the symbol IYR.

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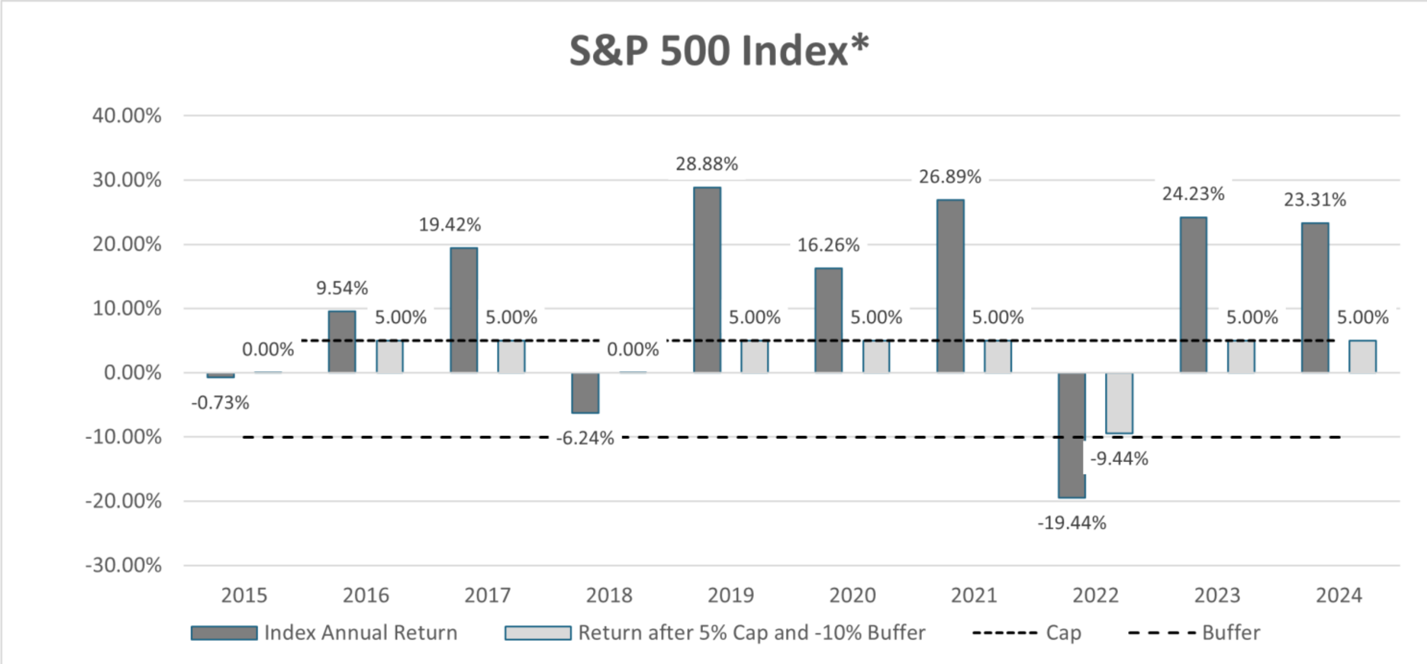
Additional Index information, including disclaimers, may be found in Appendix E.

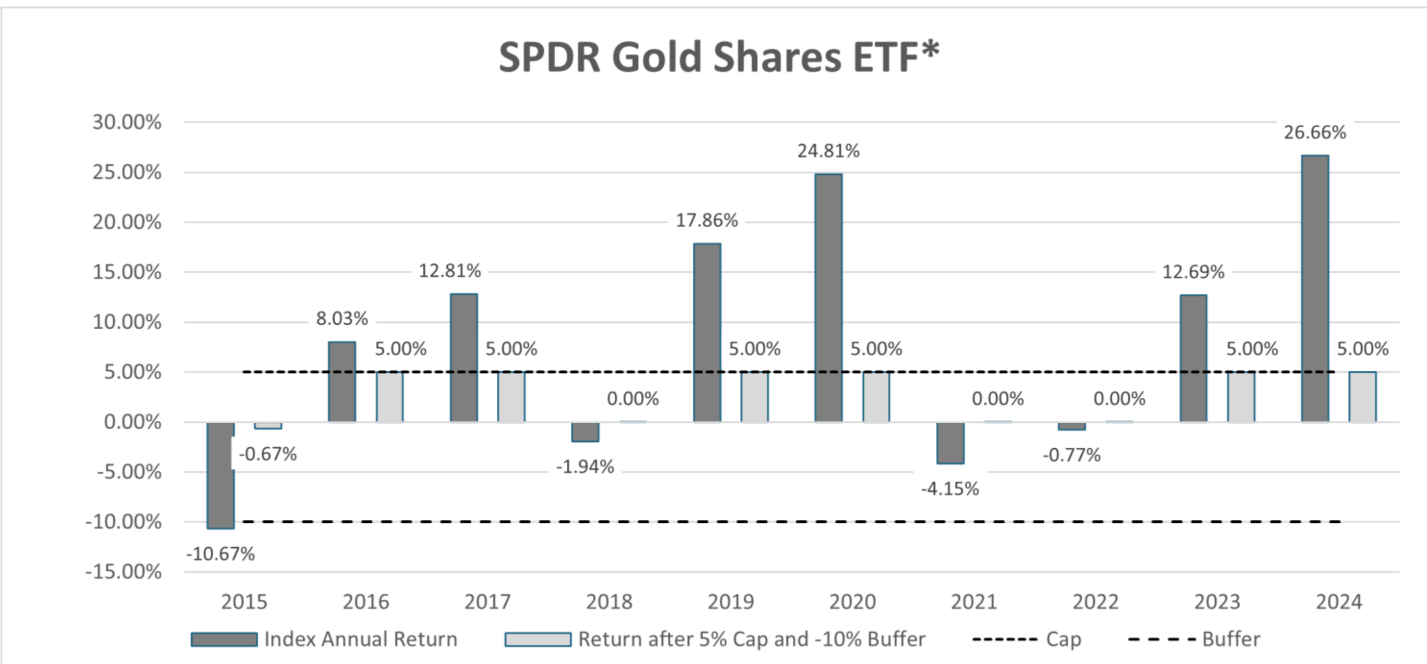
Historical Index Returns

The bar charts shown below provide each Index's annual returns for the last 10 calendar years (or for the life of the Index if less than 10 years), as well as the Index returns after applying a hypothetical 5% cap and a hypothetical -10% Buffer. The chart illustrates the variability of the returns from year to year and shows how hypothetical limits on Index gains and losses may affect these returns. Past performance is not necessarily an indication of future performance.

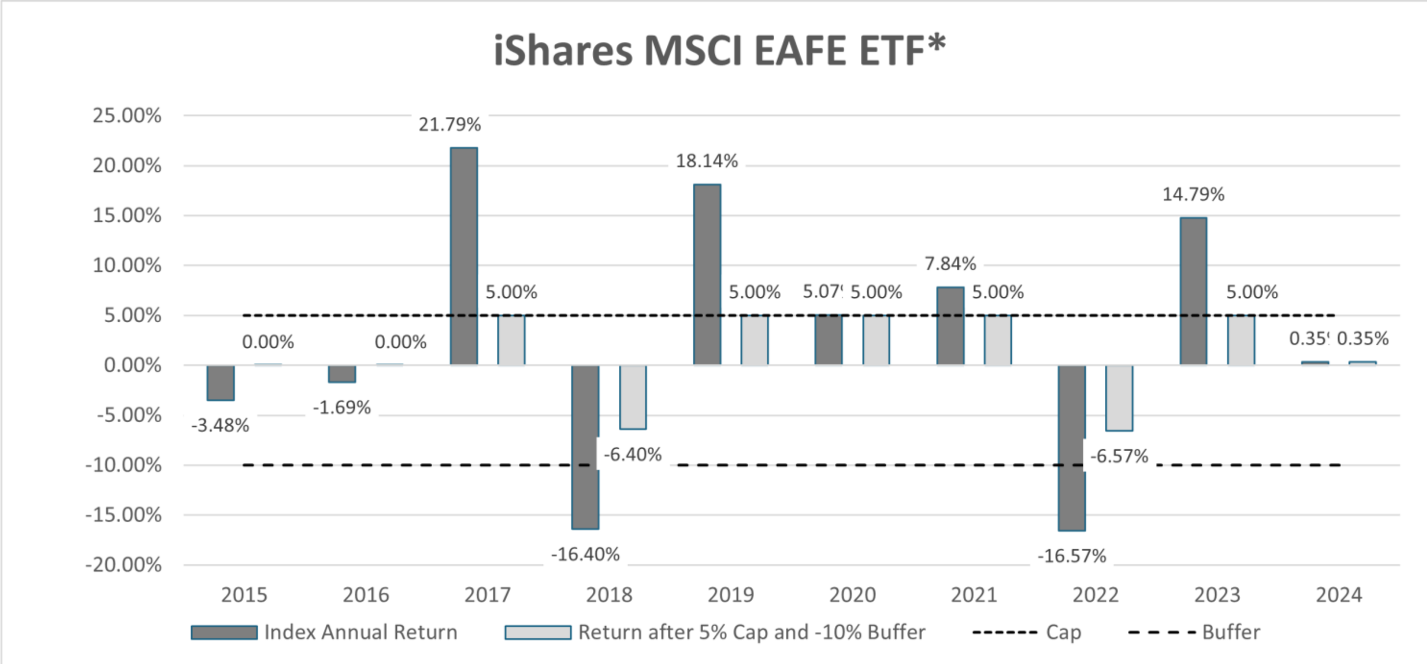
The performance below is NOT the performance of *any* Indexed Strategy. Your performance under the Contract will differ, perhaps significantly. The performance below may reflect a different return calculation, time period, and Maximum Gain and Maximum Loss or Buffer than the Indexed Strategy does, and does not reflect Contract charges and adjustments, including Early Withdrawal Charges and adjustments for Vested Gain or Loss, which reduce performance.



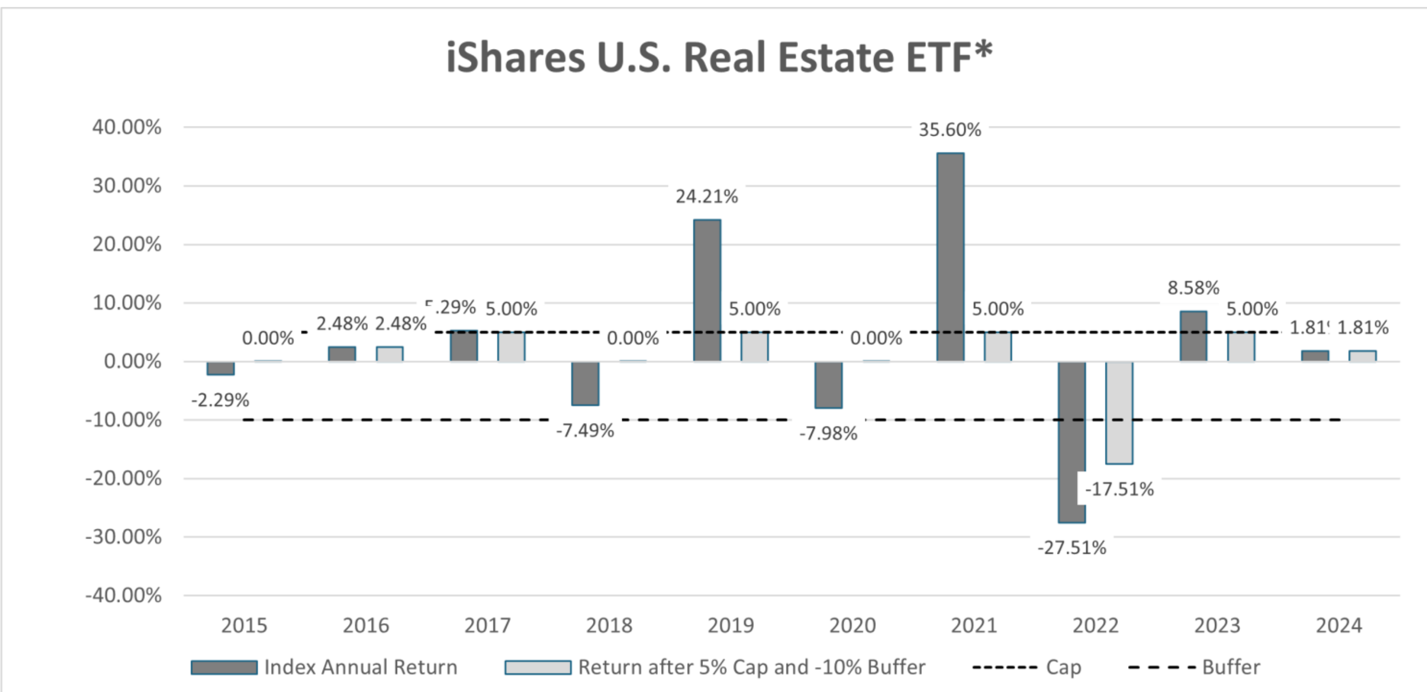
* The S&P 500 Index is a "price return index," not a "total return index," and therefore does not reflect dividends paid on the securities composing the Index. This will reduce the Index return and cause the Index to underperform a direct investment in the securities composing the Index.



* The SPDR Gold Shares ETF Index deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the Index to underperform a direct investment in gold bullion.



* The iShares MSCI EAFE ETF Index deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the Index to underperform a direct investment in the securities composing the Index.



* The iShares U.S. Real Estate ETF deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the Index to underperform a direct investment in the securities composing the Index.

Index Replacement

We may replace an Index if it is discontinued or we are no longer able to use it, its calculation changes substantially, or we determine that hedging instruments are difficult to acquire or the cost of hedging becomes excessive. We may do so at the end of a Term or during a Term. We will notify you in writing at least 30 days before we replace an Index.

We would attempt to choose a replacement Index that is similar to the old Index. To determine if a new Index is similar, we will consider factors such as asset class, Index composition, strategy or methodology inherent to the Index and Index liquidity.

If we replace an Index during a Term, we will calculate Vested Gains and Losses using the old Index up until the replacement date. After the replacement date, we will calculate Vested Gains and Losses using the new Index, but with a modified start of Term value for the new Index. The modified start of Term value for the new Index will reflect the Index Change for the old Index from the start of the Term to the replacement date.

If we replace an Index, the applicable Maximum Gain and Bailout Trigger for the Term, the applicable Maximum Loss or Buffer, and the Vesting Factors will not change.

Example. This example is intended to show how we would calculate Vested Gain or Loss on any day during a Term if we have replaced an Index during the Term. This example assumes: (1) you allocate $50,000 to a Growth/-10% Floor Strategy; and (2) the replacement is made on day 90 of the Term. To simplify the example, we assume that you take no withdrawals during the Term.

Index Change on Replacement Date for Old Index	
Old Index Value at Term Start	1000
Old Index Value on Replacement Date	1050
Old Index Change on Replacement Date	(1050 - 1000) / 1,000 = 5%

The 5% Index Change on the Replacement Date is then used to calculate the modified start of Term value for the new Index.

Modified Start of Term Value for New Index	
Old Index Change on Replacement Date	5%
New Index Value on Replacement Date	1785
Modified Start of Term Value for New Index	1785 / (100% + 5%) = 1700

The modified start of Term value for the new Index is then used to calculate the Strategy value on any date after the replacement date, including the value at the Term end.

Strategy Value at Term End	
Investment Base at Term Start	$50,000
Modified Start of Term Value for New Index	1700
Value of New Index at Term End	1853
Positive Index Change	(1853 - 1,700) / 1700) = 9%
Maximum Gain	Gain of 8%
Positive Index Change Limited by Maximum Gain	8%
Vesting Factor for Positive Index Change at Term End	100%
Vested Gain as a Percentage	8% x 100% = 8%
Vested Gain in Dollars	$50,000 x 8% = $4,000
Strategy Value at Term End	$50,000 + $4,000 = $54,000

ACCESSING YOUR CONTRACT VALUES

Cash Benefit

Surrender

You may Surrender your Contract at any time before the earlier of: (1) the Annuity Payout Initiation Date; or (2) a death for which a Death Benefit is payable. The right to Surrender may be restricted if your Contract is purchased under an employer plan subject to IRC Section 401 (pension, profit sharing, and 401(k) plans), IRC Section 403(b) (tax-sheltered annuity plans), or IRC Section 457(b) (governmental deferred compensation plans).

A Surrender must be made by a Request in Good Order. The amount paid upon Surrender is the Surrender Value. If you Surrender your Contract, the Contract terminates.

Withdrawals

You may take a withdrawal from your Contract at any time before the earliest of: (1) the Annuity Payout Initiation Date; (2) a death for which a Death Benefit is payable; or (3) the date that this Contract is Surrendered. The right to withdraw may be restricted if your Contract is purchased under an employer plan subject to IRC Section 401 (pension, profit sharing, and 401(k) plans), IRC Section 403(b) (tax-sheltered annuity plans), or IRC Section 457(b) (governmental deferred compensation plans).

A withdrawal must be made by a Request in Good Order. The amount of any withdrawal must at least $500. If the withdrawal would reduce the Account Value to less than the minimum value of $5,000, we will treat the withdrawal request as a request to withdraw the maximum amount that may be taken without reducing your Account Value to less than $5,000.

We will withdraw funds from your Account Value as of the date on which we receive your Request in Good Order or any later specified effective date. Unless you instruct us otherwise by a Request in Good Order prior to the date of the withdrawal, a withdrawal will be taken in the following order:

- first proportionally from funds that then qualify for a waiver of the Early Withdrawal Charge pursuant to the Bailout Right;
- then proportionally from the Declared Rate Strategies having the shortest Term until all Declared Rate Strategies are exhausted; and
- then proportionally from Indexed Strategies having the shortest Term.

Effect of Withdrawals

A withdrawal reduces the Account Value, which in turn reduces the amount payable upon Surrender, applied to the Annuity Payout Benefit, or payable as the Death Benefit.

If an Early Withdrawal Charge applies to your withdrawal, you will receive the amount that you requested, and your Account Value will be reduced by the amount you receive plus the amount needed to pay the Early Withdrawal Charge. A withdrawal from an Indexed Strategy other than at the end of a Term also reduces the Investment Base used to calculate the Vested Gain or Loss for the Term. The reduction in the Investment Base for a withdrawal and any related Early Withdrawal Charge is proportional to the reduction in the Account Value. **See Vested Gains and Losses section above.**

Automated Withdrawals

You may elect to withdraw money from your Contract under any automated withdrawal program that we offer. Your Account Value must be at least $10,000 in order to make an automated withdrawal election. The minimum amount of each automated withdrawal payment is $100. Automated withdrawals will be taken from the Purchase Payment Account and Strategies of your Contract in the same order as any other withdrawal.

Subject to the terms and conditions of the automated withdrawal program, you may begin or discontinue automated withdrawals at any time. You must give us at least 30 days' notice to change any automated withdrawal instructions that are currently in place. Any request to begin, discontinue or change automated withdrawals must be a Request in Good Order. We reserve the right to discontinue offering automated withdrawals at any time.

Currently, we do not charge a fee to participate in an automated withdrawal program. However, we reserve the right to impose an annual fee in such amount as we may then determine to be reasonable for participation in the automated withdrawal program. If imposed, the fee will not exceed $30 annually.

Before electing an automated withdrawal, you should consult with a financial advisor. Automated withdrawals are similar to starting Annuity Payout Benefit payments, but will result in different taxation of payments and potentially a different amount of total payments over the life of your Contract.

- Automated withdrawals during a Term from an Indexed Strategy will systematically reduce the Investment Base, which will reduce any subsequent increase in the Strategy value due to a rise in the applicable Index at the end of that Term. Such reductions could be significant.
- Automated withdrawals will reduce the amount available under the Free Withdrawal Allowance.
- Unless a waiver applies, an Early Withdrawal Charge may apply to an automated withdrawal during the first five Contract Years.
- Automated withdrawals could result in significant loss due to taxes and reduce your ability to take full advantage of any positive Index performance at the end of a Term.

Exchanges, Transfers, and Rollovers

An amount paid on a withdrawal or Surrender may be paid to or for another annuity or tax-qualified account in a tax-free exchange, transfer, or rollover to the extent allowed by federal tax law.

For detailed examples regarding the amount that may be available for withdrawal in different market environments, please refer to Appendix C.

Annuity Payout Benefit

Under the Contract you may receive regular Annuity Payout Benefit payments for the duration of the period that you select. Once Annuity Payout Benefit payments start, you can no longer Surrender the Contract or take a withdrawal, no Death Benefit will be payable under your Contract, and your Beneficiary designations will no longer apply. The amount payable after death, if any, is governed by the Payout Option you select.

The Annuity Payout Benefit is payable if the Annuity Payout Initiation Date is reached before the earlier of: (1) a death for which a Death Benefit is payable; or (2) the date that this Contract is Surrendered.

Annuity Payout Benefit payments are subject to income tax to the extent that they represent Contract earnings or pre-tax contributions. If received before age 59½, the taxable portion of an Annuity Payout Benefit payment may also be subject to an additional 10% federal penalty tax.

Annuity Payout Initiation Date

The Annuity Payout Initiation Date is the first day of the first payment interval for which payment of the Annuity Payout Benefit is to be made. Annuity Payout Benefit payments are made at the end of each payment interval. This means that for annual payments, the first payment will be made one year after the Annuity Payout Initiation Date.

You may select the Annuity Payout Initiation Date by a Request in Good Order. We must receive your request before the last Market Close on or before the Annuity Payout Initiation Date you selected and at least 30 days before the first Annuity Payout Benefit payment is to be made.

- The earliest Annuity Payout Initiation you may select is the first Contract Anniversary.
- Unless we agree, the latest Annuity Payout Initiation Date you may select is the Contract Anniversary following your 95th birthday or the 95th birthday, of a joint owner, if earlier. If the Owner is not a human being such as a trust or a corporation, then the Annuity Payout Initiation Date may not be later than the Contract Anniversary following the 95th birthday of the eldest Annuitant, unless we agree.

The earliest permitted date and the latest permitted date for the Annuity Payout Initiation Date are set out in your Contract Specifications. The latest permitted date may change if an Owner changes.

If you do not select an Annuity Payout Initiation Date by the latest permitted date, we may select it for you. We will notify you in writing at least 45 days before the date we select. We will give you an opportunity to select an earlier date.

Annuity Payout Amount

The amount of each payment under the Annuity Payout Benefit is determined on the Annuity Payout Initiation Date based on the Annuity Payout value on that date, the Payout Option that applies, the payment interval, an assumed interest rate, and for life options, the life expectancy of the Annuitant.

The Annuity Payout Value is the amount that can be applied to the Annuity Payout Benefit is equal to: (1) the Account Value on the Annuity Payout Initiation Date; minus (2) premium tax or other taxes not previously deducted.

Form of Annuity Payout Benefit

The Annuity Payout Benefit is paid in the form of annual payments as a Life Payout with Payments for at Least a Fixed Period. That fixed period will be 10 years or, if fewer, the maximum number of whole years permitted by any tax qualification endorsement.

In place of that, you may elect to have the Annuity Payout Benefit paid in any form of Payout Option that is available under your Contract. The available Payout Options are described in the Payout Options section below. You may elect a Payout Option by a Request in Good Order. We must receive your request before the last Market Close on or before the Annuity Payout Initiation Date and at least 30 days before the first Annuity Payout Benefit payment is to be made.

Payee for Annuity Payout Benefit

Payment of the Annuity Payout Benefit generally is made to the surviving Owner(s) as the payee(s). In place of that, the surviving Owner(s) may elect for payment to be made as a tax-free exchange, transfer, or rollover, or for payment to be made to the Annuitant. That election must be made by a Request in Good Order that we receive at least 30 days before the payment date.

Payments that become due after the death of the payee are made to:

- the surviving Owner(s); or if none
- then to the surviving contingent payee(s) designated by the surviving Owner(s); or if none;
- the estate of the last payee who received a payment.

The portion of any Annuity Payout Benefit remaining after the death of an Owner or Annuitant must be paid at least as rapidly as payments were being made at the time of such death.

You may designate a contingent payee by a Request in Good Order. If you designate your spouse as a contingent payee and your marriage ends before your death, then we will treat your former spouse as having predeceased you except in the following situations: (1) if a court order provides that the former spouse's rights as a contingent payee are to continue; or (2) if the former spouse remains or becomes an Owner.

Death Benefit

A Death Benefit is payable under your Contract if you die before the Annuity Payout Initiation Date and before the Contract is Surrendered. If your spouse becomes a successor owner of the Contract, no Death Benefit will be payable on account of your death.

When the Owner is a non-natural person, a Death Benefit is payable under the Contract if the Annuitant dies before the Annuity Payout Initiation Date and before the Contract is Surrendered. For this purpose, a non-natural person is a trust, custodial account, corporation, limited liability company, partnership, or other entity.

Only one Death Benefit will be paid under the Contract. If a Death Benefit becomes payable, it will be in place of all other benefits under the Contract, and all other rights under this Contract will terminate except for rights related to the Death Benefit.

Death Benefit Payout Date

- If the Death Benefit is to be paid as a lump sum, then it will be paid as soon as practicable after the receipt of proof of death and a Request in Good Order for a lump sum payment.
- If the Death Benefit is to be paid under a Payout Option, then we will apply the Death Benefit value to a Payout Option as soon as practicable after receipt of proof of death and a Request in Good Order. That application date will be the first day of the first payment interval for which a payment is to be made. Death Benefit payments under a Payout Option are made at the end of each payment interval. This means that, for annual payments, the first payment will be made one year after that application date.

Death Benefit Amount

- If the Death Benefit is paid in a lump sum, then it is equal to the Death Benefit value, increased by any additional post- death interest as required by law.
- If the Death Benefit will be paid as a series of periodic payments under a Payout Option, then the amount of each payment under the Death Benefit is determined on the date that the Death Benefit value is applied to the Payout Option. The amount or each payment will be based on the Death Benefit value (increased by any additional post-death interest as required by law to the date it is applied to the Payout Option), the Payout Option that applies, and the payment interval.

Death Benefit Value

The Death Benefit value is the greater of:

- the Account Value on the date that the Death Benefit value is determined; or
- the Purchase Payments, reduced proportionally for all withdrawals, but not including amounts applied to pay Early Withdrawal Charges (the "Purchase Payment base").

In either case, the Death Benefit value is reduced by premium tax or other taxes not previously deducted.

The reduction in your Purchase Payment base for withdrawals will be in the same proportion that your Account Value was reduced on the date of the withdrawal. A proportional reduction in your Purchase Payment base could be larger than the dollar amount of your withdrawal.

Example. Here is an example of how we calculate a proportional reduction of your Purchase Payment base. In this example, we assume you take an $8,000 withdrawal. To simplify the example, we also assume no Early Withdrawal Charge, no premium tax is deducted, and no additional post-death interest is added.

	Before Withdrawal	**After** Withdrawal	Explanation
Account Value	$100,000	$92,000	Your withdrawal reduces your Account Value by $8,000 (which is an 8% reduction in your Account Value). $8,000 / $100,000 = 8%
Purchase Payment Base for minimum Death Benefit	$120,000	$110,400	After the withdrawal, the Purchase Payment base for the minimum Death Benefit is also reduced by 8% or $9,600. $120,000 x 0.08 = $9,600

Determination Date

The date that the Death Benefit value is determined is the earlier of: (1) the first anniversary of the date of death; or (2) the date that we have received both proof of death and Requests in Good Order with instructions as to the form of Death Benefit from all Beneficiaries. Thus, in many cases where there are multiple Beneficiaries, the date that the Death Benefit value is determined will be the date when the last Beneficiary submits the necessary Request in Good Order or the first anniversary of death. Until then, the Contract values remain in the Crediting Strategies and the Indexed Strategy values may fluctuate. This risk is borne by the Beneficiaries.

Proof of Death
Before making payment of a Death Benefit, or any other payment or transfer of ownership rights that depends on the death of a specified person, we will require proof of death. We may delay making any payment until it is received. For this purpose, proof of death is:

- a certified copy of a death certificate showing the cause and manner of death;
- a certified copy of a decree that is made by a court of competent jurisdiction as to the finding of death; or
- other proof that is satisfactory to us.

Form of Death Benefit

The Death Benefit is paid in the form of annual payments for a fixed period of two years.

In place of that, you may elect to have the Death Benefit paid in one lump sum or in any form of Payout Option that is available under your Contract. The available Payout Options are described in the Payout Options section below. There is no additional charge associated with this election.

You may make an election by a Request in Good Order. We must receive your request on or before the date of death for which a Death Benefit is payable. If you do not make such an election, the Beneficiary may make that election after the date of death. The Beneficiary's election must be made by a Request in Good Order that is received by us no later than the date that the Death Benefit value is applied to a Payout Option and at least 30 days before the date of the first payment to be made.

Additional Rules
Any election is subject to the Death Benefit Distribution Rules described below.

A Payout Option that is contingent on life is based on the life of the Beneficiary or, in some cases, the life of a person to whom the Beneficiary is obligated.

We will pay the Death Benefit as a lump sum rather than as payments under a Payout Option if: (1) the Death Benefit is less than $2,000; or (2) as of the date that the Death Benefit value is to be applied to a Payout Option, the Death Benefit Distribution Rules do not allow a two-year payout.

Payee of Death Benefit Payments

Death Benefit payments generally are made to the Beneficiary as the payee.

In place of that, the Beneficiary may elect to have payments made:

- as a tax-free exchange, transfer, or rollover to or for an annuity or tax-qualified account as permitted by federal tax law; or
- in cases where the Beneficiary is an estate, trust, custodial account, corporation, limited liability company, partnership, or other entity, to a person to whom the Beneficiary is obligated to make corresponding payments.

Payments that become due after the death of the Beneficiary are made to:

- the contingent payee designated as part of a Death Benefit Payout Option elected by you; or if none
- then to a contingent payee designated by the Beneficiary; or if none
- the estate of the last payee who received a payment.

Such payments are subject to the Death Benefit Distribution Rules described below.

You may designate a contingent payee by a Request in Good Order. A Beneficiary may make or change a payee or contingent payee, except a Beneficiary may not change a designation made as part of a Payout Option election made by you for the Death Benefit. If the Beneficiary designates his or her spouse as a contingent payee and their marriage ends before the Beneficiary's death, then we will treat the former spouse as having predeceased the Beneficiary except to the extent a court order provides that the former spouse's rights as a contingent payee are to continue.

Death Benefit Distribution Rules

The Death Benefit Distribution Rules are summarized below.

- For a Tax Qualified Contract. The Death Benefit must be paid in accordance with the tax qualification endorsement.
- For a Nonqualified Contract. The Death Benefit must be paid either: (1) in full within five years of the date of death; or (2) over the life of the Beneficiary or over a period certain not exceeding the Beneficiary's life expectancy, with payments at least annually, and with the first payment made within one year of the date of death.

Payout Options

The standard Payout Options are described below.

Payments under each standard Payout Option are made at the end of a payment interval. For example, if the Annuity Payout Initiation Date is October 31, 2029 and you select annual payments, then the first payment will be paid as of October 31, 2030.

<table>
<tr><th>Option</th><th>Description for Annuity Payout Benefit</th><th>Description for Death Benefit</th></tr>
<tr><td>Fixed Period Payout</td><td>We will make periodic payments to you, or to the Annuitant, if you direct, for the fixed period of time that you select.
If the payee dies before the end of the fixed period, then we will make periodic payments to the surviving Owner(s), or if none, then to the surviving contingent payee(s), or if none, then to the estate of the last payee who received payments.
In all cases, payments will stop at the end of the fixed period.
For a nonqualified contract, fixed periods shorter than 10 years are not available. For a tax-qualified contract, the only fixed period available is 10 years.</td><td>We will make periodic payments to the Beneficiary for the fixed period of time that you or the Beneficiary selects.
If the Beneficiary dies before the end of the fixed period, then we will make periodic payments to the contingent payee designated as part of any Death Benefit Payout Option that you have elected. If no such contingent payee is surviving, then such payments will be made to a contingent payee designated by the Beneficiary. If there is no contingent payee surviving, then such payments will be made to the estate of the last payee who received payments.
In all cases, payments will stop at the end of the fixed period.
The fixed period cannot exceed the life expectancy of the Beneficiary. For a tax-qualified contract, the fixed period also cannot exceed 10 years.</td></tr>
<tr><td>Life Payout</td><td>We will make periodic payments to you, or to the Annuitant, if you direct, for as long as the Annuitant lives.

Payments will stop on the death of the Annuitant. This means that, even if we have made only one payment when the Annuitant dies, payments will stop.

If the Annuitant dies after the Annuity Payout Initiation Date but before the first payment, a Life Payout will not provide any benefit at all. In that case, we will reverse the Annuity Benefit Payout election and treat the Contract as if the Annuity Payout Initiation Date had not yet been reached.
If the Owner is living, this treatment will generally allow the Owner to choose between continuing the Contract as a deferred annuity or electing a new Annuity Payout Initiation Date and another Payout Option.
If the Annuitant's death before the Annuity Payout Initiation Date would give rise to a Death Benefit, then the Death Benefit will be available.</td><td>We will make periodic payments to the Beneficiary for as long as the Beneficiary lives.

Payments will stop on the death of the Beneficiary. This means that, even if we have made only one payment when the Beneficiary dies, payments will stop.

If the Beneficiary dies after the Death Benefit is applied to the Payout Option but before the first payment, a Life Payout will not provide any benefit at all. In that case, we will reverse the Payout Option election and allow the Beneficiary's estate to choose a new Payout Option or to take the Death Benefit as a lump sum.

For a tax-qualified contract, a Life Payout is not available to all Beneficiaries.</td></tr>
</table>

Option	Description for Annuity Payout Benefit	Description for Death Benefit
Life Payout with Payments for at Least a Fixed Period	We will make periodic payments to you, or to the Annuitant, if you direct, for as long as the Annuitant lives. • If the Annuitant dies **after** the end of the fixed period you selected, then payments will stop on the death of the Annuitant. • If the Annuitant dies **before** the end of the fixed period you selected, then we will make periodic payments to the surviving owner(s), or if none, then to the surviving contingent payee(s), or if none, then to the estate of the last payee who received payments. In this case, payments will stop at the end of the fixed period you selected. For a tax-qualified contract, fixed periods longer than 10 years are not available.	We will make periodic payments to the Beneficiary for as long as the Beneficiary lives. • If the Beneficiary dies **after** the end of the fixed period selected, then payments will stop on the death of the Beneficiary. • If the Beneficiary dies **before** the end of the fixed period you or the Beneficiary selected, then we will make periodic payments to the contingent payee designated as part of any Death Benefit Payout Option that you have elected. If no such contingent payee is surviving, then such payments will be made to a contingent payee designated by the Beneficiary. If there is no contingent payee surviving, then such payments will be made to the estate of the last payee who received payments. In this case, payments will stop at the end of the fixed period you or the Beneficiary selected. The fixed period cannot exceed the life expectancy of the Beneficiary. For a tax-qualified contract, a Life Payout with Payments for at Least a Fixed Period is not available to all Beneficiaries, and the fixed period also cannot exceed 10 years.
Joint and One-Half Survivor Payout	We will make periodic payments to you, or to the primary Annuitant, if you direct, for as long as the primary Annuitant lives. • If the primary Annuitant dies and the secondary Annuitant does **not** survive the primary Annuitant, then payments will stop on the death of the primary Annuitant. • If the primary Annuitant dies and the secondary Annuitant is surviving, then we will make one-half of the periodic payment to you, or the secondary Annuitant, if you direct, for the rest of the secondary Annuitant's life. In this case, payments will stop on the death of the secondary Annuitant. This means that, even if we have made only one payment when the primary Annuitant dies, payments will stop unless the secondary Annuitant survives. If the Annuitant dies after the Annuity Payout Initiation Date but before the first payment, a Joint and One-Half Survivor Payout will never provide the full payment amount. In that case, if the secondary Annuitant agrees, we will reverse the Annuity Benefit Payout election and treat the Contract as if the Annuity Payout Initiation Date had not been reached. • If the Owner is living, this treatment will generally allow the Owner to choose between continuing the Contract as a deferred annuity or electing a new Annuity Payout Initiation Date and another Payout Option. • If the Annuitant's death before the Annuity Benefit Payout Initiation Date would give rise to a Death Benefit, then the Death Benefit will be available.	We will make periodic payments to the Beneficiary for as long as the Beneficiary lives. • If the Beneficiary dies and the contingent payee does **not** survive the Beneficiary, then payments will stop on the death of the Beneficiary. • If the Beneficiary dies and the contingent payee designated as part of the Death Benefit Payout Option election is surviving, then we will make one-half of the periodic payment to the contingent payee for the rest of the contingent payee's life. In this case, payments will stop on the death of the contingent payee. This means that, even if we have made only one payment when the Beneficiary dies, payments will stop unless the contingent payee survives. If the Beneficiary dies after the Death Benefit is applied to the Payout Option but before the first payment, a Joint and One-Half Survivor Payout will never provide the full payment amount. In that case, if the contingent payee agrees, we will reverse the Payout Option election and allow the Beneficiary's estate to choose a new Payout Option or to take the Death Benefit as a lump sum. A Joint and One-Half Survivor Payout is only available to a Beneficiary who is the surviving spouse of the owner.

We will make payments in any other form of Payout Option that is acceptable to us at the time of any election. More than one Payout Option may be elected if the requirements for each Payout Option elected are satisfied. All elected Payout Options must comply with pertinent laws and regulations.

Payments under a Payout Option are calculated and paid as fixed dollar payments. The stream of payments is an obligation of the general account of MassMutual Ascend Life. Fixed dollar payments will remain level for the duration of the payment period. Once payments begin under a Payout Option, the Payout Option may not be changed. Once the Contract value is applied to a Payout Option, the periodic payments cannot be accelerated or converted into a lump sum payment unless we agree.

We will use the 2012 Individual Annuity Reserving Table with projection scale G2 for blended lives (60% female/40% male) with interest at 1% per year, compounded annually, to compute all guaranteed Payout Option factors, values, and benefits under the Contract. For purposes of calculating payments based on the age of a person, we will use his or her age as of his or her last birthday.

Considerations in Selecting a Payout Option

Payments under a Payout Option are affected by various factors, including the length of the payment period, the life expectancy of the person on whose life payments are based, and the frequency of the payment interval (monthly, quarterly, semi-annually or annually).

- Generally, the longer the period over which payments are made or the more frequently the payments are made, the lower the amount of each payment because more payments will be made.
- For Life Payout Options, the longer the life expectancy of the Annuitant or Beneficiary, the lower the amount of each payment because more payments are expected to be paid.

Non-Human Payees under a Payout Option

Except as stated below, the primary payee under a Payout Option must be a human being. All payments during his or her life must be made by check payable to the primary payee or by electronic transfer to a bank account owned by the primary payee.

*Exceptions***.** Below are some exceptions to the general rule that the primary payee must be a human being. We may make other exceptions in our discretion.

- A nonhuman that is the Owner of the Contract may be the primary payee. For example, if the Owner is a trust, that trust may be the primary payee.
- Payments may be made payable to another insurance company or financial institution as a tax-free exchange, transfer, or rollover to or for another annuity or tax-qualified account as allowed by federal tax law.

PROCESSING APPLICATIONS, PURCHASE PAYMENTS AND REQUESTS

Processing Applications and Initial Purchase Payments

We processed an application when we received both the application that was a Request in Good Order and the initial Purchase Payment.

- If that happened on a Market Day before the Market Close, we processed the application and applied the Purchase Payment on that Market Day.
- If that happened on a Market Day after the Market Close or on a day that was not a Market Day, then we processed the application and applied the Purchase Payment on the next Market Day.

We can no longer accept or process applications for this Contract.

Processing Additional Purchase Payments

- If we received an additional Purchase Payment during the first two months of the Contract on a Market Day before the Market Close, we applied it on that Market Day.
- If we received an additional Purchase Payment during the first two months of the Contract on a Market Day after the Market Close or on a day that was not a Market Day, then we applied it on the next Market Day.

Your Contract no longer permits an additional Purchase Payment.

Processing Requests

Requests may be made by mail at P.O. Box 5423, Cincinnati OH 45201-5423. Request by fax may be made at 800-807-9777.
Requests for reallocations among Strategies may be made by telephone at 1-800-789-6771 between 8:00 AM and 4:00 PM Eastern Time Monday through Friday. We may also permit reallocation requests to be made at our website (massmutualascend.com). Some selling firms may restrict the ability of their registered representatives to convey reallocation requests by telephone or Internet on your behalf.

To obtain one of our forms (for example, a Strategy Selection form or a Withdrawal Request form) or to obtain more information about how to make a request, call us at 1-800-789-6771 or send us a fax at 800-807-9777. You can also request forms or information by mail at MassMutual Ascend Life Insurance Company, P.O. Box 5423, Cincinnati OH 45201-5423. You may also obtain forms on our website, www.massmutualascend.com.

We cannot process a request unless it is a Request in Good Order. A request may be rejected or delayed if it is not a Request in Good Order.

- If we receive a Request in Good Order on a Market Day before the Market Close, we will process it using values determined for the Market Close on that Market Day.
- If we receive a Request in Good Order after the Market Close or on a day that is not a Market Day, then we will treat that request as received at the start of the next Market Day.

If you have any questions, you should contact us or your registered representative before submitting the request.

Exception. If a withdrawal under an automated withdrawal program is scheduled for a date that is not a Market Day, then we will process the withdrawal on the scheduled date using values at the most recent Market Close. For example, if the automated withdrawal is scheduled for a date that falls on Sunday and there was a Market Close at 4:00 PM on the previous Friday, then we will process the withdrawal on Sunday using values determined at 4:00 PM on that Friday.

Market Days and Market Close

A Market Day is each day that all markets that are used to measure available Indexed Strategies are open for regular trading.

- Saturdays, Sundays, holidays and any other day that the New York Stock Exchange and the NYSE Arca are closed are not Market Days.
- The NYSE and the NYSE Arca observe the following holidays: New Year's Day, Martin Luther King, Jr. Day, Presidents' Day, Good Friday, Memorial Day, Juneteenth, Independence Day, Labor Day, Thanksgiving Day, and Christmas Day.

A Market Close is the close of the regular or core trading session on the market used to measure a given Indexed Strategy.

NYSE	NYSE Arca
Regular trading hours usually end at 4:00 PM Eastern Time	Core trading session usually ends at 4:00 PM Eastern Time
Trading hours end at 1:00 PM Eastern Time on the day before the Fourth of July and the Friday after Thanksgiving Christmas Eve.	Core trading session ends at 1:00 PM Eastern Time on the day before the Fourth of July and the Friday after Thanksgiving Christmas Eve.

Regular trading or a core trading session may end at a different time on a Market Day under certain circumstances when and as permitted under applicable rules. Such circumstances generally cannot be predicted in advance.

Specific information about NYSE and NYSE Arca holidays and trading hours in any given calendar year is available at https://www.nyse.com/markets/hours-calendars.

