

MASSACHUSETTS MUTUAL VARIABLE LIFE SEPARATE ACCOUNT I

FORM 485BPOS

(Post-Effective Amendment (investment company, rule 485(b)))

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UNITED STATES
SECURITIES AND EXCHANGE COMMISSION
Washington, D.C. 20549

FORM N-6

REGISTRATION STATEMENT UNDER THE SECURITIES ACT OF 1933

☐ Pre-Effective Amendment No.

☒ Post-Effective Amendment No. 21

and/or

REGISTRATION STATEMENT UNDER THE INVESTMENT COMPANY ACT OF 1940

☒ Amendment No. 267

(Check appropriate box or boxes.)

Massachusetts Mutual Variable Life Separate Account I

(Exact Name of Registrant)

Massachusetts Mutual Life Insurance Company

(Name of Depositor)

1295 State Street, Springfield, Massachusetts 01111-0001

(Address of Depositor's Principal Executive Offices)

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(Name and Address of Agent for Service)

Approximate Date of Proposed Public Offering: **Continuous**

It is proposed that this filing will become effective (check appropriate box)

- ☐ immediately upon filing pursuant to paragraph (b) of Rule 485
- ☒ on April 29, 2024 pursuant to paragraph (b) of Rule 485
- ☐ 60 days after filing pursuant to paragraph (a)(1) of Rule 485
- ☐ on _____ pursuant to paragraph (a)(1) of Rule 485

If appropriate, check the following box:

- ☐ This post-effective amendment designates a new effective date for a previously filed post-effective amendment.

Title of Securities Being Registered: **Units of Interest in Variable Universal Life III (VUL III), an individual, flexible premium, adjustable, variable life insurance policy.**

Variable Universal Life III (VUL III)

Issued by Massachusetts Mutual Life Insurance Company

Massachusetts Mutual Variable Life Separate Account I

This prospectus describes an individual, flexible premium, adjustable, variable life insurance policy (policy) issued by Massachusetts Mutual Life Insurance Company (MassMutual®, Company, we, us, or our). While the policy is In Force, it provides lifetime insurance protection on the Insured. The policy is not a way to invest in mutual funds and is not suitable for short-term investment. The Owner (you or your) should consider the policy in conjunction with other life insurance you own. Replacing any existing life insurance policy with this policy or financing the purchase or maintenance of the policy through a loan or through withdrawals from another policy may not be to your advantage.

The policy is no longer available for sale. However, we continue to administer existing policies.

The policy offers a number of investment choices, including a Guaranteed Principal Account (GPA) and one or more variable investment divisions (Separate Account Divisions) offered through our separate account, Massachusetts Mutual Variable Life Separate Account I (Separate Account). Each Separate Account Division, in turn, invests in the Funds listed in Appendix A to this prospectus.

You bear the investment risks of any premium allocated to these Separate Account Divisions. The death benefit may vary and the Net Surrender Value will vary, depending on the investment performance of the Funds.

The policy is not (1) a bank or credit union deposit or obligation; (2) FDIC or NCUA insured; (3) insured by any federal government agency or (4) guaranteed by any bank or credit union. The policy may go down in value and provides guarantees that are subject to our financial strength and claims-paying ability.

This prospectus is not an offer to sell the policy in any jurisdiction where it is illegal to offer the policy nor is it an offer to sell the policy to anyone to whom it is illegal to offer the policy.

YOU MAY CANCEL YOUR POLICY WITHIN 10 DAYS OF RECEIVING IT WITHOUT PAYING FEES OR PENALTIES.

In some states, this cancellation period may be longer. Upon cancellation, you will receive either a full refund of the premiums you paid less any withdrawals and any Policy Debt or your Account Value less any withdrawals and any Policy Debt. You should review this prospectus, or consult with your investment professional, for additional information about the specific cancellation terms that apply.

Additional information about certain investment products, including variable life insurance policies, has been prepared by the Securities and Exchange Commission staff and is available at www.investor.gov.

The SEC has not approved or disapproved the policy or determined that this prospectus is accurate or complete. Any representation that it has is a criminal offense.

Please read this prospectus before investing. You should keep it for future reference.

Effective April 29, 2024

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Glossary

We have tried to make this prospectus as readable and understandable for you as possible. By the very nature of the policy, however, certain technical words or terms are unavoidable. We have identified the following as some of these words or terms.

Account Value. The value of your investment in the Separate Account Divisions and the GPA.

Accumulation Unit. A unit of measure that we use to determine the value in each Separate Account Division.

Administrative Office. MassMutual Customer Service Center, PO Box 1865, Springfield, MA 01102-1865, (800) 272-2216, (Fax) (866) 329-4527, www.MassMutual.com

Attained Age. The Insured's age on the Issue Date plus the number of completed Policy Years.

Face Amount. An amount used to determine the insurance coverage the policy provides while it is In Force.

Free Look. Your right to cancel the policy and receive a refund.

Fund(s). The investment entities in which the Separate Account Divisions invest.

Good Order. The actual receipt by our Administrative Office of the instructions related to a request or transaction in writing (or, when permitted, by telephone, fax, website, or other electronic means), within the time limits, if any, along with all forms, information and supporting legal documentation we require to effect the request or transaction. This information includes, to the extent applicable: the completed application or instruction form; your policy number; the transaction amount (in dollars or percentage terms); the names and allocations to and/or from the Separate Account Divisions affected by the request or transaction; the signatures of all Owners; if necessary, Social Security Number or Tax Identification number; tax certification; and any other information or supporting documentation we may require including consents, certifications and guarantees. Instructions must be complete and sufficiently clear so that we do not need to exercise any discretion to follow such instructions. We may, in our sole discretion, determine whether any particular request or transaction is in Good Order, and we reserve the right to change or waive any Good Order requirements at any time. If you have any questions, you may contact our Administrative Office before submitting the form or request.

Grace Period. A period that begins when the Net Surrender Value is not sufficient to cover monthly charges due and your policy stays In Force, during which you can pay the amount of premium needed to avoid termination.

Guarantee Period. A period in which the policy will remain In Force regardless of the value of the policy. The first Guarantee Period is the first nine Policy Years. The second Guarantee Period is to Attained Age 121 of the Insured.

Guarantee Premium. The monthly premium payment that must be made to meet the Safety Test during the Guarantee Period.

In Force. Your policy has not terminated.

Initial Face Amount. The Face Amount on the Policy Date.

Insurance Risk. The difference between the death benefit and the Account Value.

Insured. The person on whose life the policy is issued.

Issue Date. The date we issue the policy. The Issue Date starts the contestability and suicide periods.

Minimum Death Benefit. The minimum amount of death benefit needed for the policy to qualify as life insurance under Section 7702 of the Internal Revenue Code of 1986, as amended.

Modified Endowment Contract (MEC). A special type of life insurance under federal income tax law. Specifically, the law prescribes a test that is intended to differentiate between policies that are purchased primarily for certain tax advantages, versus policies that are purchased primarily for death protection. MECs are still life insurance and offer tax-free death benefits and tax-deferred cash value accumulation. However, pre-death distributions (including loans) are taxed as "income first" (not cost basis first), meaning they are taxable to the extent of gain in the policy. In addition, distributions may be subject to a 10% additional tax.

Monthly Charge Date. The Policy Date and the same day of each succeeding calendar month.

Net Premium. A premium payment received in Good Order minus the premium expense charge.

Net Surrender Value. Account Value less any surrender charges and Policy Debt.

Planned Premium. The amount selected by you to be paid on a periodic basis to keep your policy In Force.

Policy Anniversary. The anniversary of the Policy Date.

Policy Date. The starting point for determining the Policy Anniversaries, Policy Years, and Monthly Charge Dates. It is also the day we first deduct monthly charges under the policy.

Policy Debt. All outstanding loans plus accrued interest.

Policy Debt Limit. When total Policy Debt exceeds the Account Value less surrender charges.

Policy Termination. An event where your policy is no longer In Force due to the Net Surrender Value becoming too low to support your policy's monthly charges and the Safety Test is not met, or if the total Policy Debt exceeds the Account Value less surrender charges.

Policy Year. The twelve-month period beginning with the Policy Date, and each successive twelve-month period thereafter.

Safety Test. A no-lapse guarantee that allows you to keep the policy In Force during a Guarantee Period regardless of the value of the policy, as long as the Policy Debt Limit has not been reached.

Separate Account Division. A variable investment division offered through our Separate Account that invests in the corresponding underlying Fund.

Valuation Date. Any day on which the net asset value of the units of each Separate Account Division is determined. Generally, this is any date the New York Stock Exchange (NYSE), or its successor, is open for trading. A Valuation Date ends when the NYSE closes (usually 4 p.m. Eastern Time).

Written Request. A written or electronic communication or instruction in Good Order sent by you to us at our Administrative Office.

Important Information You Should Consider About the Policy

FEES AND EXPENSES		LOCATION IN PROSPECTUS
Charges for Early Withdrawals	<p>If you surrender the policy, decrease the Face Amount, or the policy lapses in the first nine Policy Years or the first nine years following an increase in Face Amount, a surrender charge may apply. For the Initial Face Amount, rates are based on the Insured's issue age, gender, risk class, and coverage year. For each increase in the Face Amount, rates are based on the Insured's Attained Age, gender, risk class on the effective date of the increase, and coverage year. The surrender charge is the sum of surrender charges for the Initial Face Amount and all Face Amount increases.</p> <p>For a 35-year-old male Insured, non-tobacco user, in the standard risk classification, with an initial premium of \$100,000, \$1,000,000 Face Amount and no increases in Face Amount, upon surrender in the first Policy Year, a charge of up to \$11,250 could be assessed.</p>	<p>Fee Tables – Transaction Fees – Surrender Charges and Deductions – Transaction Fees – Surrender Charges</p> <p>Death Benefit – Right to Change the Face Amount</p>
Transaction Charges	<p>In addition to surrender charges, you also may be charged for other transactions.</p> <p>Premium Expense Charge. We deduct a premium expense charge from each premium you pay. For policies issued after December 31, 2019, the current premium expense charge is 8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of premium over the Premium Expense Factor. The maximum charge is 8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of premium over the Premium Expense Factor. For policies issued on or before December 31, 2019, the current premium expense charge is 6.00% of each premium payment. The maximum charge is 8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of premium over the Premium Expense Factor.</p> <p>Withdrawal Fee. If you withdraw a portion of your Account Value, we can assess a withdrawal fee. We have waived the current fee. The maximum withdrawal fee we can assess is the lesser of \$25 per withdrawal or 2% of the amount withdrawn.</p> <p>Rider Processing Fee. We assess a one-time processing fee of up to \$250 (less in some states) when you exercise the Accelerated Death Benefit Rider for Terminal Illness and a fee of \$75 when you exercise the Substitute of Insured Rider.</p>	<p>Fee Tables – Transaction Fees</p> <p>Fee Tables – Periodic Charges Other than Annual Fund Operating Expenses</p> <p>Charges and Deductions – Transaction Fees</p>

FEES AND EXPENSES			LOCATION IN PROSPECTUS
Ongoing Fees and Expenses	In addition to surrender charges and transaction charges, an investment in the policy is subject to certain ongoing fees and expenses. Some of these fees and expenses, such as the insurance charge and the cost of certain optional riders, are set based on characteristics of the Insured (e.g., age, sex, and risk classification). You should view the policy's specifications pages for rates applicable to your policy. You also will bear fees and expenses associated with the Funds you choose, as shown below.		Fee Tables – Periodic Charges Other than Annual Fund Operating Expenses Charges and Deductions – Monthly Charges Against the Account Value Appendix A
	Annual Fee	MinimumMaximum	
	Fund options (Fund fees and expenses)	0.28% ⁽¹⁾ 1.74% ⁽¹⁾	

(1) As a percentage of Fund assets

RISKS		LOCATION IN PROSPECTUS
Risk of Loss	You can lose money by investing in this policy.	Principal Risks – Investment Risks General Information About the Company, the Separate Account and the Underlying Funds – Underlying Funds
Not a Short-Term Investment	This policy is not a short-term investment and is not appropriate for an investor who needs ready access to cash. Surrender charges apply for the first nine Policy Years and the first nine years following an increase in Face Amount. These charges will reduce the amount payable to you if you surrender the policy during those times.	Overview of the Policy – What is the policy, and what is it designed to do? Principal Risks – Suitability
Risks Associated with Investment Options	An investment in this policy is subject to the risk of poor investment performance and can vary depending upon the performance of the underlying Funds you choose. Each investment option (including any fixed account investment option) has its own unique risks. You should review the prospectuses for the available Funds before making an investment decision.	Principal Risks - Investment Risks General Information About the Company, the Separate Account and the Underlying Funds – Underlying Funds
Insurance Company Risks	An investment in the policy is subject to the risks related to the Depositor (MassMutual). Any obligations (including under any fixed account investment option), guarantees, or benefits of the policy are subject to the claims-paying ability of MassMutual. If MassMutual experiences financial distress, it may not be able to meet its obligations to you. More information about MassMutual, including its financial strength ratings, is available at www.MassMutual.com/ratings .	General Information About the Company, the Separate Account, and the Underlying Funds – The Guaranteed Principal Account (GPA)
Policy Lapse	Your policy could terminate (or lapse) if the Net Surrender Value of the policy becomes too low to support the policy's monthly charges and the Safety Test is not met, or if total Policy Debt exceeds the Account Value less surrender charges. Factors that may cause your policy to lapse include: insufficient premium payments, poor investment performance, withdrawals, and unpaid loans or loan interest. If your policy lapses, you may be able to reinstate it. To reinstate your policy, you must provide us certain written materials we require as well as a premium payment sufficient to keep the policy In Force for three months after reinstatement. The death benefit will not be paid if the policy has lapsed.	Principal Risks - Policy Termination Policy Termination and Reinstatement

	RESTRICTIONS	LOCATION IN PROSPECTUS
Investments	<p>Generally, you may transfer Account Value among the Separate Account Divisions and the GPA, subject to certain limitations. We also offer two automated transfer programs: Dollar Cost Averaging and Portfolio Rebalancing. Transfers of the policy's Account Value are subject to the following conditions:</p> <ul style="list-style-type: none"> • Transfers from the GPA are limited to one per Policy Year and may not exceed 25% of your Account Value in the GPA (less any Policy Debt). There is one exception to this rule. If you have transferred 25% of the GPA Value (less any Policy Debt) for three consecutive years and you have not added any Net Premiums or transferred amounts to the GPA during these three consecutive years, you may transfer the remainder of the GPA Value (less any Policy Debt) out of the GPA in the succeeding Policy Year. • Transfers are not permitted during the Free Look period for those policies in which we refund the premium paid less withdrawals and Policy Debt. • Transfers (including transfers through automated programs) cannot be processed during a Grace Period. <p>In addition, we reserve the right to reject or restrict transfers if we determine the transfers reflect frequent trading or a market timing strategy, or we are required to reject or restrict by the applicable Fund.</p> <p>MassMutual also reserves the right to remove or substitute Funds as investment options that are available under the policy.</p>	<p>Transfers</p> <p>General Information About the Company, the Separate Account and the Underlying Funds – Underlying Funds – Addition, Removal, Closure, or Substitution of Funds</p>
Optional Benefits	<p>Optional benefits, such as riders, may alter the benefits or charges under your policy. Rider availability and benefits may vary by state of issue, and their election may have tax consequences. Riders may have restrictions or limitations. If you elect a particular rider, it may restrict or enhance the terms of your policy, or restrict the availability or terms of other riders.</p>	<p>Other Benefits Available Under the Policy</p>

TAXES		LOCATION IN PROSPECTUS
Tax Implications	<ul style="list-style-type: none"> You should consult with a tax professional to determine the tax implications of an investment in and payments received under the policy. If you purchase the policy through a qualified retirement plan, you do not receive any additional tax deferral. Withdrawals and partial surrenders are taxed as recovery of cost basis first and income second. Loans and collateral assignments are not taxable when taken. Any gain on your policy is taxed as ordinary income. If your policy becomes a Modified Endowment Contract or MEC, loans, collateral assignments, withdrawals, and other pre-death distributions will be taxed as income first and recovery of cost basis second. You may have to pay a penalty tax if you take a distribution before you attain age 59½. 	Federal Income Tax Considerations

CONFLICTS OF INTEREST		LOCATION IN PROSPECTUS
Investment Professional Compensation	<p>Your registered representative may receive compensation in the form of commissions for selling the policy to you. If your registered representative is also a MassMutual insurance agent, they are also eligible for certain cash and non-cash benefits from us. Cash compensation includes bonuses and allowances based on factors such as sales, productivity and persistency (policy retention). Non-cash compensation includes various recognition items such as prizes and awards as well as attendance at, and payment of the costs associated with attendance at, conferences, seminars and recognition trips, and also includes contributions to certain individual plans such as pension and medical plans. Sales of the policy may help these registered representatives and their supervisors qualify for such benefits.</p> <p>This conflict of interest may influence your registered representative to offer or recommend this policy over another investment.</p>	Other Information – Distribution
Exchanges	<p>Because the policy is no longer sold, you would not be affected by a scenario in which you are asked to replace an existing life insurance policy you own with a new purchase of this policy. However, in general, you should be aware that some investment professionals may have a financial incentive to offer you a new policy in place of the one you already own. Thus, in general, you should only exchange your life insurance policy if you determine, after comparing the features, fees, and risks of both policies, that it is preferable for you to purchase the new life insurance policy rather than continue to own the existing policy.</p>	Other Benefits Available Under the Policy – Right to Exchange

Overview of the Policy

What is the policy, and what is it designed to do?

The policy is a variable life insurance policy that provides a death benefit. It is designed to allow you to fund your life insurance needs through investment in a Guaranteed Principal Account (GPA) and one or more of the variable investment divisions of the Massachusetts Mutual Variable Life Separate Account I (Separate Account). The policy allows you to allocate your Net Premiums and Account Value among the various investment choices. Your Account Value will vary based on performance of the investment choices you select and the fees and charges under the policy.

In exchange for your premium payments, we will pay the beneficiary a death benefit when the Insured dies while the policy is In Force. You can select one of the three death benefit options available under the policy. Subject to certain limitations, you can change the death benefit option you selected.

Variable life insurance is designed to help meet long-term insurance needs. It is not suitable as a vehicle for short-term savings. You should not purchase the policy if you will need the premium payments in a short period of time. The policy is not intended for people who need to take early or frequent withdrawals or who intend to engage in frequent trading among the Separate Account Divisions. You should consider your need for cash, time horizon for investment and financial goals before submitting an application to purchase the policy. You may want to consult your financial or tax adviser.

For policies issued after December 31, 2019 certain charges are different and some optional rider benefits are not available.

How are premium payments treated under the policy?

When you apply for the policy, you select (within certain limitations) the Planned Premium amount and the payment frequency (annual, semiannual, quarterly, or monthly). The Planned Premium amount is based on a number of factors, including, but not limited to, the Face Amount, the Insured's issue age, gender and risk classification. Generally, you determine the first premium you want to pay for the policy, but it must be at least equal to the Minimum Initial Premium. The Minimum Initial Premium depends on the premium frequency you choose, the policy's Initial Face Amount and death benefit option, the Insured's age, gender and risk classification, and whether the policy has any riders.

After the first premium has been paid, the policy offers premium flexibility, which allows subsequent premium payments to be paid in any amount and at any time, within certain limits. Although you must maintain sufficient Net Surrender Value to keep the policy In Force, there is no required schedule for premium payments. You should review the Premium Flexibility section of the prospectus for additional important information.

When a premium payment is received in Good Order, we deduct a premium expense charge to generally cover taxes and acquisition expenses, and the remaining amount, known as the Net Premium, is allocated among the Separate Account Divisions and the GPA according to your current allocation instructions. Depending on the state in which we issue the policy, we may hold your initial Net Premium payments in the money market division until the Free Look period is completed.

Investments in your policy's Separate Account Divisions are held in an account separate from the general assets of the Company. We have established a segment within the Separate Account to receive and invest premium payments for the Variable Universal Life III policies. Currently, the Variable Universal Life III segment is divided into over 30 Separate Account Divisions. Each Separate Account Division purchases shares in a corresponding Fund. Information about each corresponding Fund is provided at the back of this prospectus. Please see Appendix A: Funds Available Under the Policy.

Net Premium and Account Value allocated to the GPA become part of the Company's General Investment Account, which supports life insurance and annuity obligations, and are dependent on the Company's financial strength and claims-paying ability. You do not participate in the investment performance of the assets in our General Investment Account. Instead, we guarantee that amounts allocated to the GPA, in excess of Policy Debt, will earn interest at a minimum rate of 3% per year. We may credit a higher rate at our discretion.

Payment of insufficient premiums may result in the policy lapsing. Although this policy does offer a no-lapse guarantee feature, the Safety Test, there is no guarantee that the policy will remain In Force as a result of making Planned Premium payments.

Federal law, such as the Internal Revenue Code of 1986, as amended (IRC), places restrictions on the amount of money you may put into a life insurance contract and still meet the definition of life insurance for tax purposes. In order for a policy to meet the IRC's

guidelines, either the Cash Value Accumulation Test or the Guideline Premium Test must be chosen. If you choose the Cash Value Accumulation Test, any premium payment that would exceed its limits may only be accepted if the Insured provides us with satisfactory evidence of insurability. If you choose the Guideline Premium Test, we will refund any amount of premium payment that exceeds its limit.

What are the primary features and options that the policy offers?

- **Choice of Death Benefit Options.** The policy offers a choice of one of three death benefit options— a Level Option, Return of Account Value Option, and Return of Premium Option. Please see the “Death Benefit” section for more information.
- **Face Amount Changes.** You may request an increase or decrease in the Face Amount. If you change your Face Amount, your policy charges, including surrender charges, will change accordingly. If the policy's Account Value less surrender charges (or Net Surrender Value if there is Policy Debt) cannot keep the policy In Force with the requested change in Face Amount, a premium payment may be required.
- **Investment Options.** You can choose to allocate your Net Premium payments and Account Value among various investment choices. Your choices include the Separate Account Divisions, each of which invests in an underlying Fund, and the Guaranteed Principal Account (GPA).
- **Surrenders and Withdrawals.** You may surrender your policy, and we will pay you its Net Surrender Value (Account Value less any surrender charges and Policy Debt). You may also withdraw a part of the Net Surrender Value. A withdrawal reduces the policy values, may reduce the Face Amount of the policy, and may increase the risk that the policy will terminate or lapse. Surrenders and withdrawals may have adverse tax consequences.
- **Loans.** You may take a loan on the policy once your Account Value exceeds the total of any surrender charges. The policy secures the loan. Taking a loan may have adverse tax consequences and will increase the risk that your policy may terminate or lapse. Interest charges will apply.
- **Transfers.** Generally, you may transfer funds among the Separate Account Divisions and the GPA, subject to certain limitations. We also offer two automated transfer programs: Dollar Cost Averaging and Portfolio Rebalancing.
- **Safety Test.** During defined periods, your policy will not terminate or lapse, regardless of its Account Value, as long as you have made the specified minimum premium payments. However, even if the Safety Test is met, this policy may terminate if Policy Debt exceeds the Account Value less surrender charges.
- **Assignability.** Subject to our approval, you may generally assign the policy as collateral for a loan or other obligation.
- **Tax Treatment.** You are generally not taxed on the policy's earnings until you withdraw Account Value from your policy. This is known as tax deferral.
- **Additional Rider Benefits.** There are additional benefits you may add to your policy by way of riders. An additional charge may apply if you elect a rider. The riders available with this policy are listed in the “Other Benefits Available Under the Policy” section.

Fee Tables

The following tables describe the fees and expenses that you will pay when buying, owning, surrendering or making withdrawals from the policy. Please refer to your policy's specification pages 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 that you will pay at the time you buy the policy, surrender the policy, take Account Value out of the policy, or exercise certain rider options.

For Policies Issued After December 31, 2019

Transaction Fees			
Charge	When Charge is Deducted	Amount Deducted	
Premium Expense Charge⁽¹⁾	When you pay premium	Maximum:	All Coverage Years 8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of any premium payment in excess of the Premium Expense Factor.
		Current:	8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of any premium payment in excess of the Premium Expense Factor.
Surrender Charges⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ Surrender charges generally apply for the first nine Policy Years and the first nine years following an increase in Face Amount.	Upon surrender, at the time of an elected decrease in Face Amount, or policy lapse.	Maximum:	First Coverage Year \$3.08-\$50.58 per \$1,000 of Face Amount
		Current:	\$3.08-\$50.58 per \$1,000 of Face Amount
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾	\$11.25 per \$1,000 of Face Amount
Accelerated Death Benefit Rider for Terminal Illness⁽⁷⁾	When you elect an accelerated death benefit payment	Maximum:	\$250
		Current:	\$100-\$250
Adjustment to Surrender Charges Endorsement	Once, when the endorsement is attached to the policy at issue	Maximum:	\$150
		Current:	\$150

Processing Fees			
Charge	When Charge is Deducted	Amount Deducted	
Withdrawal Fee	When you withdraw a portion of your Account Value from the policy.	Maximum:	The lesser of \$25 per withdrawal or 2% of the amount withdrawn
		Current:	\$0

- (1) *The Premium Expense Factor referenced in the table is used to determine premium expense charges. For the Initial Face Amount, the Premium Expense Factor is based on the issue age, gender, and risk classification of the Insured. For each increase in the Face Amount, the Premium Expense Factor is based on the Attained Age, gender, and risk classification of the Insured on the effective date of the increase. The Premium Expense Factor is shown in the policy; it will be quoted upon request before the policy is issued. Premium Expense Factors for policies issued in New York may vary.*

Examples of Premium Expense Factors are shown in the following table. An example of how the factor is used to determine your premium expense charge is located under "Premium Expense Charge" in the "Transaction Fees" sub-section of the "Charges and Deductions" section.

Premium Expense Factors Per \$1,000 of Face Amount and Applicable Premium Expense Charges (Assumptions: Non-Tobacco Risk Classifications, Premium Payments of \$20 Per \$1,000 of Face Amount)				
Charge	Male		Female	
	Age 35	Age 55	Age 35	Age 55
Premium Expense Factor Per \$1,000 of Face Amount	9.00	25.70	7.38	20.70
A: Current and Maximum Premium Expense Charge for premiums up to and including Premium Expense Factor (8%)	\$0.72	\$1.60	\$0.59	\$1.60
B: Current and Maximum Premium Expense Charge For Premiums Exceeding Premium Expense Factor (7%)	\$0.77	n/a	\$0.88	n/a
Current and Maximum Premium Expense Charge for the entire \$20 premium (A+B)	\$1.49	\$1.60	\$1.47	\$1.60

- (2) *Maximum and current rates may vary in New York, but will not exceed the maximum rates shown. Please contact your registered representative for more information.*
- (3) *For the Initial Face Amount, the rates vary by the Insured's gender, issue age, risk classification, and year of coverage. For each increase in the Face Amount, the rates are based on the Attained Age, gender, and risk classification of the Insured on the effective date of the increase and the year of coverage. The surrender charge is shown in the policy's specifications pages. The rates in this table may not be representative of the charge that a particular Owner will pay. If you would like information on the surrender charge rates for your particular situation, you can request a personalized illustration from your registered representative or by calling our Administrative Office at (800) 272-2216.*
- (4) *Under certain circumstances, the surrender charge may not apply when exchanging this policy for a qualifying non-variable life insurance policy made available by us or one of our insurance affiliates. For additional information, please see "Adjustment to Surrender Charges Endorsement (for internal replacements)" in the Additional Benefits table and "Right to Exchange or Convert" in the "Other Benefits Available Under the Policy" section.*
- (5) *Surrender charges generally apply for the first nine Policy Years and the first nine years following an increase in Face Amount. They will equal the first year's surrender charge multiplied by the applicable annual percentage listed in the following table. These percentages vary by issue age and may vary for policies issued in New York.*

Coverage Year	%	Coverage Year	%
1	100%	6	71–82%
2	93–100%	7	60–75%
3	87–100%	8	40–50%
4	81–100%	9	20–25%
5	76–100%	10	0%

- (6) *The rates shown for the "representative insured" are first year rates only.*
- (7) *The fee we deduct may vary by state, but will not exceed \$250.*

The next table describes the fees and expenses that you will pay periodically during the time that you own the policy, other than Fund fees and expenses.

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Base Contract Charge:			
Insurance Charge ⁽¹⁾⁽²⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$83.33 per \$1,000 of Insurance Risk
		Minimum:	\$0.01 per \$1,000 of Insurance Risk
		Current:	\$0.01-\$83.33 per \$1,000 of Insurance Risk
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk ⁽¹⁾⁽²⁾⁽³⁾	\$0.075 per \$1,000 of Insurance Risk
Substandard Risk Charge ⁽⁴⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$83.33 per \$1,000 of Insurance Risk \$83.33 per \$1,000 of Face Amount (applies to flat extra charges)
		Current:	\$0.002-\$83.33 per \$1,000 of Insurance Risk \$0.08-\$83.33 per \$1,000 of Face Amount (applies to flat extra charges)
Administrative Charge ⁽²⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$15 per policy
		Current:	\$10 per policy
Asset Charge ⁽⁵⁾	Daily	Maximum:	
		Policy Years 1 – 10:	0.90% of the policy's average daily net assets in the Separate Account
		Policy Years 11+:	0.40% of the policy's average daily net assets in the Separate Account
		Current:	
	Policy Years 1 – 10:	0.50%-0.70% of the policy's average daily net assets in the Separate Account	
	Policy Years 11+:	0.15% of the policy's average daily net assets in the Separate Account	

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Face Amount Charge ⁽²⁾⁽⁶⁾⁽⁷⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$1.79 per \$1,000 of Initial Face Amount Current: \$0.00-\$1.79 per \$1,000 of Initial Face Amount Representative Insured: \$0.27 per \$1,000 of Face Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽³⁾⁽⁶⁾	
Loan Interest Rate Expense Charge ⁽⁸⁾	Daily, if there is Policy Debt.	Maximum: Policy Years 1 – 10: 1.00% annually as a percentage of loaned amount Policy Years 11+: 0.50% annually as a percentage of loaned amount Current: Policy Years 1 – 10: 0.65% annually as a percentage of loaned amount Policy Years 11+: 0.15% annually as a percentage of loaned amount	
Optional Benefit Charges:			
Disability Benefit Rider ⁽⁷⁾⁽⁹⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.00-\$0.04 per \$1 of Specified Benefit Amount Current: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.00-\$0.04 per \$1 of Specified Benefit Amount Representative Insured: \$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.02 per \$1 of Specified Benefit Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽³⁾⁽⁷⁾⁽⁹⁾	
Guaranteed Insurability Rider ⁽⁷⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$0.03-\$0.11 per \$1,000 of Option Amount Current: \$0.03-\$0.11 per \$1,000 of Option Amount Representative Insured: \$0.11 per \$1,000 of Option Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽⁷⁾	

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Other Insured Rider⁽¹⁾⁽¹¹⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$27.41 per \$1,000 of Rider Face Amount Current: \$0.01-\$27.41 per \$1,000 of Rider Face Amount Representative Insured: \$0.08 per \$1,000 of Rider Face Amount Male, Age 35, Non-Tobacco, Standard Risk⁽¹⁾⁽³⁾	
Substitute of Insured Rider	When you elect to substitute the Insured	Maximum: \$75 Current: \$75	
Waiver of Monthly Charges Rider⁽⁷⁾⁽⁹⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ Current: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ Representative Insured: \$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾ Male, Age 35, Non-Tobacco, Standard Risk⁽³⁾⁽⁷⁾⁽⁹⁾	
Waiver of Specified Premium Rider⁽⁷⁾⁽⁹⁾	Monthly, on the policy's Monthly Charge Date	Maximum: The Greater of \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.00-\$0.04 per \$1 of Specified Monthly Premium Amount Current: The Greater of \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.00-\$0.04 per \$1 of Specified Monthly Premium Amount Representative Insured: The Greater of \$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.02 per \$1 of Specified Monthly Premium Amount Male, Age 35, Non-Tobacco, Standard Risk⁽³⁾⁽⁷⁾⁽⁹⁾	

- (1) The rates vary by a number of factors including, but not limited to, the Insured's gender, issue age, risk classification, and year of coverage. The rates may not be representative of the charge that a particular Owner will pay. If you would like information on the insurance charge rates for your particular situation, you can request a personalized illustration from your registered representative or by calling our Administrative Office at (800) 272-2216. The insurance charge rates reflected in this table are for standard risks. The maximum insurance charge rates are based on the 2017 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality (2017 CSO) Tables. Insurance Risk is a liability of the insurance company and is equal to the difference between the death benefit and the Account Value.
- (2) Maximum and current rates may vary in New York, but will not exceed the maximum rates shown. Please contact your registered representative for more information.
- (3) The rates shown for the "representative insured" are first year rates only.
- (4) Additional mortality fees may be assessed for risks associated with certain health conditions, occupations, aviation, avocations or driving history (i.e., substandard risks). These fees can be in the form of higher rates known as table ratings and/or flat extra charges. Table ratings and flat extra charges are components in the calculation of the insurance charges for the base policy and any applicable monthly rider insurance charges. Substandard risk charges only apply if certain factors result in an Insured having a substandard rating and will be shown in the policy's specifications pages. Note that the insurance charges, including any table ratings and/or flat extra charges, will not exceed \$83.33 per \$1,000 of Insurance Risk or Face Amount. For additional information, refer to the "Monthly Charges Against the Account Value" sub-section of the "Charges and Deductions" section of this prospectus.

- (5) *The asset charge varies according to the policy's average daily net assets in the Separate Account and the Policy Year as detailed in the table below.*

Your Value in the Separate Account	Maximum Charge Policy Years 1 – 10	Current Charge Policy Years 1 – 10	Maximum Charge Policy Years 11+	Current Charge Policy Years 11+
\$0 – \$49,999.99	0.90%	0.70%	0.40%	0.15%
\$50,000 – \$99,999.99	0.90%	0.60%	0.40%	0.15%
\$100,000+	0.90%	0.50%	0.40%	0.15%

- (6) *The face amount charge is set at issue for the Initial Face Amount and, for each increase, on the effective date of the increase. The charges will vary by the issue age, gender and risk classification of the Insured for the Initial Face Amount and, for increases, by the Insured's Attained Age, gender and risk classification on the effective date of the increase. The face amount charge will not be reduced if the Face Amount is reduced. The range of face amount charges reflected for coverage years 1 – 5 simply accounts for the range of issue ages for all potential Insureds. Please see the full range of rates per \$1,000 of Face Amount in the table below. The rates shown are for standard risks.*

Coverage Year	Maximum Rate	Current Rates
1–2	\$1.79	\$0.07–\$1.79
3–5	\$1.19	\$0.05–\$1.19
6+	\$0.00	\$0.00

- (7) *The rates shown are for standard risks and vary by the Insured's gender and Attained Age. Exception – The rates for the Guaranteed Insurability Rider vary by the Insured's gender and issue age. The rates in this table may not be representative of the charge that a particular Owner will pay. If you would like information on the rates for your particular situation, you can request a personalized illustration from your registered representative or by calling out Administrative Office at (800) 272-2216.*
- (8) *We charge interest on policy loans, but we also credit interest on the cash value we hold as collateral on policy loans. The Loan Interest Rate Expense Charge represents the difference (cost) between the loan interest rate charged and the interest credited on loaned amounts.*
- (9) *For substandard risks, the rates may be increased by a multiple of 1 or 2 times the standard rates shown.*
- (10) *The policy's "monthly deduction" is the sum of the following current monthly charges: (a) administrative charge; (b) face amount charge; (c) insurance charge; and (d) any applicable rider charges.*
- (11) *Additional mortality fees may be assessed for risks associated with certain health conditions, occupations, aviation, avocations or driving history (i.e., substandard risks). These fees can be in the form of higher rates known as table ratings and/or flat extra charges. Table ratings and flat extra charges are components in the calculation of the insurance charges for the base policy and any applicable monthly rider insurance charges. Substandard risk charges only apply if certain factors result in an Insured having a substandard rating and will be shown in the policy's specifications pages. Note that the insurance charges, including any table ratings and/or flat extra charges, will not exceed \$83.33 per \$1,000 of rider face amount. For additional information, refer to the "Monthly Charges Against the Account Value" sub-section of the "Charges and Deductions" section of this prospectus*

All of the monthly charges listed in the table above are deducted proportionately from the then current Account Values in the Separate Account and the GPA (unless the Directed Monthly Deduction Program is in effect). The asset charge is deducted from the assets of the Separate Account only.

For Policies Issued On or Before December 31, 2019

Transaction Fees		
Charge	When Charge is Deducted	Amount Deducted
Premium Expense Charge⁽¹⁾	When you pay premium	Maximum: All Coverage Years 8.00% of each premium payment up to and including the Premium Expense Factor, and 7.00% of any premium payment in excess of the Premium Expense Factor. Current: 6.00% of each premium payment
Surrender Charges⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾ <i>Surrender charges generally apply for the first nine Policy Years and the first nine years following an increase in Face Amount.</i>	Upon surrender, at the time of an elected decrease in Face Amount, or policy lapse.	Maximum: First Coverage Year \$3.08-\$50.58 per \$1,000 of Face Amount Current: \$3.08-\$50.58 per \$1,000 of Face Amount Representative Insured: \$11.25 per \$1,000 of Face Amount Male, Age 35, Non-Tobacco, Standard Risk⁽²⁾⁽³⁾⁽⁴⁾⁽⁵⁾⁽⁶⁾
Accelerated Death Benefit Rider for Terminal Illness⁽⁷⁾ This rider is no longer issued.	When you elect an accelerated death benefit payment	Maximum: \$250 Current: \$100-\$250
Adjustment to Surrender Charges Endorsement	Once, when the endorsement is attached to the policy at issue	Maximum: \$150 Current: \$150

Processing Fees		
Charge	When Charge is Deducted	Amount Deducted
Withdrawal Fee	When you withdraw a portion of your Account Value from the policy.	Maximum: The lesser of \$25 per withdrawal or 2% of the amount withdrawn Current: \$0

(1) The Premium Expense Factor referenced in the table is used to determine premium expense charges. For the Initial Face Amount, the Premium Expense Factor is based on the issue age, gender, and risk classification of the Insured. For each increase in the Face Amount, the Premium Expense Factor is based on the Attained Age, gender, and risk classification of the Insured on the effective date of the increase. The Premium Expense Factor is shown in the policy; it will be quoted upon request before the policy is issued. Premium Expense Factors for policies issued in New York may vary.

Examples of Premium Expense Factors are shown in the following table. An example of how the factor is used to determine your premium expense charge is located under "Premium Expense Charge" in the "Transaction Fees" sub-section of the "Charges and Deductions" section.

Premium Expense Factors Per \$1,000 of Face Amount and Applicable Premium Expense Charges (Assumptions: Non-Tobacco Risk Classifications, Premium Payments of \$20 Per \$1,000 of Face Amount)				
	Male		Female	
Charge	Age 35	Age 55	Age 35	Age 55
Premium Expense Factor Per \$1,000 of Face Amount	9.00	25.70	7.38	20.70
A: Current Premium Expense Charge for premiums up to and including Premium Expense Factor (6%)	\$0.54	\$1.20	\$0.44	\$1.20
B: Current Premium Expense Charge For Premiums Exceeding Premium Expense Factor (6%)	\$0.66	n/a	\$0.76	n/a
Current Premium Expense Charge for the entire \$20 premium (A+B)	\$1.20	\$1.20	\$1.20	\$1.20
A: Maximum Premium Expense Charge for premiums up to and including Premium Expense Factor (8%)	\$0.72	\$1.60	\$0.59	\$1.60
B: Maximum Premium Expense Charge For Premiums Exceeding Premium Expense Factor (7%)	\$0.77	n/a	\$0.88	n/a
Maximum Premium Expense Charge for the entire \$20 premium (A+B)	\$1.49	\$1.60	\$1.47	\$1.60

- (2) Maximum and current rates may vary in New York, but will not exceed the maximum rates shown. Please contact your registered representative for more information.
- (3) For the Initial Face Amount, the rates vary by the Insured's gender, issue age, risk classification, and year of coverage. For each increase in the Face Amount, the rates are based on the Attained Age, gender, and risk classification of the Insured on the effective date of the increase and the year of coverage. The surrender charge is shown in the policy's specifications pages. The rates in this table may not be representative of the charge that a particular Owner will pay. If you would like information on the surrender charge rates for your particular situation, you can request a personalized illustration from your registered representative or by calling our Administrative Office at (800) 272-2216.
- (4) Under certain circumstances, the surrender charge may not apply when exchanging this policy for a qualifying non-variable life insurance policy offered by MassMutual or one of its subsidiaries. For additional information, please see the "Additional Benefits" (Adjustment to Surrender Charges Endorsements) in the "Other Benefits Available Under the Policy" section.
- (5) Surrender charges generally apply for the first nine Policy Years and the first nine years following an increase in Face Amount. They will equal the first year's surrender charge multiplied by the applicable annual percentage listed in the following table. These percentages vary by issue age and may vary for policies issued in New York.

Coverage Year	%	Coverage Year	%
1	100%	6	71–82%
2	93–100%	7	60–75%
3	87–100%	8	40–50%
4	81–100%	9	20–25%
5	76–100%	10	0%

- (6) The rates shown for the "representative insured" are first year rates only.
- (7) The fee we deduct may vary by state, but will not exceed \$250.

The next table describes the fees and expenses that you will pay periodically during the time that you own the policy, other than Fund fees and expenses.

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Base Contract Charge:			
Insurance Charge ⁽¹⁾⁽²⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$83.33 per \$1,000 of Insurance Risk
		Minimum:	\$0.02 per \$1,000 of Insurance Risk
		Current:	\$0.02-\$83.33 per \$1,000 of Insurance Risk
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk ⁽¹⁾⁽²⁾⁽³⁾	\$0.09 per \$1,000 of Insurance Risk
Substandard Risk Charge ⁽⁴⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$83.33 per \$1,000 of Insurance Risk \$83.33 per \$1,000 of Face Amount (applies to flat extra charges)
		Current:	\$0.005-\$83.33 per \$1,000 of Insurance Risk \$0.08-\$83.33 per \$1,000 of Face Amount (applies to flat extra charges)
Administrative Charge ⁽²⁾	Monthly, on the policy's Monthly Charge Date	Maximum:	\$15 per policy
		Current:	\$10 per policy
Asset Charge ⁽⁵⁾	Daily	Maximum:	
		Policy Years 1 – 10:	0.90% of the policy's average daily net assets in the Separate Account
		Policy Years 11+:	0.40% of the policy's average daily net assets in the Separate Account
		Current:	
	Policy Years 1 – 10:	0.50%-0.70% of the policy's average daily net assets in the Separate Account	
	Policy Years 11+:	0.15% of the policy's average daily net assets in the Separate Account	

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Face Amount Charge ⁽²⁾⁽⁶⁾⁽⁷⁾	Monthly, on the policy's Monthly Charge Date	Maximum: \$1.79 per \$1,000 of Initial Face Amount Current: \$0.00-\$1.79 per \$1,000 of Initial Face Amount Representative Insured: \$0.27 per \$1,000 of Face Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽³⁾⁽⁶⁾	
Loan Interest Rate Expense Charge ⁽⁸⁾	Daily, if there is Policy Debt.	Maximum: Policy Years 1 – 10: 1.00% annually as a percentage of loaned amount Policy Years 11+: 0.50% annually as a percentage of loaned amount Current: Policy Years 1 – 10: 0.65% annually as a percentage of loaned amount Policy Years 11+: 0.15% annually as a percentage of loaned amount	
Optional Benefit Charges:			
Disability Benefit Rider ⁽⁷⁾⁽⁹⁾ This rider is no longer issued.	Monthly, on the policy's Monthly Charge Date	Maximum: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.00-\$0.04 per \$1 of Specified Benefit Amount Current: \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.00-\$0.04 per \$1 of Specified Benefit Amount Representative Insured: \$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾ plus \$0.02 per \$1 of Specified Benefit Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽³⁾⁽⁷⁾⁽⁹⁾	
Guaranteed Insurability Rider ⁽⁷⁾ This rider is no longer issued.	Monthly, on the policy's Monthly Charge Date	Maximum: \$0.03-\$0.11 per \$1,000 of Option Amount Current: \$0.03-\$0.11 per \$1,000 of Option Amount Representative Insured: \$0.11 per \$1,000 of Option Amount Male, Age 35, Non-Tobacco, Standard Risk ⁽⁷⁾	

Periodic Charges Other than Annual Fund Operating Expenses			
Charge	When Charge is Deducted	Amount Deducted	
Other Insured Rider⁽¹⁾⁽¹¹⁾ This rider is no longer issued.	Monthly, on the policy's Monthly Charge Date	Maximum:	\$29.79 per \$1,000 of Rider Face Amount
		Current:	\$0.01-\$29.79 per \$1,000 of Rider Face Amount
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk⁽¹⁾⁽³⁾	\$0.08 per \$1,000 of Rider Face Amount
Substitute of Insured Rider This rider is no longer issued.	When you elect to substitute the Insured	Maximum:	\$75
		Current:	\$75
Waiver of Monthly Charges Rider⁽⁷⁾⁽⁹⁾ This rider is no longer issued.	Monthly, on the policy's Monthly Charge Date	Maximum:	\$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾
		Current:	\$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk⁽³⁾⁽⁷⁾⁽⁹⁾	\$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾
Waiver of Specified Premium Rider⁽⁷⁾⁽⁹⁾ This rider is no longer issued.	Monthly, on the policy's Monthly Charge Date	Maximum:	The Greater of \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.00-\$0.04 per \$1 of Specified Monthly Premium Amount
		Current:	The Greater of \$0.00-\$0.28 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.00-\$0.04 per \$1 of Specified Monthly Premium Amount
		Representative Insured: Male, Age 35, Non-Tobacco, Standard Risk⁽³⁾⁽⁷⁾⁽⁹⁾	The Greater of \$0.06 per \$1 of Monthly Deduction ⁽¹⁰⁾ or \$0.02 per \$1 of Specified Monthly Premium Amount

- (1) The rates vary by a number of factors including, but not limited to, the Insured's gender, issue age, risk classification, and year of coverage. The rates may not be representative of the charge that a particular Owner will pay. If you would like information on the insurance charge rates for your particular situation, you can request a personalized illustration from your registered representative or by calling our Administrative Office at (800) 272-2216. The insurance charge rates reflected in this table are for standard risks. The maximum insurance charge rates are based on the 2001 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality (2001 CSO) Tables. Insurance Risk is a liability of the insurance company and is equal to the difference between the death benefit and the Account Value.
- (2) Maximum and current rates may vary in New York, but will not exceed the maximum rates shown. Please contact your registered representative for more information.
- (3) The rates shown for the "representative insured" are first year rates only.
- (4) Additional mortality fees may be assessed for risks associated with certain health conditions, occupations, aviation, avocations or driving history (i.e., substandard risks). These fees can be in the form of higher rates known as table ratings and/or flat extra charges. Table ratings and flat extra charges are components in the calculation of the insurance charges for the base policy and any applicable monthly rider insurance charges. Substandard risk charges only apply if certain factors result in an Insured having a substandard rating and will be shown in the policy's specifications pages. Note that the insurance charges, including any table ratings and/or flat extra charges, will not exceed \$83.33 per \$1,000 of Insurance Risk or Face Amount. For additional information, refer to the "Monthly Charges Against the Account Value" sub-section of the "Charges and Deductions" section of this prospectus.

- (5) The asset charge varies according to the policy's average daily net assets in the Separate Account and the Policy Year as detailed in the table below.

Your Value in the Separate Account	Maximum Charge Policy Years 1 – 10	Current Charge Policy Years 1 – 10	Maximum Charge Policy Years 11+	Current Charge Policy Years 11+
\$0 – \$49,999.99	0.90%	0.70%	0.40%	0.15%
\$50,000 – \$99,999.99	0.90%	0.60%	0.40%	0.15%
\$100,000+	0.90%	0.50%	0.40%	0.15%

- (6) The face amount charge is set at issue for the Initial Face Amount and, for each increase, on the effective date of the increase. The charges will vary by the issue age, gender and risk classification of the Insured for the Initial Face Amount and, for increases, by the Insured's Attained Age, gender and risk classification on the effective date of the increase. The face amount charge will not be reduced if the Face Amount is reduced. The range of face amount charges reflected for coverage years 1 – 5 simply accounts for the range of issue ages for all potential Insureds. Please see the full range of rates per \$1,000 of Face Amount in the table below.

Coverage Year	Maximum Rate	Current Rates
1–2	\$1.79	\$0.07–\$1.79
3–5	\$1.19	\$0.05–\$1.19
6+	\$0.00	\$0.00

- (7) The rates shown are for standard risks and vary by the Insured's gender and Attained Age. Exception – The rates for the Guaranteed Insurability Rider vary by the Insured's gender and issue age. The rates in this table may not be representative of the charge that a particular Owner will pay. If you would like information on the rates for your particular situation, you can request a personalized illustration from your registered representative or by calling out Administrative Office at (800) 272-2216.
- (8) We charge interest on policy loans, but we also credit interest on the cash value we hold as collateral on policy loans. The Loan Interest Rate Expense Charge represents the difference (cost) between the loan interest rate charged and the interest credited on loaned amounts.
- (9) For substandard risks, the rates may be increased by a multiple of 1 or 2 times the standard rates shown.
- (10) The policy's "monthly deduction" is the sum of the following current monthly charges: (a) administrative charge; (b) face amount charge; (c) insurance charge; and (d) any applicable rider charges.
- (11) Additional mortality fees may be assessed for risks associated with certain health conditions, occupations, aviation, avocations or driving history (i.e., substandard risks). These fees can be in the form of higher rates known as table ratings and/or flat extra charges. Table ratings and flat extra charges are components in the calculation of the insurance charges for the base policy and any applicable monthly rider insurance charges. Substandard risk charges only apply if certain factors result in an Insured having a substandard rating and will be shown in the policy's specifications pages. Note that the insurance charges, including any table ratings and/or flat extra charges, will not exceed \$83.33 per \$1,000 of rider face amount. For additional information, refer to the "Monthly Charges Against the Account Value" sub-section of the "Charges and Deductions" section of this prospectus.

All of the monthly charges listed in the table above are deducted proportionately from the then current Account Values in the Separate Account and the GPA (unless you direct us to deduct monthly charges from one Separate Account Division or from the GPA). The asset charge is deducted from the assets of the Separate Account only.

The next table shows the minimum and maximum total operating expenses charged by any of the Funds in which your Separate Account Divisions invest that you may pay periodically during the time that you own the policy. A complete list of Funds in which the Separate Account Divisions invest, including their annual expenses, may be found at the back of this document in Appendix A. More detail concerning each Fund's fees and expenses is contained in the prospectus for each Fund.⁽¹⁾

Annual Fund Operating Expenses	Minimum	Maximum
(expenses are deducted from Fund assets, including management fees, distribution, and/or 12b-1 fees, and other expenses)	0.28%	1.74%

- (1) The Fund expenses used to prepare this table were provided to us by the Funds. We have not independently verified such information provided to us by Funds that are not affiliated with us.

Principal Risks

Investment Risks

The value of your policy will fluctuate with the performance of the Separate Account Divisions you select. Your Separate Account Divisions may decline in value or they may not perform to your expectations. You bear the investment risk of any Account Value invested in the Separate Account Divisions. It is possible you could lose your entire investment.

The type of investments that a Fund company makes will also create risk. A comprehensive discussion of the risks of each of the Funds underlying the Separate Account Divisions may be found in that Fund's prospectus. You should read the Fund's prospectus carefully before investing.

Suitability

Variable life insurance is designed to help meet long-term financial goals. It is not suitable as a vehicle for short-term savings. You should not purchase the policy if you will need the premium payment in a short period of time. We may restrict short-term investment strategies.

Early Surrender

If you surrender your policy, you will be subject to surrender charges during the first nine Policy Years and during the first nine years after an increase in the policy's Face Amount. The surrender charge will reduce the proceeds payable to you. In some situations, it is possible that there will be little or no value in the policy after the surrender charges are deducted. An early surrender can also result in adverse tax consequences.

Withdrawals

A withdrawal will reduce your policy's Account Value by the amount withdrawn. If the policy's Net Surrender Value is reduced to a point where it cannot meet a monthly deduction, your policy may terminate. A withdrawal may also reduce your policy's Face Amount and may have adverse tax consequences.

Loans

Taking a loan from your policy has several risks: (1) it may increase the risk that your policy will terminate; (2) it will have a permanent effect on your policy's Net Surrender Value; (3) it may increase the amount of premium needed to keep the policy In Force; (4) it will reduce the death benefit proceeds; and (5) it may have adverse tax consequences.

Policy Termination

Your policy could terminate if the Net Surrender Value of the policy becomes too low to support the policy's monthly charges and the Safety Test is not met. In addition, the policy could terminate if the total Policy Debt Limit is reached (i.e., when Policy Debt equals or exceeds the Account Value less any surrender charges that apply: (1) on a Monthly Charge Date or (2) on the Valuation Date a premium payment is received, if the policy is in the Grace Period). Factors that may cause your policy to terminate include: insufficient premium payments, poor investment performance, withdrawals, and unpaid loans or loan interest. Poor investment performance of the Funds selected by the Owner and the deduction of policy fees and monthly charges may result in termination of the policy even if all Planned Premiums are timely paid, unless the Safety Test is met and there is no Policy Debt. No death benefit or other benefits under the policy will be paid once the policy terminates.

Limitations on Access to Cash Value

- Withdrawals are not available in the first Policy Year; however, full surrenders are permitted.
- We may not allow a withdrawal if it would reduce the Face Amount to less than the policy's minimum Face Amount.
- The minimum withdrawal is \$100 and the maximum withdrawal is 75% of the Net Surrender Value.
- There may be little to no cash value available for loans and withdrawals in the policy's early years.

Insurance Company Insolvency

It is possible that we could experience financial difficulty in the future and even become insolvent, and therefore unable to provide all of the guarantees and benefits that we promise that exceed the value of the assets in the Separate Account.

Adverse Tax Consequences

Certain transactions (including, but not limited to, withdrawals, surrenders and loans) may lead to a taxable event. Under certain circumstances (usually if your premium payments in the first seven years or less exceed specified limits), your policy may become a “Modified Endowment Contract” (MEC). Under federal tax law, loans, collateral assignments, withdrawals, and other pre-death distributions received from a MEC are taxed as income first and recovery of cost basis second. Also, distributions includible in income received before you attain age 59½ may be subject to a 10% penalty tax.

Existing tax laws that benefit this policy may change at any time.

Policy Charge Increase

We have the right to increase certain policy and rider charges; however, the charges will not exceed the maximum charges identified in the fee tables. If we increase a policy or rider charge, you may need to increase the amount and/or frequency of your premiums to keep your policy In Force. We will notify the Owner of any such changes through a prospectus supplement.

Cybersecurity and Certain Business Continuity Risks

Our operations support complex transactions and are highly dependent on the proper functioning of information technology and communication systems. Any failure of or gap in the systems and processes necessary to support complex transactions and avoid systems failure, fraud, information security failures, processing errors, cyber intrusion, loss of data and breaches of regulation may lead to a materially adverse effect on our results of operations and corporate reputation. In addition, we must commit significant resources to maintain and enhance our existing systems in order to keep pace with applicable regulatory requirements, industry standards and customer preferences. If we fail to maintain secure and well-functioning information systems, we may not be able to rely on information for product pricing, compliance obligations, risk management and underwriting decisions. In addition, we cannot assure investors or consumers that interruptions, failures or breaches in security of these processes and systems will not occur, or if they do occur, that they can be timely detected and remediated. The occurrence of any of these events may have a materially adverse effect on our businesses, results of operations and financial condition. For additional detail regarding cybersecurity and related risks, please see “Other Information – Computer System, Cybersecurity, and Service Disruption Risks” in this prospectus.

General Information about the Company, the Separate Account and the Underlying Funds

The 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. Products and services are offered primarily through MassMutual's distribution channels: MassMutual Financial Advisors, MassMutual Strategic Distributors, Institutional Solutions and Worksite.

MassMutual is organized as a mutual life insurance company. MassMutual's home office is located at 1295 State Street, Springfield, Massachusetts 01111-0001.

The Guaranteed Principal Account

Net Premium and Account Value you allocate to the GPA become part of the General Investment Account of the Company. Subject to applicable law, the Company has sole discretion over the assets in its General Investment Account. The assets of our General Investment Account support our insurance and annuity obligations and are subject to our general liabilities from our business operations and to claims by our creditors. We use General Investment Account assets for many purposes including to pay death benefits, withdrawals, surrenders, policy loans, and transfers from the GPA as well as to pay amounts we provide to you through elected additional features and guarantees that are in excess of your Variable Account Value allocated to the Separate Account. We refer to our ability to meet any contractual obligations as our claims-paying ability.

It is important to note that there is no guarantee that we will always be able to meet our claims-paying obligations, and as with any insurance product, there are risks to purchasing this policy. For this reason, when purchasing a policy and making investment decisions, you should consider our financial strength and claims-paying ability to meet our obligations under the policy.

The General Investment Account has not been registered under the Securities Act of 1933 (1933 Act) or the Investment Company Act of 1940 (1940 Act) because of exemptive and exclusionary provisions. Accordingly, neither the General Investment Account nor any interests therein are generally subject to the provisions of the 1933 Act or the 1940 Act. Disclosures regarding the GPA or the General Investment Account, however, are subject to certain generally applicable provisions of the federal securities laws relating to the accuracy and completeness of statements made in this prospectus.

You do not participate in the investment performance of the assets in our General Investment Account. Instead, we guarantee that amounts allocated to the GPA, in excess of Policy Debt, will earn interest at a minimum rate of 3% per year. We may credit a higher rate of interest at our discretion. The interest rate is declared monthly and becomes effective on the first of each calendar month. You bear the risk that no higher rates of interest will be credited.

For amounts in the GPA equal to any Policy Debt, the guaranteed minimum interest rate per year is the greater of:

- 3%; or
- the policy loan rate less the maximum loan interest rate expense charge.

You may obtain interest rate information for the GPA, including the loaned portion and the non-loaned portion, by calling our Administrative Office.

The Separate Account

The part of your premium that you invest in your policy's Separate Account Divisions is held in an account that is separate from the general assets of the Company. This account is called the Massachusetts Mutual Variable Life Separate Account I. In this prospectus, we will refer to it simply as the "Separate Account."

We established the Separate Account on July 13, 1988, according to the laws of the Commonwealth of Massachusetts. We registered it with the SEC as a unit investment trust under the 1940 Act.

The Separate Account exists to keep your life insurance assets separate from our other Company assets. As such, any income, gains, and losses credited to, or charged against, the Separate Account reflect only the Separate Account's own investment experience. At no time will the Separate Account reflect the investment experience of the Company's other assets. The Company owns the assets in the Separate Account. The Separate Account is divided into divisions, each of which purchases shares in a corresponding underlying Fund.

Any death benefits, withdrawals, surrenders, policy loans, or transfers of Account Value from the Separate Account Divisions will be redeemed from the corresponding Funds.

We may not use the assets in the Separate Account to pay any liabilities of the Company other than those arising from the policies. We may, however, transfer to our General Investment Account any assets that exceed anticipated obligations of the Separate Account. We are required to pay, from our general assets, if necessary, all amounts promised under the VUL III policies. In the event that the assets in the Separate Account exceed the liabilities, the Company may only withdraw seed capital and earned fees and charges.

We have established a segment within the Separate Account to receive and invest premium payments for the VUL III policies. Currently, the VUL III segment is divided into over 30 Separate Account Divisions. Each Separate Account Division purchases shares in a corresponding Fund. The underlying Funds are listed in Appendix A. Please see "Appendix A – Funds Available Under the Policy."

Some of the underlying Funds offered are similar to mutual funds offered in the retail marketplace. They may have the same investment objectives and portfolio managers as the retail funds. The Funds offered in the VUL III policy, however, are set up exclusively for variable annuity and variable life insurance products. *Their shares are not offered for sale to the general public, and their performance results will differ from the performance of the retail funds.*

We reserve the right, subject to compliance with applicable federal securities laws and regulations and any other federal or state law, to create separate accounts and to make certain material changes to the structure and operation of the Separate Account, including, among other things to:

- create new Separate Account Divisions;
- create new segments of the Separate Account for any new variable life insurance products we create in the future;
- eliminate Separate Account Divisions;
- close existing Separate Account Divisions to allocations of new premium payments by current or new policy owners;
- combine the Separate Account or any Separate Account Divisions with one or more different separate accounts or Separate Account Divisions;
- transfer the assets of the Separate Account or any division of the Separate Account that we may determine to be associated with the class of contracts to which the policy belongs to another separate account or Separate Account Division;
- operate the Separate Account as a management investment company under the 1940 Act or in any other form permitted by law;
- de-register the Separate Account under the 1940 Act in the event such registration is no longer required; and
- change the name of the Separate Account.

Underlying Funds

We do not recommend or endorse any particular Fund and we do not provide investment advice. You are responsible for choosing the Funds, and the amounts allocated to each, that are appropriate for your own individual circumstances and your investment goals, financial situation, and risk tolerance. Since investment risk is borne by you, decisions regarding investment allocations should be carefully considered. Information regarding each Fund, including (i) its name; (ii) its type (e.g., money market fund, bond fund, balanced fund, etc.); (iii) its investment adviser and any sub-investment adviser; (iv) current expenses; and (v) performance is available in Appendix A to this prospectus. Please see "Appendix A – Funds Available Under the Policy." In making your investment selections, we encourage you to thoroughly investigate all of the information regarding the Funds that is available to you. Each Fund has issued a prospectus that contains more detailed information about the Fund.

After you select Funds for your initial premium, you should monitor and periodically re-evaluate your allocations to determine if they are still appropriate.

You bear the risk of any decline in your policy Account Value resulting from the performance of the Funds you have chosen. You can find the prospectuses and other information about the Funds online at www.MassMutual.com/VULIII. You can also request this information at no cost by calling (800) 272-2216 or sending an email request to MassMutualServiceCenter@MassMutual.com.

Addition, Removal, Closure, or Substitution of Funds

We do not guarantee that each Fund will always be available for investment through the policy. We have the right to change

the Funds offered through the policy, but only as permitted by law. If the law requires, we will also get your approval and the approval of any appropriate regulatory authorities. Changes may only impact certain Owners. Examples of possible changes include: adding new

Funds or Fund classes, removing existing Funds or Fund classes, closing existing Funds or Fund classes, or substituting a Fund with a different Fund. New or substitute Funds may have different fees and expenses. We will not add, remove, close, or substitute any shares attributable to your interest in a Separate Account Division without notice to you and prior approval of the SEC, to the extent required by applicable law. We reserve the right to transfer Separate Account assets to another separate account that we determine to be associated with the class of policies to which your policy belongs.

Conflicts of Interest

The Funds available with this policy may also be available to registered separate accounts offering variable annuity and variable life products of other affiliated and unaffiliated insurance companies, as well as to the Separate Account and other separate accounts of MassMutual. Although we do not anticipate any disadvantages to these arrangements, it is possible that a material conflict may arise between the interests of the Separate Account and one or more of the other separate accounts participating in the Funds. A conflict may occur, for example, as a result of a change in law affecting the operations of variable life and variable annuity separate accounts, differences in the voting instructions of the owners and payees and those of other insurance companies, or some other reason. In the event of a conflict of interest, we will take steps necessary to protect owners and payees, including withdrawing the Separate Account from participation in the Funds involved in the conflict or substituting shares of other Funds.

Compensation We Receive from Funds, Advisers and Sub-Advisers

Compensation We Receive from Funds

We and certain of our insurance affiliates receive compensation from certain Funds pursuant to Rule 12b-1 under the 1940 Act. This compensation is paid out of a Fund's assets and may be as much as 0.25% of the average net assets of an underlying Fund that are attributable to the variable annuity and variable life insurance products issued by us and certain of our insurance affiliates that offer the particular Fund. An investment in a Fund with a 12b-1 fee will increase the cost of your investment in this policy.

Compensation We Receive from Advisers and Sub-Advisers

We and certain of our insurance affiliates also receive compensation from the advisers and sub-advisers to some of the Funds. We may use this compensation to pay expenses that we incur in promoting, issuing, distributing and administering the policy, and providing services on behalf of the Funds in our role as intermediary to the Funds. The amount of this compensation is determined by multiplying a specified annual percentage rate by the average net assets held in that Fund that are attributable to the variable annuity or variable life insurance products offered by us and certain of our insurance affiliates. These percentage rates differ, but currently do not exceed 0.25%. Some advisers and sub-advisers pay us more than others; some advisers and sub-advisers do not pay us any such compensation.

The compensation may not be reflected in a Fund's expenses because this compensation may not be paid directly out of a Fund's assets. These payments also may be derived, in whole or in part, from the advisory fee deducted from Fund assets. Owners, through their indirect investment in the Funds, bear the costs of these advisory fees (please see the Funds' prospectuses for additional information).

In addition, we may receive fixed dollar payments from the advisers and sub-advisers to certain Funds so that the adviser and sub-adviser can participate in sales meetings conducted by us. Attending such meetings provides advisers and sub-advisers with opportunities to discuss and promote their Funds.

For a list of the Funds whose advisers currently pay such compensation, visit www.MassMutual.com/privacy-policy/compensation-arrangements or call our Administrative Office.

Compensation and Fund Selection

When selecting the Funds that will be available with the policy, we consider each Fund's investment strategy, asset class, manager's reputation, and performance. We also consider the amount of compensation that we receive from the Funds, their advisers, sub-advisers, or their distributors. The compensation that we receive may be significant, and we may profit from this compensation. Additionally, we offer certain Funds through the policy at least in part because they are managed by an affiliate.

Voting Rights

We are the legal owner of the Fund shares. However, you have the right to instruct us how to vote on questions submitted to the shareholders of the Funds supporting the policy. This right is limited to the extent you are invested in those Separate Account Divisions on the record date. We vote shares for which we do not receive instructions in the same proportion as the shares for which

we do receive instructions. The shares held in the name of the Company and its affiliates will also be proportionally voted. This process may result in a small number of Owners controlling the vote. There is no minimum number of votes required. If we determine that we are no longer required to comply with the above, we will vote the shares in our own right.

Your right to instruct us is based on the number of shares of the Funds attributable to your policy. The number of shares of any Fund, attributable to your policy, is determined by dividing the Account Value held in that Separate Account Division by \$100. Fractional votes are counted.

We will send you or, if permitted by law, make available electronically, proxy material and a form to complete giving us voting instructions.

We may, when required by state insurance regulatory authorities, disregard voting instructions, if such instructions would require shares to be voted so as to cause a change in the sub-classification or investment objective of a Fund or to approve or disapprove an investment advisory contract for the Fund. In addition, we may disregard voting instructions that would require a change in the investment policy or investment adviser of one or more of the available Funds. Our disapproval of such change must be reasonable and based on a good faith determination that the change would be contrary to state law or otherwise inappropriate, considering the Fund's objectives and purpose. If we disregard Owner voting instructions, we will advise Owners of our action and the reasons for such action.

Charges and Deductions

This section describes the charges and deductions we make under the policy to compensate us for the services and benefits we provide, costs and expenses we incur, and risks we assume. We may profit from the charges deducted, and we may use any such profits for any purpose, including payment of distribution expenses.

In addition, the Funds pay operating expenses that are deducted from the assets of the Funds. For more information about these expenses, please see the individual Fund prospectuses.

Transaction Fees

Premium Expense Charge

We deduct a premium expense charge from each premium payment you make. The premium expense charge is generally used to cover taxes assessed by a state and/or other governmental agency as well as acquisition expenses.

- For Policies Issued After December 31, 2019: The current premium expense charge we deduct is 8% of premium paid up to and including the Premium Expense Factor, and 7% of premium over the Premium Expense Factor. The maximum premium expense charge we can deduct is 8% of premium paid up to and including the Premium Expense Factor, and 7% of premium over the Premium Expense Factor.
- For Policies Issued On or Before December 31, 2019: The current premium expense charge we deduct is 6% of any premium paid. The maximum premium expense charge we can deduct is 8% of premium paid up to and including the Premium Expense Factor, and 7% of premium over the Premium Expense Factor.

For the Initial Face Amount, the Premium Expense Factor is based on the issue age, gender, and risk classification of the Insured. For each increase in the Face Amount, the Premium Expense Factor is based on the Attained Age, gender, and risk classification of the Insured on the effective date of the increase. Please see footnote (1) in the "Transaction Fees" sub-section of the "Fee Tables" section for additional information.

Example:

Assume that you are a 35-year-old male, non-smoker and that your policy has a Face Amount of \$200,000. The Premium Expense Factor for your policy is \$9 per \$1,000 of Face Amount or \$1,800 ($200 \times \9).

Now assume that you make a premium payment of \$1,000. Your maximum premium expense charge is 8% of your premium payment up to and including the policy's Premium Expense Factor. Since your premium payment is less than the policy's Premium Expense Factor of \$1,800, your maximum premium expense charge will be \$80 ($8\% \times \$1,000$).

If your premium payment had been \$2,000, it would have exceeded the Premium Expense Factor by \$200 ($\$2,000 - \$1,800$). Consequently, your maximum premium expense charge would have been \$158:

- 8% of \$1,800 (\$144) plus
- 7% of \$200 (\$14).

If you have increased the policy Face Amount, the Premium Expense Factor used for this charge is the total of the Premium Expense Factors for the Initial Face Amount and for all increases.

Surrender Charges

There is a charge if you fully surrender your policy or if you decrease the Face Amount. We will also take any applicable surrender charges if your policy lapses. (Please see the "Policy Termination and Reinstatement" section for more information.) Generally, these charges will apply during:

- the first nine Policy Years of coverage; and
- the first nine years after each increase in Face Amount.

However, in no event will we deduct surrender charges after the Insured's Attained Age 99.

This surrender charge is also sometimes called a "deferred sales load." The charge compensates us for expenses incurred in issuing the policy's Initial Face Amount, issuing Face Amount increases, and for the recovery of acquisition costs.

The surrender charge is a charge against the Account Value of the policy. The deduction is taken from the Separate Account Divisions and the non-loaned portion of the GPA in proportion to the values in each on the effective date of the surrender, decrease in Face Amount, or lapse.

We calculate surrender charges separately for the Initial Face Amount and for each increase in the Face Amount. For the Initial Face Amount, the rates are based on the Insured's issue age, gender, risk classification, and coverage year. For each increase in the Face Amount, the rates are based on the Insured's gender, Attained Age, risk classification on the effective date of the increase, and coverage year. The surrender charge for the policy is the sum of the surrender charges for the Initial Face Amount and all Face Amount increases.

The surrender charge is equal to the first-year surrender charge multiplied by the following annual percentages:

For Policies Issued After December 31, 2019

Coverage Year	%	Coverage Year	%
1	100%	6	71 – 82%
2	93 – 100%	7	60 – 75%
3	87 – 100%	8	40 – 50%
4	81 – 100%	9	20 – 25%
5	76 – 100%	10	0%

For Policies Issued On or Before December 31, 2019

Coverage Year	%	Coverage Year	%
1	100%	6	73 – 82%
2	94 – 100%	7	60 – 75%
3	88 – 100%	8	40 – 50%
4	82 – 100%	9	20 – 25%
5	77 – 100%	10	0%

The annual percentages may vary for policies issued in New York.

For all policies, the surrender charge will not exceed \$50.58 per \$1,000 of Face Amount.

Surrender Charges for Decreases in Face Amount

If you decrease your policy's Face Amount, we cancel all or a part of your Face Amount segment(s) and charge a pro-rata surrender charge that will not exceed the surrender charge associated with each decreased or cancelled segment multiplied by the proportion of that segment that is decreased.

After a Face Amount decrease, the surrender charge for a decreased segment that remains In Force is decreased proportionately. This charge provides us with a proportional compensation for expenses incurred in issuing the policy's Initial Face Amount, issuing Face Amount increases, and for the recovery of acquisition costs.

Rider Processing Fee

We will assess a one-time processing fee at the time you exercise either the Accelerated Death Benefit Rider for Terminal Illness or the Substitute of Insured Rider. The maximum processing fee for the Accelerated Death Benefit Rider for Terminal Illness is \$250 (the fee may vary by state, but will not exceed \$250) and \$75 for the Substitute of Insured Rider. Payment is due upon request to exercise the Substitute of Insured Rider; however, the fee for the Accelerated Death Benefit Rider for Terminal Illness is deducted from the accelerated benefit payment and will reduce the amount you receive.

Periodic Charges

Loan Interest Rate Expense Charge

We assess a loan interest rate expense charge against policies with outstanding loan balances. This charge, which reimburses us for the ongoing expenses of administering the loan, represents the difference between the interest we charge on policy loans and the interest we credit on the cash value we hold as collateral for policy loans. The loan interest rate minus the loan interest expense charge is the interest rate we use to credit interest to the loaned portion of the GPA.

The maximum loan interest rate expense charge is 1% for the first 10 Policy Years and 0.50% in subsequent Policy Years. The current loan interest rate expense charge is 0.65% for the first 10 Policy Years and 0.15% in subsequent Policy Years. We reserve the right to increase the loan interest rate expense charge in order to ensure your loan is not treated as a taxable distribution under federal income tax rules, which may change over time.

Monthly Charges Against the Account Value

The following charges are deducted from the Account Value on each Monthly Charge Date. The Monthly Charge Date is the date on which monthly charges for the policy are due. The first Monthly Charge Date is the policy date, and subsequent Monthly Charge Dates are on the same day of each succeeding calendar month.

Your policy's Monthly Charge Date will be listed in the policy's specifications pages. Monthly charges are deducted from the Separate Account Division(s) and the GPA in proportion to the non-loaned values in each on the date the deduction is taken.

Administrative Charge and Face Amount Charge

The administrative charge and the face amount charge reimburse us for issuing and administering the policy, and for such activities as processing claims, maintaining records and communicating with you.

Administrative Charge

The current administrative charge is \$10 per policy, per month.

Face Amount Charge

The face amount charge is based on a rate per \$1,000 of the Initial Face Amount. We calculate the face amount charge separately for the Initial Face Amount and for each increase in the Face Amount. It is based on:

- the issue age, gender and risk classification of the Insured for the Initial Face Amount; and
- for each increase, the Insured's Attained Age, gender and risk classification at time of the increase;

and it is multiplied by the segment Face Amount. The face amount charge will not be reduced if the Face Amount is reduced. Please see the "Periodic Charges Other than Fund Operating Expenses" table in the "Fee Tables" section for additional information.

Insurance Charge

The insurance charge reimburses us for providing you with life insurance protection. We deduct an insurance charge based on your policy's Insurance Risk. Insurance Risk is equal to the difference between the death benefit (discounted one month at the guaranteed minimum interest rate for the GPA) and the Account Value. These deductions are made by deducting Accumulation Units, proportionately, from each Separate Account Division in which you have an Account Value and the GPA on each Monthly Charge Date up to, but not including, the Policy Anniversary on which the Insured reaches Attained Age 121.

The maximum insurance charge rates associated with your policy are shown in the policy's specification pages.

- *For Policies Issued After December 31, 2019:* These rates are calculated using the 2017 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality Tables or, for unisex rates, the 2017 Commissioners' Standard Ordinary (80) Ultimate, Smoker-Distinct, Age Nearest Birthday Mortality Table. The rates are also based on the risk classification of the person insured by the policy.
- *For Policies Issued On or Before December 31, 2019:* These rates are calculated using the 2001 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality Tables or, for unisex rates, the 2001 Commissioners' Standard Ordinary (80) Ultimate, Smoker-Distinct, Age Nearest Birthday Mortality Table. The rates are also based on the risk classification of the person insured by the policy.

We may charge less than the maximum monthly insurance charges shown in the table(s). In this case, the monthly insurance charge rates will be based on a number of factors including, but not limited to, our expectations for future mortality, investment earnings, persistency, expense and tax results, capital and reserve requirements, and profits. The expense component of these rates is used to offset sales and issue expenses, which decrease over time. Any change in these charges will apply to all individuals in the same class.

Insurance charges for the policy will not be the same for all Owners. Your policy's actual or current insurance charge rates are based on a number of factors including, but not limited to, the Insured's issue age (and age at increase, if applicable), risk classification, and gender (unless unisex rates are used). These rates generally increase as the Insured's age increases. The rates will vary with the number of years the coverage has been In Force and with the total Face Amount of the policy.

How the Insurance Charge is Calculated

(1) If the Minimum Death Benefit is not in effect:

We calculate the insurance charge on each Monthly Charge Date by multiplying the current insurance charge rate by a discounted Insurance Risk.

The Insurance Risk is the difference between:

- the amount of benefit available on that date, under the death benefit option in effect, discounted by the monthly equivalent of 3% per year; and
- the Account Value at the beginning of the policy month reduced by any rider charges (other than disability riders) before the monthly insurance charge is due.

The following three steps describe how we calculate the insurance charge for your policy:

Step 1: We calculate the total Insurance Risk for your policy:

- (a) We divide the amount of benefit under the death benefit option in effect that would be available at the beginning of the policy month by 1.0024662698 (which is the monthly equivalent of 3%); and
- (b) We subtract your policy's Account Value at the beginning of the policy month from the amount we calculated in Step 1(a) above.

Step 2: We allocate the Insurance Risk in proportion to the Face Amount of each segment and each increase that is In Force as of your Monthly Charge Date.

Step 3: We multiply the amount of each allocated Insurance Risk by the insurance charge rate for each coverage segment. The sum of these amounts is your insurance charge.

(2) If the Minimum Death Benefit is in effect:

We also calculate the insurance charge on each Monthly Charge Date. However, in Step 1 we calculate the total Insurance Risk for your policy, as described in (1) above:

- (i) assuming the Minimum Death Benefit is in effect; and then
- (ii) assuming the Minimum Death Benefit is not in effect.

Step 2: We allocate the Insurance Risk:

- (a) calculated for (ii) in proportion to the Face Amount of each segment and each increase that is In Force as of your Monthly Charge Date; and
- (b) we subtract the risk calculated for (ii) from the risk calculated for (i) and allocate that amount to the last underwritten segment.

Step 3: We multiply the amount of each allocated Insurance Risk by the insurance charge rate for each coverage segment. The sum of these amounts is your insurance charge.

Additional Information about the Insurance Charge

We will apply any changes in the insurance charges uniformly for all Insureds of the same issue age, gender, risk classification, and whose coverage has been In Force for the same length of time. No change in insurance class or cost will occur on account of deterioration of the Insured's health after we issue the policy. We do not offer special underwriting programs for this product such as guaranteed issue or simplified issue underwriting; therefore, individuals of similar health will be classified similarly.

Because your Account Value and death benefit may vary from month to month, your insurance charge may also vary on each Monthly Charge Date. The cost of your insurance depends on the amount of Insurance Risk on your policy. Factors that may affect the Insurance Risk include:

- the amount and timing of premium payments;
- investment performance;
- fees and charges assessed;
- the addition or deletion of certain riders;
- rider charges;
- withdrawals;
- policy loans;
- changes to the Face Amount; and

- changes to the death benefit option.

Substandard Risk Charge

Additional mortality fees may be assessed for risks associated with certain health conditions, occupations, aviation, avocations or driving history (i.e., substandard risks). These fees can be in the form of higher rates known as table ratings and/or flat extra charges. Table ratings and flat extra charges are components in the calculation of the insurance charges for the base policy and any applicable monthly rider insurance charges. Substandard risk charges only apply if certain factors result in an Insured having a substandard rating and will be shown in the policy's specifications pages. Note that the insurance charges, including any table ratings and/or flat extra

charges, will not exceed \$83.33 per \$1,000 of Insurance Risk or Face Amount. Table ratings and/or flat extra charges can remain on a policy for as long as 20 years, or Attained Age 65, if longer.

Rider Charges

The charges for the following riders are deducted from the Account Value on each Monthly Charge Date: Disability Benefit Rider, Guaranteed Insurability Rider, Other Insured Rider, Waiver of Monthly Charges Rider and Waiver of Specified Premium Rider.

The rates for the Disability Benefit Rider vary by the Insured's gender and Attained Age. Charges for the Disability Benefit Rider have two components. A portion of the charge is based on current rates ranging from \$0.00 to \$0.28 per \$1 of monthly deductions. The remainder of the charge is based on current rates ranging from \$0.00 to \$0.04 per \$1 of specified benefit amount. The monthly charges for this rider will continue up to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 65.

The rates for the Guaranteed Insurability Rider vary by the Insured's gender and issue age. Current rates range from \$0.03 to \$0.11 per \$1,000 of optional insurance coverage. The monthly charges for this rider will continue up to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 46.

The rates for the Other Insured Rider vary by the Insured's gender, Attained Age, and risk classification.

- For Policies Issued After December 31, 2019: Current rates range from \$0.01 to \$27.41 per \$1,000 of rider face amount. The monthly charges for this rider will not continue beyond the earlier of the base Insured's Attained Age 99 and the other Insured's Attained Age 99.
- For Policies Issued On or Before December 31, 2019: Current rates range from \$0.01 to \$29.79 per \$1,000 of rider face amount. The monthly charges for this rider will not continue beyond the earlier of the base Insured's Attained Age 99 and the other Insured's Attained Age 99.

The rates for the Waiver of Monthly Charges Rider vary by the Insured's gender and Attained Age. Current rates range from \$0.00 to \$0.28 per \$1 of monthly deductions. This monthly charge will continue up to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 65.

The rates for the Waiver of Specified Premium Rider vary by the Insured's gender and Attained Age. The rider charge for the Waiver of Specified Premium Rider is the greater of the charge for monthly deductions or the charge for the specified monthly premium amount. If the rider charge is based on the monthly deductions, the charge is based on current rates ranging from \$0.00 to \$0.28 per \$1 of monthly deductions. If the rider charge is based on the specified premium amount, the charge is based on current rates ranging from \$0.00 to \$0.04 per \$1 of specified monthly premium amount. The monthly charges for this rider will continue up to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 65.

Directed Monthly Deduction Program

You may elect to have us deduct the monthly charges from one Separate Account Division, or from the GPA, rather than from all options on a pro rata basis. This feature is called the Directed Monthly Deduction Program (DMDP).

To elect the DMDP, complete our Directed Monthly Deduction Program Request form and send it to us for processing. The DMDP will continue as long as you have enough value in your selected option on a Monthly Charge Date to cover the monthly charges then due, or unless you have specified a termination date in your request form.

If you don't have sufficient Account Value to cover the monthly charges due in your selected option on any Monthly Charge Date, we will deduct the monthly charges pro rata from all investment options with Account Value. We may, at any time, modify, suspend, or terminate the DMDP without prior notification.

Daily Charges Against the Separate Account

The following charge is deducted daily from the Separate Account.

Asset Charge

The asset charge is determined on your policy's Monthly Charge Date and is based on your policy's Account Value, on that Monthly Charge Date, after the current monthly charges are deducted. The charge is applied, on a daily basis, to your value in the Separate Account only. The maximum annual asset charge is equal to the following percentages of the portion of your policy's average daily net assets that are invested in the Separate Account:

- The maximum charge is 0.90% in Policy Years 1-10 and drops to 0.40% in Policy Year 11 and later;
- The current charge is 0.50-0.70% in Policy Years 1-10 and drops to 0.15% in Policy Year 11 and later.

When your policy is issued, the asset charge is set assuming your policy Account Value is \$100,000, regardless of your policy's actual Account Value. The asset charge will remain at this level until the Monthly Charge Date that is on or immediately after the date we receive your first premium payment. On the Monthly Charge Date immediately following your first premium payment, your asset charge will be set according to your policy's actual Account Value. On each of the policy's subsequent Monthly Charge Dates during your first 10 Policy Years, we will determine the asset charge to be applied to your value in the Separate Account until the next Monthly Charge Date. Even though your Variable Account Value may change from day to day, the asset charge applied to your value invested in the Separate Account will only change on a Monthly Charge Date when your Account Value has increased or decreased to a level that triggers the assessment of a different asset charge as shown in the following table.

<i>Your Value in the Separate Account</i>	<i>Current Charge Policy Years 1 – 10</i>	<i>Maximum Charge Policy Years 1 – 10</i>	<i>Current Charge Policy Years 11+</i>	<i>Maximum Charge Policy Years 11+</i>
\$0 – \$49,999.99	0.70%	0.90%	0.15%	0.40%
\$50,000 – \$99,999.99	0.60%	0.90%	0.15%	0.40%
\$100,000+	0.50%	0.90%	0.15%	0.40%

The asset charge compensates us for the risks and expenses involved in issuing and administering life insurance protection.

If the asset charge is not sufficient to cover the risks and expenses involved in issuing and administering the policy, we will bear the loss. If the amount of the charge is more than sufficient to cover those risks and expenses, we will make a profit on the charge. We may use this profit for any purpose, including the payment of marketing and distribution expenses for the policy.

The Separate Account purchases shares of the Funds at net asset value. The net asset value of each Fund reflects expenses already deducted from the assets of the Fund. Such expenses include investment management fees and other expenses and may include acquired Fund fees and expenses. For some Funds, expenses will also include 12b-1 fees to cover distribution and/or certain service expenses. When you elect a Fund as an investment choice, that Fund's expenses will increase the cost of your investment in the policy. Please see each Fund's prospectus for more information regarding these expenses.

Special Circumstances

There may be special circumstances that result in sales or administrative expenses or Insurance Risks that are different than those normally associated with this policy. Under such circumstances, we may vary the charges and other terms of the policies; however, the charges will not exceed the maximum charges identified in the fee tables. We will make these variations only in accordance with uniform rules we establish.

Owner, Insured, Beneficiary

Owner

The Owner is the person who will generally make the choices that determine how the policy operates while it is In Force. In California, the policy is not available for purchase by anyone over age 59. You name the Owner in the application. However, the Owner may be changed by Written Request received in Good Order at our Administrative Office while the policy is In Force; therefore, the Owner is the person we have listed as such in our records. Generally, the change of Owner will take effect as of the date the Written Request is signed. However, in certain states you may not change Owners without our approval. We will refuse or accept any requested change of Owner on a non-discriminatory basis. Please see your policy. Each change will be subject to any payment we made or other action we took before receiving the owner designation form in Good Order. When we use the terms “you” or “your,” in this prospectus, we are referring to the Owner.

The sale of your policy to an unrelated investor, sometimes called a viatical or a life settlement, typically has transaction costs that may reduce the value of your estate. Discuss the benefits and risks of selling your life insurance policy with your registered representative and estate planner before you enter into a life settlement. Such a sale may also have adverse tax consequences. Please see “Sales to Third Parties” in the “Federal Income Tax Considerations” section for additional information.

Insured

The Insured is the person on whose life the policy is issued. The Owner must have an insurable interest in the life of the Insured in order for the policy to be valid under state law and for the policy to be considered life insurance for income tax purposes. If the policy does not comply with the insurable interest requirements of the issue state at the time of issue, the policy may be deemed void from the beginning. As a result, the policy would not provide the intended benefits. It is the responsibility of the Owner to determine whether proper insurable interest exists at the time of policy issuance.

You name the Insured in the application for the policy. We will not issue a policy for an Insured who is beyond Attained Age 90. Before issuing a policy, we will require evidence to determine the insurability of the Insured. This will usually require a medical examination.

Beneficiary

The beneficiary is the person you name in the application to receive any death benefit. You may name different classes of beneficiaries, such as primary and secondary. These classes will set the order of payment. There may be more than one beneficiary in a class.

Unless an irrevocable beneficiary has been named, you can change the beneficiary at any time before the Insured dies by sending a Written Request in Good Order to our Administrative Office. The Owner must have the consent of an irrevocable beneficiary to change the beneficiary. Generally, the change will take effect as of the date your request is signed. Each change will be subject to any payment we made or other action we took before receiving the Written Request in Good Order.

If no beneficiary is living or in existence when the Insured dies, we will pay you the death benefit unless the policy states otherwise. If you are deceased, the death benefit will be paid to your estate.

Purchasing a Policy

Purchasing a Policy

To purchase a policy, you must send us a completed application. The minimum Initial Face Amount of a policy is currently \$50,000. The Owner selects, within our limits, the policy's "Face Amount." The Face Amount is used to determine the amount of insurance coverage the policy provides while it is In Force. The "Initial Face Amount" is the Face Amount on the Policy Date. It is listed on the first page of your policy.

We determine whether to accept or reject the application for the policy and the Insured's risk classification. Coverage under the policy becomes effective on the date the last of all premiums due and necessary documents are received in Good Order at our Administrative Office.

Policies generally are issued with rates that vary based on a number of factors including, but not limited to, the gender of the Insured. In some situations, however, we may issue unisex policies (policies whose rates do not vary by the gender of the Insured). Policies issued in Montana are unisex, and policies issued as part of an employee benefit plan may be unisex. References in this prospectus to sex-distinct policy values are not applicable to unisex policies.

Your Right to Return the Policy

You have the right to cancel the policy, generally, within ten days of receiving it (Free Look). If you cancel the policy, we will issue a refund. The state in which the policy is issued determines the Free Look period and the type of refund that applies. Please see your policy for details. However, the following will give you a general idea of the type of refund you may receive.

Most states require us to refund the policy's Account Value less any withdrawals and any Policy Debt. Other states require us to refund the premium paid less withdrawals and Policy Debt. In those states that require a refund of premium, your premium payment is held in the money market division of the Separate Account during the Free Look period.

Additionally, under certain circumstances such as mistake of fact, we may reissue your policy with different features after the Free Look period expires. Please contact your registered representative for details if you feel your policy should be reissued.

To cancel the policy, return it to us at our Administrative Office, to the registered representative who sold the policy, or to one of our agency offices.

Sending Requests in Good Order

From time to time you may want to submit a Written Request for a change of beneficiary, a transfer, or some other action. A Written Request is a written or electronic communication or instruction in Good Order sent by the Owner to, and received by, MassMutual at our Administrative Office. We may allow requests to be submitted by telephone, fax, website, or other electronic media for certain transactions. Telephone, fax, email, or internet transactions may not always be available. Telephone, fax, and computer systems can experience outages or slowdowns for a variety of reasons. These outages or slowdowns may prevent or delay our receipt of your request. We may make these additional methods available at our discretion. They may be suspended or discontinued at any time without notice. Not all transaction types can be requested by telephone, website, or other electronic media.

Premiums

The Planned Premium amount you pay is based on a number of factors including, but not limited to:

- the Face Amount;
- the Insured's gender;
- the Insured's issue age;
- the Insured's risk classification;
- policy charges;
- premium frequency;
- the death benefit option; and
- whether or not any riders apply to the policy.

First Premium

Generally, you determine the first premium you want to pay for the policy, but it must be at least equal to the Minimum Initial Premium. The Minimum Initial Premium depends on:

- your chosen premium frequency;
- the policy's Initial Face Amount and death benefit option;
- the issue age, gender, and risk classification of the Insured; and
- any riders on the policy.

Generally, you will give your first premium payment or payment instructions to the registered representative who sold you the policy. The currently available methods of payment for your first premium include:

- authorizing the Company to draft the initial premium electronically from your bank account. You initiate the electronic payment for the initial premium by completing the appropriate administrative form;
- check; and
- wire transfer. For instructions on how to make a premium payment by wire transfer, please call our Administrative Office at (800) 272-2216.

Please note that your initial premium is applied to your policy when the payment is received in Good Order at our Administrative Office and after the policy has been issued.

Planned Premiums

When applying for the policy, you select (within the policy limitations) the Planned Premium and payment frequency (annual, semiannual, quarterly, or monthly).

We will send premium notices for the Planned Premium based on the payment frequency in effect. If a Planned Premium payment is not made, the policy will not necessarily terminate. Conversely, making Planned Premium payments does not necessarily guarantee the policy will remain In Force. To keep the policy In Force, it must have sufficient Surrender Value or satisfy the Safety Test. Please see the "Policy Termination and Reinstatement" section. We will send a notice of any premium needed to prevent termination of the policy.

Before making any changes to the timing or frequency of premium payments, you should speak to your registered

representative to determine the impact on your policy.

To change the amount and frequency of Planned Premiums, you may contact our Administrative Office.

If you change the frequency of your Planned Premiums, your policy may be at risk of lapsing because we do not bill for fractional payment periods.

Example:

Your Policy Anniversary is on January 2 and the planned quarterly premium payments are made. We have been sending a bill each quarter for the applicable premium. In June, we receive notification to change the Planned Premium from quarterly payments to annual payments. In this situation, we would have sent bills for the first and second quarterly payments of that year. After receiving notification, however, we would not send a bill for the last two quarterly payments of that year. We will send the next bill approximately 30 days prior to the next Policy Anniversary (January 2). If a premium payment is not made between July and January 2, your policy may lapse before the next bill is received. For more information on what happens if your policy lapses, please see the "Policy Termination and Reinstatement" section.

Subsequent Premium Payments

We will apply your subsequent premium payment on the Valuation Date that it is received in Good Order. If we receive your payment in Good Order on a non-Valuation Date or after the end of a Valuation Date, we will apply your payment on the next Valuation Date. If a payment is dishonored by your bank after we have applied the premium payment to your policy, the transaction will be deemed void and your payment will be reversed.

If mailing a subsequent premium payment, it must be sent to the appropriate lockbox (premium payment processing service). Premium payments sent to an incorrect lockbox will be considered not in Good Order. We will reroute the payment and apply it on the Valuation Date when it is determined to be in Good Order. Please see below for lockbox address details.

If you or the premium payer receives a single bill for multiple insurance policies, subsequent premium payments must be sent to:

<u>Regular Mail:</u>	<u>Overnight Mail</u>
MassMutual	MassMutual
APM Payment Processing Center	5450 N. Cumberland Ave.
PO Box 92485	Suite 100
Chicago, IL 60675-2485	Lockbox 92485
	Chicago, IL 60656

For all other policies, subsequent premium payments must be sent to the appropriate address:

<u>Regular Mail:</u>	<u>Overnight Mail</u>
MassMutual	MassMutual
PO Box 92483	5450 N. Cumberland Ave.
Chicago, IL 60675-2483	Suite 100
	Lockbox 92483
	Chicago, IL 60656

Electronic Premium Payments

We also offer options to allow you to pay premiums through electronic means.

You may initiate single or recurring premium payments for your In Force policy through our secure website (www.MassMutual.com) or by calling our Administrative Office and authorizing an electronic draft from your bank account. Requests to initiate electronic payments are effective on the Valuation Date that you submit the request in Good Order. If you wish to cancel an electronic payment, you must call our Administrative Office at (800) 272-2216 before the end of the Valuation Date (generally 4:00 p.m. Eastern Time).

If a bank draft is dishonored by your bank after we have applied the payment to your policy, the transaction will be deemed void and your payment will be reversed. In addition, if you have established recurring electronic payments and we are unable to obtain payment from your bank account, we will discontinue the recurring payments. You may re-establish recurring electronic payments through our website.

Premium payments may also be made by wire transfer. For instructions on how to make a premium payment by wire transfer, please call our Administrative Office at (800) 272-2216.

Premium Payment Plan

For recurring withdrawals from a bank account, you may elect to pay premiums by pre-authorized check. Under this procedure, we automatically deduct premium payments each month from a designated bank account. We will not send a bill for these automatic

payments. The pre-authorized check service may commence at any time, unless your policy has entered its Grace Period. This service can be discontinued by contacting our Administrative Office.

This pre-authorized check (PAC) service may be initiated or updated by visiting www.MassMutual.com or by submitting a completed PAC form.

We must receive notification of account changes at our Administrative Office at least seven business days before the next draft. Withdrawals from the designated bank account may be selected for any date between the 1st and the 28th of the month. If a date is not specified, we will select a date and send notice in advance of the first draft. We may discontinue the pre-authorized check service for your policy and automatically switch to quarterly billing if:

- your policy has insufficient value to cover the monthly charges due and the elected premium is below the current monthly deductions; or
- we are unable to obtain the premium payment from the bank account; or
- your policy has exceeded a MEC or premium limitation and we are unable to apply your payment.

Premium Flexibility

After the first premium has been paid, within limits, any amount of premium may be paid at any time while the Insured is living. Although you must maintain sufficient Net Surrender Value to keep the policy In Force, there is no required schedule for premium payments.

We reserve the right to return any premium payment under \$20.

In some cases, applying a subsequent premium payment in a Policy Year could result in your policy becoming a MEC. We will not credit any amount of premium to your policy that will exceed MEC limits unless we have written authorization from the Owner to allow MEC status. For more information on MECs, please see the "Federal Income Tax Considerations" section.

Additionally, we will follow these procedures:

- If we receive a subsequent premium that will cause the policy to become a MEC, we will apply to your policy the portion of the payment that will not cause the policy to become a MEC, and we will refund the balance to the premium payer, except under the circumstances described below. The portion of the payment that is credited to the policy will be credited as of the Valuation Date the payment was determined to be in Good Order.
- If the Policy Anniversary is within 14 calendar days of the date the premium is received, and applying the entire payment on the Policy Anniversary will not cause the policy to become a MEC, we will hold the payment without interest until the Policy Anniversary and credit the entire payment as of the Policy Anniversary date. If the anniversary date is not a Valuation Date, the payment will be credited as of the next Valuation Date following the Policy Anniversary.
- We will notify the Owner of any premium that is held or refunded in order to prevent the policy from becoming a MEC. You may also contact us to provide different instructions regarding how to apply your premium payment.

The procedures above may not apply if there has been a material change to your policy that impacts the 7-pay limit or 7-pay period because the start of the 7-pay period may no longer coincide with your Policy Anniversary. Please see "Modified Endowment Contracts" in the "Federal Income Tax Considerations" section for additional information.

Premium Limitations

The Internal Revenue Code of 1986, as amended (IRC), has limits on the amount of money you may put into a life insurance contract and still meet the definition of life insurance for tax purposes. There are two tests under the IRC rules that are used to determine if a policy meets their guidelines:

- the Cash Value Accumulation Test; and
- the Guideline Premium Test.

If you choose the Cash Value Accumulation Test, the maximum premium you can pay each Policy Year is the greatest of:

- an amount equal to \$100 plus double the annual Premium Expense Factor for the policy;
- the amount of premium paid in the preceding Policy Year; or
- the highest premium payment amount that would not increase the Insurance Risk.

If you choose the Guideline Premium Test, the maximum premium for each Policy Year is the lesser of:

- the maximum premium for the Cash Value Accumulation Test; or
- the Guideline Premium Test amount stated in the policy.

We may refund any amount of premium payment that exceeds the limit under the test you have chosen for your policy. If we did not refund the excess premium, the policy may no longer qualify as life insurance under federal tax law.

For more information on these tests, please see the “Minimum Death Benefit” sub-section in the “Death Benefit” section.

Certain policy changes (including but not limited to a change in Face Amount, a change in risk classification, or the addition or removal of a rider) may cause a recalculation of your maximum premium limit. If a policy change results in a decrease to your premium limit, we may be required to distribute funds from your policy to maintain its compliance with the adjusted premium limit. The distribution will be taken from the Separate Account Division(s) and the GPA in proportion to the non-loaned values in each.

How and When Your Premium is Allocated

Net Premium

Net Premium is a premium payment received in Good Order minus the premium expense charge. Please see “Premium Expense Charge” in the “Transaction Fees” sub-section of the “Charges and Deductions” section.

Premiums that would cause the policy to be a MEC may not be considered to be in Good Order, depending on when they are received.

The Net Premium is allocated among the Separate Account Divisions and the GPA according to your current instructions we have on record.

Net Premium Allocation

When applying for the policy, you indicate how you want Net Premiums allocated among the Separate Account Divisions and the GPA. Net Premium allocations must be whole-number percentages that add up to 100%.

You may change your Net Premium allocation at any time by sending a Net Premium Allocation Request form to us at our Administrative Office. You may also change your Net Premium allocation by telephone or fax transmission, subject to certain restrictions. To help protect against unauthorized or fraudulent telephone instructions, we will take reasonable steps to confirm that telephone instructions given to us are genuine. We may record all telephone conversations.

When accompanied by a premium payment, a request to change your Net Premium allocation will become effective on the Valuation Date we receive your request, in Good Order, at our Administrative Office. If we receive your request in Good Order on a non-Valuation Date or after the end of a Valuation Date, the change will become effective on the next Valuation Date.

When Net Premium is Allocated

The Policy Date, Issue Date, and Register Date of your policy may affect the allocation of your Net Premiums. This, in turn, can affect the investment earnings and interest credited on your policy Account Value.

The Issue Date is the date we actually issue the policy. The Policy Date normally is the same date as the Issue Date. However, you may request in your application that we set the Policy Date to be a specific date earlier than the Issue Date. In this case, monthly charges will be deducted as of the requested Policy Date. These deductions will cover a period of time during which the policy is not in effect. If you paid a premium with your application and requested a Policy Date earlier than the date we receive your payment, interest will not accrue on your policy prior to the policy's Issue Date. Additionally, the Policy Date will determine the amount of premium required for your premium to be considered in Good Order.

The Register Date is the first date premiums will be allocated. We set the Register Date depending on the type of refund offered under your policy's right to return provision. The Register Date must also be a Valuation Date.

Allocation of Initial and Subsequent Net Premiums

We will allocate any Net Premiums received on or before the Issue Date of the policy to our General Investment Account. We do not pay you interest on these amounts or credit any interest to your policy prior to the Issue Date.

It should be noted, however, that your Minimum Initial Premium may change from the amount that was originally quoted.

If, for any reason, your initial Net Premium payment is insufficient, your payment will not be considered in Good Order. We will hold the payment in our General Investment Account. We do not pay you interest on these amounts, and you will have to pay the balance before we will consider your initial premium payment in Good Order.

Initial premium payments that are in Good Order and held in our General Investment Account on the Issue Date will be credited with the current GPA interest rate on that date. Your initial Net Premium payment, including any amounts held in our General Investment Account, will be allocated among the Separate Account Divisions and the GPA according to your Net Premium allocation instructions on the Register Date.

If your policy states that upon Free Look we will refund the policy's Account Value, less any withdrawals and any Policy Debt, the Register Date is the Valuation Date that is on, or next follows, the later of:

- the day after the Issue Date of the policy; and
- the date we or the appropriate lockbox receives the balance of your initial premium.

If your policy states that upon Free Look we will refund the premium you paid less withdrawals and any Policy Debt:

- The Register Date is the Valuation Date that is on, or next follows, the later of:
 - the number of days in the policy's Free Look period starting from the Issue Date; and
 - the date we or the appropriate lockbox receives the balance of your initial premium.
- We will allocate existing values, held as of the policy's Issue Date, to the money market division on the first Valuation Date after the Issue Date. (The existing values at this time would be any money taken with the application for the policy less any applicable charges plus any interest earned on the Issue Date.); and
- We will allocate any Net Premiums received after the Issue Date but before the Register Date to the money market division.

We will apply your subsequent premium payments that are received on or after the Register Date, on the Valuation Date we receive them in Good Order. Subsequent premium payments will be applied in accordance with your premium allocation instructions.

Transfers

While your policy is In Force, you may generally transfer all or part of a Separate Account Division's Account Value to any other Separate Account Division or the GPA by indicating the dollar amount or the percentage (in whole numbers) you wish to transfer. Transfers are effective as of the Valuation Date we receive your request in Good Order at our Administrative Office. If we receive your request in Good Order on a non-Valuation Date or after the end of a Valuation Date, your transfer request will be effective as of the next Valuation Date.

We do not charge for transfers.