Receipt of Requests

For purposes of processing, we deem Requests in Good Order and other instructions (paperwork) mailed to our post office box as received by us at our administrative office when the Purchase Payment or the paperwork reaches the applicable processing department located at 191 Rosa Parks Street, Cincinnati OH 45202.

Risks and Limitations Related to Requests by Telephone or Internet

We will use reasonable procedures such as requiring certain identifying information, tape recording the telephone instructions, and providing written confirmation of the transaction, in order to confirm that instructions communicated by telephone, fax, Internet or other means are genuine. Any telephone, fax or Internet instructions reasonably believed by us to be genuine will be your responsibility, including losses arising from any errors in the communication of instructions. As a result of this policy, you will bear the risk of loss. We are not responsible for the validity of any request or action.

Telephone and computer systems may not always be available. Any telephone or computer system, whether it is yours, your service provider's, your agent's, or ours, can experience outages or slowdowns for a variety of reasons. These outages or slowdowns may delay or prevent our processing of your request. Although we have taken precautions to help our systems handle heavy use, we cannot promise complete reliability under all circumstances. If you experience technical difficulties or problems, you should consider making your request by mail.

If you purchase your contract and subsequently move or travel to a country for which we restrict website access due to Office of Foreign Assets Control (OFAC) sanctions, other US government regulations, or high computer hacker risk, you will only be able to submit transaction requests via telephone, U.S. postal service, or private carriers. The list of countries for which we currently block website access is as follows: Iran, Russia, North Korea, Ukraine, China, Syrian Arab Republic, Tunisia, Belarus, Turkey, South Korea, Venezuela, Palestinian Territory, and Vietnam. We will update this list from time to time, as needed.

Suspension of Payments or Transfers

We may be required to suspend or delay payments, withdrawals and reallocations when we cannot obtain an Index Value because:

- the New York Stock Exchange or NYSE Arca is closed (other than customary weekend and holiday closings);
- trading on the New York Stock Exchange or NYSE Arca is restricted;
- an emergency exists such that it is not reasonably practicable to determine fairly the value of the Index; or
- we are permitted to do so under a regulatory order.

Restrictions on Financial Transactions

Federal laws designed to counter terrorism and prevent money laundering might, in certain circumstances, require us to block an Owner's ability to make certain transactions. This means that we may be required to refuse to accept any request for withdrawals, Surrenders, Annuity Payout Benefit payments or Death Benefit payments, until instructions are received from the appropriate regulator. We may also be required to provide additional information about you and your Contract to government regulators.

OWNER

The Owner possesses all of the ownership rights under a Contract. The Owner is set out in the Contract Specifications section of your Contract on the Contract Effective Date or is the person who becomes the Owner under the Change of Owner provision or the Successor Owner provision.

During the Accumulation Period, the Owner's rights include making allocations among the Crediting Strategies, taking a withdrawal or Surrender, electing a Payout Option, and designating a Beneficiary. During the Annuity Payout Period, unless released by the Owner, the Owner's rights include receiving Annuity Payout Benefit payments or directing payments to the Annuitant and naming a contingent payee. After a death for which a Death Benefit is payable, the rights of the Owner cease and all rights to the Death Benefit are held by the Beneficiary or Beneficiaries.

If an Owner is a trust, custodial account, corporation, limited liability company, partnership, or other entity, then the age of the eldest Annuitant is treated as the age of the Owner for all purposes of this Contract.

Joint Owners

- ***For a Nonqualified Contract***. Two persons may jointly own the Contract. In this case, the term "Owner" includes the joint Owner and you must exercise all rights of ownership by joint action.
- ***For a Tax Qualified Contract***. No joint Owner is permitted.

Change of Owner

- ***For a Nonqualified Contract.*** You may change the Owner at any time during your lifetime. A change of Owner cancels all prior Beneficiary designations. It does not cancel a designation of an Annuitant or a Payout Option election.
- ***For a Tax Qualified Contract***. You cannot change the Owner except to the limited extent permitted by the tax qualification endorsement.

A change of Owner must be made by a Request in Good Order. A change of Owner may have adverse tax consequences.

Assignment

- ***For a Nonqualified Contract***. You may assign all or any part of your rights under this Contract except your rights to designate or change a Beneficiary or an Annuitant, to change Owners, or to elect a Payout Option.
- ***For a Tax Qualified Contract***. You cannot assign your rights under this Contract except to the limited extent permitted by the tax qualification endorsement.

An assignment must be made by a Request in Good Order. We are not responsible for the validity of any assignment. An assignment may have adverse tax consequences.

The rights of a person holding an assignment, including the right to any payment under this Contract, come before the rights of an Owner, Annuitant, Beneficiary, or other payee. An assignment may be ended only the person holding it or as provided by law.

Successor Owner

Your spouse becomes the successor owner of the Contract and succeeds to all rights of ownership if all of the following requirements are met:

- a Death Benefit is payable on account of your death;
- the sole Beneficiary under the Contract is your spouse or a revocable trust or custodial account created by your spouse;

- either you make that election by a Request in Good Order before your death or your spouse makes that election by a Request in Good Order before the Death Benefit Payment Date; and
- you were not a successor owner of the Contract.

A successor owner election cancels all prior Beneficiary designations. It does not cancel a designation of an Annuitant or a Payout Option election.

In some states, state law extends this successor owner right to a civil union partner or other person who is not your spouse as defined by federal tax law. In that case, distributions after your death must be made as required by the Death Benefit Distributions Rules described in the Death Benefit section on page 44.

Community Property

If you live in a community property state and have a spouse at any time while you own this Contract, the laws of that state may vary your ownership rights.

ANNUITANT

The Annuitant is the natural person on whose life Annuity Payout Benefit payments are based. The Annuitant on the Contract Effective Date is set out in your Contract Specifications.

- ***For a Nonqualified Contract***. The Annuitant cannot be changed at any time that the Contract is owned by a trust, custodial account, corporation, limited liability company, partnership, or other entity. Otherwise, you may change a designation of Annuitant at any time before the Annuity Payout Initiation Date.
- ***For a Tax Qualified Contract***. The Annuitant must be the natural person covered under the retirement arrangement for whose benefit the Contract is held.

A change of Annuitant must be made by a Request in Good Order. A change of Annuitant does not cancel a designation of a Beneficiary or a Payout Option election.

If an Annuitant dies before the Annuity Payout Initiation Date and no Death Benefit is payable, then in the absence of a new designation, the Annuitant will be:

- the surviving joint Annuitant(s); or if none
- the Owner(s).

BENEFICIARY

A Beneficiary is a person entitled to receive all or part of a Death Benefit that is to be paid under this Contract on account of a death before the Annuity Payout Initiation Date.

- If a Death Benefit becomes payable on account of your death or the death of a joint Owner, then the surviving Owner is the Beneficiary no matter what other designation you may have made.
- In all other cases, you may designate a person or person who will be the Beneficiaries as provided in the Designation of Beneficiary provision of the Contract.
- If no designated Beneficiary is surviving, then the Beneficiary is your estate.
- If the sole Beneficiary under the Contract is your spouse or a revocable trust or custodial account created by your spouse and all other requirements for successor ownership are met, then your spouse may become the successor owner of the Contract in lieu of receiving the Death Benefit.

A designation of Beneficiary must be made by a Request in Good Order. We must receive the request on or before the date of death for which a Death Benefit is payable.

- You may designate two or more persons jointly as the Beneficiaries. Unless you state otherwise, joint Beneficiaries that are surviving are entitled to equal shares.
- You may designate one or more persons as contingent Beneficiary. Unless you state otherwise, a contingent Beneficiary is entitled to a benefit only if there is no primary Beneficiary who that is surviving.

Survivorship Required

In order to be entitled to receive a Death Benefit, a Beneficiary must survive for at least 30 days after the death for which the Death Benefit is payable.

If you designate your spouse as a Beneficiary and your marriage ends before your death, we will treat your former spouse as having predeceased you unless:

- a court order provides that the former spouse's rights as a beneficiary are to continue; or
- the former spouse remains or becomes an Owner.

ANNUAL STATEMENT AND CONFIRMATION

At least once each calendar year, we will send you a statement that will show: (1) your Account Value; (2) all transactions regarding your Contract during the year; and (3) the interest credited to your Contract and Vested Gains and Losses credited to your Contract.

We will also send you written confirmations of Purchase Payments, Strategy allocations and renewals, withdrawals, and other financial transactions under your Contract. Statements and confirmations will be sent to your last known address on our records.

You should promptly report any inaccuracy or discrepancy in a statement or confirmation. To report an inaccuracy or discrepancy, contact us at P.O. Box 5423, Cincinnati, OH 45201-5423, or call us at 1-800-789-6771. To protect your rights, you should consider reconfirming any oral communications by sending a written statement to P.O. Box 5423, Cincinnati, OH 45201-5423.

ELECTRONIC DELIVERY

You may elect to receive electronic delivery of the Contract prospectus and other Contract related documents. Contact us at our website at http://www.massmutualascend.com for more information and to enroll.

ABANDONED PROPERTY REQUIREMENTS

Every state has unclaimed property laws. These laws generally declare annuity contracts to be abandoned after a period of inactivity of three to five years from: (1) the latest permitted Annuity Payout Initiation Date; or (2) the date of death for which a Death Benefit is due and payable. For example, if the payment of a death benefit has been triggered, but the beneficiary does not come forward to claim the death benefit in a timely manner, the unclaimed property laws will apply.

If a Death Benefit, Annuity Payout Benefit payments or other contract proceeds are unclaimed, we will pay them to the abandoned property division or unclaimed property office of the applicable state. (Escheatment is the formal, legal name for this process.) For example, on an unclaimed Death Benefit, depending on the circumstances, the proceeds are paid: (1) to the state where the beneficiary last resided, as shown on our books and records; (2) to the state where the contract owner last resided, as shown on our books and records; or (3) to Ohio, which is our state of domicile. The state will hold the proceeds without interest until a valid claim is made by the person entitled to the proceeds.

To prevent escheatment of the Death Benefit, Annuity Payout Benefit payments, or other proceeds from your Contract, it is important:

- to update your contact information, such as your address, phone number, and email address, if and as it changes; and
- to update your Beneficiary and other designations, including complete names, complete addresses, phone numbers, and social security numbers, if and as they change.

Please contact us at P.O. Box 5423, Cincinnati, OH 45201-5423, or call us at 1-800-789-6771, to make such updates.

State unclaimed property laws do not apply to annuity contracts that are held under an employer retirement plan that is subject to the Employee Retirement Income Security Act of 1974 (ERISA).

OTHER CONTRACT PROVISIONS

Amendment of the Contract

We reserve the right to amend the Contract to comply with applicable Federal or state laws or regulations. We will notify you in writing of any such amendments.

Misstatement

We may require proof of the age of the Annuitant, Owner and/or the Beneficiary before making any payments under the Contract that are measured by such person's life. If the age of the measuring life has been misstated, the amount payable will be the amount that would have been provided at the correct age. If payments based on the correct age would have been higher, we will pay the underpaid amount with interest. If payments would be lower, we may deduct the overpaid amount, with interest, from succeeding payments.

Involuntary Termination

If your Account Value on any anniversary of the initial Strategy Application Date is below the minimum value of $5,000 for any reason, we may terminate your Contract on that anniversary. If your Contract has Terms that end on the same date because you made only one Purchase Payment, any involuntary termination will occur on that date. If your Contract has Terms that end on different dates because you made more than one Purchase Payment, any involuntary termination will occur on one of those dates, which will be the end of one Term but not the end of the other Terms. In this case, the Surrender Value payable upon termination of your Contract will reflect the Vested Gains and Vested Losses used to calculate the values of Indexed Strategies with Terms that are not ending on the termination date.

Previous Notice Methods

For contracts issued before May 1, 2019, we will send you a written notice at least 30 days before the end of each Term with the Declared Rate and the Maximum Gains that will apply for the next Term.

FEDERAL TAX CONSIDERATIONS

This section provides a general description of federal income tax considerations relating to the Contracts. The purchase, holding and transfer of a Contract may have federal estate and gift tax consequences in addition to income tax consequences. Estate and gift taxation is not discussed in this prospectus. State taxation will vary, depending on the state in which you reside, and is not discussed in this prospectus.

The tax information provided in this prospectus is not intended or written to be used as legal or tax advice. It is written solely to provide general information related to the sale and holding of the Contracts. You should seek advice on legal or tax questions based on your particular circumstances from an attorney or tax advisor.

Tax Deferral on Annuities

Internal Revenue Code ("IRC") Section 72 governs taxation of annuities in general. The income earned on a Contract is generally not included in income until it is withdrawn from the Contract. In other words, a Contract is a tax-deferred investment. Tax deferral is not available for a Contract when an Owner is not a natural person unless the Contract is part of a tax-qualified retirement plan or the Owner is a mere agent for a natural person. For a nonqualified deferred compensation plan, this rule means that the employer as Owner of the Contract will generally be taxed currently on any increase in the Surrender Value, although the plan itself may provide a tax deferral to the participating employee.

Under certain circumstances, based on a rule known as the "Investor Control Doctrine," the IRS has stated that the holder of an annuity contract could be treated as the owner (for tax purposes) of the assets of a separate account that supports the annuity contract. If you were treated as the owner of an interest in the separate account, then you would be taxed on the income, gain, and loss arising out of your interest in the separate account. Although the IRS has not provided definitive guidance on the application of this rule to indexed annuity contracts, we do not believe that this rule applies to the Contract because you have no specific, fractional, or unitized interest in the separate account assets, we are not obligated to invest the separate account in any particular assets, the investment return and market value of the separate account assets is not allocated in an identical manner to any Contract, the Contract values are determined based on gains and losses regardless of the performance of the separate account assets, and the derivatives that we may hold in the separate account are not publicly traded.

Tax-Qualified Retirement Plans

Annuities may also qualify for tax-deferred treatment, or serve as a funding vehicle, under tax-qualified retirement plans that are governed by other IRC provisions. These provisions include IRC Section 401 (pension, profit sharing, and 401(k) plans), IRC Section 403(b) (tax-sheltered annuities), IRC Sections 408 and 408A (individual retirement annuities), and IRC Section 457(b) (governmental deferred compensation plans). Tax-deferral is generally also available under these tax-qualified retirement plans through the use of a trust or custodial account without the use of an annuity.

The tax law rules governing tax-qualified retirement plans and the treatment of amounts held and distributed under such plans are complex. If the Contract is to be used in connection with a tax-qualified retirement plan, including an individual retirement annuity ("IRA") under a Simplified Employee Pension (SEP) Plan, you should seek competent legal and tax advice regarding the suitability of the Contract for your particular situation.

Contributions to a tax-qualified Contract are typically made with pre-tax dollars, while contributions to other Contracts are typically made from after-tax dollars, though there are exceptions in either case. Tax-qualified Contracts may also be subject to restrictions on withdrawals that do not apply to other Contracts. These restrictions may be imposed to meet the requirements of the IRC or of an employer plan.

Following is a brief description of the types of tax-qualified retirement plans for which the Contracts are available.

Individual Retirement Annuities. IRC Sections 219 and 408 permit certain individuals or their employers to contribute to an individual retirement arrangement known as an "Individual Retirement Annuity" or "IRA". Under applicable limitations, an individual may claim a tax deduction for certain contributions to an IRA. Contributions made to an IRA for an employee under a Simplified Employee Pension (SEP) Plan or Savings Incentive Match Plan for Employees (SIMPLE) established by an employer are not includable in the gross income of the employee until distributed from the IRA. Distributions from an IRA are taxable to the extent that they represent contributions for which a tax deduction was claimed, contributions made under a SEP plan or SIMPLE, or income earned within the IRA.

Roth IRAs. IRC Section 408A permits certain individuals to contribute to a Roth IRA. Contributions to a Roth IRA are not tax deductible. Tax-free distributions of contributions may be made at any time. Distributions of earnings are tax-free following the five-year period beginning with the first year for which a Roth IRA contribution was made if the Owner has attained age 59½ , become disabled, or died, or for qualified first-time homebuyer expenses.

Tax-Sheltered Annuities. IRC Section 403(b) of permits public schools and charitable, religious, educational, and scientific organizations described in IRC Section 501(c)(3) to establish "tax-sheltered annuity" or "TSA" plans for their employees. TSA contributions and Contract earnings are generally not included in the gross income of the employee until distributed from the TSA. Amounts attributable to contributions made under a salary reduction agreement cannot be distributed until the employee attains age 59½ , severs employment, becomes disabled, incurs a hardship, is eligible for a qualified reservist distribution, or dies. The IRC and the plan may impose additional restrictions on distributions.

Pension, Profit-Sharing, and 401(k) Plans. IRC Section 401 permits employers to establish various types of retirement plans for employees, and permits self-employed individuals to establish such plans for themselves and their employees. These plans may use annuity contracts to fund plan benefits. Generally, contributions are deductible to the employer in the year made, and contributions and earnings are generally not included in the gross income of the employee until distributed from the plan. The IRC and the plan may impose restrictions on distributions. Purchasers of a Contract for use with such plans should seek competent advice regarding the suitability of the Contract under the particular plan.

Governmental Eligible Deferred Compensation Plans. State and local government employers may purchase annuity contracts to fund eligible deferred compensation plans for their employees, as described in IRC Section 457(b). Contributions and earnings are generally not included in the gross income of the employee until the employee receives distributions from the plan. Amounts cannot be distributed until the employee attains age 70 1/2, severs employment, becomes disabled, incurs an unforeseeable emergency, or dies. The plan may impose additional restrictions on distributions.

Roth TSAs, Roth 401(k)s, and Roth 457(b)s. IRC Section 402A permits TSA plans, 401(k) plans, and governmental 457(b) plans to allow participating employees to designate some part or all of their future elective contributions as Roth contributions. Roth contributions to a TSA plan, 401(k) plan, or governmental 457(b) plan are included in the employee's taxable income as earned. Amounts attributable to Roth TSA, Roth 401(k), or Roth 457(b) contributions must be held in a separate account from amounts attributable to traditional pre-tax TSA, 401(k), or 457(b) contributions. Distributions from a Roth TSA, Roth 401(k), or Roth 457(b) account are considered to come proportionally from contributions and earnings. Distributions attributable to Roth account contributions are tax-free. Distributions attributable to Roth account earnings are tax-free following the five-year period beginning with the first year for which Roth contributions are made to the plan if the employee has attained age 59½, become disabled, or died. A Roth TSA, Roth 401(k), or Roth 457(b) account is subject to the same distribution restrictions that apply to amounts attributable to traditional pre-tax TSA, 401(k), or 457(b) contributions made under a salary reduction agreement. The plan may impose additional restrictions on distributions.

Nonqualified Deferred Compensation Plans

Employers may invest in annuity contracts in connection with unfunded deferred compensation plans for their employees. Such plans may include eligible deferred compensation plans of non-governmental tax-exempt employers, as described in IRC Section 457(b); deferred compensation plans of both governmental and nongovernmental tax-exempt employers that are taxed under IRC Section 457(f) and subject to Section 409A; and nonqualified deferred compensation plans of for-profit employers subject to Section 409A. In most cases, these plans are designed so that amounts credited under the plan will not be includable in the employees' gross income until paid under the plan. In these situations, the annuity contracts are not plan assets and are subject to the claims of the employer's general creditors. Whether or not made from the Contract, plan benefit payments are subject to restrictions imposed by the IRC and the plan.

Summary of Income Tax Rules

The following chart summarizes the basic income tax rules governing tax-qualified retirement plans, nonqualified deferred compensation plans, and other non-tax-qualified Contracts.

	Tax-Qualified Contracts and Plans	**Nonqualified Deferred Compensation Plans**	**Other Non-Tax-Qualified Contracts**
Plan Types	• IRC §408 (IRA, SEP, SIMPLE IRA) • IRC §408A (Roth IRA) • IRC §403(b) (Tax-Sheltered Annuity) • IRC §401 (Pension, Profit–Sharing, 401(k)) • Governmental IRC §457(b) • IRC §402A (Roth TSA, Roth 401(k), or Roth 457(b))	• IRC §409A • Nongovernmental IRC §457(b) • IRC §457(f)	• IRC §72 only
Who May Purchase a Contract	Eligible employee, employer, or employer plan.	Employer on behalf of eligible employee. Employer generally loses tax-deferred status of Contract itself.	Anyone. Non-natural person will generally lose tax-deferred status.
Contribution Limits	Contributions are limited by IRC and/or plan requirements.		None.
Distribution Restrictions	Distributions from Contract and/or plan may be restricted to meet IRC and/or plan requirements.		None.
Taxation of Withdrawals, Surrenders, and Lump Sum Death Benefit	Generally, 100% of distributions must be included in taxable income. However, the portion that represents an after-tax investment is not taxable. Distributions from Roth IRA are deemed to come first from after-tax contributions. Distributions from other plans are generally deemed to come from income and after-tax investment (if any) on a pro-rata basis. Distributions from §408A Roth IRA or §402A Roth TSA, Roth 401(k), or Roth 457(b) are completely tax free if certain requirements are met. For tax purposes, all IRAs and SEP IRAs of an owner are treated as a single IRA, and all Roth IRAs of an owner are treated as a single Roth IRA.		Generally, distributions must be included in taxable income until all accumulated earnings are paid out. Thereafter, distributions are tax-free return of the original investment. However, distributions are tax-free until any investment made before August 14, 1982 is returned. For tax purposes, all non-tax-qualified annuity contracts issued to the same owner by the same insurer in the same calendar year are treated as one contract.
Taxation of Payout Option Payments (Annuity Benefit or Death Benefit)	A percentage of each payment is tax free equal to the ratio of after-tax investment (if any) to the total expected payments, and the balance is included in taxable income. Once the after-tax investment has been recovered, the full amount of each benefit payment is included in taxable income. Distributions from a Roth IRA, Roth TSA, Roth 401(k), or Roth 457(b) are completely tax free if certain requirements are met.		
Possible Penalty Taxes for Distributions Before Age 59 1/2	Taxable portion of payments made before age 59 1/2 may be subject to 10% penalty tax (or 25% for a SIMPLE IRA during the first two years of participation). Penalty taxes do not apply to payments after the participant's death, or to §457 plans. Other exceptions may apply.	None.	Taxable portion of payments made before age 59 1/2 may be subject to a 10% penalty tax. Penalty taxes do not apply to payments after the Owner's death. Other exceptions may apply.
Assignment/ Transfer of Contract	Assignment and transfer of Ownership generally not permitted.		Generally, deferred earnings taxable to transferor upon transfer or assignment. Gift tax consequences are not discussed herein.
Federal Income Tax Withholding	Eligible rollover distributions from §401, §403(b), and governmental §457(b) plans are subject to 20% mandatory withholding on taxable portion unless direct rollover. For other payments, Payee may generally elect to have taxes withheld or not.	Generally subject to wage withholding.	Generally, Payee may elect to have taxes withheld or not.

Rollovers, Transfers, and Exchanges

Amounts from a tax-qualified Contract may be rolled over, transferred, or exchanged into another tax-qualified account or retirement plan as permitted by the IRC and plan(s). Amounts may be rolled over, transferred, or exchanged into a tax-qualified Contract from another tax-qualified account or retirement plan as permitted by the IRC and plan(s). In most cases, such a rollover, transfer, or exchange is not taxable, unless the rollover of pre-tax amounts is made into a Roth IRA, a Roth TSA, Roth 401(k), or Roth 457(b). Rollovers, transfers, and exchanges are not subject to normal contribution limits. The IRC or plan may require that rollovers be held in a separate Contract from other plan funds.

Amounts from a non-tax-qualified Contract may be transferred to another non-tax-qualified annuity or to a qualified long-term care policy as a tax-free exchange as permitted by the IRC Section 1035. Amounts from another non-tax-qualified annuity or from a life insurance or endowment policy may be transferred to a Contract as a tax-free exchange under IRC Section 1035.

Required Distributions

The Contracts are subject to the required distribution rules of federal tax law. These rules vary based on the tax qualification of the Contract or the plan under which it is issued.

For a tax-qualified Contract other than a Roth IRA, required minimum distributions must generally begin by April 1 following the year the participant attains the applicable RMD age. The applicable RMD age is:

- age 75 if born after December 31, 1959;
- age 73 if born after December 31, 1950, but before January 1, 1960;
- age 72 if born after June 30, 1949, but before January 1, 1951; or
- age 70 1/2 if born before July 1, 1949.

However, for a 403(b) Tax-Sheltered Annuity Plan, a 401 Pension, Profit-Sharing, or 401(k) Plan, or a 457(b) Governmental Deferred Compensation Plan, a participant who is not a 5% owner of the employer may delay required minimum distributions until April 1 following the year in which the participant retires from that employer.

The required minimum distributions during life are calculated based on standard life expectancy tables adopted under federal tax law.

For a Roth IRA or for a Contract that is not tax-qualified, there are no required distributions during life.

A tax-qualified Contract must make required distributions after death. The required distributions vary depending on the type of beneficiary and whether minimum distributions were required during the life of the decedent. Some beneficiaries may take payments over life or life expectancy, and others must receive all benefits within five or ten years after death, and some must take payments over life or life expectancy with a final payment within ten years after the decedent's death. A non-tax-qualified Contract that has begun making payments under a payout option during the Owner's life must make any remaining payments at least as rapidly after death. If payments from a non-tax-qualified Contract have not begun, then the Death Benefit must be paid out in full within five years after death, or must be paid out in substantially equal payments beginning within one year of death over a period not exceeding the life expectancy of the designated beneficiary.

For a traditional IRA, a Roth IRA, or a Contract that is not tax-qualified, a beneficiary who is a surviving spouse may elect out of these requirements, and apply the required distribution rules as if the Contract were his or her own. For this purpose, federal tax law recognizes as married any two people whose marriage is valid in the state in which it was celebrated. A civil union or domestic partnership is not considered a marriage.

The Contract is intended for long-term investment purposes and the Contract and its Crediting Strategies may not be appropriate for investors who plan to take withdrawals (including automated withdrawals and required minimum distributions) during the first five Contract Years or who plan to take withdrawals from Indexed Strategies before the end of a Term.

DISTRIBUTION OF THE CONTRACTS

MM Ascend Life Investor Services, LLC ("MMALIS") is the principal underwriter and distributor of the securities offered through this prospectus. MassMutual Ascend Life Insurance Company ("MMALIC") and MMALIS are affiliated because MMALIS is a subsidiary of MMALIC. MMALIS also acts as the principal underwriter and distributor of the variable annuity contracts that are issued by one of our subsidiaries.

MMALIS's principal executive offices are located at 191 Rosa Parks Street, Cincinnati, Ohio 45202. MMALIS is registered as a broker-dealer with the Securities and Exchange Commission under the Securities Exchange Act of 1934, as well as the securities regulators in the states in which it operates and registration is required. MMALIS is a member of the Financial Industry Regulatory Authority ("FINRA").

Contracts are sold by licensed insurance agents (the "Selling Agents") in those states where the Contract may be lawfully sold. Such Selling Agents will be appointed agents of MMALIC and will be registered representatives of broker-dealer firms (the "Selling Broker-Dealers") that have entered into selling agreements with us and MMALIS. Selling Broker-Dealers will be registered under the Securities Exchange Act of 1934 and will be members of FINRA.

FINRA provides background information about broker-dealers and their registered representatives through FINRA BrokerCheck. You may contact the FINRA BrokerCheck Hotline at 1-800-289-9999, or log on to www.finra.org to learn more about MMALIS, your Selling Agent, and his or her Selling Broker Dealer.

MMALIS receives no compensation for acting as underwriter of the Contracts; however, MMALIC pays for some of MMALIS's operating and other expenses, including overhead and legal and accounting fees. MMALIC may reimburse MMALIS for certain sales expenses, such as marketing materials and advertising expenses, and other expenses of distributing the Contracts.

MMALIC or MMALIS pay the Selling Broker-Dealers compensation for the promotion and sale of the Contract. The Selling Agents who solicit sales of the Contract typically receive a portion of the compensation paid to the Selling Broker-Dealers in the form of commissions or other compensation, depending on the agreement between the Selling Broker-Dealer and the Selling Agent.

The amount and timing of commissions paid to Selling Broker-Dealers may vary depending on the selling agreement but is not expected to be more than 9.2% of each Purchase Payment. In most cases, such amounts paid to a Selling Broker-Dealer will be divided between the Selling Agent and the Selling Broker-Dealer. Some Selling Broker-Dealers may elect to receive a lower commission when a Purchase Payment is made, along with annual trail commissions up to 1.5% of Account Value for so long as a contract remains in effect or as agreed in the selling agreement. MMALIC may pay or allow other promotional incentives or payments in the form of cash or other compensation to the extent permitted by FINRA rules and other applicable laws and regulations.

MMALIC also may pay compensation to wholesaling broker-dealers or other firms or intermediaries in return for wholesaling services such as providing marketing and sales support, product training, and administrative services to the Selling Agents of the Selling Broker-Dealers. These allowances may be based on a percentage of a Purchase Payment.

In addition to the compensation described above, MMALIC may make additional cash payments, in certain circumstances referred to as "override" compensations, or reimbursements to Selling Broker-Dealers in recognition of their marketing and distribution, transaction processing and/or administrative services support. These payments are not offered to all Selling Broker-Dealers, and the terms of any particular agreement governing the payments may vary among Selling Broker-Dealers depending on, among other things, the level and type of marketing and distribution support provided. Marketing and distribution support services may include, among other services, placement of MMALIC's products on the Selling Broker-Dealers' preferred or recommended list, increased access to the Selling Broker-Dealers' registered representatives for purposes of promoting sales of MMALIC products, assistance in training and education of the Selling Agents, and opportunities for MMALIC and MMALIS to participate in sales conferences and educational seminars. The payments or reimbursements may be calculated as a percentage of the particular Selling Broker-Dealer's actual or expected aggregate sales of our indexed annuity contracts (including the Contract) and/or may be a fixed dollar amount. Broker-dealers receiving these additional payments may pass on some or all of the payments to the Selling Agents.

You should ask your Selling Agent for further information about the commissions or other compensation that he or she, or the Selling Broker-Dealer for which he or she works, may receive in connection with your purchase of a Contract.

There is no front-end sales load deducted from the Purchase Payment(s) to pay sales commissions. Commissions and other incentives or payments described above are not charged directly to you. We intend to recoup at least a portion of the sales commissions and other sales expenses through fees and charges deducted under the Contract.

MASSMUTUAL ASCEND LIFE

MassMutual Ascend Life is a stock insurance company incorporated in 1961 and continuously engaged in the insurance business since that time. We are domiciled in the state of Ohio and licensed to conduct life insurance business in all states of the United States except New York, and in the District of Columbia and Puerto Rico. Our principal executive offices are located at 191 Rosa Parks Street, Cincinnati, Ohio 45202.

We are a wholly owned subsidiary of Massachusetts Mutual Life Insurance Company ("MassMutual"), a mutual life insurance company. MassMutual and its domestic life insurance subsidiaries provide individual and group life insurance, disability insurance, individual and group annuities and guaranteed interest contracts to individual and institutional customers in all 50 states of the U.S., the District of Columbia and Puerto Rico.

Prior to October 3, 2022, MassMutual Ascend Life's name was Great American Life Insurance Company ("GALIC") and MMALIS' name was Great American Advisors, LLC ("GAA"). On May 28, 2021, American Financial Group, Inc. sold its annuity business consisting of GALIC and its two insurance subsidiaries, Annuity Investors Life Insurance Company and Manhattan National Life Insurance Company, as well as a broker-dealer affiliate, GAA, and insurance distributor, AAG Insurance Agency, Inc. to MassMutual.

Except to a small part of a Contract's Account Value funded through the Separate Account described below, the Contract guarantees and benefits are paid from our general account (the "General Account"), and such guarantees and benefits are subject to our claims-paying ability and financial strength and may lose value.

The General Account

The General Account holds all our assets other than assets in our insulated separate accounts. We own our General Account assets, and, subject to applicable law, have sole investment discretion over them.

We must invest our assets according to applicable state laws regarding the nature, quality and diversification of investments that may be made by life insurance companies. In general, these laws permit investments, within specified limits and subject to certain qualifications, in Federal, state, and municipal obligations, corporate bonds, preferred and common stocks, real estate mortgages, real estate and certain other investments.

We place a majority of the Purchase Payments made under the Contract in our General Account where we primarily invest the assets in a variety of fixed income securities.

The Separate Account

We place a portion of the Purchase Payments made under the Contract in a non-unitized separate account (the "Separate Account") that is not registered with the Securities and Exchange Commission. We established and maintain the Separate Account pursuant to the laws of our domiciliary state for the purpose of supporting our obligation to adjust the Indexed Strategy for Vested Gains and Losses associated with the Indexed Strategies or rise or fall of the Index. The assets of the Separate Account are held in our name on behalf of the Separate Account and legally belong to us. The assets in the Separate Account are not chargeable with liabilities arising out of any other business that we conduct. We may invest these assets in hedging instruments, including derivative contracts as well as other assets permitted under state law. To support our obligations to adjust the Indexed Strategy values, we may move money between the Separate Account and our General Account. We are not obligated to invest the assets of the Separate Account according to any particular plan except as we may be required to by state insurance laws. Regardless of your Strategy allocations, we do not intend to invest the assets of the Separate Account in the iShares MSCI EAFE exchange traded fund, the iShares U.S. Real Estate exchange traded fund, or the SPDR Gold Shares exchange traded fund.

Contract owners do not have any interest in or claim on the assets in the Separate Account nor do Contract owners participate in any way in the performance of assets held in the Separate Account.

LEGAL MATTERS

Reliance on Rule 12h-7

MassMutual Ascend Life relies on the exemption provided by Rule 12h-7 under the Securities Exchange Act of the 1934 Act from the requirement to file reports pursuant to Section 15(d) of that Act.

Legal Proceedings

MassMutual Ascend Life and its subsidiaries are involved in litigation from time to time, generally arising in the ordinary course of business. This litigation may include, but is not limited to, general commercial disputes, lawsuits brought by contract owners and policyholders, employment matters, reinsurance collection matters and actions challenging certain business practices of insurance subsidiaries. Also, from time to time, state and federal regulators or other officials conduct formal and informal examinations or undertake other actions dealing with various aspects of the financial services and insurance industries. It is not possible to predict with certainty the ultimate outcome of any pending legal proceeding or regulatory action. However, MassMutual Ascend Life does not believe any such action or proceeding will have a material adverse effect upon its ability to meet its obligations under the Contracts.

Legal Opinion on Contracts

Legal matters in connection with federal laws and regulations affecting the issue and sale of the Contracts described in this prospectus and the organization of MassMutual Ascend Life, its authority to issue such Contracts under Ohio law, and the validity of the forms of the Contracts under Ohio law have been passed on by John P. Gruber, General Counsel of MassMutual Ascend Life.

Securities and Exchange Commission Position on Indemnification

Insofar as indemnification for liabilities arising under the Securities Act of 1933 may be permitted to directors, officers or persons controlling MassMutual Ascend Life pursuant to its articles of incorporation or its code of regulations or pursuant to any insurance coverage or otherwise, MassMutual Ascend Life has been informed that, in the opinion of the Securities and Exchange Commission, such indemnification is against public policy as expressed in the Securities Act of 1933 and is therefore unenforceable.

FINANCIAL STATEMENTS

The consolidated financial statements of MassMutual Ascend Life Insurance Company are included in the Statement of Additional Information. They should be considered only as they relate to our ability to meet our obligations under the Contract. Instructions on how to obtain the Statement of Additional Information are included on the back cover page.

APPENDIX A: INVESTMENT OPTIONS AVAILABLE UNDER THE CONTRACT

The following is a list of Indexed Strategies currently available under the Contract. We may change the features of the Indexed Strategies listed below (including the Index and the current limits on Index gains and losses) and terminate existing Indexed Strategies. We will provide you with written notice before making any changes other than changes to current limits on Index gains. Information about current limits on Index gains is available at https://www.massmutualascend.com/index-frontier-5. For additional information about the features of the Indexed Strategies, please see the "Indexed Strategies" section in the prospectus.

Note: If amounts are removed from an Indexed Strategy before the end of its Term, the Strategy value will be determined based on the Vested Gain and Loss to the date of the withdrawal or Surrender. This may be significantly less that the Strategy value if you held the option until the end of the Term and, in the case of a Buffer Strategy, will not receive the full protection of the Buffer. You may not be able to invest in certain Indexed Strategies, as noted below.

Index	Type of Index	Term	Current Limit on Index Loss (if held until end of Term)	Minimum Limit on Index Gain (for the life of the Indexed Strategy)
S&P 500®	Market Index	1 Year	0% Floor	1% Cap
SPDR® Gold Shares ETF	ETF	1 Year	0% Floor	1% Cap
iShares U.S. Real Estate ETF	ETF	1 Year	0% Floor	1% Cap
iShares MSCI EAFE ETF	ETF	1 Year	0% Floor	1% Cap
S&P 500®	Market Index	1 Year	-10% Floor	1% Cap
SPDR® Gold Shares ETF	ETF	1 Year	-10% Floor	1% Cap
iShares U.S. Real Estate ETF	ETF	1 Year	-10% Floor	1% Cap
iShares MSCI EAFE ETF	ETF	1 Year	-10% Floor	1% Cap
S&P 500®[1]	Market Index	1 Year	10% Buffer	1% Cap

1 This Strategy is not available for Contracts issued before May 2020.

The **S&P 500** is a "price return index," not a "total return index," and therefore does not reflect dividends paid on the securities composing the Index. This will reduce the Index return and cause the Index to underperform a direct investment in the securities composing the Index.

The **iShares MSCI EAFE ETF** deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the ETF to underperform a direct investment in the securities composing the ETF.

The **iShares US Real Estate ETF** deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the ETF to underperform a direct investment in the securities composing the ETF.

The **SPDR Gold Shares ETF** deducts fees and costs when calculating Index performance. This will reduce the ETF's return and cause the ETF to underperform a direct investment in gold bullion.

Possible Changes in Indexed Strategies.

At the end of a Term, we may stop offering any Indexed Strategy, but we will always offer at least one Indexed Strategy. If the Declared Rate Strategy is no longer available, then we must offer a Conserve/0% Floor Indexed Strategy. Consequently, any particular Indexed Strategy listed above may not be available for future Terms. We have the right to replace the Index associated with an Indexed Strategy under certain circumstances.

For any Indexed Strategy, the Maximum Gain will vary from Term to Term, but will never be less than 1%.

Indexed Strategies that may be available in the future may earn a return that is lower than the return your investments would have earned if they had been invested in the other Indexed Strategies that are currently available. In addition, any reduction in the available number of Indexed Strategies may reduce your opportunity to increase your Contract value.

The following lists the Fixed Account Option currently available under the Contract. We may change the features of the Fixed Account Option listed below, offer new Fixed Account Options, and terminate existing Fixed Account Options. We will provide you with written notice before doing so. If the Declared Rate Strategy is no longer available, then we must offer an Indexed Strategy that has a Maximum Loss of 0%. Unliked a Declared Rate Strategy, no earnings are guaranteed for an Indexed Strategy.

Name	Term	Minimum Guaranteed Interest Rate
Declared Rate Strategy[2]	1 year	1.00%

The interest rate for the Declared Rate Strategy Rate will never be less than the guaranteed minimum interest rate from 1% to 3% set out in the

Declared Rate Strategy endorsement included in your Contract. The guaranteed minimum interest rate set out in the endorsement will never be less than the minimum interest rate required for fixed annuity contracts on the Contract Effective Date under the Standard Nonforfeiture Law of the state in which your Contract is issued. For more information on the Declared Rate Strategy see the Declared Rate Strategy in the prospectus.

[2] This Strategy is not available for Contracts issued in Missouri.

APPENDIX B: EXAMPLES – IMPACT OF WITHDRAWALS ON CONTRACT VALUES AND AMOUNTS REALIZED

These examples are intended to show you how a withdrawal from an Indexed Strategy before the end of the Term affects the Indexed Strategy values, Vested Gains and Losses, and amounts realized at the end of the Term. These examples assume that you allocate a $50,000 Purchase Payment to the S&P 500 Growth/-10% Floor Strategy and a $50,000 Purchase Payment to the S&P 500 10% Buffer Strategy. The examples assume that the withdrawals are covered by the Free Withdrawal Allowance and therefore no Early Withdrawal Charges apply. If Early Withdrawal Charges did apply, the amounts realized at the end of the Term would be reduced by both the withdrawal and the amount of the Early Withdrawal Charge.

Example A: Withdrawal When Index Rising Steadily

Impact of $10,000 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	1040	1040
Positive Index Change	(1040 - 1000) / 1000 = 4.00%	(1040 - 1000) / 1000 = 4.00%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	4.00%	4.00%
Vesting Factor on Day 146	25%	25%
Vested Gain as a Percentage	4.00% x 25% = 1.00% Vested Gain	4.00% x 25% = 1.00% Vested Gain
Vested Gain in Dollars	$50,000 x 1.00% = $500 Vested Gain	$50,000 x 1.00% = $500 Vested Gain
Strategy Value before Withdrawal	$50,000 + $500 = $50,500	$50,000 + $500 = $50,500
Amount Withdrawn	$5,000	$5,000
Percentage Reduction in Strategy Value	$5,000 / $50,500 = 9.90%	$5,000 / $50,500 = 9.90%
Proportional Reduction in Investment Base	$50,000 x .0990 = $4,950	$50,000 x .0990 = $4,950
Remaining Investment Base after Withdrawal	$50,000 - $4,950 = $45,050	$50,000 - $4,950 = $45,050

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Withdrawal	$45,050	$45,050
Index Value at Term Start	1000	1000
Index Value at Term End	1130	1130
Positive Index Change	(1130 - 1000) / 1000 = 13.00%	(1130 - 1000) / 1000 = 13.00%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	12.00%	13.00%
Vesting Factor at Term End	100%	100%
Vested Gain as a Percentage	12.00% x 100% = 12.00% Vested Gain	13% x 100% = 13.00% Vested Gain
Vested Gain in Dollars	$45,050 x 12.00% = $5,406 Vested Gain	$45,050 x 13.00% = $5,857 Vested Gain
Strategy Value at Term End	$45,050 + $5,406 = $50,456	$45,050 + $5,857 = $50,907

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $55,456 ($5,000 withdrawal plus the $50,456 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $56,000 ($50,000 Investment Base plus $6,000 gain ($50,000 x 12.00%)).

This hypothetical Strategy value of $56,000 exceeds the amount realized of $55,456 because:

- the gain at the time of the withdrawal caused the reduction in the Investment Base to be less than the actual amount withdrawn ($5,000 - $4,950 = $50); and

- the subsequent gain at the term end was calculated on a smaller Investment Base, which caused that gain to be smaller than the hypothetical gain ($5,406 - $6,000 = -$594).

The result for the S&P 500 Growth Strategy ($50 - $594 = -$544) is equal to the difference between the hypothetical Strategy value and the amount realized ($56,000 - $544 = $55,456).

S&P 500 Buffer Strategy

The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $55,907 ($5,000 withdrawal plus the $50,907 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term would have been $56,500 ($50,000 Investment Base plus $6,500 gain ($50,000 x 13%)). This hypothetical Strategy value exceeds the amount realized for the same reasons described above for the S&P 500 Growth Strategy.

Your investment in the S&P 500 Buffer Strategy outperformed the S&P 500 Growth Strategy by $451 in this example. The amount you realized under the Buffer Strategy ($55,907) exceeds the amount you realized under the Growth Strategy ($55,456) because the Growth Strategy had a lower Maximum Gain, and the Index Change at the end of the Term exceeded the Growth Strategy’s lower Maximum Gain.

Example B: Withdrawal When Index Falls and Then Rises

Impact of $10,000 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	880	880
Negative Index Change	(880 - 1000) / 1000 = -12.00%	(880 - 1000) / 1000 = -12.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer on Day 146 of Term	N/A	10% x (365-219)/365 = 4.00% Buffer
Negative Index Change Absorbed by Buffer	N/A	-4.00%
Negative Index Change after Buffer	N/A	-12.00% - (-4.00)% = -8.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-8.00% x 100% = 8.00% Vested Loss
Vested Loss in Dollars	$50,000 x 10.00% = $5,000 Vested Loss	$50,000 x 8.00% = $4,000 Vested Loss
Strategy Value before Withdrawal	$50,000 - $5,000 = $45,000	$50,000 - $4,000 = $46,000
Amount Withdrawn*	$4,945	$5,055
Percentage Reduction in Strategy Value	$4,945 / $45,000 = 10.99%	$5,055 / $46,000 = 10.99%
Proportional Reduction in Investment Base	$50,000 x .1099 = $5,495	$50,000 x .1099 = $5,495
Remaining Investment Base after Withdrawal	$50,000 - $5,495 = $44,505	$50,000 - $5,495 = $44,505

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Withdrawal	$44,505	$44,505
Index Value at Term Start	1000	1000
Index Value at Term End	1130	1130
Positive Index Change	(1130 - 1000) / 1000 = 13%	(1130 - 1000) / 1000 = 13%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	12.00%	13.00%
Vesting Factor at Term End	100%	100%
Vested Gain as a Percentage	12.00% x 100% = 12.00% Vested Gain	13.00% x 100% = 13.00% Vested Gain
Vested Gain in Dollars	$44,505 x 12.00% = $5,341 Vested Gain	$44,505 x 13.00% = $5,786 Vested Gain
Strategy Value at Term End	$44,505 + $5,341 = $49,846	$44,505 + $5,786 = $50,291

*Note: The withdrawal is taken proportionally from each Indexed Strategy, based on the ratio of that Strategy's value to the total value of all Indexed Strategies immediately before the withdrawal. In this example, the total value of all Indexed Strategies immediately before the withdrawal was $91,000 ($45,000 + $46,000). The S&P 500 Growth Strategy value was 49.45% of that total value ($45,000 / $91,000 = 49.45%), so 49.45% of the $10,000 withdrawal ($4,945) was taken from it. The S&P 500 Buffer Strategy value was 50.55% of that total value ($46,000 / $91,000 = 50.55%), so 50.55% of the $10,000 withdrawal ($5,055) was taken from it.

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $54,791 ($4,945 withdrawal plus the $49,846 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $56,000 ($50,000 Investment Base plus $6,000 gain ($50,000 x 12.00%)).

This hypothetical Strategy value of $56,000 exceeds the amount realized of $54,791 because:

- the loss at the time of the withdrawal caused the reduction in the Investment Base to be greater than the actual amount withdrawn ($4,945 - $5,495 = -$550); and
- the subsequent gain at the term end was calculated on a smaller Investment Base, which caused that gain to be smaller than the hypothetical gain ($5,341 - $6,000 = -$659).

The result for the S&P 500 Growth Strategy (-$550 + -$659 = -$1,209) is equal to the difference between the hypothetical Strategy value and the amount realized ($56,000 - $1,209 = $54,791).

S&P 500 Buffer Strategy
The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $55,346 ($5,055 withdrawal plus the $50,291 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term would have been $56,500 ($50,000 Investment Base plus $6,500 gain ($50,000 x 13.00%)). This hypothetical Strategy value exceeds the amount realized for the same reasons described above for the S&P 500 Growth Strategy.

Your investment in the S&P 500 Buffer Strategy outperformed the S&P 500 Growth Strategy by $555 in this example. The amount you realized under the Buffer Strategy ($55,346) exceeds the amount you realized under the Growth Strategy ($54,791) for two reasons: (1) at the time of the withdrawal, the Buffer absorbed more of the negative Index Change (4 percentage points of the -12.00% change) than the Maximum Loss absorbed (2 percentage points of the -12.00% change), thus resulting in more of the withdrawal being taken from the Buffer Strategy's value even though the Investment Base of both strategies was reduced by the same amount, and (2) the Index Change at the end of the Term exceeded the Growth Strategy's lower Maximum Gain, thus increasing the Buffer Strategy's value to a greater extent.

Example C: Withdrawal When Index Falling Steadily

Impact of $10,000 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	980	980
Negative Index Change	(980 - 1000) / 1000 = -2.00%	(980 - 1000) / 1000 = -2.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-2.00%	N/A
Buffer on Day 146 of Term	N/A	10% x (365-219)/365 = 4.00% Buffer
Negative Index Change Absorbed by Buffer	N/A	Entire -2.00% Index Change
Negative Index Change after Buffer	N/A	0%
Vested Loss as a Percentage	-2.00% x 100% = 2.00% Vested Loss	0.00% Vested Loss
Vested Loss in Dollars	$50,000 x 2.00% = $1,000 Vested Loss	$0 Vested Loss
Strategy Value before Withdrawal	$50,000 - $1,000 = $49,000	$50,000 - $0 = $50,000
Amount Withdrawn*	$4,949	$5,051
Percentage Reduction in Strategy Value	$4,949 / $49,000 = 10.10%	$5,051 / $50,000 = 10.10%
Proportional Reduction in Investment Base	$50,000 x .1010 = $5,050	$50,000 x .1010 = $5,050
Remaining Investment Base after Withdrawal	$50,000 - $5,051 = $44,950	$50,000 - $5,051 = $44,950

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Withdrawal	$44,950	$44,950
Index Value at Term Start	1000	1000
Index Value at Term End	860	860
Negative Index Change	(860 - 1000) / 1000 = -14.00%	(860 - 1000) / 1000 = -14.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer at End of Term	N/A	10% Buffer
Negative Index Change Absorbed by Buffer	N/A	-10.00%
Negative Index Change after Buffer	N/A	-14.00% - (-10.00)% = -4.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-4.00% x 100% = 4.00% Vested Loss
Vested Loss in Dollars	$44,950 x 10.00% = $4,495 Vested Loss	$44,950 x 4.00% = $1,798 Vested Loss
Strategy Value at Term End	$44,950 - $4,495 = $40,455	$44,950 - $1,798 = $43,152

*Note: The withdrawal is taken proportionally from each Indexed Strategy, based on the ratio of that Strategy's value to the total value of all Indexed Strategies immediately before the withdrawal. In this example, the total value of all Indexed Strategies immediately before the withdrawal was $99,000 ($49,000 + $50,000). The S&P 500 Growth Strategy value was 49.49% of that total value ($49,000 / $99,000 = 49.49%), so 49.49% of the $10,000 withdrawal ($4,949) was taken from it. The S&P 500 Buffer Strategy value was 50.51% of that total value ($50,000 / $99,000 = 50.51%), so 50.51% of the $10,000 withdrawal ($5,051) was taken from it.

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $45,404 ($4,949 withdrawal plus the $40,455 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $45,000 ($50,000 Investment Base minus $5,000 loss ($50,000 x -10.00%)).

The amount realized of $45,404 exceeds this hypothetical Strategy value of $45,000 because:

- the loss at the time of the withdrawal caused the reduction in the Investment Base to be greater than the actual amount withdrawn ($4,949 - $5,050 = -$101); and

- the subsequent loss at the term end was calculated on a smaller Investment Base, which caused that loss to be smaller than the hypothetical loss ($5,000 - $4,495 = $505).

The result for the S&P 500 Growth Strategy ($505 - $101 = $404) is equal to the difference between the amount realized and the hypothetical Strategy value ($45,404 - $404 = $45,000).

<u>S&P 500 Buffer Strategy</u>

The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $48,203 ($5,051 withdrawal plus the $43,152 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term would have been $48,000 ($50,000 Investment Base minus $2,000 loss ($50,000 x -4.00%)). This hypothetical Strategy value is lower than the amount realized for the same reasons described above for the S&P 500 Growth Strategy.

Your investment in the S&P 500 Buffer Strategy outperformed the S&P 500 Growth Strategy by $2,799 in this example. The amount you realized under the Buffer Strategy ($48,203) exceeds the amount you realized under the Growth Strategy ($45,404) for two reasons: (1) at the time of the withdrawal, the Buffer absorbed all of the negative Index Change of -2.00%, while the Maximum Loss did not absorb any of the negative Index Change, thus resulting in more of the withdrawal being taken from the Buffer Strategy's value even though the Investment Base of both strategies was reduced by the same amount, and (2) at the end of the Term, the Buffer absorbed more of the negative Index Change (10 percentage points of the -14.00% change) than the Maximum Loss absorbed (4 percentage points of the -14.00% change), thus reducing the Strategy value of the Growth Strategy to a greater extent.

Example D: Withdrawal When Index Falling Steadily and Precipitously

Impact of $10,000 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	850	850
Negative Index Change	(850 - 1000) / 1000 = -15.00%	(850 - 1000) / 1000 = -15.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer on Day 146 of Term	N/A	10% x (365-219)/365 = 4.00% Buffer
Negative Index Change Absorbed by Buffer	N/A	-4.00%
Negative Index Change after Buffer	N/A	-15.00% - (-4.00)% = -11.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-11.00% x 100% = 11.00% Vested Loss
Vested Loss in Dollars	$50,000 x 10.00% = $5,000 Vested Loss	$50,000 x 11.00% = $5,500 Vested Loss
Strategy Value before Withdrawal	$50,000 - $5,000 = $45,000	$50,000 - $5,500 = $44,500
Amount Withdrawn*	$5,028	$4,972
Percentage Reduction in Strategy Value	$5,028/ $45,000 = 11.17%	$4,972/ $44,500 = 11.17%
Proportional Reduction in Investment Base	$50,000 x .1117 = $5,585	$50,000 x .1117 = $5,585
Remaining Investment Base after Withdrawal	$50,000 - $5,585 = $44,415	$50,000 - $5,585 = $44,415

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Withdrawal	$44,415	$44,415
Index Value at Term Start	1000	1000
Index Value at Term End	750	750
Negative Index Change	(750 - 1000) / 1000 = -25.00%	(750 - 1000) / 1000 = -25.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer at End of Term	N/A	10% Buffer
Negative Index Change Absorbed by Buffer	N/A	-10.00%
Negative Index Change after Buffer	N/A	-25.00% - (-10.00)% = -15.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-15.00% x 100% = 15.00% Vested Loss
Vested Loss in Dollars	$44,415 x 10.00% = $4,442 Vested Loss	$44,415 x 15.00% = $6,662 Vested Loss
Strategy Value at Term End	$44,415 - $4,442 = $39,973	$44,415 - $6,662 = $37,753

*Note: The withdrawal is taken proportionally from each Indexed Strategy, based on the ratio of that Strategy's value to the total value of all Indexed Strategies immediately before the withdrawal. In this example, the total value of all Indexed Strategies immediately before the withdrawal was $89,500 ($45,000 + $44,500). The S&P 500 Growth Strategy value was 50.28% of that total value ($45,000 / $89,500 = 50.28%), so 50.28% of the $10,000 withdrawal ($5,028) was taken from it. The S&P 500 Buffer Strategy value was 49.72% of that total value ($44,500 / $89,500 = 49.72%), so 49.72% of the $10,000 withdrawal ($4,972) was taken from it.

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $45,001 ($5,028 withdrawal plus the $39,973 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $45,000 ($50,000 Investment Base minus $5,000 loss ($50,000 x -10.00%)).

The amount realized equals (after taking into account the effects of rounding) this hypothetical Strategy value of $45,000 because the Maximum Loss equally limited the negative Index Change both at the time of withdrawal and at the end of the Term.

S&P 500 Buffer Strategy

The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $42,725 ($4,972 withdrawal plus the $37,753 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term would have been $42,500 ($50,000 Investment Base minus $7,500 loss ($50,000 x -15.00%)).

The amount realized of $42,725 exceeds this hypothetical Strategy value of $42,500 because:

- the loss at the time of the withdrawal caused the reduction in the Investment Base to be greater than the actual amount withdrawn ($4,972 - $5,585 = -$613); and
- the subsequent loss at the term end was calculated on a smaller Investment Base, which caused that loss to be smaller than the hypothetical loss ($7,500 - $6,662 = -$838).

The result for the S&P 500 Buffer Strategy (-$613 + $838 = $225) is equal to the difference between the amount realized and the hypothetical Strategy value ($42,725 - $225 = $42,500).

Your investment in the S&P 500 Buffer Strategy underperformed the S&P 500 Growth Strategy by $2,276 in this example. The amount you realized under the Buffer Strategy ($42,725) is smaller than the amount you realized under the Growth Strategy ($45,001) for two reasons: (1) at the time of the withdrawal, the Buffer absorbed less of the negative Index Change of -15.00%, thus resulting in more of the withdrawal being taken from the Buffer Strategy's value even though the Investment Base of both strategies was reduced by the same amount, and (2) at the end of the Term, the Buffer absorbed less of the negative Index Change (10 percentage points of the -25.00% change) than the Maximum Loss absorbed (15 percentage points of the -25.00% change), thus reducing the Strategy value of the Buffer Strategy to a greater extent.

Example E: Withdrawal When Index Rises and Then Falls

Impact of $10,000 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	1080	1080
Positive Index Change	(1080 - 1000) / 1000 = 8.00%	(1080 - 1000) / 1000 = 8.00%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	8.00%	8.00%
Vesting Factor on Day 146	25%	25%
Vested Gain as a Percentage	8.00% x 25% = 2.00% Vested Gain	8.00% x 25% = 2.00% Vested Gain
Vested Gain in Dollars	$50,000 x 2.00% = $1,000 Vested Gain	$50,000 x 2.00% = $1,000 Vested Gain
Strategy Value before Withdrawal	$50,000 + $1,000 = $51,000	$50,000 + $1,000 = $51,000
Amount Withdrawn	$5,000	$5,000
Percentage Reduction in Strategy Value	$5,000 / $51,000 = 9.80%	$5,000 / $51,000 = 9.80%
Proportional Reduction in Investment Base	$50,000 x .0980 = $4,900	$50,000 x .0980 = $4,900
Remaining Investment Base after Withdrawal	$50,000 - $4,900 = $45,100	$50,000 - $4,900 = $45,100

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Withdrawal	$45,100	$45,100
Index Value at Term Start	1000	1000
Index Value at Term End	860	860
Negative Index Change	(860 - 1000) / 1000 = -14.00%	(860 - 1000) / 1000 = -14.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer at End of Term	N/A	10% Buffer
Negative Index Change Absorbed by Buffer	N/A	-10.00%
Negative Index Change after Buffer	N/A	-14% - (-10%) = -4.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-4.00% x 100% = 4.00% Vested Loss
Vested Loss in Dollars	$45,098 x 10.00% = $4,510 Vested Loss	$45,098 x 4.00% = $1,804 Vested Loss
Strategy Value at Term End	$45,100 - $4,510 = $40,590	$45,100 - $1,804 = $43,296

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $45,590 ($5,000 withdrawal plus the $40,590 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $45,000 ($50,000 Investment Base minus $5,000 loss ($50,000 x -10%)).

The amount realized of $45,590 exceeds this hypothetical Strategy value of $45,000 because:
- the gain at the time of the withdrawal caused the reduction in the Investment Base to be less than the actual amount withdrawn ($5,000 - $4,900 = $100); and
- the subsequent loss at the term end was calculated on a smaller Investment Base, which caused that loss to be smaller than the hypothetical loss ($5,000 - $4,510 = $490).

The result for the S&P 500 Growth Strategy ($100 + $490 = $590) is equal to the difference between the amount realized and the hypothetical Strategy value ($45,590 - $590 = $45,000).

<u>S&P 500 Buffer Strategy</u>
The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $48,296 ($5,000 withdrawal plus the $43,296 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term would have been $48,000 ($50,000 Investment Base minus $2,000 loss ($50,000 x -4.00%)). This hypothetical Strategy value is lower than the amount realized for the same reasons described above for the S&P 500 Growth Strategy.

Your investment in the S&P 500 Buffer Strategy outperformed the S&P 500 Growth Strategy by $2,706 in this example. The amount you realized under the Buffer Strategy ($48,296) exceeds the amount you realized under the Growth Strategy ($45,590) because, at the end of the Term, the Buffer absorbed more of the negative Index Change (10 percentage points of the -14.00% change) than the Maximum Loss absorbed (4 percentage points of the -14.00% change), thus reducing the Strategy value of the Growth Strategy to a greater extent.

Example F: Multiple Withdrawals in a Volatile Market

Impact of $2,500 Withdrawal on Day 146 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Investment Base at Term Start	$50,000	$50,000
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	1040	1040
Positive Index Change	(1040 - 1000) / 1000 = 4.00%	(1040 - 1000) / 1000 = 4.00%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	4.00%	4.00%
Vesting Factor on Day 146	25%	25%
Vested Gain as a Percentage	4.00% x 25% = 1.00% Vested Gain	4.00% x 25% = 1.00% Vested Gain
Vested Gain in Dollars	$50,000 x 1.00% = $500 Vested Gain	$50,000 x 1.00% = $500 Vested Gain
Strategy Value before Withdrawal	$50,000 + $500 = $50,500	$50,000 + $500 = $50,500
Amount Withdrawn	$1,250	$1,250
Percentage Reduction in Strategy Value	$1,250 / $50,500 = 2.48%	$1,250 / $50,500 = 2.48%
Proportional Reduction in Investment Base	$50,000 x .0248 = $1,240	$50,000 x .0248 = $1,240
Remaining Investment Base after Day 146 Withdrawal	$50,000 - $1,240 = $48,760	$50,000 - $1,240 = $48,760

Impact of $3,500 Withdrawal on Day 219 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Day 146 Withdrawal	$48,760	$48,760
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	970	970
Negative Index Change	(970 - 1000) / 1000 = -3.00%	(970 - 1000) / 1000 = -3.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-3.00%	N/A
Buffer on Day 219 of Term	N/A	10% x (365-146)/365 = 6.00% Buffer
Negative Index Change Absorbed by Buffer	N/A	Entire -3% Index Change
Negative Index Change after Buffer	N/A	0.00%
Vested Loss as Percentage	-3.00% x 100% = 3.00% Vested Loss	0.00% Vested Loss
Vested Loss in Dollars	$48,760 x 3.00% = $1,463 Vested Loss	$0 Vested Loss
Strategy Value before Withdrawal	$48,760 - $1,463 = $47,297	$48,760 - $0 = $48,760
Amount Withdrawn*	$1,723	$1,777
Percentage Reduction in Strategy Value	$1,723 / $47,297 = 3.64%	$1,777 / $48,760 = 3.64%
Proportional Reduction in Investment Base	$48,760 x .0364 = $1,775	$48,760 x .0364 = $1,775
Remaining Investment Base after Day 219 Withdrawal	$48,760 - $1,775 = $46,985	$48,760 - $1,775 = $46,985

Impact of $4,000 Withdrawal on Day 292 of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Day 219 Withdrawal	$46,985	$46,985
Index Value at Term Start	1000	1000
Index Value at Date of Withdrawal	1150	1150
Positive Index Change	(1150 - 1000) / 1000 = 15.00%	(1150 - 1000) / 1000 = 15.00%
Maximum Gain	Gain of 12%	Gain of 14%
Positive Index Change Limited by Maximum Gain	12.00%	14.00%
Vesting Factor in Month 8	50%	50%
Vested Gain as a Percentage	12.00% x 50% = 6.00% Vested Gain	14.00% x 50% = 7.00% Vested Gain

Vested Gain in Dollars	$46,985 x 6.00% = $2,819 Vested Gain	$46,985 x 7.00% = $3,289 Vested Gain
Strategy Value before Withdrawal	$46,985 + $2,819 = $49,804	$46,985 + $3,289 = $50,274
Amount Withdrawn*	$1,991	$2,009
Percentage Reduction in Strategy Value	$1,991 / $49,804 = 4.00%	$2,009 / $50,274 = 4.00%
Proportional Reduction in Investment Base	$46,985 x .0400 = $1,879	$46,985 x .0400 = $1,879
Remaining Investment Base after Day 292 Withdrawal	$46,985 - $1,879 = $45,106	$46,985 - $1,879 = $45,106

Value at End of Term	S&P 500 Growth Strategy	S&P 500 Buffer Strategy
Remaining Investment Base after Day 292 Withdrawal	$45,106	$45,106
Index Value at Term Start	1000	1000
Index Value at Term End	860	860
Negative Index Change	(860 - 1000) / 1000 = -14.00%	(860 - 1000) / 1000 = -14.00%
Maximum Loss	Loss of 10%	N/A
Negative Index Change Limited by Maximum Loss	-10.00%	N/A
Buffer at End of Term	N/A	10% Buffer
Negative Index Change Absorbed by Buffer	N/A	-10.00%
Negative Index Change after Buffer	N/A	-14.00% - (-10.00%) = -4.00%
Vested Loss as a Percentage	-10.00% x 100% = 10.00% Vested Loss	-4.00% x 100% = 4.00% Vested Loss
Vested Loss in Dollars	$45,106 x 10.00% = $4,511 Vested Loss	$45,106 x 4.00% = $1,804 Vested Loss
Strategy Value at Term End	$45,106 - $4,511 = $40,595	$45,106 - $1,804 = $43,302

*Note: The withdrawal is taken proportionally from each Indexed Strategy, based on the ratio of that Strategy's value to the total value of all Indexed Strategies immediately before the withdrawal. In this example, on Day 219 the total value of all Indexed Strategies immediately before the withdrawal was $96,057 ($47,297 + $48,760). The S&P 500 Growth Strategy value was 49.24% of that total value ($47,297 / $96,057 = 49.24%), so 49.24% of the $3,500 withdrawal ($1,723) was taken from it. The S&P 500 Buffer Strategy value was 50.76% of that total value ($48,760 / $96,057 = 50.76%), so 50.76% of the $3,500 withdrawal ($1,777) was taken from it.

In this example, on Day 292 the total value of all Indexed Strategies immediately before the withdrawal was $100,078 ($49,804 + $50,274). The S&P 500 Growth Strategy value was 49.77% of that total value ($49,804 / $100,078 = 49.77%), so 49.77% of the $4,000 withdrawal ($1,991) was taken from it. The S&P 500 Buffer Strategy value was 50.23% of that total value ($50,274 / $100,078 = 50.23%), so 50.23% of the $4,000 withdrawal ($2,009) was taken from it.

<u>S&P 500 Growth Strategy</u>
In this example, the amount you realized on your $50,000 investment in the S&P 500 Growth Strategy at the end of the Term is $45,559 ($4,964 total withdrawals plus the $40,595 Strategy value at the end of the Term).

Had no withdrawal occurred, your S&P 500 Growth Strategy value at the end of the Term would have been $45,000 ($50,000 Investment Base minus $5,000 loss ($50,000 x -10.00%)).

The amount realized of $45,561 exceeds this hypothetical Strategy value of $45,000 because:

- the gains at the time of the $1,250 and $1,991 withdrawals caused the reductions in the Investment Base to be less than the actual amounts withdrawn ($1,250 - $1,240 = $10 and $1,991 - $1,879 = $112);
- the loss at the time of the $1,723 withdrawal caused the reduction in the Investment Base to be greater than the actual amount withdrawn ($1,723 - $1,775 = -$52); and
- the subsequent loss at the term end was calculated on a smaller Investment Base, which caused that loss to be less than the hypothetical loss ($5,000 - $4,511 = $489).

The result for the S&P 500 Growth Strategy ($10 + $112 - $52 + $489 = $559) is equal to the difference between the amount realized and the hypothetical Strategy value ($45,559 - $559 = $45,000).

<u>S&P 500 Buffer Strategy</u>
The amount you realized on your $50,000 investment in the S&P 500 Buffer Strategy at the end of the Term is $48,338 ($5,036 total withdrawals plus the $43,302 Strategy value at the end of the Term). Had no withdrawal occurred, your S&P 500 Buffer Strategy value at the end of the Term

would have been $48,000 ($50,000 Investment Base minus $2,000 loss ($50,000 x -4.00%)). This hypothetical Strategy value is lower than the amount realized for the same reasons described above for the S&P 500 Growth Strategy.

Your investment in the S&P 500 Buffer Strategy outperformed the S&P 500 Growth Strategy by $2,779 in this example. The amount you realized under the Buffer Strategy ($48,338) exceeds the amount you realized under the Growth Strategy ($45,559) for three reasons: (1) at the time of the Day 219 withdrawal, the Buffer absorbed all of the negative Index Change of -3.00%, while the Maximum Loss did not absorb any of the negative Index Change, thus resulting in more of the withdrawal being taken from the Buffer Strategy's value even though the Investment Base of both strategies was reduced by the same amount, (2) at the time of the Day 292 withdrawal, the Index Change exceeded the Maximum Gain of both the Buffer Strategy and the Growth Strategy, but the Buffer Strategy had a higher Maximum Gain than the Growth Strategy, resulting in more of the withdrawal being taken from the Buffer Strategy's value even though the Investment Base of both strategies was reduced by the same amount, and (3) at the end of the Term, the Buffer absorbed more of the negative Index Change (10 percentage points of the -14.00% change) than the Maximum Loss absorbed (4 percentage points of the -14.00% change), thus reducing the Strategy value of the Growth Strategy to a greater extent.

APPENDIX C: EXAMPLES - AMOUNT AVAILABLE FOR WITHDRAWAL

The following examples are intended to help you understand the amount that may be available for withdrawal in different market environments.

Example A: Amount Available for a Withdrawal When Index Rises

This example assumes:

- you allocate a $50,000 Purchase Payment to the S&P 500 Growth/-10% Floor Strategy and a $50,000 Purchase Payment to the S&P 500 10% Buffer Strategy;
- the Contract Effective Date and the Term Start Date are both April 6, 2025;
- the Maximum Gain for the initial Term of the S&P 500 Growth Strategy is 12% and the S&P 500 Buffer Strategy is 14%;
- you request a $10,000 withdrawal on Day 146 of the Term (August 30, 2025);
- you do not take any other withdrawals during the initial Term; and
- the Term End Date is April 6, 2026.

Term Start Date - April 6, 2025	S&P 500 Growth Strategy	S&P 500 Buffer Strategy	
Strategy Value	$50,000	$50,000	See Footnote 1 below.
Investment Base	$50,000	$50,000	See Footnote 1 below.
Maximum Gain for Term	Gain of 12%	Gain of 14%	See Footnote 2 below.
Index Value	1900	1900	
Withdrawal Date - August 30, 2025			
Index Value	1976	1976	
Positive Index Change	4.00%	4.00%	See Footnote 3 below.
Positive Index Change Limited by Maximum Gain	4.00%	4.00%	See Footnote 4 below.
Vesting Factor on Day 146	25%	25%	See Footnote 5 below.
Vested Gain as a Percentage	1.00%	1.00%	See Footnote 6 below.
Vested Gain in Dollars	$500	$500	See Footnote 6 below.
Strategy Value before Withdrawal	$50,500	$50,500	See Footnote 7 below.
Amount of Withdrawal Requested	$10,000	$10,000	
Free Withdrawal Allowance	$5,000	$5,000	See Footnote 8 below.
Early Withdrawal Charge	$435	$435	See Footnote 9 below.
Total Amount Withdrawn	$10,435	$10,435	See Footnote 10 below.
Percentage Reduction in Strategy Value	20.66%	20.66%	See Footnote 11 below.
Proportional Reduction in Investment Base	$10,330	$10,330	See Footnote 11 below.
Remaining Investment Base after Withdrawal	$39,670	$39,670	See Footnote 12 below.
Strategy Value after Withdrawal	$40,065	$40,065	See Footnote 13 below.
Term End Date - April 6, 2026			
Index Value	2033	2033	
Positive Index Change	7.00%	7.00%	See Footnote 14 below.
Positive Index Change Limited by Maximum Gain	7.00%	7.00%	See Footnote 15 below.
Vesting Factor at Term End	100%	100%	See Footnote 16 below.
Vested Gain as a Percentage	7.00%	7.00%	See Footnote 17 below.
Remaining Investment Base after Withdrawal	$39,670	$39,670	See Footnote 12 below.
Vested Gain in Dollars	$2,777	$2,777	See Footnote 17 below.
Strategy Value at Term End	$42,447	$42,447	See Footnote 18 below.

Footnote 1. On the Term Start Date, the Strategy value is equal to the amount applied to the Strategy on the Term Start Date. The amount applied on the Term Start Date is also the beginning Investment Base.

Footnote 2. The Maximum Gain is the largest positive Index Change for a Term taken into account to determine the Vested Gain. In this example, the Maximum Gain is 12% (for the Growth Strategy) or 14% (for the Buffer Strategy), which means it will not affect the calculation of Vested Gain unless the Index goes up more than 12% or 14%, respectively.

Footnote 3. The Index Change is equal to the percentage change in the Index Value measured from the Term Start Date to the withdrawal date.

Formula	(Index Value on withdrawal date - Index Value on Term Start Date) / Index Value on Term Start Date
Calculation	(1976 - 1900) / 1900 = 4.00%

Footnote 4. In this example, the Index Change on the withdrawal date is not limited by the Maximum Gain because the Index did not go up more than 12% for the Growth Strategy or 14% for the Buffer Strategy.

Footnote 5. A Vesting Factor limits the portion of a positive Index Change that is taken into account to determine the Vested Gain. The Vesting Factor for a positive Index Change varies depending on the day of the Term. The Vesting Factor for a positive Index Change on any date within the first six months of a Term is 25%. The Vesting Factor for a positive Index Change on any date within the final six months of a Term (but before the Final Market Day of the Term) is 50%. The Vesting Factor for a positive Index Change on the final Market Day of the Term (or any date after that when the Vested Gain for the Term is calculated) is 100%. In this example, the Vesting Factor is 25% because the withdrawal date is a date within the first six months of the Term.

Footnote 6. When there is a positive Index Change, we use the following formulas to calculate the Vested Gain.

Formula	Index Change limited by Maximum Gain x Vesting Factor = Vested Gain percentage
Calculation	4.00% x 25% = 1.00%

Formula	Remaining Investment Base for the current Term x Vested Gain percentage = Vested Gain in dollars
Calculation	$50,000 x 0.0100 = $500

Footnote 7. In this example, there is a Vested Gain on the withdrawal date and you have not taken any withdrawals before that date. This means the Strategy value on the withdrawal date is the Investment Base plus the Vested Gain as of that date.

Formula	Investment Base + Vested Gain = Strategy value
Calculation	$50,000 + $500 = $50,500

Footnote 8. The Free Withdrawal Allowance (FWA) for the first Contract Year is 10% of the Purchase Payment. The FWA for each subsequent Contract Year is 10% of the Account Value as of the most recent Contract Anniversary.

Formula	Purchase Payment x 10% = FWA for first Contract Year
Calculation	$50,000 x 0.10 = $5,000

Footnote 9. The Early Withdrawal Charge that would apply to your withdrawal is equal to the amount subject to the charge multiplied by the Early Withdrawal Charge rate (EWC rate). The amount subject to the charge includes the charge itself. The amount subject to the charge does not include the FWA. The EWC rate depends on the Contract Year. In this example, the withdrawal occurs in the first Contract Year, when the EWC rate is 8%. The Early Withdrawal Charge rate declines after each of the first five Contract Years. There is no Early Withdrawal Charge after Contract Year 7.

Formula	[(Requested withdrawal - FWA) x EWC rate] / (1.00 - EWC rate) = Early Withdrawal Charge
Calculation	[($10,000 - $5,000) x 0.08] / (1.00 - 0.08) = $5,000 x 0.08 / 0.92 = $400 / 0.92 = $435

Footnote 10. When you request a withdrawal, you receive the amount you requested. If an Early Withdrawal Charge applies, we also withdraw an amount equal to the charge. This means that the total amount withdrawn from your annuity is equal to the amount you requested plus the applicable Early Withdrawal Charge.

Formula	Requested withdrawal + Early Withdrawal Charge = total amount withdrawn
Calculation	$10,000 + $435 = $10,435

Footnote 11. When you take a withdrawal, the portion of the Investment Base taken to pay for the withdrawal is proportional to the reduction in the value of the Indexed Strategy due to the withdrawal. If there is a Vested Gain as of the withdrawal date, the reduction in the Investment Base will be less than the total amount withdrawn. This difference occurs because your withdrawal is credited with a proportionate share of the Vested Gain.

Formula	Total amount withdrawn / Strategy value before withdrawal = percentage reduction in Strategy value
Calculation	$10,435 / $50,500 = 20.66%

Formula	Investment Base before withdrawal x percentage reduction in Strategy value = proportional reduction in Investment Base
Calculation	$50,000 x 0.2066 = $10,330

Footnote 12. On the withdrawal date after the withdrawal, the remaining Investment Base is equal to the Investment Base before the withdrawal minus the proportional reduction in the Investment Base for the withdrawal.

Formula	Investment Base before withdrawal - proportional reduction in Investment Base for withdrawal = Investment Base after withdrawal
Calculation	$50,000 - $10,330 = $39,670

Footnote 13. On the withdrawal date, the Strategy value after the withdrawal is equal to Strategy value before the withdrawal minus the total amount withdrawn.

Formula	Strategy value before withdrawal - total amount withdrawn = Strategy value after withdrawal
Calculation	$50,500 - $10,435 = $40,065

Footnote 14. The Index Change on the Term End Date is equal to the percentage change in the Index Value measured from the Term Start Date to the Term End Date.

Formula	(Index Value on Term End Date - Index Value on Term Start Date) / Index Value on Term Start Date
Calculation	(2033 - 1900) / 1900 = 7.00%

Footnote 15. In this example, the Index Change on the Term End Date is not limited by the Maximum Gain because the Index did not go up more than 12% for the Growth Strategy or 14% for the Buffer Strategy.

Footnote 16. The Vesting Factor for a positive Index Change on the Term End Date is 100%.

Footnote 17. When there is a positive Index Change, we use the following formulas to calculate the Vested Gain.

Formula	Index Change limited by Maximum Gain x Vesting Factor = Vested Gain percentage
Calculation	7.00% x 100% = 7.00%

Footnote 18. In this example, there is a Vested Gain on the Term End Date and you have taken a $10,000 withdrawal during the Term. This means the Strategy value on that date is the remaining Investment Base on the Term End Date plus the Vested Gain as of that date.

Formula	Remaining Investment Base on Term End Date + Vested Gain = Strategy value on Term End Date
Calculation	$39,670 + $2,777 = $42,447

Example B: Amount Available for a Withdrawal When Index Falls

This example assumes:

- you allocate a $50,000 Purchase Payment to the S&P 500 Growth/-10% Floor Strategy and a $50,000 Purchase Payment to the S&P 500 10% Buffer Strategy;
- the Contract Effective Date and the Term Start Date are both April 6, 2025;
- you request a $10,000 withdrawal on Day 146 of the Term (August 30, 2025);
- you do not take any other withdrawals during the initial Term; and
- the Term End Date is April 6, 2026.

Term Start Date - April 6, 2025	S&P 500 Growth Strategy	S&P 500 Buffer Strategy	
Strategy Value	$50,000	$50,000	See Footnote 1 below.
Investment Base	$50,000	$50,000	See Footnote 1 below.
Maximum Loss for Term	Loss of 10%	N/A	See Footnote 2 below.
End of Term Buffer	N/A	10% Buffer	See Footnote 3 below.
Index Value	1900	1900	
Withdrawal Date - August 30, 2025			
Index Value	1786	1786	
Negative Index Change	-6.00%	-6.00%	See Footnote 4 below.
Negative Index Change Limited by Maximum Loss	-6.00%	N/A	See Footnote 5 below.
Buffer on Day 146	N/A	4.00% Buffer	See Footnote 6 below.
Vested Loss as a Percentage	-6.00%	-2.00%	See Footnote 7 below.
Vested Loss in Dollars	-$3,000	-$1,000	See Footnote 7 below.
Strategy Value before Withdrawal	$47,000	$49,000	See Footnote 8 below.
Amount of Withdrawal Requested	$10,000	$10,000	
Free Withdrawal Allowance	$5,000	$5,000	See Footnote 9 below.
Early Withdrawal Charge	$435	$435	See Footnote 10 below.
Total Amount Withdrawn	$10,435	$10,435	See Footnote 11 below.
Percentage Reduction in Strategy Value	22.20%	21.30%	See Footnote 12 below.
Proportional Reduction in Investment Base	$11,100	$10,650	See Footnote 12 below.
Remaining Investment Base after Withdrawal	$38,900	$39,350	See Footnote 13 below.
Strategy Value after Withdrawal	$36,565	$38,565	See Footnote 14 below.
Term End Date - April 6, 2026			
Index Value	1748	1748	
Negative Index Change	-8.00%	-8.00%	See Footnote 15 below.
Negative Index Change Limited by Maximum Loss	-8.00%	N/A	See Footnote 16 below.
Negative Index Change Limited by Buffer	N/A	0.00%	See Footnote 17 below.
Vested Loss Percentage	-8.00%	0.00%	See Footnote 18 below.
Remaining Investment Base	$38,900	$39,350	See Footnote 13 below.
Vested Loss in Dollars	$3,112	$0	See Footnote 18 below.
Strategy Value at Term End	$35,788	$39,350	See Footnote 19 below.

Footnote 1. On the Term Start Date, the Strategy value is equal to the amount applied to the Strategy on the Term Start Date. The amount applied on the Term Start Date is also the beginning Investment Base.

Footnote 2. The Maximum Loss is the largest negative Index Change for a Term taken into account to determine the Vested Loss for Growth Strategies. In this example, the Maximum Loss is 10%, which means it will not affect the calculation of Vested Loss unless the Index goes down more than 10%.

Footnote 3. The Buffer is the portion of a negative Index Change for a Term that is disregarded when determining a Vested Loss for a Buffer Strategy. The Buffer varies depending on the day of the Term. Once the final Market Day of the Term has been reached, the Buffer is 10%. Before the final Market Day, the Buffer is:

$$10\% \times \frac{365 - N}{365}$$

where N is equal to the number of days remaining until the final Market Day of the Term.

Footnote 4. The Index Change is equal to the percentage change in the Index Value measured from the Term Start Date to the withdrawal date.

Formula	(Index Value on withdrawal date - Index Value on Term Start Date) / Index Value on Term Start Date
Calculation	(1786 - 1900) / 1900 = -6.00%

Footnote 5. In this example, the negative Index Change on the withdrawal date is not limited by the Maximum Loss because the Index did not go down more than 10%.

Footnote 6. In this example, only a portion of the negative Index Change on the withdrawal date is limited by the Buffer because the Index went down more than 4.00%.

Footnote 7.

Vested Loss – Growth Strategies: When there is a negative Index Change, we use the following formulas to calculate the Vested Loss for Growth Strategies.

Formula	Index Change limited by Maximum Loss = Vested Loss percentage
Calculation	-6.00% = -6.00%

Formula	Remaining Investment Base for the current Term x Vested Loss percentage = Vested Loss in dollars
Calculation	$50,000 x -0.0600 = -$3,000

Vested Loss – Buffer Strategies: When there is a negative Index Change, we use the following formulas to calculate the Vested Loss for Buffer Strategies.

Formula	Index Change limited by Buffer = Vested Loss percentage
Calculation	-6.00% Index Change – (-4.00%) Buffer = -2.00%

Formula	Remaining Investment Base for the current Term x Vested Loss percentage = Vested Loss in dollars
Calculation	$50,000 x -0.0200 = -$1,000

Footnote 8. In this example, there is a Vested Loss on the withdrawal date and you have not taken any withdrawals before that date. This means the Strategy value on the withdrawal date is the Investment Base, minus the Vested Loss as of that date.

Formula	Investment Base - Vested Loss = Strategy value
Calculation	For Growth Strategy: $50,000 - $3,000 = $47,000
	For Buffer Strategy: $50,000 - $1,000 = $49,000

Footnote 9. The Free Withdrawal Allowance (FWA) for the first Contract Year is 10% of the Purchase Payment. The FWA for each subsequent Contract Year is 10% of the Account Value as of the most recent Contract Anniversary.

Formula	Purchase Payment x 10% = FWA for first Contract Year
Calculation	$50,000 x 10% = $5,000

Footnote 10. The Early Withdrawal Charge that would apply to your withdrawal is equal to the amount subject to the charge multiplied by the Early Withdrawal Charge rate (EWC rate). The amount subject to the charge includes the charge itself. The amount subject to the charge does not include the FWA. The EWC rate depends on the Contract Year. In this example, the withdrawal occurs in the first Contract Year, when the EWC rate is 8%. The Early Withdrawal Charge rate declines after each of the first five Contract Years. There is no Early Withdrawal Charge after Contract Year 7.

Formula	[(Requested withdrawal - FWA) x EWC rate] / (1.00 - EWC rate) = Early Withdrawal Charge
Calculation	[($10,000 - $5,000) x 0.08] / (1.00 - 0.08) = $5,000 x 0.08 / 0.92 = $400 / 0.92 = $435

Footnote 11. When you request a withdrawal, you receive the amount you requested. If an Early Withdrawal Charge applies, we also withdraw an amount equal to the charge. This means that the total amount withdrawn from your annuity is equal to the amount you requested plus the applicable Early Withdrawal Charge.

Formula	Requested withdrawal + Early Withdrawal Charge = total amount withdrawn

Calculation	\$10,000 + \$435 = \$10,435

Footnote 12. When you take a withdrawal, the portion of the Investment Base taken to pay for the withdrawal is proportional to the reduction in the value of the Indexed Strategy due to the withdrawal. If there is a Vested Loss as of the withdrawal date, the reduction in the Investment Base will be more than the total amount withdrawn. This difference occurs because your withdrawal is charged with a proportionate share of the Vested Loss.

Formula	total amount withdrawn / Strategy value before withdrawal = percentage reduction in Strategy value
Calculation	For Growth Strategy: \$10,435 / \$47,000 = 22.20%
	For Buffer Strategy: \$10,435 / \$49,000 = 21.30%

Formula	Investment Base before withdrawal x percentage reduction in Strategy value = proportional reduction in Investment Base
Calculation	For Growth Strategy: \$50,000 x 0.2220 = \$11,100
	For Buffer Strategy: \$50,000 x 0.2130 = \$10,650

Footnote 13. On the withdrawal date, the remaining Investment Based after the withdrawal is equal to the Investment Base before the withdrawal minus the proportional reduction in the Investment Base for the withdrawal.