You can submit transfer requests by sending us a Written Request on our transfer request form. You may also submit transfer requests by telephone, or by other means we authorize, subject to certain restrictions. To help protect against unauthorized or fraudulent telephone instructions, we will take reasonable steps to confirm that telephone instructions given to us are genuine. We may record all telephone conversations.

Generally, there is no limit on the number of transfers you may make among the Separate Account Divisions. However, as discussed more fully in the section below, we may terminate, limit, or modify your ability to make such transfers due to frequent trading or market timing activity.

We limit transfers from the GPA to the Separate Account Divisions to one each Policy Year.

In addition, you may not transfer more than 25% of the GPA Value (less any Policy Debt) at the time of transfer. There is one exception to this rule. If:

- you have transferred 25% of the GPA Value (less any Policy Debt) each year for three consecutive Policy Years; and
- you have not added any Net Premiums or transferred amounts to the GPA during these three years,

then you may transfer the remainder of the GPA Value (less any Policy Debt) out of the GPA in the succeeding Policy Year.

You may not make any fund transfers during the Free Look period for policies under which we refund the premium paid for the policy less withdrawals and Policy Debt. In addition, fund transfers (including transfers through automated programs) cannot be processed during a Grace Period. You must pay the premium due before any subsequent fund transfers can be processed.

Limits on Frequent Trading and Market Timing Activity

This policy and its investment choices are not designed to serve as vehicles for what we have determined to be frequent trading or market timing trading activity. We consider these activities to be abusive trading practices that can disrupt the management of a Fund in the following ways:

- by requiring the Fund to keep more of its assets liquid rather than investing them for long-term growth, resulting in lost investment opportunity; and
- by causing unplanned portfolio turnover.

These disruptions, in turn, can result in increased expenses and can have an adverse effect on Fund performance that could impact all Owners and beneficiaries under the policy, including long-term Owners who do not engage in these activities. Therefore, we discourage frequent trading and market timing trading activity and will not accommodate frequent transfers among the Funds. Organizations and individuals that intend to trade frequently and/or use market timing investment strategies should not purchase this policy. We have adopted policies and procedures to help us identify those individuals or entities that we determine may be engaging in frequent trading and/or market timing trading activities. We monitor trading activity to uniformly enforce those procedures. However, those who engage in such activities may employ a variety of techniques to avoid detection. Our ability to detect frequent trading or market timing may be limited by operational or technological systems, as well as by our ability to predict strategies employed by Owners (or those acting on their behalf) to avoid detection. Therefore, despite our efforts to prevent frequent trading and the market timing of Funds among the Separate Account Divisions, there can be no assurance that we will be able to identify all those who trade frequently or those who employ a market timing strategy (or any intermediaries acting on behalf of such persons) and curtail their trading in every instance. Moreover, our ability to discourage and restrict frequent trading or market timing may be limited by decisions of state regulatory bodies and court orders that we cannot predict. In addition, some of the Funds are available with variable products issued by other insurance companies. We do not know the effectiveness of the policies and procedures used by these other insurance companies to detect frequent trading and/or market timing. The Funds may reflect lower performance and higher expenses across all policies as a result of undetected abusive trading practices. If we, or the investment adviser to any of the Funds available with this policy, determine that an Owner's transfer patterns reflect frequent trading or employment of a market timing strategy, we will allow the Owner to submit transfer requests by regular mail only. We will not accept the Owner's transfer request if submitted by overnight mail, fax, the telephone, our website, or any other type of electronic medium. Additionally, we may reject any single trade that we determine to be abusive or harmful to the Fund.

Orders for the purchase of Fund shares may be subject to acceptance by the Fund. Therefore, we reserve the right to reject, without prior notice, any Fund transfer request if the investment in the Fund is not accepted for any reason. In addition, Funds may assess a redemption fee (which we reserve the right to collect) on shares held for a relatively short period. The prospectuses for the Funds describe the Funds' frequent trading or market timing policies and procedures, which may be more or less restrictive than the policies and procedures we have adopted. We have entered into a written agreement, as required by SEC regulation, with each Fund or its principal underwriter that obligates us to provide to the Fund promptly upon request certain information about the trading activity of individual Owners, and to execute instructions from the Fund to restrict or prohibit further purchases or transfers by specific Owners who violate the frequent trading or market timing policies established by the Fund. Owners and other persons with interests in the policies should be aware that the purchase and redemption orders received by the Funds generally are "omnibus" orders from intermediaries, such as retirement plans or separate accounts funding variable insurance contracts. The omnibus orders reflect the aggregation and netting of multiple orders from individual Owners of variable contracts and/or individual retirement plan participants. The omnibus nature of these orders may limit the Funds in their ability to apply their frequent trading or market timing policies and procedures. It may also require us to restrict or prohibit further purchases or transfers as requested by a Fund on all policies owned by an Owner whose trading activity under one variable contract has violated a Fund's frequent trading or market timing policy. If a Fund believes that an omnibus order reflects one or more transfer requests from Owners engaged in frequent trading or market timing activity, the Fund may reject the entire omnibus order.

We will notify you in writing if we reject a transfer or if we implement a restriction due to frequent trading or the use of market timing investment strategies. If we do not accept a transfer request, no change will be made to your allocations per that request. We will then

allow you to resubmit the rejected transfer by regular mail only. Additionally, we may in the future take any of the following restrictive actions that are designed to prevent the employment of a frequent trading or market timing strategy:

- not accept transfer instructions from an Owner or other person authorized to conduct a transfer;
- limit the number of transfer requests that can be made during a Policy Year; and
- require the value transferred into a Fund to remain in that Fund for a particular period of time before it can be transferred out of the Fund.

We will apply any restrictive action we take uniformly to all Owners we believe are employing a frequent trading or market timing strategy. These restrictive actions may not work to deter frequent trading or market timing activity. We reserve the right to revise our procedures for detecting frequent trading and/or market timing at any time without prior notice if we determine it is necessary to do so in order to better detect frequent trading and/or market timing, to comply with state or federal regulatory requirements, or to impose different restrictions on frequent traders and/or market timers. If we modify our procedures, we will apply the new procedure uniformly to all Owners.

Dollar Cost Averaging Program

The Dollar Cost Averaging (DCA) Program is an automated transfer program that provides scheduled transfers of a set amount from a selected Separate Account Division to any other Separate Account Division(s) or the GPA.

DCA will not assure you of a profit and will not protect you against a loss in declining markets. Since our DCA Program anticipates continued investment during periods of fluctuating prices, you should consider your ability to assume the financial risks of continued DCA through periods of fluctuating price levels.

Initially, a minimum of \$1,000 of Account Value is placed in one Separate Account Division. Then, over a stipulated period of time and at a preset frequency, a specified amount of Account Value is transferred from that Separate Account Division and allocated to other Separate Account Divisions or to the GPA. The minimum transfer amount for the DCA Program is \$100. Account Value held in the GPA cannot be transferred out of the GPA through the DCA Program.

Since the same specified dollar amount is transferred to each Separate Account Division at a preset frequency, more Accumulation Units are purchased when prices are low than when prices are high. Therefore, a lower average cost per unit may be achievable than through a lump-sum purchase of units or through non-level purchases of units.

If on a specified DCA transfer date, however, the Separate Account Division from which amounts are being transferred does not have enough value to make the transfers you elected, DCA will not occur. DCA will occur on the next designated DCA transfer date as long as the amount you designated to be transferred is available.

To elect DCA, complete our Dollar Cost Averaging Request form and send it to us for processing. You may not elect DCA for the policy while the Portfolio Rebalancing Program is in effect. We do not charge you to participate in the DCA Program.

We may at any time modify, suspend, or terminate the DCA Program without prior notification.

Portfolio Rebalancing Program

The Portfolio Rebalancing Program is an automated transfer program that allows you to rebalance your portfolio on a predetermined schedule that you set (annual, semiannual, quarterly, and monthly). The GPA is not included in the Portfolio Rebalancing Program.

Over time, varying investment performance among the Separate Account Divisions may cause the ratios of your Account Value in those selected Separate Account Divisions to change. The Portfolio Rebalancing Program allows you to choose Separate Account Divisions among which you wish to maintain certain relative proportions of Account Value. At a pre-determined frequency, we will make transfers among all the Separate Account Divisions you select so that the Account Values in the selected Separate Account Divisions match the ratios you set.

In order for portfolio rebalancing to occur, the Account Value in at least one of the selected Funds must vary from your chosen ratio by at least \$25.

To elect the Portfolio Rebalancing Program, complete our Portfolio Rebalancing Request form and send it to us for processing. You can also elect the Portfolio Rebalancing Program by telephone, subject to certain restrictions.

You may not elect the automated Portfolio Rebalancing Program while Dollar Cost Averaging is in effect for the policy. We do not charge you to participate in the Portfolio Rebalancing Program. We may at any time modify, suspend, or terminate the Portfolio

Rebalancing Program without prior notification. Portfolio rebalancing will not assure you of a profit and will not protect you against loss in declining markets.

If you prefer a one-time portfolio rebalance instead of the automated Portfolio Rebalancing Program, you may complete our administrative form and send it to us for processing. You can also elect unscheduled portfolio rebalancing by telephone, subject to certain restrictions. Unscheduled portfolio rebalancing transactions are effective as of the Valuation Date we receive your request in Good Order at our Administrative Office. If we receive your request in Good Order on a non-Valuation Date or after the end of a Valuation Date, your unscheduled portfolio rebalancing request will be effective as of the next Valuation Date.

Example:

Assume that your initial Net Premium payment is split among four Separate Account Divisions: MML Managed Bond, MML Foreign, MML Equity and Fidelity® VIP Contrafund® Portfolio.

Further assume that you have also completed a Portfolio Rebalancing Request form indicating that you want the values in the Separate Account Divisions rebalanced quarterly as follows:

- 60% in MML Managed Bond and
- 40% in Fidelity® VIP Contrafund® Portfolio.

Over the next 2½ months the bond market does very well while the stock market performs poorly. At the end of the first quarter, the MML Managed Bond division represents 80% of the value of the two selected Separate Account Divisions in your Portfolio Rebalancing Program.

On the first day of the next quarter, we will sell all units in the MML Foreign and MML Equity divisions using the proceeds to purchase units in the MML Managed Bond (60%) and Fidelity® VIP Contrafund® Portfolio (40%) divisions. In addition, some of your units in the MML Managed Bond division will be sold and the proceeds will be used to purchase additional units in the Fidelity® VIP Contrafund® Portfolio division to bring the ratio of the two investment choices to 60/40 respectively.

Policy Value

How the Value of Your Policy is Calculated

The value of your policy is called its Account Value. The Account Value has two components:

- the Variable Account Value; and
- the Fixed Account Value.

We will calculate your Account Value on each Valuation Date.

Variable Account Value

Transactions in your Separate Account Divisions are all reflected through the purchase and sale of Accumulation Units. An Accumulation Unit is a unit of measure that we use to determine the value in each Separate Account Division. For instance, before we invest your Net Premium payment in a Separate Account Division, we convert your Net Premium payment into Accumulation Units and then purchase an appropriate number of shares in the designated Fund.

The Variable Account Value is the sum of your values in each of the Separate Account Divisions. It reflects:

- Net Premiums allocated to the Separate Account; plus
- transfers to the Separate Account from the GPA; less
- transfers and withdrawals from the Separate Account; less
- surrender charges deducted from the Separate Account due to any decreases in the Selected Face Amount; less
- fees and charges deducted from the Separate Account; adjusted by
- the Net Investment Experience of the Separate Account.

Net Investment Experience

The Net Investment Experience of the Variable Account Value is reflected in the value of the Accumulation Units.

Every Valuation Date we determine the value of an Accumulation Unit for each of the Separate Account Divisions. Changes in the Accumulation Unit value reflect the investment performance of the Fund as well as deductions for the asset charge, and Fund expenses.

The value of an Accumulation Unit may go up or down from Valuation Date to Valuation Date.

When you make a premium payment, we credit your policy with Accumulation Units. We determine the number of Accumulation Units to credit by dividing the amount of the Net Premium payment allocated to a Separate Account Division by the unit value for that Separate Account Division. When you make a withdrawal, we deduct Accumulation Units representing the withdrawal amount from your policy. We deduct Accumulation Units for insurance and other policy charges.

We calculate the value of an Accumulation Unit for each Separate Account Division at the end of each Valuation Date. Any change in the Accumulation Unit value will be reflected in your policy's Account Value.

Fixed Account Value

The Fixed Account Value is the accumulation of:

- Net Premiums allocated to the GPA; plus
- amounts transferred into the GPA; less
- amounts transferred or withdrawn from the GPA; less
- surrender charges deducted from the GPA due to any decreases in the Selected Face Amount; plus
- fees and charges deducted from the GPA; plus
- interest credited to the GPA.

Interest on the Fixed Account Value

The Fixed Account Value earns interest at an effective annual rate, credited daily.

For the part of the Fixed Account Value equal to any policy loan, the daily rate we use is the daily equivalent of:

- the policy loan rate minus the current loan interest rate expense charge; or
- 3%, if greater.

On each Policy Anniversary, the interest earned on any outstanding loan is applied to the Separate Account Divisions and the GPA according to your current premium allocation instructions.

For the part of the Fixed Account Value in excess of any policy loan, the daily rate we use is the daily equivalent of:

- (1) the current interest rate we declare; or
- (2) the guaranteed interest rate of 3%, if greater.

The current interest rate may change as often as monthly and becomes effective on the first of each calendar month.

Death Benefit

If the Insured dies while the policy is In Force and we determine that the claim is valid, we will pay the death benefit to the named beneficiary in a lump sum or under one of the payment options below.

The death benefit will be the amount provided by the death benefit option in effect on the date of death, reduced by any outstanding Policy Debt, and any unpaid premium needed to avoid Policy Termination. The death benefit is calculated as of the date of the Insured's death.

The Minimum Death Benefit for your policy is based on your policy's Account Value as described below.

While the policy is In Force, you may make changes to the death benefit option and Face Amount. You must pay any premium due before such transaction requests can be processed.

Minimum Death Benefit

In order to qualify as life insurance under IRC Section 7702, the policy must have a Minimum Death Benefit that is determined by one of two compliance tests. You choose the test when you apply for the policy. You cannot change your choice of test after the policy is issued.

Cash Value Accumulation Test (CVAT)

Under this test, the Minimum Death Benefit on any date is equal to the Account Value on that date multiplied by the death benefit factor for the Insured's Attained Age on that date. The death benefit factor depends on the Insured's gender, Attained Age, tobacco use risk classification, and the CVAT interest rate under Section 7702 of the IRC.

Guideline Premium Test

Under this test, the Minimum Death Benefit on any date is equal to the Account Value on that date multiplied by the death benefit factor, but the death benefit factor varies only by the Attained Age of the Insured.

The death benefit factors for the Cash Value Accumulation Test and the Guideline Premium Test are shown in the policy.

Your choice of the Guideline Premium Test or the Cash Value Accumulation Test will depend on how you intend to pay premiums. In general, if you intend to pay premiums only in the early Policy Years, the Cash Value Accumulation Test may be appropriate. If you intend to pay level premiums over a long period of years, the Guideline Premium Test may be more appropriate. You should review policy illustrations of both approaches with your registered representative to determine how the policy works under each test, and which is best for you.

Death Benefit Options

When you apply for the policy, you must choose one of three death benefit options. These are:

- **Option 1** – The benefit amount is the greater of:
 - the Face Amount on the date of death; or
 - the Minimum Death Benefit on the date of death.
- **Option 2** – The benefit amount is the greater of:
 - the Face Amount plus the Account Value on the date of death; or
 - the Minimum Death Benefit on the date of death.
- **Option 3** – The benefit amount is the greater of:
 - the Face Amount, plus the premiums paid (less any premiums refunded and any premiums paid after the Insured's Attained Age 90) to the date of death, plus optional interest that is credited during the first five Policy Years on premiums paid; or
 - the Minimum Death Benefit on the date of death.

You should note that under death benefit option 1, the death benefit amount is not affected by your policy's investment experience unless the death benefit is based on the Minimum Death Benefit. Under death benefit option 2, the death benefit is a variable death benefit. This means that, because the death benefit amount includes the Account Value, it can change from day to day. Your policy's Account Value will vary due to the investment performance of the Separate Account Divisions in which you have allocated premium or transferred funds. It is also impacted by the deduction of charges and other policy expenses. It is possible that the policy's Account Value can be zero, which will reduce the overall value of the death benefit. The "Policy Value" section provides more detailed information on how your policy's Account Value is determined.

Death benefit option 3 is available with the choice of having interest applied to all premiums paid (and not refunded) for the first five Policy Years. We determine the interest rate monthly and do not guarantee that the rate will be greater than zero. If interest is paid, only the death benefit amount under this option will increase; interest is not credited to the Account Value of your policy. The interest is credited on each Monthly Charge Date during the first five Policy Years. Interest, if paid, is credited on the cumulative premiums paid, including any interest previously credited.

There is no explicit fee for electing death benefit option 3 with interest; however, election must be made at the time of

application. If this option is selected and the interest rate is greater than zero in any of the first five Policy Years, insurance charges will be higher for

all subsequent Policy Years as a result of the higher death benefit attributable to electing that option. The increased death benefit resulting from this interest during the first five Policy Years may be offset over time by the higher insurance charges.

Right to Change the Death Benefit Option

After the first Policy Year, you may change the death benefit option while the Insured is living. However, a death benefit option change cannot be processed during a Grace Period. In addition, the death benefit option may not be changed to death benefit option 3 and no change will be permitted beyond the Insured's Attained Age 120. Although we do not currently restrict the number of times you may change your death benefit option, we reserve the right to limit the number of death benefit option changes in any Policy Year.

You must send a Written Request in Good Order to our Administrative Office to change your death benefit option. We do not require evidence of insurability.

The death benefit option change will be effective on the Monthly Charge Date that is on or precedes the date we approve the request.

If you change your death benefit option, we will adjust your policy's Face Amount. The Face Amount adjustment (up or down) will be in the amount needed so that the death benefit immediately before the change will be the same as the death benefit after the change.

Please see Appendix C for examples of how a change in death benefit option may impact the policy's Face Amount.

The death benefit following a death benefit option change, however, will behave differently based on the new death benefit option in effect. For example, if an Owner changes the death benefit option from option 1 (death benefit = Face Amount) to option 2 (death benefit = Face Amount + Account Value), the death benefit after the change will be based on the Account Value rather than remaining level. The Owner may decide to make this change if the desire is to have a death benefit that will increase if the Account Value grows.

Alternatively, an Owner may change from death benefit option 2 to option 1 if they would like to have a level death benefit following the change. Having a level death benefit (rather than increasing as the Account Value grows) would reduce the policy's Insurance Risk as the policy's Account Value increases and, as a result, would reduce the monthly insurance charges. If you elect death benefit option 2, you may choose to change to death benefit option 1 automatically at an Attained Age you select. You may select the Attained Age for this change at the time of application for your policy, or after issue by Written Request. You may also cancel or adjust the timing of the scheduled death benefit option change.

When the Face Amount changes as a result of a change in the death benefit option:

- the monthly charges will also change;
- the charge for certain additional benefits may change;
- the premium limitations will change (for additional information please see "Premium Limitations" in the "Premiums" section); and
- the policy surrender charge will not change.

A change in your death benefit option may also have an impact on your ability to satisfy the Safety Test. Please see the "Safety Test" sub-section in the "Policy Termination and Reinstatement" section for additional information.

You cannot change the death benefit option if, as a result, the Face Amount would be reduced to an amount that is less than the minimum Face Amount.

When We Pay Death Benefit Proceeds

If the policy is In Force and it is determined that the claim is valid, we normally pay the death benefit within seven calendar days after the date we receive due proof of the Insured's death and all required documents, in Good Order, at our Administrative Office.

Certain situations may delay payment of a death claim. These situations include, but are not limited to, our right to contest the validity of a death claim. We investigate all death claims that occur within the policy's two-year contestable periods as described below.

We have the right to contest the validity of the policy for any material misrepresentation of a fact within two years:

- after the policy is issued;
- after a Face Amount increase where evidence of insurability is required; or

- after reinstatement of the policy where evidence of insurability is required.

If the Face Amount increase is the result of a policy change that does not require evidence of insurability such as a conversion from another policy or the exercise of an option on this or another policy, we have the right to contest the validity of the Face Amount increase within two years after that other policy was issued.

We may also investigate death claims beyond the contestable periods. After any two-year contestable period, we generally cannot contest the validity of a policy or a Face Amount increase, except for failure to pay premiums. However, if the application(s) contains a fraudulent misstatement of fact, we may contest at any time, to the extent permitted by law.

We generally determine whether the contested claim is valid within five days after we receive the information from a completed investigation. Since it may take some time to receive the information, payment could be delayed during this period.

We can also delay payment of the death benefit if a portion is based on the Variable Account Value of the policy and the Insured's date of death is before or during any period when:

- it is not reasonably practicable to determine the amount because the NYSE is closed (other than customary week-end and holiday closings);
- trading is restricted by the SEC;
- an emergency exists as a result of which disposal of shares of the Funds is not reasonably practicable or we cannot reasonably value the shares of the Funds; or
- the SEC, by order, permits us to delay payment in order to protect our Owners.

Interest on Death Benefit

We will add interest to the death benefit from the date of the Insured's death to the date of a lump sum payment or the effective date of a payment option payment. Interest will be computed at an effective annual rate not less than 3%, or as required by applicable state law.

Although the death benefit is generally excludable from the income of the beneficiary who receives it, interest on the death benefit is includable in the beneficiary's income.

Payment Options

We will pay the death benefit in a lump sum or under one of the payment options described more fully below.

If the payment option is a lump sum when the Insured dies, the beneficiary may elect any payment option, with our consent. If the beneficiary does not elect a payment option and you have not elected a payment option during the Insured's lifetime, the death benefit will be paid as a single lump sum.

The different death benefit payment options are described below. None of these benefits depends upon the performance of the Separate Account or the GPA.

Installments for a Specified Period. Equal monthly payments for any period selected, up to 30 years. The amount of each payment depends on the total amount applied, the period selected, and the monthly income rates we are using when the first payment is due.

Life Income. Equal monthly payments based on the life of a named person. Payments will continue for the lifetime of that person. You can elect income with or without a minimum payment period. This benefit may be increased by the alternate life income provision.

Interest. We will hold any amount applied under this option. We will pay interest on the amount at an effective annual rate determined by us. This rate will not be less than 1%.

Installments of a Specified Amount. Fixed amount payments. The total amount paid during the first year must be at least 6% of the total amount applied. We will credit interest each month on the unpaid balance and add this interest to the unpaid balance. This interest will be an effective annual rate determined by us, but not less than 1%. Payments continue until the balance we hold is reduced to less than the agreed fixed amount. The last payment will be for the balance only.

Life Income with Payments Guaranteed for Amount Applied. Equal monthly payments based on the life of a named person. We will make payments until the total amount paid equals the amount applied, whether or not the named person lives until all payments have been made. If the named person lives beyond the payments of the total amount applied, we will continue to make monthly payments as long as the named person lives. This benefit may be increased by the alternate life income provision.

Joint Lifetime Income with Reduced Payments to Survivor. Monthly payments based on the lives of two named persons. We will make payments at the initial level while both are living, or for ten years if longer. When one dies (but not before the ten years has

elapsed), we will reduce the payments by one-third. Payments will continue at that level for the lifetime of the other. After the ten years has elapsed, payments stop when both named persons have died. This benefit may be increased by the alternate life income provision.

If the Life Income, Life Income with Payments Guaranteed for Amount Applied or Joint Life Income with Reduced Payments to Survivor payment option is elected, the named person(s) can elect to receive an alternate life income instead of receiving income based on the rates shown in the payment option rates tables in your policy. The election must be made at the time the income is to begin. The monthly alternate life income will be at least equal to the monthly income provided by a new single premium immediate annuity (first payment immediate) based on our published rates then in use when the payment option is elected. The alternate life income will not be available if we are not offering new single premium immediate annuities at the time of election.

The minimum amount that can be applied under a payment option is \$10,000 per beneficiary. If the periodic payment under any option is less than \$100, we reserve the right to make payments at less frequent intervals. Once payments have begun, only the specified amount and interest options may be changed.

All payment option elections must be sent to our Administrative Office in writing. You may change the payment option during the Insured's lifetime.

Right to Change the Face Amount

You may request an increase or decrease in the Face Amount. If you change your Face Amount, your policy charges, including surrender charges, will change accordingly. If the policy's Account Value less surrender charges (or Net Surrender Value if there is Policy Debt) cannot keep the policy In Force with the requested change in Face Amount, a premium payment may be required.

We reserve the right to limit the size and number of changes to the Face Amount in any Policy Year.

If you increase or decrease the policy Face Amount, the premium limitations will change (please see "Premium Limitations" in the "Premiums" section for additional information), and your policy may become a MEC under federal tax law. You should consult your tax adviser for information on how a MEC may affect your tax situation. MECs are discussed in the "Federal Income Tax Considerations" section.

Increases in Face Amount

To increase the policy Face Amount, you must send to our Administrative Office a written application and evidence the Insured is still insurable. We treat each Face Amount increase as a separate segment of coverage. An increase in Face Amount cannot be processed during a Grace Period.

An increase in Face Amount may not be:

- less than \$25,000; or
- made after the anniversary of your policy's Issue Date nearest the Insured's 90th birthday.

If the Net Surrender Value is insufficient to continue the changed policy In Force for three months at the new monthly charges and interest, we may require a premium payment sufficient to increase the Net Surrender Value to such an amount.

Additional insurance charges and face amount charges will apply for each Face Amount increase you elect. Additionally, a separate surrender charge schedule will apply to the amount of the increase. Generally, these surrender charges will apply during the first nine years of each segment of coverage. In addition, the Safety Test Guarantee Premium will increase.

Any increase elected under any insurability protection type of rider will be effective as directed in the rider. Any other Face Amount increases will be effective on the Monthly Charge Date that is on, or precedes, the date we approve the application for the increase.

Decreases in Face Amount

You may decrease the Face Amount any time after the first Policy Year or one year after a Face Amount increase. You must send a Written Request in Good Order to our Administrative Office. When we receive a Written Request for a decrease in Face Amount from the Owner, we will provide the Owner with a written notice that specifies the surrender charges to be assessed at the time of the decrease. If the Owner does not withdraw the request for the decrease in Face Amount within ten days from the date of the written notice, we will process the decrease in Face Amount and assess any surrender charges that may apply. If we determine that the policy will become a MEC, then the decrease will not be processed until a MEC Notice and Acknowledgment form is received in Good Order at our Administrative Office.

If you decrease the policy Face Amount, we cancel all or part of your Face Amount segments, and a partial surrender charge may apply. Surrender charges that apply when you decrease the policy's Face Amount are discussed in "Surrender Charges for Decreases in Face Amount" in the "Transaction Fees" section.

A decrease will reduce the Face Amount in the following order:

- (1) the Face Amount of the most recent increase; then
- (2) the Face Amounts of the next most recent increases successively; and last
- (3) the Initial Face Amount.

You may not decrease the Face Amount:

- after the Insured's Attained Age 120; or
- if the decrease would result in a Face Amount of less than the minimum Face Amount (\$50,000).

Face Amount decreases will be effective on the Monthly Charge Date that is on, or precedes, the date we receive (in Good Order at our Administrative Office) any applicable request for the decrease. A Face Amount decrease will reduce your policy's Account Value by the amount of any applicable partial surrender charge. The remaining surrender charge will be reduced by the amount of the partial surrender charge assessed when the Face Amount is decreased. If the policy's Account Value less any remaining surrender charge (or Net Surrender Value if there is Policy Debt) cannot keep the policy In Force, a premium payment may be required.

Decreases in the policy's Face Amount may have adverse tax consequences.

Suicide

If the Insured commits suicide, while sane or insane, within two years from the Issue Date of this policy and while the policy is In Force, this policy will terminate. In this case, we will only pay an amount equal to the premiums accepted for this policy, less any amounts withdrawn and less any Policy Debt.

If the Insured commits suicide, while sane or insane, within two years from the Reinstatement Date and while the policy is In Force, the policy will terminate. In this case, we will only pay an amount equal to any amount paid to reinstate the policy and any premiums accepted thereafter, less any amounts withdrawn and less any Policy Debt.

If the Insured commits suicide, while sane or insane, within two years after the effective date of any increase in the Face Amount, we will pay an amount equal to the monthly charges for that increase segment. No additional payments will be made for that Face Amount increase. This payment is in addition to any death benefit amount payable for coverage segments that were In Force prior to the Face Amount increase. However, if a payment as described in either of the two preceding paragraphs is made, there will be no additional payment for the increase.

Example:

Assume a policy is issued with a \$500,000 Face Amount under death benefit option 1. In Policy Year 4, the owner applies for a \$250,000 Face Amount increase, which is approved. If the Insured commits suicide within two years of the increase, the benefit payable to the beneficiaries is equal to the original \$500,000 death benefit, plus an additional payment equal to the monthly charges that were deducted from the Account Value for the increase segment of \$250,000.

We will pay the full death benefit, less any amounts withdrawn and less any Policy Debt, if the Insured commits suicide two years or more after the Issue Date, and there has been no reinstatement or increase in the Face Amount within those two years.

For policies issued in Colorado, Missouri, Minnesota, and North Dakota, all references in the provision to "two years" should be replaced with "one year."

Error of Age or Gender

If the Insured's date of birth or gender was misstated in the policy application or the policy has been issued incorrectly, we may adjust the Face Amount. The adjustment will reflect the amount provided by the most recent monthly insurance charges using the correct age and gender. Whether or not the Face Amount is adjusted, monthly charges after the correction will be based on the correct age and gender.

Other Benefits Available Under the Policy

Additional Benefits

In addition to the standard death benefit(s) associated with your policy, other standard and/or optional benefits may be available to you. You can obtain additional benefits if you request them and/or qualify for them. We provide certain additional benefits by rider or endorsement. The cost of each rider is generally deducted as part of the monthly charges. Some riders do not result in monthly charges, but do require a fee to exercise the riders. Adding or removing a rider for which there is a monthly charge may impact the premium limitations on your policy. For additional information, please see "Premium Limitations" in the "Premiums" section. If you choose to add a rider, you may cancel it at any time upon Written Request. You may not, however, add or remove a rider during a Grace Period. You must pay any premium due before such transaction requests can be processed. Having one or more riders that have monthly charges will increase the overall cost of your policy. The availability of certain riders is subject to state availability and policy Issue Date. Some riders are included automatically with the policy, and others can be added at the time of policy issue or later if you meet the qualifications.

Please note that the Disability Benefit, Waiver of Monthly Charges, and Waiver of Specified Premium Riders may not be used in combination. After you have selected and been issued one of these three riders, you may not terminate the rider and choose one of the other two riders.

Note: If your policy was issued on or before December 31, 2019, the following riders can no longer be added to your policy:

- Accelerated Death Benefit Rider for Terminal Illness
- Disability Benefit Rider
- Guaranteed Insurability Rider
- Other Insured Rider
- Substitute of Insured Rider
- Waiver of Monthly Charges Rider
- Waiver of Specified Premium Rider

We also offer two automated transfer programs as additional benefits – Portfolio Rebalancing and Dollar Cost Averaging (DCA). Please note that you cannot select both the Portfolio Rebalancing Program and the DCA Program at the same time.

The following table summarizes the information about the additional benefits available under the policy. Information about the fees associated with each benefit included in the table may be found in the Fee Table.

Name of Benefit	Purpose	Is this Benefit Standard or Optional?	Brief Description of Restrictions/Limitations
Accelerated Death Benefit Rider for Terminal Illness	Advances portion of death benefit upon Insured being terminally ill and not expected to live more than 12 months	Standard	<ul style="list-style-type: none">• Eligible payment amount (Eligible Amount) does not include: any amount of death benefit equal to the account value; amounts under riders that do not provide level or increasing coverage for at least two years after acceleration date; and the amount payable upon the death of someone other than the Insured under the policy, if applicable.• Minimum payment is \$25,000.• Maximum payment is lesser of 75% of Eligible Amount and \$250,000.• Death benefit reduced by accelerated amount.

Name of Benefit	Purpose	Is this Benefit Standard or Optional?	Brief Description of Restrictions/Limitations
Disability Benefit Rider	Credits specified amount to Account Value and waives monthly charges on specific Monthly Charge Date while Insured is totally and continuously disabled (as defined in rider)	Optional	<ul style="list-style-type: none"> Evidence of insurability required to add rider. Monthly credit of specified amount ends day before Insured's Attained Age 65. Waiver of monthly charges ends day before Insured's Attained Age 65 if total disability began at Insured's Attained Age 60 or older. Rider not available if Waiver of Monthly Charges Rider or Waiver of Specified Premium Rider added to policy.
Guaranteed Insurability Rider	Provides right to increase Face Amount or purchase new policy without evidence of insurability on specified dates	Optional	<ul style="list-style-type: none"> Evidence of insurability required to add rider. Requires premium payment to increase Face Amount or purchase new policy. Option amount limited to lesser of \$125,000 or two times Face Amount of base policy.
Other Insured Rider	Provides level term insurance on the life of either the Insured's spouse or child.	Optional	<ul style="list-style-type: none"> Rider may be converted while the Insured is living or upon the death of the Insured prior to the earlier of the rider's 10th anniversary or the Insured's Attained Age 65. Conversion on death of Insured must occur with 90 days of date we receive proof of Insured's death. The cost of the new policy will be based on other Insured's Attained Age at time of conversion.
Substitute of Insured Rider	Allows for substitution of Insured	Standard	<ul style="list-style-type: none"> Owner must have insurable interest in life of substitute Insured. Both Insured and substitute Insured must be alive on date of substitution. Age of substitute Insured on birthday nearest Policy Date cannot be less than the minimum age or greater than maximum age allowed. Evidence of insurability of substitute Insured required. Payment of premium required if needed to avoid termination.
Waiver of Monthly Charges Rider	Waives monthly charges while Insured is totally and continuously disabled (as defined in rider)	Optional	<ul style="list-style-type: none"> Evidence of insurability required to add rider. Rider benefit ends day before Insured's Attained Age 65, if Total Disability began when Insured was Attained Age 60 or older. Rider not available if Disability Benefit Rider or Waiver of Specified Premium Rider added to policy.

Name of Benefit	Purpose	Is this Benefit Standard or Optional?	Brief Description of Restrictions/Limitations
Waiver of Specified Premium Rider	Credits Account Value with the greater of (1) specified monthly premium or (2) monthly charges due, while Insured is totally and continuously disabled (as defined in rider)	Optional	<ul style="list-style-type: none"> Evidence of insurability required to add rider. Rider benefit ends day before Insured's Attained Age 65, if Total Disability began when Insured was Attained Age 60 or older. If Total Disability began before Insured was Attained Age 60 and continues to Attained Age 65, rider benefit after Age 65 limited to crediting Account Value with monthly charges due. Rider not available if Disability Benefit Rider or Waiver of Monthly Charges Rider added to policy.
Adjustment to Surrender Charges Endorsement (for internal replacements)	Waives surrender charges in exchange of policy for non-variable life policy made available by us or one of our insurance affiliates	Standard	<ul style="list-style-type: none"> Evidence of insurability required. MassMutual reserves right to require repayment of loans and loan interest.
Adjustment to Surrender Charges Endorsement	Waives surrender charges if policy fully surrendered	Optional	<ul style="list-style-type: none"> Evidence of insurability required to add endorsement. Not available for policies issued for personal use or business cases if annual premium less than \$100,000. <p>Other conditions that must be met:</p> <ul style="list-style-type: none"> Policy is In Force; Surrender occurs after first five Policy Years; No loans or withdrawals taken under policy; and Policy not assigned after issue.
Portfolio Rebalancing Program	Automatically rebalances Separate Account Divisions to maintain original percent allocation of Account Value	Optional	<ul style="list-style-type: none"> Cannot use with Dollar Cost Averaging Program.
Dollar Cost Averaging Program	Automatically transfers a specific amount of Account Value from a single Separate Account Division to other divisions or the GPA, at set intervals	Optional	<ul style="list-style-type: none"> Cannot use with the Portfolio Rebalancing Program.

Accelerated Death Benefit Rider for Terminal Illness

This rider advances a portion of the policy's death benefit to the Owner when we receive proof, satisfactory to us, that the Insured is terminally ill and is not expected to live more than 12 months. If the death benefit is accelerated under this rider, the policy values, the death benefit, cash values, and loan values under this policy will be reduced.

Benefits under the rider may be taxable. The Owner should seek tax advice prior to requesting an accelerated death benefit payment.

For the purposes of this rider, terminal illness is a medical condition that:

- is first diagnosed by a Legally Qualified Physician (as defined in the rider); and
- with reasonable medical certainty, will result in the death of the Insured within 12 months from the date the Legally Qualified Physician certifies the diagnosis; and
- is not curable by any means available to the medical profession.

We must receive the following items before an accelerated benefit can be paid:

- Owner's Written Request for payment of an accelerated death benefit under the policy;
- Insured's written authorization to release medical records to us;
- Written consent to this request of any assignee and any irrevocable beneficiary under the policy; and
- Written certification from a Legally Qualified Physician that the Insured has a terminal illness, as defined above.

The amount of the death benefit under the policy that can be considered for acceleration is determined as of the acceleration date. The acceleration date is the first date on which all the requirements for acceleration, except any confirming examination that we may require, have been met.

The amount eligible for acceleration under the rider (Eligible Amount) includes:

- the amount equal to the excess of the base policy death benefit over the Account Value; and
- the amount payable upon death of the Insured under any life insurance rider included with the policy, if that rider provides level or increasing coverage on the life of the Insured for at least two years after the acceleration date.

The Eligible Amount does not include:

- the amount payable upon the death of the Insured under any life insurance rider that does not provide level or increasing coverage for at least two years after the acceleration date; and
- the amount payable upon the death of someone other than the Insured under the policy, if applicable.

All other riders are excluded from the Eligible Amount.

The Owner may accelerate any portion of the Eligible Amount subject to the following limitations:

- the minimum amount that may be accelerated is \$25,000; and
- the maximum amount that may be accelerated is equal to the lesser of 75% of the Eligible Amount or \$250,000 minus the total amount accelerated under all other policies issued by us or any of our affiliates.

There is no premium or cost of insurance charge for this rider. However, when you exercise benefits under this rider, your death benefit will be reduced by an amount greater than the terminal illness benefit payment. The terminal illness benefit payment will be reduced by:

- a fee of not more than \$250; and
- interest at the annual interest rate we have declared for policies in this class.

In return for the advance payment, a lien is placed on the policy equal to the amount of benefit accelerated. Interest is not charged on the lien. The Owner may not voluntarily repay all or any portion of the lien. However, the amount of the lien will be deducted from the amount of payment under the policy upon the death of the Insured.

Payment of the terminal illness benefit will be made to the Owner in a single sum, unless the payment has been assigned or designated by the Owner. However, we will not make the payment if we first receive due proof of the Insured's death; in this case, we will instead pay the death benefit as if no request has been received under the rider.

After the accelerated benefit payment is made, the policy will remain In Force, and premiums and charges will continue in accordance with the policy provisions.

The rider terminates on the earliest of:

- on the date the Owner makes a Written Request to terminate (Note: The Owner may choose to terminate the rider if he or she wishes to guarantee that the policy's death benefit is paid to the named beneficiaries rather than to the Owner. However, if the rider is terminated at the Owner's request, it cannot be reinstated.);

- on the date an accelerated benefit payment is made;
- on the date the policy terminates, for any reason;
- on the date the policy matures;

- on the date the base policy is changed to a different policy on which the rider is not available; or
- two years before coverage under the policy is scheduled to terminate.

Where this rider is available, it is included automatically with the policy at no charge at the time the policy is issued.

This rider can no longer be added to policies issued on or before December 31, 2019.

An example illustrating the operation of this rider is set forth in Appendix C.

Disability Benefit Rider

This rider provides a disability benefit while the Insured is totally and continuously disabled as defined in the rider. The rider provides the following monthly benefits if the Insured becomes totally and continuously disabled.

- On specific Monthly Charge Dates we will credit an amount to the Account Value equal to the specified benefit amount shown in the policy's specifications for this rider. This amount will be treated as a Net Premium.
- We also will waive the monthly charges due for this policy on specific Monthly Charge Dates.

The benefits will be provided after the Insured has been totally disabled for four continuous months and all conditions of the rider have been met.

Total Disability is defined as an incapacity of the Insured that:

- is caused by sickness or injury; and
- requires the Insured to be under a doctor's care; and
- begins while this rider is In Force; and
- for the first 60 months of any period of Total Disability, prevents the Insured from performing the substantial and material duties of the Insured's occupation; and
- after Total Disability has continued for 60 months, prevents the Insured from engaging in any occupation the Insured is or may become qualified to perform.

The benefits will end when any of the following occurs:

- the Insured is no longer totally disabled; or
- satisfactory proof of continued Total Disability is not given to us as required; or
- the Insured refuses or fails to have an examination we require; or
- for the specified monthly benefit, the day before the Insured's Attained Age becomes 65; and
- for the waiver of monthly charges, the day before the Insured's Attained Age becomes 65 if Total Disability began when the Insured's Attained Age was 60 or older.

If Total Disability began before the Insured's Attained Age 60 and continues to Attained Age 65, the rider benefit after Attained Age 65 will be the monthly charges for this policy.

Proof of claim must be received at our Administrative Office within one year after the notice of claim was given to us. However, if it was not reasonably possible to give us proof of claim on time, the delay will not reduce the benefit if proof is given as soon as reasonably possible.

The Owner may terminate this rider at any time upon Written Request. If the rider is terminated at the Owner's request, this rider cannot be reinstated. If not terminated at the Owner's request, this rider will terminate automatically at the Insured's Attained Age 65.

There is a monthly charge for this rider, which is the sum of the charge for the specified benefit amount and the charge for the

waiver of monthly charges. This charge is based on the Insured's Attained Age and gender, and on the benefits provided.

- The specified benefit amount charge each month is equal to the specified monthly benefit multiplied by the specified benefit charge rate for the Insured's Attained Age.
- The waiver charge each month is equal to the sum of the monthly charges for the month, excluding the charge for this rider, multiplied by the waiver charge rate for the Insured's Attained Age.

The monthly charge is deducted from the Account Value on each Monthly Charge Date prior to the rider's termination.

The specified benefit charge rates and waiver charge rates are shown in the policy's specifications pages.

The example below shows the operation of this rider.

- The specified monthly benefit is \$500.
- The Insured is Attained Age 55.
- The Insured has been totally and permanently disabled for at least four months.
- Account Value on the monthly charge date prior to the deduction of monthly charges is \$100,000.
- Total monthly charges are \$400.
- The rider waives the monthly charges and credits the specified monthly benefit to the Account Value. The impact to the Account Value is as follows:

Starting Account Value	\$100,000
Rider Benefit	+ \$500
Monthly Charges	– \$0
Ending Account Value	\$100,500

This rider can no longer be added to policies issued on or before December 31, 2019. For policies issued after December 31, 2019, this rider may be added at or after the time the policy is issued up to the Insured's Attained Age 59. Satisfactory evidence of insurability is required at the time the rider is added.

Guaranteed Insurability Rider

This rider provides the right to increase the Face Amount of the policy or purchase a new policy without evidence of insurability on certain option dates as defined in the rider.

A written application is required and an initial premium for a new policy or any premium payment needed for a Face Amount increase to the existing policy must be received at our Administrative Office by the end of the option period.

There are two types of option periods, regular and substitute. Regular option periods coincide with the Policy Anniversary dates nearest the Insured's 25th, 28th, 31st, 34th, 37th, 40th, 43rd, and 46th birthday. Substitute option dates occur 91 days after the Insured's marriage, the birth of an Insured's child or adoption of a child by the Insured. In the event of multiple births, the maximum increase will be the benefit amount listed in the policy's specifications pages multiplied by the number of children born (up to a maximum of three).

A substitute option date can be exercised only if there is a subsequent regular option date. If new insurance is purchased during a substitute option period, new insurance cannot be purchased again during the next regular option period. Failure to exercise an option date does not impact your ability to exercise a future option.

The rider option amount is subject to a maximum limit of \$125,000, or, if less, two times the Face Amount of the base policy on the effective date of an increase in the rider option amount.

The rider terminates:

- when the Owner makes a Written Request to terminate (Note: If the rider is terminated at the Owner's request, it cannot be reinstated.);
- after the last regular option date as defined in the rider;
- following election of the last Face Amount increase that may be elected under the rider;
- if the policy is changed to another policy under which this rider is not available; or
- if the policy terminates.

There is a monthly charge for this rider. It is a rate per \$1,000 of rider option amount, which is deducted from the Account Value on each Monthly Charge Date prior to the rider's termination. This rider also has a rider Premium Expense Factor associated with it. The monthly charge rate per \$1,000 of rider option amount and the rider Premium Expense Factors are shown in the policy's specifications pages.

The example below shows the operation of this rider.

Policy details:

Sex	Male
Risk Class	Non-Tobacco
Issue Age	30
Attained Age	37
Selected Face Amount	\$250,000
Rider Option Amount	\$50,000

On the Policy Anniversary:

- Evidence of insurability is not required for this Face Amount increase.
- The Face Amount can be increased by the rider option amount, from \$250,000 to \$300,000 because the Insured has reached Attained Age 37 (which is a regular option date) on this Policy Anniversary.
- The increase segment gets the same risk class as the base policy (Non-Tobacco).
- Monthly charges going forward will be based on the total Face Amount of \$300,000 and will be higher.

This rider can no longer be added to policies issued on or before December 31, 2019. For policies issued after December 31, 2019, this rider may be added at or after the time the policy is issued up to the Insured's Attained Age 40. Satisfactory evidence of insurability is required at the time the rider is added.

Other Insured Rider

This rider provides level term insurance on the life of either the base policy Insured's spouse or child. The coverage for the Insured under the rider is convertible for a limited amount of time.

While the base policy Insured is living and prior to the earliest of the rider's tenth anniversary date or the other Insured's Attained Age 65, the rider may be fully or partially converted to another life insurance policy offered at the time of conversion. The cost for the new policy will be based on the other Insured's Attained Age at the time of conversion. No evidence of insurability is required to convert the rider coverage.

The rider may be converted upon the death of the base policy Insured (but only before the earliest of the rider's tenth anniversary date or the Attained Age 65 of the other insured). Conversion upon the death of the base policy Insured may be made at any time up to 90 days of the date we receive due proof of the base policy Insured's death.

The rider will terminate on the rider expiration date listed in the rider specifications. This rider will also end if any of the following occurs:

- expiration of the 90-day conversion period upon death of the base policy Insured;
- the end of the Grace Period for any unpaid premium under the policy;

- termination of the policy for any other reason;
- change of the policy to a different policy on which this rider is not available; or
- conversion of the remaining rider face amount under this rider.

You may request an increase or decrease in the face amount of the rider. If you change the Face Amount, your policy charges will change accordingly. There is an additional charge for this rider that varies based on the individual characteristics of the Insured.

The example below shows the impact of making a claim under this rider.

Policy details for Primary Insured:

Sex	Female
Risk Class	Non-Tobacco
Issue Age	30
Attained Age	40
Face Amount	\$250,000

Policy details for Other Insured

Sex	Male
Risk Class	Non-Tobacco
Issue Age	32
Attained Age	42
Rider Face Amount	\$100,000

When the Other Insured dies:

- The rider face amount of \$100,000 is paid to the beneficiary.
- The monthly rider charge for the Other Insured Rider going forward will cease.

This rider can no longer be added to policies issued on or before December 31, 2019.

Substitute of Insured Rider

This rider allows you to substitute a new Insured in place of the current Insured under the policy.

A substitute of the Insured is allowed if the policy is In Force, and all of the following conditions are met as of the Date of Substitution:

- the Owner has an insurable interest in the life of the substitute Insured;
- the substitute insured must have been born on or before the Policy Date;
- the substitute insured must not be over 85 years of age on the birthday nearest the date of substitution; and
- the age of the substitute Insured on the birthday nearest the Policy Date must not be less than the minimum age, or greater than the maximum age, allowed by us for the policy on the Policy Date.

Before the submission can become effective, we require:

- a written application for substitution, received by us at our Administration Office;

- evidence of insurability of the substitute Insured that is satisfactory to us;
- payment to us of any premium required to avoid termination under the Grace Period and Termination provision of the policy; and
- payment of a fee of \$75.00.

All monthly charges after the substitution of the Insured will be based on the life and risk classification of the substitute Insured.

The rider will continue In Force to, but not including, the Policy Anniversary date on which the current Insured's Attained Age becomes 75. However, it will end automatically before that date at the time any one of the following occurs:

- change of the policy to a different policy under which the rider is not available;
- termination of the policy for any reason.

Substituting a new Insured under the policy may have adverse tax consequences. Please consult your tax adviser before you make your decision.

This rider is available for issue ages 0-74. It is included automatically at no charge at the time the policy is issued.

This rider can no longer be added to policies issued on or before December 31, 2019.

An example of the operation of the Substitute of Insured Rider is set forth in Appendix D.

Waiver of Monthly Charges Rider

Under this rider, we will waive the monthly charges due for the policy while the Insured is totally and continuously disabled, as defined in the rider, for four months or longer. We will not return any premiums paid; however, we will adjust the Account Value according to the terms of the rider.

Total Disability is defined as an incapacity of the Insured that:

- is caused by sickness or injury; and
- requires the Insured to be under a doctor's care; and
- begins while this rider is In Force; and
- for the first 60 months of any period of Total Disability, prevents the Insured from performing the substantial and material duties of the Insured's occupation; and
- after Total Disability has continued for 60 months, prevents the Insured from engaging in any occupation the Insured is or may become qualified to perform.

The benefits will end when any of the following occurs:

- the Insured is no longer totally disabled; or
- satisfactory proof of continued Total Disability is not given to us as required; or
- the Insured refuses or fails to have an examination we require; or
- the day before the Insured's Attained Age becomes 65, if Total Disability began when the Insured was Attained Age 60 or older.

Proof of claim must be received at our Administrative Office within one year after the notice of claim was given to us. However, if it was not reasonably possible to give us notice and/or proof of claim on time, the delay will not reduce the benefit if notice and/or proof are given as soon as reasonably possible. If notice is given more than one year from the Monthly Charge Date on which charges would have first been waived due to the Insured's Total Disability, we would only provide a benefit for the twelve Monthly Charge Dates that immediately precede the date notice is given to us.

The Owner may terminate this rider at any time upon Written Request. If the rider is terminated at the Owner's request, it cannot be reinstated. If not terminated at the Owner's request, the rider will continue In Force to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 65.

There is a monthly charge for this rider. This charge is based on the Insured's Attained Age and gender. The charge each month is equal to the sum of the monthly charges for the month, excluding the charge for this rider, multiplied by the waiver charge rate for the Insured's Attained Age. The charge is deducted from the Account Value on each Monthly Charge Date prior to the rider's termination.

The waiver charge rates are shown in the policy's specifications pages.

The example below shows the operation of this rider.

- The Insured is Attained Age 55.
- The Insured has been totally and permanently disabled for at least four months.
- Account Value on Monthly Charge Date prior to the deduction of monthly charges is \$100,000.
- Total monthly charges are \$400.
- The rider waives the monthly charges, so the Account Value remains at \$100,000.

This rider can no longer be added to policies issued on or before December 31, 2019. For policies issued after December 31, 2019, this rider may be added at or after the time the policy is issued up to the Insured's Attained Age 59. Satisfactory evidence of insurability is required at the time the rider is added. It cannot be added to a policy that has the Disability Benefit Rider or the Waiver of Specified Premium Rider.

Waiver of Specified Premium Rider

Under this rider, we will credit the Account Value the greater of:

- the specified monthly premium or
- the monthly charges due for the policy

while the Insured is totally and continuously disabled, as defined in the rider, for four months or longer. We will not return any premiums paid; however, we will adjust the Account Value according to the terms of the rider.

Total Disability is defined as an incapacity of the Insured that:

- is caused by sickness or injury; and
- requires the Insured to be under a doctor's care; and
- begins while this rider is In Force; and
- for the first 60 months of any period of Total Disability, prevents the Insured from performing the substantial and material duties of the Insured's occupation; and
- after Total Disability has continued for 60 months, prevents the Insured from engaging in any occupation the Insured is or may become qualified to perform.

The benefits will end when any of the following occurs:

- the Insured is no longer totally disabled; or
- satisfactory proof of continued Total Disability is not given to us as required; or
- the Insured refuses or fails to have an examination we require; or
- the day before the Insured's Attained Age becomes 65, if Total Disability began when the Insured was Attained Age 60 or older.

Monthly charges will continue to be deducted on each Monthly Charge Date until a claim has been approved. For any of these Monthly Charge Dates that have already passed at the time a claim is approved, the Account Value will be credited to reflect provision of these monthly benefits.

If the disability began before the Insured was Attained Age 60 and continues to Attained Age 65, the rider benefit after Attained Age 65 will be the monthly charges for this policy.

Proof of claim must be received at our Administrative Office within one year after the notice of claim was given to us. However, if it was not reasonably possible to give us proof of claim on time, the delay will not reduce the benefit if proof is given as soon as reasonably possible.

The Owner may terminate this rider at any time upon Written Request. If the rider is terminated at the Owner's request, it cannot be reinstated. If not terminated at the Owner's request, the rider will continue In Force to, but not including, the Policy Anniversary date on which the Insured's Attained Age becomes 65.

There is a monthly charge for this rider, which is based on the Insured's Attained Age and gender, and on the benefits provided. The charge each month is the greater of:

- the specified benefit amount charge, which is equal to the specified monthly benefit multiplied by the specified benefit charge rate for the Insured's Attained Age; and
- the waiver charge, which is equal to the sum of the monthly charges for the month, excluding the charge for this rider, multiplied by the waiver charge rate for the Insured's Attained Age.

The charge is deducted from the Account Value on each Monthly Charge Date prior to the rider's termination.

The specified benefit charge rates and waiver charge rates are shown in the policy's specifications pages.

The example below shows the operation of this rider.

- The specified monthly benefit is \$500.
- The Insured is Attained Age 55.
- The Insured has been totally and permanently disabled for at least 4 months.
- Account Value on the Monthly Charge Date prior to the deduction of monthly charges is \$100,000.
- Total monthly charges are \$400.
- The rider credits to the Account Value the greater of the specified monthly benefit (\$500 for this example) and the monthly charges (\$400 for this example). The impact to the Account Value is as follows:

Starting Account Value	\$100,000
Rider Benefit	+ \$500
Monthly Charges	– \$400
Ending Account Value	\$100,100

This rider can no longer be added to policies issued on or before December 31, 2019. This rider may be added at or after the time the policy is issued up to the Insured's Attained Age 59. Satisfactory evidence of insurability is required at the time the rider is added. It cannot be added to a policy that has the Disability Benefit Rider or the Waiver of Monthly Charges Rider.

Adjustment to Surrender Charges Endorsement (for internal replacements)

This endorsement allows the Company to waive surrender charges if an Owner wishes to exchange this policy for a qualifying non-variable life insurance policy offered by MassMutual or one of its subsidiaries provided the following conditions are met:

- On the date of the exchange, the Net Surrender Value of the new policy must be less than or equal to the Net Surrender Value of the replaced policy;
- The Face Amount of the new policy must be equal to or greater than the Face Amount of the replaced policy; and
- The entire value of the replaced policy must be put into the new policy.

This endorsement is automatically added at the time the policy is issued. There is no charge for this endorsement.

We require a written application and evidence of insurability satisfactory to us for the new policy. There is no guarantee the new policy will be issued. We reserve the right to require repayment of any loans and loan interest.

We have the right to modify, suspend, or terminate any replacement program at any time without prior notification. This right does not apply to policies to which the endorsement has already been added.

Adjustment to Surrender Charges Endorsement

This endorsement allows the Company to waive surrender charges if an Owner wishes to surrender this policy in full provided the following conditions are met:

- The policy is In Force;
- The policy is surrendered during the first five Policy Years (including surrenders under settlement options);
- No loans have been taken against the policy;
- No withdrawals have been taken from the policy; and
- The policy has not been assigned after issue.

We require a written application and evidence of insurability satisfactory to us to attach this endorsement to the policy. We also charge a one-time fee of \$150 to add this endorsement. The endorsement is available for business cases where the annual policy premium for the case equals or exceeds \$100,000. The endorsement is not available on policies intended for personal use or where the annual policy premium for the case is less than \$100,000. A case is defined as one or more policies with a single business owner. This endorsement is only available for attachment at the time the policy is issued.

Right to Exchange

Generally, you can exchange a life insurance policy for another in a tax-free exchange under Section 1035 of the Internal Revenue Code. Before making such an exchange, you should compare the features, fees, and risks of both policies to determine whether the purchase of the new policy is in your best interest. Remember that if you replace a policy with another policy, you might have to pay a surrender charge on the surrendered policy, and there may be new surrender charges for the new policy. In addition, other charges may be higher (or lower), and the benefits may be different.

For a policy issued in New York, the Owner has the right to exchange the policy for a new flexible premium adjustable life insurance policy, offered by us, with values that do not depend on the investment results of the Separate Account. The exchange must be elected within 18 months after the Policy Date, and evidence of insurability will not be required. In addition, an Owner of a policy issued in New York has the option to surrender the policy for level paid-up life insurance at least once each Policy Year. The amount of level paid-up insurance will be determined by applying the Net Surrender Value as a net single premium at the gender and Attained Age of the Insured on that date.

Accessing the Money in Your Policy

Withdrawals

After the first Policy Year, the maximum amount you may withdraw is 75% of the current Net Surrender Value. This amount is referred to as the maximum partial withdrawal. The minimum amount you may withdraw is \$100. We do not currently charge a withdrawal fee or surrender charge for a withdrawal.

You can make a withdrawal by sending us a Written Request in Good Order on our partial withdrawal request form.

You must state in your request form the dollar amount and corresponding Separate Account Division(s) from which you want the withdrawal made. If you choose to withdraw an amount from the GPA, it may not exceed the non-loaned Account Value in the GPA. If you request a maximum partial withdrawal, the amount of the withdrawal will be deducted proportionately from the available Separate Account Divisions and the non-loaned Account Value in the GPA.

A withdrawal will reduce your policy's Account Value by the amount withdrawn. If the policy's Net Surrender Value is reduced to a point where it cannot meet a monthly deduction, your policy may terminate. A withdrawal may also: 1) reduce your policy's Face Amount; 2) have adverse tax consequences; and 3) change the premium limitations. For more information on tax implications, please see the "Federal Income Tax Considerations" section and for more information on premium limitations, please see "Premium Limitations" in the "Premiums" section.

Example:

Assume death benefit option 1 is in effect and prior to the withdrawal the policy has a Face Amount of \$600,000 and an Account Value of \$120,000. If you make a withdrawal of \$30,000, the Account Value will be reduced to \$90,000 and the Face Amount will be reduced to \$570,000. The withdrawal payment will be \$30,000.

If your policy's Face Amount is decreased because of a withdrawal, surrender charges will not apply. We may reduce the Face Amount of your policy unless you have chosen death benefit option 2 or we receive evidence of insurability satisfactory to us. The amount of the reduction will be the amount of the withdrawal.

There is one exception:

If the death benefit provided by the death benefit option immediately before the withdrawal is equal to the Minimum Death Benefit, either the Face Amount reduction will be limited or we will not reduce the Face Amount.

We will not reduce the Face Amount if the death benefit immediately after the withdrawal would be the new Minimum Death Benefit (based on the reduced Account Value). Otherwise, the Face Amount reduction will be based on a formula.

The formula considers the smallest withdrawal amount that would bring the Minimum Death Benefit below the death benefit provided by the death benefit option. The formula reduces the Face Amount by the excess of the requested withdrawal amount over this smallest withdrawal amount. (Minimum Death Benefit, death benefit, and death benefit options are explained in the "Death Benefit" section.)

We will not allow a withdrawal if it would result in a reduction of the Face Amount to less than the minimum Face Amount.

Withdrawal requests where evidence of insurability is not required will be effective on the Valuation Date we receive the Written Request in Good Order at our Administrative Office. Withdrawal requests where evidence of insurability is required will be effective on the Valuation Date we approve the evidence of insurability application provided that the remainder of the withdrawal request is in Good Order on that date. Withdrawal requests determined to be in Good Order on a non-Valuation Date or after the end of a Valuation Date, will be effective as of the next Valuation Date.

If a withdrawal would cause the policy to become a MEC, a MEC Notice and Acknowledgement Form will be required before the withdrawal will be processed. For more information on MECs, please see the "Federal Income Tax Considerations" section.

We will normally pay any withdrawal amounts within seven calendar days of the withdrawal effective date unless we are required to suspend or postpone withdrawal payments. Please see "Other Policy Rights and Limitations" in the "Other Information" section for additional information.

Surrenders

You may surrender your policy to us at any time while the policy is In Force. We will pay you its Net Surrender Value. To surrender your policy, you must submit a completed surrender form and any other forms we may require.

The surrender will be effective on the Valuation Date we receive all required, fully completed forms in Good Order at our Administrative Office. If the surrender involves an exchange or transfer of assets to a policy issued by another financial institution or insurance company (not MassMutual or any of its subsidiaries), we also will require a completed absolute assignment form and any state mandated replacement paperwork. If we receive your request in Good Order on a non-Valuation Date or after the end of a Valuation Date, your surrender request will be effective as of the next Valuation Date.

We will normally pay any surrender amounts within seven calendar days of the surrender effective date, unless we are required to suspend or postpone surrender payments. Please see "Other Policy Rights and Limitations" in the "Other Information" section for additional information.

The policy terminates as of the effective date of the surrender and cannot be reinstated unless required by law. Surrendering the policy may result in adverse tax consequences. These tax consequences are discussed in the "Federal Income Tax Considerations" section.

For a policy issued in NY, at least once each Policy Year, the Owner has the option to surrender the policy for level-paid up life insurance.

Loans

You may take a loan from the policy once the Account Value exceeds the total of any surrender charges. We charge interest on policy loans that is added to the Policy Debt. We refer to all outstanding loans plus accrued interest as Policy Debt. You may repay all or part of your Policy Debt, but you are not required to do so.

We currently allow loans in all Policy Years. The maximum loan amount allowed at any time is the amount that, with accrued loan interest calculated to the next Policy Anniversary date, will equal your Account Value less any surrender charge. The maximum amount available for a loan is the maximum loan amount allowed less any existing Policy Debt.

Taking a loan from your policy has several risks: (1) it may increase the risk that your policy will terminate; (2) it will have a permanent effect on your policy's Net Surrender Value; (3) it may increase the amount of premium needed to keep the policy In Force; (4) it will reduce the death benefit proceeds; and (5) it may have adverse tax consequences.

The risks that can result from taking a policy loan may be reduced if you repay Policy Debt. The tax consequences of loans are discussed in the "Federal Income Tax Considerations" section.

Requesting a Loan

You may take a loan by completing a loan request form and sending it to our Administrative Office, or by other means we authorize, subject to certain restrictions. You must assign the policy to us as collateral for the loan.

Once we have processed the loan request and deducted the proportionate amounts from the Separate Account Divisions and/or the GPA, we consider the loan effective and outstanding. If, after we process the loan request, you decide not to cash the check, you may submit a Written Request to our Administrative Office to repay the loan amount. The loan repayment will be effective on the Valuation Date the Written Request is received in Good Order at our Administrative Office. Loan interest begins to accrue as soon as the loan is effective. Therefore, loan interest will accrue even if the loan check is not cashed. Please see "Loan Interest Charged" below for additional information.

Payment of Proceeds

Loans will be effective on the Valuation Date we receive your loan request form and all other required documents in Good Order at our Administrative Office. If we receive your request in Good Order on a non-Valuation Date or after the end of a Valuation Date, your loan request will be effective as of the next Valuation Date.

On the effective date of the loan, we deduct proportionate amounts from the Separate Account Divisions and/or the GPA (excluding any outstanding loans) and transfer the resulting dollar amounts to the loaned portion of the GPA. We will normally pay any loan amounts within seven calendar days of the loan effective date, unless we are required to suspend or postpone loan amounts. Please see the "Other Policy Rights and Limitations" sub-section in the "Other Information" section for additional information.

Interest Credited on the Loaned Value

When you take a loan, we transfer an amount equal to the loan to the loaned portion of the GPA. This amount earns interest at a rate equal to the greater of:

- 3.00%; or
- the loan interest rate less the current loan interest rate expense charge.

On each Policy Anniversary, the interest earned on any outstanding loan is applied to the Separate Account Divisions and the GPA according to your current premium allocation instructions.

Loan Interest Charged

All Policy Debt is assessed loan interest at a fixed rate of 4%.

Interest on policy loans is not due in advance. The interest accrues daily and becomes part of the Policy Debt as it accrues. Interest is due on each Policy Anniversary date. If interest is not paid when due, it will be added to the loan and will bear interest at the loan rate. The interest is deducted proportionately from the Separate Account Divisions and the GPA according to the then current value in those Separate Account Divisions and the GPA and added to the loan. If the policy's Account Value cannot cover the loan interest due, the policy may lapse. Please see the "Policy Termination and Reinstatement" section.

Effect of a Loan on the Values of the Policy

A policy loan negatively affects policy values because we reduce the death benefit and Net Surrender Value by the amount of the Policy Debt.

Also, a policy loan, whether or not repaid, has a permanent effect on your policy's Net Surrender Value because, as long as a loan is outstanding, a portion of the Account Value equal to the loan is invested in the GPA. This amount does not participate in the investment performance of the Separate Account or receive the current interest rates credited to the non-loaned portion of the GPA. The longer a loan is outstanding, the greater the effect on your Net Surrender Value will be. In addition, if you do not repay a loan, your outstanding Policy Debt will reduce the death benefit and Net Surrender Value that might otherwise be payable.

Whenever you reach your Policy Debt Limit, your policy is at risk of terminating, even if the Safety Test is met. Your Policy Debt Limit is reached when total Policy Debt exceeds the Account Value less surrender charges. If this happens, we will notify you in writing. The "Policy Termination and Reinstatement" section explains more completely what will happen if your policy is at risk of terminating. Please note that Policy Termination with an outstanding loan also can result in adverse tax consequences. Please see the "Federal Income Tax Considerations" section for additional information.

As you repay a loan, the amount in the non-loaned section of the GPA will increase because we allocate loan repayments first to the GPA until you have repaid all loan amounts originally deducted from that account. Additionally, your ability to transfer funds out of the GPA following a loan repayment will be limited due to certain transfer restrictions. Please see the "Transfers" section for additional information.

Repayment of Loans

All or part of your Policy Debt may be repaid at any time while the Insured is living and while the policy is In Force. We will increase the death benefit and Net Surrender Value under the policy by the amount of the repayment.

A loan repayment must be identified as such or we will consider it a premium payment. We will apply the loan repayment on the Valuation Date it is received in Good Order. If we receive the loan repayment in Good Order on a non-Valuation Date or after the end of a Valuation Date, the loan repayment is effective as of the next Valuation Date. If a loan repayment is dishonored by your bank after we have applied the loan repayment to your policy, the transaction will be deemed void and your loan repayment will be reversed.

You may initiate single or recurring loan repayments through our secure website (www.MassMutual.com) or by calling our Administrative Office and authorizing an electronic draft from your bank account. Please see the "Electronic Premium Payments" sub-section in the "Premiums" section for additional information. In addition, loan repayments may be sent to MassMutual, PO Box 92483, Chicago, IL 60675-2483.

Any loan repayment made within 30 days prior to the Policy Anniversary date will be used to first pay policy loan interest due. For any other loan repayment, we will first transfer values equal to the repayment amount from the loaned portion of the GPA to the non-loaned portion of the GPA until all loan amounts originally deducted from that account have been repaid. We will allocate any additional loan repayments by transferring values equal to the repayment amount from the loaned portion of the GPA to the non-loaned portion of the GPA and/or the applicable Separate Account Divisions, based on your premium allocation instructions in effect at that time. When we receive a loan repayment and only a portion is needed to fully repay the loan, we will apply any excess as premium and allocate it according to the current premium allocation instructions after deduction of the premium expense charge. Any subsequent loan repayments received after the loan is fully repaid will be refunded to the premium payer.

We will deduct any outstanding Policy Debt from:

- the proceeds payable on the death of the Insured;
- the proceeds payable when you surrender the policy; or
- the Account Value if the policy lapses.

In these situations, we will then consider the Policy Debt paid.

Policy Termination and Reinstatement

Your policy could lapse, and terminate without value, if the Net Surrender Value of the policy becomes too low to support the policy's monthly charges. Factors that may cause your policy to terminate include: insufficient premium payments, poor investment performance, withdrawals, and unpaid loans or loan interest. Even if you have made Planned Premium payments, there is no guarantee that your policy will remain In Force. Conversely, your policy will not necessarily terminate if you do not make Planned Premium payments since the policy may have enough Net Surrender Value to cover the monthly charges.

Before your policy terminates, we allow a Grace Period during which you can pay the amount of premium needed to avoid termination. In addition, your policy offers a no-lapse guarantee, the Safety Test. If the requirements of the Safety Test are met, your policy will remain In Force during a Guarantee Period regardless of the value of the policy, unless the Policy Debt Limit is reached. We explain the Grace Period and the Safety Test in more detail in the sections below.

If there is no Policy Debt, the policy may terminate without value if:

- its Net Surrender Value on a Monthly Charge Date cannot cover the charges due; and
- the Safety Test is not met on that date.

If there is Policy Debt, the policy will terminate without value at the end of the Grace Period if:

- the Policy Debt Limit is reached, even if the Safety Test is met. The Policy Debt Limit is reached when the Policy Debt (outstanding loans plus accrued interest) exceeds the Account Value less any surrender charges that may apply: (1) on a Monthly Charge Date or (2) on the Valuation Date a premium payment is received, if the policy is in the Grace Period.

If your policy lapses, your insurance coverage terminates. In the event of a policy lapse, we would apply the applicable surrender charge, also known as a deferred sales load, which compensates us for expenses incurred related to your policy. The surrender charge is a charge against the Account Value of the policy. The deduction is taken from the Separate Account Divisions and the GPA, excluding Policy Debt, in proportion to the values in each, on the effective date of the lapse. Please see "Surrender Charges" under "Transaction Charges" for more information.

Policy Termination could have adverse tax consequences for you. To avoid Policy Termination and potential tax consequences in these situations, you may need to make substantial premium payments or loan repayments to keep your policy In Force.

Safety Test

The Safety Test allows you to keep the policy In Force, regardless of the value of the policy, by meeting monthly Guarantee Premium payment requirements. If the Safety Test is met and the Account Value is insufficient to cover the monthly charges due, the monthly charges due will be reduced to an amount equal to the Account Value. The Account Value will never be less than zero. Even if the Safety Test is met, this policy is at risk of terminating if Policy Debt exceeds the Account Value less any surrender charges that may apply: (1) on a Monthly Charge Date or (2) on the Valuation Date a premium payment is received, if the policy is in the Grace Period.

The Safety Test can be met only during the Guarantee Period(s) stated in the policy. Each Guarantee Period has an associated monthly Guarantee Premium. The amount of the Guarantee Premium depends on:

- the Insured's issue age;
- the Insured's gender;

- the Insured's risk classification;
- the riders on the policy, if any;

- the current Face Amount; and
- the death benefit option in effect at the time.

A Face Amount increase or the addition of any riders may increase the amount of Guarantee Premium. Likewise, a Face Amount decrease or the removal of any riders may decrease the amount of Guarantee Premium.

For each Guarantee Period, the Safety Test is met if:

- (1) premiums paid less any amounts refunded or withdrawn, accumulated at an effective annual interest rate of 3%, equal or exceed,
- (2) the total of all monthly Guarantee Premiums since the Policy Date, accumulated at an effective annual interest rate of 3%.

The policy has two Guarantee Periods.

- The first Guarantee Period is the first nine Policy Years.
- The second Guarantee Period is to Attained Age 121 of the Insured.

Both Guarantee Periods begin on your Policy Date. The Net Surrender Value at the end of the first Guarantee Period may be insufficient to keep the policy In Force unless an additional premium payment is made at that time.

Example:

Assume your policy is in the first Guarantee Period and the monthly Guarantee Premium for that period is \$25. Also assume that you have no Policy Debt and, beginning on the Policy Date, you have made premium payments of \$35 on each Monthly Charge Date. In this case, if the Account Value less surrender charges cannot cover the monthly charges, the policy will stay In Force because the Safety Test has been met.

Grace Period

Before your policy terminates, we allow a Grace Period during which you can pay the amount of premium needed to avoid termination. We will mail you a notice stating this amount. The Grace Period begins on the date the monthly charges are due. It ends 61 days after the date we mail you the notice.

If there is no Policy Debt, the amount of premium needed to avoid Policy Termination will be the lesser of:

- the amount needed to satisfy the Safety Test; or
- the amount needed to cover the monthly charges due.

If there is Policy Debt, the amount of premium needed to avoid Policy Termination will be the amount needed to bring the Policy Debt back within the limit (Policy Debt cannot exceed the Account Value less surrender charges that may apply: (1) on a Monthly Charge Date or (2) on the Valuation Date a premium payment is received, if the policy is in a Grace Period). During the Grace Period, the policy will stay In Force. If the Insured dies during this period and the amount of premium needed to avoid Policy Termination has not been paid, we will pay the death benefit proceeds, reduced by the amount of premium needed to avoid Policy Termination and any Policy Debt.

If we do not receive the required payment by the end of the Grace Period, the policy will terminate without value at the end of the Grace Period. We will return a premium payment if it is less than the minimum amount needed to avoid termination.

During the Grace Period, certain financial transactions cannot be processed (transfers, withdrawals, loans). You must pay the premium due before subsequent financial transactions can be processed.

The Company's mailing of a Policy Termination or a lapse notice to you constitutes sufficient notice of cancellation of coverage.

Reinstating Your Policy

If your policy terminates, you may be able to reinstate it. You may not, however, reinstate your policy if:

- you surrendered it (unless required by law); or
- five years have passed since it terminated.

To reinstate your policy, we will need:

- a written application to reinstate;
- evidence, satisfactory to us, that the Insured is still insurable;
- a premium payment sufficient to keep the policy In Force for three months after reinstatement. The minimum amount of this premium payment will be quoted upon request; and
- a MEC Notice and Acknowledgement form, if the reinstated policy would be a MEC (please see “Policy After You Reinstatement” below, and the “Federal Income Tax Considerations” section).

We will not apply the required premium for reinstatement to any investment option until we have approved your reinstatement application.

The policy will be reinstated on the Valuation Date on or next following the later of:

- the date we approve your application and
- the date we receive the premium required to reinstate the policy.

Policy After You Reinstatement

If you reinstate your policy, the Face Amount will be the same as it was when the policy terminated. Your Account Value will be:

- (1) the premium paid to reinstate your policy, less
- (2) the premium expense charge, less
- (3) applicable monthly charges due.

Additionally, if the policy lapsed during a period when a surrender charge applied and the surrender charge was taken at that time, then the applicable surrender charge will not be reinstated.

We do not reinstate Policy Debt.

Upon reinstatement, the Safety Test will apply.

If you reinstate your policy, it may become a MEC under current federal tax law. Please consult your tax adviser. More information on MECs is included in the “Federal Income Tax Considerations” section.

Reinstatement will not reverse any adverse tax consequences caused by Policy Termination unless it occurs within 90 days of the end of the Grace Period. In no situation, however, can adverse tax consequences that are a result of Policy Debt be reversed.

Federal Income Tax Considerations

The information in this prospectus is general and is not an exhaustive discussion of all tax questions that might arise under the policy. The information is not written or intended as tax or legal advice. You are encouraged to seek legal and tax advice from a qualified tax adviser. In addition, we do not profess to know the likelihood that current federal income tax laws and Treasury Regulations or the current interpretations of the Internal Revenue Code of 1986, as amended (IRC), Regulations, and other guidance will continue. We cannot make any guarantee regarding the future tax treatment of any policy. We reserve the right to make changes in the policy to ensure that it continues to qualify as life insurance for tax purposes.

No attempt is made in this prospectus to consider any applicable state or other tax laws.

Policy Proceeds and Loans

We believe the policy meets the IRC definition of life insurance. Therefore, the death benefit under the policy generally is excludible from the beneficiary's gross income under federal tax law. If you sell the policy or there is a transfer for value under IRC Section 101(a)(2), all or a portion of the death benefit under the policy may become taxable unless an exception applies.

As a life insurance policy under the IRC, the gain accumulated in the policy is not taxed until it is withdrawn or otherwise accessed. Any gain withdrawn from the policy is taxed as ordinary income.

From time to time, the Company may be entitled to certain tax benefits related to the investment of Company assets, including those comprising the policy value. These tax benefits, which may include foreign tax credits and the corporate dividends received deduction, are not passed back to you since the Company is the owner of the assets from which the tax benefits are derived.

The following information applies only to a policy that is not a MEC under federal tax law. Please see "Modified Endowment Contracts" later in this section for information about MECs.

As a general rule, withdrawals are taxable only to the extent that the amounts received exceed your cost basis (also referred to as investment in the contract) in the policy. Cost basis equals the sum of the premiums and other consideration paid for the policy less any prior withdrawals under the policy that were not subject to income taxation. For example, if your cost basis in the policy is \$10,000, amounts received under the policy will not be taxable as income until they exceed \$10,000 in the aggregate; then, only the excess over \$10,000 is taxable.

However, special rules apply to certain withdrawals associated with a decrease in the policy death benefit. The IRC provides that if:

- there is a reduction of benefits during the first 15 years after a policy is issued; and
- there is a cash distribution associated with the reduction,

you may be taxed on all or a part of the amount distributed. After 15 years, cash distributions are not subject to federal income tax, except to the extent they exceed your cost basis.

If you surrender the policy for its Net Surrender Value, all or a portion of the distribution may be taxable as ordinary income. The distribution represents income to the extent the value received exceeds your cost basis in the policy. For this calculation, the value received is equal to the Account Value, reduced by any surrender charges, but not reduced by any outstanding Policy Debt. Therefore, if there is a loan on the policy when the policy is surrendered, the loan will reduce the cash actually paid to you but will not reduce the amount you must include in your taxable income as a result of the surrender.

To illustrate how Policy Termination with an outstanding loan can result in adverse tax consequences as described above, suppose that your premiums paid (that is, your cost basis) in the policy is \$10,000, your Account Value is \$15,000, you have no surrender charges, and you have received no other distributions and taken no withdrawals under the policy. If, in this example, you have an outstanding Policy Debt of \$14,000, you would receive a payment equal to the Net Surrender Value of only \$1,000; but you still would have taxable income at the time of surrender equal to \$5,000 (\$15,000 Account Value minus \$10,000 cost basis).

The potential that Policy Debt will cause taxable income from Policy Termination to exceed the payment received at termination also may occur if the policy terminates without value. Factors that may contribute to these potential situations include:

- amount of outstanding Policy Debt at or near the maximum loan value;
- unfavorable investment results affecting your policy Account Value;
- increasing monthly policy charge rates due to increasing Attained Age of the Insured;
- high or increasing amount of Insurance Risk, depending on death benefit option and changing Account Value; and
- increasing policy loan rates if the adjustable policy loan rate is in effect.

One example occurs when the Policy Debt Limit is reached. If, using the previous example, the Account Value were to decrease to \$14,000 due to unfavorable investment results, and the policy were to terminate because the Policy Debt Limit is

reached, the policy would terminate without any cash paid to you; but your taxable income from the policy at that time would be \$4,000 (\$14,000 Account Value minus \$10,000 cost basis). The policy also may terminate without value if unpaid policy loan interest increases the outstanding Policy Debt to reach the Policy Debt Limit.

To avoid Policy Terminations that may give rise to significant income tax liability, you may need to make substantial premium payments or loan repayments to keep your policy In Force.

You can reduce the likelihood that these situations will occur by considering these risks before taking a policy loan. If you take a policy loan, you should monitor the status of your policy with your registered representative and your tax adviser at least annually, and take appropriate preventative action.

We believe that, under current tax law, any loan taken under the policy will be treated as Policy Debt of the Owner. If your policy is not a MEC, the loan will not be considered income to you when received.

Interest on policy loans used for personal purposes generally is not tax-deductible. However, you may be able to deduct this interest if the loan proceeds are used for “trade or business” or “investment” purposes, provided that you meet certain narrow criteria.

If the Owner is a corporation or other business, additional restrictions may apply. For example, there are limits on interest deductions available for loans against a business-owned policy. In addition, the IRC restricts the ability of a business to deduct interest on debt totally unrelated to any life insurance, if the business holds a cash value policy on the life of certain insureds.

Investor Control and Diversification

There are a number of tax benefits associated with variable life insurance policies. Gains on the Net Investment Experience of the Separate Account are deferred until withdrawn or otherwise accessed, and gains on transfers among Separate Account Divisions also are deferred. For these benefits to continue, the policy must continue to qualify as life insurance. In addition to other requirements, federal tax law dictates that the insurer, and not the Owner, has control of the investments underlying the various Separate Account Divisions for the policy to qualify as life insurance.

You may make transfers among Separate Account Divisions, but you may not direct the investments each Separate Account Division makes. If the IRS were to conclude that you, as the investor, have control over these investments, then the policy would no longer qualify as life insurance and you would be taxed on the gain in the policy as it is earned rather than when it is withdrawn or otherwise accessed.

The IRS has provided some guidance on investor control, but many issues remain unclear. One such issue is whether an Owner can have too much investor control if the variable life policy offers a large number of investment divisions in which to invest Account Values. We do not know if the IRS will provide any further guidance on the issue. We do not know if any such guidance would apply retroactively to policies already In Force.

Consequently, we reserve the right to further limit Net Premium allocations and transfers under the policy, so that it will not lose its qualification as life insurance due to investor control.

In addition, the IRC requires that the investments of the Separate Account Divisions be “adequately diversified” in order for a policy to be treated as a life insurance contract for federal income tax purposes. It is intended that the Separate Account Divisions, through their underlying investment Funds, will satisfy these diversification requirements.

Modified Endowment Contracts

If a policy is a Modified Endowment Contract (MEC) under federal tax law, loans, withdrawals, and other amounts distributed under the policy are taxable to the extent of any income accumulated in the policy. The policy income is the excess of the Account Value (both loaned and non-loaned) over your cost basis. For example, if your cost basis in the policy is \$10,000 and the Account Value is \$15,000, then all distributions up to \$5,000 (the accumulated policy income) are immediately taxable as income when withdrawn or otherwise accessed. The collateral assignment of a MEC is also treated as a taxable distribution. Death benefits paid under a MEC, however, are not taxed any differently than death benefits payable under other life insurance contracts.

If any amount is taxable as a distribution of income under a MEC, it may also be subject to a 10% penalty tax. There are a few exceptions to the additional penalty tax for distributions to individual Owners. The penalty tax will not apply to distributions:

- made on or after the date the taxpayer attains age 59½; or
- made because the taxpayer became disabled; or
- made as part of a series of substantially equal periodic payments paid for the life or life expectancy of the taxpayer, or the joint lives or joint life expectancies of the taxpayer and the taxpayer's beneficiary. These payments must be made at least annually.

A policy is a MEC if it satisfies the IRC definition of life insurance but fails the "7-pay test." A policy fails this test if:

- (1) the accumulated amount paid under the policy at any time during the first seven contract years exceeds
- (2) the total premiums that would have been payable at that time for a policy providing the same benefits guaranteed after the payment of seven level annual premiums.

A life insurance policy will always be treated as a MEC if it is issued as part of an IRC Section 1035 tax-free exchange from a life insurance policy that was already a MEC.

If certain changes are made to a policy, we will retest it to determine if it has become a MEC. For example, if you reduce the death benefit during a 7-pay testing period, we will retest the policy using the lower death benefit amount, from the start of that testing period. If the reduction in death benefit causes the policy to fail the 7-pay test for any prior Policy Year, the policy will be treated as a MEC beginning in the Policy Year in which the reduction takes place.

Any reduction in benefits attributable to the non-payment of premiums will not be taken into account if the benefits are reinstated within 90 days after the reduction in such benefit.

We will retest whenever there is a "material change" to the policy while it is In Force. If there is a material change, a new 7-pay test period begins at that time. The term "material change" includes certain increases in death benefits.

Since the policy provides for flexible premium payments, we have procedures for determining whether increases in death benefits or additional premium payments cause the start of a new seven-year test period or cause the policy to become a MEC.

Once a policy fails the 7-pay test, loans and distributions taken in the year of failure and in future years are taxable as distributions from a MEC to the extent of gain in the policy. In addition, the IRS has authority to apply the MEC taxation rules to loans and other distributions received in anticipation of the policy failing the 7-pay test. The IRC authorizes the issuance of regulations providing that a loan or distribution, if taken within two years prior to the policy's becoming a MEC, shall be treated as received in anticipation of failing the 7-pay test. However, such written authority has not yet been issued.

Under current circumstances, a loan, collateral assignment, or other distribution under a MEC may be taxable even though it exceeds the amount of gain accumulated in that particular policy. For purposes of determining the amount of taxable income received from a MEC, the law considers the total of all gain in all the MECs issued within the same calendar year to the same Owner by an insurer and its affiliates. Loans, collateral assignments, and distributions from any one MEC are taxable to the extent of this total gain.

Other Tax Considerations

A change of the Owner or an Insured, or an exchange or assignment of the policy, may cause the Owner to recognize taxable income.

The impact of federal income taxes on values under the policy and on the benefit to you or your beneficiary depends on MassMutual's tax status and on the tax status of the individual concerned. We currently do not make any charge against the Separate Account for federal income taxes. We may make such a charge eventually in order to recover the future federal income tax liability to the Separate Account.

Under current laws in several states, we may incur state and local taxes (in addition to premium taxes). These taxes are not currently significant, and we are not currently charging for them. If they increase, we may deduct charges for such taxes.

Federal estate and gift taxes, state and local estate taxes, and other taxes depend on the circumstances of each Owner or beneficiary.

Qualified Plans

The policy may be used as part of certain tax-qualified and/or ERISA employee benefit plans. Since the rules concerning the use of a policy with such plans are complex, you should not use the policy in this way until you have consulted a competent tax adviser. You may not use the policy as part of an Individual Retirement Account (IRA) or as part of a Tax-Sheltered Annuity (TSA) or an IRC Section 403(b) custodial account.

While the policy is owned by the qualified plan, we will only pay amounts under the policy while the Insured is still living (e.g., withdrawals, surrenders, and loans) to the qualified plan trustee or plan administrator. We will not make such payments directly to any other party, including the Insured participant. The only exception is for a Keogh plan, where the Insured participant is also the policy owner.

Employer-Owned Policies

The IRC contains certain notice and consent requirements for “employer-owned life insurance” policies. The IRC defines “employer-owned life insurance” as a life insurance contract:

- that is owned by a person or entity engaged in a trade or business (including policies owned by related or commonly controlled parties);
- insuring the life of a U.S. citizen or resident who is an employee on the date the contract is issued; and
- under which the policyholder is directly or indirectly a beneficiary.

The tax-free death benefit for employer-owned life insurance is limited to the amount of premiums paid unless certain notice and consent requirements are met. The notice requirements are met if, before the contract is issued, the employee is notified in writing of the following:

- the employer intends to insure the employee’s life;
- the maximum Face Amount for which the employee could be insured at the time the contract was issued; and
- the employer will be the beneficiary of any proceeds payable on the death of the employee.

Prior to issuance of the contract, the employee must provide written consent to being insured under the contract and to continuation of the coverage after employment terminates.

The law also imposes annual reporting and record keeping requirements for businesses owning employer-owned life insurance policies. The employer must maintain records of the employer’s notice and the employee’s consent, and must file certain annual reports with the IRS.

Provided that the notice and consent requirements are satisfied, the death proceeds of an employer-owned life insurance policy will generally be income tax-free in the following situations:

- (1) At the time the contract is issued, the insured employee is a director, highly compensated employee, or highly compensated individual within the meaning of IRC Section 101(j)(2)(A)(ii);
- (2) The Insured was an employee at any time during the 12-month period before his or her death;
- (3) The proceeds are paid to a member of the Insured’s family, an individual who is the designated beneficiary of the Insured under the contract, a trust established for the benefit of any such member of the family or designated beneficiary, or the Insured’s estate; or
- (4) The proceeds are used to purchase an equity interest in the employer from any of the persons described in (3).

Death proceeds that do not fall within one of the enumerated exceptions will be subject to ordinary income tax (even if the notice and consent requirements were met), and MassMutual will report payment of taxable proceeds to the IRS, where applicable.

Business Uses of Policy

Businesses can use the policies in various arrangements, including nonqualified deferred compensation or salary continuance

plans, split dollar insurance plans, executive bonus plans, tax exempt and nonexempt welfare benefit plans, retiree medical benefit plans and

others. The tax consequences of such plans may vary depending on the particular facts and circumstances. The Internal Revenue Service and Treasury have issued guidance that may substantially affect these arrangements. If you are purchasing the policy for any arrangement the value of which depends in part on its tax consequences, you should consult a qualified tax adviser.

Tax Shelter Regulations

Prospective Owners that are corporations should consult a tax adviser about the treatment of the policy under the Treasury Regulations applicable to corporate tax shelters.

Generation Skipping Transfer Tax Withholding

Under certain circumstances, the IRC may impose a “generation skipping transfer tax” when all or part of a life insurance policy is transferred to, or a death benefit is paid to, an individual two or more generations younger than the Owner. Regulations issued under the IRC may require us to deduct the tax from your policy, or from any applicable payment, and pay it directly to the IRS.

Withholding

To the extent that policy distributions are taxable, they are generally subject to withholding for the recipient's federal income tax liability. Recipients can generally elect, however, not to have tax withheld from distributions.

Life Insurance Purchases by Residents of Puerto Rico

Income received by residents of Puerto Rico under life insurance policies issued by a United States life insurance company is U.S.-source income that is generally subject to United States federal income tax.

Non-Resident Aliens and Foreign Entities

Generally, a distribution from a contract to a non-resident alien or foreign entity is subject to federal income tax withholding at a rate of 30% of the amount of the income that is distributed. A non-resident alien is a person who is neither a citizen, nor a resident, of the United States of America (U.S.). We are required to withhold the tax and send it to the IRS. Some distributions to non-resident aliens or foreign entities may be subject to a lower (or no) tax if a treaty applies. In order to obtain the benefits of such a treaty, the non-resident alien must claim the treaty benefit on Form W-8BEN (or the equivalent entity form), providing us with:

- proof of residency (in accordance with IRS requirements); and
- the applicable taxpayer identification number.

If the above conditions are not met, we will withhold 30% of the income from the distribution. Additionally, under the Foreign Account Tax Compliance Act, effective July 1, 2014, U.S. withholding may be required for certain entity owners (including foreign financial institutions and non-financial foreign entities (such as corporations, partnerships and trusts)) at a rate of 30% without regard to lower treaty rates.

Sales to Third Parties

If you sell your policy to a viatical settlement provider, and the Insured is considered terminally or chronically ill within the meaning of IRC Section 101(g), the proceeds of the sale will be treated as death benefit proceeds, and will generally be received by you income tax-free.

However, the sale of your policy to an unrelated investor in a sale that does not qualify as a viatical settlement may have adverse tax consequences. IRS guidance issued in 2009 provides that the gain from such a sale is taxed as ordinary income to the extent that you would have realized ordinary income if you had instead surrendered your policy. Any amount you receive in excess of that amount is taxed as capital gain income. Under the Tax Cuts and Jobs Act of 2017, these sales may qualify as reportable sales and require the purchaser and the contract issuer to report the sale to the seller and the IRS. Previously the IRS had taken the position that your cost basis in the policy for computing the gain on the sale must be decreased by the cumulative cost of insurance charge incurred prior to

the sale. The Tax Cuts and Jobs Act of 2017 provides that for reportable sales that take place after August 25, 2009, no reduction in the cost basis for the cost of insurance incurred is required.

Medicare Hospital Insurance Tax

A Medicare Hospital Insurance Tax (known as the “Unearned Income Medicare Contribution”) applies to all or part of a taxpayer’s “net investment income,” at a rate of 3.8%, when certain income thresholds are met. “Net investment income” is defined to include, among other things, non-qualified annuities and net gain attributable to the disposition of property. Under final regulations, this definition includes the taxable portion of any annuitized payment from a life insurance contract and it may also include the gain from the sale of a life insurance contract. Under current guidance we are required to report to the IRS whether a distribution is potentially subject to the tax. You should consult a tax adviser as to the potential impact of the Medicare Hospital Insurance Tax on your policy.

Other Information

Other Policy Rights and Limitations

Right to Assign the Policy

Generally, you may assign the policy as collateral for a loan or other obligation. In certain states, you cannot assign the policy without our approval. We will refuse or accept any request to assign the policy on a non-discriminatory basis. Please refer to your policy. For any assignment we allow to be binding on us, we must receive, in Good Order, written notice of the assignment and a signed copy of it at our Administrative Office. We are not responsible for the validity of any assignment. If you assign your policy, certain of your rights may only be exercised with the consent of the assignee of record.

Possible Restrictions on Financial Transactions

Federal laws designed to counter terrorism and prevent money laundering might, in certain circumstances, require us to reject a premium payment or block an Owner’s ability to make certain transactions and thereby refuse to accept any request for transfers, withdrawals, surrenders, loans, or death benefits, until the instructions are received from the appropriate regulator. We may also be required to provide additional information about you and your policy to government regulators.

Delay of Payment of Proceeds from the GPA

We may delay payment of any Net Surrender Values, withdrawals, and loan proceeds that are based on the GPA for up to six months from the date the request is received at our Administrative Office.

Delay of Payment of Proceeds from the Separate Account

We may suspend or postpone transfers from the Separate Account Divisions, or delay payment of the Net Surrender Values, withdrawals, loan proceeds and death benefits from the Separate Account during any period when:

- it is not reasonably practicable to determine the amount because the NYSE is closed (other than customary weekend and holiday closings);
- trading is restricted by the SEC;
- an emergency exists as a result of which disposal of shares of the Funds is not reasonably practicable or we cannot reasonably value the shares of the Funds; or
- the SEC, by order, permits us to delay payment in order to protect our Owners.

If, pursuant to SEC rules, a money market Fund suspends payment of redemption proceeds in connection with a liquidation of the Fund, we will delay payment of any transfer, partial withdrawal, surrender, loan, or death benefit from a money market division until the Fund is liquidated.

Distribution

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

Both MMLIS and MSD are registered with the SEC as broker-dealers under the Securities Exchange Act of 1934 and are members of the Financial Industry Regulatory Authority (FINRA). MMLIS and MSD receive compensation for their actions as principal underwriters of the policies.

Commissions and Allowances Paid to MMLIS and Broker-Dealers

Commissions are paid to MMLIS and all broker-dealers involved in the sale of the policy. Commissions for sales of the policies by MMLIS registered representatives are paid by MassMutual on behalf of MMLIS to its registered representatives. Commissions for sales of the policies by registered representatives of other broker-dealers are paid by MassMutual on behalf of MSD to those broker-dealers.

Commissions are a percentage of the premium paid in each year of coverage and differ for premiums paid up to the Target Premium and for premiums paid in excess of the Target Premium. The Target Premium is based on the issue age, gender and risk classification of the Insured.

The maximum commission percentages we pay to MMLIS registered representatives and broker-dealers are:

First Year Commission	Commission in Years 2 - 10	Commission in Years 11+
50% of premium paid up to the Target Premium and 3% of premium paid in excess of the Target Premium	3% of premium paid up to the Target Premium and 3% of premium paid in excess of the Target Premium	1% of premium paid up to the Target Premium and 1% of premium paid in excess of the Target Premium

We also pay an annual commission of 0.15% of the average monthly Account Value after the first Policy Year.

Additional Compensation Paid to MMLIS

Most MMLIS registered representatives are also MassMutual insurance agents, and as such, are eligible for certain cash and non-cash benefits from MassMutual. Cash compensation includes bonuses and allowances based on factors such as sales, productivity and persistency (policy retention). Non-cash compensation includes various recognition items such as prizes and awards as well as attendance at, and payment of the costs associated with attendance at, conferences, seminars and recognition trips, and also includes contributions to certain individual plans such as pension and medical plans. Sales of this policy may help these registered representatives and their supervisors qualify for such benefits. MMLIS registered representatives who are also General Agents or sales managers of MassMutual also may receive overrides, allowances and other compensation that is based on sales of the policy by their registered representatives.

Additional Payments to Certain Broker-Dealers

In addition to the commissions described above, we may make cash payments to certain broker-dealers to attend sales conferences and educational seminars, thereby promoting awareness of our products. The broker-dealers may use these payments for any reason, including helping offset the costs of the conference or educational seminar.

We may also make cash payments to broker-dealers pursuant to marketing service agreements. These marketing service arrangements vary depending on a number of factors, including the specific level of support being provided. These payments are not made in connection with the sale of specific policies.

These additional payments are not offered to all broker-dealers and the terms of these arrangements may differ. Any such payments will be paid by MassMutual out of our assets and will not result in any additional direct charge to you. Such payments may give us greater access to the registered representatives of the broker-dealers that receive such payments and may influence the way that a broker-dealer markets the policy.

Compensation in General

The compensation arrangements described in the paragraphs above may provide a registered representative with an incentive to sell this policy over other available policies whose issuers do not provide such compensation or which provide lower levels of compensation. You may want to take these compensation arrangements into account when evaluating any recommendations regarding this policy.

We intend to recoup a portion of the cash and non-cash compensation payments that we make through the assessment of certain charges described in this prospectus, including the contingent deferred sales charge. We may also use some of the 12b-1 distribution fee payments (if applicable) and other payments that we receive from certain Funds to help us make these cash and non-cash payments.

Your registered representative typically receives a portion of the compensation that is payable to his or her broker-dealer, depending on the agreement between the representative and their firm. MassMutual is not involved in determining compensation paid to a registered representative of an unaffiliated broker-dealer. You may contact, as applicable, MMLIS, your broker-dealer or registered representative to find out more information about the compensation they may receive in connection with your purchase of a policy.

Commissions or overrides may also be paid to broker-dealers providing wholesaling services (such as providing sales support and training for sales representatives who sell the policies).

Computer System, Cybersecurity and Service Disruption Risks

The Company and its business partners rely on computer systems to conduct business, including customer service, marketing and sales activities, customer relationship management and producing financial statements. While the Company and its business partners have policies, procedures, automation and backup plans designed to prevent or limit the effect of failures, our respective computer systems may be vulnerable to disruptions or breaches as the result of natural disasters, man-made disasters, criminal activity, pandemics, or other events beyond our control. The failure of our or our business partners' computer systems for any reason could disrupt operations, result in the loss of customer business and adversely impact profitability.

The Company and its business partners retain confidential information on our respective computer systems, including customer information and proprietary business information. Any compromise of the security of our or our business partners' computer systems that results in the disclosure of personally identifiable customer information could damage our reputation, expose us to litigation, increase regulatory scrutiny and require us to incur significant technical, legal, and other expenses. The risk of cyber-attacks may be higher during periods of geopolitical turmoil (such as the Russian invasion of Ukraine and the responses by the United States and other governments).

Geopolitical and other events, including natural disasters, war, terrorism, economic uncertainty, trade disputes, public health crises and related geopolitical events, and widespread disease, including pandemics (such as COVID-19) and epidemics, have led, and in the future may lead, to increased market volatility, which may disrupt U.S. and world economies and markets and may have significant adverse direct or indirect effects on the Company. These events may adversely affect computer and other systems on which the Company relies, interfere with the processing of contract-related transactions (including the processing of orders from Owners and orders with the Funds) and the Company's ability to administer this contract in a timely manner, or have other possible negative effects. These events may also impact the issuers of securities in which the Funds invest, which may cause the Funds underlying the contract to lose value. There can be no assurance that we, the Funds or our service providers will avoid losses affecting the contract due to these geopolitical and other events. If we are unable to receive U.S. mail or fax transmissions due to a closure of U.S. mail delivery by the government or due to the need to protect the health of our employees, you may still be able to submit transaction requests to the Company electronically or over the telephone. Our inability to receive U.S. mail or fax transmissions may cause delays in the pricing and processing of transaction requests submitted to us by U.S. mail or by fax during that time period.

Legal Proceedings

The Company is subject to legal and regulatory actions, including class action lawsuits, in the ordinary course of its business. Our pending legal and regulatory actions include proceedings specific to us, as well as proceedings generally applicable to business practices in the industry in which we operate. From time to time, we also are subject to governmental and administrative proceedings and regulatory inquiries, examinations, and investigations in the ordinary course of our business. In addition, we, along with other industry participants, may occasionally be subject to investigations, examinations, and inquiries (in some cases industry-wide) concerning issues upon which regulators have decided to focus. Some of these proceedings involve requests for substantial and/or unspecified amounts, including compensatory or punitive damages.

While it is not possible to predict with certainty the ultimate outcome of any pending litigation proceedings or regulatory action, management believes, based on information currently known to it, that the ultimate outcome of all pending litigation and regulatory matters, after consideration of applicable reserves and rights to indemnification, is not likely to have a material adverse effect upon the Separate Account, the ability of the principal underwriter(s) to perform in accordance with its contracts with the Company on behalf of the Separate Account, or the ability of the Company to meet its obligations under the policy.

For more information regarding the Company's litigation and other legal proceedings, please see the notes to the Company's financial statements contained within the SAI.

Unclaimed Property

Every state has some form of unclaimed property law that imposes varying legal and practical obligations on insurers and, indirectly, on policy owners, Insureds, beneficiaries, and any other payees of proceeds from a policy. Unclaimed property laws generally provide for the transfer of benefits or payments under various circumstances to the abandoned property division or unclaimed property office in the state of last residence. This process is known as escheatment. To help avoid escheatment, keep your own information, as well as beneficiary and any other payee information up-to-date, including: full names, postal and electronic media addresses, telephone numbers, dates of birth, and social security numbers. To update this information, contact our Administrative Office.

Financial Statements

We encourage both existing and prospective Owners to read and understand our financial statements and those of the Separate Account. Our audited statutory financial statements and the Separate Account's audited U.S. GAAP financial statements are included in the SAI. You can request the SAI by contacting our Administrative Office.

Appendix A

Funds Available Under the Policy

The following is a list of Funds currently available under the policy. This list of Funds is subject to change, as discussed in this prospectus for the policy. Before you invest, you should review the prospectuses for the Funds. These prospectuses contain more information about the Funds and their risks and may be amended from time to time. You can find the prospectuses and other information about the Funds online at www.MassMutual.com/VULIII. You can also request this information at no cost by calling (800) 272-2216 or sending an email request to MassMutualServiceCenter@MassMutual.com.

The current expenses and performance information below reflects fees and expenses of the Funds, but does not reflect the other fees and expenses that your policy may charge. Expenses would be higher and performance would be lower if these charges were included. Each Fund's past performance is not necessarily an indication of future performance.

Fund Type	Fund and Adviser/Sub-Adviser	Current Expenses (expenses/average assets)	Average Annual Total Returns (as of 12/31/2023)		
			1 Year	5 Year	10 Year
Asset Allocation	MML Aggressive Allocation Fund (Initial Class) ⁽¹⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: N/A	0.97%	18.32%	10.27%	7.32%
Asset Allocation	MML Balanced Allocation Fund (Initial Class) ⁽¹⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: N/A	0.85%	12.47%	6.44%	4.95%
Asset Allocation	MML Conservative Allocation Fund (Initial Class) ⁽¹⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: N/A	0.82%	11.65%	5.54%	4.37%
Asset Allocation	MML Growth Allocation Fund (Initial Class) ⁽¹⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: N/A	0.90%	15.98%	8.95%	6.48%
Asset Allocation	MML Moderate Allocation Fund (Initial Class) ⁽¹⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: N/A	0.86%	13.90%	7.29%	5.50%
Money Market	MML U.S. Government Money Market Fund (Initial Class) ⁽²⁾ Adviser: MML Investment Advisers, LLC Sub-Adviser: Barings LLC	0.52%	4.64%	1.54%	0.95%
Fixed Income	Invesco V.I. Global Strategic Income Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.92% ^(*)	8.88%	1.30%	1.50%
Fixed Income	MML Inflation-Protected and Income Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Barings LLC	0.61% ^(*)	5.43%	3.19%	2.48%
Fixed Income	MML Managed Bond Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Barings LLC	0.45%	6.70%	1.58%	2.04%
Large Cap Value	MML Equity Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Brandywine Global Investment Management, LLC	0.44%	9.32%	11.99%	8.34%
Large Cap Value	MML Equity Income Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: T. Rowe Price Associates, Inc.	0.79%	9.54%	11.20%	7.86%

Fund Type	Fund and Adviser/Sub-Adviser	Current Expenses (expenses/average assets)	Average Annual Total Returns (as of 12/31/2023)		
			1 Year	5 Year	10 Year
Large Cap Value	MML Income & Growth Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Barrow, Hanley, Mewhinney & Strauss, LLC	0.71%	9.19%	12.00%	8.79%
Large Cap Blend	Fidelity® VIP Contrafund® Portfolio (Initial Class) Adviser: Fidelity Management & Research Company LLC Sub-Advisers: FMR Investment Management (UK) Limited, Fidelity Management & Research (Hong Kong) Limited, and Fidelity Management & Research (Japan) Limited	0.56%	33.45%	16.65%	11.61%
Large Cap Blend	Invesco V.I. Diversified Dividend Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.68%	9.04%	9.81%	7.80%
Large Cap Blend	Invesco V.I. Main Street Fund® (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.80% ^(*)	23.22%	13.57%	10.02%
Large Cap Blend	MML Equity Index Fund (Class II) Adviser: MML Investment Advisers, LLC Sub-Adviser: Northern Trust Investments, Inc.	0.28%	25.93%	15.38%	11.73%
Large Cap Blend	MML Sustainable Equity Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: American Century Investment Management, Inc.	0.56%	24.51%	14.72%	10.97%
Large Cap Growth	Invesco V.I. Capital Appreciation Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.80% ^(*)	35.38%	16.40%	11.56%
Large Cap Growth	MML Blue Chip Growth Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: T. Rowe Price Associates, Inc.	0.78%	49.53%	12.93%	12.05%
Small/Mid-Cap Value	MML Mid Cap Value Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: American Century Investment Management, Inc.	0.89%	5.97%	11.11%	8.83%
Small/Mid-Cap Value	MML Small/Mid Cap Value Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: AllianceBernstein L.P.	0.82%	17.12%	11.06%	7.75%
Small/Mid-Cap Blend	MML Small Cap Equity Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Invesco Advisers, Inc.	0.73%	17.81%	13.18%	9.09%
Small/Mid-Cap Growth	Invesco V.I. Discovery Mid Cap Growth Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.87%	13.15%	12.77%	9.79%
Small/Mid-Cap Growth	MML Mid Cap Growth Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Advisers: T. Rowe Price Associates, Inc. and Wellington Management Company LLP	0.82%	22.64%	11.38%	10.40%
Small/Mid-Cap Growth	MML Small Cap Growth Equity Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Wellington Management Company LLP	1.08% ^(*)	16.84%	11.91%	8.80%

Fund Type	Fund and Adviser/Sub-Adviser	Current Expenses (expenses/average assets)	Average Annual Total Returns (as of 12/31/2023)		
			1 Year	5 Year	10 Year
International/Global	Invesco Oppenheimer V.I. International Growth Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	1.00% ^(*)	21.06%	8.72%	3.80%
International/Global	Invesco V.I. Global Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.82%	34.73%	12.30%	8.47%
International/Global	MML Foreign Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Thompson, Siegel and Walmsley LLC	0.95%	16.22%	6.11%	2.22%
International/Global	MML Global Fund (Class II) Adviser: MML Investment Advisers, LLC Sub-Adviser: Massachusetts Financial Services Company	0.83%	14.37%	10.46%	7.39%
Specialty ⁽³⁾	Invesco V.I. Health Care Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.98%	3.02%	8.75%	6.87%
Specialty ⁽³⁾	Invesco V.I. Technology Fund (Series I) Adviser: Invesco Advisers, Inc. Sub-Adviser: N/A	0.98%	46.94%	14.92%	12.24%
Specialty ⁽³⁾	MML Managed Volatility Fund (Initial Class) Adviser: MML Investment Advisers, LLC Sub-Adviser: Gateway Investment Advisers, LLC	1.06%	12.87%	5.74%	4.36%
Specialty ⁽³⁾	PIMCO CommodityRealReturn® Strategy Portfolio (Advisor Class) Adviser: Pacific Investment Management Company LLC Sub-Adviser: N/A	1.58% ^(*)	-7.93%	8.46%	-0.90%
Specialty ⁽³⁾	VY® CBRE Global Real Estate Portfolio (Class S) Adviser: Voya Investments, LLC Sub-Adviser: CBRE Clarion Securities LLC	1.15% ^(*)	12.33%	5.90%	4.23%

(*) These Funds and their investment advisers have entered into contractual fee waivers or expense reimbursements. These temporary fee reductions are reflected in their current expenses. Those contractual arrangements are designed to reduce the Fund's total current expenses for Owners and will continue past the current year.

- (1) These are fund-of-funds investment choices. They are known as fund-of-funds because they invest in other underlying funds. A fund offered in a fund-of-funds structure may have higher expenses than a direct investment in its underlying funds because a fund-of-funds bears its own expenses and indirectly bears its proportionate share of expenses of the underlying funds in which it invests.
- (2) You could lose money by investing in the Fund. Although the Fund seeks to preserve the value of your investment at \$1.00 per share, it cannot guarantee it will do so. An investment in the Fund is not insured or guaranteed by the Federal Deposit Insurance Corporation or any other government agency. The Fund's sponsor has no legal obligation to provide financial support to the Fund, and you should not expect that the sponsor will provide financial support to the Fund at any time. The yield of this Fund may become very low during periods of low interest rates. After deduction of Separate Account charges, the yield in the division that invests in this Fund could be negative.
- (3) Specialty funds are an all-encompassing category that consists of funds that forgo broad diversification to concentrate on a certain segment of the economy or a specific targeted strategy. For example, sector funds are targeted strategy funds aimed at specific sectors of the economy, such as financial, technology, healthcare, and so on. Sector funds can, therefore, be more volatile than a more diversified equity fund since the stocks in a given sector tend to be highly correlated with each other.

Appendix B

Hypothetical Examples of the Impact of the Minimum Death Benefit

Example I

Assume the following:

- Death Benefit Option 1.
- Face Amount is \$500,000.
- Account Value is \$50,000.
- Policy Debt is \$0.
- Insured's Attained Age is 45.
- Death Benefit Factor is 2.15.

The death benefit for death benefit option 1 is the greater of the Face Amount or the Minimum Death Benefit. The Minimum Death Benefit is calculated by multiplying the Account Value times the death benefit factor.

The death benefit will be \$500,000 based on the greater of:

- \$500,000 or
- $\$50,000 \times 2.15 = \$107,500$

Example II

Assume the following:

- Death Benefit Option 1.
- Face Amount is \$500,000.
- Account Value is \$250,000.
- Policy Debt is \$0.
- Insured's Attained Age is 45.
- Death Benefit Factor is 2.15.

The death benefit for death benefit option 1 is the greater of the Face Amount or the Minimum Death Benefit. The Minimum Death Benefit is calculated by multiplying the Account Value times the death benefit factor.

The death benefit will be \$537,500 based on the greater of:

- \$500,000 or

- $\$250,000 \times 2.15 = \$537,500$

Hypothetical Examples of the Impact of the Account Value and Premiums

Example I ~ Death Benefit Option 1

Assume the following:

- Face Amount is \$1,000,000.
- Account Value is \$50,000.
- Minimum Death Benefit is \$219,000.
- Policy Debt is \$0.

Based on these assumptions,

- the death benefit is \$1,000,000.

If the Account Value increases to \$80,000 and the Minimum Death Benefit increases to \$350,400,

- the death benefit remains at \$1,000,000.

If the Account Value decreases to \$30,000 and the Minimum Death Benefit decreases to \$131,400,

- the death benefit still remains at \$1,000,000.

Example II ~ Death Benefit Option 2

Assume the following:

- Face Amount is \$1,000,000.
- Account Value is \$50,000.
- Minimum Death Benefit is \$219,000.
- Policy Debt is \$0.

Based on these assumptions,

- the death benefit is \$1,050,000 (Face Amount plus Account Value).

If the Account Value increases to \$80,000 and the Minimum Death Benefit increases to \$350,400,

- the death benefit will increase to \$1,080,000.

If the Account Value decreases to \$30,000 and the Minimum Death Benefit decreases to \$131,400,

- the death benefit will decrease to \$1,030,000.

Example III ~ Death Benefit Option 3

Assume the following:

- Face Amount is \$1,000,000.
- Account Value is \$50,000.
- Minimum Death Benefit is \$219,000.
- Policy Debt is \$0.
- Premiums paid (and not refunded) under the policy to date total \$40,000.
- Premiums paid (and not refunded) prior to the Insured's Attained Age 90.

Based on these assumptions,

- the death benefit is \$1,040,000 (Face Amount plus Premiums paid (and not refunded)).

If you pay an additional \$30,000 of premium and the Account Value increases to \$80,000 and the Minimum Death Benefit increases to \$350,400,

- the death benefit will increase to \$1,070,000.

Hypothetical Examples of Death Benefit Option Changes

Example I ~ Change from Option 2 to Option 1

For a change from Option 2 to Option 1, the Face Amount is increased by the amount of the Account Value on the effective date of the change.

For example, if the policy has a Face Amount of \$500,000 and an Account Value of \$25,000, the death benefit under Option 2 is equal to the Face Amount plus the Account Value, or \$525,000. If you change from Option 2 to Option 1, the death benefit under Option 1 is equal to the policy Face Amount. Since the death benefit under the policy does not change as the result of a death benefit option change, the Face Amount will be increased from \$500,000 under Option 2 to \$525,000 under Option 1 and the death benefit after the change will remain at \$525,000.

Example II ~ Change from Option 3 (without interest option) to Option 1(*)

For a change from Option 3 to Option 1, the Face Amount is increased by the amount of the premiums paid (and not refunded) to the effective date of the change.

For example, if a policy has a Face Amount of \$500,000, and premium payments of \$12,000 have been made to date, the death benefit under Option 3 is equal to the Face Amount plus the premiums paid (and not refunded), or \$512,000. If you change from Option 3 to Option 1, the death benefit under Option 1 is equal to the Face Amount. Since the death benefit under the policy does not change as the result of a death benefit option change, the Face Amount will be increased from \$500,000 under Option 3 to \$512,000 under Option 1 and the death benefit after the change will remain at \$512,000.

Example III ~ Change from Option 1 to Option 2

For a change from Option 1 to Option 2, the Face Amount will be decreased by the amount of the Account Value on the effective date of the change.

For example, if the policy has a Face Amount of \$700,000 and an Account Value of \$25,000, under Option 1 the death benefit is equal to the Face Amount, or \$700,000. If you change from Option 1 to Option 2, the death benefit under Option 2 is equal to

the Face Amount plus the Account Value. Since the death benefit does not change as the result of a death benefit option change, the Face Amount will be decreased by \$25,000 to \$675,000, and the death benefit under Option 2 after the change will remain at \$700,000.

Example IV ~ Change from Option 3 to Option 2^(*)

For a change from Option 3 (without interest option) to Option 2, the Face Amount is changed (increased or decreased) by the difference between the Account Value and the premiums paid (and not refunded) to date.

For example, if the policy has a Face Amount of \$1,000,000 and an Account Value of \$70,000 and premiums paid (and not refunded) of \$25,000, the death benefit under Option 3 is equal to the Face Amount plus the premiums paid (and not refunded) to date, or \$1,025,000. If you change from Option 3 to Option 2, the death benefit under Option 2 is equal to the Face Amount plus the Account Value. Since the death benefit under the policy does not change as the result of a death benefit option change, the Face Amount will be increased by the sum of the premiums paid (and not refunded) to date and then decreased by the Account Value to \$955,000 under Option 2, maintaining a death benefit of \$1,025,000.

A similar type of change would be made for a change from Option 3 (with interest option) to Option 2.

For example, if the policy has a Face Amount of \$1,000,000 and an Account Value of \$70,000 and premiums paid (and not refunded) of \$25,000, and interest applied to premiums paid (and not refunded) of \$5,000, the death benefit under Option 3 (with interest) is equal to the Face Amount plus the premiums paid (and not refunded) to date plus interest applied to premiums paid (and not refunded) to date, or \$1,030,000. If you change from Option 3 to Option 2, the death benefit under Option 2 is equal to the Face Amount plus the Account Value. Since the death benefit under the policy does not change as the result of a death benefit option change, the Face Amount will be increased by the sum of the premiums paid (and not refunded) to date plus interest applied to premiums paid (and not refunded) to date and then decreased by the Account Value, to \$960,000 under Option 2, maintaining a death benefit of \$1,030,000.

(*) All hypothetical examples involving death benefit Option 3 are assumed to occur prior to the Insured's Attained Age 90.

Appendix C

Hypothetical Example – Accelerated Death Benefit Rider for Terminal Illness

The calculations below show the impact of accelerating the death benefit under this rider for a sample policy.

Policy details prior to the acceleration of the death benefit:

Death Benefit	\$250,000
Account Value	\$50,000

The Eligible Amount is the amount of death benefit under the policy that can be considered for acceleration.

Eligible Amount = Death Benefit - Account Value

Eligible Amount = \$250,000 - \$50,000 = \$200,000

The Amount To Be Accelerated cannot exceed 75% of the Eligible Amount, or \$150,000.

The Insured is terminally ill as defined in the rider, and the Owner requests to accelerate \$100,000 of death benefit. Alternatively, the Owner could request the Terminal Illness Benefit Payment amount rather than the amount to be accelerated. Assuming an Annual Interest Rate of 5%, the interest charge is calculated as follows:

Interest Charge = $5\% \times 100,000 / (1 + 5\%) = \$4,761.90$

The terminal illness benefit payment is then calculated as follows:

Amount to Be Accelerated	\$100,000.00
Less Interest Charge	-\$4,761.90
Less administrative fee	-\$250.00
Terminal Illness Benefit Payment	\$94,988.10

A lien of \$100,000 is placed on the policy. The death benefit after acceleration is reduced by the amount of the lien, from \$250,000 to \$150,000. No other policy values are impacted.

Appendix D

Hypothetical Example – Substitute of Insured Rider

Below is an example of exercising this rider.

Policy details prior to the substitution:

Issue Date	1/1/2020
Insured Date of Birth	1/1/1965
Issue Age	55
Sex	Male
Risk Class	Tobacco
Face Amount	\$250,000
Account Value on 1/1/2030	\$50,000

On 1/1/2030, the Substitute of Insured Rider is exercised with the following Insured:

Substitute Insured Date of Birth	1/1/1980
Issue Age	40
Sex	Female
Risk Class	Non-Tobacco

The Face Amount (\$250,000) is unchanged. A \$75 fee for exercising the rider is deducted from the Account Value. There is no other cost or credit associated with exercising the rider. Going forward, all monthly charges, surrender charges, and other values after the substitution will be based on the life and risk class of the substitute Insured as if the substitute Insured were the original Insured. Below is the impact on the guaranteed monthly charges on the date of substitution:

Breakdown of Guaranteed Monthly Charges on Date of Substitution		
	Original Insured Male Tobacco Issue Age 55 Duration 11	Substitute Insured Female Non-Tobacco Issue Age 40 Duration 11
Charge for Exercising Rider	\$ 0.00	\$ 75.00
Insurance Charge	328.98	23.00
Face Amount Charge	182.50	125.00
Administrative Charge	15.00	15.00
Surrender Charge	0.00	0.00
Account Value After Charges	49,473.52	49,762.00

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The SAI contains additional information about the Separate Account and the policy. The SAI is incorporated into this prospectus by reference and is legally part of this prospectus. We filed the SAI with the SEC.

This prospectus and the SAI are available online at www.MassMutual.com/VULIII. For a free copy of other information about this policy, or general inquiries, you can contact our Administrative Office:

MassMutual Customer Service Center
PO Box 1865
Springfield, MA 01102-1865
(800) 272-2216
(866) 329-4527 (Fax)
www.MassMutual.com
MassMutualServiceCenter@MassMutual.com (Email Requests)

Reports and other information about the Separate Account, including the SAI, are also available on the SEC website (www.sec.gov) and can be obtained, upon payment of a duplicating fee, by electronic request at the following email address: publicinfo@sec.gov.

You can also request, free of charge, a personalized illustration of death benefits, surrender values, and cash values from your registered representative or by calling our Administrative Office.

Investment Company Act file number: 811-08075
Securities Act file number: 333-150916
Class (Contract) Identifier: C000066422

STATEMENT OF ADDITIONAL INFORMATION
MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
(Depositor)
MASSACHUSETTS MUTUAL VARIABLE LIFE SEPARATE ACCOUNT I
(Registrant)

Variable Universal Life III

April 29, 2024

This Statement of Additional Information (SAI) is not a prospectus. It should be read in conjunction with the statutory prospectus dated April 29, 2024, for the Variable Universal Life III (VUL III) policy. The VUL III policy and its statutory prospectus may be referred to in this SAI.

For a copy of the VUL III statutory prospectus, contact your registered representative, our Administrative Office by mail at PO Box 1865, Springfield, Massachusetts, 01102-1865, or by phone (800) 272-2216, or access the internet at www.MassMutual.com/VULIII, or access the Securities and Exchange Commission website at www.sec.gov.

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GENERAL INFORMATION AND HISTORY

Company

In this Statement of Additional Information, the “Company,” “we,” “us,” and “our” refer to Massachusetts Mutual Life Insurance Company (MassMutual®). 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. Products and services are offered primarily through MassMutual’s distribution channels: MassMutual Financial Advisors, MassMutual Strategic Distributors, Institutional Solutions and Worksite.

MassMutual was established on May 15, 1851 and is organized as a mutual life insurance company in the Commonwealth of Massachusetts. MassMutual’s home office is located at 1295 State Street, Springfield, Massachusetts 01111-0001.

The Separate Account

The Company’s Board of Directors established the Separate Account (Massachusetts Mutual Variable Life Separate Account I) on July 13, 1988, as a separate investment account of MassMutual. It was established based on the laws of the Commonwealth of Massachusetts. It is registered with the Securities and Exchange Commission (SEC) as a unit investment trust under the provisions of the Investment Company Act of 1940.

The Separate Account exists to keep your life insurance assets separate from our other Company assets. As such, any income, gains, or losses credited to, or charged against, the Separate Account reflect only the Separate Account’s own investment experience. At no time will the Separate Account reflect the investment experience of the Company’s other assets.

We may not use the assets in the Separate Account to pay any liabilities of the Company other than those arising from the policies. We may, however, transfer to our General Investment Account any assets that exceed anticipated obligations of the Separate Account. We are required to pay, from our general assets, if necessary, all amounts promised under the VUL III policies. In the event that the assets in the Separate Account exceed the liabilities, the Company may only withdraw seed capital and earned fees and charges.

SERVICES

The Company holds title to the assets of the Separate Account. The Company maintains the records and accounts relating to the Guaranteed Principal Account, the Separate Account, the segment within the Separate Account established to receive and invest premium payments for the policies, and divisions of that segment. The Company’s principal business address is 1295 State Street, Springfield, Massachusetts 01111-0001.

ADDITIONAL INFORMATION ABOUT THE OPERATION OF THE POLICY AND THE REGISTRANT

Purchase of Shares in Underlying Investment Funds

Shares are purchased and redeemed at net asset value. Fund dividends and capital gain distributions are automatically reinvested, unless the Company, on behalf of the Separate Account, elects otherwise.

Because the underlying funds are also offered in variable annuity contracts, it is possible that conflicts could arise between the owners of variable life insurance policies and the owners of variable annuity contracts. If a conflict exists, the fund’s board will notify the insurers and take appropriate action to eliminate the conflict. Additionally, if the insurer becomes aware of such conflicts, the insurer will work with the underlying fund’s board to resolve the conflict.

Annual Reports

Each year within the 30 days following the Policy Anniversary date, we will provide the policy owner a report showing the following policy information:

- the Account Value at the beginning of the previous Policy Year;
- all premiums paid since that time;
- all additions to and deductions from the Account Value during the year; and
- the Account Value, death benefit, Net Surrender Value and Policy Debt as of the current Policy Anniversary. This report may contain additional information if required by any applicable law or regulation.

UNDERWRITERS

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

MMLIS and MSD are located at 1295 State Street, Springfield, MA 01111-0001. MMLIS and MSD are registered with the SEC as broker-dealers under the Securities Exchange Act of 1934 and are members of the Financial Industry Regulatory Authority (FINRA).

During the last three years, MMLIS and MSD were paid the compensation amounts shown below for their actions as principal underwriters for the policies described in the statutory prospectus.

Year	MMLIS	MSD
2023	\$85,992	\$5,784
2022	\$106,004	\$3,835
2021	\$70,523	\$5,580

This offering is on a continuous basis.

Commissions

Commissions are a percentage of the premium paid in each year of coverage and differ for premiums paid up to the Target Premium and for premiums paid in excess of the Target Premium. The Target Premium is based on the issue age, gender, and risk classification of the Insured.

Commissions for sales of the policies by MMLIS registered representatives are paid by MassMutual on behalf of MMLIS to its registered representatives. Commissions for sales of the policies by registered representatives of other broker-dealers are paid by MassMutual on behalf of MSD to those broker-dealers.

During the last three years, commissions, as described in the statutory prospectus, were paid by MassMutual through MMLIS and MSD as shown below.

Year	MMLIS	MSD
2023	\$430,577	\$43,483
2022	\$570,520	\$64,389
2021	\$894,776	\$72,212

ADDITIONAL INFORMATION

Underwriting Procedures

Before issuing a policy, we will require evidence of insurability that is satisfactory to us. You must complete an application and submit it to our Administrative Office. We will usually require that the Insured have a medical examination. Acceptance is subject to completion of all underwriting requirements and our underwriting rules.

The Insured is assigned an underwriting risk classification which we use to calculate insurance and other charges. The insurance charge rate will not exceed those shown on the policy's specifications pages.

- *For policies issued after December 31, 2019:* These rates are based on the 2017 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality Table (2017 CSO). In some states unisex rates may be required; in those situations, the 2017 CSO (80) Ultimate, Smoker-Distinct, Age Nearest Birthday Mortality Table is used.
- *For policies issued on or before December 31, 2019:* These rates are based on the 2001 Commissioners' Standard Ordinary Ultimate, Sex-Distinct, Smoker-Distinct, Age Nearest Birthday Mortality Table (2001 CSO). In some states unisex rates may be required; in those situations, the 2001 CSO (80) Ultimate, Smoker-Distinct, Age Nearest Birthday Mortality Table is used.

We may, however, charge less than the maximum monthly insurance charges shown in the policy's specifications pages. In this case, the monthly insurance charges will be based on a number of factors including, but not limited to, our expectations for future mortality, investment earnings, persistency and expense results, capital and reserve requirements, taxes and future profits, and other factors unrelated to mortality experience. The expense component of these rates is used to offset sales and issue expenses, which decrease over time. Any change in these charges will apply to all individuals in the same class.

Special risk classifications are used when mortality experience in excess of the standard risk classifications is expected. These substandard risks will be charged a higher cost of insurance rate that will not exceed rates based on the following:

- *For policies issued after December 31, 2019:* A multiple of 2017 CSO, male or female (unisex rates may be required in some situations), the Nonsmoker or Smoker Table, and age of the Insured on their nearest birthday plus any flat extra amount assessed. The multiple will be based on the Insured's substandard rating.
- *For policies issued on or before December 31, 2019:* A multiple of 2001 CSO, male or female (unisex rates may be required in some situations), the Nonsmoker or Smoker Table, and age of the Insured on their nearest birthday plus any flat extra amount assessed. The multiple will be based on the Insured's substandard rating.

There are five non-rated classifications: ultra preferred non-tobacco, select preferred non-tobacco, non-tobacco, select preferred tobacco, and tobacco.

Increases in Face Amount

A Face Amount increase is accomplished by issuing an additional insurance coverage segment. Each such segment has a distinct issue age and risk classification.

It is possible for risk classifications of prior segments to change in order to match the risk classification of a new segment. In cases where the risk classifications are different, the Company may change the risk classification of prior segments if doing so will reduce the insurance charges associated with the prior segments. However, the Company will not change the risk classifications of prior segments when the Face Amount increase coincides with a conversion of an existing term life insurance policy, unless evidence of insurability acceptable to us is provided. In addition, the Company will not change the risk classifications of prior segments if doing so will increase the insurance charges associated with the prior segments. Changing the risk classifications of prior segments may impact the maximum premium limits, MEC premiums and Minimum Death Benefit under the Cash Value Accumulation Test.

If you increase the Face Amount, the insurance charge and face amount charge will increase. In addition, a separate surrender charge schedule will apply during the first nine years of the segment's coverage.

Premium payments received once an increase in Face Amount becomes effective will be allocated to each segment of the Face Amount. The premium allocation will be made on a pro rata basis using the premium expense factor for each segment. If the Net Surrender Value is insufficient to continue the changed policy In Force for three months at the new monthly charges and interest, we will require a premium payment sufficient to increase the Net Surrender Value to such an amount.

PERFORMANCE DATA

From time to time, we may report historical performance for the Separate Account Divisions available under the policy. The investment performance figures are calculated using the actual historical performance of the investment options for the periods shown in the report. When applicable, the performance will include periods before the policy was available for sale.

The performance returns in these reports will reflect deductions for management fees and all other operating expenses of the underlying investment funds and an annual deduction for the asset charge. The returns will not reflect any deductions from premiums, monthly charges assessed against the Account Value of the policies, policy surrender charges, or other policy charges, which, if deducted, would significantly reduce the returns.

From time to time, we may also report actual historical performance of the investment funds underlying each division of the Separate Account. These returns will reflect the fund operating expenses but they will not reflect the asset charge, any deductions from premiums, monthly charges assessed against the Account Value of the policies, policy surrender charges, or other policy charges. If these expenses and charges were deducted, the rates of return would be significantly lower.

The rates of return we report will not be illustrative of how actual investment performance will affect the benefits under the policy. Neither are they necessarily indicative of future performance. Actual rates may be higher or lower than those reported.

We currently post investment performance reports for VUL III on our website at www.MassMutual.com/VulIII. You can also request a copy of the most recent report from your registered representative or by calling our Administrative Office at (800) 272-2216, Monday – Friday, 8 AM to 8 PM Eastern Time. Questions about the information in these reports should be directed to your registered representative.

We may also distribute sales literature that includes historical performance of broad market indices, such as the Standard & Poor's 500 Stock Index® and the Dow Jones Industrial Average. These indices are provided for informational purposes only.

EXPERTS

The financial statements of Massachusetts Mutual Variable Life Separate Account I as of December 31, 2023 and for each of the years in the two-year period then ended and the financial highlights for each of the years in the five-year period then ended and the statutory financial statements of Massachusetts Mutual Life Insurance Company (the Company) as of December 31, 2023 and 2022, and for each of the years in the three-year period ended December 31, 2023, each have been included in this Statement of Additional Information herein in reliance upon the reports of KPMG LLP, an independent registered public accounting firm, each of which are also included herein, and upon the authority of said firm as experts in accounting and auditing. KPMG LLP's report, dated February 27, 2024, states that the Company prepared its financial statements using statutory accounting practices prescribed or permitted by the Commonwealth of Massachusetts Division of Insurance (statutory accounting practices), which is a basis of accounting other than U.S. generally accepted accounting principles. Accordingly, KPMG LLP's report states that the financial statements of the Company are not intended to be and, therefore, 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 the statutory accounting practices. The principal business address of KPMG LLP is One Financial Plaza, 755 Main Street, Hartford, Connecticut 06103.

FINANCIAL STATEMENTS

The Registrant

Report of Independent Registered Public Accounting Firm

Statement of Assets and Liabilities as of December 31, 2023

Statements of Operations and Changes in Net Assets for the years ended December 31, 2023 and 2022

Notes to Financial Statements

The Depositor

Independent Auditors' Report

Statutory Statements of Financial Position as of December 31, 2023 and 2022

Statutory Statements of Operations for the years ended December 31, 2023, 2022 and 2021

Statutory Statements of Changes in Surplus for the years ended December 31, 2023, 2022 and 2021

Statutory Statements of Cash Flows for the years ended December 31, 2023, 2022 and 2021

Notes to Statutory Financial Statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY

STATUTORY FINANCIAL STATEMENTS

As of December 31, 2023 and 2022 and
for the years ended December 31, 2023, 2022 and 2021

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
STATUTORY FINANCIAL STATEMENTS

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

Independent Auditors' Report

Audit Committee of the Board of Directors
Massachusetts Mutual Life Insurance Company:

Opinions

We have audited the financial statements of Massachusetts Mutual Life Insurance Company (the Company), which comprise the statutory statements of financial position as of December 31, 2023 and 2022, and the related statutory statements of operations and changes in surplus, and cash flows for the three-year period ended December 31, 2023, and the related notes to the financial statements.

Unmodified Opinion on Statutory Basis of Accounting

In our opinion, the accompanying financial statements present fairly, in all material respects, the financial position of the Company as of December 31, 2023 and 2022, and the results of its operations and its cash flows for the three-year period ended December 31, 2023 in accordance with accounting practices prescribed or permitted by the Commonwealth of Massachusetts Division of Insurance described in Note 2.

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, 2023 and 2022, or the results of its operations or its cash flows for the three-year period ended December 31, 2023.

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 2 to the financial statements, the financial statements are prepared by the Company using accounting practices prescribed or permitted by the Commonwealth of Massachusetts Division 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 2 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 3 to the financial statements, in 2023, the Company adopted INT 23-01T - Disallowed IMR. Our opinions are not modified with respect to this matter.

KPMG LLP, a Delaware limited liability partnership and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee.



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 Commonwealth of Massachusetts Division 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.

/s/ KPMG LLP

Hartford, Connecticut
February 27, 2024

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
STATUTORY STATEMENTS OF FINANCIAL POSITION

	December 31, 2023	December 31, 2022
	(In Millions)	
Assets:		
Bonds	\$ 144,433	\$ 136,445
Preferred stocks	446	451
Common stocks – subsidiaries and affiliates	25,496	24,683
Common stocks – unaffiliated	1,623	1,477
Mortgage loans	24,021	24,972
Policy loans	15,897	17,054
Real estate	329	355
Partnerships and limited liability companies	12,907	12,296
Derivatives	20,740	22,032
Cash, cash equivalents and short-term investments	11,134	5,568
Other invested assets	2,401	1,865
Total invested assets	259,427	247,198
Investment income due and accrued	5,236	4,223
Federal income taxes	280	231
Net deferred income taxes	1,660	1,229
Other than invested assets	5,670	4,285
Total assets excluding separate accounts	272,273	257,166
Separate account assets	52,593	53,414
Total assets	\$ 324,866	\$ 310,580
Liabilities and Surplus:		
Policyholders' reserves	\$ 167,250	\$ 153,216
Liabilities for deposit-type contracts	19,645	18,089
Contract claims and other benefits	714	701
Policyholders' dividends	2,150	1,927
General expenses due or accrued	1,049	1,108
Asset valuation reserve	5,989	5,674
Repurchase agreements	3,219	3,042
Commercial paper	50	250
Collateral	2,073	4,065
Derivatives	13,734	14,003
Funds held under coinsurance	22,520	21,916
Other liabilities	5,141	5,364
Total liabilities excluding separate accounts	243,534	229,355
Separate account liabilities	52,455	53,284
Total liabilities	295,989	282,639
Surplus	28,877	27,941
Total liabilities and surplus	\$ 324,866	\$ 310,580

See accompanying notes to statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
STATUTORY STATEMENTS OF OPERATIONS

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Revenue:			
Premium income	\$ 25,490	\$ 23,524	19,891
Net investment income	11,043	9,302	8,845
Fees and other income	1,028	1,139	1,253
Total revenue	37,561	33,965	29,989
Benefits, expenses and other deductions:			
Policyholders' benefits	17,369	16,937	11,513
Change in policyholders' reserves	12,273	10,278	11,649
General insurance expenses	2,333	2,191	2,269
Commissions	1,423	1,324	1,224
State taxes, licenses and fees	329	310	326
Other deductions	1,122	677	810
Total benefits, expenses and other deductions	34,849	31,717	27,791
Net gain from operations before dividends and federal income taxes	2,712	2,248	2,198
Dividends to policyholders	2,131	1,906	1,808
Net gain from operations before federal income taxes	581	342	390
Federal income tax expense (benefit)	116	(64)	72
Net gain from operations	465	406	318
Net realized capital (losses) gains	(490)	326	(534)
Net (loss) income	\$ (25)	\$ 732	(216)

See accompanying notes to statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
STATUTORY STATEMENTS OF CHANGES IN SURPLUS

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Surplus, beginning of year	\$ 27,941	\$ 26,979	\$ 24,327
Net increase due to:			
Net (loss) income	(25)	732	(216)
Change in net unrealized capital gains (losses), net of tax	8	871	3,366
Change in net unrealized foreign exchange capital gains (losses), net of tax	376	(1,739)	(673)
Change in other net deferred income taxes	462	662	544
Change in nonadmitted assets	365	(563)	20
Change in asset valuation reserve	(315)	740	(1,209)
Change in reserve valuation basis	-	(12)	-
Change in surplus notes	(149)	413	841
Change in minimum pension liability	(7)	40	21
Prior period adjustments	173	(44)	31
Other	48	(138)	(73)
Net increase:	936	962	2,652
Surplus, end of year	\$ 28,877	\$ 27,941	\$ 26,979

See accompanying notes to statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
STATUTORY STATEMENTS OF CASH FLOWS

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Cash from operations:			
Premium and other income collected	\$ 26,418	\$ 24,719	\$ 20,237
Net investment income	12,269	8,172	9,238
Benefit payments	(17,077)	(16,698)	(11,349)
Net transfers from separate accounts	1,611	4,947	1,129
Commissions and other expenses	(5,208)	(5,292)	(4,557)
Dividends paid to policyholders	(1,908)	(1,806)	(1,688)
Federal and foreign income taxes recovered (paid)	58	5	(849)
Net cash from operations	16,163	14,047	12,161
Cash from investments:			
Proceeds from investments sold, matured or repaid:			
Bonds	23,801	28,498	37,911
Preferred and common stocks – unaffiliated	290	422	584
Common stocks – affiliated	105	72	45
Mortgage loans	3,621	3,784	4,889
Real estate	5	177	75
Partnerships and limited liability companies	1,830	2,910	1,629
Derivatives	(214)	(384)	(490)
Other	(518)	(655)	198
Total investment proceeds	28,920	34,824	44,841
Cost of investments acquired:			
Bonds	(32,278)	(43,003)	(47,343)
Preferred and common stocks – unaffiliated	(316)	(572)	(515)
Common stocks – affiliated	(256)	(624)	(3,966)
Mortgage loans	(2,896)	(2,095)	(5,170)
Real estate	(8)	(13)	(174)
Partnerships and limited liability companies	(2,988)	(3,932)	(4,033)
Derivatives	-	(267)	(66)
Other	153	11	86
Total investments acquired	(38,589)	(50,495)	(61,181)
Net increase in policy loans	1,158	(935)	(522)
Net cash used in investing activities	(8,511)	(16,606)	(16,862)
Cash from financing and miscellaneous sources:			
Net deposits on deposit-type contracts	1,238	806	2,359
Change in surplus notes	(150)	413	607
Change in repurchase agreements	171	241	(1,204)
Change in collateral	(2,024)	(2,089)	574
Other cash (used) provided	(1,321)	2,813	2,570
Net cash (used in) from financing and miscellaneous sources	(2,086)	2,184	4,906
Net change in cash, cash equivalents and short-term investments	5,566	(375)	205
Cash, cash equivalents and short-term investments:			
Beginning of year	5,568	5,943	5,738
End of year	\$ 11,134	\$ 5,568	\$ 5,943

See accompanying notes to statutory financial statements

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS

1. Nature of operations

Massachusetts Mutual Life Insurance Company (MassMutual or the Company), a mutual life insurance company domiciled in the Commonwealth of Massachusetts, and its domestic life insurance subsidiaries provide individual and group life insurance, disability insurance (DI), individual and group annuities and guaranteed interest contracts (GIC) to individual and institutional customers in all 50 states of the United States of America (U.S.), the District of Columbia and Puerto Rico. Products and services are offered primarily through the Company's MassMutual Financial Advisors (MMFA), MassMutual Strategic Distributors (MMSD), Institutional Solutions (IS) and Worksite distribution channels.

MMFA is a sales force of financial professionals that operate in the U.S. MMFA sells individual life, individual annuities, hybrid life and long-term care (LTC) and DI. The Company's MMSD channel sells life insurance, disability, annuity, and hybrid life and LTC solutions through a network of third-party distribution partners. The Company's IS distribution channel places group annuities, life insurance and GIC primarily through retirement advisory firms, actuarial consulting firms, investment banks, insurance benefit advisors and investment management companies. The Company's Worksite channel works with advisors and employers across the country to provide American workers with voluntary and executive benefits such as group whole life, critical illness, accident insurance and DI, through the workplace.

2. Summary of significant accounting policies

a. Basis of presentation

The statutory financial statements have been prepared in conformity with the statutory accounting practices of the National Association of Insurance Commissioners (NAIC) and the accounting practices prescribed or permitted by the Commonwealth of Massachusetts Division of Insurance (the Division).

Statutory accounting practices are different in some respects from financial statements prepared in accordance with U.S. generally accepted accounting principles (U.S. GAAP). The more significant differences between statutory accounting practices and U.S. GAAP are as follows:

Invested assets

- Bonds are generally carried at amortized cost, whereas U.S. GAAP reports bonds at fair value for bonds available for sale and trading or at amortized cost for bonds held to maturity (HTM)
- Changes in the fair value of derivative financial instruments are recorded as changes in surplus, whereas U.S. GAAP generally reports these changes in revenue unless deemed an effective hedge
- Interest rate and credit default swaps associated with replicated synthetic investment transactions are carried at amortized cost, whereas U.S. GAAP would carry them at fair value
- Embedded derivatives are recorded as part of the underlying contract, whereas U.S. GAAP would identify and bifurcate certain embedded derivatives from the underlying contract or security and account for them separately at fair value
- Income recognition on partnerships and limited liability companies, which are accounted for under the equity method, is limited to the amount of cash distribution, whereas U.S. GAAP is without limitation
- Certain majority-owned subsidiaries and variable interest entities are accounted for using the equity method, whereas U.S. GAAP would consolidate these entities
- Starting on January 1, 2022, the Company adopted the current expected credit loss (CECL) impairment model for U.S. GAAP, which only applies to financial assets carried at amortized cost, including mortgage and other commercial loans, equipment loans, HTM debt securities, and trade, lease, reinsurance and other receivables. CECL is based on expected credit losses rather than incurred losses. All financial assets within scope of CECL will have a credit loss allowance. The adopted guidance also changes the incurred loss model on AFS debt securities to be an allowance for credit losses with potential recoverability. Statutory accounting continues to utilize the other-than-temporary impairment(s) (OTTI) model described in *Note 2dd*.

Policyholders' liabilities

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

- Statutory policy reserves are generally based upon prescribed methods, such as the Commissioners' Reserve Valuation Method, Commissioners' Annuity Reserve Valuation Method or net level premium method, and prescribed statutory mortality, morbidity and interest assumptions at the time of issuance, whereas U.S. GAAP policy reserves would generally be based upon the net level premium method or the estimated gross margin method with estimates, at time of issuance, of future mortality, morbidity, persistency and interest
- Liabilities for policyholders' reserves, unearned premium, and unpaid claims are presented net of reinsurance ceded, whereas U.S. GAAP would present the liabilities on a direct basis and report an asset for the amounts recoverable or due from reinsurers
- Payments received for universal and variable life insurance products, certain variable and fixed deferred annuities and group annuity contracts are reported as premium income and corresponding change in reserves, whereas U.S. GAAP would treat these payments as deposits to policyholders' account balances

General insurance expenses and commissions

Certain acquisition costs, such as commissions and other variable costs, directly related to successfully acquiring new business are charged to current operations as incurred, whereas U.S. GAAP generally would capitalize these expenses and amortize them based on profit emergence over the expected life of the policies or over the premium payment period.

Net realized capital (losses) gains

- After-tax realized capital gains (losses) that result from changes in the overall level of interest rates for all types of fixed-income investments and interest-related hedging activities are deferred into the interest maintenance reserve (IMR) and amortized into revenue, whereas U.S. GAAP reports these gains and losses as revenue

Surplus

- Changes in the balances of deferred income taxes, which provide for book versus tax temporary differences, are subject to limitation and are recorded in surplus, whereas U.S. GAAP would generally include the change in deferred taxes in net income without limitation
- Assets are reported at admitted asset value and assets designated as nonadmitted are excluded through a charge against surplus, whereas U.S. GAAP recognizes all assets, net of any valuation allowances
- An asset valuation reserve (AVR) is reported as a contingency reserve to stabilize surplus against fluctuations in the statement value of real estate, partnerships and limited liability companies and certain common stocks as well as credit-related changes in the value of bonds, mortgage loans and certain derivatives, whereas U.S. GAAP does not record this reserve
- Changes to the mortgage loan valuation allowance are recognized in net unrealized capital gains (losses), net of tax, in the Consolidated Statutory Statements of Changes in Surplus, whereas U.S. GAAP follows the CECL impairment model effective 1/1/2022
- The overfunded status of pension and other postretirement plans, which is the excess of the fair value of the plan assets over the projected benefit obligation, is a nonadmitted asset for statutory accounting whereas U.S. GAAP recognizes the overfunded status as an asset
- Surplus notes are reported in surplus, whereas U.S. GAAP reports these notes as liabilities
- Statutory Statements of Changes in Surplus includes net income, change in net unrealized capital gains (losses), change in net unrealized foreign exchange capital gains (losses), change in other net deferred income taxes, change in nonadmitted assets, change in AVR, prior period adjustments and change in minimum pension liability, whereas U.S. GAAP presents net income as retained earnings and net unrealized capital gains (losses), change in net unrealized foreign exchange capital gains (losses), change in minimum pension liability as other comprehensive income
- The change in the fair value for unaffiliated common stock is recorded in surplus, whereas the change in the fair value for ownership interests in an entity not accounted for under the equity method or consolidated are recorded in revenue for U.S. GAAP

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Other

- Assets and liabilities associated with certain group annuity and variable universal life contracts, which do not pass-through all investment experience to contract holders, are maintained in separate accounts and are presented on a single line in the statutory financial statements, whereas U.S. GAAP reports these contracts as general investments and liabilities of the Company

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

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

b. Corrections of errors and reclassifications

For the years ended December 31, 2023 and 2022, corrections of prior years' errors were recorded in surplus, net of tax:

	Years Ended December 31, 2023 and 2022					
	Increase (Decrease) to:					
	Prior Years' Net Income		Current Year Surplus		Asset or Liability Balances	
			(In Millions)			
	2023	2022	2023	2022	2023	2022
Common stocks -subsidiaries and affiliates	\$ 19	\$ -	\$ 19	\$ -	\$ 19	\$ -
Partnerships and limited liability companies	15	-	15	-	15	-
Derivative assets	-	-	(125)	-	(125)	-
Investment income due and accrued	230	-	230	-	230	-
Policyholders' reserves	(143)	(65)	(143)	(65)	143	65
Derivative liabilities	-	-	7	-	(7)	-
Other Liabilities	30	25	30	25	30	(25)
Other invested assets	22	-	22	-	22	-
Cash, cash equivalents and short-term investments	-	(4)	-	(4)	-	(4)
Total	\$ 173	\$ (44)	\$ 55	\$ (44)	\$	

c. Bonds

Bonds are generally valued at amortized cost using the constant yield interest method with the exception of NAIC

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

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

Fixed income securities, with the highest ratings from a rating agency follow the retrospective method of accounting.

All other fixed income securities, such as floating rate bonds and interest only securities, including those that have been impaired, follow the prospective method of accounting.

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

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

d. Preferred stocks

Preferred stocks in good standing, those that are rated Categories 1 through 3 by the Securities Valuation Office (SVO) of the NAIC, are generally valued at amortized cost. Preferred stocks not in good standing, those that are rated Categories 4 through 6 by the SVO, are valued at the lower of amortized cost or fair value. Fair values are based on quoted market prices, when available. If quoted market prices are not available, values provided by third-party organizations are used. If values provided by third-party organizations are unavailable, fair value is estimated using internal models. These models use inputs not directly observable or correlated with observable market data. Typical inputs integrated into the Company's internal discounted expected earnings models include, but are not limited to, earnings before interest, taxes, depreciation and amortization estimates. Fair values resulting from internal models are those expected to be received in an orderly transaction between willing market participants.

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

e. Common stocks – subsidiaries and affiliates

On May 28, 2021, the Company, through a wholly owned subsidiary, Glidepath Holdings Inc. (Glidepath), acquired MassMutual Ascend Life Insurance Company (formerly known as Great American Life Insurance Company) and other subsidiaries and affiliated entities (MM Ascend) for \$3,570 million in cash. MM Ascend primarily offers traditional fixed and fixed indexed annuity products.

Common stocks of unconsolidated subsidiaries, primarily MMHLLC, Glidepath and MM Investment Holding (MMIH), are accounted for using the statutory equity method. The Company accounts for the value of MMHLLC at its underlying U.S. GAAP equity value less adjustments for the limited statutory basis of accounting related to foreign insurance subsidiaries and controlled affiliated entities as well as an adjustment of \$620 million as of December 31, 2023 for a portion of its noncontrolling interests (NCI). Glidepath is valued on it is underlying GAAP equity with adjustment to recognize its investment in MM Ascend based on MM Ascend's underlying statutory surplus, adjusted

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

for any unamortized goodwill that would have been recognized under the statutory purchase method. Operating results, less dividends declared, for MMHLLC, Glidepath and MMIH are reflected as net unrealized capital gains in the Statutory Statements of Changes in Surplus. Dividends declared from MMHLLC, Glidepath and MMIH are recorded in net investment income when declared and are limited to MMHLLC, Glidepath and MMIH's U.S. GAAP retained earnings. The cost basis of common stocks – subsidiaries and affiliates is adjusted for impairments deemed to be other than temporary.

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

f. Common stocks – unaffiliated

Unaffiliated common stocks are carried at fair value, which is based on quoted market prices when available. If quoted market prices are not available, values provided by third-party organizations are used. If values from third parties are unavailable, fair values are determined by management using estimates based upon internal models. The Company's internal models include estimates based upon comparable company analysis, review of financial statements, broker quotes and last traded price. Fair values resulting from internal models are those expected to be received in an orderly transaction between willing market participants.

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

g. Mortgage loans

Mortgage loans are valued at the unpaid principal balance of the loan, net of unamortized premium, discount, mortgage origination fees and valuation allowances. Interest income earned on impaired loans is accrued on the outstanding principal balance of the loan based on the loan's contractual coupon rate. Interest is not accrued for (a) impaired loans more than 60 days past due, (b) delinquent loans more than 90 days past due, or (c) loans that have interest that is not expected to be collected. The Company continually monitors mortgage loans where the accrual of interest has been discontinued, and will resume the accrual of interest on a mortgage loan when the facts and circumstances of the borrower and property indicate that the payments will continue to be received according to the terms of the original or modified mortgage loan agreement.

h. Policy loans

Policy loans are carried at the outstanding loan balance less amounts unsecured by the cash surrender value of the policy and amounts ceded to reinsurers.

i. Real estate

Investment real estate, which the Company has the intent to hold for the production of income, and real estate occupied by the Company are carried at depreciated cost, less encumbrances. Depreciation is calculated using the straight-line method over the estimated useful life of the real estate holding, not to exceed 40 years. Depreciation expense is included in net investment income.

Real estate held for sale is initially carried at the lower of depreciated cost or fair value less estimated selling costs and is no longer depreciated. Adjustments to carrying value, including for further declines in fair value, are recorded in a valuation reserve, which is included in net realized capital (losses) gains.

Fair value is generally estimated using the present value of expected future cash flows discounted at a rate commensurate with the underlying risks, net of encumbrances. The Company also obtains external appraisals for a rotating selection of properties annually. If an external appraisal is not obtained, an internal appraisal is performed.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

j. Partnerships and limited liability companies

Partnerships and limited liability companies, except for partnerships that generate and realize low income housing tax credits (LIHTCs), are accounted for using the equity method with the change in the equity value of the underlying investment recorded in surplus. Distributions received are recognized as net investment income to the extent the distribution does not exceed previously recorded accumulated undistributed earnings.

Investments in partnerships that generate LIHTCs are carried at amortized cost unless considered impaired. Under the amortized cost method, the excess of the carrying value of the investment over its estimated residual value is amortized into net investment income during the period in which tax benefits are recognized.

The equity method is suspended if the carrying value of the investment is reduced to zero due to losses from the investment. Once the equity method is suspended, losses are not recorded until the investment returns to profitability and the equity method is resumed. However, if the Company has guaranteed obligations of the investment or is otherwise committed to provide further financial support for the investment, losses will continue to be reported up to the amount of those guaranteed obligations or commitments.

k. Derivatives

Interest rate swaps and credit default swaps associated with replicated assets are valued at amortized cost and all other derivative types are carried at fair value, which is based primarily upon quotations obtained from counterparties and independent sources. These quotations are compared to internally derived prices and a price challenge is lodged with the counterparties and independent sources when a significant difference cannot be explained by appropriate adjustments to the internal model. When quoted market values are not reliable or available, the value is based on an internal valuation process using market observable inputs that other market participants would use. Changes in the fair value of these instruments other than interest rate swaps and credit default swaps associated with replicated synthetic investments are recorded as unrealized capital gains (losses) in surplus. Gains and losses realized on settlement, termination, closing or assignment of contracts are recorded in net realized capital (losses) gains. Amounts receivable and payable are accrued as net investment income.

l. 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 Statements of Financial Position for cash, cash equivalents and short-term investment instruments approximates the fair value.

m. Investment income due and accrued

Accrued investment income consists primarily of interest and dividends. Interest is recognized on an accrual basis and dividends are recorded as earned on the ex-dividend date.

n. Federal income taxes

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

o. Other than invested assets

Other than invested assets primarily includes the Company's investment in corporate-owned life insurance, deferred and uncollected life insurance premium, receivable from subsidiaries and affiliates, reinsurance recoverable, fixed assets and other receivables.

p. Separate accounts

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

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

Separate accounts reflect two categories of risk assumption: nonguaranteed separate accounts for which the policyholder/contract holder assumes the investment risk and guaranteed separate accounts for which the Company contractually guarantees a minimum return, a minimum account value, or both to the policyholder/contract holder. For certain guaranteed separate account products such as interest rate guaranteed products and indexed separate account products, reserve adequacy is performed on a contract-by-contract basis using, as applicable, prescribed interest rates, mortality rates and asset risk deductions. If the outcome from this adequacy analysis produces a deficiency relative to the current account value, a liability is recorded in policyholders' reserves or liabilities for deposit-type contracts in the Statutory Statements of Financial Position with the corresponding change in the liability recorded as change in policyholders' reserves or policyholders' benefits in the Statutory Statements of Operations.

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

q. Nonadmitted assets

Assets designated as nonadmitted by the NAIC primarily include pension plan assets, intangibles, certain electronic data processing equipment, advances and prepayments, certain investments in partnerships and limited liability companies for which qualifying audits are not performed, the amount of DTAs (subject to certain limitations) that will not be realized by the end of the third calendar year following the current year end, furniture and equipment, certain other receivables and uncollected premium greater than 90 days past due. Due and accrued income is nonadmitted on: (a) bonds delinquent more than 90 days or where collection of interest is improbable; (b) impaired bonds more than 60 days past due; (c) bonds in default; (d) mortgage loans in default where interest is 180 days past due; (e) rent in arrears for more than 90 days; and (f) policy loan interest due and accrued more than 90 days past due and included in the unpaid balance of the policy loan in excess of the cash surrender value of the underlying contract. Assets that are designated as nonadmitted are excluded from the Statutory Statements of Financial Position through a change in nonadmitted assets on the Statutory Statements of Changes in Surplus.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

r. Reinsurance

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

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

s. Policyholders' reserves

Policyholders' reserves are developed by actuarial methods that will provide for the present value of estimated future obligations in excess of estimated future premium on policies in force and are determined based on either statutory prescribed mortality/morbidity tables using specified interest rates and valuation methods, or principles-based reserving under Valuation Manual -20 which considers a wide range of future economic conditions, computed using justified company experience factors, such as mortality, policyholder behavior and expenses.

The Company waives deduction of deferred fractional premium at death and returns any portion of the final premium beyond the date of death. Reserves are computed using continuous functions to reflect these practices.

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

Certain variable universal life and universal life contracts include features such as guaranteed minimum death benefits (GMDB) or other guarantees that ensure continued death benefit coverage when the policy would otherwise lapse. The value of the guarantee is only available to the beneficiary in the form of a death benefit. The liability for variable and universal life GMDBs and other guarantees is included in policyholders' reserves and the related change in this liability is included in change in policyholders' reserves in the Statutory Statements of Operations.

Certain individual variable annuity and fixed annuity products have a variety of additional guarantees such as GMDBs and variable annuity guaranteed living benefits (VAGLB). The primary types of VAGLBs include guaranteed minimum accumulation benefits (GMAB), guaranteed minimum income benefits (GMIB) including GMIB Basic and GMIB Plus and guaranteed lifetime withdrawal benefits (GLWB). In general, these benefit guarantees require the contract owner or policyholder to adhere to a company-approved asset allocation strategy. The liabilities for individual variable annuity GMDBs and VAGLBs are included in policyholders' reserves in the Statements of Financial Position and the related changes in these liabilities are included in change in policyholders' reserves in the Statutory Statements of Operations.

Separate accounts include certain group annuity contracts used to fund retirement plans that offer a guarantee of a contract holder's principal, which can be withdrawn over a stated period of time. These contracts offer a stated rate of return backed by the Company. Contract payments are not contingent upon the life of the retirement plan participants.

Unpaid claims and claim expense reserves are related to disability and LTC claims. Unpaid disability claim liabilities are projected based on the average of the last three disability payments. LTC unpaid claim liabilities are projected using policy specific daily benefit amounts and aggregate utilization factors. Claim expense reserves are based on an analysis of the unit expenses related to the processing and examination of new and ongoing claims. Interest accrued on reserves is calculated by applying NAIC prescribed interest rates to the average reserves by year incurred.

Tabular interest, tabular reserves, reserves released, and tabular cost for all life and annuity contracts and supplementary contracts involving life contingencies are determined in accordance with NAIC Annual Statement instructions. For tabular interest, whole life and term products use a formula that applies a weighted average interest

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

rate determined from a seriatim valuation file to the mean average reserves. Universal life, variable life, group life, annuity and supplemental contracts use a formula that applies a weighted average credited rate to the mean account value. For contracts without an account value (e.g., a Single Premium Immediate Annuity) a weighted average statutory valuation rate is applied to the mean statutory reserve or accepted actuarial methods using applicable interest rates are applied.

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

t. Liabilities for deposit-type contracts

Liabilities for funding agreements, dividend accumulations, premium deposit funds, investment-type contracts such as supplementary contracts not involving life contingencies and certain structured settlement annuities are based on account value or accepted actuarial methods using applicable interest rates.

u. Participating contracts

Participating contracts are those that may be eligible to share in any dividends declared by the Company. Participating contracts issued by the Company represented 53% of the Company's policyholders' reserves and liabilities for deposit-type contracts as of December 31, 2023 and 56% as of December 31, 2022.

v. Policyholders' dividends

Dividends expected to be paid to policyholders in the following year are approved annually by MassMutual's Board of Directors and are recorded as an expense in the current year. The allocation of these dividends to policyholders reflects the relative contribution of each group of participating policies to surplus and considers, among other factors, investment returns, mortality and morbidity experience, expenses and taxes. The liability for policyholders' dividends includes the estimated amount of annual dividends and settlement dividends. A settlement dividend is an extra dividend payable at termination of a policy upon maturity, death or surrender.

w. Asset valuation reserve

The Company maintains an AVR that is a contingency reserve to stabilize surplus against fluctuations in the carrying value of common stocks, real estate, partnerships and limited liability companies as well as credit-related changes in the value of bonds, preferred stocks, mortgage loans, and certain derivatives. The AVR is reported as a liability within the Statutory Statements of Financial Position and the change in AVR, net of tax, is reported within the Statutory Statements of Changes in Surplus.

x. Repurchase agreements

Repurchase agreements are contracts under which the Company sells securities and simultaneously agrees to repurchase the same or substantially the same securities. These repurchase agreements are carried at cost and accounted for as collateralized borrowings with the proceeds from the sale of the securities recorded as a liability while the underlying securities continue to be recorded as an investment by the Company. Earnings on these investments are recorded as investment income and the difference between the proceeds and the amount at which the securities will be subsequently reacquired is amortized as interest expense. Repurchase agreements are used as a tool for overall portfolio management to help ensure the Company maintains adequate assets in order to provide yield, spread and duration to support liabilities and other corporate needs.

The Company provides collateral, as dictated by the repurchase agreements, to the counterparty in exchange for a loan. If the fair value of the securities sold becomes less than the loan, the counterparty may require additional collateral.

The carrying value reported in the Statutory Statements of Financial Position for repurchase agreements approximates the fair value.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

y. **Commercial paper**

The Company issues commercial paper (CP) in the form of unsecured notes. Interest on CP is calculated using a 360-day year based on the actual number of days elapsed. Due to the short-term nature of CP, the carrying value approximates fair value.

z. **Interest maintenance reserve**

The Company maintains an IMR that is used to stabilize net income against fluctuations in interest rates. After-tax realized capital gains (losses), which result from changes in interest rates for all types of fixed-income investments and interest-related derivatives, are deferred into the IMR and amortized into net investment income using the grouped amortization method. In the grouped amortization method, assets are grouped based on years of maturity. IMR is reduced by the amount ceded to reinsurers when entering into in force coinsurance ceding agreements. The IMR is included as net negative (Disallowed) IMR for any admitted portion in other than invested assets. Refer to *Note 3. "New accounting standards - Adoption of new accounting standards"* for further information on the adoption of INT 23-O1T - Disallowed IMR. Refer to *Note 7. "Other than invested assets"* for further information on the amount admitted as disallowed IMR.

aa. **Employee compensation plans**

The Company has a long-term incentive compensation plan, under which certain employees of the Company and its subsidiaries may be issued phantom share-based compensation awards. These awards include Phantom Stock Appreciation Rights (PSARs) and Phantom Restricted Stock (PRS). These awards do not grant an equity or ownership interest in the Company.

PSARs provide the participant with the opportunity to share in the value created in the total enterprise. The PSAR value is the appreciation in the phantom stock price between the grant price and the share price at the time of exercise. Awards can only be settled in cash. PSARs typically cliff vest at the end of three years and expire five years after the date of grant. Vested PSARs may be exercised during quarterly two-week exercise periods prior to expiration. The compensation expense for an individual award is recognized over the service period.

PRS provide the participant with the opportunity to share in the value created in the total enterprise. Participants receive the full phantom share value (grant price plus/minus any change in share price) over the award period. Awards can only be settled in cash. PRS typically vests on a graded basis over five years, one third per year after years three, four and five. On each vesting date, a lump sum cash settlement is paid to the participant based on the number of shares vested multiplied by the most recent phantom stock price. Compensation expense is recognized on the accelerated attribution method. The accelerated attribution method recognizes compensation expense over the vesting period by which each separate payout year is treated as if it were, in substance, a separate award.

All awards granted under the Company's plans are compensatory classified awards. Compensation costs are based on the most recent quarterly calculated intrinsic value of the PSARs (current share price less grant price per share not less than zero) and PRS (current share price per share), considering vesting provisions, net of forfeiture assumptions and are included in the Statutory Statements of Financial Position as a liability in general expenses due or accrued. The compensation expense for an individual award is recognized over the service period. The cumulative compensation expense for all outstanding awards in any period is equal to the change in calculated liability period over period. The requisite service period for the awards is the vesting period.

At the time of death or disability, awards contain vesting conditions, whereby employees' unvested awards immediately vest on an accelerated basis with a one-year exercise period for PSARs, full accelerated vesting and settlement for PRS awards.

At the time of retirement, both PRS and PSAR vest according to the original grant terms.

The phantom share price is determined using the enterprise value of each entity within the organization provided it is within a pre-established range calculated using management basis equity method. If outside the range, the maximum or minimum share price established by the management basis equity method would apply, as appropriate.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

bb. Other liabilities

Other liabilities primarily consist of the derivative interest expense liability, remittances and items not allocated, other miscellaneous liabilities, liabilities for employee benefits and accrued separate account transfers.

cc. Premium and related expense recognition

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

Premium revenue is adjusted by the related deferred premium adjustment. Deferred premium adjusts for the overstatement created in the calculation of reserves as the reserve computation assumes the entire year's net premium is collected annually at the beginning of the policy year and does not take into account installment or modal payments.

Commissions and other costs related to issuance of new policies and policy maintenance and settlement costs are charged to current operations when incurred. Surrender fee charges on certain life and annuity products are recorded as a reduction of benefits and expenses.

dd. Net realized capital (losses) gains including other-than-temporary impairments and unrealized capital gains (losses)

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

Bonds - general

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

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

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

Bonds - corporate

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

The Company analyzes investments whose fair value is below the cost for impairment. Generally, if the investment experiences significant credit or interest rate related deterioration, the cost of the investment is not recoverable, or the Company intends to sell the investment before anticipated recovery, an OTTI is recognized as realized investment loss.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Bonds - loan-backed and structured securities

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

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

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

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

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

Common and preferred stock

The cost basis of common and preferred stocks is adjusted for impairments deemed to be other than temporary. The Company considers the following factors in the evaluation of whether a decline in value is other than temporary: (a) the financial condition and near-term prospects of the issuer; (b) the Company's ability and intent to retain the investment for a period sufficient to allow for a near-term recovery in value; and (c) the period and degree to which the value has been below cost. The Company conducts a quarterly analysis of issuers whose common or preferred stock is not-in-good standing or valued below 80% of cost. The Company also considers other qualitative and quantitative factors in determining the existence of OTTI including, but not limited to, unrealized loss trend analysis and significant short-term changes in value.

Mortgage loans

The Company performs internal reviews at least annually to determine if individual mortgage loans are performing or nonperforming. The fair values of performing mortgage loans are estimated by discounting expected future cash flows using current interest rates for similar loans with similar credit risk. For nonperforming loans, the fair value is the estimated collateral value of the underlying real estate. If foreclosure is probable, the Company will obtain an external appraisal.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Mortgage loans are considered to be impaired when, based upon current available information and events, it is probable that the Company will be unable to collect all amounts of principal and interest due according to the contractual terms of the mortgage loan agreement. A valuation allowance is recorded on a loan-by-loan basis in net unrealized capital losses for the excess of the carrying value of the mortgage loan over the fair value of its underlying collateral. Such information or events could include property performance, capital budgets, future lease roll, a property inspection as well as payment trends. Collectability and estimated decreases in collateral values are also assessed on a loan-by-loan basis considering all events and conditions relevant to the loan. This evaluation is inherently subjective as it requires estimates that are susceptible to significant revisions as more information becomes available, as changes occur in the market or as negotiations with the borrowing entity evolve. If there is a change in the fair value of the underlying collateral or the estimated loss on the loan, the valuation allowance is adjusted accordingly. An OTTI occurs upon the realization of a credit loss, typically through foreclosure or after a decision is made to accept a discounted payoff, and is recognized in realized capital losses. The previously recorded valuation allowance is reversed from unrealized capital losses. When an OTTI is recorded, a new cost basis is established reflecting estimated value of the collateral.

Real estate

For real estate held for the production of income, depreciated cost is adjusted for impairments whenever events or changes in circumstances indicate the carrying amount of the asset may not be recoverable, with the impairment being included in realized capital losses. An impairment is recorded when the property's estimated future net operating cash flows over ten years, undiscounted and without interest charges, is less than book value.

Adjustments to the carrying value of real estate held for sale are recorded in a valuation reserve as realized capital losses when the fair value less estimated selling costs is less than the carrying value.

Partnerships and limited liability companies

When it is probable that the Company will be unable to recover the outstanding carrying value of an investment based on undiscounted cash flows, or there is evidence indicating an inability of the investee to sustain earnings to justify the carrying value of the investment, OTTI is recognized in realized capital losses reflecting the excess of the carrying value over the estimated fair value of the investment. The estimated fair values of limited partnership interests are generally based on the Company's share of the net asset value (NAV) as provided in the financial statements of the investees. In certain circumstances, management may adjust the NAV by a premium or discount when it has sufficient evidence to support applying such adjustments.

For determining impairments in partnerships that generate LIHTCs, the Company uses the present value of all future benefits, the majority of which are tax credits, discounted at a risk-free rate for future benefits of ten or more years and compares the results to its current book value. Impairments are recognized in realized capital losses reflecting the excess of the carrying value over the estimated fair value of the investment.

Unrealized capital gains (losses)

Unrealized capital gains (losses) include changes in the fair value of derivatives, excluding interest rate swaps and credit default index swaps associated with replicated assets; currency translation adjustments on foreign-denominated bonds; changes in the fair value of unaffiliated common stocks; changes in the fair value of bonds and preferred stocks that are carried at fair value; and changes in the inflation adjustments on U.S Treasury inflation-indexed securities. Changes in the Company's equity investments in partnerships and limited liability companies, including the earnings as reported on the financial statements, earnings recorded as accumulated undistributed earnings, foreign exchange asset valuation and mark-to-market on operating assets, and certain subsidiaries and affiliates are also reported as changes in unrealized capital gains (losses). Unrealized capital gains (losses) are recorded as a change in net unrealized capital gains (losses), net of tax, within the Statutory Statements of Changes in Surplus.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

3. New accounting standards

Adoption of new accounting standards

In June 2022, the NAIC adopted modifications to SSAP No. 25, Affiliates and Other Related Parties and SSAP No. 43R, 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. 43R 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.

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 \$1,112 million.

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." 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 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.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

4. Fair value of financial instruments

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

	December 31, 2023				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	\$ 5,060	\$ 4,744	\$ -	\$ 4,744	\$ -
All other governments	1,242	1,092	-	1,062	30
States, territories and possessions	231	229	-	229	-
Political subdivisions	363	353	-	353	-
Special revenue	4,986	4,975	-	4,938	37
Industrial and miscellaneous	122,721	114,598	66	50,893	63,639
Parent, subsidiaries and affiliates	9,830	9,410	-	1,406	8,004
Preferred stocks	446	470	96	-	374
Common stocks - subsidiaries and affiliates	430	430	253	-	177
Common stocks - unaffiliated	1,623	1,623	666	-	957
Mortgage loans - commercial	19,299	17,885	-	-	17,885
Mortgage loans - residential	4,722	4,449	-	-	4,449
Derivatives:					
Interest rate swaps	17,292	12,277	-	12,277	-
Options	547	547	68	479	-
Currency swaps	2,831	2,831	-	2,831	-
Forward contracts	13	13	-	13	-
Credit default swaps	1	1	-	1	-
Financial futures	56	56	56	-	-
Cash, cash equivalents and short-term investments	11,134	11,134	782	10,352	-
Separate account assets	52,593	52,593	35,002	15,677	1,914
Financial liabilities:					
GICs	16,207	15,550	-	-	15,550
Group annuity contracts and other deposits	2,053	1,841	-	-	1,841
Individual annuity contracts	25,861	24,495	-	-	24,495
Supplementary contracts	942	943	-	-	943
Repurchase agreements	3,219	3,219	-	3,219	-
Commercial paper	50	50	-	50	-
Derivatives:					
Interest rate swaps	11,922	12,289	-	12,289	-
Options	35	35	35	-	-
Currency swaps	1,294	1,309	-	1,309	-
Forward contracts	301	303	-	303	-
Credit default swaps	153	152	-	152	-
Financial futures	29	29	29	-	-

Common stocks-subsidaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of \$25,066 million.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2022				
	Carrying Value	Fair Value	Level 1	Level 2	Level 3
	(In Millions)				
Financial assets:					
Bonds:					
U. S. government and agencies	\$ 4,764	\$ 4,428	\$ -	\$ 4,428	\$ -
All other governments	1,635	1,385	-	1,323	62
States, territories and possessions	248	241	-	241	-
Political subdivisions	405	388	-	388	-
Special revenue	4,187	4,111	-	4,102	9
Industrial and miscellaneous	117,023	105,791	-	45,812	59,979
Parent, subsidiaries and affiliates	8,183	7,956	-	1,015	6,941
Preferred stocks	451	446	45	-	401
Common stocks - subsidiaries and affiliates	460	460	110	-	350
Common stocks - unaffiliated	1,477	1,477	507	-	970
Mortgage loans - commercial	20,756	19,152	-	-	19,152
Mortgage loans - residential	4,216	3,892	-	-	3,892
Derivatives:					
Interest rate swaps	18,287	18,456	-	18,456	-
Options	639	639	31	608	-
Currency swaps	3,071	3,071	-	3,071	-
Forward contracts	14	14	-	14	-
Financial futures	21	21	21	-	-
Cash, cash equivalents and short-term investments	5,568	5,568	420	5,148	-
Separate account assets	53,414	53,414	34,931	16,790	1,693
Financial liabilities:					
GICs	14,701	13,803	-	-	13,803
Group annuity contracts and other deposits	2,162	1,890	-	-	1,890
Individual annuity contracts	17,000	16,214	-	-	16,214
Supplementary contracts	1,139	1,140	-	-	1,140
Repurchase agreements	3,042	3,042	-	3,042	-
Commercial paper	250	250	-	250	-
Derivatives:					
Interest rate swaps	13,036	18,165	-	18,165	-
Options	6	6	6	-	-
Currency swaps	709	362	-	362	-
Forward contracts	236	236	-	236	-
Interest rate caps and floors	13	13	-	13	-
Credit default swaps	3	3	3	-	-

Common stocks - subsidiaries and affiliates do not include unconsolidated subsidiaries, which had statutory carrying values of \$24,223 million.

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

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

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

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

The Company reviews the fair value hierarchy classifications at each reporting period. Overall, reclassifications between levels occur when there are changes in the observability of inputs and market activity used in the valuation of a financial asset or liability. Such reclassifications are reported as transfers between levels at the beginning fair value for the reporting period in which the changes occur. Given the types of assets classified as Level 1 (primarily equity securities including mutual fund investments), transfers between Level 1 and Level 2 measurement categories are expected to be infrequent. Transfers into and out of Level 3 are summarized in the schedule of changes in Level 3 assets and liabilities.

The fair value of group annuity contracts and other deposits is determined by multiplying the book value of the contract by an average market value adjustment factor. The market value adjustment factor is directly related to the difference between the book value of client liabilities and the present value of installment payments discounted at current market value yields. The market value yield is measured by the Barclay's Aggregate Bond Index, subject to certain adjustments, and the installment period is equivalent to the duration of the Company's invested asset portfolio.

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	December 31, 2023			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds				
Special revenue	-	2	-	2
Industrial and miscellaneous	66	107	172	345
Preferred Stock	24	-	63	87
Common stock - subsidiaries and affiliates	253	-	177	430
Common stock - unaffiliated	666	-	957	1,623
Derivatives				
Interest rate swaps	-	17,287	-	17,287
Options	68	479	-	547
Currency swaps	-	2,831	-	2,831
Forward contracts	-	13	-	13
Financial futures	56	-	-	56
Separate account assets	35,002	15,677	1,914	52,593
Total financial assets carried at fair value	\$ 36,135	\$ 36,396	\$ 3,283	\$ 78,814
Financial liabilities:				
Derivatives:				
Interest rate swaps	\$ -	\$ 11,922	\$ -	\$ 11,922
Options	35	-	-	35
Currency swaps	-	192	-	192
Forward Contracts	-	301	-	301
Credit default swaps	-	153	-	153
Financial futures	29	-	-	29
Total financial liabilities carried at fair value	\$ 64	\$ 12,568	\$ -	\$ 12,632

For the year ended December 31, 2023 and the year ended December 31, 2022, the Company did not have any financial instruments that were carried at net asset value as a practical expedient.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	December 31, 2022			
	Level 1	Level 2	Level 3	Total
	(In Millions)			
Financial assets:				
Bonds:				
All other governments	\$ -	6	-	\$ 6
Special revenue	-	1	-	1
Industrial and miscellaneous	-	85	220	305
Preferred stocks	21	-	47	68
Common stocks - subsidiaries and affiliates	110	-	350	460
Common stocks - unaffiliated	507	-	970	1,477
Derivatives:				
Interest rate swaps	-	18,287	-	18,287
Options	31	608	-	639
Currency swaps	-	3,071	-	3,071
Forward contracts	-	14	-	14
Financial futures	21	-	-	21
Separate account assets	34,931	16,790	1,693	53,414
Total financial assets carried at fair value	\$ 35,621	\$ 38,862	\$ 3,280	\$ 77,763
Financial liabilities:				
Derivatives:				
Interest rate swaps	\$ -	13,036	-	\$ 13,036
Options	6	-	-	6
Currency swaps	-	122	-	122
Forward contracts	-	236	-	236
Credit default swaps	-	13	-	13
Financial futures	3	-	-	3
Total financial liabilities carried at fair value	\$ 9	\$ 13,407	\$ -	\$ 13,416

The Company reviews the fair value hierarchy classifications each reporting period. Changes in the observability of the valuation attributes and the level of market activity may result in a reclassification of certain financial assets or liabilities between fair value hierarchy classifications. Such reclassifications are reported as transfers between levels in the beginning fair value for the reporting period in which the changes occur.

Valuation Techniques and Inputs

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

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

Bonds (Industrial and miscellaneous) – These securities are principally valued using the market or the income approaches. Level 2 valuations are based primarily on quoted prices in markets that are not active, broker quotes, matrix pricing or other similar techniques that use standard market observable inputs such as benchmark yields, spreads versus benchmark yields, new issuances, issuer ratings, duration, and trades of identical or comparable securities. Privately placed securities are valued using discounted cash flow models using standard market observable inputs, and inputs derived from, or corroborated by, market observable data including market yield curve, duration, call provisions, observable prices and spreads for similar publicly traded or privately traded issuances that incorporate the credit quality and industry sector of the issuer. This level also includes securities priced by independent pricing services that use observable inputs. Valuations based on matrix pricing or other similar techniques that utilize significant unobservable inputs or inputs that cannot be derived principally from, or corroborated by, observable market data, including adjustments for illiquidity, delta spread adjustments or spreads to reflect industry trends or specific credit-related issues are classified as Level 3. In addition, inputs including quoted prices for identical or similar securities that are less liquid and based on lower levels of trading activity than securities classified in Level 2 are classified as Level 3.

Bonds (U.S. government and agencies) – These securities are principally valued using the market approach. Level 2 valuations are based primarily on quoted prices in markets that are not active, or using matrix pricing or other similar techniques using standard market observable inputs such as the benchmark U.S. Treasury yield curve, the spreads versus the U.S. Treasury yield curve for the identical security and comparable securities that are actively traded.

Derivative assets and liabilities – These financial instruments are primarily valued using the market approach. The estimated fair value of derivatives is based primarily on quotations obtained from counterparties and independent sources, such as quoted market values received from brokers. These quotations are compared to internally derived prices and a price challenge is lodged with the counterparties and an independent source when a significant difference cannot be explained by appropriate adjustments to the internal model. When quoted market values are not reliable or available, the value is based upon an internal valuation process using market observable inputs that other market participants would use. Significant inputs to the valuation of derivative financial instruments include overnight index swaps (OIS) and SOFR basis curves, interest rate volatility, swap yield curve, currency spot rates, cross currency basis curves and dividend yields. Due to the observability of the significant inputs to these fair value measurements, they are classified as Level 2.

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	Balance as of 1/1/23	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers			Balance as of 12/31/23
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	\$ 220	\$ (4)	\$ (10)	\$ 36	\$ 1	\$ (2)	\$ (13)	\$ -	\$ -	\$ (56)	\$ 172
Preferred stocks	47	-	11	3	-	-	-	-	-	2	63
Common stocks - subsidiaries and affiliates	350	7	(216)	21	20	(47)	-	48	-	(6)	177
Common stocks - unaffiliated	970	24	(53)	60	26	(29)	(38)	-	-	(3)	957
Separate account assets	1,693	271	-	134	-	(182)	(2)	-	-	-	1,914
Total financial assets	\$ 3,280	\$ 298	\$ (268)	\$ 254	\$ 47	\$ (260)	\$ (53)	\$ 48	\$ -	\$ (63)	\$ 3,283

	Balance as of 1/1/22	Gains (Losses) in Net Income	Losses (Gains) in Surplus	Purchases	Issuances	Sales	Settlements	Transfers			Balance as of 12/31/22
	(In Millions)										
Financial assets:											
Bonds:											
Industrial and miscellaneous	\$ 187	\$ 3	\$ (9)	\$ 19	\$ 9	\$ -	\$ (52)	\$ -	\$ -	\$ 63	\$ 220
Preferred stocks	18	-	(18)	-	-	-	-	-	-	47	47
Common stocks - subsidiaries and affiliates	253	(13)	110	(793)	980	(65)	(6)	-	-	(116)	350
Common stocks - unaffiliated	753	28	2	327	3	(27)	(112)	-	(3)	(1)	970
Separate account assets	1,894	(174)	-	282	-	(296)	-	-	(13)	-	1,693
Total financial assets	\$ 3,105	\$ (156)	\$ 85	\$ (165)	\$ 992	\$ (388)	\$ (170)	\$ -	\$ (16)	\$ (7)	\$ 3,280

Other transfers include assets that are either no longer carried at fair value or have just begun to be carried at fair value, such as assets with no level changes but a change in the lower of cost or market carrying basis. Industrial and miscellaneous bonds in other contain assets that are now carried at fair value due to ratings changes and assets are no longer carried at fair value where the fair value is now higher than the book value.

Level 3 transfers in are assets that are consistently carried at fair value but have had a level change. Common stocks unaffiliated assets were transferred from Level 2 to Level 3 due to a change in the observability of pricing inputs, at the beginning fair value for the reporting period.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

5. Investments

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

a. Bonds

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

December 31, 2023				
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	\$ 5,060	\$ 70	\$ 385	\$ 4,744
All other governments	1,242	13	163	1,092
States, territories and possessions	231	4	6	229
Political subdivisions	363	7	17	353
Special revenue	4,986	113	125	4,975
Industrial and miscellaneous	122,721	841	8,964	114,598
Parent, subsidiaries and affiliates	9,830	20	439	9,410
Total	\$ 144,433	\$ 1,068	\$ 10,099	\$ 135,401

The December 31, 2023 gross unrealized losses exclude \$127 million of losses included in the carrying value. These losses include \$126 million from NAIC Class 6 bonds and \$1 million from RMBS and CMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

December 31, 2022				
	Carrying Value	Gross Unrealized Gains	Gross Unrealized Losses	Fair Value
	(In Millions)			
U.S. government and agencies	\$ 4,764	\$ 59	\$ 395	\$ 4,428
All other governments	1,635	15	265	1,385
States, territories and possessions	248	2	9	241
Political subdivisions	405	6	23	388
Special revenue	4,187	106	182	4,111
Industrial and miscellaneous	117,023	391	11,623	105,791
Parent, subsidiaries and affiliates	8,183	1	228	7,956
Total	\$ 136,445	\$ 580	\$ 12,725	\$ 124,300

The December 31, 2022 gross unrealized losses exclude \$102 million of losses included in the carrying value. These losses include \$104 million from NAIC Class 6 bonds and \$(2) million from RMBS and CMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

NAIC Class	Equivalent Rating Agency Designation	December 31,			
		2023		2022	
		Carrying Value	% of Total	Carrying Value	% of Total
(\$ In Millions)					
1	Aaa/ Aa/ A	\$ 81,184	56%	\$ 73,290	54%
2	Baa	53,888	37	51,732	38
3	Ba	3,617	3	5,495	4
4	B	2,842	2	2,888	2
5	Caa and lower	2,512	2	2,603	2
6	In or near default	390	-	437	-
Total		\$ 144,433	100%	\$ 136,445	100%

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

NAIC Class	December 31,							
	2023				2022			
	RMBS		CMBS		RMBS		CMBS	
	Carrying Value	% of Total	Carrying Value	% of Total	Carrying Value	% of Total	Carrying Value	% of Total
(\$ In Millions)								
1	\$ 246	95%	\$ 2,020	75%	\$ 391	82%	\$ 1,693	75%
2	-	-	237	9	29	6	202	9
3	1	-	155	6	32	7	160	7
4	5	2	143	5	14	3	83	4
5	7	3	63	2	10	2	81	4
6	-	-	72	3	2	-	12	1
\$ 259		100%	\$ 2,690	100%	\$ 478	100%	\$ 2,231	100%

The following is a summary of the carrying value and fair value of bonds as of December 31, 2023 by contractual maturity. Expected maturities may differ from contractual maturities because issuers may have the right to call or prepay obligations with or without prepayment penalties. Securities with more than one maturity date are included in the table using the final maturity date.

	Carrying Value	Fair Value
(In Millions)		
Due in one year or less	\$ 8,289	\$ 7,949
Due after one year through five years	32,923	32,288
Due after five years through ten years	38,086	36,551
Due after ten years	65,135	58,613
Total	\$ 144,433	\$ 135,401

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Proceeds from sales	\$ 11,489	\$ 16,097	\$ 21,687
Gross realized capital gains from sales	102	143	406
Gross realized capital losses from sales	(645)	(624)	(135)

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

	December 31, 2023					
	Less Than 12 Months			12 Months or Longer		
	Fair Value	Unrealized Losses	Number of Issuers	Fair Value	Unrealized Losses	Number of Issuers
	(\$ In Millions)					
U.S. government and agencies	\$ 576	\$ 5	6	\$ 2,067	\$ 380	13
All other governments	26	-	5	882	163	32
States, territories and possessions	10	-	3	98	6	8
Political subdivisions	13	-	3	176	17	10
Special revenue	331	8	27	1,260	118	163
Industrial and miscellaneous	5,762	265	592	65,928	8,840	2,940
Parent, subsidiaries and affiliates	5,042	316	10	2,429	123	21
Total	\$ 11,760	\$ 594	646	\$ 72,840	\$ 9,647	3,187

The December 31, 2023 gross unrealized losses include \$127 million of losses included in the carrying value. These losses include \$126 million from NAIC Class 6 bonds and \$1 million from RMBS and CMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2022					
	Less Than 12 Months			12 Months or Longer		
	Fair Value	Unrealized Losses	Number of Issuers	Fair Value	Unrealized Losses	Number of Issuers
	(\$ In Millions)					
U.S. government and agencies	\$ 1,609	\$ 243	15	\$ 1,113	\$ 153	7
All other governments	447	46	33	737	220	27
States, territories and possessions	87	3	11	74	6	3
Political subdivisions	155	13	17	62	10	4
Special revenue	1,477	123	176	291	58	67
Industrial and miscellaneous	51,038	5,265	2,735	27,854	6,471	1,807
Parent, subsidiaries and affiliates	2,575	83	28	1,046	144	11
Total	\$ 57,388	\$ 5,776	3,015	\$ 31,177	\$ 7,062	1,926

The December 31, 2022 gross unrealized losses include \$102 million of losses included in the carrying value. These losses include \$104 million from NAIC Class 6 bonds and \$(2) million from RMBS and CMBS whose ratings were obtained from outside modelers. These losses were primarily included in industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2023 and 2022, management has not deemed these unrealized losses to be other than temporary because the investment's carrying value is expected to be realized and the Company has the ability and intent not to sell these investments until recovery, which may be at maturity.

As of December 31, 2023, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of \$17,178 million. Securities in an unrealized loss position for less than 12 months had a fair value of \$2,151 million and unrealized losses of \$48 million. Securities in an unrealized loss position for greater than 12 months had a fair value of \$15,027 million and unrealized losses of \$1,261 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

As of December 31, 2022, investments in structured and loan-backed securities that had unrealized losses, which were not recognized in earnings, had a fair value of \$20,311 million. Securities in an unrealized loss position for less than 12 months had a fair value of \$14,684 million and unrealized losses of \$892 million. Securities in an unrealized loss position for greater than 12 months had a fair value of \$5,624 million and unrealized losses of \$894 million. These securities were primarily categorized as industrial and miscellaneous or parent, subsidiaries and affiliates.

In the course of the Company's investment management activities, securities may be sold and reacquired within 30 days to enhance the Company's yield on its investment portfolio. The Company did not sell any securities with the NAIC Designation 3 or below for the years ended December 31, 2023 or 2022, that were reacquired within 30 days of the sale date.

The Company had assets on deposit with government authorities or trustees, as required by law, in the amount of \$10 million as of December 31, 2023 and December 31, 2022.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Residential mortgage-backed exposure

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

As of December 31, 2023, RMBS had a total carrying value of \$3,775 million and a fair value of \$3,756 million, of which approximately 4%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of \$1,326 million and a fair value of \$1,312 million. As of December 31, 2022, RMBS had a total carrying value of \$2,308 million and a fair value of \$2,266 million, of which approximately 8%, based on carrying value, was classified as Alt-A. Alt-A and subprime RMBS had a total carrying value of \$999 million and a fair value of \$993 million.

During the year ended December 31, 2023, there were no significant credit downgrades for the securities held by the Company that were backed by residential mortgage pools.

Leveraged loan exposure

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

As of December 31, 2023, total leveraged loans and leveraged loan CDOs had a carrying value of \$27,844 million and a fair value of \$27,509 million, of which approximately 80%, based on carrying value, were domestic leveraged loans and CDOs. As of December 31, 2022, total leveraged loans and leveraged loan CDOs had a carrying value of \$26,332 million and a fair value of \$25,664 million, of which approximately 81%, based on carrying value, were domestic leveraged loans and CDOs.

Commercial mortgage-backed exposure

The Company holds bonds backed by pools of commercial mortgages. The mortgages in these pools have varying risk characteristics related to underlying collateral type, borrower's risk profile and ability to refinance and the return provided to the borrower from the underlying collateral. These investments had a carrying value of \$2,693 million and fair value of \$2,285 million as of December 31, 2023 and a carrying value of \$2,669 million and fair value of \$2,285 million as of December 31, 2022.

b. Preferred stocks

The carrying value and fair value of preferred stocks were as follows:

	December 31,	
	2023	2022
	(In Millions)	
Carrying value	\$ 446	\$ 451
Gross unrealized gains	29	9
Gross unrealized losses	(5)	(14)
Fair value	<u>\$ 470</u>	<u>\$ 446</u>

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

As of December 31, 2023, investments in preferred stocks in an unrealized loss position included holdings with a fair value of \$267 million in 19 issuers, \$265 million of which was in an unrealized loss position for more than 12 months. As of December 31, 2022, investments in preferred stocks in an unrealized loss position included holdings with a fair value of \$245 million in 17 issuers, \$55 million of which was in an unrealized loss position for more than 12 months. Based upon the Company's impairment review process discussed in *Note 2dd*, "*Net realized capital (losses) gains including other-than-temporary impairments and unrealized capital gains (losses)*" the decline in value of these securities was not considered to be other than temporary as of December 31, 2023 or 2022.

The Company held preferred stocks for which the transfer of ownership was restricted by contractual requirements with carrying values of \$201 million as of December 31, 2023 and \$323 million as of December 31, 2022.

c. Common stocks – subsidiaries and affiliates

The Company has two primary domestic life insurance subsidiaries, C.M. Life, which primarily provides fixed and variable annuities and universal life insurance business, and MML Bay State, a subsidiary of C.M. Life, which primarily issues variable life and bank-owned life insurance policies.

Summarized below is certain combined statutory financial information for the unconsolidated domestic life insurance subsidiaries:

	As of and for the Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Total revenue	\$ 433	\$ 577	\$ 682
Net income	48	155	106
Assets	12,653	12,870	14,270
Liabilities	10,515	11,090	12,636
Shareholder's equity	2,138	1,780	1,634

In 2023, C.M. Life did not pay any dividends to MassMutual and paid \$163 million in dividends to MassMutual in 2022.

In 2023, MassMutual did not make any contributions to C.M. Life and contributed capital of \$50 million to C.M. Life in 2022.

MMHLLC, a wholly-owned subsidiary of MassMutual, is the parent of subsidiaries that include Barings LLC (Barings) and deals in markets that include retail and institutional asset management entities and registered broker dealers.

The MMHLLC statutory carrying value was \$17.6 billion, which included \$106 million of nonadmitted asset adjustments as of December 31, 2023 and \$17.2 billion as of December 31, 2022, which included \$151 million nonadmitted asset adjustments.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Summarized below is certain U.S. GAAP financial information for MMHLLC:

	As of and for the Years Ended December 31,		
	2023	2022	2021
	(In Billions)		
Total revenue	\$ 3.4	\$ 3.6	\$ 4.9
Net income	0.7	0.6	1.7
Assets	27.2	27.2	25.5
Liabilities	9.1	8.2	7.6
Member's equity	18.1	18.9	17.9

MMHLLC paid \$730 million in dividends to MassMutual for the year ended December 31, 2023, \$450 million of which were declared in 2022, and paid \$604 million in dividends to MassMutual for the year ended December 31, 2022, \$344 million of which were declared in 2021.

MMHLLC declared an additional \$630 million in dividends to MassMutual for the year ended December 31, 2023, which will be paid in 2024.

MassMutual contributed capital of \$235 million to MMHLLC for the year ended December 31, 2023 and \$660 million for the year ended December 31, 2022.

Summarized below is certain U.S. GAAP financial information for Glidepath:

	As of and for the Years Ended December 31,	
	2023	2022
	(In Billions)	
Total revenue	\$ 0.8	\$ 1.2
Net income (loss)	0.8	1.0
Assets	53.4	51.0
Liabilities	51.5	48.8
Member's equity	1.9	2.2

Summarized below is certain U.S. GAAP financial information for MMIH:

	As of and for the Years Ended December 31,		
	2023	2022	2021
	(In Billions)		
Total revenue	\$ 0.4	\$ 0.3	\$ 0.3
Net income	0.1	0.1	0.1
Assets	10.1	9.3	8.8
Liabilities	8.2	7.6	7.0
Member's Equity	1.9	1.7	1.8

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Subsidiaries of MMHLLC are involved in litigation and investigations arising in the ordinary course of their business, which seek compensatory damages, punitive damages and equitable remedies. Although the Company is not aware of any actions or allegations that reasonably could give rise to a material adverse impact to the Company's financial position or liquidity, the outcome of litigation cannot be foreseen with certainty. It is the opinion of management that the ultimate resolution of these matters will not materially impact the Company's financial position or liquidity. However, the outcome of a particular proceeding may be material to the Company's Statutory Statements of Changes in Surplus for a particular period depending upon, among other factors, the size of the loss and the level of the Company's changes in surplus for the period.

The Company does not rely on dividends from its subsidiaries to meet its operating cash flow requirements. For the domestic life insurance subsidiaries, substantially all of their statutory shareholder's equity of \$1,905 million as of December 31, 2023 was subject to dividend restrictions imposed by the State of Connecticut.

For further information on related party transactions with subsidiaries and affiliates, see *Note 17. "Related party transactions"*.

d. Common stocks - unaffiliated

The adjusted cost basis and carrying value of unaffiliated common stocks were as follows:

	December 31,	
	2023	2022
	(In Millions)	
Adjusted cost basis	\$ 1,268	\$ 1,198
Gross unrealized gains	407	317
Gross unrealized losses	(52)	(38)
Carrying value	\$ 1,623	\$ 1,477

As of December 31, 2023, investments in unaffiliated common stocks in an unrealized loss position included holdings with a fair value of \$308 million in 30 issuers, \$289 million of which were in an unrealized loss position for more than 12 months. As of December 31, 2022, investments in unaffiliated common stocks in an unrealized loss position included holdings with a fair value of \$268 million in 68 issuers, \$78 million of which were in an unrealized loss position for more than 12 months. Based upon the Company's impairment review process discussed in *Note 2dd. "Net realized capital (losses) gains including other-than-temporary impairments and unrealized capital gains (losses)"* the decline in value of these securities was not considered to be other than temporary as of December 31, 2023 or 2022.

The Company held common stocks, for which the transfer of ownership was restricted by contractual requirements, with carrying values of \$106 million as of December 31, 2023 and \$135 million as of December 31, 2022.

e. Mortgage loans

Mortgage loans are comprised of commercial mortgage loans and residential mortgage loans. The Company's commercial mortgage loans primarily finance various types of real estate properties throughout the U.S., the United Kingdom and Canada. The Company holds commercial mortgage loans for which it is the primary lender or a participant or co-lender in a mortgage loan agreement and mezzanine loans that are subordinate to senior secured first liens. The Company's loan agreements with the senior lender contain negotiated provisions that are designed to maximize the Company's influence with the objective of mitigating the Company's risks as the secondary lender for mezzanine loans. Commercial mortgage loans have varying risk characteristics including, among others, the borrower's liquidity, the underlying percentage of completion of a project, the returns generated by the collateral, the refinance risk associated with maturity of the loan and deteriorating collateral value.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Residential mortgage loans are primarily seasoned pools of homogeneous residential mortgage loans substantially backed by Federal Housing Administration (FHA) and Veterans Administration (VA) guarantees. As of December 31, 2023 and 2022, the Company did not have any direct subprime exposure through the purchases of unsecuritized whole-loan pools.

Geographical concentration is considered prior to the purchase of mortgage loans and residential mortgage loan pools. The mortgage loan portfolio is diverse with no significant collateral concentrations in any particular geographic region as of December 31, 2023 or 2022.

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

	December 31, 2023		December 31, 2022	
	Carrying Value	Fair Value	Carrying Value	Fair Value
	(In Millions)			
Commercial mortgage loans:				
Primary lender	\$ 19,162	\$ 17,766	\$ 20,662	\$ 19,065
Mezzanine loans	137	119	94	87
Total commercial mortgage loans	19,299	17,885	20,756	19,152
Residential mortgage loans:				
FHA insured and VA guaranteed	1,833	1,699	2,304	2,128
Other residential loans	2,889	2,750	1,912	1,764
Total residential mortgage loans	4,722	4,449	4,216	3,892
Total mortgage loans	\$ 24,021	\$ 22,334	\$ 24,972	\$ 23,044

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The loan-to-value ratios by property type of the Company's commercial mortgage loans were as follows:

	December 31, 2023					
	Less Than 81%	81% to 95%	Above 95%	Total	% of Total	
	(\$ In Millions)					
Office	\$ 4,957	\$ 508	\$ 1,042	\$ 6,507	34%	
Apartments	5,064	417	235	5,716	30	
Industrial and other	2,765	25	24	2,814	15	
Hotels	1,742	82	92	1,916	10	
Retail	2,276	-	70	2,346	12	
Total	\$ 16,804	\$ 1,032	\$ 1,463	\$ 19,299	100%	
	December 31, 2022					
	Less Than 81%	81% to 95%	Above 95%	Total	% of Total	
	(\$ In Millions)					
Office	\$ 6,843	\$ -	\$ 34	\$ 6,877	33%	
Apartments	5,437	447	-	5,884	28	
Industrial and other	3,447	26	-	3,473	17	
Retail	2,449	-	-	2,449	12	
Hotels	1,982	91	-	2,073	10	
Total	\$ 20,158	\$ 564	\$ 34	\$ 20,756	100%	

More than 87% of the Company's commercial mortgage loans' loan-to-value ratios are below 81% for the year ended December 31, 2023. As of December 31, 2022, more than 97% of the Company's commercial mortgage loans' loan-to-value ratios are below 81%.

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, translated into the equivalent rating agency designation:

	December 31, 2023						
	AAA/AA/A	BBB	BB	B	CCC and Lower	Total	
	(In Millions)						
Commercial mortgage loans:							
Primary lender	\$ 6,014	\$ 9,680	\$ 2,156	\$ 875	\$ 437	\$ 19,162	
Mezzanine loans	-	80	57	-	-	137	
Total commercial mortgage loans	6,014	9,760	2,213	875	437	19,299	
Residential mortgage loans:							
FHA insured and VA guaranteed	1,832	-	-	-	-	1,832	
Other residential loans	-	2,759	23	108	-	2,889	
Total residential mortgage loans	1,832	2,759	23	108	-	4,722	
Total mortgage loans	\$ 7,846	\$ 12,519	\$ 2,236	\$ 983	\$ 437	\$ 24,021	

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2022						
	AAA/AA/A	BBB	BB	B	CCC and Lower	Total	
	(In Millions)						
Commercial mortgage loans:							
Primary lender	\$ 7,632	\$ 10,300	\$ 2,306	\$ 354	\$ 70	\$ 20,662	
Mezzanine loans	-	37	57	-	-	94	
Total commercial mortgage loans	7,632	10,337	2,363	354	70	20,756	
Residential mortgage loans:							
FHA insured and VA guaranteed	2,299	5	-	-	-	2,304	
Other residential loans	61	1,832	19	-	-	1,912	
Total residential mortgage loans	2,360	1,837	19	-	-	4,216	
Total mortgage loans	\$ 9,992	\$ 12,174	\$ 2,382	\$ 354	\$ 70	\$ 24,972	

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 80% as of December 31, 2023 and 100% as of December 31, 2022.

The geographic distribution of commercial mortgage loans was as follows:

	December 31, 2023	
	Carrying Value	Average Loan-to-Value Ratio
	(\$ In Millions)	
California	\$ 3,904	66%
United Kingdom	2,110	51%
New York	1,894	66%
Texas	1,812	56%
Illinois	1,444	56%
Washington	1,018	70%
District of Columbia	929	82%
All other	6,190	72%
Total commercial mortgage loans	\$ 19,301	66%

All other consists of 30 jurisdictions, with no individual exposure exceeding \$878 million.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2022	
	Carrying Value	Average Loan-to-Value Ratio
	(\$ In Millions)	
California	\$ 4,632	50%
New York	2,157	54%
United Kingdom	2,008	48%
Texas	1,867	54%
Illinois	1,472	51%
Washington	1,114	53%
District of Columbia	1,041	58%
All other	6,465	55%
Total commercial mortgage loans	\$ 20,756	53%

All other consists of 31 jurisdictions, with no individual exposure exceeding \$897 million.

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

	Years Ended December 31,			
	2023		2022	
	Low	High	Low	High
Commercial mortgage loans	1.8%	12.9%	1.7%	11.7%
Residential mortgage loans	2.2%	11.8%	2.2%	11.7%
Mezzanine mortgage loans	5.3%	14.4%	5.3%	13.3%

Interest rates, including fixed and variable, on new mortgage loans were:

	Years Ended December 31,			
	2023		2022	
	Low	High	Low	High
Commercial mortgage loans	4.3%	11.0%	2.6%	11.7%
Residential mortgage loans	4.2%	11.8%	2.6%	11.7%
Mezzanine mortgage loans	5.5%	8.0%	12.2%	13.3%

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

As of December 31, 2023, the Company had impaired mortgage loans with or without a valuation allowance or mortgage loans derecognized as a result of foreclosure, including mortgage loans subject to a participant or co-lender mortgage loan agreement with a unilateral mortgage loan foreclosure restriction or mortgage loan derecognized as a result of a foreclosure.

The following presents a summary of the Company's impaired mortgage loans as of December 31, 2023 and as of December 31, 2022:

December 31, 2023					
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
(In Millions)					
With allowance recorded:					
Commercial mortgage loans:					
Primary lender	\$ 465	\$ 537	\$ 624	\$ (157)	\$ 24
Total	465	537	624	(157)	24
Total impaired commercial mortgage loans	\$ 465	\$ 537	\$ 624	\$ (157)	\$ 24
December 31, 2022					
	Carrying Value	Average Carrying Value	Unpaid Principal Balance	Valuation Allowance	Interest Income
(In Millions)					
With no allowance recorded:					
Commercial mortgage loans:					
Primary lender	\$ 14	\$ 15	\$ 17	\$ -	\$ 1
Total	14	15	17	-	1
Total impaired commercial mortgage loans	\$ 14	\$ 15	\$ 17	\$ -	\$ 1

The Company did not hold any restructured mortgage loans, mortgage loans with principal or interest past due, or mortgage loans with suspended interest accruals as of December 31, 2023 or 2022. The carrying value of commercial mortgage loans subject to a participant or co-lender mortgage loan agreement was \$855 million as of December 31, 2023 and \$1,264 million as of December 31, 2022.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

f. Real estate

The carrying value of real estate was as follows:

	December 31, 2023	December 31, 2022
	(In Millions)	
Held for the production of income	\$ 355	\$ 351
Accumulated depreciation	(94)	(78)
Encumbrances	(285)	(285)
Held for the production of income, net	(24)	(12)
Held for sale	76	76
Accumulated depreciation	(74)	(74)
Held for sale, net	2	2
Occupied by the Company	566	574
Accumulated depreciation	(215)	(209)
Occupied by the Company, net	351	365
Total real estate	\$ 329	\$ 355

Depreciation expense on real estate was \$31 million for the year ended December 31, 2023, \$36 million for the year ended December 31, 2022 and \$91 million for the year ended December 31, 2021.

g. Partnerships and limited liability companies

The carrying value of partnership and LLC holdings by annual statement category were:

	December 31, 2023	December 31, 2022
	(In Millions)	
Joint venture interests:		
Common stocks - subsidiaries and affiliates	\$ 2,001	\$ 2,090
Common stocks - unaffiliated	3,462	3,353
Real estate	2,382	2,212
Bonds/preferred stock	735	1,058
Other	1,718	1,144
Mortgage loans	2,096	1,930
Surplus notes	385	389
LIHTCs	128	120
Total	\$ 12,907	\$ 12,296

The Company held 13 affiliated partnerships and limited liability companies in a loss position with accumulated losses of \$63 million as of December 31, 2023, and eight affiliated partnerships and limited liability companies in a loss position with accumulated losses of \$75 million as of December 31, 2022.

The Company's unexpired tax credits expire within a range of less than 1 year to 12 years.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The Company recorded tax credits on these investments of \$55 million for the year ended December 31, 2023 and \$52 million for the year ended December 31, 2022. The minimum holding period required for the Company's LIHTC investments extends from 1 year to 15 years.

For determining impairments for LIHTC investments, the Company uses the present value of all future benefits, the majority of which are tax credits, discounted at a risk-free rate ranging from 4.4% for future benefits of two years to 3.9% for future benefits of ten or more years, and compares the result to its current carry value. The Company recorded \$14 million of impairments for the year ended December 31, 2023.

h. Derivatives

The Company uses derivative financial instruments in the normal course of business to manage risks, primarily to reduce currency, interest rate and duration imbalances determined in asset/liability analyses. The Company also uses a combination of derivatives and fixed income investments to create replicated synthetic investments. These replicated synthetic investments are created when they are economically more attractive than the actual instrument or when similar instruments are unavailable. Replicated synthetic investments are created either to hedge and reduce the Company's credit exposure or to create an investment in a particular asset. The Company held replicated synthetic investments with a notional amount of \$31,687 million as of December 31, 2023 and \$31,264 million as of December 31, 2022, as defined under statutory accounting practices as the result of pairing of a long derivative contract with cash instruments.