Formula	Investment Base before withdrawal - proportional reduction in Investment Base for withdrawal = Investment Base after withdrawal
Calculation	For Growth Strategy: \$50,000 - \$11,100 = \$38,900
	For Buffer Strategy: \$50,000 - \$10,650 = \$39,350

Footnote 14. On the withdrawal date, the Strategy value after the withdrawal is equal to the Strategy value before the withdrawal minus the total amount withdrawn.

Formula	Strategy value before withdrawal - total amount withdrawn = Strategy value after withdrawal
Calculation	For Growth Strategy: \$47,000 - \$10,435 = \$36,565
	For Buffer Strategy: \$49,000 - \$10,435 = \$38,565

Footnote 15. The Index Change on the Term End Date is equal to the percentage change in the Index Value measured from the Term Start Date to the Term End Date.

Formula	(Index Value on Term End Date - Index Value on Term Start Date) / Index Value on Term Start Date
Calculation	(1748 - 1900) / 1900 = -8.00%

Footnote 16. For the Growth Strategy, in this example, the negative Index Change on the Term End Date is not limited by the Maximum Loss because the Index did not go down more than 10%.

Footnote 17. For the Buffer Strategy, in this example, the entire negative Index Change on the Term End Date is limited by the Buffer because the Index went down less than 10%.
Footnote 18.

Vested Loss – Growth Strategies: When there is a negative Index Change, we use the following formula to calculate the Vested Loss percentage for Growth Strategies.

Formula	Index Change limited by Maximum Loss = Vested Loss percentage
Calculation	-8.00% = -8.00%

Formula	Remaining Investment Base for the current Term x Vested Loss percentage = Vested Loss in dollars
Calculation	\$38,899 x -0.0800 = -\$3,112

Vested Loss – Buffer Strategies: When there is a negative Index Change, we use the following formula to calculate the Vested Loss percentage for Buffer Strategies.

Formula	Index Change limited by Buffer = Vested Loss percentage
Calculation	-8% Index Change > -10% Buffer = 0%

Formula	Remaining Investment Base for the current Term x Vested Loss percentage = Vested Loss in dollars
Calculation	\$39,352 x 0.0000 = \$0

Footnote 19. In this example, there is a Vested Loss on the Term End Date for the Growth Strategy and you have taken a $10,000 withdrawal during the Term. This means the Strategy value on that date is the remaining Investment Base on the Term End Date minus the Vested Loss as of that date.

Formula	Remaining Investment Base on Term End Date - Vested Loss = Strategy value
Calculation	$38,900 - $3,112 = $35,788

In this example, there is no Vested Loss on the Term End Date for the Buffer Strategy and you have taken a $10,000 withdrawal during the Term. This means the Strategy value on that date is the remaining Investment Base on the Term End Date.

Formula	Remaining Investment Base on Term End Date = Strategy value
Calculation	$39,350 = $39,350

APPENDIX D: STATE VARIATIONS

This prospectus describes the material features of the Contract. Contracts issued in your state may provide different features and benefits from, and impose different costs than, those described in this prospectus because of state law variations. However, please note that the maximum charge is set forth in this prospectus. If you would like to review a copy of the Contract and any endorsements, contact us at P.O. Box 5423, Cincinnati, OH 45201-5423, visit our website at http://www.massmutualascend.com or call us at 1-800-789-6771.

The following information is a summary of material state variations as of the date of this prospectus.

General

For Contracts Issued in Illinois and New Jersey: References to "spouse" have been changed to "spouse or civil union partner."

Extended Care Waiver Rider. The table below summarizes material state variations related to the rider.

For Contracts Issued in:	*Variations in Extended Care Waiver Rider*
California	The Waiver of Early Withdrawal Charges for Facility Care or Home Care or Community-Based Services Rider (CA Rider) replaces the Extended Care Waiver Rider. The CA Rider provides a waiver under an expanded set of circumstances. The waiver will apply if, at the time of the withdrawal or Surrender, or within the immediately preceding 90 days, the following conditions are met: (1) the insured is confined in a facility or is receiving, as prescribed by a physician, registered nurse or licensed social worker, home care or community-based services; (2) the insured's confinement in a facility, the insured's receipt of home care or community-based services, or any combination thereof has continued for a period of at least 90 consecutive days; and (3) the first day of such 90-day period was at least one year after the contract effective date. Facility includes a skilled nursing facility, a convalescent nursing home, or an extended care facility or a residential care facility or a residential care facility for the elderly. Home care or community-based services includes home health care, adult day care, personal care, homemaker services, hospice services and respite care as defined in the rider. Additional conforming changes have been made including revised and new definitions, and inclusion of a description of circumstances under which the waiver does not apply. The termination provision has been modified to reflect that the rider will not terminate if you transfer or assign an interest in the contract to a person or entity other than the insured.
Connecticut	The conditions under which the waiver applies have been modified. The waiver will apply if at the time of a withdrawal or Surrender or within the immediately preceding 90 days all of the following conditions are met: (1) an insured is confined in a long-term care facility or hospital; and (2) the confinement has continued for a period of at least 90 consecutive days.
Kansas	The conditions under which the waiver applies have been modified. The first day of confinement must be at least 90 days after the contract effective date, rather than one year after the contract effective date.
Massachusetts and Missouri	This waiver rider in not available in Massachusetts or Missouri.
Montana	The definition of medically necessary has been modified and refers to the insured's physician.
Nebraska	The definition of skilled nursing facility has been modified by adding a licensed practical nurse to the list of persons who may provide nursing services or supervise the provision of nursing services.
New Hampshire	The definition of skilled nursing facility has been modified by changing the phrase "licensed and operated as a skilled nursing facility" to "operated as a skilled nursing facility."
Pennsylvania	The conditions under which the waiver is available have been modified. The waiver will apply if at the time of a withdrawal or Surrender or within the immediately preceding 90 days all of the following conditions are met: (1) an insured is confined in one or more long-term care facilities, hospital, or a combination of such; (2) the confinement is prescribed by a physician and is medically necessary; (3) the first day of the confinement is at least one year after the contract effective date; and (4) the confinement has continued for a period of at least 90 consecutive days, or has continued for a total of at least 90 days if each successive confinement occurs within six months of the previous confinement and is for the same related medical cause. The definition of long-term care facility has been modified. The following facilities have been deleted from the list of facilities excluded from that definition: a facility that primarily treats drug addicts and a facility that is a home for the mentally ill. An exclusion provision has been added to clarify that the waiver will not apply if the insured is confined in a long-term care facility or hospital for the treatment of certain types of drug addiction or mental illnesses. The definition of hospital has been modified by changing the phrase "it maintains, or has access to, medical, diagnostic, and major surgical facilities" to "it maintains, or has access to, medical and diagnostic facilities."

For Contracts Issued in:	*Variations in Extended Care Waiver Rider*
Vermont	The definition of long-term care facility has been modified. The following facilities have been deleted from the list of excluded facilities: a facility that primarily treats drug addicts, a facility that primarily treats alcoholics, and a facility that is a home for the mentally ill. The definition of physician has been modified by changing the phrase "a person who is licensed in the United States as a medical doctor or a doctor of osteopathy and who is practicing within the scope of his or her license" to "a person who is licensed in the United States who is providing medical care and treatment when such services are provided within the scope of his or her license and provided pursuant to applicable law."
Washington	The waiver is based on confinement to an extended care facility or hospital rather than a long-term care facility or hospital. Definitions are modified to reflect the new terminology, references to "skilled nursing facility" are changed to "nursing facility" and the related definition is modified. In the definition of nursing facility and hospital, a licensed practical nurse is added to the list of persons who may provide nursing services or supervise the provision of nursing services.

Terminal Illness Waiver Rider. The table below summarizes material state variations related to the rider.

For Contracts Issued in:	*Variations in Terminal Illness Waiver Rider*
Illinois, Kansas, Washington	As a result of the terminal illness, your life expectancy must be 24 months from the date of death, rather than 12 months.
Kansas	The diagnosis must be rendered 90 days after the contract effective date, rather than one year after the contract effective date.
New Jersey	The requirement related to the timing of the diagnosis does not apply. But the waiver will not be available until at least one year after the contract effective date.
Massachusetts	This waiver rider in not available in Massachusetts.
Pennsylvania	The diagnosis must be rendered after the contract effective date, rather than one year after the contract effective date. But the waiver will not be available until at least one year after the contract effective date. The waiver is based on a terminal condition as defined in the rider, rather than a terminal illness.
Texas	The diagnosis must be rendered on or after the contract effective date, rather than one year after the contract effective date.

Form of Annuity Payout Benefit

For Contracts Issued in Texas: Payments under a Payout Option are subject to a $50 minimum.

Assignment

For Contracts Issued in Ohio: Subject to the tax qualifications endorsement, if any, you may assign your rights to designate or change a Beneficiary or an Annuitant, to change Owners, or to elect a Payout Option if you make a specific Request in Good Order.

Amendment of the Contract

For Contracts Issued in Florida and Texas: You have the right to reject an endorsement that changes the provisions of this Contract to obtain or retain the intended tax treatment under federal tax law, or to take into account other pertinent laws and governmental regulations and rulings. We will not be responsible for the tax or other consequences of your rejection.

Involuntary Termination

For Contracts Issued in Texas: Our right to terminate this Contract is not tied to the minimum required value. We have the right to terminate this Contract if the Account Value would provide a benefit of less than $20 each month at age 70 under a life payout with payments for at least a fixed period of 10 years.

APPENDIX E. INDEX DISCLOSURES

S&P 500® Index

The "S&P 500 Index" is a product of S&P Dow Jones Indices LLC or its affiliates (“SPDJI”) and has been licensed for use by MassMutual Ascend Life Insurance Company. S&P®, S&P 500®, US 500, The 500, iBoxx®, iTraxx® and CDX® are trademarks of S&P Global, Inc. or its affiliates (“S&P”); Dow Jones® is a registered trademark of Dow Jones Trademark Holdings LLC (“Dow Jones”); It is not possible to invest directly in an index. MassMutual Ascend Life Insurance Company Products are not sponsored, endorsed, sold or promoted by SPDJI, Dow Jones, S&P, any of their respective affiliates (collectively, “S&P Dow Jones Indices”). S&P Dow Jones Indices does not make any representation or warranty, express or implied, to the owners of the MassMutual Ascend Life Insurance Company’s Products or any member of the public regarding the advisability of investing in securities generally or in MassMutual Ascend Life Insurance Company’s Products particularly or the ability of the S&P 500 Index to track general market performance. Past performance of an index is not an indication or guarantee of future results. S&P Dow Jones Indices’ only relationship to MassMutual Ascend Life Insurance Company with respect to the S&P 500 Index is the licensing of the Index and certain trademarks, service marks and/or trade names of S&P Dow Jones Indices and/or its licensors. The S&P 500 Index is determined, composed and calculated by S&P Dow Jones Indices without regard to MassMutual Ascend Life Insurance Company or the MassMutual Ascend Life Insurance Company’s Products. S&P Dow Jones Indices has no obligation to take the needs of MassMutual Ascend Life Insurance Company or the owners of MassMutual Ascend Life Insurance Company’s Products into consideration in determining, composing or calculating the S&P 500 Index. S&P Dow Jones Indices has no obligation or liability in connection with the administration, marketing or trading of MassMutual Ascend Life Insurance Company’s Products. There is no assurance that investment products based on the S&P 500 Index will accurately track index performance or provide positive investment returns. S&P Dow Jones Indices LLC is not an investment adviser, commodity trading advisory, commodity pool operator, broker dealer, fiduciary, promoter” (as defined in the Investment Company Act of 1940, as amended), “expert” as enumerated within 15 U.S.C. § 77k(a) or tax advisor. Inclusion of a security, commodity, crypto currency or other asset within an index is not a recommendation by S&P Dow Jones Indices to buy, sell, or hold such security, commodity, crypto currency or other asset, nor is it considered to be investment advice or commodity trading advice.

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SPDR® Gold Shares ETF Index

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iShares® MSCI EAFE ETF Index

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Our form number for the Contract is P1822217NW. Each endorsement or rider also has a separate form number. The form numbers may vary by state. The Securities and Exchange Commission file number for the Contract is 333-278200.

The Contract does not invest in any equity, debt, or other investments.

The Statement of Additional Information ("SAI"), dated May 1, 2025, includes additional information about the Contract and the Company. The SAI is incorporated by reference into this prospectus. The SAI is available, without charge, upon request. For a free copy, or to request other information about the Contract or make other inquiries, contact us by visiting https://www.massmutualascend.com/RILAcompliancedocuments, calling 1-800-789-6771, or in writing at the following address:

MassMutual Ascend Life Insurance Company
Administrative Office: P.O. Box 5423, Cincinnati OH 45201-5423
Policy Administration: 1-800-789-6771

Reports and other information about the Company are available on the SEC's website at https://www.sec.gov, and copies of this information may be obtained, upon payment of a duplicating fee, by electronic request at the following email address: publicinfo@sec.gov.

EDGAR Contract Identifier No. C000261637

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY®

INDIVIDUAL INDEX-LINKED MODIFIED SINGLE PREMIUM DEFERRED ANNUITY

INDEX FRONTIER 5

INDEX FRONTIER 7

STATEMENT OF ADDITIONAL INFORMATION DATED MAY 1, 2025

This Statement of Additional Information supplements the current prospectus for the Index Frontier 5 and Index Frontier 7 index-linked annuity contracts (the "Contracts") offered by MassMutual Ascend Life Insurance Company®. This statement of additional information is not a prospectus and should be read only in conjunction with the Prospectus for the Contracts dated May 1, 2025. Terms used in the current prospectuses for the Contracts are incorporated in this Statement of Additional Information and have the same meaning as in the Prospectuses.

A copy of a Contract prospectus dated May 1, 2025, as supplemented from time to time, may be obtained without charge by writing to MassMutual Ascend Life Insurance Company, P.O. Box 5423, Cincinnati, Ohio 45201-5423. You may also call us at 1-800-789-6771 or visit us at our website https://www.massmutualascend.com/RILAcompliancedocuments to request a copy.

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MASSMUTUAL ASCEND LIFE INSURANCE COMPANY

General Information and History

MassMutual Ascend Life Insurance Company ("MassMutual Ascend Life") is a stock insurance company incorporated in 1961. We are domiciled in the state of Ohio and have been continuously engaged in the insurance business since that time. We are licensed to conduct life insurance business in all states of the United States except New York, as well as the District of Columbia and Puerto Rico. Our principal executive offices are located at 191 Rosa Parks Street, Cincinnati, Ohio 45202.

We are a wholly-owned subsidiary of Massachusetts Mutual Life Insurance Company ("MassMutual"), a mutual life insurance company. MassMutual and its domestic life insurance subsidiaries provide individual and group life insurance, disability insurance, individual and group annuities and guaranteed interest contracts to individual and institutional customers in all 50 states of the U.S., the District of Columbia and Puerto Rico.

Prior to October 3, 2022, MassMutual Ascend Life's name was Great American Life Insurance Company ("GALIC"). On May 28, 2021, American Financial Group, Inc. sold its annuity business consisting of GALIC and its two insurance subsidiaries, Annuity Investors Life Insurance Company and Manhattan National Life Insurance Company, as well as a broker-dealer affiliate, Great American Advisors, LLC, and insurance distributor, AAG Insurance Agency, Inc. to MassMutual.

The General Account

Our general account (the "General Account") holds all our assets other than assets in our insulated separate accounts. We own our General Account assets, and, subject to applicable law, have sole investment discretion over them. The assets are subject to our general business operation liabilities and claims of our creditors and may lose value. Our General Account assets fund the guarantees provided in the Contracts.

We must invest our assets according to applicable state laws regarding the nature, quality and diversification of investments that may be made by life insurance companies. In general, these laws permit investments, within specified limits and subject to certain qualifications, in Federal, state, and municipal obligations, corporate bonds, preferred and common stocks, real estate mortgages, real estate and certain other investments.

We place a majority of the Purchase Payments made under the Contract in our General Account where we primarily invest the assets in a variety of fixed income securities.

The Separate Account

We place a portion of the Purchase Payments made under the Contract in a non-unitized separate account (the "Separate Account") that is not registered with the Securities and Exchange Commission. We established and maintain the Separate Account pursuant to the laws of our domiciliary state for the purpose of supporting our obligation to adjust the Indexed Strategy values for Vested Gains and Losses associated with the Indexed Strategies. The assets of the Separate Account are held in our name on behalf of the Separate Account and legally belong to us. The assets in the Separate Account are not chargeable with liabilities arising out of any other business that we conduct. We may invest these assets in hedging instruments, including derivative contracts as well as other assets permitted under state law. To support our obligations to adjust the Indexed Strategy values, we may move money between the Separate Account and our General Account. We are not obligated to invest the assets of the Separate Account according to any particular plan except as we may be required to by state insurance laws. Regardless of your Strategy allocations, we do not intend to invest the assets of the Separate Account in the iShares MSCI EAFE exchange traded fund, the iShares U.S. Real Estate exchange traded fund, or the SPDR Gold Shares exchange traded fund.

Contract owners do not have any interest in or claim on the assets in the Separate Account nor do Contract owners participate in any way in the performance of assets held in the Separate Account.

State Regulations

We are subject to the insurance laws and regulations of all the jurisdictions where we are licensed to operate. The availability of certain Contract rights and provisions depends on state approval and/or filing and review processes in each jurisdiction. Where required by law or regulation, or to meet the requirements for inclusion as an investment option in certain retirement programs, the Contract will be modified accordingly.

SERVICES

Pursuant to a Leased Employee Agreement between MassMutual Ascend Life and Glidepath Holdings, Inc. ("Glidepath"), a wholly-owned a subsidiary of Massachusetts Mutual Life Insurance Company ("MassMutual"), Glidepath furnishes MassMutual Ascend Life with personnel as requested by MassMutual Ascend Life. MassMutual Ascend Life pays for these services on the basis of cost, which must be fair and reasonable. Payments for these services by MassMutual Ascend Life to Glidepath were approximately $119 million in 2024, $109 million in 2023 and $98 million in 2022.

MassMutual Ascend Life and Barings LLC ("Barings"), a subsidiary of MassMutual, are parties to an Investment Services Agreement under which Barings provides investment services to MassMutual Ascend Life in accordance with guidelines. MassMutual Ascend Life pays Barings a fee based on Barings's cost of providing these services.

Pursuant to an Administrative Services Agreement between MassMutual Ascend Life and MassMutual, MassMutual furnishes MassMutual Ascend Life with office, data processing, telecommunications, and administrative and support services, including enterprise risk management services, corporate finance services, actuarial services, legal services, internal audit services, corporate compliance services and procurement services, as agreed upon by the parties. Payments for these services by MassMutual Ascend Life to MassMutual were approximately $4.3 million in 2024, $4.4 million in 2023 and $4.4 million in 2022.

MassMutual Ascend Life and its subsidiaries have entered into an intercompany tax allocation agreement. Pursuant to the agreement, each company's tax expense is determined based upon its inclusion in the consolidated tax return of MassMutual Ascend Life and its includable subsidiaries. Estimated payments are made quarterly during the year. Following year-end, additional settlements are made on the original due date of the return and, when extended, at the time the return is filed. The method of allocation among the companies under the agreement is based upon separate return calculations with current credit for losses to the extent the losses provide a benefit in the consolidated return.

INDEPENDENT REGISTERED PUBLIC ACCOUNTING FIRM

The statutory financial statements and financial statement schedules of MassMutual Ascend Life Insurance Company (formerly known as Great American Life Insurance Company) at December 31, 2024, 2023, and 2022, and for each of the years in the three year period ended December 31, 2024, have been included herein in reliance upon the reports of KPMG LLP, independent registered public accounting firm, appearing elsewhere herein, and upon the authority of said firm as experts in accounting and auditing.

The KPMG LLP report dated April 9, 2025, of MassMutual Ascend Life Insurance Company includes explanatory language that states that the financial statements are prepared by MassMutual Ascend Life Insurance Company using statutory accounting practices prescribed or permitted by the Ohio Department of Insurance, which is a basis of accounting other than U.S. generally accepted accounting principles. Accordingly, the KPMG LLP audit report states that the financial statements are not presented fairly in accordance with U.S. generally accepted accounting principles and further states that those statements are presented fairly, in all material respects, in accordance with statutory accounting practices prescribed or permitted by the Ohio Department of Insurance.

The KPMG LLP report dated April 9, 2025, of MassMutual Ascend Life Insurance Company includes an emphasis of matter paragraph that states that MassMutual Ascend Life Insurance Company elected to apply a prescribed practice promulgated under Ohio Administrative Code Section 3901-1-67 ("OAC 3901-1-67") to its derivative instruments hedging indexed products and indexed annuity reserve liabilities. The opinion was not modified with respect to this matter.

DISTRIBUTION OF THE CONTRACTS

The Contracts are offered on a continuous basis. MM Ascend Life Investor Services, LLC ("MMALIS"), formerly known as Great American Advisors, LLC, 191 Rosa Parks Street, Cincinnati, OH 45202, is the principal underwriter for all registered index-linked contracts of the Company. MMALIS is a wholly owned subsidiary of MassMutual Ascend Life and as a result, is an affiliate of the Company. MassMutual Ascend Life pays for some of MMALIS's operating and other expenses, including overhead, legal, and accounting fees.

Aggregate dollar amounts of underwriting commissions paid to MMALIS in connection with the distribution of registered index-linked contracts totaled $69,902,131 in 2024, $69,192,616 in 2023, and $71,068,762 in 2022, which MMALIS subsequently paid to selling firms in its distribution network. MMALIS did not retain any underwriting commissions in the last three fiscal years.

CONTRACT ADJUSTMENTS

Adjustments for Vested Gain or Loss

Each day of a Term, the value of an Indexed Strategy includes the Vested Gain or Loss, if any, since the start of that Term. Vested Gain or Loss is calculated on the remaining Investment Base for that Term. Before the end of a Term, if you take a withdrawal, Surrender or annuitize your Contract, or a Death Benefit becomes payable, you will be subject to a Contract adjustment that locks in an Indexed Strategy's Vested Gain or Loss. You could lose a significant amount of money due to Contract adjustments if amounts are removed from an Indexed Strategy prior to the end of a Term.

Here is the formula that we use to calculate the amount of the Vested Gain or Loss.

Amount of Vested Gain or Loss = remaining Investment Base x Vested Gain or Loss percentage

Example. At the beginning of a Term in Contract Year 10, your entire Account Value of $100,000 is allocated to a Growth/-10% Floor Strategy. You do not take any withdrawals during that Term. You Surrender your Contract at the end of that Term. No Early Withdrawal Charge applies to a Surrender in Contract Year 10.

- If the Vested Gain is 4%, then the Strategy value includes a $4,000 Vested Gain ($100,000 x 0.04). The amount payable upon Surrender will be $104,000 ($100,000 + $4,000).
- If the Vested Loss is 3%, then the Strategy value includes a $3,000 Vested Loss ($100,000 x 0.03). The amount payable upon Surrender will be $97,000 ($100,000 - $3,000).

If in this example your Surrender occurs in Contract Year 4 instead, when a 5% Early Withdrawal Charge applies, the amount payable upon Surrender is reduced by applicable Early Withdrawal Charges. For this example, we assume that the Account Value was $100,000 on the most recent Contract Anniversary.

- If the Vested Gain is 4%, then the amount payable is reduced by Early Withdrawal Charges of $4,700, calculated as 5% of the Strategy Value minus the Free Withdrawal Allowance (5% x ($104,000 – ($100,000 x 10%))). The amount payable upon Surrender will be $99,300 ($104,000 - $4,700).
- If the Vested Loss is 3%, then the amount payable is reduced by Early Withdrawal Charges of $4,350, calculated as 5% of the Strategy Value minus the Free Withdrawal Allowance (5% x ($97,000 – ($100,000 x 10%))). The amount payable upon Surrender will be $92,650 ($97,000 - $4,350).

Index Change. Before we can calculate the Vested Gain or Loss since the start of a Term, we must determine the Index Change since the start of that Term. The Index Change is the increase or decrease in the applicable Index Value. This increase or decrease is expressed as a percentage of the applicable Index Value at the start of that Term. It is measured from the Index Value at the start of that Term to the Index Value at the last Market Close on or before the date the Index Change is determined.

Example. The Index Value was 1000 at the start of a Term.

- If the Index Value at the applicable Market Close is 1065, then there is a positive Index Change of 6.5% ((1065 - 1000) / 1000).
- If the Index Value at the applicable Market Close is 925, then there is a negative Index Change of 7.5% ((925 - 1000) / 1000).

Index Values. Index Values are determined at each Market Close. An Index Value at the start of a Term is its value at the last Market Close on or before the first day of that Term. An Index Value at the end of a Term is its value at the Market Close on the last Market Day of that Term. We will use consistent sources to obtain the closing values of an Index. We currently obtain the closing values for the S&P 500 Index and the SPDR Gold Shares ETF from S&P Dow Jones Indices LLC and the closing values for the iShares MSCI EAFE ETF and the iShares U.S. Real Estate ETF from BlackRock, Inc. If those sources are no longer available, we will select an alternative published source(s) to obtain such values.

Market Close. A Market Close is the close of the regular or core trading session on the market used to measure an Index Change for a given Indexed Strategy.

Market Day. A Market Day is each day that all markets that are used to measure Index Changes for available Indexed Strategies are open for regular trading.

Vested Gain

The Vested Gain is the portion of any positive Index Change that is taken into account when determining the value of an Indexed Strategy. Here is the formula that we use to calculate a Vested Gain for any day of a Term.

> Vested Gain = any positive Index Change since the start of the current Term (but not exceeding the Maximum Gain set for the Term) x applicable Vesting Factor for that day x remaining Investment Base for the current Term

Maximum Gain*.* The Maximum Gain for an Indexed Strategy is the largest positive Index Change for a Term that is taken into account to determine the Vested Gain for that Indexed Strategy for that Term. For example, if the Maximum Gain for a Term is 5% and the Index Change at the end of that Term is positive 8%, then the Vested Gain for that Term is 5%.

Vesting Factor*.* The Vesting Factor varies depending on the day of the Term for which the Vested Gain is calculated. A Vesting Factor limits the portion of a positive Index Change that is taken into account when calculating the Vested Gain for a given Indexed Strategy for a given Term.

	Vesting Factor
Dates within first six months of a Term	25%
Dates within the final six months of a Term but before the final Market Day of that Term	50%
On the final Market Day of a Term	100%

A Market Day is each day that all markets that are used to measure Index Changes for available Indexes Strategies are open for regular trading.

Months are measured from the first day of the Term. For example, if a Term starts on January 20, the final six months of that Term will begin on July 20.

If any date in a Term is after the final Market Day of that Term, then a 100% Vesting Factor applies on that date when Vested Gain for that Term is calculated. For example, if a Term ends on a Monday when the markets are closed due to a holiday, then the final Market Day of that Term is the Friday before that holiday. If an automated transaction is scheduled for Saturday, then the 100% Vesting Factor applies to that transaction.

Example. On the date of Surrender, your entire Account Value of $100,000 is allocated to the S&P 500 Growth/-10% Floor Strategy, which has a 12% Maximum Gain for the Term. You Surrender your Contract in month 9 of that Term, which means a Vesting Factor of 50% applies. For this example, we assume that you did not take any withdrawals before you Surrender your Contract. Assume there is a positive Index Change of 15% at the date on which you Surrender your Contract. Because the Index Change exceeds the Maximum Gain, the Maximum Gain applies and limits the Index Change to 12%. As a result, the Vested Gain is 6% (12% x 0.50). The Investment Base on the date of Surrender is $100,000. The Vested Gain that applies upon Surrender will be $6,000 ($100,000 x 0.06) and the amount payable will be $106,000 minus any related Early Withdrawal Charge.

Vested Loss

The Vested Loss is the portion of any negative Index Change that is taken into account when determining the value of an Indexed Strategy. Here is the formula that we use to calculate a Vested Loss for any day of a Term.

> Vested Loss = any negative Index Change since the start of the current Term (after taking into account either the Maximum Loss for each Term or the Buffer, as applicable) x remaining Investment Base for the current Term

Maximum Loss. The Maximum Loss for a Conserve/0% Floor Strategy or a Growth/-10% Floor Strategy is the most negative Index Change for a Term that is taken into account to determine the Vested Loss for that Indexed Strategy for that Term. For example, if the Maximum Loss for a Term is 10% and the negative Index Change at the end of that Term is 14%, then the Vested Loss for that Term is 10%.

Example. On the date of Surrender, your entire Account Value of $100,000 is allocated to the S&P 500 Growth Strategy, which has a 10% Maximum Loss. You Surrender your Contract before the end of that Term. For this example, we assume that you did not take any withdrawals before you Surrender your Contract. Assume there is a negative Index Change of 12.5% on the day that you Surrender your Contract. Because the Index Change exceeds the Maximum Loss, the Maximum Loss applies and limits the Index Change to 10%. As a result, the Vested Loss is 10%. The Investment Base on the date of Surrender is $100,000. The Vested Loss that applies upon Surrender will be $10,000 ($100,000 x 0.10 = $10,000) and the amount payable will be $90,000 minus any related Early Withdrawal Charge.

Buffer. The Buffer is the portion of a negative Index Change for a Term that is disregarded when determining a Vested Loss for a 10% Buffer Strategy. The Buffer varies depending on the day of the Term. The Buffer at the end of a Term is 10%. Before the end of the Term, the Buffer is calculated daily as a prorated share of the annual 10% Buffer. For example, when 40% of a Term has elapsed, the Buffer on that day equals 40% of the Buffer that would apply at the end of the Term. When 80% of a Term has elapsed, the Buffer on that day equals 80% of the Buffer that would apply at the end of the Term. As a result, a negative Index Change of 15% would produce different Vested Losses at the following junctures:

- Day 146 of Term:
  Days Remaining to last Market Day of Term: 219
  Buffer: 10% x (365-219)/365 = 4%
  Vested Loss: 15% - 4% = 11%
- Day 292 of Term:
  Days Remaining to last Market Day of Term: 73
  Buffer: 10% x (365-73)/365 = 8%
  Vested Loss: 15% - 8% = 7%
- End of Term:
  Buffer: 10%
  Vested Loss: 15% -10% = 5%

Example. On the date of Surrender, your entire Account Value of $100,000 is allocated to a 10% Buffer Strategy. You Surrender your Contract on day 270 of the initial Term. For this example, we assume that you did not take any withdrawals before you Surrender your Contract. Assume there is a negative Index Change of 12.5% on the day that you Surrender your Contract. Because the Surrender occurred on day 270 of the Term, the prorated Buffer equals 7.4% (10% x (365-95)/365 = 7.4%), meaning that the first 7.4% of the negative Index Change is absorbed by the Buffer. As a result, the Vested Loss is 5.1% (12.5% - 7.4%). The Investment Base on the date of Surrender is $100,000. The Vested Loss that applies upon Surrender will be $5,100 ($100,000 x 0.051) and the amount payable will be $94,900 minus any related Early Withdrawal Charge.

No Vesting Factor. A Vesting Factor does not apply when the Vested Loss is calculated. This means that all of the negative Index Change is taken into account when calculating the Vested Loss for a given Indexed Strategy for a given Term.

FINANCIAL STATEMENTS

The Company's financial statements at December 31, 2024 and 2023, and for each of the three years in the period ended December 31, 2024, are included herein. Our financial statements should be considered only as bearing on our ability to meet our obligations under the Contract.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY

Statutory-Basis Financial Statements

As of December 31, 2024 and 2023 and for each of the three years ended December 31, 2024, 2023 and 2022 with Independent Auditors' Report

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY

Statutory-Basis Financial Statements

As of December 31, 2024 and 2023 and for each of the three years ended December 31, 2024, 2023 and 2022

Contents

KPMG LLP
Suite 3400
312 Walnut Street
Cincinnati, OH 45202

Independent Auditors' Report

The Board of Directors
MassMutual Ascend Life Insurance Company:

Opinions

We have audited the financial statements of MassMutual Ascend Life Insurance Company (the Company), which comprise the balance sheets statutory-basis as of December 31, 2024 and 2023, and the related statements of operations statutory-basis, statements of changes in capital and surplus statutory-basis, and statements of cash flow statutory-basis for each of the years in the three-year period ended December 31, 2024, and the related notes to the financial statements (collectively, financial statements).

Unmodified Opinion on Statutory Basis of Accounting

In our opinion, the accompanying financial statements present fairly, in all material respects, the balance sheets statutory-basis of the Company as of December 31, 2024 and 2023, and the results of its operations and its cash flow for each of the years in the three-year period ended December 31, 2024, in accordance with accounting practices prescribed or permitted by the Ohio Department of Insurance described in Note B.

Adverse Opinion on U.S. Generally Accepted Accounting Principles

In our opinion, because of the significance of the matter discussed in the Basis for Adverse Opinion on U.S. Generally Accepted Accounting Principles section of our report, the financial statements do not present fairly, in accordance with U.S. generally accepted accounting principles, the financial position of the Company as of December 31, 2024 and 2023, or the results of its operations or its cash flows for each of the years in the three-year period ended December 31, 2024.

Basis for Opinions

We conducted our audits in accordance with auditing standards generally accepted in the United States of America (GAAS). Our responsibilities under those standards are further described in the Auditors' Responsibilities for the Audit of the Financial Statements section of our report. We are required to be independent of the Company and to meet our other ethical responsibilities, in accordance with the relevant ethical requirements relating to our audits. 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 B to the financial statements, the financial statements are prepared by the Company using accounting practices prescribed or permitted by the Ohio Department of Insurance, 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 B and U.S. generally accepted accounting principles, although not reasonably determinable, are presumed to be material and pervasive.

Emphasis of Matter

As discussed in Note B to the financial statements, the Company elects to apply a prescribed practice promulgated under Ohio Administrative Code Section 3901-1-67 (“OAC 3901-1-67”) to its derivative instruments hedging indexed products and indexed annuity reserve liabilities. Our opinions are not modified with respect to this matter.

Responsibilities of Management for the Financial Statements

Management is responsible for the preparation and fair presentation of the financial statements in accordance with accounting practices prescribed or permitted by the Ohio Department of Insurance. 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.

In preparing the financial statements, management is required to evaluate whether there are conditions or events, considered in the aggregate, that raise substantial doubt about the Company’s ability to continue as a going concern for one year after the date that the financial statements are issued.

Auditors’ Responsibilities for the Audit of the Financial Statements

Our objectives are to obtain reasonable assurance about whether the financial statements as a whole are free from material misstatement, whether due to fraud or error, and to issue an auditors’ report that includes our opinion. Reasonable assurance is a high level of assurance but is not absolute assurance and therefore is not a guarantee that an audit conducted in accordance with GAAS will always detect a material misstatement when it exists. The risk of not detecting a material misstatement resulting from fraud is higher than for one resulting from error, as fraud may involve collusion, forgery, intentional omissions, misrepresentations, or the override of internal control. Misstatements are considered material if there is a substantial likelihood that, individually or in the aggregate, they would influence the judgment made by a reasonable user based on the financial statements.

In performing an audit in accordance with GAAS, we:

- Exercise professional judgment and maintain professional skepticism throughout the audit.
- Identify and assess the risks of material misstatement of the financial statements, whether due to fraud or error, and design and perform audit procedures responsive to those risks. Such procedures include examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements.
- Obtain an understanding of internal control relevant to the audit 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 Company’s internal control. Accordingly, no such opinion is expressed.
- Evaluate the appropriateness of accounting policies used and the reasonableness of significant accounting estimates made by management, as well as evaluate the overall presentation of the financial statements.
- Conclude whether, in our judgment, there are conditions or events, considered in the aggregate, that raise substantial doubt about the Company’s ability to continue as a going concern for a reasonable period of time.

We are required to communicate with those charged with governance regarding, among other matters, the planned scope and timing of the audit, significant audit findings, and certain internal control related matters that we identified during the audit.

Supplementary Information

Our audits were conducted for the purpose of forming an opinion on the financial statements as a whole. The supplementary information included in the supplemental schedule of selected statutory-basis financial data, supplemental investment disclosures, and supplemental schedule of life and health reinsurance disclosures is presented for purposes of additional analysis and is not a required part of the financial statements but is supplementary information required by the Ohio Department of Insurance. Such information is the responsibility of management and was derived from and relates directly to the underlying accounting and other records used to prepare the financial statements. The information has been subjected to the auditing procedures applied in the audits of the financial statements and certain additional procedures, including comparing and reconciling such information directly to the underlying accounting and other records used to prepare the financial statements or to the financial statements themselves, and other additional procedures in accordance with GAAS. In our opinion, the information is fairly stated in all material respects in relation to the financial statements as a whole.

/s/ KPMG LLP

Cincinnati, Ohio
April 9, 2025

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
BALANCE SHEETS
STATUTORY-BASIS
(Dollars in millions, except share data)

	December 31	
	2024	**2023**
ADMITTED ASSETS		
Cash and invested assets:		
Bonds - at amortized cost (fair value: $35,872.1 and $32,911.4)	$ 37,508.2	$ 34,972.3
Preferred stocks - (cost: $288.8 and $212.2)	297.9	201.0
Common stocks - at fair value (cost: $193.2 and $195.6)	296.7	271.2
Investments in affiliates and subsidiaries - at subsidiary capital and surplus (cost: $243.8 and $242.8)	482.1	445.2
Mortgage loans	5,123.1	4,256.5
Cash, cash equivalents and short-term investments	3,411.2	2,211.3
Policy loans	27.5	30.0
Derivatives	875.7	771.4
Other invested assets	2,798.2	1,573.2
Total cash and invested assets	50,820.6	44,732.1
Net deferred federal income tax asset	291.7	272.8
Deferred and uncollected premiums	4.5	5.6
Current federal income tax recoverable	51.6	16.0
Investment income due and accrued	535.4	528.5
Company-owned life insurance	229.8	223.1
Admitted disallowed interest maintenance reserve	253.8	271.5
Other admitted assets	208.6	495.8
Total general account admitted assets	52,396.0	46,545.4
Separate account assets	984.2	443.3
Total admitted assets	$ 53,380.2	$ 46,988.7
LIABILITIES, CAPITAL AND SURPLUS		
Liabilities:		
Policy benefit reserves	$ 36,543.3	$ 30,212.2
Liability for deposit-type contracts	786.6	788.0
Policy and contract claims	161.0	165.3
Asset valuation reserve	636.3	528.4
Funds held under reinsurance treaties	7,290.5	9,968.0
Commissions, general expenses, taxes, licenses and fees due or accrued	66.1	63.3
Payable for securities	584.3	315.1
Collateral	1,564.2	763.9
Derivatives	413.6	528.2
Other liabilities	123.8	162.0
Total general account liabilities	48,169.7	43,494.4
Separate account liabilities	984.2	443.3
Total liabilities	49,153.9	43,937.7
Capital and surplus:		
Common stock - $7.50 par value; 1,200,000 shares authorized; 223,333 shares issued and outstanding	1.7	1.5
Gross paid-in and contributed surplus	2,148.4	815.2
Unassigned funds	1,822.4	1,962.8
Aggregate write-in for special surplus funds	253.8	271.5
Total capital and surplus	4,226.3	3,051.0
Total liabilities, capital and surplus	$ 53,380.2	$ 46,988.7

See accompanying notes to statutory-basis financial statements.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
STATEMENTS OF OPERATIONS
STATUTORY-BASIS
(Dollars in millions)

	Year Ended December 31		
	2024	**2023**	**2022**
Premiums and other revenues:			
Premiums and annuity considerations	$ 8,551.2	$ 8,506.8	$ (7,198.3)
Net investment income	2,648.2	1,918.4	1,019.0
Amortization of interest maintenance reserve	(34.9)	10.4	36.4
Commissions and expense allowances and reserve adjustments on reinsurance ceded	(49.1)	70.2	496.8
Charges and fees for deposit-type contracts and miscellaneous income	62.9	59.2	47.8
Total premiums and other revenues	11,178.3	10,565.0	(5,598.3)
Benefits and expenses:			
Policyholders' benefits	837.0	748.1	505.8
Surrender benefits	2,749.2	2,434.7	1,460.5
Change in policy and contract reserves	6,331.1	5,901.8	(8,743.9)
Interest and adjustments on deposit-type contracts	150.8	156.9	142.3
Direct commissions and commissions and expense allowances on reinsurance assumed	464.4	394.2	364.6
General insurance expenses	171.5	169.8	158.7
Insurance taxes, licenses and fees	46.6	12.7	12.2
Net transfers to or (from) separate accounts	521.1	356.8	(22.0)
Other	(0.1)	(0.4)	319.3
Total benefits and expenses	11,271.6	10,174.6	(5,802.5)
(Loss) income from operations before federal income taxes and net realized capital losses	(93.3)	390.4	204.2
Federal income tax expense on operations	(85.7)	(241.8)	(13.6)
(Loss) income from operations before net realized capital gains and losses	(179.0)	148.6	190.6
Net realized capital losses:			
Net realized capital losses before related federal income taxes and transfers to interest maintenance reserve	(145.1)	(531.5)	(12.6)
Federal income tax (expense) benefit on net realized capital gains (losses)	(51.5)	23.4	14.3
Interest maintenance reserve transfers, net of tax	121.7	354.4	(34.3)
Net realized capital losses	(74.9)	(153.7)	(32.6)
Net (loss) income	$ (253.9)	$ (5.1)	$ 158.0

See accompanying notes to statutory-basis financial statements.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
STATEMENTS OF CHANGES IN CAPITAL AND SURPLUS
STATUTORY-BASIS
(Dollars in millions)

	Year Ended December 31		
	2024	**2023**	**2022**
Common stock:			
Balance at beginning of year	$ 1.5	$ 1.5	$ 1.5
Transferred from unassigned funds	0.2	-	-
Balance at end of year	$ 1.7	$ 1.5	$ 1.5
Gross paid-in and contributed surplus:			
Balance at beginning of year	$ 815.2	$ 815.2	$ 815.2
Contributions from parent	1,333.2	-	-
Balance at end of year	$ 2,148.4	$ 815.2	$ 815.2
Unassigned funds:			
Balance at end of prior year	$ 1,962.8	$ 2,015.9	$ 2,061.4
Change in reserve on account of change in valuation basis*	-	-	236.2
Cumulative effect of change in accounting principle*	-	-	(454.4)
Adjusted beginning balance	1,962.8	2,015.9	1,843.2
Net (loss) income	(253.9)	(5.1)	158.0
Change in net unrealized gains (losses) on derivatives	428.4	217.1	(204.1)
Change in net unrealized foreign exchange capital (loss) gains	(61.4)	19.9	8.8
Change in net unrealized capital (losses) gains, net of deferred taxes	(46.0)	(51.8)	3.5
Change in net deferred tax asset*	99.9	214.6	(33.1)
Change in nonadmitted assets*	(74.3)	(22.8)	(4.6)
Change in admitted disallowed interest maintenance reserve	17.7	(271.5)	-
Change in asset valuation reserve	(107.9)	48.7	(73.0)
Change in surplus as a result of reinsurance	-	-	317.2
Transferred to common stock	(0.2)	-	-
Dividends to parent	(100.0)	(200.0)	-
Correction of error, net of tax	(42.7)	(2.2)	-
Balance at end of year	$ 1,822.4	$ 1,962.8	$ 2,015.9
Special surplus funds:			
Balance at end of prior year	$ 271.5	$ -	$ -
Change in admitted disallowed interest maintenance reserve	(17.7)	271.5	-
Balance at end of year	$ 253.8	$ 271.5	$ -
Total capital and surplus	$ 4,226.3	$ 3,051.0	$ 2,832.6

* Effective January 1, 2022, the Company elected to apply Ohio Administrative Code 3901-1-67, Alternative Derivative and Reserve Accounting Practices (OAC 3901-1-67) to its derivative instruments hedging fixed-indexed products and fixed-indexed annuity reserve liabilities. At adoption, the decrease in statutory surplus of ($157.4 million) was comprised of $236.2 million in change in reserve on account of change in valuation basis, ($454.4 million) in cumulative effect of change in accounting principle, $46.2 million in change in net deferred income tax and $14.6 million in change in nonadmitted assets.