The Company's derivative strategy employs a variety of derivative financial instruments: including interest rate, currency, equity, bond, and credit default swaps; options; forward contracts and financial futures. 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.

Interest rate swaps are primarily used 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 Company uses currency swaps for the purpose of managing currency exchange risks in its assets and liabilities.

The Company does not sell credit default swaps as a participant in the credit insurance market. The Company does, however, use credit default swaps as part of its investment management process. The Company buys credit default swaps as an efficient means to reduce credit exposure to particular issuers or sectors in the Company's investment portfolio. The Company sells credit default swaps in order to create synthetic investment positions that enhance the return on its investment portfolio by providing comparable exposure to fixed income securities that might not be available in the primary market.

Options grant the purchaser the right to buy or sell a security or enter a derivative transaction at a stated price within a stated period. The Company's option contracts have terms of up to 45 years. A swaption is an option to enter an interest rate swap to either receive or pay a fixed rate at a future date. The Company purchases these options for the purpose of managing interest rate risks in its assets and liabilities.

The Company adopted a clearly defined hedging strategy (CDHS) to enable the Company to incorporate currently held hedges in risk-based capital (RBC) calculations. The CDHS is used to significantly mitigate the impact that movements in capital markets have on the liabilities associated with annuity guarantees. The hedge portfolio consists mainly of interest rate swaps, equity swaps, interest rate swaptions and equity futures, and provides protection in the stress scenarios under which RBC is calculated. The hedge portfolio has offsetting impacts relative to the total asset requirement for RBC and surplus for GMDB and VAGLB.

The Company utilizes certain other agreements including forward contracts and financial futures. In addition, the Company also uses "to be announced" forward contracts (TBAs) to hedge interest rate risk and participate in the mortgage-backed securities market in an efficient and cost-effective way. Typically, the price is agreed upon at contract inception and payment is made at a specified future date. The Company usually does not purchase TBAs with settlement by the first possible delivery date and thus, accounts for these TBAs as derivatives. TBAs that settle on the

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

first possible delivery date are accounted for as bonds. 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's principal derivative exposures to market risk are interest rate risk, which includes inflation and credit risk. Interest rate risk pertains to the change in fair value of the derivative instruments as a result of changes in market interest rates. The Company is exposed to credit-related losses in the event of nonperformance by counterparties to derivative financial instruments. The Company regularly monitors counterparty credit ratings, derivative positions, valuations and the value of collateral posted to ensure counterparties are credit-worthy and the concentration of exposure is minimized and monitors its derivative credit exposure as part of its overall risk management program.

The Company enters derivative transactions through bilateral derivative agreements with counterparties, or through over the counter cleared derivatives with a counterparty and the use of a clearinghouse. To minimize credit risk for bilateral transactions, the Company and its counterparties generally enter into master netting agreements based on agreed upon requirements that outline the framework for how collateral is to be posted in the amount owed under each transaction, subject to certain minimums. For over the counter cleared derivative transactions between the Company and a counterparty, the parties enter into a series of master netting and other agreements that govern, among other things, clearing and collateral requirements. These transactions are cleared through a clearinghouse and each derivative counterparty is only exposed to the default risk of the clearinghouse. Certain interest rate swaps and credit default swaps are considered cleared transactions. These cleared transactions require initial and daily variation margin collateral postings. These agreements allow for contracts in a positive position, in which amounts are due to the Company, to be offset by contracts in a negative position. This right of offset, combined with collateral obtained from counterparties, reduces the Company's credit exposure.

Net collateral pledged by the counterparties was \$421 million as of December 31, 2023 and \$2,427 million as of December 31, 2022. In the event of default, the full market value exposure at risk in a net gain position, net of offsets and collateral, was \$309 million as of December 31, 2023 and \$634 million as of December 31, 2022. The statutory net amount at risk, defined as net collateral pledged and statement values excluding accrued interest, was \$5,003 million as of December 31, 2023 and \$5,518 million as of December 31, 2022.

The Company had the right to rehypothecate or repledge securities totaling \$1,444 million of the \$421 million as of December 31, 2023 and \$770 million of the \$2,417 million as of December 31, 2022 of net collateral pledged by counterparties. There were no securities rehypothecated to other counterparties as of December 31, 2023 or December 31, 2022.

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

	December 31, 2023			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	\$ 17,292	\$ 177,596	\$ 11,922	\$ 128,949
Options	547	11,727	35	248
Currency swaps	2,831	28,593	1,294	14,672
Forward contracts	13	993	301	9,162
Credit default swaps	1	81	153	7,902
Financial futures	56	674	29	257
Total	\$ 20,740	\$ 219,664	\$ 13,734	\$ 161,190

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2022			
	Assets		Liabilities	
	Carrying Value	Notional Amount	Carrying Value	Notional Amount
	(In Millions)			
Interest rate swaps	\$ 18,287	\$ 134,714	\$ 13,036	\$ 136,705
Options	639	14,529	6	-
Currency swaps	3,071	27,615	709	14,814
Forward contracts	14	1,250	236	7,287
Credit default swaps	-	-	13	1,580
Financial futures	21	2,334	3	369
Total	\$ 22,032	\$ 180,442	\$ 14,003	\$ 160,775

The average fair value of outstanding derivative assets was \$22,228 million for the years ended December 31, 2023 and \$18,766 million for the years ended December 31, 2022. The average fair value of outstanding derivative liabilities was \$14,607 million for the years ended December 31, 2023 and \$10,938 million for the years ended December 31, 2022.

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

	December 31, 2023	December 31, 2022
	(In Millions)	
Due after one year through five years	\$ 7,983	\$ 1,580
Total	\$ 7,983	\$ 1,580

The following presents the Company's gross notional interest rate swap positions:

	December 31, 2023	December 31, 2022
	(In Millions)	
Open interest rate swaps in a fixed pay position	\$ 130,853	\$ 128,337
Open interest rate swaps in a fixed receive position	170,817	137,686
Other interest related swaps	4,875	5,396
Total interest rate swaps	\$ 306,545	\$ 271,418

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, 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:

	Year Ended December 31, 2023	
	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(In Millions)	
Interest rate swaps	\$ (267)	\$ 118
Currency swaps	101	(309)
Options	31	(96)
Credit default swaps	(39)	(24)
Forward contracts	(62)	(66)
Financial futures	(107)	9
Total	\$ (343)	\$ (368)

	Year Ended December 31, 2022	
	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(In Millions)	
Interest rate swaps	(717)	846
Currency swaps	69	2,204
Options	(6)	385
Credit default swaps	2	(17)
Forward contracts	853	(222)
Financial futures	(902)	(15)
Total	\$ (702)	\$ 3,181

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NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	Year Ended December 31, 2021	
	Net Realized Gains (Losses) on Closed Contracts	Change In Net Unrealized Gains (Losses) on Open Contracts
	(In Millions)	
Interest rate swaps	\$ (451)	\$ 458
Currency swaps	(25)	1,094
Options	(126)	74
Credit default swaps	2	-
Forward contracts	109	216
Financial futures	(315)	92
Total	\$ (806)	\$ 1,934

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

	December 31, 2023			December 31, 2022		
	Derivative Assets	Derivative Liabilities	Net	Derivative Assets	Derivative Liabilities	Net
	(In Millions)					
Gross	\$ 20,740	\$ 13,734	\$ 7,006	\$ 22,032	\$ 14,003	\$ 8,029
Due and accrued	1,371	2,387	(1,016)	733	1,689	(956)
Gross amounts offset	(19,063)	(19,063)	-	(15,378)	(15,378)	-
Net asset	3,048	(2,943)	5,990	7,387	314	7,073
Collateral Posted	(3,438)	(3,017)	(421)	(4,821)	(2,394)	(2,427)
Net	\$ (390)	\$ (5,959)	\$ 5,569	\$ 2,566	\$ (2,080)	\$ 4,646

i. Repurchase agreements

The Company had repurchase agreements with carrying values of \$3,221 million as of December 31, 2023 and \$3,042 million as of December 31, 2022. As of December 31, 2023, the maturities of these agreements ranged from January 8, 2024 through March 14, 2024 and the interest rates ranged from 5.52% to 5.6%. The outstanding amounts were collateralized by cash and bonds with a carrying value of \$3,230 million as of December 31, 2023 and \$3,049 million as of December 31, 2022.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following presents the Company's maximum amount and ending balance for repurchase agreements accounted for as secured borrowing for the years ended:

	December 31,			
	2023		2022	
	Maximum balance	Ending balance	Maximum balance	Ending balance
	(In Millions)			
From 1 week to 1 month	\$ 596	\$ -	\$ 773	\$ 398
Greater than 1 month to 3 months	3,247	2,136	3,227	2,644
Greater than 3 months to 1 year	1,088	1,085	1,937	-
Total	<u>\$ 4,931</u>	<u>\$ 3,221</u>	<u>\$ 5,937</u>	<u>\$ 3,042</u>

The following presents the Company's cash collateral and the fair value of security collateral received for the years ended:

	December 31,			
	2023		2022	
	Cash	Securities	Cash	Securities
	(In Millions)			
Total	\$ 69	\$ 16	\$ -	\$ -

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

j. Net investment income

Net investment income, including IMR amortization, comprised the following:

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Bonds	\$ 7,275	\$ 5,215	\$ 4,437
Preferred stocks	27	22	17
Common stocks - subsidiaries and affiliates	1,115	878	717
Common stocks - unaffiliated	111	102	55
Mortgage loans	1,102	1,118	1,145
Policy loans	1,058	1,141	1,103
Real estate	70	79	162
Partnerships and LLCs	957	1,014	1,171
Derivatives	(84)	464	539
Cash, cash equivalents and short-term investments	363	80	61
Other	184	35	18
Subtotal investment income	12,178	10,148	9,425
Amortization of the IMR	(51)	(50)	150
Net gains from separate accounts	3	-	-
Investment expenses	(1,087)	(796)	(730)
Net investment income	\$ 11,043	\$ 9,302	\$ 8,845

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

k. Net realized capital (losses) gains

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Bonds	\$ (720)	\$ (889)	\$ 199
Preferred stocks	-	(6)	9
Common stocks - subsidiaries and affiliates	24	(13)	10
Common stocks - unaffiliated	15	64	147
Mortgage loans	(73)	(41)	(7)
Real estate	3	127	24
Partnerships and limited liability companies	(314)	(355)	(413)
Derivatives	(344)	(701)	(806)
Other	(7)	(74)	7
Net realized capital losses (gains) before federal and state taxes and deferral to the IMR	(1,416)	(1,888)	(830)
Net federal and state tax benefit (expense)	281	94	(86)
Net realized capital losses before deferral to the IMR	(1,135)	(1,794)	(916)
Net after tax deferred to the IMR	645	2,120	382
Net realized capital (losses) gains	\$ (490)	\$ 326	\$ (534)

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Bonds	\$ (178)	\$ (416)	\$ (80)
Preferred stock	-	(6)	-
Common stocks- subsidiaries and affiliates	(1)	-	-
Common stocks - unaffiliated	-	(2)	(11)
Mortgage loans	(13)	(4)	(17)
Partnerships and LLCs	(353)	(183)	(483)
Total OTTI	\$ (545)	(611)	(591)

The Company recognized OTTI of \$15 million for the year ended December 31, 2023 and \$14 million for the year ended December 31, 2022 on structured and loan-backed securities, which are included in bonds, primarily due to the present value of expected cash flows being less than the amortized cost.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The Company utilized internally-developed models to determine less than 1% of the \$178 million of bond OTTI for the year ended December 31, 2023, less than 1% of the \$416 million of bond OTTI for the year ended December 31, 2022 and less than 1% of the \$80 million of bond OTTI for the year ended December 31, 2021. The remaining OTTI amounts were determined using external inputs such as publicly observable fair values and credit ratings. Refer to *Note 2dd. "Net realized capital (losses) gains including other-than-temporary impairments and unrealized capital gains (losses)"* for more information on assumptions and inputs used in the Company's OTTI models.

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NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

6. Federal income taxes

On August 16th, 2022, the Inflation Reduction Act (“IRA”) was signed into law and includes certain corporate income tax provisions. Impacts to the Company could include the imposition of a corporate alternative minimum tax (“CAMT”) applicable to tax years beginning after December 31, 2022. The CAMT imposes a 15% minimum tax on adjusted financial statement income on applicable corporations that have an average group wide adjusted financial statement income over \$1 billion in the prior three-year period (2020-2022). As of the reporting date, the Company has determined that it is not an applicable corporation and therefore not liable for CAMT in 2023. The United States Treasury Secretary and the IRS have been authorized to issue further guidance and intend to publish proposed regulations in 2024.

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	December 31, 2023		
	Ordinary	Capital	Total
	(In Millions)		
Gross DTAs	\$ 3,943	\$ 740	\$ 4,683
Statutory valuation allowance adjustment	-	-	-
Adjusted gross DTAs	3,943	740	4,683
DTAs nonadmitted	(82)	-	(82)
Subtotal net admitted DTA	3,861	740	4,601
Total gross DTLs	(2,009)	(932)	(2,941)
Net admitted DTA(L)	\$ 1,852	\$ (192)	\$ 1,660

	December 31, 2022		
	Ordinary	Capital	Total
	(In Millions)		
Gross DTAs	\$ 3,444	\$ 742	\$ 4,186
Statutory valuation allowance adjustment	-	-	-
Adjusted gross DTAs	3,444	742	4,186
DTAs nonadmitted	-	-	-
Subtotal net admitted DTA	3,444	742	4,186
Total gross DTLs	(2,045)	(912)	(2,957)
Net admitted DTA(L)	\$ 1,399	\$ (170)	\$ 1,229

	Change		
	Ordinary	Capital	Total
	(In Millions)		
Gross DTAs	\$ 499	\$ (2)	\$ 497
Statutory valuation allowance adjustment	-	-	-
Adjusted gross DTAs	499	(2)	497
DTAs nonadmitted	(82)	-	(82)
Subtotal net admitted DTA	417	(2)	415
Total gross DTLs	36	(20)	16
Net admitted DTA(L)	\$ 453	\$ (22)	\$ 431

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The amount of adjusted gross DTA admitted under each component of the guidance and the resulting change by tax character are as follows:

	December 31, 2023		
	Ordinary	Capital	Total
	(In Millions)		
Admitted DTA 3 years:			
Federal income taxes that can be recovered	\$ -	\$ 90	\$ 90
Remaining adjusted gross DTAs expected to be realized within 3 years:			
1. Adjusted gross DTA to be realized	1,570	-	1,570
2. Adjusted gross DTA allowed per limitation threshold	4,081	-	4,081
Lesser of lines 1 or 2	1,570	-	1,570
Adjusted gross DTAs offset by existing DTLs	2,291	650	2,941
Total admitted DTA realized within 3 years	\$ 3,861	\$ 740	\$ 4,601
	December 31, 2022		
	Ordinary	Capital	Total
	(In Millions)		
Admitted DTA 3 years:			
Federal income taxes that can be recovered	\$ -	\$ 63	\$ 63
Remaining adjusted gross DTAs expected to be realized within 3 years:			
1. Adjusted gross DTA to be realized	1,287	-	1,287
2. Adjusted gross DTA allowed per limitation threshold	4,005	-	4,005
Lesser of lines 1 or 2	1,287	-	1,287
Adjusted gross DTAs offset by existing DTLs	2,158	678	2,836
Total admitted DTA realized within 3 years	\$ 3,445	\$ 741	\$ 4,186
	Change		
	Ordinary	Capital	Total
	(In Millions)		
Admitted DTA 3 years:			
Federal income taxes that can be recovered	\$ -	\$ 27	\$ 27
Remaining adjusted gross DTAs expected to be realized within 3 years:			
1. Adjusted gross DTA to be realized	283	-	283
2. Adjusted gross DTA allowed per limitation threshold	76	-	76
Lesser of lines 1 or 2	283	-	283
Adjusted gross DTAs offset by existing DTLs	133	(28)	105
Total admitted DTA realized within 3 years	\$ 416	\$ (1)	\$ 415

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	December 31, 2023	December 31, 2022
	(\$ In Millions)	
Ratio percentage used to determine recovery period and threshold limitation	850%	860%
Amount of adjusted capital and surplus used to determine recovery period and threshold limitation above	\$ 27,207	\$ 26,703

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

	December 31, 2023		
	Ordinary	Capital	Total
	(Percent)		
Impact of tax-planning strategies:			
Adjusted gross DTAs (% of total adjusted gross DTAs)	-%	-%	-%
Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs)	79%	-%	79%

	December 31, 2022		
	Ordinary	Capital	Total
	(Percent)		
Impact of tax-planning strategies:			
Adjusted gross DTAs (% of total adjusted gross DTAs)	-%	-%	-%
Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs)	69%	-%	69%

	Change		
	Ordinary	Capital	Total
	(Percent)		
Impact of tax-planning strategies:			
Adjusted gross DTAs (% of total adjusted gross DTAs)	-%	-%	-%
Net admitted adjusted gross DTAs (% of total net admitted adjusted gross DTAs)	10%	-%	10%

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

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Federal income tax expense (benefit) on operating earnings	\$ 111	\$ (92)	\$ 69
Foreign income tax expense on operating earnings	5	28	3
Total federal and foreign income tax expense (benefit) on operating earnings	116	(64)	72
Federal income tax expense (benefit) on net realized capital gains (losses)	(268)	(106)	43
Total federal and foreign income tax expense (benefit)	<u>\$ (152)</u>	<u>\$ (170)</u>	<u>\$ 115</u>

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	2023	December 31, 2022	Change
	(In Millions)		
DTAs:			
Ordinary			
Reserve items	\$ 1,779	\$ 1,522	\$ 257
Policy acquisition costs	931	856	75
Nonadmitted assets	320	305	15
Pension and compensation related items	73	49	24
Policyholders' dividends	234	218	16
Investment items	207	224	(17)
Expense items	66	59	7
Other	333	211	122
Total ordinary DTAs	3,943	3,444	499
Nonadmitted DTAs	82	-	82
Admitted ordinary DTAs	3,861	3,444	417
Capital			
Unrealized investment losses	434	397	37
Expense items	18	18	-
Investment items	288	327	(39)
Total capital DTAs	740	742	(2)
Admitted capital DTAs	740	742	(2)
Admitted DTAs	4,601	4,186	415
DTLs:			
Ordinary			
Reserve items	143	212	(69)
Unrealized investment gains	1,128	1,104	24
Deferred and uncollected premium	309	295	14
Pension items	64	68	(4)
Investment items	-	5	(5)
Other	365	361	4
Total ordinary DTLs	2,009	2,045	(36)
Capital			
Unrealized investment gains	808	821	(13)
Investment items	124	91	33
Total capital DTLs	932	912	20
Total DTLs	2,941	2,957	(16)
Net admitted DTA	\$ 1,660	\$ 1,229	\$ 431

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The change in net deferred income taxes comprised the following:

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Net DTA(L)	\$ 512	\$ 520	\$ 201
Less: Items not recorded in the change in net deferred income taxes:			
Tax-effect of unrealized gains/(losses)	(38)	105	343
Tax-effect of changes from investment transfers	(12)	37	-
Change in net deferred income taxes	<u>\$ 462</u>	<u>\$ 662</u>	<u>\$ 544</u>

As of December 31, 2023, the Company had no net operating or capital loss carryforwards to include in deferred income taxes. The Company has \$241 million in tax credit carryforwards included in deferred taxes.

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
	21%	21%	21%
Provision computed at federal statutory rate	\$ (175)	\$ (325)	\$ (92)
Expense items	(4)	19	(38)
Foreign governmental income taxes	5	28	3
Investment items	(248)	(188)	(135)
Nonadmitted assets	(15)	(10)	4
Tax credits	(222)	(293)	(95)
Other	45	(63)	(76)
Total statutory income tax benefit	<u>\$ (614)</u>	<u>\$ (832)</u>	<u>\$ (429)</u>
Federal and foreign income tax expense (benefit)	<u>\$ (152)</u>	<u>\$ (170)</u>	<u>\$ 115</u>
Change in net deferred income taxes	<u>(462)</u>	<u>(662)</u>	<u>(544)</u>
Total statutory income tax benefit	<u>\$ (614)</u>	<u>\$ (832)</u>	<u>\$ (429)</u>

The Company received refunds of federal income taxes in the amounts of \$58 million in 2023 and \$5 million in 2022 and paid \$849 million in 2021.

The total income taxes incurred in the current and prior years that will be available for recoupment in the event of future net capital losses totaled \$0 million related to 2023, \$29 million related to 2022, and \$124 million related to 2021.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

MassMutual and its eligible U.S. subsidiaries are included in a consolidated U.S. federal income tax return. MassMutual and its eligible U.S. subsidiaries also file income tax returns in various states and foreign jurisdictions. MassMutual and its eligible U.S. subsidiaries and certain affiliates (the Parties) have executed and are subject to a written tax allocation agreement (the Tax Agreement). The Tax Agreement sets forth the manner in which the total combined federal income tax is allocated among the Parties. The Tax Agreement provides MassMutual 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 MassMutual with the enforceable right to utilize its net losses carried forward as an offset to future net income subject to federal income taxes. In accordance with the Tax Agreement, future corporate alternative minimum tax (CAMT) is outside of the scope to the general tax allocation method and, consequently any future CAMT liability shall be allocated solely to MassMutual.

Companies are generally required to disclose unrecognized tax benefits, which are the tax effect of positions taken on their tax returns that may be challenged by various taxing authorities, in order to provide users of financial statements more information regarding potential liabilities. The Company recognizes tax benefits and related reserves in accordance with existing statutory accounting practices for liabilities, contingencies and impairments of assets.

The following is a reconciliation of the beginning and ending liability for unrecognized tax benefits (in millions):

Balance, January 1, 2023	\$	214
Gross change related to positions taken in prior years		-
Gross change related to settlements		-
Gross change related to positions taken in current year		14
Gross change related to lapse of statutes of limitations		-
Balance, December 31, 2023	\$	229

Included in the liability for unrecognized tax benefits as of December 31, 2023, are \$215 million of tax positions for which the ultimate deductibility is highly certain but for which there is uncertainty about the timing of such deductibility. The liability for the unrecognized tax benefits as of December 31, 2023 includes \$9 million of unrecognized tax benefits that, if recognized, would impact the Company's effective tax rate.

The Company recognized an increase of \$8 million in accrued interest related to the liability for unrecognized tax benefits as a component of the provision for income taxes. The amount of net interest recognized was \$32 million as of December 31, 2023 and \$24 million as of December 31, 2022. The Company has no accrued penalties related to the liability for unrecognized tax benefits. In the next year, the Company does not anticipate the total amount of uncertain tax positions to significantly increase or decrease.

The Internal Revenue Service (IRS) has completed its examination of MassMutual and its subsidiaries for the year 2013 and prior. The 2014-2016 tax years are in the process of going to Appeals for 3 carryforward issues. The IRS completed its examination of 2017-2018 tax years and is being transferred to Appeals. The adjustments resulting from these examinations are not expected to materially affect the position or liquidity of the Company.

As of December 31, 2023 and 2022, the Company did not recognize any protective deposits as admitted assets.

7. Other than invested assets

a. Admitted negative (disallowed) IMR

As of December 31, 2023, the Company had \$1,112 million of negative (disallowed) IMR in aggregate and in the general account.

As of December 31, 2023, the Company had \$1,112 million of negative (disallowed) IMR admitted in the general account.

As of December 31, 2023, the calculated adjusted general capital and surplus was \$26,015 million.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

As of December 31, 2023, the percentage of adjusted general capital and surplus for which the admitted disallowed IMR represents was 4%.

The following represents allocated gains (losses) previously deferred to the IMR from derivatives:

	December 31, 2023 (In Millions)
Realized capital gains	2,940
Realized capital losses	(3,935)
Total allocated gains (losses) to IMR from derivatives	\$ (995)

When the Company sells bonds and recognizes losses due to interest-rate related factors, and the realized losses are transferred to the IMR, the sales proceeds are generally used for reinvestment as governed by prudent asset liability management (ALM) policies and procedures. Such sales of bonds are intermittently used to meet liquidity needs and managed within the ALM framework.

IMR losses for fixed income related derivatives were in accordance with documented risk management procedures, as well as the Company's derivative use plans, and reflect the same historical treatment of derivative gains reversed to IMR and amortized rather than immediately recognized as realized gain upon termination.

b. Corporate-owned life insurance

The Company holds corporate-owned life insurance issued by unaffiliated third-party insurers to cover the lives of certain qualified senior employees. The primary purpose of the program is to offset future employee benefit expenses. The Company pays all premiums and is the owner and beneficiary of these policies. The Company had recorded cash surrender values of these policies of \$2,825 million as of December 31, 2023 and \$2,619 million as of December 31, 2022.

The cash surrender value is allocated by the following investment categories:

	December 31,	
	2023	2022
Other invested assets	45%	39%
Bonds	28	32
Stocks	17	16
Cash and short-term investments	7	10
Real estate	3	3
	100%	100%

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

c. Deferred and uncollected life insurance premium

Deferred and uncollected life insurance premium, net of loading and reinsurance, are included in other than invested assets in the Company's Statutory Statements of Financial Position. The following summarizes the deferred and uncollected life insurance premium on a gross basis, as well as, net of loading and reinsurance:

	December 31,			
	2023		2022	
	Gross	Net	Gross	Net
	(In Millions)			
Ordinary new business	\$ 154	\$ 88	\$ 163	\$ 103
Ordinary renewal	1,258	1,220	1,159	1,145
Group life	10	10	10	10
Total	\$ 1,422	\$ 1,318	\$ 1,332	\$ 1,258

Deferred premium is the portion of the annual premium not earned at the reporting date. Loading on deferred premium is an amount obtained by subtracting the valuation net deferred premium from the gross deferred premium and generally includes allowances for acquisition costs and other expenses.

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

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

In certain instances, gross premium is less than net premium according to the standard valuation set by the Division and the Department. The gross premium is less than the net premium needed to establish the reserves because the statutory reserves must use standard conservative valuation mortality tables, while the gross premium calculated in pricing uses mortality tables that reflect both the Company's experience and the transfer of mortality risk to reinsurers. The Company had life insurance in force of \$57,978 million as of December 31, 2023 and \$59,911 million as of December 31, 2022 for which gross premium was less than net premium.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

8. Policyholders' liabilities

a. Policyholders' reserves

The Company had life insurance in force of \$953,410 million as of December 31, 2023 and \$907,462 million as of December 31, 2022.

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

	December 31,									
	2023					2022				
	Amount		Interest Rates			Amount		Interest Rates		
	(\$ In Millions)									
Individual life	\$	80,071	2.5%	-	6.0%	\$	74,960	2.5%	-	6.0%
Group annuities		19,737	1.0%	-	11.8%		18,692	1.0%	-	11.8%
Individual universal and variable life		25,346	3.5%	-	6.0%		25,180	3.5%	-	6.0%
Individual annuities		34,055	1.0%	-	11.8%		23,575	1.0%	-	11.8%
Group life		4,178	3.0%	-	4.0%		6,382	3.0%	-	4.0%
Disabled life claim reserves		1,856	3.0%	-	6.0%		1,831	3.0%	-	6.0%
Disability active life reserves		1,504	3.0%	-	6.0%		2,118	3.0%	-	6.0%
Other		503	2.5%	-	6.0%		478	2.5%	-	6.0%
Total	\$	167,250				\$	153,216			

Individual life includes whole life and term insurance. Group life includes corporate-owned life insurance, bank-owned life insurance, group universal life and group variable universal life products. Individual annuities include individual annuity contracts, supplementary contracts involving life contingencies and structured settlements. Group annuities include deferred annuities and single premium annuity contracts. Disabled life claim reserves include disability income and LTC contracts and cover the future payments of known claims. Disability active life reserves include disability income and LTC contracts issued. Other is comprised of disability life and accidental death insurance.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

b. Liabilities for deposit-type contracts

The following summarizes liabilities for deposit-type contracts and the range of interest rates by type of product:

	December 31,									
	2023				2022					
	Amount		Interest Rates		Amount		Interest Rates			
	(In Millions)									
GICs:										
Note programs	\$	12,376	0.6%	-	5.6%	\$	10,813	0.5%	-	5.6%
Federal Home Loan Bank of Boston		2,111	0.8%	-	3.4%		2,111	0.8%	-	3.4%
Municipal contracts		1,720	0.0%	-	7.2%		1,777	0.2%	-	7.3%
Supplementary contracts		2,978	1.0%	-	6.0%		2,909	1.0%	-	6.0%
Dividend accumulations		439	3.0%	-	3.5%		455	3.0%	-	3.0%
Other deposits		21	4.0%	-	8.0%		24	4.0%	-	8.0%
Total	\$	19,645				\$	18,089			

Note program

Funding agreements are investment contracts sold to domestic and international institutional investors. Funding agreement liabilities are equal to the account value and are established by contract deposits, increased by interest credited and decreased by contract coupon payments and maturities. Contract holders do not have the right to terminate the contract prior to the contractually stated maturity date. The Company may retire funding agreements prior to the contractually-stated maturity date by repurchasing the agreement in the market or, in some cases, by calling the agreement. If this occurs, the difference in value is an adjustment to interest credited to liabilities for deposit-type contracts in the Statutory Statements of Operations. Credited interest rates vary by contract and can be fixed or floating. Agreements do not have put provisions or ratings-based triggers. The liability of non-U.S. dollar denominated funding agreements may increase or decrease due to changes in foreign exchange rates. Currency swaps are employed to eliminate foreign exchange risk from all funding agreements issued to back non-U.S. dollar denominated notes.

Under the note program, the Company creates special purpose entities (SPEs), which are investment vehicles or trusts, for the purpose of issuing medium-term notes to investors. Proceeds from the sale of the medium-term notes issued by these SPEs are used to purchase funding agreements from the Company. The payment terms of any particular series of notes are matched by the payment terms of the funding agreement securing the series. Notes are currently issued from the Company's \$16.0 billion Global Medium-Term Note Program.

Federal Home Loan Bank of Boston

MassMutual has funding agreements with Federal Home Loan Bank of Boston (FHLB Boston) in an investment spread strategy, consistent with its other funding agreements. These funding agreements are collateralized by securities with estimated fair values of \$1,955 million as of December 31, 2023. MassMutual's borrowing capacity with FHLB Boston is subject to the lower of the limitation on the pledge of collateral for a loan set forth by law or by MassMutual's internal limit. MassMutual's unused capacity was \$3,889 million as of December 31, 2023. As a member of FHLB Boston, MassMutual held common stock of FHLB Boston with a statement value of \$92 million as of December 31, 2023 and \$92 million as of December 31, 2022.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Municipal contracts

Municipal guaranteed investment contracts (municipal contracts) include contracts that contain terms with above market crediting rates. Liabilities for these contracts includes the municipal contracts' account values, which are established by contract deposits, increased by interest credited (fixed or floating) and decreased by contract coupon payments, additional withdrawals, maturities and amortization of premium. Certain municipal contracts allow additional deposits, subject to restrictions, which are credited based on the rates in the contracts. Contracts have scheduled payment dates and amounts and interest is paid periodically. In addition, certain contracts allow additional withdrawals above and beyond the scheduled payments. These additional withdrawals have certain restrictions on the number per year, minimum dollar amount and are limited to the maximum contract balance. The majority of the municipal contracts allow early contract termination under certain conditions.

Certain municipal contracts contain make-whole provisions, which document the formula for full contract payout. Certain municipal contracts have ratings-based triggers that allow the trustee to declare the entire balance due and payable. Municipal contracts may also have terms that require the Company to post collateral to a third party based on the contract balance in the event of a downgrade in ratings below certain levels under certain circumstances. When the collateral is other than cash, the collateral value is required to be greater than the account balance. The collateral was \$216 million as of December 31, 2023 and \$339 million as of December 31, 2022. The Company employs a rigorous asset/liability management process to help mitigate the economic impacts of various liability risks. By performing asset liability management and performing other risk management activities, the Company believes that these contract provisions do not create an undue level of operating risk to the Company.

Other deposits

Other deposits primarily consist of investment contracts assumed as part of the indemnity reinsurance agreement discussed in *Note 9. "Reinsurance"*. These contracts are used to fund retirement plans. Contract payments are not contingent upon the life of the retirement plan participant.

As of December 31, 2023, the Company's GICs by expected maturity year were as follows (in millions):

2024	\$	2,584
2025		2,790
2026		3,386
2027		1,887
2028		1,689
Thereafter		3,871
Total	\$	16,207

Most GICs only mature on their contractual maturity date. Actual maturities for municipal contracts may differ from their contractual maturity dates, as these contracts permit early contract termination under certain conditions.

c. Unpaid claims and claim expense reserves

The Company establishes unpaid claims and claim expense reserves to provide for the estimated costs of claims for individual disability and LTC policies. These reserves include estimates for both claims that have been reported and those that have been incurred but not reported, and include estimates of all future expenses associated with the processing and settling of these claims. This estimation process is primarily based on the assumption that experience is an appropriate indicator of future events and involves a variety of actuarial techniques that analyze experience, trends and other relevant factors. The amounts recorded for unpaid claims and claim expense reserves represent the Company's best estimate based upon facts and actuarial guidelines. Accordingly, actual claim payouts may vary from these estimates.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following summarizes the changes in disabled life and LTC unpaid claims and claim expense reserves:

	December 31,	
	2023	2022
	(In Millions)	
Claim reserves, beginning of year	\$ 2,232	\$ 2,175
Less: Reinsurance recoverables	367	308
Net claim reserves, beginning of year	1,865	1,867
Claims paid related to:		
Current year	(14)	(14)
Prior years	(333)	(335)
Total claims paid	(347)	(349)
Incurred related to:		
Current year's incurred	375	324
Current year's interest	9	8
Prior year's incurred	(79)	(54)
Prior year's interest	68	69
Total incurred	373	347
Net claim reserves, end of year	1,891	1,865
Reinsurance recoverables	651	367
Claim reserves, end of year	\$ 2,542	\$ 2,232

The changes in reserves for incurred claims related to prior years are generally the result of recent loss development trends. The \$79 million decrease in the prior years' incurred claims for 2023 and the \$54 million decrease in the prior years' incurred claims for 2022 were generally the result of differences between actual termination experience and statutorily prescribed termination tables. In 2023, claim experience included normal claim volume with higher terminations, resulting in a reduction to the incurred reserve from favorable experience, while 2022 claims incurred was due to maturing LTC business partially offset by a corresponding increase in reinsurance recoverable.

The following reconciles disabled life claim reserves to the net claim reserves at the end of the years presented in the previous table. Disabled life claim reserves are recorded in policyholders' reserves. Accrued claim liabilities are recorded in other liabilities.

	December 31,	
	2023	2022
	(In Millions)	
Disabled life claim reserves	\$ 1,856	\$ 1,831
Accrued claim liabilities	33	33
Net claim reserves, end of year	\$ 1,889	\$ 1,864

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

d. Additional liability for annuity contracts

Certain individual variable annuity and fixed index annuity products have additional death or other insurance benefit features, such as GMDBs, GMIBs, GMABs and GLWBs. In general, living benefit guarantees require the contract holder or policyholder to adhere to a company approved asset-allocation strategy. Election of these benefit guarantees is generally only available at contract issue.

The following shows the changes in the liabilities for GMDB, GMIB, GMAB and GLWB (in millions):

Liability as of January 1, 2022	\$ 42
Incurred guarantee benefits	18
Paid guarantee benefits	(5)
Liability as of December 31, 2022	55
Incurred guarantee benefits	2
Paid guarantee benefits	(8)
Liability as of December 31, 2023	\$ 49

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

	December 31, 2023			December 31, 2022		
	Account Value	Net Amount at Risk	Weighted Average Attained	Account Value	Net Amount at Risk	Weighted Average Attained
	(\$ In Millions)					
GMDB	\$ 8,572	\$ 25	66	\$ 8,685	\$ 199	66
GMIB Basic	449	7	73	466	21	72
GMIB Plus	1,240	448	69	1,198	505	68
GMAB	1,400	20	63	1,552	84	62
GLWB	94	15	75	97	22	74

As of December 31, 2023, the GMDB account value above consists of \$3,712 million of Modco assumed within the separate accounts. As of December 31, 2022, the GMDB account value above consists of \$3,600 million of Modco assumed within the separate accounts.

Account values of variable annuity contracts with GMDB, GMIB, GMAB and GLWB are summarized below:

	December 31, 2023			December 31, 2022		
	Separate Account	General Account	Total	Separate Account	General Account	Total
	(In Millions)					
GMDB	\$ 7,437	\$ 1,135	\$ 8,572	\$ 7,426	\$ 1,259	\$ 8,685
GMIB Basic	434	15	449	445	21	466
GMIB Plus	1,240	-	1,240	1,198	-	1,198
GMAB	1,368	32	1,400	1,516	37	1,553
GLWB	94	-	94	97	-	97

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

e. Additional liability for individual life contracts

Certain universal life and variable universal life contracts include features such as GMDBs or other guarantees that ensure continued death benefit coverage when the policy would otherwise lapse. The value of the guarantee is only available to the beneficiary in the form of a death benefit.

The following presents the changes in the liability, net of reinsurance, for guarantees on universal life and variable universal life type contracts:

	December 31,	
	2023	2022
	(In Millions)	
Beginning balance	\$ 5,154	\$ 4,601
Net liability increase	332	553
Ending balance	\$ 5,486	\$ 5,154

9. Reinsurance

The Company enters into reinsurance agreements with affiliated and unaffiliated insurers in the normal course of business in order to mitigate the impact of underwriting mortality and morbidity risks or to assume business. Such transfers do not relieve the Company of its primary liability to its customers and, as such, failure of reinsurers to honor their obligations could result in credit losses that could arise if a reinsurer defaults. The Company reduces reinsurance default risk by evaluating the financial condition of reinsurers and monitoring for possible concentrations within the Company's reinsurers and using trust structures, when appropriate. The Company reinsures a portion of its mortality risk in its life business under either a first dollar quota-share arrangement or an in excess of the retention limit arrangement with reinsurers. The Company also reinsures a portion of its morbidity risk in its disability and LTC business. The amounts reinsured are on a yearly renewable term, coinsurance funds withheld, coinsurance or Modco basis. The Company's highest retention limit for new issues of life policies ranges from \$15 million to \$35 million.

Refer to *Note 17. "Related party transactions"* for information about the Company's affiliated assumed reinsurance transactions.

There are no reinsurance agreements in effect under which the reinsurer may unilaterally cancel any reinsurance for reasons other than for nonpayment of premium or other similar credits. The Company has no reinsurance agreements in effect such that the amount of losses paid or accrued through the statement date may result in a payment to the reinsurer of amounts which, in aggregate and allowing for offset of mutual credits from other reinsurance agreements with the same reinsurer, exceed the total direct premium collected under the reinsured policies.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Direct premium	\$ 34,223	\$ 35,530	\$ 30,907
Premium assumed	977	1,013	1,112
Premium ceded	(9,711)	(13,019)	(12,128)
Total net premium	\$ 25,490	\$ 23,524	\$ 19,891
Ceded reinsurance recoveries	\$ 1,842	\$ 1,540	\$ 1,699
Assumed losses	\$ 425	\$ 330	\$ 356

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

	December 31,	
	2023	2022
	(In Millions)	
Reinsurance reserves:		
Assumed	\$ 6,476	\$ 551
Ceded	(47,326)	(47,416)
Ceded amounts recoverable	\$ 324	\$ 329
Benefits payable on assumed business	\$ 65	\$ 40
Funds held under coinsurance		
Ceded	\$ 22,520	\$ 21,916

Reinsurance reserves ceded to unaffiliated reinsurers as of December 31, 2023 include \$9,219 million associated with life insurance policies, \$6,497 million for LTC, \$22,659 million for annuity, \$14 million for disability and \$6 million for group life and health. Reinsurance reserves ceded to unaffiliated reinsurers as of December 31, 2022 include \$9,016 million associated with life insurance policies \$5,998 million for LTC, \$32,381 million for annuity, \$15 million for disability and \$6 million for group life and health.

For the year ended December 31, 2023, the Company decreased its gross LTC policyholders' premium deficiency reserve by \$590 million primarily through a combination of various assumption changes to reflect the risk inherent in the cash flows of this business. The majority of the risk is ceded to unaffiliated reinsurers resulting in the ceded policyholders' premium deficiency reserves decreasing by \$295 million. The total net impact of the change is \$295 million, which was recorded as a decrease to policyholders' liabilities on the Statutory Statements of Financial Position and a decrease to change in policyholders' reserves on the Statutory Statements of Operations.

For the year ended December 31, 2022, the Company decreased its gross LTC policyholders' premium deficiency reserve by \$165 million primarily through a combination of various assumption changes to reflect the risk inherent in the cash flows of this business. The majority of the risk is ceded to unaffiliated reinsurers resulting in the ceded policyholders' premium deficiency reserves decreasing by \$345 million. The total net impact of the change is \$180 million, which was recorded as an increase to policyholders' liabilities on the Statutory Statements of Financial Position and an increase to change in policyholders' reserves on the Statutory Statements of Operations.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

	December 31, 2023		
	(In Millions)		
	Direct	Ceded	Net
LTC premium deficiency reserves, beginning of year	\$ 4,390	\$ (3,910)	\$ 480
Assumption changes	(590)	295	(295)
LTC premium deficiency reserves, end of year	<u>\$ 3,800</u>	<u>\$ (3,615)</u>	<u>\$ 185</u>

As of December 31, 2023, one reinsurer accounted for 29% of the outstanding balance of the reinsurance recoverable and the next largest reinsurer had 21%. The Company continues to monitor its morbidity risk ceded to one reinsurer for its LTC business, in which 72% of the reserves are held in trust.

On July 5, 2023, the Company recaptured approximately \$16 million of statutory reserves reinsured on a yearly renewable term (YRT) basis for certain closed blocks of LTC business and reinsured on a coinsurance basis a portion of this product resulting in ceding \$692 million statutory reserves to a different reinsurer. The recapture settlement of \$17 million relieved the reinsurer of all obligations under the YRT agreement and resulted in an offset to premiums and disability benefits. As part of the coinsurance transaction, the Company transferred \$657 million of premium to the reinsurer.

The Company holds invested assets associated with funds withheld that are managed externally, as of December 31, 2023 and 2022, these assets, at carry value, included:

	December 31,	
	2023	2022
	(In Millions)	
Bonds	\$ 15,215	\$ 14,955
Preferred stocks	79	70
Mortgage loans	1,043	1,473
Partnerships and LLCs	51	126
Cash, cash equivalents and short-term investments	946	361
Total	<u>\$ 17,334</u>	<u>\$ 16,985</u>

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

10. Withdrawal characteristics

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

The withdrawal characteristics of the Company's annuity actuarial reserves and deposit-type contracts as of December 31, 2023 are illustrated below:

Individual annuities

	General Account	Separate Account with Guarantees	Separate Account Non- Guaranteed	Total	% of Total
	(In Millions)				
Subject to discretionary withdrawal:					
With market value adjustment	\$ 570	\$ -	\$ -	\$ 570	1%
At book value less current surrender charge of 5% or more	32,552	-	-	32,552	61
At fair value	-	-	8,058	8,058	15
Total with market value adjustment or at fair value	33,122	-	8,058	41,180	77
At book value without adjustment (minimal or no charge or adjustment)	3,905	-	-	3,905	7
Not subject to discretionary withdrawal	8,302	-	-	8,302	16
Total	\$ 45,329	\$ -	\$ 8,058	\$ 53,387	100%
Reinsurance ceded	11,323	-	-	11,323	
Total, net of reinsurance	\$ 34,006	\$ -	\$ 8,058	\$ 42,064	
Amount included in book value moving to at book value without adjustment after statement date	1,304	-	-	1,304	

Group annuities

	General Account	Separate Account with Guarantees	Separate Account Non- Guaranteed	Total	% of Total
	(In Millions)				
Subject to discretionary withdrawal:					
With market value adjustment	\$ 13,547	\$ -	\$ -	\$ 13,547	20%
At fair value	-	10,694	20,623	31,317	45
Total with market value adjustment or at fair value	13,547	10,694	20,623	44,864	65
At book value without adjustment (minimal or no charge or adjustment)	311	376	-	687	1
Not subject to discretionary withdrawal	23,544	-	-	23,544	34
Total	\$ 37,402	\$ 11,070	\$ 20,623	\$ 69,095	100%
Reinsurance ceded	17,690	-	-	17,690	
Total, net of reinsurance	\$ 19,712	\$ 11,070	\$ 20,623	\$ 51,405	

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Deposit-type contracts

	General Account	Separate Account with Guarantees	Separate Account Non- Guaranteed	Total	% of Total
	(In Millions)				
Subject to discretionary withdrawal:					
With market value adjustment	\$ 2,479	\$ -	\$ -	\$ 2,479	8%
At fair value	-	-	9,332	9,332	30
Total with market value adjustment or at fair value	2,479	-	9,332	11,811	38
At book value without adjustment (minimal or no charge or adjustment)	2,704	-	-	2,704	8
Not subject to discretionary withdrawal	17,038	-	-	17,038	54
Total	\$ 22,221	\$ -	\$ 9,332	\$ 31,553	100%
Reinsurance ceded	2,576	-	-	2,576	
Total, net of reinsurance	\$ 19,645	\$ -	\$ 9,332	\$ 28,977	

The following is a summary of total annuity actuarial reserves and liabilities for deposit-type contracts as of December 31, 2023 (in millions):

Statutory Statements of Financial Position:	
Policyholders' reserves – group annuities	\$ 19,712
Policyholders' reserves – individual annuities	34,005
Liabilities for deposit-type contracts	19,645
Subtotal	73,362
Separate Account Annual Statement:	
Annuities	39,751
Other annuity contract deposit-funds and GICs	9,332
Subtotal	49,083
Total	\$ 122,445

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

b. Analysis of life actuarial reserves by withdrawal characteristics

The withdrawal characteristics of the Company's life actuarial reserves as of December 31, 2023 are illustrated below:

General Account

	Account Value	Cash Value	Reserve
	(In Millions)		
Subject to discretionary withdrawal, surrender values, or policy loans:			
Universal life	\$ 22,384	\$ 22,381	\$ 22,439
Universal life with secondary guarantees	1,710	1,520	7,088
Other permanent cash value life insurance	-	79,893	84,398
Variable life	1	1	1
Variable universal life	888	886	938
Not subject to discretionary withdrawal or no cash values:			
Term policies without cash value	-	-	2,971
Accidental death benefits	-	-	3
Disability - active lives	-	-	192
Disability - disabled lives	-	-	311
Miscellaneous reserves	-	-	975
Total (gross: direct + assumed)	\$ 24,983	\$ 104,681	\$ 119,316
Reinsurance Ceded	4,479	5,166	9,219
Total (net)	\$ 20,504	\$ 99,515	\$ 110,097

Separate Account with Guarantees

	Account Value	Cash Value	Reserve
	(In Millions)		
Subject to discretionary withdrawal, surrender values, or policy loans:			
Variable universal life	\$ 1,549	\$ 1,549	\$ 1,549
Not subject to discretionary withdrawal or no cash values:			
Total (gross: direct + assumed)	1,549	1,549	1,549
Total (net)	\$ 1,549	\$ 1,549	\$ 1,549

Separate Account Nonguaranteed

	Account Value	Cash Value	Reserve
	(In Millions)		
Subject to discretionary withdrawal, surrender values, or policy loans:			
Variable life	\$ 1	\$ 1	2
Variable universal life	1,657	1,629	1,645
Not subject to discretionary withdrawal or no cash values:			
Total (gross: direct + assumed)	1,658	1,630	1,647
Total (net)	\$ 1,658	\$ 1,630	\$ 1,647

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

c. Separate accounts

The Company has guaranteed separate accounts classified as the following: nonindexed, which have multiple concurrent guarantees, including a guarantee that applies for as long as the contract is in effect and does not exceed a 4% rate of return. The Company has nonguaranteed separate accounts which are variable accounts where the benefit is determined by the performance and/or market value of the investments held in the separate account with incidental risk, notional expense and minimum death benefit guarantees.

Information regarding the separate accounts of the Company as of and for the year ended December 31, 2023 is as follows:

	Guaranteed			
	Nonindexed Less Than/ Equal to		Non Guarantee	
	Indexed			Total
	(In Millions)			
Net premium, considerations or deposits for the year ended December 31, 2023	\$ -	\$ -	\$ 4,769	\$ 4,769
Reserves at December 31, 2023:				
For accounts with assets at:				
Fair value	\$ -	\$ 11,447	\$ 39,284	\$ 50,731
Amortized cost/book value	-	1,549	-	1,549
Subtotal SIA Reserves	-	12,996	39,284	52,280
Nonpolicy liabilities	-	-	175	175
Total Separate Account Liabilities	\$ -	\$ 12,996	\$ 39,459	\$ 52,455
Reserves by withdrawal characteristics:				
Subject to discretionary withdrawal:				
At fair value	\$ -	\$ 11,447	\$ 39,284	\$ 50,731
At book value without market value adjustment and current surrender charge of less than 5%	-	1,549	-	1,549
Subtotal	-	12,996	39,284	52,280
Nonpolicy liabilities	-	-	175	175
Total Separate Account Liabilities	\$ -	\$ 12,996	\$ 39,459	\$ 52,455

The Company does not have any reserves in separate accounts for asset default risk in lieu of AVR.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
From the Separate Account Annual Statement:			
Transfers to separate accounts	\$ 1,935	\$ 4,205	\$ 3,971
Transfers from separate accounts	(9,387)	(14,220)	(11,152)
Subtotal	(7,452)	(10,015)	(7,181)
Reconciling adjustments:			
Miscellaneous	4,278	3,481	4,537
Net deposits on deposit-type liabilities	1,573	1,939	1,202
Net transfers from separate accounts	<u>\$ (1,601)</u>	<u>\$ (4,595)</u>	<u>\$ (1,442)</u>

Net deposits on deposit-type liabilities are not considered premium and therefore are excluded from the Statutory Statements of Operations.

11. Debt

MassMutual issues commercial paper in the form of Notes in minimum denominations of \$250 thousand up to a total aggregation of \$1,000 million with maturity dates up to a maximum of 270 days from the date of issuance. Noninterest bearing Notes are sold at par less a discount representing an interest factor. Interest bearing Notes are sold at par. The Notes are not redeemable or subject to voluntary prepayments by MassMutual. The Notes have a carrying value and face amount of \$50 million as of December 31, 2023 and \$250 million as of December 31, 2022. Notes issued in 2023 had interest rates ranging from 4.36% to 5.40% with maturity dates ranging from 1-36 days. Interest expense for commercial paper was \$7 million for the year ended December 31, 2023 and \$5 million for the year ended December 31, 2022.

MassMutual has a \$1,500 million, five-year credit facility, with a syndicate of lenders that can be used for general corporate purposes and to support commercial paper borrowings. During December 2022, the facility was renewed and the scheduled maturity is December 16, 2027. The facility includes two one-year extension options that may be exercised with proper notification as set forth in the agreement. The facility has an upside option for an additional \$500 million. 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 years ended December 31, 2023 and 2022, MassMutual was in compliance with all covenants under the credit facility. For the years ended December 31, 2023 and 2022, there were no draws on the credit facilities. Credit facility fees were less than \$1 million for the years ended December 31, 2023 and December 31, 2022.

12. Employee benefit plans

The Company sponsors multiple employee benefit plans, providing retirement, life, health and other benefits to employees, certain employees of unconsolidated subsidiaries, agents, general agents and retirees who meet plan eligibility requirements.

a. Pension plans

The Company sponsors funded and unfunded noncontributory defined benefit pension plans for its eligible employees, agents and retirees.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The funded qualified defined benefit plan generally provides benefits under a cash balance formula based on age, service and salary during the participants' careers. Certain eligible participants may be entitled to benefits under a legacy defined benefit formula. The Company's policy is to fund the qualified pension plan in accordance with the Employee Retirement Income Security Act of 1974. There were no contributions in 2023 and 2022.

b. Defined contribution plans

The Company sponsors funded qualified defined contribution plans and unfunded nonqualified deferred compensation thrift savings plans for its employees, agents and retirees. Defined contribution plan expense for 2023 and 2022 was \$56 million and \$52 million, respectively.

c. Other postretirement benefits

The Company provides certain life insurance and health care benefits (other postretirement benefits) for its retired employees and agents, their beneficiaries and covered dependents. MMHLLC has the obligation to pay the Company's other postretirement benefits. The transfer of this obligation to MMHLLC does not relieve the Company of its primary liability. MMHLLC is allocated other postretirement expenses related to interest cost, amortization of actuarial gains (losses) and expected return on plan assets, whereas service cost and prior service cost are recorded by the Company.

Substantially all of the Company's U.S. employees and agents may become eligible to receive other postretirement benefits. These benefits are funded as the benefits are provided to the participants. For eligible employees who retire after 2009, except certain employees who were close to retirement in 2010, the Company's cost is limited to a retiree health reimbursement account (RHRA), which accumulates during an employee's career and can be drawn down by the retiree to purchase coverage outside of the Company or for other health care costs. Retired employees with a RHRA also may choose to purchase coverage through the private retiree exchange.

For other eligible current and future retired employees, and current and future retired agents, the Company provides access to postretirement health care plans through a private retiree exchange. The Company's cost is limited to the fixed annual subsidy provided to retirees through a Health Reimbursement Account each year that the retiree can use to purchase coverage on the exchange or for other health care costs.

Company-paid basic life insurance is provided to retirees who retired before 2010 and certain employees who retire after 2009 but were close to retirement in 2010. Supplemental life insurance is available to certain retirees on a retiree-pay-all basis.

The Company provides retiree life insurance coverage for home office employees who, as of January 1, 2010, were age 50 with at least 10 years of service or had attained 75 points, generally age plus service, with a minimum 10 years of service.

d. Benefit obligations

Accumulated and projected benefit obligations are the present value of pension benefits earned as of a December 31 measurement date (the Measurement Date) based on service and compensation as of that date.

Refer to *Note 12f. "Amounts recognized in the Statutory Statements of Financial Position,"* for details on the funded status of the plans. Accumulated and projected postretirement benefit obligations for other postretirement benefits are the present value of postretirement medical and life insurance benefits earned as of the Measurement Date projected for estimated salary increases to an assumed date with respect to retirement, disability or death.

Actuarial (gains) losses represent the difference between the expected results and the actual results used to determine the projected benefit obligation, accumulated benefit obligation and current year expense. Select assumptions used in this calculation include expected future compensation levels, mortality and expected retirement age.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following presents the total pension and other postretirement accumulated benefit obligation:

	December 31,			
	2023	2022	2023	2022
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Accumulated benefit obligation	\$ 2,634	\$ 2,590	\$ 313	\$ 315

The following sets forth the change in projected benefit obligation of the defined benefit pension and other postretirement plans:

	December 31,			
	2023	2022	2023	2022
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Projected benefit obligation, beginning of year	\$ 2,590	\$ 3,099	\$ 315	\$ 374
Service cost	86	97	7	10
Interest cost	125	86	15	11
Actuarial (gains) losses	21	44	(14)	(10)
Benefits paid	(222)	(180)	(14)	(14)
Change in discount rate	34	(565)	4	(56)
Change in actuarial assumptions	-	9	-	-
Projected benefit obligation, end of year	\$ 2,634	\$ 2,590	\$ 313	\$ 315

The determination of the discount rate is based upon rates commensurate with current yields on high quality corporate bonds as of the Measurement Date. A spot yield curve is developed from this data that is used to determine the present value for the obligation. The projected plan cash flows are discounted to the Measurement Date based on the spot yield curve. A single discount rate is utilized to ensure the present value of the benefits cash flow equals the present value computed using the spot yield curve. A 25-basis point change in the discount rate results in approximately a \$59 million change in the projected pension benefit obligation. The methodology includes producing a cash flow of annual accrued benefits. Refer to Note 12h. "Assumptions" for details on the discount rate.

e. Plan assets

The assets of the qualified pension plan are invested in a MassMutual group annuity contract and in the MassMutual Pension Plan Trust (Pension Trust). The group annuity contract includes a general investment account (GIA). As of December 31, 2023 and 2022, GIA assets managed by the Company were \$229 million and \$168 million, respectively. The Company was rated AA+ by Standards and Poor's as of December 31, 2023..

The Company's overall objective is to manage the assets in a liability framework where investments are selected that are expected to have similar changes in fair value as the related liabilities will have upon changes in interest rates. The company invests in a portfolio of both return-seeking and liability-hedging assets, to achieve long-term growth and to insulate the funded position from interest rate volatility.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The target range allocations are based on two broad categories, return-seeking (generally equities and alternative investments) and liability-hedging (generally fixed income). The return-seeking allocation range is 46% to 54% and liability-hedging range is 46% to 54%. Of the return-seeking assets, the range is 35% to 55% global public equity and 45% to 65% alternatives. The pension plan assets invested in the GIA through the unallocated group annuity contract earn a fixed interest. These assets comprised approximately 9% of the plan assets as of December 31, 2023 and 7% as of December 31, 2022.

The following presents the change in plan assets:

	2023	December 31, 2022	2023	2022
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Plan assets, beginning of year	\$ 2,483	\$ 3,053	\$ 2	\$ 2
Actual return on plan assets	230	(415)	-	-
Employer contributions	30	25	14	14
Benefits paid	(222)	(180)	(14)	(14)
Other	-	-	2	-
Plan assets, end of year	<u>\$ 2,521</u>	<u>\$ 2,483</u>	<u>\$ 4</u>	<u>\$ 2</u>

The GIA is designed to provide stable, long-term investment growth. Investments in the GIA are stated at contract value. Contract value is the amount participants would receive if they were to initiate certain transactions under the terms of the plan. It provides for a stated return on principal invested over a specified period and permits withdrawals at contract value for benefit payments, loans, or transfers.

Investments in the Pension Trust are stated at fair value. Noninterest bearing cash is stated at cost value.

Fair Value Measurements

The Company's fair value hierarchy is defined in *Note 4. "Fair Value of financial instruments"*.

The following is a description of the valuation methodologies used to measure fair value for the investments in the qualified pension plan.

Cash, cash equivalents and short-term investments: Short-term investments are stated at cost, which is equal to fair value. Foreign currencies are stated at cost and adjusted for foreign currency gains and losses.

Government securities: Marked to market daily based on values provided by third-party vendors or market makers to the extent available or based on model prices. Valuations furnished by a pricing service take into account factors such as institutional-size trading in similar securities, yield, quality, coupon rate, maturity, type of issue, trading characteristics, and other market data and are therefore classified as Level 2.

Bonds: If Level 1 valuations are not available, the fair value is determined using models such as matrix pricing and therefore, is classified as Level 2, which uses quoted market prices of debt securities with similar characteristics. Valued using the closing price reported on the active market on which the individual securities are traded.

Mutual funds: Mutual funds are valued at the daily closing price as reported by the fund. Certain mutual funds held by the plan are registered with the SEC and are required to publish their daily NAV. These mutual funds held by the Plan are deemed to be actively traded and are therefore classified as Level 1. The remaining mutual funds do not publish their daily NAV and are therefore classified as Level 2.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Collective investment trusts: Valued using the NAV per unit. The net asset value per unit of the funds is calculated on each business day by dividing the total value of assets, less liabilities, by the number of units outstanding. Unit issuances and redemptions are based on the net asset value determined at the end of the current day and therefore is classified as NAV practical expedient.

Real estate investment trusts: Real estate investment trusts are valued using the plan's pro-rata interest in the fund and does not have a lock-up period, a funding commitment, or a specific redemption period but are dependent upon the liquidation of underlying assets. Therefore, these investments are classified as NAV practical expedient.

Hedge funds: Hedge funds are based on the plan's pro rata interest in the fund and have a 45-day redemption period and therefore classified as NAV practical expedient.

Limited partnerships – Private equity/venture capital: The plan utilizes the NAV practical expedient to calculate fair value of its investments based on the Plan's pro rata interest in net assets of each underlying partnership. All valuations utilize financial information supplied by the partnership, including income, expenses, gains and losses. The underlying investments are accounted for at fair value as described in the partnership's audited financial statements. These funds can be redeemed periodically with notice that generally ranges from 45 to 90 days. There are no lockups or funding commitments.

Limited partnerships – Real estate: The plan utilizes the NAV practical expedient to calculate fair value of its investments based on the Plan's pro rata interest in net assets of each underlying partnership. All valuations utilize financial information supplied by the partnership, including income, expenses, gains and losses. The underlying investments of the partnership are accounted for at fair value as described in the partnership's audited financial statements. These funds can be redeemed periodically with notice that generally ranges from 45 to 90 days. There are no lockups or funding commitments.

Limited partnerships – Hedge: The Plan utilizes the NAV practical expedient to calculate fair value of its investments based on the Plan's pro rata interest in net assets of each underlying partnership. All valuations utilize financial information supplied by the partnership, including income, expenses, gains and losses. The underlying investments of the partnership are accounted for at fair value as described in the partnership's audited financial statements. The hedge funds can be redeemed semi-annually with 95 days' notice. There are no lockups or funding commitments.

Other investments: Investments included in this category include asset backed securities, mortgage backed securities, swaps, derivatives, futures and options. Closing prices are not available on the active market. Fair value is determined using models such as matrix pricing and therefore, these securities are classified as Level 2.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following tables set forth by level, within the fair value hierarchy, the plan's assets at fair value as of December 31, 2023 and 2022.

	Fair Value as of December 31, 2023				
	Level 1	Level 2	Level 3	NAV Practical Expedient	Total
	(In Millions)				
Cash, cash equivalents, and short-term investments	\$ 76	-	-	-	76
Government securities	-	486	-	-	486
Bonds	-	371	-	-	371
Mutual funds	471	-	-	-	471
Real estate investment trusts	-	-	-	54	54
Hedge funds	-	-	-	31	31
Limited partnerships					
Private equity/venture capital	-	-	-	480	480
Real estate	-	-	-	120	120
Hedge	-	-	-	205	205
Other investments	-	12	-	-	12
Total	\$ 547	\$ 869	\$ -	\$ 890	\$ 2,306

Plan assets measured at contract value and non-interest bearing cash are excluded from the preceding table.

	Fair Value as of December 31, 2022				
	Level 1	Level 2	Level 3	NAV Practical Expedient	Total
	(In Millions)				
Cash, cash equivalents, and short-term investments	\$ 5	\$ 24	\$ -	\$ -	\$ 29
Mutual funds	458	293	-	-	751
Collective investment trusts	-	63	-	-	63
Hedge funds	-	-	-	27	27
Limited partnerships					
Private equity/venture capital	-	-	-	414	414
Real estate	-	-	-	135	135
Hedge	-	-	-	185	185
Debt Instruments:					
Corporate and other bonds	-	331	-	-	331
Other:					
Government securities	-	378	-	-	378
Other	-	2	-	-	2
Total pension trust assets	\$ 463	\$ 1,091	\$ -	\$ 761	\$ 2,315
Total General Investment Account	-	-	168	-	168
Total	\$ 463	\$ 1,091	\$ 168	\$ 761	\$ 2,483

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

f. Amounts recognized in the Statutory Statements of Financial Position

Unrecognized prior service cost is the adjustment to the projected benefit obligation as a result of plan amendments. It represents the increase or decrease in benefits for service performed in prior periods. For pension benefits, this cost is amortized into net periodic benefit cost over the average remaining service years of active employees at the time of the amendment. For other postretirement benefits, this cost is amortized into net periodic benefit cost over the average remaining lifetime of eligible employees and retirees at the time of the amendment.

Unrecognized net actuarial (gains) losses are variances between assumptions used and actual experience. These assumptions include return on assets, discount rate, demographics and mortality. The unrecognized net actuarial (gains) losses are amortized if they exceed 10% of the projected benefit obligation and are amortized starting in the period after recognition. These are amortized for pension and other postretirement benefits into net periodic benefit cost over the remaining service-years of active employees.

The prepaid pension asset is a cumulative balance of employer contributions made to the plan netted against the plan's accumulated net periodic benefit costs. The prepaid pension asset is a nonadmitted asset.

The accrued benefit cost recognized is the funded status of the plan adjusted for the remaining balance of unrecognized prior service cost, unrecognized net actuarial loss and the nonadmitted prepaid pension asset.

The following sets forth the projected benefit obligation funded status of the plans:

	December 31,			
	2023	2022	2023	2022
	Pension Benefits		Other Postretirement Benefits	
	(In Millions)			
Projected benefit obligation	\$ (2,634)	\$ (2,590)	\$ (313)	\$ (315)
Plan assets	2,521	2,483	4	2
Projected benefit obligation funded status	\$ (113)	\$ (107)	\$ (309)	\$ (313)

The qualified pension plan was overfunded by \$312 million as of December 31, 2023 and \$296 million as of December 31, 2022. The nonqualified pension plans are not funded and have total projected benefit obligations of \$425 million as of December 31, 2023 and \$403 million as of December 31, 2022.

The qualified pension plan nonadmitted pension plan asset was \$653 million as of December 31, 2023 and \$678 million as of December 31, 2022.

The Company intends to fund \$56 million in 2024 to meet its expected current obligations under its qualified and nonqualified pension plans and other postretirement benefit plans.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

g. Net periodic cost

The net periodic cost represents the annual accounting income or expense recognized by the Company and is included in general insurance expenses in the Statutory Statements of Operations. The net periodic cost recognized is as follows:

	Years Ended December 31,						
	2023	2022	2021	2023	2022	2021	
	Pension Benefits			Other Postretirement Benefits			
	(In Millions)						
Service cost	\$ 86	\$ 97	\$ 110	\$ 7	\$ 9	\$ 10	
Interest cost	125	86	77	15	10	9	
Expected return on plan assets	(169)	(194)	(183)	-	-	-	
Amortization of unrecognized (gains) and losses	27	9	39	(9)	(1)	-	
Amortization of unrecognized prior service benefit	-	-	-	(5)	(6)	(6)	
Total net periodic cost/(benefit)	\$ 69	\$ (2)	\$ 43	\$ 8	\$ 12	\$ 13	

The expected future pension and other postretirement benefit payments which reflect expected future service are as follows:

	Pension Benefits	Other Postretirement Benefits
	(In Millions)	
2024	\$ 199	\$ 19
2025	201	20
2026	206	20
2027	204	21
2028	209	21
2029-2033	1,055	109

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

h. Assumptions

The assumptions the Company used to calculate the benefit obligations and to determine the benefit costs are as follows:

	Years Ended December 31,					
	2023	2022	2021	2023	2022	2021
	Pension Benefits			Other Postretirement Benefits		
Weighted-average assumptions used to determine:						
Benefit obligations:						
Discount rate	4.85%	5.00%	2.85%	4.85%	5.05%	2.80%
Expected rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Interest Crediting rate	5.00%	5.00%	5.00%	4.85%	5.05%	2.80%
Net periodic benefit cost:						
Discount rate	5.00%	2.85%	2.50%	5.05%	2.80%	2.45%
Expected long-term rate of return on plan assets	7.00%	6.50%	6.50%	3.00%	3.00%	3.00%
Expected rate of compensation increase	3.50%	3.50%	3.50%	3.50%	3.50%	3.50%
Interest Crediting rate	5.00%	5.00%	5.00%	5.05%	2.80%	2.45%

The discount rate used to determine the benefit obligations as of year end is used to determine the expense in the next fiscal year.

The Company determines its assumptions for the expected rate of return on plan assets for its plans using a “building block” approach, which focuses on ranges of anticipated rates of return for each asset class. A weighted range of nominal rates is determined based on target allocations for each class of asset.

13. Employee compensation plans

The Company has a long-term incentive compensation plan under which certain employees of the Company and its subsidiaries may be issued phantom stock-based compensation awards. These awards include PSARs and PRS. These awards do not grant an equity or ownership interest in the Company.

A summary of the weighted average grant price of PSARs and PRS shares granted, the intrinsic value of PSARs shares exercised, the PRS liabilities paid and the fair value of shares vested during the year is as follows:

	December 31,		
	2023	2022	2021
Weighted average grant date fair value:			
PSARs granted during the year	\$ 145.77	\$ 243.40	\$ 141.86
PRS granted during the year	145.67	238.54	153.38
Intrinsic value (in thousands):			
PSARs options exercised	65,810	135,219	124,551
PRS liabilities paid	45,600	70,029	48,298
Fair value of shares vested during the year	64,779	136,945	246,047

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

A summary of PSARs and PRS shares is as follows:

	PSARs			PRS		
	Number of Share Units (In Thousands)	Weighted Average		Number of Share Units (In Thousands)	Weighted Average	
		Price	Remaining Contract Terms (In Years)		Price	Remaining Contract Terms (In Years)
Outstanding as of						
December 31, 2021	4,510	\$ 130.23	4.1	1,070	\$ 122.41	2.5
Granted	808	243.40		168	238.54	
Exercised	(1,616)	119.34		(288)	98.47	
Forfeited	(308)	155.09		(78)	137.13	
Outstanding as of						
December 31, 2022	3,394	160.09	4.0	872	151.41	2.4
Granted	2,762	145.77		1,002	145.67	
Exercised	(1,329)	130.59		(252)	116.36	
Forfeited	(788)	239.79		(37)	180.80	
Outstanding as of						
December 31, 2023	4,039	144.46	4.4	1,585	152.73	2.1
Exercisable as of						
December 31, 2023	28	\$ 139.51	3.9	9	\$ 149.59	2.1

The PSARs compensation was an expense of \$17 million for the year ended December 31, 2023 and an expense of \$(34) million for the year ended December 31, 2022 and an expense of \$253 million for the year ended December 31, 2021. The PSARs accrued compensation liability was \$13 million as of December 31, 2023 and \$99 million as of December 31, 2022. The unrecognized compensation expense related to nonvested PSARs awards was \$20 million for the year ended December 31, 2023, \$19 million for the year ended December 31, 2022 and \$108 million for the year ended December 31, 2021. The weighted average period over which the expense is expected to be recognized is 4.4 years. The PSARs unrecognized compensation expense represents the total intrinsic value of all shares issued if 100% vested at current stock price, minus current compensation liability.

The PRS compensation expense was \$96 million for the year ended December 31, 2023 and \$31 million for the year ended December 31, 2022 and \$77 million for the year ended December 31, 2021. The PRS accrued compensation liability was \$148 million for the year ended December 31, 2023 and \$99 million for the year ended December 31, 2022. The unrecognized compensation expense related to nonvested PRS awards was \$87 million as of December 31, 2023, \$56 million as of December 31, 2022 and \$77 million as of December 31, 2021 respectively. The weighted average period over which the expense is expected to be recognized is 2.1 years. The PRS unrecognized compensation expense represents the total value of all shares issued if 100% vested at the current stock price, minus current compensation liability.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

14. Surplus notes

The following table summarizes the surplus notes issued and outstanding as of December 31, 2023:

Issue Date	Face Amount	Carrying Value	Interest Rate	Maturity Date	Scheduled Interest Payment Dates
	(\$ In Millions)				
03/01/1994	50	50	7.500%	03/01/2024	Mar 1 & Sept 1
05/12/2003	193	193	5.625%	05/15/2033	May 15 & Nov 15
06/01/2009	130	129	8.875%	06/01/2039	Jun 1 & Dec 1
01/17/2012	263	263	5.375%	12/01/2041	Jun 1 & Dec 1
04/15/2015	258	254	4.500%	04/15/2065	Apr 15 & Oct 15
03/23/2017	475	471	4.900%	04/01/2077	Apr 1 & Oct 1
10/11/2019	838	597	3.729%	10/15/2070	Apr 15 & Oct 15
04/16/2020	700	697	3.375%	04/15/2050	Apr 15 & Oct 15
06/26/2020	600	820	5.077%	02/15/2069	Feb 15 & Aug 15
03/01/2021	200	232	5.077%	02/15/2069	Feb 15 & Aug 15
11/18/2021	675	670	3.200%	12/01/2061	Jun 1 & Dec 1
12/01/2022	500	500	5.672%	12/01/2052	Jun 1 & Dec 1
Total	\$ 4,882	\$ 4,876			

All payments of interest and principal are subject to the prior approval of the Division. Interest expense is not recorded until approval for payment is received from the Division. As of December 31, 2023, the unapproved interest was \$44 million. Through December 31, 2023, the Company paid cumulative interest of \$2,609 million on surplus notes. Interest of \$231 million was approved and paid during the year ended December 31, 2023.

The anticipated sinking fund payments that are due for the notes issued in 1994 are \$50 million in 2024. There are no sinking fund requirements for the notes issued in 2003, 2009, 2012, 2015, 2017, 2019, 2020, 2021 or 2022.

These notes are unsecured and subordinate to all present and future indebtedness of the Company, all policy claims and all prior claims against the Company as provided by the Massachusetts General Laws. The surplus notes are all held by bank custodians for unaffiliated investors. All issuances were approved by the Division. Surplus notes are included in surplus on the Statutory Statements of Financial Position.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

15. Presentation of the Statutory Statements of Cash Flows

The following table presents those transactions that have affected the Company's recognized assets or liabilities but have not resulted in cash receipts or payments during the years ended December 31, 2023, 2022 and 2021. Accordingly, the Company has excluded these non-cash activities from the Statutory Statements of Cash Flows for the years ended December 31, 2023, 2022 and 2021.

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Bond conversions and refinancing	\$ 1,460	\$ 1,177	\$ 729
Transfer of partnerships and limited liability companies to partnerships and limited liability companies	277	620	-
Change in market value of corporate owned life insurance asset	217	(46)	272
Stock conversions	202	13	107
Transfer of mortgage loans to bonds	132	-	-
Bonds transferred to partnerships and limited liability companies	122	441	-
Transfer of partnerships and limited liability companies to bonds	100	187	-
Transfer of mortgage loans to short-term investments	60	-	-
Transfer of stocks to partnerships and limited liability companies	38	-	-
Net investment income payment in-kind bonds	14	12	16
Accrued discount on mortgage loans	10	-	-
Transfer of partnerships and limited liability companies to stocks	3	-	-
Transfer of bonds to mortgage loans	-	626	-
Transfer of partnerships and limited liability companies to common stocks - subsidiaries and affiliates	-	227	-
Transfer of common stocks unaffiliated to common stocks - subsidiaries and affiliates	-	97	-
Transfer of mortgage loans to partnerships and limited liability companies	-	40	11
Deferred gain on real estate	-	16	-
Premium income recognized for group annuity contracts	-	-	1,237
Bonds received as consideration for group annuity contracts	-	-	(1,231)
Premium ceded in exchange for invested assets	-	-	(514)
Bonds transferred in exchange for premium	-	-	511
Surplus notes issued in exchange for bonds	-	-	233
Bonds received as consideration for surplus notes	-	-	(233)
Transfer of bonds to cash equivalent	-	-	150
Exchange of mortgage loans for other assets	-	-	18
Transfer of stocks to partnerships	-	-	4
Preferred stock transferred in exchange for premium ceded	-	-	3
Common stock received as consideration for group annuity contracts	-	-	(6)

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

16. Business risks, commitments and contingencies

a. Risks and uncertainties

The Company operates in a business environment subject to various risks and uncertainties. The principal risks include insurance and underwriting risks, investment and interest rate risks, currency exchange risk and credit risk. The combined impact of these risks could have a material, adverse effect on the Company's financial statements or result in operating losses in future periods. The Company employs the use of reinsurance, portfolio diversification, asset/liability management processes and other risk management techniques to mitigate the impact of these risks.

Insurance and underwriting risks

The Company prices its products based on estimated benefit payments reflecting assumptions with respect to mortality, morbidity, longevity, persistency, interest rates and other factors. If actual policy experience emerges that is significantly and adversely different from assumptions used in product pricing, the effect could be material to the profitability of the Company. For participating whole life products, the Company's dividends to policyholders primarily reflect the difference between actual investment, mortality, expense and persistency experience and the experience embedded in the whole life premiums and guaranteed elements. The Company also reinsures certain life insurance and other long-term care insurance policies to mitigate the impact of its underwriting risk.

Investment and interest rate risks

The fair value, cash flows and earnings of investments can be influenced by a variety of factors including changes in interest rates, credit spreads, equity markets, portfolio asset allocation and general economic conditions. The Company employs a rigorous asset/liability management process to help mitigate the economic impacts of various investment risks, in particular interest rate risk. By effectively matching the market sensitivity of assets with the liabilities they support, the impact of interest rate changes is addressed, on an economic basis, as the change in the value of the asset is offset by a corresponding change in the value of the supported liability. The Company uses derivatives, such as interest rate swaps and swaptions, as well as synthetic assets to reduce interest rate and duration imbalances determined in asset/liability analyses.

The levels of U.S. interest rates are influenced by U.S. monetary policies and by the relative attractiveness of U.S. markets to investors versus other global markets. As interest rates increase, certain debt securities may experience amortization or prepayment speeds that are slower than those assumed at purchase, impacting the expected maturity of these securities and the ability to reinvest the proceeds at the higher yields. Rising interest rates may also result in a decrease in the fair value of the investment portfolio. As interest rates decline, certain debt securities may experience accelerated amortization and prepayment speeds than what was assumed at purchase. During such periods, the Company is at risk of lower net investment income as it may not be able to reinvest the proceeds at comparable yields. Declining interest rates may also increase the fair value of the investment portfolio.

Interest rates also have an impact on the Company's products with guaranteed minimum payouts and on interest credited to account holders. As interest rates decrease, investment spreads may contract as crediting rates approach minimum guarantees, resulting in an increased liability.

In periods of increasing interest rates, policy loans, surrenders and withdrawals may increase as policyholders seek investments with higher perceived returns. This could result in cash outflows requiring the Company to sell invested assets at a time when the prices of those assets are adversely affected by the increase in market interest rates, which could cause the Company to realize investment losses.

Currency exchange risk

The Company has currency risk due to its non-U.S. dollar denominated investments and medium-term notes along with its indirect international operations. The Company mitigates a portion of its currency risk through the use of cross-currency swaps and forward contracts. Cross-currency swaps are used to minimize currency risk for certain non-U.S. dollar assets and liabilities through a pre-specified exchange of interest and principal. Forward contracts are used to hedge movements in exchange rates.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Credit and other market risks

The Company manages its investments to limit credit and other market risks by diversifying its portfolio among various security types and industry sectors as well as purchasing credit default swaps to transfer some of the risk.

Stressed conditions, volatility and disruptions in global capital markets or in particular markets or financial asset classes can have an adverse effect on the Company, in part because the Company has a large investment portfolio and assets supporting the Company's insurance liabilities are sensitive to changing market factors. Global market factors, including interest rates, credit spread, equity prices, real estate markets, foreign currency exchange rates, consumer spending, business investment, government spending, the volatility and strength of the capital markets, deflation and inflation, all affect the business and economic environment and, ultimately, the profitability of the Company's business. Disruptions in one market or asset class can also spread to other markets or asset classes. Upheavals in the financial markets can also affect the Company's business through their effects on general levels of economic activity, employment and customer behavior.

Real estate markets are monitored continuously with attention on regional differences in price performance, absorption trends and supply and demand fundamentals that can impact the rate of foreclosures and delinquencies. Public sector strengths and weaknesses, job growth and macro-economic issues are factors that are closely monitored to identify any impact on the Company's real estate related investments.

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

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

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

Asset-based fees calculated as a percentage of the separate account assets are a source of revenue to the Company. Gains and losses in the investment markets may result in corresponding increases and decreases in the Company's separate account assets and related revenue.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Market risk arises within the Company's employee benefit plans to the extent that the obligations of the plans are not fully matched by assets with determinable cash flows. Pension and postretirement obligations are subject to change due to fluctuations in the discount rates used to measure the liabilities as well as factors such as changes in inflation, salary increases and participants living longer. The risks are that such fluctuations could result in assets that are insufficient over time to cover the level of projected benefit obligations. In addition, increases in inflation and members living longer could increase the pension and postretirement obligations. Management determines the level of this risk using reports prepared by independent actuaries and takes action, where appropriate, in terms of setting investment strategy and determining contribution levels. In the event that the pension obligations arising under the Company's employee benefit plans exceed the assets set aside to meet the obligations, the Company may be required to make additional contributions or increase its level of contributions to these plans.

The long-term impact of the COVID-19 pandemic is dependent on numerous factors including, but not limited to, the length and severity of the pandemic, the efficacy and rate of vaccine adoption and therapeutics, the responses to the pandemic taken by governments and private sector businesses, and the impacts on MassMutual's policyholders, employees and counterparties. At its height, the pandemic led to significant economic disruption, including significant volatility in the U.S. and international markets, which had an adverse effect on MassMutual's business. The extent to which the COVID-19 pandemic continues to impact MassMutual's business will depend on future developments which are highly uncertain, including the emergence of future variants of COVID-19 and the efficacy of vaccines in the broader population (including with respect to future variants).

Political Uncertainties

Political events, domestically or internationally, may directly or indirectly trigger or exacerbate risks related to product offerings, profitability, or any of the risk factors described above. Whether those underlying risk factors are driven by geopolitics or not, the Company's dynamic approach to managing risks enables management to identify risks, internally and externally, develop mitigation plans, and respond to risks in an attempt to proactively reduce the potential impact of each underlying risk factor on the Company.

b. Leases

The Company leases office space and equipment in the normal course of business under various noncancelable operating lease agreements. Additionally, the Company, as lessee, has entered various sublease agreements with affiliates for office space, such as Barings. Total rental expense on net operating leases, recorded in general insurance expenses, was \$93 million for the year ended December 31, 2023 and \$91 million for the year ended December 31, 2022. Net operating leases are net of sublease receipts of \$5 million for the year ended December 31, 2023 and \$3 million for the year ended December 31, 2022.

For the years ended December 31, 2023 and December 31, 2022, the company has not entered into any sale-leaseback transactions with any unrelated parties.

Future minimum commitments for all lease obligations as of December 31, 2023 were as follows:

	Gross	Affiliated Subleases	Nonaffiliated Subleases	Net
	(In Millions)			
2024	\$ 85	\$ 2	\$ 4	\$ 79
2025	73	2	4	67
2026	58	2	4	52
2027	52	2	2	48
2028	48	1	2	45
Thereafter	304	-	7	297
Total	\$ 620	\$ 9	\$ 23	\$ 588

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

c. *Guaranty funds*

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

b. *Litigation and regulatory matters*

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

The Company evaluates the need for accruals of loss contingencies for each matter. When a liability for a matter is probable and can be estimated, the Company accrues an estimate of the loss offset by related insurance recoveries or other contributions, if any. An accrual may be subject to subsequent adjustment as a result of additional information and other developments. The resolution of matters is inherently difficult to predict, especially in the early stages of matter. Even if a loss is probable, due to many complex factors, such as speed of discovery and the timing of court decisions or rulings, a loss or range of loss may not be reasonably estimated until the later stages of the matter. For matters where a loss is material and it is either probable or reasonably possible then it is disclosed. For matters where a loss may be reasonably possible, but not probable, or is probable but not reasonably estimated, no accrual is established, but the matter, if material, is disclosed.

e. *Commitments*

In the normal course of business, the Company provides specified guarantees and funding to MMHLLC and certain of its subsidiaries. As of December 31, 2023, the Company had approximately \$800 million of these unsecured funding commitments to its subsidiaries and \$261 million as of December 31, 2022. The unsecured commitments are included in private placements in the table below. As of December 31, 2023 and 2022, the Company had not funded, nor had an outstanding balance due on, these commitments.

In the normal course of business, the Company enters into letter of credit arrangements. The Company had outstanding letter of credit arrangements of approximately \$77 million as of December 31, 2023 and approximately \$77 million as of December 31, 2022. As of December 31, 2023 and 2022, the Company did not have any funding requests attributable to these letter of credit arrangements.

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.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

As of December 31, 2023, the Company had the following outstanding commitments:

	2024	2025	2026	2027	2028	Thereafter	Total
	(In Millions)						
Private placements	\$ 3,803	\$ 1,770	\$ 2,620	\$ 1,236	\$ 373	\$ 727	\$ 10,529
Mortgage loans	402	361	588	63	80	77	1,571
Partnerships and LLC	1,703	1,055	951	961	336	1,226	6,232
LIHTCs (including equity contributions)	-	-	-	-	1	42	43
Total	\$ 5,908	\$ 3,186	\$ 4,159	\$ 2,260	\$ 790	\$ 2,072	\$ 18,375

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, 2023 and 2022, the Company had no outstanding obligations attributable to these commitments.

f. Guarantees

In the normal course of business the Company enters into guarantees related to employee and retirement benefits, the maintenance of subsidiary regulatory capital, surplus levels and liquidity sufficient to meet certain obligations, and other property lease arrangements. If the Company were to recognize a liability, the financial statement impact would be to recognize either an expense or an investment in a subsidiary, controlled, or affiliated entity. The Company has no expectations for recoveries from third parties should these guarantees be triggered. As of December 31, 2023 and 2022, the Company had no outstanding obligations to any obligor attributable to these guarantees.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following details contingent guarantees that are made on behalf of the Company's subsidiaries and affiliates as of December 31, 2023.

Type of guarantee	Nature of guarantee (including term) and events and circumstances that would require the guarantor to perform under guarantee	Carrying amount of liability	Maximum potential amount of future payments (undiscounted) required under the guarantee
Employee and Retirement Benefits	The Company guarantees the payment of certain employee and retirement benefits for its wholly-owned subsidiary Barings, if the subsidiary is unable to pay.	-	The liabilities for these plans of \$564 million have been recorded on the subsidiaries' books and represent the Company's maximum obligation.
Capital and Surplus Support of Subsidiaries	Certain guarantees of the Company provide for the maintenance of a subsidiary's regulatory capital, surplus levels and liquidity sufficient to meet certain obligations. These unlimited guarantees are made on behalf of certain wholly-owned subsidiaries. (C.M. Life and MML Bay State Life).	-	These guarantees are not limited and cannot be estimated.
Other Property Lease Arrangements	The Company guarantees the payment of various lease obligations on behalf of its subsidiaries and affiliates.	-	The future maximum potential obligations are immaterial to the Company.
Real Estate Development Guarantee	The construction lender for an office building in London, UK required a cost overrun guarantee equivalent to 8% of the total budgeted cost (£6 million). The Company will only be responsible for its pro rata share of any cost overruns with a maximum additional commitment of approximately £3 million.	-	£9 million
Secure Capital for Variable Annuity Separate Accounts	The Company guarantees the capital contributions required to be made by a variable annuity separate account contract holder in the event the contract holder fails to payoff a subscription line utilized to deploy capital for the separate account.	-	\$135 million with the right to increase the line to \$175 million.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

17. Related party transactions

MassMutual has management and service contracts and cost-sharing arrangements with various subsidiaries and affiliates where MassMutual, for a fee, will furnish a subsidiary or affiliate, as required, operating facilities, human resources, computer software development and managerial services.

MassMutual has agreements with its subsidiaries and affiliates, including Insurance Road LLC, Copper Hill LLC, MML Investment Advisers LLC, The MassMutual Trust Company, FSB, MassMutual International LLC and Baring International Investment Limited, where MassMutual receives revenue for certain recordkeeping and other services that MassMutual provides to customers who select, as investment options, mutual funds managed by these affiliates.

MassMutual has agreements with its subsidiaries, Barings, MML Investment Advisers LLC and MassMutual Intellectual Property LLC, which provide investment advisory services and licensing agreements to MassMutual.

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

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Fee income:			
Management and service contracts and cost-sharing arrangements	\$ 425	\$ 366	\$ 364
Investment advisory income	16	18	23
Recordkeeping and other services	11	16	20
Fee expense:			
Investment advisory services	221	236	240
Royalty and licensing fees	84	71	58

The Company reported amounts due from subsidiaries and affiliates of \$132 million as of December 31, 2023 and \$103 million as of December 31, 2022. The Company reported amounts due to subsidiaries and affiliates of \$39 million as of December 31, 2023 and \$33 million as of December 31, 2022. Terms generally require settlement of these amounts within 30 to 90 days.

The Company held debt issued by MMHLLC that amounted to \$2,144 million as of December 31, 2023 and \$2,315 million as of December 31, 2022. The Company recorded interest income on MMHLLC debt of \$125 million in 2023 and \$94 million in 2022. The notes maturing as of June 2022 were refinanced at 5.00% for \$257 million. The notes maturing as of December 15, 2023 were refinanced at 5.75% for \$380 million. A new note was issued on December 22, 2023 with a maturity date of December 22, 2030 at 5.90% for \$375 million.

As of December 31, 2023, MMIH and C.M. Life, together, provided financing of \$5,500 million, \$5,253 million and \$247 million respectively, for MMAF that can be used to finance ongoing asset purchases. MMIH provided financing of \$5,253 million as of December 31, 2023 and \$5,253 million as of December 31, 2022. During 2022, MMAF borrowed \$2,244 million and repaid \$1,123 million under the credit facility. During 2023, MMAF borrowed \$2,271 million and repaid \$2,203 million under the credit facility. Outstanding borrowings under the facility were \$4,824 million as of December 31, 2023 and \$3,703 million as of December 31, 2022. Interest for these borrowings was \$131 million for the year ended December 31, 2023 and \$86 million for the year ended December 31, 2022. The floating rate borrowings bear interest at a spread over the 30 day LIBOR. The fixed rate borrowings bear an interest at a spread over average life Treasuries.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Together, MassMutual and C.M. Life, provide a credit facility to Jefferies Finance, LLC whereby Jefferies Finance, LLC (Jefferies) borrows cash through short-term approved financings to fund the purchase of loans for securitization. During 2023, Jefferies borrowed \$79 million and repaid \$79 million under the credit facility. During 2022, Jefferies borrowed \$225 million and repaid \$225 million under the credit facility. As of December 31, 2023, there were no outstanding borrowings under this facility. All outstanding interest due under the facility, as of December 31, 2023, had been paid. The interest of this facility is calculated based on a full pass through of interest accrued on the underlying loans purchased.

In 2023, MassMutual made capital contributions of \$13 million to HavenTech Asia.

In 2023, MassMutual made capital contributions of \$116 million to ITPS Holdings LLC.

In 2023, MassMutual made capital contributions of \$88 million to MassMutual Mortgage Lending LLC, \$50 million to MMIH Bond Holdings LLC, and \$13 million to MML CM LLC.

In 2023, MassMutual purchased \$531 million of private placement corporate assets from C.M. Life.

In 2022, Insurance Road LLC paid \$90 million in dividends and a \$123 million return of capital to MassMutual.

In 2022, MassMutual made capital contributions of \$17 million to MassMutual International LLC.

In 2022, MassMutual made capital contributions of \$35 million to ITPS Holding LLC.

In 2022, MassMutual transferred its ownership in Martello Re to MMHLLC of (\$58) million.

In 2022, MassMutual transferred its ownership of partnerships and LLCs to MMHLLC of \$194 million.

In 2022, MassMutual made contributions to DPI Acres Capital for \$154 million.

In 2022, MassMutual made contributions of \$27 million to downstream subsidiaries.

The Company has reinsurance agreements with its subsidiary, C.M. Life, and its indirect subsidiary, MML Bay State, including stop-loss, Modco and yearly renewable term agreements on life insurance and annuity products. The Company also has coinsurance agreements with C.M. Life where the Company assumes substantially all of the premium on certain universal life policies.

Effective December 31, 2020, MassMutual provides C.M. Life a stop-loss coverage to transfer a specific interest rate risk. All Odyssey fixed-deferred annuity contracts issued by C.M. Life are covered under this agreement. C.M. Life pays an annual premium to MassMutual. If the coverage is triggered, there will be a settlement at year end from MassMutual to C.M. Life. The maximum total liability of MassMutual under the agreement is \$200 million over seven years.

As of December 31, 2023, the net reinsurance amounts due to C.M. Life and MML Bay State were \$29 million and as of December 31, 2022, the net reinsurance amounts due to C.M. Life and MML Bay State were \$53 million. These outstanding balances are due and payable with terms ranging from monthly to annually, depending on the agreement in effect.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following table summarizes the reinsurance transactions for these reinsurance agreements:

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Premium assumed	\$ 43	\$ 44	\$ 49
Modco adjustments, included in fees and other income	24	12	11
Expense allowance on reinsurance assumed, included in commissions	(13)	(13)	(13)
Policyholders' benefits	(108)	(88)	(144)
Experience refunds (paid) received	1	(1)	-
Accrual for stop-loss agreement	-	(18)	-

The Company currently has one longevity swap reinsurance agreement with Rothesay Life Plc on certain inforce annuity products. Under this agreement, the Company is the reinsurer and Rothesay Life Plc is the cedent.

The following table summarizes the related party transactions between the Company and Rothesay Life Plc:

	Years Ended December 31,		
	2023	2022	2021
	(In Millions)		
Premium assumed	\$ (248)	\$ (203)	\$ (165)
Policyholders' benefits	235	192	157

For further information on common stocks - subsidiaries and affiliates, refer to *Note 5c. "Common stocks - subsidiaries and affiliates."*

In the normal course of business, the Company provides specified guarantees and funding to MMHLLC and certain of its subsidiaries. Refer to *Note 16e. "Commitments"* for information on the Company's accounting policies regarding these related party commitments and *Note 16f. "Guarantees"* for information on the guarantees.

18. *Subsidiaries and affiliated companies*

A summary of ownership and relationship of the Company and its subsidiaries and affiliated companies as of December 31, 2023 is illustrated below. Subsidiaries are wholly owned, except as noted.

Subsidiaries of MassMutual

C.M. Life
Berkshire Way LLC
MML Special Situations Investor LLC
Timberland Forest Holding LLC – 37% (remaining 63% owned by MassMutual Trad Private Equity LLC)
MSP – SC, LLC
Insurance Road LLC
MM Copper Hill Road LLC
Jefferies Finance LLC– 50% (remaining 50% owned by Jefferies Group, Inc.)
MML Distributors LLC – 99% (remaining 1% owned by MassMutual Holding LLC)
MML Investment Advisers, LLC
Pioneers Gate LLC
MML Strategic Distributors, LLC
The MassMutual Trust Company, FSB

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

MassMutual Mortgage Lending LLC
MML Private Placement Investment Company I, LLC
MML Private Equity Fund Investor LLC
MM Private Equity Intercontinental LLC
MassMutual Holding LLC
MassMutual Investment Holding, LLC
MassMutual International, LLC
MML Mezzanine Investor II, LLC
MML Mezzanine Investor III, LLC
MassMutual External Benefits Group LLC
EM Opportunities LLC
MassMutual MCAM Insurance Company, Inc.
CML Global Capabilities
MM Global Capabilities I LLC
MM Global Capabilities II LLC
MM Global Capabilities III LLC
MML CM LLC
Glidepath Holdings Inc
ITPS Holding LLC
MM/Barings Mutifamily TEBS 2020 LLC
MM Direct Private Investments Holding LLC
MassMutual Ventures Europe/APAC I GP, LLC
MassMutual Ventures US IV, GP, LLC
DPI-ACRES Capital LLC
Amherst Long Term Holdings, LLC

Subsidiaries of C.M. Life Insurance Company

MML Bay State Life Insurance Company
CML Mezzanine Investor III, LLC
CML Special Situations Investor LLC

Subsidiaries of MML Bay State Life Insurance Company

(No subsidiaries)

Subsidiaries of Timberland Forest Holding LLC

Lyne Adirondack Forest Company, LLC

Subsidiaries of Insurance Road LLC

MassMutual Trad Private Equity LLC
MassMutual Intellectual Property LLC
Trad Investments LLC

MML Investment Advisers, LLC

(No Subsidiaries)

Pioneers Gate LLC

(No subsidiaries)

Subsidiaries of MassMutual Holding LLC

Fern Street LLC
Low Carbon Energy Holding
Haven Life Insurance Agency, LLC
MassMutual Assignment Company
MassMutual Capital Partners LLC
MassMutual Ventures Holding LLC

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

MM Rothesay Holdco US LLC
MML Investors Services, LLC
LifeScore Labs, LLC
Sleeper Street LLC
MM Asset Management Holding LLC
MM Catalyst Fund LLC
Aland Royalty Holdings LP
GASL Holdings LLC
Barings Asset-Based Income Fund (US) LP
Babson Capital Global Special Situation Credit Fund 2
Barings Global Real Assets Fund LP
Barings Global Special Situations Credit Fund 3
Barings North American Private Loan Fund LP
Marco Hotel LLC
HB Naples Golf Owner LLC
RB Apartments LLC

Subsidiaries of MassMutual International LLC

MassMutual Solutions LLC
Yunfeng Financial Group Limited
MassMutual Asia Limited (SPV)

Subsidiaries of CML CM LLC

Blueprint Income LLC
Flourish Digital Assets LLC
Flourish Financial LLC
Flourish Holding Company LLC
Flourish Technologies LLC

Subsidiaries of Glidepath Holdings Inc

Great American Life Insurance Company
AAG Insurance Agency, LLC
Annuity Investor Life Insurance Company
Great American Advisors, LLC
Manhattan National Holding Corporation

Subsidiaries of MassMutual Ventures Holding LLC

MassMutual Ventures US I LLC
MassMutual Ventures US II LLC
MassMutual Ventures US III LLC
MassMutual Ventures US IV LLC
MassMutual Ventures UK LLC
MassMutual Ventures Southeast Asia I LLC
MassMutual Ventures Southeast Asia II LLC
MassMutual Ventures Management LLC
MassMutual Ventures SEA Management Private Limited (an indirect subsidiary of Subsidiary of MassMutual Ventures Holding LLC)
Athens Fund Management LLC
Open Alternatives LLC

MML Investors Services, LLC

MMLISI Financial Alliances, LLC
MML Insurance agency, LLC

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

Subsidiaries of Barings LLC (a subsidiary of MM Asset Management Holding LLC)

Barings Finance LLC
Barings Securities LLC
Barings Guernsey Limited
Barings Real Estate Acquisitions LLC
Barings Asset Management (Asia) Holdings Limited
Barings Multifamily Capital Holdings LLC
Barings Australia Real Estate Holdings Pty Ltd

Subsidiaries of Baring Asset Management Limited (an indirect subsidiary of MassMutual Baring Holding LLC)

Baring International Investment Limited
Baring International Investment Management Holdings Limited
Baring Fund Managers Limited
Baring Investment Services Limited
Barings Global Advisers Limited
Barings European Core Property Fund GP Sàrl
Barings BME GP Sàrl
Barings Core Fund Feeder I GP S.à.r.l.
Barings Investment Fund (LUX) GP S.à.r.l.
Barings GPC GP S.à.r.l.
Barings Umbrella Fund (LUX) GP S.à.r.l.
GPLF4(S) GP S.à.r.l.
PREIF Holdings Limited Partnership

Subsidiaries of Baring International Investment Limited

(No subsidiaries)

Subsidiaries of MassMutual Investment Holding

MML Management Corporation
MassMutual Asset Finance LLC
MMIH Bond Holdings LLC

Subsidiaries of MML Management Corporation

MassMutual Holding MSC, Inc.
MassMutual International Holding MSC, Inc.

Subsidiaries of MassMutual Asset Finance LLC

MMAF Equipment Finance LLC 2014-A
MMAF Equipment Finance LLC 2017-A
MMAF Equipment Finance LLC 2017-B
MMAF Equipment Finance LLC 2018-A
MMAF Equipment Finance LLC 2019-A
MMAF Equipment Finance LLC 2019-B
MMAF Equipment Finance LLC 2020-A
MMAF Equipment Finance LLC 2020-B
MMAF Equipment Finance LLC 2021-A
MMAF Equipment Finance LLC 2022-A
MMAF Equipment Finance LLC 2022-B
Rozier LLC

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
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Information regarding filings of Subsidiaries and Controlled Affiliates

The following presents certain information regarding the Company's valuation filings for controlled affiliates of the Company:

	CUSIP	As of December 31, 2023				2022 Approved Valuation	Filing Code	Valuation Method Disallowed?
		Gross Value	Non- admitted	Admitted	Latest Filing			
		(\$ in Millions)						
MassMutual Holding LLC	57543#-11-8	\$ 17,592	\$ -	\$ 17,592	8/30/2023	\$ 17,227	Sub-2	No
The MassMutual Trust Co, FSB	57631@-10-5	25	-	25	6/30/2023	25	Sub-2	No
MM Investment Holding	G5695@10-8	687	-	687	7/12/2023	659	Sub-2	No
MM Investment Holding	G5695@11-6	1,162	-	1,162	7/12/2023	1,071	Sub-2	No
Glidepath Holdings Inc	37930@-10-5	3,643	-	3,643	11/11/2022	3,475	Sub-2	No
Aggregate Total		<u>\$ 23,109</u>	<u>\$ -</u>	<u>\$ 23,109</u>		<u>\$ 22,457</u>		

19. Subsequent events

Management of the Company has evaluated subsequent events through February 27, 2024, the date the financial statements were available to be issued to state regulators and subsequently on the Company's website. No events have occurred subsequent to the date of the financial statements, except for:

On January 17, 2024, MassMutual issued a \$650 million funding agreement with a 4.85% fixed rate and a 5-year maturity.

On January 29, 2024, MassMutual issued a \$300 million funding agreement with a floating rate based on the Secured Overnight Financing Rate and a 3-year maturity.

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

20. Impairment listing for loan-backed and structured securities

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

Period Ended	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
December 31, 2023	\$ 53,672,524	\$ -	\$ 53,672,524	\$ 51,118,891	\$ (2,553,633)	\$ 51,118,891	\$ 42,903,097
September 30, 2023	24,928,010	-	24,928,010	24,065,666	(862,344)	24,065,666	21,743,474
June 30, 2023	16,432,523	-	16,432,523	15,955,963	(476,560)	15,955,963	15,431,923
March 31, 2023	56,797,193	-	56,797,193	45,999,577	(10,797,616)	45,999,577	39,477,567
December 31, 2022	47,152,655	-	47,152,655	42,630,344	(4,522,311)	42,630,344	35,962,545
September 30, 2022	23,315,048	-	23,315,048	22,016,070	(1,298,978)	22,016,070	19,284,696
June 30, 2022	17,306,639	-	17,306,639	15,826,391	(1,480,248)	15,826,391	13,534,918
March 31, 2022	30,135,997	-	30,135,997	23,857,778	(6,278,218)	23,857,778	23,674,371
December 31, 2021	6,658,614	-	6,658,615	6,490,508	(168,107)	6,490,508	6,369,198
September 30, 2021	4,061,382	-	4,061,382	3,955,723	(105,659)	3,955,723	3,595,213
June 30, 2021	11,352,643	-	11,352,642	10,386,581	(966,063)	10,386,581	11,323,900
March 31, 2021	11,247,256	-	11,247,257	5,074,493	(6,172,764)	5,074,493	5,237,174
December 31, 2020	16,071,907	-	16,071,907	14,674,300	(1,397,607)	14,674,300	15,473,517
September 30, 2020	21,375,383	-	21,375,383	19,160,250	(2,215,134)	19,160,250	18,862,027
June 30, 2020	10,180,123	-	10,180,123	8,992,610	(1,187,513)	8,992,610	9,249,851
March 31, 2020	24,799,788	-	24,799,788	20,197,344	(4,602,443)	20,197,344	24,683,947
December 31, 2019	3,992,400	-	3,992,400	3,539,281	(453,119)	3,539,281	3,439,138
September 30, 2019	16,909,029	-	16,909,029	15,191,932	(1,717,097)	15,191,932	14,639,756
June 30, 2019	6,980,030	-	6,980,030	6,187,029	(793,001)	6,187,029	7,133,620
March 31, 2019	7,791,000	-	7,791,000	7,634,637	(156,363)	7,634,637	7,683,021
December 31, 2018	4,550,173	-	4,550,173	3,815,559	(734,614)	3,815,559	4,014,514
September 30, 2018	4,320,826	-	4,320,826	3,663,181	(657,645)	3,663,181	3,687,297
June 30, 2018	634,235	-	634,235	279,221	(355,014)	279,221	386,752
March 31, 2018	645,690	-	645,690	488,181	(157,509)	488,181	448,494
December 31, 2017	3,949,513	-	3,949,513	1,958,759	(1,990,754)	1,958,759	2,023,952
September 30, 2017	4,436,542	-	4,436,542	876,942	(3,559,600)	876,942	4,647,683
June 30, 2017	40,538,551	-	40,538,551	39,808,956	(729,595)	39,808,956	60,990,732
March 31, 2017	41,788,380	-	41,788,380	41,391,889	(396,491)	41,391,889	56,156,936
December 31, 2016	42,175,938	-	42,175,938	42,045,721	(130,217)	42,045,721	54,619,477
September 30, 2016	44,266,478	-	44,266,478	41,890,535	(2,375,942)	41,890,535	61,300,066
June 30, 2016	49,097,217	-	49,097,217	48,202,703	(894,514)	48,202,703	63,207,410
March 31, 2016	57,985,071	-	57,985,071	55,783,979	(2,201,092)	55,783,979	70,578,397
December 31, 2015	4,881,394	-	4,881,394	4,783,194	(98,200)	4,783,194	4,728,736
September 30, 2015	50,531,382	-	50,531,382	45,665,859	(4,865,524)	45,665,859	58,523,652
June 30, 2015	66,924,927	-	66,924,927	65,240,585	(1,684,341)	65,240,585	72,953,475
March 31, 2015	17,856,447	-	17,856,447	17,681,510	(174,937)	17,681,510	17,553,999
December 31, 2014	69,225,743	-	69,225,743	68,301,291	(924,452)	68,301,291	79,410,553
September 30, 2014	645,721	-	645,721	604,437	(41,284)	604,437	627,381
June 30, 2014	57,012,606	-	57,012,606	55,422,168	(1,590,438)	55,422,168	75,253,388
March 31, 2014	91,702,041	-	91,702,041	80,744,074	(10,957,967)	80,744,074	97,672,071
December 31, 2013	113,707,951	-	113,707,951	108,815,640	(4,892,311)	108,815,640	111,783,052
September 30, 2013	81,945,730	-	81,945,730	80,589,482	(1,356,248)	80,589,482	77,049,314
June 30, 2013	147,215,936	-	147,215,936	142,140,572	(5,075,365)	142,140,572	130,973,023
March 31, 2013	194,772,025	-	194,772,025	188,372,089	(6,399,936)	188,372,089	176,678,910
December 31, 2012	378,096,660	-	378,096,660	366,323,110	(11,773,550)	366,323,110	333,086,073
September 30, 2012	816,573,456	-	816,573,456	788,350,823	(28,222,633)	788,350,823	697,683,289
June 30, 2012	912,025,937	-	912,025,937	890,494,221	(21,531,716)	890,494,221	708,872,106
March 31, 2012	1,095,018,529	-	1,095,018,529	1,058,132,041	(36,886,488)	1,058,132,041	841,095,013
December 31, 2011	1,090,904,993	-	1,090,904,993	1,056,761,288	(34,143,705)	1,056,761,288	754,310,838
September 30, 2011	762,320,632	-	762,320,632	738,510,048	(23,810,584)	738,510,048	546,494,232

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
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June 30, 2011	1,130,732,656	-	1,130,732,656	1,078,535,670	(52,196,986)	1,078,535,670	839,143,290
March 31, 2011	1,097,705,351	-	1,097,705,351	1,068,852,204	(28,853,147)	1,068,852,204	816,688,348
December 31, 2010	968,742,508	-	968,742,508	950,111,417	(18,631,091)	950,111,417	708,895,637
September 30, 2010	915,728,030	-	915,728,030	889,896,058	(25,831,972)	889,896,058	673,462,493
June 30, 2010	1,362,887,892	-	1,362,887,892	1,335,628,212	(27,259,681)	1,335,628,212	975,241,506
March 31, 2010	1,471,905,696	-	1,471,905,696	1,391,337,543	(80,568,153)	1,391,337,543	1,015,645,802
December 31, 2009	1,349,124,214	-	1,349,124,214	1,290,817,168	(58,307,047)	1,290,817,168	852,088,739
September 30, 2009	2,953,442,689	(106,853,708)	2,846,588,981	2,700,948,264	(145,640,717)	2,700,948,264	1,692,409,640
Totals		\$ (106,853,708)			\$ (694,106,238)		

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2023:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
040104RV5	\$ 2,347,899	\$ -	\$ 2,347,899	\$ 2,282,725	\$ (65,174)	\$ 2,282,725	\$ 1,302,564
040104TF8	54,340	-	54,340	52,649	(1,691)	52,649	32,844
040104TG6	691,003	-	691,003	659,349	(31,654)	659,349	425,196
04012XAC9	181,150	-	181,150	170,182	(10,968)	170,182	110,338
12479DAC2	1,630,508	-	1,630,508	1,585,965	(44,543)	1,585,965	1,297,291
1248MGAJ3	58,623	-	58,623	57,506	(1,117)	57,506	34,138
17311YAC7	1,187,982	-	1,187,982	1,153,900	(34,082)	1,153,900	1,128,264
30247DAD3	1,217,263	-	1,217,263	1,201,793	(15,470)	1,201,793	492,353
35729RAE6	3,593,051	-	3,593,051	3,420,695	(172,356)	3,420,695	3,107,574
40431KAE0	1,990,110	-	1,990,110	1,933,246	(56,864)	1,933,246	2,021,305
45071KDD3	564,498	-	564,498	527,624	(36,874)	527,624	361,094
46629NAC7	44,849	-	44,849	43,647	(1,202)	43,647	26,205
46630KAA4	125,971	-	125,971	124,577	(1,394)	124,577	143,209
61749BAB9	80,209	-	80,209	75,699	(4,510)	75,699	62,492
61750FAE0	545,703	-	545,703	520,383	(25,320)	520,383	363,586
617526AE8	486,709	-	486,709	455,151	(31,558)	455,151	187,873
86359DXD4	453,194	-	453,194	443,928	(9,266)	443,928	154,120
073882AC6	71,557	-	71,557	48,705	(22,852)	48,705	70,671
12668ABP9	129,890	-	129,890	116,635	(13,255)	116,635	133,533
22943HAD8	3,271,684	-	3,271,684	3,247,368	(24,316)	3,247,368	1,868,818
251513AQ0	40,724	-	40,724	38,804	(1,920)	38,804	36,075
45254TRX4	72,218	-	72,218	71,387	(831)	71,387	56,387
45254TSM7	548,532	-	548,532	528,758	(19,774)	528,758	461,568
45660LAU3	56,496	-	56,496	52,294	(4,202)	52,294	56,783
45660LYW3	859,170	-	859,170	822,796	(36,374)	822,796	663,220
466247XE8	664,779	-	664,779	659,135	(5,644)	659,135	476,466
59020UW43	62,573	-	62,573	53,844	(8,729)	53,844	62,448
61915RBZ8	278,208	-	278,208	277,681	(527)	277,681	147,160
761118FM5	1,510,955	-	1,510,955	1,466,742	(44,213)	1,466,742	1,474,675
761118RJ9	128,234	-	128,234	127,627	(607)	127,627	62,725
85554NAG5	74,686	-	74,686	64,953	(9,733)	64,953	71,686
86358HHX0	174,701	-	174,701	164,900	(9,801)	164,900	128,481
86359BLQ2	695,503	-	695,503	655,372	(40,131)	655,372	471,720
92978EAA2	143,827	-	143,827	140,068	(3,759)	140,068	69,546
41161PTP8	222,917	-	222,917	220,268	(2,649)	220,268	158,889
41161PWB5	610,727	-	610,727	606,127	(4,600)	606,127	558,552
45660N5H4	1,863,029	-	1,863,029	1,822,939	(40,090)	1,822,939	1,020,735
45660NT88	20,836	-	20,836	20,337	(499)	20,337	12,881
576433H33	1,161,358	-	1,161,358	989,170	(172,188)	989,170	735,308
61915RBB1	2,021,487	-	2,021,487	2,020,812	(675)	2,020,812	1,337,686
86360UAF3	1,108,924	-	1,108,924	1,088,747	(20,177)	1,088,747	706,779
05949CCB0	31,358	-	31,358	30,629	(729)	30,629	32,023

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

17309FAE8	54,306	-	54,306	54,227	(79)	54,227	72,467
362341VU0	1,364,188	-	1,364,188	1,354,304	(9,884)	1,354,304	1,273,386
36298XAA0	5,896,550	-	5,896,550	5,835,572	(60,978)	5,835,572	4,308,340
576433NH5	314,175	-	314,175	303,311	(10,864)	303,311	189,068
57645LAA2	10,260,489	-	10,260,489	9,150,641	(1,109,848)	9,150,641	11,015,616
86359DMC8	4,340,486	-	4,340,486	4,016,353	(324,133)	4,016,353	3,563,716
86359DME4	364,895	-	364,895	359,366	(5,529)	359,366	355,243
Totals	\$ 53,672,524	\$ -	\$ 53,672,524	\$ 51,118,891	\$ (2,553,633)	\$ 51,118,891	\$ 42,903,097

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2023:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
05535DCF9	\$ 1,782,860	\$ -	\$ 1,782,860	\$ 1,774,615	\$ (8,245)	\$ 1,774,615	\$ 1,615,108
1248MGJ3	42,122	-	42,122	40,755	(1,367)	40,755	34,109
17311YAC7	1,214,183	-	1,214,183	1,173,580	(40,603)	1,173,580	1,158,277
30247DAD3	544,986	-	544,986	530,143	(14,843)	530,143	485,430
40431KAE0	2,020,232	-	2,020,232	1,964,115	(56,117)	1,964,115	1,941,678
46629NAC7	33,121	-	33,121	32,454	(667)	32,454	26,826
46630KAA4	152,848	-	152,848	149,286	(3,562)	149,286	140,157
57643LMP8	664,369	-	664,369	615,398	(48,971)	615,398	616,435
590212AB2	33,970	-	33,970	29,921	(4,049)	29,921	33,420
86359DXD4	169,272	-	169,272	159,443	(9,829)	159,443	163,801
86363HAB8	33,650	-	33,650	32,774	(876)	32,774	29,320
93934XAB9	123,880	-	123,880	115,382	(8,498)	115,382	121,783
05535DAN4	674,819	-	674,819	518,140	(156,679)	518,140	538,849
12667FYS8	83,749	-	83,749	70,404	(13,345)	70,404	83,180
12667GKG7	44,892	-	44,892	43,316	(1,576)	43,316	45,430
22943HAD8	3,333,227	-	3,333,227	3,209,290	(123,937)	3,209,290	1,862,665
32053LAA0	18,494	-	18,494	18,440	(54)	18,440	17,268
43739EAP2	1,209,064	-	1,209,064	1,182,999	(26,065)	1,182,999	1,133,684
45254TSM7	541,921	-	541,921	538,498	(3,423)	538,498	461,187
45660LYW3	775,781	-	775,781	720,142	(55,639)	720,142	694,930
466247XE8	565,725	-	565,725	560,689	(5,036)	560,689	492,033
61749LAN1	101,590	-	101,590	90,612	(10,978)	90,612	106,962
61915RBZ8	164,901	-	164,901	163,993	(908)	163,993	148,770
65535VRK6	471,315	-	471,315	442,770	(28,545)	442,770	467,415
761118RJ9	89,235	-	89,235	81,669	(7,566)	81,669	67,865
86358HHX0	168,641	-	168,641	166,229	(2,412)	166,229	118,809
86359A6A6	484,213	-	484,213	466,106	(18,107)	466,106	432,201
92978EAA2	80,092	-	80,092	77,179	(2,913)	77,179	72,870
126694YM4	579,079	-	579,079	572,556	(6,523)	572,556	496,668
41161PTP8	204,192	-	204,192	176,002	(28,190)	176,002	158,045
41161PWB5	670,938	-	670,938	662,621	(8,317)	662,621	557,761
61915RBB1	1,481,939	-	1,481,939	1,476,700	(5,239)	1,476,700	1,345,239
17309FAE8	73,197	-	73,197	54,698	(18,499)	54,698	75,336
362341VU0	1,378,634	-	1,378,634	1,378,467	(167)	1,378,467	1,232,954
36298XAA0	4,569,319	-	4,569,319	4,451,723	(117,596)	4,451,723	4,338,427
576433NH5	347,560	-	347,560	324,557	(23,003)	324,557	428,582
Totals	\$ 24,928,010	\$ -	\$ 24,928,010	\$ 24,065,666	\$ (862,344)	\$ 24,065,666	\$ 21,743,474

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2023:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
00442FAB8	\$ 50,571	\$ -	\$ 50,571	\$ 38,681	\$ (11,890)	\$ 38,681	\$ 8,265
040104RV5	1,421,615	-	1,421,615	1,379,721	(41,894)	1,379,721	1,316,932
1248MGJ3	42,545	-	42,545	42,165	(380)	42,165	34,889
17311YAC7	1,241,873	-	1,241,873	1,206,602	(35,271)	1,206,602	1,232,111
40431KAE0	2,053,478	-	2,053,478	2,006,843	(46,635)	2,006,843	2,030,117
45071KDD3	360,529	-	360,529	358,225	(2,304)	358,225	357,570
61750FAE0	396,971	-	396,971	394,270	(2,701)	394,270	358,577
84752CAE7	555,369	-	555,369	510,004	(45,365)	510,004	679,671
86359DXD4	182,513	-	182,513	169,184	(13,329)	169,184	170,546
92926SAB2	385	-	385	380	(5)	380	379
12667FYL3	212,185	-	212,185	199,941	(12,244)	199,941	201,624
12669FKR3	40,116	-	40,116	37,606	(2,510)	37,606	37,952
18974BAA7	131,289	-	131,289	130,311	(978)	130,311	133,783
18974BAN9	67,323	-	67,323	64,834	(2,489)	64,834	69,970
22540VG71	35,173	-	35,173	35,094	(79)	35,094	35,963
23321P6A1	1,405,020	-	1,405,020	1,371,044	(33,976)	1,371,044	1,329,368
32053LAA0	18,926	-	18,926	18,853	(73)	18,853	18,262
45660LAU3	69,258	-	69,258	65,015	(4,243)	65,015	67,725
466247XE8	578,949	-	578,949	575,151	(3,798)	575,151	499,997
525221AJ6	502,913	-	502,913	502,636	(277)	502,636	524,046
61915RBZ8	173,679	-	173,679	173,638	(41)	173,638	155,279
86358HHX0	176,678	-	176,678	173,936	(2,742)	173,936	129,387
92978EAA2	80,634	-	80,634	80,479	(155)	80,479	72,910
93935PAH2	112,081	-	112,081	105,729	(6,352)	105,729	109,259
05946XYP2	267,693	-	267,693	266,462	(1,231)	266,462	225,954
86360UAF3	977,832	-	977,832	929,807	(48,025)	929,807	761,473
92922FWU8	357,222	-	357,222	355,654	(1,568)	355,654	335,837
12669GTE1	4,194	-	4,194	3,937	(257)	3,937	4,201
32051DCJ9	41,478	-	41,478	41,458	(20)	41,458	39,754
36298XAA0	4,842,551	-	4,842,551	4,688,750	(153,801)	4,688,750	4,460,917
92922FBW7	31,480	-	31,480	29,553	(1,927)	29,553	29,205
Totals	\$ 16,432,523	\$ -	\$ 16,432,523	\$ 15,955,963	\$ (476,560)	\$ 15,955,963	\$ 15,431,923

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2023:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
12624QAC7	\$ 3,512,422	\$ -	\$ 3,512,422	\$ 3,120,715	\$ (391,707)	\$ 3,120,715	\$ 1,664,875
12624SAE9	2,546,182	-	2,546,182	2,252,873	(293,309)	2,252,873	672,000
36192RAL6	2,950,000	-	2,950,000	1,475,000	(1,475,000)	1,475,000	527,313
040104RV5	1,466,218	-	1,466,218	1,404,587	(61,631)	1,404,587	1,357,561
040104TF8	44,673	-	44,673	40,179	(4,494)	40,179	34,156
040104TG6	471,373	-	471,373	395,907	(75,466)	395,907	442,138
04012XAC9	136,023	-	136,023	130,363	(5,660)	130,363	111,736
1248MBAF2	12,589,914	-	12,589,914	5,496,141	(7,093,773)	5,496,141	5,479,168
1248MGJ3	43,914	-	43,914	42,609	(1,305)	42,609	35,260
17311YAC7	1,273,018	-	1,273,018	1,228,216	(44,802)	1,228,216	1,264,914
30247DAD3	572,150	-	572,150	552,362	(19,788)	552,362	512,472
35729RAE6	3,632,752	-	3,632,752	3,523,491	(109,261)	3,523,491	3,272,827
40431KAE0	2,092,929	-	2,092,929	2,043,034	(49,895)	2,043,034	2,095,485
45071KDD3	419,880	-	419,880	359,858	(60,022)	359,858	365,022

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

46629NAC7	34,588	-	34,588	32,979	(1,609)	32,979	27,783
46630KAA4	158,523	-	158,523	155,152	(3,371)	155,152	149,476
617463AA2	8,734	-	8,734	7,949	(785)	7,949	6,705
61749BAB9	61,518	-	61,518	60,870	(648)	60,870	64,742
61750FAE0	412,694	-	412,694	394,112	(18,582)	394,112	366,377
61750MAB1	3,264	-	3,264	3,129	(135)	3,129	3,014
61755AAB2	3,183	-	3,183	2,639	(544)	2,639	2,526
86359DXD4	193,613	-	193,613	183,061	(10,552)	183,061	184,312
86363HAB8	36,193	-	36,193	34,244	(1,949)	34,244	30,923
92926SAB2	493	-	493	381	(112)	381	382
93934XAB9	137,528	-	137,528	122,528	(15,000)	122,528	129,850
12668ALV5	1,990,831	-	1,990,831	1,755,977	(234,854)	1,755,977	1,754,077
22540VG71	36,270	-	36,270	36,232	(38)	36,232	37,823
22943HAD8	3,510,613	-	3,510,613	3,380,974	(129,639)	3,380,974	1,886,340
32053LAA0	19,363	-	19,363	19,262	(101)	19,262	18,644
45254TRX4	23,933	-	23,933	23,574	(359)	23,574	23,161
45254TSM7	615,674	-	615,674	594,492	(21,182)	594,492	528,927
45660LAU3	57,004	-	57,004	56,426	(578)	56,426	55,897
45660LYW3	797,875	-	797,875	786,087	(11,788)	786,087	724,845
466247XE8	622,921	-	622,921	612,163	(10,758)	612,163	537,075
525221AJ6	561,909	-	561,909	502,260	(59,649)	502,260	551,875
61915RBZ8	178,926	-	178,926	178,879	(47)	178,879	164,881
65535VRK6	479,926	-	479,926	469,432	(10,494)	469,432	495,515
75115DAH8	3,502	-	3,502	3,266	(236)	3,266	3,118
761118FM5	1,722,865	-	1,722,865	1,583,656	(139,209)	1,583,656	1,584,522
76112BUE8	107,208	-	107,208	96,659	(10,549)	96,659	122,032
855541AC2	219,356	-	219,356	180,352	(39,004)	180,352	226,114
86359BLQ2	792,449	-	792,449	779,863	(12,586)	779,863	701,652
92978EAA2	83,791	-	83,791	81,555	(2,236)	81,555	79,259
92979DAA3	15,795	-	15,795	15,379	(416)	15,379	15,469
41161PWB5	723,595	-	723,595	713,315	(10,280)	713,315	587,280
45660N5H4	1,202,840	-	1,202,840	1,156,288	(46,552)	1,156,288	1,159,986
45660NT88	14,960	-	14,960	14,830	(130)	14,830	14,372
92922F5T1	1,438,953	-	1,438,953	1,412,027	(26,926)	1,412,027	1,244,390
939336X65	1,599,517	-	1,599,517	1,419,593	(179,924)	1,419,593	1,427,509
05949CCB0	34,367	-	34,367	34,278	(89)	34,278	35,010
32051DCJ9	44,524	-	44,524	44,461	(63)	44,461	43,405
36228FWU6	150,442	-	150,442	141,049	(9,393)	141,049	147,677
362341VU0	1,530,315	-	1,530,315	1,520,759	(9,556)	1,520,759	1,428,432
36298XAA0	4,788,213	-	4,788,213	4,743,999	(44,214)	4,743,999	4,501,267
5899292N7	48,660	-	48,660	47,935	(725)	47,935	46,874
589929N38	42,499	-	42,499	40,236	(2,263)	40,236	39,978
59020UNZ4	89,539	-	89,539	75,877	(13,662)	75,877	85,656
86359DME4	439,975	-	439,975	415,180	(24,795)	415,180	400,433
929227ZF6	6,804	-	6,804	883	(5,921)	883	3,055
Totals	\$ 56,797,193	\$ -	\$ 56,797,193	\$ 45,999,577	\$ (10,797,616)	\$ 45,999,577	\$ 39,477,567

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2022:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
12624QAC7	\$ 3,800,115	\$ -	\$ 3,800,115	\$ 3,420,115	\$ (380,000)	\$ 3,420,115	\$ 1,588,875
12624SAE9	2,716,498	-	2,716,498	2,435,538	(280,960)	2,435,538	835,883
36192RAL6	2,950,670	-	2,950,670	1,475,670	(1,475,000)	1,475,670	1,096,111
00442FAB8	54,320	-	54,320	42,042	(12,278)	42,042	9,321
02660CAH3	30,449	-	30,449	27,509	(2,940)	27,509	621

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

040104RV5	1,538,602	-	1,538,602	1,447,321	(91,281)	1,447,321	1,361,477
040104TF8	46,015	-	46,015	44,165	(1,850)	44,165	34,412
04012XAC9	140,344	-	140,344	134,035	(6,309)	134,035	114,094
04544TAB7	29,637	-	29,637	8,031	(21,606)	8,031	27,105
12479DAC2	1,754,671	-	1,754,671	1,705,748	(48,923)	1,705,748	1,321,385
1248MGAJ3	45,771	-	45,771	43,936	(1,835)	43,936	36,622
17311YAC7	1,339,319	-	1,339,319	1,249,956	(89,363)	1,249,956	1,251,680
30247DAD3	615,686	-	615,686	576,172	(39,514)	576,172	523,602
35729RAE6	3,769,442	-	3,769,442	3,620,540	(148,902)	3,620,540	3,166,561
40431KAE0	2,102,171	-	2,102,171	2,066,603	(35,567)	2,066,603	2,080,134
46630KAA4	163,709	-	163,709	160,394	(3,316)	160,394	150,262
57643LMP8	699,246	-	699,246	655,527	(43,720)	655,527	703,992
590212AB2	36,752	-	36,752	32,892	(3,860)	32,892	35,553
61749BAB9	25,730	-	25,730	18,784	(6,946)	18,784	19,869
61750FAE0	427,971	-	427,971	409,815	(18,156)	409,815	364,414
61750MAB1	3,966	-	3,966	3,252	(714)	3,252	3,061
84752CAE7	780,353	-	780,353	534,007	(246,346)	534,007	735,662
86359DXD4	207,910	-	207,910	194,222	(13,688)	194,222	192,670
86363HAB8	38,745	-	38,745	36,881	(1,864)	36,881	32,197
05535DAN4	815,322	-	815,322	781,142	(34,180)	781,142	668,809
12667GKG7	48,651	-	48,651	47,599	(1,052)	47,599	49,753
17025RAA3	274,474	-	274,474	222,741	(51,733)	222,741	264,605
22943HAD8	3,639,676	-	3,639,676	3,553,679	(85,998)	3,553,679	1,966,703
251563FB3	21,743	-	21,743	18,668	(3,075)	18,668	21,315
32053LAA0	20,430	-	20,430	19,665	(765)	19,665	19,195
362290AC2	165,551	-	165,551	119,985	(45,566)	119,985	163,292
43739EAP2	1,491,643	-	1,491,643	1,378,947	(112,696)	1,378,947	1,338,336
45254TRX4	27,269	-	27,269	24,861	(2,408)	24,861	24,629
45660LYW3	807,355	-	807,355	801,731	(5,623)	801,731	740,968
466247XE8	648,455	-	648,455	636,766	(11,689)	636,766	552,507
589929X29	476,677	-	476,677	442,351	(34,326)	442,351	455,505
59020UW43	96,706	-	96,706	67,631	(29,075)	67,631	81,213
61915RBZ8	182,035	-	182,035	180,158	(1,878)	180,158	165,479
65535VRK6	496,060	-	496,060	477,703	(18,357)	477,703	503,077
86358HHX0	185,982	-	185,982	180,224	(5,758)	180,224	138,376
86359BLQ2	912,392	-	912,392	860,886	(51,506)	860,886	788,258
92978EAA2	87,160	-	87,160	83,990	(3,170)	83,990	80,341
41161PHU0	1,288,335	-	1,288,335	1,111,121	(177,215)	1,111,121	1,242,875
41161PTP8	79,162	-	79,162	70,296	(8,866)	70,296	69,500
41161PWB5	748,794	-	748,794	743,267	(5,528)	743,267	642,772
45660N5H4	1,326,680	-	1,326,680	1,291,747	(34,933)	1,291,747	1,293,674
05949CCB0	37,242	-	37,242	34,365	(2,878)	34,365	35,868
36298XAA0	4,996,628	-	4,996,628	4,820,011	(176,617)	4,820,011	4,541,703
36298XAB8	4,960,140	-	4,960,140	4,317,655	(642,484)	4,317,655	4,428,229
Totals	\$ 47,152,655	\$ -	\$ 47,152,655	\$ 42,630,344	\$ (4,522,311)	\$ 42,630,344	\$ 35,962,545

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2022:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
01853GAB6	\$ 14,137	\$ -	\$ 14,137	\$ 14,133	\$ (4)	\$ 14,133	\$ 81,535
02660CAH3	30,416	-	30,416	30,133	(283)	30,133	520
040104RV5	1,615,798	-	1,615,798	1,524,246	(91,552)	1,524,246	1,400,628
040104TF8	51,554	-	51,554	45,567	(5,987)	45,567	35,698
040104TG6	548,457	-	548,457	448,751	(99,706)	448,751	462,045
04012XAC9	158,236	-	158,236	138,996	(19,240)	138,996	114,648
1248MGAJ3	48,376	-	48,376	46,059	(2,317)	46,059	37,828
14454AAB5	676,443	-	676,443	675,900	(543)	675,900	797,469

35729RAE6	4,081,381	-	4,081,381	3,766,230	(315,151)	3,766,230	3,254,010
40431KAE0	2,165,192	-	2,165,192	2,079,404	(85,788)	2,079,404	2,080,910

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

46629NAC7	37,064	-	37,064	34,532	(2,532)	34,532	28,639
46630KAA4	168,908	-	168,908	166,176	(2,733)	166,176	156,211
57643LMP8	794,964	-	794,964	695,958	(99,006)	695,958	707,626
617463AA2	9,759	-	9,759	8,712	(1,047)	8,712	6,788
61750FAE0	472,290	-	472,290	426,190	(46,100)	426,190	370,275
617526AE8	213,790	-	213,790	183,317	(30,473)	183,317	205,107
86359DXD4	258,372	-	258,372	209,421	(48,950)	209,421	209,160
86363HAB8	42,386	-	42,386	39,363	(3,023)	39,363	33,395
93934XAB9	173,541	-	173,541	135,596	(37,945)	135,596	152,650
05535DAN4	846,722	-	846,722	844,091	(2,632)	844,091	719,154
12667GKG7	53,610	-	53,610	50,015	(3,595)	50,015	52,574
12668ACY9	196,165	-	196,165	158,127	(38,037)	158,127	199,829
18974BAA7	139,604	-	139,604	135,673	(3,931)	135,673	142,094
22540VG71	39,290	-	39,290	38,205	(1,085)	38,205	39,865
22943HAD8	3,726,422	-	3,726,422	3,648,804	(77,618)	3,648,804	1,947,539
45254TSM7	666,066	-	666,066	648,569	(17,497)	648,569	557,450
466247XE8	670,770	-	670,770	665,673	(5,097)	665,673	576,833
525221AJ6	554,561	-	554,561	553,790	(771)	553,790	552,476
59020UW43	99,571	-	99,571	98,502	(1,069)	98,502	80,640
65535VRK6	537,959	-	537,959	492,267	(45,692)	492,267	506,957
75116CET9	52,218	-	52,218	37,480	(14,738)	37,480	51,726
92926UAC5	57,744	-	57,744	45,834	(11,910)	45,834	55,826
92978EAA2	93,378	-	93,378	87,280	(6,098)	87,280	83,812
23332UCM4	26,121	-	26,121	24,163	(1,958)	24,163	25,263
41161PTP8	76,675	-	76,675	72,259	(4,416)	72,259	68,493
41161PWB5	796,629	-	796,629	761,585	(35,044)	761,585	655,513
45660N5H4	1,475,897	-	1,475,897	1,375,793	(100,104)	1,375,793	1,309,005
362341VU0	1,644,583	-	1,644,583	1,609,277	(35,306)	1,609,277	1,524,505
Totals	\$ 23,315,048	\$ -	\$ 23,315,048	\$ 22,016,070	\$ (1,298,978)	\$ 22,016,070	\$ 19,284,696

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2022:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
01853GAB6	\$ 66,515	\$ -	\$ 66,515	\$ 11,444	\$ (55,072)	\$ 11,444	\$ 88,216
040104RV5	1,784,407	-	1,784,407	1,603,660	(180,747)	1,603,660	1,520,334
040104TF8	38,441	-	38,441	35,870	(2,572)	35,870	27,369
04012XAC9	110,303	-	110,303	106,039	(4,264)	106,039	85,613
1248MGAJ3	33,572	-	33,572	31,812	(1,760)	31,812	27,009
14454AAB5	881,442	-	881,442	677,715	(203,728)	677,715	840,850
35729RAE6	4,202,719	-	4,202,719	4,089,490	(113,229)	4,089,490	3,504,758
45071KDD3	273,858	-	273,858	258,285	(15,573)	258,285	253,045
61749BAB9	51,130	-	51,130	41,427	(9,703)	41,427	50,025
86359DXD4	272,114	-	272,114	262,835	(9,280)	262,835	230,996
86363HAB8	33,458	-	33,458	28,887	(4,571)	28,887	26,054
05535DAN4	1,158,770	-	1,158,770	873,964	(284,806)	873,964	779,790
07387AFX8	65,702	-	65,702	54,499	(11,203)	54,499	65,889
12668ABP9	177,942	-	177,942	145,191	(32,751)	145,191	170,379
18974BAA7	163,686	-	163,686	159,493	(4,193)	159,493	158,996
18974BAN9	77,869	-	77,869	70,973	(6,896)	70,973	75,478
22943HAD8	4,013,588	-	4,013,588	3,751,800	(261,788)	3,751,800	2,037,389
45254TRX4	45,557	-	45,557	40,333	(5,224)	40,333	42,158
525221AJ6	718,882	-	718,882	583,189	(135,692)	583,189	606,787
59020UW43	106,578	-	106,578	102,698	(3,880)	102,698	124,978
761118FM5	1,217,616	-	1,217,616	1,142,589	(75,026)	1,142,589	1,144,285
85554NAG5	94,558	-	94,558	80,862	(13,696)	80,862	90,860
92978EAA2	67,304	-	67,304	65,210	(2,094)	65,210	61,610
45660N5H4	1,537,499	-	1,537,499	1,502,180	(35,320)	1,502,180	1,379,463

12669GXW6	44,815	-	44,815	41,990	(2,826)	41,990	77,371
589929N38	68,312	-	68,312	63,956	(4,356)	63,956	65,216
Totals	\$ 17,306,639	\$ -	\$ 17,306,639	\$ 15,826,391	\$ (1,480,248)	\$ 15,826,391	\$ 13,534,918

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2022:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
00256DAA0	\$ 1,762,699	\$ -	\$ 1,762,699	\$ 1,364,210	\$ (398,489)	\$ 1,364,210	\$ 1,122,333
07388VAH1	2,364,730	-	2,364,730	244,594	(2,120,137)	244,594	244,594
22545XBB8	1,683,921	-	1,683,921	211,871	(1,472,050)	211,871	210,934
00442FAB8	70,075	-	70,075	52,264	(17,811)	52,264	10,685
040104TF8	59,249	-	59,249	53,852	(5,397)	53,852	41,892
040104TG6	623,388	-	623,388	531,410	(91,978)	531,410	545,952
04012XAC9	178,777	-	178,777	162,199	(16,578)	162,199	136,446
1248MGAJ3	52,182	-	52,182	51,033	(1,149)	51,033	45,331
17311YAC7	1,623,994	-	1,623,994	1,327,822	(296,172)	1,327,822	1,502,602
24763LFY1	134,155	-	134,155	67,703	(66,452)	67,703	106,050
35729RAE6	4,416,912	-	4,416,912	4,231,274	(185,638)	4,231,274	3,947,591
40431KAE0	2,521,316	-	2,521,316	2,214,702	(306,614)	2,214,702	2,513,960
45071KDD3	488,363	-	488,363	436,903	(51,460)	436,903	448,752
55291KAC1	633,248	-	633,248	169,402	(463,846)	169,402	598,172
57643LMP8	906,102	-	906,102	809,314	(96,788)	809,314	815,499
617463AA2	10,553	-	10,553	9,894	(659)	9,894	8,101
61750FAE0	509,354	-	509,354	473,873	(35,481)	473,873	435,242
617526AE8	262,688	-	262,688	214,229	(48,459)	214,229	243,939
86359DXD4	304,264	-	304,264	279,462	(24,802)	279,462	275,224
07384YPP5	314,885	-	314,885	207,555	(107,330)	207,555	66,352
32053LAA0	27,875	-	27,875	22,820	(5,055)	22,820	25,221
45660LAU3	78,731	-	78,731	75,334	(3,397)	75,334	76,824
59020UW43	176,900	-	176,900	108,489	(68,411)	108,489	132,229
65535VRK6	592,663	-	592,663	536,987	(55,676)	536,987	561,983
761118FM5	1,932,729	-	1,932,729	1,911,872	(20,857)	1,911,872	1,863,619
76112HAE7	13,536	-	13,536	10,283	(3,253)	10,283	13,495
92978EAA2	102,806	-	102,806	97,782	(5,024)	97,782	94,757
93935PAH2	137,585	-	137,585	115,483	(22,102)	115,483	131,766
41161PWB5	884,324	-	884,324	852,993	(31,331)	852,993	771,130
45660N5H4	1,600,750	-	1,600,750	1,533,921	(66,829)	1,533,921	1,444,261
36298XAB8	5,320,204	-	5,320,204	5,307,865	(12,338)	5,307,865	5,034,048
55274SAM3	177,495	-	177,495	25,133	(152,362)	25,133	29,827
59024WAB3	137,567	-	137,567	119,223	(18,344)	119,223	142,528
94984GAD9	31,976	-	31,976	26,026	(5,950)	26,026	33,031
Totals	\$ 30,135,997	\$ -	\$ 30,135,997	\$ 23,857,778	\$ (6,278,218)	\$ 23,857,778	\$ 23,674,371

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2021:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
040104TF8	\$ 59,686	\$ -	\$ 59,686	\$ 59,300	\$ (386)	\$ 59,300	\$ 49,870
04012XAC9	130,314	-	130,314	122,160	(8,154)	122,160	107,581
1248MGAJ3	35,096	-	35,096	34,855	(241)	34,855	31,996
35729RAE6	4,028,108	-	4,028,108	3,999,290	(28,818)	3,999,290	3,995,059
617463AA2	6,685	-	6,685	5,767	(918)	5,767	5,247
61749BAB9	61,698	-	61,698	51,363	(10,335)	51,363	60,638
61750FAE0	342,930	-	342,930	319,304	(23,626)	319,304	307,808
61750MAB1	3,456	-	3,456	3,113	(343)	3,113	3,182
86359DXD4	335,476	-	335,476	308,315	(27,161)	308,315	309,361
92926SAB2	558	-	558	494	(64)	494	521
45660LYW3	677,413	-	677,413	675,162	(2,251)	675,162	630,760
79548KXQ6	51,835	-	51,835	37,121	(14,714)	37,121	65,254

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

92978EAA2	75,569	-	75,569	72,635	(2,934)	72,635	72,325
41161PWB5	822,378	-	822,378	776,768	(45,610)	776,768	706,114
55274SAM3	27,413	-	27,413	24,861	(2,552)	24,861	23,482
Totals	\$ 6,658,614	\$ -	\$ 6,658,615	\$ 6,490,508	\$ (168,107)	\$ 6,490,508	\$ 6,369,198

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2021:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
040104TF8	\$ 59,686	\$ -	\$ 59,686	\$ 59,300	\$ (386)	\$ 59,300	\$ 49,870
04012XAC9	130,314	-	130,314	122,160	(8,154)	122,160	107,581
1248MGJ3	35,096	-	35,096	34,855	(241)	34,855	31,996
35729RAE6	4,028,108	-	4,028,108	3,999,290	(28,818)	3,999,290	3,995,059
617463AA2	6,685	-	6,685	5,767	(918)	5,767	5,247
61749BAB9	61,698	-	61,698	51,363	(10,335)	51,363	60,638
61750FAE0	342,930	-	342,930	319,304	(23,626)	319,304	307,808
61750MAB1	3,456	-	3,456	3,113	(343)	3,113	3,182
86359DXD4	335,476	-	335,476	308,315	(27,161)	308,315	309,361
92926SAB2	558	-	558	494	(64)	494	521
45660LYW3	677,413	-	677,413	675,162	(2,251)	675,162	630,760
79548KXQ6	51,835	-	51,835	37,121	(14,714)	37,121	65,254
92978EAA2	75,569	-	75,569	72,635	(2,934)	72,635	72,325
41161PWB5	822,378	-	822,378	776,768	(45,610)	776,768	706,114
55274SAM3	27,413	-	27,413	24,861	(2,552)	24,861	23,482
Totals	\$ 6,658,614	\$ -	\$ 6,658,615	\$ 6,490,508	\$ (168,107)	\$ 6,490,508	\$ 6,369,198

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2021:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
00442FAB8	\$ 95,903	\$ -	\$ 95,903	\$ 70,276	\$ (25,627)	\$ 70,276	\$ 60,821
86359DXD4	359,657	-	359,657	339,761	(19,896)	339,761	337,895
05535DAN4	1,260,315	-	1,260,315	1,255,426	(4,889)	1,255,426	1,020,099
073879QF8	247,750	-	247,750	226,078	(21,672)	226,078	256,430
45660LYW3	907,047	-	907,047	906,647	(400)	906,647	879,977
92978EAA2	110,354	-	110,354	108,384	(1,970)	108,384	106,564
41161PWB5	1,049,397	-	1,049,397	1,023,087	(26,310)	1,023,087	908,082
55274SAM3	30,959	-	30,959	26,064	(4,895)	26,064	25,345
Totals	\$ 4,061,382	\$ -	\$ 4,061,382	\$ 3,955,723	\$ (105,659)	\$ 3,955,723	\$ 3,595,213

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2021:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
040104TG6	\$ 751,483	\$ -	\$ 751,483	\$ 596,747	\$ (154,736)	\$ 596,747	\$ 700,223
05535DCF9	2,412,525	-	2,412,525	2,168,139	(244,386)	2,168,139	2,608,461
40431KAE0	2,389,667	-	2,389,667	2,348,253	(41,414)	2,348,253	2,745,165
61750FAE0	555,370	-	555,370	534,914	(20,456)	534,914	493,887
86359DXD4	394,726	-	394,726	364,962	(29,764)	364,962	369,964
05535DAN4	1,386,766	-	1,386,766	1,038,889	(347,877)	1,038,889	1,141,961
45660LYW3	959,375	-	959,375	942,757	(16,618)	942,757	927,049
79548KXQ6	121,590	-	121,590	96,976	(24,616)	96,976	97,070
92978EAA2	115,502	-	115,502	112,103	(3,399)	112,103	110,484
41161PWB5	1,112,829	-	1,112,829	1,079,359	(33,470)	1,079,359	969,681
576433H33	1,119,491	-	1,119,491	1,071,784	(47,707)	1,071,784	1,074,403
55274SAM3	33,318	-	33,318	31,698	(1,620)	31,698	85,553
Totals	\$ 11,352,643	\$ -	\$ 11,352,642	\$ 10,386,581	\$ (966,063)	\$ 10,386,581	\$ 11,323,900

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2021:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
36828QQJ8	\$ 5,796,000	\$ -	\$ 5,796,000	\$ -	\$ (5,796,000)	\$ -	\$ -
05535DCF9	2,560,946	-	2,560,946	2,505,561	(55,385)	2,505,561	2,647,762
61750FAE0	582,728	-	582,728	558,079	(24,649)	558,079	500,569
18974BAA7	203,962	-	203,962	193,231	(10,731)	193,231	197,038
22540V3F7	124,724	-	124,724	11,082	(113,642)	11,082	3,496
92978EAA2	123,118	-	123,118	119,363	(3,755)	119,363	115,107
41161PWB5	1,183,481	-	1,183,481	1,153,338	(30,143)	1,153,338	1,017,022
12669GXW6	153,925	-	153,925	20,286	(133,639)	20,286	173,435
55274SAM3	38,192	-	38,192	33,418	(4,774)	33,418	84,650
86359DME4	480,180	-	480,180	480,135	(45)	480,135	498,095
Totals	\$ 11,247,256	\$ -	\$ 11,247,257	\$ 5,074,493	\$ (6,172,764)	\$ 5,074,493	\$ 5,237,174

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2020:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
01853GAB6	\$ 166,318	\$ -	\$ 166,318	\$ 58,609	\$ (107,709)	\$ 58,609	\$ 136,619
05535DCF9	2,639,139	-	2,639,139	2,595,116	(44,023)	2,595,116	2,812,127
61750FAE0	594,740	-	594,740	584,887	(9,853)	584,887	530,736
61750MAB1	4,675	-	4,675	4,502	(173)	4,502	4,545
92926SAB2	585	-	585	567	(18)	567	562
124860CB1	21,523	-	21,523	14,872	(6,651)	14,872	17,887
18974BAA7	205,451	-	205,451	204,843	(608)	204,843	186,946
18974BAN9	101,669	-	101,669	101,513	(156)	101,513	98,300
2254W0NK7	89,902	-	89,902	23,726	(66,176)	23,726	94,611
45660LYW3	1,074,456	-	1,074,456	1,035,449	(39,007)	1,035,449	1,020,046
65535VRK6	681,735	-	681,735	601,631	(80,104)	601,631	653,481
79548KXQ6	99,323	-	99,323	98,725	(598)	98,725	92,899
92978EAA2	130,042	-	130,042	125,448	(4,594)	125,448	119,223
23332UBW3	26,310	-	26,310	21,116	(5,193)	21,116	30,347
576433H33	1,207,614	-	1,207,614	1,145,808	(61,806)	1,145,808	1,116,853
125435AA5	1,635,577	-	1,635,577	1,543,519	(92,058)	1,543,519	1,596,490
36298XAA0	6,639,520	-	6,639,520	5,802,921	(836,599)	5,802,921	6,153,831
55274SAM3	61,225	-	61,225	42,760	(18,465)	42,760	93,792
86359DME4	673,784	-	673,784	662,791	(10,993)	662,791	698,159
92922ZF6	18,319	-	18,319	5,496	(12,823)	5,496	16,063
Totals	\$ 16,071,907	\$ -	\$ 16,071,907	\$ 14,674,300	\$ (1,397,607)	\$ 14,674,300	\$ 15,473,517

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2020:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
US05618HAE53	\$ 555,162	\$ -	\$ 555,162	\$ 387,040	\$ (168,122)	\$ 387,040	\$ 162,575
00442FAB8	144,957	-	144,957	79,275	(65,682)	79,275	112,060
05535DCF9	2,755,413	-	2,755,413	2,649,186	(106,228)	2,649,186	2,553,142
46630KAA4	191,718	-	191,718	184,342	(7,376)	184,342	179,699
61749BAB9	105,432	-	105,432	91,620	(13,812)	91,620	88,204
61750MAB1	4,837	-	4,837	4,672	(165)	4,672	3,421
92926SAB2	604	-	604	588	(16)	588	438

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

07384YPP5	12,990	-	12,990	9,466	(3,524)	9,466	35,174
073879QF8	45,111	-	45,111	43,889	(1,222)	43,889	39,772
17307GRU4	104,250	-	104,250	55,590	(48,659)	55,590	91,680
18974BAA7	215,833	-	215,833	212,231	(3,602)	212,231	183,053
18974BAN9	106,359	-	106,359	104,851	(1,507)	104,851	97,631
9393365V1	399,194	-	399,194	394,263	(4,932)	394,263	364,935
23332UBW3	31,650	-	31,650	29,218	(2,432)	29,218	22,244
12669GWN7	849,557	-	849,557	799,224	(50,333)	799,224	782,638
12669GXW6	244,251	-	244,251	233,647	(10,604)	233,647	223,233
32051DCK6	79,208	-	79,208	61,819	(17,389)	61,819	82,998
36298XAA0	7,738,893	-	7,738,893	7,511,130	(227,763)	7,511,130	7,120,125
36298XAB8	7,666,120	-	7,666,120	6,250,751	(1,415,369)	6,250,751	6,539,292
45660LY94	13,115	-	13,115	6,394	(6,721)	6,394	26,528
74951PBT4	110,729	-	110,729	51,052	(59,676)	51,052	153,185
Totals	\$ 21,375,383	\$ -	\$ 21,375,383	\$ 19,160,250	\$ (2,215,134)	\$ 19,160,250	\$ 18,862,027

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2020:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
17307GRU4	\$ 107,326	\$ -	\$ 107,326	\$ 77,392	\$ (29,934)	\$ 77,392	\$ 160,449
18974BAA7	245,427	-	245,427	235,230	(10,197)	235,230	201,416
18974BAN9	119,509	-	119,509	114,571	(4,938)	114,571	107,924
362290AC2	220,776	-	220,776	219,541	(1,235)	219,541	307,360
79548KXQ6	172,175	-	172,175	170,007	(2,168)	170,007	130,248
855541AC2	508,940	-	508,940	384,558	(124,383)	384,558	460,800
9393365V1	433,313	-	433,313	415,261	(18,053)	415,261	356,247
45660LY94	28,987	-	28,987	13,258	(15,729)	13,258	21,174
57643QAE5	2,203,118	-	2,203,118	1,819,560	(383,558)	1,819,560	2,367,000
74951PBT4	260,811	-	260,811	143,231	(117,579)	143,231	157,616
86359DMC8	5,799,490	-	5,799,490	5,333,524	(465,966)	5,333,524	4,907,737
92990GAE3	80,251	-	80,251	66,477	(13,773)	66,477	71,880
Totals	\$ 10,180,123	\$ -	\$ 10,180,123	\$ 8,992,610	\$ (1,187,513)	\$ 8,992,610	\$ 9,249,851

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2020:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
05535DCF9	\$ 3,012,907	\$ -	\$ 3,012,907	\$ 2,862,429	\$ (150,478)	\$ 2,862,429	\$ 2,528,432
24763LFY1	147,758	-	147,758	146,827	(931)	146,827	180,454
45071KDD3	575,329	-	575,329	510,787	(64,542)	510,787	491,576
07384YPP5	33,493	-	33,493	28,061	(5,431)	28,061	46,723
12667GKG7	93,290	-	93,290	83,622	(9,668)	83,622	98,905
17307GRU4	114,325	-	114,325	112,699	(1,625)	112,699	157,144
362290AC2	316,883	-	316,883	225,907	(90,976)	225,907	322,987
59020UW43	214,183	-	214,183	182,719	(31,463)	182,719	200,181
65535VRK6	716,497	-	716,497	699,498	(16,998)	699,498	646,333
75115DAH8	6,842	-	6,842	6,564	(279)	6,564	6,397
76112BUE8	181,578	-	181,578	148,845	(32,733)	148,845	129,998
79548KXQ6	187,063	-	187,063	182,973	(4,090)	182,973	137,728
92926UAC5	136,220	-	136,220	130,734	(5,486)	130,734	130,957
23332UBW3	46,195	-	46,195	32,143	(14,052)	32,143	24,852
12669GWN7	889,281	-	889,281	871,126	(18,155)	871,126	863,235
32051DCK6	88,205	-	88,205	86,848	(1,358)	86,848	89,678
362334CN2	14,634	-	14,634	11,177	(3,457)	11,177	13,996
466247K93	7,584	-	7,584	6,335	(1,249)	6,335	7,318
57645LAA2	18,017,521	-	18,017,521	13,868,050	(4,149,471)	13,868,050	18,607,055
Totals	\$ 24,799,788	\$ -	\$ 24,799,788	\$ 20,197,344	\$ (4,602,443)	\$ 20,197,344	\$ 24,683,947

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following is the impairment listing for loan-backed and structured securities for the three months ended December 31, 2019:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
24763LFY1	\$ 182,113	\$ -	\$ 182,113	\$ 160,832	\$ (21,281)	\$ 160,832	\$ 200,613
05535DAN4	1,930,918	-	1,930,918	1,855,207	(75,711)	1,855,207	1,598,238
07384YPP5	187,700	-	187,700	39,691	(148,009)	39,691	71,760
17307GRU4	164,558	-	164,558	133,524	(31,034)	133,524	229,670
18974BAN9	134,619	-	134,619	125,398	(9,221)	125,398	126,170
65535VRK6	797,949	-	797,949	712,007	(85,942)	712,007	774,700
79548KXQ6	207,254	-	207,254	192,282	(14,972)	192,282	113,588
85554NAG5	194,730	-	194,730	158,214	(36,515)	158,214	187,575
12669FXR9	117,999	-	117,999	114,307	(3,692)	114,307	101,165
23332UBW3	74,561	-	74,561	47,819	(26,742)	47,819	35,659
Totals	\$ 3,992,400	\$ -	\$ 3,992,400	\$ 3,539,281	\$ (453,119)	\$ 3,539,281	\$ 3,439,138

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2019:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
12667F2A2	\$ 642,800	\$ -	\$ 642,800	\$ 484,346	\$ (158,455)	\$ 484,346	\$ 68,241
32053LAA0	47,447	-	47,447	40,280	(7,167)	40,280	47,846
761118FM5	2,843,393	-	2,843,393	2,789,133	(54,260)	2,789,133	2,918,992
79548KXQ6	297,379	-	297,379	277,239	(20,140)	277,239	60,979
23332UBW3	78,084	-	78,084	76,934	(1,151)	76,934	43,636
576433H33	1,579,401	-	1,579,401	1,448,247	(131,155)	1,448,247	1,448,863
12669GWN7	1,037,688	-	1,037,688	957,205	(80,484)	957,205	936,853
17309FAE8	161,243	-	161,243	129,536	(31,707)	129,536	159,357
36298XAA0	10,097,887	-	10,097,887	8,887,246	(1,210,641)	8,887,246	8,841,272
92990GAE3	86,314	-	86,314	85,680	(634)	85,680	87,117
US74951PBV94	37,392	-	37,392	16,087	(21,305)	16,087	26,602
Totals	\$ 16,909,029	\$ -	\$ 16,909,029	\$ 15,191,932	\$ (1,717,097)	\$ 15,191,932	\$ 14,639,756

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2019:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
61750MAB1	\$ 4,942	\$ -	\$ 4,942	\$ 4,899	\$ (42)	\$ 4,899	\$ 4,344
18974BAN9	143,913	-	143,913	143,911	(2)	143,911	141,999
761118FM5	3,338,972	-	3,338,972	3,276,460	(62,512)	3,276,460	3,468,889
79548KXQ6	335,309	-	335,309	321,864	(13,445)	321,864	218,663
55274SAM3	114,173	-	114,173	79,608	(34,565)	79,608	119,029
57643QAE5	3,042,722	-	3,042,722	2,360,287	(682,436)	2,360,287	3,180,695
Totals	\$ 6,980,030	\$ -	\$ 6,980,030	\$ 6,187,029	\$ (793,001)	\$ 6,187,029	\$ 7,133,620

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

The following is the impairment listing for loan-backed and structured securities for the three months ended March 31, 2019:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
61750MAB1	\$ 5,275	\$ -	\$ 5,275	\$ 4,933	\$ (341)	\$ 4,933	\$ 4,989
65106FAG7	232,843	-	232,843	215,726	(17,118)	215,726	6,316
18974BAA7	285,889	-	285,889	270,801	(15,088)	270,801	278,616
18974BAN9	149,774	-	149,774	139,333	(10,441)	139,333	148,234
22541QQR6	1,569	-	1,569	-	(1,569)	-	1
32051GCF0	22,786	-	22,786	(6,720)	(29,507)	(6,720)	17,553
761118FM5	3,259,303	-	3,259,303	3,218,368	(40,935)	3,218,368	3,244,154
17309FAE8	200,512	-	200,512	200,501	(11)	200,501	208,828
466247UG6	467,713	-	467,713	452,359	(15,354)	452,359	459,812
57643QAE5	3,114,325	-	3,114,325	3,109,376	(4,949)	3,109,376	3,256,107
US74951PBV94	51,011	-	51,011	29,960	(21,051)	29,960	58,411
Totals	\$ 7,791,000	\$ -	\$ 7,791,000	\$ 7,634,637	\$ (156,362)	\$ 7,634,637	\$ 7,683,021

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
65106FAG7	\$ 205,885	\$ -	\$ 205,885	\$ 17,668	\$ (188,218)	\$ 17,668	\$ 21,031
18974BAA7	306,428	-	306,428	295,291	(11,137)	295,291	294,986
22541QQR6	28,742	-	28,742	(9,704)	(38,446)	(9,704)	1
32051GCF0	32,493	-	32,493	20,481	(12,012)	20,481	20,063
17309FAE8	203,743	-	203,743	202,326	(1,417)	202,326	201,875
57643QAE5	3,657,695	-	3,657,695	3,177,611	(480,084)	3,177,611	3,365,017
92990GAE3	115,186	-	115,186	111,886	(3,300)	111,886	111,541
Totals	\$ 4,550,173	\$ -	\$ 4,550,173	\$ 3,815,559	\$ (734,614)	\$ 3,815,559	\$ 4,014,514

The following is the impairment listing for loan-backed and structured securities for the three months ended September 30, 2018:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
05535DCF9	\$ 3,454,425	\$ -	\$ 3,454,425	\$ 3,141,048	\$ (313,377)	\$ 3,141,048	\$ 3,134,409
07384YPP5	321,829	-	321,829	148,884	(172,945)	148,884	132,968
07386HCP4	2,164	-	2,164	(6,255)	(8,418)	(6,255)	320
76110H4M8	1,715	-	1,715	(3,719)	(5,434)	(3,719)	641
79548KXQ6	423,086	-	423,086	383,222	(39,864)	383,222	292,015
939336Z48	117,607	-	117,607	-	(117,607)	-	126,945
Totals	\$ 4,320,826	\$ -	\$ 4,320,826	\$ 3,663,181	\$ (657,645)	\$ 3,663,181	\$ 3,687,297

The following is the impairment listing for loan-backed and structured securities for the three months ended June 30, 2018:

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
59020UW43	\$ 337,732	\$ -	\$ 337,732	\$ 271,686	\$ (66,046)	\$ 271,686	\$ 354,508
76110H4M8	6,848	-	6,848	1,969	(4,879)	1,969	1,713
863579DV7	289,655	-	289,655	5,567	(284,089)	5,567	30,531
Totals	\$ 634,235	\$ -	\$ 634,235	\$ 279,221	\$ (355,014)	\$ 279,221	\$ 386,752

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
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07386HEN7	\$	43,711	\$	-	\$	43,711	\$	2,334	\$	(41,377)	\$	2,334	\$	1,609
79548KXQ6		520,764		-		520,764		476,293		(44,471)		476,293		365,994
45660NZY4		81,215		-		81,215		9,554		(71,661)		9,554		80,891
Totals	\$	645,690	\$	-	\$	645,690	\$	488,181	\$	(157,509)	\$	488,181	\$	448,494

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
03927RAA2	\$ 2,886,563	\$ -	\$ 2,886,563	\$ 1,464,907	\$ (1,421,656)	\$ 1,464,907	\$ 1,481,241
03927RAB0	910,639	-	910,639	363,543	(547,096)	363,543	362,176
07386HCP4	7,995	-	7,995	1,386	(6,609)	1,386	2,673
12669GMS7	25,101	-	25,101	21,923	(3,177)	21,923	21,921
22541QOR6	21,202	-	21,202	12,504	(8,698)	12,504	16,106
2254W0NK7	97,695	-	97,695	94,495	(3,200)	94,495	139,833
86359ACG6	318	-	318	-	(318)	-	2
Totals	\$ 3,949,513	\$ -	\$ 3,949,513	\$ 1,958,759	\$ (1,990,754)	\$ 1,958,759	\$ 2,023,952

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
22541NMA4	\$ 42,273	\$ -	\$ 42,273	\$ 41,434	\$ (839)	\$ 41,434	\$ 41,095
22541NMB2	11,869	-	11,869	11,634	(234)	11,634	11,535
22541SSD1	12,232	-	12,232	20	(12,213)	20	5,978
52108MDP5	3,497,947	-	3,497,947	-	(3,497,947)	-	1,925,413
55274SAM3	167,196	-	167,196	153,991	(13,206)	153,991	179,429
76110W4J2	1,131	-	1,131	229	(902)	229	556
88157QAL2	686,945	-	686,945	660,921	(26,024)	660,921	2,125,943
89789KAC9	16,949	-	16,949	8,714	(8,235)	8,714	357,735
Totals	\$ 4,436,542	\$ -	\$ 4,436,542	\$ 876,942	\$ (3,559,600)	\$ 876,942	\$ 4,647,683

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
76110H4M8	\$ 4,413	\$ -	\$ 4,413	\$ 2,326	\$ (2,087)	\$ 2,326	\$ 4,073
86358RLG0	3,485	-	3,485	2,670	(815)	2,670	30,171
86359ACG6	16,324	-	16,324	2	(16,322)	2	2
88157QAL2	774,182	-	774,182	675,599	(98,583)	675,599	1,947,675
89789KAC9	17,294	-	17,294	8,920	(8,374)	8,920	356,047
77277LAF4	22,514,590	-	22,514,590	22,167,493	(347,097)	22,167,493	34,318,674
77277LAH0	1,135,088	-	1,135,088	1,118,159	(16,929)	1,118,159	2,738,435
77277LAJ6	16,073,175	-	16,073,175	15,833,787	(239,388)	15,833,787	21,595,653
Totals	\$ 40,538,551	\$ -	\$ 40,538,551	\$ 39,808,956	\$ (729,595)	\$ 39,808,956	\$ 60,990,732

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

CUSIP	Amortized Cost before Cumulative Adjustment	Cumulative Adjustment	Amortized Cost before OTTI	Projected Cash Flow	Recognized OTTI	Amortized Cost after OTTI	Fair Value
17307GH76	\$ 274,894	\$ -	\$ 274,894	\$ 44,730	\$ (230,163)	\$ 44,730	\$ 152,777
22541QJR4	11,175	-	11,175	54	(11,122)	54	6,866
32051DCK6	182,177	-	182,177	160,728	(21,449)	160,728	179,180
55274SAM3	225,790	-	225,790	209,839	(15,951)	209,839	218,832
86358RA23	1,326,199	-	1,326,199	1,253,636	(72,563)	1,253,636	1,289,099
86359ACG6	6,287	-	6,287	49	(6,239)	49	2

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
NOTES TO STATUTORY FINANCIAL STATEMENTS, continued

US77277LAF40	22,537,014	-	22,537,014	22,514,590	(22,424)	22,514,590	31,699,907
US77277LAH06	1,136,182	-	1,136,182	1,135,088	(1,094)	1,135,088	2,662,526
US77277LAJ61	16,088,661	-	16,088,661	16,073,175	(15,486)	16,073,175	19,947,746
Totals	\$ 41,788,380	\$ -	\$ 41,788,380	\$ 41,391,889	\$ (396,491)	\$ 41,391,889	\$ 56,156,936



KPMG LLP
Two Financial Center
60 South Street
Boston, MA 02111

Report of Independent Registered Public Accounting Firm

The Board of Directors of Massachusetts Mutual Life Insurance Company and Policy Owners of Massachusetts Mutual Variable Life Separate Account I:

Opinion on the Financial Statements

We have audited the accompanying statements of assets and liabilities of the divisions listed in Appendix A that comprise Massachusetts Mutual Variable Life Separate Account I (Separate Account), as of December 31, 2023, the related statements of operations and changes in net assets for each of the years in the two-year period then ended (or for the periods indicated in Appendix A), and the related notes, including the financial highlights in Note 8, for each of the years or periods in the five-year period then ended, (collectively, the financial statements). In our opinion, the financial statements present fairly, in all material respects, the financial position of each division as of December 31, 2023, and the results of their operations and the changes in their net assets for each of the years in the two-year period then ended (or for the periods indicated in Appendix A), and the financial highlights for each of the years or periods in the five-year period then ended, in conformity with U.S. generally accepted accounting principles.

Basis for Opinion

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

We conducted our audits in accordance with the standards of the PCAOB. Those standards require that we plan and perform the audit to obtain reasonable assurance about whether the financial statements are free of material misstatement, whether due to error or fraud. Our audits included performing procedures to assess the risks of material misstatement of the financial statements, whether due to error or fraud, and performing procedures that respond to those risks. Such procedures included examining, on a test basis, evidence regarding the amounts and disclosures in the financial statements. Such procedures also included confirmation of securities owned as of December 31, 2023, by correspondence with the underlying mutual funds or their transfer agent. Our audits also included evaluating the accounting principles used and significant estimates made by management, as well as evaluating the overall presentation of the financial statements. We believe that our audits provide a reasonable basis for our opinion.

/s/ KPMG LLP

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

Boston, Massachusetts
March 7, 2024

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KPMG LLP, a Delaware limited liability partnership and a member firm of the KPMG global organization of independent member firms affiliated with KPMG International Limited, a private English company limited by guarantee.

Appendix A

Massachusetts Mutual Variable Life Separate Account I was comprised of the following divisions of as December 31, 2023. Statements of assets and liabilities as of December 31, 2023, statements of operations and changes in net assets for each of the years in the two-year period ended December 31, 2023 unless otherwise noted.

Divisions

American Century VP Capital Appreciation Division	Fidelity® VIP Index 500 Division (Service Class)
American Century VP Disciplined Core Value Division	Fidelity® VIP International Index Division (Initial Class)
American Century VP Inflation Protection Division	Fidelity® VIP International Index Division (Service Class 2)
American Century VP International Division	Fidelity® VIP Overseas Division*
American Century VP Value Division	Fidelity® VIP Real Estate Division (Initial Class)*
American Funds Insurance Series® Asset Allocation Division**	Fidelity® VIP Real Estate Division (Service Class)
American Funds Insurance Series® Growth-Income Division**	Fidelity® VIP Strategic Income Division*
BlackRock High Yield V.I. Division	Fidelity® VIP Total Market Index
BlackRock Small Cap Index V.I. Division (Class I)	Franklin Mutual Global Discovery VIP Division
BlackRock Small Cap Index V.I. Division (Class III)	Franklin Small Cap Value VIP Division
BlackRock Total Return V.I. Division	Franklin Strategic Income VIP Division
BNY Mellon MidCap Stock Division	Goldman Sachs Core Fixed Income Division
Delaware Ivy VIP Asset Strategy Division (Class I)	Goldman Sachs International Equity Insights Division
Delaware Ivy VIP Asset Strategy Division (Class II)	Goldman Sachs Large Cap Value Division
Delaware Ivy VIP Science and Technology Division	Goldman Sachs Mid Cap Value Division
Delaware VIP® Emerging Markets Division	Goldman Sachs Small Cap Equity Insights Division
Delaware VIP® Small Cap Value Division	Goldman Sachs Strategic Growth Division
DWS Small Cap Index Division	Goldman Sachs U.S. Equity Insights Division
Eaton Vance VT Floating-Rate Income Division	Invesco Oppenheimer V.I. International Growth Division
Fidelity® VIP Bond Index Division (Initial Class)	Invesco V.I. American Franchise Division
Fidelity® VIP Contrafund® Division (Initial Class)	Invesco V.I. Capital Appreciation Division
Fidelity® VIP Contrafund® Division (Service Class)	Invesco V.I. Comstock Division
Fidelity® VIP Extended Market Index Division (Initial Class)	Invesco V.I. Conservative Balanced Division
Fidelity® VIP Extended Market Index Division (Service Class)	Invesco V.I. Core Plus Bond Division*
Fidelity® VIP Freedom 2020 Division	Invesco V.I. Discovery Mid Cap Growth Division
Fidelity® VIP Freedom 2025 Division	Invesco V.I. Diversified Dividend Division
Fidelity® VIP Freedom 2030 Division	Invesco V.I. EQV International Equity Division**
Fidelity® VIP Freedom 2035 Division	Invesco V.I. Global Division
Fidelity® VIP Freedom 2040 Division	Invesco V.I. Global Real Estate Division
Fidelity® VIP Freedom 2045 Division	Invesco V.I. Global Strategic Income Division
Fidelity® VIP Freedom 2050 Division	Invesco V.I. Health Care Division
Fidelity® VIP Freedom 2055 Division	Invesco V.I. Main Street Division
Fidelity® VIP Freedom 2060 Division	Invesco V.I. Main Street Small Cap Division
Fidelity® VIP Growth Division	Invesco V.I. Small Cap Equity Division
Fidelity® VIP Health Care Division*	Invesco V.I. Technology Division

LA2050

Invesco V.I. U.S. Government Money Division
 Janus Henderson Balanced Division (Institutional Class)
 Janus Henderson Balanced Division (Service Class)
 Janus Henderson Forty Division (Institutional Class)
 Janus Henderson Forty Division (Service Class)
 Janus Henderson Global Research Division
 (Institutional Class)
 Janus Henderson Global Research Division
 (Service Class)
 Janus Henderson Global Technology and Innovation Division*
 Lord Abbett Developing Growth Division
 LVIP JPMorgan U.S. Equity Division*
 MFS® Blended Research® Core Equity Division
 MFS® Global Real Estate Division
 MFS® Government Securities Division
 MFS® Growth Division
 MFS® International Intrinsic Value Division
 MFS® Investors Trust Division
 MFS® Mid Cap Value Division
 MFS® New Discovery Division
 MFS® Research Division
 MFS® Utilities Division
 MFS® Value Division
 MML Aggressive Allocation Division
 MML American Funds Core Allocation Division
 MML American Funds Growth Division
 MML Balanced Allocation Division
 MML Blend Division
 MML Blue Chip Growth Division
 MML Conservative Allocation Division
 MML Dynamic Bond Division
 MML Equity Division
 MML Equity Income Division
 MML Equity Index Division (Service Class I)
 MML Equity Index Division (Class II)
 MML Equity Index Division (Class III)
 MML Equity Rotation Division*
 MML Focused Equity Division
 MML Foreign Division
 MML Fundamental Equity Division
 MML Fundamental Value Division
 MML Global Division (Service Class I)

MML Global Division (Class II)
 MML Growth Allocation Division
 MML High Yield Division
 MML Income & Growth Division
 MML Inflation-Protected and Income Division
 MML International Equity Division
 MML iShares® 60/40 Allocation Division*
 MML iShares® 80/20 Allocation Division*
 MML Large Cap Growth Division
 MML Managed Bond Division
 MML Managed Volatility Division
 MML Mid Cap Growth Division
 MML Mid Cap Value Division
 MML Moderate Allocation Division
 MML Short-Duration Bond Division
 MML Small Cap Equity Division
 MML Small Cap Growth Equity Division
 MML Small Company Value Division
 MML Small/Mid Cap Value Division
 MML Strategic Emerging Markets Division
 MML Sustainable Equity Division**
 MML Total Return Bond Division
 MML U.S. Government Money Market Division
 PIMCO CommodityRealReturn® Strategy Division
 PIMCO Global Bond Opportunities Division
 PIMCO High Yield Division
 PIMCO Income Division*
 PIMCO Real Return Division
 PIMCO Total Return Division
 T. Rowe Price All-Cap Opportunities Division
 T. Rowe Price Blue Chip Growth Division
 T. Rowe Price Equity Income Division
 T. Rowe Price Limited-Term Bond Division
 T. Rowe Price Mid-Cap Growth Division
 Templeton Foreign VIP Division
 Templeton Global Bond VIP Division
 Vanguard VIF Global Bond Index Division
 Vanguard VIF Mid-Cap Index Division
 Vanguard VIF Real Estate Index Division
 Voya International Index Division
 Voya Russell™ Mid Cap Index Division
 Voya Russell™ Small Cap Index Division
 VY® CBRE Global Real Estate Division**

* Statements of operations and changes in net assets for the period from May 1, 2023 to December 31, 2023.

** The following Divisions had name changes:

Current Year	Prior Year Equivalent
American Funds Insurance Series® Asset Allocation Division	American Funds® IS Asset Allocation Division
American Funds Insurance Series® Growth- Income Division	American Funds® IS Growth-Income Division
Invesco V.I. EQV International Equity Division	Invesco V.I. International Growth Division
MML Sustainable Equity Division	MML Growth & Income Division
VY® CBRE Global Real Estate Division	VY® Clarion Global Real Estate Division

Other periods presented:

For the Oppenheimer Global Multi-Alternatives Division, the financial highlights are presented for the period January 1, 2019 to April 29, 2019. Effective April 29, 2019, this Division liquidated and any contract value in the Division after the close of the New York Stock Exchange on April 29, 2019 was automatically transferred to the MML U.S. Government Money Market Division.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES

December 31, 2023

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds Insurance Series® Asset Allocation Division	American Funds Insurance Series® Growth-Income Division	BlackRock High Yield V.I. Division
ASSETS								
Investments								
Number of shares	78,542	4,244,616	3,008	140,165	1,416,950	1,063,181	796,962	9,378
Identified cost	\$ 1,098,987	\$ 38,375,443	\$ 28,087	\$ 1,728,163	\$ 15,658,904	\$ 25,149,655	\$ 41,551,616	\$ 61,761
Value	\$ 1,116,867	\$ 32,556,201	\$ 28,183	\$ 1,482,944	\$ 17,272,619	\$ 25,016,647	\$ 46,462,905	\$ 64,148
Dividends receivable	-	-	-	-	-	-	-	346
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	-	11
Total assets	1,116,867	32,556,201	28,183	1,482,944	17,272,619	25,016,647	46,462,905	64,505
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	1	41	2	10	83	57	71	-
Total liabilities	1	41	2	10	83	57	71	-
NET ASSETS	\$ 1,116,866	\$ 32,556,160	\$ 28,181	\$ 1,482,934	\$ 17,272,536	\$ 25,016,590	\$ 46,462,834	\$ 64,505
Outstanding units								
Policy owners	579,437	7,953,129	24,847	1,017,477	3,545,573	5,962,672	8,213,963	48,906
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	3.37	-	-	6.32	-	-	-
Variable Life Select	-	3.53	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	3.51	-	-	4.79	-	-	-
Survivorship Variable Universal Life	-	4.40	-	-	5.54	4.63	6.69	-
Variable Universal Life	-	3.79	-	-	5.21	4.35	6.29	-
Strategic Variable Life® Plus	-	3.16	-	1.66	5.92	-	-	-
Survivorship Variable Universal Life II	-	3.49	-	-	5.54	4.63	6.69	-
Variable Universal Life II								
Tier 1	-	3.51	-	-	5.00	4.17	6.04	-
Tier 2	-	4.39	-	-	4.78	4.18	5.64	-
VUL Guard SM								
Tier 1	-	4.85	-	-	5.26	4.39	6.36	-
Tier 2	-	3.97	-	-	4.32	3.78	5.10	-
Tier 3	-	3.77	-	-	4.11	3.59	4.85	-
Tier 4	-	3.85	-	-	4.19	3.67	4.95	-
Tier 5	-	4.17	-	-	4.54	3.97	5.37	-
Survivorship VUL Guard SM								
Tier 1	-	3.57	-	-	3.77	3.48	4.70	-
Tier 2	-	3.64	-	-	3.85	3.54	4.79	-
Tier 3	-	3.71	-	-	3.92	3.61	4.88	-
Tier 4	-	3.71	-	-	3.92	3.61	4.88	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	1.93	-	1.13	1.43	-	-	-	1.32
APEX VUL	-	-	-	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
ASSETS								
Investments								
Number of shares	80,527	2,012	20,405	18,720	3,611	14,128	687	24,991
Identified cost	\$ 891,467	\$ 21,184	\$ 204,699	\$ 367,441	\$ 30,828	\$ 115,170	\$ 13,220	\$ 533,309
Value	\$ 912,376	\$ 22,715	\$ 208,746	\$ 347,437	\$ 31,630	\$ 123,760	\$ 15,791	\$ 549,291
Dividends receivable	-	-	678	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	21	-	-	1	-	-
Total assets	912,376	22,715	209,445	347,437	31,630	123,761	15,791	549,291
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	1	4	-	1	1	-	-	-
Total liabilities	1	4	-	1	1	-	-	-
NET ASSETS	\$ 912,375	\$ 22,711	\$ 209,445	\$ 347,436	\$ 31,629	\$ 123,761	\$ 15,791	\$ 549,291
Outstanding units								
Policy owners	808,424	24,827	194,736	227,903	28,575	79,234	6,642	460,537
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	-	-	-	-	-	-	-	-
Variable Universal Life	-	-	-	-	-	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life II	-	-	-	-	-	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
VUL Guard SM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Tier 5	-	-	-	-	-	-	-	-
Survivorship VUL Guard SM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	1.57	-	-
MassMutual Electrum SM	-	0.91	1.08	1.52	-	1.54	2.38	1.19
APEX VUL	1.13	-	-	-	1.11	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Delaware VIP® Small Cap Value Division	DWS Small Cap Index Division	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division (Initial Class)	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Initial Class)	Fidelity® VIP Extended Market Index Division (Service Class)
ASSETS								
Investments								
Number of shares	21,505	727,978	2,759	72,572	2,177,899	168,124	45,010	14,863
Identified cost	\$ 745,459	\$ 10,794,134	\$ 23,582	\$ 704,895	\$ 89,204,992	\$ 6,473,683	\$ 542,973	\$ 171,948
Value	\$ 820,211	\$ 9,922,344	\$ 23,896	\$ 701,769	\$ 105,911,223	\$ 8,120,392	\$ 582,425	\$ 191,730
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	3	-	2	-	-	-	2	-
Total assets	820,214	9,922,344	23,898	701,769	105,911,223	8,120,392	582,427	191,730
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	56	-	1	64	8	-	-
Total liabilities	-	56	-	1	64	8	-	-
NET ASSETS	\$ 820,214	\$ 9,922,288	\$ 23,898	\$ 701,768	\$ 105,911,159	\$ 8,120,384	\$ 582,427	\$ 191,730
Outstanding units								
Policy owners	576,506	2,227,999	18,911	799,613	16,615,944	1,357,752	477,416	196,194
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	6.82	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	6.40	-	-
Survivorship Variable Universal Life	-	4.85	-	-	8.98	-	-	-
Variable Universal Life	-	4.37	-	-	7.32	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	6.86	-	-
Survivorship Variable Universal Life II	-	4.69	-	-	6.51	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	4.41	-	-	6.81	-	-	-
Tier 2	-	4.45	-	-	7.24	-	-	-
VUL GuardSM								
Tier 1	-	5.66	-	-	8.20	-	-	-
Tier 2	-	4.03	-	-	6.55	-	-	-
Tier 3	-	3.83	-	-	6.23	-	-	-
Tier 4	-	3.91	-	-	6.35	-	-	-
Tier 5	-	4.23	-	-	6.88	-	-	-
Survivorship VUL GuardSM								
Tier 1	-	3.84	-	-	6.05	-	-	-
Tier 2	-	3.91	-	-	6.17	-	-	-
Tier 3	-	3.99	-	-	6.29	-	-	-
Tier 4	-	3.99	-	-	6.29	-	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	6.03	-	-	-
Tier 2	-	-	-	-	6.12	-	-	-
Tier 3	-	-	-	-	6.22	-	-	-
Tier 4	-	-	-	-	6.56	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	2.60	-	-
MassMutual Electrum SM	1.42	-	1.26	-	2.21	-	-	0.98
APEX VUL	-	-	-	0.88	1.29	-	1.22	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
ASSETS								
Investments								
Number of shares	9,612	81,856	95,698	67,854	12,001	677	15,507	77
Identified cost	\$ 115,466	\$ 1,176,962	\$ 1,397,032	\$ 1,612,493	\$ 273,671	\$ 16,046	\$ 316,266	\$ 916
Value	\$ 119,673	\$ 1,236,850	\$ 1,465,132	\$ 1,757,410	\$ 298,102	\$ 17,022	\$ 351,864	\$ 978
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	2	1	3	2	-	2	-
Total assets	119,673	1,236,852	1,465,133	1,757,413	298,104	17,022	351,866	978
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	-	-
Total liabilities	-	-	-	-	-	-	-	-
NET ASSETS	\$ 119,673	\$ 1,236,852	\$ 1,465,133	\$ 1,757,413	\$ 298,104	\$ 17,022	\$ 351,866	\$ 978
Outstanding units								
Policy owners	83,337	832,720	942,739	1,059,304	172,137	16,273	202,304	934
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	-	-	-	-	-	-	-	-
Variable Universal Life	-	-	-	-	-	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life II	-	-	-	-	-	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
VUL Guard SM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Tier 5	-	-	-	-	-	-	-	-
Survivorship VUL Guard SM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Variable Universal Life III	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	1.44	1.49	1.55	1.66	1.73	1.05	1.74	1.05
APEX VUL	-	-	-	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Health Care Division	Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Division (Service Class 2)	Fidelity® VIP Overseas Division	Fidelity® VIP Real Estate Division (Initial Class)
ASSETS								
Investments								
Number of shares	1,278	17,965	385	2,853	72,391	28,340	38	1
Identified cost	\$ 15,203	\$ 1,391,757	\$ 12,386	\$ 1,237,200	\$ 725,459	\$ 286,122	\$ 945	\$ 18
Value	\$ 16,079	\$ 1,659,285	\$ 13,193	\$ 1,311,712	\$ 768,066	\$ 299,274	\$ 994	\$ 18
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	4	-	1	-	-
Total assets	16,079	1,659,285	13,193	1,311,716	768,066	299,275	994	18
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	1	1	-	1	-	1	-
Total liabilities	-	1	1	-	1	-	1	-
NET ASSETS	\$ 16,079	\$ 1,659,284	\$ 13,192	\$ 1,311,716	\$ 768,065	\$ 299,275	\$ 993	\$ 18
Outstanding units								
Policy owners	15,372	567,689	13,352	1,111,184	708,749	305,960	938	17
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	-	-	-	-	-	-	-	-
Variable Universal Life	-	-	-	-	-	-	-	-
Strategic Variable Life® Plus	-	4.08	-	-	-	-	-	-
Survivorship Variable Universal Life II	-	-	-	-	-	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
VUL GuardSM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Tier 5	-	-	-	-	-	-	-	-
Survivorship VUL GuardSM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	1.05	2.74	-	1.18	-	0.98	1.51	-
APEX VUL	-	-	0.99	-	1.08	-	1.06	1.08

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Fidelity® VIP Real Estate Division (Service Class)	Fidelity® VIP Strategic Income Division	Fidelity® VIP Total Market Index Division (Initial Class)	Franklin Mutual Global Discovery VIP Division	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division
ASSETS								
Investments								
Number of shares	7,731	24	80,625	164	1,352,781	190	92,844	29,656
Identified cost	\$ 123,888	\$ 248	\$ 1,239,166	\$ 2,903	\$ 18,219,120	\$ 1,672	\$ 880,693	\$ 250,032
Value	\$ 132,672	\$ 250	\$ 1,391,583	\$ 3,013	\$ 17,951,408	\$ 1,712	\$ 897,801	\$ 262,455
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	1	-	-	-	-	-	1	-
Total assets	132,673	250	1,391,583	3,013	17,951,408	1,712	897,802	262,455
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	-	2	-	45	-	-	3
Total liabilities	-	-	2	-	45	-	-	3
NET ASSETS	\$ 132,673	\$ 250	\$ 1,391,581	\$ 3,013	\$ 17,951,363	\$ 1,712	\$ 897,802	\$ 262,452
Outstanding units								
Policy owners	109,152	238	1,053,612	2,044	3,648,614	1,569	849,586	167,207
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	-	-	-	-	6.62	-	-	-
Variable Universal Life	-	-	-	-	6.22	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	1.97
Survivorship Variable Universal Life II	-	-	-	-	6.62	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	5.97	-	-	-
Tier 2	-	-	-	-	5.35	-	-	-
VUL GuardSM								
Tier 1	-	-	-	-	6.29	-	-	-
Tier 2	-	-	-	-	4.84	-	-	-
Tier 3	-	-	-	-	4.60	-	-	-
Tier 4	-	-	-	-	4.69	-	-	-
Tier 5	-	-	-	-	5.09	-	-	-
Survivorship VUL GuardSM								
Tier 1	-	-	-	-	4.20	-	-	-
Tier 2	-	-	-	-	4.29	-	-	-
Tier 3	-	-	-	-	4.37	-	-	-
Tier 4	-	-	-	-	4.37	-	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	1.22	-	-	1.47	1.60	1.09	1.06	1.33
APEX VUL	-	1.05	1.32	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division
ASSETS								
Investments								
Number of shares	345	130,231	4,505	949,132	8,849	13,477,945	7,431	1,921,204
Identified cost	\$ 3,121	\$ 2,171,342	\$ 52,373	\$ 11,796,615	\$ 141,268	\$ 29,745,191	\$ 404,766	\$ 93,732,441
Value	\$ 2,907	\$ 2,085,006	\$ 55,319	\$ 11,902,112	\$ 172,819	\$ 27,225,448	\$ 438,128	\$ 90,431,066
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	4	-	-	-	-	-	-
Total assets	2,907	2,085,010	55,319	11,902,112	172,819	27,225,448	438,128	90,431,066
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	6	-	-	82	15	61	-	97
Total liabilities	6	-	-	82	15	61	-	97
NET ASSETS	\$ 2,901	\$ 2,085,010	\$ 55,319	\$ 11,902,030	\$ 172,804	\$ 27,225,387	\$ 438,128	\$ 90,430,969
Outstanding units								
Policy owners	774	258,933	34,164	1,917,718	39,290	7,827,963	198,188	15,425,839
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	3.87	9.83	-	6.39	5.33	4.04	-	12.60
Variable Life Select	-	-	-	-	-	-	-	11.52
Strategic Group Variable Universal Life®	-	-	-	-	-	3.91	-	6.13
Survivorship Variable Universal Life	-	-	-	5.51	-	3.22	-	6.14
Variable Universal Life	-	-	-	4.38	-	3.01	-	5.18
Strategic Variable Life® Plus	3.50	9.09	-	5.24	4.40	3.61	-	5.00
Survivorship Variable Universal Life II	-	-	-	4.70	-	3.22	-	3.73
Variable Universal Life II								
Tier 1	-	-	-	4.79	-	2.72	-	3.70
Tier 2	-	-	-	6.81	-	3.82	-	5.24
VUL GuardSM								
Tier 1	-	-	-	7.24	-	5.21	-	5.85
Tier 2	-	-	-	6.16	-	3.45	-	4.74
Tier 3	-	-	-	5.86	-	3.28	-	4.50
Tier 4	-	-	-	5.97	-	3.35	-	4.60
Tier 5	-	-	-	6.48	-	3.63	-	4.98
Survivorship VUL GuardSM								
Tier 1	-	-	-	5.77	-	3.29	-	4.51
Tier 2	-	-	-	5.89	-	3.36	-	4.60
Tier 3	-	-	-	6.00	-	3.42	-	4.69
Tier 4	-	-	-	6.00	-	3.42	-	4.69
Variable Universal Life III								
Tier 1	-	-	-	-	-	3.01	-	5.60
Tier 2	-	-	-	-	-	3.05	-	5.68
Tier 3	-	-	-	-	-	3.10	-	5.77
Tier 4	-	-	-	-	-	3.27	-	6.09
Strategic Group Variable Universal Life® II	-	-	-	-	-	1.51	-	-
MassMutual Electrum SM	-	1.79	1.62	-	-	1.34	2.21	-
APEX VUL	-	-	-	-	-	1.01	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division	Invesco V.I. Diversified Dividend Division	Invesco V.I. EQV International Equity Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division
ASSETS								
Investments								
Number of shares	5,344	92,308	2,512,136	1,033,914	99,458	676	2,794,358	4,285
Identified cost	\$ 95,149	\$ 1,445,210	\$ 16,480,026	\$ 77,425,052	\$ 2,543,777	\$ 20,498	\$ 107,222,723	\$ 55,454
Value	\$ 105,109	\$ 1,417,843	\$ 14,419,662	\$ 64,940,109	\$ 2,410,874	\$ 23,045	\$ 102,161,740	\$ 59,903
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	3	-	-	1	-	-
Total assets	105,109	1,417,843	14,419,665	64,940,109	2,410,874	23,046	102,161,740	59,903
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	4	-	51	59	-	109	-
Total liabilities	-	4	-	51	59	-	109	-
NET ASSETS	\$ 105,109	\$ 1,417,839	\$ 14,419,665	\$ 64,940,058	\$ 2,410,815	\$ 23,046	\$ 102,161,631	\$ 59,903
Outstanding units								
Policy owners	55,585	548,818	10,254,266	13,017,146	1,090,322	16,647	16,632,778	54,624
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 4.46	\$ -
Large Case Variable Life Plus	-	-	-	8.75	-	-	11.99	-
Strategic Variable Life®	-	4.21	2.05	8.55	-	-	13.08	-
Variable Life Select	-	-	-	7.77	-	-	11.85	-
Strategic Group Variable Universal Life®	-	2.58	1.55	4.47	-	-	7.83	-
Survivorship Variable Universal Life	-	-	1.48	4.72	2.25	-	8.19	-
Variable Universal Life	-	-	1.54	4.48	2.11	-	7.43	-
Strategic Variable Life® Plus	-	2.53	1.51	4.12	-	-	7.18	-
Survivorship Variable Universal Life II	-	-	1.65	2.38	2.25	-	4.68	-
Variable Universal Life II								
Tier 1	-	-	1.34	3.52	2.03	-	4.66	-
Tier 2	-	-	1.29	4.90	1.91	-	5.44	-
VUL Guard SM								
Tier 1	-	-	1.23	5.65	2.13	-	6.80	-
Tier 2	-	-	1.16	4.43	1.73	-	4.92	-
Tier 3	-	-	1.11	4.21	1.64	-	4.68	-
Tier 4	-	-	1.13	4.29	1.68	-	4.77	-
Tier 5	-	-	1.22	4.65	1.82	-	5.17	-
Survivorship VUL Guard SM								
Tier 1	-	-	1.08	4.26	1.61	-	4.55	-
Tier 2	-	-	1.10	4.34	1.64	-	4.64	-
Tier 3	-	-	1.12	4.43	1.67	-	4.73	-
Tier 4	-	-	1.12	4.43	1.67	-	4.73	-
Variable Universal Life III								
Tier 1	-	-	-	5.48	3.25	-	4.60	-
Tier 2	-	-	-	5.57	3.30	-	4.67	-
Tier 3	-	-	-	5.65	3.35	-	4.74	-
Tier 4	-	-	-	5.96	3.53	-	4.99	-
Strategic Group Variable Universal Life® II	-	-	-	2.25	-	-	2.06	-
MassMutual Electrum SM	1.89	-	-	1.92	1.53	1.38	1.78	1.10
APEX VUL	-	-	-	0.98	-	-	1.11	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)
December 31, 2023

	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division (Institutional Class)
ASSETS								
Investments								
Number of shares	7,509,236	164,603	1,836,134	129,979	45	382,790	3,487,062	28
Identified cost	\$ 32,935,774	\$ 4,683,472	\$ 40,545,473	\$ 3,187,964	\$ 683	\$ 7,816,963	\$ 3,487,062	\$ 1,297
Value	\$ 32,214,621	\$ 4,264,852	\$ 33,454,356	\$ 3,497,733	\$ 781	\$ 7,081,608	\$ 3,487,062	\$ 1,287
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	80	-
Total assets	32,214,621	4,264,852	33,454,356	3,497,733	781	7,081,608	3,487,142	1,287
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	89	66	78	4	-	84	-	8
Total liabilities	89	66	78	4	-	84	-	8
NET ASSETS	\$ 32,214,532	\$ 4,264,786	\$ 33,454,278	\$ 3,497,729	\$ 781	\$ 7,081,524	\$ 3,487,142	\$ 1,279
Outstanding units								
Policy owners	13,454,447	931,122	7,176,261	431,845	471	1,298,780	2,615,717	308
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	0.81	-	-	-	-	-	-	-
Strategic Variable Life®	3.53	-	11.09	8.80	-	-	1.68	-
Variable Life Select	3.28	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	2.45	-	4.59	7.96	-	-	1.34	-
Survivorship Variable Universal Life	2.68	5.12	4.72	-	-	3.31	-	-
Variable Universal Life	2.51	4.81	3.75	-	-	3.09	-	-
Strategic Variable Life® Plus	2.48	-	4.38	8.22	-	-	1.31	4.15
Survivorship Variable Universal Life II	2.63	5.12	4.03	-	-	3.31	-	-
Variable Universal Life II								
Tier 1	2.27	4.62	4.10	-	-	2.63	-	-
Tier 2	2.01	4.72	5.14	-	-	5.38	-	-
VUL GuardSM								
Tier 1	2.03	4.86	5.63	-	-	6.80	-	-
Tier 2	1.82	4.27	4.65	-	-	4.87	-	-
Tier 3	1.73	4.06	4.42	-	-	4.63	-	-
Tier 4	1.76	4.14	4.51	-	-	4.72	-	-
Tier 5	1.91	4.49	4.89	-	-	5.12	-	-
Survivorship VUL GuardSM								
Tier 1	1.69	3.89	4.33	-	-	5.46	-	-
Tier 2	1.72	3.97	4.41	-	-	5.57	-	-
Tier 3	1.75	4.05	4.50	-	-	5.68	-	-
Tier 4	1.75	4.05	4.50	-	-	5.68	-	-
Variable Universal Life III								
Tier 1	1.64	3.97	5.11	-	-	6.51	-	-
Tier 2	1.66	4.03	5.19	-	-	6.61	-	-
Tier 3	1.69	4.09	5.27	-	-	6.72	-	-
Tier 4	1.78	4.31	5.55	-	-	7.08	-	-
Strategic Group Variable Universal Life® II	1.13	-	2.24	-	-	-	-	-
MassMutual Electrum SM	1.04	-	1.85	-	1.66	-	-	-
APEX VUL	0.94	-	1.27	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Janus Henderson Balanced Division (Service Class)	Janus Henderson Forty Division (Institutional Class)	Janus Henderson Forty Division (Service Class)	Janus Henderson Global Research Division (Institutional Class)	Janus Henderson Global Research Division (Service Class)	Janus Henderson Global Technology and Innovation Division	Lord Abnett Developing Growth Division	LVIP JPMorgan U.S. Equity Division
ASSETS								
Investments								
Number of shares	131,418	583,632	8,513	399,356	5,913	429	7,835	39,531
Identified cost	\$ 5,589,607	\$ 24,513,151	\$ 368,470	\$ 21,254,058	\$ 321,458	\$ 6,217	\$ 225,766	\$ 1,496,490
Value	\$ 6,314,656	\$ 27,634,982	\$ 361,718	\$ 24,400,660	\$ 348,977	\$ 6,855	\$ 187,722	\$ 1,487,381
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	-	1
Total assets	6,314,656	27,634,982	361,718	24,400,660	348,977	6,855	187,722	1,487,382
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	59	31	45	-	43	7	-	-
Total liabilities	59	31	45	-	43	7	-	-
NET ASSETS	\$ 6,314,597	\$ 27,634,951	\$ 361,673	\$ 24,400,660	\$ 348,934	\$ 6,848	\$ 187,722	\$ 1,487,382
Outstanding units								
Policy owners	1,372,650	3,388,528	42,668	9,943,265	95,568	5,360	100,311	645,592
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	5.61	-	2.11	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	4.91	-	-	-	-	-	-	-
Variable Universal Life	4.62	5.33	-	2.03	-	-	-	-
Strategic Variable Life® Plus	-	5.26	-	1.98	-	-	-	-
Survivorship Variable Universal Life II	4.91	5.72	-	2.18	-	-	-	-
Variable Universal Life II								
Tier 1	4.43	6.93	-	2.63	-	-	-	-
Tier 2	4.63	9.79	-	4.04	-	-	-	-
VUL GuardSM								
Tier 1	4.66	-	9.70	-	4.30	-	-	-
Tier 2	4.19	-	8.42	-	3.48	-	-	-
Tier 3	3.98	-	8.01	-	3.31	-	-	-
Tier 4	4.06	-	8.17	-	3.37	-	-	-
Tier 5	4.40	-	8.86	-	3.66	-	-	-
Survivorship VUL GuardSM								
Tier 1	3.95	-	7.63	-	3.45	-	-	-
Tier 2	4.02	-	7.78	-	3.51	-	-	-
Tier 3	4.10	-	7.93	-	3.58	-	-	-
Tier 4	4.10	-	7.93	-	3.58	-	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	-	-	-	-	-	-	1.87	2.30
APEX VUL	-	-	-	-	-	1.28	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MFS® Blended Research® Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division
ASSETS								
Investments								
Number of shares	7,252	24,160	50	42,440	45,870	22,319	24,742	485,646
Identified cost	\$ 371,950	\$ 331,632	\$ 542	\$ 2,471,412	\$ 1,330,049	\$ 800,410	\$ 228,130	\$ 8,619,565
Value	\$ 402,105	\$ 316,016	\$ 548	\$ 2,558,715	\$ 1,348,573	\$ 803,255	\$ 243,210	\$ 6,284,263
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	1	-	-	-	-	1	-
Total assets	402,105	316,017	548	2,558,715	1,348,573	803,255	243,211	6,284,263
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	-	-	9	2	35	-	54
Total liabilities	-	-	-	9	2	35	-	54
NET ASSETS	\$ 402,105	\$ 316,017	\$ 548	\$ 2,558,706	\$ 1,348,571	\$ 803,220	\$ 243,211	\$ 6,284,209
Outstanding units								
Policy owners	187,947	225,052	535	560,304	902,358	137,883	139,347	1,075,318
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	7.12	-	-	-	8.51
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	5.54	-	-	-	6.54
Survivorship Variable Universal Life	-	-	-	-	-	6.45	-	6.93
Variable Universal Life	-	-	-	-	-	6.07	-	6.51
Strategic Variable Life® Plus	-	-	-	5.88	-	-	-	7.30
Survivorship Variable Universal Life II	-	-	-	-	-	6.45	-	6.93
Variable Universal Life II								
Tier 1	-	-	-	-	-	5.82	-	6.25
Tier 2	-	-	-	-	-	5.81	-	5.36
VUL GuardSM								
Tier 1	-	-	-	-	-	6.13	-	6.58
Tier 2	-	-	-	-	-	5.25	-	4.84
Tier 3	-	-	-	-	-	4.99	-	4.61
Tier 4	-	-	-	-	-	5.09	-	4.70
Tier 5	-	-	-	-	-	5.52	-	5.09
Survivorship VUL GuardSM								
Tier 1	-	-	-	-	-	4.92	-	5.44
Tier 2	-	-	-	-	-	5.01	-	5.55
Tier 3	-	-	-	-	-	5.11	-	5.66
Tier 4	-	-	-	-	-	5.11	-	5.66
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	2.14	1.40	1.03	2.41	1.49	-	1.75	-
APEX VUL	-	-	-	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division	MML American Funds Growth Division	MML Balanced Allocation Division	MML Blend Division
ASSETS								
Investments								
Number of shares	28,487	1,068	244,944	745,100	163,287	362,209	414,457	1,631,260
Identified cost	\$ 821,522	\$ 37,358	\$ 5,545,625	\$ 6,681,672	\$ 1,690,311	\$ 5,399,923	\$ 3,773,106	\$ 34,096,831
Value	\$ 910,725	\$ 34,444	\$ 5,209,968	\$ 6,206,684	\$ 1,642,665	\$ 5,056,445	\$ 3,406,839	\$ 31,734,071
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	4	-	1	8	-	-
Total assets	910,725	34,444	5,209,972	6,206,684	1,642,666	5,056,453	3,406,839	31,734,071
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	9	-	-	24	-	-	29	61
Total liabilities	9	-	-	24	-	-	29	61
NET ASSETS	\$ 910,716	\$ 34,444	\$ 5,209,972	\$ 6,206,660	\$ 1,642,666	\$ 5,056,453	\$ 3,406,810	\$ 31,734,010
Outstanding units								
Policy owners	190,077	21,979	3,118,821	2,124,003	1,296,151	3,681,159	1,966,775	6,897,148
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 13.03
Large Case Variable Life Plus	-	-	-	-	-	-	-	10.79
Strategic Variable Life®	5.65	-	-	-	-	-	-	6.37
Variable Life Select	-	-	-	-	-	-	-	5.91
Strategic Group Variable Universal Life®	4.52	-	-	2.46	-	-	1.82	-
Survivorship Variable Universal Life	-	-	-	-	-	-	-	4.04
Variable Universal Life	-	-	-	-	-	-	-	3.63
Strategic Variable Life® Plus	4.85	-	-	-	-	-	-	3.57
Survivorship Variable Universal Life II	-	-	-	-	-	-	-	3.87
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	3.57
Tier 2	-	-	-	-	-	-	-	4.12
VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	4.28
Tier 2	-	-	-	-	-	-	-	3.73
Tier 3	-	-	-	-	-	-	-	3.55
Tier 4	-	-	-	-	-	-	-	3.62
Tier 5	-	-	-	-	-	-	-	3.92
Survivorship VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	3.46
Tier 2	-	-	-	-	-	-	-	3.53
Tier 3	-	-	-	-	-	-	-	3.60
Tier 4	-	-	-	-	-	-	-	3.60
Variable Universal Life III	-	-	-	-	-	-	-	-
Tier 1	-	-	-	3.94	-	-	2.65	-
Tier 2	-	-	-	4.00	-	-	2.69	-
Tier 3	-	-	-	4.06	-	-	2.73	-
Tier 4	-	-	-	4.29	-	-	2.88	-
Strategic Group Variable Universal Life® II	-	-	-	1.89	1.72	3.15	1.52	1.85
MassMutual Electrum SM	-	1.57	1.67	1.62	1.50	2.55	1.37	1.61
APEX VUL	-	-	-	1.19	1.12	1.24	1.06	1.14

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division	MML Equity Income Division	MML Equity Index Division (Service Class I)	MML Equity Index Division (Class II)	MML Equity Index Division (Class III)
ASSETS								
Investments								
Number of shares	1,172,552	229,850	21,538	3,824,395	349,350	205,691	3,739,188	193,101
Identified cost	\$ 18,165,180	\$ 2,093,128	\$ 189,019	\$ 98,767,029	\$ 3,622,597	\$ 5,449,520	\$ 106,381,630	\$ 5,531,152
Value	\$ 18,760,826	\$ 1,841,101	\$ 185,009	\$ 100,476,910	\$ 3,455,069	\$ 5,837,505	\$ 112,287,815	\$ 5,781,437
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	1	-	-	6	-	6
Total assets	18,760,826	1,841,101	185,010	100,476,910	3,455,069	5,837,511	112,287,815	5,781,443
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	43	27	-	88	6	-	22	-
Total liabilities	43	27	-	88	6	-	22	-
NET ASSETS	\$ 18,760,783	\$ 1,841,074	\$ 185,010	\$ 100,476,822	\$ 3,455,063	\$ 5,837,511	\$ 112,287,793	\$ 5,781,443
Outstanding units								
Policy owners	5,282,513	1,068,204	179,247	17,945,278	1,539,176	2,738,435	20,275,166	4,252,177
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ 14.94	\$ -	\$ -	\$ 4.29	\$ -
Large Case Variable Life Plus	-	-	-	12.15	-	-	10.17	-
Strategic Variable Life®	3.00	-	-	6.84	-	-	8.37	-
Variable Life Select	-	-	-	6.31	-	-	4.58	-
Strategic Group Variable Universal Life®	3.76	1.68	-	2.85	-	-	6.19	-
Survivorship Variable Universal Life	4.39	-	-	3.70	-	-	5.88	-
Variable Universal Life	3.04	-	-	3.35	-	-	4.97	-
Strategic Variable Life® Plus	2.81	-	-	3.28	-	-	4.75	-
Survivorship Variable Universal Life II	3.27	-	-	3.69	-	-	4.51	-
Variable Universal Life II								
Tier 1	3.76	-	-	3.22	-	-	4.65	-
Tier 2	5.73	-	-	4.32	-	-	6.12	-
VUL GuardSM								
Tier 1	6.10	-	-	4.75	-	-	6.69	-
Tier 2	5.18	-	-	3.90	-	-	5.54	-
Tier 3	4.93	-	-	3.71	-	-	5.26	-
Tier 4	5.03	-	-	3.79	-	-	5.37	-
Tier 5	5.45	-	-	4.11	-	-	5.82	-
Survivorship VUL GuardSM								
Tier 1	5.08	-	-	3.51	-	-	5.11	-
Tier 2	5.18	-	-	3.58	-	-	5.21	-
Tier 3	5.28	-	-	3.65	-	-	5.31	-
Tier 4	5.28	-	-	3.65	-	-	5.31	-
Variable Universal Life III								
Tier 1	7.31	2.41	-	4.16	3.92	-	5.78	-
Tier 2	7.42	2.44	-	4.22	3.98	-	5.87	-
Tier 3	7.53	2.48	-	4.29	4.04	-	5.96	-
Tier 4	7.94	2.62	-	4.52	4.26	-	6.29	-
Strategic Group Variable Universal Life® II	2.57	1.45	1.15	2.00	2.07	-	-	-
MassMutual Electrum SM	2.16	1.32	1.06	1.73	1.70	2.13	-	-
APEX VUL	1.07	1.04	0.91	1.38	1.35	-	-	1.36