See accompanying notes to statutory-basis financial statements.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
STATEMENTS OF CASH FLOW
STATUTORY-BASIS
(Dollars in millions)

	Year Ended December 31		
	2024	**2023**	**2022**
Operations:			
Premiums and annuity considerations	$ 8,552.6	$ 8,509.2	$ 6,877.6
Net investment income	3,208.9	2,279.3	1,244.9
Benefits paid	(3,291.0)	(3,375.1)	(2,266.8)
Commissions, expenses and other deductions	(678.2)	(570.4)	(551.5)
Federal income taxes paid	(172.7)	(144.6)	(103.8)
Other	5.3	119.1	562.2
Net cash provided by operations	7,624.9	6,817.5	5,762.6
Investing activities:			
Sales, maturities or repayments of investments, net:			
Bonds	6,989.8	8,046.0	14,058.5
Stocks	96.4	131.1	18.2
Mortgage loans	1,005.3	715.1	537.0
Other invested assets	173.8	322.1	274.0
Net losses on cash, cash equivalents and short-term investments	(1.1)	-	(0.1)
Miscellaneous proceeds	155.9	56.7	(22.3)
Purchases of investments:			
Bonds	(9,943.1)	(10,104.1)	(16,364.8)
Stocks	(166.8)	(128.7)	(109.2)
Mortgage loans	(1,849.1)	(1,881.1)	(1,107.7)
Other invested assets	(307.9)	(340.0)	(300.9)
Miscellaneous applications	(786.2)	(796.7)	(673.9)
Net decrease in policy loans	2.5	1.5	32.7
Net cash used in investing activities	(4,630.5)	(3,978.1)	(3,658.5)
Financing and miscellaneous activities:			
Cash contribution from parent	98.3	-	-
Net (withdrawals) deposits on deposit-type contracts	(178.5)	(136.5)	50.4
Dividends to parent	(100.0)	(200.0)	-
Other	(1,614.3)	(2,282.8)	(1,172.2)
Net cash used in financing and miscellaneous activities	(1,794.5)	(2,619.3)	(1,121.8)
Net increase in cash and short-term investments	1,199.9	220.1	982.3
Cash and short-term investments at beginning of year	2,211.3	1,991.2	1,008.9
Cash and short-term investments at end of year	$ 3,411.2	$ 2,211.3	$ 1,991.2
Cash flow information for non-cash transactions:			
Other invested assets contribution from parent	$ 1,234.9	$ -	$ -
Bond conversions and refinancing	288.8	255.4	453.1
Transfer preferred stock to bond	11.7	-	-
Net investment income payment-in-kind for bonds	3.9	-	1.1
Common stock conversions	2.8	34.4	0.2
Perferred stock conversions	0.2	0.4	-
Bonds transferred to other invested assets	-	18.6	119.7
Other invested assets transferred to common stocks	-	15.5	-
Common stocks transferred to other invested assets	-	6.4	-
Bonds transferred to mortgage loans	-	-	362.7
Other invested assets transferred to bonds	-	-	17.1

See accompanying notes to statutory-basis financial statements.

A. ORGANIZATION AND NATURE OF OPERATIONS

As of May 28, 2021, Great American Life Insurance Company ("GALIC" or "the Company"), a stock life insurance company domiciled in the State of Ohio, is a direct, wholly-owned subsidiary of Glidepath Holdings, Inc. ("Glidepath"), a financial services holding company wholly-owned by Massachusetts Mutual Life Insurance Company ("MassMutual"). Prior to that date, GALIC was a direct wholly-owned subsidiary of Great American Financial Resources, Inc., a financial services holding company wholly-owned by American Financial Group, Inc. In the fourth quarter of 2022 the Company's name was changed to MassMutual Ascend Life Insurance Company ("MMALIC"). MMALIC predominantly markets traditional fixed, fixed-indexed and registered index-linked annuities ("RILA") in the retail, financial institutions, broker-dealer and registered investment advisor markets, and maintains pension risk transfer business ("PRT"), which is a run-off block of business. MMALIC also has small blocks of long-term care products ("LTC"), other accident and health business, term and universal life in-force business, much of which is reinsured to third parties and are run-off blocks of business. MMALIC is licensed to write life, annuity and accident & health insurance in forty-nine states, District of Columbia and Puerto Rico (effective February 8, 2024).

B. SIGNIFICANT ACCOUNTING POLICIES

BASIS OF PRESENTATION

The accompanying financial statements have been prepared in conformity with accounting practices prescribed or permitted by the National Association of Insurance Commissioners ("NAIC") and the Ohio Department of Insurance, which vary in some respects from U.S. generally accepted accounting principles ("GAAP"). Although the differences to GAAP have not been quantified, they are presumed to be material. The more significant of the differences using these statutory policies versus GAAP are as follows:

(a) annuity receipts are accounted for as revenues versus liabilities for GAAP,
(b) costs incurred in the acquisition of new business such as commissions, underwriting and policy issuance costs are expensed at the time incurred versus being capitalized for GAAP,
(c) reserves established for future policy benefits are calculated using more conservative assumptions for mortality and interest rates than would be used under GAAP. Beginning on January 1, 2022, certain indexed annuity reserves are calculated in accordance with a prescribed practice under the Ohio Administrative Code discussed elsewhere in this footnote,
(d) for statutory reporting, an Interest Maintenance Reserve ("IMR") is provided whereby portions of certain realized gains and losses from fixed income investments are deferred and amortized into investment income as prescribed by the NAIC,
(e) investments in bonds considered "available for sale" (as defined under GAAP) are generally recorded at amortized cost versus fair value for GAAP, except those with an NAIC designation of "6," which are stated at the lower of amortized cost or fair value,
(f) investments in non-affiliated common stocks are carried at fair value. Redeemable preferred stocks rated RP1 through RP3 are stated at book value. All other redeemable preferred stocks are stated at the lower of book value or fair value. Perpetual preferred stocks are stated at fair value, not to exceed any effective call price. GAAP requires that equity securities are carried at fair value with holding gains and losses reported in realized gains,
(g) for statutory reporting, surplus notes are carried at book value. Under GAAP, surplus notes are considered investments in bonds "available for sale" recorded at fair value,
(h) investments in equity securities of wholly-owned subsidiaries are carried at statutory and GAAP equity, in accordance with Statement of Statutory Accounting Principle ("SSAP") No. 97, *Investments in Subsidiary, Controlled and Affiliated Entities*, versus being consolidated for GAAP,
(i) for statutory reporting, an Asset Valuation Reserve ("AVR") is provided under a formula prescribed by the NAIC as a valuation allowance for invested assets, which reclassifies a portion of surplus to liabilities,
(j) the cost of certain assets designated as "nonadmitted assets" (principally disallowed IMR, advance commissions paid to agents, inventory and prepaid assets on real estate holdings, deferred tax assets ("DTA") and certain investment income due and accrued in excess of statutory limitations) is charged against surplus,
(k) policy liabilities and accruals in the statutory-basis balance sheets are reported net of reinsurance credits and recoverable unpaid losses. Under GAAP, balance sheet amounts are reported gross of reinsurance,

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

(l) commissions allowed by reinsurers on business ceded are reported as income when incurred rather than being deferred and amortized with deferred policy acquisition costs as required under GAAP. Gains on reinsurance transactions are recorded to surplus when incurred rather than being deferred as required under GAAP,
(m) for statutory reporting, reinsurance agreements are reported in accordance with SSAP No. 61, *Life, Deposit-Type and Accident and Health Reinsurance*; certain reinsurance agreements are accounted for using deposit accounting for GAAP,
(n) the mark to market on RILA options, forward contracts, currency swaps and interest rate swaps is included as an unrealized gain/(loss) in unassigned surplus versus income for GAAP. Prior to January 1, 2022, fixed-indexed annuity options were carried at fair value and the mark to market was included as an unrealized gain/(loss) in unassigned funds versus income for GAAP,
(o) the fixed-indexed annuity options are carried at amortized cost versus fair value for GAAP. Prior to January 1, 2022, fixed-indexed annuity options were carried at fair value,
(p) in accordance with SSAP No. 101, *Income Taxes*, DTAs are limited to: 1) the amount of federal income taxes paid in prior years that can be recovered through loss carrybacks for existing temporary differences that reverse during a timeframe corresponding with Internal Revenue Service ("IRS") tax loss carryback provisions, not to exceed three years, including amounts established in accordance with the provision of SSAP No. 5, plus 2) for entities who meet the required realization threshold in SSAP No. 101, the lesser of the remaining gross DTAs expected to be realized within three years of the balance sheet date or 15% of capital and surplus excluding any net DTAs, EDP equipment and operating software and any net positive goodwill, plus 3) the amount of remaining gross DTAs that can be offset against existing gross deferred tax liabilities ("DTL"). The remaining DTAs are nonadmitted. Deferred taxes do not include amounts for state taxes. Under GAAP, a DTA is recorded for the amount of gross DTAs expected to be realized in future years, and a valuation allowance is established for DTAs not realizable,
(q) for statutory reporting, cash, cash equivalents, and short-term investments represent cash balances and investments with initial maturities of one year or less. Under GAAP, cash and cash equivalents include cash balances and investments with initial maturities of three months or less, and negative cash balances are reported as negative assets,
(r) changes in deferred taxes are recognized in operations under GAAP versus a change in surplus for statutory reporting,
(s) statutory financial statements are prepared using language and groupings substantially the same as the annual statements of the Company filed with the Ohio Department of Insurance,
(t) statutory statements of cash flows are presented on the basis prescribed by the NAIC, and
(u) statutory financial statements do not include accumulated other comprehensive income.

INTEREST RATE RISK

Significant changes in interest rates expose the Company to the risk of not earning income or experiencing losses based on the differences between the interest rates earned on investments and the credited interest rates paid on outstanding fixed annuity contracts and life insurance products with account values. Significant changes in interest rates may affect:

- the unrealized gains and losses in the investment portfolio;
- the book yield of the investment portfolio; and
- the ability of the Company to maintain appropriate interest rate spreads over the fixed rates guaranteed in life and annuity products.

CREDIT RISK

Third party debtors may not pay or perform their obligations. These parties may include the issuers of securities, customers, reinsurers, and other financial intermediaries.

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

PRESCRIBED OR PERMITTED PRACTICES

The Ohio Department of Insurance recognizes only statutory accounting practices prescribed or permitted by the State of Ohio for determining and reporting the financial condition and results of operations of an insurance company, for determining its solvency under the Ohio Insurance Law. The NAIC's *Accounting Practices and Procedures Manual* ("NAIC SAP") has been adopted as a component of prescribed or permitted practices by the State of Ohio. The Company has no prescribed practices or permitted practices that would result in differences between NAIC SAP and the State of Ohio with the exception of OAC 3901-1-67.

Effective January 1, 2022, the Company elected to apply OAC 3901-1-67 to its derivative instruments hedging fixed-indexed products and fixed-indexed reserve liabilities. Under OAC 3901-1-67, derivative instruments are carried at amortized cost with the initial hedge cost amortized over the term and asset payoffs realized at the end of the term being reported through net investment income. Additionally, the cash surrender value reserves for fixed-indexed products only reflect index interest credits at the end of the crediting term as compared to partial index interest credits accumulating throughout the crediting term through change in policy and contract reserves.

If the prescribed practices were not applied, the Company's risk-based capital would continue to be above regulatory action levels. A reconciliation of the Company's net (loss) income between NAIC SAP and prescribed practice is shown below:

				Year Ended December 31		
Net (Loss) Income (*in millions*)	SSAP #	F/S Page	State of Domicile	2024	2023	2022
(1) State basis	XXX	XXX	XXX	$ (253.9)	$ (5.1)	$ 158.0
(2) State prescribed practices that are an increase/(decrease) from NAIC SAP	XXX	XXX	XXX			
OAC 3901-1-67:						
Derivative instruments	86	4	OH	(58.6)	(49.3)	(26.4)
Reserves for fixed indexed annuities	51	4	OH	208.1	306.6	(188.0)
Tax impact	101	4	OH	2.6	0.7	0.4
(3) State permitted practices that are an increase/(decrease) from NAIC SAP	XXX	XXX	XXX	-	-	-
(4) NAIC SAP (1-2-3=4)	XXX	XXX	XXX	$ (406.0)	$ (263.1)	$ 372.0

A reconciliation of the Company's capital and surplus between the NAIC SAP and prescribed practice is shown below:

				Year Ended December 31		
Capital and Surplus (*in millions*)	SSAP #	F/S Page	State of Domicile	2024	2023	2022
(5) Statutory surplus state basis	XXX	XXX	XXX	$ 4,226.3	$ 3,051.0	$ 2,832.6
(6) State prescribed practices that are an increase/(decrease) from NAIC SAP						
OAC 3901-1-67:						
Derivative instruments	86	2, 4	OH	(604.8)	(525.3)	(39.2)
Reserves for fixed indexed annuities	51	3, 4	OH	562.9	354.8	48.2
Tax impact	101	2, 4	OH	23.8	50.8	13.1
(7) State permitted practices that are an increase/(decrease) from NAIC SAP	XXX	XXX	XXX	-	-	-
(8) NAIC SAP (5-6-7=8)	XXX	XXX	XXX	$ 4,244.4	$ 3,170.7	$ 2,810.5

On February 17, 2022, MMALIC entered into a Funds Withheld Coinsurance agreement effective February 1, 2022, with Martello Re Limited, a Bermuda-domiciled Class E life and annuity reinsurer launched in 2022. MMALIC ceded statutory reserves of approximately $14.2 billion on a closed block of fixed, fixed-indexed and payout annuity policies, in exchange for a $320 million ceding commission paid by Martello Re. The transaction resulted in a significant increase to MMALIC's Risk Based Capital ratio. See "Note F - Reinsurance" for additional disclosure.

Preparation of the statutory-basis financial statements requires management to make estimates and assumptions that affect amounts reported in the financial statements and accompanying notes. Such estimates and assumptions could change in the future as more information becomes known, which could impact the amounts reported and disclosed herein.

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

INVESTMENTS

Investments are generally stated as follows:

a) bonds with a NAIC rating 1 through 5 are stated at amortized cost using the interest method; all others are stated at the lower of amortized cost or fair value. For residential mortgage-backed securities ("MBS"), commercial MBS and loan-backed and structured securities ("LBASS"), the NAIC has retained a third-party investment management firm to assist in the determination of the appropriate NAIC designations and Book Adjusted Carrying Values based on not only the probability of loss, but also the severity of loss. Those residential MBS, commercial MBS and LBASS securities that are not modeled but receive a current year NAIC Credit Rating Provider rating equal to NAIC 1 and 2 are stated at amortized cost and NAIC 3-6 are stated at lower of amortized cost or fair value. Dealer modeled prepayment assumptions are used for mortgage-backed and asset-backed securities at the date of purchase to determine effective yields; significant changes in estimated cash flows from the original purchase assumptions are accounted for on a prospective basis,
b) short-term investments are carried at cost,
c) redeemable preferred stocks rated RP1 through RP3 are stated at book value. All other redeemable preferred stocks are stated at the lower of book value or fair value. Perpetual preferred stocks are stated at fair value, not to exceed any effective call price,
d) common stocks are carried at fair value except investments in stocks of unconsolidated subsidiaries and affiliates in which the Company has an interest of 10% or more are carried on the equity basis in accordance with SSAP No. 97,
e) RILA options, forward contracts, financial futures, currency swaps and interest rate swaps are carried at fair value,
f) fixed-indexed annuity options are carried at amortized cost. Prior to adoption of OAC 3901-1-67, fixed-indexed annuity options were carried at fair value,
g) other invested assets include limited partnerships, limited liability companies and surplus notes. Surplus notes are stated at the lower of amortized cost or fair value. Investments in limited partnerships and limited liability companies are accounted for using the equity method,
h) mortgage loans on real estate are carried at amortized cost less an allowance, and
i) policy loans are stated at the aggregate unpaid balance.

If it is determined that a decline in fair value of a specific investment is other-than-temporary, an impairment is recognized as a realized capital loss. Investments that are in an unrealized loss position that the Company intends to sell, or does not have the intent and ability to hold until recovery, are written down to fair value. Loan-backed and structured securities (included in bonds) that are in an unrealized loss position that the Company has the intent and ability to hold until recovery, are written down only to the extent the present value of expected future cash flows using the security's effective yield is lower than the amortized cost. All other bonds that are in an unrealized loss position that the Company has the intent and ability to hold until recovery are written down to fair value if declines are credit-related and not written down for interest-related declines. When a decline in the value of a specific investment is considered to be other-than-temporary, a provision for impairment is charged to earnings (included in net realized capital gains (losses)) and the cost basis of that investment is reduced by the amount of the charge.

The Company's derivative strategy employs a variety of derivative financial instruments including interest rate and currency swaps, options, financial futures, and forward contracts. Investment risk is assessed on a portfolio basis and individual derivative financial instruments are not generally designated in hedging relationships; therefore, as allowed by statutory accounting practices, the Company intentionally has not applied hedge accounting. Subsequent to the adoption of OAC on January 1, 2022, options related to fixed-indexed annuities are recorded at amortized cost with amortization and expirations recorded in Net investment income. All other derivative instruments are recorded at fair value with the related changes reported in Unassigned funds and settlements and expirations reported in Net realized capital gains (losses).

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

Counterparties to financial instruments expose the Company to credit-related losses in the event of nonperformance, but the Company does not expect any counterparties to fail to meet their obligations and expects any nonperformance to not have a material impact on the Company's financial statements. The Company receives collateral from certain counterparties to support its purchased equity index call option assets (net of collateral required under put option contracts with the same counterparties).

Investments having maturities of three months or less when purchased are considered to be cash equivalents for purposes of the statutory-basis financial statements. The carrying values of cash and short-term investments approximate their fair values.

Gains or losses on sales of securities are recognized at the time of disposition with the amount of gain or loss determined on the specific identification basis.

The IMR applies to interest-related realized capital gains and losses (net of tax) and is intended to defer realized gains and losses resulting from changes in the general level of interest rates. Gains and losses deferred from realized capital gains and losses are reported in interest maintenance reserve transfers, net of tax on the Statement of Operations. The IMR is amortized into investment income over the approximate remaining life of the investments sold.

The AVR provides for possible credit-related losses on securities and is calculated according to a specified formula as prescribed by the NAIC for the purpose of stabilizing surplus against fluctuations in the fair value of investment securities. Changes in the required reserve balances are made by direct credits or charges to surplus.

During 2024 and 2023, the Company did not reduce the interest rates on any of the outstanding mortgage loans due to credit concerns. Fire insurance, at least equal to the excess of the loan over the maximum loan that would be permitted by law on the land without the buildings, is required on all properties covered by mortgage loans.

Investments in the capital stock of MMALIC's wholly-owned insurance subsidiaries, Annuity Investors Life Insurance Company ("AILIC") and Manhattan National Life Insurance Company ("MNLIC"), are carried at the subsidiary's statutory equity in accordance with SSAP No. 97.

PREMIUMS

Annuity premiums and considerations are recognized as revenue when received. Life and accident and health premiums are recognized as revenue when due and premiums over 90 days past due are nonadmitted and charged against surplus. Additionally, life and accident and health premiums include deferred premiums on in-force business.

SEPARATE ACCOUNT

Separate account assets and liabilities reported in the accompanying statutory-basis balance sheet represent funds that are separately administered to hedge the Company's registered index-linked annuity contracts. Separate account assets are reported at fair value and include equity index call options. Separate account liabilities are reported at fair value and include equity index put options and registered index-linked annuity reserves. The operations of the separate account are not included in the accompanying statutory-basis financial statements.

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

POLICY BENEFIT RESERVES

Life, annuity, and accident and health disability benefit reserves are developed by actuarial methods and are determined based on published tables using statutorily specified interest rates and valuation methods that will provide, in the aggregate, reserves that are greater than or equal to the minimum or guaranteed policy cash values or the amounts required by the Ohio Department of Insurance. MMALIC waives deduction of deferred fractional premiums on the death of life and annuity policy insureds and returns any premium beyond the date of death. Surrender values on policies do not exceed the corresponding benefit reserves.

For life insurance policies extra premiums are charged for substandard lives. Additional reserves are established when the results of cash flow testing under various interest rate scenarios indicate the need for such reserves or, where required by the valuation standards, when the net premiums exceed the gross premiums. The net deficiency reserve at December 31, 2024 and December 31, 2023, was $1.5 million and $1.7 million, respectively. The net amount of insurance in force for these reserves at December 31, 2024 and December 31, 2023 was approximately $12.7 million and $13.9 million, respectively. Much of the deficiency reserve is related to a cash endowment rider.

The valuation mortality table and interest assumptions being used on the vast majority of life policies in force is the 1980 Commissioners Standard Ordinary Table with 2.0% to 6.0% interest. Approximately one-sixth of the future life insurance benefits are based on a net level reserve basis and the remaining are based on a modified reserve basis. The effect of using a modified reserve basis is to partially offset the effect of immediately expensing acquisition costs by providing a reserve increase in the first policy year which is less than the increase in the renewal years.

For life insurance policies the mean reserve method is used to adjust the calculated terminal reserve to the appropriate reserve at December 31. Mean reserves for substandard lives are determined by computing the regular mean reserve for the plan at the rated age and holding, in addition, one-half of the extra premium charge for the year. An asset is recorded for deferred premiums net of loading to adjust the reserve for modal premium payments.

Life insurance deferred and uncollected premiums represent annual or fractional premiums, either due and uncollected or not yet due, whereby policy reserves have been provided on the assumption that the full premium for the current policy year has been collected.

Annuity policy and deposit fund reserves are based on principles underlying the Commissioners Annuity Reserve Valuation Method. Valuation interest rates range from 0.75% to 11.25%. Valuation mortality rates are from the 1971 Individual Annuity Mortality ("IAM") table, the 1983 IAM table, 1994 Group Annuity Mortality table, Annuity 2000 mortality table and the 2012 Individual Annuity Reserving mortality table. Reserves for fixed-indexed annuities are calculated using the market value reserve method as defined in NAIC Actuarial Guideline 35, adjusted in accordance with OAC 3901-1-67. The fixed-indexed reserves will only reflect index interest credits at the end of the crediting term as compared to partially reflecting the index interest credits throughout the crediting term in aggregate reserves for life and accident and health contracts. Prior to 2022, reserves for fixed-indexed annuities were calculated using the market value reserve method as defined in NAIC Actuarial Guideline 35. Reserves for registered index-linked annuities are calculated using the reserve method defined in the Valuation Manual (VM-21), including the use of the Alternative Methodology for calculating the Conditional Tail Expectation Amount. Rates determined by section VM-22 of the Valuation Manual were used for pension risk transfer contracts and single premium immediate annuities with issue years after 2017 and payout annuities issued as an annuitization of a deferred annuity originally issued after 2017.

Tabular interest, tabular less actual reserves released and tabular costs have been determined by formula. Tabular interest on funds not involving life contingencies is calculated as the product of such valuation rate of interest times the mean of the amount of funds subject to such valuation rate of interest held at the beginning and end of the year of valuation.

The nature of significant other reserve changes primarily relates to annuity reserves ceded to both Martello Re Limited and Commonwealth Annuity and Life Insurance Company ("Commonwealth"). The Company has ceded approximately $12.0 billion and $15.0 billion of annuity reserves in aggregate to Martello Re Limited and Commonwealth at December 31, 2024 and 2023, respectively.

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

The liability for unreported claims is based on actual, recent Company experience of unreported life and annuity claim development. This experience is monitored and the liability is adjusted accordingly each quarter.

The Company is required to perform an annual asset adequacy test of reserves, to determine if they are adequate under moderately adverse conditions. The Appointed Actuary oversees the analysis and determines if and how much additional reserves are required. The additional reserve net of reinsurance was $150.0 million and $0.0 million as of December 31, 2024 and 2023, respectively.

FEDERAL INCOME TAXES

Beginning in June of 2021, MMALIC and its subsidiaries entered into a separate intercompany tax allocation agreement (the Tax Agreement). The Tax Agreement sets forth the manner in which the total combined federal income is allocated among the subsidiaries. The Tax Agreement provides MMALIC 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 Tax Agreement provides MMALIC with the enforceable right to utilize its net losses carried forward as an offset to future net income subject to federal income taxes. Estimated payments are made quarterly during the year. Following year-end, additional settlements are made on the original due date of the return and, when extended, at the time the return is filed.

CORRECTION OF ERRORS

For the year ended December 31, 2024 corrections of prior year errors were recorded in surplus, net of tax:

	Year Ended December 31, 2024 Increase (Decrease) to:		
	Prior Year Net Income 2024	Current Year Surplus 2024	Asset or Liability Balances 2024
Bonds	$ (0.2)	$ (0.2)	$ (0.2)
Common stocks	(0.8)	(0.8)	(0.8)
Mortgage loans	7.0	7.0	7.0
Other invested assets	2.2	2.2	2.2
Accrued investment income	(21.0)	(21.0)	(21.0)
Payable for securities	(45.6)	(45.6)	45.6
Current federal income tax recoverable	11.4	11.4	11.4
Total	$ (47.0)	$ (47.0)	

ADOPTION OF NEW ACCOUNTING STANDARDS

In June 2022, the NAIC adopted modifications to SSAP No. 25, *Affiliates and Other Related Parties* and SSAP No. 43, *Loan-Backed and Structured Securities*, effective December 31, 2022. The modifications clarify application of the existing affiliate definition and incorporate disclosure requirements for all investments that involve related parties, regardless of whether they meet the affiliate definition. The revisions to SSAP No. 43 also included additional clarifications that the investments from any arrangements that results in direct or indirect control, which include but are not limited to control through a servicer, shall be reported as affiliated investments. The modifications did not have a material effect on the Company's financial statements.

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

In August 2023, the NAIC adopted INT 23-01T, *Disallowed IMR* ("INT 23-01T"). INT 23-01T provides optional, limited-term guidance for the assessment of disallowed IMR for up to 10% of adjusted general account capital and surplus. An insurer's capital and surplus must first be adjusted to exclude certain "soft assets" including net positive goodwill, electronic data processing equipment and operating system software, net deferred tax assets and admitted disallowed IMR. An insurer will only be able to admit the negative IMR if the insurer's risk-based capital is over 300% authorized control level after adjusting to remove the assets described above.

As adopted, negative IMR may be admitted first in the insurer's general account and then, if all disallowed IMR in the general account is admitted and the percentage limit is not reached, to the separate account proportionately between insulated and noninsulated accounts. If the insurer can demonstrate historical practice in which acquired gains from derivatives were also reversed to IMR (as liabilities) and amortized, there is no exclusion for derivatives losses. INT 23-01T was adopted by the Company as of September 30, 2023 and will be effective through December 31, 2025. To the extent the Company's IMR balance is a net negative, the effects of INT 23-01T will be reflected in the Company's financial position, results of operations, and financial statement disclosures. The Company has adopted this guidance and the adoption resulted in an admitted disallowed IMR of $253.8 million and $271.5 million at December 31, 2024 and 2023, respectively.

In March 2023, the NAIC adopted modifications to SSAP No. 34, *Investment Income Due and Accrued*, effective December 31, 2023. The modifications require additional disclosures and data capture related to gross, non-admitted and admitted amounts for interest income due and accrued, deferred interest, and paid-in-kind ("PIK") interest.

In August 2023, the NAIC adopted revisions to further clarify the PIK interest disclosure in SSAP No. 34, effective December 31, 2023. The revisions clarify that decreasing amounts to principal balances are first applied to any PIK interest included in the principal balance. The original principal would not be reduced until the PIK interest had been fully eliminated from the balance. The revisions also provide a practical expedient for determining the PIK interest in the cumulative balance by subtracting the original principal/ par value from the current principal/ par value, with the resulting PIK interest not to go less than zero. The modifications did not have a material effect on the Company's impact of PIK in relation to the financial statements.

In December 2023, the NAIC adopted revisions, effective January 1, 2024, to avoid allocating realized gains or losses from bond sales to the IMR when sold before a rating downgrade. Revisions were also made to avoid allocating realized gains or losses from mortgage loan sales when there is a credit loss allowance, where payments are not 90 days past due. Revisions were also made to update guidance on changes in credit ratings used to allocate credit or interest rate related gains or losses, requiring identification of realized losses from acute credit events to be allocated to AVR. The modifications did not have a material effect on the Company's financial statements.

FUTURE ADOPTION OF NEW ACCOUNTING STANDARDS

In August 2023, the NAIC adopted revisions to clarify and incorporate a new bond definition within disclosures SSAP No. 26, *Bonds*, SSAP No. 43, *Asset-Backed Securities*, and other related SSAPs, effective January 1, 2025. The revisions were issued in connection with its principle-based bond definition project, the Bond Project.

The Bond Project began in October 2020 through the development of a principle-based bond definition to be used for all securities in determining whether they qualify for reporting on the statutory annual statement Schedule D. Within the new bond definition, bonds are classified as an "issuer credit obligation" or an "asset-backed security."

B. SIGNIFICANT ACCOUNTING POLICIES (CONTINUED)

An "issuer credit obligation" is defined as a bond where repayment is supported by the general creditworthiness of an operating entity, and an "asset-backed security" is defined as a bond issued by an entity created for the primary purpose of raising capital through debt backed by financial assets. The revisions to SSAP No. 26 reflect the principle-based bond definition, and SSAP No. 43 provides accounting and reporting guidance for investments that qualify as asset-backed securities under the new bond definition. Upon adoption, investments that do not qualify as bonds will not be permitted to be reported as bonds on Schedule D, Part 1 thereafter as there will be no grandfathering for existing investments that do not qualify under the revised SSAPs. The Company is currently assessing the impacts of the adopted SSAP No. 26, SSAP No. 43 and other related SSAPs in relation to the financial statements.

In March 2024, the NAIC adopted revisions to SSAP No. 21, *Other Admitted Assets*, effective January 1, 2025, clarifying that residuals follow the effective yield approach with a cap and providing an election for the cost recovery method. The modifications are not expected to have a material effect on the Company's financial statements. The Company will elect the effective yield method using the allowable earned yield, capped by the amount of cash distributions received. The Company is assessing the potential impact on the Company's financial statements.

Effective January 1, 2025, revisions will be made to short-term investments, which include excluding additional investment types from being reported as cash equivalents or short-term investments regardless of maturity date of the investment at the date of acquisition. Investments will be eliminated from being reported as cash equivalents or short-term investments unless they would qualify under SSAP No. 26, *Bonds* as an issuer credit obligation. Such investments will then only qualify as a cash equivalent or short-term investment if they have a maturity date within 3-months (cash equivalents) or 12-months (short-term) from the date of acquisition or meet the specific requirements for money market mutual funds or cash pooling arrangement. The Company is assessing the potential impact on the Company's financial statements.

The NAIC adopted revisions to various SSAPs at the Spring 2024 National Meeting for investments in tax credits and acquired tax credits in response to the comments received, as well as updated annual statement reporting categories for tax credit investment risk-based capital. These revisions are in addition to the previous ones, which include broad criteria to scope in various tax credit programs, including solar programs and state specific programs. Proportional amortization will be the measurement approach as with existing low-income housing tax credits, which means recording amortization of the investment in the partnership through net investment income and use of the tax credits in the appropriate tax line. The adopted revisions will be effective on January 1, 2025. The Company is assessing the potential impact on the Company's financial statements.

SUBSEQUENT EVENTS

Management has evaluated all events occurring after December 31, 2024 through the date the financial statements were available to be issued, and determined there were no subsequent events that required either recognition or disclosure in the financial statements.

C. FAIR VALUE MEASUREMENTS

Fair value is defined 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. Fair value measurements are based upon observable and unobservable inputs. Observable inputs reflect market data obtained from independent sources, while unobservable inputs reflect the Company's view of market assumptions in the absence of observable market information. The Company utilizes valuation techniques that maximize the use of observable inputs and minimize the use of unobservable inputs. In determining fair value, the Company uses various methods, including market, income and cost approaches.

The Company categorizes its financial instruments into a three-level hierarchy based on the priority of the inputs to the valuation technique. The fair value hierarchy gives the highest priority to quoted prices in active markets for identical assets or liabilities (Level 1) and the lowest priority to unobservable inputs (Level 3). If the inputs used to measure fair value fall within different levels of the hierarchy, the category level is based on the lowest priority level input that is significant to the fair value measurement of the instrument in its entirety.

The three levels of the hierarchy are as follows:

Level 1 - Quoted prices for identical assets or liabilities in active markets (markets in which transactions occur with sufficient frequency and volume to provide pricing information on an ongoing basis). MMALIC's Level 1 financial instruments consist primarily of cash, cash equivalents and short-term investments and publicly traded equity securities for which quoted market prices in active markets are available.

Level 2 - Quoted prices for similar instruments in active markets; quoted prices for identical or similar assets or liabilities in inactive markets (markets in which there are few transactions, the prices are not current, price quotations vary substantially over time or among market makers, or in which little information is released publicly); and valuations based on other significant inputs that are observable in active markets. MMALIC's Level 2 financial instruments include fixed maturities, non-affiliated preferred stocks, separate account assets and liabilities and derivative instruments priced using observable inputs. Level 2 inputs include benchmark yields, reported trades, corroborated broker/dealer quotes, issuer spreads and benchmark securities. When non-binding broker quotes can be corroborated by comparison to similar securities priced using observable inputs, they are classified as Level 2.

Level 3 - Valuations derived from market valuation techniques generally consistent with those used to estimate the fair value of Level 2 financial instruments in which one or more significant inputs are unobservable or when the market for a security exhibits significantly less liquidity relative to markets supporting the Level 2 fair value measurements. The unobservable inputs may include management's own assumptions about the assumptions market participants would use based on the best information available in the circumstances. MMALIC's Level 3 is comprised of financial instruments whose fair value is estimated based on non-binding broker quotes or internally developed using significant inputs not based on, or corroborated by, observable market information.

Management is responsible for the valuation process and uses data from outside sources (including nationally recognized pricing services and broker/dealers) in establishing fair value. Valuation techniques utilized by pricing services and prices obtained from external sources are reviewed by internal investment professionals who are familiar with the securities being priced and the markets in which they trade to ensure the fair value determination is representative of an exit price. To validate the appropriateness of the prices obtained, the investment manager considers widely published indices (as benchmarks), recent trades, changes in interest rates, general economic conditions and the credit quality of the specific issuers. In addition, management communicates directly with the pricing service regarding the methods and assumptions used in pricing, including verifying, on a test basis, the inputs used by the service to value specific securities. See "Note D - Investments" for fair value of investment securities.

C. FAIR VALUE MEASUREMENTS (CONTINUED)

Financial assets and liabilities measured at fair value on a recurring basis categorized into the three-level fair value hierarchy at December 31, 2024 are summarized below (in millions):

Description	Level 1	Level 2	Level 3	Total
Assets:				
Bonds:				
Industrial and miscellaneous	$ -	$ 12.2	$ 22.6	$ 34.8
Total bonds	-	12.2	22.6	34.8
Non-affiliated preferred stocks	77.9	-	69.5	147.4
Non-affiliated common stocks	138.9	-	157.8	296.7
Currency swaps	-	10.4	-	10.4
Currency forwards	-	23.4	-	23.4
Interest rate swaps	-	160.1	-	160.1
Separate account assets	9.6	974.6	-	984.2
Total assets accounted for at fair value	$ 226.4	$ 1,180.7	$ 249.9	$ 1,657.0
Liabilities:				
Currency swaps	$ -	$ 16.6	$ -	$ 16.6
Currency forwards	-	1.9	-	1.9
Interest rate swaps	-	90.5	-	90.5
Separate account liabilities	9.6	974.6	-	984.2
Total liabilities accounted for at fair value	$ 9.6	$ 1,083.6	$ -	$ 1,093.2

Financial assets and liabilities measured at fair value on a recurring basis categorized into the three-level fair value hierarchy at December 31, 2023 are summarized below (in millions):

Description	Level 1	Level 2	Level 3	Total
Assets:				
Bonds:				
Industrial and miscellaneous	$ -	$ 8.0	$ 6.3	$ 14.3
Total bonds	-	8.0	6.3	14.3
Non-affiliated preferred stocks	45.2	16.4	67.7	129.3
Non-affiliated common stocks	113.0	-	158.2	271.2
Financial futures	21.0	-	-	21.0
Interest rate swaps	-	26.6	-	26.6
Separate account assets	5.2	438.1	-	443.3
Total assets accounted for at fair value	$ 184.4	$ 489.1	$ 232.2	$ 905.7
Liabilities:				
Currency swaps	$ -	$ 38.8	$ -	$ 38.8
Currency forwards	-	5.0	-	5.0
Interest rate swaps	-	66.3	-	66.3
Separate account liabilities	5.2	438.1	-	443.3
Total liabilities accounted for at fair value	$ 5.2	$ 548.2	$ -	$ 553.4

The Company had no material assets or liabilities measured at fair value on a nonrecurring basis as of December 31, 2024 and 2023.

C. FAIR VALUE MEASUREMENTS (CONTINUED)

The Company recognizes and records the transfer of securities into and out of Level 3 due to changes in availability of market observable inputs. All transfers are reflected in the tables below at fair values as of the end of the reporting periods (in millions):

	Balance as of 1/1/2024	Gain (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Settlements	Sales	Transfers In	Transfers Out	Other	Balance as of 12/31/2024
Financial assets:											
Industial and miscellaneous	$ 6.3	$ -	$ (10.8)	$ 3.9	$ 8.4	$ (0.7)	$ -	$ -	$ -	$ 15.5	$ 22.6
Preferred stocks - unaffiliated	67.7	-	6.0	-	-	-	-	-	-	(4.2)	69.5
Common stocks - unaffiliated	158.2	21.6	(2.3)	-	(7.8)	(38.0)	(0.2)	5.8	-	20.5	157.8
Total financial assets	$ 232.2	$ 21.6	$ (7.1)	$ 3.9	$ 0.6	$ (38.7)	$ (0.2)	$ 5.8	$ -	$ 31.8	$ 249.9

	Balance as of 1/1/2023	Gain (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Settlements	Sales	Transfers In	Transfers Out	Other	Balance as of 12/31/2023
Financial assets:											
Industial and miscellaneous	$ 12.7	$ 2.7	$ (6.8)	$ 0.8	$ -	$ -	$ -	$ -	$ -	$ (3.1)	$ 6.3
Preferred stocks - unaffiliated	127.3	-	(10.9)	-	0.9	(0.5)	-	-	-	(49.1)	67.7
Common stocks - unaffiliated	139.1	6.1	(15.9)	-	-	(40.7)	(0.3)	-	-	69.9	158.2
Total financial assets	$ 279.1	$ 8.8	$ (33.6)	$ 0.8	$ 0.9	$ (41.2)	$ (0.3)	$ -	$ -	$ 17.7	$ 232.2

C. FAIR VALUE MEASUREMENTS (CONTINUED)

The following table categorizes all the financial assets and liabilities in the financial statements into the three-level fair value hierarchy at December 31, 2024 (in millions):

Description	Fair Value	Carrying Value	Level 1	Level 2	Level 3
Financial assets:					
Bonds:					
U.S. Government and agencies	$ 131.2	$ 168.6	$ -	$ 131.2	$ -
All other governments	13.5	14.8	-	8.9	4.6
States, territories and possessions	151.5	157.5	-	151.5	-
Political subdivisions	217.2	221.8	-	217.2	-
Special revenue	1,625.4	1,759.1	-	1,610.0	15.4
Industrial and miscellaneous	32,774.1	34,216.7	-	23,423.3	9,350.8
Parent, subsidiaries and affiliates	959.2	969.7	-	779.0	180.2
Total bonds	$ 35,872.1	$ 37,508.2	$ -	$ 26,321.1	$ 9,551.0
Non-affiliated preferred stocks	353.0	297.9	185.4	-	167.6
Non-affiliated common stocks	296.7	296.7	138.9	-	157.8
Mortgage loans	4,975.8	5,123.1	-	-	4,975.8
Currency forwards	23.4	23.4	-	23.4	-
Fixed-indexed annuity options**	973.4	681.8	403.9	569.5	-
Interest rate swaps	160.1	160.1	-	160.1	-
Currency swaps	10.4	10.4	-	10.4	-
Separate account assets	984.2	984.2	9.6	974.6	-
Cash, cash equivalents and short-term investments	3,411.2	3,411.2	3,411.2	-	-
Policy loans	27.5	27.5	-	-	27.5
Total financial assets	$ 47,087.8	$ 48,524.5	$ 4,149.0	$ 28,059.1	$ 14,879.7
Financial liabilities:					
Currency swaps	$ 16.6	$ 16.6	$ -	$ 16.6	$ -
Currency forwards	1.9	1.9	-	1.9	-
Interest rate swaps	90.5	90.5	-	90.5	-
Fixed-indexed annuity options**	-	304.6	-	-	-
Separate account liabilities	984.2	984.2	9.6	974.6	-
Total financial liabilities	$ 1,093.2	$ 1,397.8	$ 9.6	$ 1,083.6	$ -

*Separate account liabilities incorporates the fair value of the separate account reserve and equity index put options.
**Effective 1/1/2022, Fixed-indexed annuity options are carried at amortized cost per OAC 3901-1-67. Fair Value of options is reported net in the asset section for disclosure.

C. FAIR VALUE MEASUREMENTS (CONTINUED)

The following table categorizes all the financial assets and liabilities in the financial statements into the three-level fair value hierarchy at December 31, 2023 (in millions):

Description	Fair Value	Carrying Value	Level 1	Level 2	Level 3
Financial assets:					
Bonds:					
U.S. Government and agencies	$ 156.8	$ 186.7	$ -	$ 156.8	$ -
All other governments	18.2	19.2	-	18.2	-
States, territories and possessions	175.5	180.4	-	175.5	-
Political subdivisions	228.7	231.5	-	228.7	-
Special revenue	1,800.2	1,920.8	-	1,784.9	15.3
Industrial and miscellaneous	29,809.8	31,688.5	-	21,914.2	7,895.6
Parent, subsidiaries and affiliates	722.2	745.2	-	583.4	138.8
Total bonds	$ 32,911.4	$ 34,972.3	$ -	$ 24,861.7	$ 8,049.7
Non-affiliated preferred stocks	217.9	201.0	89.8	16.4	111.7
Non-affiliated common stocks	271.2	271.2	113.0	-	158.2
Mortgage loans	4,053.2	4,256.5	-	-	4,053.2
Fixed-indexed annuity options**	822.9	723.8	317.9	505.0	-
Interest rate swaps	26.6	26.6	-	26.6	-
Financial futures	21.0	21.0	-	21.0	-
Separate account assets	443.3	443.3	5.2	438.1	-
Cash, cash equivalents and short-term investments	2,211.3	2,211.3	2,211.3	-	-
Policy loans	30.0	30.0	-	-	30.0
Total financial assets	$ 41,008.8	$ 43,157.0	$ 2,737.2	$ 25,868.8	$ 12,402.8
Financial liabilities:					
Currency swaps	$ 38.8	$ 38.8	$ -	$ 38.8	$ -
Currency forwards	5.0	5.0	-	5.0	-
Interest rate swaps	66.3	66.3	-	66.3	-
Fixed-indexed annuity options**	-	418.1	-	-	-
Separate account liabilities	443.3	443.3	5.2	438.1	-
Total financial liabilities	$ 553.4	$ 971.5	$ 5.2	$ 548.2	$ -

*Separate account liabilities incorporates the fair value of the separate account reserve and equity index put options.
**Effective 1/1/2022, Fixed-indexed annuity options are carried at amortized cost per OAC 3901-1-67. Fair Value of options is reported net in the asset section for disclosure.

C. FAIR VALUE MEASUREMENTS (CONTINUED)

FAIR VALUE OF FINANCIAL INSTRUMENTS

The following methods and assumptions were used to estimate the fair values of financial instruments:

Bonds: Fair values for investments in publicly traded bonds are obtained from nationally recognized pricing services. Fair values for privately placed investment grade bonds are obtained from broker quotes or determined internally by security analysts of the Company's affiliated investment portfolio manager.

Non-affiliated preferred and common stock: Fair values of equity securities are generally based on closing prices obtained from the exchanges on which the securities are traded. For the remainder of these securities, fair values are determined by management's internal investment professionals using data from nationally recognized pricing services as well as non-binding broker quotes.

Mortgage Loans: The fair values for the Company's mortgage loans are estimated by discounting the future contractual cash flows using the current rates at which similar loans would be made to borrowers with similar credit ratings.

Derivative instruments: The fair values for MMALIC's derivative instruments are based on settlement values, quoted market prices of comparable instruments, fees currently charged to enter into similar agreements, taking into account the remaining terms of the agreements and the counterparties' credit standing (guarantees, loan commitments), or, if there are no relevant comparables, on pricing models or formulas using current assumptions.

Separate Account: The separate account consists of derivative instruments in both asset and liability positions and registered index-linked annuity reserves. The reserves are set equal to the net fair value of the separate account derivative instruments. The methods and assumptions used for the separate account derivatives and reserves are described in more detail above.

Policy Loans: The Company states policy loans at the aggregate unpaid balance, which approximates fair value.

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, money market mutual funds 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 Balance Sheet for cash, cash equivalents and short-term investment instruments approximates the fair value.

D. INVESTMENTS

Bonds at December 31 consisted of the following (in millions):

	2024			
	Carrying	Fair	Gross Unrealized	
	Value	Value	Gains	Losses
U.S. Government and agencies	$ 168.6	$ 131.2	$ 1.8	$ 39.2
All other governments	14.8	13.5	-	1.3
States, territories and possessions	157.5	151.5	-	6.0
Political subdivisions	221.8	217.2	2.1	6.7
Special revenue	1,759.1	1,625.4	6.1	139.8
Industrial and miscellaneous	34,216.7	32,774.1	288.7	1,731.3
Parent, subsidiaries and affiliates	969.7	959.2	5.1	15.6
Total bonds	$ 37,508.2	$ 35,872.1	$ 303.8	$ 1,939.9

The December 31, 2024 gross unrealized losses exclude $13.8 million of losses included in the carrying value. These losses include $13.8 million from NAIC Class 6 bonds and were primarily included in industrial and miscellaneous.

Bonds at December 31 consisted of the following (in millions):

	2023			
	Carrying	Fair	Gross Unrealized	
	Value	Value	Gains	Losses
U.S. Government and agencies	$ 186.7	$ 156.8	$ 3.9	$ 33.8
All other governments	19.2	18.2	-	1.0
States, territories and possessions	180.4	175.5	0.5	5.4
Political subdivisions	231.5	228.7	3.7	6.5
Special revenue	1,920.8	1,800.2	10.5	131.1
Industrial and miscellaneous	31,688.5	29,809.8	247.6	2,126.3
Parent, subsidiaries and affiliates	745.2	722.2	4.2	27.2
Total bonds	$ 34,972.3	$ 32,911.4	$ 270.4	$ 2,331.3

The December 31, 2023 gross unrealized losses exclude $12.8 million of losses included in the carrying value. These losses include $12.5 million from NAIC Class 6 bonds and $0.3 million from residential mortgage-backed securities (RMBS) whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous.

At December 31, 2024 and 2023, the Company held unrated or less-than-investment grade bonds of $1,990.2 million and $2,077.4 million, respectively, with an aggregate fair value of $1,964.4 million and $1,950.7 million, respectively. Those holdings amounted to 5.3% and 5.9% of the Company's investments in bonds and approximately 3.7% and 4.4% of the Company's total admitted assets at December 31, 2024 and 2023, respectively. The Company performs periodic evaluations of the relative credit standing of the issuers of these bonds.

Mortgage loans are collateralized by underlying real estate properties, with geographic diversification across the United States. The Company monitors loan-to-value ratios and debt-service coverage ratios in assessing the credit quality of the underlying mortgage loans. There have been no material losses related to commercial mortgage loans historically or in 2024, 2023 or 2022.

D. INVESTMENTS (CONTINUED)

The carrying value and fair value of the Company's mortgage loans at December 31 were as follows (in millions):

	2024		2023	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Commercial mortgage loans:				
Primary lender	$ 1,711.6	$ 1,620.4	$ 1,431.9	$ 1,343.4
Mezzanine loans	78.2	78.5	47.6	47.6
Total commercial mortgage loans	1,789.8	1,698.9	1,479.5	1,391.0
Residential mortgage loans:				
FHA insured and VA guranteed	374.2	342.7	428.1	393.0
Other residential mortgage loans	2,959.1	2,934.2	2,348.9	2,269.2
Total residential mortgage loans	3,333.3	3,276.9	2,777.0	2,662.2
Total mortgage loans	$ 5,123.1	$ 4,975.8	$ 4,256.5	$ 4,053.2

The loan-to-value ratios by property type of the Company's commercial mortgage loans at December 31 were as follows (in millions):

	2024				
	Less Than 81%	81% to 95%	Above 95%	Total	% of Total
Office	$ 34.8	$ 22.2	$ 43.7	$ 100.7	6%
Apartments	605.3	49.7	35.7	690.7	39%
Industrial and other	359.9	4.5	14.8	379.2	21%
Hotels	547.6	21.6	50.0	619.2	34%
Total	$ 1,547.6	$ 98.0	$ 144.2	$ 1,789.8	100%

More than 86% of the Company’s commercial mortgage loans’ loan-to-value ratios are below 81% for the year ended December 31, 2024.

	2023				
	Less Than 81%	81% to 95%	Above 95%	Total	% of Total
Office	$ 53.5	$ 17.6	$ 25.1	$ 96.2	7%
Apartments	597.8	65.5	-	663.3	45%
Industrial and other	238.9	-	-	238.9	16%
Hotels	382.1	47.4	51.6	481.1	32%
Total	$ 1,272.3	$ 130.5	$ 76.7	$ 1,479.5	100%

More than 85% of the Company’s commercial mortgage loans’ loan-to-value ratios were below 81% for the year ended December 31, 2023.

D. INVESTMENTS (CONTINUED)

The Company uses an internal rating system as its primary method of monitoring credit quality. The following illustrates the Company's mortgage loan portfolio rating at December 31, translated into the equivalent rating agency designation (in millions):

	2024					
	AAA/AA/A	BBB	BB	B	CCC and Lower	Total
Commercial mortgage loans:						
Primary lender	$ 156.4	$ 875.2	$ 619.2	$ 60.8	$ -	$ 1,711.6
Mezzanine loans	-	20.0	58.2	-	-	78.2
Total commercial mortgage loans	156.4	895.2	677.4	60.8	-	1,789.8
Residential mortgage loans:						
FHA insured and VA guranteed	374.2	-	-	-	-	374.2
Other residential mortgage loans	104.7	2,832.1	20.4	1.9	-	2,959.1
Total residential mortgage loans	478.9	2,832.1	20.4	1.9	-	3,333.3
Total mortgage loans	$ 635.3	$ 3,727.3	$ 697.8	$ 62.7	$ -	$ 5,123.1

	2023					
	AAA/AA/A	BBB	BB	B	CCC and Lower	Total
Commercial mortgage loans:						
Primary lender	$ 178.0	$ 947.7	$ 288.5	$ 17.7	$ -	$ 1,431.9
Mezzanine loans	-	22.6	25.0	-	-	47.6
Total commercial mortgage loans	178.0	970.3	313.5	17.7	-	1,479.5
Residential mortgage loans:						
FHA insured and VA guranteed	428.1	-	-	-	-	428.1
Other residential mortgage loans	-	2,325.1	23.8	-	-	2,348.9
Total residential mortgage loans	428.1	2,325.1	23.8	-	-	2,777.0
Total mortgage loans	$ 606.1	$ 3,295.4	$ 337.3	$ 17.7	$ -	$ 4,256.5

The maximum percentage of any one commercial mortgage loan to the estimated value of secured collateral at the time the loan was originated, exclusive of mezzanine, insured, guaranteed or purchase money mortgages, was 100% as of December 31, 2024 and 100% as of December 31, 2023.

D. INVESTMENTS (CONTINUED)

The geographic distribution of commercial mortgage loans as of December 31 was as follows (in millions):

	2024	
	Carrying Value	Average Loan-to-Value Ratio
Florida	$ 242.7	49%
New York	208.1	65%
Texas	142.6	73%
California	140.5	73%
Virginia	128.3	64%
Massachusetts	110.0	60%
All other	817.6	74%
Total commercial mortgage loans	$ 1,789.8	76%

All other consists of 20 jurisdictions, with no individual exposure exceeding $101.6 million.

The geographic distribution of commercial mortgage loans as of December 31 was as follows (in millions):

	2023	
	Carrying Value	Average Loan-to-Value Ratio
Colorado	$ 175.8	68%
Florida	170.5	67%
New York	142.3	50%
Texas	128.8	61%
California	126.2	51%
Virginia	104.7	61%
All other	631.2	69%
Total commercial mortgage loans	$ 1,479.5	64%

All other consists of 19 jurisdictions, with no individual exposure exceeding $83.1 million.

D. INVESTMENTS (CONTINUED)

Interest rates, including fixed and variable, on the Company's portfolio of mortgage loans at December 31 were:

	2024		2023	
	Low	High	Low	High
Commercial mortgage loans:	2.6%	12.2%	2.6%	12.9%
Residential mortgage loans	2.2%	12.2%	4.8%	11.8%
Mezzanine mortgage loans	10.2%	13.7%	11.0%	14.4%

Interest rates, including fixed and variable, on new mortgage loans at December 31 were:

	2024		2023	
	Low	High	Low	High
Commercial mortgage loans:	4.3%	11.3%	4.7%	11.0%
Residential mortgage loans	4.0%	11.6%	7.1%	11.8%
Mezzanine mortgage loans	0.0%	0.0%	11.0%	11.0%

As of December 31, 2024 and 2023, the Company had no impaired mortgage loans with or without a valuation allowance or mortgage loans derecognized as a result of foreclosure, including mortgage loans subject to a participant or co-lender mortgage loan agreement with a unilateral mortgage loan foreclosure restriction or mortgage loan derecognized as a result of a foreclosure.

D. INVESTMENTS (CONTINUED)

Unrealized gains and losses on investments in non-affiliated preferred and common stocks are reported directly in unassigned funds and do not affect operations. The cost, gross unrealized gains and losses and fair value of those investments are summarized as follows (in millions):

		Fair	Gross Unrealized	
	Cost	Value	Gains	Losses
At December 31, 2024				
Non-affiliated preferred stocks	$ 288.8	$ 353.0	$ 69.9	$ 5.7
Non-affiliated common stocks	193.2	296.7	115.7	12.2
Total	$ 482.0	$ 649.7	$ 185.6	$ 17.9

		Fair	Gross Unrealized	
	Cost	Value	Gains	Losses
At December 31, 2023				
Non-affiliated preferred stocks	$ 212.2	$ 217.9	$ 31.2	$ 25.5
Non-affiliated common stocks	195.6	271.2	102.4	26.8
Total	$ 407.8	$ 489.1	$ 133.6	$ 52.3

D. INVESTMENTS (CONTINUED)

The following tables present gross unrealized losses and fair values on bonds and non-affiliated preferred and common stocks by investment category and length of time that individual securities have been in a continuous unrealized loss position as of December 31 (in millions):

	2024					
	Twelve Months or Less			More Than Twelve Months		
	Fair Value	Gross Unrealized Loss	Number of Issuers	Fair Value	Gross Unrealized Loss	Number of Issuers
U.S. Government and agencies	$ 23.6	$ 0.6	4	$ 35.5	$ 38.6	5
All other governments	4.5	0.1	1	8.9	1.2	10
States, territories and possessions	63.9	0.8	4	84.2	5.2	8
Political subdivisions	21.0	0.4	4	92.0	6.3	9
Special revenue	385.2	8.8	38	974.9	131.0	91
Industrial and miscellaneous	6,184.6	98.8	635	11,846.5	1,646.3	1,236
Parent, subsidiaries and affiliates	127.1	1.1	7	226.0	14.5	5
Total bonds	$ 6,809.9	$ 110.6	693	$ 13,268.0	$ 1,843.1	1,364
Non-affiliated preferred stocks	$ 53.8	$ 1.0	5	$ 50.9	$ 4.7	3
Non-affiliated common stocks	15.2	1.5	40	13.8	10.7	15
Total non-affiliated preferred and common stocks	$ 69.0	$ 2.5	45	$ 64.7	$ 15.4	18

The December 31, 2024 gross unrealized losses exclude $13.8 million of losses included in the carrying value. These losses include $13.8 million from NAIC Class 6 bonds and were primarily included in industrial and miscellaneous.

	2023					
	Twelve Months or Less			More Than Twelve Months		
	Fair Value	Gross Unrealized Loss	Number of Issuers	Fair Value	Gross Unrealized Loss	Number of Issuers
U.S. Government and agencies	$ 24.6	$ 0.2	2	$ 45.4	$ 33.6	3
All other governments	-	-	0	18.2	1.0	11
States, territories and possessions	17.8	0.1	3	120.8	5.3	8
Political subdivisions	25.5	0.5	5	113.0	6.0	13
Special revenue	134.5	2.1	25	1,132.3	129.0	104
Industrial and miscellaneous	2,181.0	55.7	322	16,931.4	2,083.4	1,585
Parent, subsidiaries and affiliates	132.7	0.4	6	369.4	26.8	10
Total bonds	$ 2,516.1	$ 59.0	363	$ 18,730.5	$ 2,285.1	1,734
Non-affiliated preferred stocks	$ 11.6	$ 22.1	3	$ -	$ 3.4	0
Non-affiliated common stocks	5.0	4.6	31	9.0	22.2	18
Total non-affiliated preferred and common stocks	$ 16.6	$ 26.7	34	$ 9.0	$ 25.6	18

The December 31, 2023, gross unrealized losses include $12.8 million of losses included in the carrying value. These losses include $12.5 million from NAIC Class 6 bonds and $0.3 million from RMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous.

D. INVESTMENTS (CONTINUED)

The quality of the bond portfolio is determined by the use of Securities Valuation Office ("SVO") ratings and the equivalent rating agency designations, except for RMBS and CMBS that use third-party modelers. The following sets forth the NAIC class ratings for the bond portfolio (in millions):

		2024		2023	
NAIC Class	Equivalent Rating Agency Designation	Carrying Value	% of Total	Carrying Value	% of Total
1	Aaa/Aa/A	$ 22,015.1	58.7%	$ 20,190.9	57.8%
2	Baa	13,502.9	36.0%	12,704.0	36.3%
3	Ba	1,112.8	3.0%	1,253.2	3.6%
4	B	526.2	1.4%	495.3	1.4%
5	Caa and lower	239.8	0.6%	287.0	0.8%
6	In or near default	111.4	0.3%	41.9	0.1%
	Total	$ 37,508.2	100.0%	$ 34,972.3	100.0%

When a decline in the fair value of a specific investment is considered to be other-than-temporary, a provision for impairment is charged to earnings (accounted for as realized capital loss) and the cost basis of that investment is reduced by the amount of the charge. The determination of whether unrealized losses are other-than-temporary requires judgment based on subjective as well as objective factors. Factors considered and resources used by management include:

(a) whether the unrealized loss is credit-driven or a result of changes in market interest rates,
(b) the extent to which fair value is less than cost basis,
(c) cash flow projections received from independent sources,
(d) historical operating, balance sheet and cash flow data contained in issuer Securities and Exchange Commission filings and news releases,
(e) near-term prospects for improvement in the issuer and/or its industry,
(f) third party research and communications with industry specialists,
(g) financial models and forecasts,
(h) the continuity of dividend payments, maintenance of investment grade ratings and hybrid nature of certain investments,
(i) discussions with issuer management, and
(j) the ability and intent to hold investment for a period of time sufficient to allow for any anticipated recovery in fair value.

Based on its analysis of the factors enumerated above, management believes (i) MMALIC will recover its cost basis in the securities with unrealized losses and (ii) that MMALIC has the ability and intent to hold securities until they recover in value. Although MMALIC has the ability to continue holding its investments with unrealized losses, its intent to hold them may change due to deterioration in the issuers' creditworthiness, decisions to lessen exposure to a particular issuer or industry, asset/liability management decisions, market movements, changes in views about appropriate asset allocation or the desire to offset taxable realized gains. Should MMALIC's ability or intent change with regard to a particular security, a charge for impairment would likely be required. While it is not possible to accurately predict if or when a specific security will become impaired, charges for other-than-temporary impairment ("OTTI") could be material to results of operations in future periods.

Net realized gains (losses) on investments sold and charges for OTTI on investments held were as follows for the years ended December 31 (dollars in millions):

Year	Net Realized Gains (Losses) (Net of IMR Transfers and Taxes)	Charges for Impairment	Total	Number of Investments with Impairment Charges
2024	$ 73.2	$ (148.1)	$ (74.9)	161
2023	(64.3)	(89.4)	(153.7)	137
2022	8.4	(41.0)	(32.6)	138

D. INVESTMENTS (CONTINUED)

The following is a summary of the carrying value and fair value of bonds as of December 31, 2024 and 2023 (in millions) 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:

	2024		2023	
	Carrying Value	Fair Value	Carrying Value	Fair Value
Maturity:				
One year or less	$ 964.6	$ 958.3	$ 477.7	$ 461.8
After one year through five years	10,257.1	10,221.2	7,313.4	7,226.3
After five years through ten years	9,264.8	9,002.9	10,259.6	9,804.4
After ten years	17,021.7	15,689.7	16,921.6	15,418.9
Total bonds by maturity	$ 37,508.2	$ 35,872.1	$ 34,972.3	$ 32,911.4

The aggregate amount of investment income generated as a result of prepayment penalties and acceleration fees was $0.0 million, $0.0 million, and $0.6 million during 2024, 2023, and 2022, respectively.

Proceeds from sales of bonds were $2,006.6 million, $5,146.6 million, and $10,640.3 million for 2024, 2023, and 2022, respectively. Gross realized gains of $22.8 million, $21.3 million, and $282.1 million and gross realized losses of $167.3 million, $491.4 million, and $232.4 million were realized on bonds during 2024, 2023, and 2022, respectively. The number of securities disposed of with a callable feature in 2024 and 2023 was 127 and 136, respectively.

MMALIC's $4,316.6 million investment in MBS represents approximately 12% of the carrying value of its bonds at December 31, 2024. The Company's indirect exposure to subprime mortgage risk as of December 31, 2024 had a total actual cost and book adjusted carrying value of approximately $1,197.0 million and $1,191.4 million, respectively, and a total fair value of approximately $1,113.7 million. MMALIC's $4,365.1 million investment in MBS represents approximately 12% of the carrying value of its bonds at December 31, 2023. The Company's indirect exposure to subprime mortgage risk as of December 31, 2023 had a total actual cost and book adjusted carrying value of approximately $1,185.0 million and $1,184.6 million, respectively, and a total fair value of approximately $1,083.9 million.

Leveraged loans are loans extended to companies that already have considerable amounts of debt. MMALIC 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, 2024, total leveraged loans had a carrying value of $479.8 million and a fair value of $481.5 million, of which approximately 77%, based on carrying value, were domestic leveraged loans. As of December 31, 2023, total leveraged loans had a carrying value of $447.6 million and a fair value of $446.9 million, of which approximately 83%, based on carrying value, were domestic leveraged loans.

The Company has no aggregate loan-backed securities with an OTTI in which the Company has the intent to sell or the inability or lack of intent to retain the investment in the security for a period of time to recover the amortized cost basis.

D. INVESTMENTS (CONTINUED)

The following table shows each loan-backed security with an OTTI recognized in 2024, as the present value of cash flows expected to be collected is less than the amortized cost basis of the security (in whole dollars):

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
07325DAF1	$ 188,446	$ 183,894	$ 4,552	$ 183,894	$ 173,542	03/31/2024
07389NAC9	252,999	244,622	8,378	244,622	249,997	03/31/2024
3622EAAA8	3,363,495	3,323,775	39,721	3,323,775	3,153,854	03/31/2024
61751DAE4	1,528,252	1,458,023	70,229	1,458,023	1,795,267	03/31/2024
86358RXY8	141,707	140,513	1,193	140,513	140,491	03/31/2024
86358RXZ5	221,359	218,722	2,638	218,722	201,247	03/31/2024
00703QAD4	3,309,564	3,330,880	(21,316)	3,330,880	2,331,478	03/31/2024
02147XAR8	569,821	568,694	1,127	568,694	462,724	03/31/2024
02152AAS8	1,681,039	1,680,195	844	1,680,195	1,709,668	03/31/2024
059522AU6	1,990,654	1,977,703	12,952	1,977,703	1,952,207	03/31/2024
05952GAT8	319,263	302,417	16,846	302,417	279,733	03/31/2024
05952GAV3	458,831	435,162	23,669	435,162	402,521	03/31/2024
07386XAH9	947,290	948,547	(1,257)	948,547	771,263	03/31/2024
12566UAN4	549,670	541,211	8,459	541,211	531,037	03/31/2024
12566XAM0	651,755	636,729	15,027	636,729	579,587	03/31/2024
12628LAD2	664,264	632,237	32,026	632,237	522,656	03/31/2024
12667F4N2	1,982,772	1,961,149	21,623	1,961,149	1,892,614	03/31/2024
17309BAB3	197,256	194,233	3,023	194,233	166,593	03/31/2024
32051GT70	601,477	580,656	20,821	580,656	513,722	03/31/2024
36244SAD0	2,013,709	2,018,709	(5,000)	2,018,709	2,114,288	03/31/2024
43739EAP2	555,880	552,194	3,685	552,194	523,782	03/31/2024
46627MCY1	3,736,516	3,706,574	29,942	3,706,574	3,728,355	03/31/2024
46627MEC7	346,366	345,013	1,353	345,013	316,216	03/31/2024
46627MEJ2	1,051,940	1,051,330	610	1,051,330	871,833	03/31/2024
47232CAH7	1,625,552	1,588,003	37,549	1,588,003	1,634,793	03/31/2024
643529AC4	499,851	483,505	16,346	483,505	541,706	03/31/2024
65535VMJ4	528,500	514,916	13,584	514,916	545,242	03/31/2024
65535VNL8	1,911,718	1,911,036	683	1,911,036	2,083,864	03/31/2024
65535VSJ8	1,249,637	1,197,771	51,865	1,197,771	1,003,257	03/31/2024
74928RAB0	215,991	215,991	(0)	215,991	236,763	03/31/2024
75115BAC3	932,748	928,740	4,009	928,740	1,022,173	03/31/2024
761118BU1	501,401	464,499	36,902	464,499	506,476	03/31/2024
761118GS1	1,045,906	1,039,755	6,151	1,039,755	922,272	03/31/2024
761118SC3	1,408,050	1,385,794	22,255	1,385,794	1,191,653	03/31/2024
855541AC2	727,538	712,958	14,579	712,958	653,434	03/31/2024
863579J90	310,964	284,727	26,237	284,727	287,552	03/31/2024
86360BAJ7	659,289	637,763	21,526	637,763	625,317	03/31/2024
87222EAB4	751,711	731,584	20,127	731,584	682,690	03/31/2024
87222EAC2	870,200	839,182	31,018	839,182	680,970	03/31/2024
93934NAC9	441,899	429,939	11,960	429,939	357,528	03/31/2024
45660LCK3	2,514,539	2,470,098	44,442	2,470,098	2,723,605	03/31/2024
058931AT3	1,087,439	1,038,180	49,259	1,038,180	879,088	03/31/2024
05949CKX3	1,152,881	1,152,938	(58)	1,152,938	1,158,454	03/31/2024

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
05990HAT0	835,338	815,604	19,735	815,604	806,647	03/31/2024
07386YAE4	2,127,460	1,872,598	254,863	1,872,598	1,732,749	03/31/2024
07401CAS2	2,546,303	2,534,503	11,800	2,534,503	2,518,043	03/31/2024
12638PAB5	666,442	630,577	35,865	630,577	479,103	03/31/2024
12669G4K4	2,465,908	2,448,797	17,111	2,448,797	2,303,793	03/31/2024
12669GR45	454,211	451,011	3,200	451,011	405,877	03/31/2024
170257AE9	1,986,016	1,903,375	82,642	1,903,375	1,421,183	03/31/2024
2254582Y3	1,063,127	1,052,270	10,856	1,052,270	941,835	03/31/2024
225458L55	477,807	465,565	12,242	465,565	402,724	03/31/2024
32052EAA7	42,488	41,783	704	41,783	39,155	03/31/2024
32056JAA2	1,021,287	994,518	26,768	994,518	1,080,580	03/31/2024
362341FN4	694,244	680,711	13,534	680,711	609,991	03/31/2024
362341XC8	809,401	777,534	31,867	777,534	695,392	03/31/2024
41161PCX9	153,937	153,895	42	153,895	157,664	03/31/2024
46630WAL4	438,439	438,782	(343)	438,782	293,935	03/31/2024
576433D52	471,876	409,240	62,636	409,240	430,054	03/31/2024
57643MLZ5	205,469	199,902	5,567	199,902	176,526	03/31/2024
59023PAB9	470,257	467,493	2,764	467,493	476,269	03/31/2024
74958YAE2	262,093	259,755	2,338	259,755	258,713	03/31/2024
863579RP5	618,742	604,955	13,787	604,955	564,247	03/31/2024
863579UL0	255,178	254,285	893	254,285	237,173	03/31/2024
863579UU0	939,669	934,433	5,236	934,433	960,949	03/31/2024
863579XR4	1,954,913	1,890,491	64,421	1,890,491	1,887,147	03/31/2024
885220KW2	1,741,141	1,720,731	20,410	1,720,731	1,602,474	03/31/2024
03235TAA5	2,269,468	89,151	2,180,317	89,151	91,091	06/30/2024
62878HAA9	77,803,827	67,655,502	10,148,325	67,655,502	37,210,526	06/30/2024
07325DAF1	178,481	176,126	2,355	176,126	166,148	06/30/2024
3622EAAA8	3,292,504	3,184,660	107,843	3,184,660	3,041,184	06/30/2024
86358RXY8	123,852	123,852	0	123,852	123,889	06/30/2024
86358RXZ5	372,918	188,377	184,541	188,377	171,206	06/30/2024
00703QAD4	3,296,107	3,259,847	36,260	3,259,847	2,386,522	06/30/2024
02152AAS8	1,650,275	1,657,538	(7,263)	1,657,538	1,694,329	06/30/2024
05532TAF9	1,330,063	1,000,180	329,883	1,000,180	1,320,833	06/30/2024
059522AU6	2,241,312	1,925,540	315,772	1,925,540	1,895,287	06/30/2024
05952GAV3	459,594	459,364	231	459,364	396,506	06/30/2024
07384YKF2	1,676,124	1,597,771	78,353	1,597,771	1,509,395	06/30/2024
12566UAE4	391,661	388,055	3,606	388,055	342,216	06/30/2024
12566UAN4	537,632	510,793	26,839	510,793	530,113	06/30/2024
12628LAD2	642,284	622,397	19,887	622,397	514,736	06/30/2024
12667F4N2	1,914,833	1,908,135	6,698	1,908,135	1,810,552	06/30/2024
12667GAC7	587,654	584,787	2,867	584,787	567,539	06/30/2024
12668APC3	769,291	754,235	15,056	754,235	708,505	06/30/2024
17307GED6	1,262,267	1,251,250	11,017	1,251,250	1,309,786	06/30/2024
17309BAB3	194,329	190,609	3,721	190,609	163,894	06/30/2024
25150NAB0	1,429,029	1,411,817	17,212	1,411,817	1,189,708	06/30/2024
45254NNT0	86,269	46,530	39,739	46,530	37,525	06/30/2024

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
46627MAD9	497,454	495,061	2,393	495,061	429,325	06/30/2024
46627MCY1	3,504,842	3,460,914	43,928	3,460,914	3,510,994	06/30/2024
46627MEJ2	1,029,088	1,028,470	619	1,028,470	850,323	06/30/2024
61748HUF6	444,541	437,080	7,462	437,080	394,526	06/30/2024
643529AC4	488,451	472,942	15,509	472,942	512,282	06/30/2024
65535VSJ8	1,198,546	1,139,006	59,540	1,139,006	965,916	06/30/2024
75115DAA3	176,480	172,897	3,583	172,897	155,478	06/30/2024
75116FBH1	1,316,094	1,293,501	22,593	1,293,501	1,096,145	06/30/2024
76110HH85	209,667	196,650	13,018	196,650	207,840	06/30/2024
761118BU1	356,973	358,468	(1,495)	358,468	390,598	06/30/2024
761118FM5	1,654,272	1,550,452	103,819	1,550,452	1,634,697	06/30/2024
761118GS1	577,336	578,234	(897)	578,234	519,129	06/30/2024
761118SC3	1,347,876	1,353,200	(5,324)	1,353,200	1,178,737	06/30/2024
855541AC2	681,799	664,359	17,440	664,359	610,581	06/30/2024
863579J90	281,218	263,740	17,478	263,740	257,606	06/30/2024
86360BAG3	1,593,226	1,526,542	66,684	1,526,542	1,446,404	06/30/2024
86360BAJ7	732,362	624,365	107,997	624,365	608,246	06/30/2024
87222EAB4	737,391	714,622	22,770	714,622	678,658	06/30/2024
87222EAC2	854,908	824,739	30,169	824,739	673,478	06/30/2024
93934NAC9	212,897	212,897	0	212,897	177,003	06/30/2024
45660LCK3	2,492,599	2,447,687	44,912	2,447,687	2,730,961	06/30/2024
058931AT3	849,462	844,051	5,410	844,051	736,680	06/30/2024
05946XY72	969,731	968,019	1,712	968,019	907,973	06/30/2024
05990HAT0	797,257	776,355	20,901	776,355	770,842	06/30/2024
073880AD8	1,041,747	980,882	60,865	980,882	884,127	06/30/2024
07401CAS2	2,149,928	1,800,366	349,563	1,800,366	1,769,018	06/30/2024
12544DAG4	76,422	76,273	149	76,273	63,205	06/30/2024
1266942H0	487,696	485,711	1,985	485,711	402,837	06/30/2024
126694HP6	424,687	418,006	6,681	418,006	407,545	06/30/2024
12669G3S8	1,109,352	1,086,152	23,199	1,086,152	970,937	06/30/2024
12669G4K4	2,416,802	2,413,996	2,805	2,413,996	2,282,559	06/30/2024
12669GR45	488,586	443,234	45,352	443,234	418,915	06/30/2024
2254582Y3	1,038,258	1,042,487	(4,229)	1,042,487	922,895	06/30/2024
225470VF7	1,214,433	1,144,277	70,156	1,144,277	1,034,928	06/30/2024
32052EAA7	41,561	40,891	670	40,891	38,638	06/30/2024
32056JAA2	946,028	935,645	10,383	935,645	957,523	06/30/2024
362341FN4	682,514	656,914	25,600	656,914	596,198	06/30/2024
362341XC8	753,782	753,720	62	753,720	684,524	06/30/2024
466247UG6	396,801	389,244	7,556	389,244	391,491	06/30/2024
46630WAL4	429,077	428,735	343	428,735	286,999	06/30/2024
46631NAA7	629,936	624,489	5,447	624,489	490,712	06/30/2024
46631NDT3	5,702,643	5,440,665	261,978	5,440,665	5,514,444	06/30/2024
52520MCE1	192,541	190,485	2,057	190,485	182,118	06/30/2024
57643MLZ5	197,781	191,438	6,343	191,438	175,020	06/30/2024
59023PAB9	459,882	457,928	1,954	457,928	464,081	06/30/2024
61758VAQ0	2,524,715	2,424,826	99,890	2,424,826	2,004,345	06/30/2024

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
74958YAE2	259,088	254,354	4,734	254,354	256,384	06/30/2024
863579RP5	601,854	558,618	43,237	558,618	556,863	06/30/2024
863579UL0	255,370	250,985	4,385	250,985	234,764	06/30/2024
863579UU0	1,012,782	885,453	127,329	885,453	919,353	06/30/2024
863579XR4	1,816,437	1,747,652	68,785	1,747,652	1,724,184	06/30/2024
92925VAF7	1,963,141	1,392,435	570,706	1,392,435	1,835,677	06/30/2024
92979DAC9	2,345,113	2,281,758	63,356	2,281,758	2,403,743	06/30/2024
94985AAA7	172,846	172,336	510	172,336	162,836	06/30/2024
94986CAA2	160,856	162,103	(1,247)	162,103	209,862	06/30/2024
07325DAF1	168,747	158,506	10,241	158,506	162,126	09/30/2024
3622EAAA8	3,162,718	3,164,266	(1,548)	3,164,266	3,105,133	09/30/2024
86358RXZ5	173,920	162,831	11,089	162,831	147,869	09/30/2024
00703QAD4	3,230,243	2,980,491	249,753	2,980,491	2,393,260	09/30/2024
05951KAN3	536,453	516,986	19,467	516,986	480,378	09/30/2024
05952GAT8	301,408	301,407	1	301,407	279,298	09/30/2024
07384YKF2	1,545,478	1,473,109	72,368	1,473,109	1,502,463	09/30/2024
12566UAE4	382,321	381,811	510	381,811	347,647	09/30/2024
12628LAD2	623,895	538,842	85,054	538,842	488,888	09/30/2024
12667F4N2	1,854,333	1,825,794	28,539	1,825,794	1,795,414	09/30/2024
12667F5E1	885,926	883,092	2,834	883,092	840,192	09/30/2024
12667GAC7	574,616	574,616	0	574,616	569,728	09/30/2024
17307GED6	1,243,444	1,237,646	5,798	1,237,646	1,306,304	09/30/2024
17309BAB3	188,676	178,404	10,273	178,404	162,800	09/30/2024
25150NAB0	1,395,413	1,340,207	55,206	1,340,207	1,185,177	09/30/2024
32051GT70	553,883	489,420	64,463	489,420	470,987	09/30/2024
36244SAD0	2,079,721	1,738,096	341,626	1,738,096	1,990,034	09/30/2024
46627MAD9	485,365	467,136	18,228	467,136	418,182	09/30/2024
46627MEC7	333,531	312,472	21,058	312,472	300,268	09/30/2024
46627MEJ2	1,002,416	975,069	27,347	975,069	835,072	09/30/2024
61748HUF6	428,955	412,384	16,570	412,384	395,350	09/30/2024
643529AC4	475,293	476,634	(1,341)	476,634	500,686	09/30/2024
65535VSJ8	1,145,447	994,986	150,461	994,986	958,994	09/30/2024
75115DAA3	170,761	164,486	6,275	164,486	151,842	09/30/2024
761118FM5	1,541,807	1,543,298	(1,492)	1,543,298	1,629,022	09/30/2024
761118UG1	420,057	420,046	11	420,046	373,060	09/30/2024
863579J90	250,612	252,143	(1,531)	252,143	245,916	09/30/2024
86360BAG3	1,314,325	1,248,853	65,472	1,248,853	1,207,074	09/30/2024
86360BAJ7	600,711	599,768	944	599,768	589,162	09/30/2024
87222EAB4	717,218	700,713	16,505	700,713	677,103	09/30/2024
87222EAC2	837,388	792,140	45,248	792,140	670,814	09/30/2024
058931AT3	836,589	777,756	58,832	777,756	735,448	09/30/2024
05990HAT0	774,291	709,503	64,788	709,503	797,291	09/30/2024
073880AD8	958,917	955,572	3,345	955,572	876,008	09/30/2024
12544DAG4	75,232	74,708	525	74,708	64,751	09/30/2024
1266942H0	472,093	470,717	1,376	470,717	381,368	09/30/2024
12669G4K4	2,386,332	2,386,419	(87)	2,386,419	2,304,003	09/30/2024

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
16162YAL9	304,287	300,592	3,695	300,592	302,447	09/30/2024
170257AE9	1,844,597	1,830,194	14,403	1,830,194	1,400,315	09/30/2024
2254582Y3	1,035,685	987,491	48,194	987,491	916,096	09/30/2024
225470VF7	1,045,176	1,047,328	(2,152)	1,047,328	914,335	09/30/2024
466247UG6	388,455	385,026	3,430	385,026	394,828	09/30/2024
46630WAL4	414,400	402,824	11,576	402,824	275,971	09/30/2024
46631NAA7	619,024	566,235	52,789	566,235	485,405	09/30/2024
52520MCE1	187,510	169,666	17,844	169,666	178,580	09/30/2024
57643MLZ5	189,667	181,845	7,821	181,845	175,427	09/30/2024
74958YAE2	252,881	235,028	17,853	235,028	260,844	09/30/2024
863579UU0	872,015	877,227	(5,212)	877,227	896,401	09/30/2024
92925VAF7	1,353,551	1,353,551	(0)	1,353,551	1,805,104	09/30/2024
62878HAA9	57,507,177	37,210,526	20,296,651	37,210,526	37,210,526	12/31/2024
86358RXZ5	150,451	150,523	(72)	150,523	128,721	12/31/2024
00703QAD4	2,884,931	2,591,154	293,777	2,591,154	2,159,579	12/31/2024
07386XAH9	895,372	883,112	12,260	883,112	700,640	12/31/2024
225470Q89	461,254	350,813	110,442	350,813	316,228	12/31/2024
32051GT70	516,567	526,142	(9,576)	526,142	447,968	12/31/2024
45254NNT0	40,960	10,690	30,269	10,690	21,416	12/31/2024
46627MAD9	452,369	457,946	(5,577)	457,946	392,752	12/31/2024
61748HUF6	409,958	408,345	1,613	408,345	379,740	12/31/2024
86360BAG3	1,252,210	1,243,829	8,381	1,243,829	1,137,848	12/31/2024
86360BAJ7	622,383	583,382	39,002	583,382	556,638	12/31/2024
87222EAC2	792,850	794,291	(1,441)	794,291	638,603	12/31/2024
058931AT3	547,740	547,703	37	547,703	507,449	12/31/2024
073880AD8	947,481	946,754	728	946,754	863,064	12/31/2024
12638PAB5	650,731	553,226	97,504	553,226	453,690	12/31/2024
1266942H0	457,088	442,059	15,028	442,059	352,275	12/31/2024
126694CS5	2,368,937	2,330,168	38,769	2,330,168	1,789,779	12/31/2024
126694LC0	1,302,316	1,096,712	205,604	1,096,712	956,653	12/31/2024
170257AE9	1,799,754	1,793,779	5,975	1,793,779	1,342,095	12/31/2024
2254582Y3	981,101	981,382	(281)	981,382	878,279	12/31/2024
46630WAL4	400,452	395,212	5,240	395,212	268,169	12/31/2024
74958YAE2	230,512	230,132	380	230,132	247,059	12/31/2024
863579UU0	853,614	853,536	78	853,536	847,155	12/31/2024
Total			$ 40,145,833			

D. INVESTMENTS (CONTINUED)

The following table shows each loan-backed security with an OTTI recognized in 2023, as the present value of cash flows expected to be collected is less than the amortized cost basis of the security (in whole dollars):