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MML Equity Rotation Division	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division	MML Global Division (Service Class I)	MML Global Division (Class II)	MML Growth Allocation Division
ASSETS								
Investments								
Number of shares	4	63,821	89,423	108,933	14,603	72,932	165,472	955,500
Identified cost	\$ 49	\$ 460,408	\$ 841,671	\$ 1,108,197	\$ 176,987	\$ 263,004	\$ 774,848	\$ 6,960,518
Value	\$ 52	\$ 456,956	\$ 852,201	\$ 1,110,024	\$ 176,116	\$ 291,727	\$ 762,827	\$ 6,889,153
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	-	-
Total assets	52	456,956	852,201	1,110,024	176,116	291,727	762,827	6,889,153
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	7	23	7	9	-	24	16
Total liabilities	-	7	23	7	9	-	24	16
NET ASSETS	\$ 52	\$ 456,949	\$ 852,178	\$ 1,110,017	\$ 176,107	\$ 291,727	\$ 762,803	\$ 6,889,137
Outstanding units								
Policy owners	48	247,711	559,198	492,360	111,479	182,688	277,802	2,296,938
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	2.21
Survivorship Variable Universal Life	-	-	-	-	-	-	-	-
Variable Universal Life	-	-	-	-	-	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life II	-	-	-	-	-	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
VUL GuardSM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Tier 5	-	-	-	-	-	-	-	-
Survivorship VUL GuardSM								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Variable Universal Life III								
Tier 1	-	-	1.97	-	-	-	4.05	3.42
Tier 2	-	-	2.00	-	-	-	4.11	3.47
Tier 3	-	-	2.03	-	-	-	4.17	3.52
Tier 4	-	-	2.14	-	-	-	4.40	3.71
Strategic Group Variable Universal Life® II	-	2.62	1.35	2.65	2.02	-	1.94	1.75
MassMutual Electrum SM	-	2.08	1.22	2.28	1.73	1.60	-	1.53
APEX VUL	1.08	1.29	1.17	1.27	1.43	-	1.14	1.14

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML iShares® 60/40 Allocation Division	MML iShares® 80/20 Allocation Division	MML Large Cap Growth Division	MML Managed Bond Division
ASSETS								
Investments								
Number of shares	29,190	148,923	615,001	14,379	649	2,266	52,358	1,988,165
Identified cost	\$ 250,351	\$ 1,505,007	\$ 6,229,711	\$ 141,446	\$ 6,184	\$ 21,560	\$ 665,021	\$ 24,312,725
Value	\$ 251,327	\$ 1,498,161	\$ 5,362,803	\$ 147,677	\$ 6,356	\$ 22,637	\$ 727,776	\$ 21,581,109
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	1	-	-	-	-	-	-	-
Total assets	251,328	1,498,161	5,362,803	147,677	6,356	22,637	727,776	21,581,109
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	-	21	71	4	6	-	8	67
Total liabilities	-	21	71	4	6	-	8	67
NET ASSETS	\$ 251,328	\$ 1,498,140	\$ 5,362,732	\$ 147,673	\$ 6,350	\$ 22,637	\$ 727,768	\$ 21,581,042
Outstanding units								
Policy owners	209,556	654,223	3,038,072	110,693	5,872	20,507	414,702	10,003,280
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 5.66
Large Case Variable Life Plus	-	-	-	-	-	-	-	4.96
Strategic Variable Life®	-	-	-	-	-	-	-	3.18
Variable Life Select	-	-	-	-	-	-	-	2.99
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	2.22
Survivorship Variable Universal Life	-	-	1.95	-	-	-	-	2.58
Variable Universal Life	-	-	1.83	-	-	-	-	2.32
Strategic Variable Life® Plus	-	-	-	-	-	-	-	2.33
Survivorship Variable Universal Life II	-	-	1.95	-	-	-	-	2.50
Variable Universal Life II							-	
Tier 1	-	-	1.75	-	-	-	-	1.99
Tier 2	-	-	1.81	-	-	-	-	1.91
VUL Guard SM							-	
Tier 1	-	-	1.77	-	-	-	-	1.82
Tier 2	-	-	1.64	-	-	-	-	1.73
Tier 3	-	-	1.56	-	-	-	-	1.64
Tier 4	-	-	1.59	-	-	-	-	1.67
Tier 5	-	-	1.72	-	-	-	-	1.82
Survivorship VUL Guard SM							-	
Tier 1	-	-	1.53	-	-	-	-	1.61
Tier 2	-	-	1.56	-	-	-	-	1.65
Tier 3	-	-	1.59	-	-	-	-	1.68
Tier 4	-	-	1.59	-	-	-	-	1.68
Variable Universal Life III							-	
Tier 1	-	3.89	1.61	-	-	-	-	1.53
Tier 2	-	3.95	1.63	-	-	-	-	1.55
Tier 3	-	4.01	1.66	-	-	-	-	1.57
Tier 4	-	4.23	1.75	-	-	-	-	1.66
Strategic Group Variable Universal Life® II	1.51	2.11	1.25	1.52	-	-	2.92	1.15
MassMutual Electrum SM	1.26	1.72	1.17	1.27	-	-	2.51	1.09
APEX VUL	1.09	1.41	0.97	1.18	1.08	1.10	1.32	0.90

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division	MML Small Company Value Division
ASSETS								
Investments								
Number of shares	812,407	327,073	272,235	275,510	40,716	2,682,046	1,855,204	55,967
Identified cost	\$ 10,337,597	\$ 3,570,668	\$ 2,425,482	\$ 2,653,513	\$ 358,514	\$ 26,838,924	\$ 22,217,276	\$ 543,204
Value	\$ 9,933,032	\$ 3,525,847	\$ 2,150,657	\$ 2,336,326	\$ 362,782	\$ 29,297,411	\$ 18,257,619	\$ 476,840
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	-	-	-	-	-
Total assets	9,933,032	3,525,847	2,150,657	2,336,326	362,782	29,297,411	18,257,619	476,840
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	90	17	24	42	1	74	102	10
Total liabilities	90	17	24	42	1	74	102	10
NET ASSETS	\$ 9,932,942	\$ 3,525,830	\$ 2,150,633	\$ 2,336,284	\$ 362,781	\$ 29,297,337	\$ 18,257,517	\$ 476,830
Outstanding units								
Policy owners	4,027,241	974,670	757,179	976,188	336,090	5,752,578	4,063,245	289,137
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	4.13	-
Variable Life Select	-	-	-	-	-	6.07	-	-
Strategic Group Variable Universal Life®	-	-	-	1.96	-	6.04	-	-
Survivorship Variable Universal Life	2.49	-	-	-	-	5.63	5.67	-
Variable Universal Life	2.32	-	-	-	-	6.45	4.22	-
Strategic Variable Life® Plus	2.06	-	-	-	-	6.77	3.87	-
Survivorship Variable Universal Life II	2.49	-	-	-	-	6.22	4.53	-
Variable Universal Life II				-				
Tier 1	2.18	-	-	-	-	5.13	5.04	-
Tier 2	2.58	-	-	-	-	4.99	5.71	-
VUL Guard SM				-				
Tier 1	2.89	-	-	-	-	5.83	7.20	-
Tier 2	2.34	-	-	-	-	4.52	5.16	-
Tier 3	2.22	-	-	-	-	4.29	4.91	-
Tier 4	2.27	-	-	-	-	4.38	5.01	-
Tier 5	2.46	-	-	-	-	4.75	5.43	-
Survivorship VUL Guard SM				-				
Tier 1	2.11	-	-	-	-	4.40	5.21	-
Tier 2	2.15	-	-	-	-	4.49	5.31	-
Tier 3	2.19	-	-	-	-	4.57	5.41	-
Tier 4	2.19	-	-	-	-	4.57	5.41	-
Variable Universal Life III				-				
Tier 1	2.36	6.59	4.84	2.92	-	5.47	5.38	-
Tier 2	2.40	6.69	4.92	2.97	-	5.55	5.46	-
Tier 3	2.44	6.79	4.99	3.01	-	5.64	5.54	-
Tier 4	2.57	7.16	5.27	3.18	-	5.94	5.84	-
Strategic Group Variable Universal Life® II	1.43	2.21	1.97	1.60	1.14	2.18	2.22	2.07
MassMutual Electrum SM	1.31	1.84	1.57	1.42	1.09	1.78	1.86	1.61
APEX VUL	1.11	1.07	1.29	1.10	0.99	1.27	1.04	1.30

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division	PIMCO High Yield Division
ASSETS								
Investments								
Number of shares	148,097	43,139	130,969	53,959	22,589,077	90,903	22,236	23,492
Identified cost	\$ 1,436,606	\$ 272,356	\$ 2,310,352	\$ 476,344	\$ 22,589,077	\$ 583,854	\$ 248,177	\$ 180,333
Value	\$ 1,328,434	\$ 229,930	\$ 1,927,869	\$ 487,253	\$ 22,589,075	\$ 496,328	\$ 213,914	\$ 168,676
Dividends receivable	-	-	-	-	1	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	1	562	-	13	26
Total assets	1,328,434	229,930	1,927,869	487,254	22,589,638	496,328	213,927	168,702
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	20	11	22	-	-	25	-	-
Total liabilities	20	11	22	-	-	25	-	-
NET ASSETS	\$ 1,328,414	\$ 229,919	\$ 1,927,847	\$ 487,254	\$ 22,589,638	\$ 496,303	\$ 213,927	\$ 168,702
Outstanding units								
Policy owners	426,872	270,427	541,371	494,452	19,075,762	440,774	206,390	134,084
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ 2.27	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	1.99	-	-	-
Strategic Variable Life®	-	-	-	-	1.64	-	-	-
Variable Life Select	-	-	-	-	1.52	-	-	-
Strategic Group Variable Universal Life®	-	0.83	-	-	-	-	-	-
Survivorship Variable Universal Life	-	-	-	-	1.44	-	-	-
Variable Universal Life	-	-	-	-	1.30	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life II	-	-	-	-	1.32	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	1.12	-	-	-
Tier 2	-	-	-	-	1.21	-	-	-
VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	1.15	-	-	-
Tier 2	-	-	-	-	1.09	-	-	-
Tier 3	-	-	-	-	1.04	-	-	-
Tier 4	-	-	-	-	1.06	-	-	-
Tier 5	-	-	-	-	1.15	-	-	-
Survivorship VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	1.07	-	-	-
Tier 2	-	-	-	-	1.09	-	-	-
Tier 3	-	-	-	-	1.11	-	-	-
Tier 4	-	-	-	-	1.11	-	-	-
Variable Universal Life III	-	-	-	-	-	-	-	-
Tier 1	4.92	-	5.27	-	0.99	1.08	-	-
Tier 2	5.00	-	5.35	-	1.01	1.09	-	-
Tier 3	5.08	-	5.43	-	1.02	1.11	-	-
Tier 4	5.35	-	5.72	-	1.08	1.17	-	-
Strategic Group Variable Universal Life® II	1.94	1.32	2.50	1.11	1.10	-	-	-
MassMutual Electrum SM	1.59	1.09	2.08	1.06	1.10	1.40	1.04	1.26
APEX VUL	1.37	0.77	1.34	0.87	1.03	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	PIMCO Income Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
ASSETS								
Investments								
Number of shares	1,496	1,855	17,146	145,807	497,770	818,551	15,353	2,153,608
Identified cost	\$ 14,624	\$ 21,297	\$ 153,947	\$ 4,785,002	\$ 21,329,918	\$ 21,980,859	\$ 72,555	\$ 61,662,758
Value	\$ 14,881	\$ 21,467	\$ 157,402	\$ 5,015,752	\$ 22,992,011	\$ 22,722,973	\$ 71,543	\$ 62,691,526
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	1	12	-	-	-	-	-
Total assets	14,881	21,468	157,414	5,015,752	22,992,011	22,722,973	71,543	62,691,526
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	9	-	-	12	27	77	5	50
Total liabilities	9	-	-	12	27	77	5	50
NET ASSETS	\$ 14,872	\$ 21,468	\$ 157,414	\$ 5,015,740	\$ 22,991,984	\$ 22,722,896	\$ 71,538	\$ 62,691,476
Outstanding units								
Policy owners	14,068	18,460	147,323	766,818	3,094,494	5,059,409	64,225	7,274,609
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ 7.46
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	8.38	-	-	-	11.65
Variable Life Select	-	-	-	-	-	-	-	9.21
Strategic Group Variable Universal Life®	-	-	-	6.43	-	-	-	9.12
Survivorship Variable Universal Life	-	-	-	-	8.41	5.07	-	11.29
Variable Universal Life	-	-	-	-	7.90	4.77	-	10.12
Strategic Variable Life® Plus	-	-	-	7.01	-	-	1.74	10.03
Survivorship Variable Universal Life II	-	-	-	-	8.41	5.07	-	8.20
Variable Universal Life II								
Tier 1	-	-	-	-	7.58	4.58	-	7.32
Tier 2	-	-	-	-	7.41	4.46	-	7.90
VUL Guard SM								
Tier 1	-	-	-	-	7.99	4.82	-	9.40
Tier 2	-	-	-	-	6.70	4.03	-	7.14
Tier 3	-	-	-	-	6.37	3.83	-	6.79
Tier 4	-	-	-	-	6.50	3.91	-	6.93
Tier 5	-	-	-	-	7.05	4.24	-	7.51
Survivorship VUL Guard SM								
Tier 1	-	-	-	-	6.34	3.56	-	-
Tier 2	-	-	-	-	6.46	3.63	-	-
Tier 3	-	-	-	-	6.59	3.70	-	-
Tier 4	-	-	-	-	6.59	3.70	-	-
Variable Universal Life III								
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	-	-	-	-	-	-	-
MassMutual Electrum SM	-	1.16	1.07	-	-	-	1.11	-
APEX VUL	1.06	-	-	-	-	-	-	-

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	Templeton Foreign VIP	Templeton Global Bond VIP	Vanguard VIF Global Bond Index	Vanguard VIF Mid Cap Index	Vanguard VIF Real Estate Index	Voya International Index	Voya Russell™ Mid Cap Index	Voya Russell™ Small Cap Index
ASSETS								
Investments								
Number of shares	840,037	4,671	24,299	59,038	42,406	169,746	271,040	56,208
Identified cost	\$ 10,871,204	\$ 61,083	\$ 445,105	\$ 1,341,842	\$ 515,721	\$ 1,723,271	\$ 2,890,347	\$ 707,933
Value	\$ 11,962,131	\$ 63,391	\$ 451,968	\$ 1,412,791	\$ 505,478	\$ 1,868,906	\$ 2,951,627	\$ 765,548
Dividends receivable	-	-	-	-	-	-	-	-
Receivable to Massachusetts Mutual Life Insurance Company	-	-	-	3	-	1	-	-
Total assets	11,962,131	63,391	451,968	1,412,794	505,478	1,868,907	2,951,627	765,548
LIABILITIES								
Payable to Massachusetts Mutual Life Insurance Company	72	-	11	-	1	-	1	1
Total liabilities								
NET ASSETS	\$ 11,962,059	\$ 63,391	\$ 451,957	\$ 1,412,794	\$ 505,477	\$ 1,868,907	\$ 2,951,626	\$ 765,547
Outstanding units								
Policy owners	5,020,897	68,923	508,934	1,176,536	440,975	1,380,711	1,695,519	508,815
UNIT VALUE								
Variable Life Plus	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -	\$ -
Large Case Variable Life Plus	-	-	-	-	-	-	-	-
Strategic Variable Life®	-	-	-	-	-	-	-	-
Variable Life Select	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life®	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life	2.23	-	-	-	-	-	-	-
Variable Universal Life	1.96	-	-	-	-	-	-	-
Strategic Variable Life® Plus	-	-	-	-	-	-	-	-
Survivorship Variable Universal Life II	2.10	-	-	-	-	-	-	-
Variable Universal Life II	-	-	-	-	-	-	-	-
Tier 1	1.93	-	-	-	-	-	-	-
Tier 2	2.43	-	-	-	-	-	-	-
VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	2.86	-	-	-	-	-	-	-
Tier 2	2.20	-	-	-	-	-	-	-
Tier 3	2.09	-	-	-	-	-	-	-
Tier 4	2.13	-	-	-	-	-	-	-
Tier 5	2.31	-	-	-	-	-	-	-
Survivorship VUL Guard SM	-	-	-	-	-	-	-	-
Tier 1	1.98	-	-	-	-	-	-	-
Tier 2	2.02	-	-	-	-	-	-	-
Tier 3	2.06	-	-	-	-	-	-	-
Tier 4	2.06	-	-	-	-	-	-	-
Variable Universal Life III	-	-	-	-	-	-	-	-
Tier 1	-	-	-	-	-	-	-	-
Tier 2	-	-	-	-	-	-	-	-
Tier 3	-	-	-	-	-	-	-	-
Tier 4	-	-	-	-	-	-	-	-
Strategic Group Variable Universal Life® II	-	0.92	-	-	-	1.35	1.74	1.50
MassMutual Electrum SM	-	-	0.89	1.20	1.15	-	-	-
APEX VUL	30.36	0.92	0.89	1.20	1.15	1.35	1.74	1.50

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF ASSETS AND LIABILITIES (Continued)

December 31, 2023

	VY® CBRE Global Real Estate
ASSETS	
Investments	
Number of shares	61,306
Identified cost	\$ 648,802
Value	\$ 627,772
Dividends receivable	-
Receivable to Massachusetts Mutual Life Insurance Company	-
Total assets	627,772
LIABILITIES	-
Payable to Massachusetts Mutual Life Insurance Company	15
Total liabilities	
NET ASSETS	\$ 627,757
Outstanding units	
Policy owners	242,413
UNIT VALUE	
Variable Life Plus	\$ -
Large Case Variable Life Plus	-
Strategic Variable Life®	-
Variable Life Select	-
Strategic Group Variable Universal Life®	-
Survivorship Variable Universal Life	-
Variable Universal Life	-
Strategic Variable Life® Plus	-
Survivorship Variable Universal Life II	-
Variable Universal Life II	-
Tier 1	-
Tier 2	-
VUL Guard SM	-
Tier 1	-
Tier 2	-
Tier 3	-
Tier 4	-
Tier 5	-
Survivorship VUL Guard SM	-
Tier 1	-
Tier 2	-
Tier 3	-
Tier 4	-
Variable Universal Life III	2.46
Tier 1	2.49
Tier 2	2.53
Tier 3	2.67
Tier 4	-
Strategic Group Variable Universal Life® II	-
MassMutual Electrum SM	-
APEX VUL	10.16

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS
For The Year Ended December 31, 2023

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds Insurance Series® Asset Allocation Division	American Funds Insurance Series® Growth-Income Division	BlackRock High Yield V.I. Division
Investment Income								
Dividends	\$ -	\$ 476,703	\$ 958	\$ 17,735	\$ 391,383	\$ 530,993	\$ 585,020	\$ 3,779
Expenses								
Mortality and expense risk fees	2,502	108,088	71	3,692	55,682	69,809	124,686	144
Net investment income (loss)	(2,502)	368,615	887	14,043	335,701	461,184	460,334	3,635
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(16,855)	(653,771)	(1,163)	(6,847)	205,920	(99,566)	240,127	123
Realized gain distribution	1,362	-	-	-	1,274,827	921,152	2,244,505	-
Realized gain (loss)	(15,493)	(653,771)	(1,163)	(6,847)	1,480,747	821,586	2,484,632	123
Change in net unrealized appreciation/depreciation of investments	202,276	2,787,656	1,359	144,370	(422,540)	1,850,137	6,850,825	4,323
Net gain (loss) on investments	186,783	2,133,885	196	137,523	1,058,207	2,671,723	9,335,457	4,446
Net increase (decrease) in net assets resulting from operations	184,281	2,502,500	1,083	151,566	1,393,908	3,132,907	9,795,791	8,081
Capital transactions:								
Transfers of net premiums	114,030	1,034,979	-	144,605	574,847	828,840	1,444,210	1,533
Transfers due to death benefits	-	(151,246)	-	-	(82,689)	(129,463)	(127,842)	-
Transfers due to withdrawal of funds	(1)	(996,171)	-	-	(333,949)	(689,915)	(1,219,292)	24
Transfers due to policy loans, net of repayments	-	(561,096)	-	-	(309,804)	(983,297)	(1,396,174)	-
Transfers due to charges for administrative and insurance costs	(6,365)	(984,860)	(460)	(12,764)	(525,839)	(792,976)	(1,374,715)	(935)
Transfers between Divisions and to/from General Account	(49,397)	221,815	(4,860)	(1,703)	284,645	299,903	405,848	(21,786)
Net increase (decrease) in net assets resulting from capital transactions	58,267	(1,436,579)	(5,320)	130,138	(392,789)	(1,466,908)	(2,267,965)	(21,164)
Total increase (decrease)	242,548	1,065,921	(4,237)	281,704	1,001,119	1,665,999	7,527,826	(13,083)
NET ASSETS, at beginning of the year	874,318	31,490,239	32,418	1,201,230	16,271,417	23,350,591	38,935,008	77,588
NET ASSETS, at end of the year	\$ 1,116,866	\$ 32,556,160	\$ 28,181	\$ 1,482,934	\$17,272,536	\$ 25,016,590	\$ 46,462,834	\$ 64,505

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
Investment Income								
Dividends	\$ 10,866	\$ 240	\$ 8,551	\$ 1,753	\$ 727	\$ 2,507	\$ -	\$ 2,591
Expenses								
Mortality and expense risk fees	5,530	37	549	790	201	685	39	525
Net investment income (loss)	5,336	203	8,002	963	526	1,822	(39)	2,066
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(32,643)	(611)	(3,387)	(14,160)	(329)	(65)	163	(25,280)
Realized gain distribution	21,180	548	-	10,299	-	-	865	-
Realized gain (loss)	(11,463)	(63)	(3,387)	(3,861)	(329)	(65)	1,028	(25,280)
Change in net unrealized appreciation/depreciation of investments	117,421	2,662	8,237	56,762	3,059	12,318	3,914	50,294
Net gain (loss) on investments	105,958	2,599	4,850	52,901	2,730	12,253	4,942	25,014
Net increase (decrease) in net assets resulting from operations	111,294	2,802	12,852	53,864	3,256	14,075	4,903	27,080
Capital transactions:								
Transfers of net premiums	358,354	8,585	123,056	-	13,495	7,495	-	24,534
Transfers due to death benefits	8	-	-	-	-	-	-	-
Transfers due to withdrawal of funds	(6,790)	(2)	18	(1)	(92)	(95)	(1)	(3)
Transfers due to policy loans, net of repayments	(26,899)	-	-	(391)	-	-	(2,219)	-
Transfers due to charges for administrative and insurance costs	(103,962)	(783)	(3,868)	(8,525)	(3,933)	(411)	(1,133)	(4,314)
Transfers between Divisions and to/from General Account	16,709	2,111	(198,233)	(6,115)	-	48	-	315,077
Net increase (decrease) in net assets resulting from capital transactions	237,420	9,911	(79,027)	(15,032)	9,470	7,037	(3,353)	335,294
Total increase (decrease)	348,714	12,713	(66,175)	38,832	12,726	21,112	1,550	362,374
NET ASSETS, at beginning of the year	563,661	9,998	275,620	308,604	18,903	102,649	14,241	186,917
NET ASSETS, at end of the year	\$ 912,375	\$ 22,711	\$ 209,445	\$ 347,436	\$ 31,629	\$ 123,761	\$ 15,791	\$ 549,291

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Delaware VIP® Small Cap Value Division	DWS Small Cap Index Division	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division (Initial Class)	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Initial Class)	Fidelity® VIP Extended Market Index Division (Service Class)
Investment Income								
Dividends	\$ 4,069	\$ 103,463	\$ 2,531	\$ 15,814	\$ 469,907	\$ 28,905	\$ 9,126	\$ 2,712
Expenses								
Mortality and expense risk fees	1,609	26,520	75	4,610	328,968	54,568	3,436	368
Net investment income (loss)	2,460	76,943	2,456	11,204	140,939	(25,663)	5,690	2,344
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(48,333)	(400,421)	48	(10,187)	1,247,192	332,425	(10,119)	(6,134)
Realized gain distribution	27,276	221,789	-	-	3,386,849	264,712	-	-
Realized gain (loss)	(21,057)	(178,632)	48	(10,187)	4,634,041	597,137	(10,119)	(6,134)
Change in net unrealized appreciation/depreciation of investments	83,371	1,530,752	807	26,624	22,126,662	1,525,055	76,636	19,782
Net gain (loss) on investments	62,314	1,352,120	855	16,437	26,760,703	2,122,192	66,517	13,648
Net increase (decrease) in net assets resulting from operations	64,774	1,429,063	3,311	27,641	26,901,642	2,096,529	72,207	15,992
Capital transactions:								
Transfers of net premiums	189,228	343,056	361	276,525	4,296,087	216,096	241,278	-
Transfers due to death benefits	-	(7,035)	-	-	(464,106)	(25,169)	9	(1)
Transfers due to withdrawal of funds	4	(312,774)	12	(19,006)	(3,583,683)	(633,775)	(1,098)	-
Transfers due to policy loans, net of repayments	-	(206,159)	-	(6,114)	(2,436,624)	(10,323)	(3,017)	-
Transfers due to charges for administrative and insurance costs	(8,075)	(295,142)	(534)	(71,069)	(3,235,133)	(182,012)	(66,346)	(1,995)
Transfers between Divisions and to/from General Account	148,974	(149,716)	(20,068)	19,107	1,124,010	(62,747)	7,184	177,734
Net increase (decrease) in net assets resulting from capital transactions	330,131	(627,770)	(20,229)	199,443	(4,299,449)	(697,930)	178,010	175,738
Total increase (decrease)	394,905	801,293	(16,918)	227,084	22,602,193	1,398,599	250,217	191,730
NET ASSETS, at beginning of the year	425,309	9,120,995	40,816	474,684	83,308,966	6,721,785	332,210	-
NET ASSETS, at end of the year	\$ 820,214	\$9,922,288	\$ 23,898	\$ 701,768	\$105,911,159	\$ 8,120,384	\$ 582,427	\$ 191,730

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
Investment Income								
Dividends	\$ 2,781	\$ 31,139	\$ 30,309	\$ 30,207	\$ 4,020	\$ 222	\$ 4,332	\$ 12
Expenses								
Mortality and expense risk fees	139	2,711	2,606	3,705	539	44	629	12
Net investment income (loss)	2,642	28,428	27,703	26,502	3,481	178	3,703	-
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(104)	25,427	35,810	36,112	6,487	167	954	459
Realized gain distribution	298	-	-	2,959	2,915	239	2,747	19
Realized gain (loss)	194	25,427	35,810	39,071	9,402	406	3,701	478
Change in net unrealized appreciation/depreciation of investments	6,828	77,340	65,657	177,480	28,127	1,890	39,461	117
Net gain (loss) on investments	7,022	102,767	101,467	216,551	37,529	2,296	43,162	595
Net increase (decrease) in net assets resulting from operations	9,664	131,195	129,170	243,053	41,010	2,474	46,865	595
Capital transactions:								
Transfers of net premiums	38	144,243	128,222	122,709	16,799	501	63,177	38
Transfers due to death benefits	-	-	-	-	-	-	-	-
Transfers due to withdrawal of funds	-	-	(1)	10	(2)	-	(1)	-
Transfers due to policy loans, net of repayments	(1,650)	(708)	(57)	-	-	-	-	-
Transfers due to charges for administrative and insurance costs	(1,472)	(20,888)	(16,575)	(13,759)	(2,554)	(352)	(4,371)	(59)
Transfers between Divisions and to/from General Account	99,879	181,902	811,465	(11,116)	56,854	1,562	72,035	(568)
Net increase (decrease) in net assets resulting from capital transactions	96,795	304,549	923,054	97,844	71,097	1,711	130,840	(589)
Total increase (decrease)	106,459	435,744	1,052,224	340,897	112,107	4,185	177,705	6
NET ASSETS, at beginning of the year	13,214	801,108	412,909	1,416,516	185,997	12,837	174,161	972
NET ASSETS, at end of the year	\$ 119,673	\$ 1,236,852	\$ 1,465,133	\$ 1,757,413	\$ 298,104	\$ 17,022	\$ 351,866	\$ 978

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Health Care Division	Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Division (Service Class 2)	Fidelity® VIP Overseas Division	Fidelity® VIP Real Estate Division (Initial Class)
Investment Income								
Dividends	\$ 198	\$ 548	\$ -	\$ 18,505	\$ 19,399	\$ 7,031	\$ 9	\$ -
Expenses								
Mortality and expense risk fees	90	3,725	22	3,956	4,821	507	1	-
Net investment income (loss)	108	(3,177)	(22)	14,549	14,578	6,524	8	-
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	2,017	(2,841)	(66)	104,287	(7,808)	4,434	2	-
Realized gain distribution	528	67,868	-	17,480	-	-	2	-
Realized gain (loss)	2,545	65,027	(66)	121,767	(7,808)	4,434	4	-
Change in net unrealized appreciation/depreciation of investments	4,379	343,031	807	146,599	76,962	13,066	48	-
Net gain (loss) on investments	6,924	408,058	741	268,366	69,154	17,500	52	-
Net increase (decrease) in net assets resulting from operations	7,032	404,881	719	282,915	83,732	24,024	60	-
Capital transactions:								
Transfers of net premiums	1,511	250,961	8,434	390,390	324,090	14,124	1,350	22
Transfers due to death benefits	-	-	-	-	4	-	-	-
Transfers due to withdrawal of funds	(1)	(5)	(14)	7	(2,612)	(2)	-	-
Transfers due to policy loans, net of repayments	-	-	-	-	(8,188)	-	-	-
Transfers due to charges for administrative and insurance costs	(742)	(27,349)	(1,707)	(27,869)	(98,462)	(3,639)	(417)	(5)
Transfers between Divisions and to/from General Account	(36,831)	27,488	5,760	360,554	2,498	227,661	-	1
Net increase (decrease) in net assets resulting from capital transactions	(36,063)	251,095	12,473	723,082	217,330	238,144	933	18
Total increase (decrease)	(29,031)	655,976	13,192	1,005,997	301,062	262,168	993	18
NET ASSETS, at beginning of the year	45,110	1,003,308	-	305,719	467,003	37,107	-	-
NET ASSETS, at end of the year	\$ 16,079	\$ 1,659,284	\$ 13,192	\$ 1,311,716	\$ 768,065	\$ 299,275	\$ 993	\$ 18

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Fidelity® VIP Real Estate Division (Service Class)	Fidelity® VIP Strategic Income Division	Fidelity® VIP Total Market Index Division (Initial Class)	Franklin Mutual Global Discovery VIP Division	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division
Investment Income								
Dividends	\$ 2,842	\$ 3	\$ 12,276	\$ 72	\$ 84,951	\$ 56	\$ 22,946	\$ 6,739
Expenses								
Mortality and expense risk fees	269	-	6,223	6	46,116	3	1,865	734
Net investment income (loss)	2,573	3	6,053	66	38,835	53	21,081	6,005
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(13,646)	-	(8,595)	86	(364,509)	(1)	(53,626)	2,998
Realized gain distribution	4,524	-	-	156	920,950	-	-	-
Realized gain (loss)	(9,122)	-	(8,595)	242	556,441	(1)	(53,626)	2,998
Change in net unrealized appreciation/depreciation of investments	20,646	2	205,437	146	1,402,529	50	78,715	28,059
Net gain (loss) on investments	11,524	2	196,842	388	1,958,970	49	25,089	31,057
Net increase (decrease) in net assets resulting from operations	14,097	5	202,895	454	1,997,805	102	46,170	37,062
Capital transactions:								
Transfers of net premiums	5,817	417	736,765	-	593,591	866	26,102	41,769
Transfers due to death benefits	-	-	-	-	(29,546)	-	-	-
Transfers due to withdrawal of funds	(2)	-	(2,188)	1	(612,061)	-	-	-
Transfers due to policy loans, net of repayments	-	-	(7,862)	(288)	(285,577)	-	-	-
Transfers due to charges for administrative and insurance costs	(2,460)	(172)	(134,008)	(159)	(563,328)	(72)	(14,155)	(4,726)
Transfers between Divisions and to/from General Account	8,819	-	94,376	1,007	348,634	(86)	107,623	475
Net increase (decrease) in net assets resulting from capital transactions	12,174	245	687,083	561	(548,287)	708	119,570	37,518
Total increase (decrease)	26,271	250	889,978	1,015	1,449,518	810	165,740	74,580
NET ASSETS, at beginning of the year	106,402	-	501,603	1,998	16,501,845	902	732,062	187,872
NET ASSETS, at end of the year	\$ 132,673	\$ 250	\$ 1,391,581	\$ 3,013	\$ 17,951,363	\$ 1,712	\$ 897,802	\$ 262,452

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division
Investment Income								
Dividends	\$ 48	\$ 20,049	\$ 515	\$ -	\$ 1,102	\$ 151,707	\$ -	\$ -
Expenses								
Mortality and expense risk fees	9	7,537	113	31,701	627	89,934	678	319,059
Net investment income (loss)	39	12,512	402	(31,701)	475	61,773	(678)	(319,059)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(16)	(2,506)	(126)	(21,349)	2,612	(1,666,324)	59,110	(2,481,706)
Realized gain distribution	245	49,381	-	444,208	-	-	7,164	-
Realized gain (loss)	229	46,875	(126)	422,859	2,612	(1,666,324)	66,274	(2,481,706)
Change in net unrealized appreciation/depreciation of investments	60	147,288	7,929	3,164,941	30,064	6,427,615	35,772	26,955,775
Net gain (loss) on investments	289	194,163	7,803	3,587,800	32,676	4,761,291	102,046	24,474,069
Net increase (decrease) in net assets resulting from operations	328	206,675	8,205	3,556,099	33,151	4,823,064	101,368	24,155,010
Capital transactions:								
Transfers of net premiums	49	3,052	8,680	225,156	-	1,764,679	231,726	2,548,719
Transfers due to death benefits	-	-	-	(67,990)	-	(95,271)	-	(528,416)
Transfers due to withdrawal of funds	-	(4)	-	(175,374)	(4)	(790,627)	-	(3,264,994)
Transfers due to policy loans, net of repayments	-	-	-	(188,058)	-	(503,768)	-	(1,405,237)
Transfers due to charges for administrative and insurance costs	(129)	(18,328)	(603)	(331,608)	(5,096)	(904,045)	(3,866)	(2,606,275)
Transfers between Divisions and to/from General Account	-	3,417	-	(72,855)	-	(2,023,474)	(87,798)	233,377
Net increase (decrease) in net assets resulting from capital transactions	(80)	(11,863)	8,077	(610,729)	(5,100)	(2,552,506)	140,062	(5,022,826)
Total increase (decrease)	248	194,812	16,282	2,945,370	28,051	2,270,558	241,430	19,132,184
NET ASSETS, at beginning of the year	2,653	1,890,198	39,037	8,956,660	144,753	24,954,829	196,698	71,298,785
NET ASSETS, at end of the year	\$ 2,901	\$ 2,085,010	\$ 55,319	\$ 11,902,030	\$ 172,804	\$ 27,225,387	\$ 438,128	\$ 90,430,969

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division	Invesco V.I. Diversified Dividend Division	Invesco V.I. EQV International Equity Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division
Investment Income								
Dividends	\$ 1,818	\$ 25,663	\$ 365,700	\$ -	\$ 46,079	\$ 43	\$ 213,199	\$ 684
Expenses								
Mortality and expense risk fees	217	10,701	47,623	270,458	8,183	52	366,875	109
Net investment income (loss)	1,601	14,962	318,077	(270,458)	37,896	(9)	(153,676)	575
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	102	(96)	(321,635)	(1,424,213)	(26,841)	(1,419)	130,143	(2,178)
Realized gain distribution	11,188	-	-	-	189,769	16	10,781,420	-
Realized gain (loss)	11,290	(96)	(321,635)	(1,424,213)	162,928	(1,403)	10,911,563	(2,178)
Change in net unrealized appreciation/depreciation of investments	(2,304)	145,675	815,863	9,080,411	(8,866)	4,736	18,064,435	5,838
Net gain (loss) on investments	8,986	145,579	494,228	7,656,198	154,062	3,333	28,975,998	3,660
Net increase (decrease) in net assets resulting from operations	10,587	160,541	812,305	7,385,740	191,958	3,324	28,822,322	4,235
Capital transactions:								
Transfers of net premiums	16,045	64,256	1,187,566	2,395,334	225,544	-	3,278,192	43,862
Transfers due to death benefits	-	(20,038)	(79,399)	(199,584)	(2,237)	-	(701,652)	-
Transfers due to withdrawal of funds	-	(199,638)	(206,993)	(2,175,705)	(19,936)	-	(3,206,884)	-
Transfers due to policy loans, net of repayments	-	179	(161,974)	(969,861)	(50,538)	(293)	(1,562,777)	-
Transfers due to charges for administrative and insurance costs	(1,150)	(37,765)	(552,036)	(1,934,639)	(95,402)	(312)	(2,947,991)	(708)
Transfers between Divisions and to/from General Account	-	443	(613,581)	957,199	(139,590)	2,931	(11,105,466)	(18,094)
Net increase (decrease) in net assets resulting from capital transactions	14,895	(192,563)	(426,417)	(1,927,256)	(82,159)	2,326	(16,246,578)	25,060
Total increase (decrease)	25,482	(32,022)	385,888	5,458,484	109,799	5,650	12,575,744	29,295
NET ASSETS, at beginning of the year	79,627	1,449,861	14,033,777	59,481,574	2,301,016	17,396	89,585,887	30,608
NET ASSETS, at end of the year	\$ 105,109	\$ 1,417,839	\$14,419,665	\$ 64,940,058	\$ 2,410,815	\$ 23,046	\$102,161,631	\$ 59,903

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division (Institutional Class)
Investment Income								
Dividends	\$ -	\$ -	\$ 266,073	\$ 37,621	\$ -	\$ -	\$ 189,445	\$ 26
Expenses								
Mortality and expense risk fees	77,608	13,809	113,281	17,905	2	20,082	28,932	4
Net investment income (loss)	(77,608)	(13,809)	152,792	19,716	(2)	(20,082)	160,513	22
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(517,263)	(100,917)	(1,911,179)	30,372	2	(827,628)	-	(8)
Realized gain distribution	-	-	2,163,513	-	13	-	-	-
Realized gain (loss)	(517,263)	(100,917)	252,334	30,372	15	(827,628)	-	(8)
Change in net unrealized appreciation/depreciation of investments	2,919,664	225,687	6,010,003	468,433	90	3,260,208	-	160
Net gain (loss) on investments	2,402,401	124,770	6,262,337	498,805	105	2,432,580	-	152
Net increase (decrease) in net assets resulting from operations	2,324,793	110,961	6,415,129	518,521	103	2,412,498	160,513	174
Capital transactions:								
Transfers of net premiums	1,495,840	258,790	1,236,738	209,164	22	340,060	1,502,410	-
Transfers due to death benefits	(175,172)	(3,456)	(211,175)	(4,852)	-	(46,244)	(6,425)	-
Transfers due to withdrawal of funds	(721,312)	(69,255)	(1,453,844)	(113,163)	-	(86,615)	(2,571,076)	(1)
Transfers due to policy loans, net of repayments	(494,868)	(145,084)	(561,873)	5,655	-	(189,471)	(12,947)	-
Transfers due to charges for administrative and insurance costs	(1,055,286)	(170,526)	(1,100,828)	(110,634)	(14)	(246,710)	(57,532)	(97)
Transfers between Divisions and to/from General Account	11,741,150	20,042	226,284	(15,033)	93	(379,311)	(66,297)	-
Net increase (decrease) in net assets resulting from capital transactions	10,790,352	(109,489)	(1,864,698)	(28,863)	101	(608,291)	(1,211,867)	(98)
Total increase (decrease)	13,115,145	1,472	4,550,431	489,658	204	1,804,207	(1,051,354)	76
NET ASSETS, at beginning of the year	19,099,387	4,263,314	28,903,847	3,008,071	577	5,277,317	4,538,496	1,203
NET ASSETS, at end of the year	\$ 32,214,532	\$ 4,264,786	\$33,454,278	\$ 3,497,729	\$ 781	\$ 7,081,524	\$ 3,487,142	\$ 1,279

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Janus Henderson Balanced Division (Service Class)	Janus Henderson Forty Division (Institutional Class)	Janus Henderson Forty Division (Service Class)	Janus Henderson Global Research Division (Institutional Class)	Janus Henderson Global Research Division (Service Class)	Janus Henderson Global Technology and Innovation Division	Lord Abbett Developing Growth Division	LVIP JPMorgan U.S. Equity Division
Investment Income								
Dividends	\$ 109,530	\$ 47,233	\$ 408	\$ 144,367	\$ 2,459	\$ -	\$ -	\$ 8,892
Expenses								
Mortality and expense risk fees	18,979	78,139	1,875	45,445	1,643	16	404	1,399
Net investment income (loss)	90,551	(30,906)	(1,467)	98,922	816	(16)	(404)	7,493
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	204,672	(21,513)	(3,641)	309,677	889	22	(3,732)	(658)
Realized gain distribution	-	-	-	302,504	9,214	-	-	26,123
Realized gain (loss)	204,672	(21,513)	(3,641)	612,181	10,103	22	(3,732)	25,465
Change in net unrealized appreciation/depreciation of investments	557,264	8,221,708	110,807	2,924,439	62,396	639	17,954	101,017
Net gain (loss) on investments	761,936	8,200,195	107,166	3,536,620	72,499	661	14,222	126,482
Net increase (decrease) in net assets resulting from operations	852,487	8,169,289	105,699	3,635,542	73,315	645	13,818	133,975
Capital transactions:								
Transfers of net premiums	200,006	596,177	8,646	408,874	3,140	6,407	2,860	-
Transfers due to death benefits	(387,451)	(233,742)	-	(148,787)	-	-	-	-
Transfers due to withdrawal of funds	(61,222)	(1,111,134)	(18,030)	(326,913)	(5,653)	(21)	-	2
Transfers due to policy loans, net of repayments	(126,222)	(439,074)	(7,472)	(351,200)	(4,953)	-	-	-
Transfers due to charges for administrative and insurance costs	(260,239)	(719,969)	(8,631)	(393,097)	(12,102)	(638)	(4,153)	(5,840)
Transfers between Divisions and to/from General Account	145,260	(184,365)	(639)	11,750,384	1,813	455	27,479	857,150
Net increase (decrease) in net assets resulting from capital transactions	(489,868)	(2,092,107)	(26,126)	10,939,261	(17,755)	6,203	26,186	851,312
Total increase (decrease)	362,619	6,077,182	79,573	14,574,803	55,560	6,848	40,004	985,287
NET ASSETS, at beginning of the year	5,951,978	21,557,769	282,100	9,825,857	293,374	-	147,718	502,095
NET ASSETS, at end of the year	\$ 6,314,597	\$ 27,634,951	\$ 361,673	\$ 24,400,660	\$ 348,934	\$ 6,848	\$ 187,722	\$1,487,382

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	MFS® Blended Research® Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division
Investment Income								
Dividends	\$ 4,929	\$ 813	\$ 7	\$ -	\$ 3,797	\$ 6,607	\$ 3,781	\$ -
Expenses								
Mortality and expense risk fees	879	233	1	15,026	1,303	2,869	499	24,776
Net investment income (loss)	4,050	580	6	(15,026)	2,494	3,738	3,282	(24,776)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(29,167)	(301)	-	66,835	(42,368)	14,553	(6,106)	(378,136)
Realized gain distribution	27,695	6,622	-	189,137	39,450	50,846	7,170	-
Realized gain (loss)	(1,472)	6,321	-	255,972	(2,918)	65,399	1,064	(378,136)
Change in net unrealized appreciation/depreciation of investments	90,129	3,341	13	492,364	83,461	83,953	20,581	1,182,971
Net gain (loss) on investments	88,657	9,662	13	748,336	80,543	149,352	21,645	804,835
Net increase (decrease) in net assets resulting from operations	92,707	10,242	19	733,310	83,037	153,090	24,927	780,059
Capital transactions:								
Transfers of net premiums	-	32	26	45,421	23,287	21,030	131,574	179,864
Transfers due to death benefits	-	-	-	(1,802)	-	(1,689)	-	(20,457)
Transfers due to withdrawal of funds	-	(1)	-	(261,165)	(2)	(33,909)	1	(137,546)
Transfers due to policy loans, net of repayments	-	-	-	1,377	-	(202,146)	-	(109,543)
Transfers due to charges for administrative and insurance costs	(9,083)	(1,056)	(11)	(57,515)	(6,450)	(16,568)	(3,318)	(166,308)
Transfers between Divisions and to/from General Account	(56,475)	214,429	178	(128,252)	782,025	(9,246)	(50,561)	43,755
Net increase (decrease) in net assets resulting from capital transactions	(65,558)	213,404	193	(401,936)	798,860	(242,528)	77,696	(210,235)
Total increase (decrease)	27,149	223,646	212	331,374	881,897	(89,438)	102,623	569,824
NET ASSETS, at beginning of the year	374,956	92,371	336	2,227,332	466,674	892,658	140,588	5,714,385
NET ASSETS, at end of the year	\$ 402,105	\$ 316,017	\$ 548	\$ 2,558,706	\$ 1,348,571	\$ 803,220	\$ 243,211	\$ 6,284,209

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division	MML American Funds Growth Division	MML Balanced Allocation Division	MML Blend Division
Investment Income								
Dividends	\$ 4,584	\$ 1,165	\$ 73,602	\$ 162,627	\$ 46,125	\$ 54,576	\$ 103,173	\$ 512,285
Expenses								
Mortality and expense risk fees	4,720	78	10,731	24,383	7,225	26,630	15,115	122,614
Net investment income (loss)	(136)	1,087	62,871	138,244	38,900	27,946	88,058	389,671
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	15,165	(16)	6,674	(205,843)	(7,626)	(196,925)	(83,220)	(677,075)
Realized gain distribution	48,451	1,803	309,371	669,548	135,852	582,345	265,210	-
Realized gain (loss)	63,616	1,787	316,045	463,705	128,226	385,420	181,990	(677,075)
Change in net unrealized appreciation/depreciation of investments	108,231	(3,569)	(43,478)	308,253	(26,666)	691,623	65,660	5,059,741
Net gain (loss) on investments	171,847	(1,782)	272,567	771,958	101,560	1,077,043	247,650	4,382,666
Net increase (decrease) in net assets resulting from operations	171,711	(695)	335,438	910,202	140,460	1,104,989	335,708	4,772,337
Capital transactions:								
Transfers of net premiums	12,838	5,637	316,034	1,329,438	462,705	1,533,990	452,330	1,414,427
Transfers due to death benefits	-	-	-	(3,223)	-	-	-	(168,791)
Transfers due to withdrawal of funds	(73,603)	-	-	(193,854)	(2,212)	(112,738)	(126,769)	(837,781)
Transfers due to policy loans, net of repayments	4,614	-	-	(256,992)	(770)	(117,110)	(4,920)	(358,047)
Transfers due to charges for administrative and insurance costs	(21,439)	(411)	(36,320)	(483,667)	(58,311)	(408,730)	(165,226)	(1,433,754)
Transfers between Divisions and to/from General Account	502	-	438,410	50,133	423,768	484,472	742,031	(480,623)
Net increase (decrease) in net assets resulting from capital transactions	(77,088)	5,226	718,124	441,835	825,180	1,379,884	897,446	(1,864,569)
Total increase (decrease)	94,623	4,531	1,053,562	1,352,037	965,640	2,484,873	1,233,154	2,907,768
NET ASSETS, at beginning of the year	816,093	29,913	4,156,410	4,854,623	677,026	2,571,580	2,173,656	28,826,242
NET ASSETS, at end of the year	\$ 910,716	\$ 34,444	\$ 5,209,972	\$ 6,206,660	\$ 1,642,666	\$ 5,056,453	\$ 3,406,810	\$ 31,734,010

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division	MML Equity Income Division	MML Equity Index Division (Service Class I)	MML Equity Index Division (Class II)	MML Equity Index Division (Class III)
Investment Income								
Dividends	\$ -	\$ 56,273	\$ 7,464	\$ 2,055,201	\$ 71,438	\$ 50,557	\$ 1,437,400	\$ 67,940
Expenses								
Mortality and expense risk fees	67,367	10,965	777	427,608	13,729	12,640	404,828	32,274
Net investment income (loss)	(67,367)	45,308	6,687	1,627,593	57,709	37,917	1,032,572	35,666
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(904,227)	(41,515)	(2,592)	1,245,674	(35,581)	(295,638)	959,333	(91,616)
Realized gain distribution	-	126,289	-	7,831,639	256,743	506,176	9,600,365	403,425
Realized gain (loss)	(904,227)	84,774	(2,592)	9,077,313	221,162	210,538	10,559,698	311,809
Change in net unrealized appreciation/depreciation of investments	7,093,552	41,487	7,209	(2,515,322)	5,478	916,005	11,420,117	590,078
Net gain (loss) on investments	6,189,325	126,261	4,617	6,561,991	226,640	1,126,543	21,979,815	901,887
Net increase (decrease) in net assets resulting from operations	6,121,958	171,569	11,304	8,189,584	284,349	1,164,460	23,012,387	937,553
Capital transactions:								
Transfers of net premiums	1,570,169	174,564	58,173	3,625,668	308,572	657,795	2,826,150	2,003,031
Transfers due to death benefits	(8,248)	-	-	(1,449,574)	-	-	(947,930)	-
Transfers due to withdrawal of funds	(872,229)	(45,688)	29	(2,402,393)	(54,899)	1	(3,617,984)	(15,537)
Transfers due to policy loans, net of repayments	(499,787)	(2,209)	(3,568)	(1,275,736)	(20,806)	(4,546)	(796,273)	(15,251)
Transfers due to charges for administrative and insurance costs	(654,799)	(51,863)	(5,063)	(3,952,454)	(156,237)	(49,577)	(3,032,604)	(424,756)
Transfers between Divisions and to/from General Account	839,422	125,429	12,403	167,490	321,422	(952,083)	638,202	581,030
Net increase (decrease) in net assets resulting from capital transactions	374,528	200,233	61,974	(5,286,999)	398,052	(348,410)	(4,930,439)	2,128,517
Total increase (decrease)	6,496,486	371,802	73,278	2,902,585	682,401	816,050	18,081,948	3,066,070
NET ASSETS, at beginning of the year	12,264,297	1,469,272	111,732	97,574,237	2,772,662	5,021,461	94,205,845	2,715,373
NET ASSETS, at end of the year	\$ 18,760,783	\$ 1,841,074	\$ 185,010	\$ 100,476,822	\$ 3,455,063	\$ 5,837,511	\$ 112,287,793	\$ 5,781,443

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	MML Equity Rotation Division	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division	MML Global Division (Service Class I)	MML Global Division (Class II)	MML Growth Allocation Division
Investment Income								
Dividends	\$ -	\$ 3,985	\$ 10,774	\$ 9,247	\$ 1,927	\$ 911	\$ 5,897	\$ 186,733
Expenses								
Mortality and expense risk fees	-	1,560	2,892	2,905	1,100	331	3,784	30,030
Net investment income (loss)	-	2,425	7,882	6,342	827	580	2,113	156,703
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	1	(23,109)	(14,740)	(21,272)	(1,031)	90	(229,597)	(1,091,307)
Realized gain distribution	-	37,702	-	-	8,931	7,376	40,706	813,463
Realized gain (loss)	1	14,593	(14,740)	(21,272)	7,900	7,466	(188,891)	(277,844)
Change in net unrealized appreciation/depreciation of investments	2	21,399	115,028	218,800	9,971	29,791	275,357	1,026,082
Net gain (loss) on investments	3	35,992	100,288	197,528	17,871	37,257	86,466	748,238
Net increase (decrease) in net assets resulting from operations	3	38,417	108,170	203,870	18,698	37,837	88,579	904,941
Capital transactions:								
Transfers of net premiums	71	59,095	134,578	34,736	39,289	-	154,938	850,856
Transfers due to death benefits	-	-	-	-	-	-	-	125
Transfers due to withdrawal of funds	-	(36,730)	(6,146)	(64,091)	(520)	(1)	(44,662)	(219,764)
Transfers due to policy loans, net of repayments	-	(3,386)	(1,497)	(3)	(13)	-	(17,393)	(31,514)
Transfers due to charges for administrative and insurance costs	(22)	(24,610)	(26,653)	(9,705)	(13,747)	(3,431)	(43,253)	(318,637)
Transfers between Divisions and to/from General Account	-	(33,289)	3,475	518	10,794	167,468	(9,008)	(16,430)
Net increase (decrease) in net assets resulting from capital transactions	49	(38,920)	103,757	(38,545)	35,803	164,036	40,622	264,636
Total increase (decrease)	52	(503)	211,927	165,325	54,501	201,873	129,201	1,169,577
NET ASSETS, at beginning of the year	-	457,452	640,251	944,692	121,606	89,854	633,602	5,719,560
NET ASSETS, at end of the year	\$ 52	\$ 456,949	\$ 852,178	\$ 1,110,017	\$ 176,107	\$ 291,727	\$ 762,803	\$ 6,889,137

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML iShares® 60/40 Allocation Division	MML iShares® 80/20 Allocation Division	MML Large Cap Growth Division	MML Managed Bond Division
Investment Income								
Dividends	\$ 14,602	\$ 30,375	\$ 245,892	\$ 1,707	\$ 79	\$ 273	\$ -	\$ 1,241,566
Expenses								
Mortality and expense risk fees	1,542	5,142	16,760	984	6	41	4,102	102,565
Net investment income (loss)	13,060	25,233	229,132	723	73	232	(4,102)	1,139,001
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(11,831)	(74,028)	(142,522)	(677)	124	(1)	(1,806)	(2,799,506)
Realized gain distribution	-	183,311	-	-	-	-	40,939	-
Realized gain (loss)	(11,831)	109,283	(142,522)	(677)	124	(1)	39,133	(2,799,506)
Change in net unrealized appreciation/depreciation of investments	23,460	(16,857)	173,263	19,978	172	1,077	174,455	2,875,286
Net gain (loss) on investments	11,629	92,426	30,741	19,301	296	1,076	213,588	75,780
Net increase (decrease) in net assets resulting from operations	24,689	117,659	259,873	20,024	369	1,308	209,486	1,214,781
Capital transactions:								
Transfers of net premiums	84,668	641,322	324,157	28,238	7,979	13,095	218,155	1,160,715
Transfers due to death benefits	-	(501)	(35,760)	-	-	-	-	(560,683)
Transfers due to withdrawal of funds	(39,655)	(96,329)	(165,392)	(3)	(27)	(52)	(71,352)	(874,948)
Transfers due to policy loans, net of repayments	(3,618)	(1,526)	(156,062)	(6)	-	-	(6,084)	(446,430)
Transfers due to charges for administrative and insurance costs	(16,140)	(72,278)	(231,409)	(6,434)	(4,350)	(2,246)	(56,936)	(1,004,069)
Transfers between Divisions and to/from General Account	25,097	(545,690)	154,122	(304)	2,379	10,532	42,506	(9,110,799)
Net increase (decrease) in net assets resulting from capital transactions	50,352	(75,002)	(110,344)	21,491	5,981	21,329	126,289	(10,836,214)
Total increase (decrease)	75,041	42,657	149,529	41,515	6,350	22,637	335,775	(9,621,433)
NET ASSETS, at beginning of the year	176,287	1,455,483	5,213,203	106,158	-	-	391,993	31,202,475
NET ASSETS, at end of the year	\$ 251,328	\$ 1,498,140	\$ 5,362,732	\$ 147,673	\$ 6,350	\$ 22,637	\$ 727,768	\$ 21,581,042

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division	MML Small Company Value Division
Investment Income								
Dividends	\$ 56,551	\$ -	\$ 54,198	\$ 71,237	\$ 12,796	\$ 349,665	\$ -	\$ 4,108
Expenses								
Mortality and expense risk fees	29,576	15,478	9,324	10,577	1,318	94,143	53,921	2,265
Net investment income (loss)	26,975	(15,478)	44,874	60,660	11,478	255,522	(53,921)	1,843
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	95,258	(408,981)	(130,338)	(59,432)	2,474	5,226	(1,419,365)	(61,436)
Realized gain distribution	1,794,481	-	325,488	214,586	-	-	-	941
Realized gain (loss)	1,889,739	(408,981)	195,150	155,154	2,474	5,226	(1,419,365)	(60,495)
Change in net unrealized appreciation/depreciation of investments	(747,257)	1,041,306	(129,698)	53,847	13,592	4,186,130	4,094,511	121,713
Net gain (loss) on investments	1,142,482	632,325	65,452	209,001	16,066	4,191,356	2,675,146	61,218
Net increase (decrease) in net assets resulting from operations	1,169,457	616,847	110,326	269,661	27,544	4,446,878	2,621,225	63,061
Capital transactions:								
Transfers of net premiums	499,874	629,321	418,537	342,755	19,099	1,205,587	813,451	68,827
Transfers due to death benefits	(39,335)	(105)	(108)	(10,948)	-	(211,561)	(21,229)	-
Transfers due to withdrawal of funds	(714,682)	(137,803)	(102,826)	(111,362)	(394)	(1,005,488)	(843,910)	(31,492)
Transfers due to policy loans, net of repayments	(389,772)	(192,393)	(43,094)	(1,631)	(270)	(648,418)	(364,581)	(7,694)
Transfers due to charges for administrative and insurance costs	(386,407)	(184,981)	(118,697)	(119,782)	(11,720)	(931,140)	(547,369)	(15,246)
Transfers between Divisions and to/from General Account	(26,741)	9,979	(18,311)	16,487	(178,116)	40,330	128,346	32,765
Net increase (decrease) in net assets resulting from capital transactions	(1,057,063)	124,018	135,501	115,519	(171,401)	(1,550,690)	(835,292)	47,160
Total increase (decrease)	112,394	740,865	245,827	385,180	(143,857)	2,896,188	1,785,933	110,221
NET ASSETS, at beginning of the year	9,820,548	2,784,965	1,904,806	1,951,104	506,638	26,401,149	16,471,584	366,609
NET ASSETS, at end of the year	\$ 9,932,942	\$ 3,525,830	\$ 2,150,633	\$ 2,336,284	\$ 362,781	\$ 29,297,337	\$ 18,257,517	\$ 476,830

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division	PIMCO High Yield Division
Investment Income								
Dividends	\$ 12,852	\$ 236	\$ 16,432	\$ 10,566	\$ 1,188,071	\$ 80,386	\$ 4,515	\$ 8,931
Expenses								
Mortality and expense risk fees	5,504	1,632	8,849	1,800	82,526	2,187	434	394
Net investment income (loss)	7,348	(1,396)	7,583	8,766	1,105,545	78,199	4,081	8,537
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(70,223)	(51,857)	(52,442)	(11,848)	(4)	(93,296)	(2,170)	(324)
Realized gain distribution	147,892	-	527,001	-	-	-	2,110	-
Realized gain (loss)	77,669	(51,857)	474,559	(11,848)	(4)	(93,296)	(60)	(324)
Change in net unrealized appreciation/depreciation of investments	101,955	73,077	(112,262)	22,907	4	(29,812)	6,135	9,797
Net gain (loss) on investments	179,624	21,220	362,297	11,059	-	(123,108)	6,075	9,473
Net increase (decrease) in net assets resulting from operations	186,972	19,824	369,880	19,825	1,105,545	(44,909)	10,156	18,010
Capital transactions:								
Transfers of net premiums	220,636	74,403	254,192	198,543	7,792,106	88,474	12,206	1,170
Transfers due to death benefits	(108)	-	(123,951)	-	(84,890)	-	-	-
Transfers due to withdrawal of funds	(39,061)	(29,626)	(67,307)	(16,384)	(4,149,755)	(21,669)	6	47
Transfers due to policy loans, net of repayments	(48,382)	(13,355)	(16,960)	(2,865)	(681,075)	(79,956)	-	-
Transfers due to charges for administrative and insurance costs	(71,869)	(15,339)	(111,674)	(21,401)	(1,362,796)	(22,686)	(2,799)	(1,709)
Transfers between Divisions and to/from General Account	21,043	6,376	5,721	11,888	(4,364,414)	33,039	(398)	-
Net increase (decrease) in net assets resulting from capital transactions	82,259	22,459	(59,979)	169,781	(2,850,824)	(2,798)	9,015	(492)
Total increase (decrease)	269,231	42,283	309,901	189,606	(1,745,279)	(47,707)	19,171	17,518
NET ASSETS, at beginning of the year	1,059,183	187,636	1,617,946	297,648	24,334,917	544,010	194,756	151,184
NET ASSETS, at end of the year	\$ 1,328,414	\$ 229,919	\$ 1,927,847	\$ 487,254	\$ 22,589,638	\$ 496,303	\$ 213,927	\$ 168,702

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	PIMCO Income Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
Investment Income								
Dividends	\$ 68	\$ 629	\$ 5,581	\$ 11,492	\$ -	\$ 451,056	\$ 2,687	\$ -
Expenses								
Mortality and expense risk fees	9	51	390	31,390	56,704	59,901	206	226,981
Net investment income (loss)	59	578	5,191	(19,898)	(56,704)	391,155	2,481	(226,981)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	23	(859)	(4,675)	117,213	(53,273)	(13,688)	(388)	197,313
Realized gain distribution	-	-	-	330,210	-	924,955	-	3,757,356
Realized gain (loss)	23	(859)	(4,675)	447,423	(53,273)	911,267	(388)	3,954,669
Change in net unrealized appreciation/depreciation of investments	256	994	8,324	688,962	7,756,588	675,687	1,392	6,740,423
Net gain (loss) on investments	279	135	3,649	1,136,385	7,703,315	1,586,954	1,004	10,695,092
Net increase (decrease) in net assets resulting from operations	338	713	8,840	1,116,487	7,646,611	1,978,109	3,485	10,468,111
Capital transactions:								
Transfers of net premiums	15,828	16,222	31	132,155	407,796	750,964	-	1,529,329
Transfers due to death benefits	-	-	-	-	(17,730)	(63,294)	-	(363,047)
Transfers due to withdrawal of funds	-	1	10	(320,451)	(234,698)	(411,837)	2	(1,957,038)
Transfers due to policy loans, net of repayments	-	-	-	222,144	(487,721)	(701,883)	(11,523)	(695,536)
Transfers due to charges for administrative and insurance costs	(1,334)	(529)	(2,514)	(61,865)	(476,414)	(756,817)	(6,099)	(1,751,870)
Transfers between Divisions and to/from General Account	40	(13,833)	(11,831)	22,921	738,763	169,816	-	174,644
Net increase (decrease) in net assets resulting from capital transactions	14,534	1,861	(14,304)	(5,096)	(70,004)	(1,013,051)	(17,620)	(3,063,518)
Total increase (decrease)	14,872	2,574	(5,464)	1,111,391	7,576,607	965,058	(14,135)	7,404,593
NET ASSETS, at beginning of the year	-	18,894	162,878	3,904,349	15,415,377	21,757,838	85,673	55,286,883
NET ASSETS, at end of the year	\$ 14,872	\$ 21,468	\$ 157,414	\$ 5,015,740	\$ 22,991,984	\$ 22,722,896	\$ 71,538	\$ 62,691,476

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2023

	Templeton Foreign VIP Division	Templeton Global Bond VIP Division	Vanguard VIF Global Bond Index Division	Vanguard VIF Mid Cap Index Division	Vanguard VIF Real Estate Index Division	Voya International Index Division	Voya Russell™ Mid Cap Index Division	Voya Russell™ Small Cap Index Division
Investment Income								
Dividends	\$ 354,240	\$ -	\$ 6,366	\$ 12,283	\$ 8,490	\$ 80,360	\$ 32,139	\$ 9,412
Expenses								
Mortality and expense risk fees	31,685	140	2,911	8,124	3,048	4,225	5,068	1,568
Net investment income (loss)	322,555	(140)	3,455	4,159	5,442	76,135	27,071	7,844
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(27,045)	(325)	(11,538)	(21,703)	(19,141)	14,873	(288,724)	(46,171)
Realized gain distribution	-	-	555	15,414	16,016	-	203,230	23,217
Realized gain (loss)	(27,045)	(325)	(10,983)	(6,289)	(3,125)	14,873	(85,494)	(22,954)
Change in net unrealized appreciation/depreciation of investments	1,762,049	2,430	30,177	158,984	44,271	174,696	370,966	101,779
Net gain (loss) on investments	1,735,004	2,105	19,194	152,695	41,146	189,569	285,472	78,825
Net increase (decrease) in net assets resulting from operations	2,057,559	1,965	22,649	156,854	46,588	265,704	312,543	86,669
Capital transactions:								
Transfers of net premiums	533,142	11,274	162,700	655,869	185,481	242,509	154,545	17,405
Transfers due to death benefits	(2,948)	-	-	4	3	-	-	-
Transfers due to withdrawal of funds	(190,631)	-	(2,444)	(12,981)	(3,741)	5	(7)	(2)
Transfers due to policy loans, net of repayments	(290,781)	(34)	-	(14,714)	(610)	-	-	-
Transfers due to charges for administrative and insurance costs	(439,236)	(764)	(49,183)	(148,068)	(54,876)	(11,891)	(22,151)	(9,384)
Transfers between Divisions and to/from General Account	99,551	(8,302)	(10,514)	38,237	8,321	(120,865)	433,083	154,816
Net increase (decrease) in net assets resulting from capital transactions	(290,903)	2,174	100,559	518,347	134,578	109,758	565,470	162,835
Total increase (decrease)	1,766,656	4,139	123,208	675,201	181,166	375,462	878,013	249,504
NET ASSETS, at beginning of the year	10,195,403	59,252	328,749	737,593	324,311	1,493,445	2,073,613	516,043
NET ASSETS, at end of the year	\$11,962,059	\$ 63,391	\$ 451,957	\$ 1,412,794	\$ 505,477	\$ 1,868,907	\$ 2,951,626	\$ 765,547

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2023

	VY® CBRE Global Real Estate Division
Investment Income	
Dividends	\$ 10,001
Expenses	
Mortality and expense risk fees	2,091
Net investment income (loss)	7,910
Net realized and unrealized gain (loss) on investments	
Realized gain (loss) on sale of fund shares	(16,503)
Realized gain distribution	5,989
Realized gain (loss)	(10,514)
Change in net unrealized appreciation/depreciation of investments	68,079
Net gain (loss) on investments	57,565
Net increase (decrease) in net assets resulting from operations	65,475
Capital transactions:	
Transfers of net premiums	67,098
Transfers due to death benefits	(54)
Transfers due to withdrawal of funds	(10,657)
Transfers due to policy loans, net of repayments	(9,879)
Transfers due to charges for administrative and insurance costs	(20,162)
Transfers between Divisions and to/from General Account	4,268
Net increase (decrease) in net assets resulting from capital transactions	30,614
Total increase (decrease)	96,089
NET ASSETS, at beginning of the year	531,668
NET ASSETS, at end of the year	\$ 627,757

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS
For The Year Ended December 31, 2022

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds® Asset Allocation Division	American Funds® Growth-Income Division	BlackRock High Yield V.I. Division
Investment Income								
Dividends	\$ -	\$ 591,143	\$ 1,599	\$ 20,361	\$ 340,837	\$ 464,627	\$ 531,911	\$ 5,045
Expenses								
Mortality and expense risk fees	2,312	121,231	82	3,548	61,972	80,486	139,020	246
Net investment income (loss)	(2,312)	469,912	1,517	16,813	278,865	384,141	392,891	4,799
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(27,907)	(170,745)	(5,024)	(178,519)	459,172	188,996	809,090	(17,882)
Realized gain distribution	135,116	8,198,114	180	214,316	1,285,449	2,530,667	4,131,874	-
Realized gain (loss)	107,209	8,027,369	(4,844)	35,797	1,744,621	2,719,663	4,940,964	(17,882)
Change in net unrealized appreciation/depreciation of investments	(438,447)	(13,368,070)	(1,387)	(499,541)	(1,967,206)	(6,895,167)	(13,631,573)	(1,332)
Net gain (loss) on investments	(331,238)	(5,340,701)	(6,231)	(463,744)	(222,585)	(4,175,504)	(8,690,609)	(19,214)
Net increase (decrease) in net assets resulting from operations	(333,550)	(4,870,789)	(4,714)	(446,931)	56,280	(3,791,363)	(8,297,718)	(14,415)
Capital transactions:								
Transfers of net premiums	71,659	1,076,356	1	148,692	570,116	881,663	1,507,740	4,363
Transfers due to death benefits	-	(120,134)	-	(300)	(22,467)	(139,420)	(921,340)	(228)
Transfers due to withdrawal of funds	(1)	(870,316)	-	(76)	(234,984)	(455,586)	(1,029,178)	2
Transfers due to policy loans, net of repayments	-	(545,651)	-	-	(361,706)	(238,226)	(687,194)	-
Transfers due to charges for administrative and insurance costs	(6,055)	(998,119)	(444)	(11,990)	(498,290)	(761,807)	(1,326,007)	(1,380)
Transfers between Divisions and to/from General Account	(16,559)	(3,195)	672	(278,626)	5,397	53,464	173,373	(64,153)
Net increase (decrease) in net assets resulting from capital transactions	49,044	(1,461,059)	229	(142,300)	(541,934)	(659,912)	(2,282,606)	(61,396)
Total increase (decrease)	(284,506)	(6,331,848)	(4,485)	(589,231)	(485,654)	(4,451,275)	(10,580,324)	(75,811)
NET ASSETS, at beginning of the year	1,158,824	37,822,087	36,903	1,790,461	16,757,071	27,801,866	49,515,332	153,399
NET ASSETS, at end of the year	\$ 874,318	\$ 31,490,239	\$ 32,418	\$ 1,201,230	\$ 16,271,417	\$ 23,350,591	\$ 38,935,008	\$ 77,588

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
Investment Income								
Dividends	\$ 6,917	\$ 113	\$ 6,412	\$ 1,263	\$ 359	\$ 1,691	\$ -	\$ 8,426
Expenses								
Mortality and expense risk fees	3,613	16	679	671	96	1,035	77	527
Net investment income (loss)	3,304	97	5,733	592	263	656	(77)	7,899
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(42,306)	(468)	(45,419)	(14,086)	(269)	(37,512)	(24,099)	(53,799)
Realized gain distribution	9,859	168	52	69,674	1,197	11,009	4,228	-
Realized gain (loss)	(32,447)	(300)	(45,367)	55,588	928	(26,503)	(19,871)	(53,799)
Change in net unrealized appreciation/depreciation of investments	(61,509)	(897)	(1,918)	(97,635)	(2,235)	(5,618)	6,644	(28,118)
Net gain (loss) on investments	(93,956)	(1,197)	(47,285)	(42,047)	(1,307)	(32,121)	(13,227)	(81,917)
Net increase (decrease) in net assets resulting from operations	(90,652)	(1,100)	(41,552)	(41,455)	(1,044)	(31,465)	(13,304)	(74,018)
Capital transactions:								
Transfers of net premiums	379,177	6,874	93,098	3,727	21,392	10,299	12,348	37,584
Transfers due to death benefits	(526)	-	-	-	-	-	-	(284)
Transfers due to withdrawal of funds	(8,828)	-	(33,253)	(14,272)	(20)	(61,611)	(20,980)	(21,122)
Transfers due to policy loans, net of repayments	(4,476)	-	-	(3)	-	-	(16)	-
Transfers due to charges for administrative and insurance costs	(79,051)	(728)	(5,548)	(7,492)	(2,079)	(412)	(1,365)	(5,282)
Transfers between Divisions and to/from General Account	38,936	3,459	(5,929)	130,787	114	4	(6,284)	(16,531)
Net increase (decrease) in net assets resulting from capital transactions	325,232	9,605	48,368	112,747	19,407	(51,720)	(16,297)	(5,635)
Total increase (decrease)	234,580	8,505	6,816	71,292	18,363	(83,185)	(29,601)	(79,653)
NET ASSETS, at beginning of the year	329,081	1,493	268,804	237,312	540	185,834	43,842	266,570
NET ASSETS, at end of the year	\$ 563,661	\$ 9,998	\$ 275,620	\$ 308,604	\$ 18,903	\$ 102,649	\$ 14,241	\$ 186,917

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Delaware VIP® Small Cap Value Division (Initial Class)	DWS Small Cap Index Division (Service Class)	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Service Class I)	Fidelity® VIP Extended Market Index Division (Service Class II)
Investment Income								
Dividends	\$ 2,425	\$ 89,454	\$ 1,811	\$ 7,462	\$ 469,561	\$ 30,136	\$ 4,642	\$ -
Expenses								
Mortality and expense risk fees	1,101	30,731	94	2,682	344,523	55,102	2,180	-
Net investment income (loss)	1,324	58,723	1,717	4,780	125,038	(24,966)	2,462	-
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(64,589)	(38,888)	(2,155)	(23,262)	3,051,823	132,969	(28,655)	(14)
Realized gain distribution	32,329	1,682,680	-	-	4,419,968	361,450	5,982	-
Realized gain (loss)	(32,260)	1,643,792	(2,155)	(23,262)	7,471,791	494,419	(22,673)	(14)
Change in net unrealized appreciation/depreciation of investments	(37,153)	(4,157,998)	(382)	(26,747)	(38,336,089)	(3,043,139)	(28,920)	-
Net gain (loss) on investments	(69,413)	(2,514,206)	(2,537)	(50,009)	(30,864,298)	(2,548,720)	(51,593)	(14)
Net increase (decrease) in net assets resulting from operations	(68,089)	(2,455,483)	(820)	(45,229)	(30,739,260)	(2,573,686)	(49,131)	(14)
Capital transactions:								
Transfers of net premiums	168,800	394,035	8,804	361,390	4,608,519	201,110	197,816	-
Transfers due to death benefits	-	(21,626)	(450)	-	(463,505)	(18,668)	(704)	-
Transfers due to withdrawal of funds	(9,105)	(203,240)	22	(1,396)	(2,393,059)	(388,415)	(5,183)	-
Transfers due to policy loans, net of repayments	-	(217,987)	-	(18,434)	(1,805,283)	(3,723)	-	-
Transfers due to charges for administrative and insurance costs	(6,864)	(299,429)	(664)	(48,805)	(3,119,895)	(175,704)	(46,971)	-
Transfers between Divisions and to/from General Account	(145,354)	63,790	(9,157)	34,901	441,491	(31,635)	45,518	14
Net increase (decrease) in net assets resulting from capital transactions	7,477	(284,457)	(1,445)	327,656	(2,731,732)	(417,035)	190,476	14
Total increase (decrease)	(60,612)	(2,739,940)	(2,265)	282,427	(33,470,992)	(2,990,721)	141,345	-
NET ASSETS, at beginning of the year	485,921	11,860,935	43,081	192,257	116,779,958	9,712,506	190,865	-
NET ASSETS, at end of the year	\$ 425,309	\$ 9,120,995	\$ 40,816	\$ 474,684	\$ 83,308,966	\$ 6,721,785	\$ 332,210	\$ -

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
Investment Income								
Dividends	\$ 270	\$ 14,546	\$ 6,267	\$ 21,420	\$ 2,362	\$ 165	\$ 3,089	\$ 13
Expenses								
Mortality and expense risk fees	32	1,706	750	2,674	442	18	667	1
Net investment income (loss)	238	12,840	5,517	18,746	1,920	147	2,422	12
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(374)	(163,402)	(60,631)	(234,025)	(45,049)	(793)	(76,939)	(139)
Realized gain distribution	1,287	43,775	11,274	63,486	12,137	377	20,040	56
Realized gain (loss)	913	(119,627)	(49,357)	(170,539)	(32,912)	(416)	(56,899)	(83)
Change in net unrealized appreciation/depreciation of investments	(3,477)	(20,229)	3,129	(34,633)	(3,773)	(914)	(4,427)	(56)
Net gain (loss) on investments	(2,564)	(139,856)	(46,228)	(205,172)	(36,685)	(1,330)	(61,326)	(139)
Net increase (decrease) in net assets resulting from operations	(2,326)	(127,016)	(40,711)	(186,426)	(34,765)	(1,183)	(58,904)	(127)
Capital transactions:								
Transfers of net premiums	1,087	156,417	123,979	574,924	90,052	11,531	192,319	1,063
Transfers due to death benefits	(74)	(1,437)	(2,770)	(3,304)	(1,784)	(746)	(4,172)	(73)
Transfers due to withdrawal of funds	2	27	(1,410)	(840)	(37,839)	61	(241,368)	13
Transfers due to policy loans, net of repayments	(13)	(5)	-	-	-	-	-	-
Transfers due to charges for administrative and insurance costs	(713)	(16,785)	(8,149)	(14,078)	(3,751)	(313)	(8,532)	(33)
Transfers between Divisions and to/from General Account	1,734	172,242	214,886	126,821	38,335	3,487	59,255	129
Net increase (decrease) in net assets resulting from capital transactions	2,023	310,459	326,536	683,523	85,013	14,020	(2,498)	1,099
Total increase (decrease)	(303)	183,443	285,825	497,097	50,248	12,837	(61,402)	972
NET ASSETS, at beginning of the year	13,517	617,665	127,084	919,419	135,749	-	235,563	-
NET ASSETS, at end of the year	\$ 13,214	\$ 801,108	\$ 412,909	\$ 1,416,516	\$ 185,997	\$ 12,837	\$ 174,161	\$ 972

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Division (Service Class II)	Fidelity® VIP Real Estate Division	Fidelity® VIP Total Market Index Division	Franklin Mutual Global Discovery VIP Division
Investment Income								
Dividends	\$ 603	\$ 4,425	\$ 4,542	\$ 10,186	\$ 797	\$ 1,311	\$ 7,128	\$ 29
Expenses								
Mortality and expense risk fees	53	2,605	758	2,885	30	508	3,055	5
Net investment income (loss)	550	1,820	3,784	7,301	767	803	4,073	24
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(1,028)	(131,026)	(2,867)	(35,693)	(2,664)	(39,992)	(18,192)	(2)
Realized gain distribution	956	66,495	2,595	-	-	7,056	515	172
Realized gain (loss)	(72)	(64,531)	(272)	(35,693)	(2,664)	(32,936)	(17,677)	170
Change in net unrealized appreciation/depreciation of investments	(3,503)	(182,712)	(72,089)	(27,970)	520	(42,336)	(61,683)	(324)
Net gain (loss) on investments	(3,575)	(247,243)	(72,361)	(63,663)	(2,144)	(75,272)	(79,360)	(154)
Net increase (decrease) in net assets resulting from operations	(3,025)	(245,423)	(68,577)	(56,362)	(1,377)	(74,469)	(75,287)	(130)
Capital transactions:								
Transfers of net premiums	35,920	164,878	-	315,863	10,168	6,739	314,735	-
Transfers due to death benefits	(2,082)	-	-	(708)	-	-	-	-
Transfers due to withdrawal of funds	182	(2)	1	(3,622)	-	(6,488)	(5,232)	(492)
Transfers due to policy loans, net of repayments	-	-	-	-	-	-	-	(2)
Transfers due to charges for administrative and insurance costs	(935)	(20,424)	(14,008)	(65,842)	(1,212)	(4,886)	(79,966)	(110)
Transfers between Divisions and to/from General Account	15,050	244,118	388,303	42,250	15,974	(42,674)	68,784	790
Net increase (decrease) in net assets resulting from capital transactions	48,135	388,570	374,296	287,941	24,930	(47,309)	298,321	186
Total increase (decrease)	45,110	143,147	305,719	231,579	23,553	(121,778)	223,034	56
NET ASSETS, at beginning of the year	-	860,161	-	235,424	13,554	228,180	278,569	1,942
NET ASSETS, at end of the year	\$ 45,110	\$1,003,308	\$ 305,719	\$ 467,003	\$ 37,107	\$ 106,402	\$ 501,603	\$ 1,998

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division (Class II)	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division
Investment Income								
Dividends	\$ 165,133	\$ 481	\$ 12,492	\$ 5,931	\$ 37	\$ 13,409	\$ 129	\$ -
Expenses								
Mortality and expense risk fees	55,396	18	2,142	566	9	7,494	120	33,793
Net investment income (loss)	109,737	463	10,350	5,365	28	5,915	9	(33,793)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	15,543	(1,364)	(96,772)	(7,796)	236	4,439	(11,173)	(425,970)
Realized gain distribution	3,116,263	-	-	-	260	288,362	432	1,754,687
Realized gain (loss)	3,131,806	(1,364)	(96,772)	(7,796)	496	292,801	(10,741)	1,328,717
Change in net unrealized appreciation/depreciation of investments	(5,196,792)	(10)	(55,062)	(19,619)	(676)	(515,689)	(761)	(5,764,345)
Net gain (loss) on investments	(2,064,986)	(1,374)	(151,834)	(27,415)	(180)	(222,888)	(11,502)	(4,435,628)
Net increase (decrease) in net assets resulting from operations	(1,955,249)	(911)	(141,484)	(22,050)	(152)	(216,973)	(11,493)	(4,469,421)
Capital transactions:								
Transfers of net premiums	653,481	5,806	29,884	25,710	112	16,594	25,801	267,074
Transfers due to death benefits	(34,358)	-	(49,362)	-	-	-	-	(15,099)
Transfers due to withdrawal of funds	(410,689)	(12,767)	2	(1)	(4,492)	(6,551)	(16,314)	(207,984)
Transfers due to policy loans, net of repayments	(317,949)	-	-	-	-	-	-	(288,831)
Transfers due to charges for administrative and insurance costs	(570,039)	(275)	(14,511)	(3,962)	(192)	(17,480)	(948)	(315,710)
Transfers between Divisions and to/from General Account	579	1,060	7,397	29,018	-	12,817	(14,273)	280,976
Net increase (decrease) in net assets resulting from capital transactions	(678,975)	(6,176)	(26,590)	50,765	(4,572)	5,380	(5,734)	(279,574)
Total increase (decrease)	(2,634,224)	(7,087)	(168,074)	28,715	(4,724)	(211,593)	(17,227)	(4,748,995)
NET ASSETS, at beginning of the year	19,136,069	7,989	900,136	159,157	7,377	2,101,791	56,264	13,705,655
NET ASSETS, at end of the year	\$ 16,501,845	\$ 902	\$ 732,062	\$ 187,872	\$ 2,653	\$ 1,890,198	\$ 39,037	\$ 8,956,660

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2022

	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division
Investment Income								
Dividends	\$ 1,288	\$ -	\$ -	\$ -	\$ 1,290	\$ 21,367	\$ 561,158	\$ -
Expenses								
Mortality and expense risk fees	629	100,325	601	333,273	178	11,799	52,077	301,371
Net investment income (loss)	659	(100,325)	(601)	(333,273)	1,112	9,568	509,081	(301,371)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	2,515	(463,254)	(161,648)	456,124	129	17,038	(245,669)	517,815
Realized gain distribution	820	4,917,962	59,154	28,656,198	2,460	116,432	9,053	18,118,520
Realized gain (loss)	3,335	4,454,708	(102,494)	29,112,322	2,589	133,470	(236,616)	18,636,335
Change in net unrealized appreciation/depreciation of investments	(41,311)	(13,453,333)	(1,495)	(61,590,444)	(3,229)	(463,546)	(2,577,340)	(46,273,771)
Net gain (loss) on investments	(37,976)	(8,998,625)	(103,989)	(32,478,122)	(640)	(330,076)	(2,813,956)	(27,637,436)
Net increase (decrease) in net assets resulting from operations	(37,317)	(9,098,950)	(104,590)	(32,811,395)	472	(320,508)	(2,304,875)	(27,938,807)
Capital transactions:								
Transfers of net premiums	-	1,892,219	231,724	2,729,493	13,723	53,377	1,213,171	2,629,975
Transfers due to death benefits	-	(32,186)	-	(502,276)	-	(28,849)	(39,105)	(217,301)
Transfers due to withdrawal of funds	(5,587)	(460,671)	-	(1,684,151)	(2)	(15,858)	(231,785)	(1,829,565)
Transfers due to policy loans, net of repayments	-	(179,218)	-	(1,196,034)	-	(119)	(108,652)	(772,421)
Transfers due to charges for administrative and insurance costs	(4,810)	(905,608)	(5,287)	(2,630,676)	(1,115)	(45,063)	(562,901)	(1,967,832)
Transfers between Divisions and to/from General Account	-	525,382	(169,454)	679,335	-	(35,076)	6,057	(924,992)
Net increase (decrease) in net assets resulting from capital transactions	(10,397)	839,918	56,983	(2,604,309)	12,606	(71,588)	276,785	(3,082,136)
Total increase (decrease)	(47,714)	(8,259,032)	(47,607)	(35,415,704)	13,078	(392,096)	(2,028,090)	(31,020,943)
NET ASSETS, at beginning of the year	192,467	33,213,861	244,305	106,714,489	66,549	1,841,957	16,061,867	90,502,517
NET ASSETS, at end of the year	\$ 144,753	\$ 24,954,829	\$ 196,698	\$ 71,298,785	\$ 79,627	\$ 1,449,861	\$ 14,033,777	\$ 59,481,574

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2022

	Invesco V.I. Diversified Dividend Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. International Growth Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division
Investment Income								
Dividends	\$ 47,245	\$ -	\$ 851	\$ -	\$ -	\$ 241	\$ 466,528	\$ 17,043
Expenses								
Mortality and expense risk fees	9,368	385,372	106	72,740	15,706	30	117,107	18,014
Net investment income (loss)	37,877	(385,372)	745	(72,740)	(15,706)	211	349,421	(971)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	53,176	1,095,299	(8,403)	(765,418)	(3,435)	(1,734)	(218,712)	31,552
Realized gain distribution	309,954	17,261,633	-	-	586,320	1,538	12,024,857	369,801
Realized gain (loss)	363,130	18,356,932	(8,403)	(765,418)	582,885	(196)	11,806,145	401,353
Change in net unrealized appreciation/depreciation of investments	(447,617)	(61,424,552)	(4,372)	(1,777,283)	(1,262,467)	(2,166)	(19,849,790)	(992,076)
Net gain (loss) on investments	(84,487)	(43,067,620)	(12,775)	(2,542,701)	(679,582)	(2,362)	(8,043,645)	(590,723)
Net increase (decrease) in net assets resulting from operations	(46,610)	(43,452,992)	(12,030)	(2,615,441)	(695,288)	(2,151)	(7,694,224)	(591,694)
Capital transactions:								
Transfers of net premiums	239,494	3,432,601	26,669	1,562,884	247,234	-	1,241,454	207,808
Transfers due to death benefits	(4,821)	(1,597,450)	-	(124,583)	(6,223)	-	(189,282)	(3,026)
Transfers due to withdrawal of funds	(264,069)	(1,842,855)	-	(940,129)	(146,773)	-	(863,301)	(84,654)
Transfers due to policy loans, net of repayments	(85,242)	(1,884,760)	-	(368,573)	(91,251)	(2)	(723,371)	(2,705)
Transfers due to charges for administrative and insurance costs	(106,647)	(2,808,684)	(1,074)	(953,679)	(173,520)	(246)	(1,097,269)	(106,910)
Transfers between Divisions and to/from General Account	(101,197)	1,135,042	(26,599)	538,079	60,708	13,748	119,343	5,051
Net increase (decrease) in net assets resulting from capital transactions	(322,482)	(3,566,106)	(1,004)	(286,001)	(109,825)	13,500	(1,512,426)	15,564
Total increase (decrease)	(369,092)	(47,019,098)	(13,034)	(2,901,442)	(805,113)	11,349	(9,206,650)	(576,130)
NET ASSETS, at beginning of the year	2,670,108	136,604,985	43,642	22,000,829	5,068,427	6,047	38,110,497	3,584,201
NET ASSETS, at end of the year	\$ 2,301,016	\$ 89,585,887	\$ 30,608	\$ 19,099,387	\$ 4,263,314	\$ 17,396	\$ 28,903,847	\$ 3,008,071

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division (Institutional Class)	Janus Henderson Balanced Division (Service Class)	Janus Henderson Forty Division (Institutional Class)	Janus Henderson Forty Division (Service Class)	Janus Henderson Global Research Division (Institutional Class)
Investment Income								
Dividends	\$ -	\$ -	\$ 57,727	\$ 16	\$ 61,838	\$ 47,963	\$ 162	\$ 111,004
Expenses								
Mortality and expense risk fees	-	21,309	29,147	5	22,499	90,096	1,892	40,162
Net investment income (loss)	-	(21,309)	28,580	11	39,339	(42,133)	(1,730)	70,842
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(2)	(141,372)	-	(6)	238,604	94,633	(8,803)	356,678
Realized gain distribution	-	2,437,580	-	41	190,140	3,855,617	52,490	1,177,114
Realized gain (loss)	(2)	2,296,208	-	35	428,744	3,950,250	43,687	1,533,792
Change in net unrealized appreciation/depreciation of investments	5	(5,699,185)	-	(301)	(1,728,132)	(15,558,283)	(186,748)	(4,124,718)
Net gain (loss) on investments	3	(3,402,977)	-	(266)	(1,299,388)	(11,608,033)	(143,061)	(2,590,926)
Net increase (decrease) in net assets resulting from operations	3	(3,424,286)	28,580	(255)	(1,260,049)	(11,650,166)	(144,791)	(2,520,084)
Capital transactions:								
Transfers of net premiums	5	340,395	1,106,237	-	203,691	650,357	8,683	446,945
Transfers due to death benefits	-	(5,017)	-	-	(9,598)	(57,785)	(5,548)	(16,553)
Transfers due to withdrawal of funds	-	(98,192)	(480,174)	-	(192,819)	(823,875)	69	(333,997)
Transfers due to policy loans, net of repayments	-	(233,283)	240	-	(68,121)	(663,557)	(922)	(494,082)
Transfers due to charges for administrative and insurance costs	(1)	(248,966)	(62,862)	(86)	(245,834)	(711,195)	(8,102)	(355,059)
Transfers between Divisions and to/from General Account	544	405,295	84,214	-	(19,110)	(831,617)	3,566	224,135
Net increase (decrease) in net assets resulting from capital transactions	548	160,232	647,655	(86)	(331,791)	(2,437,672)	(2,254)	(528,611)
Total increase (decrease)	551	(3,264,054)	676,235	(341)	(1,591,840)	(14,087,838)	(147,045)	(3,048,695)
NET ASSETS, at beginning of the year	26	8,541,371	3,862,261	1,544	7,543,818	35,645,607	429,145	12,874,552
NET ASSETS, at end of the year	\$ 577	\$ 5,277,317	\$ 4,538,496	\$ 1,203	\$ 5,951,978	\$ 21,557,769	\$ 282,100	\$ 9,825,857

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Janus Henderson Global Research Division (Service Class)	JPMorgan Insurance Trust U.S. Equity Division	Lord Abbett Developing Growth Division	MFS® Blended Research Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division
Investment Income								
Dividends	\$ 2,792	\$ 2,865	\$ -	\$ 2,885	\$ 1,687	\$ 6	\$ -	\$ 3,781
Expenses								
Mortality and expense risk fees	1,660	1,357	552	711	259	-	16,112	1,186
Net investment income (loss)	1,132	1,508	(552)	2,174	1,428	6	(16,112)	2,595
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(1,905)	600	(105,493)	(27,368)	(28)	(27)	(23,794)	(60,259)
Realized gain distribution	35,682	79,293	-	43,346	7,368	-	311,800	21,024
Realized gain (loss)	33,777	79,893	(105,493)	15,978	7,340	(27)	288,006	(39,235)
Change in net unrealized appreciation/depreciation of investments	(111,385)	(200,330)	(3,457)	(69,133)	(43,207)	(6)	(1,462,608)	(106,158)
Net gain (loss) on investments	(77,608)	(120,437)	(108,950)	(53,155)	(35,867)	(33)	(1,174,602)	(145,393)
Net increase (decrease) in net assets resulting from operations	(76,476)	(118,929)	(109,502)	(50,981)	(34,439)	(27)	(1,190,714)	(142,798)
Capital transactions:								
Transfers of net premiums	3,716	2,892	2,409	4,117	9	21	43,940	27,349
Transfers due to death benefits	(8,145)	-	-	-	-	-	(125,341)	-
Transfers due to withdrawal of funds	(4,992)	(6,439)	-	(9,904)	(2)	(2)	(30,080)	1
Transfers due to policy loans, net of repayments	(1,686)	-	-	-	-	-	14,889	-
Transfers due to charges for administrative and insurance costs	(7,810)	(8,411)	(5,916)	(6,488)	(1,742)	(7)	(62,046)	(7,959)
Transfers between Divisions and to/from General Account	1,716	49	13,752	136,494	795	213	(183,313)	13,283
Net increase (decrease) in net assets resulting from capital transactions	(17,201)	(11,909)	10,245	124,219	(940)	225	(341,951)	32,674
Total increase (decrease)	(93,677)	(130,838)	(99,257)	73,238	(35,379)	198	(1,532,665)	(110,124)
NET ASSETS, at beginning of the year	387,051	632,933	246,975	301,718	127,750	138	3,759,997	576,798
NET ASSETS, at end of the year	\$ 293,374	\$ 502,095	\$ 147,718	\$ 374,956	\$ 92,371	\$ 336	\$ 2,227,332	\$ 466,674

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division
Investment Income								
Dividends	\$ 6,144	\$ 1,363	\$ -	\$ 4,596	\$ 647	\$ 53,195	\$ 102,001	\$ 6,612
Expenses								
Mortality and expense risk fees	3,594	302	28,194	5,041	63	9,385	23,099	1,733
Net investment income (loss)	2,550	1,061	(28,194)	(445)	584	43,810	78,902	4,879
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	24,522	(13,722)	(274,393)	27,719	31	6,713	(235,069)	(40,004)
Realized gain distribution	117,768	11,365	1,938,054	119,948	1,026	226,719	690,617	20,491
Realized gain (loss)	142,290	(2,357)	1,663,661	147,667	1,057	233,432	455,548	(19,513)
Change in net unrealized appreciation/depreciation of investments	(323,176)	(10,108)	(4,233,859)	(339,731)	(1,314)	(487,380)	(1,427,803)	(32,584)
Net gain (loss) on investments	(180,886)	(12,465)	(2,570,198)	(192,064)	(257)	(253,948)	(972,255)	(52,097)
Net increase (decrease) in net assets resulting from operations	(178,336)	(11,404)	(2,598,392)	(192,509)	327	(210,138)	(893,353)	(47,218)
Capital transactions:								
Transfers of net premiums	23,490	79,916	198,795	11,713	8,456	313,165	1,198,353	520,767
Transfers due to death benefits	(2,212)	-	(21,484)	(3,942)	-	-	(8,324)	-
Transfers due to withdrawal of funds	(10,113)	-	(216,162)	(20,362)	-	5	(178,338)	(1,089)
Transfers due to policy loans, net of repayments	(7,205)	-	(222,585)	(346)	-	-	(11,564)	-
Transfers due to charges for administrative and insurance costs	(17,521)	(3,160)	(159,531)	(28,602)	(365)	(35,029)	(460,347)	(32,796)
Transfers between Divisions and to/from General Account	8,393	(10)	(77,784)	(77,331)	-	196,072	26,730	(173,876)
Net increase (decrease) in net assets resulting from capital transactions	(5,168)	76,746	(498,751)	(118,870)	8,091	474,213	566,510	313,006
Total increase (decrease)	(183,504)	65,342	(3,097,143)	(311,379)	8,418	264,075	(326,843)	265,788
NET ASSETS, at beginning of the year	1,076,162	75,246	8,811,528	1,127,472	21,495	3,892,335	5,181,466	411,238
NET ASSETS, at end of the year	\$ 892,658	\$ 140,588	\$ 5,714,385	\$ 816,093	\$ 29,913	\$ 4,156,410	\$ 4,854,623	\$ 677,026

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2022

	MML American Funds Growth Division	MML American Funds International Division	MML Balanced Allocation Division	MML Blend Division	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division
Investment Income								
Dividends	\$ 10,210	\$ 32,105	\$ 82,162	\$ 420,410	\$ -	\$ 59,495	\$ 3,972	\$ 1,591,127
Expenses								
Mortality and expense risk fees	15,130	825	11,997	127,120	62,287	10,337	469	443,366
Net investment income (loss)	(4,920)	31,280	70,165	293,290	(62,287)	49,158	3,503	1,147,761
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(99,979)	(84,591)	(22,936)	(242,955)	(1,419,943)	(10,634)	(8,523)	2,022,645
Realized gain distribution	524,310	4,151	160,094	562,956	2,642,295	125,402	-	10,635,913
Realized gain (loss)	424,331	(80,440)	137,158	320,001	1,222,352	114,768	(8,523)	12,658,558
Change in net unrealized appreciation/depreciation of investments	(1,150,089)	3,051	(570,738)	(6,587,638)	(9,161,221)	(424,669)	(9,715)	(19,275,782)
Net gain (loss) on investments	(725,758)	(77,389)	(433,580)	(6,267,637)	(7,938,869)	(309,901)	(18,238)	(6,617,224)
Net increase (decrease) in net assets resulting from operations	(730,678)	(46,109)	(363,415)	(5,974,347)	(8,001,156)	(260,743)	(14,735)	(5,469,463)
Capital transactions:								
Transfers of net premiums	1,710,966	81,715	390,408	1,521,385	1,477,316	211,081	29,791	3,795,339
Transfers due to death benefits	-	-	(1,960)	(419,193)	(34,886)	(1,953)	-	(542,402)
Transfers due to withdrawal of funds	(5,837)	(26,681)	(46,697)	(425,864)	(370,759)	(124,901)	(1,482)	(2,705,674)
Transfers due to policy loans, net of repayments	(112,304)	(4,469)	(6,820)	(126,379)	(159,453)	(907)	-	(976,836)
Transfers due to charges for administrative and insurance costs	(289,524)	(13,454)	(123,478)	(1,415,524)	(607,725)	(37,186)	(3,382)	(3,941,622)
Transfers between Divisions and to/from General Account	160,171	(136,432)	11,517	189,834	3,424	(52,528)	15,057	456,814
Net increase (decrease) in net assets resulting from capital transactions	1,463,472	(99,321)	222,970	(675,741)	307,917	(6,394)	39,984	(3,914,381)
Total increase (decrease)	732,794	(145,430)	(140,445)	(6,650,088)	(7,693,239)	(267,137)	25,249	(9,383,844)
NET ASSETS, at beginning of the year	1,838,786	145,430	2,314,101	35,476,330	19,957,536	1,736,409	86,483	106,958,081
NET ASSETS, at end of the year	\$ 2,571,580	\$ -	\$ 2,173,656	\$ 28,826,242	\$ 12,264,297	\$ 1,469,272	\$ 111,732	\$ 97,574,237

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	MML Equity Income Division	MML Equity Index Division (Service Class I)	MML Equity Index Division (Class II)	MML Equity Index Division (Class III)	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division
Investment Income								
Dividends	\$ 41,873	\$ 44,496	\$ 1,249,978	\$ 32,165	\$ 3,234	\$ 23,514	\$ 5,799	\$ 1,416
Expenses								
Mortality and expense risk fees	11,227	14,144	422,141	14,063	1,314	2,233	3,049	951
Net investment income (loss)	30,646	30,352	827,837	18,102	1,920	21,281	2,750	465
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	43,086	(777,754)	2,187,735	(24,164)	(1,254)	(2,529)	(5,622)	1,625
Realized gain distribution	326,791	354,432	6,142,149	139,930	29,603	43,802	160,623	25,412
Realized gain (loss)	369,877	(423,322)	8,329,884	115,766	28,349	41,273	155,001	27,037
Change in net unrealized appreciation/depreciation of investments	(475,969)	(875,499)	(31,567,505)	(371,943)	(56,568)	(150,419)	(399,009)	(34,340)
Net gain (loss) on investments	(106,092)	(1,298,821)	(23,237,621)	(256,177)	(28,219)	(109,146)	(244,008)	(7,303)
Net increase (decrease) in net assets resulting from operations	(75,446)	(1,268,469)	(22,409,784)	(238,075)	(26,299)	(87,865)	(241,258)	(6,838)
Capital transactions:								
Transfers of net premiums	286,703	604,119	3,175,402	1,390,197	70,222	138,174	25,706	52,010
Transfers due to death benefits	(1,259)	-	(1,401,327)	-	-	-	-	-
Transfers due to withdrawal of funds	(38,287)	(10)	(1,278,369)	(6,455)	(306)	(25,067)	(8,097)	(29,663)
Transfers due to policy loans, net of repayments	(19,553)	(32)	(1,938,974)	(26,023)	(4)	(148)	(3)	(14)
Transfers due to charges for administrative and insurance costs	(136,119)	(61,740)	(3,065,049)	(226,447)	(8,817)	(25,214)	(7,335)	(9,323)
Transfers between Divisions and to/from General Account	526,669	(557,521)	(119,921)	970,126	(24,706)	39,968	2,590	12,162
Net increase (decrease) in net assets resulting from capital transactions	618,154	(15,184)	(4,628,238)	2,101,398	36,389	127,713	12,861	25,172
Total increase (decrease)	542,708	(1,283,653)	(27,038,022)	1,863,323	10,090	39,848	(228,397)	18,334
NET ASSETS, at beginning of the year	2,229,954	6,305,114	121,243,867	852,050	447,362	600,403	1,173,089	103,272
NET ASSETS, at end of the year	\$ 2,772,662	\$ 5,021,461	\$ 94,205,845	\$ 2,715,373	\$ 457,452	\$ 640,251	\$ 944,692	\$ 121,606

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	MML Global Division (Service Class I)	MML Global Division (Class II)	MML Growth Allocation Division	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML Large Cap Growth Division
Investment Income								
Dividends	\$ 2,153	\$ 10,453	\$ 156,574	\$ 11,800	\$ 19,151	\$ 148,919	\$ 1,076	\$ -
Expenses								
Mortality and expense risk fees	333	3,564	29,978	1,029	4,760	20,001	650	2,500
Net investment income (loss)	1,820	6,889	126,596	10,771	14,391	128,918	426	(2,500)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(138,214)	(173,535)	(68,794)	(3,012)	3,489	(98,132)	(1,257)	(5,021)
Realized gain distribution	97,700	393,464	647,105	-	145,783	418,717	4,900	34,637
Realized gain (loss)	(40,514)	219,929	578,311	(3,012)	149,272	320,585	3,643	29,616
Change in net unrealized appreciation/depreciation of investments	2,882	(353,260)	(1,711,478)	(23,184)	(177,623)	(1,287,634)	(15,978)	(136,279)
Net gain (loss) on investments	(37,632)	(133,331)	(1,133,167)	(26,196)	(28,351)	(967,049)	(12,335)	(106,663)
Net increase (decrease) in net assets resulting from operations	(35,812)	(126,442)	(1,006,571)	(15,425)	(13,960)	(838,131)	(11,909)	(109,163)
Capital transactions:								
Transfers of net premiums	2	132,797	848,765	100,479	381,222	334,270	28,817	128,923
Transfers due to death benefits	-	(2,788)	(22,566)	-	(3,933)	(119,291)	-	-
Transfers due to withdrawal of funds	-	(15,518)	(87,547)	(23,308)	(3,023)	(264,446)	(16)	(2,468)
Transfers due to policy loans, net of repayments	-	(3,007)	(16,904)	-	(11,987)	(73,720)	(4)	(14)
Transfers due to charges for administrative and insurance costs	(3,631)	(41,594)	(344,536)	(8,984)	(58,649)	(235,184)	(4,343)	(32,628)
Transfers between Divisions and to/from General Account	1,081	9,372	49,519	23,033	(124,331)	340,065	16,006	46,065
Net increase (decrease) in net assets resulting from capital transactions	(2,548)	79,262	426,731	91,220	179,299	(18,306)	40,460	139,878
Total increase (decrease)	(38,360)	(47,180)	(579,840)	75,795	165,339	(856,437)	28,551	30,715
NET ASSETS, at beginning of the year	128,214	680,782	6,299,400	100,492	1,290,144	6,069,640	77,607	361,278
NET ASSETS, at end of the year	\$ 89,854	\$ 633,602	\$ 5,719,560	\$ 176,287	\$ 1,455,483	\$ 5,213,203	\$ 106,158	\$ 391,993

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	MML Managed Bond Division	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division
Investment Income								
Dividends	\$ 1,045,926	\$ 50,999	\$ -	\$ 34,633	\$ 65,502	\$ 15,869	\$ 197,906	\$ -
Expenses								
Mortality and expense risk fees	120,299	33,124	14,406	7,973	9,872	1,349	101,260	60,965
Net investment income (loss)	925,627	17,875	(14,406)	26,660	55,630	14,520	96,646	(60,965)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(296,117)	143,723	(763,253)	(18,820)	(83,417)	(39,105)	467,978	(746,348)
Realized gain distribution	349,985	-	900,288	394,202	179,516	-	3,313,108	5,037,964
Realized gain (loss)	53,868	143,723	137,035	375,382	96,099	(39,105)	3,781,086	4,291,616
Change in net unrealized appreciation/depreciation of investments	(6,797,750)	(1,563,434)	(1,064,959)	(424,602)	(477,606)	(4,900)	(9,125,166)	(9,191,163)
Net gain (loss) on investments	(6,743,882)	(1,419,711)	(927,924)	(49,220)	(381,507)	(44,005)	(5,344,080)	(4,899,547)
Net increase (decrease) in net assets resulting from operations	(5,818,255)	(1,401,836)	(942,330)	(22,560)	(325,877)	(29,485)	(5,247,434)	(4,960,512)
Capital transactions:								
Transfers of net premiums	1,252,701	529,292	664,518	291,342	347,574	13,457	1,183,617	831,323
Transfers due to death benefits	(876,968)	(28,426)	(4,573)	(5,422)	(7,776)	-	(82,199)	(24,687)
Transfers due to withdrawal of funds	(507,486)	(211,816)	(177,336)	(28,138)	(38,582)	(545)	(726,113)	(273,190)
Transfers due to policy loans, net of repayments	(214,938)	(154,211)	(18,928)	(16,551)	(511)	(6)	(526,635)	(168,165)
Transfers due to charges for administrative and insurance costs	(1,097,499)	(376,946)	(196,638)	(101,212)	(118,736)	(10,091)	(977,926)	(544,078)
Transfers between Divisions and to/from General Account	227,614	126,787	(79,552)	200,210	57,886	201,359	(67,005)	561,278
Net increase (decrease) in net assets resulting from capital transactions	(1,216,576)	(115,320)	187,491	340,229	239,855	204,174	(1,196,261)	382,481
Total increase (decrease)	(7,034,831)	(1,517,156)	(754,839)	317,669	(86,022)	174,689	(6,443,695)	(4,578,031)
NET ASSETS, at beginning of the year	38,237,306	11,337,704	3,539,804	1,587,137	2,037,126	331,949	32,844,844	21,049,615
NET ASSETS, at end of the year	\$ 31,202,475	\$ 9,820,548	\$ 2,784,965	\$ 1,904,806	\$ 1,951,104	\$ 506,638	\$ 26,401,149	\$ 16,471,584

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	MML Small Company Value Division	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division
Investment Income								
Dividends	\$ 793	\$ 12,734	\$ 5,589	\$ 15,968	\$ 3,581	\$ 285,547	\$ 118,207	\$ 3,228
Expenses								
Mortality and expense risk fees	2,078	4,859	1,110	8,551	1,071	75,832	2,610	529
Net investment income (loss)	(1,285)	7,875	4,479	7,417	2,510	209,715	115,597	2,699
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(73,932)	(32,975)	(8,693)	(13,758)	(33,450)	(2)	65,109	(8,224)
Realized gain distribution	220,522	276,994	56,667	242,467	-	-	-	3,088
Realized gain (loss)	146,590	244,019	47,974	228,709	(33,450)	(2)	65,109	(5,136)
Change in net unrealized appreciation/depreciation of investments	(213,960)	(433,760)	(95,036)	(574,130)	(9,798)	1	(140,997)	(23,590)
Net gain (loss) on investments	(67,370)	(189,741)	(47,062)	(345,421)	(43,248)	(1)	(75,888)	(28,726)
Net increase (decrease) in net assets resulting from operations	(68,655)	(181,866)	(42,583)	(338,004)	(40,738)	209,714	39,709	(26,027)
Capital transactions:								
Transfers of net premiums	68,297	239,260	80,539	288,963	133,957	7,948,279	76,493	13,448
Transfers due to death benefits	-	(2,505)	-	(6,556)	-	(119,435)	-	(23,884)
Transfers due to withdrawal of funds	(581)	(34,337)	(286)	(24,060)	(4,791)	(2,167,528)	(21,655)	(7)
Transfers due to policy loans, net of repayments	(3,392)	(3,822)	(5,295)	(39,797)	3	(638,879)	(19,928)	-
Transfers due to charges for administrative and insurance costs	(12,641)	(70,016)	(10,960)	(137,949)	(17,980)	(1,326,135)	(30,050)	(2,288)
Transfers between Divisions and to/from General Account	10,396	19,976	20,142	(89,833)	102,763	4,032,695	7,260	207
Net increase (decrease) in net assets resulting from capital transactions	62,079	148,556	84,140	(9,232)	213,952	7,728,997	12,120	(12,524)
Total increase (decrease)	(6,576)	(33,310)	41,557	(347,236)	173,214	7,938,711	51,829	(38,551)
NET ASSETS, at beginning of the year	373,185	1,092,493	146,079	1,965,182	124,434	16,396,206	492,181	233,307
NET ASSETS, at end of the year	\$ 366,609	\$ 1,059,183	\$ 187,636	\$ 1,617,946	\$ 297,648	\$ 24,334,917	\$ 544,010	\$ 194,756

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2022

	PIMCO High Yield Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
Investment Income								
Dividends	\$ 7,941	\$ 1,435	\$ 4,387	\$ -	\$ -	\$ 414,292	\$ 1,468	\$ -
Expenses								
Mortality and expense risk fees	394	51	415	28,121	59,438	70,026	177	229,337
Net investment income (loss)	7,547	1,384	3,972	(28,121)	(59,438)	344,266	1,291	(229,337)
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(1,227)	(3,125)	(28,295)	66,697	229,084	334,670	108	304,865
Realized gain distribution	-	-	-	217,276	811,951	1,119,785	136	1,732,439
Realized gain (loss)	(1,227)	(3,125)	(28,295)	283,973	1,041,035	1,454,455	244	2,037,304
Change in net unrealized appreciation/depreciation of investments	(24,960)	(949)	(4,248)	(1,326,778)	(10,923,769)	(2,622,142)	(4,429)	(18,834,143)
Net gain (loss) on investments	(26,187)	(4,074)	(32,543)	(1,042,805)	(9,882,734)	(1,167,687)	(4,185)	(16,796,839)
Net increase (decrease) in net assets resulting from operations	(18,640)	(2,690)	(28,571)	(1,070,926)	(9,942,172)	(823,421)	(2,894)	(17,026,176)
Capital transactions:								
Transfers of net premiums	1,099	13,070	7	120,362	426,139	840,578	-	1,592,673
Transfers due to death benefits	-	-	-	(15,042)	(14,203)	(55,531)	-	(320,267)
Transfers due to withdrawal of funds	(7,158)	-	(17)	(171,977)	(343,480)	(443,613)	-	(1,364,238)
Transfers due to policy loans, net of repayments	-	-	-	197,904	(224,693)	(762,250)	(84)	(864,889)
Transfers due to charges for administrative and insurance costs	(2,003)	(669)	(2,250)	(58,676)	(415,009)	(778,211)	(4,214)	(1,759,626)
Transfers between Divisions and to/from General Account	-	(12,464)	(2,339)	(17,598)	53,435	250,208	44,763	(126,514)
Net increase (decrease) in net assets resulting from capital transactions	(8,062)	(63)	(4,599)	54,973	(517,811)	(948,819)	40,465	(2,842,861)
Total increase (decrease)	(26,702)	(2,753)	(33,170)	(1,015,953)	(10,459,983)	(1,772,240)	37,571	(19,869,037)
NET ASSETS, at beginning of the year	177,886	21,647	196,048	4,920,302	25,875,360	23,530,078	48,102	75,155,920
NET ASSETS, at end of the year	\$ 151,184	\$ 18,894	\$ 162,878	\$ 3,904,349	\$ 15,415,377	\$ 21,757,838	\$ 85,673	\$ 55,286,883

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)

For The Year Ended December 31, 2022

	Templeton Foreign VIP Division	Templeton Global Bond VIP Division	Vanguard VIF Global Bond Index Division	Vanguard VIF Mid Cap Index Division	Vanguard VIF Real Estate Index Division	Voya International Index Division	Voya Russell™ Mid Cap Index Division	Voya Russell™ Small Cap Index Division
Investment Income								
Dividends	\$ 313,386	\$ -	\$ 6,436	\$ 4,351	\$ 4,464	\$ 49,108	\$ 15,346	\$ 2,026
Expenses								
Mortality and expense risk fees	34,472	133	2,181	4,281	2,314	3,759	5,184	1,014
Net investment income (loss)	278,914	(133)	4,255	70	2,150	45,349	10,162	1,012
Net realized and unrealized gain (loss) on investments								
Realized gain (loss) on sale of fund shares	(324,369)	(3,040)	(22,354)	(31,133)	(29,715)	(3,696)	(47,122)	(93,138)
Realized gain distribution	-	-	2,377	41,276	10,083	-	173,388	35,455
Realized gain (loss)	(324,369)	(3,040)	(19,977)	10,143	(19,632)	(3,696)	126,266	(57,683)
Change in net unrealized appreciation/depreciation of investments	(839,567)	396	(21,696)	(100,150)	(71,769)	(305,870)	(580,394)	(44,465)
Net gain (loss) on investments	(1,163,936)	(2,644)	(41,673)	(90,007)	(91,401)	(309,566)	(454,128)	(102,148)
Net increase (decrease) in net assets resulting from operations	(885,022)	(2,777)	(37,418)	(89,937)	(89,251)	(264,217)	(443,966)	(101,136)
Capital transactions:								
Transfers of net premiums	583,667	20,860	178,464	559,613	246,435	160,482	122,127	39,066
Transfers due to death benefits	(28,062)	-	-	(353)	(327)	-	-	-
Transfers due to withdrawal of funds	(297,518)	(18,048)	(1,302)	(6,917)	(5,086)	(6)	9	-
Transfers due to policy loans, net of repayments	(714,527)	-	-	(3,486)	(4,417)	-	-	-
Transfers due to charges for administrative and insurance costs	(387,510)	(905)	(37,251)	(98,275)	(46,553)	(10,873)	(25,038)	(6,078)
Transfers between Divisions and to/from General Account	(235,756)	19,488	34,789	56,314	2,138	(85,363)	126,016	151,014
Net increase (decrease) in net assets resulting from capital transactions	(1,079,706)	21,395	174,700	506,896	192,190	64,240	223,114	184,002
Total increase (decrease)	(1,964,728)	18,618	137,282	416,959	102,939	(199,977)	(220,852)	82,866
NET ASSETS, at beginning of the year	12,160,131	40,634	191,467	320,634	221,372	1,693,422	2,294,465	433,177
NET ASSETS, at end of the year	\$10,195,403	\$ 59,252	\$ 328,749	\$ 737,593	\$ 324,311	\$ 1,493,445	\$ 2,073,613	\$ 516,043

See Notes to Financial Statements.

Massachusetts Mutual Variable Life Separate Account I

STATEMENTS OF OPERATIONS AND CHANGES IN NET ASSETS (Continued)
For The Year Ended December 31, 2022

	VY® CBRE Global Real Estate Division
Investment Income	
Dividends	\$ 17,808
Expenses	
Mortality and expense risk fees	2,311
Net investment income (loss)	15,497
Net realized and unrealized gain (loss) on investments	
Realized gain (loss) on sale of fund shares	4,092
Realized gain distribution	30,510
Realized gain (loss)	34,602
Change in net unrealized appreciation/depreciation of investments	(232,534)
Net gain (loss) on investments	(197,932)
Net increase (decrease) in net assets resulting from operations	(182,435)
Capital transactions:	
Transfers of net premiums	69,864
Transfers due to death benefits	-
Transfers due to withdrawal of funds	(44,333)
Transfers due to policy loans, net of repayments	(2,170)
Transfers due to charges for administrative and insurance costs	(26,574)
Transfers between Divisions and to/from General Account	15,847
Net increase (decrease) in net assets resulting from capital transactions	12,634
Total increase (decrease)	(169,801)
NET ASSETS, at beginning of the year	701,469
NET ASSETS, at end of the year	\$ 531,668

See Notes to Financial Statements.

Notes To Financial Statements

1. ORGANIZATION

Massachusetts Mutual Variable Life Separate Account I (“the Separate Account”) is a separate investment account of Massachusetts Mutual Life Insurance Company (“MassMutual”) established on July 13, 1988. The Separate Account is registered as a unit investment trust under the Investment Company Act of 1940 (“the 1940 Act”).

MassMutual maintains the following sixteen segments within the Separate Account: Variable Life Plus, Large Case Variable Life Plus, Strategic Variable Life®, Variable Life Select, Strategic Group Variable Universal Life®, Strategic Group Variable Universal Life® II, Survivorship Variable Universal Life, Variable Universal Life, Strategic Variable Life® Plus, Survivorship Variable Universal Life II, Variable Universal Life II, VUL GuardSM, Survivorship VUL GuardSM, Variable Universal Life III, MassMutual ElectrumSM and Apex VULSM. Four of the sixteen segments within the Separate Account: Variable Universal Life II, VUL GuardSM, Survivorship VUL GuardSM and Variable Universal Life III, have multiple tiers. The unit values of these tiers differ based on the associated expense ratios.

The assets and liabilities of the Separate Account are clearly identified and distinguished from MassMutual’s other assets and liabilities. The portion of the Separate Account assets applicable to the variable life policies is not chargeable with liabilities arising from any other MassMutual business.

2. INVESTMENT OF THE SEPARATE ACCOUNT’S ASSETS

For the year or period ended December 31, 2023, the Separate Account consists of one hundred sixty-two divisions that invest in the following mutual funds. All of the divisions may not be available to all of the sixteen segments of the Separate Account:

Divisions	The division listed in the first column invests in the fund in this column
American Century VP Capital Appreciation Division	American Century VP Capital Appreciation Fund ¹
American Century VP Disciplined Core Value Division	American Century VP Disciplined Core Value Fund ¹
American Century VP Inflation Protection Division	American Century VP Inflation Protection Fund ¹
American Century VP International Division	American Century VP International Fund ¹
American Century VP Value Division	American Century VP Value Fund ¹
American Funds Insurance Series® Asset Allocation Division	American Funds Insurance Series® Asset Allocation Fund ²
American Funds Insurance Series® Growth-Income Division	American Funds Insurance Series® Growth-Income Fund ²
BlackRock Basic Value V.I. Division ²³	BlackRock Basic Value V.I. Fund ^{4,23}
BlackRock High Yield V.I. Division	BlackRock High Yield V.I. Fund ⁴
BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Fund (Class I) ⁴
BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Small Cap Index V.I. Fund (Class III) ⁴
BlackRock Total Return V.I. Division	BlackRock Total Return V.I. Fund ⁴
BNY Mellon MidCap Stock Division	BNY Mellon MidCap Stock Portfolio ³
Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Portfolio (Class I) ⁵
Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Asset Strategy Portfolio (Class II) ⁵
Delaware Ivy VIP Science and Technology Division	Delaware Ivy VIP Science and Technology Portfolio ⁵
Delaware VIP® Emerging Markets Division	Delaware VIP® Emerging Markets Series ⁵
Delaware VIP® Small Cap Value Division	Delaware VIP® Small Cap Value Portfolio ⁵
DWS Small Cap Index Division	DWS Small Cap Index VIP Fund ⁶
Eaton Vance VT Floating-Rate Income Division	Eaton Vance VT Floating-Rate Income Fund ⁷
Fidelity® VIP Bond Index Division (Initial Class)	Fidelity® VIP Bond Index Portfolio (Initial Class) ⁸
Fidelity® VIP Bond Index Division (Service Class 2) ²⁴	Fidelity® VIP Bond Index Portfolio (Service Class 2) ^{8, 24}
Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Portfolio (Initial Class) ⁸
Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Contrafund® Portfolio (Service Class) ⁸
Fidelity® VIP Extended Market Index Division (Initial Class)	Fidelity® VIP Extended Market Index Portfolio (Initial Class) ⁸

Fidelity® VIP Extended Market Index Division (Service Class)	Fidelity® VIP Extended Market Index Portfolio (Service Class) ⁸
Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2020 Portfolio ⁸
Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2025 Portfolio ⁸
Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2030 Portfolio ⁸
Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2035 Portfolio ⁸
Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2040 Portfolio ⁸
Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2045 Portfolio ⁸
Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2050 Portfolio ⁸
Fidelity® VIP Freedom 2055 Division	Fidelity® VIP Freedom 2055 Portfolio ⁸
Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Freedom 2060 Portfolio ⁸
Fidelity® VIP Freedom Income Division ²⁴	Fidelity® VIP Freedom Income Portfolio ^{8, 24}
Fidelity® VIP Growth Division	Fidelity® VIP Growth Portfolio ⁸
Fidelity® VIP Health Care Division (Initial Class) ²⁵	Fidelity® VIP Health Care Portfolio (Initial Class) ^{8, 25}
Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP Index 500 Portfolio (Service Class) ⁸
Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Portfolio (Initial Class) ⁸
Fidelity® VIP International Index Division (Service Class 2)	Fidelity® VIP International Index Portfolio (Service Class 2) ⁸
Fidelity® VIP Overseas Division ²⁵	Fidelity® VIP Overseas Portfolio ^{8, 25}
Fidelity® VIP Real Estate Division (Initial Class) ²⁵	Fidelity® VIP Real Estate Portfolio (Initial Class) ^{8, 25}
Fidelity® VIP Real Estate Division (Service Class)	Fidelity® VIP Real Estate Portfolio (Service Class) ⁸
Fidelity® VIP Strategic Income Division (Initial Class) ²⁵	Fidelity® VIP Strategic Income Portfolio (Initial Class) ^{8, 25}
Fidelity® VIP Total Market Index Division (Initial Class)	Fidelity® VIP Total Market Index Portfolio (Initial Class) ⁸
Fidelity® VIP Total Market Index Division (Service Class 2) ²⁴	Fidelity® VIP Total Market Index Portfolio (Service Class 2) ^{8, 24}
Franklin Mutual Global Discovery VIP Division	Franklin Mutual Global Discovery VIP Fund ⁹
Franklin Small Cap Value VIP Division	Franklin Small Cap Value VIP Fund ⁹
Franklin Strategic Income VIP Division	Franklin Strategic Income VIP Fund ¹⁰
Goldman Sachs Core Fixed Income Division	Goldman Sachs Core Fixed Income Fund ¹¹
Goldman Sachs International Equity Insights Division	Goldman Sachs International Equity Insights Fund ¹¹
Goldman Sachs Large Cap Value Division	Goldman Sachs Large Cap Value Fund ¹¹
Goldman Sachs Mid Cap Growth Division ^{24, 26}	Goldman Sachs Mid Cap Growth Fund ^{11, 24, 26}
Goldman Sachs Mid Cap Value Division	Goldman Sachs Mid Cap Value Fund ¹¹
Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Small Cap Equity Insights Fund ¹¹
Goldman Sachs Strategic Growth Division	Goldman Sachs Strategic Growth Fund ¹¹
Goldman Sachs U.S. Equity Insights Division	Goldman Sachs U.S. Equity Insights Fund ¹¹
Invesco Oppenheimer V.I. International Growth Division	Invesco Oppenheimer V.I. International Growth Fund ¹²
Invesco V.I. American Franchise Division	Invesco V.I. American Franchise Fund ¹²
Invesco V.I. Capital Appreciation Division	Invesco V.I. Capital Appreciation Fund ¹²
Invesco V.I. Comstock Division	Invesco V.I. Comstock Fund ¹²
Invesco V.I. Conservative Balanced Division	Invesco V.I. Conservative Balanced Fund ¹²
Invesco V.I. Core Plus Bond Division	Invesco V.I. Core Plus Bond Fund ^{12, 31}
Invesco V.I. Discovery Mid Cap Growth Division	Invesco V.I. Discovery Mid Cap Growth Fund ¹²
Invesco V.I. Diversified Dividend Division	Invesco V.I. Diversified Dividend Fund ¹²
Invesco V.I. EQV International Equity Division ³⁰	Invesco V.I. EQV International Equity Fund ^{12, 30}
Invesco V.I. Global Division	Invesco V.I. Global Fund ¹²
Invesco V.I. Global Real Estate Division	Invesco V.I. Global Real Estate Fund ¹²
Invesco V.I. Global Strategic Income Division	Invesco V.I. Global Strategic Income Fund ¹²
Invesco V.I. Health Care Division	Invesco V.I. Health Care Fund ¹²
Invesco V.I. Main Street Division	Invesco V.I. Main Street Fund ¹²
Invesco V.I. Main Street Small Cap Division	Invesco V.I. Main Street Small Cap Fund ¹²

Notes To Financial Statements (Continued)

Invesco V.I. Small Cap Equity Division
 Invesco V.I. Technology Division
 Invesco V.I. U.S. Government Money Division
 Janus Henderson Balanced Division (Institutional Class)
 Janus Henderson Balanced Division (Service Class)
 Janus Henderson Forty Division (Institutional Class)
 Janus Henderson Forty Division (Service Class)
 Janus Henderson Global Research Division
 (Institutional Class)
 Janus Henderson Global Research Division
 (Service Class)
 Janus Henderson Global Technology and Innovation Division (Institutional
 Class)²⁵
 Lord Abnett Developing Growth Division
 Lord Abnett Mid Cap Stock Division²⁴
 LVIP JPMorgan U.S. Equity Division²⁹
 MFS® Blended Research® Core Equity Division
 MFS® Global Real Estate Division
 MFS® Government Securities Division
 MFS® Growth Division
 MFS® International Intrinsic Value Division
 MFS® Investors Trust Division
 MFS® Mid Cap Value Division
 MFS® New Discovery Division
 MFS® Research Division
 MFS® Utilities Division
 MFS® Value Division
 MML Aggressive Allocation Division
 MML American Funds Core Allocation Division
 MML American Funds Growth Division
 MML Balanced Allocation Division
 MML Blend Division
 MML Blue Chip Growth Division
 MML Conservative Allocation Division
 MML Dynamic Bond Division
 MML Equity Division
 MML Equity Income Division
 MML Equity Index Division (Class II)
 MML Equity Index Division (Class III)
 MML Equity Index Division (Service Class I)
 MML Equity Rotation Division²⁵
 MML Focused Equity Division
 MML Foreign Division
 MML Fundamental Equity Division
 MML Fundamental Value Division
 MML Global Division (Class II)
 MML Global Division (Service Class I)
 MML Growth Allocation Division
 MML High Yield Division
 MML Income & Growth Division
 MML Inflation-Protected and Income Division
 MML International Equity Division
 MML iShares® 60/40 Allocation Division (Class II)²⁵

Invesco V.I. Small Cap Equity Fund¹²
 Invesco V.I. Technology Fund¹²
 Invesco V.I. U.S. Government Money Portfolio¹²
 Janus Henderson Balanced Portfolio (Institutional Class)¹³
 Janus Henderson Balanced Portfolio (Service Class)¹³
 Janus Henderson Forty Portfolio (Institutional Class)¹³
 Janus Henderson Forty Portfolio (Service Class)¹³
 Janus Henderson Global Research Portfolio
 (Institutional Class)¹³
 Janus Henderson Global Research Portfolio
 (Service Class)¹³
 Janus Henderson Global Technology and Innovation Portfolio
 (Institutional Class)^{13, 25}
 Lord Abnett Developing Growth Portfolio¹⁵
 Lord Abnett Mid Cap Stock Portfolio^{15, 24}
 LVIP JPMorgan U.S. Equity Portfolio^{14, 29}
 MFS® Blended Research® Core Equity Portfolio¹⁶
 MFS® Global Real Estate Portfolio¹⁶
 MFS® Government Securities Portfolio¹⁶
 MFS® Growth Series¹⁶
 MFS® International Intrinsic Value Portfolio¹⁶
 MFS® Investors Trust Series¹⁶
 MFS® Mid Cap Value Portfolio¹⁶
 MFS® New Discovery Series¹⁶
 MFS® Research Series¹⁶
 MFS® Utilities Series¹⁶
 MFS® Value Series¹⁶
 MML Aggressive Allocation Fund¹⁷
 MML American Funds Core Allocation Fund¹⁷
 MML American Funds Growth Fund¹⁷
 MML Balanced Allocation Fund¹⁷
 MML Blend Fund¹⁷
 MML Blue Chip Growth Fund¹⁷
 MML Conservative Allocation Fund¹⁷
 MML Dynamic Bond Fund¹⁷
 MML Equity Fund¹⁷
 MML Equity Income Fund¹⁷
 MML Equity Index Fund (Class II)¹⁷
 MML Equity Index Fund (Class III)¹⁷
 MML Equity Index Fund (Service Class I)¹⁷
 MML Equity Rotation Fund^{17, 25}
 MML Focused Equity Fund¹⁷
 MML Foreign Fund¹⁷
 MML Fundamental Equity Fund¹⁷
 MML Fundamental Value Fund¹⁷
 MML Global Fund (Class II)¹⁷
 MML Global Fund (Service Class I)¹⁷
 MML Growth Allocation Fund¹⁷
 MML High Yield Fund¹⁷
 MML Income & Growth Fund¹⁷
 MML Inflation-Protected and Income Fund¹⁷
 MML International Equity Fund¹⁷
 MML iShares® 60/40 Allocation Fund (Class II)^{17, 25}

Notes To Financial Statements (Continued)

MML iShares® 80/20 Allocation Division (Class II)²⁵

MML Large Cap Growth Division

MML Managed Bond Division

MML Managed Volatility Division

MML Mid Cap Growth Division

MML Mid Cap Value Division

MML Moderate Allocation Division

MML Short-Duration Bond Division

MML Small Cap Equity Division

MML Small Cap Growth Equity Division

MML Small Company Value Division

MML Small/Mid Cap Value Division

MML Strategic Emerging Markets Division

MML Sustainable Equity Division²⁷

MML Total Return Bond Division

MML U.S. Government Money Market Division

PIMCO All Asset Division²⁴

PIMCO CommodityRealReturn® Strategy Division

PIMCO Emerging Markets Bond Division²⁴

PIMCO Global Bond Opportunities Division

PIMCO High Yield Division

PIMCO Income Division²⁵

PIMCO Long-Term U.S. Government Division²⁴

PIMCO Real Return Division

PIMCO Total Return Division

T. Rowe Price All-Cap Opportunities Division

T. Rowe Price Blue Chip Growth Division

T. Rowe Price Equity Income Division

T. Rowe Price Limited-Term Bond Division

T. Rowe Price Mid-Cap Growth Division

Templeton Foreign VIP Division

Templeton Global Bond VIP Division

Vanguard VIF Global Bond Index Division

Vanguard VIF Mid Cap Index Division

Vanguard VIF Real Estate Index Division

Voya International Index Division

Voya Russell™ Mid Cap Index Division

Voya Russell™ Small Cap Index Division

VY® CBRE Global Real Estate Division²⁸

MML iShares® 80/20 Allocation Fund (Class II)^{17, 25}

MML Large Cap Growth Fund¹⁷

MML Managed Bond Fund¹⁷

MML Managed Volatility Fund¹⁷

MML Mid Cap Growth Fund¹⁷

MML Mid Cap Value Fund¹⁷

MML Moderate Allocation Fund¹⁷

MML Short-Duration Bond Fund¹⁷

MML Small Cap Equity Fund¹⁷

MML Small Cap Growth Equity Fund¹⁷

MML Small Company Value Fund¹⁷

MML Small/Mid Cap Value Fund¹⁷

MML Strategic Emerging Markets Fund¹⁷

MML Sustainable Equity Fund^{17, 27}

MML Total Return Bond Fund¹⁷

MML U.S. Government Money Market Fund¹⁷

PIMCO All Asset Portfolio^{18, 24}

PIMCO CommodityRealReturn® Strategy Portfolio¹⁸

PIMCO Emerging Markets Bond Portfolio^{18, 24}

PIMCO Global Bond Opportunities Portfolio¹⁸

PIMCO High Yield Portfolio¹⁸

PIMCO Income Portfolio^{18, 25}

PIMCO Long-Term U.S. Government Portfolio^{18, 24}

PIMCO Real Return Portfolio¹⁸

PIMCO Total Return Portfolio¹⁸

T. Rowe Price All-Cap Opportunities Portfolio¹⁹

T. Rowe Price Blue Chip Growth Portfolio¹⁹

T. Rowe Price Equity Income Portfolio¹⁹

T. Rowe Price Limited-Term Bond Portfolio¹⁹

T. Rowe Price Mid-Cap Growth Portfolio¹⁹

Templeton Foreign VIP Fund²⁰

Templeton Global Bond VIP Fund²⁰

Vanguard VIF Global Bond Index Fund²¹

Vanguard VIF Mid Cap Index Fund²¹

Vanguard VIF Real Estate Index Fund²¹

Voya International Index Portfolio²²

Voya Russell™ Mid Cap Index Portfolio²²

Voya Russell™ Small Cap Index Portfolio²²

VY® CBRE Global Real Estate Portfolio^{22, 28}

In addition to the one hundred sixty-two divisions, policy owners may also allocate funds to the Guaranteed Principal Account (“GPA”), which is part of MassMutual’s general investment account (“General Account”). Because of exemptive and exclusionary provisions in the securities law, interests in the GPA are not registered under the Securities Act of 1933. The General Account and the GPA are not registered as an investment company under the 1940 Act.

¹American Century Investment Management, Inc. is the investment adviser to this Fund.

²Capital Research and Management Company is the investment adviser to this Fund.

³BNY Mellon Investment Adviser, Inc. is the investment adviser to this Portfolio.

⁴BlackRock Advisors, LLC is the investment adviser to this Fund.

⁵Delaware Management Company is the investment adviser to this Series.

⁶DWS Investment Management Americas Inc. is the investment adviser to this Fund.

⁷Eaton Vance Management is the investment adviser to this Fund.

⁸Fidelity Management & Research Company LLC is the investment adviser to this Portfolio.

⁹Franklin Mutual Advisers, LLC is the investment adviser to this Fund.

Notes To Financial Statements (Continued)

¹⁰Franklin Advisers, Inc. Is the investment adviser to this Fund.

¹¹Goldman Sachs Asset Management, L.P. is the investment adviser to this Fund.

¹²Invesco Advisers, Inc. is the investment adviser to this Fund.

¹³Janus Capital Management, LLC is the investment adviser to this Fund.

¹⁴Lincoln Variable Insurance Products Trust is the investment adviser to this Fund.

¹⁵Lord, Abnett & Co. LLC is the investment adviser to this Fund.

¹⁶Massachusetts Financial Services Company is the investment adviser to this Fund.

¹⁷MML Investment Advisers, LLC is the investment adviser to the Fund.

¹⁸Pacific Investment Management Company LLC is the investment adviser to this Fund.

¹⁹T. Rowe Price Associates, Inc. is the investment adviser to this Portfolio.

²⁰Templeton Investment Counsel, LLC is the investment adviser to this Fund.

²¹The Vanguard Group, Inc. is the investment adviser to this Fund.

²²Voya Investments, LLC is the investment adviser to this Fund.

²³This division did not have any investment or unit activity from 2017 to 2023.

²⁴This division did not have any investment or unit activity in 2021 to 2023.

²⁵This Sub-Account/Fund became available to the Separate Account as an investment option on May 1, 2023.

²⁶Prior to April 29, 2022, known as Goldman Sachs Growth Opportunities Division/Portfolio.

²⁷Prior to April 29, 2022, known as MML Growth & Income Division/Fund.

²⁸Prior to May 1, 2022, known as VY® Clarion Global Real Estate Division/Portfolio.

²⁹Effective May 1, 2023, the JPMorgan Insurance Trust U.S. Equity Portfolio merged into the LVIP JPMorgan U.S. Equity Fund. The LVIP JPMorgan U.S. Equity Fund assumed the accounting and performance history of the JPMorgan Insurance Trust U.S. Equity Portfolio.

³⁰Prior to April 29, 2022, known as Invesco V.I. International Growth Division/Fund.

³¹After the close of business on April 29, 2022, Invesco V.I. Core Plus Bond Fund acquired all the net assets of Invesco V.I. Core Bond Fund pursuant to a plan of reorganization approved by the Board of Trustees of the Invesco V.I. Core Plus Bond Fund on December 1, 2021 and by the shareholders of the Invesco V.I. Core Bond Fund on March 31, 2022. The acquisition was accomplished by a tax -free exchange as of the close of business on April 29, 2022. Shares of Invesco V.I. Core Bond Fund were exchanged for the like class of shares of Invesco V.I. Core Plus Bond Fund, based on the relative net asset value of the two funds which resulted in Invesco V.I. Core Bond Fund receiving 1.15816327 shares of Invesco V.I. Core Plus Bond Fund in exchange of 1 share of Invesco V.I. Core Bond Fund. As a result of the underlying fund merger, the division name changed from Invesco V.I. Core Bond to Invesco V.I. Core Plus Bond.

3. SIGNIFICANT ACCOUNTING POLICIES

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

A. Investment Valuation

Investments in the underlying funds held by each division are carried at fair value which is based on the closing net asset value of each of the respective underlying funds, which value their investment securities at fair value.

B. Accounting for Investments

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

C. Federal Income Taxes

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

D. Policy Charges

See Note 8B for charges associated with the policies.

E. Estimates

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

F. Policy Loans

When a policy loan is made, the Separate Account transfers the amount of the loan to MassMutual, thereby decreasing both the investments and the net assets of the Separate Account by an equal amount. The policy owner is charged interest on the outstanding policy loan amount generally equal to either a fixed interest rate of 4% to 6% per year or (in all qualifying jurisdictions) an adjustable loan rate, where applicable. The adjustable loan rate is determined each year for the following policy year.

As long as a loan is outstanding, a portion of the policy account value equal to the loan is invested in the GPA. The amount of the loan earns interest at a rate equal to the greater of either a fixed interest rate generally equal to 2% to 5% of the loan or the policy loan rate less the loan interest rate expense charge.

G. Life Reserves

Life reserves are developed by using accepted actuarial methods and are computed using the 1980 CSO, 2001 CSO, or 2017 CSO mortality tables.

4. FAIR VALUE OF FINANCIAL INSTRUMENTS

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

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

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

The investments of the Separate Account are measured at fair value. All the investments are categorized as Level 1 as of December 31, 2023. There have been no transfers between levels for the year ended December 31, 2023.

5. RELATED PARTY TRANSACTIONS

A. Sales Agreements

The policies currently being offered are sold by registered representatives of MML Investors Services, LLC ("MMLIS"), a subsidiary of MassMutual, and by registered representatives of other broker-dealers who have entered into distribution agreements with MML Distributors, LLC ("MML Distributors") and/or MML Strategic Distributors, LLC ("MSD"), subsidiaries of MassMutual. Pursuant to separate underwriting agreements with MassMutual, on its own behalf and on behalf of the Separate Account, MMLIS serves as principal underwriter of the policies sold by its registered representatives, and MML Distributors and MSD serve as principal underwriters of the policies sold by registered representatives of other broker-dealers who have entered into distribution agreements with MML Distributors and/or MSD.

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

B. Receivable from/Payable to MassMutual

Certain fees such as mortality and expense fees are charges paid between the General Account and the Separate Account. The General Account is not registered as an investment company under the 1940 Act.

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS

The cost of purchases and proceeds from sales of investments for each of the years in the two-year period ended December 31, 2023 were as follows:

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds Insurance Series® Asset Allocation Division	American Funds Insurance Series® Growth-Income Division	BlackRock High Yield V.I. Division
2023								
Cost of purchases	\$ 234,527	\$ 1,450,775	\$ 37,722	\$ 164,253	\$ 2,767,106	\$ 2,985,829	\$ 5,317,033	\$ 59,917
Proceeds from sales	(177,399)	(2,518,724)	(42,152)	(20,069)	(1,549,367)	(3,070,404)	(4,880,161)	(77,387)
	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
2023 (Continued)								
Cost of purchases	\$ 340,391	\$ 16,589	\$ 418,086	\$ 33,283	\$ 12,021	\$ 9,430	\$ 865	\$ 424,606
Proceeds from sales	(76,452)	(5,922)	(488,931)	(37,050)	(2,027)	(572)	(3,392)	(87,246)
	Delaware VIP® Small Cap Value Division	DWS Small Cap Index Division	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division (Initial Class)	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Initial Class)	Fidelity® VIP Extended Market Index Division (Service Class)
2023 (Continued)								
Cost of purchases	\$ 1,354,033	\$ 869,026	\$ 29,365	\$ 277,024	\$ 9,922,678	\$ 490,285	\$ 227,514	\$ 1,174,367
Proceeds from sales	(994,169)	(1,198,061)	(47,125)	(66,377)	(10,694,294)	(949,158)	(43,822)	(996,284)
	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
2023 (Continued)								
Cost of purchases	\$ 850,430	\$ 1,354,476	\$ 2,687,797	\$ 1,075,267	\$ 219,924	\$ 234,593	\$ 217,214	\$ 64,406
Proceeds from sales	(750,695)	(1,021,504)	(1,737,041)	(947,965)	(142,432)	(232,464)	(79,926)	(64,976)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Health Care Division	Fidelity® VIP Index 500 Division	Fidelity® VIP International Index Division	Fidelity® VIP International Index Division	Fidelity® VIP Overseas Division	Fidelity® VIP Real Estate Division
2023 (Continued)	(Service Class)				(Initial Class)	(Service Class 2)		(Initial Class)
Cost of purchases	\$ 63,400	\$ 761,348	\$ 13,528	\$ 5,152,422	\$ 278,303	\$ 900,527	\$ 1,182	\$ 88
Proceeds from sales	(98,827)	(445,569)	(1,076)	(4,397,316)	(46,394)	(655,859)	(239)	(71)
	Fidelity® VIP Real Estate Division	Fidelity® VIP Strategic Income Division	Fidelity® VIP Total Market Index Division	Franklin Mutual Global Discovery VIP Division	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division
2023 (Continued)	(Service Class)		(Initial Class)					
Cost of purchases	\$ 101,603	\$ 315	\$ 1,038,033	\$ 1,386	\$ 2,736,314	\$ 966	\$ 1,256,330	\$ 109,550
Proceeds from sales	(82,334)	(66)	(344,896)	(603)	(2,324,837)	(204)	(1,115,682)	(66,028)
	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division
2023 (Continued)								
Cost of purchases	\$ 342	\$ 115,921	\$ 9,195	\$ 1,509,307	\$ 1,102	\$ 3,849,619	\$ 1,192,091	\$ 2,598,999
Proceeds from sales	(139)	(65,894)	(715)	(1,707,508)	(5,723)	(6,340,395)	(1,045,544)	(7,940,873)
	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division	Invesco V.I. Diversified Dividend Division	Invesco V.I. EQV International Equity Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division
2023 (Continued)								
Cost of purchases	\$ 29,050	\$ 107,114	\$ 1,661,959	\$ 4,584,497	\$ 646,280	\$ 10,911	\$ 15,957,085	\$ 102,605
Proceeds from sales	(1,367)	(284,722)	(1,770,330)	(6,782,233)	(500,753)	(8,579)	(21,575,905)	(76,970)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division
2023 (Continued)	(Institutional Class)							
Cost of purchases	\$ 13,197,924	\$ 621,744	\$ 3,738,331	\$ 265,810	\$ 145	\$ 743,846	\$ 1,739,040	\$ 26
Proceeds from sales	(2,485,154)	(745,022)	(3,286,690)	(274,957)	(32)	(1,372,195)	(2,789,510)	(97)
	Janus Henderson Balanced Division	Janus Henderson Forty Division	Janus Henderson Forty Division	Janus Henderson Global Research Division	Janus Henderson Global Research Division	Janus Henderson Global Technology and Innovation Division	Lord Abbett Developing Growth Division	LVIP JPMorgan U.S. Equity Division
2023 (Continued)	(Service Class)	(Institutional Class)	(Service Class)	(Institutional Class)				
Cost of purchases	\$ 659,080	\$ 2,145,283	\$ 9,557	\$ 12,719,772	\$ 15,302	\$ 6,624	\$ 29,980	\$ 892,165
Proceeds from sales	(1,058,373)	(4,268,278)	(37,138)	(1,379,101)	(23,016)	(429)	(4,198)	(7,241)
	MFS® Blended Research® Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division
2023 (Continued)								
Cost of purchases	\$ 78,340	\$ 221,942	\$ 562	\$ 289,326	\$ 1,115,130	\$ 382,388	\$ 256,057	\$ 405,259
Proceeds from sales	(112,153)	(1,336)	(364)	(517,144)	(274,325)	(570,309)	(167,911)	(640,246)
	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division	MML American Funds Growth Division	MML Balanced Allocation Division	MML Blend Division
2023 (Continued)								
Cost of purchases	\$ 80,676	\$ 8,606	\$ 1,142,936	\$ 3,340,000	\$ 1,030,577	\$ 2,351,871	\$ 1,953,968	\$ 2,027,859
Proceeds from sales	(109,438)	(489)	(52,559)	(2,090,391)	(30,653)	(361,710)	(703,257)	(3,502,692)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division	MML Equity Income Division	MML Equity Index Division	MML Equity Index Division	MML Equity Index Division	MML Equity Index Division
2023 (Continued)						(Service Class I)	(Class II)	(Class III)	
Cost of purchases	\$ 4,310,278	\$ 612,924	\$ 128,246	\$ 13,297,569	\$ 1,155,123	\$ 2,448,139	\$ 16,690,745	\$ 2,978,637	
Proceeds from sales	(4,003,099)	(241,078)	(59,588)	(9,125,301)	(442,620)	(2,252,451)	(10,988,261)	(411,038)	
	MML Equity Rotation Division	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division	MML Global Division	MML Global Division	MML Global Division	MML Growth Allocation Division
2023 (Continued)						(Service Class I)	(Class II)		
Cost of purchases	\$ 55	\$ 268,001	\$ 250,924	\$ 54,425	\$ 50,036	\$ 175,527	\$ 317,556	\$ 5,594,418	
Proceeds from sales	(7)	(266,791)	(139,285)	(86,622)	(4,471)	(3,533)	(234,094)	(4,359,623)	
	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML iShares® 60/40 Allocation Division	MML iShares® 80/20 Allocation Division	MML Large Cap Growth Division	MML Managed Bond Division	
2023 (Continued)									
Cost of purchases	\$ 129,508	\$ 1,144,185	\$ 870,717	\$ 25,999	\$ 8,062	\$ 23,100	\$ 265,730	\$ 2,898,440	
Proceeds from sales	(66,102)	(1,010,632)	(751,920)	(3,772)	(2,003)	(1,539)	(102,603)	(12,595,683)	
	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division	MML Small Company Value Division	
2023 (Continued)									
Cost of purchases	\$ 2,437,042	\$ 1,913,075	\$ 1,693,134	\$ 719,740	\$ 401,308	\$ 1,901,480	\$ 1,869,782	\$ 104,643	
Proceeds from sales	(1,672,657)	(1,804,546)	(1,187,247)	(328,973)	(561,229)	(3,196,634)	(2,758,970)	(54,691)	

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division	PIMCO High Yield Division
2023 (Continued)								
Cost of purchases	\$ 480,208	\$ 76,072	\$ 1,116,881	\$ 1,281,773	\$ 17,182,387	\$ 359,290	\$ 23,046	\$ 10,110
Proceeds from sales	(242,685)	(55,004)	(642,276)	(1,103,231)	(18,928,103)	(283,874)	(7,848)	(2,079)
	PIMCO Income Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
2023 (Continued)								
Cost of purchases	\$ 15,254	\$ 28,476	\$ 164,216	\$ 717,320	\$ 1,580,241	\$ 3,090,033	\$ 2,689	\$ 5,181,643
Proceeds from sales	(654)	(26,039)	(173,343)	(412,101)	(1,706,938)	(2,786,970)	(17,826)	(4,714,779)
	Templeton Foreign VIP Division	Templeton Global Bond VIP Division	Vanguard VIF Global Bond Index Division	Vanguard VIF Mid Cap Index Division	Vanguard VIF Real Estate Index Division	Voya International Index Division	Voya Russell™ Mid Cap Index Division	Voya Russell™ Small Cap Index Division
2023 (Continued)								
Cost of purchases	\$ 1,324,733	\$ 13,857	\$ 166,449	\$ 609,630	\$ 197,756	\$ 434,790	\$ 1,861,132	\$ 791,108
Proceeds from sales	(1,293,058)	(11,824)	(61,875)	(71,714)	(41,725)	(248,897)	(1,065,360)	(597,210)
	VY® CBRE Global Real Estate Division							
2023 (Continued)								
Cost of purchases	\$ 162,127							
Proceeds from sales	(117,614)							

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds® Asset Allocation Division	American Funds® Growth-Income Division	BlackRock High Yield V.I. Division
2022								
Cost of purchases	\$ 422,748	\$ 10,327,371	\$ 98,209	\$ 397,917	\$ 3,892,087	\$ 5,702,875	\$ 10,508,082	\$ 299,273
Proceeds from sales	(240,902)	(3,120,390)	(96,284)	(309,079)	(2,869,682)	(3,447,976)	(8,265,897)	(355,708)
	BlackRock Small Cap Index V.I. Division	BlackRock Small Cap Index V.I. Division	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division	Delaware Ivy VIP Asset Strategy Division	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
2022 (Continued)	(Class III)	(Class III)			(Class I)	(Class II)		
Cost of purchases	\$ 457,770	\$ 11,585	\$ 703,285	\$ 234,170	\$ 22,421	\$ 141,374	\$ 36,324	\$ 172,886
Proceeds from sales	(119,377)	(1,715)	(649,472)	(51,158)	(1,550)	(181,429)	(48,469)	(170,623)
	Delaware VIP® Small Cap Value Division	DWS Small Cap Index Division	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division	Fidelity® VIP Contrafund® Division	Fidelity® VIP Contrafund® Division	Fidelity® VIP Extended Market Index Division	Fidelity® VIP Extended Market Index Division
2022 (Continued)					(Initial Class)	(Service Class)	(Service Class I)	(Service Class II)
Cost of purchases	\$ 678,068	\$ 2,728,714	\$ 81,194	\$ 467,503	\$ 14,721,093	\$ 541,671	\$ 311,428	\$ 566
Proceeds from sales	(636,939)	(1,271,766)	(80,931)	(135,068)	(12,907,843)	(622,223)	(112,507)	(552)
	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
2022 (Continued)								
Cost of purchases	\$ 5,861	\$ 1,411,151	\$ 1,902,463	\$ 3,371,717	\$ 799,517	\$ 17,676	\$ 346,741	\$ 2,089
Proceeds from sales	(2,314)	(1,044,075)	(1,559,137)	(2,605,962)	(700,448)	(3,133)	(326,777)	(923)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Index 500 Division	Fidelity® VIP International Index Division	Fidelity® VIP International Index Division	Fidelity® VIP Real Estate Division	Fidelity® VIP Total Market Index Division	Franklin Mutual Global Discovery VIP Division
2022 (Continued)			(Service Class)	(Initial Class)	(Service Class II)			
Cost of purchases	\$ 54,760	\$ 947,305	\$ 398,446	\$ 404,887	\$ 120,549	\$ 207,502	\$ 421,207	\$ 1,149
Proceeds from sales	(5,120)	(490,414)	(17,773)	(109,647)	(94,853)	(246,952)	(118,298)	(767)
	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division
2022 (Continued)								
Cost of purchases	\$ 5,704,851	\$ 17,057	\$ 736,186	\$ 102,321	\$ 409	\$ 356,725	\$ 33,461	\$ 2,764,044
Proceeds from sales	(3,157,805)	(22,770)	(752,426)	(46,188)	(4,706)	(57,071)	(38,753)	(1,322,717)
	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division
2022 (Continued)								
Cost of purchases	\$ 2,111	\$ 9,327,217	\$ 2,902,994	\$ 31,987,075	\$ 17,472	\$ 178,983	\$ 2,458,229	\$ 22,971,375
Proceeds from sales	(11,033)	(3,669,622)	(2,787,458)	(6,268,425)	(1,293)	(124,564)	(1,661,898)	(8,236,345)
	Invesco V.I. Diversified Dividend Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. International Growth Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division
2022 (Continued)								
Cost of purchases	\$ 1,096,029	\$ 25,693,006	\$ 80,564	\$ 2,756,891	\$ 1,499,080	\$ 21,676	\$ 13,964,424	\$ 600,888
Proceeds from sales	(1,070,727)	(12,382,839)	(80,824)	(3,115,662)	(1,038,292)	(6,426)	(3,102,588)	(216,492)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division	Janus Henderson Balanced Division	Janus Henderson Forty Division	Janus Henderson Forty Division	Janus Henderson Global Research Division
2022 (Continued)				(Institutional Class)	(Service Class)	(Institutional Class)	(Service Class)	
Cost of purchases	\$ 568	\$ 3,609,682	\$ 1,256,181	\$ 57	\$ 1,111,363	\$ 5,760,579	\$ 126,188	\$ 2,093,514
Proceeds from sales	(20)	(1,033,157)	(580,900)	(96)	(1,213,692)	(4,384,748)	(77,683)	(1,374,168)
	Janus Henderson Global Research Division	JPMorgan Insurance Trust U.S. Equity Division	Lord Abbett Developing Growth Division	MFS® Blended Research Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division
2022 (Continued)	(Service Class)							
Cost of purchases	\$ 62,972	\$ 88,377	\$ 112,541	\$ 467,741	\$ 9,857	\$ 674	\$ 599,169	\$ 402,262
Proceeds from sales	(43,373)	(19,482)	(102,849)	(298,004)	(2,002)	(442)	(645,446)	(345,968)
	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division
2022 (Continued)								
Cost of purchases	\$ 208,889	\$ 244,932	\$ 2,622,913	\$ 134,369	\$ 10,129	\$ 797,976	\$ 3,501,595	\$ 736,329
Proceeds from sales	(93,762)	(155,761)	(1,211,822)	(133,748)	(428)	(53,251)	(2,165,530)	(397,948)
	MML American Funds Growth Division	MML American Funds International Division	MML Balanced Allocation Division	MML Blend Division	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division
2022 (Continued)								
Cost of purchases	\$ 2,212,692	\$ 867,148	\$ 635,522	\$ 2,629,739	\$ 7,466,151	\$ 479,928	\$ 108,173	\$ 16,305,414
Proceeds from sales	(229,823)	(931,038)	(182,279)	(2,449,278)	(4,578,220)	(311,776)	(64,688)	(8,436,127)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	MML Equity Income Division	MML Equity Index Division	MML Equity Index Division	MML Equity Index Division	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division
2022 (Continued)		(Service Class I)	(Class II)	(Class III)				
Cost of purchases	\$ 1,663,172	\$ 7,019,504	\$ 15,544,776	\$ 2,405,506	\$ 334,486	\$ 315,531	\$ 193,550	\$ 83,618
Proceeds from sales	(687,597)	(6,649,901)	(13,202,989)	(146,074)	(266,574)	(122,738)	(17,318)	(32,570)
	MML Global Division	MML Global Division	MML Growth Allocation Division	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML Large Cap Growth Division
2022 (Continued)	(Service Class I)	(Class II)						
Cost of purchases	\$ 171,915	\$ 734,631	\$ 2,069,062	\$ 140,304	\$ 1,140,576	\$ 1,643,160	\$ 49,809	\$ 190,083
Proceeds from sales	(74,945)	(255,037)	(868,630)	(38,313)	(801,124)	(1,113,855)	(4,032)	(18,071)
	MML Managed Bond Division	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division
2022 (Continued)								
Cost of purchases	\$ 3,293,708	\$ 1,376,940	\$ 2,476,242	\$ 1,527,900	\$ 964,934	\$ 857,324	\$ 5,605,896	\$ 7,538,565
Proceeds from sales	(3,234,630)	(1,474,377)	(1,402,846)	(766,829)	(489,917)	(638,635)	(3,392,383)	(2,179,066)
	MML Small Company Value Division	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division
2022 (Continued)								
Cost of purchases	\$ 370,402	\$ 788,642	\$ 155,317	\$ 582,546	\$ 1,339,654	\$ 24,332,741	\$ 395,823	\$ 25,921
Proceeds from sales	(89,095)	(355,242)	(10,040)	(341,880)	(1,123,188)	(16,394,342)	(268,113)	(32,665)

Notes To Financial Statements (Continued)

6. PURCHASES AND SALES OF INVESTMENTS (Continued)

	<u>PIMCO High Yield Division</u>	<u>PIMCO Real Return Division</u>	<u>PIMCO Total Return Division</u>	<u>T. Rowe Price All-Cap Opportunities Division</u>	<u>T. Rowe Price Blue Chip Growth Division</u>	<u>T. Rowe Price Equity Income Division</u>	<u>T. Rowe Price Limited-Term Bond Division</u>	<u>T. Rowe Price Mid-Cap Growth Division</u>
<u>2022 (Continued)</u>								
Cost of purchases	\$ 8,893	\$ 36,102	\$ 385,324	\$ 526,732	\$ 2,429,365	4,471,615	56,501	2,825,131
Proceeds from sales	(9,423)	(34,781)	(385,950)	(282,603)	(2,194,685)	(3,956,374)	(14,606)	(4,164,908)
	<u>Templeton Foreign VIP Division</u>	<u>Templeton Global Bond VIP Division</u>	<u>Vanguard VIF Global Bond Index Division</u>	<u>Vanguard VIF Mid Cap Index Division</u>	<u>Vanguard VIF Real Estate Index Division</u>	<u>Voya International Index Division</u>	<u>Voya Russell™ Mid Cap Index Division</u>	<u>Voya Russell™ Small Cap Index Division</u>
<u>2022 (Continued)</u>								
Cost of purchases	\$ 1,868,217	\$ 66,134	\$ 294,261	\$ 656,291	\$ 348,408	\$ 332,072	\$ 1,972,967	\$ 564,531
Proceeds from sales	(2,668,995)	(44,872)	(112,926)	(108,049)	(143,984)	(222,484)	(1,566,300)	(344,062)
	<u>VY® CBRE Global Real Estate Division</u>							
<u>2022 (Continued)</u>								
Cost of purchases	\$ 256,320							
Proceeds from sales	(197,686)							

Notes To Financial Statements (Continued)

7. NET INCREASE (DECREASE) IN OUTSTANDING UNITS

The changes in outstanding units for each of the years in the two-year period ended December 31, 2023 were as follows:

	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds Insurance Series® Asset Allocation Division	American Funds Insurance Series® Growth-Income Division	BlackRock High Yield V.I. Division
2023								
Units purchased	65,005	342,561	-	104,743	170,683	255,426	453,672	1,255
Units withdrawn	(5,043)	(701,370)	(478)	(11,079)	(279,509)	(675,434)	(818,584)	(879)
Units transferred between divisions and transferred to/from GPA	(27,971)	(38,848)	(4,229)	(1,105)	27,939	40,433	(55,840)	(18,082)
Net increase (decrease)	31,991	(397,657)	(4,707)	92,559	(80,887)	(379,575)	(420,752)	(17,706)
2023 (Continued)	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
Units purchased	350,880	10,525	117,329	-	13,115	5,200	-	22,330
Units withdrawn	(134,828)	(997)	(4,262)	(6,752)	(3,900)	(825)	(581)	(4,354)
Units transferred between divisions and transferred to/from GPA	14,152	2,575	(189,543)	(4,184)	-	34	(1,107)	264,772
Net increase (decrease)	230,204	12,103	(76,476)	(10,936)	9,215	4,409	(1,688)	282,748
2023 (Continued)	Delaware VIP® Small Cap Value Division	DWS Small Cap Index Division	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division (Initial Class)	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Initial Class)	Fidelity® VIP Extended Market Index Division (Service Class)
Units purchased	142,654	112,258	313	347,612	1,663,132	44,480	222,755	-
Units withdrawn	(7,406)	(206,345)	(513)	(113,614)	(1,900,649)	(150,177)	(63,632)	(2,677)
Units transferred between divisions and transferred to/from GPA	115,127	(63,105)	(16,894)	(322)	16,880	(12,589)	1,041	198,871
Net increase (decrease)	250,375	(157,192)	(17,094)	233,676	(220,637)	(118,286)	160,164	196,194
2023 (Continued)	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
Units purchased	29	103,780	88,616	81,036	10,707	539	40,014	41
Units withdrawn	(1,198)	(16,981)	(13,250)	(11,458)	(1,957)	(417)	(3,144)	(74)
Units transferred between divisions and transferred to/from GPA	74,168	133,856	563,014	(6,770)	35,827	1,507	45,912	(141)
Net increase (decrease)	72,999	220,655	638,380	62,808	44,577	1,629	82,782	(174)

Notes To Financial Statements (Continued)

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

2023 (Continued)	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Health Care Division	Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Division (Service Class 2)	Fidelity® VIP Overseas Division	Fidelity® VIP Real Estate Division (Initial Class)
Units purchased	1,625	108,994	15,216	402,671	318,685	15,703	1,364	51
Units withdrawn	(882)	(12,052)	(1,867)	(30,497)	(108,026)	(4,567)	(426)	(5)
Units transferred between divisions and transferred to/from GPA	(36,822)	11,200	3	412,511	1,499	250,864	-	(29)
Net increase (decrease)	(36,079)	108,142	13,352	784,685	212,158	262,000	938	17
2023 (Continued)	Fidelity® VIP Real Estate Division (Service Class)	Fidelity® VIP Strategic Income Division	Fidelity® VIP Total Market Index Division (Initial Class)	Franklin Mutual Global Discovery VIP Division	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division
Units purchased	5,207	407	631,329	-	155,722	831	25,469	33,972
Units withdrawn	(2,436)	(170)	(123,579)	(123)	(301,172)	(72)	(15,780)	(3,346)
Units transferred between divisions and transferred to/from GPA	9,136	-	70,871	536	277,210	(83)	106,763	37
Net increase (decrease)	11,907	237	578,621	413	131,760	676	116,452	30,663
2023 (Continued)	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division
Units purchased	14	1,823	5,901	59,051	38	923,171	140,535	682,689
Units withdrawn	(37)	(2,480)	(492)	(140,111)	(1,333)	(923,218)	(2,414)	(1,596,686)
Units transferred between divisions and transferred to/from GPA	-	2,172	-	(58,344)	-	(839,991)	(65,324)	(158,915)
Net increase (decrease)	(23)	1,515	5,409	(139,404)	(1,295)	(840,038)	72,797	(1,072,912)
2023 (Continued)	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division	Invesco V.I. Diversified Dividend Division	Invesco V.I. EQV International Equity Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division
Units purchased	9,057	26,408	1,519,191	959,097	127,442	-	946,609	42,976
Units withdrawn	(786)	(105,076)	(1,334,144)	(1,272,270)	(81,056)	(286)	(1,530,359)	(799)
Units transferred between divisions and transferred to/from GPA	-	257	(580,105)	(53,842)	(95,948)	2,086	(1,158,525)	(17,989)
Net increase (decrease)	8,271	(78,411)	(395,058)	(367,015)	(49,562)	1,800	(1,742,275)	24,188

Notes To Financial Statements (Continued)

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

2023 (Continued)	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division (Institutional Class)
Units purchased	996,701	72,583	394,936	53,237	15	87,943	1,150,823	-
Units withdrawn	(1,323,634)	(88,805)	(783,357)	(56,609)	(10)	(133,187)	(2,004,455)	(25)
Units transferred between divisions and transferred to/from GPA	3,960,649	(8,982)	(7,844)	(1,500)	61	(147,712)	(59,271)	-
Net increase (decrease)	3,633,716	(25,204)	(396,265)	(4,872)	66	(192,956)	(912,903)	(25)
2023 (Continued)	Janus Henderson Balanced Division (Service Class)	Janus Henderson Forty Division (Institutional Class)	Janus Henderson Forty Division (Service Class)	Janus Henderson Global Research Division (Institutional Class)	Janus Henderson Global Research Division	Janus Henderson Global Technology and Innovation Division	Lord Abnett Developing Growth Division	LVIP JPMorgan U.S. Equity Division
Units purchased	55,573	103,442	1,336	196,736	1,698	5,729	1,607	-
Units withdrawn	(192,214)	(334,986)	(4,503)	(453,266)	(7,186)	(547)	(2,524)	(3,577)
Units transferred between divisions and transferred to/from GPA	21,202	(114,575)	(278)	5,960,085	(157)	177	15,844	372,043
Net increase (decrease)	(115,439)	(346,119)	(3,445)	5,703,555	(5,645)	5,359	14,927	368,466
2023 (Continued)	Blended Research® Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division	MFS® Investors Trust Division	MFS® Mid Cap Value Division (Service Class I)	MFS® New Discovery Division (Service Class II)
Units purchased	-	24	26	10,216	16,635	5,002	83,392	46,441
Units withdrawn	(5,289)	(1,005)	(12)	(68,422)	(5,583)	(46,036)	(2,381)	(79,986)
Units transferred between divisions and transferred to/from GPA	(32,015)	152,716	179	(52,165)	523,914	(2,599)	(32,464)	4,601
Net increase (decrease)	(37,304)	151,735	193	(110,371)	534,966	(43,633)	48,547	(28,944)
2023 (Continued)	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division	MML American Funds Growth Division	MML Balanced Allocation Division	MML Blend Division
Units purchased	3,235	3,613	200,773	773,928	348,334	1,445,450	331,375	532,281
Units withdrawn	(22,541)	(319)	(30,207)	(417,279)	(58,455)	(557,982)	(199,379)	(677,351)
Units transferred between divisions and transferred to/from GPA	1,130	-	262,770	(19,038)	408,293	179,893	576,496	(116,346)
Net increase (decrease)	(18,176)	3,294	433,336	337,611	698,172	1,067,361	708,492	(261,416)

Notes To Financial Statements (Continued)

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

2023 (Continued)	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division	MML Equity Income Division	MML Equity Index Division (Service Class I)	MML Equity Index Division (Class II)	MML Equity Index Division (Class III)
Units purchased	973,220	107,443	61,632	1,011,187	168,428	362,785	803,344	1,690,106
Units withdrawn	(683,572)	(70,023)	(6,819)	(1,934,096)	(111,808)	(32,689)	(1,851,781)	(374,175)
Units transferred between divisions and transferred to/from GPA	258,414	133,526	12,172	(64,770)	223,391	(546,640)	(40,714)	437,964
Net increase (decrease)	548,062	170,946	66,985	(987,679)	280,011	(216,544)	(1,089,151)	1,753,895
2023 (Continued)	MML Equity Rotation Division	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division	MML Global Division (Service Class I)	MML Global Division (Class II)	MML Growth Allocation Division
Units purchased	71	40,871	99,584	24,043	29,755	-	88,989	460,502
Units withdrawn	(23)	(35,531)	(23,654)	(40,279)	(10,750)	(2,490)	(53,730)	(248,222)
Units transferred between divisions and transferred to/from GPA	-	(11,988)	39	225	7,917	120,985	(4,013)	(67,444)
Net increase (decrease)	48	(6,648)	75,969	(16,011)	26,922	118,495	31,246	144,836
2023 (Continued)	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML iShares® 60/40 Allocation Division	MML iShares® 80/20 Allocation Division	MML Large Cap Growth Division	MML Managed Bond Division
Units purchased	82,522	397,677	263,933	24,368	7,827	21,878	195,188	776,525
Units withdrawn	(46,331)	(88,975)	(345,157)	(6,214)	(4,196)	(2,171)	(86,263)	(1,396,652)
Units transferred between divisions and transferred to/from GPA	17,421	(351,423)	39,427	(286)	2,242	799	20,770	(3,034,093)
Net increase (decrease)	53,612	(42,721)	(41,797)	17,868	5,873	20,506	129,695	(3,654,220)
2023 (Continued)	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division	MML Small Company Value Division
Units purchased	267,516	319,504	221,301	180,018	20,005	411,129	352,738	60,718
Units withdrawn	(652,911)	(161,577)	(108,422)	(119,849)	(13,273)	(620,646)	(453,204)	(38,307)
Units transferred between divisions and transferred to/from GPA	(87,461)	(40,806)	1,607	7,434	(172,668)	(35,735)	(22,223)	21,024
Net increase (decrease)	(472,856)	117,121	114,486	67,603	(165,936)	(245,252)	(122,689)	43,435

Notes To Financial Statements (Continued)

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

	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division	PIMCO High Yield Division
2023 (Continued)								
Units purchased	103,301	98,957	98,520	217,607	7,639,206	108,647	12,281	998
Units withdrawn	(64,045)	(62,140)	(90,620)	(43,955)	(5,481,370)	(109,541)	(3,275)	(1,794)
Units transferred between divisions and transferred to/from GPA	7,894	(6,548)	(1,659)	11,823	(4,200,206)	(5,707)	(399)	-
Net increase (decrease)	47,150	30,269	6,241	185,475	(2,042,370)	(6,601)	8,607	(796)
	PIMCO Income Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
2023 (Continued)								
Units purchased	15,348	14,258	30	23,666	88,131	252,125	-	262,474
Units withdrawn	(1,279)	(511)	(2,831)	(66,215)	(196,629)	(462,129)	(5,757)	(646,140)
Units transferred between divisions and transferred to/from GPA	-	(12,131)	(11,366)	45,002	115,878	(15,899)	(10,674)	(22,345)
Net increase (decrease)	14,069	1,616	(14,167)	2,453	7,380	(225,903)	(16,431)	(406,011)
	Templeton Foreign VIP Division	Templeton Global Bond VIP Division	Vanguard VIF Global Bond Index Division	Vanguard VIF Mid Cap Index Division	Vanguard VIF Real Estate Index Division	Voya International Index Division	Voya Russell™ Mid Cap Index Division	Voya Russell™ Small Cap Index Division
2023 (Continued)								
Units purchased	346,961	12,714	190,922	607,401	179,843	192,175	98,300	12,620
Units withdrawn	(419,252)	(1,029)	(60,251)	(160,562)	(56,533)	(12,804)	(17,258)	(8,057)
Units transferred between divisions and transferred to/from GPA	(127,598)	(9,243)	(12,926)	23,859	4,153	(95,509)	226,717	105,177
Net increase (decrease)	(199,889)	2,442	117,745	470,698	127,463	83,862	307,759	109,740
	VY® CBRE Global Real Estate Division							
2023 (Continued)								
Units purchased	30,450							
Units withdrawn	(17,792)							
Units transferred between divisions and transferred to/from GPA	(1,446)							
Net increase (decrease)	11,212							

Notes To Financial Statements (Continued)

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

2022	American Century VP Capital Appreciation Division	American Century VP Disciplined Core Value Division	American Century VP Inflation Protection Division	American Century VP International Division	American Century VP Value Division	American Funds® Asset Allocation Division	American Funds® Growth-Income Division	BlackRock High Yield V.I. Division
Units purchased	40,323	341,950	-	124,811	177,562	286,773	453,108	3,584
Units withdrawn	(4,991)	(638,536)	(454)	(11,178)	(259,023)	(425,269)	(874,681)	(1,538)
Units transferred between divisions and transferred to/from GPA	(9,511)	(124,304)	764	(227,943)	(11,429)	(32,434)	(6,516)	(53,498)
Net increase (decrease)	25,821	(420,890)	310	(114,310)	(92,890)	(170,930)	(428,089)	(51,452)
2022 (Continued)	BlackRock Small Cap Index V.I. Division (Class I)	BlackRock Small Cap Index V.I. Division (Class III)	BlackRock Total Return V.I. Division	BNY Mellon MidCap Stock Division	Delaware Ivy VIP Asset Strategy Division (Class I)	Delaware Ivy VIP Asset Strategy Division (Class II)	Delaware Ivy VIP Science and Technology Division	Delaware VIP® Emerging Markets Division
Units purchased	404,061	8,244	84,344	2,741	20,964	7,429	6,052	30,924
Units withdrawn	(85,169)	(892)	(37,251)	(16,965)	(2,127)	(47,744)	(11,898)	(24,173)
Units transferred between divisions and transferred to/from GPA	(7,045)	3,864	(3,207)	95,633	54	3	(3,302)	(11,998)
Net increase (decrease)	311,847	11,216	43,886	81,409	18,891	(40,312)	(9,148)	(5,247)
2022 (Continued)	Delaware VIP® Small Cap Value Division (Initial Class)	DWS Small Cap Index Division (Service Class)	Eaton Vance VT Floating-Rate Income Division	Fidelity® VIP Bond Index Division	Fidelity® VIP Contrafund® Division (Initial Class)	Fidelity® VIP Contrafund® Division (Service Class)	Fidelity® VIP Extended Market Index Division (Service Class I)	Fidelity® VIP Extended Market Index Division (Service Class II)
Units purchased	116,390	131,371	7,739	457,159	1,880,044	42,959	215,011	-
Units withdrawn	(12,747)	(182,832)	(1,055)	(78,726)	(1,572,055)	(124,293)	(44,110)	-
Units transferred between divisions and transferred to/from GPA	(104,079)	(17,448)	(7,783)	(9,895)	(103,601)	(6,274)	(1,695)	-
Net increase (decrease)	(436)	(68,909)	(1,099)	368,538	204,388	(87,608)	169,206	-
2022 (Continued)	Fidelity® VIP Freedom 2020 Division	Fidelity® VIP Freedom 2025 Division	Fidelity® VIP Freedom 2030 Division	Fidelity® VIP Freedom 2035 Division	Fidelity® VIP Freedom 2040 Division	Fidelity® VIP Freedom 2045 Division	Fidelity® VIP Freedom 2050 Division	Fidelity® VIP Freedom 2055 Division
Units purchased	783	112,012	84,585	391,594	59,085	12,615	122,526	1,107
Units withdrawn	(609)	(14,548)	(9,298)	(14,139)	(29,514)	(1,130)	(171,931)	(110)
Units transferred between divisions and transferred to/from GPA	1,262	120,601	151,270	87,064	21,929	3,159	36,937	112
Net increase (decrease)	1,436	218,065	226,557	464,519	51,500	14,644	(12,468)	1,109

Notes To Financial Statements (Continued)

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

	Fidelity® VIP Freedom 2060 Division	Fidelity® VIP Growth Division	Fidelity® VIP Index 500 Division (Service Class)	Fidelity® VIP International Index Division (Initial Class)	Fidelity® VIP International Index Division (Service Class II)	Fidelity® VIP Real Estate Division	Fidelity® VIP Total Market Index Division	Franklin Mutual Global Discovery VIP Division
2022 (Continued)								
Units purchased	39,353	71,688	-	367,915	11,621	5,268	332,729	-
Units withdrawn	(3,224)	(9,523)	(14,979)	(72,398)	(1,408)	(9,533)	(72,873)	(511)
Units transferred between divisions and transferred to/from GPA	15,323	114,463	341,478	(7,493)	20,292	(49,441)	3,737	632
Net increase (decrease)	51,452	176,628	326,499	288,024	30,505	(53,706)	263,593	121
	Franklin Small Cap Value VIP Division	Franklin Strategic Income VIP Division	Goldman Sachs Core Fixed Income Division	Goldman Sachs International Equity Insights Division	Goldman Sachs Large Cap Value Division	Goldman Sachs Mid Cap Value Division	Goldman Sachs Small Cap Equity Insights Division	Goldman Sachs Strategic Growth Division
2022 (Continued)								
Units purchased	174,005	5,480	29,597	21,852	36	10,250	17,684	78,326
Units withdrawn	(277,021)	(12,744)	(64,929)	(2,889)	(1,269)	(3,003)	(12,072)	(171,800)
Units transferred between divisions and transferred to/from GPA	17,244	1,092	(4,286)	26,904	-	7,867	(10,269)	(2,278)
Net increase (decrease)	(85,772)	(6,172)	(39,618)	45,867	(1,233)	15,114	(4,657)	(95,752)
	Goldman Sachs U.S. Equity Insights Division	Invesco Oppenheimer V.I. International Growth Division	Invesco V.I. American Franchise Division	Invesco V.I. Capital Appreciation Division	Invesco V.I. Comstock Division	Invesco V.I. Conservative Balanced Division	Invesco V.I. Core Plus Bond Division	Invesco V.I. Discovery Mid Cap Growth Division
2022 (Continued)								
Units purchased	-	917,885	107,844	726,237	8,108	21,464	961,579	1,108,233
Units withdrawn	(2,329)	(585,398)	(3,216)	(1,261,097)	(781)	(37,188)	(707,912)	(1,138,926)
Units transferred between divisions and transferred to/from GPA	-	(147,040)	(86,521)	(125,790)	-	(14,894)	(41,765)	(340,284)
Net increase (decrease)	(2,329)	185,447	18,107	(660,650)	7,327	(30,618)	211,902	(370,977)
	Invesco V.I. Diversified Dividend Division	Invesco V.I. Global Division	Invesco V.I. Global Real Estate Division	Invesco V.I. Global Strategic Income Division	Invesco V.I. Health Care Division	Invesco V.I. International Growth Division	Invesco V.I. Main Street Division	Invesco V.I. Main Street Small Cap Division
2022 (Continued)								
Units purchased	156,472	1,004,758	21,797	976,776	72,251	-	392,998	28,002
Units withdrawn	(247,443)	(1,556,906)	(1,041)	(1,243,316)	(95,712)	(233)	(696,589)	(27,274)
Units transferred between divisions and transferred to/from GPA	(99,671)	7,604	(22,896)	173,868	205	10,863	(72,905)	260
Net increase (decrease)	(190,642)	(544,544)	(2,140)	(92,672)	(23,256)	10,630	(376,496)	988

Notes To Financial Statements (Continued)

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

2022 (Continued)	Invesco V.I. Small Cap Equity Division	Invesco V.I. Technology Division	Invesco V.I. U.S. Government Money Division	Janus Henderson Balanced Division (Institutional Class)	Janus Henderson Balanced Division (Service Class)	Janus Henderson Forty Division (Institutional Class)	Janus Henderson Forty Division (Service Class)	Janus Henderson Global Research Division (Institutional Class)
Units purchased	4	103,720	861,780	-	64,382	139,151	1,534	230,682
Units withdrawn	(1)	(138,696)	(418,359)	(23)	(122,900)	(327,127)	(2,023)	(507,007)
Units transferred between divisions and transferred to/from GPA	388	5,775	65,458	-	(26,991)	(272,907)	245	(36,287)
Net increase (decrease)	391	(29,201)	508,879	(23)	(85,509)	(460,883)	(244)	(312,612)
2022 (Continued)	Janus Henderson Global Research Division (Service Class)	JPMorgan Insurance Trust U.S. Equity Division	Lord Abbett Developing Growth Division	MFS® Blended Research Core Equity Division	MFS® Global Real Estate Division	MFS® Government Securities Division	MFS® Growth Division	MFS® International Intrinsic Value Division
Units purchased	1,766	1,453	1,185	2,292	6	20	10,770	20,907
Units withdrawn	(7,410)	(8,416)	(3,410)	(9,817)	(1,410)	(8)	(44,183)	(6,948)
Units transferred between divisions and transferred to/from GPA	142	57	(3,780)	80,530	636	207	(105,882)	6,317
Net increase (decrease)	(5,502)	(6,906)	(6,005)	73,005	(768)	219	(139,295)	20,276
2022 (Continued)	MFS® Investors Trust Division	MFS® Mid Cap Value Division	MFS® New Discovery Division	MFS® Research Division	MFS® Utilities Division	MFS® Value Division	MML Aggressive Allocation Division	MML American Funds Core Allocation Division
Units purchased	10,893	50,008	42,072	2,929	5,428	211,791	673,937	420,408
Units withdrawn	(7,434)	(2,227)	(111,270)	(13,197)	(271)	(29,505)	(342,562)	(33,016)
Units transferred between divisions and transferred to/from GPA	(3,899)	(1,310)	1,130	(18,472)	-	136,902	(37,707)	(72,115)
Net increase (decrease)	(440)	46,471	(68,068)	(28,740)	5,157	319,188	293,668	315,277
2022 (Continued)	MML American Funds Growth Division	MML American Funds International Division	MML Balanced Allocation Division	MML Blend Division	MML Blue Chip Growth Division	MML Conservative Allocation Division	MML Dynamic Bond Division	MML Equity Division
Units purchased	1,771,031	91,712	262,773	653,934	776,624	123,534	29,182	1,068,769
Units withdrawn	(408,227)	(46,459)	(93,757)	(584,720)	(444,195)	(95,649)	(5,257)	(1,676,549)
Units transferred between divisions and transferred to/from GPA	52,245	(163,789)	3,619	64,779	(52,492)	(15,657)	15,287	2,558
Net increase (decrease)	1,415,049	(118,536)	172,635	133,993	279,937	12,228	39,212	(605,222)

Notes To Financial Statements (Continued)

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

2022 (Continued)	MML Equity Income Division	MML Equity Index Division (Service Class I)	MML Equity Index Division (Class II)	MML Equity Index Division (Class III)	MML Focused Equity Division	MML Foreign Division	MML Fundamental Equity Division	MML Fundamental Value Division
Units purchased	131,941	308,466	756,385	1,262,157	52,783	100,893	18,075	39,776
Units withdrawn	(81,613)	(42,092)	(1,622,908)	(223,083)	(6,871)	(32,104)	(10,438)	(24,539)
Units transferred between divisions and transferred to/from GPA	349,577	(328,428)	(205,990)	823,253	(15,261)	45,924	2,237	10,170
Net increase (decrease)	399,905	(62,054)	(1,072,513)	1,862,327	30,651	114,713	9,874	25,407
2022 (Continued)	MML Global Division (Service Class I)	MML Global Division (Class II)	MML Growth Allocation Division	MML High Yield Division	MML Income & Growth Division	MML Inflation- Protected and Income Division	MML International Equity Division	MML Large Cap Growth Division
Units purchased	-	74,118	448,856	94,132	228,885	234,749	27,603	130,842
Units withdrawn	(2,766)	(25,668)	(207,828)	(29,606)	(35,553)	(389,005)	(4,743)	(35,689)
Units transferred between divisions and transferred to/from GPA	(8,152)	3,184	46,993	21,692	(87,212)	150,629	16,235	33,764
Net increase (decrease)	(10,918)	51,634	288,021	86,218	106,120	(3,627)	39,095	128,917
2022 (Continued)	MML Managed Bond Division	MML Managed Volatility Division	MML Mid Cap Growth Division	MML Mid Cap Value Division	MML Moderate Allocation Division	MML Short-Duration Bond Division	MML Small Cap Equity Division	MML Small Cap Growth Equity Division
Units purchased	785,523	297,691	274,887	129,490	170,571	14,166	365,262	311,442
Units withdrawn	(1,188,470)	(335,283)	(171,311)	(43,689)	(75,913)	(11,697)	(529,951)	(238,491)
Units transferred between divisions and transferred to/from GPA	65,536	(49,769)	(48,183)	136,615	42,552	199,812	(50,790)	209,836
Net increase (decrease)	(337,411)	(87,361)	55,393	222,416	137,210	202,281	(215,479)	282,787
2022 (Continued)	MML Small Company Value Division	MML Small/Mid Cap Value Division	MML Strategic Emerging Markets Division	MML Sustainable Equity Division	MML Total Return Bond Division	MML U.S. Government Money Market Division	PIMCO Commodity- RealReturn® Strategy Division	PIMCO Global Bond Opportunities Division
Units purchased	56,686	122,934	106,603	122,468	139,722	8,033,027	70,620	13,780
Units withdrawn	(14,338)	(38,025)	(21,958)	(65,760)	(25,356)	(3,580,228)	(53,348)	(27,113)
Units transferred between divisions and transferred to/from GPA	1,221	20,659	23,974	(63,723)	88,890	2,298,302	(6,082)	265
Net increase (decrease)	43,569	105,568	108,619	(7,015)	203,256	6,751,101	11,190	(13,068)

Notes To Financial Statements (Continued)

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

	PIMCO High Yield Division	PIMCO Real Return Division	PIMCO Total Return Division	T. Rowe Price All-Cap Opportunities Division	T. Rowe Price Blue Chip Growth Division	T. Rowe Price Equity Income Division	T. Rowe Price Limited-Term Bond Division	T. Rowe Price Mid-Cap Growth Division
2022 (Continued)								
Units purchased	959	10,929	7	21,608	87,437	275,481	-	263,290
Units withdrawn	(8,439)	(605)	(2,526)	(45,213)	(168,829)	(491,656)	(4,021)	(604,985)
Units transferred between divisions and transferred to/from GPA	-	(10,481)	(2,556)	37,427	(1,860)	14,323	41,627	(43,329)
Net increase (decrease)	(7,480)	(157)	(5,075)	13,822	(83,252)	(201,852)	37,606	(385,024)
	Templeton Foreign VIP Division	Templeton Global Bond VIP Division	Vanguard VIF Global Bond Index Division	Vanguard VIF Mid Cap Index Division	Vanguard VIF Real Estate Index Division	Voya International Index Division	Voya Russell™ Mid Cap Index Division	Voya Russell™ Small Cap Index Division
2022 (Continued)								
Units purchased	415,297	23,328	248,281	548,339	235,112	136,712	75,400	29,278
Units withdrawn	(728,504)	(21,725)	(43,698)	(95,622)	(44,310)	(12,689)	(19,390)	(5,184)
Units transferred between divisions and transferred to/from GPA	(341,472)	21,496	(9,742)	6,020	(33,760)	(78,954)	68,984	109,974
Net increase (decrease)	(654,679)	23,099	194,841	458,737	157,042	45,069	124,994	134,068
	VY® CBRE Global Real Estate Division							
2022 (Continued)								
Units purchased	29,503							
Units withdrawn	(29,950)							
Units transferred between divisions and transferred to/from GPA	4,117							
Net increase (decrease)	3,670							

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS

A. A summary of units outstanding, unit values, net assets, investment income ratios, expense ratios (excluding expenses of the underlying funds) and total return ratios for each of the years in the five-year period ended December 31, 2023 follows:

	At December 31,				For the Years Ended December 31,					
	Units	Unit Value ³ (Lowest to Highest)		Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)		Total Return ³ (Lowest to Highest)		
American Century VP Capital Appreciation Division										
2023	579,437	\$ - -	\$ 1.93	\$ 1,116,866	-%	-% -	0.25%	- % -	20.69 %	
2022	547,445	- -	1.60	874,318	-	- -	0.25	- -	(28.11)	
2021	521,624	- -	2.22	1,158,824	-	- -	0.25	- -	11.16	
2020	498,219	- -	2.00	995,745	-	- -	0.25	- -	42.46	
2019	495,140	- -	1.40	694,663	-	- -	0.25	- -	35.56	
American Century VP Disciplined Core Value Division										
2023	7,953,129	3.77 to	4.40	32,556,160	1.54	0.25 to	1.00	7.58 to	8.38	
2022	8,350,786	3.51 to	4.06	31,490,239	1.77	0.25 to	1.00	(13.60) to	(12.95)	
2021	8,771,675	4.06 to	4.66	37,822,087	1.08	0.25 to	1.00	22.42 to	23.34	
2020	9,231,503	3.32 to	3.78	32,069,155	1.95	0.25 to	1.00	10.70 to	11.53	
2019	10,009,285	3.00 to	3.39	30,738,840	2.08	0.25 to	1.00	22.72 to	23.64	
American Century VP Inflation Protection Division										
2023	24,847	- -	1.13	28,181	3.34	- -	0.25	- -	3.40	
2022	29,553	- -	1.10	32,418	4.80	- -	0.25	- -	(13.08)	
2021	29,243	- -	1.26	36,903	2.57	- -	0.25	- -	6.27	
2020	75,810	- -	1.19	90,026	1.44	- -	0.25	- -	9.55	
2019	45,675	- -	1.08	49,510	2.17	- -	0.25	- -	8.90	
American Century VP International Division										
2023	1,017,477	1.43 to	1.66	1,482,934	1.32	0.25 to	0.40	12.12 to	12.57	
2022	924,918	1.27 to	1.48	1,201,230	1.58	0.25 to	0.40	(25.05) to	(24.75)	
2021	1,039,229	1.68 to	1.98	1,790,461	0.04	0.25 to	0.40	8.26 to	8.75	
2020	137,681	1.55 to	1.83	251,549	0.48	0.25 to	0.60	25.13 to	25.88	
2019	139,289	1.23 to	1.46	203,381	0.86	0.25 to	0.60	27.65 to	28.42	
American Century VP Value Division										
2023	3,545,573	4.11 to	5.54	17,272,536	2.39	0.25 to	1.00	8.02 to	8.83	
2022	3,626,460	3.80 to	5.09	16,271,417	2.10	0.25 to	1.00	(0.46) to	0.29	
2021	3,719,350	3.82 to	5.07	16,757,071	1.74	0.25 to	1.00	23.27 to	24.20	
2020	3,866,025	3.10 to	4.09	14,131,672	2.32	0.25 to	1.00	(0.03) to	0.73	
2019	3,984,737	3.10 to	4.06	14,599,998	2.12	0.25 to	1.00	25.77 to	26.72	
American Funds Insurance Series® Asset Allocation Division										
2023	5,962,672	3.59 to	4.63	25,016,590	2.24	0.25 to	1.00	13.14 to	13.98	
2022	6,342,247	3.18 to	4.06	23,350,591	1.91	0.25 to	1.00	(14.26) to	(13.62)	
2021	6,513,177	3.70 to	4.70	27,801,866	1.55	0.25 to	1.00	13.96 to	14.81	
2020	6,719,434	3.25 to	4.09	25,043,652	1.70	0.25 to	1.00	11.34 to	12.18	
2019	6,803,166	2.92 to	3.65	22,695,282	1.90	0.25 to	1.00	20.03 to	20.93	
American Funds Insurance Series® Growth-Income Division										
2023	8,213,963	4.85 to	6.69	46,462,834	1.38	0.25 to	1.00	24.89 to	25.82	
2022	8,634,714	3.89 to	5.32	38,935,008	1.28	0.25 to	1.00	(17.32) to	(16.70)	
2021	9,062,804	4.70 to	6.39	49,515,332	1.13	0.25 to	1.00	22.86 to	23.79	
2020	9,654,332	3.82 to	5.16	43,139,764	1.38	0.25 to	1.00	12.42 to	13.26	
2019	9,980,605	3.40 to	4.55	40,028,763	1.68	0.25 to	1.00	24.88 to	25.82	
BlackRock High Yield V.I. Division										
2023	48,906	- -	1.32	64,505	6.54	- -	0.25	- -	13.24	
2022	66,612	- -	1.16	77,588	5.14	- -	0.25	- -	(10.35)	
2021	118,064	- -	1.30	153,399	4.50	- -	0.25	- -	5.33	
2020	111,215	- -	1.23	137,185	5.27	- -	0.25	- -	7.31	
2019	63,746	- -	1.15	73,277	4.17	- -	0.25	- -	15.32	

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,											
						Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)							
	Units	Unit Value ³ (Lowest to Highest)		Net Assets													
BlackRock Small Cap Index V.I. Division (Class I) ⁸																	
2023	808,424	\$	-	-	\$	1.13	\$	912,375	1.56%	-	%	-	0.80%	-	%	-	15.77 %
2022	578,220		-	-		0.97		563,661	1.52	-	-		0.80	-	-		(21.09)
2021	266,372		-	-		1.24		329,081	2.41	-	-		0.80	-	-		13.66
2020	5,324		-	-		1.09		5,787	0.20	-	-		0.80	-	-		-
BlackRock Small Cap Index V.I. Division (Class III) ¹⁰																	
2023	24,827		-	-		0.91		22,711	1.55	-	-		0.25	-	-		16.43
2022	12,724		-	-		0.79		9,998	1.63	-	-		0.25	-	-		-
2021	1,508		-	-		0.99		1,493	1.21	-	-		0.25	-	-		-
BlackRock Total Return V.I. Division																	
2023	194,736		-	-		1.08		209,445	3.87	-	-		0.25	-	-		5.83
2022	271,212		-	-		1.02		275,620	2.38	-	-		0.25	-	-		(14.06)
2021	227,326		-	-		1.18		268,804	1.68	-	-		0.25	-	-		(1.43)
2020	370,330		-	-		1.20		444,258	2.17	-	-		0.25	-	-		8.90
2019	299,448		-	-		1.10		329,864	2.16	-	-		0.25	-	-		9.51
BNY Mellon MidCap Stock Division ⁷																	
2023	227,903		-	-		1.52		347,436	0.56	-	-		0.25	-	-		17.99
2022	238,839		-	-		1.29		308,604	0.47	-	-		0.25	-	-		(14.28)
2021	157,431		-	-		1.51		237,312	0.23	-	-		0.25	-	-		25.56
2020	65,893		-	-		1.20		79,107	0.40	-	-		0.25	-	-		7.85
Delaware Ivy VIP Asset Strategy Division (Class I) ⁷																	
2023	28,575		-	-		1.11		31,629	2.87	-	-		0.80	-	-		13.36
2022	19,360		-	-		0.98		18,903	2.97	-	-		0.80	-	-		(15.25)
2021	468		-	-		1.15		540	3.03	-	-		0.80	-	-		9.84
Delaware Ivy VIP Asset Strategy Division (Class II)																	
2023	79,234	1.54	to	1.57		123,761	2.24	0.25	to	0.75		13.94	to	13.94			
2022	74,825	1.35	to	1.38		102,649	1.12	0.25	to	0.75		(14.74)	to	(14.74)			
2021	115,137	1.58	to	1.62		185,834	1.94	0.25	to	0.75		10.44	to	10.44			
2020	54,707	1.43	to	1.47		79,892	2.21	0.25	to	0.75		13.88	to	13.88			
2019	48,457	1.26	to	1.29		62,237	2.28	0.25	to	0.75		21.78	to	21.78			
Delaware Ivy VIP Science and Technology Division ⁷																	
2023	6,642	-	-	2.38		15,791	-	-	-	0.25		-	-	39.06			
2022	8,330	-	-	1.71		14,241	-	-	-	0.25		-	-	(31.84)			
2021	17,479	-	-	2.51		43,842	-	-	-	0.25		-	-	15.17			
2020	9,295	-	-	2.18		20,245	-	-	-	0.25		-	-	35.36			
Delaware VIP® Emerging Markets Division																	
2023	460,537	-	-	1.19		549,291	1.22	-	-	0.25		-	-	13.45			
2022	177,788	-	-	1.05		186,917	4.03	-	-	0.25		-	-	(27.81)			
2021	183,036	-	-	1.46		266,570	0.06	-	-	0.25		-	-	(3.13)			
2020	100,762	-	-	1.50		151,492	0.50	-	-	0.25		-	-	24.69			
2019	58,261	-	-	1.21		70,248	0.39	-	-	0.25		-	-	22.25			
Delaware VIP® Small Cap Value Division																	
2023	576,506	-	-	1.42		820,214	0.62	-	-	0.25		-	-	9.10			
2022	326,131	-	-	1.30		425,309	0.55	-	-	0.25		-	-	(12.36)			
2021	326,567	-	-	1.49		485,921	0.33	-	-	0.25		-	-	34.01			
2020	22,326	-	-	1.11		24,788	0.17	-	-	0.25		-	-	(2.18)			
2019	2,181	-	-	1.14		2,476	-	-	-	0.25		-	-	27.72			

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³		Net Assets	Investment Income Ratio ¹	Expense Ratio ²			Total Return ³			
		(Lowest to Highest)				(Lowest to Highest)		(Lowest to Highest)				
DWS Small Cap Index Division												
2023	2,227,999	\$ 3.83	to \$ 4.85	\$ 9,922,288	1.12%	0.25%	to	1.00%	15.60 %	to	16.47 %	
2022	2,385,191	3.31	to 4.17	9,120,995	0.91	0.25	to	1.00	(21.42)	to	(20.83)	
2021	2,454,100	4.21	to 5.27	11,860,935	0.83	0.25	to	1.00	13.36	to	14.22	
2020	2,521,917	3.72	to 4.61	10,685,836	1.10	0.25	to	1.00	18.24	to	19.13	
2019	2,590,878	3.14	to 3.87	9,231,210	1.05	0.25	to	1.00	23.98	to	24.91	
Eaton Vance VT Floating-Rate Income Division												
2023	18,911	-	- 1.26	23,898	8.34	-	- 0.25	-	- 11.47			
2022	36,004	-	- 1.13	40,816	4.78	-	- 0.25	-	- (2.36)			
2021	37,104	-	- 1.16	43,081	3.14	-	- 0.25	-	- 3.76			
2020	95,460	-	- 1.12	106,816	3.46	-	- 0.25	-	- 2.27			
2019	41,816	-	- 1.09	45,751	3.46	-	- 0.25	-	- 7.47			
Fidelity® VIP Bond Index Division (Initial Class)*												
2023	799,613	-	- 0.88	701,768	2.73	-	- 0.80	-	- 4.64			
2022	565,938	-	- 0.84	474,684	2.21	-	- 0.80	-	- (13.88)			
2021	197,399	-	- 0.97	192,257	1.66	-	- 0.80	-	- (2.73)			
2020	2,885	-	- 1.00	2,889	0.17	-	- 0.80	-	- -			
Fidelity® VIP Contrafund® Division (Initial Class)												
2023	16,615,944	6.23	to 6.56	105,911,159	0.49	0.15	to	1.00	32.13	to	33.25	
2022	16,836,581	4.71	to 4.92	83,308,966	0.51	0.15	to	1.00	(27.05)	to	(26.42)	
2021	16,632,193	6.46	to 6.69	116,779,958	0.06	0.15	to	1.00	26.56	to	27.64	
2020	16,934,529	5.10	to 5.24	95,130,421	0.25	0.15	to	1.00	29.27	to	30.37	
2019	17,515,147	3.95	to 4.02	75,526,172	0.46	0.15	to	1.00	30.27	to	31.38	
Fidelity® VIP Contrafund® Division (Service Class)												
2023	1,357,752	6.40	to 6.86	8,120,384	0.38	0.40	to	0.75	32.35	to	32.81	
2022	1,476,037	4.84	to 5.17	6,721,785	0.40	0.40	to	0.75	(26.93)	to	(26.68)	
2021	1,563,644	6.62	to 7.05	9,712,506	0.05	0.40	to	0.75	26.76	to	27.14	
2020	1,631,705	5.22	to 5.54	8,374,787	0.15	0.60	to	0.75	29.46	to	29.65	
2019	1,718,442	4.03	to 4.28	6,785,433	0.36	0.60	to	0.75	30.47	to	30.66	
Fidelity® VIP Extended Market Index Division (Initial Class)*												
2023	477,416	-	- 1.22	582,427	2.11	-	- 0.80	-	- 16.50			
2022	317,252	-	- 1.05	332,210	1.69	-	- 0.80	-	- (18.78)			
2021	148,046	-	- 1.29	190,865	2.38	-	- 0.80	-	- 20.27			
2020	2,427	-	- 1.07	2,602	-	-	- 0.80	-	- -			
Fidelity® VIP Extended Market Index Division (Service Class) ¹⁰												
2023	196,194	-	- 0.98	191,730	1.79	-	- 0.25	-	- 17.11			
Fidelity® VIP Freedom 2020 Division ⁷												
2023	83,337	-	- 1.44	119,673	4.70	-	- 0.25	-	- 12.34			
2022	10,337	-	- 1.28	13,214	2.12	-	- 0.25	-	- (15.83)			
2021	8,901	-	- 1.52	13,517	0.89	-	- 0.25	-	- 9.47			
2020	10,701	-	- 1.39	14,846	1.13	-	- 0.25	-	- 14.92			
Fidelity® VIP Freedom 2025 Division ⁷												
2023	832,720	-	- 1.49	1,236,852	2.84	-	- 0.25	-	- 13.48			
2022	612,066	-	- 1.31	801,108	2.10	-	- 0.25	-	- (16.51)			
2021	394,002	-	- 1.57	617,665	1.18	-	- 0.25	-	- 10.71			
2020	162,124	-	- 1.42	229,577	1.45	-	- 0.25	-	- 15.83			
Fidelity® VIP Freedom 2030 Division ⁷												
2023	942,739	-	- 1.55	1,465,133	2.84	-	- 0.25	-	- 14.56			
2022	304,359	-	- 1.36	412,909	2.12	-	- 0.25	-	- (16.94)			
2021	77,802	-	- 1.63	127,084	1.31	-	- 0.25	-	- 12.24			
2020	10,532	-	- 1.46	15,328	2.36	-	- 0.25	-	- 16.76			

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,								
	Units	Unit Value ³ (Lowest to Highest)		Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)					
Fidelity® VIP Freedom 2035 Division														
2023	1,059,304	\$	-	\$	1.66	\$	1,757,413	1.99%	-%	-	0.25%	- %	-	16.71 %
2022	996,496		-		1.42		1,416,516	1.97	-	-	0.25	-	-	(17.75)
2021	531,977		-		1.73		919,419	1.03	-	-	0.25	-	-	15.32
2020	357,294		-		1.50		535,494	1.72	-	-	0.25	-	-	18.15
2019	229,431		-		1.27		291,049	1.52	-	-	0.25	-	-	27.33
Fidelity® VIP Freedom 2040 Division														
2023	172,137		-		1.73		298,104	1.80	-	-	0.25	-	-	18.77
2022	127,560		-		1.46		185,997	1.37	-	-	0.25	-	-	(18.30)
2021	76,059		-		1.78		135,749	1.02	-	-	0.25	-	-	17.69
2020	34,486		-		1.52		52,301	1.32	-	-	0.25	-	-	19.16
2019	15,277		-		1.27		19,443	5.79	-	-	0.25	-	-	28.39
Fidelity® VIP Freedom 2045 Division ¹⁰														
2023	16,273		-		1.05		17,022	1.28	-	-	0.25	-	-	19.33
2022	14,644		-		0.88		12,837	2.27	-	-	0.25	-	-	(18.30)
Fidelity® VIP Freedom 2050 Division ⁷														
2023	202,304		-		1.74		351,866	1.74	-	-	0.25	-	-	19.36
2022	119,522		-		1.46		174,161	1.17	-	-	0.25	-	-	(18.35)
2021	131,990		-		1.78		235,563	1.67	-	-	0.25	-	-	17.73
2020	9,651		-		1.52		14,629	1.21	-	-	0.25	-	-	19.17
Fidelity® VIP Freedom 2055 Division ¹⁰														
2023	934		-		1.05		978	0.26	-	-	0.25	-	-	19.40
2022	1,109		-		0.88		972	2.24	-	-	0.25	-	-	(18.36)
Fidelity® VIP Freedom 2060 Division ¹⁰														
2023	15,372		-		1.05		16,079	0.57	-	-	0.25	-	-	19.30
2022	51,451		-		0.88		45,110	2.74	-	-	0.25	-	-	-
Fidelity® VIP Growth Division														
2023	567,689	2.74	to	4.08		1,659,284	0.04	0.25	to	0.40	35.55	to	36.09	
2022	459,547	2.02	to	3.01		1,003,308	0.50	0.25	to	0.40	(24.82)	to	(24.52)	
2021	282,918	2.67	to	4.00		860,161	-	0.25	to	0.40	22.53	to	23.08	
2020	161,149	2.17	to	3.27		435,983	0.05	0.25	to	0.60	42.89	to	43.75	
2019	82,580	1.51	to	2.29		188,085	0.16	0.25	to	0.60	33.38	to	34.18	
Fidelity® VIP Health Care Division ¹¹														
2023	13,352	-	-	0.99		13,192	-	-	to	0.25	-	-	-	
Fidelity® VIP Index 500 Division (Service Class) ⁸														
2023	1,111,184	-	-	1.18		1,311,716	1.17	-	-	0.25	-	-	26.07	
2022	326,499	-	-	0.94		305,719	1.37	-	-	0.25	-	-	(18.30)	
Fidelity® VIP International Index Division (Initial Class) ¹⁰														
2023	708,749	-	-	1.08		768,065	3.20	-	-	0.80	-	-	15.24	
2022	496,591	-	-	0.94		467,003	2.81	-	-	0.80	-	-	(16.69)	
2021	208,568	-	-	1.13		235,424	5.14	-	-	0.80	-	-	6.86	
2020	6,120	-	-	1.06		6,465	0.46	-	-	0.80	-	-	-	
Fidelity® VIP International Index Division (Service Class 2) ¹⁰														
2023	305,960	-	-	0.98		299,275	3.27	-	-	0.25	-	-	15.88	
2022	43,959	-	-	0.84		37,107	5.89	-	-	0.25	-	-	(16.21)	
2021	13,454	-	-	1.01		13,554	3.74	-	-	0.25	-	-	-	

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,						For the Years Ended December 31,								
	Units	Unit Value ³ (Lowest to Highest)				Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)				
Fidelity® VIP Overseas Division ¹¹															
2023	938	\$	1.06	-	\$	1.51	\$	993	3.44%	0.25%	-	0.80%	-%	-	20.51 %
Fidelity® VIP Real Estate Division (Initial Class) ¹¹															
2023	17		-	-		1.08		18	-	-	-	0.80	-	-	-
Fidelity® VIP Real Estate Division (Service Class)															
2023	109,152		-	-		1.22		132,673	2.64	-	-	0.25	-	-	11.09
2022	97,244		-	-		1.09		106,402	0.63	-	-	0.25	-	-	(27.62)
2021	150,950		-	-		1.51		228,180	1.03	-	-	0.25	-	-	38.86
2020	118,029		-	-		1.09		128,487	2.13	-	-	0.25	-	-	(6.61)
2019	34,147		-	-		1.17		39,801	0.61	-	-	0.25	-	-	23.09
Fidelity® VIP Strategic Income Division ¹¹															
2023	238		-	-		1.05		250	4.45	-	-	0.80	-	-	-
Fidelity® VIP Total Market Index Division (Initial Class) ⁷															
2023	1,053,612		-	-		1.32		1,391,581	1.56	-	-	0.80	-	-	25.07
2022	474,991		-	-		1.06		501,603	1.85	-	-	0.80	-	-	(19.86)
2021	211,399		-	-		1.32		278,569	1.98	-	-	0.80	-	-	24.68
2020	7,537		-	-		1.06		7,966	0.67	-	-	0.80	-	-	-
Franklin Mutual Global Discovery VIP Division ⁷															
2023	2,044		-	-		1.47		3,013	2.81	-	-	0.25	-	-	20.31
2022	1,630		-	-		1.23		1,998	1.40	-	-	0.25	-	-	(4.75)
2021	1,509		-	-		1.29		1,942	2.63	-	-	0.25	-	-	19.13
2020	1,773		-	-		1.08		1,915	2.72	-	-	0.25	-	-	(4.46)
Franklin Small Cap Value VIP Division															
2023	3,648,614		4.60	to		6.62		17,951,363	0.52	0.25	to	1.00	11.63	to	12.46
2022	3,516,854		4.12	to		5.89		16,501,845	0.98	0.25	to	1.00	(10.96)	to	(10.29)
2021	3,602,625		4.63	to		6.56		19,136,069	1.01	0.25	to	1.00	24.12	to	25.05
2020	3,445,561		3.73	to		5.25		15,380,819	1.49	0.25	to	1.00	4.14	to	4.93
2019	3,382,682		3.58	to		5.00		14,844,653	1.05	0.25	to	1.00	25.09	to	26.03
Franklin Strategic Income VIP Division ⁷															
2023	1,569		-	-		1.09		1,712	4.49	-	-	0.25	-	-	8.18
2022	894		-	-		1.01		902	6.73	-	-	0.25	-	-	(10.75)
2021	7,066		-	-		1.13		7,989	1.87	-	-	0.25	-	-	2.11
Goldman Sachs Core Fixed Income Division															
2023	849,586		-	-		1.06		897,802	2.86	-	-	0.25	-	-	5.83
2022	733,135		-	-		1.00		732,062	1.45	-	-	0.25	-	-	(14.28)
2021	772,752		-	-		1.16		900,136	1.11	-	-	0.25	-	-	(2.23)
2020	532,525		-	-		1.19		634,452	2.00	-	-	0.25	-	-	9.40
2019	383,383		-	-		1.09		417,527	2.55	-	-	0.25	-	-	9.00