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
00176BAM5	$ 202,546	$ 110,277	$ 92,269	$ 110,277	$ 116,065	03/31/2023
001406AA5	1,763,035	1,274,229	488,807	1,274,229	1,285,767	03/31/2023
26827EAC9	9,193,316	4,723,119	4,470,196	4,723,119	6,207,776	03/31/2023
3622EAAA8	3,756,795	3,647,858	108,936	3,647,858	3,611,452	03/31/2023
61751DAE4	1,645,601	1,578,836	66,764	1,578,836	1,967,072	03/31/2023
617526AD0	2,356,207	2,115,198	241,009	2,115,198	2,354,557	03/31/2023
86358RXZ5	421,445	412,256	9,189	412,256	413,530	03/31/2023
05951KAN3	622,182	623,350	(1,169)	623,350	601,336	03/31/2023
059522AU6	2,269,369	2,102,631	166,738	2,102,631	2,176,835	03/31/2023
12628LAD2	785,041	763,053	21,988	763,053	660,429	03/31/2023
12667F4N2	2,210,900	2,186,739	24,161	2,186,739	2,182,686	03/31/2023
12667F5E1	1,062,067	1,059,207	2,860	1,059,207	995,081	03/31/2023
12668APC3	896,073	883,009	13,065	883,009	857,687	03/31/2023
17307GED6	1,409,643	1,393,308	16,335	1,393,308	1,455,502	03/31/2023
17309BAB3	220,495	214,662	5,834	214,662	195,222	03/31/2023
32051GSQ9	1,814,597	1,786,038	28,559	1,786,038	1,836,075	03/31/2023
32051GT70	663,419	662,609	810	662,609	596,313	03/31/2023
46627MAD9	589,002	581,089	7,914	581,089	518,389	03/31/2023
46627MEJ2	1,138,638	1,136,631	2,006	1,136,631	957,220	03/31/2023
59020UW43	223,543	223,584	(41)	223,584	245,108	03/31/2023
643529AC4	537,761	506,075	31,686	506,075	563,770	03/31/2023
74923GAC7	1,432,936	1,431,302	1,634	1,431,302	1,521,208	03/31/2023
74923HAQ4	538,028	538,123	(95)	538,123	480,166	03/31/2023
74928RAB0	248,088	241,996	6,091	241,996	266,975	03/31/2023
74928XBB6	4,436,827	3,886,418	550,409	3,886,418	4,352,809	03/31/2023
75115BAC3	1,010,823	1,015,108	(4,285)	1,015,108	1,087,275	03/31/2023
75115DAA3	195,780	193,598	2,183	193,598	182,546	03/31/2023
761118BU1	717,506	688,322	29,183	688,322	756,457	03/31/2023
761118FM5	2,089,659	1,852,770	236,889	1,852,770	1,945,475	03/31/2023
761118GS1	1,139,848	1,138,816	1,032	1,138,816	1,041,063	03/31/2023
761118SC3	1,581,486	1,581,588	(103)	1,581,588	1,360,351	03/31/2023
761118UG1	506,268	503,201	3,067	503,201	428,316	03/31/2023
76112BNM8	4,707,569	4,708,889	(1,320)	4,708,889	4,941,288	03/31/2023
855541AC2	854,276	851,419	2,857	851,419	808,830	03/31/2023
863579J90	344,828	339,476	5,352	339,476	355,595	03/31/2023
86360BAG3	1,782,553	1,688,545	94,008	1,688,545	1,858,413	03/31/2023
86360BAJ7	684,793	671,937	12,855	671,937	700,892	03/31/2023
87222EAB4	838,918	811,788	27,130	811,788	736,793	03/31/2023
87222EAC2	971,562	933,068	38,494	933,068	795,832	03/31/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
45660LCK3	2,673,423	2,598,842	74,581	2,598,842	2,689,571	03/31/2023
939336X99	1,829,627	1,670,689	158,938	1,670,689	1,792,660	03/31/2023
05949CHM1	768,548	755,812	12,736	755,812	773,623	03/31/2023
05949CKX3	1,213,201	1,188,146	25,055	1,188,146	1,243,199	03/31/2023
05990HAT0	934,146	930,177	3,969	930,177	940,458	03/31/2023
073880AD8	1,121,205	1,122,339	(1,134)	1,122,339	1,064,409	03/31/2023
07401CAS2	3,138,214	3,078,739	59,474	3,078,739	3,132,170	03/31/2023
12543XAD8	1,165,771	1,150,483	15,288	1,150,483	1,070,971	03/31/2023
12544DAG4	85,474	83,364	2,109	83,364	73,861	03/31/2023
12545EAK2	1,406,029	1,363,895	42,134	1,363,895	1,226,917	03/31/2023
12638PAB5	719,347	697,335	22,011	697,335	549,668	03/31/2023
126694CS5	2,842,754	2,832,174	10,581	2,832,174	2,292,959	03/31/2023
126694HP6	421,087	419,930	1,157	419,930	402,076	03/31/2023
12669G3S8	1,254,365	1,250,349	4,015	1,250,349	1,124,398	03/31/2023
16165MAG3	1,841,254	1,776,091	65,163	1,776,091	1,597,907	03/31/2023
2254582Y3	1,208,346	1,200,002	8,344	1,200,002	1,082,976	03/31/2023
225458L55	539,692	536,533	3,159	536,533	500,154	03/31/2023
225470VF7	1,460,576	1,422,984	37,592	1,422,984	1,400,985	03/31/2023
36185N6N5	4,571,722	4,071,935	499,788	4,071,935	4,514,039	03/31/2023
362341FN4	774,099	765,095	9,005	765,095	702,117	03/31/2023
362341XC8	857,596	848,675	8,921	848,675	768,173	03/31/2023
36242DQY2	99,752	97,979	1,772	97,979	93,530	03/31/2023
41161PCX9	191,672	191,284	388	191,284	190,228	03/31/2023
466247J46	74,610	73,055	1,554	73,055	73,519	03/31/2023
466247UG6	526,361	514,800	11,561	514,800	510,820	03/31/2023
46630WAB6	872,431	866,888	5,543	866,888	808,108	03/31/2023
46630WAL4	506,494	500,786	5,709	500,786	479,625	03/31/2023
46631NAA7	719,259	693,483	25,776	693,483	569,822	03/31/2023
576433D52	503,578	493,400	10,178	493,400	450,563	03/31/2023
57643MLZ5	284,150	280,753	3,397	280,753	269,995	03/31/2023
59023PAB9	508,302	498,819	9,484	498,819	517,983	03/31/2023
74958YAE2	287,181	287,688	(507)	287,688	287,680	03/31/2023
78473TAJ9	198,841	177,853	20,989	177,853	154,392	03/31/2023
863579RP5	609,579	590,361	19,218	590,361	577,909	03/31/2023
863579UL0	263,373	261,997	1,377	261,997	256,211	03/31/2023
92979DAC9	2,710,529	2,629,297	81,232	2,629,297	2,800,364	03/31/2023
94984DAC8	342,454	342,081	373	342,081	345,646	03/31/2023
94986CAA2	264,625	265,827	(1,202)	265,827	262,986	03/31/2023
001406AA55	27,755	-	27,755	-	-	06/30/2023
61751DAE4	1,614,822	1,548,177	66,645	1,548,177	1,908,732	06/30/2023
86358RXZ5	381,361	332,609	48,752	332,609	337,433	06/30/2023
02146TAL1	361,912	345,869	16,042	345,869	366,804	06/30/2023
02147XAR8	617,209	612,988	4,221	612,988	505,733	06/30/2023
059522AU6	2,107,010	2,107,010	-	2,107,010	2,147,399	06/30/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
07386XAH9	984,857	984,374	483	984,374	807,325	06/30/2023
12566UAN4	572,055	570,484	1,571	570,484	586,599	06/30/2023
12628LAD2	766,444	716,904	49,540	716,904	624,798	06/30/2023
12667F5E1	1,039,544	1,031,360	8,184	1,031,360	960,648	06/30/2023
12667GAC7	662,986	611,428	51,558	611,428	628,342	06/30/2023
12668APC3	845,763	838,619	7,144	838,619	804,549	06/30/2023
17309BAB3	213,365	208,774	4,591	208,774	183,775	06/30/2023
32051GSQ9	1,688,266	1,682,972	5,294	1,682,972	1,728,278	06/30/2023
32051GT70	654,707	650,913	3,793	650,913	584,241	06/30/2023
36244SAD0	2,252,386	2,071,962	180,424	2,071,962	2,271,187	06/30/2023
43739EAP2	616,209	611,759	4,449	611,759	570,177	06/30/2023
46627MAD9	572,129	572,115	13	572,115	503,882	06/30/2023
46627MEC7	377,567	371,830	5,737	371,830	339,925	06/30/2023
46627MEJ2	1,118,100	1,113,603	4,497	1,113,603	921,828	06/30/2023
643529AC4	520,520	491,053	29,467	491,053	557,549	06/30/2023
65535VNL8	2,089,478	2,081,888	7,590	2,081,888	2,063,447	06/30/2023
65535VSJ8	1,285,712	1,246,997	38,715	1,246,997	1,115,827	06/30/2023
74923HAQ4	525,772	519,269	6,502	519,269	443,687	06/30/2023
75116FBH1	1,485,771	1,465,650	20,121	1,465,650	1,253,422	06/30/2023
761118SC3	1,528,680	1,515,672	13,008	1,515,672	1,309,921	06/30/2023
761118UG1	485,611	483,232	2,379	483,232	409,243	06/30/2023
863579J90	326,147	321,439	4,707	321,439	331,247	06/30/2023
86360BAJ7	664,426	663,728	698	663,728	678,337	06/30/2023
87222EAB4	814,203	791,937	22,266	791,937	715,293	06/30/2023
87222EAC2	944,500	906,175	38,325	906,175	780,900	06/30/2023
05949CHM1	754,991	752,303	2,689	752,303	770,786	06/30/2023
05949CKX3	1,233,035	1,190,687	42,348	1,190,687	1,225,158	06/30/2023
07386YAE4	1,919,895	1,890,046	29,849	1,890,046	1,717,512	06/30/2023
073880AD8	1,095,079	1,087,921	7,158	1,087,921	1,010,811	06/30/2023
12543XAD8	1,146,866	1,132,734	14,132	1,132,734	1,025,398	06/30/2023
12544DAG4	82,048	82,482	(434)	82,482	72,144	06/30/2023
12638PAB5	704,325	687,341	16,984	687,341	538,077	06/30/2023
12669G3S8	1,216,352	1,205,920	10,432	1,205,920	1,077,627	06/30/2023
16165MAG3	1,698,141	1,698,815	(675)	1,698,815	1,501,094	06/30/2023
17025AAH5	866,588	804,309	62,279	804,309	831,165	06/30/2023
2254582Y3	239,471	239,472	(2)	239,472	214,686	06/30/2023
225458L55	535,805	532,092	3,713	532,092	459,983	06/30/2023
225470VF7	1,403,814	1,403,895	(81)	1,403,895	1,341,332	06/30/2023
45669AAD6	3,387,280	3,358,005	29,274	3,358,005	3,217,657	06/30/2023
466247J46	71,231	71,237	(5)	71,237	69,271	06/30/2023
466247ZP1	550,885	540,659	10,226	540,659	482,855	06/30/2023
46628LAB4	41,586	40,556	1,030	40,556	41,521	06/30/2023
46630WAL4	515,281	485,878	29,403	485,878	468,594	06/30/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
46631NAA7	691,427	678,636	12,791	678,636	532,232	06/30/2023
46631NDT3	6,223,773	6,162,743	61,029	6,162,743	6,052,651	06/30/2023
576433D52	492,252	487,446	4,806	487,446	417,672	06/30/2023
57643MLZ5	269,334	264,924	4,410	264,924	253,589	06/30/2023
59023PAB9	497,202	495,714	1,488	495,714	511,575	06/30/2023
74958YAE2	281,262	262,418	18,844	262,418	270,970	06/30/2023
863579XC7	1,084,387	1,062,034	22,353	1,062,034	1,101,633	06/30/2023
863579XR4	2,120,615	2,023,213	97,402	2,023,213	2,051,084	06/30/2023
86363GAF1	1,315,519	1,224,816	90,703	1,224,816	1,244,515	06/30/2023
885220KW2	1,906,234	1,901,275	4,960	1,901,275	1,823,623	06/30/2023
00176BAM54	101,071	71	101,000	71	78,651	09/30/2023
57430U301	1,207,914	922,371	285,543	922,371	815,210	09/30/2023
07325DAF1	214,725	211,984	2,742	211,984	195,404	09/30/2023
3622EAAA8	3,564,775	3,424,094	140,681	3,424,094	3,261,277	09/30/2023
61751DAE4	1,569,635	1,508,933	60,702	1,508,933	1,731,342	09/30/2023
86358RXY8	199,869	182,391	17,478	182,391	196,421	09/30/2023
86358RXZ5	297,911	283,221	14,691	283,221	280,466	09/30/2023
02146TAL1	356,025	334,459	21,566	334,459	347,841	09/30/2023
02147XAR8	595,098	598,203	(3,104)	598,203	483,800	09/30/2023
058933AN2	801,762	795,980	5,782	795,980	738,147	09/30/2023
059522AU6	2,113,373	2,046,846	66,528	2,046,846	2,043,226	09/30/2023
07386XAH9	967,729	884,778	82,951	884,778	783,965	09/30/2023
12628LAD2	722,914	702,073	20,842	702,073	584,662	09/30/2023
12667F4N2	2,131,981	2,102,525	29,456	2,102,525	2,003,869	09/30/2023
12667F5E1	998,934	999,062	(128)	999,062	919,366	09/30/2023
12667GAC7	641,949	642,107	(158)	642,107	605,263	09/30/2023
12668APC3	811,652	812,953	(1,300)	812,953	775,662	09/30/2023
17307GED6	1,383,968	1,370,895	13,074	1,370,895	1,414,213	09/30/2023
17309BAB3	205,994	202,794	3,201	202,794	171,985	09/30/2023
32051GSQ9	1,609,003	1,603,331	5,672	1,603,331	1,656,065	09/30/2023
32051GT70	638,394	635,227	3,166	635,227	561,409	09/30/2023
36244SAD0	2,086,866	2,091,595	(4,729)	2,091,595	2,092,913	09/30/2023
43739EAP2	600,361	591,499	8,862	591,499	566,842	09/30/2023
46627MAD9	551,967	541,058	10,909	541,058	474,792	09/30/2023
46627MEC7	364,017	360,581	3,437	360,581	323,064	09/30/2023
46627MEJ2	1,097,236	1,094,239	2,997	1,094,239	888,082	09/30/2023
643529AC4	504,332	491,904	12,428	491,904	538,114	09/30/2023
65535VNL8	2,075,144	2,055,698	19,446	2,055,698	2,078,429	09/30/2023
65535VSJ8	1,256,596	1,234,664	21,931	1,234,664	1,073,207	09/30/2023
69337BAH7	1,342,250	1,324,870	17,380	1,324,870	1,128,015	09/30/2023
74923HAQ4	509,767	510,394	(627)	510,394	429,265	09/30/2023
75115DAA3	188,747	185,664	3,083	185,664	182,465	09/30/2023
761118GS1	1,085,700	1,072,281	13,419	1,072,281	1,007,009	09/30/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
761118SC3	1,483,628	1,492,604	(8,976)	1,492,604	1,269,597	09/30/2023
761118UG1	468,938	469,663	(725)	469,663	393,703	09/30/2023
863579J90	308,602	305,810	2,792	305,810	317,961	09/30/2023
86360BAJ7	651,289	649,170	2,119	649,170	663,487	09/30/2023
87222EAB4	794,273	757,539	36,733	757,539	695,006	09/30/2023
87222EAC2	917,429	875,091	42,338	875,091	735,483	09/30/2023
41161PTN3	331,804	277,221	54,583	277,221	311,042	09/30/2023
45660LCK3	2,616,065	2,518,214	97,852	2,518,214	2,766,498	09/30/2023
05946XY72	1,018,663	1,014,239	4,424	1,014,239	947,595	09/30/2023
05949CHM1	666,490	660,363	6,127	660,363	690,602	09/30/2023
07386YAE4	1,885,974	1,866,881	19,093	1,866,881	1,705,295	09/30/2023
073880AD8	1,076,505	1,037,154	39,351	1,037,154	987,684	09/30/2023
12543XAD8	1,101,148	1,105,980	(4,831)	1,105,980	936,389	09/30/2023
12638PAB5	694,351	675,173	19,178	675,173	512,071	09/30/2023
12669G4K4	2,601,658	2,601,146	511	2,601,146	2,396,294	09/30/2023
12669GR45	498,496	476,051	22,445	476,051	430,865	09/30/2023
170257AE9	2,360,086	2,294,691	65,396	2,294,691	1,706,184	09/30/2023
17025AAH5	753,396	787,624	(34,228)	787,624	795,445	09/30/2023
225458L55	495,061	491,459	3,602	491,459	425,644	09/30/2023
225470VF7	1,387,201	1,333,114	54,088	1,333,114	1,298,598	09/30/2023
32052EAA7	46,567	43,785	2,782	43,785	40,679	09/30/2023
362341FN4	754,611	747,216	7,395	747,216	669,320	09/30/2023
362341XC8	827,434	812,370	15,063	812,370	684,900	09/30/2023
41161PCX9	180,773	179,982	791	179,982	176,391	09/30/2023
46631NDT3	5,999,611	6,009,390	(9,779)	6,009,390	5,617,945	09/30/2023
47233DAB7	595,329	204,708	390,622	204,708	681,585	09/30/2023
576433D52	486,384	480,875	5,509	480,875	413,266	09/30/2023
57643MLZ5	248,993	244,183	4,811	244,183	230,150	09/30/2023
59023PAB9	483,479	478,356	5,122	478,356	492,971	09/30/2023
74958TAB9	519,216	508,266	10,950	508,266	470,425	09/30/2023
863579RP5	591,272	566,391	24,881	566,391	560,020	09/30/2023
863579UL0	259,923	258,399	1,523	258,399	245,880	09/30/2023
863579UU0	1,016,080	963,663	52,416	963,663	990,946	09/30/2023
863579XC7	1,037,796	981,054	56,742	981,054	1,022,671	09/30/2023
86363GAF1	1,179,527	1,182,146	(2,619)	1,182,146	1,193,014	09/30/2023
885220KW2	1,896,532	1,874,254	22,278	1,874,254	1,835,343	09/30/2023
07325DAF1	193,552	193,679	(127)	193,679	183,083	12/31/2023
3622EAAA8	3,286,278	3,237,272	49,006	3,237,272	3,255,864	12/31/2023
61751DAE4	1,543,361	1,498,683	44,678	1,498,683	1,797,931	12/31/2023
75156VAD7	2,959,112	2,496,716	462,396	2,496,716	2,973,028	12/31/2023
86358RDX2	963,691	945,774	17,917	945,774	795,532	12/31/2023
86358RXY8	191,518	165,259	26,259	165,259	165,808	12/31/2023
86358RXZ5	327,597	248,323	79,275	248,323	244,869	12/31/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
00703QAD4	2,455,266	2,403,956	51,310	2,403,956	2,362,111	12/31/2023
02147XAR8	582,086	581,667	419	581,667	475,448	12/31/2023
02152AAS8	1,839,976	1,736,745	103,231	1,736,745	1,709,492	12/31/2023
058933AN2	794,268	793,985	283	793,985	750,932	12/31/2023
05951KAN3	580,528	579,964	564	579,964	514,479	12/31/2023
07386XAH9	876,767	875,510	1,257	875,510	782,619	12/31/2023
12628LAD2	708,617	661,150	47,467	661,150	587,483	12/31/2023
12667F4N2	2,025,464	2,012,088	13,376	2,012,088	1,984,305	12/31/2023
12667F5E1	983,360	978,296	5,064	978,296	909,176	12/31/2023
12667GAC7	619,616	613,153	6,463	613,153	585,116	12/31/2023
17307GED6	1,341,806	1,336,284	5,522	1,336,284	1,400,985	12/31/2023
17309BAB3	201,958	198,201	3,757	198,201	176,462	12/31/2023
32051GSQ9	1,522,783	1,512,933	9,850	1,512,933	1,515,991	12/31/2023
32051GT70	619,138	612,519	6,618	612,519	534,842	12/31/2023
36244SAD0	2,148,368	1,989,448	158,920	1,989,448	2,137,247	12/31/2023
43739EAP2	561,096	556,890	4,206	556,890	538,989	12/31/2023
46627MAD9	524,569	524,569	(0)	524,569	468,198	12/31/2023
46627MCY1	3,947,612	3,784,942	162,670	3,784,942	3,845,527	12/31/2023
46627MEC7	353,579	351,690	1,889	351,690	326,489	12/31/2023
643529AC4	505,690	486,982	18,708	486,982	551,521	12/31/2023
65535VNL8	1,947,633	1,933,908	13,724	1,933,908	2,036,022	12/31/2023
65535VSJ8	1,230,484	1,232,758	(2,274)	1,232,758	989,929	12/31/2023
69337BAH7	1,311,917	1,303,815	8,102	1,303,815	1,159,687	12/31/2023
74928RAB0	239,342	216,651	22,691	216,651	238,268	12/31/2023
74928XBB6	3,183,555	3,039,107	144,448	3,039,107	3,430,881	12/31/2023
75115BAC3	1,030,772	916,005	114,767	916,005	1,035,843	12/31/2023
75115DAA3	186,218	186,790	(572)	186,790	164,206	12/31/2023
75116FBH1	1,377,535	1,361,078	16,456	1,361,078	1,145,682	12/31/2023
76110HT90	840,834	582,373	258,461	582,373	917,175	12/31/2023
761118SC3	1,431,534	1,428,103	3,431	1,428,103	1,242,244	12/31/2023
855541AC2	750,496	745,072	5,424	745,072	691,191	12/31/2023
863579J90	303,000	300,072	2,928	300,072	306,643	12/31/2023
86360BAJ7	680,750	643,758	36,993	643,758	672,067	12/31/2023
87222EAB4	834,894	822,502	12,392	822,502	694,825	12/31/2023
87222EAC2	882,066	857,058	25,008	857,058	695,801	12/31/2023
45660LCK3	3,167,425	2,938,420	229,005	2,938,420	2,780,987	12/31/2023
058931AT3	1,095,711	1,095,714	(3)	1,095,714	918,016	12/31/2023
05946XY72	977,968	978,683	(715)	978,683	937,593	12/31/2023
05949CHM1	663,718	655,328	8,390	655,328	662,826	12/31/2023
05949CKX3	1,187,717	1,150,126	37,591	1,150,126	1,168,876	12/31/2023
073880AD8	1,030,655	1,019,083	11,571	1,019,083	930,752	12/31/2023
12544DAG4	78,643	78,571	72	78,571	64,456	12/31/2023
12638PAB5	679,907	659,700	20,206	659,700	486,778	12/31/2023

D. INVESTMENTS (CONTINUED)

CUSIP	Amortized Cost Before OTTI	Present Value of Projected Cash Flows	OTTI Charge Recognized in Statement of Operations	Amortized Cost After OTTI	Fair Value at Time of OTTI	Date Reported
1266942H0	512,111	510,107	2,004	510,107	423,601	12/31/2023
12669G4K4	2,556,809	2,555,364	1,445	2,555,364	2,427,811	12/31/2023
12669GR45	470,597	467,135	3,462	467,135	435,906	12/31/2023
2254582Y3	1,077,827	1,066,955	10,873	1,066,955	959,317	12/31/2023
225458L55	491,469	487,840	3,628	487,840	406,462	12/31/2023
32052EAA7	43,448	42,472	976	42,472	41,090	12/31/2023
362341FN4	733,600	729,603	3,996	729,603	662,609	12/31/2023
362341XC8	795,518	795,302	217	795,302	720,040	12/31/2023
466247UG6	427,081	426,051	1,029	426,051	391,055	12/31/2023
46628LAB4	37,967	37,273	694	37,273	37,689	12/31/2023
46630WAL4	455,687	451,993	3,694	451,993	302,703	12/31/2023
46631NDT3	5,867,333	5,886,670	(19,337)	5,886,670	5,731,594	12/31/2023
57643MLZ5	229,612	225,458	4,154	225,458	205,035	12/31/2023
59023PAB9	475,891	473,619	2,272	473,619	481,056	12/31/2023
863579RP5	600,470	597,146	3,324	597,146	549,353	12/31/2023
863579UL0	258,471	257,405	1,065	257,405	242,466	12/31/2023
863579UU0	958,195	945,112	13,083	945,112	980,662	12/31/2023
863579XC7	980,418	980,418	-	980,418	1,038,343	12/31/2023
863579XR4	1,957,805	1,957,254	552	1,957,254	2,023,487	12/31/2023
86363GAF1	1,167,594	1,159,765	7,829	1,159,765	1,173,720	12/31/2023
885220KW2	1,840,344	1,731,006	109,338	1,731,006	1,616,956	12/31/2023
92979DAC9	2,388,453	2,324,573	63,880	2,324,573	2,467,969	12/31/2023
94984DAC8	277,596	275,841	1,755	275,841	284,511	12/31/2023
Total			$ 13,772,890			

D. INVESTMENTS (CONTINUED)

The following table shows the amount of assets pledged to others as collateral or otherwise restricted for the years ended December 31 (in millions):

Restricted Asset Category	2024	2023	(Decrease)/ Increase	Gross Restricted to Total Assets	Restricted to Total Admitted Assets
Letter stock or securities restricted as to sale	$ 125.2	$ 157.4	$ (32.2)	0.2%	0.2%
FHLB capital stock	41.5	41.5	-	0.1%	0.1%
On deposit with states	7.4	6.6	0.8	0.0%	0.0%
Pledged as collateral to FHLB (including assets backing funding agreements)	1,531.1	1,279.2	251.9	2.9%	2.9%
Pledged as collateral not captured in other categories	114.2	196.4	(82.2)	0.2%	0.2%
Total restricted assets	$ 1,819.4	$ 1,681.1	$ 138.3	3.4%	3.4%

Net investment income consisted of the following for the years ended December 31 (in millions):

	2024	2023	2022
Investment income:			
Bonds	$ 2,005.2	$ 1,803.2	$ 1,436.1
Equity securities	28.3	23.7	9.3
Mortgage loans	284.1	200.3	116.5
Policy loans	3.6	3.8	4.1
Cash and short-term investments	176.8	109.7	17.5
Other invested assets	120.2	131.9	96.1
Derivative instruments	420.2	(41.3)	(174.6)
Other	17.7	-	2.9
Gross investment income	3,056.1	2,231.3	1,507.9
Investment expenses	(114.2)	(72.2)	(35.6)
Ceded investment income	(293.7)	(240.7)	(453.3)
Net investment income	$ 2,648.2	$ 1,918.4	$ 1,019.0

D. INVESTMENTS (CONTINUED)

The carrying value of partnership and limited liability company holdings by annual statement category as of December 31 were (in millions):

	2024	2023
Joint venture interests:		
Common stocks - subsidiaries and affiliates	$ 1,205.6	$ 0.1
Common stocks - unaffiliated	736.6	717.8
Real estate	132.3	93.3
Bonds/preferred stock	45.4	54.2
Mortgage loans	263.9	172.9
Other	117.7	110.2
Surplus notes	241.8	213.6
Residual tranches	46.3	44.7
Other	16.0	1.0
Gross other invested assets	2,805.6	1,407.8
Nonadmitted	(10.3)	-
Net admitted other invested assets	$ 2,795.3	$ 1,407.8

The Company held nine affiliated partnership and limited liability company in a loss position with accumulated losses of $10.9 million as of December 31, 2024, and held one in a loss position with accumulated losses of less than $0.1 million as of December 31, 2023.

E. OTHER FINANCIAL INSTRUMENTS

The Company's derivative strategy employs a variety of derivative financial instruments including interest rate and currency swaps, options, financial futures, and forward contracts. Investment risk is assessed on a portfolio basis and individual derivative financial instruments are not generally designated in hedging relationships; therefore, as allowed by statutory accounting practices, the Company intentionally has not applied hedge accounting.

MMALIC primarily utilizes a variety of financial instruments as part of its efforts to economically hedge and manage fluctuations in the fair value of its investment portfolio attributable to changes in general interest rate levels and to manage duration mismatch of assets and liabilities. Those instruments may include interest rate exchange agreements, equity index options purchased in either over-the-counter market or on the Chicago Board Options Exchange, payer swaptions, and commitments to extend credit. All instruments involve elements of credit and market risks in excess of the amounts recognized in the accompanying financial statements at a given point of time. The contract or notional amounts of those instruments reflect the extent of involvement in the various types of financial instruments.

Equity index options are contracts that give the purchaser the right, but not the obligation, to buy or sell securities at a specified price during a specified period. MMALIC's equity index options backing fixed-indexed and registered index-linked annuities are based on an existing market index (generally the S&P 500). The equity index options expire ratably between 2025 and 2031. Under the indexed annuity products, the crediting rate is linked to changes in the equity indices or Exchanged Traded Funds (ETF) for specified periods and participation rates. The prices of the options purchased are calculated with reference to the underlying index or ETF, participation rates, caps, floors, durations and notional amounts of the underlying contracts. As a purchaser of options, MMALIC pays, at the beginning of the contract, a premium for transferring the risk of an unfavorable change in the price of the underlying financial instrument. As of January 1, 2022, options backing the fixed-indexed annuities for which the company is applying the OAC prescribed practice are now accounted for at amortized cost.

As of December 31, 2024, MMALIC has entered into seventeen interest rate swaps to more closely match the cash flows of assets and liabilities. Interest rate swaps are also used to mitigate changes in the value of assets anticipated to be purchased and other anticipated transactions and commitments. The notional amounts of the interest rate swaps generally decline over each swap's respective life (the swaps expire between 2025 and 2042).

The Company uses currency swaps for the purpose of managing currency exchange risks in its assets and liabilities.

The Company utilizes certain other agreements including forward contracts and financial futures. Currency forwards are contracts in which the Company agrees with other parties to exchange specified amounts of identified currencies at a specific future date. Typically, the exchange rate is agreed upon at the time of the contract. The Company's futures contracts are exchange traded and have credit risk. Margin requirements are met with the deposit of securities. Futures contracts are generally settled with offsetting transactions. Forward contracts and financial futures are used by the Company to reduce exposures to various risks including interest rates and currency rates.

The Company enters derivative transactions through bilateral derivative agreements with counterparties, or through over the counter cleared derivatives with a counterparty and the use of a clearinghouse. To minimize credit risk for bilateral transactions, the Company and its counterparties generally enter into master netting agreements based on agreed upon requirements that outline the framework for how collateral is to be posted in the amount owed under each transaction, subject to certain minimums. For over the counter cleared derivative transactions between the Company and a counterparty, the parties enter into a series of master netting and other agreements that govern, among other things, clearing and collateral requirements. These transactions are cleared through a clearinghouse and each derivative counterparty is only exposed to the default risk of the clearinghouse. Certain interest rate swaps are considered cleared transactions. These cleared transactions require initial and daily variation margin collateral postings. These agreements allow for contracts in a positive position, in which amounts are due to the Company, to be offset by contracts in a negative position. This right of offset, combined with collateral obtained from counterparties, reduces the Company's credit exposure.

E. OTHER FINANCIAL INSTRUMENTS (CONTINUED)

Net collateral pledged by the counterparties was $1,565.4 million as of December 31, 2024 and $789.0 million as of December 31, 2023. In the event of default, the full market value exposure at risk, net of offsets and collateral, was $419.8 million as of December 31, 2024 and $425.9 million as of December 31, 2023. The exposure net of collateral, defined as net collateral pledged and statement values excluding accrued interest, was $398.2 million as of December 31, 2024 and $428.6 million as of December 31, 2023.

The following tables summarize the carrying values and notional amounts of the Company's derivative financial instruments within the general account:

	December 31, 2024			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(in millions)			
Fixed-indexed options*	$ 681.8	$ 19,482.1	$ 304.6	$ 14,292.3
Interest rate swaps	160.1	2,480.0	90.5	3,320.0
Currency swaps	10.4	445.8	16.6	392.9
Forward contracts	23.4	767.7	1.9	178.4
Total	$ 875.7	$ 23,175.6	$ 413.6	$ 18,183.6

*Beginning January 1, 2022, fixed-indexed options are held at amortized cost under OAC 3901-1-67. Prior to the adoption of OAC 3901-1-67, fixed-indexed options were carried at fair value. The fair value amount related to fixed-indexed options was $973.4 million as of December 31, 2024.

	December 31, 2023			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(in millions)			
Fixed-indexed options*	$ 723.8	$ 19,765.4	$ 418.1	$ 16,036.9
Interest rate swaps	26.6	4,774.8	66.3	2,451.0
Financial futures	21.0	1,343.1	-	-
Currency swaps	-	-	38.8	443.5
Forward contracts	-	3.2	5.0	183.9
Total	$ 771.4	$ 25,886.5	$ 528.2	$ 19,115.3

*Beginning January 1, 2022, fixed-indexed options are held at amortized cost under OAC 3901-1-67. Prior to the adoption of OAC 3901-1-67, fixed-indexed options were carried at fair value. The fair value amount related to fixed-indexed options was $822.9 million as of December 31, 2023.

The following presents the Company's gross notional interest rate swap positions:

	December 31, 2024	December 31, 2023
	(in millions)	
Open interest rate swaps in a fixed pay position	$ 2,480.0	$ 2,484.8
Open interest rate swaps in a fixed receive position	3,320.0	4,741.0
Total interest rate swaps	$ 5,800.0	$ 7,225.8

E. OTHER FINANCIAL INSTRUMENTS (CONTINUED)

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

	Years Ended December 31,			
	2024		2023	
	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(in millions)			
Registered index-linked options	$ 125.7	$ 281.3	$ 22.9	$ 203.7
Interest rate swaps	0.3	109.0	-	30.0
Currency swaps	0.6	32.6	(0.1)	(35.0)
Forward contracts	3.1	26.5	0.3	(2.6)
Financial futures	(21.9)	(21.0)	0.2	21.0
Total	$ 107.8	$ 428.4	$ 23.3	$ 217.1

Fixed-indexed options are carried at amortized cost with amortization and expirations recorded in Net investment income. The Company recorded gains on expirations of $1,110.2 million and amortization of $661.3 million in 2024. The Company recorded gains on expirations of $521.1 million and amortization of $537.7 million in 2023.

The Company became a member of the Federal Home Loan Bank ("FHLB") on August 14, 2009. The FHLB makes advances and provides other banking services to member institutions. The Company owned $20.0 million of FHLB Class B membership stock at December 31, 2024 and 2023. The Company has no membership stock eligible for redemption. Through its association with the FHLB and by purchasing a set amount of FHLB stock, the Company can enter into deposit-type contracts with the FHLB known as funding agreements.

At December 31, 2024 and 2023, MMALIC had $500.0 million (the maximum amount of borrowings, as permitted by the FHLB, during the reporting period was $500.0 million) in outstanding advances from the FHLB (included in liability for deposit-type contracts), bearing interest at rates ranging from 1.35% to 1.97% (average rate of 1.72% at December 31, 2024). The Company paid interest of approximately $8.6 million, $8.6 million, and $8.4 million on FHLB advances in 2024, 2023 and 2022, respectively. These advances must be repaid between 2025 and 2030 ($200.0 million in 2025 and $300.0 million in 2030). The Company has invested the proceeds from the advances in bonds for the purpose of earning a spread over the interest payments due to the FHLB. Per the funding agreement, the Company was required to purchase 215,252 shares ($21.5 million) of FHLB activity and excess stock.

The Company posted collateral to the FHLB of assets with a fair value of approximately $1,458.5 million and $1,204.1 million at December 31, 2024 and 2023, respectively. The Company posted collateral to the FHLB of assets with a carrying value of approximately $1,531.1 million and $1,279.2 million at December 31, 2024 and 2023, respectively. The Company's FHLB borrowing capacity is based on the Company's estimate of collateral eligible to be pledged with the FHLB. The deposit contract liabilities are reported in liability for deposit-type contracts in the balance sheet, and related assets are accounted for in the Company's general account. FHLB capital stock is reported in Common stocks in the balance sheet.

MMALIC has a $750.0 million five-year credit facility, $750.0 million of undrawn commitment, with a syndicate of lenders that can be used for general corporate purposes. During December 2024, the facility was established with a scheduled maturity on December 27, 2029. The terms of the credit facility additionally provide for, among other provisions, covenants pertaining to liens, fundamental changes, transactions with affiliates and adjusted statutory surplus. As of and for the year ended December 31, 2024, MMALIC was in compliance with all covenants under the credit facility. For the year ended December 31, 2024, there were no draws on the credit facility. Credit facility fees were less than $1.0 million for the year ended December 31, 2024.

E. OTHER FINANCIAL INSTRUMENTS (CONTINUED)

In the normal course of business, the Company enters into commitments to purchase certain investments. The majority of these commitments have funding periods that extend between one and five years. The Company is not required to fund commitments once the commitment period expires.

As of December 31, 2024, the Company had the following outstanding commitments:

	2025	2026	2027	2028	2029	Thereafter	Total
	(in millions)						
Private Placements	$ 22.8	$ 97.9	$ 196.3	$ 59.8	$ 73.2	$ 651.6	$ 1,101.6
Mortgage Loans	105.0	221.7	101.4	18.8	12.0	2.6	461.5
Real Estate	1.1	1.1	-	-	-	5.1	7.3
Partnerships and LLC	27.3	31.4	50.9	53.9	80.9	195.5	439.9
Preferred Stock	16.0	-	-	-	-	1.8	17.8
Total	$ 172.2	$ 352.1	$ 348.6	$ 132.5	$ 166.1	$ 856.6	$ 2,028.1

In the normal course of business, the Company enters into commitments related to property lease arrangements, certain indemnities, investments and other business obligations. As of December 31, 2024 and 2023, the Company had no outstanding obligations attributable to these commitments.

F. REINSURANCE

The Company is contingently liable with respect to reinsurance ceded in that the liability for such reinsurance would become that of the Company upon failure of any reinsurer to meet its obligations under a particular reinsurance agreement. The Company currently reinsures its ordinary life insurance, LTC, other health products and a portion of fixed and fixed-indexed annuity products. The maximum amount the Company retains on any one life under MassMutual's corporate retention limits is $15.0 million.

On February 17, 2022, MMALIC entered into a Funds Withheld Coinsurance agreement effective February 1, 2022, with Martello Re Limited, a Bermuda-domiciled Class E life and annuity reinsurer launched in 2022. MMALIC ceded statutory reserves of approximately $14.2 billion on a closed block of fixed, fixed-indexed and payout annuity policies, in exchange for a $320 million ceding commission paid by Martello Re that was recorded to surplus net of tax. The Company has ceded approximately $7.5 billion and $10.0 billion of statutory annuity reserves at December 31, 2024 and 2023, respectively. The Company's funds held under reinsurance treaties was approximately $7.3 billion and $10.0 billion at December 31, 2024 and 2023, respectively.

The impact of the Martello Re transaction on MMALIC's income statement as of December 31, 2022 was as follows (in millions):

	2022
Premiums and other revenues:	
Premiums and annuity considerations	$ (14,113.4)
Net investment income	(451.8)
Commissions and expense allowances and reserve adjustments on reinsurance ceded	451.6
Charges and fees for deposit-type contracts and miscellaneous income	(34.6)
Total premiums and other revenues	$ (14,148.2)
Benefits and expenses:	
Policyholders' benefits	$ (470.7)
Surrender benefits	(1,604.8)
Change in policy and contract reserves	(12,416.6)
Other	317.2
Total benefits and expenses	$ (14,174.9)

Effective January 1, 2007, MMALIC entered into a reinsurance agreement with Loyal American Life Insurance Company ("Loyal"), at the time an indirect wholly-owned insurance subsidiary domiciled in Ohio, whereby Loyal cedes 100% of certain fixed-indexed annuity business written to MMALIC. Annuity reserves assumed by MMALIC under this agreement were $8.8 million and $10.7 million at December 31, 2024 and 2023, respectively.

On August 31, 2012, in conjunction with and prior to the sale of certain affiliated insurance companies to Cigna, the Company entered into a reinsurance agreement with Cigna which ceded 100% of all accident and health policies, excluding LTC. Under this agreement, all activity on these policies after existing reinsurance is ceded to Loyal, a Cigna subsidiary and one of the sold companies.

Also, effective August 31, 2012, the Company entered into an agreement to retrocede 90% of the life and annuity business assumed from Loyal to Hannover Life Reassurance Company of America. This business was previously reinsured directly from Loyal to Hannover Life Reassurance of Ireland. This transaction did not have any significant impact on the operations and capital of MMALIC.

F. REINSURANCE (CONTINUED)

The Company entered into a coinsurance agreement with Great American Life Assurance Company ("GALAC"), an affiliated life insurance company domiciled in Ohio, effective June 30, 2011. Under this agreement the Company assumes 100% of GALAC's life and annuity business, with statutory reserves of approximately $4.0 million and $4.3 million at December 31, 2024 and 2023, respectively. GALAC was sold to an unaffiliated insurance company on July 3, 2012, re-domiciled in Iowa, and is currently named Accordia Life and Annuity Company.

The Company entered into a coinsurance agreement with United Teacher Associates Insurance Company ("UTAIC"), a life insurance company domiciled in Texas, effective October 31, 2015. Under this agreement the Company assumes 100% of UTAIC's life, annuity, and LTC business issued in the state of Florida. Effective December 31, 2016, UTAIC merged into Continental General Insurance Company, a life insurance company domiciled in Texas. Assumed reserves under this agreement were approximately $57.3 million and $55.3 million at December 31, 2024 and 2023, respectively.

The Company entered into a quota share indemnity reinsurance agreement on fixed-indexed annuity policies with Hannover Life Reassurance Company of America effective December 31, 2018. The reinsurance treaty transfers risk of certain surrender activity in MMALIC's fixed-indexed annuity business. This treaty reduced statutory capital and surplus volatility related to MMALIC's fixed-indexed annuity policies from stock market fluctuations, which could impact the Company's risk-based capital. Effective January 1, 2022 the Company recaptured the fixed-indexed annuity policies ceded to Hannover Life Reassurance Company of America in the agreement that became effective on December 31, 2018. The financial impact of the reinsurance recapture was a decrease to statutory capital of $140.6 million.

The Company entered into a flow coinsurance agreement with Commonwealth, a subsidiary of Global Atlantic Financial Group, effective May 7, 2020. Under this agreement, the Company cedes certain newly issued traditional fixed and fixed-indexed annuities on a quota share coinsurance basis with such quota share percentages being up to 50%. The Company has ceded approximately $2,071.7 million and $1,601.8 million of deferred annuity reserves to Commonwealth under this agreement at December 31, 2024 and 2023, respectively.

The Company entered into a block coinsurance agreement with Commonwealth effective October 1, 2020. Under this agreement the Company ceded approximately $5.7 billion of deferred annuity reserves and transferred investments with a statutory carrying value of approximately $5.7 billion and market value of approximately $6.1 billion to Commonwealth. The Company has ceded approximately $2,734.3 million and $3,581.1 million of deferred annuity reserves under this agreement at December 31, 2024 and 2023, respectively.

The Company has reinsured with various insurance companies approximately $12,433.3 million and $15,350.1 million of reserves at December 31, 2024 and 2023, respectively.

The effect of reinsurance on premiums and annuity considerations for the years ended December 31 is as follows (in millions):

	2024	2023	2022
Direct premiums and annuity considerations	$ 9,093.1	$ 8,775.8	$ 7,379.8
Reinsurance assumed	5.5	6.6	6.7
Reinsurance ceded	(547.4)	(275.6)	(14,584.8)
Net premium and annuity considerations	$ 8,551.2	$ 8,506.8	$ (7,198.3)

The effect of reinsurance on benefits paid to policyholders and withdrawals on deposit-type contract funds during the years ended December 31 is as follows (in millions):

	2024	2023	2022
Direct benefits paid to policyholders and withdrawals on deposit-type contracts	$ 7,944.3	$ 7,621.5	$ 5,063.7
Reinsurance assumed	30.7	37.1	26.8
Reinsurance ceded	(4,234.6)	(4,354.9)	(2,862.0)
Net benefits paid to policyholders and withdrawals on deposit-type contracts	$ 3,740.4	$ 3,303.7	$ 2,228.5

G. FEDERAL INCOME TAXES

On August 16th, 2022, the Inflation Reduction Act was signed into law and includes certain corporate income tax provisions. Potential impacts to the Company include the imposition of a corporate alternative minimum tax ("CAMT"). The CAMT imposes a 15% minimum tax on adjusted financial statement income on applicable corporations that have an average adjusted financial statement income over $1 billion in the prior three-year period. The United States Treasury Department and the Internal Revenue Service released proposed regulations on September 12, 2024. As of the reporting date, the Company is not an applicable corporation and therefore not liable for CAMT in 2024.