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,									
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)					
Goldman Sachs International Equity Insights Division															
2023	167,207	\$	1.33	to	\$	1.97	\$	262,452	2.98%	0.25% to	0.40%	18.23 % to	18.71 %		
2022	136,545		1.12	to		1.67		187,872	3.66	0.25 to	0.40	(13.90) to	(13.55)		
2021	90,678		1.30	to		1.93		159,157	2.96	0.25 to	0.40	11.67 to	12.17		
2020	76,640		1.16	to		1.73		126,576	1.36	0.25 to	0.60	6.17 to	6.81		
2019	94,242		1.09	to		1.63		153,804	2.43	0.25 to	0.60	17.74 to	18.45		
Goldman Sachs Large Cap Value Division															
2023	774		3.50	to		3.87		2,901	1.78	0.30 to	0.40	12.56 to	12.67		
2022	798		3.11	to		3.44		2,653	1.37	0.30 to	0.40	(6.74) to	(6.65)		
2021	2,031		3.34	to		3.68		7,377	1.14	0.30 to	0.40	23.58 to	23.76		
2020	2,273		2.70	to		2.97		6,680	1.38	0.30 to	0.60	3.36 to	3.67		
2019	2,564		2.61	to		2.87		7,278	0.93	0.30 to	0.60	25.17 to	25.55		
Goldman Sachs Mid Cap Value Division															
2023	258,933		1.79	to		9.09		2,085,010	1.04	0.25 to	0.40	10.98 to	11.42		
2022	257,418		1.60	to		8.19		1,890,198	0.70	0.25 to	0.40	(10.35) to	(9.99)		
2021	242,304		1.78	to		9.13		2,101,791	0.46	0.25 to	0.40	30.36 to	30.95		
2020	260,663		1.36	to		7.01		1,751,755	0.60	0.25 to	0.60	7.75 to	8.40		
2019	372,255		1.25	to		6.50		2,461,947	0.84	0.25 to	0.60	31.13 to	31.53		
Goldman Sachs Small Cap Equity Insights Division															
2023	34,164		-	-		1.62		55,319	1.14	-	-	0.25	-	-	19.27
2022	28,756		-	-		1.36		39,037	0.27	-	-	0.25	-	-	(19.38)
2021	33,413		-	-		1.68		56,264	0.64	-	-	0.25	-	-	23.79
2020	14,983		-	-		1.36		20,381	0.30	-	-	0.25	-	-	8.58
2019	6,379		-	-		1.25		7,991	0.77	-	-	0.25	-	-	24.84
Goldman Sachs Strategic Growth Division															
2023	1,917,718		5.51	to		5.86		11,902,030	-	0.25 to	1.00	40.53 to	41.59		
2022	2,057,122		3.89	to		4.17		8,956,660	-	0.25 to	1.00	(33.19) to	(32.68)		
2021	2,152,874		5.78	to		6.24		13,705,655	-	0.25 to	1.00	20.71 to	21.62		
2020	2,272,721		4.75	to		5.17		11,749,749	0.09	0.25 to	1.00	39.11 to	40.15		
2019	2,573,061		2.89	to		3.71		8,967,076	0.29	0.25 to	1.00	34.18 to	35.19		
Goldman Sachs U.S. Equity Insights Division															
2023	39,290		4.40	to		5.33		172,804	0.70	0.30 to	0.40	23.31 to	23.44		
2022	40,585		3.57	to		4.32		144,753	0.82	0.30 to	0.40	(20.06) to	(19.98)		
2021	42,914		4.46	to		5.40		192,467	0.83	0.30 to	0.40	28.83 to	29.02		
2020	43,658		3.46	to		4.18		152,124	0.88	0.30 to	0.60	16.84 to	17.19		
2019	45,227		2.96	to		3.57		134,986	1.29	0.30 to	0.60	24.46 to	24.84		
Invesco Oppenheimer V.I. International Growth Division															
2023	7,827,963		3.27	to		3.28		27,225,387	0.60	0.15 to	1.00	19.86 to	21.06		
2022	8,668,000		2.70	to		2.74		24,954,829	-	0.15 to	1.00	(27.85) to	(27.13)		
2021	8,482,553		3.71	to		3.80		33,213,861	-	0.15 to	1.00	9.12 to	10.22		
2020	8,858,724		3.38	to		3.48		30,988,304	0.99	0.15 to	1.00	20.29 to	21.32		
2019	9,242,895		2.78	to		2.89		25,318,416	1.03	0.15 to	1.00	27.32 to	28.41		
Invesco V.I. American Franchise Division ⁷															
2023	198,188		-	-		2.21		438,128	-	-	-	0.25	-	-	40.93
2022	125,391		-	-		1.57		196,698	-	-	-	0.25	-	-	(31.11)
2021	107,285		-	-		2.28		244,305	-	-	-	0.25	-	-	11.93
Invesco V.I. Capital Appreciation Division															
2023	15,425,839		4.50	to		6.09		90,430,969	-	0.15 to	1.00	34.03 to	35.17		
2022	16,498,752		3.36	to		4.50		71,298,785	-	0.15 to	1.00	(31.47) to	(30.89)		
2021	17,159,403		4.90	to		6.51		106,714,489	-	0.15 to	1.00	21.35 to	22.38		
2020	18,217,853		4.04	to		5.32		91,482,106	-	0.15 to	1.00	35.23 to	36.38		
2019	20,221,940		2.99	to		3.90		74,819,293	0.06	0.15 to	1.00	34.84 to	35.99		

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
Invesco V.I. Comstock Division												
2023	55,585	\$	-	\$ 1.89	\$ 105,109	2.10%	-%	-	0.25%	-	%	12.36 %
2022	47,314		-	1.68	79,627	1.83	-	-	0.25	-	-	1.12
2021	39,987		-	1.66	66,549	2.06	-	-	0.25	-	-	33.36
2020	31,477		-	1.25	39,281	3.32	-	-	0.25	-	-	(0.85)
2019	12,235		-	1.26	15,400	1.98	-	-	0.25	-	-	25.30
Invesco V.I. Conservative Balanced Division												
2023	548,818		2.58	to 4.21	1,417,839	1.79	0.30	to 0.75		11.76	to 12.26	
2022	627,229		2.31	to 3.75	1,449,861	1.34	0.30	to 0.75		(17.47)	to (17.10)	
2021	657,847		2.80	to 4.52	1,841,957	1.52	0.30	to 0.75		9.81	to 10.30	
2020	833,476		2.55	to 4.10	2,125,431	2.13	0.30	to 0.75		14.00	to 14.51	
2019	803,323		2.24	to 3.58	1,796,954	2.27	0.30	to 0.75		16.64	to 17.16	
Invesco V.I. Core Plus Bond Division ⁵												
2023	10,254,266		1.11	to 1.48	14,419,665	2.69	0.25	to 1.00		5.09	to 5.88	
2022	10,649,324		1.05	to 1.40	14,033,777	1.92	0.25	to 1.00		(14.88)	to (14.24)	
2021	10,437,422		1.24	to 1.63	16,061,867	2.16	0.25	to 1.00		(2.63)	to (1.89)	
2020	10,262,042		1.27	to 1.66	16,092,701	3.27	0.25	to 1.00		8.62	to 9.44	
2019	9,499,209		1.17	to 1.70	13,725,099	3.30	0.25	to 1.00		8.44	to 9.25	
Invesco V.I. Discovery Mid Cap Growth Division												
2023	13,017,146		4.21	to 5.96	64,940,058	-	0.15	to 1.00		12.03	to 12.98	
2022	13,384,160		3.76	to 5.28	59,481,574	-	0.15	to 1.00		(31.67)	to (31.08)	
2021	13,755,137		5.50	to 7.66	90,502,517	-	0.15	to 1.00		17.91	to 18.92	
2020	14,069,144		4.66	to 6.44	78,851,437	0.04	0.15	to 1.00		39.29	to 40.48	
2019	15,356,351		3.35	to 4.58	60,331,547	-	0.15	to 1.00		37.98	to 39.15	
Invesco V.I. Diversified Dividend Division												
2023	1,090,322		1.64	to 3.53	2,410,815	1.94	0.15	to 1.00		7.96	to 8.88	
2022	1,139,884		1.52	to 3.24	2,301,016	1.88	0.15	to 1.00		(2.66)	to (1.83)	
2021	1,330,527		1.57	to 3.30	2,670,108	2.07	0.15	to 1.00		17.71	to 18.72	
2020	1,370,729		1.33	to 2.78	2,338,155	3.17	0.15	to 1.00		(0.86)	to (0.01)	
2019	1,366,611		1.34	to 2.78	2,338,701	2.95	0.15	to 1.00		23.85	to 24.90	
Invesco V.I. EQV International Equity Division ^{4,7}												
2023	16,647		-	- 1.38	23,046	0.20	-	- 0.25		-	- 18.15	
2022	14,847		-	- 1.17	17,396	2.01	-	- 0.25		-	- (18.31)	
2021	4,216		-	- 1.43	6,047	1.34	-	- 0.25		-	- 5.89	
2020	1,976		-	- 1.35	2,676	2.64	-	- 0.25		-	- 14.00	
Invesco V.I. Global Division												
2023	16,632,778		4.68	to 4.99	102,161,631	0.21	0.15	to 1.00		33.40	to 34.53	
2022	18,375,053		3.51	to 3.71	89,585,887	-	0.15	to 1.00		(32.44)	to (31.87)	
2021	18,919,597		5.19	to 5.45	136,604,985	-	0.15	to 1.00		14.34	to 15.32	
2020	19,763,167		4.54	to 4.73	123,742,247	0.70	0.15	to 1.00		26.37	to 27.45	
2019	21,014,111		3.59	to 3.71	102,363,468	0.90	0.15	to 1.00		30.48	to 31.59	
Invesco V.I. Global Real Estate Division ⁷												
2023	54,624		-	- 1.10	59,903	1.60	-	- 0.25		-	- 9.05	
2022	30,436		-	- 1.01	30,608	2.02	-	- 0.25		-	- (24.93)	
2021	32,576		-	- 1.34	43,642	3.31	-	- 0.25		-	- 25.71	
2020	9,207		-	- 1.07	9,812	6.60	-	- 0.25		-	- (12.32)	

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,						For the Years Ended December 31,						
							Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
	Units	Unit Value ³ (Lowest to Highest)		Net Assets									
Invesco V.I. Global Strategic Income Division													
2023	13,454,447	\$ 1.73	to \$ 1.78	\$ 32,214,532	-	0.15%	to 1.00%	7.80 %	to 8.72 %				
2022	9,820,731	1.60	to 1.64	19,099,387	-	0.15	to 1.00	(12.34)	to (11.59)				
2021	9,913,403	1.83	to 1.85	22,000,829	4.77	0.15	to 1.00	(4.37)	to (3.56)				
2020	9,704,485	1.91	to 1.92	22,762,739	6.04	0.15	to 1.00	2.37	to 3.25				
2019	9,586,299	1.86	to 1.87	22,295,339	3.77	0.15	to 1.00	9.70	to 10.64				
Invesco V.I. Health Care Division													
2023	931,122	4.06	to 4.31	4,264,786	-	0.15	to 1.00	2.00	to 2.87				
2022	956,327	3.98	to 4.19	4,263,314	-	0.15	to 1.00	(14.18)	to (13.45)				
2021	979,583	4.64	to 4.84	5,068,427	0.21	0.15	to 1.00	11.18	to 12.13				
2020	979,943	4.17	to 4.32	4,530,666	0.32	0.15	to 1.00	13.32	to 14.29				
2019	968,353	3.68	to 3.78	3,946,910	0.04	0.15	to 1.00	31.19	to 32.30				
Invesco V.I. Main Street Division													
2023	7,176,261	4.42	to 5.55	33,454,278	0.85	0.15	to 1.00	22.00	to 23.03				
2022	7,572,527	3.62	to 4.51	28,903,847	1.48	0.15	to 1.00	(20.93)	to (20.25)				
2021	7,949,023	4.58	to 5.66	38,110,497	0.71	0.15	to 1.00	26.30	to 27.38				
2020	8,351,957	3.63	to 4.44	31,295,753	1.49	0.15	to 1.00	12.81	to 13.77				
2019	9,218,501	3.21	to 3.91	30,111,174	1.07	0.15	to 1.00	30.77	to 31.88				
Invesco V.I. Main Street Small Cap Division													
2023	431,845	7.96	to 8.80	3,497,729	1.20	0.30	to 0.75	17.25	to 17.78				
2022	436,716	6.79	to 7.47	3,008,071	0.01	0.30	to 0.75	(16.46)	to (16.09)				
2021	435,729	8.13	to 8.90	3,584,201	0.35	0.30	to 0.75	21.64	to 22.19				
2020	500,028	6.69	to 7.29	3,370,033	0.66	0.30	to 0.75	19.03	to 19.57				
2019	512,076	5.62	to 6.09	2,894,554	0.18	0.30	to 0.75	25.53	to 26.09				
Invesco V.I. Small Cap Equity Division ⁷													
2023	471	- -	1.66	781	-	- -	0.25	- -	16.57				
2022	406	- -	1.42	577	-	- -	0.25	- -	(20.51)				
2021	15	- -	1.79	26	-	- -	0.25	- -	20.40				
2020	37	- -	1.49	55	-	- -	0.25	- -	27.24				
Invesco V.I. Technology Division													
2023	1,298,780	4.63	to 7.08	7,081,524	-	0.15	to 1.00	45.49	to 46.72				
2022	1,491,735	3.18	to 4.83	5,277,317	-	0.15	to 1.00	(40.55)	to (40.04)				
2021	1,520,936	5.35	to 8.05	8,541,371	-	0.15	to 1.00	13.27	to 14.24				
2020	1,604,054	4.72	to 7.05	7,438,818	-	0.15	to 1.00	44.66	to 45.90				
2019	1,776,311	3.27	to 4.83	5,161,971	-	0.15	to 1.00	34.53	to 35.68				
Invesco V.I. U.S. Government Money Division													
2023	2,615,717	1.34	to 1.68	3,487,142	4.39	0.30	to 0.75	3.74	to 4.21				
2022	3,528,620	1.29	to 1.61	4,538,496	1.33	0.30	to 0.75	0.53	to 0.98				
2021	3,019,741	1.29	to 1.60	3,862,261	0.01	0.30	to 0.75	(0.74)	to (0.29)				
2020	2,865,754	1.30	to 1.60	3,689,343	0.21	0.30	to 0.75	(0.52)	to (0.08)				
2019	2,839,331	1.30	to 1.61	3,673,096	1.70	0.30	to 0.75	0.95	to 1.40				
Janus Henderson Balanced Division (Institutional Class)													
2023	308	- -	4.15	1,279	2.11	- -	0.40	- -	14.95				
2022	334	- -	3.61	1,203	1.23	- -	0.40	- -	(16.73)				
2021	357	- -	4.33	1,544	0.88	- -	0.40	- -	16.67				
2020	56,841	- -	3.71	210,982	1.80	- -	0.60	- -	13.63				
2019	59,786	- -	3.27	195,299	1.94	- -	0.60	- -	21.86				
Janus Henderson Balanced Division (Service Class)													
2023	1,372,650	3.98	to 4.91	6,314,597	1.77	0.25	to 1.00	13.99	to 14.85				
2022	1,488,090	3.49	to 4.28	5,951,978	0.97	0.25	to 1.00	(17.45)	to (16.83)				
2021	1,573,599	4.23	to 5.14	7,543,818	0.67	0.25	to 1.00	15.75	to 16.62				
2020	1,645,617	3.65	to 4.41	6,755,986	1.49	0.25	to 1.00	12.89	to 13.74				
2019	1,652,455	3.24	to 3.88	5,954,940	1.68	0.25	to 1.00	21.06	to 21.97				

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)		Net Assets		Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
Janus Henderson Forty Division (Institutional Class)												
2023	3,388,528	\$ 5.72	to \$ 6.93	\$ 27,634,951	0.19%	0.25%	to	0.75%	38.92%	to	39.61 %	
2022	3,734,647	4.10	to 4.99	21,557,769	0.19	0.25	to	0.75	(34.05)	to	(33.72)	
2021	4,195,530	6.19	to 7.56	35,645,607	-	0.25	to	0.75	21.98	to	22.59	
2020	4,499,035	5.05	to 6.20	31,036,579	0.27	0.25	to	0.75	38.36	to	39.05	
2019	4,871,577	3.63	to 4.48	23,845,964	0.15	0.25	to	0.75	36.14	to	36.82	
Janus Henderson Forty Division (Service Class)												
2023	42,668	8.01	to 9.70	361,673	0.12	0.50	to	1.00	38.27	to	38.96	
2022	46,113	5.79	to 6.98	282,100	0.05	0.50	to	1.00	(34.39)	to	(34.06)	
2021	46,358	8.83	to 10.58	429,145	-	0.50	to	1.00	21.38	to	21.99	
2020	48,440	7.27	to 8.68	365,341	0.16	0.50	to	1.00	37.65	to	38.34	
2019	48,670	5.28	to 6.27	264,895	-	0.50	to	1.00	35.49	to	36.17	
Janus Henderson Global Research Division (Institutional Class)												
2023	9,943,265	2.18	to 2.63	24,400,660	1.08	0.25	to	0.75	25.83	to	26.46	
2022	4,239,710	1.73	to 2.09	9,825,857	1.05	0.25	to	0.75	(20.01)	to	(19.61)	
2021	4,552,323	2.15	to 2.62	12,874,552	0.52	0.25	to	0.75	17.21	to	17.80	
2020	4,834,686	1.82	to 2.23	11,541,450	0.73	0.25	to	0.75	19.16	to	19.76	
2019	5,116,176	1.52	to 1.87	10,129,324	1.00	0.25	to	0.75	28.08	to	28.72	
Janus Henderson Global Research Division (Service Class)												
2023	95,568	3.31	to 4.30	348,934	0.77	0.50	to	1.00	25.22	to	25.84	
2022	101,212	2.64	to 3.42	293,374	0.89	0.50	to	1.00	(20.41)	to	(20.01)	
2021	106,715	3.32	to 4.27	387,051	0.35	0.50	to	1.00	16.62	to	17.21	
2020	103,333	2.85	to 3.64	324,899	0.56	0.50	to	1.00	18.57	to	19.17	
2019	101,847	2.40	to 3.06	268,482	0.87	0.50	to	1.00	27.43	to	28.07	
Janus Henderson Global Technology and Innovation Division ¹¹												
2023	5,360	-	- 1.28	6,848	-	-	-	0.80	-	-	-	
Lord Abbett Developing Growth Division												
2023	100,311	-	- 1.87	187,722	-	-	-	0.25	-	-	8.17	
2022	85,384	-	- 1.73	147,718	-	-	-	0.25	-	-	(35.98)	
2021	91,390	-	- 2.70	246,975	-	-	-	0.25	-	-	(2.75)	
2020	49,827	-	- 2.78	138,457	-	-	-	0.25	-	-	72.60	
2019	1,436	-	- 1.61	2,312	-	-	-	0.25	-	-	31.77	
LVIP JPMorgan U.S. Equity Division ^{7,9}												
2023	645,592	-	- 2.30	1,487,382	1.57	-	-	0.25	-	-	27.16	
2022	277,127	-	- 1.81	502,095	0.53	-	-	0.25	-	-	(18.69)	
2021	284,033	-	- 2.23	632,933	0.83	-	-	0.25	-	-	29.34	
2020	22,125	-	- 1.72	38,118	-	-	-	0.25	-	-	25.26	
MFS® Blended Research® Core Equity Division												
2023	187,947	-	- 2.14	402,105	1.40	-	-	0.25	-	-	28.53	
2022	225,250	-	- 1.66	374,956	1.02	-	-	0.25	-	-	(16.00)	
2021	152,245	-	- 1.98	301,718	1.14	-	-	0.25	-	-	29.53	
2020	75,921	-	- 1.53	116,161	1.61	-	-	0.25	-	-	15.34	
2019	13,000	-	- 1.33	17,246	1.61	-	-	0.25	-	-	29.17	
MFS® Global Real Estate Division ⁷												
2023	225,052	-	- 1.40	316,017	0.86	-	-	0.25	-	-	11.46	
2022	73,318	-	- 1.26	92,371	1.63	-	-	0.25	-	-	(26.94)	
2021	74,086	-	- 1.72	127,750	1.49	-	-	0.25	-	-	30.13	
MFS® Government Securities Division ⁷												
2023	535	-	- 1.03	548	1.58	-	-	0.25	-	-	4.15	
2022	342	-	- 0.98	336	2.54	-	-	0.25	-	-	(12.26)	
2021	123	-	- 1.12	138	2.59	-	-	0.25	-	-	(1.89)	

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
MFS® Growth Division												
2023	560,304	\$ 2.41	to \$ 5.54	\$ 2,558,706	-%	0.25%	to 0.75%	34.85 %	to 35.86 %			
2022	670,674	1.77	to 4.11	2,227,332	-	0.25	to 0.75	(32.15)	to (31.63)			
2021	809,969	2.59	to 6.05	3,759,997	-	0.25	to 0.75	22.61	to 23.53			
2020	726,226	2.10	to 4.94	3,105,539	-	0.25	to 0.75	30.87	to 31.86			
2019	758,864	1.59	to 3.77	3,064,314	-	0.25	to 0.75	37.12	to 38.15			
MFS® International Intrinsic Value Division												
2023	902,358	-	- 1.49	1,348,571	0.72	-	- 0.25	-	- 17.66			
2022	367,393	-	- 1.27	466,674	0.80	-	- 0.25	-	- (23.56)			
2021	347,117	-	- 1.66	576,798	0.40	-	- 0.25	-	- 10.55			
2020	63,241	-	- 1.50	95,053	1.10	-	- 0.25	-	- 20.52			
2019	17,457	-	- 1.25	21,771	1.33	-	- 0.25	-	- 25.94			
MFS® Investors Trust Division												
2023	137,883	4.99	to 6.45	803,220	0.73	0.25	to 1.00	17.80	to 18.68			
2022	181,516	4.24	to 5.44	892,658	0.67	0.25	to 1.00	(17.32)	to (16.70)			
2021	181,956	5.13	to 6.53	1,076,162	0.64	0.25	to 1.00	25.55	to 26.50			
2020	164,039	4.08	to 5.16	770,630	0.65	0.25	to 1.00	12.74	to 13.58			
2019	224,146	3.62	to 4.54	926,606	0.68	0.25	to 0.75	30.27	to 31.25			
MFS® Mid Cap Value Division ⁷												
2023	139,347	-	- 1.75	243,211	1.90	-	- 0.25	-	- 12.73			
2022	90,800	-	- 1.55	140,588	1.14	-	- 0.25	-	- (8.79)			
2021	44,329	-	- 1.70	75,246	0.54	-	- 0.25	-	- 30.99			
2020	23,260	-	- 1.30	30,142	1.28	-	- 0.25	-	- 3.87			
MFS® New Discovery Division												
2023	1,075,318	4.61	to 6.93	6,284,209	-	0.25	to 1.00	13.28	to 14.13			
2022	1,104,263	4.07	to 6.07	5,714,385	-	0.25	to 1.00	(30.46)	to (29.93)			
2021	1,172,331	5.85	to 8.67	8,811,528	-	0.25	to 1.00	0.79	to 1.55			
2020	1,212,613	5.80	to 8.54	9,107,858	-	0.25	to 1.00	44.44	to 45.52			
2019	1,257,914	4.02	to 5.87	6,625,713	-	0.25	to 1.00	40.29	to 41.35			
MFS® Research Division												
2023	190,077	4.52	to 5.65	910,716	0.53	0.30	to 0.75	21.51	to 22.05			
2022	208,253	3.72	to 4.63	816,093	0.50	0.30	to 0.75	(17.83)	to (17.46)			
2021	236,993	4.53	to 5.61	1,127,472	0.55	0.30	to 0.75	23.87	to 24.43			
2020	360,042	3.66	to 4.51	1,454,714	0.70	0.30	to 0.75	15.72	to 16.24			
2019	320,275	3.16	to 3.88	1,083,046	0.79	0.30	to 0.75	31.95	to 32.55			
MFS® Utilities Division												
2023	21,979	-	- 1.57	34,444	3.71	-	- 0.25	-	- (2.11)			
2022	18,685	-	- 1.60	29,913	2.55	-	- 0.25	-	- 0.76			
2021	13,528	-	- 1.59	21,495	1.89	-	- 0.25	-	- 14.09			
2020	7,984	-	- 1.39	11,119	2.81	-	- 0.25	-	- 5.90			
2019	3,687	-	- 1.32	4,848	-	-	- 0.25	-	- 25.07			
MFS® Value Division												
2023	3,118,821	-	- 1.67	5,209,972	1.72	-	- 0.25	-	- 7.93			
2022	2,685,484	-	- 1.55	4,156,410	1.41	-	- 0.25	-	- (5.91)			
2021	2,366,296	-	- 1.64	3,892,335	2.58	-	- 0.25	-	- 25.45			
2020	117,320	-	- 1.31	153,828	1.82	-	- 0.25	-	- 3.47			
2019	28,747	-	- 1.27	36,426	-	-	- 0.25	-	- 29.80			

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,						For the Years Ended December 31,								
	Units		Unit Value ³		Net Assets		Investment	Expense Ratio ²			Total Return ³				
			(Lowest to Highest)				Income Ratio ¹								
MML Aggressive Allocation Division															
2023	2,124,003	\$	1.19	to	\$	4.29	\$	6,206,660	2.93%	0.15%	to	0.80%	17.38 %	to	18.14 %
2022	1,786,393		1.01	to		3.63		4,854,623	2.11	0.15	to	0.80	(16.57)	to	(16.03)
2021	1,492,725		1.21	to		4.32		5,181,466	1.26	0.15	to	0.80	15.72	to	16.47
2020	1,265,727		1.05	to		3.71		4,056,899	1.62	0.15	to	0.80	(45.58)	to	13.18
2019	1,220,243		1.93	to		3.28		3,446,034	2.03	0.15	to	0.75	23.01	to	23.75
MML American Funds Core Allocation Division															
2023	1,296,151		1.12	to		1.50		1,642,666	4.11	0.25	to	0.80	13.46	to	14.37
2022	597,979		0.99	to		1.31		677,026	1.85	0.25	to	0.80	(14.39)	to	(13.70)
2021	282,702		1.16	to		1.52		411,238	1.34	0.25	to	0.80	11.95	to	12.85
2020	259,913		1.03	to		1.35		353,215	1.86	0.25	to	0.80	11.39	to	11.39
2019	17,018		1.21	to		1.39		23,627	2.53	0.25	to	0.75	18.12	to	18.12
MML American Funds Growth Division															
2023	3,681,159		1.24	to		2.55		5,056,453	1.53	0.25	to	0.80	36.86	to	37.96
2022	2,613,797		0.91	to		1.85		2,571,580	0.49	0.25	to	0.80	(30.85)	to	(30.29)
2021	1,198,749		1.32	to		2.66		1,838,786	-	0.25	to	0.80	20.58	to	21.54
2020	58,532		1.09	to		2.19		146,356	0.73	0.25	to	0.80	(24.43)	to	51.41
2019	44,023		1.44	to		1.78		75,873	0.29	0.25	to	0.75	30.22	to	30.22
MML American Funds International Division															
2023	-		-	-		-		-	-	0.25	to	0.80	-	-	-
2022 ⁶	-		-	-		-		-	20.85	0.25	to	0.80	(100.00)	to	(100.00)
2021	118,537		1.05	to		1.32		145,430	0.17	0.25	to	0.80	(2.74)	to	(1.96)
2020	20,660		1.08	to		1.34		32,556	1.02	0.25	to	0.80	(9.02)	to	13.44
2019	19,796		1.18	to		1.39		27,498	2.80	0.25	to	0.75	22.31	to	22.31
MML Balanced Allocation Division															
2023	1,966,775		1.06	to		2.88		3,406,810	3.43	0.15	to	0.80	11.57	to	12.30
2022	1,258,283		0.95	to		2.56		2,173,656	3.80	0.15	to	0.80	(15.41)	to	(14.86)
2021	1,085,648		1.12	to		3.01		2,314,101	1.42	0.15	to	0.80	9.10	to	9.82
2020	1,031,245		1.03	to		2.74		2,195,795	2.69	0.15	to	0.80	(35.75)	to	10.77
2019	961,864		1.60	to		2.48		1,843,654	2.51	0.15	to	0.75	15.88	to	16.57
MML Blend Division															
2023	6,897,148		3.55	to		4.04		31,734,010	1.70	0.25	to	1.00	16.45	to	17.32
2022	7,158,565		3.05	to		3.44		28,826,242	1.37	0.25	to	1.00	(17.42)	to	(16.80)
2021	7,024,572		3.69	to		4.13		35,476,330	2.12	0.25	to	1.00	13.88	to	14.74
2020	7,377,933		3.24	to		3.60		33,347,845	-	0.25	to	1.00	11.74	to	12.58
2019	7,528,109		2.90	to		3.20		31,243,992	2.44	0.25	to	1.00	20.17	to	21.08
MML Blue Chip Growth Division															
2023	5,282,513		4.93	to		7.94		18,760,783	-	0.15	to	1.00	48.05	to	49.31
2022	4,734,451		3.33	to		5.32		12,264,297	-	0.15	to	1.00	(40.10)	to	(39.59)
2021	4,454,514		5.56	to		8.80		19,957,536	-	0.15	to	1.00	15.18	to	16.16
2020	4,378,157		4.83	to		7.58		17,390,444	-	0.15	to	1.00	33.07	to	34.20
2019	4,013,299		3.63	to		5.65		12,396,513	-	0.15	to	1.00	28.55	to	29.65
MML Conservative Allocation Division															
2023	1,068,204		1.04	to		2.62		1,841,074	3.44	0.15	to	0.80	10.77	to	11.49
2022	897,259		0.94	to		2.35		1,469,272	3.89	0.15	to	0.80	(15.42)	to	(14.86)
2021	885,031		1.11	to		2.76		1,736,409	1.28	0.15	to	0.80	7.74	to	8.44
2020	1,027,526		1.03	to		2.54		1,920,967	2.76	0.15	to	0.80	(32.76)	to	9.77
2019	1,077,490		1.53	to		2.31		1,838,023	2.52	0.15	to	0.75	14.34	to	15.02

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,								
						Investment								
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)				
MML Dynamic Bond Division														
2023	179,247	\$	0.91	to	\$ 1.06	\$	185,010	4.87%	0.25%	to	0.80%	7.13 %	to	7.99 %
2022	112,262		0.85	to	0.98		111,732	4.05	0.25	to	0.80	(14.66)	to	(13.97)
2021	73,050		1.00	to	1.14		86,483	4.35	0.25	to	0.80	(0.81)	to	(0.01)
2020	30,457		1.01	to	1.14		35,776	0.31	0.25	to	0.80	(8.44)	to	3.91
2019	8,669		1.10	to	1.19		10,289	3.70	0.25	to	0.75	8.73	to	8.73
MML Equity Division														
2023	17,945,278		3.71	to	4.52		100,476,822	2.13	0.15	to	1.00	8.24	to	9.16
2022	18,932,957		3.43	to	4.14		97,574,237	1.62	0.15	to	1.00	(5.59)	to	(4.79)
2021	19,538,179		3.63	to	4.35		106,958,081	1.67	0.15	to	1.00	28.96	to	30.06
2020	20,335,113		2.82	to	3.34		85,886,429	2.32	0.15	to	1.00	2.00	to	2.87
2019	21,224,056		2.76	to	3.25		87,307,189	2.03	0.15	to	1.00	24.67	to	25.73
MML Equity Income Division														
2023	1,539,176		1.35	to	4.26		3,455,063	2.36	0.15	to	1.00	8.67	to	9.38
2022	1,259,165		1.25	to	3.89		2,772,662	1.73	0.15	to	0.80	(4.33)	to	(3.71)
2021	859,260		1.30	to	4.04		2,229,954	2.33	0.15	to	0.80	24.58	to	25.39
2020	687,283		1.04	to	3.22		1,546,292	2.44	0.15	to	0.80	(32.27)	to	1.19
2019	454,444		1.54	to	3.19		1,134,639	2.35	0.15	to	0.75	26.26	to	26.45
MML Equity Index Division (Service Class I)														
2023	2,738,435		-	-	2.13		5,837,511	1.00	-	-	0.25	-	-	25.44
2022	2,954,979		-	-	1.70		5,021,461	0.78	-	-	0.25	-	-	(18.69)
2021	3,017,033		-	-	2.09		6,305,114	0.59	-	-	0.25	-	-	28.01
2020	2,542,413		-	-	1.63		4,150,568	1.74	-	-	0.25	-	-	18.06
2019	2,088,086		-	-	1.38		2,887,488	2.71	-	-	0.25	-	-	30.86
MML Equity Index Division (Class II)														
2023	20,275,166		5.26	to	6.29		112,287,793	1.41	0.15	to	1.00	24.68	to	25.74
2022	21,364,317		4.22	to	5.00		94,205,845	1.22	0.15	to	1.00	(19.16)	to	(18.47)
2021	22,436,830		5.22	to	6.13		121,243,867	1.43	0.15	to	1.00	27.10	to	28.18
2020	22,938,054		4.11	to	4.78		95,853,069	1.89	0.15	to	1.00	17.04	to	18.04
2019	24,254,914		3.51	to	4.05		85,127,840	2.85	0.15	to	1.00	29.75	to	30.86
MML Equity Index Division (Class III)*														
2023	4,252,177		-	-	1.36		5,781,443	1.67	-	-	0.80	-	-	-
2022	2,498,282		-	-	1.09		2,715,373	1.81	-	-	0.80	-	-	-
2021	635,956		-	-	1.34		852,050	1.99	-	-	0.80	-	-	-
2020	3,066		-	-	1.05		3,221	-	-	-	0.80	-	-	-
MML Equity Rotation Division ¹¹														
2023	48		-	-	1.08		52	-	-	-	0.80	-	-	-
MML Focused Equity Division														
2023	247,711		1.29	to	2.08		456,949	0.94	0.25	to	0.80	9.01	to	9.88
2022	254,360		1.19	to	1.89		457,452	0.81	0.25	to	0.80	(5.45)	to	(4.69)
2021	223,708		1.26	to	1.99		447,362	1.10	0.25	to	0.80	21.28	to	22.25
2020	206,972		1.03	to	1.62		342,768	0.84	0.25	to	0.80	(28.16)	to	12.76
2019	167,057		1.44	to	1.81		246,359	0.28	0.25	to	0.75	30.15	to	30.15

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

At December 31,					For the Years Ended December 31,						
Units		Unit Value ³ (Lowest to Highest)		Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
MML Foreign Division											
2023	559,198	\$	1.17 to \$	2.14	\$	852,178	1.45%	0.15%	to	0.80%	15.30 % to 16.05 %
2022	483,229		1.02 to	1.85		640,251	4.11	0.15	to	0.80	(15.26) to (14.71)
2021	368,515		1.20 to	2.17		600,403	3.21	0.15	to	0.80	12.14 to 12.88
2020	184,216		1.07 to	1.92		319,256	3.17	0.15	to	0.80	(6.21) to 5.77
2019	153,545		1.14 to	1.81		259,567	1.81	0.15	to	0.75	13.00 to 13.17
MML Fundamental Equity Division											
2023	492,360		1.27 to	2.28		1,110,017	0.92	0.25	to	0.80	22.02 to 23.00
2022	508,371		1.04 to	1.86		944,692	0.58	0.25	to	0.80	(20.87) to (20.23)
2021	498,497		1.32 to	2.33		1,173,089	0.50	0.25	to	0.80	26.65 to 27.67
2020	498,713		1.04 to	1.82		921,656	0.04	0.25	to	0.80	(31.47) to 20.02
2019	503,737		1.52 to	1.76		775,224	0.50	0.25	to	0.75	33.74 to 33.74
MML Fundamental Value Division											
2023	111,479		1.43 to	1.73		176,107	1.36	0.25	to	0.80	12.79 to 13.69
2022	84,557		1.26 to	1.52		121,606	1.15	0.25	to	0.80	(5.62) to (4.86)
2021	59,150		1.34 to	1.60		103,272	1.74	0.25	to	0.80	28.98 to 30.02
2020	65,496		1.04 to	1.23		93,987	1.30	0.25	to	0.80	(13.26) to 2.67
2019	103,360		1.20 to	1.40		144,459	1.97	0.25	to	0.75	22.79 to 22.79
MML Global Division (Service Class I) ⁷											
2023	182,688		- -	1.60		291,727	0.68	- -	0.25		- - 14.08
2022	64,193		- -	1.40		89,854	1.61	- -	0.25		- - (18.00)
2021	75,112		- -	1.71		128,214	0.40	- -	0.25		- - 17.27
2020	32,923		- -	1.46		47,922	1.12	- -	0.25		- - 14.02
MML Global Division (Class II)											
2023	277,802		1.14 to	4.40		762,803	0.86	0.15	to	0.80	13.46 to 14.20
2022	246,557		1.01 to	3.85		633,602	1.71	0.15	to	0.80	(18.37) to (17.84)
2021	194,922		1.23 to	4.69		680,782	0.97	0.15	to	0.80	16.49 to 17.25
2020	135,298		1.06 to	4.00		478,710	1.08	0.15	to	0.80	(31.20) to 13.79
2019	124,229		1.54 to	3.51		385,155	0.59	0.15	to	0.75	30.39 to 30.58
MML Growth Allocation Division											
2023	2,296,938		1.14 to	3.71		6,889,137	2.97	0.15	to	0.80	15.06 to 15.80
2022	2,152,103		0.99 to	3.21		5,719,560	2.75	0.15	to	0.80	(15.97) to (15.42)
2021	1,864,082		1.18 to	3.79		6,299,400	1.55	0.15	to	0.80	13.42 to 14.16
2020	1,531,939		1.04 to	3.32		4,691,615	2.09	0.15	to	0.80	(42.27) to 12.59
2019	1,620,661		1.80 to	2.95		4,454,638	2.25	0.15	to	0.75	20.30 to 21.03
MML High Yield Division											
2023	209,556		1.09 to	1.26		251,328	7.41	0.25	to	0.80	12.31 to 13.21
2022	155,944		0.97 to	1.11		176,287	8.34	0.25	to	0.80	(12.42) to (11.72)
2021	69,726		1.11 to	1.26		100,492	9.64	0.25	to	0.80	7.26 to 8.12
2020	81,248		1.03 to	1.17		113,187	0.02	0.25	to	0.80	(6.54) to 5.56
2019	75,480		1.10 to	1.32		99,616	6.29	0.25	to	0.75	12.25 to 12.25
MML Income & Growth Division											
2023	654,223		1.41 to	4.23		1,498,140	2.13	0.15	to	0.80	8.33 to 9.03
2022	696,943		1.30 to	3.88		1,455,483	1.44	0.15	to	0.80	(1.11) to (0.46)
2021	590,823		1.31 to	3.90		1,290,144	1.84	0.15	to	0.80	25.27 to 26.08
2020	359,473		1.05 to	3.09		717,380	2.14	0.15	to	0.80	(29.66) to 2.87
2019	211,374		1.49 to	3.01		489,310	1.96	0.15	to	0.75	24.25 to 24.43
MML Inflation-Protected and Income Division											
2023	3,038,072		1.56 to	1.75		5,362,732	4.62	0.15	to	1.00	4.38 to 5.27
2022	3,079,868		1.49 to	1.66		5,213,203	2.65	0.15	to	1.00	(14.21) to (13.48)
2021	3,083,496		1.74 to	1.92		6,069,640	1.08	0.15	to	1.00	5.34 to 6.24
2020	2,877,526		1.65 to	1.81		5,359,804	0.12	0.15	to	1.00	10.01 to 10.95
2019	2,962,522		1.50 to	1.63		4,975,538	2.41	0.15	to	1.00	7.23 to 8.15

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,						For the Years Ended December 31,					
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
MML International Equity Division												
2023	110,693	\$	1.18	to \$	1.27	\$	147,673	1.33%	0.25% to	0.80%	17.56 % to	18.51 %
2022	92,824		1.00	to	1.07		106,158	1.27	0.25 to	0.80	(15.77) to	(15.10)
2021	53,729		1.19	to	1.26		77,607	0.80	0.25 to	0.80	10.88 to	11.77
2020	24,128		1.07	to	1.13		32,658	3.48	0.25 to	0.80	0.28 to	5.37
2019	20,299		1.07	to	1.29		26,084	1.73	0.25 to	0.75	24.63 to	24.63
MML iShares® 60/40 Allocation Division ¹¹												
2023	5,872		-	-	1.08		6,350	3.95	- -	0.80	- -	-
MML iShares® 80/20 Allocation Division ¹¹												
2023	20,507		-	-	1.10		22,637	2.67	- -	0.80	- -	-
MML Large Cap Growth Division												
2023	414,702		1.32	to	2.51		727,768	-	0.25 to	0.80	50.51 to	51.71
2022	285,008		0.88	to	1.65		391,993	-	0.25 to	0.80	(28.13) to	(27.55)
2021	156,091		1.22	to	2.28		361,278	0.07	0.25 to	0.80	17.47 to	18.41
2020	46,223		1.04	to	1.93		103,492	0.34	0.25 to	0.80	(28.82) to	31.78
2019	43,127		1.46	to	1.70		73,302	0.61	0.25 to	0.75	31.99 to	31.99
MML Managed Bond Division												
2023	10,003,280		1.64	to	1.66		21,581,042	4.29	0.15 to	1.00	5.64 to	6.54
2022	13,657,500		1.55	to	1.56		31,202,475	3.11	0.15 to	1.00	(15.85) to	(15.14)
2021	13,994,912		1.84	to	1.85		38,237,306	3.17	0.15 to	1.00	(0.19) to	0.66
2020	13,886,442		1.82	to	1.85		38,463,908	0.10	0.15 to	1.00	6.64 to	7.55
2019	14,136,877		1.70	to	1.73		36,821,375	3.70	0.15 to	1.00	8.72 to	9.65
MML Managed Volatility Division												
2023	4,027,241		2.22	to	2.57		9,932,942	0.57	0.15 to	1.00	11.75 to	12.70
2022	4,500,097		1.99	to	2.28		9,820,548	0.49	0.15 to	1.00	(12.92) to	(12.18)
2021	4,587,458		2.28	to	2.60		11,337,704	0.99	0.15 to	1.00	10.43 to	11.37
2020	4,702,318		2.07	to	2.33		10,400,525	1.40	0.15 to	1.00	5.62 to	6.52
2019	4,758,639		1.96	to	2.19		9,752,657	1.61	0.15 to	1.00	10.78 to	11.73
MML Mid Cap Growth Division												
2023	974,670		1.07	to	7.16		3,525,830	-	0.15 to	0.80	21.67 to	22.46
2022	857,548		0.88	to	5.85		2,784,965	-	0.15 to	0.80	(25.71) to	(25.23)
2021	802,155		1.19	to	7.82		3,539,804	-	0.15 to	0.80	12.31 to	13.04
2020	676,628		1.06	to	6.92		2,851,566	0.08	0.15 to	0.80	(37.42) to	25.38
2019	520,871		1.69	to	5.52		1,851,438	0.02	0.15 to	0.75	31.10 to	31.30
MML Mid Cap Value Division												
2023	757,179		1.29	to	5.27		2,150,633	2.69	0.15 to	0.80	5.13 to	5.81
2022	642,693		1.23	to	4.98		1,904,806	2.09	0.15 to	0.80	(2.12) to	(1.48)
2021	420,278		1.25	to	5.05		1,587,137	1.45	0.15 to	0.80	22.33 to	23.13
2020	362,212		1.02	to	4.10		1,187,960	1.86	0.15 to	0.80	(31.67) to	1.56
2019	292,549		1.50	to	4.04		970,295	1.72	0.15 to	0.75	28.94 to	29.13
MML Moderate Allocation Division												
2023	976,188		1.10	to	3.18		2,336,284	3.33	0.15 to	0.80	12.99 to	13.73
2022	908,586		0.97	to	2.79		1,951,104	3.42	0.15 to	0.80	(15.65) to	(15.10)
2021	771,376		1.15	to	3.29		2,037,126	1.39	0.15 to	0.80	11.10 to	11.83
2020	769,964		1.03	to	2.94		1,810,582	2.60	0.15 to	0.80	(38.48) to	10.38
2019	658,245		1.68	to	2.66		1,440,195	2.57	0.15 to	0.75	17.70 to	18.41

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
MML Short-Duration Bond Division												
2023	336,090	\$ 0.99	to	\$ 1.09	\$ 362,781	2.92%	0.25	% to	0.80%	6.09 %	to	6.94 %
2022	502,027	0.93	to	1.02	506,638	3.73	0.25	to	0.80	(8.52)	to	(7.79)
2021	299,747	1.02	to	1.11	331,949	5.24	0.25	to	0.80	1.20	to	2.01
2020	12,038	1.01	to	1.09	13,182	-	0.25	to	0.80	(5.94)	to	1.55
2019	15,622	1.07	to	1.11	16,793	3.18	0.25	to	0.75	4.45	to	4.45
MML Small Cap Equity Division												
2023	5,752,578	4.29	to	5.94	29,297,337	1.29	0.15	to	1.00	16.64	to	17.63
2022	5,997,831	3.68	to	5.05	26,401,149	0.71	0.15	to	1.00	(16.72)	to	(16.01)
2021	6,213,310	4.42	to	6.01	32,844,844	0.44	0.15	to	1.00	21.53	to	22.57
2020	6,441,838	3.64	to	4.91	28,249,486	0.54	0.15	to	1.00	19.49	to	20.51
2019	6,482,956	3.04	to	4.07	23,767,587	0.47	0.15	to	1.00	25.21	to	26.28
MML Small Cap Growth Equity Division												
2023	4,063,245	4.91	to	5.84	18,257,517	-	0.15	to	1.00	15.68	to	16.67
2022	4,185,934	4.24	to	5.01	16,471,584	-	0.15	to	1.00	(23.92)	to	(23.27)
2021	3,903,146	5.58	to	6.53	21,049,615	-	0.15	to	1.00	6.24	to	7.15
2020	4,021,518	5.25	to	6.09	20,925,468	-	0.15	to	1.00	34.27	to	35.42
2019	4,030,464	3.91	to	4.50	15,692,114	-	0.15	to	1.00	32.99	to	34.12
MML Small Company Value Division												
2023	289,137	1.30	to	1.61	476,830	1.05	0.25	to	0.80	15.22	to	16.14
2022	245,703	1.13	to	1.38	366,609	0.20	0.25	to	0.80	(15.46)	to	(14.78)
2021	202,134	1.33	to	1.62	373,185	0.40	0.25	to	0.80	24.47	to	25.47
2020	96,982	1.07	to	1.29	130,835	0.30	0.25	to	0.80	(9.75)	to	9.16
2019	13,952	1.19	to	1.53	21,300	0.27	0.25	to	0.75	25.54	to	25.54
MML Small/Mid Cap Value Division												
2023	426,872	1.37	to	5.35	1,328,414	1.13	0.15	to	0.80	16.19	to	16.95
2022	379,722	1.18	to	4.58	1,059,183	1.24	0.15	to	0.80	(16.36)	to	(15.82)
2021	274,154	1.41	to	5.44	1,092,493	1.08	0.15	to	0.80	34.86	to	35.74
2020	299,300	1.05	to	4.00	809,605	1.10	0.15	to	0.80	(23.94)	to	4.49
2019	233,198	1.38	to	3.83	651,868	0.64	0.15	to	0.75	20.10	to	20.28
MML Strategic Emerging Markets Division												
2023	270,427	0.77	to	1.09	229,919	0.11	0.25	to	0.80	9.59	to	10.47
2022	240,158	0.70	to	0.99	187,636	3.75	0.25	to	0.80	(27.16)	to	(26.58)
2021	131,540	0.96	to	1.35	146,079	-	0.25	to	0.80	(8.79)	to	(8.06)
2020	101,850	1.05	to	1.46	118,330	0.43	0.25	to	0.80	8.57	to	17.55
2019	132,199	0.97	to	1.24	130,203	0.23	0.25	to	0.75	24.60	to	25.53
MML Sustainable Equity Division												
2023	541,371	1.34	to	5.72	1,927,847	0.96	0.15	to	0.80	23.52	to	24.32
2022	535,130	1.09	to	4.60	1,617,946	0.95	0.15	to	0.80	(17.67)	to	(17.14)
2021	542,145	1.32	to	5.56	1,965,182	0.89	0.15	to	0.80	26.13	to	26.95
2020	321,231	1.05	to	4.38	1,294,731	0.93	0.15	to	0.80	(36.96)	to	14.34
2019	294,083	1.66	to	3.83	1,036,164	0.94	0.15	to	0.75	31.90	to	32.10
MML Total Return Bond Division												
2023	494,452	0.87	to	1.06	487,254	2.72	0.25	to	0.80	4.61	to	5.45
2022	308,977	0.83	to	1.01	297,648	1.44	0.25	to	0.80	(15.38)	to	(14.70)
2021	105,722	0.98	to	1.18	124,434	2.19	0.25	to	0.80	(1.98)	to	(1.19)
2020	32,588	1.00	to	1.19	40,203	3.07	0.25	to	0.80	(8.60)	to	8.79
2019	20,536	1.10	to	1.15	23,663	2.43	0.25	to	0.75	8.91	to	8.91
MML U.S. Government Money Market Division												
2023	19,075,762	1.04	to	1.08	22,589,638	4.53	0.15	to	1.00	3.60	to	4.48
2022	21,118,133	1.00	to	1.03	24,334,917	1.27	0.15	to	1.00	0.22	to	1.07
2021	14,367,031	1.00	to	1.02	16,396,206	-	0.15	to	1.00	(1.00)	to	(0.15)
2020	18,588,916	1.01	to	1.02	22,206,288	0.20	0.15	to	1.00	(0.77)	to	0.08
2019	13,153,952	1.02	to	1.02	15,295,854	1.69	0.15	to	1.00	0.70	to	1.56

Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,				For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)		Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
Oppenheimer Global Multi-Alternatives Division											
2023	- \$	- \$	- \$	-	-%	-%	-	-%	- %	-	-%
2022	-	-	-	-	-	-	-	-	-	-	-
2021	-	-	-	-	-	-	-	-	-	-	-
2020	-	-	-	-	-	-	-	-	-	-	-
2019 ¹²	-	1.00	to 1.03	-	1.44	0.25	to 0.75		3.53	to 3.53	
PIMCO CommodityRealReturn® Strategy Division											
2023	440,774	1.08	to 1.17	496,303	15.53	0.15	to 0.70		(8.57)	to (8.07)	
2022	447,376	1.18	to 1.27	544,010	20.51	0.15	to 0.70		7.91	to 8.50	
2021	436,186	1.09	to 1.17	492,181	4.19	0.15	to 0.70		32.18	to 32.91	
2020	432,307	0.83	to 0.88	365,739	6.07	0.15	to 0.70		0.52	to 1.08	
2019	370,676	0.82	to 0.87	309,923	4.36	0.15	to 0.70		10.57	to 11.19	
PIMCO Global Bond Opportunities Division											
2023	206,390	-	- 1.04	213,927	2.25	-	- 0.25		-	- 5.26	
2022	197,782	-	- 0.98	194,756	1.49	-	- 0.25		-	- (11.01)	
2021	210,849	-	- 1.11	233,307	4.93	-	- 0.25		-	- (4.16)	
2020	197,425	-	- 1.15	227,936	2.45	-	- 0.25		-	- 10.12	
2019	187,216	-	- 1.05	196,278	2.45	-	- 0.25		-	- 6.13	
PIMCO High Yield Division											
2023	134,084	-	- 1.26	168,702	5.66	-	- 0.25		-	- 12.25	
2022	134,880	-	- 1.12	151,184	5.04	-	- 0.25		-	- (10.30)	
2021	142,359	-	- 1.25	177,886	4.40	-	- 0.25		-	- 3.64	
2020	220,608	-	- 1.21	265,993	4.80	-	- 0.25		-	- 5.76	
2019	154,943	-	- 1.14	176,652	1.12	-	- 0.25		-	- 14.75	
PIMCO Income Division ¹¹											
2023	14,068	-	- 1.06	14,872	0.33	-	- 0.25		-	-	-
PIMCO Real Return Division ⁷											
2023	18,460	-	- 1.16	21,468	3.05	-	- 0.25		-	- 3.67	
2022	16,844	-	- 1.12	18,894	7.06	-	- 0.25		-	- (11.91)	
2021	17,000	-	- 1.27	21,647	4.92	-	- 0.25		-	- 5.61	
2020	17,085	-	- 1.21	20,601	0.94	-	- 0.25		-	- 11.72	
PIMCO Total Return Division											
2023	147,323	-	- 1.07	157,414	3.56	-	- 0.25		-	- 5.94	
2022	161,489	-	- 1.01	162,878	2.60	-	- 0.25		-	- (14.31)	
2021	166,564	-	- 1.18	196,048	1.85	-	- 0.25		-	- (1.27)	
2020	150,514	-	- 1.19	179,430	2.08	-	- 0.25		-	- 8.66	
2019	118,445	-	- 1.10	129,945	2.30	-	- 0.25		-	- 8.37	
T. Rowe Price All-Cap Opportunities Division											
2023	766,818	6.43	to 8.38	5,015,740	0.25	0.30	to 0.75		28.00	to 28.58	
2022	764,364	5.02	to 6.52	3,904,349	-	0.30	to 0.75		(22.10)	to (21.74)	
2021	750,541	6.45	to 8.33	4,920,302	-	0.30	to 0.75		19.89	to 20.43	
2020	810,125	5.38	to 6.91	4,529,302	-	0.30	to 0.75		43.30	to 43.94	
2019	908,636	3.75	to 4.80	3,539,489	0.42	0.30	to 0.75		33.92	to 34.52	
T. Rowe Price Blue Chip Growth Division											
2023	3,094,494	6.37	to 8.41	22,991,984	-	0.25	to 1.00		47.81	to 48.92	
2022	3,087,115	4.31	to 5.65	15,415,377	-	0.25	to 1.00		(39.11)	to (38.66)	
2021	3,170,366	7.08	to 9.21	25,875,360	-	0.25	to 1.00		16.45	to 17.33	
2020	3,391,891	6.08	to 7.85	23,754,759	-	0.25	to 1.00		32.94	to 33.94	
2019	3,509,332	4.57	to 5.86	18,577,729	-	0.25	to 1.00		28.60	to 29.56	

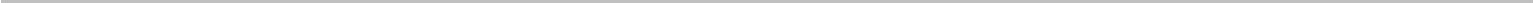
Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)		Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)			
T. Rowe Price Equity Income Division												
2023	5,059,409	\$ 3.83	to \$ 5.07	\$ 22,722,896	2.10%	0.25%	to	1.00%	8.45 %	to	9.27 %	
2022	5,285,312	3.53	to 4.64	21,757,838	1.87	0.25	to	1.00	(4.30)	to	(3.58)	
2021	5,487,164	3.69	to 4.82	23,530,078	1.58	0.25	to	1.00	24.30	to	25.24	
2020	5,467,518	2.97	to 3.85	18,840,838	2.35	0.25	to	1.00	0.18	to	0.93	
2019	5,417,533	2.96	to 3.81	18,706,568	2.33	0.25	to	1.00	25.14	to	26.08	
T. Rowe Price Limited-Term Bond Division												
2023	64,225	1.11	to 1.74	71,538	3.29	0.25	to	0.40	4.53	to	4.94	
2022	80,657	1.06	to 1.67	85,673	2.09	0.25	to	0.40	(4.90)	to	(4.52)	
2021	43,051	1.11	to 1.75	48,102	1.35	0.25	to	0.40	(0.32)	to	0.13	
2020	96,431	1.11	to 1.76	107,265	1.81	0.25	to	0.60	4.09	to	4.71	
2019	781	1.06	to 1.69	1,319	2.42	0.25	to	0.60	3.73	to	4.36	
T. Rowe Price Mid-Cap Growth Division												
2023	7,274,609	6.79	to 11.29	62,691,476	-	0.25	to	1.00	18.77	to	19.66	
2022	7,680,620	5.72	to 9.44	55,286,883	-	0.25	to	1.00	(23.35)	to	(22.77)	
2021	8,065,644	7.46	to 12.22	75,155,920	-	0.25	to	1.00	13.71	to	14.56	
2020	8,662,009	6.56	to 10.67	70,544,711	-	0.25	to	1.00	22.57	to	23.50	
2019	9,498,129	5.35	to 8.64	62,866,836	0.14	0.25	to	1.00	29.98	to	30.96	
Templeton Foreign VIP Division												
2023	5,020,897	2.09	to 2.23	11,962,059	3.17	0.25	to	1.00	19.56	to	20.46	
2022	5,220,787	1.75	to 1.86	10,195,403	3.00	0.25	to	1.00	(8.52)	to	(7.84)	
2021	5,875,466	1.91	to 2.01	12,160,131	1.84	0.25	to	1.00	3.12	to	3.90	
2020	5,834,770	1.85	to 1.94	11,342,176	3.39	0.25	to	1.00	(2.14)	to	(1.40)	
2019	5,904,930	1.85	to 1.90	11,293,030	1.72	0.25	to	1.00	11.41	to	12.25	
Templeton Global Bond VIP Division												
2023	68,923	-	- 0.92	63,391	-	-	- 0.25	-	-	- 3.19		
2022	66,481	-	- 0.89	59,252	-	-	- 0.25	-	-	- (4.85)		
2021	43,381	-	- 0.94	40,634	-	-	- 0.25	-	-	- (4.62)		
2020	43,761	-	- 0.98	42,977	8.55	-	- 0.25	-	-	- (5.07)		
2019	22,781	-	- 1.03	23,569	-	-	- 0.25	-	-	- 2.26		
Vanguard VIF Global Bond Index Division*												
2023	508,934	-	- 0.89	451,957	1.74	-	- 0.80	-	-	- 5.67		
2022	391,189	-	- 0.84	328,749	2.35	-	- 0.80	-	-	- (13.82)		
2021	196,349	-	- 0.98	191,467	0.24	-	- 0.80	-	-	- (2.62)		
2020	2,914	-	- 1.00	2,918	-	-	- 0.80	-	-	- -		
Vanguard VIF Mid Cap Index Division*												
2023	1,176,536	-	- 1.20	1,412,794	1.20	-	- 0.80	-	-	- 14.91		
2022	705,838	-	- 1.04	737,593	0.81	-	- 0.80	-	-	- (19.47)		
2021	247,101	-	- 1.30	320,634	0.10	-	- 0.80	-	-	- 23.37		
2020	5,400	-	- 1.05	5,680	-	-	- 0.80	-	-	- -		
Vanguard VIF Real Estate Index Division*												
2023	440,975	-	- 1.15	505,477	2.22	-	- 0.80	-	-	- 10.81		
2022	313,512	-	- 1.03	324,311	1.54	-	- 0.80	-	-	- (26.88)		
2021	156,470	-	- 1.41	221,372	0.17	-	- 0.80	-	-	- 39.09		
2020	4,937	-	- 1.02	5,022	-	-	- 0.80	-	-	- -		

Voya International Index Division

2023	1,380,711	-	-	1.35	1,868,907	4.77	-	-	0.25	-	-	17.54
2022	1,296,850	-	-	1.15	1,493,445	3.27	-	-	0.25	-	-	(14.87)
2021	1,251,780	-	-	1.35	1,693,422	1.88	-	-	0.25	-	-	10.62
2020	1,211,566	-	-	1.22	1,481,694	2.48	-	-	0.25	-	-	7.62
2019	1,139,366	-	-	1.14	1,294,774	2.77	-	-	0.25	-	-	21.04



Notes To Financial Statements (Continued)

8. FINANCIAL HIGHLIGHTS (Continued)

	At December 31,					For the Years Ended December 31,						
	Units	Unit Value ³ (Lowest to Highest)			Net Assets	Investment Income Ratio ¹	Expense Ratio ² (Lowest to Highest)			Total Return ³ (Lowest to Highest)		
Voya Russell™ Mid Cap Index Division												
2023	1,695,519	\$	-	\$	1.74	\$	2,951,626	1.58%	-%	-	0.25%	- % - 16.51 %
2022	1,387,761		-		1.49		2,073,613	0.74	-	-	0.25	- - (17.77)
2021	1,262,767		-		1.82		2,294,465	0.79	-	-	0.25	- - 21.80
2020	996,375		-		1.49		1,486,419	1.20	-	-	0.25	- - 16.32
2019	748,449		-		1.28		959,866	1.24	-	-	0.25	- - 29.74
Voya Russell™ Small Cap Index Division												
2023	508,815		-		1.50		765,547	1.50	-	-	0.25	- - 16.35
2022	399,075		-		1.29		516,043	0.50	-	-	0.25	- - (20.89)
2021	265,008		-		1.63		433,177	0.46	-	-	0.25	- - 14.04
2020	255,930		-		1.43		366,824	1.06	-	-	0.25	- - 19.34
2019	166,147		-		1.20		199,550	0.70	-	-	0.25	- - 24.77
VY® CBRE Global Real Estate Division												
2023	242,413		2.46	to	2.67		627,757	1.79	0.15	to	0.70	11.55 to 12.16
2022	231,202		2.20	to	2.38		531,668	3.01	0.15	to	0.70	(25.65) to (25.24)
2021	227,531		2.96	to	3.19		701,469	2.71	0.15	to	0.70	33.21 to 33.94
2020	223,661		2.22	to	2.38		510,408	5.82	0.15	to	0.70	(5.70) to (5.18)
2019	196,349		2.36	to	2.51		472,645	2.54	0.15	to	0.70	23.48 to 24.16

¹The investment income ratios represent the dividends, excluding distributions of capital gains, received by the division from the underlying mutual fund, divided by the average net assets. These ratios exclude expenses, such as mortality and expense charges, that are assessed against policy owner accounts either through reductions in the unit values or the redemption of units. The recognition of investment income by the division is affected by the timing of the declaration of dividends by the underlying fund in which the division invests.

²The expense ratios represent the annualized policy expense of the divisions of the Separate Account, consisting primarily of mortality and expense charges, for each period indicated. The ratios include only those expenses that result in a direct reduction of unit values. Charges made directly to policy owner accounts through the redemption of units and expenses of the underlying fund have been excluded.

³The total returns are for the periods indicated, including changes in the value of the underlying fund, and the expenses assessed through the reduction of unit values. These ratios do not include any expenses assessed through the redemption of units. As the total return is presented as a range of minimum to maximum values, based on the product grouping representing the related minimum and maximum expense ratio amounts, some individual policy total returns and unit values are not within the ranges presented.

⁴See Note 2 to the financial statements for the previous name of this division.

⁵After the close of business on April 29, 2022, Invesco V.I. Core Plus Bond Fund acquired all the net assets of Invesco V.I. Core Bond Fund pursuant to a plan of reorganization approved by the Board of Trustees of the Invesco V.I. Core Plus Bond Fund on December 1, 2021 and by the shareholders of the Invesco V.I. Core Bond Fund on March 31, 2022. The acquisition was accomplished by a tax-free exchange as of the close of business on April 29, 2022. Shares of Invesco V.I. Core Bond Fund were exchanged for the like class of shares of Invesco V.I. Core Plus Bond Fund, based on the relative net asset value of the two funds which resulted in Invesco V.I. Core Bond Fund receiving 1.15816327 shares of Invesco V.I. Core Plus Bond Fund in exchange of 1 share of Invesco V.I. Core Bond Fund. As a result of the underlying fund merger, the division name changed from Invesco V.I. Core Bond to Invesco V.I. Core Plus Bond. Financial highlights for the years 2018-2021 correspond to the Invesco V.I. Core Bond Division.

⁶For the period January 1, 2022 to November 4, 2022. Effective November 4, 2022 this Division liquidated and any contract value in the Division after the close of the New York Stock Exchange on November 4, 2022 was automatically transferred to the MML U.S. Government Money Market Division.

⁷This fund/division became available to the Separate Account as an investment option on June 26, 2017, but it is presented from the year when the investment or unit activity has been started.

⁸This fund/division became available to the Separate Account as an investment option on October 16, 2020, but it is presented from the year when the investment or unit activity has been started.

⁹Effective May 1, 2023, the JPMorgan Insurance Trust U.S. Equity Portfolio merged into the LVIP JPMorgan U.S. Equity Fund. The LVIP JPMorgan U.S. Equity Fund assumed the accounting and performance history of the JPMorgan Insurance Trust U.S. Equity Portfolio.

¹⁰This fund/division became available to the Separate Account as an investment option on May 1, 2021, but it is presented from the year when the investment or unit activity has been started.

¹¹This fund/division became available to the Separate Account as an investment option on May 1, 2023, but it is presented from the year when the investment or unit activity has been started.

¹²For the period January 1, 2019 through April 29, 2019. Effective April 29, 2019 this Sub-Account liquidated and any contract value in the Sub-Account after the close of the New York Stock Exchange on April 29, 2019 was automatically transferred to the MML U.S. Government Money Market Sub-Account.

8. FINANCIAL HIGHLIGHTS (Continued)

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

Administrative Charge This charge is assessed through the redemption of units.	\$0 - \$12 per month per policy
Asset Charge/Mortality and Expense Risk Charge This charge is assessed through a reduction in unit values or through the redemption of units.	Effective annual rate of 0.10% - 1.00% of the policy’s assets held in the Separate Account.
Additional Mortality Fees This charge is assessed through a redemption of units.	\$0.00 to \$83.33 per \$1,000 of insurance risk \$0.08 to \$83.33 per \$1,000 of face amount
Face Amount Charge This charge is assessed through a redemption of units.	\$0.00 - \$1.79 per month per \$1,000 face amount of policy; or charge is based on the initial selected face amount of the Policy, the issue age of the insured, and the Policy year in which the deduction is made.
Insurance Charge/Cost of Insurance Protection Charge/Mortality Charge These charges are assessed through a redemption of units.	\$0.00 - \$83.33 per month per \$1,000 of insurance risk; or MassMutual may charge up to the maximum rate in the Table of Maximum Monthly Mortality Charges in a Policy. MassMutual may charge less than the maximum. If policies are issued in a Group Case, any changes in these charges will apply to all policies in the same case.
Loan Interest Rate Expense Charge This charge is assessed through a redemption of units.	Effective annual rate of 0.00% - 1.00% of the loan amount

Rider Charges: The rider charges do not apply to all segments within the Separate Account. These charges are assessed through a redemption of units.	
A. Accidental Death Benefit	\$0.025 - \$0.12929 per \$1,000 of coverage
B. Additional Insurance	\$0.01 to \$82.50 per \$1,000 of insurance risk \$0.00 to \$0.41 per \$1,000 of face amount
C. Death Benefit Guarantee	\$0.01 per \$1,000 of face amount
D. Disability Benefit	\$0.00 to \$0.32 per \$1 of monthly deductions \$0.00 to \$0.04 per \$1 of specified benefit amount \$0.009 to \$0.149 per \$1 of specified premium \$0.00 to \$0.09783 per \$1,000 of insurance risk
E. Estate Protection	\$0.00 to \$21.96 per \$1,000 of insurance risk
F. Guaranteed Insurability	\$0.03 to \$0.11 per \$1,000 of option amount
G. Insurability Protection	\$0.043 to \$0.179 per \$1,000 of rider face amount
H. Other Insured	\$0.01 to \$79.16 per \$1,000 of insurance risk
I. Survivorship Term	\$0.00 to \$80.83 per \$1,000 of insurance risk \$0.00 to \$0.30 per \$1,000 of face amount
J. Waiver of Monthly Charges	\$0.00 to \$0.349 per \$1 of monthly deductions \$4.55 to \$11.98 per \$100 of monthly deductions
K. Waiver of Specified Premium	\$0.00 to \$0.28 per \$1 of monthly deduction \$0.00 to \$0.04 per \$1 of specified premium amount
L. Additional Mortality Fees	\$0.00 to \$83.33 per \$1,000 of insurance risk \$0.00 to \$83.33 per \$1,000 of face amount
M. Underwriting Charge	\$0.01 to \$0.06 per \$1,000 of selected face amount
N. Term Rider	\$0.01 to \$36.72 per \$1,000 of insurance risk
O. Children's Level Term Insurance Rider	\$4.50 per month
P. Spouse Level Term Insurance Rider	\$0.06 - \$1.22 per \$1,000 of rider coverage

9. SUBSEQUENT EVENTS

The Separate Account's management has reviewed events occurring through March 7, 2024, the date the financial statements were issued, and no subsequent events occurred requiring accrual or disclosure.

PART C OTHER INFORMATION

Item 30. Exhibits

Exhibit (a)	<u>Board of Directors of Massachusetts Mutual Life Insurance Company authorizing the establishment of the Separate Account I – Incorporated by reference to Post-Effective Amendment No. 11 to Registration Statement File No. 333-206438 filed November 15, 2021</u>
Exhibit (b)	Not Applicable
Exhibit (c)	<ul style="list-style-type: none"> i. <u>Underwriting and Servicing Agreement dated December 16, 2014 by and between MML Investors Services, LLC and Massachusetts Mutual Life Insurance Company – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u> ii. <u>Underwriting and Servicing Agreement (Distribution Servicing Agreement) dated April 1, 2014 between MML Strategic Distributors, LLC and Massachusetts Mutual Life Insurance Company – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u> iii. <u>Template for Insurance Product Distribution Agreement (version 4/2021) (MML Strategic Distributors, LLC, Massachusetts Mutual Life Insurance Company and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 2 to Registration Statement File No. 333-255824 filed April 25, 2023</u>
Exhibit (d)	<ul style="list-style-type: none"> i. <u>Form of Flexible Premium Adjustable Variable Life Insurance Policy – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> ii. <u>Form of Accelerated Death Benefit Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> iii. <u>Disability Benefit Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> iv. <u>Guaranteed Insurability Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> v. <u>Other Insured Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> vi. <u>Substitute of Insured Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> vii. <u>Waiver of Monthly Charges Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u> viii. <u>Waiver of Specified Premium Rider – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u>
Exhibit (e)	<u>Application for Life or Disability Income Insurance (rev. 11/2012) – Incorporated by reference to Post-Effective Amendment No. 19 to Registration Statement File No. 333-150916 filed April 28, 2022</u>
Exhibit (f)	<ul style="list-style-type: none"> i. <u>Copy of Charter documentation as amended through August 10, 2008 of Massachusetts Mutual Life Insurance Company – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u> ii. <u>By-Laws of Massachusetts Mutual Life Insurance Company as adopted April 8, 2015 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
Exhibit (g)	Reinsurance Contracts

i. Canada Life Assurance Company

- a. [Automatic YRT Agreement effective August 1, 2008 \(MML Bay State Life Insurance Company, C.M. Life Insurance Company and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed September 12, 2008](#)
1. [Amendment effective January 1, 2009 – Incorporated by reference to Post-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed April 28, 2009](#)
 2. [Amendments effective August 1, 2009 and March 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)
 3. [Amendments effective August 1, 2008, July 1, 2011 and August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-150916 filed April 25, 2012](#)
 4. [Amendments effective January 1, 2012, July 30, 2012 and January 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-150916 filed April 23, 2013](#)
 5. [Amendments effective May 1, 2001, April 15, 2013, May 7, 2013 and September 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 6 to Registration Statement File No. 333-150916 filed April 28, 2014](#)
 6. [Amendments effective December 1, 2015, April 15, 2018, October 1, 2018, August 1, 2019, January 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 17 to Registration Statement File No. 333-150916 filed April 28, 2020](#)
 7. [Amendment effective February 28, 2021 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)

ii. Munich American Reassurance

- a. [Automatic YRT Agreement effective August 1, 2008 \(MML Bay State Life Insurance Company, C.M. Life Insurance Company and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed September 12, 2008](#)
1. [Amendment effective January 1, 2009 – Incorporated by reference to Post-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed April 28, 2009](#)
 2. [Amendments effective August 1, 2009 and March 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)
 3. [Amendments effective August 1, 2008 and August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-150916 filed April 25, 2012](#)
 4. [Amendments effective as of August 1, 2008, July 30, 2012 and January 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-150916 filed April 23, 2013](#)
 5. [Amendments effective May 1, 2001, April 15, 2013, May 7, 2013 and September 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 6 to Registration Statement File No. 333-150916 filed April 28, 2014](#)
 6. [Amendments effective April 15, 2018, October 1, 2018, August 1, 2019, January 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 17 to Registration Statement File No. 333-150916 filed April 28, 2020](#)
 7. [Amendment effective February 28, 2021 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)
 8. Amendment effective January 1, 2022 – Incorporated by reference to Post-Effective Amendment No. 35 to Registration Statement File No. 333-22557 filed on or about April 25, 2024

iii. RGA Reinsurance Company

- a. [Automatic YRT Agreement effective August 1, 2008 \(MML Bay State Life Insurance Company, C.M. Life Insurance Company and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed September 12, 2008](#)
1. [Amendment effective January 1, 2009 – Incorporated by reference to Post-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed April 28, 2009](#)
 2. [Amendments effective August 1, 2009 and March 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)

3. [Amendments effective August 1, 2008, February 28, 2011 and August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-150916 filed April 25, 2012](#)
4. [Amendments effective January 1, 2012, June 1, 2012, July 30, 2012 and January 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-150916 filed April 23, 2013](#)
5. [Amendments effective May 1, 2001, April 15, 2013 and May 7, 2013 – Incorporated by reference to Post-Effective Amendment No. 6 to Registration Statement File No. 333-150916 filed April 28, 2014](#)
6. [Amendments effective August 1, 2008, April 15, 2018, July 7, 2018, October 1, 2018, August 1, 2019, January 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 17 to Registration Statement File No. 333-150916 filed April 28, 2020](#)
7. [Amendments effective June 1, 2012 and February 28, 2021 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)

iv. SCOR Global Life Reinsurance Company of America / XL Re Life America Inc.

- a. [Automatic YRT Agreement effective August 1, 2008 \(MML Bay State Life Insurance Company, C.M. Life Insurance Company and Massachusetts Mutual Life Insurance Company and XL Re Life America Inc.\) – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed September 12, 2008](#)
 1. [Amendments effective August 1, 2009 and March 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)
 2. [Name Change letter effective February 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)
 3. [Amendments effective August 1, 2008 and August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-150916 filed April 25, 2012](#)
 4. [Amendments effective January 1, 2012, July 30, 2012 and January 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-150916 filed April 23, 2013](#)
 5. [Amendments effective May 1, 2001, April 15, 2013 and May 7, 2013 – Incorporated by reference to Post-Effective Amendment No. 6 to Registration Statement File No. 333-150916 filed April 28, 2014](#)
 6. [Amendment effective April 30, 2014 – Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-150916 filed April 28, 2015](#)
 7. [Amendments effective April 15, 2018, October 1, 2018, August 1, 2019, January 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 17 to Registration Statement File No. 333-150916 filed April 28, 2020](#)
 8. [Amendment effective February 28, 2021 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)

v. Swiss Re Life & Health America, Inc.

- a. [Automatic YRT Agreement effective August 1, 2008 \(MML Bay State Life Insurance Company, C.M. Life Insurance Company and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed September 12, 2008](#)
 1. [Amendment effective January 1, 2009 – Incorporated by reference to Post-Effective Amendment No. 1 to Registration Statement File No. 333-150916 filed April 28, 2009](#)
 2. [Amendments effective August 1, 2009 and March 1, 2010 – Incorporated by reference to Post-Effective Amendment No. 3 to Registration Statement File No. 333-150916 filed April 26, 2011](#)
 3. [Amendments effective August 1, 2008 and August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-150916 filed April 25, 2012](#)
 4. [Amendments effective as of August 1, 2008, July 30, 2012 and January 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-150916 filed April 23, 2013](#)
 5. [Amendments effective December 1, 2010, January 1, 2012, May 7, 2013 and September 1, 2013 – Incorporated by reference to Post-Effective Amendment No. 6 to Registration Statement File No. 333-150916 filed April 28, 2014](#)
 6. [Amendment effective April 21, 2014 – Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-150916 filed April 28, 2015](#)

7. [Amendments effective April 15, 2018, October 1, 2018, August 1, 2019, January 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 17 to Registration Statement File No. 333-150916 filed April 28, 2020](#)
8. [Amendment effective February 28, 2021 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)

Exhibit (h) i. Participation, Selling, Servicing Agreements:

a. AIM Funds (Invesco Funds)

1. [Participation Agreement dated April 30, 2004 with revised Schedule A as of July 6, 2005 \(AIM Variable Insurance Funds, AIM Distributors, Inc., and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - i. [Amendment No. 1 effective as of July 1, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - ii. [Amendment No. 2 effective April 30, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iii. [Amendment No. 3 effective May 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iv. [Amendment dated May 3, 2021 regarding Rules 30e-3 and 498A – Incorporated by reference to Post-Effective Amendment No. 11 to Registration Statement File No. 333-206438 filed November 15, 2021](#)
 - i. [Amendment No. 1 dated May 24, 2019 – Incorporated by reference to Post-Effective Amendment No. 11 to Registration Statement File No. 333-206438 filed November 15, 2021](#)
 - ii. [Amendment No. 2 effective April 1, 2022 – Incorporated by reference to Post-Effective Amendment No. 2 to Registration Statement File No. 333-255824 filed April 25, 2023](#)
3. [Administrative Services Agreement dated October 1, 2016 \(Invesco Advisers, Inc. and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)

b. Fidelity® Funds

1. [Amended and Restated Participation Agreement dated May 22, 2017 \(Fidelity® Variable Insurance Products Fund, Fidelity® Variable Insurance Products Fund II, Fidelity® Variable Insurance Products Fund III, Fidelity® Variable Insurance Products Fund IV, Fidelity® Variable Insurance Products Fund V, Fidelity Distributors Corporation and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 4 to Registration Statement File No. 333-202684 filed April 24, 2018](#)
 - i. [First Amendment dated May 22, 2017 – Incorporated by reference to Post-Effective Amendment No. 10 to Registration Statement File No. 333-150916 filed April 24, 2018](#)
 - ii. [Amendment dated January 21, 2019 – Incorporated by reference to Post-Effective Amendment No. 5 to Registration Statement File No. 333-202684 filed April 25, 2019](#)
 - iii. [Amendment dated October 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iv. [Amendment dated March 1, 2021 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - v. [Amendment dated October 18, 2023 – Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-255824 filed on or about April 25, 2024](#)
2. [Summary Prospectus Agreement effective May 1, 2011 \(Fidelity Distributors Corporation and Massachusetts Mutual Life Insurance Company, C.M. Life Insurance Company, and MML Bay State Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
3. [Service Contract dated January 1, 2004 \(MML Investors Services, LLC, MML Strategic Distributors, LLC, and MML Distributors, LLC and Massachusetts Mutual Life Insurance Company\) – Incorporated by reference to Pre-Effective Amendment No. 2 to Registration Statement File No. 333-215823 filed June 14, 2017](#)

- i. [First Amendment dated October 1, 2008 – Incorporated by reference to Pre-Effective Amendment No. 2 to Registration Statement File No. 333-215823 filed June 14, 2017](#)
- ii. [Second Amendment dated May 22, 2017 – Incorporated by reference to Post-Effective Amendment No. 11 to Registration Statement File No. 333-206438 filed November 15, 2021](#)
- iii. [Third Amendment dated November 1, 2018 – Incorporated by reference to Initial Registration Statement to Registration Statement File No. 333-259818 filed September 27, 2021](#)
- iv. [Fourth Amendment dated September 28, 2021 \(C.M. Life Insurance Company becomes a party to the Agreement\) – Incorporated by reference to Registration Statement File No. 333-206438 filed November 15, 2021](#)
- 4. [Service Agreement dated October 1, 1999 – Incorporated by reference to Pre-Effective Amendment No. 2 to Registration Statement File No. 333-215823 filed June 14, 2017](#)
 - i. [Amendment dated May 22, 2017 – Incorporated by reference to Post-Effective Amendment No. 11 to Registration Statement File No. 333-206438 filed November 15, 2021](#)
 - ii. [Second Amendment dated December 13, 2017 – Incorporated by reference to Post-Effective Amendment No. 10 to Registration Statement File No. 333-150916 filed April 24, 2018](#)
 - iii. [Third Amendment dated January 1, 2021 – Incorporated by reference to Post-Effective Amendment No. 12 to Registration Statement File No. 333-202684 filed April 28, 2021](#)
- c. MML Funds
 - 1. [Participation Agreement dated November 17, 2005 \(MML Series Investment Fund, Massachusetts Mutual Life Insurance Company and MML Bay State Life Insurance Company and C.M. Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - i. [First Amendment effective November 17, 2005 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - ii. [Second Amendment dated as of August 26, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iii. [Third Amendment dated April 9, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iv. [Fourth Amendment dated and effective July 23, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - v. [Fifth Amendment dated August 28, 2012 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - vi. [Sixth Amendment dated April 1, 2014 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - vii. [Seventh Amendment dated August 11, 2015 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - viii. [Eighth Amendment dated February 20, 2020 – Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-202684 filed April 28, 2020](#)
 - ix. [Ninth Amendment dated June 2, 2021 regarding Rules 30e-3 and 498A – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-255824 filed August 24, 2021](#)
- d. MML II Funds
 - 1. [Participation Agreement dated November 17, 2005 \(MML Series Investment Fund II, Massachusetts Mutual Life Insurance Company and MML Bay State Life Insurance Company and C.M. Life Insurance Company\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - i. [First Amendment effective November 17, 2005 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - ii. [Second Amendment dated as of August 26, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iii. [Third Amendment dated as of April 9, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)

- iv. [Fourth Amendment dated and effective July 23, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- v. [Fifth Amendment dated August 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- vi. [Sixth Amendment dated and effective August 28, 2012 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- vii. [Seventh Amendment dated and effective November 12, 2012 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- viii. [Eighth Amendment dated April 1, 2014 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- ix. [Ninth Amendment dated August 11, 2015 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- x. [Tenth Amendment dated February 20, 2020 – Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-202684 filed April 28, 2020](#)
- xi. [Eleventh Amendment dated June 2, 2021 regarding Rules 30e-3 and 498A – Incorporated by reference to Pre-Effective Amendment No. 1 to Registration Statement File No. 333-255824 filed August 24, 2021](#)

e. PIMCO Funds

- 1. [Participation Agreement dated as of April 21, 2006 \(Massachusetts Mutual Life Insurance Company, C.M. Life Insurance Company and PIMCO Variable Insurance Trust and Allianz Global Investors Distributors LLC\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - i. [Amendment No. 1 effective as of June 30, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - ii. [New Agreements and Amendments dated November 10, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iii. [Amendment effective as of May 1, 2011 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - iv. [Amendment signed March 1, 2017 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-95845 filed April 26, 2017](#)
- 2. [Termination Agreement dated November 10, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- 3. [Selling Agreement executed on April 26, 2006 \(Allianz Global Investors Distributors LLC, Massachusetts Mutual Life Insurance Company and C.M. Life Insurance Company\) for Advisor Class Shares of PIMCO Variable Insurance Trust – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
- 4. [Services Agreement \(Trust\) for PIMCO Variable Insurance Trust \(Pacific Investment Management Company LLC, Massachusetts Mutual Life Insurance Company and C.M. Life Insurance Company\) effective as of March 1, 2017 – Incorporated by reference to Pre-Effective Amendment No. 2 to Registration Statement File No. 333-215823 filed June 14, 2017](#)
 - i. [Amendment No. 1 dated November 1, 2020 – Incorporated by reference to Post-Effective Amendment No. 18 to Registration Statement File No. 333-150916 filed April 28, 2021](#)

f. Voya Funds

- 1. [Participation Agreement dated April 26, 2006 \(Massachusetts Mutual Life Insurance Company, ING Funds Distributor, LLC and ING Variable Products Trust\) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - i. [Amendment dated May 28, 2007 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)
 - ii. [Amendment dated April 3, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021](#)

	iii. <u>Amendment dated September 6, 2008 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
	iv. <u>Amendment dated May 27, 2010 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
	v. <u>Amendment dated January 17, 2014 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
	vi. <u>Amendment dated December 23, 2014 – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
	vii. <u>Amendment dated June 29, 2016 – Incorporated by reference to Post-Effective Amendment No. 26 to Registration Statement File No. 333-112626 filed April 26, 2017</u>
ii.	Shareholder Information Agreements (Rule 22c-2 Agreements)
a.	<u>AIM Investment Services, Inc. effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
1.	<u>Amendment No. 1 dated June 30, 2020 – Incorporated by reference to Pre-Effective Amendment 3 to Registration Statement File No. 333-229670 filed October 2, 2020</u>
b.	<u>Fidelity Distributors Corporation effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, MML Bay State Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
c.	<u>MML Series Investment Fund effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, MML Bay State Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
d.	<u>MML Series Investment Fund II effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, MML Bay State Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
e.	<u>PIMCO Variable Insurance Trust effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
f.	<u>Voya Variable Products Trust effective October 16, 2007 (Massachusetts Mutual Life Insurance Company, and C.M. Life Insurance Company) – Incorporated by reference to Post-Effective Amendment No. 28 to Registration Statement File No. 333-45039 filed June 25, 2021</u>
Exhibit (i)	Not Applicable
Exhibit (j)	Not Applicable
Exhibit (k)	<u>Opinion and Consent of Counsel as to the legality of the securities being registered – Incorporated by reference to Post-Effective Amendment No. 15 to Registration Statement File No. 333-150916 filed October 11, 2019</u>
Exhibit (l)	Not Applicable
Exhibit (m)	Not Applicable

Exhibit (n)	i. Auditor Consents:
	<ul style="list-style-type: none"> • Company Financial Statements (*) • Separate Account Financial Statements (*)
	ii. a. Powers of Attorney for:
	<ul style="list-style-type: none"> • Roger W. Crandall • Mark T. Bertolini • Kathleen A. Corbet • James H. DeGraffenreidt, Jr. • Isabel D. Goren • Bernard A. Harris, Jr. • Michelle K. Lee • Jeffrey H. Leiden • Laura J. Sen • William T. Spitz • H. Todd Stitzer • Elizabeth A. Ward
	– Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-229670 filed September 1, 2023
	b. Power of Attorney for Keith McDonagh
	– Incorporated by reference to Post-Effective Amendment No. 7 to Registration Statement File No. 333-255824 filed on or about April 25, 2024
	iii. Resolution Regarding the Rules and Regulations of the Board of Directors dated February 13, 2019 – Incorporated by reference to Pre-Effective Amendment No. 3 to Registration Statement File No. 333-229670 filed October 2, 2020
Exhibit (o)	Not Applicable
Exhibit (p)	Not Applicable
Exhibit (q)	SEC Procedures Memorandum dated April 29, 2024, describing Massachusetts Mutual Life Insurance Company issuance, transfer, and redemption procedures for the Policy – Incorporated by reference to Post-Effective Amendment No. 10 to Registration Statement File No. 333-229670 filed on or about April 25, 2024

(*) filed herewith

Item 31. Directors and Officers of the Depositor**Directors of Massachusetts Mutual Life Insurance Company**

*Roger W. Crandall, Director,
Chairman*
1295 State Street
Springfield, MA 01111

Mark T. Bertolini, Director
PO Box 20917
700 Columbus Avenue
New York, NY 10025

Jeffrey M. Leiden, Director
15 North Beach Road
Hobe Sound, FL 33455

H. Todd Stitzer, Lead Director
1312 Casey Key Road
Nokomis, FL 34275

Kathleen A. Corbet, Director
49 Cros Ridge Road
New Canaan, CT 06840

James H. DeGraffenreidt, Jr., Director
1340 Smith Avenue, Suite 200
Baltimore, MD 21209

Laura J. Sen, Director
95 Pembroke Street, Unit 1
Boston, MA 02118

Bernard A. Harris, Jr., Director
3333 Allen Parkway, #1709
Houston, Texas 77019

Isabella D. Goren, Director
8030 Acoma Lane
Dallas, TX 75252

William T. Spitz, Director
16 Wynstone
Nashville, TN 37215

Michelle K. Lee, Director
19952 Moran Lane
Saratoga, CA 95070

Principal Officers of Massachusetts Mutual Life Insurance Company

Roger W. Crandall, President and Chief Executive Officer
1295 State Street
Springfield, MA 01111

Julietta Sinisgalli, Treasurer
1295 State Street
Springfield, MA 01111

Michael J. O'Connor, General Counsel
1295 State Street
Springfield, MA 01111

Elizabeth A. Ward, Chief Financial Officer
1295 State Street
Springfield, MA 01111

Dominic Blue, Head of Third-Party Distribution and New Markets
1295 State Street
Springfield, MA 01111

Paul LaPiana, Head of Brand, Product and Affiliated Distribution
1295 State Street
Springfield, MA 01111

Keith McDonagh, Corporate Controller
10 Fan Pier Boulevard
Boston, MA 02210

Eric Partlan, Chief Investment Officer
1295 State Street
Springfield, MA 01111

John Rugel, Head of Operations
1295 State Street
Springfield, MA 01111

Susan Cicco, Head of Human Resources & Employee Experience
1295 State Street
Springfield, MA 01111

Sears Merritt, Head of Technology & Experience
1295 State Street
Springfield, MA 01111

Geoffrey Craddock, Chief Risk Officer
10 Fan Pier Boulevard
Boston, MA 02210

Akintokunbo Akinbajo, Corporate Secretary
1295 State Street
Springfield, MA 01111

Item 32. Persons Controlled by or Under Common Control with the Depositor or the Registrant

– Incorporated by reference to Item 32 on Form N-6 in Post-Effective Amendment No. 3 to Registration Statement File No. 333-259818 filed on or about April 25, 2024

Item 33. Indemnification

MassMutual directors and officers are indemnified under Article V. of the by-laws of Massachusetts Mutual Life Insurance Company, as set forth below.

ARTICLE V. of the By-laws of MassMutual provides for indemnification of directors and officers as follows:

“ARTICLE V.

INDEMNIFICATION

Subject to limitations of law, the Company shall indemnify:

- (a) each director, officer or employee;
- (b) any individual who serves at the request of the Company as a director, board member, committee member, partner, trustee, officer or employee of any foreign or domestic organization or any separate investment account; or
- (c) any individual who serves in any capacity with respect to any employee benefit plan,

from and against all loss, liability and expense imposed upon or incurred by such person in connection with any threatened, pending or completed action, claim, suit, investigation or proceeding of any nature whatsoever, in which such person may be involved or with which he or she may be threatened to be involved, by reason of any alleged act, omission or otherwise while serving in any such capacity, whether such action, claim, suit, investigation or proceeding is civil, criminal, administrative, arbitrative, or investigative and/or formal or informal in nature. Indemnification shall be provided although the person no longer serves in such capacity and shall include protection for the person’s heirs and legal representatives.

Indemnities hereunder shall include, but not be limited to, all costs and reasonable counsel fees, fines, penalties, judgments or awards of any kind, and the amount of reasonable settlements, whether or not payable to the Company or to any of the other entities described in the preceding paragraph, or to the policyholders or security holders thereof.

Notwithstanding the foregoing, no indemnification shall be provided with respect to:

- (1) any matter as to which the person shall have been adjudicated in any proceeding not to have acted in good faith in the reasonable belief that his or her action was in the best interests of the Company or, to the extent that such matter relates to service with respect to any employee benefit plan, in the best interests of the participants or beneficiaries of such employee benefit plan;
- (2) any liability to any entity which is registered as an investment company under the Federal Investment Company Act of 1940 or to the security holders thereof, where the basis for such liability is willful misfeasance, bad faith, gross negligence or reckless disregard of the duties involved in the conduct of office; and
- (3) any action, claim or proceeding voluntarily initiated by any person seeking indemnification, unless such action, claim or proceeding had been authorized by the Board of Directors or unless such person’s indemnification is awarded by vote of the Board of Directors.

In any matter disposed of by settlement or in the event of an adjudication which in the opinion of the General Counsel or his or her delegate does not make a sufficient determination of conduct which could preclude or permit indemnification in accordance with the preceding paragraphs (1), (2) and (3), the person shall be entitled to indemnification unless, as determined by the majority of the disinterested directors or in the opinion of counsel (who may be an officer of the Company or outside counsel employed by the Company), such person’s conduct was such as precludes indemnification under any such paragraph. The termination of any action, claim, suit, investigation or proceeding by judgment, order, settlement, conviction, or upon a plea of nolo contendere or its equivalent shall not, of itself, create a presumption that the person did not act in good faith and in a manner which he or she reasonably believed to be in the best interests of the Company.

The Company may at its option indemnify for expenses incurred in connection with any action or proceeding in advance of its final disposition, upon receipt of a satisfactory undertaking for repayment if it be subsequently determined that the person thus indemnified is not entitled to indemnification under this Article V.”

To provide certainty and more clarification regarding the indemnification provisions of the Bylaws set forth above, MassMutual has entered into indemnification agreements with each of its directors, and with each of its officers who serve as a director of a subsidiary of MassMutual, (a "Director"). Pursuant to the Agreements, MassMutual agrees to indemnify a Director, to the extent legally permissible, against (a) all expenses, judgments, fines and settlements ("Costs"), liabilities, and penalties paid in connection with a proceeding involving the Director because he or she is a director if the Director (i) acted in good faith, (ii) reasonably believed the conduct was in the Company's best interests; (iii) had no reasonable cause to believe the conduct was unlawful (in a criminal proceeding); and, (iv) engaged in conduct for which the Director shall not be liable under MassMutual's Charter or By-Laws. MassMutual further agrees to indemnify a Director, to the extent permitted by law, against all Costs paid in connection with any proceeding (i) unless the Director breached a duty of loyalty, (ii) except for liability for acts or omissions not in good faith, involving intentional misconduct or a knowing violation of law, (iii) except for liability under Section 6.40 of Chapter 156D of Massachusetts Business Corporation Act ("MBCA"), or (iv) except for liability related to any transaction from which the Director derived an improper benefit. MassMutual will also indemnify a Director, to the fullest extent authorized by the MBCA, against all expenses to the extent the Director has been successful on the merits or in defense of any proceeding. If any court determines that despite an adjudication of liability to MassMutual or its subsidiary that the Director is entitled to indemnification, MassMutual will indemnify the Director to the extent permitted by law. Subject to the Director's obligation to pay MassMutual in the event that the Director is not entitled to indemnification, MassMutual will pay the expenses of the Director prior to a final determination as to whether the Director is entitled to indemnification.

Item 34. Principal Underwriters

- (a) MML Investors Services, LLC ("MMLIS") acts as principal underwriter of the contracts/policies/certificates sold by its registered representatives and MML Strategic Distributors, LLC ("MSD") serves as principal underwriter of the contracts/policies/certificates sold by registered representatives of other broker-dealers who have entered into distribution agreements with MSD.

MMLIS and MSD either jointly or individually act as principal underwriters for:

Massachusetts Mutual Variable Life Separate Account I, Massachusetts Mutual Variable Annuity Separate Account 1, Massachusetts Mutual Variable Annuity Separate Account 2, Massachusetts Mutual Variable Annuity Separate Account 3, Massachusetts Mutual Variable Annuity Separate Account 4, Panorama Separate Account, Connecticut Mutual Variable Life Separate Account I, MML Bay State Variable Life Separate Account I, MML Bay State Variable Annuity Separate Account 1, Panorama Plus Separate Account, C.M. Multi-Account A, C.M. Life Variable Life Separate Account I, Massachusetts Mutual Variable Life Separate Account II.

- (b) MMLIS and MSD are the principal underwriters for this Policy. The following people are officers and directors of MMLIS and officers and directors of MSD:

DIRECTORS AND OFFICERS OF MML INVESTORS SERVICES, LLC

Name	Positions and Offices	Principal Business Address
John Vaccaro	Director, Chief Executive Officer, Chairman of the Board, and Agency Field Force Supervisor	(*)
Vaughn Bowman	Director and President	(*)
Geoffrey Craddock	Director	10 Fan Pier Boulevard Boston, MA 02210
Paul LaPiana	Director	(*)
Jennifer Reilly	Director	10 Fan Pier Boulevard Boston, MA 02210
David Mink	Vice President and Chief Operations Officer	11215 North Community House Rd. Charlotte, NC 28277
Frank Rispoli	Chief Financial Officer and Treasurer	(*)
Edward K. Duch, III	Chief Legal Officer, Vice President, and Secretary	(*)
Courtney Reid	Chief Compliance Officer	(*)
James P. Puhala	Deputy Chief Compliance Officer	(*)
Michael Gilliland	Deputy Chief Compliance Officer	(*)
Thomas Bauer	Chief Technology Officer	(*)
Anthony Frogameni	Chief Privacy Officer	(*)
Linda Bestepe	Vice President	(*)
Daken Vanderburg	Vice President	(*)
Brian Foley	Vice President	(*)
James Langham	Vice President	(*)
Mary B. Wilkinson	Vice President	11215 North Community House Rd. Charlotte, NC 28277
David Holtzer	Field Risk Officer	11215 North Community House Rd. Charlotte, NC 28277
Amy Francella	Assistant Secretary	(*)
Alyssa O'Connor	Assistant Secretary	(*)
Pablo Cabrera	Assistant Treasurer	(*)
Jeffrey Sajdak	Assistant Treasurer	(*)
Julieta Sinisgalli	Assistant Treasurer	(*)
Kevin Lacombe	Assistant Treasurer	(*)
Tricia Cohen	Continuing Education Officer	(*)
Mario Morton	Registration Manager	(*)
Kelly Pirrotta	AML Compliance Officer	(*)
John Rogan	Regional Vice President	(*)
Michelle Pedigo	Regional Vice President	(*)

(*) 1295 State Street, Springfield, MA 01111-0001

OFFICERS AND DIRECTORS OF MML STRATEGIC DISTRIBUTORS, LLC

Name	Positions and Offices	Principal Business Address
Dominic Blue	Director and Chairman of the Board	(*)
Matthew DiGangi	Director and Chief Executive Officer and President	(*)
Geoffrey Craddock	Director	10 Fan Pier Boulevard Boston, MA 02210
Jennifer Reilly	Director	10 Fan Pier Boulevard Boston, MA 02210
Frank Rispoli	Chief Financial Officer and Treasurer	(*)
Edward K. Duch, III	Chief Legal Officer, Vice President, and Secretary	(*)
James P. Puhala	Vice President and Chief Compliance Officer	(*)
Vincent Baggetta	Chief Risk Officer	(*)
Paul LaPiana	Vice President	(*)
Lisa Todd	Vice President	(*)
Delphine Soucie	Vice President	(*)
Alyssa O'Connor	Assistant Secretary	(*)
Pablo Cabrera	Assistant Treasurer	(*)
Jeffrey Sajdak	Assistant Treasurer	(*)
Julieta Sinisgalli	Assistant Treasurer	(*)
Mario Morton	Registration Manager	(*)
Kelly Pirrotta	AML Compliance Officer	(*)

(*) 1295 State Street, Springfield, MA 01111-0001

(c) **Compensation From the Registrant**

For information about all commissions and other compensation received by each principal underwriter, directly or indirectly, from the Registrant during the Registrant's last fiscal year, refer to the "Underwriters" section of the Statement of Additional Information.

Item 35. Location of Accounts and Records

All accounts, books, or other documents required to be maintained by Section 31(a) of the Investment Company Act of 1940 and the rules promulgated thereunder are maintained by the Registrant through Massachusetts Mutual Life Insurance Company, 1295 State Street, Springfield, Massachusetts 01111-0001.

Item 36. Management Services

Not Applicable.

Item 37. Fee Representation

REPRESENTATION UNDER SECTION 26(f)(2)(A) OF THE INVESTMENT COMPANY ACT OF 1940

Massachusetts Mutual Life Insurance Company hereby represents that the fees and charges deducted under the Variable Universal Life III ("VUL III") policy described in this Registration Statement, in the aggregate, are reasonable in relation to the services rendered, the expenses expected to be incurred, and the risks assumed by Massachusetts Mutual Life Insurance Company.

SIGNATURES

Pursuant to the requirements of Securities Act of 1933 and the Investment Company Act of 1940, the Registrant certifies that it meets all of the requirements for effectiveness of this registration statement under Rule 485(b) under the Securities Act and has duly caused this registration statement to be signed on its behalf by the undersigned, duly authorized, in the City of Wilmington, and the State of North Carolina on this 24th day of April, 2024.

MASSACHUSETTS MUTUAL VARIABLE LIFE SEPARATE ACCOUNT I
(Registrant)

MASSACHUSETTS MUTUAL LIFE INSURANCE COMPANY
(Depositor)

By ROGER W. CRANDALL*
Roger W. Crandall
President and Chief Executive Officer
(principal executive officer)
Massachusetts Mutual Life Insurance Company

Pursuant to the requirements of the Securities Act of 1933, this registration statement has been signed by the following persons in the capacities and on the dates indicated.

Signature	Title	Date
<u>ROGER W. CRANDALL *</u> Roger W. Crandall	Director and Chief Executive Officer (principal executive officer)	April 24, 2024
<u>ELIZABETH A. WARD *</u> Elizabeth A. Ward	Chief Financial Officer (principal financial officer)	April 24, 2024
<u>KEITH MCDONAGH *</u> Keith McDonagh	Corporate Controller (principal accounting officer)	April 24, 2024
<u>MARK T. BERTOLINI *</u> Mark T. Bertolini	Director	April 24, 2024
<u>KATHLEEN A. CORBET *</u> Kathleen A. Corbet	Director	April 24, 2024
<u>JAMES H. DEGRAFFENREIDT, JR. *</u> James H. DeGraffenreidt, Jr.	Director	April 24, 2024
<u>ISABELLA D. GOREN *</u> Isabella D. Goren	Director	April 24, 2024
<u>BERNARD A. HARRIS, JR. *</u> Bernard A. Harris, Jr.	Director	April 24, 2024
<u>MICHELLE K. LEE *</u> Michelle K. Lee	Director	April 24, 2024
<u>JEFFREY M. LEIDEN *</u> Jeffrey M. Leiden	Director	April 24, 2024
<u>LAURA J. SEN *</u> Laura J. Sen	Director	April 24, 2024
<u>WILLIAM T. SPITZ *</u> William T. Spitz	Director	April 24, 2024
<u>H. TODD STITZER *</u> H. Todd Stitzer	Director	April 24, 2024
<u>/s/ GARY F. MURTAGH</u> * Gary F. Murtagh Attorney-in-Fact pursuant to Powers of Attorney		

INDEX TO EXHIBITS

Item No.	Exhibit
Item 30.	Exhibit (n) i. Auditor Consents <ul style="list-style-type: none">• Company Financial Statements• Separate Account Financial Statements

[KPMG letterhead appears here]

Consent of Independent Registered Public Accounting Firm

We consent to the use of our report dated February 27, 2024, with respect to the statutory financial statements of Massachusetts Mutual Life Insurance Company, included herein, and to the reference to our firm under the heading “Experts” in the Statement of Additional Information.

/s/ KPMG LLP

Hartford, Connecticut
April 22, 2024

[KPMG letterhead appears here]

Consent of Independent Registered Public Accounting Firm

We consent to the use of our report dated March 7, 2024, with respect to the financial statements of Massachusetts Mutual Variable Life Separate Account I, included herein, and to the reference to our firm under the heading “Experts” in the Statement of Additional Information.

/s/ KPMG LLP

Boston, Massachusetts
April 22, 2024