The components of the net deferred tax assets at December 31 are as follows (in millions):

	2024	2023	Change
DTAs resulting in book/tax differences in:			
Ordinary:			
Deferred acquisition costs	$ 91.4	$ 77.6	$ 13.8
Reserves	249.2	168.1	81.1
Investment items	126.5	111.7	14.8
Deferred compensation	0.1	0.2	(0.1)
Accrued expenses	6.9	5.8	1.1
Other	5.8	5.5	0.3
Total ordinary DTAs	479.9	368.9	111.0
Capital:			
Investment items	178.7	78.4	100.3
Total capital DTAs	178.7	78.4	100.3
Total DTAs	658.6	447.3	211.3
Deferred tax assets nonadmitted	-	(36.1)	36.1
Admitted DTAs	658.6	411.2	247.4
DTLs resulting in book/tax differences in:			
Ordinary:			
Section 807(f) amortization	14.2	21.7	(7.5)
Investment items	85.0	55.8	29.2
Depreciation/other	0.3	0.3	-
Reserve transition adjustment	11.0	22.0	(11.0)
Total ordinary DTLs	110.5	99.8	10.7
Capital:			
Unrealized gains	155.7	38.6	117.1
Investment items	100.7	-	100.7
Total capital DTLs	256.4	38.6	217.8
Total DTLs	366.9	138.4	228.5
Total net deferred admitted tax assets	$ 291.7	$ 272.8	$ 18.9
Change in deferred tax assets nonadmitted	$ 36.1	$ (33.9)	

G. FEDERAL INCOME TAXES (CONTINUED)

The results of the admissibility calculations at December 31 are as follows (in millions):

	2024			2023			Change		
	Ordinary	Capital	Total	Ordinary	Capital	Total	Ordinary	Capital	Total
a. Federal income taxes paid in prior years recoverable through loss carrybacks	$ -	$ 70.4	$ 70.4	$ -	$ 42.3	$ 42.3	$ -	$ 28.1	$ 28.1
b. Adjusted gross deferred tax assets expected to be realized (excluding the amount of deferred tax assets from (a) above) after application of the threshold limitation. (The lesser of (b)1 and (b)2 below)	225.3	17.8	243.1	218.5	12.0	230.5	6.8	5.8	12.6
1. Adjusted gross deferred tax assets expected to be realized following the balance sheet date	225.3	17.8	243.1	218.5	12.0	230.5	6.8	5.8	12.6
2. Adjusted gross deferred tax assets allowed per limitation threshold	XXX	XXX	424.0	XXX	XXX	416.7	XXX	XXX	7.3
c. Adjusted gross deferred tax assets (excluding the amount of deferred tax assets from (a) and (b) above) offset by gross deferred tax liabilities	254.6	90.5	345.1	114.3	24.1	138.4	140.3	66.4	206.7
d. Deferred tax assets admitted as the result of application of SSAP No. 101	$ 479.9	$178.7	$ 658.6	$ 332.8	$ 78.4	$ 411.2	$ 147.1	$100.3	$247.4

The other admissibility criteria for the Company are as follows (dollars in millions):

	2024	2023	2022
a. Ratio percentage used to determine recovery period and threshold limitation amount	852%	828%	871%
b. Amount of adjusted capital and surplus used to determine recovery period and threshold limitation in the table above	$ 2,826.4	$ 2,778.2	$ 2,770.8

The impact of the Company's tax planning strategies, which do not include the use of reinsurance, on the adjusted gross DTAs and net admitted adjusted gross DTAs by tax character is as follows:

	2024		2023		Change	
	Ordinary	Capital	Ordinary	Capital	Ordinary	Capital
a. Adjusted gross DTAs (% of total adjusted gross DTAs)	0%	0%	0%	0%	0%	0%
b. Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs)	0%	0%	4%	0%	-4%	0%

G. FEDERAL INCOME TAXES (CONTINUED)

The provision for incurred income taxes on operating earnings and capital gains and the change in DTAs and DTLs for the years ended December 31 are as follows (in millions):

	2024	2023	2022
Current federal income tax expense on operations	$ 85.7	$ 241.8	$ 13.6
Federal income tax expense (benefit) on net realized capital gains	51.5	(23.4)	(14.3)
Total federal income tax expense (benefit)	$ 137.2	$ 218.4	$ (0.7)
Net DTA(L)	$ 18.9	$ 200.6	$ 10.5
Less: Items not recorded in the change in net deferred tax asset:			
Tax-effect of unrealized gains (losses)	117.1	(16.3)	(31.2)
Tax-effect of correction of error	-	(3.6)	-
Tax-effect of changes in nonadmitted DTA	(36.1)	33.9	(12.4)
Change in net deferred tax asset	$ 99.9	$ 214.6	$ (33.1)

The Company's income tax expense and change in DTA/DTL for the year ended December 31 differs from the amount obtained by applying the federal statutory rate of 21% to income from operations before federal income taxes for the following reasons (in millions):

	2024	2023	2022
Provision computed at federal statutory rate	$ (50.1)	$ (29.6)	$ 40.3
Reinsurance items	-	11.7	54.9
OAC 3901-1-67 adoption	-	-	(46.2)
Investment items	5.4	(3.8)	(10.4)
Nonadmitted assets	(1.2)	2.3	(3.6)
Provision to return adjustments	(4.1)	-	(0.1)
Section 481 - change in accounting method	-	25.2	-
Vine Street transfer from MassMutual	98.3	-	-
Derivative transfer to unrealized	(7.8)	-	-
Other	(3.2)	(2.0)	(2.5)
Total statutory income tax expense	$ 37.3	$ 3.8	$ 32.4
Federal and foreign income tax expense (benefit)	$ 137.2	$ 218.4	$ (0.7)
Change in net deferred income taxes	(99.9)	(214.6)	33.1
Total statutory income tax expense	$ 37.3	$ 3.8	$ 32.4

G. FEDERAL INCOME TAXES (CONTINUED)

As of December 31, 2024 and 2023, the Company does not have any operating loss carryforwards available to offset future net income subject to federal income taxes. As of December 31, 2024 and 2023, the Company does not have a capital loss carryforward.

The following are income taxes incurred in the current and prior years that will be available for recoupment in the event of future net losses (in millions):

Year	Operations	Realized Gains	Total
2024	$ -	$ 57.0	$ 57.0
2023	-	-	-
2022	-	13.4	13.4

As of December 31, 2024, MMALIC's consolidated federal income tax returns for the 2021 through 2024 tax years remain subject to examination by the IRS. The Company does not have any uncertain tax positions.

The consolidated federal income tax returns include the following entities:

AAG Insurance Agency, LLC
Annuity Investors Life Insurance Company
MM Ascend Life Investor Services, LLC
MassMutual Ascend Life Insurance Company
Manhattan National Holding, LLC
Manhattan National Life Insurance Company

The Company has determined that it is more likely than not that gross DTAs will be recoverable through future taxable income and that a valuation allowance is not necessary.

H. RELATED PARTY TRANSACTIONS

Certain administrative, management, accounting, actuarial, data processing, underwriting, claim, collection and investment services are provided under agreements between MMALIC and affiliates at charges not unfavorable to MMALIC or the insurance affiliates. The net amount received from affiliates was $9.7 million in 2024, the net amount received from affiliates was $8.4 million in 2023, and the net amount received from affiliates was $13.1 million in 2022, included in general insurance expenses in the Statement of Operations.

The Company has an agreement with Barings, LLC, an affiliate, which provides investment advisory services to the Company. MMALIC expensed investment management charges related to Barings, LLC of $47.8 million in 2024, $34.8 million in 2023 and $32.8 million in 2022, included in net investment income in the Statement of Operations.

For 2024, the Company contributed to the retirement plans of Glidepath. The plans are for benefit of eligible employees of Glidepath providing services to MMALIC and affiliates. Glidepath sponsored a funded qualified defined contribution 401(k) thrift savings plan and unfunded nonqualified deferred compensation thrift savings plan for its employees and retirees. The Company’s total matching thrift savings contributions included in general insurance expenses were $4.7 million for the year ended December 31, 2024 and $4.5 million for the year ended December 31, 2023. As of the close of business on December 31, 2024, the Company transitioned to a MassMutual employee qualified defined contribution plan and unfunded nonqualified deferred compensation thrift savings plan.

MMALIC has an agreement with MassMutual Ascend Life Investor Services (“MMALIS,” formerly known as Great American Advisors, Inc.), a wholly-owned subsidiary of MMALIC, whereby MMALIS is the principal underwriter and distributor of MMALIC’s registered index-linked annuity contracts. MMALIC pays MMALIS for acting as underwriter under a distribution agreement. MMALIC paid $69.9 million in 2024 to MMALIS, 99% of which was paid to other broker/dealers as commissions. The remaining 1% of MMALIC commissions were paid to registered representatives of MMALIS. MMALIC paid $69.2 million in 2023 to MMALIS, 99% of which was paid to other broker/dealers as commissions. The remaining 1% of MMALIC commissions were paid to registered representatives of MMALIS. MMALIC paid $71.1 million in 2022 to MMALIS, 99% of which was paid to other broker/dealers as commissions. The remaining 1% of MMALIC commissions were paid to registered representatives of MMALIS. MMALIS exited the retail brokerage business on August 3, 2010 after MMALIC announced a definitive agreement with Lincoln Investment Planning, Inc., an independent broker dealer.

The Company paid an extraordinary dividend to Glidepath in the amount of $600.0 million on December 23, 2024. The cash portion of the dividend was $100.0 million, and the rest was a stock dividend. The Company paid $200.0 million in ordinary dividends to Glidepath in 2023 and none in 2022.

The Company received a capital contribution from MassMutual of $1,333.2 million in December 2024. The contribution consisted of Vine Street LLC (Schedule BA investment that owns equity investments), which at transfer was valued at $1,234.9 million, and reported within Other invested assets on the statutory-basis Balance Sheet. This transaction created a deferred tax liability of $98.3 million which was offset with a cash capital contribution.

I. ANNUITY RESERVES AND DEPOSIT-TYPE FUNDS

At December 31, 2024, MMALIC's annuity (individual and group) reserves and deposit-type funds that are subject to discretionary withdrawal (with adjustment), subject to discretionary withdrawal (without adjustment), and not subject to discretionary withdrawal are summarized as follows (in millions):

A. Individual Annuities:

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ 28,630.2	$ -	$ -	$ 28,630.2	60.0%
b. At book value less current surrender charge of 5% or more	5,221.3	-	-	5,221.3	10.9%
c. At fair value	-	-	908.6	908.6	1.9%
d. Total with market value adjustment or at fair value (total of a through c)	33,851.5	-	908.6	34,760.1	72.8%
e. At book value without adjustment (minimal or no charge or adjustment)	10,670.1	-	-	10,670.1	22.4%
2. Not subject to discretionary withdrawal	2,268.9	-	-	2,268.9	4.8%
3. Total (gross: direct + assumed)	46,790.5	-	908.6	47,699.1	100.0%
4. Reinsurance ceded	11,583.2	-	-	11,583.2	
5. Total (net) (3) - (4)	35,207.3	-	908.6	36,115.9	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ 1,051.6	$ -	$ -	$ 1,051.6	

B. Group Annuities:

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ -	$ -	$ -	$ -	0.0%
b. At book value less current surrender charge of 5% or more	113.1	-	-	113.1	7.0%
c. At fair value	-	-	-	-	0.0%
d. Total with market value adjustment or at fair value (total of a through c)	113.1	-	-	113.1	7.0%
e. At book value without adjustment (minimal or no charge or adjustment)	645.3	-	-	645.3	40.1%
2. Not subject to discretionary withdrawal	851.1	-	-	851.1	52.9%
3. Total (gross: direct + assumed)	1,609.5	-	-	1,609.5	100.0%
4. Reinsurance ceded	455.2	-	-	455.2	
5. Total (net) (3) - (4)	1,154.3	-	-	1,154.3	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ 2.4	$ -	$ -	$ 2.4	

I. ANNUITY RESERVES AND DEPOSIT-TYPE FUNDS (CONTINUED)

C. Deposit-Type Funds
(no life contingencies):

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ -	$ -	$ -	$ -	0.0%
b. At book value less current surrender charge of 5% or more	-	-	-	-	0.0%
c. At fair value	-	-	-	-	0.0%
d. Total with market value adjustment or at fair value (total of a through c)	-	-	-	-	0.0%
e. At book value without adjustment (minimal or no charge or adjustment)	-	-	-	-	0.0%
2. Not subject to discretionary withdrawal	907.2	-	-	907.2	100.0%
3. Total (gross: direct + assumed)	907.2	-	-	907.2	100.0%
4. Reinsurance ceded	120.6	-	-	120.6	
5. Total (net) (3) - (4)	786.6	-	-	786.6	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ -	$ -	$ -	$ -	

D. Reconciliation to total annuity reserves and deposit-type funds:

Net annuity reserves	$ 36,360.9
Net supplementary contracts	0.7
Deposit-type funds	786.6
Separate account nonguaranteed liabilities	908.6
Total	$ 38,056.8

I. ANNUITY RESERVES AND DEPOSIT-TYPE FUNDS (CONTINUED)

At December 31, 2023, MMALIC's annuity (individual and group) reserves and deposit-type funds that are subject to discretionary withdrawal (with adjustment), subject to discretionary withdrawal (without adjustment), and not subject to discretionary withdrawal are summarized as follows (in millions):

A. Individual Annuities:

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ 22,517.3	$ -	$ -	$ 22,517.3	51.6%
b. At book value less current surrender charge of 5% or more	5,279.5	-	-	5,279.5	12.1%
c. At fair value	-	-	387.5	387.5	0.9%
d. Total with market value adjustment or at fair value (total of a through c)	27,796.8	-	387.5	28,184.3	64.6%
e. At book value without adjustment (minimal or no charge or adjustment)	13,422.5	-	-	13,422.5	30.7%
2. Not subject to discretionary withdrawal	2,063.5	-	-	2,063.5	4.7%
3. Total (gross: direct + assumed)	43,282.8	-	387.5	43,670.3	100.0%
4. Reinsurance ceded	14,472.5	-	-	14,472.5	
5. Total (net) (3) - (4)	28,810.3	-	387.5	29,197.8	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ 970.2	$ -	$ -	$ 970.2	

B. Group Annuities:

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ -	$ -	$ -	$ -	0.0%
b. At book value less current surrender charge of 5% or more	116.0	-	-	116.0	6.8%
c. At fair value	-	-	-	-	0.0%
d. Total with market value adjustment or at fair value (total of a through c)	116.0	-	-	116.0	6.8%
e. At book value without adjustment (minimal or no charge or adjustment)	686.3	-	-	686.3	40.4%
2. Not subject to discretionary withdrawal	898.1	-	-	898.1	52.8%
3. Total (gross: direct + assumed)	1,700.4	-	-	1,700.4	100.0%
4. Reinsurance ceded	481.2	-	-	481.2	
5. Total (net) (3) - (4)	1,219.2	-	-	1,219.2	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ 2.5	$ -	$ -	$ 2.5	

I. ANNUITY RESERVES AND DEPOSIT-TYPE FUNDS (CONTINUED)

C. Deposit-Type Funds
(no life contingencies):

	General Account	Separate Account with Guarantees	Separate Account Nonguaranteed	Total	% of Total
1. Subject to discretionary withdrawal:					
a. With market value adjustment	$ -	$ -	$ -	$ -	0.0%
b. At book value less current surrender charge of 5% or more	-	-	-	-	0.0%
c. At fair value	-	-	-	-	0.0%
d. Total with market value adjustment or at fair value (total of a through c)	-	-	-	-	0.0%
e. At book value without adjustment (minimal or no charge or adjustment)	-	-	-	-	0.0%
2. Not subject to discretionary withdrawal	903.6	-	-	903.6	100.0%
3. Total (gross: direct + assumed)	903.6	-	-	903.6	100.0%
4. Reinsurance ceded	115.6	-	-	115.6	
5. Total (net) (3) - (4)	788.0	-	-	788.0	
6. Amount included in A(1)b above that will move to A(1)e in the year after the statement date	$ -	$ -	$ -	$ -	

D. Reconciliation to total annuity reserves and deposit-type funds:

Net annuity reserves	$ 30,028.6
Net supplementary contracts	0.9
Deposit-type funds	788.0
Separate account nonguaranteed liabilities	387.5
Total	$ 31,205.0

J. LIFE RESERVES

At December 31, 2024, MMALIC's account value, cash value and reserves for the breakouts of life insurance by withdrawal characteristics for general account products are summarized as follows (in millions):

	December 31, 2024		
	General Account		
	Account Value	Cash Value	Reserve
A. Subject to discretionary withdrawal, surrender values, or policy loans:			
Universal Life	$ 101.6	$ 101.0	$ 101.0
Other Permanent Cash Value Life Insurance	-	46.6	46.6
B. Not subject to discretionary withdrawal or no cash values			
Term Policies without Cash Value	XXX	XXX	176.7
Accidental Death Benefits	XXX	XXX	0.1
Disability - Active Lives	XXX	XXX	0.1
Disability - Disabled Lives	XXX	XXX	4.0
Miscellaneous Reserves	XXX	XXX	5.1
C. Total (gross: direct + assumed)	101.6	147.6	333.6
D. Reinsurance ceded	61.3	89.9	206.8
E. Total (net) (C) - (D)	$ 40.3	$ 57.7	$ 126.8

F.	Amount
Reconciliation to total life reserves:	
Life insurance, total (net)	$ 121.9
Accidental death benefits, total (net)	-
Disability - active lives, total (net)	-
Disability - disabled lives, total (net)	1.4
Miscellaneous reserves, total (net)	3.5
Total	$ 126.8

J. LIFE RESERVES (CONTINUED)

At December 31, 2023, MMALIC's account value, cash value and reserves for the breakouts of life insurance by withdrawal characteristics for general account products are summarized as follows (in millions):

	December 31, 2023		
	General Account		
	Account Value	Cash Value	Reserve
A. Subject to discretionary withdrawal, surrender values, or policy loans:			
Universal Life	$ 105.4	$ 104.6	$ 104.6
Other Permanent Cash Value Life Insurance	-	48.7	48.7
B. Not subject to discretionary withdrawal or no cash values			
Term Policies without Cash Value	XXX	XXX	184.2
Accidental Death Benefits	XXX	XXX	0.1
Disability - Active Lives	XXX	XXX	0.1
Disability - Disabled Lives	XXX	XXX	3.4
Miscellaneous Reserves	XXX	XXX	5.5
C. Total (gross: direct + assumed)	105.4	153.3	346.6
D. Reinsurance ceded	64.2	93.9	216.3
E. Total (net) (C) - (D)	$ 41.2	$ 59.4	$ 130.3

F.	Amount
Reconciliation to total life reserves:	
Life insurance, total (net)	$ 125.2
Accidental death benefits, total (net)	-
Disability - active lives, total (net)	-
Disability - disabled lives, total (net)	1.3
Miscellaneous reserves, total (net)	3.8
Total	$ 130.3

K. CAPITAL AND SURPLUS

The portion of the Company's unassigned funds represented or reduced by each item below is as follows at December 31 (in millions):

	2024	2023	2022
Unrealized gains and losses (excluding subsidiaries)	$ 741.2	$ 339.7	$ 213.4
Nonadmitted asset values	$ (129.0)	$ (54.7)	$ (31.9)
Asset valuation reserve	$ (636.3)	$ (528.4)	$ (577.1)

Life/health insurance companies are subject to certain Risk-Based Capital ("RBC") requirements as specified by the NAIC. Under those requirements, the amount of capital and surplus maintained by a life/health insurance company is to be determined based on the various risk factors related to it. At December 31, 2024 and 2023, MMALIC exceeds the RBC requirements.

The maximum amount of dividends which can be paid to stockholders by life insurance companies domiciled in the State of Ohio without prior approval of the Insurance Commissioner is the greater of 10% of surplus as regards policyholders or net income as of the preceding December 31, but only to the extent of earned surplus as of the preceding December 31. The maximum amount of dividends payable in 2025 without prior approval is $422.5 million based on 10% of surplus as regards to policyholders as of the preceding December 31. At December 31, 2024, surplus as regards policyholders was $4,224.6 million, earned surplus was $1,822.4 million, and 2024 net loss was $253.9 million.

L. SEPARATE ACCOUNT

The Company utilizes a non-unitized separate account to record and account for assets and liabilities for individual registered index-linked annuities. MMALIC maintains the separate account pursuant to the laws of Ohio for the purpose of supporting the obligation to adjust the indexed strategy values based on the daily value calculation or rise and fall of the index. The assets of the separate account are held in MMALIC's name on behalf of the separate account and legally belong to MMALIC. The assets in the separate account are not chargeable with liabilities arising out of any other business the Company conducts. MMALIC may invest these assets in hedging instruments, including derivative contracts as well as other assets permitted under state law (ORC 3907.15). To support the Company's obligations to adjust the index strategy values, the Company may move funds between the separate account and the general account. MMALIC is not obligated to invest the assets of the separate account according to any particular plan except as the Company may be required to by state insurance laws (MMALIC does have a derivative use plan).

In accordance with the products and transactions recorded within the separate account, all assets are considered legally insulated from the general account and are not chargeable with liabilities incurred in any other business operation of the Company. As of December 31, 2024 and 2023, the Company's separate account statement included legally insulated registered index-linked annuity assets of $984.2 million and $443.3 million, respectively.

With regard to the products and transactions recorded within the separate account, registered index-linked annuity products have guarantees backed by the general account. The separate account does not remit any risk charges to the general account for guaranteed benefits for the registered index-linked annuity products. The general account has not paid any guarantees for registered index-linked annuity products through December 31, 2024.

Net transfers to or (from) the Company's separate account for the years ended December 31, 2024, 2023, and 2022 were $521.1 million, $356.8 million and ($22.0) million, respectively.

All separate account reserves are non-guaranteed and subject to discretionary withdrawal at fair value. Investments in the separate account at December 31, 2024 had a cost of $472.0 million and fair value of $908.6 million. The notional amount of these investments at December 31, 2024 was $7,695.6 million. Investments in the separate account at December 31, 2023 had a cost of $232.6 million and fair value of $387.5 million. The notional amount of these investments at December 31, 2023 was $5,650.5 million.

SUPPLEMENTARY INFORMATION

Basis of Presentation

The accompanying supplemental schedules and interrogatories present selected statutory-basis financial data as of December 31, 2024 and for the year then ended for purposes of complying with the National Association of Insurance Commissioners' ("NAIC") *Annual Statement Instructions* and the NAIC's *Accounting Practices and Procedures Manual,* and agrees to or is included in the amounts reported in the Company's 2024 Statutory Annual Statement as filed with the Ohio Department of Insurance. Captions not presented were not applicable to the Company.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
SUPPLEMENTAL SCHEDULE OF SELECTED STATUTORY-BASIS FINANCIAL DATA
DECEMBER 31, 2024
(Dollars in millions)

Investment income earned:	
U.S. Government bonds	$ 8.0
Bonds exempt from U.S. tax	-
Other bonds (unaffiliated)	1,973.6
Bonds of affiliates	23.6
Preferred stocks (unaffiliated)	17.4
Common stocks (unaffiliated)	10.9
Common stocks (affiliated)	-
Mortgage loans	284.1
Real estate	-
Policy loans	3.6
Cash, cash equivalents and short-term investments	176.8
Derivative instruments	420.2
Other invested assets	137.9
Gross investment income	$ 3,056.1
Real estate owned (book value less encumbrances)	$ -
Mortgage loans - book value:	
Residential mortgages	$ 3,333.3
Commercial mortgages	1,789.8
Total mortgage loans	$ 5,123.1
Mortgage loans by standing - book value	
Good standing	$ 5,123.1
Interest overdue more than 90 days, not in foreclosure	$ -
Other long term assets - statement value	$ 2,795.3
Bonds and stocks of parents, subsidiaries and affiliates - book value	
Bonds	$ 969.7
Common stocks	$ 482.1
Bonds (including short-term investments and cash equivalents) by expected maturity - statement value	
Due within one year or less	$ 6,643.3
Over 1 year through 5 years	16,422.2
Over 5 years through 10 years	10,150.1
Over 10 years through 20 years	4,864.5
Over 20 years	2,559.3
Total by maturity	$ 40,639.4
Bonds (including short-term investments and cash equivalents) by NAIC designation - statement value	
NAIC 1	$ 22,980.5
NAIC 2	15,668.7
NAIC 3	1,112.8
NAIC 4	526.2
NAIC 5	239.8
NAIC 6	111.4
Total by NAIC designation	$ 40,639.4
Total bonds publicly traded	$ 14,593.4
Total bonds privately placed	$ 26,046.0
Preferred stocks - statement value	$ 297.9
Common stocks - market value	$ 778.8
Short-term investments - book value	$ 376.0
Derivative instruments owned - statement value	$ 462.1
Cash on deposit	$ 61.7
Cash equivalents	$ 2,973.5

(Continued)

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
SUPPLEMENTAL SCHEDULE OF SELECTED STATUTORY-BASIS FINANCIAL DATA
(CONTINUED)
DECEMBER 31, 2024
(Dollars in millions)

Life insurance in force:		
Ordinary	$	3,560.0
Group life	$	11.6
Amount of accidental death insurance in-force under ordinary policies:	$	58.7
Life insurance with disability provisions in-force:		
Ordinary	$	58.5
Group life	$	-
Annuities:		
Ordinary:		
Immediate - amount of income payable	$	185.4
Deferred - fully paid account balance	$	29,423.3
Deferred - not fully paid - account balance	$	15,626.7
Group		
Amount of income payable	$	74.5
Fully paid account balance	$	83.0
Not fully paid - account balance	$	675.0
Accident and health insurance - premiums in force:		
Ordinary	$	2.8
Claim payments 2024		
Other accident and health:		
2024	$	4.6

See accompanying independent auditors' report.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
SUPPLEMENTAL INVESTMENT DISCLOSURES
DECEMBER 31, 2024
(Dollars in millions)

1. MMALIC's total admitted assets as reported on page two of its Annual Statement excluding separate account assets are $52,396.0 million.

2. Following are the 10 largest exposures to a single issuer/borrower/investment, by investment category, excluding: (i) U.S. Government, U.S. Government agency securities and those U.S. Government money market funds listed in the appendix to the SVO Practices and Procedures Manual as exempt, (ii) property occupied by MMALIC, and (iii) policy loans.

Issuer	Amount	Percent of Total Admitted Assets
NP Inc	$ 645.5	1.2%
Annuity Investors Life Insurance Co	464.5	0.9%
Luxury Mortgage Corp	456.7	0.9%
FHA/VA Residential Whole Loans	376.8	0.7%
McKesson Corp	362.2	0.7%
Churchill Finance LLC	265.8	0.5%
NQM Funding LLC	222.4	0.4%
Herlan Peak Funding Trust	168.0	0.3%
Deephaven Mortgage LLC	160.4	0.3%
Perimeter Master Note Business Trust	152.6	0.3%

3. MMALIC's total admitted assets held in bonds (including short-term investments and cash equivalents) and preferred stocks by NAIC rating, are as follows:

Bonds			Preferred Stocks		
NAIC Rating	Amount	Percentage of Total Admitted Assets	NAIC Rating	Amount	Percentage of Total Admitted Assets
NAIC-1	$ 22,980.5	43.9%	P/RP-1	$ 15.0	0.0%
NAIC-2	15,668.7	29.9%	P/RP-2	251.5	0.5%
NAIC-3	1,112.8	2.1%	P/RP-3	7.3	0.0%
NAIC-4	526.2	1.0%	P/RP-4	-	0.0%
NAIC-5	239.8	0.5%	P/RP-5	8.3	0.0%
NAIC-6	111.4	0.2%	P/RP-6	15.8	0.0%
Total	$ 40,639.4	77.6%	Total	$ 297.9	0.5%

4. Assets held in foreign investments:

	Amount	Percent of Total Admitted Assets
Total admitted assets held in foreign investments	$ 9,213.3	17.6%
Foreign-currency-denominated investments	-	0.0%
Insurance liabilities denominated in that same foreign currency	-	0.0%

(Continued)

(Dollars in millions)

5. Aggregate foreign investment exposure categorized by NAIC sovereign rating:

	Amount	Percent of Total Admitted Assets
Countries rated NAIC-1	$ 8,797.7	16.8%
Countries rated NAIC-2	103.8	0.2%
Countries rated NAIC-3 or below	311.8	0.6%

6. Two largest foreign investment exposures to a single country, categorized by the country's NAIC sovereign rating:

	Amount	Percent of Total Admitted Assets
Countries rated NAIC-1:		
Cayman Islands	$ 3,975.8	7.6%
United Kingdom	1,171.3	2.2%
Countries rated NAIC-2		
Italy	$ 50.7	0.1%
Mexico	29.8	0.1%
Countries rated NAIC-3 or below		
Northern Mariana Islands	$ 99.0	0.2%
Greenland	23.5	0.0%

7. The Company has $9,213.3 million of unhedged foreign currency exposure.

8. Aggregate unhedged foreign currency exposure categorized by NAIC sovereign rating:

	Amount	Percent of Total Admitted Assets
Countries rated NAIC-1	$ 8,797.7	16.8%
Countries rated NAIC-2	103.8	0.2%
Countries rated NAIC-3 or below	311.8	0.6%

9. Largest unhedged foreign currency exposures by country, categorized by the country's NAIC sovereign designation:

	Amount	Percent of Total Admitted Assets
Countries rated NAIC-1:		
Cayman Islands	$ 3,975.8	7.6%
United Kingdom	1,171.3	2.2%
Countries rated NAIC-2		
Italy	$ 50.7	0.1%
Mexico	29.8	0.1%
Countries rated NAIC-3 or below		
Northern Mariana Islands	$ 99.0	0.2%
Greenland	23.5	0.0%

(Continued)

(Dollars in millions)

10. Ten largest non-sovereign (i.e. non-governmental) foreign issues:

Issuer	NAIC Rating	Amount	Percent of Total Admitted Assets
NP Inc	Mortgage Loan	$ 244.8	0.5%
CIP VIII Holdings Spv LP Inc	1	139.5	0.3%
DNB Bank ASA	1	90.9	0.2%
Elis SA	2	88.0	0.2%
BP Capital Markets PLC	1	83.3	0.2%
Seaspan Holdco III Ltd	2	80.0	0.2%
Modec Finance B.V.	2	75.0	0.1%
Canadian Pacific Railway Co	2	65.9	0.1%
Heineken NV	2	62.4	0.1%
Golub Capital Partners CLO 17 Ltd	2	60.4	0.1%

11. Assets held in Canadian investments are less than 2.5% of the Company's total admitted assets.

12. Assets held with contractual sales restrictions are less than 2.5% of the Company's total admitted assets.

13. Following are MMALIC's total admitted assets held in the largest 10 equity interests:

Name of Issuer	Amount	Percentage of Total Admitted Assets
Annuity Investors Life Insurance Co	$ 464.5	0.9%
CGL Holdings LLC	77.3	0.1%
NexBank Capital Inc	47.3	0.1%
Federal Home Loan Banks	41.5	0.1%
TPG Operating Group II LP	33.3	0.1%
Athene Holding Ltd	27.0	0.1%
Morgan Stanley	26.7	0.1%
AT&T Mobility II LLC	23.3	0.0%
Apollo Global Management Inc	20.0	0.0%
Reinsurance Group of America Inc	17.5	0.0%

14. Following are MMALIC's largest three investments held in nonaffiliated, privately placed equities:

Name of Issuer	Amount	Percentage of Total Admitted Assets
CGL Holdings LLC	$ 77.3	0.1%
NexBank Capital Inc	47.3	0.1%
Federal Home Loan Banks	41.5	0.1%

15. Assets held in general partnership interests, excluding limited partnership interests and LLC investments, are less than 2.5% of the Company's total admitted assets.

16. Following are MMALIC's total admitted assets held in the largest 10 mortgage loans:

Type (Residential, Commercial, Agricultural)	Amount	Percentage of Total Admitted Assets
NP Inc (Residential)	$ 645.5	1.2%
Luxury Mortgage Corp (Residential)	450.7	0.9%
Churchill Finance LLC (Residential)	383.1	0.7%
FHA/VA Residential Whole Loans (Residential)	376.8	0.7%
NQM Funding LLC (Residential)	222.4	0.4%
Herlan Peak Funding Trust (Residential)	168.0	0.3%
Deephaven Mortgage LLC (Residential)	160.4	0.3%
Quontic Bank (Residential)	125.9	0.2%
Colchis Real Properties Income Fund II LP (Residential)	100.0	0.2%
Deephaven Residential Mortgage Trust (Residential)	87.8	0.2%

(Continued)

(Dollars in millions)

17. Following are MMALIC's loan-to-value ratios as determined from the most current appraisal:

Loan-to-Value	Residential		Commercial		Agricultural	
above 95%	$ 3,194.9	6.1%	$ 144.2	0.3%	$ -	0.0%
91% to 95%	138.4	0.3%	21.6	0.0%	-	0.0%
81% to 90%	-	0.0%	76.4	0.1%	-	0.0%
71% to 80%	-	0.0%	341.2	0.7%	-	0.0%
below 70%	-	0.0%	1,206.4	2.3%	-	0.0%

18. The assets held in real estate are less than 2.5% of the Company's total admitted assets.

19. Investments in mezzanine real estate loans are less than 2.5% of the Company's total admitted assets.

20. The Company has no admitted assets subject to securities lending agreements, repurchase agreements, reverse repurchase agreements, dollar repurchase agreements, or dollar reverse repurchase agreements.

21. The Company owns $377.2 million in hedging options.

22. The Company's potential exposure for swaps and forwards is $82.7 million.

23. The Company does not have any potential exposure for financial futures.

MASSMUTUAL ASCEND LIFE INSURANCE COMPANY
SUPPLEMENTAL INVESTMENT DISCLOSURES (CONTINUED)
DECEMBER 31, 2024
(Dollars in millions)

	Gross Investment Holdings*		Admitted Assets as Reported in the Annual Statement			
Investment Categories	Amount	Percentage of Column 1 Line 13	Amount	Securities Lending Reinvested Collateral Amount	Total (Col 3 +4) Amount	Percentage of Column 5 Line 13
1. Long-Term Bonds:						
1.01 U.S. Governments	$ 168.6	0.3%	$ 168.6	$ -	$ 168.6	0.3%
1.02 All Other Governments	14.8	0.0%	14.8	-	14.8	0.0%
1.03 U.S. States, Territories and Possessions etc., Guaranteed	157.5	0.3%	157.5	-	157.5	0.3%
1.04 U.S. Political Subdivisions of States, Territories and Possessions, Guaranteed	221.8	0.4%	221.8	-	221.8	0.4%
1.05 U.S. Special Revenue and Special Assessment Obligations, etc., Non-Guaranteed	1,759.2	3.5%	1,759.2	-	1,759.2	3.5%
1.06 Industrial and Miscellaneous	29,378.4	57.9%	29,378.4	-	29,378.4	57.9%
1.07 Hybrid Securities	1,186.6	2.3%	1,186.6	-	1,186.6	2.3%
1.08 Parent, Subsidiaries and Affiliates	969.6	1.9%	969.6	-	969.6	1.9%
1.09 SVO Identified Funds	-	0.0%	-	-	-	0.0%
1.10 Unaffiliated Bank Loans	3,651.7	7.2%	3,651.7	-	3,651.7	7.2%
1.11 Total Long-Term Bonds	37,508.2	73.8%	37,508.2	-	37,508.2	73.8%
2. Preferred Stocks:						
2.01 Industrial and Misc. (Unaffiliated)	297.9	0.6%	297.9	-	297.9	0.6%
2.02 Parent, Subsidiaries and Affiliates	-	0.0%	-	-	-	0.0%
2.03 Total Preferred Stock	297.9	0.6%	297.9	-	297.9	0.6%
3. Common Stocks:						
3.01 Industrial and Miscellaneous Publicly Traded (Unaffiliated)	139.0	0.3%	139.0	-	139.0	0.3%
3.02 Industrial and Miscellaneous Other (Unaffiliated)	157.1	0.3%	157.1	-	157.1	0.3%
3.03 Parent, Subsidiaries and Affiliates Publicly Traded	-	0.0%	-	-	-	0.0%
3.04 Parent, Subsidiaries and Affiliates Other	482.1	0.9%	482.1	-	482.1	0.9%
3.05 Mutual Funds	-	0.0%	-	-	-	0.0%
3.06 Unit Investment Trusts	-	0.0%	-	-	-	0.0%
3.07 Closed-End Funds.	-	0.0%	-	-	-	0.0%
3.08 Exchange traded funds	0.6	0.0%	0.6	-	0.6	0.0%
3.09 Total Common Stocks	778.8	1.5%	778.8	-	778.8	1.5%
4. Mortgage Loans:						
4.01 Farm Mortgages	-	0.0%	-	-	-	0.0%
4.02 Residential Mortgages	3,333.3	6.6%	3,333.3	-	3,333.3	6.6%
4.03 Commercial Mortgages	1,711.6	3.4%	1,711.6	-	1,711.6	3.4%
4.04 Mezzanine Real Estate Loans	78.2	0.2%	78.2	-	78.2	0.2%
4.05 Total Mortgage Loans	5,123.1	10.2%	5,123.1	-	5,123.1	10.2%
5. Real estate:						
5.01 Properties Occupied by Company	-	0.0%	-	-	-	0.0%
5.02 Properties Held for Production of Income	-	0.0%	-	-	-	0.0%
5.03 Properties Held for Sale	-	0.0%	-	-	-	0.0%
5.04 Total Real Estate	-	0.0%	-	-	-	0.0%
6. Cash, Cash Equivalents, and Short-Term Investments:						
6.01 Cash	61.7	0.1%	61.7	-	61.7	0.1%
6.02 Cash Equivalents	2,973.5	5.8%	2,973.5	-	2,973.5	5.8%
6.03 Short-Term Investments	376.0	0.7%	376.0	-	376.0	0.7%
6.04 Total Cash, Cash Equivalents, and Short-Term Investments	3,411.2	6.6%	3,411.2	-	3,411.2	6.6%
7. Contract Loans	27.5	0.1%	27.5	-	27.5	0.1%
8. Derivatives	875.7	1.7%	875.7	-	875.7	1.7%
9. Other Invested Assets	2,805.6	5.5%	2,795.3	-	2,795.3	5.5%
10. Receivables for Securities	2.9	0.0%	2.9	-	2.9	0.0%
11. Securities Lending	-	0.0%	-	-	-	0.0%
12. Other Invested Assets	-	0.0%	-	-	-	0.0%
13. Total Invested Assets	50,830.9	100.0%	50,820.6	-	50,820.6	100.0%

* Gross investment holdings as valued in compliance with NAIC SAP.

See accompanying independent auditors' report.

The following information regarding reinsurance contracts is presented to satisfy the disclosure requirements in SSAP No. 61, *Life, Deposit-Type and Accident and Health Reinsurance*, which apply to reinsurance contracts entered into, renewed or amended on or after January 1, 1996.

1. Has MassMutual Ascend Life Insurance Company reinsured any risk with any other entity under a reinsurance contract (or multiple contracts with the same reinsurer or its affiliates) that is subject to Appendix A-791, *Life and Health Reinsurance Agreements*, and includes a provision that limits the reinsurer's assumption of significant risks identified in Appendix A-791?

   Examples of risk-limiting features include provisions such as a deductible, a loss ratio corridor, a loss cap, an aggregate limit or other provisions that result in similar effects.

   Yes ☐ No ☒

   If yes, indicate the number of reinsurance contracts to which such provisions apply: __________

   If yes, indicate if deposit accounting was applied for all contracts subject to Appendix A-791 that limit significant risks.

   Yes ☐ No ☐ N/A ☒

2. Has MassMutual Ascend Life Insurance Company reinsured any risk with any other entity under a reinsurance contract (or multiple contracts with the same reinsurer or its affiliates) that is not subject to Appendix A-791, for which reinsurance accounting was applied and includes a provision that limits the reinsurer's assumption of risk?

   Examples of risk-limiting features include provisions such as a deductible, a loss ratio corridor, a loss cap, an aggregate limit or other provisions that result in similar effects.

   Yes ☐ No ☒

   If yes, indicate the number of reinsurance contracts to which such provisions apply: __________

   If yes, indicate whether the reinsurance credit was reduced for the risk-limiting features.

   Yes ☐ No ☐ N/A ☒

3. Does MassMutual Ascend Life Insurance Company have any reinsurance contracts (other than reinsurance contracts with a federal or state facility) that contain one or more of the following features which may result in delays in payment in form or in fact:

   (a) Provisions that permit the reporting of losses to be made less frequently than quarterly;
   (b) Provisions that permit settlements to be made less frequently than quarterly;
   (c) Provisions that permit payments due from the reinsurer to not be made in cash within ninety (90) days of the settlement date (unless there is no activity during the period); or
   (d) The existence of payment schedules, accumulating retentions from multiple years, or any features inherently designed to delay timing of the reimbursement to the ceding entity.

   Yes ☐ No ☒

(Continued)

4. Has MassMutual Ascend Life Insurance Company reflected reinsurance accounting credit for any contracts that are not subject to Appendix A-791 and not yearly renewable term reinsurance, which meet the risk transfer requirements of SSAP No. 61?

Type of contract:	Response:	Identify reinsurance contract(s):	Has the insured event(s) triggering contract coverage been recognized?
Assumption reinsurance – new for the reporting period	Yes ☐ No ☒		N/A
Non-proportional reinsurance, which does not result in significant surplus relief	Yes ☐ No ☒		Yes ☐ No ☐ N/A ☒

5. Has MassMutual Ascend Life Insurance Company ceded any risk, which is not subject to Appendix A-791 and not yearly renewable term reinsurance, under any reinsurance contract (or multiple contracts with the same reinsurer or its affiliates) during the period covered by the financial statements, and either:

   (a) Accounted for that contract as reinsurance under statutory accounting principles (SAP) and as a deposit under generally accepted accounting principles (GAAP); or

   Yes ☐ No ☒ N/A ☐

   (b) Accounted for that contract as reinsurance under GAAP and as a deposit under SAP?

   Yes ☐ No ☒ N/A ☐

If the answer to item (a) or item (b) is yes, include relevant information regarding GAAP to SAP differences from the accounting policy footnote to the audited statutory-basis financial statements to explain why the contract(s) is treated differently for GAAP and SAP below:

See accompanying independent auditors' report